File No. 140699

Committee Item No. 4
Board Item No. 16

COMMITTEE/BOARD OF SUPERVISORS

AGENDA PACKET CONTENTS LIST

Committee: Land Use and Economic Development **Date** July 14, 2014

Board of Supervisors Meeting **Date** July 22, 2014

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Completed by: Andrea Ausberry **Date** July 11, 2014
Completed by: AA **Date** 7.16.14

[Adopting California Environmental Quality Act Findings - San Francisco International Airport - Terminal 1 Program]

Resolution adopting California Environmental Quality Act Findings related to the Terminal 1 Program at San Francisco International Airport.

WHEREAS, The Board of Supervisors ("Board") has reviewed the 1992 San Francisco International Airport Master Plan Final Program Environmental Impact Report ("Master Plan EIR") prepared by the City and County of San Francisco Planning Department, Office of Environmental Review ("OER"), and certified by the San Francisco Planning Commission on May 28, 1992 by Motion No. 13356, in accordance with the requirements of the California Environmental Quality Act ("CEQA"), California Public Resources Code Section 21000 et seq., Title 14, Section 15000 et seq. of the California Code of Regulations ("CEQA Guidelines") and Chapter 31 of the San Francisco Administrative Code; and

WHEREAS, By Resolution No. 1006-92 dated December 7, 1992, the Board adopted relevant CEQA findings, which findings are incorporated herein by reference as though fully set forth; and

WHEREAS, The Master Plan EIR evaluated redevelopment of Terminal 1 as a component of the Master Plan. Since certification of the Master Plan EIR, the Airport now refers to the redevelopment of Terminal 1 as the Terminal 1/Boarding Area B Redevelopment Program ("T1 Program") for convenience and to administratively organize the project into a program to accommodate grouping separate activities into smaller components for implementation; and

WHEREAS, The T1 Program is a project included in the Master Plan and is described generally in the Master Plan and analyzed in the Master Plan EIR; and

WHEREAS, Section 15168 of the CEQA Guidelines requires subsequent activities in a program that are covered by a program EIR be examined in light of the program EIR to determine whether additional environmental documentation must be prepared; and

WHEREAS, After reviewing the information regarding the T1 Program, the San Francisco Department of City Planning, Office of Major Environmental Analysis ("MEA"), prepared an addendum to the Master Plan EIR, dated October 24, 2007, on file with the Clerk of the Board of Supervisors in File No. 140699, and hereby incorporated by reference herein as though fully set forth; and

WHEREAS, MEA evaluated the impacts of the modifications to the T1 Program and concluded that, as modified from its description in the Master Plan EIR, the T1 Program was within the scope of the project described in the Master Plan EIR, that the modifications to the T1 Program would not cause new significant impacts not identified in the Master Plan EIR nor require new mitigation measures; and that no supplemental environmental review was required; now, therefore, be it

RESOLVED, That this Board of Supervisors certifies that it has reviewed and considered the information in the Master Plan EIR and the Master Plan EIR Addendum for the Terminal 1 Program, dated October 24, 2007, concluding that no further environmental review is necessary; and, be it

FURTHER RESOLVED, That this Board of Supervisors hereby adopts as its own the findings contained in the Master Plan EIR Addendum relating to the Terminal 1 Program.

SFO

San Francisco International Airport

RECEIVED
BOARD OF SUPERVISORS
SAN FRANCISCO
2014 JUN 12 PM 1:57

June 5, 2014

Ms. Angela Calvillo
Clerk of the Board
Board of Supervisors
City Hall
1 Dr. Carlton B. Goodlett Place, Room 244
San Francisco, California 94102-4689

Subject: Uncodified ordinance to vary from the selection process prescribed in Administration Code Section 6.61 (Design-Build) of the San Francisco Administrative Code

Dear Ms. Calvillo:

Pursuant to Charter Section 2.105, I am forwarding for the Board of Supervisors' approval a proposed uncodified ordinance to allow the Airport Commission to vary from the selection process prescribed in Administrative Code 6.61 (Design-Build) for two Airport Terminal 1 projects. Also enclosed is a proposed resolution containing the environmental review findings for the Terminal 1 Program at the San Francisco International Airport. These environmental review findings are to be adopted by the Board of Supervisors prior to its approval of the proposed ordinance.

The proposed ordinance authorizes the Airport to reorder evaluation criteria between the qualification and final selection processes; to allow the design-builders to select certain subcontractors by qualifications only; and to increase the limit from 7.5% to 15% for the trade subcontracts that the design-builders may directly negotiate rather than competitively bid.

The attached resolution is intended to be a companion measure to approval of the ordinance and should be calendared together. The City Planning Department, Environmental Review division, reviewed the Terminal 1 Program and determined that this project is covered within the scope of the San Francisco International Airport Master Plan Program Environmental Impact Report (EIR), which was approved by the Airport Commission on November 3, 1992. The Planning Department prepared an Addendum to the Airport's Master Plan EIR, dated October 24, 2007, to address the changes to the project and documented that the Program EIR prepared for the Master Plan adequately described the project and its potential environmental effects for purposes of the California Environmental Quality Act (CEQA), and that no supplemental EIR was required.

Action on the environmental resolution should be calendared immediately before the Board's action on the first reading of the Ordinance. In addition, the agenda title for the Ordinance should contain the following information at the end of the item:

This activity is within the scope of the San Francisco International Airport Master Plan Program, which was approved by the Airport Commission on November 3, 1992. The Master Plan EIR prepared for the Master Plan Program, including addenda thereto, adequately describes this activity and its potential environmental effects for the purposes of the California Environmental Quality Act (CEQA).

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The Original and two sets of the following documents are enclosed for review:

- Proposed Resolution containing environmental review findings;
- Proposed Ordinance
- City Attorney's Office Legislative Digest;

Further, three copies of the following supporting documents are enclosed for reference:

- Airport Commission Resolution No14-0112 and Memorandum;
- Airport Commission Off-Calendar Memorandum regarding CEQA findings which includes the following;
    - EIR Summary/Addendum Summary Report
    - San Francisco International Airport Master Plan Terminals 1 & 2 Addendum

One copy of the San Francisco International Airport Master Plan EIR is enclosed. The Master Plan EIR can also be found in Board File No. 170-92-13.

Please contact Cathy Widener, Airport Governmental Affairs Manager at (650) 821-5023 if you have questions or concerns regarding this matter.

Very truly yours,

Jean Caramatti

Jean Caramatti
Commission Secretary

Enclosures

Cc: Cathy Widener
Reuben Halili
Geri Rayca

AIRPORT COMMISSION

CITY AND COUNTY OF SAN FRANCISCO

RESOLUTION NO. 14-0112

AUTHORIZATION TO ISSUE A REQUEST FOR QUALIFICATIONS/PROPOSAL (RFQ/RFP) FOR TWO CONTRACTS: CONTRACT NO. 10010.66, DESIGN-BUILD SERVICES FOR THE NEW BOARDING AREA B RECONSTRUCTION AND CONTRACT NO. 10011.66 DESIGN-BUILD SERVICES FOR TERMINAL 1 CENTER RENOVATION

WHEREAS, by Resolution 14-0026 dated February 18, 2014, this Commission authorized the implementation of the Terminal 1/Boarding Area B Redevelopment Program (T1 Program); and

WHEREAS, two of the major projects of T1 Program are the New Boarding Area B (BAB) Reconstruction and the Terminal 1 Center Renovation (T1 Center) with a combined rough order of magnitude of $1 billion; and

WHEREAS, the Airport seeks to hire two different design-build contractors – one for the BAB and one for the T1 Center – both with proven ability and expertise to work well in a highly collaborative environment and with key personnel experienced in the design-build of major terminal renovation/reconstruction programs; and

WHEREAS, Staff proposes to select the design-build teams through a three step RFQ/RFP procurement process utilizing two selection panels; and

WHEREAS, Staff's proposed selection process requires approval of the Board of Supervisors as it varies from the design-builder selection process permitted under Administrative Code Section 6.61; now, therefore be it

RESOLVED, that the Commission authorizes the Director to issue a Request for Qualifications/Proposal for two contracts: Contract No. 10010.66, Design-Build Services for New Boarding Area B Reconstruction and Contract No. 10011.66, Design-Build Services for Terminal 1 Center Renovation; and be it further

RESOLVED, that the Commission authorizes the Director to negotiate with the highest ranked proposers in successive order until negotiations are successful with two of the qualified proposers; and be it further

RESOLVED, that the Commission directs the Commission Secretary to submit a proposed ordinance to the Board of Supervisors modifying certain design-build selection and contracting requirements for the Terminal 1 Center Renovation and New Boarding Area B Reconstruction Projects.

I hereby certify that the foregoing resolution was adopted by the Airport Commission

at its meeting of JUN 03 2014

Jean Caramatti

Secretary

San Francisco International Airport

MEMORANDUM
June 3, 2014

TO: AIRPORT COMMISSION
Hon. Larry Mazzola, President
Hon. Linda S. Crayton, Vice President
Hon. Eleanor Johns
Hon. Richard J. Guggenhime
Hon. Peter A. Stern

14-0112

JUN 0 3 2014

FROM: Airport Director

SUBJECT: Authorization to Issue Request for Qualifications/Proposal (RFQ/RFP) for Contract No. 10010.66, Design-Build Services for New Boarding Area B Reconstruction and for Contract No. 10011.66 Design-Build Services for Terminal 1 Center Renovation with a Modified Prime and Subcontractor Selection Process.

DIRECTOR'S RECOMMENDATION: AUTHORIZE THE DIRECTOR TO ISSUE A RFQ/RFP FOR TWO CONTRACTS: CONTRACT NO. 10010.66, DESIGN-BUILD SERVICES FOR NEW BOARDING AREA B RECONSTRUCTION AND CONTRACT NO. 10011.66 DESIGN-BUILD SERVICES FOR TERMINAL 1 CENTER RENOVATION WITH A MODIFIED PRIME AND SUBCONTRACTOR SELECTION PROCESS

Executive Summary

The Terminal 1/Boarding Area B Redevelopment Program (T1 Program) consists of various projects for the demolition and reconstruction of the aging Terminal 1 infrastructure and realignment of aircraft taxi lanes. The main projects in the Program are the new Boarding Area B (BAB) Reconstruction Project and the Terminal 1 Center Renovation Project (collectively "Projects").

Transmitted herewith for your approval is a proposed resolution authorizing the Director to issue a single RFQ/RFP for the award of two design-build services contracts in support of the Projects.

In support of the Projects, the proposed resolution also authorizes the Commission Secretary to submit to the Board of Supervisors a proposed Ordinance modifying certain requirements of the San Francisco Administrative Code (Administrative Code) for a modified selection process and contract terms for these two contracts.

Background

By Resolution No. 14-0026 dated February 18, 2014, this Commission authorized the implementation of the T1 Program. The two main projects of the Terminal 1 Program are the BAB Reconstruction ("Boarding Area") Project and the Terminal 1 Center Renovation ("T1 Center") Project. It is anticipated that the T1 Center project will be followed in the future by the T1 North and T1 South projects.

The BAB Project includes construction of an approximately 500,000 square foot new boarding area to accommodate up to 24 gates to help the Airport serve the increasing passenger forecasts. Several of the new gates along the Boarding Area A (BAA) side of BAB will be configured to accommodate international arrivals. New BAB will have passenger amenities consistent with Terminal 2 and Terminal 3 Boarding Area E (BAE), new Passenger Boarding Bridges, Pre-Conditioned Air and 400 Hz power systems, and a new aircraft apron and jet fuel hydrant system.

THIS PRINT COVERS CALENDAR ITEM NO. 4

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The T1 Center Project includes: a new architectural building envelope for the Terminal; complete electrical, HVAC, and special systems replacement; renovations and upgrades to the check-in facilities and passenger screening checkpoint; a meet and greet area; and passenger amenities consistent with the Terminal 2 and Terminal 3 BAE. The T1 Center Project will also include a new consolidated common use baggage handling system (BHS) and checked baggage screening system.

While the Terminal and Boarding Area will ultimately be one contiguous building (the T1 Center flows into the Boarding Area), Staff has split the design and construction into separate projects to provide more contracting, job and local business opportunities. Further, due to the size of the construction, two smaller projects will be more fiscally manageable for the contractors and reduce the required bonding capacity required for an individual Design-Builder. Both projects will be designed and constructed concurrently. Both projects will be managed by a fully integrated team of Airport staff and consultant personnel. The design-build teams must have a proven ability and expertise to work well in a highly collaborative environment with qualified key personnel experienced in the design-build of major terminal renovation/reconstruction programs.

A separate design-build team will be selected to construct the new BHS and checked baggage screening system for the Projects. Airport Staff anticipates recommending that the Commission assign the BHS contract to the selected T1 Center Design-Builder after award of this contract. Staff will seek authorization to issue a RFP for the BHS Design-Builder through a separate resolution.

The proposed duration of each design-build contract is 72 months. The rough order of magnitude (ROM) design-build cost is $570 million for the BAB and $260 million for the T1 Center. The ROM for the BHS contract is $ 182 million.

The Airport is working with the Small Business Affairs Office and the City's Contracts Monitoring Division (CMD) to develop a highly progressive Local Business Enterprise (LBE) program that will strongly encourage and incentivize prime-level joint ventures, or joint associations with small, local firms and LBE firms.

Design-Build Selection Process

Due to the size, complexity, and schedule constraints, Staff proposes a design-build approach in order to achieve a more informed collaborative design process and schedule efficiencies. Design-build provides a means for the earliest practical engagement of qualified and experienced design professionals, contractors and subcontractors who share the Airport's goal to achieve exceptional well-designed and constructed projects, with reduced or eliminated field and/or implementation errors and conflicts. Based on the above, the Director has determined that it is in the public's best interest that qualifications be considered in the procurement process and that the contracts not be awarded solely on a low bid basis.

Staff plans to proceed with a single RFQ/RFP for both of these Projects, in part to ensure the selection of two different teams, and in part to streamline the process as the work for both projects is similar and the selection process will be identical. Staff proposes a three-step procurement process utilizing two selection panels to best evaluate different selection criteria of the design-build teams.

Step One – Qualifications and Technical/Management Approach:

Staff will issue a single RFQ for both design-build services contracts. Interested design-build teams will respond to the requirements stated in the Minimum Qualifications and provide their written Technical/Management Approach to execute the work in a Statement of Qualifications (SOQ). A selection panel with the necessary experience regarding technical qualifications will score each team's SOQ. Up to six teams will be shortlisted and advance in the procurement process.

Step Two – Design Concepts:

The shortlisted design-build teams will be invited to submit Design Concept documents for the entire Terminal 1 and BAB facility. The Design Concepts will reflect the team's understanding of the Airport's culture and aspirations, the team's interpretation of project-related known attributes, and the team's creativity through visual expression of the Airport's goals, vision, and Revenue Enhancement And Customer Hospitality (REACH) objectives to achieve an exceptional passenger experience. A second selection panel with the necessary design experience will score each team's Design Concepts. Based on the cumulative score of Step One and Step Two, up to four teams will be shortlisted for Step 3. The Airport will provide a $50,000 stipend to all of the shortlisted design-build teams submitting Design Concepts that are not selected for award of either contract.

Step Three – Oral Interviews and Cost Proposals:

Staff will issue to the shortlisted pre-qualified teams from Step 2 a single RFP for both contracts. The teams will submit separate cost proposals for each contract and participate in a "scenario based" oral interview.

The first selection panel will score the oral interviews. Staff will analyze the cost proposals and develop the scoring for the cost component. The cost criterion will constitute not less than 65 percent of the final evaluation in conformance with the Administrative Code. Based on the results of the oral interviews and cost evaluation, Staff will rank the firms. The teams ranking highest based on the sum of the oral interview score and the cost component score for each contract will be selected for negotiations. If negotiations fail with either selected team, Staff will negotiate with the next highest ranked teams for the respective contract in order, until negotiations are successful with a qualified team. In the event a single team scores highest on both contracts, the team will get to choose which contract they prefer being awarded. The second highest team will be eligible for award of the other contract.

Upon successfully negotiating each contract, Staff will return to the Commission with a recommendation to award the contracts to the two teams.

Proposed Ordinance

The selection process outlined above varies slightly from the selection process set forth in Administrative Code Section 6.61 (Design-Build) as explained below and will require approval from the Board of Supervisors in the form of an uncodified ordinance.

Modifications to Selection of Prime Contractor:

Administrative Code Section 6.61 ("Section 6.61") requires Pre-Qualification and a Final Selection Process by low bid or an Alternative Final Selection Process through a combination of qualifications and price, with price constituting at least 65% of the evaluation. The non-cost qualifications include some required qualification criteria and some optional criteria, including design and interviews. The proposed ordinance moves required and optional non-cost evaluation from the final selection process into the pre-qualification, allowing more weight to be assigned to the oral interviews in the final selection scoring.

More specifically, the proposed ordinance allows the Airport to consider the prospective proposer's (1) plan for expediency in completing the proposed project; (2) compliance with the goals set by the Contract Monitoring Division and requirements of the Administrative Code Chapters 12 and 14; (3) commitment to meet the City's hiring goals; and (4) design in the pre-qualification process instead of the final selection process.

Modification to Selection of Subcontractors:

Under Section 6.61, the design-builder selects trade subcontractors during the project through a competitive bid process. Section 6.61 does allow for pre-qualification of bidders for each trade bid package prior to competitively bidding the individual trade packages. Section 6.61 also allows for up to 7.5 percent of the total estimated trade subcontracts to be directly negotiated instead of competitively bid.

The proposed ordinance will allow the following subcontractors ("Core Subcontractors") to be selected by qualifications only rather than by competitive bid:

- Mechanical,
- Electrical,
- Plumbing,
- Technology and Special System, and
- Building Envelope/Curtain Wall.

Typically, trade subcontractors are retained after the design is complete for their respective trade work. However, for the above trades, it is becoming industry standard for the same subcontractor to design and build the trade work. The proposed ordinance will allow Core Subcontractors to be retained for design services. The Core Subcontractor may also provide value engineering proposals and constructability assessments, and review of other designs for completeness and accuracy to eliminate errors and omissions. Further, in line with industry standards, the Core Subcontractors may be permitted to submit price proposals for trade work related to their designs. If a Core Subcontractor's cost proposal for the work does not exceed the Airport's independent cost estimate by more than 5%, the proposed ordinance will allow the trade subcontract to be awarded to the Core Subcontractors without a competitive bid of the trade work.

The proposed ordinance also increases the limit from 7.5% to 15% for the trade subcontracts that the design-builder may directly negotiate rather than competively bid. The Airport has a number of critical components and complex systems which are provided by vendors presently under contract with the Airport, including passenger boarding bridges, PC Air/400 Hertz, passenger processing check-in systems, security systems, etc. It is critical that these systems in the new Terminal 1 integrate with the Airport's existing systems as well as the systems to be constructed under both Projects. Competitively bidding each system on each project might result in the selection of two different systems rather than allow for an integrated Terminal 1 system.

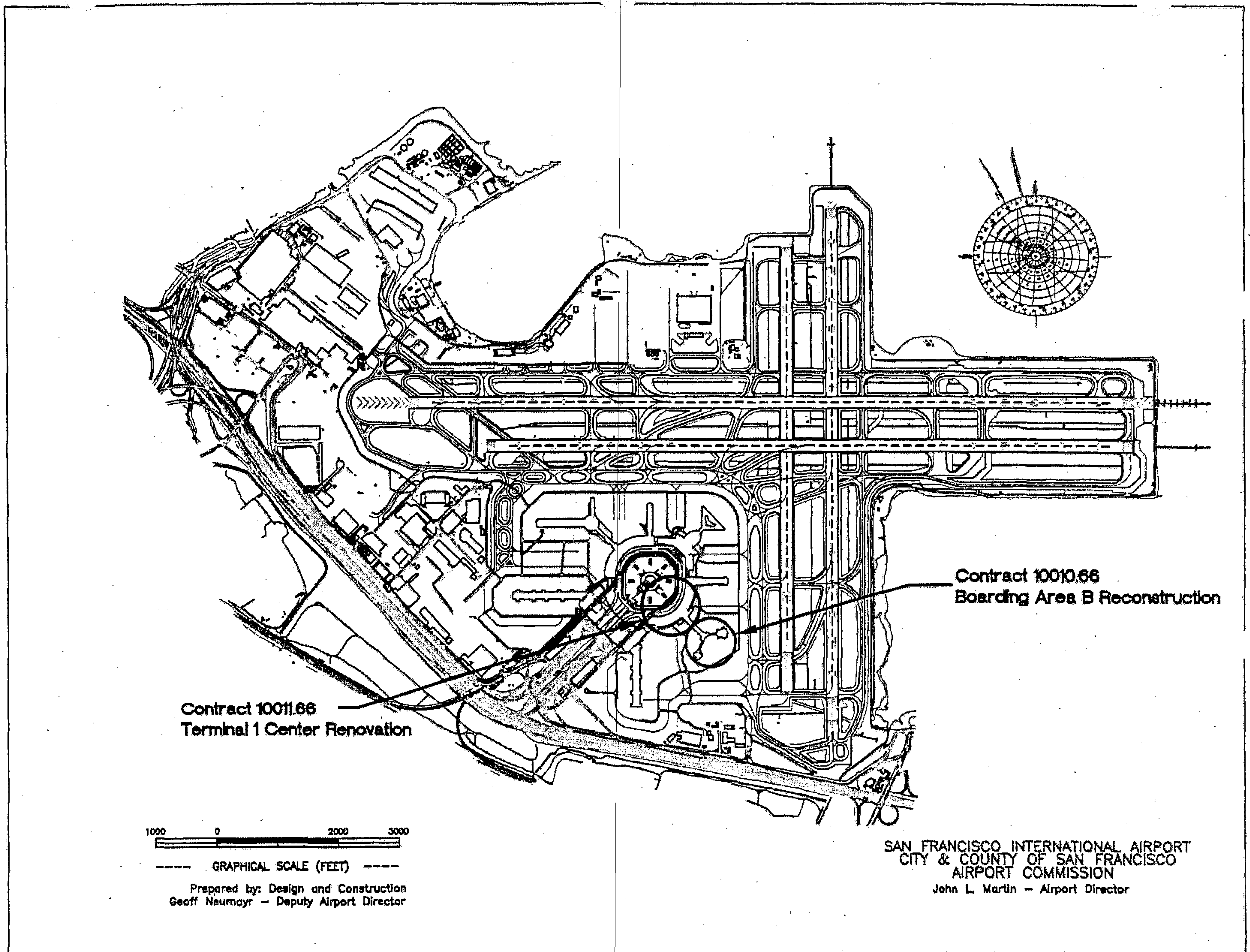
Recommendation

Based on the above, I recommend that the Commission authorize the Director to issue a Request for Qualifications/Proposal for two contracts: 1) Contract No. 10010.66, Design-Build Services for New Boarding Area B Reconstruction and 2) Contract No. 10011.66 Design-Build Services for Terminal 1 Center Renovation. I further recommend that the Commission authorize the Director to negotiate with the highest ranked proposers in successive order until negotiations are successful with two of the qualified proposers.

John L. Martin
Airport Director

Prepared by: Geoffrey W. Neumayr
Deputy Airport Director
Design & Construction

Attachment


Contract 10010.66
Boarding Area B Reconstruction
Contract 10011.66
Terminal 1 Center Renovation
1000 0 2000 3000
GRAPHICAL SCALE (FEET)
Prepared by: Design and Construction
Geoff Neumayr – Deputy Airport Director
SAN FRANCISCO INTERNATIONAL AIRPORT
CITY & COUNTY OF SAN FRANCISCO
AIRPORT COMMISSION
John L. Martin – Airport Director

SFO

San Francisco International Airport

February 12, 2014

TO: AIRPORT COMMISSION
Hon. Larry Mazzola, President
Hon. Linda S. Crayton, Vice President
Hon. Eleanor Johns
Hon. Richard J. Guggenhime
Hon. Peter A. Stern

FROM: Airport Director

SUBJECT: Authorization to Implement the Redevelopment of Terminal 1/Boarding Area B; Authorization to Issue a Request for Qualifications/Proposals for Contract No. 10010.41, Boarding Area B Reconstruction Project Management Support Services, and for Contract No. 10011.41, Terminal 1 Center Renovation Project Management Support Services

At its next meeting on February 18, 2014, the Commission will consider authorization to implement Redevelopment of Terminal 1/Boarding Area B and authorization to issue a Request for Qualifications/Proposals for two Project Management Support Services contracts for the Terminal 1 Redevelopment Project. The environmental impacts of the Terminal 1/Boarding Area B Redevelopment Project were analyzed under the California Environmental Quality Act (CEQA) in the final Environmental Impact Report (FEIR) for the Airport's Master Plan, approved by the Commission in 1992, and on October 24, 2007, the San Francisco Planning Department issued a Master Plan EIR Addendum (Addendum). The Addendum concludes that the analyses conducted and conclusions reached in the FEIR remain valid and that the Redevelopment of Terminal 1/Boarding Area B project, as described in the Addendum, would not cause any new significant impacts on the environment that were not identified in the FEIR. The City's Environmental Review Officer determined that no additional environmental review is required for the Terminal 1/Boarding Area B project.

In order to facilitate your review, we are transmitting in advance the Addendum. In addition, staff has prepared an Environmental Summary that describes the CEQA environmental review process that has taken place for the Master Plan and Redevelopment of Terminal 1/Boarding Area B. The FEIR has been and remains on file with the Commission's secretary and available for review.

John L. Martin
Airport Director

Attachment

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SUMMARY SHEET

San Francisco International Airport Master Plan
Final Environmental Impact Report
and the
Addendum for the Terminal 1/Boarding Area B Redevelopment Project

Introduction: A Program Environmental Impact Report (#86.638E) was prepared for the San Francisco International Airport Master Plan in 1991-1992, encompassing landside modifications and Airport expansion projects through 2006. The San Francisco International Airport Master Plan Final EIR was certified by the San Francisco Planning Commission on May 28, 1992. The San Francisco Airport Commission approved the Master Plan, Master Plan Final EIR and accompanying Final Mitigation Program and conditions of approval on November 3, 1992. In addition, the Board of Supervisors reviewed the 1992 San Francisco International Airport Final EIR and by Resolution No. 1006-92 adopted relevant findings under the California Environmental Quality Act (CEQA).

Master Plan: The Master Plan focused on the accommodation of facilities through the development of improved land use and circulation patterns for all Airport-owned lands excluding the undeveloped area referred to as the West-of-Bayshore Parcel. The major master plan improvements included in the FEIR analyses were: 1) the new International Terminal; 2) consolidation of cargo facilities in the North and West Field Areas; 3) an Airport People Mover System (AirTrain); 4) roadway/circulation improvements to the International Terminal Building; 5) on-Airport hotel development; 6) Renovation of the former International Terminal (T2) for domestic operations; and (7) Replacement of the South Terminal (T1), Boarding Area B.

Master Plan FEIR: The FEIR analyzed the transportation, noise, air quality, energy, cultural resources, geology and seismicity, hazardous materials, employment and housing, utilities, public services, aviation safety, and growth inducement impacts resulting from the implementation of the Master Plan. The FEIR found that the Master Plan would cause the following project specific significant impacts:

1. Increase levels of service to degrade to "E" or below at certain street intersections, freeway ramps, and freeway sections in the vicinity of the Airport;
2. Increase air pollutant emissions that exceed Bay Area Air Quality Management District (BAAQMD) thresholds;
3. Expose construction workers, other Airport workers or the public to hazardous wastes if hazards are found in soils in and around construction areas;
4. Contribute to cumulative traffic increases on U.S. 101 that would further reduce levels of service on some segments of the freeway; and
5. Contribute to cumulative air quality impacts on San Mateo County and the Bay Area region.

To address these significant environmental impacts, the Airport Commission approved a Final Mitigation Plan to mitigate or partially mitigate the potentially significant environmental effects of the Master Plan projects. The Final Mitigation Plan included the following major mitigation measures which have been subsequently implemented by the Airport Commission:

1. To address Transportation Impacts: widen two airport roads to four lanes in the immediate vicinity of the airport; establish a Transportation System Management (TSM) Program for SFIA, focused on reducing trips made by single-occupant vehicles; modify freeway ramps;
2. To address Noise Impacts: select the earliest practicable date to achieve 100 percent Stage 3 operations; work with the FAA to revise the Quiet Bridge Approach to Runway 28L and 28R, expand the use of the "quiet departure" on Runways 1L and 1R, conduct a regional study to identify flight patterns and routes that would be environmentally desirable and maintain aircraft safety;
3. To address temporary noise impacts from construction: require contractors to muffle and shield construction equipment and tools, where feasible, construct noise barriers around stationary equipment to reduce construction noise by as much as five dBA; and
4. To address Air Quality Impacts: for temporary construction impacts, require contractors to water demolition sites and unpaved construction areas, cover stockpiles of soil and sand, cover trucks hauling debris, soils and sand, so as to minimize emissions of particulates and other pollutants. For operation impacts on air quality, for aircraft to reduce the time each aircraft spends in the taxi/idle phase. Airport would require each airline that aircraft engines not be started until the aircraft is ready to pull away from the gate. Long queues of idling planes on the taxiways would not be permitted. When no gate is immediately available to unload newly arrived aircraft, aircraft engines would be turned off and aircraft would be towed when a gate becomes available.

In conjunction with the approval of the Master Plan, the Airport Commission adopted CEQA findings regarding the potentially significant impacts of the Master Plan, the feasibility of alternatives to the Master Plan and mitigation measures to be included as part of the Master Plan approval, and a Mitigation Plan pursuant to Resolution No. 92-0284, dated November 3, 1992. The Commission also adopted a Mitigation Monitoring Program. The Findings recognized that implementation of the Master Plan without mitigation would have the potential for significant environmental effects as identified in the FEIR. Where adoption of the Final Mitigation Plan would still result in significant unavoidable impacts, the Airport Commission adopted a Statement of Overriding Considerations and found that the following social, economic and other considerations warranted the approval of the Master Plan project notwithstanding any unavoidable or unmitigated impacts of the project:

1. The Master Plan is necessary to respond to project demand on Airport facilities to accommodate forecast passenger growth. As a result, new terminal infrastructure and facilities are necessary to maintain acceptable service levels, reduce delays and congestion and associated environmental impacts, and maintain the Airport's market share of the Pacific Rim business;

2. Increase job opportunities for 31,000 airport employees who are residents of San Francisco and San Mateo Counties. Over 43,000 jobs in San Francisco and 30,000 jobs in San Mateo County depend on visitors who arrive and depart from the Airport.
3. The Light Rail System (AirTrain) and ramps connections and interchange improvements to U.S. Highway 101 will improve the transportation system on and around the Airport; and
4. Improvements to the Airport will enhance the Bay Area as a destination business and recreation area.

By Resolution No. 1006-92, the Board of Supervisors adopted relevant CEQA Findings by incorporating by reference the Findings adopted by the Airport Commission with respect to findings of significance, adoption and rejection of mitigation measures and project alternatives identified in the FEIR, and Statement of Overriding Considerations.

EIR Addendum for the Terminal 1/Boarding Area B Redevelopment Project: Since certification of the FEIR in 1992, the Airport completed most of the projects under the Master Plan Program. However, a number of projects were delayed because of economic conditions and events of September 11, 2001, causing a drop in passenger levels and aircraft operations at SFO. The Airport is now moving forward with the redevelopment of Terminal 1/Boarding B.

The City Planning Department, Environmental Planning Division (EP), prepared an Addendum to the Airport Master Plan FEIR, dated October 24, 2007, to address the changes to the Terminal 1/Boarding Area B Renovation Project and documented that the proposed revisions to the project would not cause new significant impacts not identified in the FEIR, and no new mitigation measures would be necessary to reduce significant impacts. No changes have occurred with respect to circumstances surrounding the project that would cause significant environmental impacts to which the project would contribute considerably, and no new information has become available that shows that the project would cause significant environmental impacts. Based on the environmental analysis contained in the EIR Addendum, EP concluded that the analyses conducted and the conclusions reached in the FEIR remain valid. Therefore, no supplemental EIR is required beyond this addendum.

SAN FRANCISCO
PLANNING DEPARTMENT

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Information:
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ADDENDUM TO ENVIRONMENTAL IMPACT REPORT

Date of Publication of Addendum: October 24, 2007

Date of Certification of Final Environmental Impact Report: May 28,1992 (Case No. 86.683E)

Lead Agency: Planning Department, City and County of San Francisco
1650 Mission Street, San Francisco, CA 94103

Agency Contact Person: Paul Maltzer **Telephone:** (415) 575-9038

Project Title: 2007.1149E – San Francisco International Airport Master Plan Terminals 1 & 2

Project Sponsor/Contact: Nixon Lam **Telephone:** (650) 821-5347

Project Address: San Francisco International Airport

Assessor's Block and Lot: N/A – Unincorporated San Mateo County

City and County: San Mateo County

Remarks: See Attached Materials

Conclusion

Based on the analysis attached, it is concluded that the analyses conducted and the conclusions reached in the final EIR certified on May 28, 1992 remain valid. The proposed revisions to the project would not cause new significant impacts not identified in the EIR, and no new mitigation measures would be necessary to reduce significant impacts. No changes have occurred with respect to circumstances surrounding the proposed project that would cause significant environmental impacts to which the project would contribute considerably, and no new information has become available that shows that the project would cause significant environmental impacts. Therefore, no supplemental environmental review is required beyond this addendum.

Date of Determination:

10/24/07

I do hereby certify that the above determination has been made pursuant to State and Local requirements.

WILLIAM C. WYCKO
Environmental Review Officer

RECEIVED
OCT 26 2007
Planning and Environmental Affairs

cc: Distribution List
Master Decision File

SAN FRANCISCO INTERNATIONAL AIRPORT MASTER PLAN
Final Environmental Impact Report Addendum For The

TERMINAL 2 RENOVATION AND TERMINAL 1 REDEVELOPMENT PROJECTS

October 24, 2007

Addendum File No. 2007.1149E
EIR File No. 86-683E
SCH #90030535

Prepared by
San Francisco Planning Department

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I. INTRODUCTION

A Program EIR (#86.638E) was prepared for the San Francisco International Airport Master Plan in 1991-1992, encompassing landside modifications and Airport expansion projects through 2006. The San Francisco International Airport Master Plan Final EIR was certified on May 28, 1992. The San Francisco Airport Commission approved the Master Plan and accompanying Final Mitigation Program and conditions of approval on November 3, 1992.

The Master Plan focused on the accommodation of facilities through the development of improved land use and circulation patterns for all Airport-owned lands excluding the undeveloped area referred to as the West-of-Bayshore Parcel. The major master plan improvements included in the FEIR analyses were: 1) the new International Terminal; 2) consolidation of cargo facilities in the North and West Field Areas; 3) an Airport People Mover System (AirTrain); 4) roadway/circulation improvements to the International Terminal Building; 5) on-Airport hotel development; 6) Renovation of the former International Terminal (T2) for domestic operations; and (7) Replacement of the South Terminal (T1), Boarding Area B.

Since certification of the FEIR, the Airport has completed many of the projects under the Master Plan Program. However, a number of projects were delayed because of economic conditions and events of September 11, 2001, causing a drop in passenger levels and aircraft operations at SFO. Passenger levels have begun to approach pre-2001 levels, and the Airport is now ready to move forward with two of the remaining Master Plan projects relating to domestic terminal improvement: (1) renovation of Boarding D in the old International or Central Terminal (now called Terminal 2 or T2) to convert the boarding area from its former use as an international terminal to a domestic terminal; and (2) redevelopment of Boarding Area B and the old South Terminal (now referred to as Terminal 1 or T1).

As described in the FEIR (p.50) and presented in Table 1, the T2 Renovation involves the conversion of the former international terminal facilities in T2 into a domestic terminal. Approximately 490,000 s.f. of interior space in Boarding Area D would be renovated for this purpose. In T1, the existing Boarding Area A (185,600 s.f.) and 60,000 s.f. of Boarding Area B would be demolished. In the near-term phase, 400,000 s.f. of new boarding area space would be constructed at T1, Boarding Area B. In the long-term phase, the remaining 32,000 s.f. of existing space at T1, Boarding Area B would be demolished and replaced with 104,000 s.f. of new boarding area space.

As analyzed in the FEIR, the change in domestic terminal space when comparing the T2 and T1 master plan projects with existing space (1990) is summarized in **Table 1.** In sum, the T2 and T1 master plan projects would have resulted in a 15 percent space increase over the existing T2 and T1 facilities in 1990.

As described in State CEQA Guidelines §15168, a Program EIR evaluates a group or series of activities that can be characterized as one large project and that, in the case of the SFIA Master Plan, are related both geographically and as logical parts in a chain of actions to expand, improve and reorganize landside functions and facilities at the San Francisco International Airport. Among other things, a program EIR permits the Lead Agency to efficiently consider both individual and overall cumulative effects of a large group of contemplated activities and to avoid duplication and repetition in subsequent environmental review of individual projects included in the overall program.

Table 1: Comparison of Master Plan T2 and T1 Projects

	Existing T2 & T1 Facilities (1990)	Master Plan Near-Term Projects (1996)	Master Plan Long-Term Project (2006)
Terminal 2	610,000 s.f.	610,000 s.f. [1]	610,000 s.f.
Terminal 1	849,00 s.f.	1,003,400 s.f. [2]	1,075,900 s.f. [3]
Total Space	1,459,000 s.f.	1,613,400 s.f.	1,685,000 [4]

Source: SFIA Master Plan FEIR (1992, p.50)

Note:
1. T2 Renovation – Boarding Area D (490,000 s.f.) within the 610,000 s.f. Terminal 2 Facility
2. T1 Redevelopment, Phase 1 – Demolish Boarding Area A (185,000 s.f.) and a part of Boarding Area B (60,000 s.f.); construct new Boarding Area B space (400,000 s.f.)
3. T1 Redevelopment, Phase 2 – Demolish a part of Boarding Area B (32,000 s.f.); construct new Boarding Area B space (104,000 s.f.)
4. 1,685,000 s.f. ÷ 1,459,000 = 115.5%

CEQA requires that individual projects previously evaluated as part of a program EIR be reviewed in light of the information in the program EIR to ensure that the individual project was analyzed in that EIR and no new environmental analysis is required. The evaluation of the two domestic terminal improvement projects is presented in this Addendum to the FEIR, pursuant to State CEQA Guidelines §15164. Section 15164 calls for preparation of an addendum to an EIR when (1) none of the conditions described in §15162 calling for preparation of a subsequent EIR have occurred, (2) only minor technical changes or additions are necessary to make an FEIR adequate under CEQA, and (3) the changes do not raise important new issues about significant environmental effects not already discussed in the FEIR. An addendum must be considered by the Airport Commission, or other decision-making body, prior to acting on the proposed projects.

The State CEQA Guidelines §15168 suggests that a written checklist or similar method be used in the determination that the effects of a specific project included in a program have been analyzed in the Program EIR. An environmental issues checklist has been prepared for the proposed Terminal 2 Renovation and Terminal 1 Redevelopment Projects, and is included in this Addendum. The checklist notes the potential environmental impacts of the proposed Terminal projects and indicates whether the potential impacts have been discussed in the SFIA Master Plan Final EIR. Topics from the checklist found to warrant a more thorough assessment are evaluated in more detail in this Addendum.

II. AIR TRAFFIC TRENDS

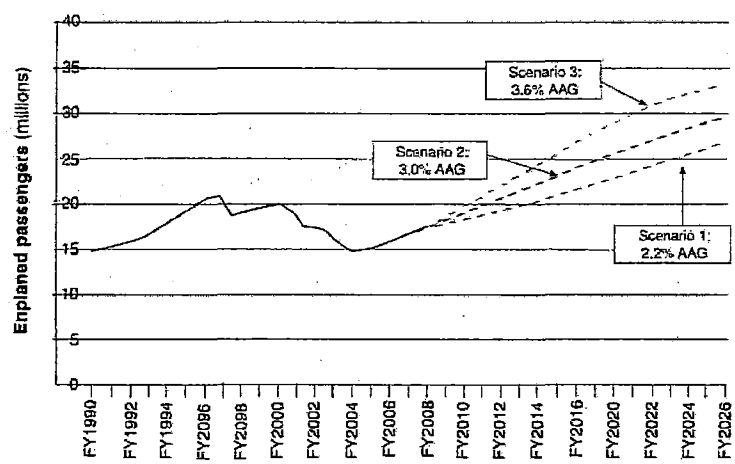
Figures 1 and **2** present historical and forecast passenger enplanement and passenger airline aircraft departure operations volumes at SFO for the historical period 1990-2007 and the forecast period 2008-2026. The Airport is the principal commercial service airport for the San Francisco Bay Area and is the 14th busiest airport in the U.S. in terms of passengers.

In early 2001, shortly following the opening of the new International Terminal Building, the Airport was faced with a local economic downturn associated with the dot.com implosion which coincided with the national economic recession, which began in March 2001. Following an initial downturn in traffic volumes and passenger levels at SFO, the Airport experienced the cumulative effects of the September 11, 2001 terrorist attacks, the Iraq War and the Asian SARS epidemic in the spring of 2003, and several airline bankruptcies (including United Airlines, the Airport's hub carrier) between 2003 and the present.

Air passenger volume at the Airport declined 28 percent between FY 2000 and FY 2003 from 40.2 million annual passengers to 29.2 million annual passengers. The Airport's domestic traffic decreased 31 percent over this period and international traffic decreased 11 percent. Passenger aircraft operations decreased by approximately 24 percent over this period. At the same time, the Airport's airline cost per enplaned passenger (CPE), an airline industry metric used to compare the cost of operating at one airport to another, rose to among the highest levels in the nation.

As a result of significant traffic declines and increasing airline costs, several Master Plan projects were deferred, including the two terminal redevelopment projects at Terminal 1 and Terminal 2, the hotel development, and the West Field Cargo Redevelopment.

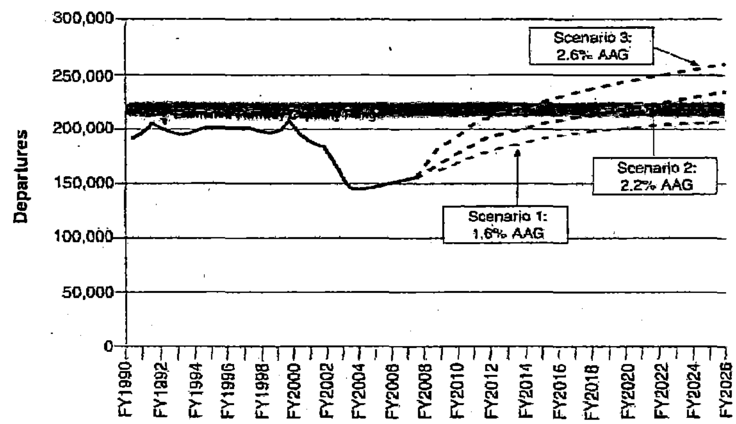
Figure 1
ENPLANED PASSENGER FORECASTS
SAN FRANCISCO INTERNATIONAL AIRPORT
FY 1990 - FY 2026



AAG = Average annual growth

Sources: SFO Bureau of Planning and Environmental Affairs; Forecast: Jacobs Consultancy, March 2007

Figure 2
PASSENGER AIRLINE AIRCRAFT DEPARTURE FORECASTS
SAN FRANCISCO INTERNATIONAL AIRPORT
FY 1990 - FY 2026



AAG = Average annual growth

Sources: SFO Air Traffic Monitoring System; Forecast: Jacobs Consultancy, March 2007

Although still approximately 16 percent below peak FY 2000 passenger levels (as of fiscal year end 2007), the Airport has experienced year-over-year growth in passenger activity since 2003 and is forecast to recover to pre-2001 traffic levels by 2011. By deferring capital expenditures, increasing non-airline revenues, and refinancing the Airport's outstanding revenue bond debt, the Airport's CPE has decreased from approximately $20 in 2003 to less than $14 in 2007.

In 2007, three new low-cost carriers have begun service to SFO: JetBlue Airways in May 2007 and Southwest Airlines and Virgin America in August 2007. Until new domestic terminal capacity is available at Terminal 2, these three airlines will be accommodated within the International Terminal and at Terminal 1. However, after deferring the renovation of Terminal 2 for almost seven years and the redevelopment of Terminal 1, Boarding Area B, the Airport needs to redevelop gates to accommodate growth by new entrants as well as other incumbent carriers.

Recent air traffic forecasts for SFO indicate that new aircraft gate capacity will be required by 2011 or earlier. The 14-gate Terminal 2 renovation would provide new gate capacity for new entrant carriers and also serve as replacement gates for Terminal 1 gates that are expected to be redeveloped following the re-opening of Terminal 2. When Terminal 1 and Terminal 2 are redeveloped, the Airport will have a total of 103 aircraft gates – the same number of gates evaluated in the FEIR for the SFO Master Plan (Table 2.12, *Summary of Near-Term and Long-Term Requirements, SFO Master Plan*, p.2.9, November 1989).

III. PROJECT DESCRIPTION

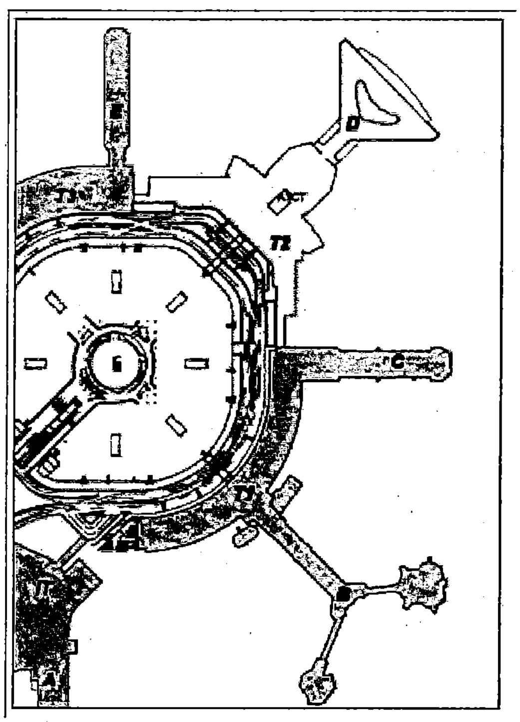
A. Terminal 2 Renovation (Boarding Area D)

As shown in **Figure 3**, Boarding Area D, located in the old Central Terminal, was formerly used and configured as an international terminal. The terminal closed in December 2000 when the new International Terminal Building was opened. Under the Master Plan, this terminal is to be renovated for a domestic terminal.

The renovation of Boarding Area D into a domestic terminal is described in the Master Plan (Master Plan, p.10.4; Figure 10.1), and the Master Plan EIR Project Description in Figure 4 (Final EIR, p.42), and FEIR Appendix B, Table B-1 (vol. III, p.A.18). As described in these documents, the square footage for the existing Boarding Area D is 490,000 square feet (Master Plan, p. 10.2).

The proposed T2 renovation would convert the facility from a 10-gate international wide body aircraft terminal to a 14-gate domestic narrow body aircraft terminal. The renovation project includes the terminal building's interior space, including holdrooms, concession spaces, baggage claim areas, and building systems. It would include renovation of the departures and arrivals levels of the building. As currently planned, the T2 renovation project would include filling in atrium spaces in the connector building and boarding area to provide additional circulation and concession spaces and provide greater structural support and seismic reinforcement for the building. These changes would increase the Boarding Area D square footage from 490,000 square feet as referenced in the FEIR, to approximately 525,000 square feet – an increase of 35,000 square feet or 7%.

Figure 3: Terminal 2 Renovation



Source: SFO Bureau of Planning and Environmental Affairs, September 2007

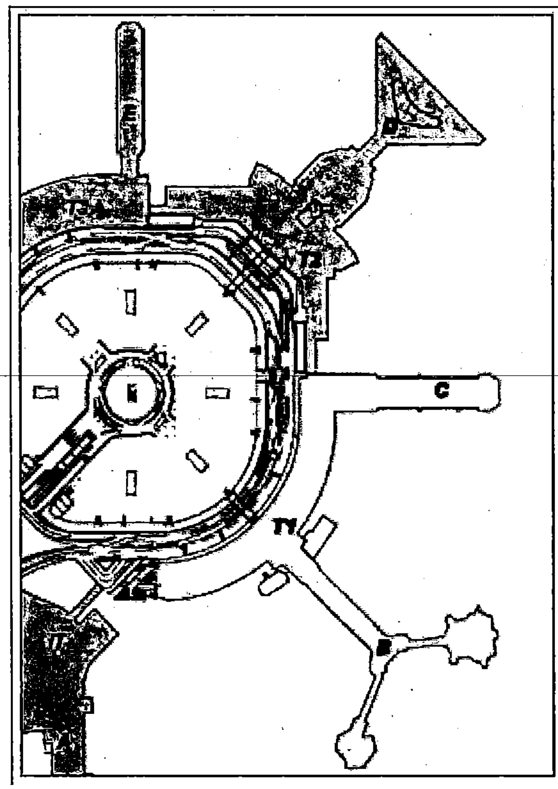
The Terminal 2 renovation project, shown in Figure 3, is consistent with the project described and analyzed in the Master Plan FEIR, and would not increase the total number of aircraft gates beyond that analyzed in the FEIR.

The Airport anticipates a 24-36 month schedule for the completion of design and construction associated with the Terminal 2 renovation project.

B. Terminal 1 Redevelopment

Terminal 1, shown in **Figure 4,** is a 28-gate domestic terminal that accommodates Delta Air Lines, Northwest Airlines, Hawaiian Airlines and Frontier Airlines at Boarding Area C and Alaska, US Airways, Continental, and Southwest Airlines at Boarding Area B. The terminal building and Boarding Area B were built in the 1960s. Boarding Area C was built in the 1980s.

Figure 4: Terminal 1 – Existing Conditions



Source: SFO Bureau of Planning and Environmental Affairs, September 2007

The SFO Master Plan proposed the redevelopment of Terminal 1, Boarding Area B due to the age and condition of the facility, which is not pile-supported and has significant structural, seismic and building code deficiencies. While the Airport has maintained the boarding area and made capital investments to keep the facility operational over the last ten years, Terminal 1 and Boarding Area B are accommodating many more passengers than they were designed to accommodate and passenger level of service is expected to deteriorate as domestic traffic levels increase. The ongoing maintenance requirements of the building and associated building systems are significant due to the continued settlement of the 1960's-era boarding area. Since its opening, the first two sections of the boarding area have settled approximately 40 inches.

The demolition and reconstruction of existing Boarding Area B was to occur in two phases and is described in the Master Plan and in the Master Plan EIR (Master Plan, pp. 10.1, 10.2 (Figure 10.1), 10.5 (Figure 10.3), 10.10, 10.14 (Figure 10.10), 10.33 (Figure 10.22; Master Plan EIR, pp. 42 (Figure 4), 44 (Figure 6), 46 (Table 4), 43 (Figure 5), 45 (Figure 7), 47 (Table 5); Master Plan EIR vol. III, Appendix B pp.A.18 (Table B-1), A.19 (Table B-1).

In the Phase 1 near-term, 60,000 square feet of the total 92,000 square feet Boarding Area B was to be demolished and a 400,000 square feet Boarding Area B would be constructed, resulting in a total of 432,000 square feet for Boarding Area B at the completion of Phase I of the project (FEIR, vol. III, Appendix B p. A.18). In the Phase II long-term, the remaining original 32,000 square feet of the old "satellite" configuration of the Boarding Area B would be demolished and replaced with a 104,000 square feet facility. At the completion of Phases I and II, Boarding Area B would total 504,000 square feet. (FEIR, Volume III, Appendices, Appendix B p. A.19). The Phase I and II configuration of the Boarding Area B would have been similar to that of Boarding Area F in Terminal 3 (formerly the North Terminal), with two piers extending from a central hub (Master Plan, pp.10.10, 10.14 (Figure 10.10).

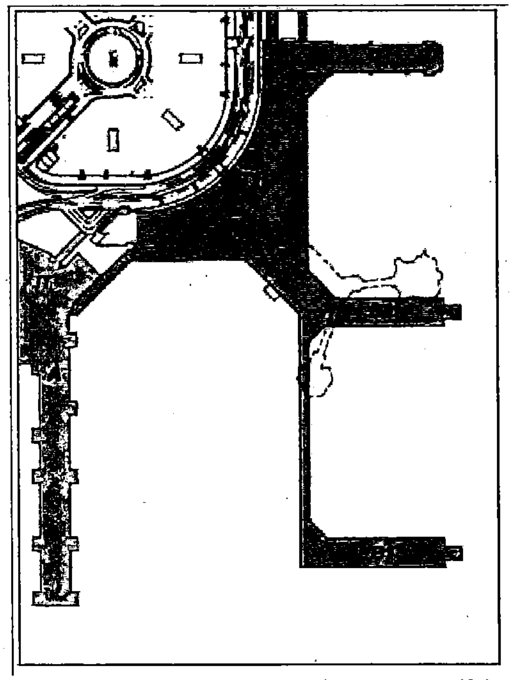
The Airport proposes to move forward with the Terminal 1 redevelopment project when the renovation of Boarding Area D is completed. At this time, the Airport is evaluating two alternative designs for Terminal 1 redevelopment.

In 2006, the Airport initiated a planning study for the redevelopment of Terminal 1 and has identified two alternative redevelopment plans for the terminal building and boarding areas. Both alternatives provide for approximately the same number of aircraft gates – 18 at Boarding Area B and 10 at Boarding Area C – that exist today at Terminal 1, but provide for reconfiguration of the terminal layout to provide improved passenger processing facilities (e.g., ticketing, security screening, holdrooms, and baggage claim areas), airline support facilities, and aircraft operating environment (including improvements to taxilane layouts in the vicinity of the terminal boarding areas to improve the operational capability of the Airport and reduce aircraft delays).

Alternative 1 – the Finger Pier Alternative (as shown in **Figure 5**) – would retain Boarding Area C in its current configuration and redevelop Boarding Area B with two finger piers. The second alternative – the Modified Linear Alternative (as shown in **Figure 6**) – would reconfigure both boarding areas into a single linear concourse consolidating the various passenger processing facilities within Terminal 1 and integrating the terminal building with Terminal 2. Over the next several months, the Airport will identify a preferred Terminal 1 redevelopment alternative.

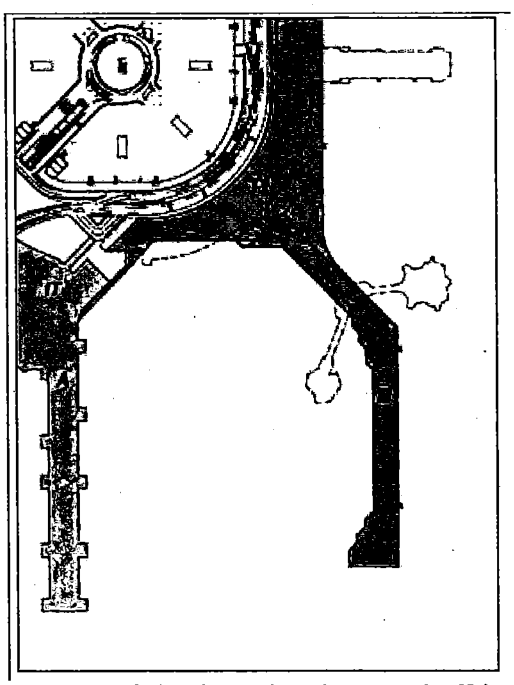
It is anticipated that the redevelopment of Terminal 1 (under either alternative) would be initiated following the completion of the Terminal 2 renovation project. The first phase of construction is anticipated to begin in 2011 and the final phase of construction would conclude in 2018.

Figure 5: Terminal 1 Redevelopment – Finger Pier Alternative



Source: SFO Bureau of Planning and Environmental Affairs, September 2007

Figure 6: Terminal 1 Redevelopment – Modified Linear Alternative



Source: SFO Bureau of Planning and Environmental Affairs, September 2007

The anticipated number of aircraft gates at Terminal 1 is the same as the number proposed to be constructed at the completion of the Master Plan. Although the terminal square footage is expected to increase to account for changes in passenger processing since 2001 (to accommodate new security screening requirements for passengers and baggage), the forecast passenger and aircraft operations levels are consistent with the levels analyzed in the Master Plan FEIR.

IV. ENVIRONMENTAL IMPACT ANALYSIS OF THE PROPOSED PROJECTS

A. Comparison of Proposed Terminal Projects with Projects Analyzed in the FEIR

For the T2 renovation project, there would be no substantial change to the overall footprint of the building or the number of total aircraft gates from what was described in the FEIR, and is essentially the same as the project proposed in the Master Plan and analyzed in the FEIR.. All environmental impacts identified in the FEIR would remain essentially as described, and as explained in further detail below.

For the T1 redevelopment project, the physical layout of the two proposed T1 design alternatives (the Finger Pier and the Modified Linear schemes) differ from the configuration of the T1 project described in the FEIR. However, the design change does not materially affect the total building square footage and number of aircraft gates for the South Terminal from that proposed in the SFIA Master Plan and analyzed in the FEIR.

The specific environmental impacts as discussed in the FEIR when compared to the current Terminal 2 renovation and Terminal 1 redevelopment projects are described below. As shown in **Table 2**, there are no substantial changes in the activity levels or aircraft gates at the Airport between the projects as analyzed in the Master Plan compared with the proposed projects.

At the completion of the Terminal 2 renovation and Terminal 1 redevelopment projects, it is expected that there would be no change in the total number of aircraft gates at the Airport compared with the number of aircraft gates anticipated in the Master Plan. Forecast passengers accommodated by the Airport over the planning horizon generally remain the same, but due to economic conditions since 2000 and for other reasons described previously, the design forecast year has shifted from the 2006 Plan Year shown in the Master Plan (51.3 million annual passengers; Master Plan, p.2.9) to 2026 under the Airport's low forecast scenario (50.6 million annual passengers by 2026) and 2016 under the Airport's high forecast scenario (53.6 million annual passengers by 2016).

Aircraft operations are now forecast to reach between 448,000 and 479,000 between 2016 and 2026, compared with 537,600 aircraft operations forecast in the Master Plan for 2006. The Airport recently completed an airfield capacity study that determined that the Airport's runway capacity is constrained, so it is unlikely that the Airport could achieve the aircraft operations levels previously forecast in the Master Plan.

Table 2: Comparison of Master Plan FEIR and Proposed 2007 Terminal Redevelopment Projects

	Master Plan FEIR (2006)	2007 Proposed Terminal Redevelopment (2016-2026)	% Difference
Passenger Forecast	51.3 million	50.6-53.6 million	-1 to +4%
Aircraft Gates	103	101 – 103	-2 to 0%
Aircraft Operations	537,600	448,000-479,000	-12 to -18%
Terminal 2 Renovation	490,000 s.f. (B\A D)	525,000 s.f. (B\A D) [1]	+7%
Terminal 1 Redevelopment	1,075,900 s.f. (B\A B)	Finger Pier [2] Alternative - 1,183,500 s.f.	+10%
		Modified Linear [3] Alternative - 962,000 s.f.	-11%

Sources: (1) 1989 SFIA Master Plan, (2) 1992 SFIA Master Plan FEIR, (3) SFO Bureau of Design and Construction, (4) SFO Bureau of Planning and Environmental Affairs

Notes: 1. The current T2 project includes filling 9,000 s.f. of interior space in the atrium, and 10,000 s.f. at the narrow concourse area referred to as the "throat. A bump out at the end of the B\A D would add an additional 16,000 s.f. of holdroom – concession space. These improvements were not anticipated in the FEIR's programmatic level of detail.
2. The Finger Pier Alt. includes a refurbished B\A C not contemplated in the FEIR and separates B\A B into two concourses.
3. The Modified Linear Alt. would replace B\A C with frontal gates, and a replace B\A B with a linear concourse.

The following is a summary of the environmental impacts described in the FEIR for the Master Plan projects, including the T2 and T1 projects. When available, the 1996 and 2006 forecast information from the FEIR is compared with actual information for those years. These comparisons indicate that for the topical environmental impact area, and for the reasons described in the project description of this addendum, the levels of forecast environmental impact, such as Highway 101 traffic volume, have not occurred because of economic conditions that have affected air passenger levels and aircraft operations at the Airport, which have had a similar effect on the traffic volumes and other activities in the region as a whole.

B. Traffic and Circulation

The transportation impacts of the Master Plan projects were analyzed on pages 265-330 of the FEIR. Updated passenger forecasts prepared in 2007 show 2016 (high forecast) and 2026 (low forecast) passenger levels are comparable to what the FEIR forecast for 2006.

Although the T2 and T1 projects are not expected to be completed until 2011 and 2018, respectively, the transportation impacts anticipated from these project has been added to year 2006 data for purposes of comparing impacts to those stated in the Master Plan FEIR.

The potential traffic and circulation impacts of the proposed T2 and T1 projects are not expected to deviate from what was analyzed in the FEIR. As shown in **Table 3**, a comparison of peak hour traffic on one Highway 101 mainline segment, between Millbrae Avenue and the SFO, indicate that the FEIR analysis presented higher traffic volume, and therefore, the traffic impacts of the proposed T2 and T1 projects are within the envelope of FEIR traffic analysis. For this mainline segment, the actual Caltrans traffic count for 1996 is 16 percent higher than the 1996 forecast in the FEIR, but by 2006, the actual Caltrans traffic count is 21 percent less than the 2006 forecast in the FEIR. Unlike the straight line forecast used in the FEIR, the actual Caltrans traffic numbers rose higher than forecast in 1996, but decreased significantly by 2006. However, there is no difference when the MP FEIR forecast for 2006 is compared to the actual 2006 Caltrans traffic volume when you include the estimated net traffic trips for the passengers (i.e., enplanements and deplanements) that are now expected in 2016.

Table 3: A Comparison of Highway 101 Peak Hour Traffic Volume

			1996		2006		
Hwy 101 Mainline Segment	**1990 MP FEIR Existing[1]**	**1992 Caltrans Actual[2]**	**MP FEIR Forecast[1]**	**Caltrans Actual [3]**	**MP FEIR Forecast[1]**	**Caltrans Actual[2]**	**Caltrans Actual + 2016 Terminal Area Trips[4]**
Millbrae Avenue To SFIA[3]	16,617	16,500	18,430	21,300	20,494	16,200	20,489
% Difference	- 1%[5]		+ 16%		- 21%		0%

Sources: (1) 1992 Master Plan FEIR, (2) Caltrans Traffic Operations web page (2006), (3) Comparative Traffic Reports – August and December 2006, SFO Financial Planning & Analysis Unit, (4) DTRP – Terminal Program Analysis (2016), SFO Planning & Env. Affairs

Notes:
1. The Master Plan FEIR figures are the sum of the weekday peak hour volumes for the northbound direction in the morning, and for the southbound direction in the afternoon.
2. The Caltrans data is reported as a composite annual peak hour volume.
3. Volume is total of all main lines in both the north- and south- bound directions between the Millbrae Avenue interchange and the SFIA ramps. This segment was chosen for consistency in analysis since Caltrans records for the segment between the SFIA ramps and the San Bruno interchange were not recorded in 2006.
4. Comparison of actual 2006 Caltrans trips and 2016 Terminal Area traffic to the FEIR 2006 forecast used the following assumptions – 2016 Peak Hr Passengers (T2 = 2,525. T1 = 3,958 – 3,796 (2007); 1.98 trips per passenger; terminal employees trips are 25% of passenger trips; 64.5% of terminal trips are southbound on Hwy 101. The 2006 FEIR forecast and the 2016 Terminal Area Trips overstates the number of trip because only 75% of total number of passengers are local (origination & destination) and would generate traffic trips. The remaining 25% are transferring passengers who never enter the area vehicular roadway system.
5. The percentage difference is given for the existing 1990 peak hour volume in the FEIR and the closest year found in the Caltrans Traffic Operations Website. For 1996 and 2006, the FEIR forecast numbers are compared to Caltrans actual numbers.

The Master Plan project impacts on 1996 and 2006 Forecast AM and Peak Hour traffic volumes for the 31 Highway 101 and I-380 ramps in the vicinity of the Airport were presented on pp. 315 to 316 of the FEIR. As shown in **Table 4**, the estimated volume of traffic in 1996 attributed to Master Plan projects would account for approximately 13 percent and 17 percent of AM and PM Peak Hour traffic, respectively. By 2006, the FEIR forecast that the Master Plan projects share of AM and PM Peak Hour traffic would increase to 23 percent and 28 percent, respectively.

Table 4: 1996 and 2006 Master Plan Project Impacts on Freeway Ramps

MP Forecast Years	AM PEAK Forecast Increase	AM PEAK + MP Projects	% MP Share	PM Peak Forecast Increase	PM Peak + MP Projects	% MP Share
1996 [1]	30,482	34,565	13%	30,080	35,097	17%
2006 [1]	32,005	39,421	23%	31,289	40,091	28%

Source : (1) SFIA Master Plan FEIR, Table 43, pp. 315 to 316, (2) Traffic Engineering, SFO Bureau of Design and Construction, September 2007.

Notes: 1. The peak hour traffic volume presented for each forecast year is the sum of 31 ramps in the vicinity of the Airport as identified in Table 42 of the FEIR, pp.315 to 316.

Whereas Table 4 presents the Airport's estimated project traffic impacts or contribution to Highway 101 peak traffic volumes, **Table 5** presents the actual results of a 2005 Airport Ramps Traffic Count Survey conducted by the Airport's Traffic Engineering Section. As shown in Table 5, the Airport's share of the average daily traffic on Highway 101 between Millbrae Avenue and I-380 is approximately 24 percent. As a percentage share of Highway 101 traffic, the 24 percent is similar to the 2006 forecast of 28 percent shown in Table 4.

Table 5: Airport Share of Highway 101 Traffic

Highway 101 Mainline Segment	101 Average Daily Traffic	Airport Average Daily Traffic	Airport Share of Highway 101
Millbrae Avenue to SFIA	235,000	49,263	21%
SFIA to I-380	240,000	65,904	27%
Total	475,000	115,167	24%

Source: (1) Caltrans Traffic Operations web page (2006), (2) 2005 Airport Ramp Traffic Count Survey – Traffic Engineering, SFO Bureau of Design and Construction, September 2007.

As Table 3, 4 and 5 indicate, the Airport's Master Plan projects, including the T2 and T1 projects are within the FEIR's envelope of analysis. The actual 2006 Highway 101 mainline traffic volumes are 21 percent less than the FEIR forecast for 2006. The Airport's percentage share of Highway 101 traffic volume in the Airport vicinity is within the range presented in the FEIR traffic analysis. In addition, the following transportation projects and programs that were implemented after the completion of the FEIR have served to encourage the use of alternative transportation options for Airport passengers and employees and resulted in an overall reduction in traffic and circulation impacts:

- The on-Airport **AirTrain** System, a master plan project referred to in the FEIR as the people-mover system, began operations in 2003. AirTrain has eliminated 200,000 annual shuttle bus trips from the terminal roadways;
- The **SFO BART Extension** that began operation in 2003 had a ridership of 215,000 passengers per month in 2005. In 2007 (year to date), average monthly BART ridership to SFO has increased to 241,322 (SFO Landside Operations, September 2007);
- The Airport's Transit-First Program promotes the use of public and private High Occupancy Vehicles (HOV) to and from the Airport. The 2006 Air Passenger Survey indicated that 46 percent of air passengers used public transportation in the form of BART,

CalTrain, SamTrans, door-to-door vans, taxis, limousines, charters, or Airporter bus service to access the Airport; and

- Adopted in 1993, the Airport's **Employee Trip Reduction Program** encourages the more than 18,000 airport tenant and airport employees to take advantage of HOV ground access alternatives to their on-airport job sites. Approximately 53 percent of airport employees surveyed in 2005 did not drive alone and used an alternative form of transportation to reach their place of employment[1] (SFO Landside Operations, September 2007).

C. Air Quality

Air quality impacts of the SFIA Master Plan were analyzed on pp. 171 to 177 and pp. 353 to 365, in the FEIR. The FEIR found that project-related surface traffic would contribute to existing exceedances of roadside CO concentrations and would likely lead to an increase in the frequency of standards violations in the project area. The FEIR also found that the project would contribute more than one percent of transportation-related emissions resulting from development in the San Mateo County, and would create emissions that would exceed BAAQMD thresholds. The range of construction-related impacts was analyzed in the FEIR on p. 353. The construction-related emissions for the proposed T2 and T1 Master Plan projects are expected to remain within the envelope of impacts discussed in the FEIR, because the scale of construction of the currently proposed projects are similar in size and scope as the two projects described and analyzed in the FEIR.

The overall vehicular activity under the current T2 and T1 master plan projects would remain within the general envelope of vehicular trips and associated increases in air pollution as discussed in the FEIR.

The FEIR found air quality impacts were potentially significant impacts. However, the project impacts relating to air quality have been avoided or substantially lessened, to the maximum extent possible, by the implementation of mitigation measures as adopted by the Airport Commission in the *SFIA Final Mitigation Monitoring Program*. These mitigation measures would be incorporated into the construction specifications for the T2 and T1 projects. To the extent that these mitigation measures do not avoid or substantially lessen the impacts of the master plan construction projects, the Airport Commission made the finding that the environmental, economic, social benefits of the Master Plan project would override the remaining impacts related to air quality, as stated fully in the Airport Commissions adoption of the Statement of Overriding Considerations. (*SFIA Master Plan – Findings Related to the Approval of the SFIA Master Plan*, November 3, 1992, pp. 57 to 58).

Since the certification of the FEIR, the Airport has implemented a number of measures that have served to reduce air emission levels at the Airport. These comprehensive air quality enhancements have been organized under the Airport's Environmental Sustainability Program[2], and include the following measures:

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[1] 2005 SFO Employee Commute Survey, Monday through Sunday work week (including days off)

[2] (Source: *San Francisco International Airport – 2007 Environmental Sustainability Report*, June 2007, pp.29 to 36; TSM Program, SFO Landside Operations, September 2007)

- The on-airport **AirTrain** System, a master plan project referred to in the FEIR as the people-mover system, began operations in 2003. AirTrain has eliminated 200,000 annual shuttle bus trips from the terminal roadways, reducing both traffic congestion and the associated emissions created by the predominantly diesel shuttle bus fleet.
- The **SFO BART Extension** that began operation in 2003 had a ridership of 215,000 passengers per month in 2005. Assuming an average automobile road trip of 25 miles per passenger to SFIA, the BART Extension to SFO has reduced an estimated 64.5 million miles of vehicle travel in the Bay Area in 2005. The annual gross reductions in air emissions are estimated to be 3,300 tons of carbon monoxide (CO), 250 tons of Nitrogen Oxides (NOx), as well as reductions in Reactive Organic Gases (ROG) and Particulate Matter less than 10 microns (PM_{10}). In 2007 (year to date), monthly BART ridership to SFO has been 241,322 (SFO Landside Operations, September 2007). With this 12 percent increase in ridership between 2007 and 2005, further reductions in estimated annual gross air emissions would be expected.
- Under the Airport's **Transit-First Program**, SFO is a leader among U.S. airports in the use of shared ground transportation for Airport access. The Transit-First Program promotes the use of public and private High Occupancy Vehicles (HOV) to and from the Airport. The 2006 Air Passenger Survey indicated that 46 percent of air passengers used public transportation in the form of BART, CalTrain, SamTrans, door-to-door vans, taxis, limousines, charters, or Airporter bus service to access the Airport.
- Adopted in 1993, the Airport's **Employee Trip Reduction Program** encourages the more than 18,000 airport tenant and airport employees to take advantage of HOV ground access alternatives to their on-airport job sites. All employers with 100 or more employees are required to appoint an employee transportation coordinator (ETC) to prepare and implement a Trip Reduction Program for their employees. Ground transportation information and financial incentive programs (i.e., Commuter Checks) are disseminated to tenant and airport employees. Approximately 53 percent of airport employees surveyed in 2005 did not drive alone and used an alternative form of transportation to reach their place of employment (SFO Landside Operations, September 2007).
- SFO adopted the **Clean Air Vehicle Policy** in 2000. The policy mandated that 50 percent of vehicles in applicable fleets at SFO use clean fuels by 2005 and 100% by 2012. SFO met the 2005 goal for hotel and parking courtesy shuttle vehicles and public transit, and expects to meet the 2012 goal for all categories of regulated vehicles. In 2003, the rental car shuttles were virtually eliminated and replaced by the zero emission AirTrain system. By the end of 2007, there will be 1,237 CNG, propane, electric and other alternative fuel vehicles in use at the Airport.
- SFO has implemented a number of **airside operations procedures** to reduce fuel consumption and emissions associated with aircraft ground operations such the installation of 400 Hz ground power and pre-conditioned air at the International Gates and in Boarding Areas B, E, and F to reduce the use of aircraft auxiliary power units. SFO also encourages airlines and ground service operators to convert to clean fuel service equipment, single-engine taxiing of aircraft, and towing aircraft between terminals and runways.

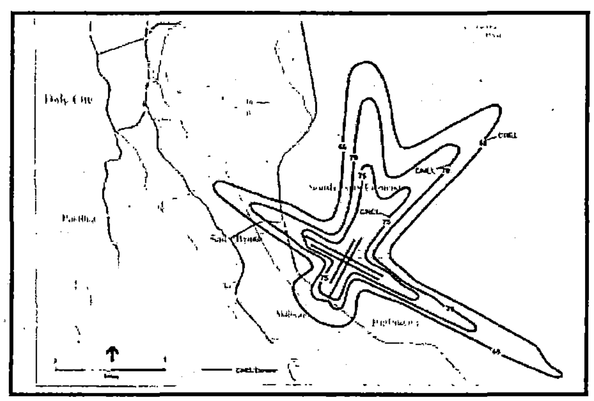
These improvements have resulted in an overall reduction in the level of criteria emissions.

Moreover, there has been a reduction in aircraft emissions resulting from the phase out of older, noisier and more polluting Stage 2 aircraft from the commercial aviation fleet that became effective January 1, 2000. This phase out was not anticipated at the time the FEIR was prepared. In fact, the FEIR noise analysis indicated that 299 of 833 average daily aircraft operations at SFO in 1990 were Stage 2 aircraft (FEIR, Table 17, p. 156). The majority of the new generation Stage 3 aircraft are considerably "cleaner" than the older aircraft included in the FEIR analyses. As older aircraft are phased out of the commercial airlines fleet, aircraft emissions will be further reduced. Therefore, the air quality impacts of the proposed T2 renovation and T1 redevelopment projects would remain within the envelope of analysis in the FEIR.

D. Noise

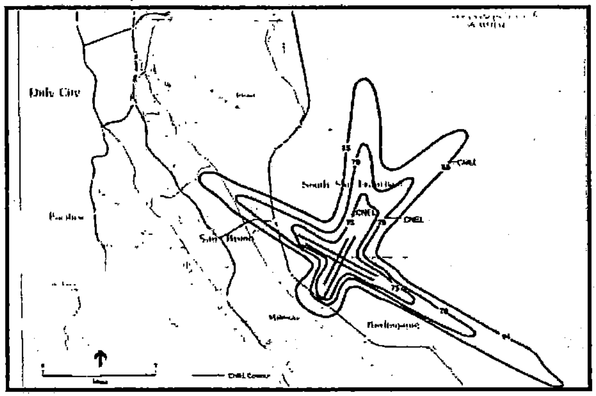
Noise impacts (surface traffic and aircraft related) of the Master Plan projects were analyzed on pages 153-170 and 331-352 of the FEIR. As shown in **Figures 7a – 7c**, the noise impacts of the proposed terminal projects would not change substantially from the original projects analyzed in the FEIR. Although the 2007 65 CNEL contour extends further to the northwest than the 1996 and 2006 forecast noise contours from the FEIR, the discrepancy can be attributed to differences in the distribution of aircraft operations between Runways 1 L/R (over the water) and Runways 28 L/R (through the San Bruno Gap). However, the T2 and T1 projects would have no effect on this discrepancy in aircraft distribution between runways. In the FEIR, the Integrated Noise Model assigned more air operations to Runways 1 L/R than the current noise model used by the SFO Aircraft Noise Abatement Office for their quarterly noise reports.

Figure 7a: Aircraft Noise Contours- 65+ CNEL (1996 – FEIR Forecast)



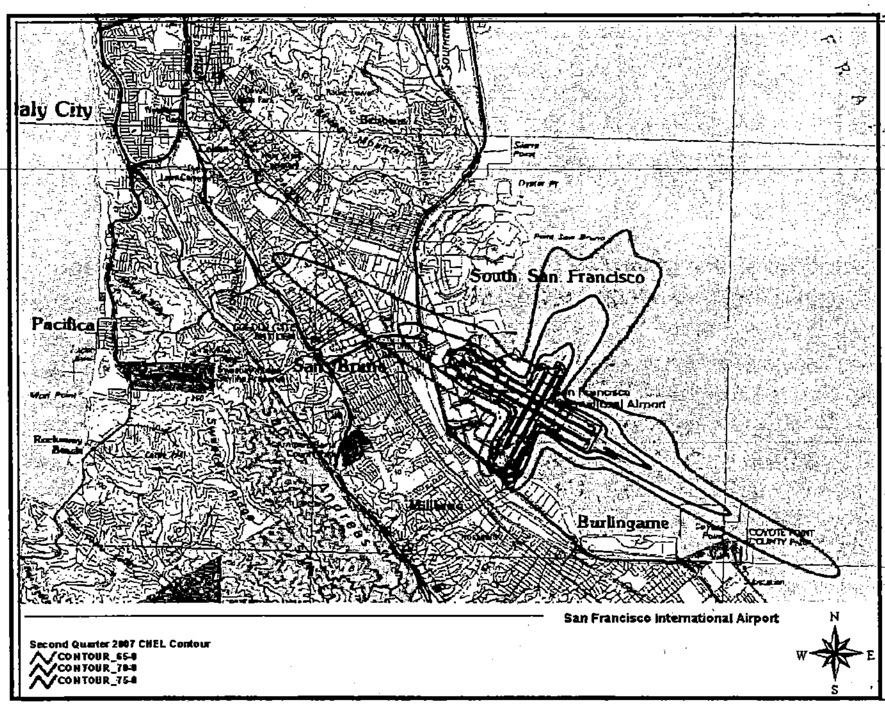
Source: (1) SFIA Master Plan FEIR, Figure 32, p. 340

Figure 7b: Aircraft Noise Contours- 65+ CNEL (2006 – FEIR Forecast)



Source: (1) SFIA Master Plan FEIR, Figure 33, p. 345

Figure 7c: Aircraft Noise Contours- 65+ CNEL (2007- Actual)



Source: (1) SFO Aircraft Noise Abatement Office, September 2007

The forecast aircraft operations are expected to be similar to or lower than the activity levels analyzed in the FEIR. As shown in **Table 6**, the actual population (2007) exposed to aircraft noise levels of 65 CNEL[3] or higher is lower than the 2006 forecast population in the FEIR. In addition,

[3] CNEL has been adopted by the California Department of Transportation, Div. of Aeronautics, for the purposes of the State Noise Standards governing aircraft operations at California Airports. The Noise Standards state, "the standard for the acceptable level of aircraft noise for persons living in the vicinity of airports is hereby established to be a community noise equivalent level of 65 decibels." (FEIR, p. 153)

the proposed improvements to the apron area and taxilanes in the vicinity of T1 under either the Finger Pier or the Modified Linear alternatives will improve aircraft circulation on the airfield. These improvements would reduce aircraft queuing times and reduce aircraft noise and air emission impacts on the airfield and surrounding community. The actual population in the 2007 65+ CNEL noise contour, approximately 4,534 people, is 69 percent less than the 2006 Forecast population of 6,600 shown in the FEIR. In terms of households, the 1,945 households in 2007 are 76 percent lower than the 2,563 households forecast in the FEIR for 2006.

Table 6: Resident Population/Households Exposed to Aircraft Noise 65 CNEL and Above (1990, 1996, 2006) FEIR Forecast vs. 2007 Actual

Noise Exposure Range (CNEL)	FEIR Existing Setting		FEIR Forecasts			2007 Pop. (Actual)	% Difference Betw. 2007 & 2006 Pop.	FEIR Forecast	2007 H'hld (Actual)	% Difference Betw. 2007 & 2006 H'hlds
	1990 Population	1990 Household	1996 Pop.	1996 H'hld	2006 Pop.			2006 H'hld		
75+	340	133	0	0	0	0	0%	0	0	0%
70 - 75	1,980	777	1,500	618	760	344	45%	321	145	45%
65 - 70	12,660	4,939	5,500	2,129	5,840	4,190	72%	2,242	1,800	80%
Total 65+	14, 980	5,849	7,000	2,747	6,600	4,534	**69%**	2,563	1,945	**76%**

Source: (1) SFIA Master Plan FEIR, Table 52, p. 341, (2) Aircraft Noise Abatement Office, September 2007

The noise impacts from aircraft operations at SFO have decreased significantly over the years, due primarily to the implementation of the Airport's Noise Abatement Program and the process of phasing out Stage 2 aircraft in the late 1990s. Historically, the number of people who reside in the 65+ CNEL noise contour has decreased 91 percent from 31,500 in 1976 to 3,298 in 2000. In terms of total area, the 65 CNEL noise contour has been significantly reduced from 2.2 square miles in 1986 to 0.41 square mile in 2007 (SFO Aircraft Noise Abatement Office, September 2007). SFO was the first major airport in California to eliminate all incompatible land uses within the 65 CNEL noise contour, primarily through its noise insulation program, and to operate without a variance as defined by California Code of Regulations, Title 21 (2007 *Environmental Sustainability Report*, June 2007, p. 40).

Additional initiatives and programs implemented as part of the Airport's Noise Abatement Program have also contributed to a reduction in airport related noise below the levels predicted in the FEIR. Those measures include:

- **The Fly Quiet Program** - The program encourages individual airlines to operate as quietly as possible at SFO. The program promotes a participatory approach to compliance with noise abatement procedures. A Fly Quiet Report provides airline scores on such noise indicators as noise exceedances, nighttime preferential runway use, shoreline and gap departure frequency, and Foster City arrival ratings;
- **Noise Complaint Program** - A database of all noise complaints is maintained. This information is used to develop operational changes that could reduce or eliminate the nuisance conditions;

- **Aircraft Noise Monitoring** - The Monitoring System keeps track of noise levels in the surrounding communities through the deployment of 29 monitoring stations located around the Bay Area. The information gathered allows Noise Abatement staff to correlate noise events and complaints to individual flight operations and aircraft types;
- **Noise Reduction of Nighttime Operations** - SFO has worked with participating airlines to voluntarily reduce aircraft noise during nighttime hours;.
- **Coordination with FAA Air Traffic Control** - The Aircraft Noise Abatement Office works collaboratively with FAA Air Traffic Control to suggest changes to approach and departure procedures such as increasing altitudes for arriving Transpacific aircraft, which reduced noise impacts for southern San Mateo County residents; and
- **Noise Reduction Feasibility Study** - The Noise Abatement Office worked with Boeing Company, the FAA, and United Airlines on "Oceanic Tailored Arrivals" (OTA) to reduce noise from arriving flights from the Pacific Rim. Trials of the proposed procedure were conducted in August/September 2006 and December 2006/January 2007. The procedure could potentially increase glide time upon arrival approach to the Airport. The reduction in altitude changes and engine thrust would simplify the final approach for pilots, save fuel, and result in quieter operations because of reduced power settings and noise associated with drag-inducing settings for flaps, speed brakes, and landing gear.

(Source: SFO 2007 *Environmental Sustainability Report*, June 2007, p. 41 to 43)

E. Hazardous Materials

Hazardous materials impacts of the Master Plan projects were analyzed on pages 201-227, and 381-393 of the FEIR. The FEIR indicated that excavation work could expose workers and the public to soils, gases or groundwater contaminated with hazardous materials. This exposure relates to the various construction activities including building demolition or renovation, excavation and dewatering. Although chemical compounds could vary, petroleum fuels are the primary soil and groundwater contaminant at the Airport (*FEIR*, p.381).

As stated in the FEIR and adopted in the SFIA Master Plan Final Mitigation Program (November 3, 1992), SFO will conduct Phase I and II environmental assessments of the project sites. If site remediation is necessary, the work would be performed by the responsible party, in accordance with all applicable law and the Hazardous Materials Mitigation Measures identified in the SFIA Master Plan Mitigation Monitoring Program (Airport Commission, November 3, 1992).

Between 1992 and 2006, coinciding with the implementation of the SFIA Master Plan program, SFO and its tenants carried out an extensive program of site investigation, characterization, and remediation of contaminated soil and groundwater to protect human health and safety and to prevent the degradation of environmental resources at the Airport. The $55 million environmental clean up program resulted in the removal and treatment or disposal of approximately 500,000 tons of contaminated soil and more than 20 million gallons of contaminated groundwater. The Airport manages on-going activities such as Hazardous Material Management, Hazardous Waste Materials Disposal, Soil and Groundwater Remediation, and a Materials Substitution Program (2007 *Environmental Sustainability Report*, June 2007, p. 61 to 65).

Through the environmental clean up program, the Airport conducted asbestos and soil surveys of both T2 and T1. These surveys found that both T2 and T1 will require clean up activities for asbestos and petroleum hydrocarbons (SFO Bureau of Design and Construction, Environmental

Remediation Section, September 2007). These adverse environmental impacts would be addressed though the implementation of mitigation measures as adopted by the Airport Commission in the *SFIA Final Mitigation Monitoring Program*. These mitigation measures would be incorporated into the construction specifications for the T2 and T1 projects. This would be consistent with the information presented in the FEIR regarding potential impacts from the T2 and T1 projects.

As shown in **Table 7**, the Airport disposes or recycles a significant amount of hazardous waste material. The Airport closely monitors the release of any fuels and other contaminants, treats contaminated groundwater prior to disposal, and disposes of these contaminated soils in permitted landfills or, if appropriate, collect materials for recycling.

Table 7: Hazardous Waste Materials Disposed or Recycled in 2005

Material Type	Quantity
Solid Hazardous Waste (Recycled)	31,279 pounds
Liquid Hazardous Waste (Recycled)	4,217 pounds
Anti-Freeze (Recycled)	175 gallons
Vehicle Batteries (Recycled)	150 pieces
Contaminated Soil	4,955 tons

Source: 2007 SFO *Environmental Sustainability Report*, June 2007, p. 63

V. ADMINISTRATIVE FINDINGS AND ENVIRONMENTAL CHECKLIST

A. Findings

The SFO Master Plan FEIR analyzed the potential impacts of the Master Plan. The T2 renovation and T1 redevelopment projects were identified as individual projects in the Master Plan. This EIR Addendum was prepared to ensure that the subsequent changes to individual projects were compared to the Master Plan Program FEIR, and it was found that no new additional substantial environmental analysis is required.

Based on the analysis in this Addendum, the proposed activities of the T2 and T1 Master Plan projects that are described and included in the SFO Master Plan program would not require additional environmental analysis.

The proposed T2 renovation project would differ from the T2, Boarding Area D project described in the Master Plan FEIR in terms of the overall square footage of interior space improvement. The FEIR analyzed approximately 490,000 square feet of renovation at Boarding Area D. The current T2 renovation project proposes approximately 35,000 square feet of additional interior improvements. With exception of a 16,000 square foot bump out on the upper level of Boarding Area D, the proposed increase in square footage would be improvements to interior space within the overall 610,000 square foot terminal space identified in the FEIR. The additional 35,000 square feet of interior improvements will be used for concession space to serve the air passengers. Since SFO concessions do not have a separate draw for consumers and are patronized by those already at the Airport for travel purposes, there will be no additional environmental impacts resulting from the additional interior improvements. Therefore, the potential environmental impacts associated with the proposed T2 renovation are comparable to the T2 project analyzed in the FEIR.

The two proposed Terminal 1 redevelopment alternatives differ from the Terminal 1, Boarding Area B project described in the Master Plan FEIR in terms of the overall configuration of the facility and terminal square footage required to accommodate changes in passenger processing facility requirements (e.g., passenger security screening and queuing areas and in-line baggage screening systems) in the post-September 11 airport operating environment. Despite the proposed increase in terminal square footage in the most recent plans compared to the Terminal 1, Boarding Area B replacement project considered in the Master Plan, the number of aircraft gates within the Terminal 1 complex would remain the same. Based on the revised forecast level of aircraft operations that would be accommodated at Terminal 1, the potential environmental impacts associated with the two alternative redevelopment schemes are comparable to the project analyzed in the FEIR.

This Addendum analyzed potential environmental impacts for the T2 and T1 projects and determined findings with respect to the following potential impact categories:

- **Transportation**
- **Air Quality**
- **Noise**
- **Hazardous Materials**

With respect to State CEQA Guidelines §15162, the effects of the proposed T2 and T1 Master Plan projects were fully analyzed in the Program FEIR. It is also determined that a subsequent EIR would not be required for the T2 and T1 Master Plan projects for the following reasons:

1. The current T2 and T1 projects propose no substantial changes to the Master Plan that would require major revisions to the SFIA Master Plan because of new significant environmental impacts or increases in the severity of previously identified significant effects not reviewed and discussed in the SFIA Master Plan FEIR;
2. There have been no substantial changes in circumstance under which the T2 and T1 projects are to be undertaken that would require major revisions in the Master Plan FEIR due to the involvement of new significant environmental effects or increase in severity of identified significant effects; and
3. There is no new information of substantial importance to the Master Plan that would suggest there are new significant environmental impacts not fully analyzed in the SFIA Master Plan Program FEIR.

As explained in the analysis of this Addendum, none of the mitigation measures rejected by the Airport Commission have become feasible, and there are no new mitigation measures related to the T2 and T1 projects that have become available for consideration since certification of the SFO Master Plan Program FEIR that would reduce otherwise significant environmental impacts disclosed in the FEIR.

On the basis of the analysis and discussion contained herein, the environmental impacts of the proposed T2 and T1 projects are within the scope of impacts covered in the Program FEIR for the overall SFIA Master Plan. Therefore, no new substantial environmental analysis is required.

B. Environmental Checklist

This environmental checklist was used to evaluate the potential changes in the proposed T2 and T1 projects (from what was analyzed in the FEIR) to result in impacts not already identified in the FEIR. When an item in the checklist is marked "No", it reflects the conclusion that the proposed projects would result in no additional adverse impacts. The conclusion is based on a review of the impact analysis in the FEIR and a consideration of the impacts of changes in the proposed projects relative to what was analyzed in the FEIR, as summarized in the discussion beneath each topic heading. Further discussion or analysis of items contained elsewhere in the Addendum is referenced, as applicable.

i. Compatibility with Existing Zoning and Plans

	Applicable	*Not Applicable*
Discuss any variances, special authorizations, or changes proposed to the Planning Code or Zoning Map, if applicable.		X
Discuss any conflicts with any adopted plans and goals of the City or Region, if applicable.		X
Discuss any approvals and/or permits from City departments other than the Planning Department or the Department of Building Inspection, or from Regional, State, or Federal Agencies.		X

Compatibility of the SFIA Master Plan with existing zoning and general plans was analyzed in the FEIR, on pp. 78 to 93a and pp. 250 to 264. In evaluating the environmental impacts of the master plan projects on Land Use and Plans (Page 250 of the FEIR), notes that:

"*The SFIA Master Plan would not alter land use types at the Airport, but would intensify, reconfigure and/or consolidate existing uses.*" (FEIR, p.250)

SFO is located in unincorporated San Mateo County, so changes to the San Francisco County Planning Code and Zoning Map are not applicable. Similarly, the analysis of potential conflicts focused on the plans and policies of the surrounding jurisdictions. The T2 and T1 projects were contemplated in the SFIA Master Plan, therefore no new zoning and/or general plan policy issues would be raised by the proposed T2 and T1 Master Plan projects.

ii. Summary of Environmental Effects

The proposed project could potentially affect the environmental factor(s) checked below. The following pages present a more detailed checklist and discussion of each environmental factor.

- **Transportation**
- **Air Quality**
- **Noise**
- **Hazardous Materials**

iii. Evaluation of Environmental Effects

Topics:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Not Applicable
1. LAND USE AND LAND USE PLANNING— Would the project:					
a) Physically divide an established community?				X	
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?				X	
c) Have a substantial impact upon the existing character of the vicinity?				X	

Land use impacts of the SFIA Master Plan were analyzed on pp. 78 to 93a and pp. 250 to 264, of the FEIR. The currently proposed T2 and T1 projects have been redesigned from that shown in the SFIA Master Plan but would be constructed within the same general areas of the Terminal facilities, and have no substantial land use impacts beyond those identified in the FEIR. The T2 renovation now includes additional infill construction of the interior space but would occupy the same footprint of the existing facility as analyzed in the FEIR. The T1 project now considers redevelopment of both Boarding Areas B and C. The layout of Boarding Areas B and C would differ from the schematic layout presented in the FEIR. These changes reflect the need for additional concourse and ticketing lobby space for new safety and security, baggage system and queuing needs. However, there would be no change to the overall number of gates identified in the Master Plan (Master Plan, p.2.9) and analyzed in the FEIR.

Topics:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Not Applicable
2. AESTHETICS—Would the project:					
a) Have a substantial adverse effect on a scenic vista?				X	
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and other features of the built or natural environment which				X	

Topics:	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*	*Not Applicable*
contribute to a scenic public setting?					
c) Substantially degrade the existing visual character or quality of the site and its surroundings?				X	
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area or which would substantially impact other people or properties?				X	

Visual quality impacts of the SFIA Master Plan were not analyzed in the FEIR because the Master Projects were determined not to have any significant visual quality impacts (as discussed in the FEIR, Volume III, Appendices, Appendix A, Initial Study). Most of the revisions to the T2 project involve reallocation and design of interior terminal space to maximize the existing of floor plans to convert of the former international terminal to domestic use. The redevelopment of T1 would maximize the interface of the terminal complex and the immediate gate apron areas and adjacent aircraft taxilanes. Changes to the height and bulk of terminal structures would not result in substantial changes to the exterior design and/or architectural fascia of the terminal facility.

The potential for light and glare from the T2 and T1 Master Plan projects would be minimal because of their location situated away form residences and other sensitive receptors. Therefore, no substantial adverse visual, light and glare, or aesthetic effects would expected from the T2 and T1 Master Plan projects.

Scenic views or vistas of the Bay would not be degraded or obstructed, because Highway 101 and the elevated circulation roadway, a Master Plan project already considered in the FEIR, is located approximately 60 feet above the ground. The presence of the constructed elevated ramps and roadway, the intensive lighting already associated with the operation of the Airport, and the potential impacts associated with the proposed T1 redevelopment project would not constitute a substantial change from the T1 – Boarding Area B project analyzed in the FEIR, and therefore, the visual quality impacts would remain minimal.

Night time construction activities would occur on a temporary, intermittent basis, and these activities would require floodlighting. Existing residential uses are located west of Highway 101, away from the project site locations. Therefore, similar to the T1 – Boarding Area B project analyzed in the FEIR, the additional temporary night time light and glare impacts would be negligible.

Topics:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Not Applicable
3. POPULATION AND HOUSING— Would the project:					
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?				X	
b) Displace substantial numbers of existing housing units or create demand for additional housing, necessitating the construction of replacement housing?				X	
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?				X	

Population related effects of the SFIA Master Plan were analyzed on pp. 228 to 231 and pp. 394 to 399 of the FEIR. Changes to the T2 and T1 projects from what was analyzed in the FEIR would not result in the need for substantial additional construction employment; the number of employees would likely be within the estimates analyzed in the FEIR (with the modification that the impacts analyzed in the FEIR would apply to the 2007-2018 construction timeframe). The changes to the phasing of the T2 and T1 construction would not otherwise have any additional long-term effects on population, employment, or the demand for housing.

Topics:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Not Applicable
4. CULTURAL RESOURCES— Would the project:					
a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5, including those resources listed in Article 10 or Article 11 of the San Francisco *Planning Code*?		X			
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?		X			

Topics:	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*	*Not Applicable*
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?		X			
d) Disturb any human remains, including those interred outside of formal cemeteries?		X			

Cultural resource impacts of the SFIA Master Plan were analyzed on pp. 183 to 191, and pp. 371 to 373, of the FEIR. The FEIR found that although impacts to prehistoric and historic resources would be unlikely, the SFIA Master Plan would have the potential to affect unknown archaeological deposits. The mitigation measures identified in the FEIR (p. 428) and adopted by the Airport Commission would apply to the proposed T2 and T1 projects. Therefore, there would be no new impacts to cultural resources not otherwise identified in the FEIR. No significant architectural or historic building or feature would be affected by the proposed T2 and T1 Master Plan projects.

The FEIR found cultural resources impacts were potentially significant impacts. However, the project impacts relating to cultural resources have been avoided or substantially lessened by the implementation of mitigation measures as adopted by the Airport Commission in the *SFIA Final Mitigation Monitoring Program* that ensure that an archaeologist would, if necessary, implement measures to limit the project's impacts on cultural resources to the maximum extent possible. To the extent that these mitigation measures do not avoid or substantially lessen the impacts of the master plan construction projects on cultural resources, the Airport Commission made the finding that the environmental, economic, and social benefits of the Master Plan project would override the remaining impacts related to cultural resources, as stated fully in the Airport Commission's adoption of the Statement of Overriding Considerations. (*SFIA Master Plan – Findings Related to the Approval of the SFIA Master Plan*, November 3, 1992, p. 49 to 51).

Topics:	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*	*Not Applicable*
5. TRANSPORTATION AND CIRCULATION— Would the project:					
a) Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume-to-capacity ratio on roads, or congestion at intersections)?			X		

Topics:	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*	*Not Applicable*
b) Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways (unless it is practical to achieve the standard through increased use of alternative transportation modes)?			X		
c) Result in a change in air traffic patterns, including either an increase in traffic levels, obstructions to flight, or a change in location, that results in substantial safety risks?				X	
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses?				X	
e) Result in inadequate emergency access?				X	
f) Result in inadequate parking capacity that could not be accommodated by alternative solutions?				X	
g) Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., conflict with policies promoting bus turnouts, bicycle racks, etc.), or cause a substantial increase in transit demand which cannot be accommodated by existing or proposed transit capacity or alternative travel modes?				X	

Transportation impacts of the SFIA Master Plan were analyzed on pp. 125 to 152 and pp.265 to 330 of the FEIR. Increases in traffic, changes in circulation patterns, demand on transit, and parking demand were analyzed. The delay in implementing the T2 and T1 projects presents changes to Highway 101 traffic volumes from those forecasts in the FEIR. In addition, mitigation measures such as that for Transportation System Management (TSM) to encourage vehicular trip reductions to the Airport and the construction of the Airport BART station have substantially increased alternative transportation usage at the Airport. The Master Plan traffic improvements that have been implemented by the Airport are discussed further in the Project Analysis section of this Addendum (see pp. 10 to 13). As a result of successful TSM measures, no substantial new traffic, circulation or parking impacts would result from the T2 and T1 projects, beyond those identified in the FEIR.

The FEIR found that the transportation impacts of the Master Plan projects would contribute to cumulative traffic increases on US Highway 101 in the vicinity of the Airport. However, the project's transportation impacts have been avoided or substantially lessened to the maximum extent possible by the implementation of mitigation measures as adopted by the Airport Commission in the *SFIA Final Mitigation Monitoring Program*. To the extent that these mitigation measures do not avoid or substantially lessen the transportation impacts of the master plan construction projects, the Airport Commission made the finding that the environmental, economic, social benefits of the Master Plan project would override the remaining impacts related to transportation and circulation, as stated fully in the Airport Commissions adoption of the Statement of Overriding Considerations. (*SFIA Master Plan – Findings Related to the Approval of the SFIA Master Plan*, November 3, 1992, p. 28 to 34).

Topics:	***Potentially Significant Impact***	***Less Than Significant with Mitigation Incorporated***	***Less Than Significant Impact***	***No Impact***	***Not Applicable***
6. NOISE—Would the project:					
a) Result in exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?			X		
b) Result in exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?			X		
c) Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?			X		
d) Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?		X			
e) For a project located within an airport land use plan area, or, where such a plan has not been adopted, in an area within two miles of a public airport or public use airport, would the project expose people residing or working in the area to excessive noise levels?			X		
f) For a project located in the vicinity of a private airstrip, would the project expose people residing or working					X

Topics:	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*	*Not Applicable*
in the project area to excessive noise levels?					
g) Be substantially affected by existing noise levels?			X		

Noise impacts resulting from the SFIA Master Plan were analyzed on pp. 153 to 170 and pp. 331 to 352 of the FEIR. The potential construction or long-term traffic noise impacts of the proposed T2 and T1 Master Plan projects would not change substantially from the T2 and T1 Master Plan projects as described and analyzed in the FEIR. Specific noise mitigation measures were adopted in the Final Mitigation Program for the FEIR. Those mitigation measures would be implemented for the proposed T2 and T1 projects.

Construction noise impacts are described in the FEIR beginning on p. 331. Typical noise levels for construction activities and the distances of various noise contours from the construction site were presented on p. 332. The FEIR identified the Airport Hilton (since demolished in 1998), the Lomita Park Elementary School, the Lomita Park residential neighborhood, and other Millbrae neighborhoods as sensitive noise receptors. The FEIR concluded that "the [Master Plan expansion] project would have a temporary, although significant effect on sensitive receptors during construction" and that this would be a significant unavoidable impact. Noise impacts on Millbrae neighborhoods that could be affected were analyzed in the FEIR, and the proposed T2 and T1 construction activities would be within the same general scope of activities previously considered and analyzed.

As part of the approval of the SFIA Master Plan, the Airport adopted several mitigation measures related to construction noise impacts, including:

- Implementing noise reduction measures for construction equipment (e.g., muffle and shield intake and shrouds);
- Predrillling holes for piles to maximum feasible depth to minimize noise and vibration from pile driving; and
- Require the general contractor to consider construction of barriers around the site (if such barriers would reduce noise level by 5 dBA or more) and to locate stationary equipment in pit areas or excavated areas to serve as noise barriers.

These measures would be implemented, as applicable, for the T2 and T1 Master Plan projects.

The FEIR analyzed potential long-term impacts related to surface traffic and construction-related noise. The changes to the proposed T2 and T1 projects from that analyzed in the FEIR would not result in substantial changes to the noise impact analysis in the FEIR. However, there have been substantial improvements to the Airport's noise exposure when comparing the 1990 and 1996 aircraft noise contours with the current noise contours (2007). In cooperation with the FAA, airlines, and local communities, the Airport's Aircraft Noise Abatement Office has implemented a number of successful programs that have resulted in a significant reduction in aircraft overflight noise on neighboring communities, as well reduced the population and households within the 65+ CNEL noise contour. These noise improvements are discussed on pp. 17 to 18 of this EIR Addendum.

The Airport Commission, when approving the Master Plan Program and certifying the FEIR in November 3, 1992, made the CEQA finding that the project impacts related to construction would be avoided or substantially lessened by the implementation of the adopted Final Mitigation Plan. The mitigation measures specifically for noise impacts would reduce the impact of the master plan projects because the measures would employ a wide array of equipment specifications, physical barriers, construction methods and scheduling programs that are designed to limit noise impacts on potentially sensitive areas to the maximum extent feasible. To the extent that these mitigation measures do not avoid or substantially lessen the impacts of master plan construction noise, the Airport Commission made the finding that the environmental, economic, and social benefits of the Master Plan project would override the remaining impacts related to construction noise, as stated fully in the Airport Commissions adoption of the Statement of Overriding Considerations. (*SFIA Master Plan – Findings Related to the Approval of the SFIA Master Plan*, November 3, 1992, p. 48 to 49).

Topics:	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*	*Not Applicable*
7. AIR QUALITY Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. **Would the project:**					
a) Conflict with or obstruct implementation of the applicable air quality plan?				X	
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?				X	
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal, state, or regional ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?				X	
d) Expose sensitive receptors to substantial pollutant concentrations?				X	
e) Create objectionable odors affecting a substantial number of people?				X	

Air quality impacts of the SFIA Master Plan were analyzed on pp. 171 to 177 and pp. 353 to 365, in the FEIR. The FEIR found that project-related surface traffic would contribute to existing exceedances of roadside CO concentrations and would likely lead to an increase in the frequency of standards violations in the project area. The FEIR also found that the project would contribute more than one percent of transportation-related emissions resulting from development in San Mateo County, and would create emissions that would exceed BAAQMD thresholds. The range of construction-related impacts was analyzed in the FEIR on p. 353. The construction-related emissions for the proposed T2 and T1 projects are expected to remain within the envelope of impacts discussed in the FEIR, because the scale of construction of the currently proposed projects are similar in size and scope as the two projects described and analyzed in the FEIR.

The overall vehicular activity under the current T2 and T1 master plan projects would remain within the general envelope of vehicular trips and associated increases in air pollution as discussed in the FEIR. However, as discussed on p. 14 of this Addendum, the Airport has administered an expansive TSM program to reduce employee and passenger traffic trips to the Airport. Approximately 40% of employee trips to the Airport are on high occupancy modes of transportation. In addition, AirTrain, the Master Plan people-mover project, has significantly reduced terminal roadway congestion by replacing approximately 200,000 annual vehicle trips (i.e., employee shuttle buses, parking shuttles, etc). In addition, the SFO-BART extension has a monthly ridership of approximately 240,000 passengers and employees at the Airport in 2007. These improvements have resulted in an overall reduction in the level of criteria emissions such that the Master Plan Environmental Assessment prepared for the FAA's NEPA purposes, resulted in a de minimus general conformity determination accepted by the BAAQMD (*SFO Master Plan EA/FONSI*, October 1998).

The FEIR found air quality impacts were potentially significant impacts. However, the project impacts relating to air quality have been avoided or substantially lessened to the maximum extent possible, by the implementation of mitigation measures as adopted by the Airport Commission in the *SFIA Final Mitigation Monitoring Program*. To the extent that these mitigation measures do not avoid or substantially lessen the impacts of the master plan construction projects on cultural resources, the Airport Commission made the finding that the environmental, economic, social benefits of the Master Plan project would override the remaining impacts related to air quality, as stated fully in the Airport Commissions adoption of the Statement of Overriding Considerations. (*SFIA Master Plan – Findings Related to the Approval of the SFIA Master Plan*, November 3, 1992, p. 57 to 58).

Topics:	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*	*Not Applicable*
8. WIND AND SHADOW—Would the project:					
a) Alter wind in a manner that substantially affects public areas?				X	
b) Create new shadow in a manner that substantially affects outdoor recreation facilities or other public areas?				X	

Wind and shadow impacts were not analyzed in the FEIR because it was determined that the Master Plan would not have any significant wind or shadow impacts on public areas (see FEIR Volume III, Appendices, Appendix A, Initial Study, p. A.9). The proposed T2 and T1 Master Plan projects would not result in any new impacts with respect to wind or shadow effects that would require consideration in this EIR Addendum.

Topics:	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*	*Not Applicable*
9. RECREATION—Would the project:					
a) Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facilities would occur or be accelerated?				X	
b) Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?				X	
c) Physically degrade existing recreational resources?				X	

The initial study for the FEIR indicated that there would be not be any substantial increase in demand on schools, recreation or other public facilities resulting from the Master Plan projects (Initial Study, FEIR Vol III., p.A.9). No further environmental analyses for recreational impacts were conducted in the FEIR.

Topics:	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*	*Not Applicable*
10. UTILITIES AND SERVICE SYSTEMS—Would the project:					
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?				X	
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?				X	

Topics:	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*	*Not Applicable*
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?				X	
d) Have sufficient water supply available to serve the project from existing entitlements and resources, or require new or expanded water supply resources or entitlements?				X	
e) Result in a determination by the wastewater treatment provider that would serve the project that it has inadequate capacity to serve the project's projected demand in addition to the provider's existing commitments?				X	
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?				X	
g) Comply with federal, state, and local statutes and regulations related to solid waste?				X	

Utilities and services setting and impacts of the SFIA Master Plan were analyzed on pp. 232 to 236 and pp. 400 to 404, of the FEIR. The current T2 and T1 projects as described in this EIR Addendum, are similar in size and scope to the projects analyzed in the FEIR, and would serve a similar number of annual forecast passengers and aircraft operations. Therefore, no increase in demand for water, sewer service or solid waste disposal beyond that evaluated in the FEIR would be required.

Topics:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact	Not Applicable
11. PUBLIC SERVICES— Would the project:					
a) Result in substantial adverse physical impacts associated with the provision of, or the need for, new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any public services such as fire protection, police protection, schools, parks, or other services?				X	

Public services setting and impacts of the SFIA Master Plan were analyzed on pp. 237 to 241 and pp. 405 to 406, of the FEIR. The current T2 and T1 projects, as described in this FEIR Addendum, are similar in size and scope to the projects analyzed in the FEIR, and would serve the similar a number of annual forecast passengers and aircraft operations. Therefore, no increase in demand for public safety and fire protection beyond that evaluated in the FEIR would be required. For the same reasons, the currently proposed T2 and T1 projects would not increase demand for schools, recreation, or other public facilities beyond what was previously analyzed in the FEIR.

Topics:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact	Not Applicable
12. BIOLOGICAL RESOURCES— Would the project:					
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?				X	
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and				X	

Topics:	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*	*Not Applicable*
Game or U.S. Fish and Wildlife Service?					
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?				X	
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?				X	
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?				X	
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?				X	

Biological impacts of the SFIA Master Plan were not analyzed in the FEIR because it was determined that the Master Plan would not have any significant impacts on plants and wildlife or their habitat (see FEIR Volume III, Appendices, Appendix A, Initial Study, pp. A.9 to A.10). The proposed T2 and T1 projects are located on paved areas of the terminal area complex and would not pose new impacts on plants and wildlife or their habitat.

Topics:	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*	*Not Applicable*
13. GEOLOGY AND SOILS— Would the project:					
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or				X	

Topics:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Not Applicable
death involving:					
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? (Refer to Division of Mines and Geology Special Publication 42.)				X	
ii) Strong seismic ground shaking?				X	
iii) Seismic-related ground failure, including liquefaction?				X	
iv) Landslides?				X	
b) Result in substantial soil erosion or the loss of topsoil?				X	
c) Be located on geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?				X	
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code, creating substantial risks to life or property?				X	
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?					X
f) Change substantially the topography or any unique geologic or physical features of the site?				X	

Geological impacts of the SFIA Master Plan were analyzed on pp. 192 to 199 and pp. 374 to 379 of the FEIR. The impact analysis explored issues related to geological and soil conditions and facility design, excavation, construction-related erosion, and seismic hazards. The Final Mitigation Program for the FEIR includes specific construction-related geotechnical measures that would be implemented for master plan projects such as the International Terminal Building and the T2 and T1 projects. These measures would also apply to the proposed T2 renovation and T1 redevelopment projects.

The FEIR found impacts on geology were potentially significant impacts. However, the project impacts relating to geology have been avoided or substantially lessened by the implementation of mitigation measures as adopted by the Airport Commission in the *SFIA Final Mitigation Monitoring Program*, which reduce the risk of erosion of exposed soil during construction and dewatering activities, to the maximum extent possible. To the extent that these mitigation measures do not avoid or substantially lessen the impacts of geology on the master plan construction projects, the Airport Commission made the finding that the environmental, economic, and social benefits of the Master Plan project would override the remaining impacts related to geology, as stated fully in the Airport Commissions adoption of the Statement of Overriding Considerations (*SFIA Master Plan – Findings Related to the Approval of the SFIA Master Plan*, November 3, 1992, p. 51 to 52).

Topics:	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*	*Not Applicable*
14. HYDROLOGY AND WATER QUALITY—Would the project:					
a) Violate any water quality standards or waste discharge requirements?				X	
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?				X	
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion of siltation on- or off-site?				X	
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or off-site?				X	

Topics:	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*	*Not Applicable*
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?				X	
f) Otherwise substantially degrade water quality?				X	
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other authoritative flood hazard delineation map?					X
h) Place within a 100-year flood hazard area structures that would impede or redirect flood flows?					X
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?				X	
j) Expose people or structures to a significant risk of loss, injury or death involving inundation by seiche, tsunami, or mudflow?				X	

As stated in the initial study for the FEIR, *"The water table in the airport area is approximately five feet above sea level in winter months and drops several feet during the drier summer months. The water table has posed a problem for previous construction activities at SFIA. However, proper construction methods and dewatering of the construction site have permitted previous construction activities to proceed without affecting surrounding structures. Therefore, issues related to SFIA Master Plan Facility Construction will not be addressed in the EIR. Potential contamination and its effect on water quality will be analyzed in the EIR."* (FEIR Volume III, Appendices, Appendix A, *Initial Study*, pp. A.12).

Impacts on the SFIA Master Plan projects related to the high water table in the vicinity of the Airport were generally analyzed on pp. 374 to 376 of the FEIR. Potential for groundwater contamination was analyzed as part of the Hazardous Materials section of the FEIR, on pp. 201 to 227 and pp. 381 to 393. The potential for erosion impacts was analyzed as part of the Geology and Seismicity section of the FEIR, on pp. 192 to 199 and pp. 374 to 379. The proposed T2 and T1 projects would incorporate mitigation measures for dewatering, excavation depth limitations, erosion control plans, and groundwater testing, as described in the Master Plan Final Mitigation Program for the FEIR, as applicable.

Topics:	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*	*Not Applicable*
15. HAZARDS AND HAZARDOUS MATERIALS Would the project:					
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?				X	
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?			X		
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?				x	
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?				X	
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?			X		
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?			X		
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?				X	

Topics:	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*	*Not Applicable*
h) Expose people or structures to a significant risk of loss, injury or death involving fires?			X		

Hazardous materials impacts of the SFIA Master Plan were analyzed on pp. 201 to 227 and pp. 381 to 393 of the FEIR. Impacts related to development of the proposed T2 and T1 projects would be within the envelope of impacts already discussed in the FEIR. Therefore, no additional analysis is necessary. The proposed T2 and T1 projects would implement the site investigation and remediation measures contained in the Final Mitigation Program for the FEIR. The proposed project revisions would have no substantial effect on emergency response plans or result in substantial new fire hazards.

Topics:	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*	*Not Applicable*
16. MINERAL AND ENERGY RESOURCES—Would the project:					
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?					X
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?					X
c) Encourage activities which result in the use of large amounts of fuel, water, or energy, or use these in a wasteful manner?				X	

Energy impacts of the SFIA Master Plan were analyzed on pp. 178 to 182 and pp. 366 to 370 of the FEIR. Construction energy usage is discussed generally on p. 366. The energy impacts of the proposed T2 and T1 projects are considered to be within the envelope of impacts evaluated in the FEIR. The proposed T2 and T1 projects would not result in substantial increases in energy usage beyond that analyzed in the FEIR. In fact, the Airport is implementing energy conservation measures contained in the Final Mitigation Program and the Airport's Sustainability Program.

Topics:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Not Applicable
17. **AGRICULTURE RESOURCES** In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Department of Conservation as an optional model to use in assessing impacts on agriculture and farmland. **Would the project:**					
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance, as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?					X
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?					X
c) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland of Statewide Importance, to non-agricultural use?					X

There are no agricultural resources within the boundaries of the Airport. The FEIR did not address agricultural resource impacts. The proposed T2 and T1 projects are located within the existing environs of the Airport and would not pose any new substantial impacts for this topical environmental impact area.

iv. Mandatory Findings of Significance

Topics:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact	Not Applicable
18. **MANDATORY FINDINGS OF SIGNIFICANCE— Would the project:**					
a) Have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history					X

Topics:	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*	*Not Applicable*
or prehistory?					
b) Have impacts that would be individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.)					X
c) Have environmental effects that would cause substantial adverse effects on human beings, either directly or indirectly?					X

The mandatory findings of significance would relate to the decision to prepare an Environmental Impact Report or a Negative Declaration. This environmental checklist has been prepared in support of an EIR Addendum, which includes administrative findings regarding its adequacy and the need to prepare additional environmental documentation. These administrative findings are discussed on p. 19 of this EIR Addendum. Therefore, no further discussion of this topic is necessary.

VI. REFERENCES

Caltrans, District 4, Traffic Operations Web Page, www.dot.ca.gov/hq/traffops/saferesr/trafdata/.

SFIA, *San Francisco International Airport Final Draft Master Plan*, November 1989.

SFIA, *San Francisco International Airport Master Plan - Highway 101 Interchange Modifications and Roadway Improvements EIR Addendum*, January 26, 1996.

SFIA, *San Francisco International Airport Master Plan - Mitigation Monitoring Program*, November 3, 1992

SFIA, *San Francisco International Airport Master Plan FEIR – Final Revised Staff Report*, November 3, 1992

SFIA, *San Francisco International Airport Master Plan Final Environmental Impact Report, Vol. I to III*, May 28, 1992.

SFO Aircraft Noise Abatement Office, Bert Ganoung, Manager

SFO Bureau of Design and Construction, Edwin Leung, Senior Transportation Engineer

SFO Bureau of Design and Construction, Kathleen Swindler, Associate Transportation Engineer

SFO Bureau of Design and Construction, Ray Quesada, Project Manager

SFO Bureau of Design and Construction, Sam Mehta, Environmental Remediation and Cost Recovery Manager

SFO Bureau of Landside Operations, Elizabeth Mingle, Associate Transportation Planner

SFO Bureau of Planning and Environmental Affairs, Anna Fantoni – Senior Airport Planner

SFO, *2007 SFO Aircraft Noise Contour Map*, Noise Abatement Office.

SFO, *San Francisco International Airport – 2007 Environmental Sustainability Report*, June 2007.

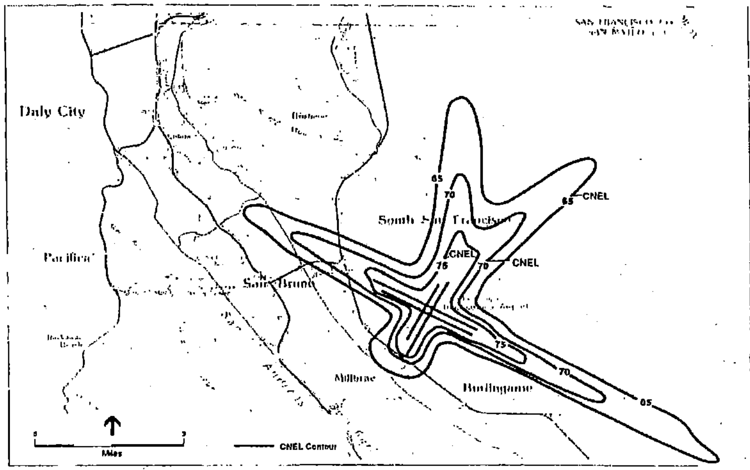
VII. APPENDICES

A. 1996, 2006, 2007 Noise Contours

B. 1996 and 2006 Traffic Counts for Highway 101 – Millbrae Avenue to SFO Ramps and SFO to I-380 Ramps

C. San Francisco International Airport - 2007 Environmental Sustainability Report, SFO, June 2007 (Separate Document)

Appendix A: 1996, 2006, 2007 Noise Contours



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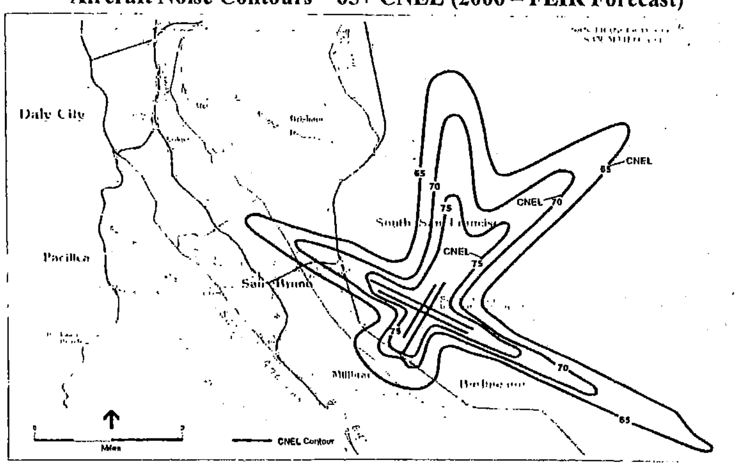
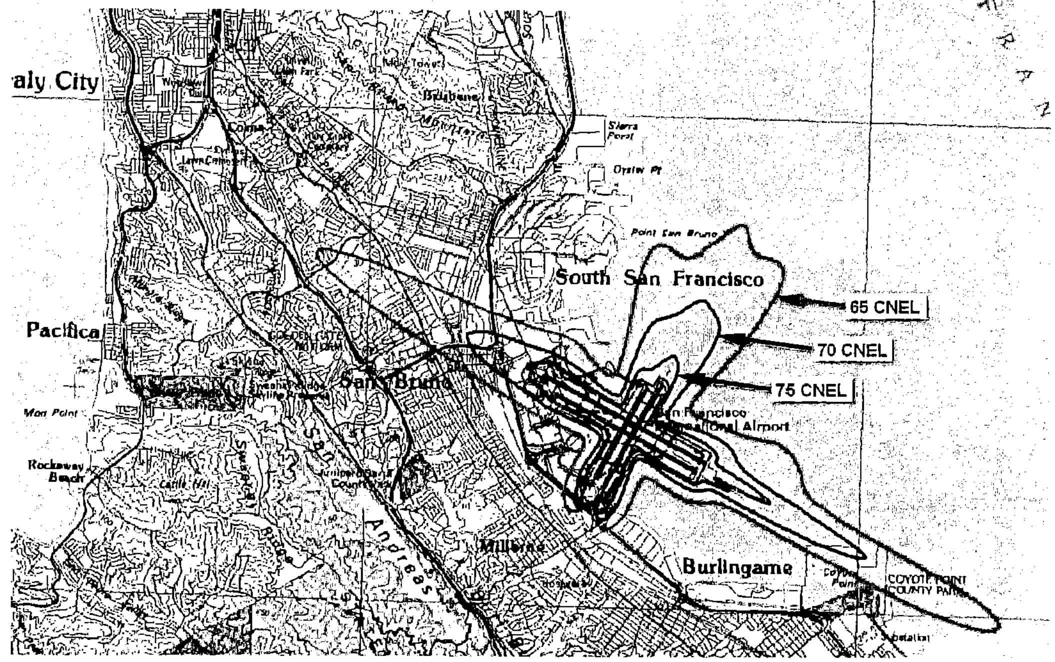
Aircraft Noise Contours – 65+ CNEL (2006 – FEIR Forecast)



Aircraft Noise Contours – 65+ CNEL (1996 – FEIR Forecast)

65+ CNEL (2007 – Actual)



Sources: (1) SFIA Airport Master Plan FEIR, May 28, 1992, (2) SFO Aircraft Noise Abatement Office

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Appendix B: 1996 and 2006 Traffic Counts for Highway 101 – Millbrae Avenue to SFO Ramps and SFO to I-380 Ramps

Airport Share of US 101 ADT

US 101 ADT - 2006	
Millbrae Exit to SFIA Ramps	**235,000**
SFIA Ramps to I-380	**240,000**

ADT, US 101 - South of SFO	**235,000**	**ADT, US 101 - North of SFO**	**240,000**
Terminal Area		**Terminal Area**	
SFO SB 101 On Ramp Dom.	8,714		
SFO NB 101 Off Ramp Arr. Dom.	4,431	SFO NB 101 On Ramp Dom.	12,364
SFO NB Off Ramp Dep. Dom.	5,107	SFO SB 101 Off Ramp Dom.	18,080
	18,252		**30,444**
SFO SB Out I.T.	3,430	SFO NB Out I.T.	5,038
SFO SB Out North Link	2,846	SFO NB Out North Link	3,370
SFO NB In I.T.	3,585	SFO SB In South Link	3,052
SFO NB In South Link	2,750	SFO SB In I.T.	5,600
	12,611		**17,060**
Total - Two Way	**30,863**	Total - Two Way	**47,504**

North & West Field Area	**Both Dir.**	**ADT - South of SFO (40%)**
Long-Term Parking	737	295
Rental Car Center	5,538	2,215
North Access Rd. Cargo Area	4,379	1,752
SB McDonnell Rd.	6,181	2,472
UAL Parking Lot	4,200	1,680
One Way	21,035	8,414
Two Way	**42,070**	**16,828**
South Field Area	**Both Dir.**	**ADT - South of SFO**
NB S. McDonnell Rd	2,000	800
One Way	2,000	800
Two Way	**4,000**	1,600

US 101 - South of SFO		**US 101 - North of SFO**	
SFO Ramps	**49,263**	SFO Ramps	**65,904**
US 101 ADT	**235,000**	NB US 101 ADT	**240,000**
SFO Share of SB US 101	**21%**	SFO Share of NB US 101	**27%**

US 101 - South + North of SFO	
SFO Ramps	**115,167**
NB/SB US 101 ADT	**475,000**
SFO Share	**24%**

Source: 2005 Airport Ramp Traffic Count Survey
Edwin Leung, Manager - Traffic Engineering, BDC 9/19/2007

US Highway 101 - Traffic Volumes for 1992, 1996, and 2006 (Actual)

1992 Highway 101 - Traffic Volumes

District	Route	County	Post Mile Prefix	Post Mile	Description	BackLeg Peak Hr	Peak Mo	AADT	AheadLeg Peak Hr	Peak Mo	AADT
4	101	SM		17.95	MILLBRAE, MILLBRAE AVENUE INTERCHANGE	17,700	216,000	205,000	17,200	217,000	207,000
4	101	SM		19.12	SAN FRANCISCO AIRPORT INTERCHANGE	17,200	217,000	207,000	16,500	221,000	211,000
4	101	SM	R	20.39	SAN BRUNO AVENUE INTERCHANGE						

1996 Highway 101 - Traffic Volumes

District	Route	County	Post Mile Prefix	Post Mile	Description	BackLeg Peak Hr	Peak Mo	AADT	AheadLeg Peak Hr	Peak Mo	AADT
4	101	SM		17.95	MILLBRAE, MILLBRAE AVENUE INTERCHANGE	16,400	237,000	232,000	21,300	270,000	257,000
4	101	SM		19.12	SAN FRANCISCO AIRPORT INTERCHANGE	21,300	270,000	257,000	20,100	269,000	257,000
4	101	SM	R	20.39	SAN BRUNO AVENUE INTERCHANGE						

2006 Highway 101 - Traffic Volumes

District	Route	County	Post Mile Prefix	Post Mile	Description	BackLeg Peak Hr	Peak Mo	AADT	AheadLeg Peak Hr	Peak Mo	AADT
4	101	SM		17.95	MILLBRAE, MILLBRAE AVENUE	15,700	234,000	225,000	16,200	244,000	235,000
4	101	SM		19.12	SAN FRANCISCO AIRPORT INTERCHANGE	16,200	244,000	235,000	16,400	250,000	240,000
4	101	SM	R	20.39	SAN BRUNO AVENUE INTERCHANGE						

Source: Caltrans, District 4, Traffic Operations Web Page,www.dot.ca.gov/hq/trafficops/saferesr/trafdata/

BOARD of SUPERVISORS

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July 10, 2014

File No. 140699

John Rahaim
Director
Planning Department
1650 Mission Street, 4th Floor
San Francisco, CA 94103

Dear Director Rahaim:

On June 24, 2014, the Air Port Commission introduced the following proposed legislation:

File No. 140699

Resolution adopting California Environmental Quality Act Findings related to the Terminal 1 Program at San Francisco International Airport.

If you have any additional comments or reports to be included with the file, please forward them to me at the Board of Supervisors, City Hall, Room 244, 1 Dr. Carlton B. Goodlett Place, San Francisco, CA 94102.

Angela Calvillo, Clerk of the Board

A. Ausberry

By: Andrea Ausberry, Assistant Clerk
Land Use & Economic Development Committee

Attachment

c: Scott Sanchez, Zoning Administrator
Sarah Jones, Environmental Review Officer
Aaron Starr, Legislative Affairs Manager
AnMarie Rodgers, Senior Policy Advisor
Joy Navarrete, Environmental Planning
Jeanie Poling, Environmental Planning

City and County of San Francisco
Department of City Planning

SAN FRANCISCO INTERNATIONAL AIRPORT MASTER PLAN
Final
Environmental Impact Report

86.638E
SCH #90030535

Volume I: Text

Draft EIR Publication Date: July 11, 1991
Draft EIR Public Hearing Dates:
August 27, 1991, 7:30 p.m., Clarion Hotel, Millbrae
August 29, 1991, 1:30 p.m. or later, City Hall, Room 282, San Francisco
October 17, 1991, 1:30 p.m. or later, City Hall, Room 282, San Francisco
Draft EIR Public Comment Period: July 11, 1991 to October 21, 1991
Final EIR Certification Date: May 28, 1992

● **CERTIFICATION MOTION**

File No.: 86.638E
San Francisco Airport EIR

SAN FRANCISCO

CITY PLANNING COMMISSION

MOTION NO. 13356

ADOPTING FINDINGS RELATED TO THE CERTIFICATION OF A FINAL ENVIRONMENTAL IMPACT REPORT FOR THE PROPOSED SAN FRANCISCO INTERNATIONAL AIRPORT MASTER PLAN.

MOVED, That the San Francisco City Planning Commission (hereinafter "Commission") hereby CERTIFIES the Final Environmental Impact Report identified as case file No. 86.638E, San Francisco International Airport Master Plan (hereinafter "Project") based upon the following findings:

1) The City and County of San Francisco, acting through the Department of City Planning (hereinafter "Department") fulfilled all procedural requirements of the California Environmental Quality Act (Cal. Pub. Res. Code Section 21000 et seq., hereinafter "CEQA"), the State CEQA Guidelines (Cal. Admin. Code Title 14, Section 15000 et. seq., (hereinafter "CEQA Guidelines") and Chapter 31 of the San Francisco Administrative Code (hereinafter "Chapter 31").

a. The Department determined that an EIR was required and provided public notice of that determination by publication in newspapers of general circulation on August 11, 1989.

b. On June 25, 1990, the Department issued a Notice of Preparation, circulated to interested individuals, to communities surrounding the San Francisco International Airport (hereinafter "SFIA") and through the State Clearinghouse.

b. On July 11, 1991, the Department published the Draft Environmental Impact Report (hereinafter "DEIR") and provided public notice in newspapers of general circulation in San Francisco and San Mateo Counties of the availability of the DEIR for public review and comment and of the date and time of the City Planning Commission public hearing on the DEIR; this notice was mailed to the Department's list of persons requesting such notice.

c. Notices of availability of the DEIR and of the date and time of the public hearing were posted near the project site by S.F. Airport staff on or about July 11, 1991.

d. On July 11-13, 1991 copies of the DEIR were mailed or otherwise delivered to a list of persons requesting it, to those noted on the distribution list in the DEIR, to adjacent property owners, and to government agencies, the latter both directly and through the State Clearinghouse. In addition, notices of availability of the DEIR were mailed to other persons and organizations noted on the distribution list in the DEIR.

e. Notice of Completion was filed with the State Secretary of Resources via the State Clearinghouse on July 15, 1991.

2) The Commission delegated to the Environmental Review Officer a noticed public hearing held in Millbrae on August 27, 1991, and held a duly advertised public hearing on said Draft Environmental Impact Report on August 29, 1991, continued to October 17, 1991, at which opportunity for public comment was given, and public comment was received on the DEIR. The period for acceptance of written comments ended October 21, 1991.

3) The Department prepared responses to comments on environmental issues received at the public hearings and in writing during the 102-day public review period for the DEIR, prepared revisions to the text of the DEIR in response to comments received or based on additional information that became available during the public review period, and corrected errors in the DEIR. This material was presented in a "Draft Summary of Comments and Responses," published on May 7, 1992, was distributed to the Commission and to all parties who commented on the DEIR, and was available to others upon request at Department offices.

4) A Final Environmental Impact Report has been prepared by the Department, consisting of the Draft Environmental Impact Report, any consultations and comments received during the review process, any additional information that became available, and the Summary of Comments and Responses all as required by law.

5) Project Environmental Impact Report files have been made available for review by the Commission and the public, and these files are part of the record before the Commission.

6) On May 28, 1992, the Commission reviewed and considered the Final Environmental Impact Report and found that the contents of said report and the procedures through which the Final Environmental Impact Report was prepared, publicized and reviewed comply with the provisions of CEQA, the CEQA Guidelines and Chapter 31.

7) The City Planning Commission hereby does find that the Final Environmental Impact Report concerning File No. 86.638E: San Francisco International Airport Master Plan is adequate, accurate and objective, and that the Summary of Comments and Responses contains no significant revisions to the Draft Environmental Impact Report, and hereby does CERTIFY THE COMPLETION of said Final Environmental Impact Report in compliance with CEQA and the CEQA Guidelines.

8) The Commission, in certifying the completion of said Final Environmental Impact Report, hereby does find that the project described in the Environmental Impact Report, without consideration or inclusion of mitigation measures described in the Final Environmental Impact Report as "Identified In this Report," will have the following significant environmental impacts:

a. Will have a project-specific significant effect on the environment by (1) causing levels of service to degrade to "E" or below at the following intersections: California Drive at Millbrae Avenue (a.m. and p.m. peak hours), Rollins Road at Millbrae Ave. (p.m. peak hour), Long-Term Parking Road and Road R-3 on SFIA property and at Holly Street at Ralston Ave (a.m. and p.m. peak hours); (2) causing levels of service to degrade to "E" or below on certain freeway ramps in the vicinity of SFIA; (3) causing levels of service to degrade to "E" or below on various sections of the freeways in the vicinity of SFIA; (4) causing increased noise levels at sensitive receptors such as schools during construction activities; (5) causing violations of particulate air quality standards due to dust production during construction; (6) contributing to increased frequency of violation of CO standards at certain nearby intersections (violations would occur at these locations without the project but would occur more frequently with the project and without extensive transportation mitigation); (7) causing air pollutant emissions that exceed

BAAQMD thresholds; (8) possibly causing impacts on subsurface cultural resources during construction; (9) causing sediment from dewatering (if any) and from other construction activities to enter storm drains and/or the Bay; and (10) causing soil to be temporarily exposed to erosion during construction; and (11) exposing construction workers, other Airport workers or the public to hazardous wastes if hazards are found in soils or groundwater in and around construction areas.

b. Will contribute to cumulative traffic increases on US 101 in the vicinity that would further reduce levels of service on some segments of the freeway, and will contribute to cumulative air quality impacts in San Mateo County and the Bay Area region.

Note that many of these environmental impacts could be mitigated to levels of insignificance by measures described in the Final EIR. The San Francisco Airports Commission, the decision maker for the Project, will consider whether or not to include these measures in its deliberations on the proposed project.

I hereby certify that the foregoing Motion was ADOPTED by the City Planning Commission at its regular meeting of May 28, 1992.

Linda Avery
Commission Secretary

AYES: Commissioners, Unobskey, Fung, Karasick, Levine, Lowenberg, and Smith

NOES: None

ABSENT: Commissioner Boldridge

ADOPTED: May 28, 1992

BWS:557/rlj

SAN FRANCISCO INTERNATIONAL AIRPORT
● FINAL EIR

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I. SUMMARY

A. PROJECT DESCRIPTION

The project evaluated in this Environmental Impact Report (EIR) is the proposed San Francisco International Airport (SFIA) *Final Draft Master Plan* (hereinafter referred to as the SFIA Master Plan), published in November, 1989. The proposed SFIA Master Plan is a two-phase physical/management design plan for airport landside facilities and circulation systems. Near-term SFIA Master Plan projects would be implemented from start-up through 1996. Long-term SFIA Master Plan projects would be implemented from 1997 through 2006.

SFIA is on the west shore of San Francisco Bay, about 13 miles south of San Francisco in unincorporated San Mateo County. SFIA is an agency of the City and County of San Francisco, and the Airport property is part of San Francisco's jurisdiction. The SFIA Master Plan Area (Project Area) comprises the 2,500-acre Airport complex, including runways, passenger terminals, support services, airline maintenance, air-freight facilities and over 550 acres of undeveloped land. Freeway access to SFIA is available via U.S. Highway 101 (US 101), U.S. Interstate Highway I-280 (I-280) and U.S. Interstate Highway I-380 (I-380).

Existing and proposed SFIA facilities, as categorized in the SFIA Master Plan, include terminals, airline support, airline maintenance, General Aviation, air freight, airport support, commercial, administration/office, transportation, miscellaneous, parking, roads, and airside (runways and taxiways).

Existing SFIA building space, excluding parking garages and utilities in buildings, totals about 8.2 million square feet. The 2.6-million-square-foot terminal complex includes six boarding piers and 80 jet aircraft gates, 48 of which can accommodate wide-body jets. Airline support functions (primarily catering, storage and warehousing) occupy about 81,800 square feet of building space; airline-maintenance facilities total approximately 3.9 million square feet; and air-freight functions occupy about 867,700 square feet of building space. General aviation functions total about 88,100 square feet; airport support functions, about 172,800 square feet; commercial facilities, about 234,000 square feet; and administration/office functions, about

126,100 square feet. The U.S. Coast Guard Air Station occupies approximately 88,400 square feet of building space.

Airport utility systems include aircraft fueling; airfield lighting; power distribution; natural gas and water supply; industrial waste collection and disposal; and storm drainage. Existing auto parking facilities at SFIA, including employee, rental car and short- and long-term public parking, total about 30,050 stalls. Roadways on SFIA property total about 18 miles.

According to SFIA Master Plan forecast and facility requirements analyses, demand for SFIA services (passenger, cargo and aircraft operations) would be constrained by inadequate landside facilities if SFIA Master Plan projects were not implemented. If not constrained, the number of annual passengers would, according to SFIA Master Plan forecasts, grow about 41 percent by 1996 and about 71 percent by 2006. International passenger traffic would grow more rapidly than domestic traffic, nearly doubling between 1990 and 2006. The SFIA Master Plan forecasts that, if not constrained, total cargo and mail tonnage would increase about 32 percent by 1996 and about 55 percent by 2006. To accommodate passenger and cargo demand, air carrier operations would also be expected to increase, by 24 percent under the near-term SFIA Master Plan and 36 percent under the total SFIA Master Plan. Larger capacity aircraft and higher load factors (proportion of available seats occupied) are among the factors expected to produce higher rates of growth in passenger counts than aircraft operations.

Proposed SFIA Master Plan projects were developed by the consulting firm of Daniel, Mann, Johnson, & Mendenhall (DMJM), using the forecast and requirements analyses prepared by Thompson Consultants International (TCI), under contract to the Airports Commission. Principal projects include: construction of a new international terminal and additional boarding areas and aircraft gates; construction of a Rental Car Garage / Ground Transportation Center and Automated People Mover (APM); consolidation and expansion of air cargo facilities; consolidation of airport administrative facilities; consolidation and expansion of airline support, maintenance and administrative facilities; modification and expansion of ground-vehicle parking and circulation systems; and development of additional hotel, commercial and airport support facilities. Airside facility (runway) changes are not included in the SFIA Master Plan except where necessary to accommodate other SFIA Master Plan projects. No runway extensions, relocations or additions are proposed as part of this project.

Total SFIA building area, excluding parking garages and utility structures, would increase by 31 percent under the near-term SFIA Master Plan (1990-1996) and by 35 percent under the total SFIA Master Plan (1990-2006). Approximately 1.4 million square feet of building space would be demolished and about 4.2 million square feet would be constructed by 2006, bringing total SFIA building area to approximately 11.1 million square feet. The greatest net growth would occur in the terminal complex (about 1.5 million net new square feet) and air freight facilities (about 785,000 net new square feet). Between 22 and 26 aircraft gates would be added to the terminal complex (Boarding Areas A and G) by 1996, and several more gates would be added to the reconfigured Boarding Area B between 1997 and 2006. Over 780,000 square feet of existing SFIA facility area would be remodeled by 2006. About 3.6 million square feet of parking garages and transportation facilities would be constructed and about 7,340 net new parking stalls would be added by 2006 under the SFIA Master Plan.

B. MAIN ENVIRONMENTAL EFFECTS

LAND USE AND PLANS

The SFIA Master Plan would not alter land use types at the airport, but would intensify, reconfigure and/or consolidate existing uses. Runway expansions and reconfigurations are not included in the SFIA Master Plan; therefore, no runway land use impacts would result directly from near-term or long-term SFIA Master Plan projects. Several vacant parcels would be developed in airport uses, but the 180-acre West-of-Bayshore site, an identified habitat of the San Francisco garter snake, an endangered species, and the red-legged frog, a candidate for the endangered species list, would not be affected by the SFIA Master Plan. Total land area under the airport's jurisdiction would not increase, nor would additional land area be created by filling of tidelands owned by SFIA.

The cities closest to the airport and partially within the 65 dBA, CNEL contour (see definition in Section III.B, Noise) (i.e., Brisbane, South San Francisco, San Bruno, Millbrae and Burlingame) are affected by airport-related safety and noise regulations. However, since aircraft approach zones and flight paths would not be altered by the SFIA Master Plan, Airport Land Use Commission and Federal Aviation Administration (FAA) building-height and clear-zone regulations currently affecting parts of these cities would not change as a result of SFIA Master Plan implementation.

The SFIA Master Plan calls for the extension of North Access Road and alteration or construction of a multiuse dock facility. Both projects would require San Francisco Bay Conservation and Development Commission (BCDC) approval.

There are a number of plans by various local, regional, and state agencies that address the provision of facilities to accommodate regional air transportation demand. Most of those plans were developed on the basis of forecasts of regional transportation demand, assessments of the capabilities of facilities in the Bay Area (airports and the facilities for other modes of transportation) to accommodate the forecast demand, and various recommended means of meeting demand (such as facility expansion). Those plans do not include the same recommended means for meeting forecast demand. The *California Aviation System Plan* (*CASP*), forecasts expansion at SFIA to about 52,770,000 passengers in 2006 (three percent over the SFIA Master Plan). The Federal Aviation Administration (FAA) forecasts indicate that SFIA expansion would be less than predicted in the SFIA Master Plan.

TRANSPORTATION

This section takes into consideration all future ground travel related to the projected airside and landside operations at SFIA, with special emphasis on the off-site transportation impacts of those operations. The EIR analysis, which makes use of surveyed traffic, pedestrian, parking and transit data collected in the SFIA vicinity, considers the projected increases in air passengers, freight tonnage and SFIA employment.

The EIR analysis indicates the following impacts of the proposed SFIA expansion:

Vehicular traffic would increase from approximately 110,700 daily, 5,100 a.m. peak hour and 5,530 p.m.-peak-hour trips in 1990 to 151,000 daily, 6,950 a.m.-peak-hour and 7,550 p.m.-peak-hour trips in 1996; and 179,700 daily, 8,270 a.m.-peak-hour and 8,990 p.m.-peak-hour trips in 2006. If the Bay Area Rapid Transit (BART) system (or other transit service) is extended to SFIA by 2006, future vehicular traffic would not increase as much. With a mass transit extension to SFIA, it is projected that SFIA would generate 168,500 daily, 7,750 a.m.-peak-hour and 8,430 p.m.-peak-hour vehicle trips in 2006.

Peak-day parking demand would increase from about 23,800 spaces in 1990 to about 35,200 spaces in 1996 and about 42,200 spaces in 2006. There would be a surplus of spaces in 1996. A peak-day deficit of about 4,400 spaces would exist in 2006.

Given the improvements programmed by Caltrans, area local governments and the Airports Commission, the project proposed for 1996 would cause El Camino Real (SR 82) at Millbrae Avenue and Rollins Road at Millbrae Avenue to worsen below level of service (LOS) E during the a.m. peak hour. The project alone would not cause p.m.-peak-hour conditions to worsen below LOS D. Four intersections (either in the a.m. or p.m.) would operate below LOS D in 1996 even without the project. LOS at these intersections would not worsen as a result of the project.

The project proposed for 2006 would cause no study intersections to worsen further during the a.m. peak hour, except for South Airport Boulevard at North Access Road South, which would degrade from LOS A to LOS B; and California Drive at Millbrae Avenue, for which minor street turns into the major street would degrade from LOS D to LOS E. In the p.m. peak hour, the Rollins Road at Millbrae Avenue intersection would worsen below LOS D; the intersections of South Airport Boulevard with North Access Road South and North would degrade from LOS A to LOS C and B, respectively; San Mateo Avenue at San Bruno Avenue would degrade from LOS B to C; at California Drive and Millbrae Avenue, minor street turns into the major street would degrade from LOS D to LOS E; and at Long-Term Parking and Road R-3, minor street turns into the major street would degrade from LOS C to LOS E. Three intersections (either in the a.m. or p.m.) will operate below LOS D in 2006 even without the project. LOS at these intersections would not worsen as a result of the project.

The proposed project would cause further deterioration of levels of service on the surrounding freeway network, and decreases in levels of service on the arterial street network in surrounding communities.

The proposed project would affect existing transit and shuttle services to SFIA such that both systems would require expansion to serve the increased demand.

NOISE

Construction activities would temporarily increase noise levels in the vicinity of construction sites. Nearby noise-sensitive areas include residential land uses, schools and hospitals. During project construction, exterior noise levels at all these noise sensitive areas would exceed San Francisco Noise Ordinance standards.

In 1996, surface traffic due to the project would increase noise levels on local roads by a maximum of one decibel over 1996 baseline conditions. In 2006, surface traffic would increase noise levels by a maximum of one decibel over 2006 baseline conditions.

Noise levels from aircraft operations at SFIA are forecast to decrease from 1990 through 2006. Noise levels and single-event noise at almost all remote monitoring sites and study locations are forecast to decrease. These improvements in the future noise environment would occur despite increases in aircraft activity at SFIA forecast for the project, because of the increased use of newer, quieter aircraft.

Noise levels would also decrease in the future without the proposed project. The increase in aviation activity allowed by the project would have virtually no effect on overall noise levels because the additional flights would be performed by the quieter aircraft. The increase would contribute to single-event noise in a noticeable way although each noise event would be somewhat quieter than at present.

Even with the forecast decreases in aircraft noise levels, there would still be people within the 65dBA, CNEL contour in 1996 and 2006, who would continue to be adversely affected by the operation of the Airport. The number of people exposed to aircraft noise of 65 dBA, CNEL and above is forecast to decrease from 14,980 in 1990 to 6,600 in 2006.

AIR QUALITY

Project construction would temporarily affect local air quality in the project area through dust emissions generated by vehicle movement, building demolition, and other construction-related activities. Land clearing, excavation, and grading activities would generate particulate matter in the form of fugitive dust during the construction period.

Project-related surface traffic would add to cumulative regional pollutant emissions. Existing roadside CO concentrations at many intersections examined already violate State CO standards. Project-related surface traffic would further contribute to these violations, but would not cause any new violations at intersections examined. However, project-generated vehicular traffic would probably lead to an increase in the frequency of standards violations in the project area over future CO levels without the project. Project-related traffic would contribute more than one percent of transportation-related emissions resulting from development in the County, based on the BAAQMD Emissions Summary Report.

Emissions from aircraft and total Airport operations would increase in the future. In 1996, total SFIA emissions of CO, nitrogen oxides, hydrocarbons and fine particulate matter would make up 3.8, 4.7, 3.8 and 1.2 percent, respectively, of the countywide emissions. In 2006, these total SFIA emissions of CO, nitrogen oxides, hydrocarbons and fine particulate matter would increase to 11.7, 9.8, 11.6 and 4.4 percent, respectively, of the countywide emissions.

ENERGY

Electricity

SFIA has recently requested an additional 15 MW in peak power capacity by 1994 and another additional 10 MW by 2006. This increased demand would necessitate expansion of an existing PG&E substation.

Gas

The existing natural gas distribution system was found to be adequate. Consumption of natural gas at SFIA is not expected to increase, so additional enlargement of the natural gas distribution system would not be required and was not included as part of the SFIA Master Plan.

Aviation Fuel Supply

On a proportional basis, aviation fuel consumption at SFIA would increase from 50,000 to about 66,000 barrels a day in the near-term and to about 71,000 barrels a day in the long-term. SFIA's existing fuel distribution system would be capable of handling the increase in demand, though modifications and improvements could be necessary to enhance system efficiency.

CULTURAL RESOURCES

SFIA Master Plan construction and demolition projects would have no discernible effect on known prehistoric resources and would have little potential to affect historic resources. It is possible, but unlikely, that unsuspected archaeological deposits could be discovered by excavations associated with SFIA Master Plan projects that would extend beneath the artificial fill that covers the site. The thickness of the artificial fill at SFIA varies widely across the site, and on average ranges from about 8 to 16 feet. No roadways, mission outposts or adobe structures from the Spanish or Mexican periods are known to have existed on, or immediately adjacent to, the project area. However, the Jose Sanchez family did construct a levee and wharf southeast of present day Millbrae Avenue, just outside the southern land boundary of Airport property. During the early American period, shrimp and oyster industry activities and cement factory operations took place in the vicinity of the project site. At present, evidence exists of shrimp camp sites, oyster industry structures or cement company dredging equipment near or within the project area. These cultural resources would not be impacted by project implementation.

Pre-1946 airport structures that would be affected by SFIA Master Plan projects are representative of common building types found throughout the state and County. These buildings lack architectural distinction, are not the work of a master architect and are not associated with important people or significant historical events. The remaining SFIA buildings are post-1946 structures, most of which were constructed over the past three decades and appear to have no historical importance.

GEOLOGY AND SEISMICITY

Development at SFIA would be subject to ground settlement that could affect the structural integrity of buildings and utility lines. Construction activities would present hazards from potential underground pipe ruptures.

Development at SFIA would be subject to strong ground shaking during future moderate to large earthquakes in the San Francisco Bay Area. Portions of the site may be subject to ground failure during strong ground shaking. Development at SFIA would generally replace older structures that are in poor condition with modern, more seismically resistant structures. This should reduce the likelihood of structural damage due to strong ground shaking in future earthquakes. However, SFIA Master Plan projects would increase the number of employees, passengers and visitors at the airport who could be at risk of injury due to non-structural hazards in future earthquakes.

The proposed use of deep pile foundations would reduce or eliminate the impacts of settlement and seismically induced ground failure on buildings.

HAZARDS

Implementation of the SFIA Master Plan would affect hazardous-material handling during construction of new facilities and overall airport operations. The SFIA Master Plan proposes construction of new facilities and demolition of existing facilities in areas of known contamination. Construction activities could uncover hazardous materials in the soil or groundwater. Most of the known contamination at SFIA is the result of past petroleum fuel leaks. Some buildings planned for demolition are known to contain asbestos and may have PCB-containing equipment. Potential impacts pertaining to the health and safety of workers and the public that may result could be mitigated by site investigation and remediation of contaminated areas prior to excavation, dewatering or construction activities. In addition, buildings would be inspected for hazardous materials before demolition or renovation begins. PCBs, asbestos or other hazardous materials must be removed prior to demolition in accordance with applicable regulations.

Expansion of the Airport to accommodate increased Airport activity may result in an increase in hazardous material use and hazardous waste production. Hazardous-material use at line-maintenance and Airport-owned facilities is limited and any increase would have minimal effect if safe handling practices are continued. As no expansion is planned for the only "major" maintenance facility at SFIA, the United Airlines Maintenance Center, increases in hazardous-material use at this facility would not be expected. The industrial waste treatment facility at SFIA has the capacity to treat increased wastewater flow and higher contaminant concentrations than would result from SFIA Master Plan implementation. Increases in hazardous wastes produced may be lessened by recycling and treatment efforts, but may inevitably contribute to the shortage of landfill space for these wastes.

EMPLOYMENT AND HOUSING

Employment at SFIA under the proposed master plan is expected to increase from about 33,400 employees in 1990 to about 38,000 in 1996 and to about 42,300 employees in 2006. The majority of the new employees would be flight-crew and passenger-service personnel employed by the airlines.

Construction-related employment is expected to average 1,400 jobs between 1990 and 1996, peaking at about 2,400 jobs in 1993. Between 1997 and 2006, annual construction-related employment would fall to an average of about 200 jobs.

Employment growth associated with the near-term SFIA Master Plan (1990-1996) would generate demand for approximately 3,460 dwelling units. About 1,220 of these units would be needed in San Mateo County, about 960 in San Francisco and about 420 in Alameda County. Total SFIA Master Plan employment growth would generate demand for approximately 6,850 dwelling units by 2006. About 2,450 of these units would be needed in San Mateo County. About 1,940 units in San Francisco and about 810 in Alameda County would be needed.

UTILITIES

Water

The SFIA Master Plan would generate an additional near-term demand of about 0.42 million gallons per day (mgd) of water and an additional long-term demand of about 0.27 mgd over the near-term increases. The San Francisco Water Department projects a long-term demand of about 0.2 mgd less than the SFIA Master Plan and suggests that water conservation methods be adopted. Additional water infrastructure would not be required to service the site.

Sanitary Sewage

On the basis of 100 percent water demand, the existing SFIA sanitary sewer plant (present capacity 2.2 mgd) could accommodate the near-term demand increase of 25 percent. To meet the long-term demand of 2.4 mgd, SFIA sanitary sewer capacity would need to be increased. SFIA plans to add 0.8 mgd of capacity, which would raise the capacity of the plant to 3.0 mgd. The sanitary sewer system would then be able to meet the 2.4 mgd demand projected by the SFIA Master Plan for 2006.

Industrial Wastes

Currently, the SFIA industrial wastewater treatment plant has a capacity of 1.65 mgd and operates between 0.8 and 1.2 mgd. Proposed SFIA Master Plan projects are not expected to contribute more than five percent additional demand to the industrial-waste-collection system. The plant would not require additional capacity to accommodate SFIA Master Plan projects.

Solid Waste

San Mateo County annually generates one million tons of solid waste. SFIA's major activity centers contribute approximately 18,250 to 36,500 tons of the one million tons annual total for the County. The expansion area of the existing Ox Mountain landfill would be the likely disposal site for the solid waste generated at the Airport during the SFIA Master Plan period. However, increases in solid-waste generation would still further diminish the finite resource of landfill space.

PUBLIC SERVICES

Crash/Fire/Rescue

Projected growth in terminal passenger traffic could generate additional requests for SFIA Fire Department Services and could result in increased response times. Proposed SFIA Master Plan demolition and construction projects and increased traffic congestion in the passenger terminal area could hinder the SFIA Fire Department's ability to respond to a major emergency event.

Police

Projected growth in terminal passenger traffic could generate additional request for SFIA police services. Unless staffing levels were raised proportionately, SFIA police response times could increase as a result of SFIA Master Plan projects.

AVIATION SAFETY

Increasing operations at SFIA have the potential to approach and possibly exceed the capacity of the Airport. SFIA Master Plan projections would cause the hourly capacity of SFIA to be exceeded for certain hours of the day in both the near-term and long-term.

FAA regulations and the Air Traffic Control System limit the level of activity that can occur safely in the airspace of any airport. Therefore, if operations exceed the capacity of the Airport for a number of hours during the day, flights would be delayed.

The existing accident rate for SFIA in 1990 would be 0.83 accidents per year based on the National Transportation Safety Board accident rate average. The Airport is actually operating at an accident rate below this level; in 20 years of operation, five aircraft accidents have taken place at SFIA.

Implementation of the near-term SFIA Master Plan would increase the estimated accident rate to 0.97 per year using the National Transportation Safety Board accident rate average. In the long term, the estimated accident rate would increase to 1.0, using the same standard. Based on SFIA's existing record, the accident rate would be expected to be lower than this, but would still increase.

GROWTH-INDUCING IMPACTS

Increases in passenger volumes could induce pressure for hotel, restaurant and other travel-serving development, while increases in SFIA employment could stimulate demand for additional housing and public services in Airport environs cities. Ground transportation and parking needs of both employees and passengers could also induce growth of roadway, parking and transit land uses in Airport environs cities. However, while existing land uses could intensify, Airport-induced development would not likely divide or disrupt established communities, nor would new types of land uses likely be generated. Except in cities closest to the Airport (South San Francisco, San Bruno, Millbrae and Burlingame), development types induced by SFIA would not likely be distinguishable from background development although intensity and/or density could increase.

C. <u>MITIGATION MEASURES</u>

TRANSPORTATION

The major mitigation measures that are part of the SFIA Master Plan include:

- Building a new Ground Transportation Center, served by a people mover that distributes air passengers and employees to the terminal buildings;

- Adding parking in both lots and structures; and
- Widening two SFIA roads to four lanes in the immediate vicinity of SFIA.

Additional measures that are identified to address project and cumulative impacts include:

- Establishing a Transportation System Management (TSM) Program for SFIA, focused on reducing trips made to SFIA by single-occupant vehicles;
- Adding park-and-ride lots on US 101;
- Creating High-Occupancy Vehicle (HOV) lanes out of existing traffic lanes on US 101 from San Jose to San Francisco;
- Widening US 101 to eight lanes south of San Carlos;
- Requiring SFIA to provide a share of SamTrans, CalTrain and BART operating costs;
- Requiring an exclusive right-of-way rail or bus facility that connects SFIA to BART's planned station west of US 101;
- Modifying freeway ramps to serve the Ground Transportation Center , and providing direct ramp connections to the recommended HOV lanes so that buses, shuttles and carpool vehicles can move efficiently in and out of the Ground Transportation Center and terminal area;
- Installing variable message signs internal to the Ground Transportation Center and Short-Term Garage;
- Requiring right-of-way reservations for future high-speed rail;
- Providing bicycle travel lanes; and
- Generally enhancing transit services to and from SFIA.

NOISE

Major measures that are identified in this EIR to mitigate aircraft noise impacts include:

- Select the earliest practicable date by which the Airport is to achieve 100 percent Stage 3 operations, and amend the SFIA Noise Abatement Regulation to reflect the phase-out date (such an amendment is currently under consideration by the Airports Commission).

- Encourage the airlines to use larger long-range, two-engine aircraft as an alternative to four-engine aircraft. The use of the aircraft would allow more long-range flights to depart on Runways 1L and 1R over the Bay, and would reduce noise levels in areas under departure paths from Runway 28R.

- Together with the FAA, review and, if possible, revise the Quiet Bridge Approach to Runways 28L and 28R. Increasing the distance between approaching planes and Foster City could reduce noise levels there.

- Together with the FAA, study and, if possible, revise and expand the use of the "quiet departure" for aircraft departing on Runways 1L and 1R.

- Accelerate development of the Passive Aircraft Detection Instrument System so that it could be used to analyze flight tracks and to help develop and implement noise abatement measures.

- In conjunction with the FAA, California Department of Transportation, local agencies, Bay Area airports staffs, public interest groups, and area residents, conduct a regional study that would involve identifying the flight patterns and routes region-wide that are most environmentally desirable, determining how to establish and coordinate use of the routes while maintaining aircraft safety. SFIA could work with area airports, the FAA, and pilots to implement any changes to flight patterns or procedures.

- Continue studying the feasibility of and benefits from a new runway or extension(s) to the existing runway(s). These airfield improvements could provide a runway(s) able to handle departures by long-range, heavy aircraft such as the B-747, with flight paths over the Bay instead of the Peninsula. This measure could require bay fill and could have impacts on the aquatic environment.

- In coordination with the FAA and airlines serving SFIA, develop a "quiet climb" program to reduce the single-event noise of Stage 2 aircraft in areas near SFIA.

- Develop and implement a "quiet climb" program to reduce maximum single event noise of Stage 2 aircraft by delaying the application of climb power after cutback until reaching 5000 feet above ground level (or an altitude to be determined) or clear of populated areas.

Major measures that are identified in this EIR to mitigate construction noise impacts include:

- The construction contract would require that the project contractor muffle and shield intakes and exhausts, shroud or shield impact tools, and use electric-powered rather than diesel-powered construction equipment, as feasible.

- The project sponsor would require the general contractor to construct barriers around the site, and around stationary equipment such as compressors, which would reduce construction noise by as much as five dBA, and to locate stationary equipment in pit areas or excavated areas, as these areas would serve as noise barriers.

AIR QUALITY

The major measures identified in the EIR to mitigate air emissions include:

- The project sponsor would require the contractor to sprinkle demolition sites with water continuously during demolition activity; sprinkle unpaved construction areas with water at least twice per day; cover stockpiles of soil, sand, and other material; cover trucks hauling debris, soils, sand or other such material; and sweep streets surrounding demolition and construction sites at least once per day to reduce particulate emissions. The project sponsor would require the project contractor to maintain and operate construction equipment so as to minimize exhaust emissions of particulates and other pollutants, by such means as a prohibition on idling of motors when equipment is not in use or when trucks are waiting in queues, and implementation of specific maintenance programs to reduce emissions for equipment that would be in frequent use for much of the construction period.
- Mitigation measures designed to reduce aircraft emissions would be centered on reducing the time each aircraft spends in the taxi/idle phase. SFIA would require of each airline that aircraft engines not be started until the aircraft is ready to pull away from the gate. Long queues of idling planes on taxiways would not be permitted. When no gate is immediately available to unload newly arrived aircraft, aircraft engines would be turned off and aircraft would be towed when a gate becomes available.

SEISMICITY

The major measure identified in the EIR to mitigate seismicity is:

- Facilities earthquake safety inspections would continue and would be expanded to include all new facilities. Periodic training concerning earthquake preparedness and seismic hazards reduction would be conducted at all new facilities.

D. <u>ALTERNATIVES</u>

Three categories of alternatives to the proposed project are examined in this EIR: the No-Project Alternative (includes two variants), Onsite Alternative, and Offsite Alternative.

ALTERNATIVE A: NO PROJECT

The No-Project Alternative assumes no future development of SFIA landside facilities to meet forecast passenger, cargo and flight operation demand. Under both No-Project Alternative variants, only new facilities included in the September 1989

SFIA Five-Year Capital Projects Plan would be constructed at SFIA during the SFIA Master Plan period (1990 - 2006). Alternative A, Variant 1 reflects the SFIA Master Plan assumption that terminal facilities, and specifically boarding gates, represent the primary capacity constraint at SFIA. Alternative A, Variant 2 reflects the assumption of other agencies -- including Caltrans, Metropolitan Transportation Commission (MTC), and the FAA -- that airfield facilities, airspace and/or ground traffic congestion represent the primary capacity constraints at SFIA. Both variants are based on the existing SFIA facility inventory and the approved SFIA Five-Year Capital Projects Plan.

Two categories of environmental impacts could result from the No-Project Alternative: a) impacts associated with growth in aviation activity at SFIA, and b) impacts associated with unserved demand for expanded aviation services and facilities at SFIA. The second category of impacts is addressed under Offsite Alternatives. Impacts of demolition and construction associated with SFIA Master Plan projects would be avoided under both variants of the No-Project Alternative. Impacts of Variant 1 would generally be less than impacts of the project. Impacts of Variant 2 would be less than those of either the project or Variant 1.

ALTERNATIVE B: ONSITE

The Onsite Alternative (reduced-intensity SFIA landside development), which is similar to the "Preferred Concept Plan" in SFIA *Master Plan Working Paper B*, (except that no parking would be provided west of Bayshore) would not include a new international terminal and, overall, would require less demolition and construction than would the project. Operationally, however, impacts of the Onsite Alternative are based on the same passenger, cargo and aircraft operations forecasts as the SFIA Master Plan. Thus, impacts from this Alternative would be essentially the same as impacts of the project.

A second Onsite Alternative, incorporating proposed SFIA runway expansions, is not included in this EIR. A preliminary feasibility study for the expansion of SFIA runways, completed in June 1990, includes proposed new runway locations that could conflict with existing uses and proposed Master Plan projects in the East Field area.

Any future proposed runway expansions would require separate environmental review under the California Environmental Quality Act and the National Environmental Policy Act, and separate approval by the FAA, BCDC, and other agencies not involved in the SFIA Master Plan approval process.

ALTERNATIVE C: OFFSITE

Under the Offsite Alternatives, potential demand for aviation activity at SFIA not served under the No-Project Alternatives would be redistributed to other airports and transportation modes (intercity rail). Redistribution of aviation demand from SFIA to other airports is recommended by MTC, Caltrans Division of Aeronautics, FAA, and the other Bay Area air carrier airports (Metropolitan Oakland International and San Jose International). These agencies differ from SFIA and from one another in their forecasts of future passenger, cargo and aircraft operations, estimates of available and future airport capacities, and recommended actions to best accommodate forecast demand. This Alternative summarizes FAA and Caltrans assumptions and recommendations for redistribution of future aviation demand in the Bay Area.

Like SFIA, other Bay Area airports would have specific constraints and potential environmental impacts associated with either landside or airside expansion. The offsite expansions summarized and referenced in this EIR would not be caused exclusively by redistribution of demand from SFIA. Potential environmental impacts of action plan recommendations, many of which would require FAA and BCDC approval, airline policy decisions, and/or separate environmental review under NEPA, are associated with the regional aviation system as a whole and are therefore addressed only qualitatively in this EIR. For areas in the vicinity of SFIA, impacts from these Alternatives would be essentially the same as for the two variants of the No-Project Alternative. Impacts would occur in other geographic locations such as in Oakland and/or San Jose with this Alternative; environmental impacts would worsen in these other geographic locations.

II. PROJECT DESCRIPTION

A. OBJECTIVES OF THE PROJECT SPONSOR

The project evaluated in this Environmental Impact Report (EIR) is the proposed San Francisco International Airport (SFIA) *Final Draft Master Plan* (hereinafter referred to as the SFIA Master Plan), published in November, 1989. The SFIA Master Plan is a set of demand and facility requirements forecasts, proposed projects, and supporting information that is intended to serve as a framework for expanding, consolidating, remodeling and implementing other changes in SFIA landside (non-airfield) facilities over the 20-year planning period (1986 through 2006). For clarity, this EIR uses 1990 as base year.

SFIA is owned by the City and County of San Francisco and operated by a five-member Airports Commission appointed by the Mayor and a Director of Airports appointed by the Airports Commission. The Airports Commission is the SFIA Master Plan author and Project Sponsor. Unlike most other City departments, SFIA is self-contained in terms of planning, construction, maintenance and monitoring of its facilities. The Airports Commission establishes and enforces SFIA building codes./1/

Principal Airports Commission objectives for the SFIA Master Plan, as stated in the SFIA Master Plan Executive Summary, are:

1. To provide a coordinated development plan that will consolidate and relocate many of the existing landside facilities in order to increase the efficiency and cost effectiveness of landside operations; and

2. To respond to the projected economic growth of the Bay Area and ensure that the future development required to meet that demand at the airport is implemented in a manner compatible with the plan./2/

Served by over 50 airlines, SFIA is the principal air passenger and air cargo facility in the San Francisco Bay Area and, as of 1989, the seventh-busiest U.S. airport in terms of total passengers and total cargo tonnage. In 1989, SFIA handled about 30 million passengers (counted as enplanements and deplanements, including transfers but excluding through passengers); about 560,000 metric tons of cargo (total loaded and unloaded, including mail); and about 430,000 aircraft operations (total landings and takeoffs)./3/ Commercial jet carriers accounted for approximately 70 percent of SFIA aircraft operations and the remainder was shared by non-jet carriers (commuter and air taxi), General Aviation (private planes) and military aircraft (U.S. Coast Guard helicopters)./4,5/

Design capacity of the SFIA terminal complex is 31 million annual passengers./4/ In 1986, the SFIA Master Plan base year, SFIA accommodated approximately 27.8 million passengers and in 1989, the SFIA terminal complex operated at 29.9 million annual passengers, near its design capacity. Passenger estimates for 1990, the base year, are essentially the same as those for 1989. According to SFIA Master Plan aviation activity forecasts, SFIA passenger counts could reach about 42.3 million annual passengers by 1996 and about 51.3 million annual passengers by 2006, a potential 84 percent increase for the 20-year planning period (1986-2006) and a potential 71 percent increase from 1990./6/

To respond to this projected demand and to increase operational efficiency, the Airports Commission has proposed the following principal SFIA Master Plan projects:

- Construction of a new international terminal, additional boarding areas and aircraft gates;
- Construction of a Rental Car Garage / Ground Transportation Center and Automated People Mover (APM);
- Consolidation and expansion of air cargo facilities;
- Consolidation of airport administrative facilities;
- Consolidation and expansion of airline support, maintenance and administrative facilities;
- Modification and expansion of ground-vehicle parking and circulation systems; and
- Development of additional hotel, commercial and airport support facilities.

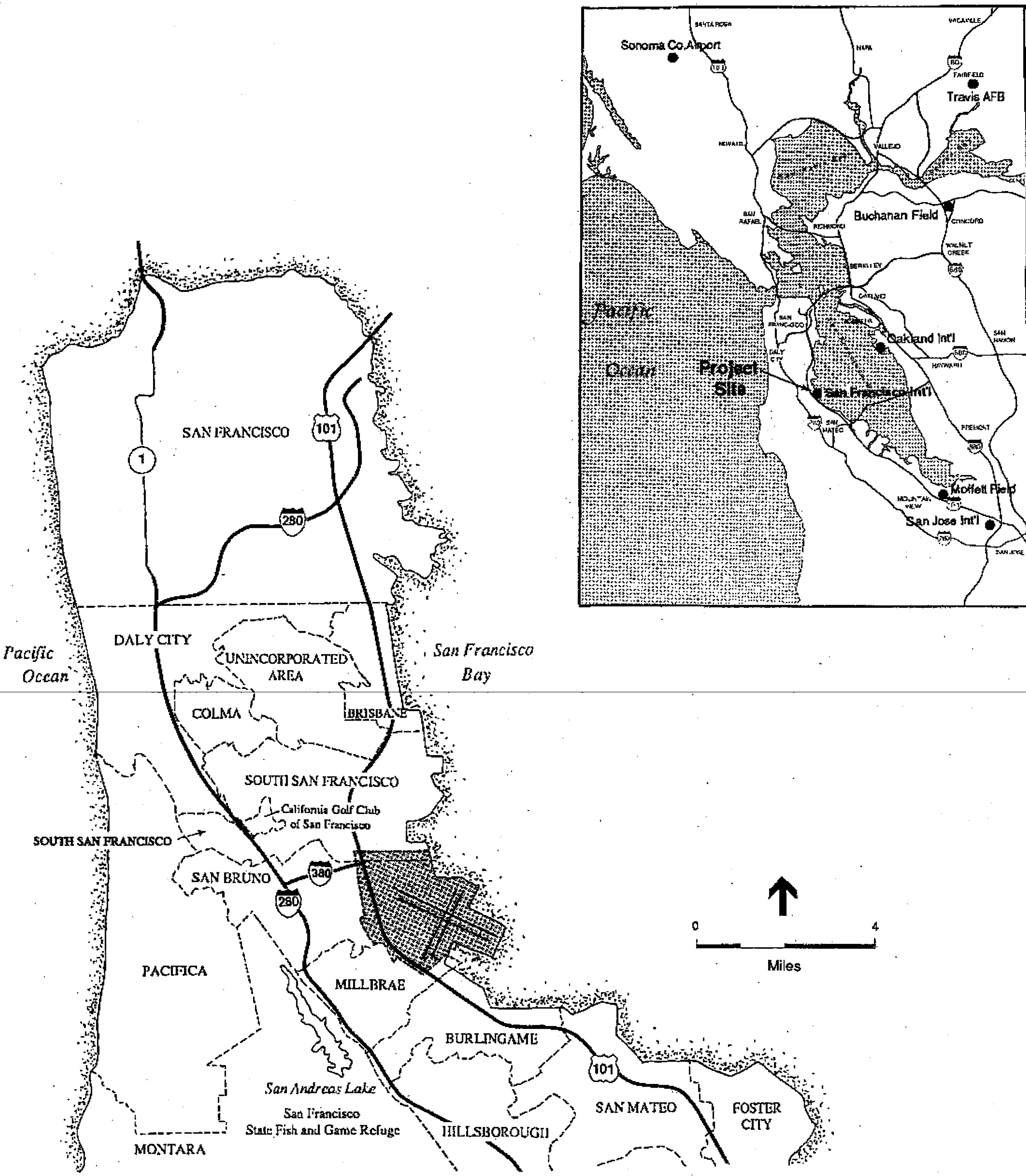
B. PROJECT LOCATION

SFIA encompasses approximately 5,200 acres in unincorporated San Mateo County, about 2,700 of which are land and about 2,500 of which are tideland./4/ SFIA is approximately 13 freeway-miles south of downtown San Francisco, 23 freeway-miles southwest of downtown Oakland and 36 freeway-miles northwest of downtown San Jose. The SFIA Master Plan Area (Project Area) includes about 2,500 acres of SFIA land, bounded by US 101 (Bayshore Freeway) to the west, North Field Access Road to the north and San Francisco Bay to the east and south. Not included in the Project Area are 180 acres of mostly undeveloped SFIA land west of US 101 (West-of-Bayshore site). This site was removed from the SFIA Master Plan process because it is a habitat for the San Francisco garter snake, an endangered species, and the red-legged frog, a candidate for the endangered species list./2/

The Project Area is occupied by the airport complex, including runways, passenger terminals, support services, airline maintenance and air freight facilities and over 550 acres of undeveloped land. Figure 1 shows the location of SFIA and adjoining jurisdictions within San Mateo County. The insert shows the location of SFIA, other airfields, principal cities and highways in the nine-county San Francisco Bay region (Bay Area).

SFIA is bordered on the east and south by San Francisco Bay, on the north by the City of South San Francisco, on the west by the City of San Bruno and on the southwest by the City of Millbrae. Other San Mateo County jurisdictions in the airport vicinity include the cities of Brisbane, Colma, Daly City, Pacifica, Burlingame, Hillsborough, San Mateo and Foster City. Also in the airport vicinity are the unincorporated areas of San Bruno Mountain and the San Francisco Water Department Lands, containing the San Andreas and Crystal Springs Reservoirs and a State Fish and Game Department easement.

● Within the nine-county San Francisco Bay region are four air carrier or commercial service airports (SFIA, Metropolitan Oakland International, San Jose International and Sonoma County Airport), four U.S. military airfields (one of which is closed), 21 public use General Aviation airfields, 20 private use General Aviation airfields and numerous heliports, most of them for medical or military



SOURCE: Environmental Science Associates, Inc.

● **Figure 1**
Project Location

use./7/ Regional and interstate ground-transportation linkages to SFIA include US 101 (Bayshore Freeway), which bounds the Project Area's west side; U.S. Interstate Highway 280, west of and roughly parallel to US 101; and U.S. Interstate Highway 380, the east-west connector between Highways 101 and 280 in the vicinity of SFIA. Direct access between SFIA and US 101 is provided by four interchanges in the vicinity of SFIA. Interstate passenger rail (Amtrak) lines serve Oakland and San Jose; Amtrak motor coaches link the Oakland station with downtown San Francisco. The Caltrans commuter rail line (CalTrain) serving Peninsula cities from San Francisco to San Jose does not serve SFIA directly; the stations nearest SFIA are in downtown San Bruno and Millbrae. Extension of the Bay Area Rapid Transit (BART) system to the SFIA vicinity was approved by San Mateo County voters in February of 1990 and is slated for completion in 2001.

C. PROJECT CHARACTERISTICS

OVERVIEW

The proposed SFIA Master Plan is a physical/management design plan for facilities and circulation systems on all airport-owned lands, excluding the mostly undeveloped West-of-Bayshore site./8/ The proposed SFIA Master Plan would be implemented in two phases: near-term (1986-1996) and long-term (1997-2006). For clarity, this EIR uses 1990 as the base year and defines the near-term Master Plan as 1990-1996.

The following chapters are included in the SFIA Master Plan:

1.0 Introduction
2.0 Executive Summary
3.0 Local and Regional Plans
4.0 Environmental Setting
5.0 Ground Access
6.0 Inventory of Existing Facilities
7.0 Forecasts
8.0 Facility Requirements
9.0 Alternative Development Concepts
10.0 Recommended Master Plan
11.0 Budgetary Development Costs
12.0 Appendix

SFIA Master Plan projects are based on a facility requirements program, described in SFIA Master Plan Chapter 8.0, that was derived by the Airports Commission's planning consultant, Daniel, Mann, Johnson, & Mendenhall (DMJM). DMJM developed the facility requirements program on the basis of a set of SFIA Master Plan aviation activity forecasts prepared by Thompson Consultants International (TCI) and described in SFIA Master Plan Chapter 7.0. The SFIA Master Plan aviation activity forecasts, as shown in Table 1, reflect the Airports Commission's expectation that future regional economic growth will generate increased demand for SFIA operations in all key categories./2/ The number of total annual passengers is forecast to grow by about 41 percent in the near term (1990-1996) and by about 71 percent for the total SFIA Master Plan period (1990-2006). The international segment of SFIA passenger counts is forecast to grow more rapidly than the domestic segment, nearly doubling between 1990 and 2006. Total cargo and mail tonnage is forecast to grow by about 32 percent under the near-term Master Plan and by about 55 percent under the total Master Plan. International mail is forecast to grow by about 75 percent during the total Master Plan period.

Air carrier operations are forecast to grow by about 24 percent under the near-term Master Plan and by about 36 percent under the total Master Plan. Larger-capacity aircraft and higher load factors (proportion of available seats occupied) are among the factors expected to produce higher rates of growth in passenger counts than in aircraft operations. SFIA aviation activity forecasts and assumptions are discussed in II.D. Future Growth under the Project Compared to Other Future Scenarios, p. 61.

To accommodate forecast growth in aviation activity, the SFIA Master Plan process addressed SFIA "landside" facilities, which include the passenger terminal complex, aircraft aprons, air freight facilities, aircraft maintenance hangars, General Aviation facilities, and support facilities such as administration, parking and roadways. Development of "airside" facilities, which include SFIA's airfields and taxiways, was addressed during the master plan process "only to the extent of its impact on landside constraints and opportunities"/2/, meaning that airfields and taxiways are proposed for modification only where necessary to accommodate proposed physical changes in the SFIA landside facilities. SFIA Master Plan projects would modify on-airport facilities

TABLE 1: SFIA AVIATION ACTIVITY COMPARISON, ACTUAL 1990 AND SFIA MASTER PLAN FORECASTS, 1996 AND 2006

Aviation Activity	Actual 1990/a/	Master Plan Forecast 1996	Master Plan Forecast 2006	Percent Change 1990-1996	Percent Change 1990-2006
Annual Passengers/b/					
Domestic	26,263,136	36,620,000	44,110,000	39%	68%
International	3,676,699	5,660,000	7,220,000	54%	96%
Total	29,939,835	42,280,000	51,330,000	41%	71%
Cargo and Mail /c/					
Domestic Cargo	214,500	310,500	332,200	45%	55%
Int'l. Cargo	236,550	268,500	345,500	14%	46%
Mail	107,028	156,872	187,704	47%	75%
Total	558,078	735,872	865,404	32%	55%
Annual Aircraft Operations /d/					
Air Carrier /e/	302,460	375,105	411,564	24%	36%
Commuter /f/	87,266	91,700	100,000	5%	15%
General Aviation /g/	35,132	27,300	24,200	-22%	-31%
Military /h/	2,617	2,700	2,700	0%	0%
Total /i/	427,475	496,805	538,464	16%	26%

NOTES:

/a/ 1989 figures have been used as approximations of 1990, the EIR base year.

/b/ "Annual Passengers" is sum of enplanements and deplanements, including passenger transfers but excluding "through" passengers (continuing on the same flight). 1989 passenger figures are from "San Francisco International Airport Comparative Traffic Report," December 1989. Master Plan total passenger forecasts were developed by Thompson Consultants International (TCI) for *SFIA Master Plan Working Paper A*, San Francisco Airports Commission, 1987, and are cited in Final Draft Master Plan Table 7.2. Master Plan international passenger forecasts were developed by TCI in 1989 and cited in Master Plan Table 7.22. Domestic passenger forecasts represent the difference between total and international passenger forecasts. The Master Plan passenger forecasts represent the "unconstrained" scenario, which is based on the continuation of the existing pattern of growth in the Bay Area coupled with adequate ground access to the airport, and expansion of terminal and gate facilities (SFIA Master Plan, p. 2.4).

/c/ All cargo and mail figures are total metric tons loaded and unloaded. 1989 figures are from "San Francisco International Airport Comparative Traffic Report," December 1989. Master Plan cargo and mail forecasts were developed by TCI and cited in Final Draft Master Plan Tables 7.7 - 7.11.

(Continued)

TABLE 1: SFIA AVIATION ACTIVITY COMPARISON, ACTUAL 1990 AND SFIA MASTER PLAN FORECASTS, 1996 AND 2006 (Continued)

/d/ Aircraft operations include all takeoffs and landings. Air carrier operations, as defined by SFIA, are scheduled commercial jet operations. Commuter operations, as defined by SFIA, are "the operations of the trunk carriers' subsidiary airlines operating primarily turbo-prop aircraft." These operations are accounted for at SFIA by two carriers: United Express (affiliated with United Airlines) and American Eagle (affiliated with American Airlines). The FAA defines commuter/regional carriers as those which "operate aircraft with a maximum of 60 seats, provide at least five round trips per week between two or more points, or carry mail" (FAA "Terminal Area Forecasts, FY 1989 - 2005," Appendix B). General Aviation historically refers to all aviation activity other than airline and military activity. General Aviation operations at SFIA are those using the Fixed Base Operator (FBO) and Chevron Corporation facilities. Almost all military aircraft operations at SFIA are accounted for by U.S. Coast Guard helicopter activities.

/e/ 1989 air carrier operations total of 302,460 is from 1989 SFIA landing fee reports, which are based on fees paid to SFIA by runway users. SFIA landing fee report air carrier figures are about 2% lower than the FAA tower counts used in the SFIA Comparative Traffic Reports (the latter reported 309,126 air carrier operations for 1989). The SFIA landing fee report figure is cited here because it is used in SFIA Noise Abatement Program reports to the State, and because it is the basis of constrained and unconstrained fleetmix forecasts generated by Ken Eldred Engineering (KEE) for this EIR (telephone conversation with Ken Eldred, August 1, 1990). 1996 and 2006 Master Plan forecasts of air carrier operations were derived by KEE from actual 1989 SFIA fleetmix data, FAA national fleetmix forecasts, and SFIA Draft Master Plan "unconstrained" passenger forecasts and aircraft load factor forecasts (letter dated July 20, 1990 from Ken Eldred).

/f/ 1989 commuter operations total of 87,266 is from a letter dated July 14, 1990 from John Costas, SFIA, and matches the 1989 SFIA landing fee report figure. The 1989 commuter operations total from FAA tower counts, as reported in the "San Francisco International Airport Comparative Traffic Report," December 1989, was 83,595, which is approximately 4% less than the landing fee report figure. This discrepancy may derive from miscategorization of commuter and air carrier operations; as noted above, the 1989 FAA tower report air carrier figure is greater than the landing report air carrier figure. When air carrier and commuter figures from the respective reports are added, the discrepancy between the two sources is 2,995 operations, or about 0.8% (letter dated July 20, 1990 from Ken Eldred).

/g/ The 1989 General Aviation total, from FAA tower counts reported in the December 1989 SFIA Comparative Traffic Report, was 32,137. To reconcile total operations by category with FAA tower counts, the 2,995 operations noted above have been added to the General Aviation category, bringing it to an estimated 35,132 operations in 1989 (as recommended in letter dated August 2, 1990 from Ken Eldred). 1996 and 2006 Master Plan forecasts of General Aviation activity are from July 14, 1990 letter from John Costas, SFIA.

(Continued)

TABLE 1: SFIA AVIATION ACTIVITY COMPARISON, ACTUAL 1990 AND SFIA MASTER PLAN FORECASTS, 1996 AND 2006 (Continued)

/h/ Military aircraft operations are expected to remain near 1990 levels throughout the SFIA Master Plan period.

/i/ The total 1996 and 2006 aircraft operations forecasts represent combined KEE air carrier forecasts and figures from July 14, 1990 letter from John Costas, SFIA.

SOURCES: *SFIA Final Draft Master Plan*; San Francisco International Airport Comparative Traffic Reports, December 1987 and December 1989; Ken Eldred Engineering; Environmental Science Associates, Inc.

in all landside functional categories but would not affect runways. SFIA Master Plan airside projects include realignment of four existing taxiways (A, B, C and R) and extension of taxiways A and B (see Figure 4, Near-Term Master Plan, p. 42). SFIA airside operations, capacities and levels of service (delays) are discussed at the end of this section, beginning on p. 61.

Near-term and long-term SFIA Master Plan projects would together result in demolition of nearly 1.4 million square feet of existing SFIA building area (about 16 percent of total 1990 SFIA building area, excluding parking garages and utilities in buildings). By 2006, SFIA Master Plan projects would result in remodeling of about 0.8 million square feet of existing SFIA building area, and construction of over 4.2 million square feet of building area. Net new building area by 2006 would total nearly 2.9 million square feet, bringing SFIA building area, excluding parking garages and the proposed Rental Car Garage / Ground Transportation Center, to about 11.1 million square feet. From the 1989 total of about 8.2 million square feet, SFIA area in buildings would thus increase by about 35 percent as a result of proposed SFIA Master Plan projects.

The 2.9 million square feet of net new building area proposed for the combined near-term and long-term SFIA Master Plan (1990 through 2006) would include about 1,476,000 square feet of additional passenger terminal area and 22 or more additional aircraft gates; about 785,000 square feet of additional air freight area; about

275,000 square feet of additional airline maintenance area; about 226,000 square feet of additional administration/office area; about 90,000 square feet of additional commercial area; about 40,000 square feet of additional airline support area; and about 6,000 square feet of airport support and General Aviation area.

In addition to consolidation and expansion of SFIA building area, the combined near-term and long-term SFIA Master Plan projects would result in demolition, modification and/or construction of parking lots, garages, utilities and other non-building facilities. The proposed Rental Car Garage / Ground Transportation Center would comprise over one million square feet, and proposed parking garages DD and CC could total approximately 2.6 million square feet. Existing parking spaces would be eliminated under both near-term and long-term Master Plans, but new parking would more than offset the loss, for a net increase of approximately 7,340 short-term and long-term auto parking stalls (in both garages and surface lots) by 2006. This would represent about a 24 percent increase over 1990 SFIA auto parking capacity.

Non-building facilities that would be demolished, constructed or modified under the SFIA Master Plan include surface and elevated roadways, vehicle staging areas, pedestrian transit (automated people mover) facilities, aircraft hardstands (parking positions), terminal apron areas, aircraft taxiways, and multi-use harbor docking facilities (modifications to aircraft hardstands and apron facilities are not quantified in the Master Plan). SFIA Master Plan roadway projects would include widening of key intra-airport roads, construction of bi-level access roads for the proposed Rental Car Garage / Ground Transportation Center, and construction of two new ramps connecting SFIA and US 101. Airport utilities (electricity, natural gas, water, industrial waste, sanitary and storm sewers, and aircraft fueling facilities) would be upgraded and, in most cases, expanded.

About ten SFIA Master Plan projects, most of them affecting roadways and parking facilities, are also included in the approved SFIA Five-Year Capital Projects Plan (September 18, 1989), and will therefore likely be implemented whether or not the SFIA Master Plan is adopted./9/ These projects are analyzed in this EIR both as part of the SFIA Master Plan and as part of the No-Project alternative (see EIR Section IX. Alternatives, p. 439). Projects included in both the SFIA Master Plan and the approved SFIA Five-Year Capital Projects Plan are listed in Table 2, below. Projects included in the SFIA Five-Year Capital Projects Plan are listed in Appendix B, Table B-4.

TABLE 2: SFIA CAPITAL PROJECTS RELATED TO SFIA MASTER PLAN PROJECTS

Contract Number/Project		Program Year
Master Plan Projects in Approved 9/18/89 SFIA Capital Projects Plan		
1106	Frontage Road R-3 (McDonnell Road) Widening	1991-92
1680A	Parking Garage Restriping (for 800 more stalls - in design phase)	1988-89
1723	New Firehouse No. 2 (in construction)	1989-90
1730	North Access Road Realignment and Widening	1989-90
1731	Demolition of Flying Tiger Hangar (Plot 17)	1989-90
2102	Development of Parking Lot DD (3,000 auto stalls - in design phase)	1990-91
2103	Vehicular Bridge from Lot D to Lot DD (in design phase)	1990-91
2254	Relocation of Budget Rental Car (in design phase)	1989-90
2255	Relocation of Dollar Rental Car (in design phase)	1989-90
2084	Water Main Improvement - Plots 20, 22, 24 & 25	1990-91
2133	Contingency Facility (airport support functions)	1989-90

SOURCES: *SFIA Final Draft Master Plan*, 1989; SFIA Five-Year Capital Projects Plan, 1989.

EXISTING SFIA FACILITIES

While normally part of the Environmental Setting section, the following discussion of existing facilities is provided to help orient the reader so that the description of proposed new and remodeled facilities will be clear.

As noted, proposed SFIA facility modifications are categorized under thirteen functions in the Recommended Master Plan (SFIA Master Plan Chapter 10.0) and related Appendix tables. In the Inventory of Existing Facilities (SFIA Master Plan Chapter 6.0), most of the same functional categories are used, except that the Commercial, Administration/Office and Miscellaneous categories are aggregated into the Airline Support and Airport Support categories, and an additional category, Undeveloped Areas, is included. Master Plan Facilities Inventory graphics, on the other hand, identify five functional categories. Categorization of functions is further complicated by the existence in many instances of multiple functions within a single building. For example, while each of the existing airport terminal buildings contains commercial uses, airport administration and other support functions, only the overall terminal function is assigned these buildings under the Master Plan Facilities Inventory. Similarly, many of the hangars at the airport contain cargo, maintenance and associated support functions.

For consistency and ease of comparison in this EIR, the thirteen functional categories in SFIA Master Plan project description Appendix tables (Chapter 12.0) are used to describe both existing and proposed SFIA facilities./2/ An attempt has been made to identify each facility by its primary functional area and to note where other functions are also present. The thirteen functional categories include:

1.0	Terminal
2.0	Airline Support
3.0	Airline Maintenance
4.0	General Aviation
5.0	Air Freight
6.0	Airport Support
7.0	Commercial
8.0	Administration/Office
9.0	Transportation
10.0	Miscellaneous
11.0	Parking
12.0	Roads
13.0	Airside

Note that in the names of the functional categories, "airport" refers to SFIA and "airline" refers to the various carriers that use SFIA.

Existing facilities are further classified in this EIR as building or non-building facilities; although the parking category contains both lots and garages, it is included in the discussion of non-building areas. Utilities are also discussed under non-building facilities.

<u>Existing SFIA Facilities in Buildings</u>

As of 1990, SFIA building space, excluding parking garages and utilities in buildings, totaled about 8.2 million square feet./2,10/ Existing SFIA facilities in buildings (functional categories 1.0 through 8.0 and 10.0) are summarized in Table 3 and illustrated in Figure 2, p. 34. Note that building numbers in the table correspond to those in the figure, and that functions are aggregated into six categories in the figure. Buildings containing more than one function are listed by primary function, with secondary functions noted (where information is available). Most buildings on SFIA land are owned by the City of San Francisco and leased under various terms to airport users (airlines, rental car companies, etc.). Additional facility data, including ownership, tenant and lease status, acreage and associated aircraft and auto parking, are in SFIA Master Plan Table 6.3./2/

Functional Area 1.0: Existing Terminal Facilities

Located between Bayshore Freeway and the main runways, the SFIA passenger terminal complex totaled approximately 2,621,500 square feet as of 1989. The complex has been expanded and upgraded several times since its construction; implementation of the latest Terminal Master Plan (1985) was completed in 1988. The existing three-terminal configuration forms an arc, within which is a short-term, public auto parking garage and a bi-level roadway loop, and outside of which are the boarding piers, gate facilities and aircraft aprons (see Figure 2, p. 34). Six pedestrian tunnels and two bridges link the terminals with the five-level, circular auto parking garage.

The terminal complex includes six boarding piers and 80 jet aircraft gates, 48 of which can accommodate wide-body jets. The South Terminal, including boarding areas A, B and C, totals about 849,500 square feet. The Central (International) Terminal, including Boarding Area D, totals about 610,000 square feet. The North Terminal, including Boarding Areas E and F, totals about 1,161,000 square feet./2,4/

Functional Area 2.0: Existing Airline Support Facilities

Airline support functions are provided by, and complement the operations of, the airlines using SFIA. In many instances, these functions share facility space with freight, maintenance or other airline operations. Airline support functions inventoried in the SFIA Master Plan include catering, storage and warehousing, and administration (the latter is under functional category 8.0). About 81,800 square feet of Airline Support functions, not including those in mixed-use facilities, are at SFIA.

TABLE 3: EXISTING SFIA FACILITIES IN BUILDINGS BY FUNCTION, 1990

Facility Number/Name		Area in Square Feet/a/
1.0 TERMINAL		
	North Terminal /b/	1,161,000
	International Terminal /c/	610,000
	South Terminal /d/	849,500
	SUBTOTAL TERMINAL	2,620,500
2.0 AIRLINE SUPPORT (NONTERMINAL)		
	Catering:	
52	Host International	31,690
62	United Airlines Catering	13,800
	Supporting Facilities:	
31	United Warehouse	12,544
38	American Ground Services Equipment (GSE)	2,500
45	Delta Warehouse	7,200
90	ASII/Evergreen /e/	12,544
93	Pan Am Crew Baggage Holding	1,500
	SUBTOTAL AIRLINE SUPPORT (NONTERMINAL)	81,800
3.0 AIRLINE MAINTENANCE		
	Major:	
1-12	United Maintenance Center	2,870,950
	Line:	
32	Hangar (Vacant)	16,000
33	American Maintenance	392,240
39	Qantas Maintenance Hangar	168,761
42	Continental Maintenance Hangar	26,825
45,47	Delta Maintenance	136,875
60	United Airlines Service Center	90,000
65	Pan Am	161,825
67	TWA Service	9,800
84	JAL Maintenance Building	9,000
51	Northwest Maintenance Hangar	36,000
	SUBTOTAL AIRLINE MAINTENANCE	3,918,300

(Continued)

TABLE 3: EXISTING SFIA FACILITIES IN BUILDINGS BY FUNCTION, 1990 (Continued)

Facility Number/Name		Area in Square Feet/a/
4.0 GENERAL AVIATION		
40	Fixed Base Operator (FBO): Butler	48,112
54	Chevron, USA Hangar	40,000
	SUBTOTAL General Aviation	88,100
5.0 AIR FREIGHT		
	All-Cargo Carriers:	
16	Flying Tigers Hangar	108,036
43	U.S. Air Mail Facility	168,000
83	JAL Cargo Building	78,000
	Top-Off Carriers:	
41	Airborne Cargo Bldg./f/	60,000
46	Delta	21,000
53	Cargo Building No. 7	55,296
55	Northwest Orient Cargo	114,550
56	American Airlines Cargo	71,400
57	U.S. Air Cargo	6,356
58	United Cargo	113,720
68	TWA Cargo	71,387
	SUBTOTAL AIR FREIGHT	867,700
6.0 AIRPORT SUPPORT /g/		
49	Engineering Building	30,800
	Maintenance:	
50	Shops/Office /h/	56,000
48	Equipment Garage	20,000
88	Bus Maintenance	5,000
	Crash, Fire and Rescue:	
17	Contingency Building 1000	10,800
35	Fire Station No. 1	12,000
34	Fire Station No. 2	12,000
28	Community College Flight School	26,200
	SUBTOTAL AIRPORT SUPPORT	172,800

(Continued)

TABLE 3: EXISTING SFIA FACILITIES IN BUILDINGS BY FUNCTION, 1990 (Continued)

Facility Number/Name		Area in Square Feet/a/
7.0 COMMERCIAL /i/		
44	Bank of America	13,062
63	Hilton Inn	220,000
	Chevron Gas Station	900
	SUBTOTAL COMMERCIAL	234,000
8.0 ADMINISTRATION/OFFICE /j/		
59	United Administration	92,216
64	Pan Am Administration	33,852
	SUBTOTAL ADMIN./OFFICE	126,100
10.0 MISCELLANEOUS		
	U.S. Coast Guard Facilities	
	"A" Hangar	29,700
	"B" Administration Building	12,021
	"C" Barracks	25,000
	"D" Building	1,721
	"F" Building	14,000
	"H" Building	6,000
	SUBTOTAL MISCELLANEOUS	88,400
TOTAL 1990 SFIA BUILDING AREA /k/		8,197,700

/a/ Figures represent gross building areas; ancillary unbuilt areas (e.g., parking lots, outdoor work areas) are not included. Subtotals are rounded, as is the grand total.
/b/ Includes Boarding Areas E and F, as well as 4,500 square feet of Airport Police facilities. Terminals also contain commercial and administration/office space.
/c/ Includes Boarding Area D.
/d/ Includes Boarding Areas A, B and C.
/e/ Also contains air freight functions.
/f/ Also contains administration/office space.
/g/ Airport support utility structures are listed in EIR Section III.J, Utilities.
/h/ Not included is an adjacent 45,000-square-foot open maintenance yard.
/i/ Does not include commercial space within terminal facilities.
/j/ Does not include administration/office space in buildings with mixed functions (e.g., terminal and air freight facilities).
/k/ Total does not include selected utilities in buildings, for which data are not available, or building area in parking garages.

SOURCES: Table 6.3, *SFIA Final Draft Master Plan*, 1989; Airports Commission, 1990; U.S. Coast Guard, 1990; Environmental Science Associates, Inc.

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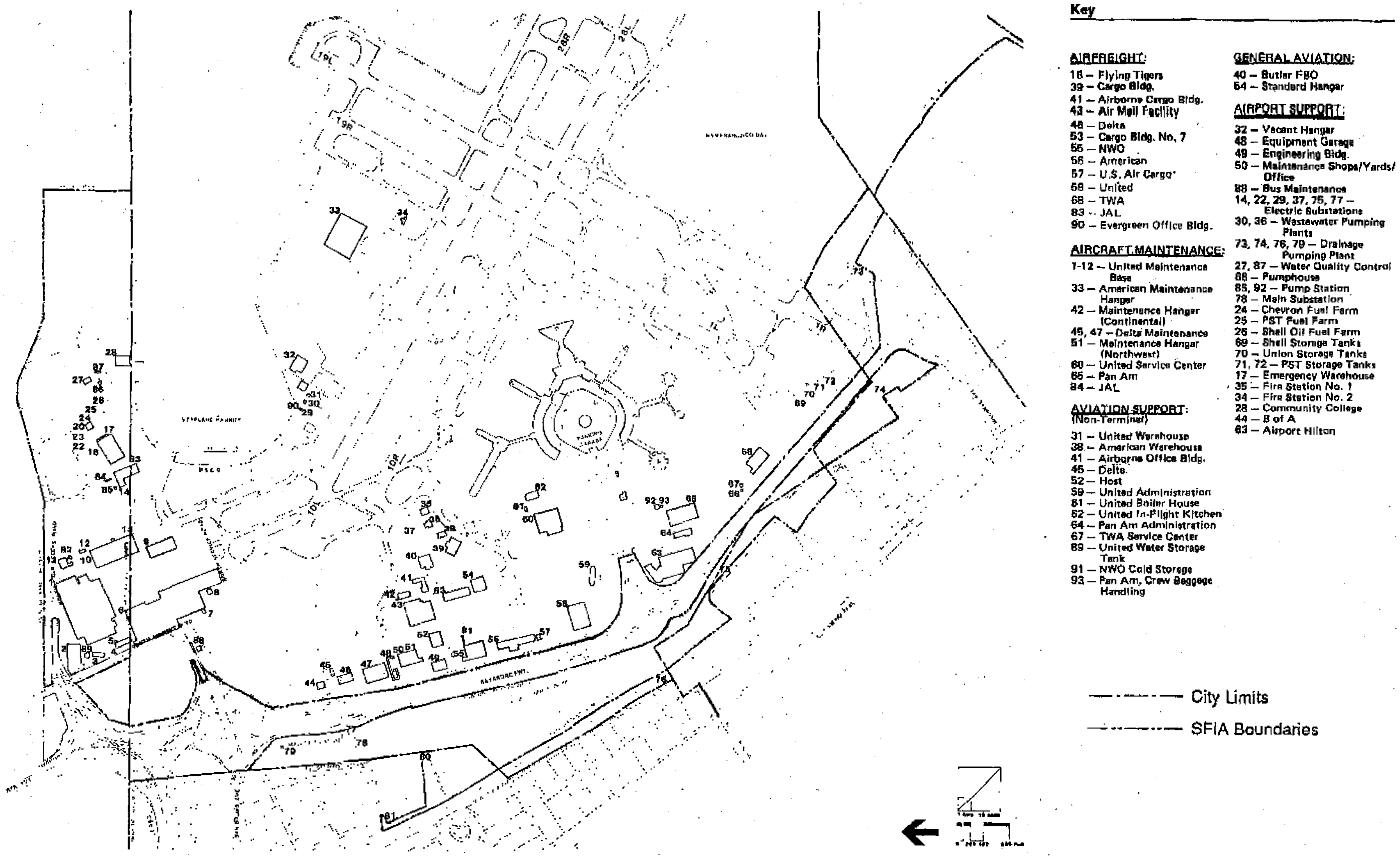


SOURCE: San Francisco International Airport Master Plan

Figure 2
Facility Inventory

Functional Area 3.0: Existing Airline Maintenance Facilities

All major maintenance for the United Airlines (UAL) aircraft fleet is performed at SFIA. ("Major" maintenance includes full overhauls; "line" maintenance includes primarily routine procedures.) The UAL Maintenance Center occupies nearly 2.9 million square feet of building space on 170 acres in the North Field area, and employs over 9,000 people in a three-shift, seven-day-per-week operation.

Seven other airlines operate line maintenance facilities, the largest of which, at approximately 392,200 square feet, is the American Airlines superbay hangar in the east field area. Airline maintenance facilities at SFIA, including the UAL center, total approximately 3.9 million square feet.

Functional Area 4.0: Existing General Aviation Facilities

General Aviation historically refers to all aviation activity other than airline and military activity, and may include agricultural, industrial, recreational, air charter, air ambulance service, aerial photography, police patrol, fire control or Federal, State and local government aircraft operations./11/ These operations represent a relatively small portion of total SFIA aviation activity (approximately ten percent or less). SFIA's fixed-base operator (FBO) is Butler Aviation, which occupies approximately 48,100 square feet of building space in the West Field area. Chevron Corporation operates a 40,000-square-foot hangar in the same area.

Functional Area 5.0: Existing Air Freight Facilities

Air freight operations at SFIA are of two types: all-cargo and top-off. All-cargo carriers, which transport freight only, do not require access to the passenger terminal. Top-off carriers require proximity to the passenger terminal because they use excess capacity in scheduled passenger flights for transporting freight.

All-cargo carriers, whose facilities are in the north and east field areas, include Flying Tigers (Federal Express), Japan Airlines (JAL), DHL and Evergreen. An Environmental Impact Report was certified in 1980 for a proposed addition to the adjacent Flying Tigers and JAL facilities. The project included replacement of the existing approximately 108,000-square-foot Flying Tigers Hangar with a 112,000-square-foot warehouse and maintenance center, and construction of a 35,000-square-foot cargo/warehouse addition to the existing 78,000-square-foot JAL facility. (NOTE: This project, which has not been implemented, would be superseded under the near term SFIA Master Plan by construction of the proposed North Field Cargo Maintenance Facility. Only the project proposed in the SFIA Master Plan is addressed by this EIR.)

Top-off carrier operations are concentrated in the north side of the passenger terminal in the west field area, with the exception of Pan Am and TWA, whose facilities are adjacent to the South Terminal. (In Table 2, p. 28, the Pan Am facility is listed under the maintenance category). Most of the top-off carriers lease space in shared facilities such as Cargo Building 7, or sub-lease space from another carrier. All-cargo and top-off carrier functions at SFIA together occupy approximately 868,000 square feet of building area.

Functional Area 6.0: Existing Airport Support Facilities

In contrast to airline support facilities, by which the airlines using SFIA support their own operations, airport support functions relate directly to operations of the airport. The SFIA Master Plan Facilities Inventory, on page 6.11 of the SFIA Master Plan, broadly defines airport support to include airport administration, airport engineering, building and field maintenance, Crash/Fire/Rescue facilities, utilities, airport police, commercial enterprises, and rental cars. This broad definition appears to consider commercial enterprises that generate revenue for the SFIA as airport support functions. For the purposes of defining program requirements and proposing specific projects, however, SFIA Master Plan categories are more detailed: commercial enterprises are in category 7.0, airport administration is in category 8.0 and parking is in category 11.0. This EIR uses the more detailed categorization, and discusses non-building utilities separately. Existing administration/office and commercial facilities within the terminal buildings were not inventoried in the SFIA Master Plan and are discussed only qualitatively in this EIR.

The SFIA engineering building, maintenance shops, equipment garage and bus maintenance facilities together occupy about 111,800 square feet of space in separate facilities (the main shops are in a hangar shared with DHL, north of the passenger terminal).

Crash/Fire/Rescue facilities include two 12,000-square-foot fire stations and a support building. A replacement facility for Fire Station No. 2, at the intersection of runways 10L-28R and 1L-19R, is under construction. Fire Station No. 1 is north of the passenger terminal, adjacent to Butler Aviation. Airport police maintain a 4,500-square-foot station within the North Terminal.

The approximately 26,000-square-foot San Francisco Community College Flight School is in the North Field area, adjacent to the Seaplane Harbor.

Functional Area 7.0: Existing Commercial Facilities

Excluding rental car operations (discussed under functional category 11.0) and commercial facilities within the passenger terminals (which were not inventoried in the SFIA Master Plan), existing commercial facilities at SFIA include an approximately 220,000-square-foot Hilton Inn, a Chevron gas station and a Bank of America branch. The hotel and gas station are located between the terminal complex and US 101; the bank is north of the air freight area near McDonnell Road (Frontage Road R-3).

Functional Area 8.0: Existing Administration/Office Facilities

Airport administration functions are located within the existing terminal complex and were not inventoried in the SFIA Master Plan. Airline administration is in many cases combined with other functions; United Airlines and Pan Am maintain administration functions in separate facilities of about 92,200 square feet and 33,800 square feet, respectively. The facilities are north and south of the terminal access road, relatively near US 101.

Functional Area 9.0: Transportation (Rental Car Garage / Ground Transportation Center)

This is a new functional area under the SFIA Master Plan; it does not currently exist.

Functional Area 10.0: Existing Miscellaneous Facilities (in Buildings)

The U.S. Coast Guard maintains helicopter base facilities at SFIA, including approximately 88,400 square feet of building space in barracks and shops. The U.S. Coast Guard facilities are adjacent to the Seaplane Harbor, on federal government property.

Existing SFIA Non-Building Facilities

As of 1989, undeveloped SFIA-owned area (excluding approximately 2,500 acres of tidelands and the 180-acre West-of-Bayshore site) included an 18-acre parcel near the San Bruno Avenue and Interstate 380 interchange; a 150-acre parcel in the north field area near the Flying Tigers and JAL freight facilities; and a 400-acre parcel in the east field area.

Existing airport utility systems include aircraft fueling, airfield lighting (approximately 65 miles of lines), power supply and distribution (approximately 80 miles of lines), water supply and distribution, sanitary sewage collection and treatment, industrial waste collection and disposal, natural gas supply and distribution, and storm drainage and collection (approximately 45 miles of pipelines)./2,4/ These systems are described in EIR Sections III.H. Hazardous Materials, p. 201, and III.J. Utilities, p. 232.

Functional Area 11.0: Existing Parking Facilities

Auto parking facilities at SFIA, including employee, rental car and short- and long-term public parking, totaled about 30,730 stalls in 1990. Approximately 6,790 stalls, most of them for short-term public use, were in the five-level, 3.7-million-square-foot main parking garage, adjacent to the passenger terminal complex. Long-term parking is available in Lot D (approximately 3,560 public stalls and 970 employee stalls). Existing rental car parking lots, containing a total of about 2,010 auto parking stalls, are concentrated in the area between the passenger terminal and US 101 (see Figure 3). About 12,930 city and tenant employee parking stalls are at scattered locations on airport grounds (including the 970 employee stalls in Lot D), about 180 stalls are in the terminal courtyard area and about 5,170 parking stalls are located off-site in the airport vicinity. No Ground Transportation Center (RCP/GTC) facilities currently exist, apart from the curb areas between the terminals and the bi-level terminal loop roadway. SFIA parking facilities are detailed in EIR Section III.B, Transportation.

Functional Area 12.0: Existing Roads

Freeway access to SFIA is available via U.S. Highway 101 (US 101), U.S. Interstate Highway I-380 (I-380) and U.S. Interstate Highway I-280 (I-280) via I-380 (see Figure 1, p. 21). Four interchanges provide direct access to SFIA from US 101: Millbrae Avenue interchange, Terminal Access Road interchange, San Bruno Avenue interchange and North Access Road (I-380) interchange. Arterial streets that serve SFIA, in addition to Millbrae Avenue and San Bruno Avenue, include Old Bayshore Highway and South Airport Boulevard. As of 1989, roadways on SFIA property totaled about 18 miles, including the terminal access loop and the frontage road R-3 (McDonnell Road). SFIA roadway and pedestrian facilities are detailed in EIR Section III.B, Transportation.

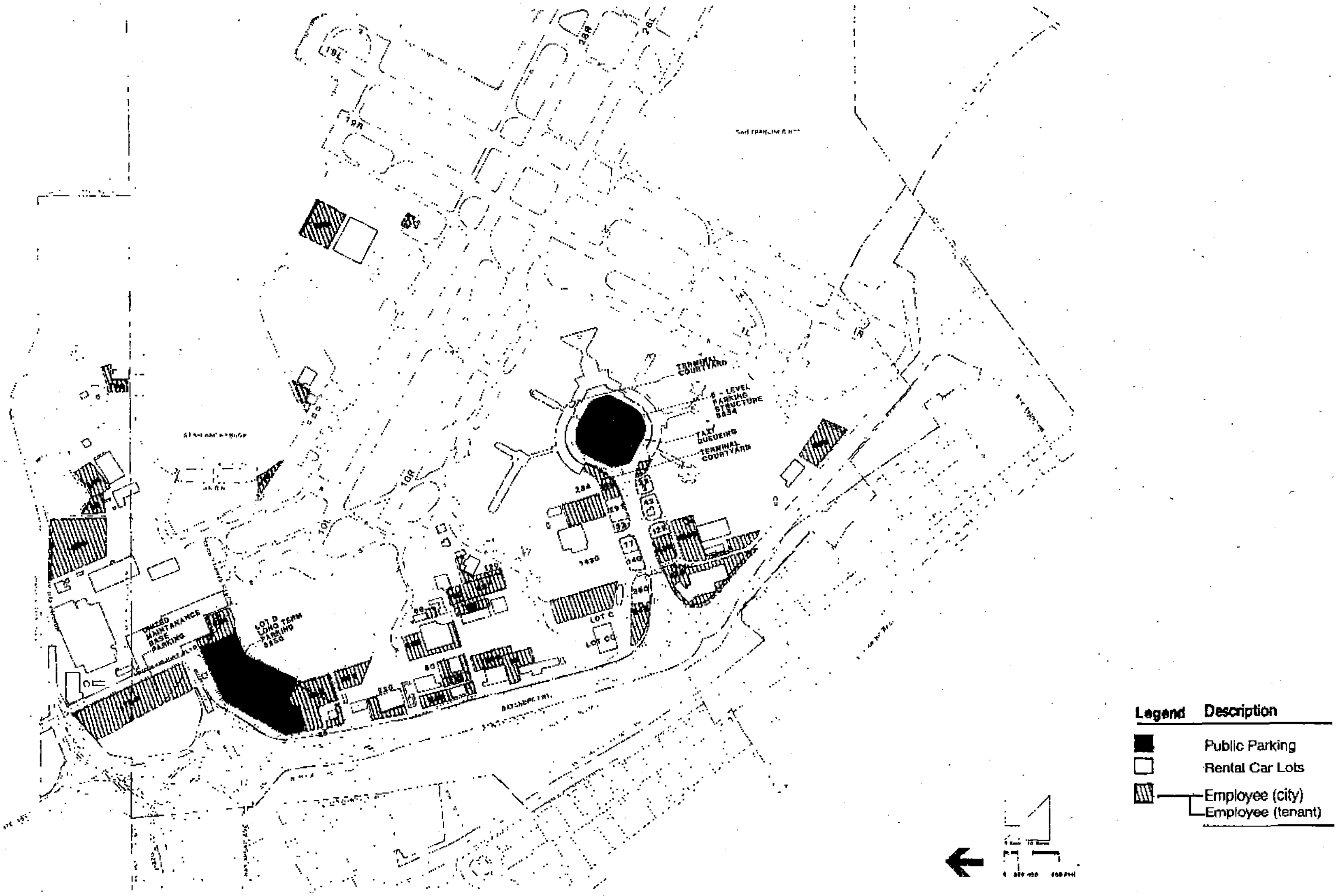
Functional Area 13.0: Existing Airside Facilities

SFIA runways are inventoried in the SFIA Master Plan but are not included in near-term and long-term projects (SFIA Master Plan airside projects include six proposed modifications on four taxiways). Existing runways and taxiways are also depicted graphically in the SFIA Master Plan (see Figure 2, p. 34).

The four existing SFIA runways, completed in 1951, lie on land created in the 1930s and 1940s by filling of San Francisco Bay. Each of the four intersecting runways is 200 feet wide and paved, and three runways are equipped for Instrument Flight Rule (IFR) landing operations. Lengths of the parallel east-west runways 28R-10L and 28L-10R are 11,870 feet and 10,600 feet, respectively. Lengths of the parallel north-south runways 1R-19L and 1L-19R are 9,500 feet and 7,000 feet, respectively.

SFIA MASTER PLAN PROJECTS

Proposed SFIA near-term and long-term Master Plan projects and demolition plans are illustrated in Figures 4 to 7, pp. 42 to 45. Projects under functional Parking categories



SOURCE: San Francisco International Airport Master Plan

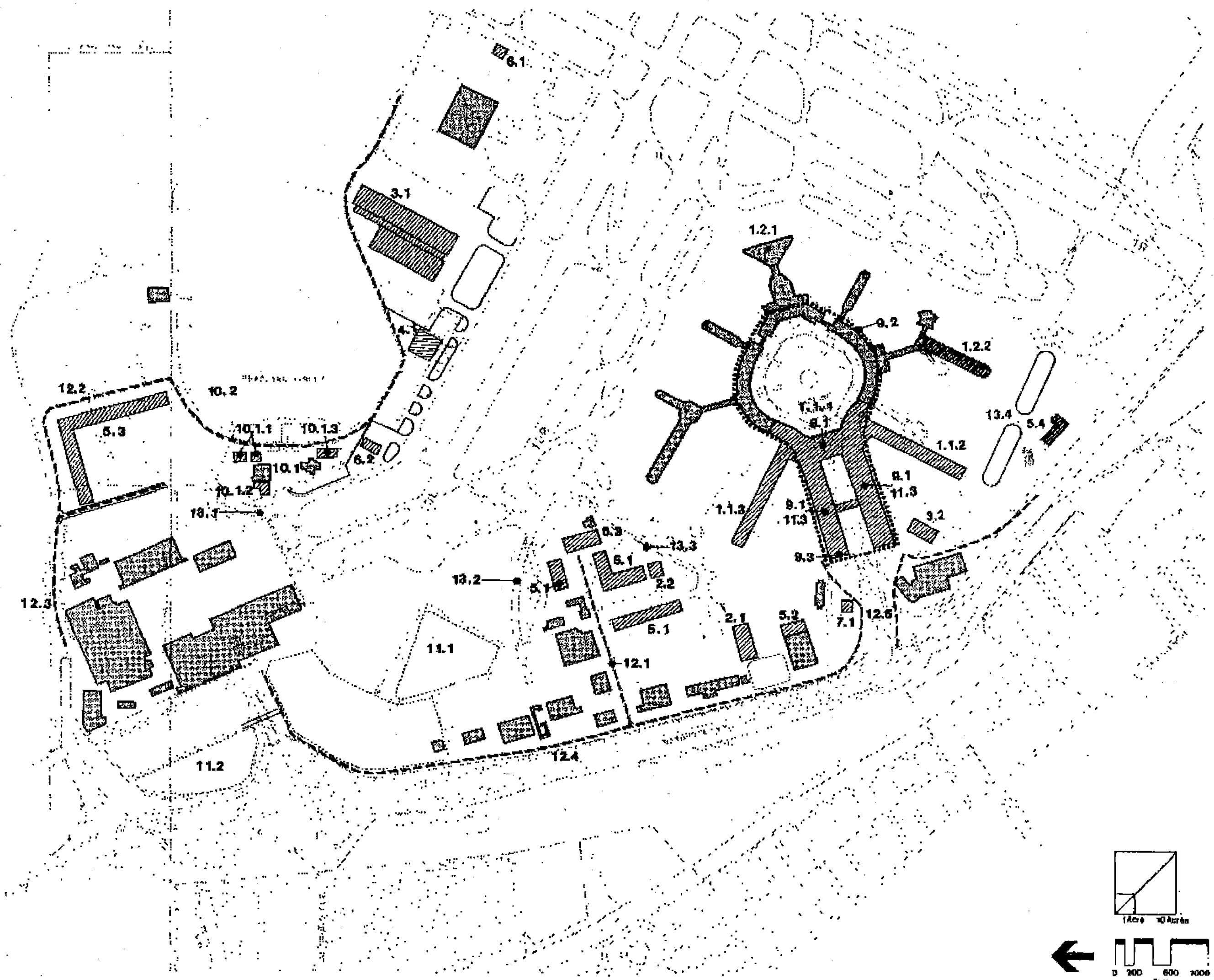
San Francisco International Airport ■

Figure 3
Parking

1.0 through 10.0 are summarized in Tables 4 to 7, pp. 46 to 49, and are presented in further detail in Appendix B, Table B.1, pp. A.18-31, respectively. Master Plan Summary tables in the Airports Commission's more abbreviated format are presented in Appendix B, Table B.2. Proposed changes in functional categories 11.0 through 13.0 (Parking, Roadway and Airside) are described briefly below and in more detail in EIR Sections III.B. Transportation, and III.C. Noise. Some SFIA Master Plan projects are in the approved September, 1989 SFIA Five-Year Capital Projects Plan (see Table 2, p. 28). Approved Capital Plan projects are analyzed in this EIR as part of both the project (SFIA Master Plan) and No-Project alternative.

Under the near-term SFIA Master Plan, about 1.2 million square feet of building space would be demolished and about 3.7 million square feet would be constructed, for a net increase of approximately 2.5 million square feet, bringing total 1996 SFIA building area to about 10.7 million square feet (figures do not include proposed parking garages and Rental Car Garage / Ground Transportation Center facilities). This net change would represent a 31 percent increase from the approximately 8.2 million total square feet of existing building area at SFIA. Under the long-term SFIA Master Plan, about 0.1 million additional square feet of building space would be demolished and about 0.5 million square feet would be constructed, for a net increase of about 0.4 million square feet in the 1997-2006 period.

Near-term and long-term SFIA Master Plan projects would together result in demolition of about 1.4 million square feet of existing building area and construction of about 4.2 million square feet of new building area, for a net increase of about 2.9 million square feet of building area. This total net change for combined SFIA Master Plan near-term and long-term projects represent a 35 percent increase from the existing 1989 SFIA building area total of about 8.2 million square feet. About 0.8 million square feet of existing building area would be remodeled and about 7,340 net new parking stalls would be added under combined near-term and long-term SFIA Master Plan projects.



Key

FUNCTIONAL CATEGORY	PROJ. NO.	PROJECT DESCRIPTION	STATUS*
TERMINAL	1.1.1	International Terminal	New
	1.1.2	Boarding Area A	Rep.
	1.1.3	Boarding Area G	New
	1.2.1	Boarding Area D	Ren.
	1.2.2	Boarding Area B, Phase I	Rep.
AIRLINE SUPPORT	2.1	UAL Catering	Rep
	2.2	American GSE	Rep.
AIRLINE MAINTENANCE	3.1	E. Field Maint. Hangar	Rep./New
	3.2	Pan Am Maint. Hangar	Rel.
GENERAL AVIATION	4.1	FBO	Rep.
AIRFREIGHT	5.1	W. Field Cargo/Maint.	Rep./New
	5.2	UAL Cargo Facility Expansion	New
	5.3	N. Field Cargo/Maint.	Rep./New
	5.4	TWA Cargo	Ren.
AIRPORT SUPPORT	6.1	CFR No. 3	Ren.
	6.2	Multipurpose Facility	Rep.
	6.3	CFR Support Bldg.	Rep.
COMMERCIAL	7.1	Service Station	Rep.
ADMINISTRATION	8.1	International Terminal Levels 4, 5, 6, 7 & 8	Rep./New
TRANSPORTATION	9.1	Transport/Rental Car Center	New
	9.2	Automated People Mover	New
	9.3	APM Maint. Facility	New
MISC. FACILITIES	10.1	Relocation of Coast Guard Facilities	Rel.
	10.2	Seaplane Harbor Dock Facility	New
PARKING	11.1	Addition to Lot D	New
	11.2	Lot DD & Overpass	New
	11.3	Transportation Center 5th Level	New
ROADS	12.1	Widening of R-8	
	12.2	Rdwy. @ USCG Perimeter	
	12.3	Widening of North Access Road	
	12.4	Widening of R-3	
	12.5	Caltrans Ramps & Elev. Rdwys.	New
AIRSIDE	13.1	Taxiway C Realignment	
	13.2	Taxiway R Realignment	
	13.3	Taxiway A&B Realignment	
	13.4	Taxiway A&B Extension	

*Rel. = Relocation Ren. = Renewal Rep. = Replacement

Legend

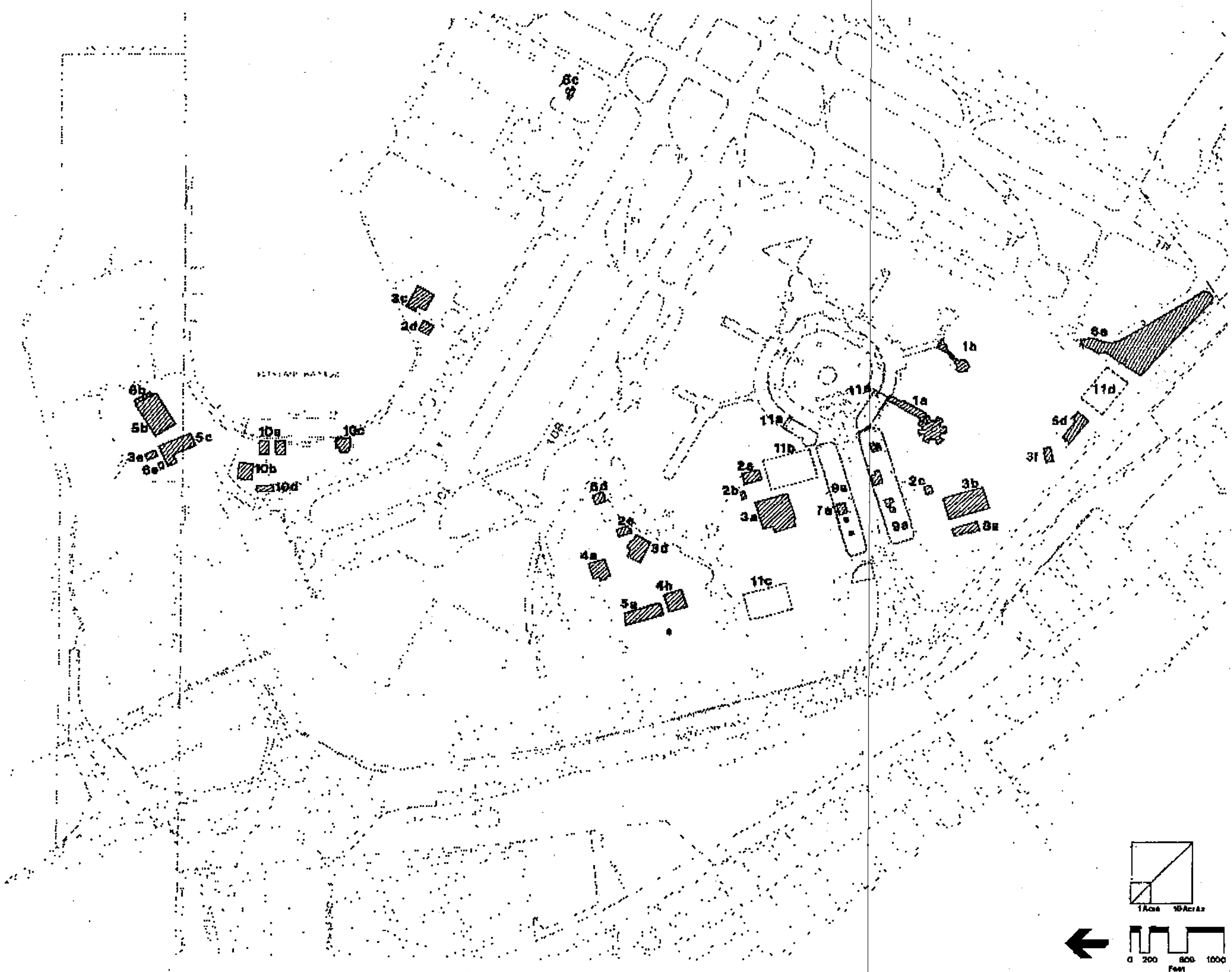
- A.P.M. (Automated People Mover)
- Road Improvements & Additions
- Parking Improvements & Additions
- Near-Term Projects - Facilities
- Existing Facilities

SOURCE: San Francisco International Airport Master Plan

San Francisco International Airport

Figure 4
Near-Term Master Plan

439



Key

CATEGORY	CODE NO.	EXISTING FACILITY TO BE DEMOLISHED	ACTION*
TERMINAL	1a	Boarding Area A	Rep.
	1b	Boarding Area B, 1	Rel.
	Subtotal		
AIRLINE SUPPORT	2a	UAL Catering	Rel.
	2b	UAL Boiler House	Rel.
	2c	Pan Am Crew Baggage	Rel.
	2d	ASII/Evergreen	Rel.
	2e	American GSE	Rel.
	Subtotal		
AIRLINE MAINTENANCE	3a	UAL Service Center	Rel.
	3b	Pan Am Maint. Hangar	Rel.
	3c	Hangar Building	Demol.
	3d	Maint. Hangar	Rel.
	3e	JAL Maintenance	Rel
	3f	TWA Service Center	Rel
	Subtotal		
GENERAL AVIATION	4a	Butler FBO	Rel
	4b	Chevron Hangar	Rel.
	Subtotal		
AIRFREIGHT	5a	Cargo Bldg 7	Rep.
	5b	Flying Tigers	Rel.
	5c	JAL Cargo	Rel.
	5d	TWA Cargo	Rec.
	Subtotal		
AIRPORT SUPPORT	6a	Dry Storage Tanks	Demol
	6b	Building 1000	Rel
	6c	CFR 2	Rel.
	6d	CFR 1 Support Bldg.	Rel.
	6e	Pump Station	Rel.
	Subtotal		
COMMERCIAL	7a	Service Station	Rel.
ADMIN./OFFICE	8a	Pan Am Admin.	Rel.
TRANSPORTATION	9a	Rental Car Lots	Rep.
MISCELLANEOUS	10a	USCG Ramps, Pumps, Fuel Hydrants	Rel.
	10b	Tank Farm	Rel.
	10c	Barracks	Demol
	10d	Shop Bldg.	Rel.
PARKING	11a	Tenant Parking	
	11b	UAL Service Center Parking	
	11c	UAL Emp. Parking (Plots 5&6)	
	11d	TWA Parking	Rec.

*Demol. = Demolish Facility with No Replacement
Rel. = Relocated Facility to New Site
Rep. = Replaced Facility on Existing Site
Rec. = Reconfigure

Legend

Demolition Projects – Parking

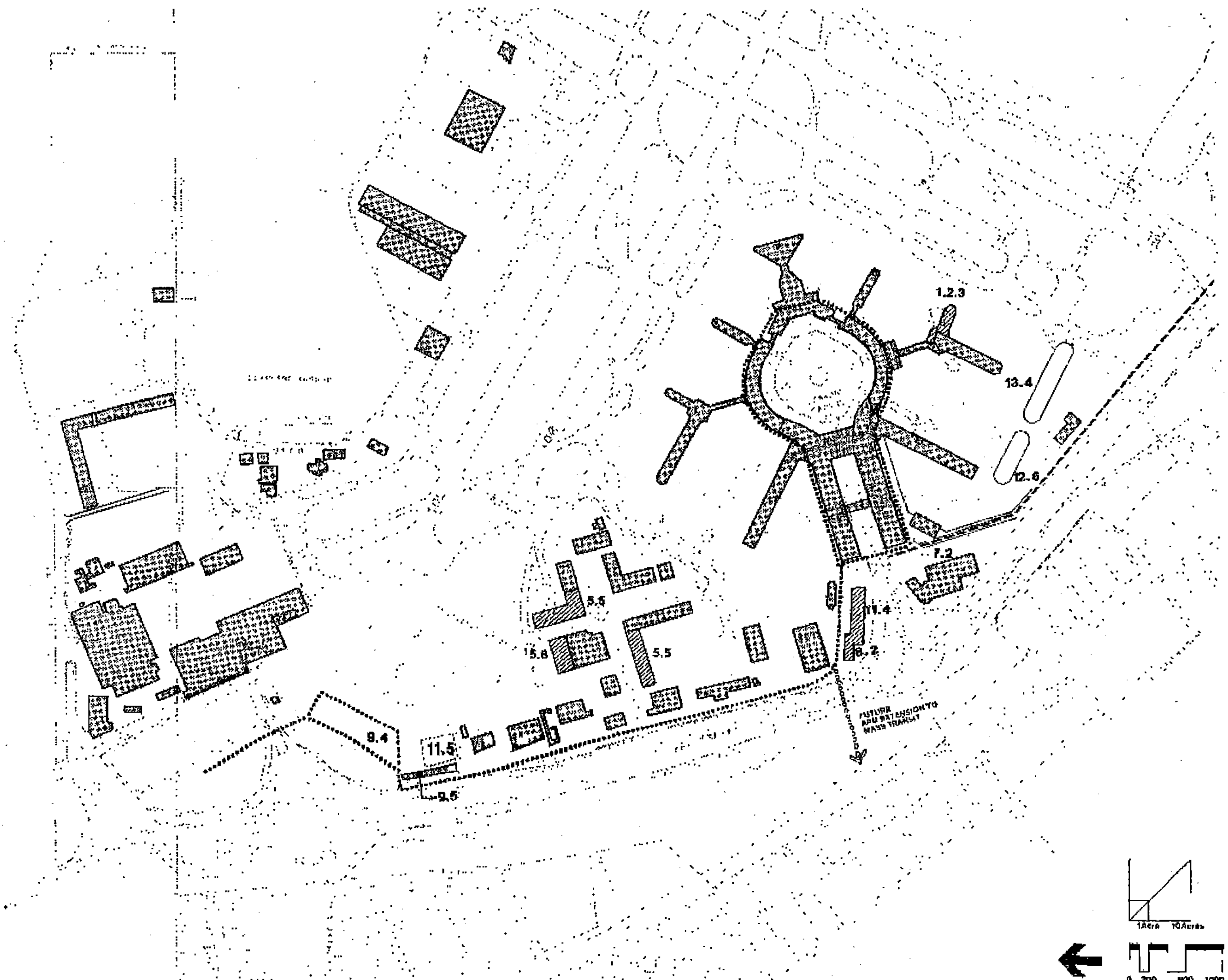
Demolition Projects – Facilities

SOURCE: San Francisco International Airport Master Plan

San Francisco International Airport

Figure 5

Near-Term Demolition Projects



Key

FUNCTIONAL CATEGORY	PROJ. NO.	PROJECT DESCRIPTION	STATUS*
TERMINAL	1,2,3	Boarding Area B, Phase II	Rep.
AIRFREIGHT	5.5	W. Field Cargo/Maint.	New
	5.6	Mail Facility Expansion	New
COMMERCIAL	7.2	Hilton Hotel Expansion/ Renovation	Rem.
ADMIN./OFFICE	8.2	Office	New
TRANSPORTATION	9.4	APM - Phase II	New
	9.5	APM Maint. Facility	New
PARKING	11.4	New 5 Level Parking Structure	New
	11.5	Lot D Expansion to B of A Lot	New
ROADWAY	12.6	Widening of R-2	

*Rem. = Remodeled Facility
Rep. = Replaced Facility on Existing Site

Legend

- A.P.M. (Automated People Mover)
- Road Improvements & Additions
- Parking Improvements & Additions
- Long-Term Projects Facilities
- Existing and Near-Term Facilities

SOURCE: San Francisco International Airport Master Plan

San Francisco International Airport

Figure 6

Long-Term Master Plan

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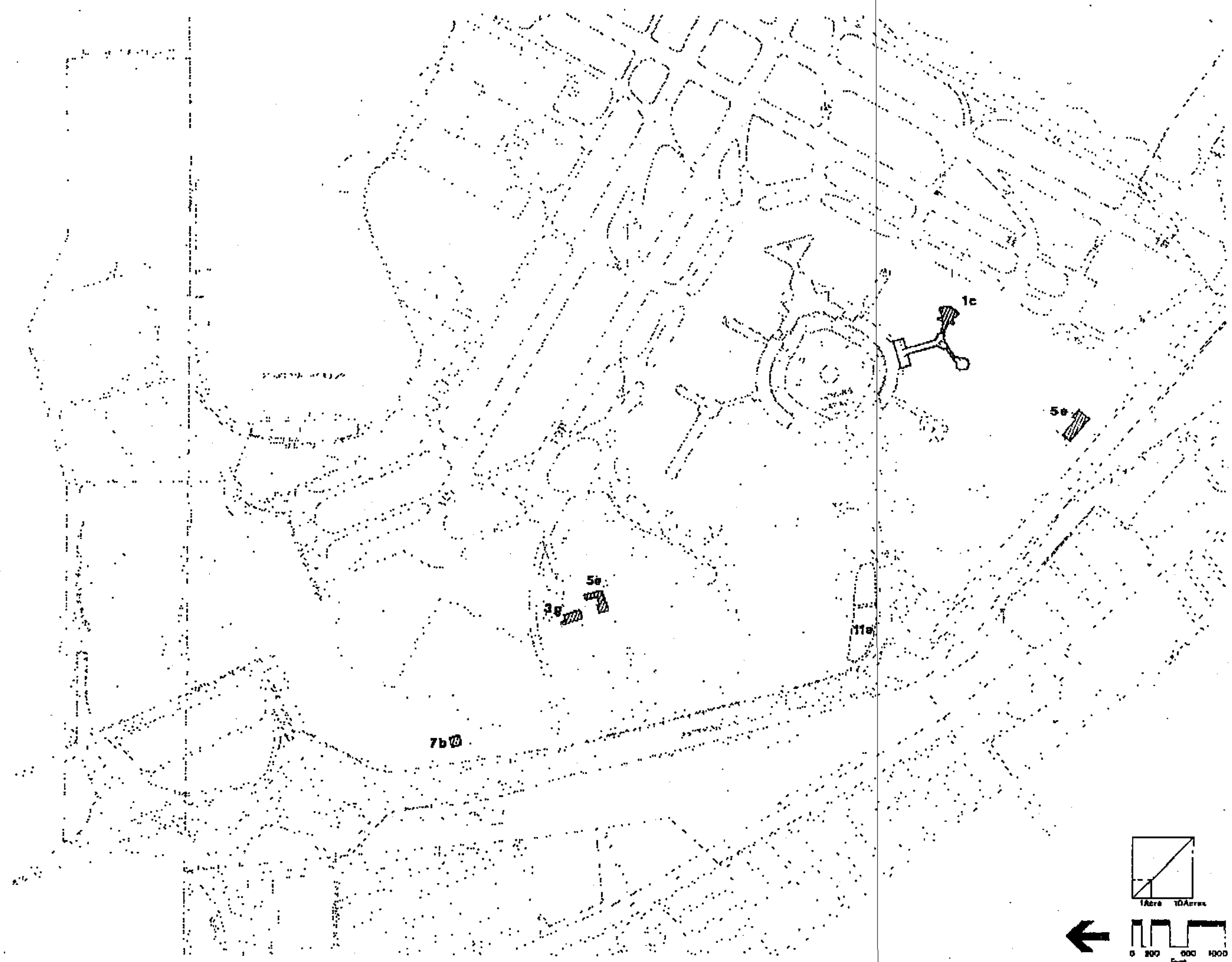


Key

CATEGORY	CODE NO.	EXISTING FACILITY TO BE DEMOLISHED	ACTION*
TERMINAL	1c	Boarding Area B. Phase II	Rep.
AIRLINE MAINTENANCE	[illegible]	Bldg. 42 Maint. Hangar	Rel.
	Subtotal		
AIRFREIGHT	5e	Airborne Cargo	Rel.
	Subtotal		
COMMERCIAL	7b	Bank of America	Rel.
PARKING	11a	Lots C&CC Tenant Parking	Rel.

*Rel. = Relocated Facility to New Site
Rep. = Replaced Facility on Existing Site

Legend

Demolition Projects – Parking

Demolition Projects – Facilities

SOURCE: San Francisco International Airport Master Plan

San Francisco International Airport

Figure 7

Long-Term Demolition Projects

TABLE 4: NEAR-TERM SFIA MASTER PLAN PROJECTS BY FUNCTIONAL AREA (1990-1996) - SUMMARY /a/

	Function	Existing 1990	Demolish	Construct	Net New Construction/b/	Remodel	No Change/c/	1996 Total/d/
1.0	SUBTOTAL TERMINAL	2,620,500	(245,600)	1,650,000	1,404,400	490,000	1,884,900	4,024,900
2.0	SUBTOTAL AIRLINE SUPPORT (NONTERMINAL)	81,800	(30,300)	70,000	39,700		51,500	121,500
3.0	SUBTOTAL AIRLINE MAINT.	3,918,300	(455,400)	757,500	302,100		3,462,900	4,220,400
4.0	SUBTOTAL GENERAL AVIATION	88,100	(88,100)	90,000	1,900			90,000
5.0	SUBTOTAL AIR FREIGHT	867,700	(241,300)	792,300	551,000	71,400	555,000	1,418,700
6.0	SUBTOTAL AIRPORT SUPPORT	172,800	(34,800)	39,000	4,200		138,000	177,000
7.0	SUBTOTAL COMMERCIAL	234,000	(900)	101,000	100,100		233,100	334,100
8.0	SUBTOTAL ADMIN./OFFICE	126,100	(33,900)	160,000	126,100		92,200	252,200
10.0	SUBTOTAL MISCELLANEOUS	88,400	(88,400)	63,400	(25,000)			63,400
TOTAL NEAR-TERM PLAN		**8,197,700**	**(1,218,700)**	**3,723,200**	**2,504,500**	**561,400**	**6,417,600**	**10,702,200**

46442

NOTE: Negative values are in parentheses.

/a/ All figures are in gross building square feet. Detailed building project summaries by function are in Appendix B, Table B.1.
/b/ Net New Construction = Construct square feet minus Demolish square feet.
/c/ No Change = Existing 1990 square feet minus (Demolish square feet + Remodel square feet).
/d/ Total 1996 = Construct square feet + Remodel square feet + No Change square feet OR Existing 1990 square feet + Net New Construction square feet.

SOURCES: Table 6.3 and Appendix 12.5, *SFIA Final Draft Master Plan*, 1989; SFIA Airports Commission, 1990; U.S. Coast Guard, 1990; Environmental Science Associates, Inc., 1990.

TABLE 5: LONG-TERM SFIA MASTER PLAN PROJECTS BY FUNCTIONAL AREA (1997-2006) - SUMMARY/a/

	Function	1996 Total	Demolish	Construct	Net New Construction/b/	Remodel	No Change/c/	2006 Total/d/
1.0	SUBTOTAL TERMINAL	4,024,900	(32,000)	104,000	72,000		3,992,900	4,096,900
2.0	SUBTOTAL AIRLINE SUPPORT (NONTERMINAL)	121,500					121,500	121,500
3.0	SUBTOTAL AIRLINE MAINT.	4,220,400	(26,800)		(26,800)		4,193,600	4,193,600
4.0	SUBTOTAL GENERAL AVIATION	90,000					90,000	90,000
5.0	SUBTOTAL AIR FREIGHT	1,418,700	(60,000)	294,000	234,000		1,358,700	1,652,700
6.0	SUBTOTAL AIRPORT SUPPORT	177,000					177,000	177,000
7.0	SUBTOTAL COMMERCIAL	334,100	(13,100)		(13,100)	220,000	101,000	321,000
8.0	SUBTOTAL ADMIN./OFFICE	252,200		100,000	100,000		252,200	352,200
10.0	SUBTOTAL MISCELLANEOUS	63,400					63,400	63,400
TOTAL LONG-TERM PLAN		**10,702,200**	**(131,900)**	**498,000**	**366,100**	**220,000**	**10,350,300**	**11,068,300**

NOTE: Negative values are in parentheses.

/a/ All figures are in gross building square feet. Detailed building project summaries by function are in Appendix B, Table B.1.
/b/ Net New Construction = Construct square feet minus Demolish square feet.
/c/ No Change = 1996 Total square feet minus (Demolish square feet + Remodel square feet).
/d/ Total 2006 = Construct square feet + Remodel square feet + No Change square feet OR 1996 Total square feet + Net New Construction square feet.

SOURCES: Table 6.3 and Appendix 12.5, *SFIA Final Draft Master Plan*, 1989; SFIA Airports Commission, 1990; U.S. Coast Guard, 1990; Environmental Science Associates, Inc., 1990.

TABLE 6: TOTAL SFIA MASTER PLAN PROJECTS BY FUNCTIONAL AREA (1990-2006) - SUMMARY/a/

	Function	1990 Total	Demolish	Construct	Net New Construction/b/	Remodel	2006 Total/c/
1.0	TOTAL TERMINAL	2,620,500	(277,600)	1,754,000	1,476,400	490,000	4,096,900
2.0	TOTAL AIRLINE SUPPORT (NONTERMINAL)	81,800	(30,300)	70,000	39,700		121,500
3.0	TOTAL AIRLINE MAINT.	3,918,300	(482,200)	757,500	275,300		4,193,600
4.0	TOTAL GENERAL AVIATION	88,100	(88,100)	90,000	1,900		90,000
5.0	TOTAL AIR FREIGHT	867,700	(301,300)	1,086,300	785,000	71,400	1,652,700
6.0	TOTAL AIRPORT SUPPORT	172,800	(34,800)	39,000	4,200		177,000
7.0	TOTAL COMMERCIAL	234,000	(14,000)	101,000	87,000	220,000	321,000
8.0	TOTAL ADMIN./OFFICE	126,100	(33,900)	260,000	226,100		352,200
10.0	TOTAL MISCELLANEOUS	88,400	(88,400)	63,400	(25,000)		63,400
GRAND TOTAL MASTER PLAN		**8,197,700**	**(1,350,600)**	**4,221,200**	**2,870,600**	**781,400**	**11,068,300**

NOTE: Negative values are in parentheses.

/a/ All figures are in gross building square feet. Detailed building project summaries by function are in Appendix B, Table B.1.
/b/ Net New Construction = Construct square feet minus Demolish square feet.
/c/ Total 2006 = Existing 1990 square feet + Net New Construction square feet.

SOURCES: Table 6.3 and Appendix 12.5, *SFIA Final Draft Master Plan*, 1989; SFIA Airports Commission, 1990; U.S. Coast Guard, 1990; Environmental Science Associates, Inc., 1990.

TABLE 7: SFIA MASTER PLAN BUILDING AREA CHANGES, 1996 AND 2006 /a/

		Near-Term Master Plan (1990 - 1996)			Total Master Plan (1989 - 2006)		
Function	Building Area Total 1990	Building Area Total 1996	Net Change 1990-1996	Percent Change 1990-1996	Building Area Total 2006	Net Change 1990-2006	Percent Change 1990-2006
1.0 Terminal	2,620,500	4,024,900	1,404,400	54%	4,096,900	1,476,400	56%
2.0 Airline Support	81,800	121,500	39,700	49%	121,500	39,700	49%
3.0 Airline Maint.	3,918,300	4,220,400	302,100	8%	4,193,600	275,300	7%
4.0 General Aviation	88,100	90,000	1,900	2%	90,000	1,900	2%
5.0 Air Freight	867,700	1,418,700	551,000	64%	1,652,700	785,000	90%
6.0 Airport Support	172,800	177,000	4,200	2%	177,000	4,200	2%
7.0 Commercial	234,000	334,100	100,100	43%	321,000	87,000	37%
8.0 Admin./Office	126,100	252,200	126,100	100%	352,200	226,100	179%
10.0 Miscellaneous	88,400	63,400	(25,000)	(28%)	63,400	(25,000)	(28%)
TOTAL BUILDING AREA	8,197,700	10,702,200	2,504,500	31%	11,068,300	2,870,600	35%

NOTE: Negative values are in parentheses.

/a/ All figures are in gross building square feet. Detailed building project summaries by function are in Appendix B, Table B.1.

SOURCES: Appendix 12.5, *SFIA Final Draft Master Plan*, 1989; U.S. Coast Guard, 1990; Environmental Science Associates, Inc., 1990.

- Proposed Facility Projects in Buildings

- 1.0 Terminal Facilities: SFIA Master Plan Projects

Near-Term SFIA Master Plan (1990 - 1996). A 250,000-square-foot International Terminal would be constructed on the west side of the terminal complex, above the existing terminal area access road. The building would have seven levels; the lower three levels would accommodate 250,000 square feet of passenger terminal functions and the upper four levels would accommodate about 160,000 square feet of administration and office functions and 100,000 square feet of hotel space (the latter are described under functional areas 7.0 and 8.0). A two-level roadway system would be constructed to provide access to the enplaning and deplaning levels. Two bi-level, 500,000-square-foot boarding piers (replacement Boarding Area A and new Boarding Area G) would be constructed adjacent to the new International Terminal. Each pier would extend approximately 1,200 feet and provide up to 13 gate positions.

Existing Boarding Area A (185,600 square feet) and 60,000 square feet of existing Boarding Area B would be demolished. A 400,000-square-foot boarding area (replacement Boarding Area B, Phase I) would be constructed to serve the existing South Terminal. Net additional terminal building area (excluding administration/office and hotel space in the new terminal) would total approximately 1,404,400 square feet. About 490,000 square feet of existing international terminal and boarding area would be remodeled for domestic terminal use.

Long-Term SFIA Master Plan (1997 - 2006). The remaining 32,000 square feet of Boarding Area B would be demolished and replaced with 104,000 square feet (replacement Boarding Area B, Phase II), for a net addition of 72,000 square feet. Combined near-term and long-term terminal projects would result in demolition of about 277,600 square feet and construction of about 1,754,000 square feet, for a total net addition of approximately 1,476,400 square feet of building area, including 22 or more additional aircraft gates.

2.0 Airline Support Facilities: SFIA Master Plan Projects

Near-Term SFIA Master Plan (1990 - 1996). A boilerhouse and four buildings, comprising about 30,300 square feet of area, would be demolished: United Airlines (UAL) Catering, American Airlines Ground Services Equipment (GSE) building, ASII/Evergreen building and Pan Am Crew Baggage Holding. A two-level, 60,000-square-foot replacement UAL Catering building and a single-level, 10,000-square-foot replacement American GSE would be constructed in the West Field area, totaling 70,000 square feet of new construction and about 39,700 square feet of net new building area. Pan Am Crew Baggage Holding would be accommodated in the proposed Pan Am Maintenance/Administration/Cargo Facility south of the terminal access road (under Functional Area 3.0), and ASII/Evergreen would be accommodated in the proposed North Field Cargo/Maintenance Facility (under Functional Area 5.0).

Long-Term SFIA Master Plan (1997 - 2006). No additional Airline Support projects would be included in the Long-Term SFIA Master Plan.

3.0 Airline Maintenance Facilities: SFIA Master Plan Projects

Near-Term SFIA Master Plan (1990 - 1996). Six buildings, comprising about 455,400 square feet of area, would be demolished: Vacant Hangar (Building 32), Qantas Maintenance Hangar, United Airlines Maintenance Center, Pan Am Maintenance, TWA Service Building and Japan Airlines (JAL) Maintenance Building. A 495,000-square-foot East Field Maintenance Hangar would be constructed to accommodate future expansion and to consolidate functions from the demolished maintenance buildings in the West Field area (all of the above-named except JAL and Pan Am). A 262,500-square-foot replacement Pan Am building, to house maintenance, administration and air freight functions, would be constructed in the vicinity of the existing Pan Am building, which would be demolished to accommodate the proposed expansion of Boarding Area A. JAL Maintenance would relocate to the proposed North Field Cargo/Maintenance facility (described under 5.0 Air Freight, below). Airline maintenance facility construction would total about 757,500 square feet; net new building area would total about 302,100 square feet.

Long-Term SFIA Master Plan (1997 - 2006). The Continental Maintenance Hangar (Building 42), containing about 26,800 square feet of building area, would be demolished. Combined near-term and long-term airline maintenance projects would result in demolition of about 482,200 square feet and construction of about 757,500 square feet, for a total net addition of approximately 275,300 square feet of building area.

4.0 General Aviation Facilities: SFIA Master Plan Projects

Near-Term SFIA Master Plan (1990 - 1996). The 48,112-square-foot Butler Aviation Fixed Base Operator (FBO) facility, and the 40,000-square-foot Chevron Hangar, both now located in the West Field area, would be demolished. A new, 90,000-square-foot replacement facility would be constructed in the East Field area, near the proposed East Field Maintenance Hangar.

Long-Term SFIA Master Plan (1997 - 2006). No additional General Aviation projects would be included in the Long-Term SFIA Master Plan.

5.0 Air Freight Facilities: SFIA Master Plan Projects

Near-Term SFIA Master Plan (1990 - 1996). Three air freight facilities, totaling about 241,300 square feet, would be demolished: Flying Tigers Hangar (Federal Express), JAL Cargo Building, and Cargo Building Number 7. (The Flying Tigers Hangar is slated for demolition in 1989-90 under the approved SFIA Capital Projects Plan; the demolition is analyzed in this EIR as part of the SFIA Master Plan and also as part of the No-Project alternative.) A 324,000-square-foot, four-building West Field Cargo/Maintenance facility, and a 432,000-square-foot North Field Cargo/Maintenance facility would be constructed. A 36,300-square-foot addition to the existing United Cargo facility, located in the West Field area, would also be constructed. Air Freight facility construction would total about 792,300 square feet; net new building area would total about 551,000 square feet. The TWA Cargo facility, about 71,400 square feet, would be remodeled.

Long-Term SFIA Master Plan (1997 - 2006). The 60,000-square-foot Airborne Cargo Building, located in the West Field Area, would be demolished. Three buildings, totaling about 162,000 square feet, would be constructed as part of the West Field Cargo/Maintenance facility, and a 132,000-square-foot addition would be constructed for the nearby U.S. Air Mail facility, bringing total construction under the long-term SFIA Master Plan to about 294,000 square feet of building area. Combined near-term and long-term Air Freight projects would result in demolition of about 301,300 square feet and construction of about 1,806,300 square feet, for a total Master Plan net addition of approximately 785,000 square feet of building area.

6.0 Airport Support Facilities: SFIA Master Plan Projects

Near-Term SFIA Master Plan (1990 - 1996). Day storage fuel tanks in the South Field area, and the Shell Garage/Warehouse in the North Field area would be demolished. All three Crash/Fire/Rescue facilities, totaling about 34,800 square feet of building area, would be demolished and replaced by three facilities totaling about 39,000 square feet of building area. (Replacement of CFR Building #2, scheduled for 1989-90 under the approved SFIA Five-Year Capital Projects Plan, is ongoing.)

Airport support projects would also include installation of additional utilities, including new water lines, sanitary sewage lines, industrial waste sewer lines, storm drainage lines, and electrical transmission lines. Changes to existing utility structures are listed in Table 8. Proposed utility projects are further described in EIR Section IV.J. Utilities.

Long-Term SFIA Master Plan (1997 - 2006). Beyond completion of new utility systems, no additional airport support projects would be included in the Long-Term SFIA Master Plan.

7.0 Commercial Facilities: SFIA Master Plan Projects

Near-Term SFIA Master Plan (1990 - 1996). The 900-square-foot Chevron gas station, north of the terminal roadway, would be demolished and a 1000-square-foot replacement facility would be constructed nearby. Approximately 100,000 square feet of hotel area would be constructed in conjunction with the 160,000 square feet of administrative/office space planned for levels four through eight of the proposed new international terminal.

Long-Term SFIA Master Plan (1997 - 2006). The approximately 13,100-square-foot Bank of America, on the north end of the West Field area, would be demolished. Replacement area would be provided near the terminal roadway in the proposed 100,000-square-foot office building (described under 8.0 Administration/Office, below). The 220,000-square-foot Hilton Inn would be remodeled. Combined near-term and long-term commercial projects would result in demolition of about 14,000 square feet, remodeling of about 220,000 square feet, and construction of about 101,000 square feet, for a total Master Plan net increase of approximately 87,000 square feet of building area.

TABLE 8: MISCELLANEOUS STRUCTURES AFFECTED BY MASTER PLAN PROJECTS (1990-2006)

Facility	Demolish	Construct
AIRLINE SUPPORT		
61 United Boilerhouse	x	x
AIRPORT SUPPORT		
Day Storage:		
69 Shell Storage Tanks	x	
86 Shell Garage/Warehouse	x	
70 Union Storage Tanks	x	
71 PST Tanks	x	
72 PST Tanks	x	
MISCELLANEOUS		
U.S. Coast Guard Facilities		
Ramps	x	x
Pumps	x	x
Fuel Hydrants	x	x
Tank Farm	x	x
Multi-Use Harbor Dock	x	x

SOURCE: *SFIA Final Draft Master Plan*, 1989.

8.0 Administration/Office Facilities: SFIA Master Plan Projects

Near-Term SFIA Master Plan (1990 - 1996). The approximately 33,900-square-foot Pan Am Administration building, near the Pan Am Maintenance facility in the South Field area, would be demolished. Replacement area would be provided in the 160,000-square-foot, four-level office/administration area to be constructed over the proposed three-level International Terminal. The airport administration offices, currently situated in the existing International Terminal, would relocate to the new terminal as well. (As described above under Functional Area 1.0, 100,000 square feet of hotel space would also be built above the International Terminal.) Net new

Office/Administration construction under the near-term SFIA Master Plan would total about 126,100 square feet of building area. Note: administration/office space in existing terminal buildings, not inventoried in the SFIA Master Plan, would continue in those uses. The existing International Terminal would be converted to domestic use.

Long-Term SFIA Master Plan (1997 - 2006). A 100,000-square-foot office building (with adjoining five-level parking Garage CC) would be constructed in the West Field area, near the terminal roadway. Combined near-term and long-term Administration/Office projects would result in demolition of about 33,900 square feet and construction of about 260,000 square feet, for a total net addition of approximately 226,100 square feet of building area.

9.0 Rental Car Garage / Ground Transportation Facilities: SFIA Master Plan Projects

Near-Term SFIA Master Plan (1990 - 1996). A 960,000-square-foot, multi-level Rental Car Garage / Ground Transportation Center (RCG/GTC) would be constructed on both sides of, and above, existing terminal roadways R-1N and R-1S. North and south portions of the Rental Car Garage / Ground Transportation Center would be connected by vehicle bridges and would be served by a new elevated roadway system designed to segregate traffic from the existing airport entrance and terminal roadway system. Level 1 would accommodate rental car shops, offices, car washing and garage facilities; Level 2 would accommodate bus and shuttle van staging areas; Level 3 would accommodate rental car pickup and return areas; Level 4 would accommodate rental car staging and storage; and Level 5 would accommodate short-term public, permit and city employee parking. Underground fuel storage for rental car agencies would be installed at the outside perimeter of the proposed Rental Car Garage / Ground Transportation Center./12/

Existing rental car facilities and the Chevron gas station would be relocated to accommodate the Rental Car Garage / Ground Transportation Center (relocation of Dollar and Budget rental car companies is included in the approved SFIA Capital Projects Plan). Existing underground utilities would also be removed and reconstructed to accommodate the Rental Car Garage / Ground Transportation Center./12/

An Automated People Mover (APM) system, consisting of a dual fixed guideway alignment with trains moving in both directions, would be constructed along the circumference of the terminal roadway. A 30,000-square-foot interim APM maintenance facility would be constructed within the proposed Rental Car Garage / Ground Transportation Center. A parking Garage DD, approximately two million square feet in area, would be constructed adjacent to parking Lot D. Transportation construction under the near-term SFIA Master Plan would total approximately 3,180,000 square feet of building area (parking facilities are described further under functional area 11.0). Note: Rental Car Garage / Ground Transportation Center building area is not included in the totals shown in the SFIA Master Plan Project Summary Tables 3 - 6, pp. 31-33, 46-48, but is instead included with the SFIA Master Plan parking garage project totals, shown in Table 9, p. 57.

Long-Term SFIA Master Plan (1997 - 2006). The APM system would be extended to the existing and proposed new remote long-term parking Lots D and DD. The interim APM maintenance facility would be demolished and converted into additional Transportation Center parking (approximately 80 spaces). A 60,000-square-foot, permanent APM maintenance facility would be constructed in parking Lot D. A parking Lot CC, approximately 440,000 square feet in area, would be constructed next to the proposed new office building. Combined near-term and long-term transportation projects would result in a net addition of approximately 3,648,000 square feet of building area. As above, this building area is shown in Table 9, p. 57.

10.0 Miscellaneous Facilities: SFIA Master Plan Projects

Near-Term SFIA Master Plan (1990 - 1996). Existing U.S. Coast Guard facilities (about 88,400 square feet of barracks and shops, as well as ramps, pumps, fuel hydrants and tank farm) would be demolished and all but the 25,000-square-foot barracks reconstructed at a new location to accommodate Master Plan projects in the North and East Field areas. (Realignment of Taxiway C, and construction of a new roadway through the U.S. Coast Guard property, would also be implemented.)

Existing SFIA dock facilities (about 10,000 square feet) at the seaplane harbor would be demolished and replaced with an approximately 20,000-square-foot multi-use harbor dock facility. Other proposed demolition and reconstruction of miscellaneous structures are shown in Table 8, p. 54.

TABLE 9: RENTAL CAR GARAGE / GROUND TRANSPORTATION CENTER, AUTOMATED PEOPLE MOVER (APM) AND PARKING GARAGE AREAS - NEAR-TERM AND LONG-TERM MASTER PLAN

Facility	Area in Square Feet
Near-Term Master Plan	
Rental Car Garage / Ground Transportation Center	960,000
Automated People Mover (APM) Maintenance (interim)	30,000
Garage DD	2,190,000 /a/
Subtotal, Near-Term Plan	3,180,000
Long-Term Master Plan	
APM Maintenance (interim)	(30,000)
APM Maintenance (permanent)	60,000
Garage CC	438,000
Subtotal, Long-Term Plan	468,000
TOTAL MASTER PLAN	3,648,000

/a/ Garage areas are estimated from number of stalls listed in SFIA Master Plan, using a factor of 365 square feet per stall. The proposed Garage DD would have about 6,000 stalls and the proposed garage CC would have about 1,200 stalls.

SOURCES: *SFIA Final Draft Master Plan; Transportation and Traffic Engineering Handbook*, Second Edition, Institute of Transportation Engineering, Washington, D.C., 1982; Environmental Science Associates, Inc.

Airport utility systems would be expanded and upgraded under both near- and long-term Master Plans, as described in EIR Section IV.J. Utilities Impacts.

Long-Term SFIA Master Plan (1997 - 2006). Beyond completion of utility systems, no additional miscellaneous facility projects would be included in the long-term SFIA Master Plan.

11.0 Parking Facilities: SFIA Master Plan Projects

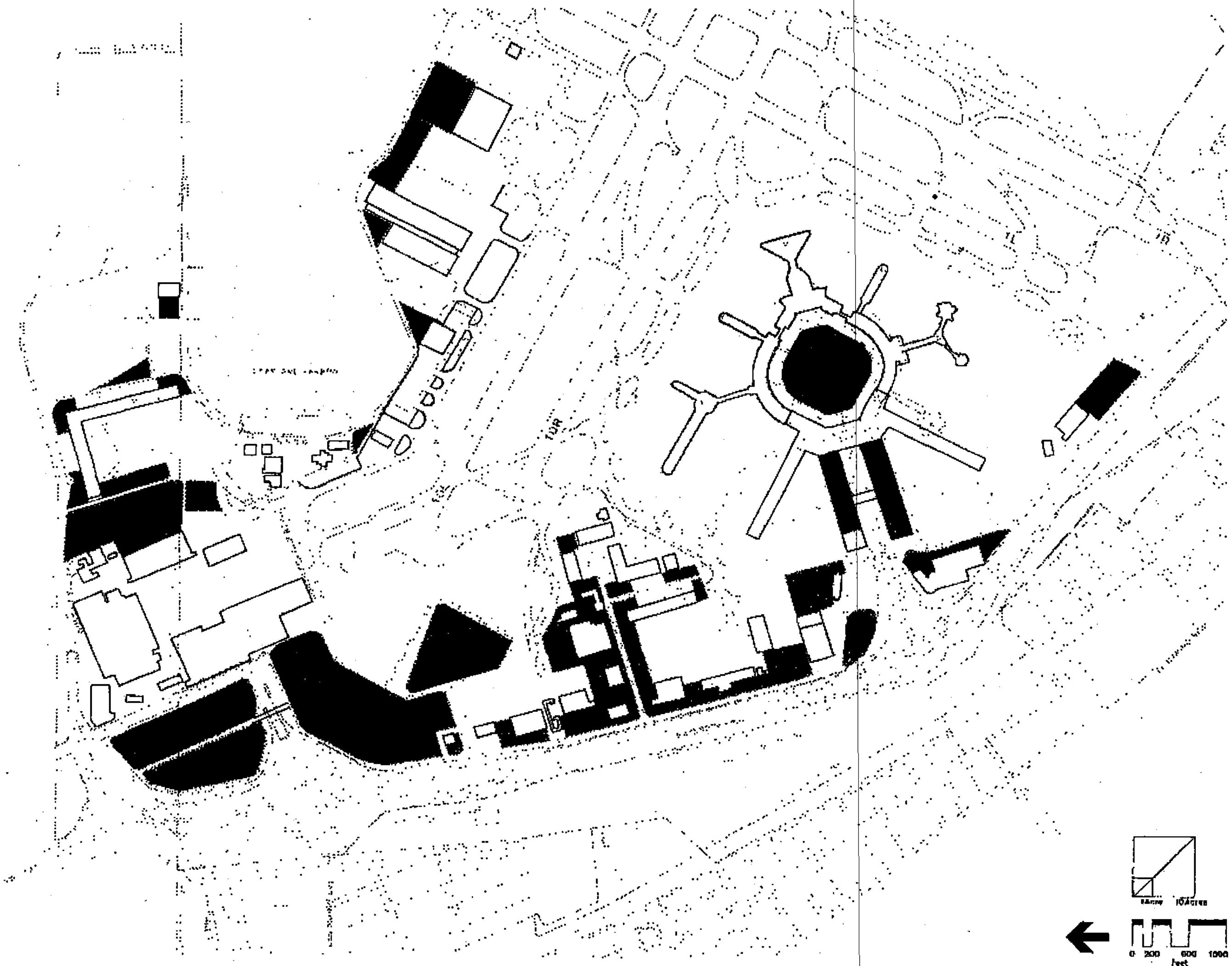
Near-Term SFIA Master Plan (1990 - 1996). Parking Lot D (long-term) would be expanded by about 3,000 auto stalls and a two- or three-level parking structure DD of about 2.2 million square feet (6,000 stalls) would be constructed adjacent to Lot D. A vehicle bridge would be constructed to link the two facilities (expansion of Lot D and construction of the vehicle bridge to Garage DD are included in the approved SFIA Capital Projects Plan; these projects are analyzed in this EIR as part of the SFIA Master Plan and also as part of the No-Project alternative). The top (fifth) level of the proposed Rental Car Garage / Ground Transportation Center would also be used for public parking (about 850 stalls). Accounting for stalls lost as a result of other Master Plan projects, net new near-term parking would total about 7,010 stalls.

Long-Term SFIA Master Plan (1997 - 2006). Long-term Parking Lot D would be further expanded and a multi-story parking structure C and CC of about 440,000 square feet (1,200 stalls) would be constructed adjacent to the proposed 100,000-square-foot office building (described above, under 8.0 Administration/Office). Accounting for stalls lost as a result of other Master Plan projects, total parking would increase by about 2,500 stalls under the long-term plan. Combined near-term and long-term SFIA Master Plan parking projects would result in net addition of about 7,340 stalls.

Building areas of the proposed Rental Car Garage / Ground Transportation Center, Automated People Mover (APM) and parking garages are summarized in Table 9, p. 57. Near-term and long-term SFIA Master Plan parking projects are shown in Figures 8 and 9, pp. 59 - 60. SFIA Master Plan parking projects are further detailed in EIR Section III.B. Transportation.

12.0 Roadway Facilities: SFIA Master Plan Projects

Near-Term SFIA Master Plan (1990 - 1996). Several near-term SFIA Master Plan roadway projects are programmed as part of the approved SFIA Five-Year Capital Plan. These include the widening of Frontage Road R-3 (McDonnell Road) from two lanes to four lanes (scheduled for implementation in 1991/92), and widening of North Access Road from two lanes to four lanes (scheduled for implementation in 1989/90,



Key

PARKING CATEGORY	CODE	LOCATION
PUBLIC SHORT-TERM	A	Garage
	B	Ground Transportation Center
PUBLIC LONG-TERM	C	Lot B
		Lot D
	D	Lot D Addition
	E	Lot DD
TENANT	F	UAL Catering Facility
	G	Lot DD
	H	Plot 52
	I	E. Field Cargo Maint.
	J	N. Field Cargo Maint.
	K	General Aviation
CITY EMPLOYEE	L	Lot DD

Legend

New Parking Areas

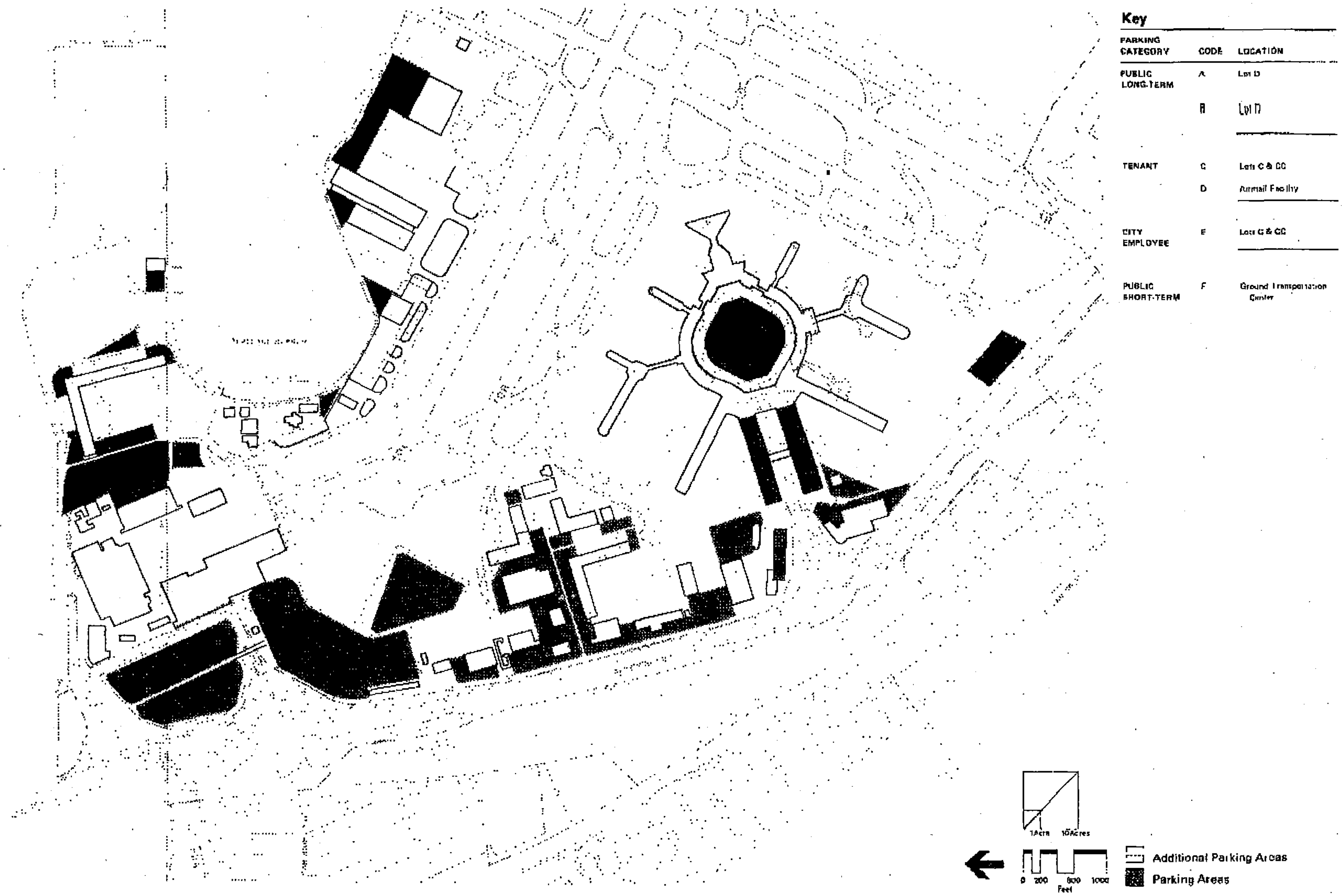
Parking Areas

SOURCE: San Francisco International Airport Master Plan

San Francisco International Airport

Figure 8

Near-Term Parking Plan



SOURCE: San Francisco International Airport Master Plan

San Francisco International Airport ■

Figure 9

Long-Term Parking Plan

but not done as of February 1991). These projects are analyzed in this EIR as part of the SFIA Master Plan and also as part of the No-Project alternative. SFIA Master Plan roadway projects not included in the SFIA Five-Year Capital Projects Plan include widening of Roadway R-6, construction of a new perimeter roadway to the U.S. Coast Guard facilities, reconfiguration of the US 101 - terminal area interchange and reconfiguration of the Interstate 380 - SFIA interchange. Roadway projects are further detailed in EIR Section IV.B. Transportation.

<u>Long-Term SFIA Master Plan (1997 - 2006)</u>. Additional roadway projects under the long-term Master Plan would include the widening of Frontage Road R-2 (south of the passenger terminal).

13.0 Airside Facilities: SFIA Master Plan Projects

<u>Near-Term SFIA Master Plan (1989 - 1996)</u>. Airfield modifications included in the near-term SFIA Master Plan include realignment of Taxiways A, B, C and R, and extension of Taxiways A and B. Other airfield improvements are programmed as part of the SFIA Five-Year Capital Projects Plan. These include installation of a microwave landing system, extension of Taxiway L to Runway 19L, extension of Taxiway V to Taxiway L, and construction of two high-speed exit taxiways -- one at Runway 19L and Taxiway F and one at Runway 10L and Taxiway L.

<u>Long-Term SFIA Master Plan (1997 - 2006)</u>. One additional airfield project is included in the long-term Master Plan: expansion of the south terminal ramp area to accommodate reconfiguration of Boarding Area B and extension of Taxiways A and B.

D. <u>FUTURE GROWTH UNDER THE PROJECT COMPARED TO OTHER FUTURE SCENARIOS</u>

The SFIA Master Plan was developed on the basis of forecasts of aviation activity and requirements for Airport facilities to meet forecast demand. As discussed in Chapter 7 of the SFIA Master Plan, the SFIA activity forecasts were developed from a set of assumptions about the characteristics of activity in the Bay Area region and at SFIA.

Other forecasts have been developed for SFIA, using different assumptions about the characteristics of regional and Airport activity. If the future characteristics of activity are as assumed by those forecasts, future aviation activity at SFIA could be different from that forecast in the SFIA Master Plan.

The master planning process is intended to be flexible and respond to unforeseen changes in activity./16/ However, the capability of the future landside facilities currently planned under the project to accommodate future activity could be affected if the activity is different from that forecast in the SFIA Master Plan.

The capability of the existing SFIA airfield (airside facilities) to accommodate future activity with "acceptable" delays is also affected by the level and characteristics of the activity.

This section includes a comparison of the SFIA Master Plan forecasts for SFIA with forecasts prepared by the California Department of Transportation in the *California Aviation System Plan (CASP)*, and by the FAA in the document *Terminal Area Forecasts, FY 1989-2005*./17,18/ A discussion of regional passenger forecasts prepared by the CASP and FAA is provided in Section III.A. Land Use and Plans, beginning on p. 107

Aviation Activity Forecasts

A summary of the forecasts developed in the SFIA Master Plan is provided in Table 1, p. 24, and in Appendix B, Table B-2, pp. A.32-35. Key assumptions made in developing the forecasts include:

- The Bay Area region will continue to experience strong passenger growth.
- SFIA will continue to capture the major share of passenger demand.
- SFIA will continue to be the primary facility serving international activity.
- Larger aircraft will be serving SFIA in the future, and more passengers will be on each aircraft.
- Continued growth in activity is accommodated by increased utilization of aircraft and Airport facilities.
- Existing and future landside facilities will be available to satisfy demand.

In the CASP forecasts, total passenger traffic in California is the sum of individual forecasts at each of the state's existing and projected air carrier airports. For each airport, a service area relating to county boundaries was defined. The SFIA service area includes the nine counties that make up the Bay Area region (some of which are also part of the service areas for Metropolitan Oakland International and San Jose International Airports)./17/

Historic passengers at SFIA were compared to historic population within the SFIA service area to obtain factors for enplaned passengers per capita. For example, enplaned passengers per capita at SFIA increased from about 0.6 in 1980 to about 0.91 in 1985.

Forecasts were then made of the enplaned-passengers-per-capita factors. For example, enplaned passengers per capita at SFIA are forecast to increase to 1.5 in 1995 and 2.3 in 2005. These factors were applied to forecast service area population to determine forecast passengers.

In the FAA forecasts, growth factors developed through the use of a terminal area forecast data base were applied to individual airports. At some airports, the forecasts were modified to reflect forecasts for major hubs. The hub forecasts were developed using analysis of trends, the characteristics of activity at each airport within the hub, and socioeconomic trends and forecasts./18/

Summary of SFIA Annual Passenger and Operations Forecasts. Table 10 shows a comparison of the annual activity forecasts for SFIA developed in the SFIA Master Plan, CASP, and FAA studies. The table shows that:

- The CASP passenger forecasts for 2006 are 3 percent higher than the SFIA Master Plan forecasts, but the CASP air carrier operations forecasts for 2006 are 74 percent higher (or 40 percent higher if commuter operations are included in the SFIA Master Plan forecast). The difference is due to differing assumptions about aircraft size and load factors.

- The FAA passenger forecasts for 2006 are 21 percent lower than the SFIA Master Plan forecasts, but the FAA air carrier operations forecasts for 2006 are 8 percent lower. Although the aircraft size and load factors assumed by FAA are not available, they are likely to be lower than the corresponding aircraft size and load factors assumed in the SFIA Master Plan.

TABLE 10: COMPARISON OF ANNUAL ACTIVITY FORECASTS FOR SFIA, 1996 AND 2006

	SFIA Master Plan/a/	CASP/b/	FAA/b/
Annual Passengers			
1996	42,280,000	39,268,000 /c/	35,668,000 /c/
2006	51,330,000	52,770,000 /c/	40,567,000 /c/
SFIA Share of Region's Passengers			
1996	71%	69%	69%
2006	70%	65%	63%
Average Seats Per Aircraft			
1996	175 /d/	137 /e/	NA
2006	180 /d/	138 /e/	NA
Average Load Factor			
1996	59%	54% /e/	NA
2006	65%	53% /e/	NA
Annual Air Carrier Operations			
1996	375,100	534,600 /f/	346,000 /g/
2006	411,600	715,300 /f/	378,000 /g/
Annual Total Operations			
1996	496,800	605,900	498,000
2006	538,500	802,300	536,000

NA = Not available

/a/ See Table 1 for assumptions about activity forecast in the SFIA Master Plan.
/b/ CASP and FAA forecasts for 1995 and 2005 are adjusted to reflect forecast activity in 1996 and 2006.
/c/ Includes passengers on commuter flights.
/d/ During the average day of the peak month.
/e/ During the average day of the year.
/f/ Includes flights by commuter aircraft.
/g/ Classified as air carrier by the FAA Airport Traffic Control Tower.

SOURCES: Chapter 7, SFIA Master Plan; California Department of Transportation, Division of Aeronautics, The California Aviation System Plan, July 1989; U.S. Department of Transportation, Federal Aviation Administration, Terminal Area Forecasts, FY 1989 - 2005, April 1989.

- Both the CASP and FAA forecasts were developed assuming that SFIA would capture a smaller proportion of the region's demand than was assumed in the SFIA Master Plan.
- The SFIA Master Plan forecasts were prepared assuming that aircraft size and load factors would increase, in response to an increasingly capacity-constrained environment. The CASP forecasts were prepared assuming that aircraft size and load factors would remain virtually constant, and that "as traffic and service reach design capacity limits, air service growth for the Bay Area will increasingly be re-directed..."/17/

Future Landside Facilities

In the SFIA Master Plan, terminal requirements were developed on the basis of forecast passengers and operations during the average day of the peak month, and the peak hour. The requirements for other landside facilities were developed using the relationship between forecast passengers and operations and building areas, surveys of Airport tenants, and general planning criteria.

If the scenario forecast in the CASP occurs, there would be more passengers and more operations, by generally smaller aircraft, than forecast in the SFIA Master Plan. If the scenario forecast by the FAA occurs, there would be fewer passengers and operations than forecast in the SFIA Master Plan.

The master planning process involves continually reassessing the level and nature of demand and adjusting plans for development accordingly. "Ideally, the master plan should reflect an up-to-date assessment of what exists and what is required."/16/ If such a reassessment is performed, future landside facilities at the Airport could be modified to accommodate changes in future activity.

However, if the other forecast scenarios described were to occur and landside facility plans were not modified, future Airport facilities might not be able to provide a high or adequate level of service, and crowding and delays in loading and unloading aircraft might result.

Analysis of Airfield Capacity and Aircraft Delay

This section includes a discussion of analyses of airfield capacity and aircraft delay prepared for the SFIA Master Plan, San Francisco Bay Area Airports Task Force Capacity Study, and CASP.

Airfield capacity, as analyzed in the SFIA Master Plan and Task Force studies, is the maximum number of aircraft operations that can take place in a given time, under specified conditions. "Congestion results whenever the volume of aircraft operations at an airport approaches airfield capacity."/19/

The annual service volume was estimated for purposes of evaluating airfield capacity in the CASP:

> "The [annual service volume] ASV is the annual volume of aircraft operations beyond which the average delay to each aircraft increases rapidly with relatively small increases in aircraft operations (and beyond which the levels of service on the airfield deteriorate).
>
> "The ASV is a reasonable estimate of an airport's annual capacity in terms of aircraft operations that may be used as a reference in airport planning....However, it is recognized that for many airports...the peak hour...capacity is a more important and relevant measure of an airport's airfield capacity than the annual service volume..."/20/

SFIA Master Plan

The analysis of airfield capacity was based on a survey of scheduled airline operations in 1986, FAA Engineered Performance Standards, the Task Force study, and FAA aviation forecasts. "Practical" and "calculated" airfield capacities at SFIA were estimated for various runway uses (configurations) and weather conditions. Practical capacity was defined as "a function of passenger and airline tolerance of delays." Calculated capacity is the theoretical maximum capacity of the airfield.

Table 11 shows the practical and calculated capacities during VFR (visual flight rules) and IFR (instrument flight rules) conditions and for the primary runway configurations at SFIA, along with the percent of the time each combination of weather conditions and runway use occurs.

As shown in the table, the practical capacity of the airfield during VFR conditions, with Runways 28L and 28R used for arrivals and 1L and IR used for departures, is 103 operations per hour. It is estimated that this maximum capacity use can occur

TABLE 11: SFIA AIRFIELD CAPACITIES DURING VARIOUS WEATHER AND RUNWAY USE CONDITIONS, SFIA MASTER PLAN

Runway Use		Airfield Capacity (Operations Per Hour)		Percent Annual
Visual Flight Rules/a/				
Arrivals	Departures	Practical/b/	Calculated/c/	Use/d/
28L, 28R	1L, 1R	103	109	61.4%
28L, 28R	28L, 28R	90	84	24.6
19L, 19R	10L, 10R	85	77	6.6
				92.6%
Instrument Flight Rules/a/				
Arrivals	Departures			
28L, 28R	1L, 1R	53	68	5.6%
28L, 28R	28L, 28R	53	62	0.4
19L, 19R	10L, 10R	53	53	1.4
				7.4%

/a/ Visual flight rules conditions occur when the cloud ceiling is at 1,000 feet or above and visibility is at least 3 miles. Instrument flight rules conditions occur when the ceiling and visibility are below those minima.
/b/ "Practical" capacity reflects passenger and airline tolerance of delays, and can vary among airports.
/c/ "Calculated" capacity is the maximum capacity of the airfield.
/d/ Given the percent occurrence of various ceiling, visibility, and wind conditions.

SOURCE: SFIA Master Plan, Section 7.3.

about 61 percent of the year. Other runway configurations during VFR conditions result in lower airfield capacities. Practical airfield capacity during IFR conditions is estimated to be 53 operations per hour.

As shown in Appendix J, Table J-1, p. 179, in 1990 there were 94 aircraft operations during the peak hour, 69 of which were performed by airline aircraft. Total peak hour operations are forecast to increase to 120 by 2006; airline peak hour operations are forecast to increase to 96 by 2006. A comparison of the peak-hour activity in Table J-1 with the estimated capacities in Table 11 shows that under VFR conditions, forecast airline activity during the peak hour would be less than estimated capacity while total aircraft operations would be higher than capacity during the peak hour in 2006. Under IFR conditions, forecast airline activity during the peak hour would be about 1.8 times higher than estimated capacity.

Section 7.3 of the SFIA Master Plan includes the following conclusions regarding airfield capacity and aircraft delay:

- "Under VFR conditions, there appears to be adequate capacity to accommodate the forecast levels of demand for scheduled air carriers."
- "Increasing delays during peak periods may result in the 'squeezing out' of general aviation aircraft, passenger acceptance of delays, spreading of peak activity over longer periods, cancellation of flights, or greater use of other airports.
- "Under IFR conditions, the existing airfield capacity limit...may be expected to result in an unmanageable situation for the forecast levels of traffic."
- "The effects of this...will result in the implementation of...technological innovations..., increased utilization of other airports..., additional improvements to the airfield."

FAA Capacity Task Force

The San Francisco Bay Area Airports Capacity Task Force was established by the FAA to analyze capacity and existing and forecast delays and evaluate proposed actions to increase capacity and reduce delays at the Bay Area's airports. The study was performed jointly by the FAA, Bay Area international airport staffs, the Air Transport Association, and the airlines serving the Bay Area./19/

The study was based on aircraft operations in 1986 and two forecast years (1990 and 1995). Table 12 shows total annual, average day of the peak month, and peak hour operations at SFIA in 1986 and forecast for 1990 and 1995.

The Task Force analysis of airfield capacity was based on estimated "maximum throughput" and "acceptable delay" capacities for various runway uses and weather conditions. Acceptable delay was defined as an average of four minutes for arriving aircraft./19/ Table 13, p. 70 shows then-current airfield capacities at SFIA.

TABLE 12: ACTUAL AND FORECAST AIRCRAFT OPERATIONS AT SFIA, CAPACITY TASK FORCE STUDY

Time Period	Actual 1986	Task Force Forecast 1990	Task Force Forecast 1995
Annual	450,000	500,000	525,000
Average Day, Peak Month	1,307	1,451	1,540
Peak Hour (All Operations)	96	105	108

SOURCE: U.S. Department of Transportation, Federal Aviation Administration, San Francisco Bay Area Airports Task Force Capacity Study of SFO, SJC, and OAK International Airports, 1987.

As shown in Table 13, "acceptable delay" capacity during VFR conditions, with Runways 28L and 28R used for arrivals and 1L and 1R for departures, was 93 operations (assuming arrival priority and 50 percent arrival demand). This maximum capacity use can occur up to about 61 percent of the year.

As shown by comparing the peak hour forecasts in Table 12 with the estimated capacities in Table 13, forecast peak hour activity is higher than estimated capacity under all weather conditions and runway configurations.

In the Task Force study, average delays (above the "acceptable" delay of four minutes) were estimated to be 11 minutes per operation in 1986 and forecast to be 17 minutes in 1990 and 24 minutes in 1995. These delays were estimated to result in direct airline operating costs of about $170 million in 1986, $270 million in 1990, and $370 million in 1995./19/

TABLE 13: SFIA AIRFIELD CAPACITIES DURING VARIOUS WEATHER AND RUNWAY USE CONDITIONS, CAPACITY TASK FORCE STUDY

Runway Use		Airfield Capacity (Operations Per Hour)/b/		Percent Annual Use/e/
Visual Flight Rules/a/				
Arrivals	Departures	Acceptable Delay/c/	Maximum Throughput/d/	
8L, 28R	1L, 1R	93	109	61.4%
8L, 28R	28L, 28R	92	107	24.6
9L, 19R	10L, 10R	75	97	6.6
				92.6%
Instrument Flight Rules/a/				
Arrivals	Departures			
28R	1L, 1R	67	71	5.6%
28L, 28R	28L, 28R	57	67	0.4
19L	10L, 10R	52	55	1.4
				7.4%

/a/ Visual flight rules conditions occur when the cloud ceiling is at 1,000 feet or above and visibility is at least 3 miles. Instrument flight rules conditions occur when the ceiling and visibility are below those minima.
/b/ Assuming arrivals are given priority by air traffic control, and that arrivals are 50% of all operations. Capacities for arrivals and departures (shown separately in the Task Force study) are added.
/c/ Assuming that a four-minute delay is considered acceptable.
/d/ Assuming that there is always an aircraft waiting to arrive or depart.
/e/ Given the percent occurrence of various ceiling, visibility, and wind conditions. Some of the runway uses shown in the Task Force study are combined in this table.

SOURCE: U.S. Department of Transportation, Federal Aviation Administration, San Francisco Bay Area Airports Task Force Capacity Study of SFO, SJC, and OAK International Airports, 1987.

The Task Force studied 19 proposals for increasing airfield capacity and reducing aircraft delay. The 16 proposals recommended for implementation are listed in Appendix I, p. A.173. The recommended improvements providing the largest annual savings in delay costs were the extension of Runways 28L and 28R and the distribution of traffic more evenly among the three Bay Area airports.

CASP

In the CASP study of statewide system requirements, the estimated annual service volume at each airport was compared with forecast aircraft operations through the year 2005. Where forecast operations were higher than the annual service volume, proposed actions to alleviate the "capacity shortage" were evaluated in terms of their effects on a system-wide as well as individual airport basis./20/

The annual service volume for SFIA was estimated to be 500,000 annual aircraft operations. Total aircraft operations are forecast to increase to about 780,000 by the year 2005, according to the CASP. The projected capacity shortage in 2005 is about 280,000 operations, or about 56 percent of the existing airfield capacity.

Because projected capacity shortages are concentrated at the air carrier airports in the Los Angeles Basin, San Francisco Bay Area, and San Diego area, the impacts of potential "air carrier airport scenarios," consisting of combinations of remedial actions, were evaluated. Remedial actions evaluated included the redistribution of air carrier operations to other airports, relocation of general aviation operations, rescheduling of operations to off-peak hours, implementation of air traffic control improvements, and addition of facilities at existing or new airport sites./20/

The preliminary CASP recommendations for the San Francisco Bay Area are listed in Appendix I, p. A.173. The recommendations include the redistribution of operations among the Bay Area airports, construction of a new runway at Metropolitan Oakland International Airport, extension of a runway at San Jose International Airport, and addition of air carrier service to Travis Air Force Base.

Forecasts and Future Airside Facilities

The analyses of capacity and delay prepared as part of the Task Force and CASP studies cannot be compared directly to the SFIA Master Plan, as they were developed on the basis of different forecasts. However, it is likely that, if future activity at SFIA occurs as forecast in the SFIA Master Plan, the delays and delay costs estimated by the Task Force for 1990 would occur at SFIA by 1996 and the delays and costs estimated for 1995 would occur at SFIA in or before 2006.

If future activity at SFIA occurs as forecast in the CASP, delays could be longer and costs higher than estimated in the Task Force study, depending on the number of operations, mix of aircraft types serving the airport, and distribution of future activity during the day.

Assumptions for Evaluation of Environmental Effects

The capability of facilities at SFIA to accommodate forecast activity could affect future environmental conditions near the Airport. For example, delays to aircraft on the apron or taxiways result in increased aircraft noise, air pollutant emissions, and fuel consumption. The spreading of aircraft operations into non-peak hours (as a result of delays or rescheduling) can result in increased noise during evening or nighttime hours. Aircraft delays may affect the feasibility of implementing current or proposed noise abatement procedures.

As discussed in Section II.C. Project Characteristics, p. 22, the landside improvements proposed under the project are designed to accommodate the forecasts of activity developed in the SFIA Master Plan. If future activity occurs as forecast in the SFIA Master Plan, airport landside facilities with the project would not constrain the activity such that the constraints cause additional environmental effects. If future activity occurs as forecast under the CASP, however, SFIA landside facilities with the project may constrain the activity such that the constraints cause additional environmental effects. Those effects cannot be estimated specifically.

According to SFIA, the existing airfield could accommodate SFIA Master Plan related growth. This EIR evaluates whether the existing airfield could accommodate the forecast growth, and whether there could be airfield constraints that could cause additional environmental effects.

Because no major airside improvements are proposed as part of the SFIA Master Plan, the evaluation of future environmental conditions (with or without the project) must reflect projected delays to aircraft using the existing airfield. The effects of average delays, as estimated in the Task Force study, on aircraft noise, air pollution, and fuel consumption at SFIA are discussed in Sections IV.C. Noise, IV.D. Air Quality, and IV.E. Energy.

E. PROJECT APPROVALS AND SCHEDULE

MASTER PLAN APPROVAL PROCESS

Background

Development of the SFIA Master plan began in late 1986, with site inventories and development of demand forecasts. Findings were published in SFIA Master Plan Working Paper A (June 1987)./13/ On the basis of review and comment on Working Paper A from interested agencies and individuals, SFIA Master Plan facilities programs and alternatives were developed and published in Working Paper B (August 1988)./14/ Further refinements of the facilities programs, alternatives and costs were incorporated into Working Paper C (published in June 1989)./15/ The Final Draft SFIA Master Plan was published in November 1989./2/

Environmental Review

An Initial Study for the SFIA Master Plan EIR was published by the San Francisco Department of City Planning (DCP) on August 11, 1989. On the basis of the Initial Study, DCP determined that the proposed project might have a significant effect on the environment and that an EIR was therefore required according to the California Environmental Quality Act (CEQA). Notice that a Draft Environmental Impact Report (DEIR) was required was provided to local agencies and individuals at that time. On July 9, 1990, a formal Notice of Preparation was circulated via the State Clearinghouse to state agencies. Responses were received from interested individuals and local and state agencies.

Publication of the DEIR will be followed by a 45 to 60-day public comment period, including at least one public hearing on the Draft EIR before the San Francisco City Planning Commission (the certifying body of the "lead agency" under CEQA). Following the public hearing on this Draft EIR, responses to written and oral comments will be prepared. The Draft EIR, plus the Summary of Comments and Responses document containing instructions for revising the Draft EIR, will serve as the Final EIR (FEIR). The FEIR will be presented to the San Francisco City Planning Commission for certification as to accuracy, objectivity and completeness. The certified Final EIR will be used by the San Francisco Airports Commission in its decisions both on the proposed SFIA Master Plan and, if adopted, on projects carried out pursuant to the SFIA Master Plan. No actions pursuant to the SFIA Master Plan permits may be taken until the Final EIR is certified.

- Approval of the SFIA Master Plan is a separate action from EIR certification, and will include public hearings to be held by the Airports Commission.

This EIR is classified as a Program EIR under Section 15168 of the State CEQA Guidelines. A Program EIR is intended to provide a comprehensive assessment of all cumulative project impacts but does not examine each specific project component in detail. In the case of the SFIA Master Plan, this comprehensive assessment, when certified, would be intended to serve as a framework for implementing all project components included in the near-term SFIA Master Plan programs, without requiring further component-specific EIRs.

SFIA Master Plan Approval Requirements

Because SFIA is owned by and under the jurisdiction of the City and County of San Francisco, which is not subject to land use regulations of San Mateo County, no zoning ordinance amendments, General Plan amendments or conditional use authorizations or other approvals would be required from San Mateo County for implementation of the proposed SFIA Master Plan. Permits would likely be required from regional, state and federal agencies that have regulatory authority over aspects of SFIA land use and operations ("responsible agencies" under CEQA).

Bay Conservation and Development Commission (BCDC) approval would be required for construction of a public roadway adjacent to the U.S. Coast Guard sea wall that would permit employees and visitors to access East Field area facilities from the North Field access road, and for alteration or construction of a new multi-use dock facility, located adjacent to the U.S. Coast Guard Station at Seaplane Harbor. In considering the proposed dock in Seaplane Harbor, BCDC must find, among other things, that the use of the dock would be water-oriented, that the dock itself would be the minimum size necessary to achieve its purpose, that there was no feasible upland location for some or all of the dock, that the placement of the dock would minimize any harmful effects on fish and wildlife resources, water quality, and marshes and mudflats, and that any significant impacts on the Bay would be mitigated./20a/

- In considering the expansion of the roadway, BCDC must find that the use of the roadway would be consistent with the airport priority use designation and that the maximum feasible public access consistent with the project would be provided. All other proposed improvements outside BCDC's jurisdiction but within the Airport appear to be generally consistent with the airport priority use designation of the Bay Plan./20a/

  The Regional Water Quality Control Board, San Francisco Bay Region (RWQCB) would be responsible for regulating additional sewer and industrial wastewater discharges resulting from SFIA Master plan project implementation (see Section IV.J. Utilities).

- The proposed SFIA Master Plan project is located on historic and/or existing tidelands and submerged lands granted in trust by the California Legislature to the City and County of San Francisco pursuant to Chapter 987, Statutes of 1943, as amended. Uses involving granted tidelands must be consistent with the public trust and the applicable granting statutes. The City, as grantee, has the day-to-day administration of these lands and the State Lands Commission retains oversight authority. A permit from the State Lands Commission will, therefore, not be required. /20b/

Changes in freeway ramp configurations at the SFIA interchange with US 101, and at the I-380/US 101 interchange, as described in Section IV.B. Transportation, would require Caltrans action, in concert with SFIA. Discussions between Caltrans and SFIA are ongoing.

Caltrans Division of Aeronautics administers state noise standards and issues state permits for all airports. (See Section IV.C. Noise, for an analysis of noise impacts due to the SFIA Master Plan.) Since no runway extensions, relocations or additions are included in the SFIA Master Plan, the State Airport Permit for San Francisco International Airport should not be affected by the project. /20c/

SFIA Master Plan projects would not alter runways, aircraft approach zones or flight paths. Federal Aviation Administration (FAA) clear zone regulations currently affecting portions of Burlingame, Millbrae, San Bruno, South San Francisco and unincorporated areas of San Mateo County owned by SFIA would not change as a result of SFIA Master Plan implementation. Therefore no FAA action would be necessary for the SFIA Master Plan projects. Aviation safety issues are in FAA's purview and are discussed in Sections III.L and IV.M. Aviation Safety.

The U.S. Fish and Wildlife Service (USFWS) under the Endangered Species Act, is required to ensure that the continued existence of any endangered or threatened species is not jeopardized as a result of federally funded or authorized action. This Act applies to projects that would adversely modify or destroy habitat critical to these species. The West of Bayshore site has been identified as the habitat of the San Francisco garter snake, an endangered species, and the red-legged frog, a candidate for the endangered species list. This site is not included for development in the SFIA Master Plan.

Under the 1972 Federal Water Pollution Control Act, the Corps of Engineers was assigned permit authority over all dredging and filling operations in all waters of the United States. This definition includes San Francisco Bay up to the mean higher high water mark and adjacent wetlands, marshes, bogs, and similar areas. The Corps' principal concerns are the impacts that dredging or filling would have on water quality and marine life, erosion potential, and water supplies. Any person or public agency proposing to locate a structure, excavate, or discharge dredged or fill material into waters of the US or to transport dredged material for the purpose of dumping it into ocean waters must obtain a "404" permit. The construction of the Seaplane Harbor dock facility may fall under the jurisdiction of the COE and evoke the "404" permit requirement.

SFIA MASTER PLAN IMPLEMENTATION SCHEDULE AND COSTS

Near-term SFIA Master Plan projects would commence upon certification of the Final Environmental Impact Report and approval of the Master Plan, in autumn of 1991, or later. The bulk of demolition and construction would be completed within the first four to five years of SFIA Master Plan implementation. Total SFIA Master Plan costs are estimated at approximately $1.7 billion, with near-term demolition and construction projects representing nearly 70 percent of total costs.

NOTES - Project Description

/1/ Costas, John, Assistant Administrator, Planning and Construction, San Francisco International Airport, letter to Barbara Sahm, San Francisco Environmental Review Officer, dated October 15, 1990.

/2/ Airports Commission, San Francisco International Airport, *Final Draft Master Plan*, November 1989. (1989 figures have been used as approximations of 1990, the base year.)

/3/ 1989 aviation activity figures are primarily from "San Francisco International Airport Comparative Traffic Report," December 1989. Unrounded figures are presented in Table 1.

/4/ Airports Commission, San Francisco International Airport, "Information Package," September 1989.

/5/ Military aircraft operations are limited to the U.S. Coast Guard heliport facility in the East Field area of SFIA, which is Federal Government property.

/6/ 1986 and 1989 passenger figures are from "San Francisco International Airport Comparative Traffic Report," December 1987 and December 1989. SFIA Master Plan passenger forecasts were developed by Thompson Consultants International, in SFIA Master Plan Working Paper A, San Francisco Airports Commission, 1987.

/7/ Metropolitan Transportation Commission, Draft Regional Airport System Plan Update Inventory, May 22, 1991. Military airfields include: Hamilton Air Force Base/Army Airfield (surplus); Travis Air Force Base; Alameda Naval Air Station; and Moffett Field Naval Air Station (potential surplus). Public use General Aviation airfields include: Hayward Air Terminal, Livermore Municipal Airport and Oakland North Airfield in Alameda County; Buchanan Field, and Byron Airport in Contra Costa County; Gnoss Field in Marin County; Napa County Airport and Parrett Field in Napa County; Half Moon Bay and San Carlos Airports in San Mateo County; Palo Alto, Reid-Hillview and South County Airports in Santa Clara County; Nut Tree and Rio Vista Airports in Solano County; and Cloverdale, Healdsburg, Petaluma, Santa Rosa Air Center, Sonoma Sky Park and Sonoma Valley Airport in Sonoma County. Private use General Aviation airfields include: Fremont (closed), Meadow Lark and Sky Soaring Airports in Alameda County; Antioch and Delta Airports in Contra Costa County; Marin Airport and Commodore Seaplane Base in Marin County;

- Calistoga (closed), Inglenook Ranch, Moskowite, Mysterious Valley and Pope Valley Airports in Napa County; Blake, Garibaldi, Maine Prairie, Travis Air Force Base Aero Club, Vaca-Dixon (closed), and Vacaville Airports in Solano County; and Graywood and Sea Ranch Airports in Sonoma County.

/8/ City and County of San Francisco, Department of City Planning, Notice that an Environmental Impact Report is Determined to be Required, San Francisco International Airport Master Plan, August 11, 1989.

/9/ San Francisco International Airport, Five-Year Capital Projects Plan, Project Descriptions, September 18, 1989.

/10/ The SFIA Master Plan Facility Inventory has been updated from 1986 on the basis of information provided by John Costas, Assistant Administrator, Planning and Construction, San Francisco International Airport.

/11/ California Department of Transportation, Division of Aeronautics, *California Aviation System Plan, Element VI: Report on Action Plan*, July, 1989.

/12/ Airports Commission, San Francisco International Airport, Draft Rental Car Garage / Ground Transportation Center (RCG/GTC) Project Description, June 1990.

/13/ Airports Commission, San Francisco International Airport, *Master Plan Working Paper A*, June 1987.

/14/ Airports Commission, San Francisco International Airport, *Master Plan Working Paper B*, August 1988.

/15/ Airports Commission, San Francisco International Airport, *Master Plan Working Paper C*, June 1989.

/16/ U.S. Department of Transportation, Federal Aviation Administration, Advisory Circular 150/5070-6A, *Airport Master Plans*, June 1985.

/17/ California Department of Transportation, Division of Aeronautics, *The California Aviation System Plan, Element II: Forecasts*, July 1989.

/18/ U.S. Department of Transportation, Federal Aviation Administration, *Terminal Area Forecasts, FY 1989-2005*, April 1989.

/19/ U.S. Department of Transportation, Federal Aviation Administration, *San Francisco Bay Area Airports Task Force Capacity Study of SFO, SJC, and OAK International Airports* (prepared jointly by FAA, Bay Area international airports staffs, Air Transport Association, and the airlines serving the San Francisco Bay Area), 1987.

/20/ California Department of Transportation, Division of Aeronautics, *The California Aviation System Plan, Element IV: System Requirements*, July 1989.

● /20a/ McAdam, Steven A., San Francisco Bay Conservation and Development Commission, letter, August 5, 1991.

● /20b/ Jones, Diane, State Lands Commission staff, letter, August 14, 1991.

● /20c/ Hesnard, Sandy, California Department of Transportation, Division of Aeronautics, letter, September 5, 1991.

III. ENVIRONMENTAL SETTING

INTRODUCTION

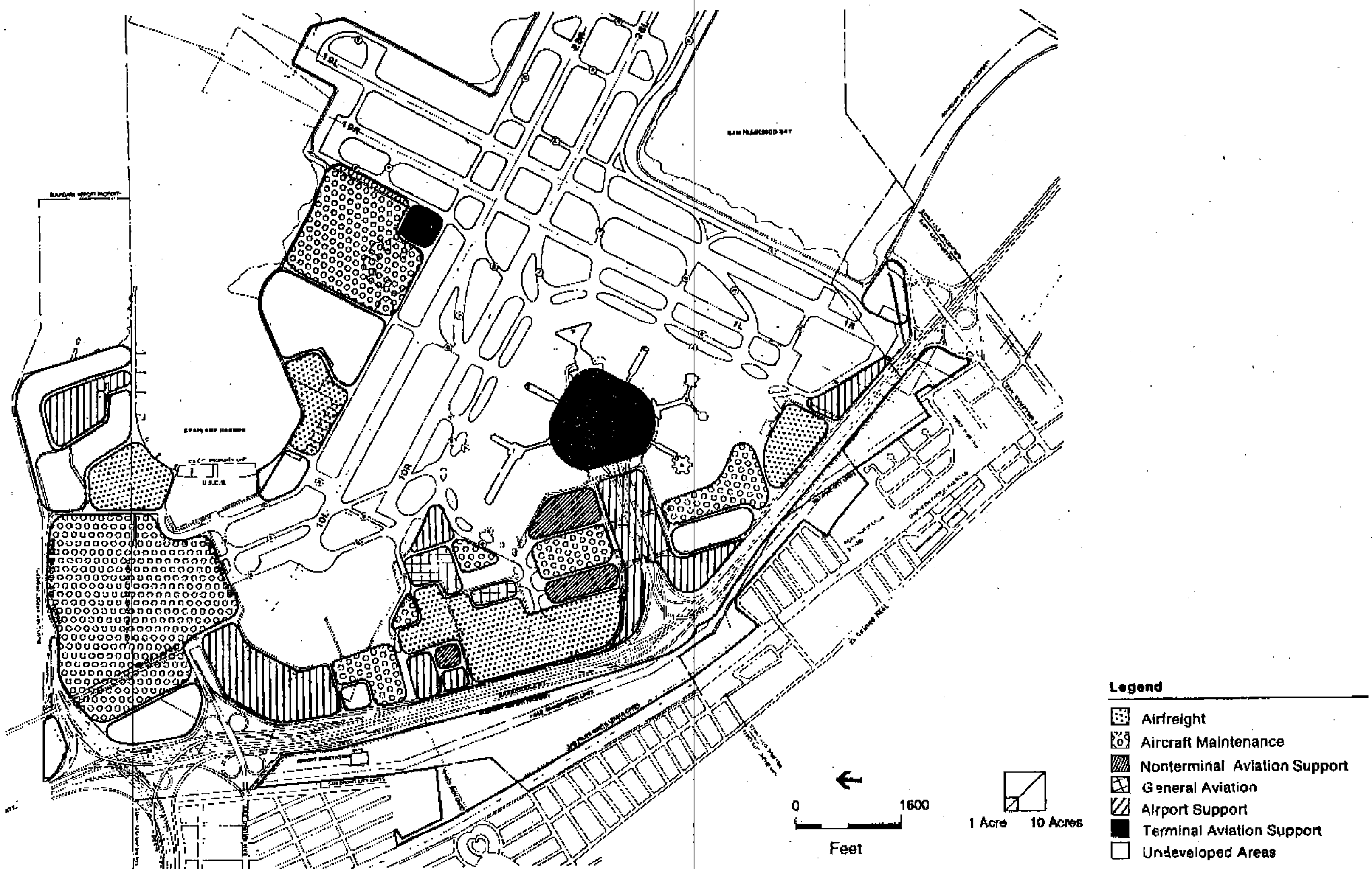
This chapter contains a rather extensive description of San Francisco International Airport and its surroundings. Even so, much of the quantitative data for issues such as transportation, noise and air quality, have been placed in Chapter IV. Environmental Impacts. This has been done to make comparison of existing and future conditions easier.

A. LAND USE AND PLANS

EXISTING AIRPORT LAND USE /1/

Land use at the San Francisco International Airport (SFIA) is governed principally by the City and County of San Francisco. Although SFIA is located in unincorporated San Mateo County, SFIA is owned by the City and County of San Francisco and is therefore not subject to the land use regulations of the County of San Mateo. Other agencies that have planning or regulatory powers in portions of SFIA are the Bay Conservation and Development Commission (BCDC), U.S. Army Corps of Engineers, U.S. Coast Guard and U.S. Fish and Wildlife Service (USFWS).

SFIA covers approximately 5,200 acres. About 2,700 acres have been developed for airport use and 2,500 acres are tideland, which have not been developed. Land uses at SFIA are categorized broadly into airside and landside land uses. The airside category consists of the runway and taxiway systems and occupies approximately 1,700 acres. The landside category is divided into twelve functional classes: terminal complex, non-terminal airline support, airline maintenance, General Aviation, air freight, airport support, commercial, administration/office, transportation, miscellaneous, parking and roads. These categories of land uses occupy approximately 1,000 acres and are shown in Figure 10.



SOURCE: San Francisco International Airport Master Plan

San Francisco International Airport

Figure 10

SFIA Existing Land Use

Airside Land Uses /2/

There are four intersecting runways, two parallel east-west runways and two parallel north-south runways. All runways are 200 feet wide. Three runways are equipped with instrument landing systems for arrivals. East-west runway 28R-10L is 11,870 feet long, paved, and instrument-rated Category IIIA. The parallel is 28L-10R, which is 10,600 feet long, paved, and instrument-rated Category I. North-south runway 1R-19L is 9,500 feet long, paved and instrument-rated Category I. The parallel is 1L-19R, which is 7,000 feet long, paved, and not instrument-rated. The runways are built on land that was reclaimed from bay tidelands during and shortly after World War II.

Existing runways and taxiways are depicted in Figure 2 in Chapter II. Project Description.

Landside Land Uses

The terminal complex (terminal and garage buildings) covers approximately 6,320,000 sq. ft. The terminal complex includes a central garage, six terminal buildings and the terminal apron. The terminals are built in a six-pier configuration with several pedestrian bridges and tunnels connecting the terminal to a central garage. The terminal complex is divided into North, South and Central (International) Terminals which house the ticket and boarding areas for domestic and international flights. The terminal apron frontage has a capacity of 80 gates to accommodate a mix of aircraft. The central garage is a five-level structure with about 6,800 parking stalls.

Airline support land uses consist of in-flight kitchens, catering services, employee cafeterias and parking lots, offices, storage facilities, ground transportation, non-aircraft maintenance facilities, and an airline training school. About 60 acres are committed to this land use. With a few exceptions, these aviation support facilities are intermingled with airline, air cargo, and maintenance facilities.

Airline maintenance land uses are those buildings, facilities and land areas used for routine maintenance or major overhaul of air carrier aircraft, engines, parts, accessories, and equipment. Approximately 3.9 million sq. ft. of building space is used for aircraft maintenance. Nine airlines have maintenance hangars at the airport. United Airlines provides maintenance services to other carriers as well as its own fleet. The United Airlines Maintenance Center alone has over 2.8 million sq. ft. of building space, accounting for over half the space dedicated to aircraft maintenance. Approximately 262 acres, including parking, are devoted to aircraft maintenance operations.

General Aviation land uses involve commercial General Aviation services offered to the general public. These services include aircraft storage, servicing, repair, maintenance, fueling and charter services. Approximately five acres of land are devoted to these General Aviation land uses.

Air freight land uses include the buildings, facilities and land areas involved in the handling and storage of air cargo and mail. Existing air cargo functions are accommodated in over 11 buildings, totaling approximately 868,000 sq. ft. of building area. The associated land area covers approximately 90 acres.

Airport support land uses are differentiated from airline support land uses in that they serve public interests as well as private interests. Airport support includes crash/fire/rescue (CFR) stations; facilities relating to utility supplies and distribution; storm and sewer drainage facilities; airport administration; airport engineering, maintenance, and storage facilities; public parking; and bank and hotel services. Bulk storage facilities for aviation operations are on the north side of the airport and are also considered as airport support land uses. Airport administration facilities are within the existing terminal complex. Approximately 87 acres are devoted to airport support land uses.

The U.S. Coast Guard operates a 21-acre air station as a helicopter base on federally owned land at the west end of the Seaplane Harbor, and leases approximately two more adjacent acres for parking. Buildings, shops and hangars contain approximately 88,400 sq. ft./3/

The San Francisco Community College District's Department of Aeronautics leases 3.5 acres of land at the extreme end of the North Access Road for its flight training school.

Over 700 acres of airport property are undeveloped. Approximately 180 of these acres are west of the Bayshore Freeway and not included in the SFIA Master Plan.

Auto parking facilities at SFIA include employee, rental-car and short- and long-term public parking. SFIA parking, roadway and pedestrian facilities are detailed in EIR Section III.B, Transportation. That section also covers details of SFIA roadway and pedestrian facilities.

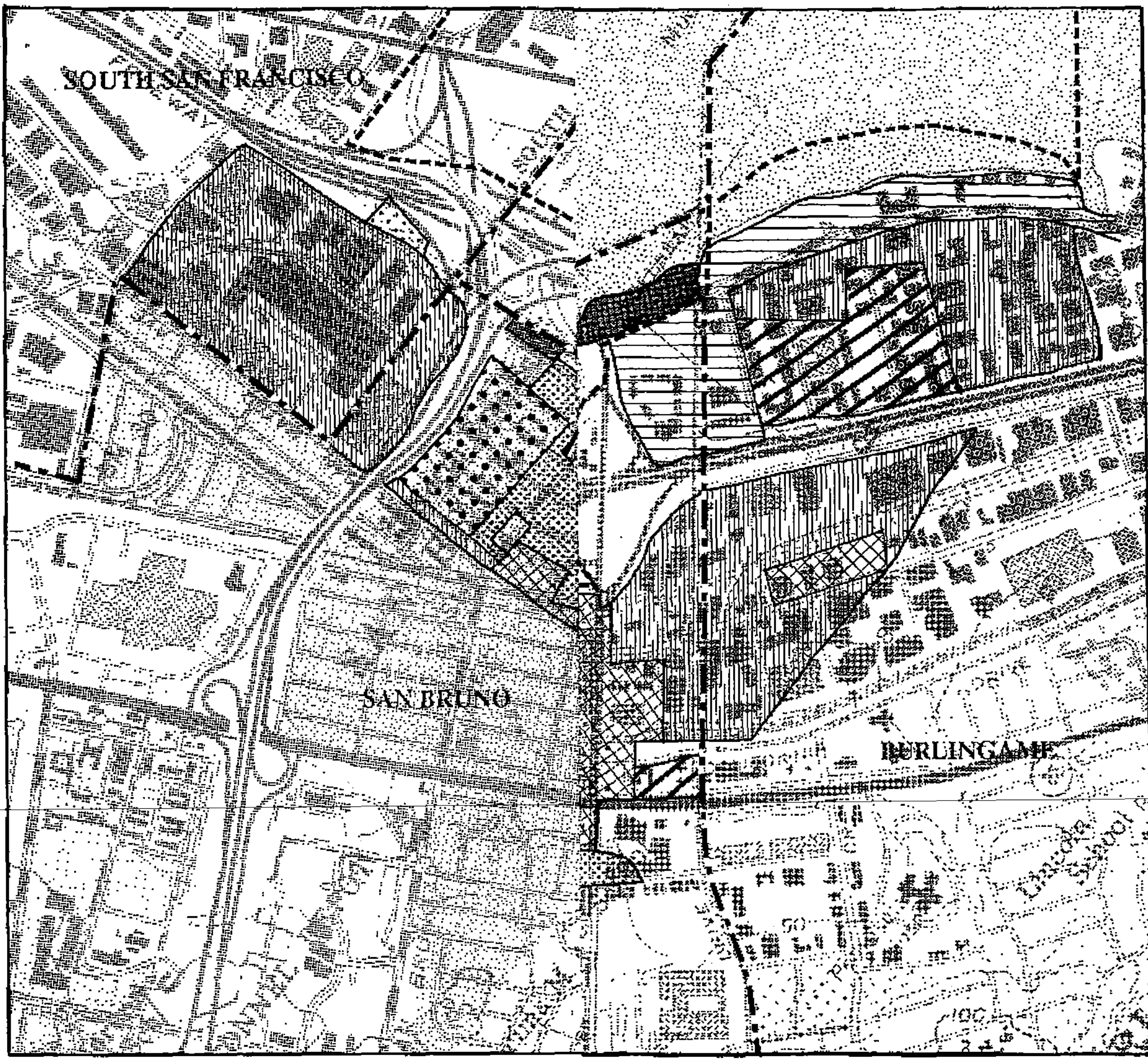
AIRPORT ENVIRONS CITIES LAND USE

Areas in San Mateo County within the 1987 65+ Community Noise Equivalent Level (CNEL) contours and considered airport-influenced are classified in the SFIA Master Plan as Airport Environs Areas. CNEL contours are contours of equal energy noise exposures and are used as the basis for determination of noise/land-use compatibility. These areas include portions of the cities of: Brisbane, Burlingame, Colma, Daly City, Foster City, Hillsborough, Millbrae, Pacifica, San Bruno, San Mateo, and South San Francisco. The locations of these cities relative to SFIA are shown in EIR Chapter II, Project Description, Figure 1, p. 21. General Plan land use designations immediately adjacent to SFIA are shown in Figure 11.

City of Brisbane

Community Setting and Land Use

The City of Brisbane is northwest of SFIA, with an estimated population of about 3,070 in 1990./4/ Brisbane is about 1,450 acres in size and was incorporated in 1961. The Brisbane General Plan estimates a holding capacity of 3,600 persons, because of the physical constraints of development within the city limits./5/ Because of its proximity to major transportation corridors, Brisbane is a gateway between San Francisco and the urban areas of San Mateo and Santa Clara Counties. In 1990, Brisbane had a population of about 2,950 persons, and about 1,390 households with a mean household income of about $45,100, compared to a Countywide mean household income of $55,100./4,6,7/



Home / Hospital

care

Other

- Vacant
- Industrial
- Park
- Electric Utility Facilities
- City Boundary
- Airport Boundary

0 2000

Feet

SOURCE: Environmental Science Associates, Inc.;
United States Geological Survey

San Francisco International Airport

Figure 11
Existing Land Use and
City Boundaries Adjacent to SFIA

Brisbane is a predominantly residential city, but most of the land has been zoned for commercial or industrial uses. The General Plan states: "Light industrial use comprises 20.94 percent of the city's area, while streets account for 13.13%. Single-family residential accounts for 5.13%, multi-family only 0.22% and duplexes 0.17%."/8/ In 1980, over half of the city's land was vacant. The southeastern portion of Brisbane, the Sierra Point area, is designated for commercial, retail, and office uses. The General Plan states:

> "The City has reached a critical point in providing services that meet the demands of its citizens. Either additional revenue must be found or lower levels of service must be accepted by the public. For this reason City planning priorities are oriented to the future development of Sierra Point and other lands in the eastern portion of the City./9/. . . The Southern Pacific Switching Yard is planned to be removed and the land developed as an industrial park with warehousing and distribution centers."/10/

Land Use / Noise Compatibility

The General Plan states:

> "The Noise Contour Map, contained in the 1976 Noise Element, shows the primary sources of surface noise in Brisbane to be vehicular traffic on US 101 and Bayshore Highway, aircraft, and trains . . . The Day-Night Average levels range from 55 dB in the Candlestick Point and Brisbane Acres to almost 80 dB along US 101. The 65 dB noise contour from the 1979 SFIA / San Mateo Joint Land Use Study includes all of Sierra Point. The 70 dB noise contour parallels the eastern edge of Sierra Point. Most of Brisbane is below the 60 dB Community Noise Equivalent Level (CNEL), however, changes in San Francisco International Airport flight paths or proposed levels of testing could raise the CNEL. In addition, there is increasing awareness of low frequency noise reverberations that affect central Brisbane because of its bowl-like terrain.
>
> "Since the residential section of Brisbane is contained primarily in central Brisbane, nearly all of the population lives in a relatively quiet environment.
>
> "Viewing future noise levels indicates that State and Federal requirements to reduce noise from vehicles and reductions in energy consumption will result in reduction in surface traffic noise levels by 5 dB in 1985 and an additional 7 dB by 1995. The reduction in aircraft noise is less easy to determine. Proposed shifts of flights over the industrial area of Brisbane and the Bay could raise CNEL noise levels above 65 dB by 1986. These shifts are an environmental constraint that could affect land use policies on Sierra Point."/11/

The SFIA Master Plan would accommodate more aircraft traffic in the future and could contribute to environmental constraints affecting land use policies in Brisbane. However, Brisbane is currently outside the 65 dBA, CNEL contour and will continue to be so with or without implementation of the project.

Safety

The Safety Element of the General Plan discusses the Southern Pacific Tank Farm, located northwest of the Tunnel Avenue / Lagoon Way intersection between the railroad tracks and Tunnel Avenue in Brisbane's Baylands Subarea. The tank farm has two pipelines, one 10-inch pipeline and one 12-inch pipeline coming from the oil refineries in the Richmond / Benicia / Martinez area. There are also two 8-inch lines exiting the tank farm, one which earlier served the Southern Pacific Roundhouse and the other which carries jet fuel to SFIA. The Southern Pacific Roundhouse is no longer in operation. The Southern Pacific Tank Farm facilitates onward transportation of jet fuel to SFIA./12/

City of Burlingame

Community Setting and Land Use

The City of Burlingame is south of San Francisco and had an estimated population of about 27,400 in 1990./4/ It is surrounded by the cities of Hillsborough and San Mateo to the south; San Francisco Bay to the east; and Millbrae to the north and west. Burlingame does not share a common land boundary with SFIA. Its northern border is about one-half mile south of the southern boundary of the airport. Burlingame had a population of about 26,800 persons in 1990./6/ Mean household income in 1990 was about $52,700, and the total number of households was estimated to be about 12,840./4,7/

Major transportation facilities serving Burlingame are U.S. Highway 101 (US 101), Interstate Highway 280 (I-280), State Route 82 (El Camino Real), Southern Pacific Railroad and CalTrain, and SFIA.

The city is almost built-out as predominantly residential. New land developments in the city are concentrated in the Bayfront planning area, a strip of land at the northeastern corner of the city adjacent to SFIA./13/ The Bayfront is bounded on the east by San Francisco Bay and on the west by US 101. Airport operations and land use developments affect the pattern of land use in Burlingame; airport-oriented hotels, restaurants, and airport parking are within the northern portion of the city./13,14/

The Bayfront Specific Plan contains a policy recommendation that recognizes the special locational value of proximity to SFIA./14/ The Specific Plan encourages accommodation of expansion at SFIA, citing the relationship between the volume of air travel and the demand for hotel space. It also recommends development of waterfront-commercial uses that either depend on, or benefit directly from, waterfront location. Recommended waterfront uses include airport-dependent activities such as hotels and restaurants. The SFIA Master Plan would not conflict with the Bayfront Specific Plan.

Land Use / Noise Compatibility

According to the Burlingame General Plan, SFIA noise affects industrial, commercial, and residential land uses in Burlingame. Residential areas are most affected during the winter and early spring. Regarding the 1974 CNEL Average Annual contours from the San Francisco Airport Environmental Impact Assessment Report (EIAR), the city's General Plan states:

> "These seasonal contours were based upon runway utilization distributions during the months of May and June; the worst-case months during which Burlingame is affected by airport noise are historically October, December, January, February, and March. During these latter five months, southerly and southwesterly winds necessitate takeoff and landing patterns to shift so that aircraft arrive and depart over the City of Burlingame.
>
> "These calculations indicate that while these worst-case months are not reflected in the average annual impact of airport noise in Burlingame and do not show up on average annual noise contours, the City of Burlingame is more heavily affected by noise for certain months of each year than others. During these months, some aircraft take off over Burlingame's industrial area, make a left turn over Peninsula Hospital and fly south above El Camino Real; other aircraft land in approximately the reverse pattern.
>
> "Although the worst-case months were not able to be monitored during this study, many measurements were taken to assess the airport's contribution to Burlingame's noise climate."/15/

Airport Land Use Commission (ALUC) height restrictions for development in areas beneath flight paths into and out of SFIA are in effect in Burlingame. (See discussion of ALUC height limitations beginning on p. 104.)

Safety

The most likely hazard relating to SFIA is danger of a plane crash. According to the city's 1975 Safety Element, Burlingame has not studied fire department and medical aid response to an airplane crash within a residential district of the city. The City of Burlingame has not issued a study regarding fire department and medical aid response in the case of an airplane crash. However, since 1975, the Burlingame Fire and Police Departments have entered into contractual mutual aid and automatic response agreements with San Mateo County and with surrounding cities. These agreements allow the City of Burlingame to respond to a disaster such as an airplane crash. The City of Burlingame also participates in mock plane-crash drills sponsored by SFIA so that it can better respond in case of air-crash emergency./16/

Town of Colma

Community Setting and Land Use

The Town of Colma was incorporated in 1924 and is approximately two miles from the southern border of San Francisco./17/ "Colma is a greenbelt community with attractive cemeteries and agricultural fields surrounding a regionally oriented core commercial area."/16/ The town, with a total area of 1.95 square miles, is bounded on the north and west by Daly City, on the south by South San Francisco, and on the east by San Bruno Mountain Park in unincorporated San Mateo County. The population of Colma in 1990 was about 1,100 persons; the mean household income was about $41,700./4,6,7/

The Association of Bay Area Governments (ABAG) projects steady growth in population and employment for all Bay Area cities to the year 2000. Although ABAG estimates that the population of Colma could reach 2,500 by the year 2000, the Colma City Council has adopted a goal of no more than 1,500 (a doubling of the population) in the same time period.

About 1.5 percent of the area within the town limits is currently committed to residential uses. Historically, the town has emphasized cemetery land uses and interests in its planning policy. Currently, about 15 percent of the land area is designated as industrial and about 77 percent as cemetery and agricultural. Regional commercial facilities, including two shopping centers, are centered along Serramonte Boulevard, with a concentration of automobile and truck dealerships./18/ Aircraft noise is not identified as a constraint to housing development./18/ Thus, implementation of the SFIA Master Plan would not conflict with Town of Colma noise policies.

City of Daly City

Community Setting and Land Use

Daly City was incorporated in 1911 and is immediately south of the City and County of San Francisco. The 1990 population was estimated to be about 92,310 persons; the mean household income was about $48,600./6,7/ The city was 96 percent built-out in 1987./19/

Daly City's predominant land use is residential. In 1987, approximately 53 percent of the land was in residential use, 10 percent in commercial use, 13 percent in public use, 16 percent open space, and 8 percent vacant. The majority of commercial land uses are retail and neighborhood-serving establishments along transportation corridors./19/

Land Use / Noise Compatibility

The city considers land uses in the southeastern tip of the city, the Serramonte neighborhood, which is largely single-family residential and adjacent to Pacifica, to be airport-influenced, because of the frequency of flights over that area./19/ Daly City's Land Use Policy 10.4 states:

> "The City shall encourage San Francisco International Airport to increase the use of the shoreline take off route and discourage the use of the gap departure route. From a land use standpoint, however, increases in air traffic would affect all types of land uses within the City. Depending on the usage of a particular departure route, there could be a negative impact in terms of safety and noise on the residential section of the City."/19/

Implementation of the SFIA Master Plan would accommodate additional aircraft flights and could be in conflict with this policy.

Land Use Policy 11.1 states that "the City should actively participate in land use decisions that are made by the County, adjacent cities, and jurisdictions that have regional influence, when these decisions affect Daly City." The Land Use Element of the General Plan recognizes that "land use plans for the San Francisco Airport have regional implications for the entire County"./19/

The following objectives and policies are from the Noise Element of the city's General Plan:

"Objective 2. Ensure that noise levels appropriate to protect the public health and well-being are maintained.

"Policy 2.7: Avoid noise impacts from intensification or alteration of existing land uses.

"Objective 3. Reduce aircraft noise exposure by five decibels.

"Policy 3.1: Participate in Regional Planning Committee activities.

"The City is currently a member of the Regional Planning Committee which is the designated Airport Land Use Commission for the County of San Mateo. The RPC responds to airport matters, produces an airport land use plan, and develops policy in order to provide for the safe and orderly growth around airports. The City should continue this activity.

"Policy 3.2: Participate in the airport planning process.

"Active participation by affected municipalities and citizenry driving the airport planning processes will assist in reducing noise impacts. The City has participated in airport planning processes by commenting on draft noise regulations, the proposed amendments to Title 21, the Airport Master Plan, and through the Regional Planning Committee. Participation such as this should be continued. The City should actively encourage the citizenry of Daly City to actively participate in the process.

"Policy 3.3: Coordinate, as appropriate, with other municipalities to facilitate an integrated effort to reduce airport related noise.

"Airport noise affects many cities in San Mateo County. Hours of airport operation and selection of flight paths used will affect different cities in different ways and to various levels of impact. There does exist, however, in some areas commonalities of impact, either in the types of noise regulation adopted by the airport or by the operating hours of the airport. Whenever possible these commonalities should be identified through staff meetings with various cities in order to develop an integrated approach to airport noise issues. Daly City, has in the past, worked with other cities such as South San Francisco, in responding to airport operations; this cooperative action should be continued."/20/

City of Foster City

Community Profile

Foster City was incorporated in 1971 and is bordered by the City of San Mateo on the west, Belmont on the south, and Redwood City to the southeast. The city is built on about 2,592 acres (approximately four square miles) of reclaimed tidal marsh of San Francisco Bay. The 1990 population was about 30,140./4/ Because of the limited remaining land area of the city, a total residential population of 31,300 is projected. The estimated year of build-out is the end of 1990./21/

There were about 11,340 households and about 28,180 persons in Foster City in 1990./4,6/ The mean household income was $65,600, compared to $55,100 for all of San Mateo County./7/

Land Use

The city's predominant land use is residential, with commercial development occurring in the northern section./21/ When the city is fully builtout, approximately 53 percent of the land will be in residential use, 18 percent in commercial / industrial use, 5 percent in public use, and 24 percent will be open space./21/

Land Use / Noise Compatibility

Pages 19 and 20 of the Noise Element of the Foster City General Plan state:

> "The most pervading noise source within Foster City is from aircraft using San Francisco International Airport and San Carlos Airport. Aircraft noise is found in varying degrees within every neighborhood. The most adversely affected area is Neighborhood 2 which is located almost directly under the approach to runway 28 L to San Francisco International Airport. The frequency of this approach pattern is such that this is considered as a major noise problem for most people in this area. Flights from San Carlos Airport have less effect upon the community as a whole but do have a greater impact upon the residents of Neighborhood 8 which is located at the northern end of the runway approach to that facility. The City has extremely limited ability in the control of noise generated by these sources. The regulation of these noise sources is administered by Federal agencies and the City is restricted only to controlling the noise by requiring insulation of buildings and regulating land use patterns."/22/

Furthermore, recommendations listed under "Findings and Recommendations" of the Noise Element include the following:

> "Standards for the control of the most significant noise sources, aircraft and motor vehicles are established by Federal and State regulations. Noise impacts of aircraft operations can be mitigated by cooperative efforts of local governments and aircraft, airline and airport officials."
>
> "The control of noise along its path or at the receiver places the burden of attenuation on those who do not produce the noise. It is therefore most desirable to the City of Foster City to control noise at its source."/22/

Implementation of the SFIA Master Plan would not conflict with the Noise Element of the Foster City General Plan.

Safety

The entire area of Foster City is flown over by aircraft and is therefore at risk of aircraft accidents. Section 8200 of the Safety Element of the Foster City General Plan states:

> "In the event of a major air disaster occurring in San Mateo County, the County Civil Defense organization has prepared an emergency plan called Code 1000. It involves interjurisdictional response to a major air disaster in San Mateo County. If Foster City were to experience a major air disaster, Foster City would notify the Redwood Fire Control Center via radio and advise the Control Center of the approximate location of the air disaster. Once the initial communication has been made, the next step involves the establishment of a command post to direct operations. In the event of an air disaster striking Foster City, the Cities of Brisbane, Burlingame, Daly City, Hillsborough, Millbrae, San Bruno and San Carlos will send one engine each to the City; the Cities of Belmont, Menlo Park and Redwood City will send two engines each to the City; the California Division of Forestry will send two engines. In addition to these, the City of Foster City currently has three engines and one truck, all of which have pumping capabilities available in the event of an air disaster."/23/

<u>Town of Hillsborough</u>

Community Setting and Land Use

The Town of Hillsborough is approximately 12 miles south of San Francisco. Hillsborough is bordered by Burlingame on the north; San Mateo on the east and south; and the San Francisco Fish and Game Refuge on the west. With the exception of assorted public facilities, Hillsborough is exclusively a single-family residential community. It was incorporated in 1910. The population of Hillsborough in 1990 was about 10,670./6/ Mean household income was about $140,700, the highest in San Mateo County./7/

Hillsborough comprises over 4,000 acres of incorporated land, of which 68 percent is single-family residential, 17 percent is occupied by public uses, and approximately 15 percent is developable vacant land.

Land Use / Noise Compatibility

Airport and aircraft noise is identified as a source of noise pollution by the Town of Hillsborough. Part "A" under Proposed Remedial Action on (Noise) Sources in the Noise Element of Hillsborough's General Plan states:

> "Maintain active status in planning to stay aware of developments and exert a continuing effort to see that existing standards are enforced and reasonable compliance maintained. Assist in promoting and supporting relevant legislation for proper planning of land use and noise reduction through joint efforts with adjacent jurisdictions."/24/

Under Projected Conditions, Part "A", the Noise Element states that there would be "expected increase in Aircraft activities and a limited decrease in source noise."/23/

Implementation of the SFIA Master plan would not conflict with the Noise Element of the Hillsborough General Plan.

City of Millbrae

Community Setting and Land Use

The City of Millbrae is bordered by both San Francisco Bay and the San Francisco International Airport, whose boundaries it overlaps, to the east; San Francisco Watershed lands, owned by the Water Department of the City and County of San Francisco, to the west; the City of San Bruno to the north; and the City of Burlingame to the south. Millbrae occupies approximately 2,050 acres or about 3.2 square miles. The population in 1990 was about 20,410 persons, and the mean household income was $60,600./6,7/ Almost all developable land in Millbrae has been developed. The estimated build-out population is 25,000./26/

The city's General Plan was adopted in 1974./25/ Emphasis of the General Plan is on preservation of the residential character of the City. To the west of the airport along the Bayshore Freeway are three residential subdivisions, Bayside Manor, Marina Vista, and the north Millbrae Subdivision./26/ To the south and east, along the old Bayshore Highway, the land is zoned for industrial uses. SFIA lands within the City of Millbrae are designated Industrial/Utility east of US 101, and designated Open Space west of US 101, by the City of Millbrae General Plan. These lands are zoned Industrial east of US 101, and zoned Open Space west of US 101, by the City of Millbrae Zoning Ordinance./26a/ These SFIA lands are within the City of Millbrae's Sphere-of Influence.

The Airport Land Use Commission height restrictions for development in areas beneath flight paths into and out of SFIA are in effect in the city. (See discussion of ALUC height limitations beginning on p. 104.)

The City of Millbrae General Plan lists the following land-use recommendations for the San Francisco International Airport under Recommendations, Area D:

"10. The City should negotiate for the use of the Airport-owned property, between the Airport and Old Bayshore, for use as an airplane viewing area.

"13. Any development of the Airport property should result in an attractive appearance from the freeway.

"14. Signs on Airport property should be strictly regulated as to size, height, type, and location."/26/

In addition, Policy 13 under Environmental Resources Management of the General Plan states:

"The Airport should be encouraged to continually monitor the level of pollutant emissions generated by Airport activity. All possible reductions in these emissions should be encouraged."/27/

SFIA does not currently monitor pollutant emissions nor is air monitoring proposed as part of the SFIA Master Plan.

Land Use / Noise Compatibility

According to Recommendation 5 of the Community Development Section of the 1974 City of Millbrae General Plan,

> "Noise levels should be monitored by the Airport Land Use Commission and the City to determine the effectiveness of remedial practices. This information should be requested and reviewed by the City on a regular basis to insure conformance with State law requiring reduction of 15 dBA by 1985."

Community Development Policies 18 and 19 of the General Plan state:

"18. The City should incorporate noise standards in zoning ordinances and building codes which are consistent with the Airport Land Use Plan recommendations.

"19. The Airport, the FAA and other State and Federal agencies should be encouraged to use all operative controls under their jurisdiction to reduce aircraft noise levels."/26/

City of Pacifica

Community Setting and Land Use

The City of Pacifica is on the Pacific Ocean side of San Mateo County, approximately three miles south of San Francisco. It is bordered by Daly City on the north; San Bruno and South San Francisco on the east; unincorporated areas of San Mateo County on the south; and the Pacific Ocean on the west. The City of Pacifica was incorporated in 1957. The city comprises 7,800 acres (about 12.2 square miles), about half of which had been developed by 1980. The population of Pacifica in 1990 was about 37,670 persons, and the mean household income was $51,100./6,7/

In 1980, almost 40 percent of the approximately 3,870 acres of developed land within the city limits was single-family residences. Parks and public areas occupy 28 percent of the developed land, while streets and other public uses constitute about 25 percent. Slightly more than half of Pacifica's total acreage is vacant or in agricultural use. Of the approximate 3,930 acres of underdeveloped land, almost 3,300 acres are within the Hillside Preservation District. Although some of this vacant land is suitable for development, most is too steep under current regulations to permit development./28/

Land Use / Noise Compatibility

● The adopted Noise Element of the General Plan states that aircraft noise is not considered a problem for the City of Pacifica./29/ The SFIA 1976 65 dB CNEL contour did not cross into Pacifica's city limits. However, participation in the Airport/Community Roundtable (see p. 167) and at other community meetings concerned with aircraft noise has indicated that noise, particularly single-event noise levels and overflight patterns, is currently perceived as a problem by some City of Pacifica residents./29a/

- Nevertheless, the primary source of surface noise in Pacifica is the arterial / collector street system. According to the Noise Element of the 1980 City of Pacifica General Plan:

"Highest levels, 75 dB, are generated by Highway 1. No stationary noise sources have been identified, since Pacifica has no significant industrial areas where fixed noise sources are usually located.

"When looking at the number of people exposed to higher noise levels (above 60 dB) the Noise Inventory Chart shows that 79 percent of the population lives in a relatively quiet environment. Of the remaining 21 percent, 13 percent are subject to 60-65 dB, 7 percent are subject to 65-70 dB, and less than one percent are subject to over 70 dB.

"A look at future noise levels indicates that State and Federal requirements to reduce noise from vehicles and reduction in energy consumption will result in reductions in surface traffic noise levels by 5 dB in 1985 and an additional 7 dB by 1995. The reduction in aircraft noise is less easy to determine, although studies for San Francisco Airport indicate a 5 dB reduction by 1986.

"Assuming a fairly conservative reduction of 5 dB in surface and aircraft noise, a marked improvement is achieved in Pacifica's noise environment. Less than one percent of the 1995 population will be subject to noise greater than 65 dB, as compared to 8 percent in 1977. The proportion of the City population living in a noise environment of less than 60 dB will increase from 79 to 93 percent over the 1977-1995 period. The major noise source will continue to be the Route 1 and Skyline Boulevard corridors, but noise levels will be lower."/29/

Implementation of the SFIA Master Plan would not conflict with the Noise Element of the Pacifica General Plan.

Safety

The Safety Element of the Pacifica General Plan addresses the City's Emergency Plan:

"The City's emergency plan is regularly updated and improved. Because of State requirements, the focus of the Emergency Plan is on preparedness for a natural disaster. Since a natural disaster is more likely to occur in Pacifica, the City has included preparedness for natural disasters, including earthquakes, unconfined fire, major flooding, tsunami, airplane accidents and landslides. The City is currently updating the emergency plan and is including more specific standard operating procedures for natural disasters. The City monitors changes in the Federal Disaster Act regulations. Public awareness and disaster planning for individual neighborhoods has been included in disaster preparedness. A Disaster Preparedness Commission has been established by the City Council."/30,31/

City of San Bruno

Community Setting and Land Use

The City of San Bruno is approximately five miles south of the San Francisco County line and is immediately west of SFIA. San Bruno was incorporated in 1914 and occupies approximately 3,760 acres (5.87 square miles). San Bruno is bordered by San Francisco International Airport on the east; the City of South San Francisco on the north, the City of Millbrae on the south; and the City of Pacifica and San Francisco Watershed lands to the west./32/

The city is a suburban residential community, predominantly single-family homes, and was approximately 96 percent built-out in 1984. The population of San Bruno was about 38,960 in 1990, with a mean household income of about $51,400./6,7/ Commercial development is concentrated along El Camino Real, San Bruno Avenue and San Mateo Avenue, and in the Tanforan Shopping Center.

The 80+ acres of SFIA land within the San Bruno sphere of influence is designated for light industrial use in the City's General Plan./32/

Land Use / Noise Compatibility

Airport noise is considered to be an environmental constraint to development. Approximately one-quarter of the housing units are subject to CNEL greater than 65 dB, primarily from airport noise in the north-easterly portion of the City. These areas include the neighborhoods of San Bruno Park, Lomita Park, Bel Air, and Tanforan./33/

The ALUC has developed height restrictions for development in areas beneath flight paths into and out of SFIA. These restrictions are incorporated into the City of San Bruno's development review process./34/ According to the Housing Element of the 1984 City of San Bruno General Plan:

> "The airport lands, also known as the eastern sphere of influence, are unincorporated and not presently served with urban services. The 11-acre site is designated for industrial use in the City's and County's General Plans. The property is subject to noise levels of up to 75 CNEL from the San Francisco Airport, and is also subject to freeway and train noise. Residential development

within 65-70 CNEL requires special noise insulation features. In areas subject to 70+ CNEL, residential development is not considered appropriate. Other constraints to development of the airport lands are flooding hazards, the presence of power lines and high pressure underground pipes crossing the site, an environmentally sensitive habitat area for the San Francisco garter snake, and poor vehicular access from collectors and arterials. Mitigation of these constraints would be costly, thus it does not seem feasible to construct affordable housing."/34/

In regard to lands surrounding the airport, the General Plan Land Use Element comments that:

"Approximately 80 acres of vacant land lie between San Bruno's eastern city limits and the freeway. This land is commonly known as the airport lands, since until recently it was under the control of the San Francisco International Airport. The land is owned by the City and County of San Francisco and is included in San Bruno's Sphere of Influence. The City of San Francisco has no definite plans for the property at this time. Alternatives considered include a regional transportation center and uses associated with the airport. The lands south of San Bruno Channel have no road access and are subject to excessive noise from the airport. Height restrictions in airplane take-off paths also limit development. The site contains habitat areas of the endangered San Francisco garter snake protected under State and Federal law. Pacific Gas and Electric power lines and underground cables bisect this property from north to south and must be relocated prior to development. This site is subject to flooding and liquefaction."/32/

Noise

The Noise Element of the 1984 City of San Bruno General Plan states:

"The northeasterly portion of San Bruno is within the 65 dB to 70 dB CNEL from San Francisco International Airport noise contours. Much of central San Bruno is within the 60 to 65 dB CNEL contours. The San Mateo County Airport Land Use Commission has published standards for airport noise/land use compatibility. These standards indicate that new residential, school, library, church, hospital, nursing home and auditorium uses should not be developed in areas greater than 70 dB and should include noise reduction features between 65 dB and 70 dB. Commercial uses should not be developed in areas above 80 dB and should include necessary noise reduction in areas between 70 dB and 80 dB. Industrial uses should not be developed in areas above 85 dB unless related to airport activities or services; noise reducing measures should be included in new development in areas between 75 dB and 85 dB. These standards are incorporated in the Noise Element as Noise/Land Use Compatibility Standards.

"The ALUC [Airport Land Use Commission] has developed height restrictions for development in areas beneath flight paths. These restrictions will be incorporated into the City's development review process.

"There are approximately 14,650 housing units in San Bruno. Approximately 96% of the houses are subject to noise levels of 60 dB or greater. Areas outside the 60 dB contour are the southwestern and western portions of San Bruno, those areas furthest from the airport. Approximately one-quarter of the total units are subject to CNEL in excess of 65 dB, primarily from airport noise. These units are located mainly in the north-westerly portion of the City. Residents in this area are also subject to highway noise levels above 60 dB. Aircraft noise is the dominant noise factor, however.

"Certain land uses are defined in the state law as 'noise sensitive.' These include schools, hospitals, and other health care facilities. San Bruno has no hospitals. Schools are shown on the noise contour map. Noise levels near these uses are based upon monitoring of airport noise or calculated using a standardized formula."

"Future Noise

"The prevailing environmental noise in San Bruno is generated by aircraft departing from San Francisco Airport. Except for noise levels generated by automotive vehicles on the Junipero Serra Freeway, almost all other highway noise is masked in terms of annual levels, by aircraft noise. Highway noise is expected to be reduced in the future, in spite of increased traffic, due to technological changes in vehicles stimulated by national and State policies. Aircraft noise is also subject to Federal regulations which mandate quieter aircraft in the future. The San Francisco Airport Land Use Commission adopted a target of reducing the number of dwelling units within the 65 CNEL contour to 7,500 by 1987. There has already been a substantial reduction in the number of units affected by noise levels of 65 CNEL from 15,400 to 8,200 units between 1980 and mid-1983, a 47% reduction. The results of constant monitoring will indicate whether or not the benefits of quieter aircraft will be offset by increased number of flights."/33/

Implementation of the SFIA Master Plan would have virtually no effect on the future noise contours in San Bruno.

Safety

The Safety Element of the 1984 City of San Bruno General Plan states:

"Industrial fire hazards are associated with the transmission of jet fuel to San Francisco International Airport. Industrial chemicals and processing contribute to fire hazards, compounded by the crowded conditions, old buildings, and narrow streets in the Fifth Addition. Structures along San Mateo Avenue, built prior to fire safety codes, without adequate separation between buildings, or good access, are also hazardous.

"Outside of these areas, San Bruno has a very good overall fire rating. The fire rating is based upon, among other things, the type and amount of fire fighting equipment, number of fire fighters, water flow and pressure. The fire department has adequate staff and equipment. The City's water system is not in optimum condition. Old or worn water lines and connections in some parts of the City need upgrading or replacement to uphold satisfactory water flow and pressure requirements.

"The City of San Bruno has an Emergency Response Plan, adopted in 1980, which identified City officials' responsibilities in case of emergency. The plan establishes contingency organizational plans and assigns responsibility among City departments for transportation, communication, food and shelter, health and other emergency needs."/35/

City of San Mateo

Community Setting and Land Use

The City of San Mateo is approximately ten miles south of the San Francisco County line. It is bordered by San Francisco Bay on the north; Foster City on the east; Belmont on the south; and Hillsborough and unincorporated County areas on the west.

Incorporated in 1894, San Mateo had a 1990 population of about 85,490./6/ The City expects full build-out by the year 2000 and a population of approximately 115,000 to 120,000./36/ The mean household income in 1990 was about $54,500./7/

Land Use / Noise Compatibility

The Noise Element of the 1990 City of San Mateo General Plan states:

"A noise measurement survey was conducted in San Mateo during October, 1987 to determine noise levels throughout the community. Noise exposure in San Mateo is dominated by traffic and the SP rail line. Aircraft operation associated with San Francisco International Airport does not significantly affect noise levels throughout San Mateo, although some neighborhoods in the northeastern portion of the City are impacted by the airport approach path."/37/

The General Plan offers the following mitigating policies:

"Adoption and enforcement of a noise control ordinance can reduce nuisance noise generated by commercial uses or from residential sources such as amplified music, parties, leaf blowers or barking dogs. Construction activities also generate substantial short-term noise impacts which can be limited to specified hours and days of the week.

"N 2.2: *Minimize Noise Impact*. Protect all "noise sensitive" land uses from adverse impacts caused by noise generated on-site by new developments. Incorporate necessary mitigation measures into development design to minimize noise impacts. Prohibit long-term exposure increases of 3 dB (L_{dn}) or above at the common property line, or new uses which generate noise levels of 60 dB (L_{dn}) or above at the property line, excluding ambient noise levels.

> "Noise sensitive land uses, such as residential neighborhoods, hotels, hospitals, schools and outdoor recreation areas, must be protected from new development which causes discernible increases in noise levels as a result of on-site activities. Noise generators such as machinery or parking lots must be mitigated through physical or operational limits.
>
> "N 2.3: *Minimize Commercial Noise*. Protect land uses other than those listed as "noise sensitive" from adverse impacts caused by on-site noise generated by new developments. Incorporate necessary mitigation measures into development design to minimize noise impacts. Prohibit new uses which generate noise levels of 65 dBA (L_{dn}) or above at the property line, excluding ambient noise levels."
>
> "Commercial and industrial areas typically tolerate a higher noise level than residential neighborhoods. However, some control is necessary for new development within non-residential areas so that exceptionally noisy uses are restricted."/37/

Implementation of the SFIA Master Plan would not conflict with the Noise Element of the City of San Mateo General Plan.

City of South San Francisco

Community Setting and Land Use

The City of South San Francisco was incorporated in 1908 and contains approximately 5,250 acres. The city had 54,310 residents in 1990 and 100,000 employees./4,6/ The mean household income was $45,900./7/

The City is bordered by San Bruno Mountain on the north; San Francisco Bay on the east; San Bruno and SFIA on the south; and Daly City and Colma on the west.

There are more airport-related structures (cargo facilities and maintenance buildings) within South San Francisco's city limits than within the city limits of any other city adjacent to SFIA. For planning purposes, the South San Francisco portion adjacent to SFIA is designated as the South Airport Boulevard Planning Area. This planning area includes all land east of US 101 between SFIA and East Grand Avenue./38/

Land Use / Noise Compatibility

The Noise Element of the City of South San Francisco describes aircraft noise in South San Francisco as follows:

"The single major source of noise community-wide is San Francisco International Airport. Aircraft departing Runways 28 Left and 28 Right overfly South San Francisco resulting in significant noise impacts to a number of noise-sensitive land uses. Aircraft departing from Runways 1 Left and 1 Right bound for the south overfly various parts of the City. While these overflights are at somewhat higher altitudes than the aircraft departing Runways 28, they also impact various noise-sensitive land uses within the City. Aircraft departing from Oakland International Airport also overfly South San Francisco but these aircraft are usually at altitudes above 4,000 feet and, thus, have minimal impacts on the City."/39/

The overall goal of the Draft Noise Element is to "provide a safe and pleasant environment for all citizens, workers, and visitors of South San Francisco."/39/ To achieve this, the Draft Noise Element advances the following objectives and policies:

"OBJECTIVE:	To mitigate and reduce noise impacts from aircraft generated sources.
"Policy N-1	"As appropriate, the City of South San Francisco shall continue to participate in the various regional and local bodies to reduce aircraft noise impacts to the City.
"Policy N-2	The City of South San Francisco shall continue to support the concept of not shifting noise from one impacted community to another.
"Policy N-3	The City shall oppose inordinate expansion of international traffic at San Francisco International Airport and shall support the concept presented in the Regional Airport Plan that traffic of all types should be distributed between the three regional international airports and not concentrated at one facility, specifically San Francisco International Airport.
"Policy N-4	The City shall urge adoption of strong enforceable noise regulations by the San Francisco Airports Commission that eliminate nighttime departures by Stage 2 aircraft.
"Policy N-5	The City of South San Francisco shall do all within its power to ensure continued funding of the Noise Insulation/Noise Easement Program and support the concept that, even in the absence of any Federal funding, San Francisco International Airport provide matching funding for the Noise Insulation Program.
"OBJECTIVE:	To ensure adequate and correct evaluation of aircraft noise impacts by the San Mateo Airport Land Use Commission.
"Policy N-6	The City shall urge adoption by the San Mateo Airport Land Use Commission of a continually updated noise exposure map for the San Francisco International Airport environs."/39/

Implementation of the SFIA Master Plan could conflict with policies of the Noise Element of the City of South San Francisco General Plan.

The City and County of San Francisco

Land Use / Noise Compatibility

The City and County of San Francisco's Transportation Noise section within the Environmental Protection Element of its Master Plan provides a guide for development and land use in relation to noise. The objectives and policies in this section are intended for use within City of San Francisco limits only. However, they establish San Francisco's general criteria for "achieving an environment in which noise levels will not interfere with the health and welfare of people in their everyday activities." The section also states, "In San Francisco, major attention must be given to three main aspects of the problem: the sources of the noise, the path it travels, and the receiver of the noise. In general, techniques should be designed to quiet the noise at the source, to block the path over which it is transmitted, and to shield or remove the receiver from the noise."/40/

Listed objectives and policies that relate to land use and noise compatibility are as follows:

"Objective 10	Policy 1:	Promote site planning, building orientation and designing and interior layout that will lessen noise intrusion.
"Objective 11	Policy 1:	Discourage new uses in areas in which the noise level exceeds the noise compatibility guidelines for that use.
	Policy 2:	"Consider the relocation to more appropriate areas of those land uses which need more quiet and cannot be effectively insulated from noise in their present location, as well as those land uses which are noisy and are presently in noise-sensitive areas.
	Policy 3:	"Locate new noise-generating development so that the noise impact is reduced."/40/

In addition, the "Land Use Compatibility Chart for Community Noise" outlines acceptable noise levels by land use category. Under the heading "Commercial -

Wholesale and Some Retail, Industrial/Manufacturing, Transportation, Communications and Utilities", for noise levels above 83 dBA, L_{dn} (see Section III.C. Noise for the definition of dBA and L_{dn}), new construction or development should be undertaken only if a detailed analysis of the noise-reduction requirements is made and needed noise-insulation features are included in the design./40/

Implementation of the SFIA Master Plan would not conflict with policies of the Environmental Protection Element of the City and County of San Francisco.

COUNTY OF SAN MATEO

While SFIA is located on unincorporated land within San Mateo County, SFIA is owned by the City and County of San Francisco as a public utility and is, therefore, under Section 53090 of the California Government Code, not subject to the land use regulations of the County of San Mateo./41/

However, SFIA is recognized as having an influence over surrounding areas and is in the Urban Land Use Element of San Mateo County's 1986 *General Plan* and in the San Mateo County *Zoning Ordinance*. The Urban Land Use Element designates SFIA as a "Special Urban Area", Airport, under the grouping of "Institutional Areas". The primary feasible uses associated with the Airport designation are "(t)ransportation uses including air transportation and related terminal transfer, maintenance and loading area facilities." The Urban Land Use Policy for "...San Francisco International Airport (is to) maintain current uses and allow redevelopment and expansion if compatible with adjacent land uses and other General Plan policies." /Objective 8.4.b./ The element indicates a development potential of 260 industrial acres./42/

The San Mateo County *Zoning Ordinance* designates airport land as primarily zoned M-1 (Light Industrial) and C-1/S-1 (Neighborhood Commercial) and overall as an Airport Overlay District (A-O). The A-O district limits the concentration of people where hazards from aircraft are considered to be greatest. Permitted uses are not specified; however, preference is given to uses that are anticipated to attract no more than ten persons per net acre at any one time. The requirements of the A-O district are applied in addition to the requirements of the primary zoning designation./43/

In the winter of 1990, the City / County Association of Governments (CCAG) of San Mateo County was formed by a joint powers agreement between the cities of San Mateo County and the County of San Mateo. CCAG has created several committees to address various issues and to assist in preparing state-mandated plans. One of the committees created was the Airport Land Use Commission of San Mateo County.

County of San Mateo Airport Land Use Commission (ALUC)

Airport Land Use Commissions (ALUCs) are established by California state law to coordinate new development in the vicinity of public use and military airports and to make recommendations, which, by promoting the compatibility of new development with existing and planned airport operations, will protect the welfare of nearby inhabitants and the general public./44/ An ALUC does not have any authority over airport operations, but it does have the authority to conduct land use planning for areas around airports in the County. The ALUC must make a determination that general plans, zoning regulations, and any proposed new development in its planning area are in conformance with its Airport Land Use Plan. However, local governments can overturn decisions of the ALUC by a four-fifths vote. The 1981 San Mateo *Airport Land Use Plan* requires that airport "approach zones" be kept free of structures. Nonstructural uses may be permitted in approach zones if they do not cause a concentration of more than ten persons per acre on a regular basis./45/ The San Mateo ALUC was created to regulate land uses in areas that could be affected by the operation of an airport and prepared an airport land use plan in 1973. All cities affected by Half Moon Bay Airport, San Carlos Airport, and SFIA are represented. Of primary importance to the ALUC is the intensity of land uses under the flight paths, the compatibility of projects under consideration by public agencies with current and future airport operations, and the adequacy of construction material.

San Mateo *Airport Land Use Plan* regulations include the following:

> "HEIGHT RESTRICTIONS. The ALUC Plan does not allow tall structures to be built around the three airports if such buildings would be hazardous to flight. Under these regulations, structures are prohibited above measured flat planes that slope upward and outward from a runway. These are referred to as 'approach surfaces' and should not be confused with the approach zones described in the previous section.
>
> "ALUC height restrictions are based primarily on Federal Aviation Regulations Part 77, 'Objects Affecting Navigable Airspace'. Structures which would penetrate Part 77 surfaces are prohibited. Maps defining these surfaces appear on the 'SID' (Standard Instrument Departure) and 'TERPS' (Terminal and Enroute Procedure Standards). Surfaces are subject to case-by-case review by ALUC.

"The drawing below [Figure 12] illustrates a typical surface located in relation to an airport runway and approach zone. The illustration also demonstrates how 34:1 slope would permit a structure to be built to a maximum height of 58.8' at the end of a 2,000' approach zone."/45/

Joint Powers Board, San Francisco International Airport and San Mateo County Environs Area

In 1976, a Joint Powers Board was created to undertake a comprehensive effort to improve compatibility between San Francisco International Airport and the San Mateo County Environs Area. With financial support from the City and County of San Francisco, San Mateo County and the Federal Aviation Administration (FAA), the Joint Powers Board undertook a Joint Land Use Study that began in 1978 and culminated in 1980 with the publication of the *Joint Land Use Study Final Technical Report.* In addition to the Airports Commission, San Mateo County ALUC staff, local governments and consultants to the Joint Powers Board, participants in the Joint Land Use Study process included members of community groups, business, labor unions, and the aviation industry. Prior to the establishment of the Joint Powers Board, resolution of compatibility problems between SFIA and surrounding communities was undertaken on a piecemeal basis by the jurisdictions concerned: the Airports Commission, San Mateo County, the San Mateo County ALUC and cities in the vicinity of SFIA./46/ The original objectives of the Joint Land Use Study were as follows:

- "To provide for the orderly and timely growth of San Francisco International Airport, adequate to meet present and future air transportation needs, but consistent with the safety and general welfare of the inhabitants within the vicinity of the Airport and the public in general.

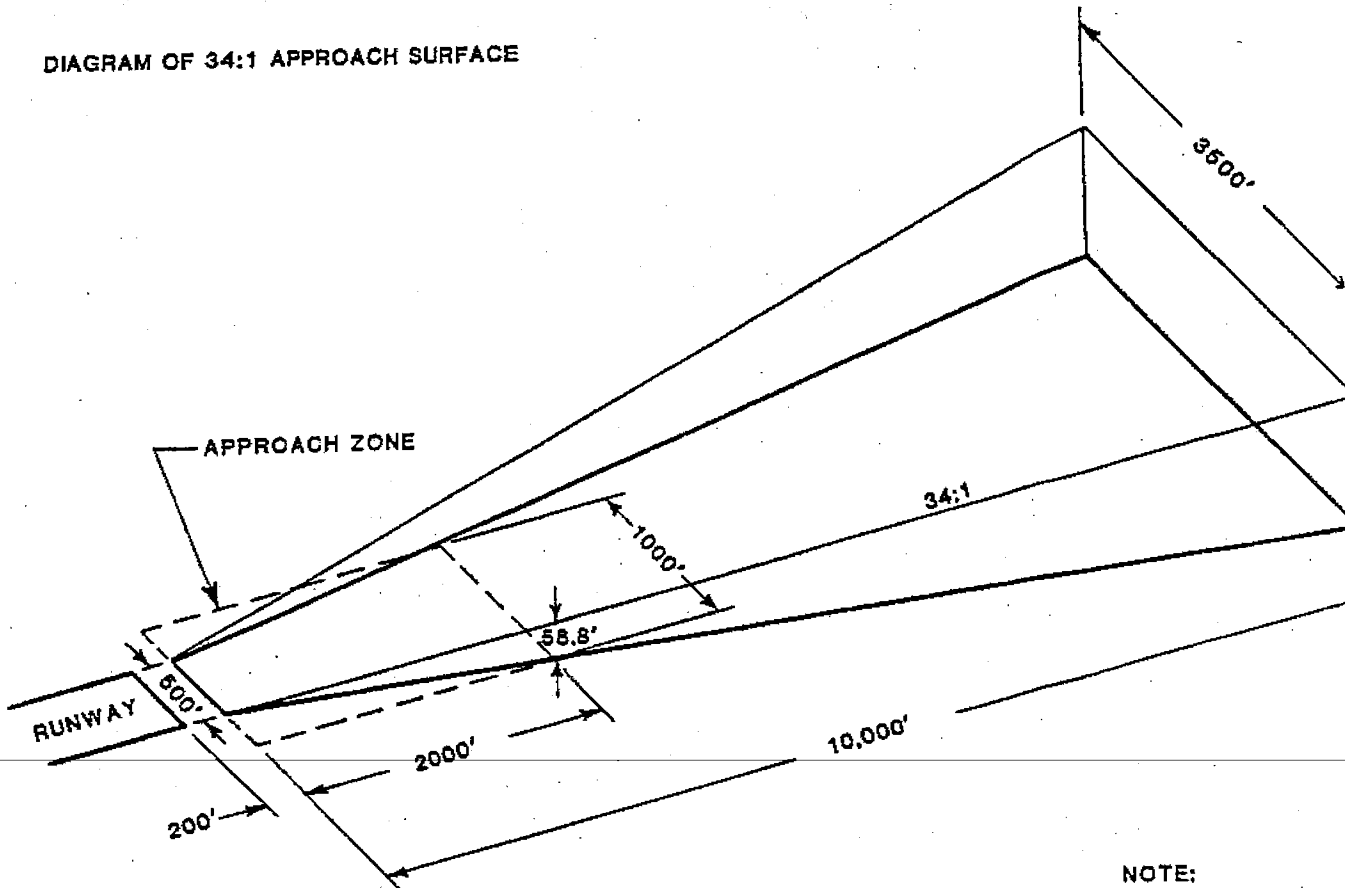
- "To provide governmental jurisdictions in the vicinity of the airport with tools for evaluating and implementing planning actions in a systematic fashion.

- "To inform public and private aviation interests, as well as the general public, of Airport land requirements, and to create a general awareness of the need for a systematic approach to planning the Airport and its Environs.

- "To optimize use of land and air space resources and guide community growth patterns according to comprehensive planning goals and objectives.

- "To provide for protection and enhancement of the environment through the development of land use specifications, height restrictions and/or building standards within the planning areas and through establishment of guidelines consistent with Federal and State regulations to avoid intrusion of unacceptable levels of noise and air pollution into the surrounding communities."/46/

DIAGRAM OF 34:1 APPROACH SURFACE



SOURCE: Environmental Science Associates, Inc.; San Mateo County Land Use Commission

San Francisco International Airport ■

● **Figure 12**

ALUC Runway Approach Zones

During the course of the Joint Land Use Study, increasing interest in noise conditions and mitigations led to a re-ordering of Study objectives and priorities to emphasize noise issues and de-emphasize land use planning, ground access and air quality issues. Recommended Actions of the Joint Land Use Study focused on noise reduction and mitigation measures, including improvement of airport noise monitoring and mitigation programs; flight procedure changes; Airport noise limits, use restrictions and economic incentives; off-Airport voluntary noise insulation and avigation easement programs; neighborhood improvement programs; and preventive land use planning. Ground access and air quality recommendations included transit improvements and continued joint study of Airport Environs traffic; development of an aircraft emissions control program; and submission of Study recommendations to the Airports Commission for consideration in master planning studies./46/

Alternatives considered but not recommended by the Joint Land Use Study included reduction of Airport operations, construction of new or extended runways, and acquisition of noise-affected homes and schools. The Study concluded that a reduction in operations "would result in extreme economic, financial, and air service impacts," and that acquisition of noise-affected homes and schools "would result in extreme physical and social impacts to existing viable residential neighborhoods . . ." New or extended runways, the Study concluded, "would result in extreme environmental impacts to the ecosystem of San Francisco Bay if bayfill were required in sufficiently large amounts to allow construction of new or extended runways solely for noise abatement."/46/

REGIONAL CONTEXT

Association of Bay Area Governments (ABAG) and Metropolitan Transportation Commission (MTC)

The Association of Bay Area Governments (ABAG) is a voluntary regional governmental body that includes the entire nine-county Bay Area. ABAG is largely a long-range planning agency that provides cities and counties with analytical research and technical assistance. ABAG prepared and adopted a Regional Airport Plan as an element of its *Regional Plan 1970: 1990*./47/ During the 1970s, ABAG also conducted a Regional Airport Systems Study, which it adopted as a special plan element of the Regional Plan./48-51/

In 1970, the Metropolitan Transportation Commission (MTC) was established by the California State Legislature as the comprehensive transportation planning and programming agency for the nine San Francisco Bay Area counties. MTC has authority to review local projects for consistency with regional transit/transportation policies. MTC has authority to review and comment on SFIA Master Plan projects that could affect either regional ground transportation systems or regional aviation systems.

Regional Airport Plan (RAP). This Plan was prepared by MTC and ABAG to guide future aviation growth in the Bay Area, was adopted as an element of the MTC *Regional Transportation Plan* in March, 1975, and was subsequently revised as part of the 1980 edition of MTC's *Regional Transportation Plan.*/52,53/ Forecasts developed for the 1980 Regional Airport Plan have been periodically reviewed and revised./53a/ An update of the 1980 *Regional Airport Plan*, known as the Regional Airport System Plan (RASP) Update, is currently in progress and slated for publication by the end of 1992. An environmental impact report on the RASP Update is scheduled for completion in early 1993./53b/

The RASP Update will include historical, current and forecast levels of aviation activity in the Bay Area; data on Bay Area aviation facilities, capacities and requirements, including ground access systems, terminals, airfields, airspace, etc.; environmental and other constraints affecting the regional airport/aviation system; and a range of alternatives for coordinating regional aviation planning, investments in capacity-increasing and other airport projects, and operations./54,55/ The RASP Update will examine airport system alternatives for 2005 and 2010./53a/

The alternative regional aviation system plans will range from no major infrastructure improvements to construction of one or more new air carrier airports, and will also include new technologies, the Master Plans of existing air carrier airports, recommendations of other agencies and studies, and various combinations of identified actions./54,55,56/

Among the assumptions likely to influence the 1992 *Regional Airport Plan* forecasts is whether growth in aviation activity between SFIA and Pacific Rim countries continues, while the other Bay Area air carrier airports increase their shares of domestic passenger traffic, particularly in the California Corridor (Southern California - Bay Area - Sacramento)./54/

The *Regional Airport Plan* is the basis of MTC consistency determinations concerning airport plans and development proposals. Provisions of the 1980 *Regional Airport Plan* include the following:

"Mitigation proposals. Regional policy calls for the development of airport ground transportation improvement, noise abatement, and air quality improvement programs by the airports prior to major expansion. One of the key recommendations concerns the establishment of a regional airport noise allocation system. This recommendation creates a noise 'budget' for each airport based on the airport's share of traffic in the RAP *[Regional Airport Plan]* and the assumption that all aircraft using the Bay Area airports will meet Federal Aviation Regulations--Part 36, Aircraft Noise Certification Requirements by 1987. Revised standards to achieve continuing reductions in the emissions from aircraft engines are also supported to minimize local airport air quality problems.

"North Bay Airport. The regional plan has identified a demand of up to one (1) million annual passengers in the North Bay who would need air service to cities in California in the 1985-1989 time frame and up to two million annual passengers in the 1994-2000 time frame. A joint policy study by regional and local governments has proposed that the need for a California Corridor Service and/or regional airport (interstate and international airline service at Travis AFB [Air Force Base] or a new airport) be reviewed around 1990. In the interim, local governments should permit only compatible land uses around Travis AFB. Also, it is recommended that responsible agencies look into management techniques at existing airports to control noise and improve capacity, and thus alleviate pressures for an airport in the North Bay.

"General Aviation. It will also be necessary to expand and improve the region's general aviation airports, particularly as general aviation becomes a more important transportation mode for business and other travelers needing to reach locations that are not served by the airlines. An efficient system of 'reliever' general aviation airports is also needed in order to divert small aircraft away from the crowded airspace in the central Bay and improve air safety. In the North Bay, Hamilton AFB and Napa County Airport have the greatest potential to relieve general aviation congestion around San Francisco and Oakland Airports. (Sonoma County and Nut Tree Airports will provide relief by serving local training demand.) In the South Bay, improvements to general aviation airports in the south county and Fremont area could substantially relieve San Jose Municipal Airport, and the possibility of joint use of Moffett Field for training purposes should also be explored . . .

"Expansion of major air carrier airports. Airline service at San Francisco International Airport, Metropolitan Oakland International Airport, and San Jose Municipal Airport should be consistent with the regional plan and with master plans prepared for these airports. The regional plan recommends that airport improvement programs and local land use decisions be guided by the assignments of air passengers shown in the following table:

● [TABLE 14]
Regional Passenger Assignments
(Millions of Annual Passengers)

Airport	1985-1989	1994-2000
San Francisco	24-27	27-31
Oakland	7-8	10-13
San Jose	6-7	8-10
Total*	37-42	45-54

* Total regional demand is projected to be 37-43 MAP [Million Annual Passengers] in 1985-1989 and 45-56 MAP [Million Annual Passengers] in 1994-2000. Some portion of the projected regional demand may remain unserved, depending on the availability of air service in the North Bay."/53/

Source: Metropolitan Transportation Commission, *Regional Transportation Plan*, 1980.

● A comparison of MTC's 1980 Region Airport Plan-recommended shares of regional passenger activity and actual 1989 shares for the five Bay Area air carrier airports is presented in the discussion of regional aviation activity and regional capacity issues, beginning on p. 118.

● Tables 14A and 14B, below, reflect the most recent MTC regional airport plan passenger forecasts (revised in 1986) and airport traffic assignments (revised in 1987). Anticipated total regional air passenger demand in the most recent forecasts is higher than in MTC's 1980 Regional Airport Plan forecasts, and the most recent forecasts are extended to 2005 (whereas the previous forecasts extended to 2000). The recommendation that SFIA's passenger share should decrease relative to shares of the airports at Oakland, San Jose and Concord as total Bay Area air passenger demand increases, is inherent in both the 1980 and the 1986-1987 Regional Airport Plan airport traffic assignments.

[TABLE 14A]

PROJECTED BAY AREA AIR PASSENGER DEMAND
(Millions of annual passengers - on & off)

Time Frame	Total Bay Area Air Passengers
1995	40.8 - 46.8
2005	48.7 - 58.7

Source: Metropolitan Transportation Commission, *Regional Transportation Plan for the Nine-County San Francisco Bay Area,* 1988.

[TABLE 14B]

AIRPORT TRAFFIC ASSIGNMENTS
(Millions of annual air passengers - on & off)

	Level 1		Level 2		Level 3	
Airport	Demand	Share	Demand	Share	Demand	Share
San Francisco	19.9	78.7%	30.0	69.3%	31.0	55.1%
Oakland	2.6	10.1	6.0	13.9	15.0	26.6
San Jose	2.8	11.2	7.0	16.2	10.0	17.8
Buchanan Field	--	--	0.3	0.6	0.3	0.5
Total	25.3	100.0%	43.3	100.0%	56.3	100.0%

Level 1 represents the 1981 traffic level and traffic distribution among the airports. Levels 2 and 3 represent shares derived from policies in the RAP and airport master plans. Air passenger assignments for intermediate levels of Bay Area demand may be determined by interpolation between the three levels of demand shown in the table.

Source: Metropolitan Transportation Commission, *Regional Transportation Plan for the Nine-County San Francisco Bay Area,* 1988.

In 1990, SFIA's actual passenger level (about 30.4 MAP) and regional share (about 70.4 percent) were relatively close to MTC's recommendations for SFIA's component of regional passenger demand Level 2, shown in Table 14B. At regional demand Level 2 (43.3 MAP for the region), MTC recommended 30 MAP and 69.3 percent of the regional passenger market for SFIA. The actual regional total in 1990 was about 43.8 MAP. Thus, SFIA's 1990 passenger level and regional market share were consistent with MTC's most recent (1987) airport traffic assignments.

- However, the passenger levels and market shares anticipated in the SFIA Master Plan are not consistent with MTC's airport traffic assignments. As shown in Table 14B, MTC assumed a 13 MAP or 30 percent increase in total passengers for the region between demand Levels 2 and 3, but recommended that SFIA's passenger total increase by only one MAP (to 31 MAP) and that its market share decline from 69.3 percent to 55.1 percent of the regional total. The SFIA Master Plan, in contrast, assumes that SFIA would serve between 70.5 and 72.8 percent of regional passenger demand at Level 3, or 56.3 MAP. (The basis of this comparison is SFIA Master Plan Table 7.1, "Total Passengers -- Regional San Francisco-Oakland-San Jose Area Passenger Forecasts" and Table 7.2, "Total Passengers--San Francisco Airport Passenger Forecasts." Forecasts in SFIA Master Plan Table 7.1 show the 56.3 MAP level being reached between 1994 and 1995; according to SFIA Master Plan Table 7.2, SFIA's "unconstrained" passenger total would be about 39.7 MAP in 1994 and about 41 MAP in 1995. Thus, the data in the two tables reflect an expected regional share under the SFIA Master Plan of 70.5 to 72.8 percent for a regional passenger level of 56.3 MAP, MTC's Level 3.)

- MTC's most recent (1986) regional air passenger demand forecasts and most recent (1987) airport traffic assignments are being revised as part of the RASP Update.

SCR 74 Peninsula Mass Transit Study. Since the late 1970s, MTC has undertaken several studies of the Peninsula Route 101 corridor between San Francisco and San Jose, one of the most congested and heavily travelled corridors in the Bay Area. In 1984, MTC was directed by the State Legislature, Senate Concurrent Resolution Number 74, to develop a mass transit plan for the San Francisco - San Jose corridor in cooperation with the California Department of Transportation (Caltrans), transit operators, and local governments. The SCR 74 Peninsula Mass Transit Study identified a range of transit system alternatives, including improvements in the commuter rail (CalTrain) service and extension of CalTrain to a downtown San Francisco station; several possible BART extensions (Colma and San Jose); a possible light-rail system between San Francisco and San Jose; a "major system transfer facility" (BART or light-rail station) at SFIA; addition of high-occupancy vehicle (HOV) lanes on US 101; and alternatives combining BART and light-rail transit, CalTrain or buses./56/

Metropolitan Oakland International Airport (Oakland Airport)

Oakland Airport, managed and operated by the Port of Oakland, has prepared a draft *Master Plan Update* (1988). The Oakland Airport draft *Master Plan Update* is currently undergoing environmental review as required by both the California Environmental Quality Act (CEQA) and the National Environmental Policy Act

(NEPA). Draft elements of the Oakland Airport *Master Plan Update* include *Chapter II: Introduction; Chapter III: Inventory; Chapter IV: Aviation Demand Forecast; Chapter V: Capacity Analysis*; and *Chapter VI: Facility Requirements*./57/

Goals of the Port of Oakland pertaining to the Oakland Airport draft *Master Plan Update* are as follows:

- "To provide comprehensive and convenient air travel services for Oakland and the East Bay Area.
- "To increase Metropolitan Oakland International Airport's share of the Bay Area passenger market.
- "To encourage Metropolitan Oakland International Airport to become a major west coast center for air cargo activity.
- "To increase Metropolitan Oakland International Airport's share of the Bay Area air cargo market."/59/

Issues identified in the Oakland Airport draft *Master Plan Update* that pertain to development of Oakland Airport include the regional role of the airport, the airport's role in the community, role of North Field and South Field (the facility is now divided), airspace capacity, airport airside capacity and facilities development, airport landside accessibility and circulation, passenger terminal development, environmental effects of airport operations and development, and compatible development of adjoining land uses.

According to the Oakland Airport draft *Master Plan Update*, "Bay Area airspace is perhaps the most complex in the nation and may be the most significant factor in determining the capacity of the Airport. Close coordination with the FAA and area airports will be required in determining airspace impacts."/57/

Fluctuations in the aviation industry, as well as potential environmental controversy and other institutional changes, caused the Port of Oakland to re-scope the Master Plan update program and scale back the plan time frame, a process which has culminated in the development of the 10-year 2002 Airport Development Program. Among the projects under consideration in the 2002 Airport Development Plan are the modification of existing terminal facilities, widening of existing airport access roads and construction of new airport access roads, construction of a ground transportation center/parking structure and remote parking lots, enhancements and additions to existing airline support and air cargo facilities, improvements to taxiway and runway facilities, and restoration of wetlands as mitigation for a previous 33-acre fill on Oakland Airport lands. The improvements to the airfield facilities are intended to enhance the current level of safe and efficient operations of aircraft and would not expand the overall capacity of the Oakland Airport airfield.

San Jose International Airport (San Jose Airport)

San Jose International Airport, owned and operated by the City of San Jose, is also updating its Master Plan, a process that began in 1988 and will likely continue for another two years (through 1994). According to demand forecasts, total annual aircraft operations at San Jose Airport are expected to increase by 90 percent between 1988 and 2010./58/ Land availability is considered a more important constraint at San Jose Airport than airspace capacity./59/

San Jose Airport staff and consultants are currently in the process of defining and scoping four Master Plan alternatives that have been identified for consideration by the San Jose City Council. An EIR will be prepared on the four alternatives, and selection of a preferred alternative will occur after completion of the EIR (expected in mid-1993). The first of the four alternatives would accommodate all of the air carrier demand projected for San Jose Airport in the Master Plan technical analysis. The second alternative, prepared by Citizens Against Airport Pollution, is an environmental-performance-based alternative that would, at most, allow limited expansion at San Jose Airport. The third, or moderate growth alternative, would fall between the first and second alternatives in terms of the amount of expansion it would allow at San Jose Airport. The fourth alternative is the No-Project alternative, defined as continuation of the existing (1980) Master Plan. Any of the four alternatives may ultimately be selected as the preferred alternative for San Jose Airport./59a/

California Department of Transportation (Caltrans)

In addition to it role in planning and operating the ground transportation systems serving SFIA (see Section III.B. Transportation, p. 125 and Section IV.B. Transportation, p. 265), Caltrans is involved in state aviation system planning and research through its Division of Aeronautics and its Office of Research and New Technology. The Division of Aeronautics recently completed the Phase I update of its *California Aviation System Plan (CASP)*, begun in 1987. Phase I of the *CASP* comprises six elements and a *Status Report and Summary.* The six Phase I *CASP* elements include *Element I: Inventory; Element II: Forecasts; Element III: Policies; Element IV: System Requirements; Element V: Financial; and Element VI: Action Plan.* The Policy element was adopted by the California Transportation Commission in November, 1990./60/ *CASP* forecasts of SFIA passenger levels and aircraft operations are presented in the previous section (Project Description).

- Phase II of the *CASP* comprised in-depth studies of issues related to air cargo, airport ground access and airspace utilization. These three Phase II *CASP* studies, and an Executive Summary, were published in August, 1991./61/

Aviation-related policies of the California Department of Transportation are identified in *CASP Element III: Policies* as follows:

> "Policy 1. The Department will identify a statewide airport system to meet the State's immediate and future air transportation needs and will promote development and maintenance of the system.
>
> "Policy 2. The Department will facilitate coordinated and comprehensive statewide aviation system planning through continuous and active participation in Federal, State, regional and local activities related to aviation.
>
> "Policy 3. The Department will coordinate aviation system planning efforts with the Federal Aviation Administration (FAA) and the military on airspace issues to achieve efficient and safe use of airspace in California.
>
> "Policy 4. The Department will strive for the safest possible public-use airport facilities.
>
> "Policy 5. The Department will encourage development of an air transportation system that meets demand as identified in the *California Aviation System Plan (CASP)*.
>
> "Policy 6. The Department will promote and assist in ensuring compatibility between airports and surrounding land uses.
>
> "Policy 7. The Department will maintain hazard-free approach surfaces at all public-use airports, and will seek to achieve obstruction-free approach zones.
>
> "Policy 8. The Department will promote and encourage development of adequate ground access to public-use airports.
>
> "Policy 9. The Department will promote adequate air transportation access to the state and national air transportation systems for all the State's citizens.
>
> "Policy 10. The Department will recommend funding in a manner that will provide the optimum benefit to the State airport system.
>
> "Policy 11. The Department will provide aviation expertise to airports in engineering, planning, and technical areas.
>
> "Policy 12. The Department will assist airports in becoming economically viable and self-sustaining.
>
> "Policy 13. The Department will promote awareness of the socioeconomic benefits of aviation throughout the State and will support aviation education."/62/

In implementing the above policies, the Caltrans Division of Aeronautics prepares the *CASP* and participates in other aviation studies and programs; reviews and comments on Regional Transportation Plans, Airport Master Plans, Compatible Land Use Plans, and associated environmental documents; reviews and comments on Federal rule-making and legislation; drafts and reviews proposed State legislation related to aviation; and administers various State funding and loan programs for airports. The Division also administers State Noise Standards, issues State permits for all airports and heliports, and has permitting authority for erection or extension of structures more than 500 feet above ground or near-airport obstructions near airports declared a hazard by the FAA./62/

The Caltrans Division of Aeronautics is currently reviewing military airfields scheduled for closure to determine their potential use as civilian airports. Two Northern California facilities (Mather Air Force Base and Hamilton Air Force Base) and two Southern California facilities (Norton Air Force Base and George Air Force Base) were included in the first phase of this review./60/ A report on possible conversion of these four bases to civilian aviation was published by Hodges & Shutt, a consultant to the Caltrans Division of Aeronautics, in May 1991./60a/ Other Northern California military airfields that may be studied by Caltrans for potential civilian use include Alameda Naval Air Station, Moffett Naval Air Station and Fritzsche AAF (Fort Ord)./63/

The Caltrans Office of Research and New Technology, in association with the Institute of Transportation Studies at the University of California, Berkeley, is currently studying the feasibility of locating additional off-airport terminals in the Los Angeles Basin and the San Francisco Bay Area. Off-airport terminals provide regularly scheduled bus or rail service to one or more airports from remote parking facilities. Usually located about 15 to 20 miles from the airport(s), off-airport terminals may also include baggage check-in and airline ticket counters. Existing California off-airport terminals include the Van Nuys FlyAway, which provides service to Los Angeles International Airport and is operated by the Los Angeles Department of Airports, and the Marin Airporter, which provides service to SFIA from the Marin County community of Larkspur./62/

The objective of the current study is to identify two potential sites - one in the San Francisco Bay Area and one in the Los Angeles Basin - and to develop a plan for a Caltrans-sponsored off-airport terminal demonstration program. According to the Institute of Transportation Studies and Caltrans studies, off-airport terminals can benefit users in terms of cost savings and convenience, can contribute to reductions in highway congestion and vehicle emissions by diverting airport traffic to high-occupancy vehicles, and may also contribute to a more balanced use of regional airport capacity by providing more ground transportation options in multiple-airport regions./64,65/

The California Department of Transportation also led the Los Angeles -Fresno - Bay Area / Sacramento High-Speed Rail Corridor Study, mandated by Assembly Bill AB-971, passed into law in June, 1988, and submitted to the State Legislature in June, 1990. AB-971 called for the establishment of a 30-member Study Group to "study and develop a plan for development of a high-speed rail corridor" in the Los Angeles -Fresno - Sacramento / Bay Area corridor./66/ The Study Group's Final Report to the California State Legislature stated that:

> "On the air trip between the downtown parts of Los Angeles and San Francisco, the majority of time and nearly all the stress is associated with ground access, not with the air journey itself. The airports suffer from severe capacity limits on landing slots, airplane space, fuel storage, parking and congested automobile traffic. Air travel is now less convenient, less pleasant and more costly....In its fully developed form, [the California Corridor] will comprise a high speed rail spine approximately 425 miles long and an interregional rail network with a total length of over 600 miles. Its gross population catchment of more than 20 million Californians will include more than two-thirds of all state residents. The character of this state-wide corridor makes its full and early development, and the creation of the infrastructure to support it, a California state-wide priority of the highest order."/67/

The objectives adopted by the Study Group are to:

"1. Reduce travel time and enhance speed for trips within the corridor.

"2. Provide additional passenger rail service and passenger-carrying capacity within the corridor.

"3. Extend direct rail service to Los Angeles and to Sacramento and the Bay Area.

"4. Provide San Joaquin service between Fresno, Modesto, and Stockton on the Southern Pacific Railroad on a schedule equivalent to running times achievable on the parallel Santa Fe Railway.

"5. Increase patronage potential and accessibility of rail service within the corridor.

"6. Improve the quality of passenger rail service within the corridor.

"7. Maintain capacity of freight operations.

"8. Provide cost-effective improvements that maximize benefits in the corridor relative to costs."/66/

In part of a long-term planning effort to develop rail service in the California Corridor, the Study Group identified four levels of improvement for phased implementation. Level 1 is the status quo. Level 1a would expand 79 miles per hour (mph) service and extend direct rail service to Sacramento and Los Angeles. Level 2 would include a new high-speed (185 mph potential) electrified rail line between Bakersfield and Los Angeles, 110-125 mph maximum speed service between Bakersfield and Sacramento and 79 mph maximum speed service between Stockton and Oakland. Level 3 would include new high-speed rail links (185 mph maximum speeds) between the Central Valley and the San Francisco Bay Area, with state-of-the-art equipment and dedicated passenger tracks. Level 4 would include Magnetic Levitation (Maglev) as an alternative to Level 3, built over the Level 2 alignment and having 300 mph maximum speeds./66/ According to Study Group technology analysis, travel time between San Francisco and Los Angeles (downtown to downtown) would be 3 hours, 21 minutes at 185 mph maximum speed, and 2 hours, 13 minutes at 300 mph maximum speed./65/

California Commission on Aviation and Airports

The 25-member California Commission on Aviation and Airports was established by the State Legislature in 1986 to review, monitor and evaluate issues relevant to aviation and airports in California. The Commission is composed of representatives of the aviation industry, users of the air travel system and members of the Legislature. The Commission's January, 1989 report to the Legislature stated that California is facing an aviation capacity "crisis" with potentially severe consequences for the viability and competitiveness of the State's economy. The report outlined the historic and present role of the State in aviation system planning and development, citing the State's limited control relative to Federal and local agencies and emphasizing the need for a more proactive State involvement. The report also contained recommendations for addressing the "capacity crisis," including "development of a legislative program in the State to encourage local communities, through monetary incentives, to build new public use airport facilities and heliports." The report also advocated State involvement in joint military-civilian airport uses and civilian re-use of surplus military airfields. According to the Report,

> "Recently the Federal Base Realignment and Closure Commission recommended the closure of a number of military airfields in California....It would behoove the State of California to begin preliminary discussions with the appropriate federal and local agencies as to the acquisition and operation of these bases for commercial air carrier use. The cost, while not insignificant, would be much less than the development of a brand new facility in the area."/68/

On matters related to the potential availability of surplus military airfields, the Commission report included the following recommendations:

- "Require the State to act as an interim operator of airports, including military bases, being closed until a permanent operator can be found.
- "Develop, on the state level, a plan to work with the military and the federal government on joint and/or shared use airports and on military airfields which may become surplus and closed."/68/

Bay Conservation and Development Commission (BCDC)

The state Bay Conservation and Development Commission (BCDC), created by the McAteer-Petris Act in 1965, has regulatory authority over development in two areas: 1) all areas of San Francisco Bay below the line of highest tidal action, and 2) the 100-foot shoreline band inland of the line of highest tidal action. BCDC implements the McAteer-Petris Act, the *San Francisco Bay Plan*, and the Federal Coastal Zone Management Act./70/ BCDC's *San Francisco Bay Plan* contains two fundamental objectives:

> "(1) To protect the Bay as a natural resource for the benefit of present and future generations.
>
> "(2) To develop the Bay and its shoreline to their highest potential with a minimum of bay filling."

Any fill or substantial change in use of any water, land, or structure within BCDC's jurisdictional area is subject to a permit process established in the California Government Code (Sections 66600 and following)./69/

The *San Francisco Bay Plan* findings and policies pertinent to the SFIA Master Plan include the following:

"a) The shoreline is a favored location for airports because the Bay provides an open space for takeoffs and landings away from populated areas.

"b) A regional airport system plan should be prepared with full participation of affected public agencies and should include analyses of expected air traffic, alternative sites and their alternative environmental consequences, surface transportation, and the location of the jobs and homes within the Bay Area.

"c) Airports on the Bay shoreline should include terminals, parking areas, and necessary supporting facilities, but no fill should be permitted, directly or indirectly.

"d) In order to minimize additional filling of the Bay, tall buildings and residential developments should not be permitted within BCDC's area of shoreline jurisdiction."/70/

A discussion of the Bay Area Rapid Transit District (BART) is included in Section III.B. Transportation.

A discussion of the Bay Area Air Quality Management District (BAAQMD) is included in Section III.D. Air Quality.

A discussion of the San Francisco Bay Regional Water Quality Control Board is included in Section III.J. Public Utilities.

A discussion of the FAA is included in Section III.L. Aviation Safety.

REGIONAL AVIATION ACTIVITY AND REGIONAL CAPACITY

Shares of regional passenger activity for the five Bay Area Airports recommended by the Metropolitan Transportation Commission (MTC) in its 1980 *Regional Airport Plan (RAP)* are shown in Table 15.

The 1980 *Regional Airport Plan* recommended that SFIA's relative share of passenger activity continue to decline, while the relative shares of Oakland and San Jose

TABLE 15: 1980 *RAP*-RECOMMENDED SHARES OF TOTAL REGIONAL PASSENGER ACTIVITY

Airport	1985-1989 % of Low/a/	1985-1989 % of High/b/	1994-2000 % of Low/c/	1994-2000 % of High/d/
San Francisco	64.9%	62.8%	60.0%	55.4%
Oakland	18.9%	18.6%	22.2%	23.2%
San Jose	16.2%	16.3%	17.8%	17.9%
Total	100.0%	97.7%/e/	100.0%	96.5%/e/

/a/ Low end of the three airports' assignment ranges for 1985-1989, as percent of low regional forecast for 1985-1989 (37 million annual passengers).
/b/ High end of the three airports' assignment ranges for 1985-1989, as percent of high regional forecast for 1985-1989 (43 million annual passengers).
/c/ Low end of the three airports' assignment ranges for 1994-2000, as percent of low regional forecast for 1994-2000 (45 million annual passengers).
/d/ High end of the three airports' assignment ranges for 1994-2000, as percent of high regional forecast for 1994-2000 (56 million annual passengers).
/e/ High-end percentages for the sums of the three airports' passenger shares do not total 100 percent of the high-end regional forecast because the *Regional Airport Plan* assumed that some passenger demand could remain unmet, depending on the availability of air service in the North Bay.

SOURCES: Metropolitan Transportation Commission, *Regional Transportation Plan*, 1980; Environmental Science Associates, Inc., 1991.

Airports, as well as one or more North Bay Airports, continue to increase. The 1980 *Regional Airport Plan* also recommended that, on the basis of the need to control and abate airport noise and better utilize airport and airspace capacity in the Bay Area, SFIA not exceed the level of 31 million annual passengers as a matter of policy./53/

Historical passenger totals and relative shares of regional passenger activity for the five Bay Area air carrier airports are shown in Appendix B, Tables B-3 and B-4.

The actual 1990 regional total of approximately 42,993,350 passengers was at the high end of the 1985-1989 forecast range contained in the 1980 *Regional Airport Plan* (the 1990 regional total includes all five Bay Area air carrier airports: San Francisco, Oakland, San Jose, Buchanan Field and Sonoma County). SFIA's actual passenger total in 1990 was approximately 30,387,920, or 70.7 percent of the regional total, compared to 62.8 percent recommended by the 1980 *Regional Airport Plan* for 1985-1989. Oakland Airport's 5,261,160 passengers represented about 12.2 percent of the 1990 regional total, compared to 18.6 percent recommended by the 1980 *Regional Airport Plan* for 1985-1989. San Jose Airport's 7,090,270 passengers represented about 16.5 percent of the 1990 regional total, roughly equal to the 16.3 percent recommended by the 1980 *Regional Airport Plan* for 1985-1989. Buchanan Field and Sonoma County Airport together captured about 0.6 percent of the 1990 regional total, whereas the 1980 *Regional Airport Plan* high-end forecast for 1985-1989 assumed that up to 2.3 percent of the regional passenger total would need to be served by North Bay air service./53,55/

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B. TRANSPORTATION

The San Francisco International Airport (SFIA), itself a major hub in Northern California's transportation network, can be accessed from the local, regional and interstate roadways in a variety of ways. SFIA is bounded on the west by US 101 and on the north by North Access Road. San Francisco Bay is directly east and south of SFIA. Internally, SFIA is served by local roadways entirely east of US 101. The project location relative to the surrounding roadway network is shown in Figure 1, Chapter II. Project Description, p. 21.

In addition to the highway facilities, a variety of van and bus shuttle services link SFIA with many of the Bay Area cities and counties, as well as local SamTrans bus service that operates between downtown San Francisco and points in San Mateo County, with stops at SFIA. Passenger rail service also penetrates the project impact area; the nearest CalTrain station is approximately two miles west of SFIA in Millbrae. BART service is eight miles northwest of SFIA in Daly City. BART tracks currently extend south of Daly City to Colma, the first station on the phased extension to the vicinity of SFIA.

THE ROADWAY NETWORK

Freeways

US 101 is a state-maintained, primary north-south highway that runs along the entire west coast. In the vicinity of SFIA, it is an eight-lane freeway (four lanes in each direction) with a collector-distributor system serving four interchanges that can be used to access SFIA's passenger terminals and employment areas:

- Millbrae Avenue (southernmost interchange)
- Airport (direct access to passenger terminal buildings)
- San Bruno Avenue
- Interstate 380 (I-380) / North Access Road (northernmost interchange).

Each of these interchanges connects to local roads (e.g., South Airport Boulevard, McDonnell Road or Old Bayshore Highway) that access all areas of SFIA.

South of the Millbrae Avenue interchange, US 101 has an average daily traffic volume (ADT) of 232,000 vehicles. Between the Millbrae Avenue and Airport interchanges, US 101 has an ADT of 241,000 vehicles. Between the Airport and the San Bruno Avenue interchanges, US 101 has an ADT of 256,000 vehicles. North of I-380 the ADT on US 101 drops to 214,000 vehicles./1/

Interstate 380 is an east-west freeway with six lanes that connects US 101 / North Access Road in South San Francisco with I-280 in San Bruno (a two-mile distance). The ADT is 82,000 vehicles west of State Route (SR) 82 (El Camino Real) and 71,000 vehicles east of SR 82, the segment closer to SFIA./1/ El Camino Real is the only interchange on I-380 between I-280 and US 101. Although most I-380 traffic interchanges with US 101 on the east, there are also direct ramps from I-380 to South Airport Boulevard and North Access Road.

Interstate 280, a north-south freeway with eight lanes, runs roughly parallel to US 101 approximately two miles to its west. I-280 connects San Jose and the Silicon Valley communities with San Francisco. South of the Millbrae Avenue interchange, I-280's ADT is 91,000 vehicles. Between the Millbrae Avenue and San Bruno Avenue interchanges, the ADT on I-280 is approximately 96,000 vehicles. Between San Bruno Avenue and I-380, the ADT is 87,000 vehicles, and north of the I-380 interchange the ADT is 152,000 vehicles./1/

Traffic conditions on freeways in the study area have not noticeably changed from conditions prior to the October 17, 1989 Loma Prieta Earthquake. Immediately after the earthquake, during the time when the San Francisco - Oakland Bay Bridge was closed, traffic volumes on US 101 were higher than normal. Although parts of I-280 north of the Alemany interchange on US 101 in San Francisco remain closed today, this is not affecting US 101 in the vicinity of SFIA, because the closure is over ten miles to the north./2/

<u>Arterials</u>

El Camino Real (SR 82) runs north-south along the Peninsula from San Jose to San Francisco, east of I-280 and west of US 101. In the vicinity of SFIA, El Camino Real is a six-lane arterial with an ADT of approximately 34,000 vehicles north of Millbrae Avenue, and 43,500 vehicles north of San Bruno Avenue./1/ El Camino Real and South Airport Boulevard provide access to SFIA for portions of the cities immediately north of SFIA (e.g., South San Francisco and Daly City).

South Airport Boulevard is a four-lane arterial running from Gateway Boulevard in South San Francisco to San Bruno Avenue / McDonnell Road (Road R-3) near SFIA. It provides access to SFIA from several developments in southeastern South San Francisco. There are ramps from South Airport Boulevard directly to I-380. The intersection at South Airport Boulevard / North Access Road / I-380 leads to the buildings and services at the north end of SFIA. At the southern end of South Airport Boulevard is the entrance to the United Airlines maintenance facility and the intersection at San Bruno Avenue.

San Bruno Avenue is a four-lane arterial running east-west from Skyline Boulevard (SR 35) in San Bruno to South Airport Boulevard. It has interchanges with I-280 and US 101. San Bruno Avenue provides access to SFIA for areas west and north of SFIA (e.g., San Bruno and Pacifica) via US 101 or McDonnell Road. It is the only continuous east-west arterial in San Bruno.

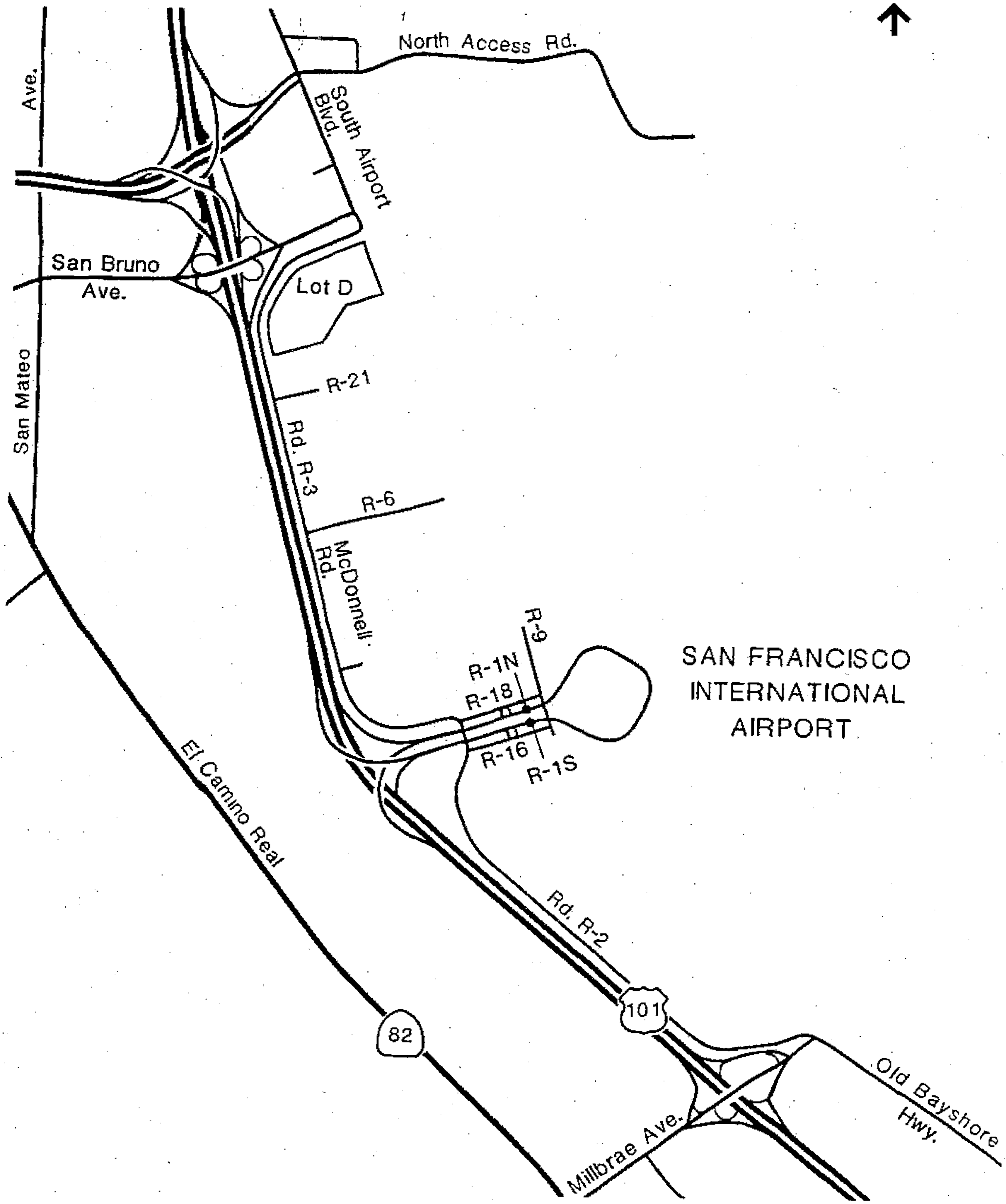
● Running east-west, Millbrae Avenue is a two-lane arterial between I-280 and El Camino Real and a six-lane arterial between El Camino Real and Old Bayshore Highway. It provides access to SFIA for areas west and south of SFIA (e.g., Millbrae) via Road R-2.

Old Bayshore Highway is a four-lane north-south arterial extending from Broadway in Burlingame to Millbrae Avenue in Millbrae. It provides access to SFIA for the areas south of SFIA and east of US 101 (e.g., northeast and east Burlingame) via Road R-2.

Local Roads

Primary access to the passenger terminals of SFIA is provided by direct ramps from US 101 northbound and southbound, with secondary access from Roads R-2 and R-3 (Figure 13). Figure 27, p. 271, Section IV.B. Transportation Impacts provides more detail on the internal Airport roadways. For inbound motorists, the ramps lead motorists to eastbound Road 1-S, then signage directs motorists to one of four areas:

- South of Road 1-S are the Hilton Hotel and rental car return areas. These are accessed from the far right lane of Road 1-S.
- The right lanes of Road 1-S direct traffic onto the (upper) departures roadway.



SOURCE: DKS Associates

San Francisco International Airport ■

● Figure 13
Local Roadways
in the Vicinity of SFIA

- The center lanes of Road 1-S direct traffic to the (lower) arrivals roadway.
- The left lanes of Road 1-S serve the entrance to the short-term parking garage and taxi staging area.

Westbound Road 1-N provides access for motorists leaving the terminal area to go to US 101, I-380, and Road R-3 (via R-20 [a crossroad between R-1S and R-1N] and R-18). It leads away from the arrival and departure decks, the parking garage, and Road R-22. It is parallel to Road 1-S, the eastbound (inbound) roadway leading to the passenger terminal and parking garage.

Road R-2 is a two-lane collector running north-south from McDonnell Road / Road 1-S (near the Airport Interchange with U.S. 101) to Millbrae Avenue in Millbrae. Road R-2 provides access to the Hilton Hotel, the TWA cargo facility and US 101 near the US 101 interchange at Millbrae Avenue. It also serves as a connecting roadway from Old Bayshore Highway and the developments in northeastern Burlingame to SFIA.

McDonnell Road (Road R-3) is a two-lane collector roadway within SFIA extending north from Road 1-N (near the Airport interchange with US 101) to South Airport Boulevard. McDonnell Road provides access to Roads R-6, R-21, the long-term parking facility (Lot D) and San Bruno Avenue.

North Access Road is a two-lane local road within SFIA, running from South Airport Boulevard and the I-380 / US 101 interchange to the Bay shoreline near the northeast corner of SFIA. It provides access to the Seaplane Harbor, the U.S. Coast Guard Air Station, the Federal Express cargo building and several other SFIA facilities.

Road R-16 is a two-lane collector south of Road 1-S, running from Road R-9 to Road R-2. It is connected to Road 1-S via one-way (cross) Roads R-24 northbound and R-26 southbound. Road R-18 is a two-lane collector north of Road 1-N, running from Road R-9 to Road R-3. It is connected to Road 1-N via one-way (cross) Roads R-20 northbound and R-22 southbound.

Average Daily Traffic (ADT) on local roads is shown in Section IV.B. Transportation Impacts, Figure 28, p. 273.

The speed limit on most local roads at or in the vicinity of SFIA is 25 mph.

EXISTING GROUND TRANSPORTATION SERVICES

Several internal transportation services are available within SFIA, and are discussed first. There are a variety of ground transportation services available both to and from SFIA. This section provides a synopsis of these services, broken down by regional service area. Services range from inexpensive public transit buses and shared-ride vans to more-expensive private limousines.

Ground Transportation Within SFIA

There are two SFIA shuttle bus routes providing service to all passenger arrival gates, outlying employment sites (e.g., United Airlines Maintenance, Federal Express Cargo), and long-term parking Lot D. Service is provided free of charge and runs approximately every five minutes.

Ground Transportation to Bay Area Cities/3/

Posted outside the baggage claim areas are color-coded ground transportation service information signs. These signs direct passengers to car rental, door-to-door van services, luxury limousines, taxis, scheduled transportation service, and bus stops. Several carriers also offer services for handicapped passengers. Fare, availability and advance notice requirements vary. Fares listed are as of January 1, 1990.

San Francisco

There are currently seven door-to-door van carriers providing service from SFIA to San Francisco. The carriers and their respective one-way fares are listed below:

• Door-to-Door Airport Express	$8.00
• Good Neighbors Airport Shuttle	$9.00
• Francisco's Adventure	$7.00
• Lorrie's Airport Shuttle	$9.00
• Shuttle Express	$8.00
• Super Shuttle	$10.00
• Yellow Airport Shuttle	$9.00

All limousine services are arranged through the Associated Limousine counter on the lower level of each terminal. Services range from shared ride to private luxury cars. To San Francisco, the cost ranges from $7.00 to $10.00 for shared ride limousines to $45 per hour for private luxury limousine service.

The SFO Airporter bus provides service to SFIA from several downtown San Francisco hotels at 20-minute intervals. Convenient transfers are available for East Bay passengers at the Embarcadero BART station. The Airporter fare is $5.00 one-way and $8.00 round trip.

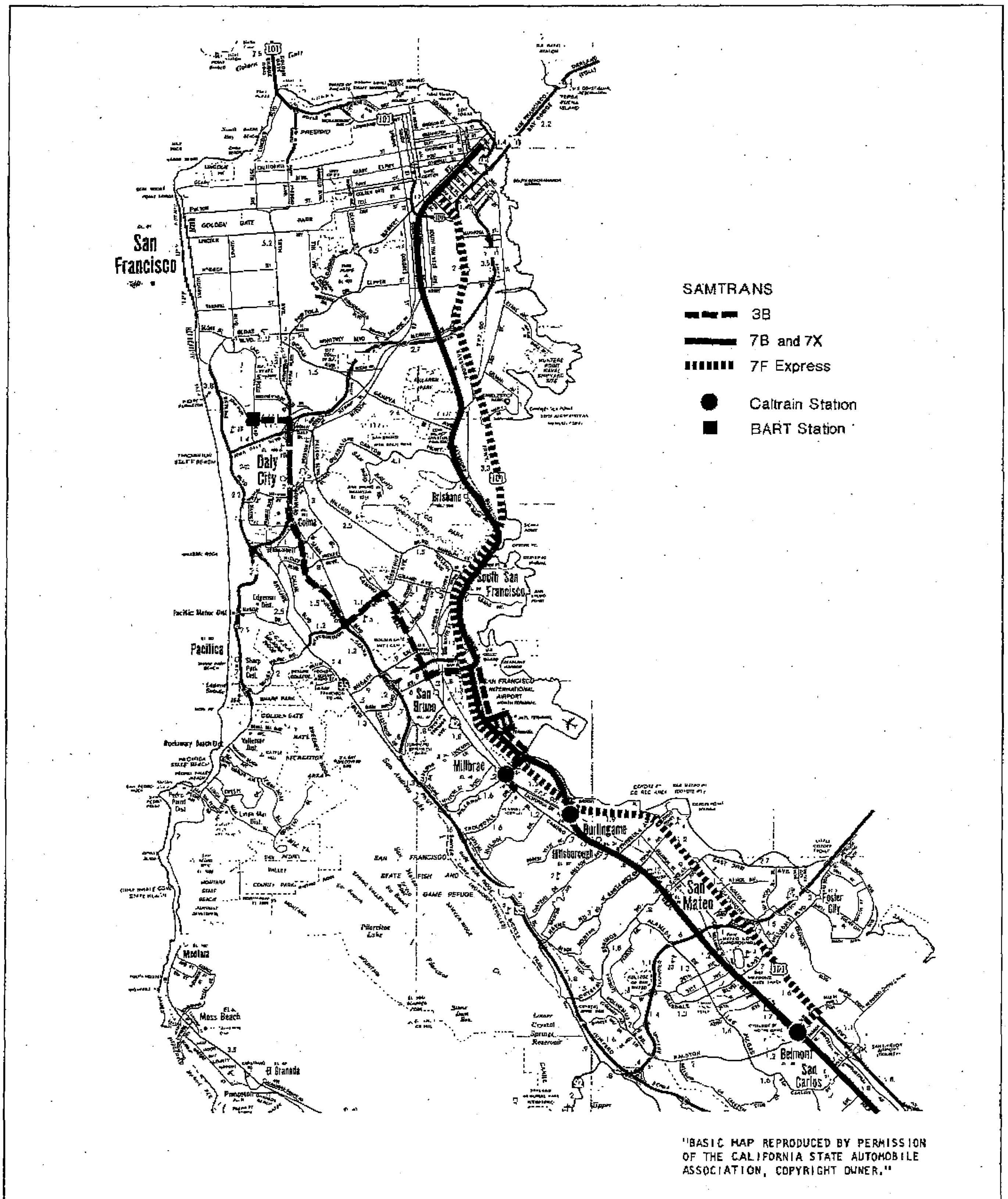
SamTrans (San Mateo County Transit District) serves SFIA with two express and two regular fixed-route bus routes, as shown in Figure 14. Route 7X (express) bus operates weekdays from the Transbay Terminal in downtown San Francisco to SFIA via US 101, for a one-way fare of $1.25. Route 7F (express) does not allow passengers to carry luggage on board. Route 7B (local) runs on local streets, providing both weekend and holiday service; the one-way fare is $1.00. Route 3B provides service from Stonestown Shopping Center in San Francisco to the Daly City BART station, continuing to SFIA. The fare for Route 3B is $0.50. SamTrans recently entered into a fare-coordination agreement with BART that provides free rides on some SamTrans buses (and credits on others) to passengers who present semi-monthly AC / BART Plus passes. These passes, subject to additional monthly fees, are good for free passage on MUNI routes also.

South Bay

The South Bay, which include parts of San Mateo, Santa Clara, Santa Cruz, and Monterey Counties, is served by several transportation operators.

Door-to-door van services are provided by Bayporter Express and Super Shuttle in San Mateo County, and also by South Bay Airport Shuttle and Express Shuttle in Santa Clara County. Fares vary based on the exact location served.

Limousine service is arranged through Associated Limousine Operators of San Francisco. Service is available to San Mateo and Santa Clara Counties, and costs are $24 to $51 for shared ride service or $45 per hour for private luxury limousine service.



SOURCE: DKS Associates

Figure 14
Bus Routes to SFIA

The Santa Cruz Airporter provides bus service between Watsonville and SFIA. There are four round trips per day to SFIA. The fares are $35 each way from Watsonville, $25 from Santa Cruz and $20 from San Jose.

SamTrans provides connecting bus service from the Belmont, Burlingame Broadway, and Millbrae CalTrain stations in San Mateo County throughout the day./4/ Transfer times at CalTrain are usually between three and eleven minutes. In addition, SamTrans provides service to SFIA from Palo Alto on Route 7F (Express) and from Redwood City on Route 7B (Local).

Greyhound runs regular bus service between Monterey and SFIA. The fare is $18.85 one way, and $35.80 round trip.

North Bay

There are no door-to-door van services to the North Bay. However, there are several scheduled transportation carriers (Marin Airporter, Sonoma County Airport Express, Santa Rosa Airporter) providing service from as far north as Ukiah to SFIA.

Limousine service is available through Associated Limousine and serves Marin County. The fare ranges from $66 to $160 one-way for shared ride service. Luxury limousine service is available for $45 per hour.

The Marin Airporter provides bus service between Novato and SFIA for a one-way fare of $12. The Sonoma County Airport Express provides service from Santa Rosa to SFIA. The fare is $12 one-way and $20 round trip.

The Santa Rosa Airporter bus runs from Ukiah to SFIA for $30 each way, and from Novato for $14 each way. The Sonoma Airporter provides bus service to SFIA on one route. The fare is $20 one-way from the Town of Sonoma.

East Bay / I-80 Corridor

Door-to-door van services are provided by several carriers. In Alameda County, Bayporter Express charges between $12 and $30 one-way, and East Bay Connection charges between $14 and $20. In Contra Costa County, Bayporter Express and East Bay Connection provide service in addition to Direct Shuttle. Charges for these services range from $16 to $26.

Limousine service to the East Bay is provided by Associated Limousine. For service to Alameda County the one-way fare ranges from $28 to $32 for shared rides, and $45 per hour for luxury service. In Contra Costa County the one-way fare is $24 to $51 for shared rides, and $45 per hour for luxury limousine service.

A number of scheduled transportation services are available in the East Bay / I-80 corridor for service to SFIA. Evans Airport Service runs bus service between Napa and SFIA for $15 each way. Capitol City Commuter charges $25 each way for bus service to and from Sacramento. Travis/Solano Airporter provides bus service between Travis Air Force Base and SFIA for $15 each way.

Bay Area Shuttle vans go from Claremont (an Oakland neighborhood) to SFIA for a fare of $10 one-way. Bay Area Bus Service is a shuttle service running hourly between Oakland International Airport and SFIA. The fare is $7 each way. The Fun Connection bus service travels to SFIA from Fremont for $15 each way. United Shuttle Systems provides bus service from Turlock (in the Central Valley) to SFIA for $24 one-way. San Ramon Valley Airporter Express buses run from Pleasanton to SFIA for $17 each way.

Shuttle Services for Disabled Persons

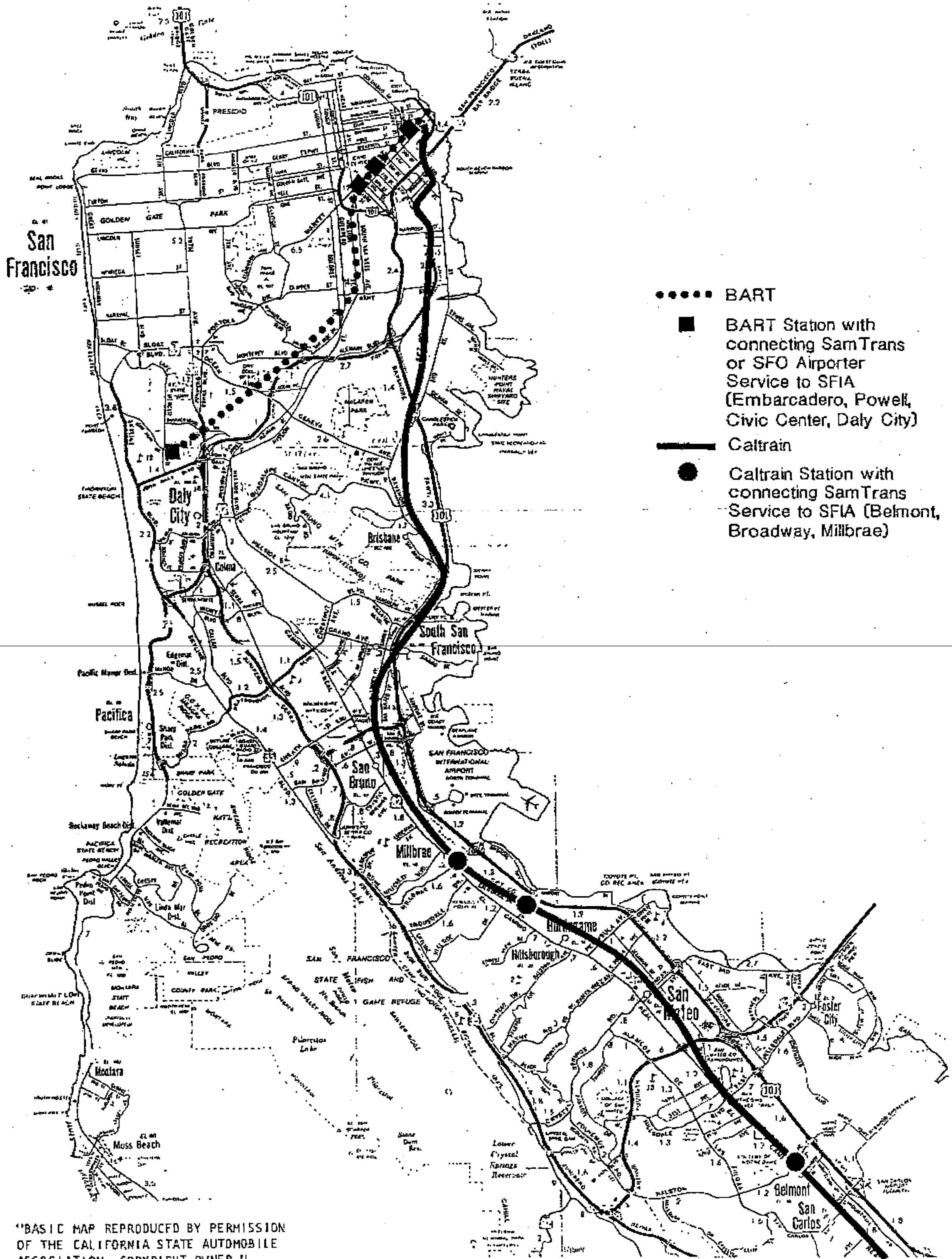
Disabled persons have several alternatives for transportation, including SamTrans route 3B (providing connecting service from Daly City BART), Yellow Airport Shuttle, Medi-Van and Super Shuttle. Except for SamTrans and BART, advance notice is required.

EXISTING RAIL TRANSPORTATION

Two commuter rail services serve one or more stations in San Mateo County, which connect with bus service to SFIA. Either rail service could provide direct or connecting service to SFIA at a later date: Bay Area Rapid Transit (BART) and CalTrain. Figure 15 shows the rail routes that serve SFIA.

BART

BART provides regional rail service to San Francisco, Alameda and Contra Costa counties. The Daly City BART station, approximately eight miles northwest of SFIA,



"BASIC MAP REPRODUCED BY PERMISSION OF THE CALIFORNIA STATE AUTOMOBILE ASSOCIATION, COPYRIGHT OWNER."

SOURCE: DKS Associates

San Francisco International Airport

Figure 15

Rail Routes to SFIA

is the current terminus of the Richmond - Daly City, Concord - Daly City and Fremont - Daly City lines, which operate from 6:00 a.m. until midnight. The three lines operate on 7½- to 20-minute headways, depending on time of day. SamTrans provides connecting service between the Daly City BART station and SFIA as described above.

CalTrain

The Peninsula Commute Service (CalTrain) provides regional rail service to San Francisco, San Mateo and Santa Clara counties, connecting San Jose with the South of Market district in San Francisco along a route adjacent to or near the US 101 Corridor. The Southern Pacific Transportation Company (SP) operates the trains under contract to the California Department of Transportation (Caltrans).

CalTrain operates on 8- to 120-minute headways (however, generally 30-minute headways during peak periods) from 5:00 a.m. to midnight, serving SFIA through SamTrans connecting service from the Belmont, Burlingame, Burlingame Broadway, and Millbrae CalTrain stations.

PEDESTRIANS

Other than for the movement of air passengers and employees between the main garage and the terminal buildings, there is little pedestrian movement among the various buildings at SFIA. Currently, some air passengers and employees cross vehicular traffic on the arrivals and departures roadways, primarily to go between the parking garage, transit/shuttle services, and the terminal buildings. Although this inhibits traffic flow, the pedestrian activity does not impair the ability of the arrival and departure roadways to serve the terminal buildings (i.e., no backups onto Road 1-S occur during peak periods or other times).

BICYCLES

None of the streets that surround SFIA are designated as bike routes. The nearest suggested routes are west of US 101 in Millbrae, San Bruno and South San Francisco. The 1983 SamTrans employee transportation survey (see following section on existing SFIA transportation characteristics for a description of the survey) did not specify cycling as a separate mode, and it is unlikely that more than 50 SFIA employees (out of 31,000) currently commute by bicycle. Travel by bicycle to and from SFIA is not convenient since the cyclist must travel through congested high-noise areas to access SFIA.

TRUCK TRAFFIC

Truck traffic is generated at SFIA primarily due to air cargo and U.S. Mail operations, as well as delivery trips associated with food and beverage service and SFIA administration. Truck activity is concentrated on McDonnell Road (Road R-3) north of the terminal and on North Access Road. Several locations at SFIA were surveyed to determine the percentage of trucks in the total a.m.- and p.m.-peak-hour traffic mix/5/:

A.M. Peak Hour

- S. Airport Boulevard / N. Access Road / Freeway on-ramps - 7.5 percent
- S. Airport Boulevard / N. Access Road / Freeway off-ramps - 4.1 percent
- N. Access Road / N. Access Road Extension - 3.9 percent
- S. Airport Boulevard / San Bruno Avenue - 8.3 percent
- Road R-2 / Road R-16 / Hilton Hotel - 6.8 percent
- Arrivals and departures decks - less than 1 percent

P.M. Peak Hour

- S. Airport Boulevard / N. Access Road / Freeway on-ramps - 6.0 percent
- S. Airport Boulevard / N. Access Road / Freeway off-ramps - 5.1 percent
- N. Access Road / N. Access Road Extension - 5.8 percent
- S. Airport Boulevard / San Bruno Avenue - 6.4 percent
- Road R-2 / Road R-16 / Hilton Hotel - 4.1 percent
- Arrivals and departures decks - less than 1 percent

EXISTING SFIA TRANSPORTATION CHARACTERISTICS

For information on the transportation and parking characteristics of air passengers and employees of San Francisco International Airport, several transportation surveys were used:

- 1983 Employee Survey conducted by SamTrans.
- 1989 Air Passenger Survey conducted by the Metropolitan Transportation Commission (MTC).
- 1989 ramp and roadway automatic machine counts (tube counts) conducted by SFIA.
- 1990 intersection turning movement counts, ramp volume counts, vehicle classification counts, vehicle occupancy counts and pedestrian counts conducted by DKS Associates for this document.

1983 SamTrans Employee Survey

SamTrans' SFO Airport Employee/Employer Survey was conducted in Fall of 1983. At that time, there were approximately 20,000 employees at SFIA, compared to 31,000 today. There has not been another comprehensive employee survey since 1983. The survey covered origin of trips for employees, location of job within SFIA, mode of travel on day of survey, commute time and parking fees for employees. In addition, there were questions regarding incentives that SamTrans could use to attract SFIA employees to take transit. The 1983 mode split for SFIA employees was as follows:

Mode	Percent
Drive Alone & Park	68
Carpool	14
Charter	8
VanPool	4
SamTrans	3
Other	2
Airporter (private shuttle)	1
SamTrans & Other	<1
SamTrans & BART	<1
SamTrans & CalTrain	<1

The percentage of employees who took transit (approximately four percent) is typical of most suburban employment sites in the Bay Area. Review of current operations and discussion with SFIA staff indicate that these percentages have not changed significantly since 1983.

SFIA Airports Commission Air Passenger Surveys

The City and County of San Francisco Airports Commission conducts a survey of air passengers in May of each year. The most recently published survey was conducted in

May, 1990. Departing passengers were asked to respond to questions covering residency, mode of arrival at SFIA, the parking facilities, problems encountered while at SFIA, and products and services that they would like to see at SFIA. Passengers were also asked to make explanatory comments at several points throughout the interview. The largest number of comments regarding ground transportation referred to a desire to see BART extended to SFIA, followed by the need for more traffic lanes on freeways leading to SFIA, congestion and confusion on "the freeway" (respondents did not distinguish among US 101, I-380 and I-280) and heavy traffic around SFIA. The survey was used for trip distribution for air passengers, as shown in Figure 29, p. 290, in Section IV.B. Transportation Impacts.

Information on person-trips was obtained from the air passenger survey. This survey also asked travelers how they arrived at the airport (mode of travel); however, it did not ask how many other passengers were in the same vehicle. Therefore, information on vehicle occupancy was obtained as part of a 1990 Mode Split Survey conducted by DKS (described below). Vehicle occupancy information is necessary in order to determine the number of vehicle trips to be used in assessing traffic impacts. (The number of vehicle trips was calculated by dividing the number of person trips by the average vehicle occupancy.)

<u>1989 Tube Count Program by SFIA Office of Landside Operations</u>

In August of each year, the SFIA Office of Landside Operations conducts a tube count program using automatic traffic counting machines. Counts are taken for a minimum of seven days at over 30 locations within and at the boundaries of SFIA. These counts are taken in the peak month of air passenger travel at SFIA, and thus represent peak traffic conditions at SFIA.

The tube counts have been used to establish SFIA air passenger trip rates. The August ramp counts were factored to May volumes based on the ratio of May to August enplanements and the number of employees at SFIA (which does not fluctuate as much as air-passenger/enplanement ratios). The counts were factored to May volumes to present a consistent analysis period (intersection turning movement counts were performed in May, 1990). The methodology used to determine the air passenger trip-generation rate is explained in the Impacts Chapter, Section V.B. Transportation. The trip generation rate for air passengers is based on total enplanements, and was calculated to be 1.98 trips/enplanement for air passengers at SFIA.

<u>1990 Traffic Counts</u>

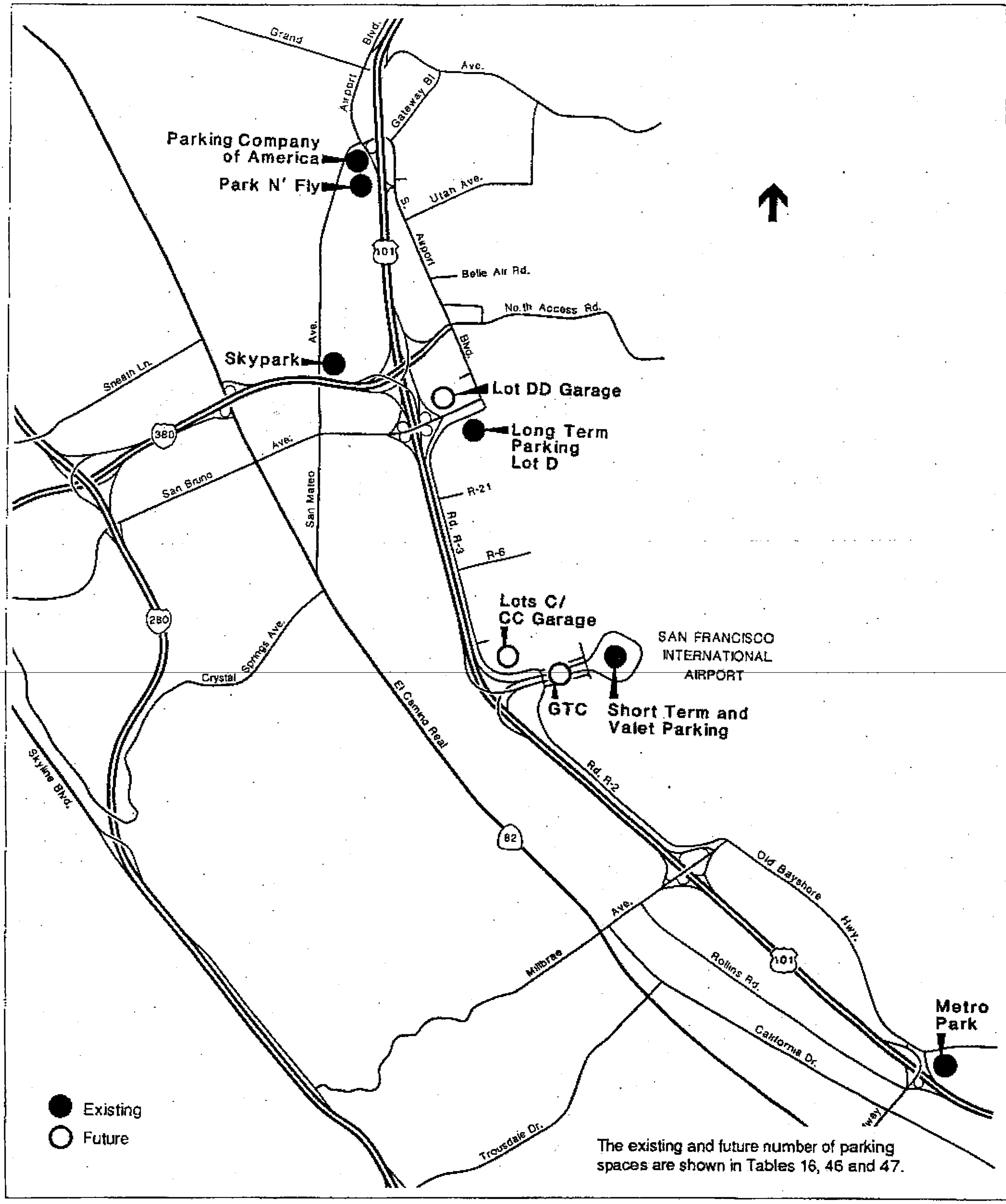
In May 1990, intersection turning movement counts were conducted at 25 intersections around SFIA./6/ These included intersections in Millbrae, San Bruno and South San Francisco. Counts were taken during the a.m. and p.m. peak periods, which for most intersections are 7:00 a.m. to 9:00 a.m. and 4:00 p.m. to 6:00 p.m. For those intersections in the vicinity of United Air Lines Maintenance, a.m. peak hour intersection counts were started at 6:00 a.m. and p.m. peak hour intersection counts were started at 3:00 p.m. In addition to intersection counts, a.m. and p.m. peak hour mainline freeway counts on US 101 at the San Bruno Avenue overcrossing were performed, as well as ramp volume counts at selected locations.

<u>1990 Mode Split Survey</u>

The mode split for air passengers was determined on the basis of a field survey conducted by DKS Associates in May 1990. Vehicles were surveyed on Road 1-S at a location just west of the arrivals deck, departures deck and garage entrance. The survey information was used to establish air passenger mode split and average vehicle occupancy, as shown in Tables 27-30, pp. 283-286, in Section IV.B. Transportation Impacts. The number of vehicle-trips were calculated by dividing the number of person-trips by the average vehicle occupancy.

PARKING

Both short- and long-term parking are available, convenient to the terminal buildings. In addition, there is valet parking service available and four more remote parking locations. Airport parking, which currently totals 15,515 public spaces, is shown in Figure 16.



SOURCE: DKS Associates

Figure 16
Parking Locations

Parking Access from Freeways

"Airport Parking Available" signage directs motorists on US 101 southbound to exit at either South Airport Boulevard or North Access Road, both of which are just north of the SFIA terminal area. Motorists exiting at South Airport Boulevard are directed toward the off-airport long-term parking areas (e.g., Park N' Fly, Parking Company of America, and Skypark) in South San Francisco off Produce Avenue. Motorists exiting at North Access Road are directed to the long-term Parking Lot D within SFIA.

Motorists traveling on US 101 northbound are directed to exit at the Broadway interchange in Burlingame, two exits south of the main SFIA exit. They are then directed toward the off-airport long-term parking facility (Metro Park) in Burlingame, south of Broadway and east of US 101.

Motorists traveling on I-380 eastbound are directed to exit at North Access Road for parking availability. The signs then direct them to Lot D as they do for motorists from US 101 southbound.

Although specific signage is not provided on US 101 or I-380, all motorists who desire short-term parking proceed directly to the Airport interchange from US 101 either northbound or southbound. This interchange takes motorists directly to the terminal area, the parking garage, or other areas within SFIA via Road R-1S and then Roads R-2 or R-3 (McDonnell Road).

Short-Term Parking at SFIA

Short term parking is available at the garage in the center of the SFIA terminal complex. The garage can accommodate approximately 6,800 vehicles, and in January 1986 was 60 percent occupied on average and 78 percent occupied during peak periods, which occurred on Fridays at 8:00 p.m. Discussions with SFIA staff indicate that the January 1990 occupancy level of the garage has increased from the January 1986 level. During holiday periods, occupancy levels are higher (90 percent or higher), and at least one lot or garage closure (due to full occupancy) occurs in each of seven months per year./7/ Rates vary from $1 for the first hour to a maximum of $13 for 6 to 24 hours. Generally it is suggested that the garage be used for those who wish to park five hours or less.

Long-Term Parking at SFIA

Long term parking is available at Lot D, off McDonnell Road south of San Bruno Avenue. Rates vary from $4 for the first three hours to $8 for 3 to 24 hours. The lot, which can accommodate approximately 3,500 vehicles, was, in January 1986, 70 percent occupied on average and 73 percent occupied during the peak period, which occurred on a Sunday at about 4:00 a.m. Discussions with SFIA staff indicate that the January 1990 occupancy level of long-term Parking Lot D was similar to the January 1986 level. During holidays, Lot D can be 100 percent occupied and SFIA air passengers are directed to use short-term parking and/or off-site lots. Free shuttle service to Lot D is provided from the terminal buildings every 5-7 minutes, except between midnight and 6:00 a.m., when the frequency of shuttles is every 15-20 minutes.

Off-site (Remote) Parking

There are currently four off-site (remote) parking lots, each operated by a private company. Park N' Fly, Parking Company of America, and Skypark are in the vicinity of the US 101 / I-380 interchange. Metro Park is south of SFIA in Burlingame. The rates for each company are approximately $7-8 per day, with the seventh day free, roughly comparable to rates for long-term SFIA parking. Skypark has a seven-day minimum for its $7 daily rate, and also offers indoor parking for $10 per day. Approximately 4,750 parking spaces exist (May 1990) in the remote lots, which were 70 percent occupied on average in January 1986. Recent phone conversations with operators of remote parking lots indicated that the operators were generally unwilling to divulge any information on their operations.

SFIA passengers can also park at many of the area hotels and pay for one night's lodging in exchange for 7-21 days parking privileges. Since this is an informal arrangement, no data is kept on the number of air passengers who choose this option.

Valet Parking

Valet parking is located midway along the departures roadway (on the departure deck) across from the south terminal building. Free shuttle service is provided from the valet lot to all airlines. The rate for valet parking is $25 per day and there are 223 spaces.

Parking for Disabled Persons

Handicapped parking is available at the beginning of the arrivals roadway, as well as in courtyards north and south of the International Terminal. Seventy-two hours of courtesy parking is permitted for vehicles displaying handicapped license plates. There are 51 parking spaces for the disabled, with spaces generally available during peak periods. Handicapped persons can park after making arrangements by phone with SFIA police.

Observation Area

Northwest of the Millbrae Avenue / Old Bayshore Highway intersection, there is a dirt lot that is popular for watching takeoffs and landings. About 10-15 vehicles can park off-street in the observation area.

On-Street Parking

Parking on-street is not common in the vicinity of SFIA. Many local streets are signed "No Parking" and there is no shuttle access to the airport for people who might consider this option.

PARKING DEMAND

The SFIA Master Plan and operational data from the short-term garage provided by the SFIA Office of Landside Operations were used to determine the existing SFIA employee and air passenger parking demand. The existing supply and demand are shown in Table 16. The total parking demand for air passengers and employees is about 23,900 spaces, with about 14,400 (or 60 percent) needed by air passengers and about 9,500 (or 40 percent) needed by SFIA employees. The remaining parking demand results mainly from rental car storage and taxi parking. The existing (1991) parking space demand was derived from the May 1991 parking occupancy survey. SFIA employee space demand was based on 1991 employment levels, and air passenger space demand was based on estimated enplanements on a Friday in May 1991./8/

TABLE 16: EXISTING PARKING SUPPLY AND DEMAND /a,b,c,d,e/

	Daily Enplanements	57,700 (estimated)	
	1991 Employees	31,000	
	Supply	Demand	Difference
Public Spaces			
Garage			
Public short-term	6,294	4,128	2,166
Permit/Valet	492	124	368
Lot D			
Public long-term	3,559	2,801	758
Off-Airport	5,170	6,168	- 998
Subtotal	15,515	13,221	2,294
Employee Spaces			
Garage		See Public Spaces	
Lot D	971	794	177
Other	11,963	8,685	3,278
Subtotal	12,934	9,479	3,455
Other Spaces /e/			
Rental Cars	2,011	965	1,046
Courtyard	183	186	-3
Taxi Staging (in Garage)	86	57	29
Subtotal	2,280	1,208	1,072
TOTAL	30,729	23,908	6,821

NOTES:

/a/ August enplanements are used in this table as August represents the highest month for enplanements of SFIA, and therefore the peak month for parking demand.

/b/ This table assumes a theoretical maximum lot and garage occupancy of 95 percent for passengers and 97 percent for employees.

/c/ Negative numbers represent periods where demand for parking spaces exceeds the number of available spaces based on a peak-period, peak-day, worst-case scenario. In those situations, the excess demand must find alternative parking locations.

/d/ Demand rates based on May 1991 enplanements and May 1991 parking occupancy survey: Public short-term = 0.0981 spaces/enplanement; public long-term = 0.0485 spaces/enplanement; off-site parking = 0.1069 spaces/enplanement; employee = 0.3500 spaces/employee.

/e/ Not included: Limo parking, van staging and vehicle impound lot (246 spaces)

SOURCE: SFIA Office of Landside Operations, and DKS Associates.

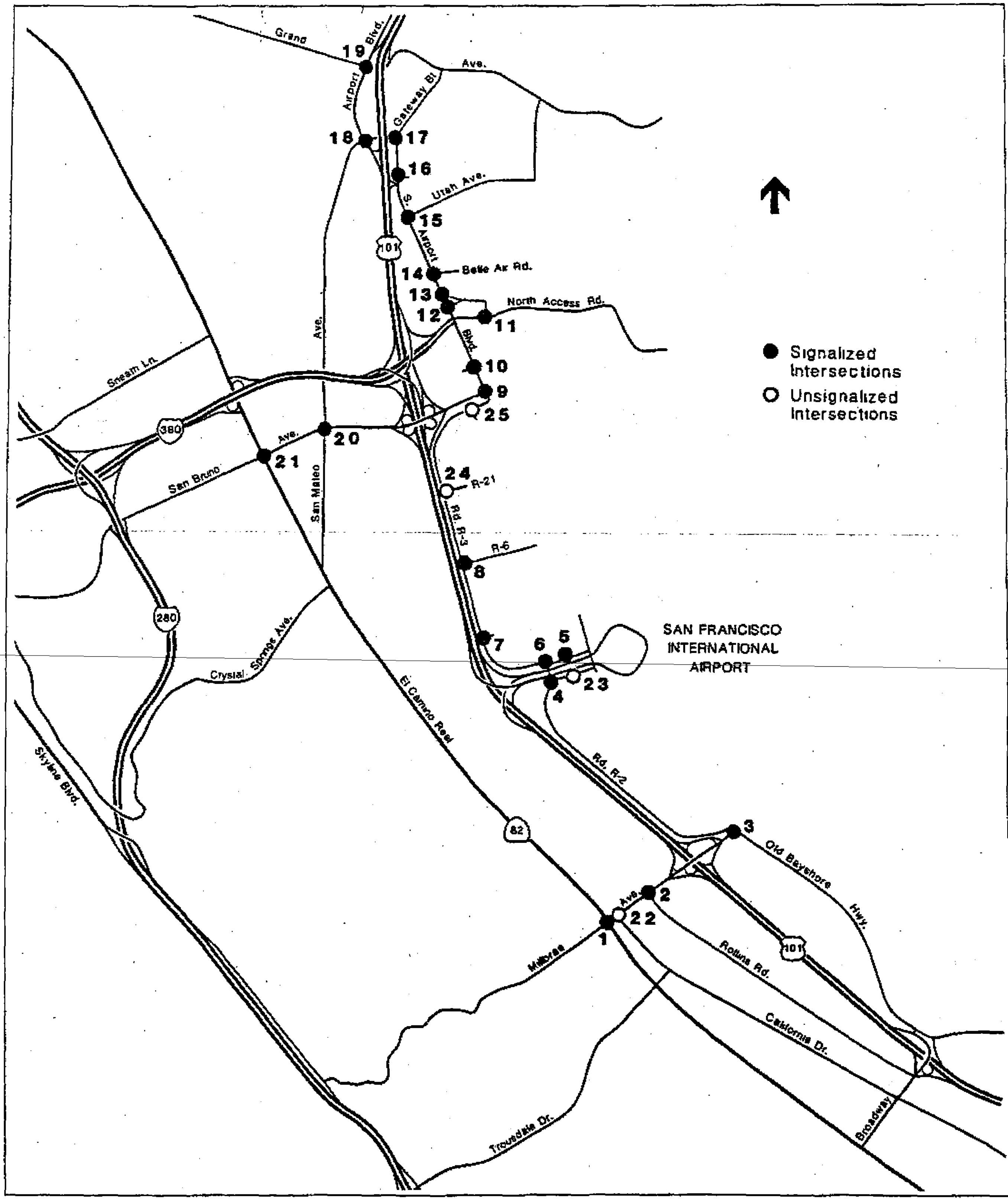
EXISTING TRAFFIC CONDITIONS

Evaluated Intersections

To help evaluate current traffic conditions, vehicle turning movement counts were conducted on a Friday in May 1990 at 21 signalized intersections in the vicinity of SFIA during both the a.m. and p.m. peak periods./6/ Counts were also taken at four unsignalized intersections. The following list of study intersections (illustrated by number in Figure 17) was developed in cooperation with the SFIA Office of Landside Operations; the cities of Burlingame, Millbrae, San Bruno and South San Francisco; the City and County of San Francisco; and Caltrans District 4 (Bay Area):

Signalized

1 El Camino Real (SR 82) / Millbrae Avenue
2 Rollins Road / Millbrae Avenue
3 Old Bayshore Highway / Millbrae Avenue
4 Road R-2 / Road R-16 / Hilton Hotel
5 Roads R-20,R-22 / Road R-18
6 Road R-3 (McDonnell Road) / Road R-18
7 Road R-3 (McDonnell Road) / UAL Cargo Facility
8 Road R-3 (McDonnell Road) / Road R-6
9 South Airport Boulevard / San Bruno Avenue
10 South Airport Boulevard / United Air Lines West Parking Lot/9/
11 North Access Road Extension / North Access Road East
12 South Airport Boulevard / North Access Road South / I-380 & US 101 off-ramp
13 South Airport Boulevard / North Access Road North / I-380 & US 101 on-ramp
14 South Airport Boulevard / Belle Air Road
15 South Airport Boulevard / Utah Avenue
16 South Airport Boulevard / Radisson Hotel / US 101 on- and off-ramps
17 South Airport Boulevard / Gateway Boulevard / Mitchell Avenue
18 Airport Boulevard / Produce Avenue / San Mateo Avenue
19 Airport Boulevard / Grand Avenue
20 San Mateo Avenue / San Bruno Avenue
21 El Camino Real (SR 82) / San Bruno Avenue



SOURCE: DKS Associates

San Francisco International Airport

Figure 17
Intersections Analyzed

Unsignalized

22 California Drive / Millbrae Avenue
23 Roads R-24,R-26 / Road R-16
24 Road R-3 (McDonnell Road) / Road R-21
25 Road R-3 (McDonnell Road) / Long-term Parking Lot D

Signalized Intersections

Traffic levels of service for the signalized intersections were analyzed using the methods outlined in Transportation Research Circular 212./10/ Level of service (LOS) is a common measure of traffic service that uses letters A through F to indicate the amount of congestion and delay. LOS A represents free-flow conditions. LOS D is typically considered acceptable for peak hour periods in urban areas. LOS E is approaching capacity and LOS F represents conditions at or above capacity. Appendix G, Table G-1, p. A.162, provides a definition of levels of service for signalized intersections. Table 34, on p. 293 in Section IV.B. Transportation Impacts, summarizes the existing level of service calculations for the a.m. and p.m. peak hours.

A.M. Peak Hour

For the purposes of this analysis, the a.m. peak hour is defined as a continuous 60-minute period in the interval from 6:00 a.m. to 9:00 a.m. where traffic volumes are highest at an intersection. For one intersection, it could be from 6:30 a.m. to 7:30 a.m. and for another intersection it could be from 8:00 a.m. to 9:00 a.m. This is done to ensure that the highest and worst-case traffic volumes are considered. Generally, the a.m. peak hour for intersections beyond the SFIA boundary, based on 1990 count data, was from 7:30 a.m. to 8:30 a.m. For the following intersections near the United Air Lines Maintenance Facility, traffic peaks earlier due to change-in-shift times:

- South Airport Boulevard / San Bruno Avenue, 6:15 a.m. to 7:15 a.m.
- North Access Road Extension / North Access Road, 6:00 a.m. to 7:00 a.m.
- McDonnell Road crosswalks at the United Air Lines West Parking Lot (pedestrian movement only), 7:00 a.m. to 8:00 a.m.

All of the intersections located on the SFIA internal roadway network /11/ currently operate at acceptable levels of service (LOS C or better) during the a.m. peak hour, when they experience their peak in traffic from 7:00 a.m. to 8:00 a.m. In the surrounding municipalities (e.g., San Bruno, Millbrae and South San Francisco), two intersections currently operate below (worse than) LOS D during the a.m. peak hour: El Camino Real (SR 82) at Millbrae Avenue, and Rollins Road at Millbrae Avenue, both LOS E.

P.M. Peak Hour

The p.m. peak hour is defined as a continuous 60-minute period in the interval 3:00 p.m. to 6:00 p.m. when traffic volumes are the highest at an individual intersection. In the vicinity of SFIA, the p.m. peak hour was generally from 4:30 p.m. to 5:30 p.m., except at the above noted United Air Lines Maintenance - related intersections, where peaking occurred from 3:00 p.m. to 4:00 p.m. During the afternoon peak hour, three intersections operate at or below (worse than) LOS D: El Camino Real at Millbrae Avenue, LOS E/F; Utah Avenue at South Airport Boulevard, LOS D/E; and El Camino Real at San Bruno Avenue, LOS E/F.

Unsignalized Intersections

Traffic levels of service for the unsignalized intersections were evaluated using the methodology outlined in the 1985 *Highway Capacity Manual*./12/ At unsignalized intersections, each traffic movement that must yield to another movement is evaluated separately and assigned a level of service. The level of service is based on the relative ability of turning traffic to find adequate gaps in conflicting traffic flows. Appendix G, Table G-3, p. A.164, provides a definition of levels of service for unsignalized intersections. Each of the four unsignalized intersections currently operates at an acceptable level of service in both the a.m. and p.m. peak hours.

Basic Freeway Sections

For the analysis of basic freeway sections, the heaviest direction of traffic was considered. For US 101 and I-280 in the vicinity of the Airport, this is northbound (toward San Francisco) in the a.m. peak hour and southbound (toward San Jose / Silicon Valley) in the p.m. peak hour. For I-380, the heaviest traffic is eastbound (toward SFIA) during the a.m. peak hour and westbound (away from SFIA) during the p.m. peak hour.

On the basis of methods outlined in the 1985 Highway Capacity Manual, the basic freeway section of US 101 currently operates at LOS F from Third Avenue in San Mateo to the I-380 interchange during both peak hours. North of the Grand Avenue interchange, US 101's operation improves to LOS D. I-380 operates at peak-hour LOS C, and I-280 operates at LOS C south of I-380 and LOS E north of I-380. Contrary to the level of service calculations based on techniques from the 1985 *Highway Capacity Manual*, field observations show traffic on US 101, I-280 and I-380 flowing well, even during the peak periods. Existing freeway segment levels of service are shown in Table 40, on p. 309 in Section IV.B. Transportation Impacts.

Truck Traffic on Freeways

On US 101 in the vicinity of SFIA, trucks make up 5.1 percent of total traffic near Third Avenue in San Mateo, 4.2 percent near Broadway in Burlingame, 3.7 percent near San Bruno Avenue, 4.2 percent near Linden Avenue in South San Francisco and 4.8 percent at Third Avenue in San Francisco. On most segments of I-280, trucks make up roughly 2.0 percent of total traffic (varying from 1.2 percent at SR 92 to 2.3 percent at San Bruno Avenue), and on I-380, trucks make up 5.4-6.2 percent of total traffic./13/

Freeway Ramps

Caltrans reports daily ramp volumes in Ramp Volumes on the California State Freeway System: District 4. There are ramps within the SFIA vicinity, but a relatively small number for which peak-hour counts are available. Ramps that were counted recently (by Caltrans, SFIA Office of Landside Operations or DKS Associates) are shown in Table 42, on p. 314 in Section III.B. Transportation Impacts. The peak hours of an average weekday for the SFIA terminal ramps off US 101 occurred between 11:00 a.m. and 12:00 noon and between 7:30 p.m. and 8:30 p.m. for the off-ramps, while the peak hour for the on-ramps occurred between 12:45 p.m. and 1:45 p.m.

Ramp level of service for two-lane ramps was analyzed by use of the *Highway Capacity Manual*, Chapter 5, "Approximate Service Flow Rates for Single-Lane Ramps," as modified for two-lane ramps according to the methods presented. (Ramp levels of service for one-lane ramps could be obtained directly from the *Highway Capacity Manual.*) Service flow rates vary from a maximum of 1,250 vehicles per lane per hour for ramps with a design speed of less than 20 miles per hour (e.g., US 101 northbound and southbound off ramps to Millbrae Avenue) to approximately 1,700 vehicles per lane per hour for ramps with design speeds greater than 50 miles per hour (e.g., SFIA Road 1-N on-ramps to US 101 northbound and southbound). While the ramp volume could indicate a relatively good level of service, mainline freeway congestion can cause lengthy queues on on-ramps.

Currently, each of the off-ramps from US 101 leading onto SFIA Road 1-S operates at LOS C during the a.m. and p.m. peak hours. The ramps from SFIA Road 1-N leading on to US 101 and I-380 viaduct operate at LOS C or better. The only ramp currently operating at LOS E is the US 101 southbound collector / distributor off to Millbrae Avenue, during the a.m. peak hour. Three other ramps currently operate at LOS F: I-380 eastbound off to US 101 southbound, and I-280 southbound off to I-380 eastbound, both during the a.m. peak hour; and I-380 westbound off to I-280 northbound during the p.m. peak hour.

NOTES - Transportation

/1/ Caltrans, *1989 Traffic Volumes on California State Highways*, 1990.

/2/ Caltrans, 1988 Traffic Volumes on California State Highways, 1989 and Caltrans traffic counts on US 101 taken November 3, 1989, provided by Jack Neville, Caltrans District 4 Office of Highway Operations.

/3/ SFIA, San Francisco International Airport Guide--Ground Transportation Services and Parking, SFIA Landside Operations, January 1, 1990.

/4/ Although the San Bruno CalTrain station is closest to the employment center of SFIA, no direct SamTrans service is provided at this time.

/5/ On the basis of traffic counts taken May 4, 11, 18, and 25, 1990, the a.m. peak hour for traffic on SFIA roadways is 7:00 - 8:00 a.m., and the p.m. peak hour is 4:00 - 5:00 p.m.

/6/ Intersection turning movement counts conducted by DKS Associates, May 4, 11, 18, and 25, 1990, 7:00 - 9:00 a.m. and 4:00 - 6:00 p.m.

/7/ Cabangis, Oscar, SFIA Office of Landside Operations, telephone conversation, February 4, 1991.

/8/ For consistency in generating parking-demand factors, May 1991 enplanement, employment and parking data were used for the parking-demand analysis (rather than the May 1990 base year assumed elsewhere in the transportation sections), partly because May 1990 air passenger data were lower than May 1989 air passenger data due to decreased air passenger travel at SFIA as a result of the October 17, 1989 Loma Prieta earthquake. Use of the May 1990 data with the May 1991 parking survey would have resulted in an artificially high air-passenger parking-demand rate, thereby resulting in an overestimate of future parking space needs.

/9/ Pedestrian volumes only were collected at this location. This intersection was therefore not evaluated for vehicular levels of service in the Impact Analysis.

/10/ Transportation Research Board, Transportation Research Circular 212, 1980.

/11/ Internal intersections are those on SFIA property, politically a part of the City and County of San Francisco.

/12/ Transportation Research Board, Special Report 209, Highway Capacity Manual, 1985.

/13/ Caltrans, 1988 Average Daily Truck Traffic on the California State Highway System, August 1989.

C. NOISE

INTRODUCTION

Noise levels are measured in decibels (dB)./1/ Each three-decibel increase or decrease in sound pressure level represents a doubling or halving, respectively, of sound intensity. Human perception of sound "loudness" does not relate directly to sound pressure level and varies among individuals. In general, a difference of three dB is perceptible and a difference of ten dB is perceived as a doubling of loudness. Some common indoor and outdoor noise levels and typical public reactions are shown in Figure 18.

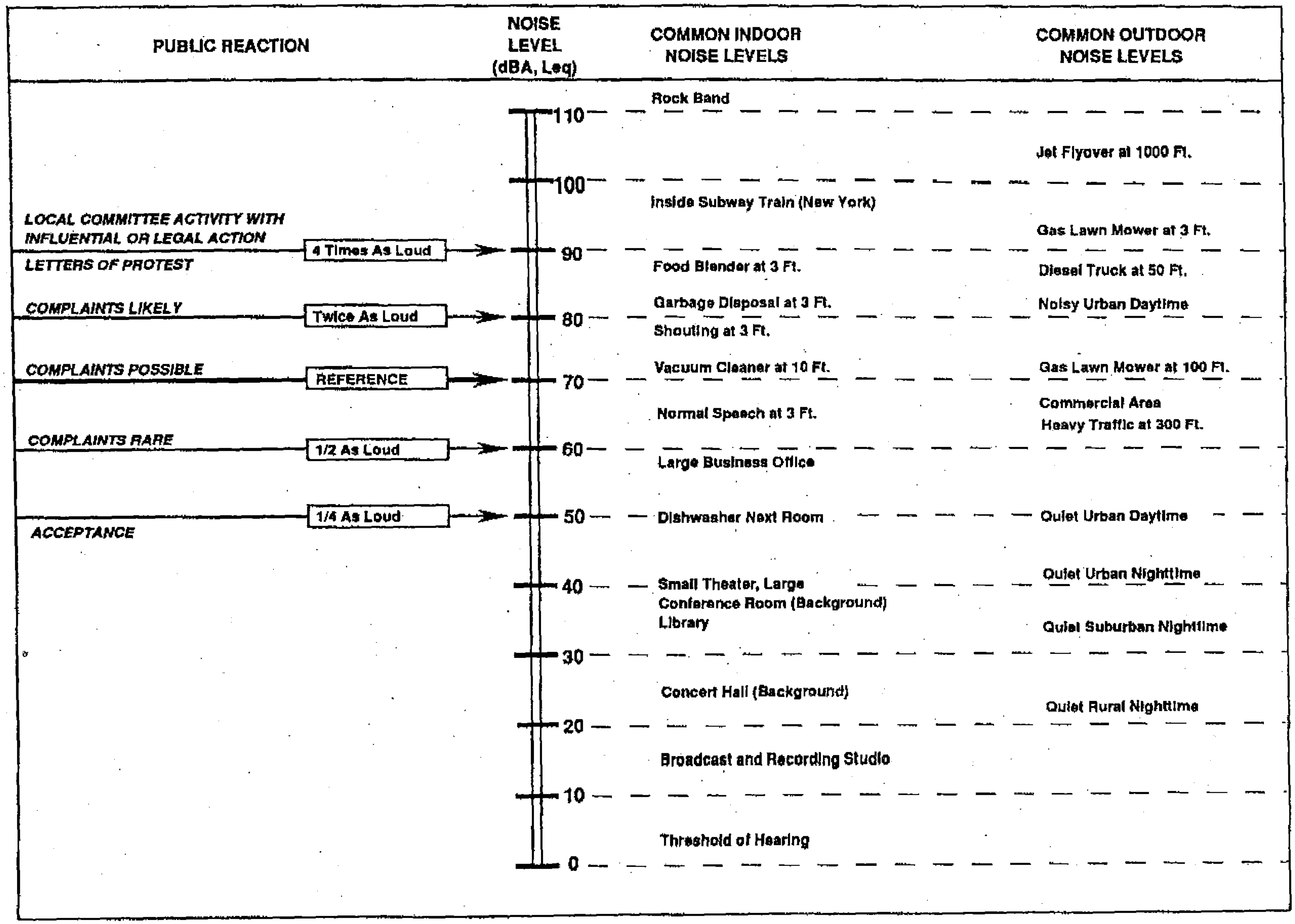
Environmental noise levels typically fluctuate over time, and different types of noise descriptors are used to account for this variability. Descriptors representing time-averaged noise levels include L_{eq}, L_{dn}, and CNEL./2,3,4/ L_{eq} represents the actual time-averaged noise level, while L_{dn} and CNEL are 24-hour noise descriptors calculated from L_{eq}. The calculation of L_{dn} and CNEL accounts for the greater sensitivity of most people to nighttime noise.

L_{dn} and CNEL are commonly used in establishing noise exposure guidelines for specific land uses. CNEL has been adopted by the California Department of Transportation, Division of Aeronautics, for the purposes of the state Noise Standards governing the operation of aircraft at California airports./5/ According to the Noise Standards, "the standard for the acceptable level of aircraft noise for persons living in the vicinity of airports is hereby established to be a community noise equivalent level of 65 decibels."

A discussion of descriptors of environmental noise is presented in Appendix C, together with a summary of the principal effects of noise on people.

EXISTING NOISE ENVIRONMENT

The existing noise environment in the vicinity of San Francisco International Airport is influenced by both surface-vehicle traffic on approach roads and adjacent roads, principally the US 101 (Bayshore Freeway) corridor, and by air traffic arriving at and departing from the Airport.



SOURCE: Caltrans Transportation Laboratory Noise Manual
Modifications by Environmental Science Associates, Inc.

Figure 18
Common Indoor and Outdoor Noise Levels

Surface Traffic

The US 101 corridor, bounding the Airport property on its western side on a generally north-to-south alignment, is the largest source of noise from motor vehicles; at 50 feet from the centerline, peak-hour noise levels along US 101 are about 80 dBA, L_{eq}. Other principal roads in the vicinity of the Airport are San Bruno Avenue, an east-west connector north of the Airport, and Millbrae Avenue, an east west connector south of the Airport. The peak-hour noise level is about 65 dBA, L_{eq} on San Bruno Avenue and about 69 dBA, L_{eq} on Millbrae Avenue.

Air Traffic

Aircraft operations constitute the primary source of noise from the use of SFIA. The noise from aircraft operations at SFIA results primarily from air carrier aircraft powered by turbofan engines. Additional noise is experienced from operations by military, commuter and turbojet-powered General Aviation aircraft, but it is not considered further in this analysis./6/

The aircraft noise levels experienced in the vicinity of the Airport are a function of the type of operation (arrival or departure), the number of flights, the types of aircraft, the destinations of departing aircraft (which affect aircraft weight and noise levels by determining the amount of fuel required), the use of the Airport runways, the locations and relative use of flight tracks into and out of the Airport, and the time of day.

Operations by Aircraft Type and Time of Day

Table 17 shows the estimated number of aircraft operations, by type of operation, time of day, and aircraft type, for an average day of the year in 1990. (Annual data for 1989 were used to represent 1990 conditions.) The types of aircraft listed in Table 17 are representative, and are not meant to constitute the full range of aircraft that currently use the Airport.

TABLE 17: AVERAGE DAILY AIR CARRIER AIRCRAFT OPERATIONS BY TYPE OF OPERATION, TIME OF DAY, AND AIRCRAFT TYPE, 1990/a/

	Number of Arrivals				Number of Departures				
Type of Aircraft	Day/b/	Eve./b/	Night/b/	Total	Day/b/	Eve./b/	Night/b/	Total	Total Ops.
Stage 2/c/									
B-727 (all)	50	24	9	83	50	24	9	83	166
B-737 (-100,-200)/d/	43	11	3	57	45	6	5	56	113
B-747/e/	7	2	1	10	6	2	2	10	20
Stage 3/c/									
B-737-300	53	13	4	70	56	8	7	71	141
B-747	12	3	2	17	12	3	3	18	35
B-757 (all)	7	4	2	13	10	0/f/	3	13	26
B-767 (all)	12	10	3	25	23	0	2	25	50
DC-8-71	3	3	1	7	5	1	2	8	15
DC-10,L-1011(all)	21	15	7	43	31	3	9	43	86
MD-80 series	27	9	6	42	25	9	8	42	84
Airbus(all types)	4	1	1	6	1	1	3	5	11
BAe-146	34	6	3	43	35	6	2	43	86
Total	273	101	42	416	299	63	55	417	833

NOTES:

/a/ Average daily aircraft operations are equal to annual operations (takeoffs and landings) divided by 365 and rounded to the nearest whole number. Annual data for 1989 were used to represent 1990 conditions. Air carrier operations, as defined by SFIA, are scheduled commercial jet operations.
/b/ Day = 7:00 a.m. to 7:00 p.m.; evening = 7:00 p.m. to 10:00 p.m.; night = 10:00 p.m. to 7:00 a.m.
/c/ Classification of aircraft as "Stage 2" or "Stage 3" refers to noise standards established by Federal Aviation Regulations Part 36. Stage 3 aircraft are generally quieter than Stage 2 aircraft.
/d/ Includes operations by DC-9 aircraft.
/e/ Earlier models of the B-747 are classified as Stage 2 aircraft.
/f/ Fewer than 0.5 operations per day (183 operations per year).

SOURCES: Ken Eldred Engineering, from information provided by SFIA landing fee reports and the Metropolitan Transportation Commission; Environmental Science Associates, Inc.

- As shown in Table 17, p. 156, about 143 aircraft arrivals, or about 34%, occurred during evening or nighttime hours (7:00 p.m. to 7:00 a.m.); 118 aircraft departures, or about 28%, occurred during evening or nighttime hours. Operations by aircraft meeting Federal Aviation Regulations (FAR) Part 36 Stage 3 noise standards (newer, quieter technology aircraft) accounted for about 64% of total average daily operations./7/

The number of average daily aircraft departures by trip length is shown in Appendix C.

Runway Use

The historical average distribution of aircraft arrivals and departures on each pair of parallel runway ends is shown in Table 18. (Figure 19, p. 159, includes a diagram of the runways with the ends labeled.)

TABLE 18: HISTORICAL AIRCRAFT ARRIVALS AND DEPARTURES AT SFIA BY PAIR OF RUNWAY ENDS

	Percent Aircraft Arrivals and Departures by Pair of Runway Ends/a/							
	Arrivals				Departures			
Year	1	10	19	28	1	10	19	28
1985	0.1	0.2	2.6	97.2	75.3	5.8	0.3	18.1
1986	0.0	0.1	5.3	94.5	74.0	8.7	1.2	16.1
1987	0.5	0.6	4.5	94.4	81.9	6.0	0.7	11.5
1988	0.3	0.3	2.7	96.6	85.2	4.5	0.2	10.2
1989	0.2	0.1	3.8	95.9	87.4	4.6	0.3	7.6
Average	0.2	0.3	3.8	95.7	80.8	5.9	0.5	12.7

/a/ Each of the four pairs of runway ends listed refers to the ends of the parallel Runways 1-19 and 10-28 (e.g., "1" refers to Runways 1L and 1R). Use of the runway ends within each pair is roughly equal (except for long-distance flights by B-747 aircraft). The arrival runway ends are nearest the point where the aircraft land; the departure runway ends are where the aircraft start their takeoff roll.

SOURCE: Ken Eldred Engineering.

Runways are labelled according to their orientation relative to the North magnetic pole. Runway 1L-19R at SFIA, for example, is oriented along headings of about 10° and 190°. The two headings assigned to the runway reflect the fact that the runway can be used in two directions. When only one end of a runway is referred to, the reference is to use of that end (or direction) of the runway. Aircraft departing on Runway 1L, for example, would start their takeoff roll at the (south-southwest) end of the runway labelled 1L and would initially be travelling north-northeast (at a heading of 10°).

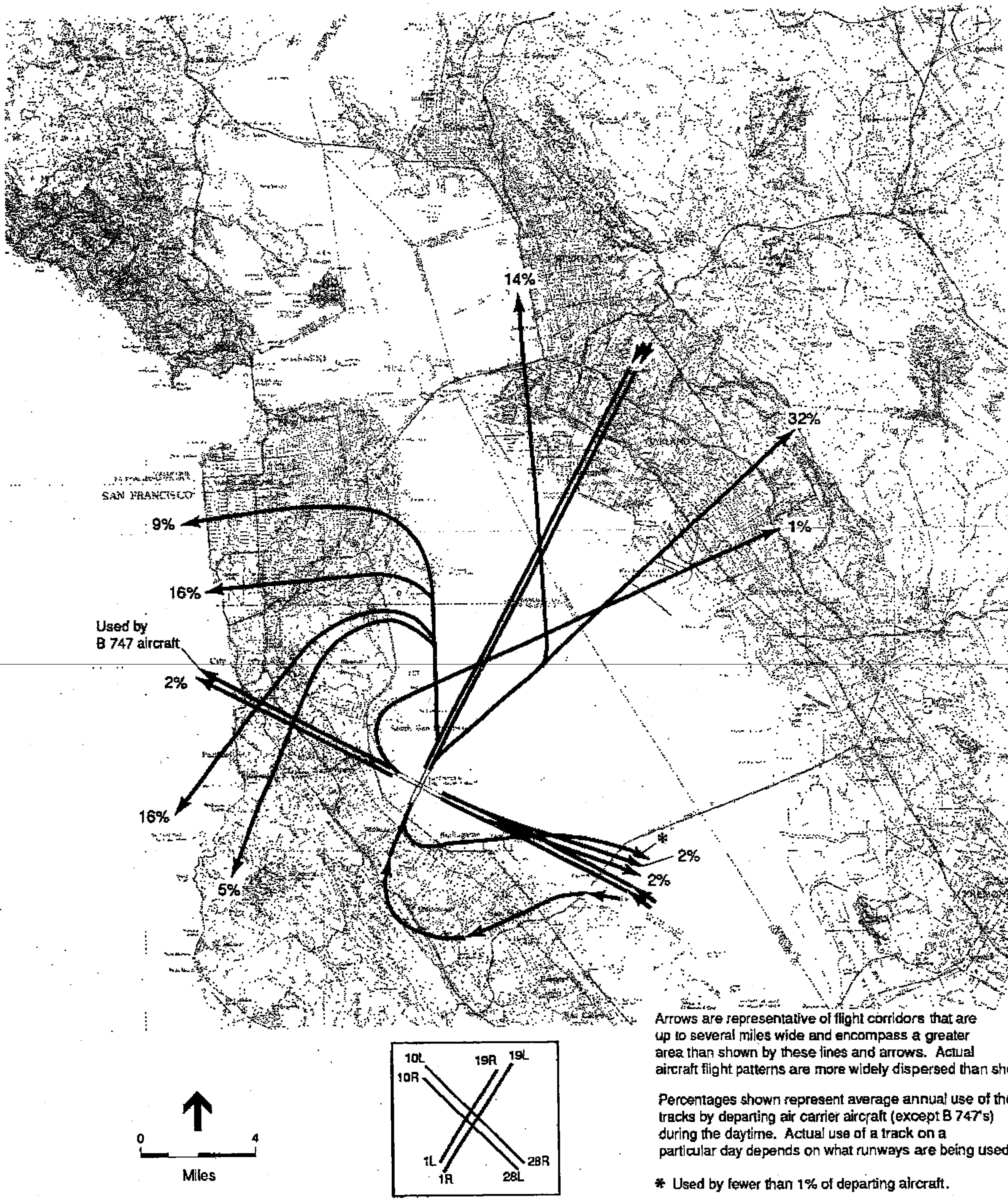
The use of Runways 1L and 1R for departures increased from about 75 percent in 1985 to about 87 percent in 1989. The use of Runways 28L and 28R for departures decreased from about 18 percent in 1985 to about 8 percent in 1989. Runway 28R is still used for most of the departures by the heaviest aircraft. Runways 28L and 28R are used by almost all arriving aircraft. Between 1:00 a.m. and 6:00 a.m., Runways 10L and 10R are used for most departures and Runways 28L and 28R for most arrivals. This nighttime traffic distribution is part of SFIA's current noise abatement program, discussed below. See Appendix C, Table C-2, p. A.46 for estimates of actual nighttime runway use.

Locations and Use of Flight Tracks

The generalized flight tracks for the main Airport flow (runway use) conditions are shown in Figure 19. The flight tracks depicted are averages; deviation from the tracks occurs because of weather conditions, pilot technique, air traffic control, and aircraft weight.

The flight tracks shown in the figure were developed through discussions with SFIA Airport Traffic Control Tower personnel; a review of Airport flight track data; and a review of standard instrument departures (SID) published by the FAA. SID are coded descriptions of aircraft routes assigned to pilots by air traffic control. A complete set of the SID used at SFIA is reproduced in Appendix C.

As shown in Figure 19, the San Francisco peninsula experiences overflights of aircraft departing from Runway 1L and Runways 28L and 28R (which together with Runway 1R accounted for 95 percent of departures in 1989). Many aircraft departing on Runway 1L for destinations south of San Francisco use the Eugen Four SID, which instructs pilots to turn left (by 150°) after climbing to 1,600 feet altitude and four



Arrows are representative of flight corridors that are up to several miles wide and encompass a greater area than shown by these lines and arrows. Actual aircraft flight patterns are more widely dispersed than shown.

Percentages shown represent average annual use of the tracks by departing air carrier aircraft (except B 747's) during the daytime. Actual use of a track on a particular day depends on what runways are being used.

* Used by fewer than 1% of departing aircraft.

San Francisco International Airport

SOURCE: Ken Eldred Engineering and Envirionmental Science Associates, Inc.

Figure 19
Generalized Flight Tracks

nautical miles from the Airport. Aircraft departing on Runways 28L and 28R use one of several SID instructing pilots to continue straight out through the San Bruno gap. Aircraft departing on Runways 10L and 10R turn left as soon as practicable and climb out over the Bay.

Aircraft departing on Runway 1R tend to go northeast over Metropolitan Oakland International Airport or north up the Bay. Almost all arriving aircraft approach the Airport over the Bay and land on Runways 28L and 28R.

The use of each of the generalized flight tracks was estimated from the runway use patterns discussed above, and the relationship between departure routing and flight destinations.

SFIA Aircraft Noise Contours -- 1990

The CNEL contours for 1990, calculated by the Integrated Noise Model (INM, a computer program developed by the FAA), are shown in Figure 20. (Annual data for 1989 were used to represent 1990 conditions.) As shown in Figure 20, most of the area within the CNEL 65 contour is over the Bay and the Airport. Residential areas in San Bruno, Millbrae, Burlingame and South San Francisco are exposed to aircraft noise of 65 dBA, CNEL and above. The noise impacts in those areas are associated primarily with aircraft departing on Runways 28L and 28R, and aircraft beginning their takeoff roll on Runways 1L and 1R.

- There are currently (in 1990) about 12,660 people, about 1,980 people, and about 340 people who live in areas of 65-70 dBA, 70-75 dBA, and 75+ dBA, CNEL, respectively.

Comparison of Calculated and Measured CNEL Values

Actual noise levels are recorded regularly at 27 remote monitoring stations in the vicinity of SFIA, and submitted to the California Department of Transportation in compliance with the state Noise Standards. The remote monitoring stations and 20 additional sites selected for this study are shown in Figure 21, p. 162.

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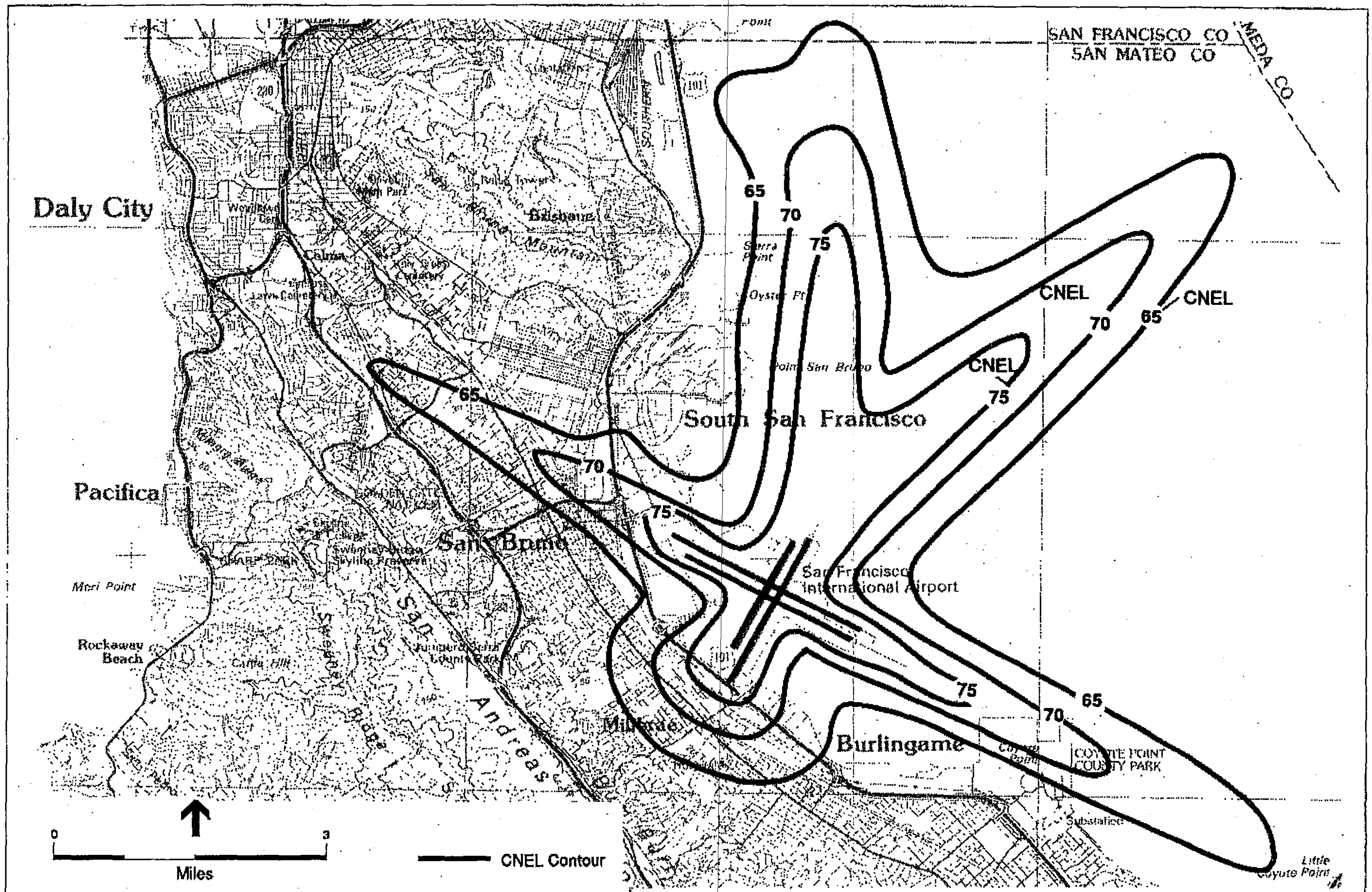
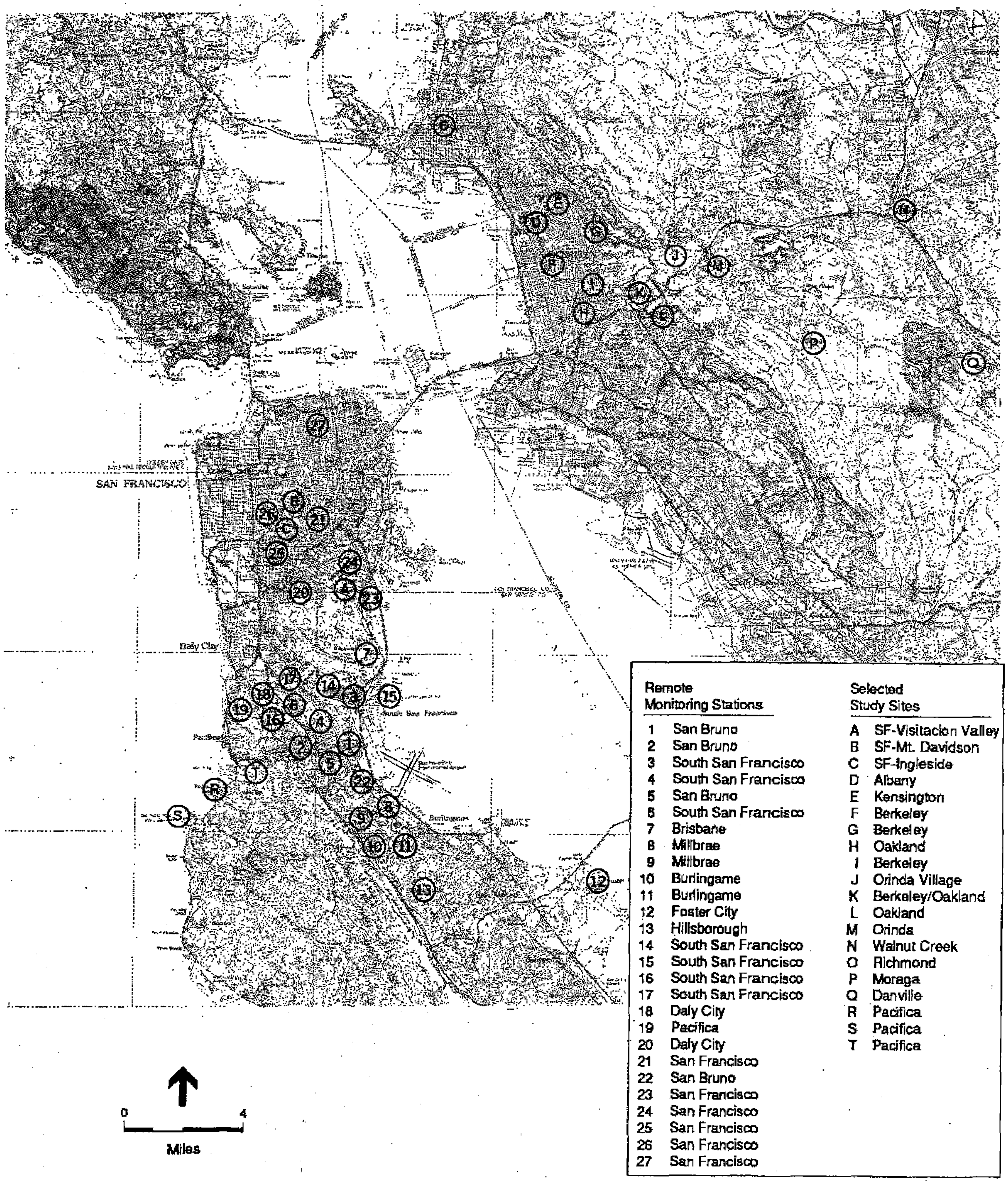


SOURCE: Ken Eldred Engineering and Environmental Science Associates, Inc.

● Figure 20
1990 Aircraft Noise Contours



SOURCE: Ken Eldred Engineering and Environmental Science Associates, Inc.

San Francisco International Airport ■

Figure 21
Remote Monitoring Stations
and Selected Study Sites

Measured CNEL values at the remote monitoring stations were compared with CNEL values calculated by the Integrated Noise Model, to determine the accuracy of the model in predicting current and future noise levels near SFIA (as represented by the CNEL contours). The comparison showed that:

- At stations 1-6 and 14-19, located near the departure tracks for Runways 1L and 1R and Runways 28L and 28R, the calculated and measured CNEL values are similar.

- At stations 8-11, located in Millbrae and Burlingame, the calculated CNEL values are 0.9 dBA higher on average than the measured values. The calculated values would be substantially lower than the measured values without a modification to the Integrated Noise Model (INM)to improve its representation of the "back blast" from takeoffs on Runways 1L and 1R. (Without the modification the calculated CNEL values would be about 13 dB lower than the measured values.) The modification involved removing the excess ground attenuation in the model, which is inappropriate to this terrain, and changes to the INM computer program algorithm representing the noise during takeoff ground roll. These changes were based on data obtained by Tracor (in its investigation of low-freqency noise at SFIA) and on data on noise radiation over water in Boston./7a,7b/

- At stations 20-21 and 24-26, located in Daly City and San Francisco, the calculated CNEL values are 1.9 dBA lower on average than the measured values. Areas of the San Francisco peninsula are exposed to noise from aircraft departing from Metropolitan Oakland International Airport and turning southwest. The additional noise from those aircraft is included in the measured CNEL values (which reflect all noise recorded by the monitors), but is not included in the calculated CNEL values (which reflect estimates of the noise produced only by aircraft using SFIA).

The calculated CNEL values at the remote monitoring stations, and the corresponding CNEL contours, may differ from the comparable measurement data presented to the State on a quarterly basis as required by the State Noise Standards. The reason is that the computer program used to model the noise measurement data for the State adjusts its parameters in order to minimize differences between the model results and the noise measurements. Consequently, the program is accurate with respect to locations near the monitoring stations, but not necessarily accurate at locations far from the monitoring stations.

The Integrated Noise Model (used to calculate existing and forecast CNEL values and contours for this EIR) operates independent of the noise measurement results. The comparison of measured and calculated CNEL values above simply provides information about the accuracy of the model at the monitoring stations. As the comparison shows, the measured and calculated values at most monitoring stations were similar (for noise produced by aircraft using SFIA). Thus, the Integrated Noise Model provides a reasonable foundation for calculating noise values in future years, and for comparing existing and forecast noise levels.

The calculated and measured CNEL values at the 27 remote monitoring stations are shown in Table C-3 in Appendix C, p. A.47. The calculated CNEL values range from 40.5 dBA at Station 27 in San Francisco to 71.7 dBA at Station 1 in San Bruno. The measured CNEL values range from 53.4 dBA at Station 2 in San Bruno to 72.4 dBA at Station 1 in San Bruno. The calculated and measured CNEL values at most stations are between 55 and 65 dBA.

Contribution of SFIA Aircraft to Noise Levels in the East Bay

Some aircraft departing from SFIA fly over communities in the East Bay. CNEL values were calculated for 20 locations selected for this study on the basis of noise complaints, including 14 locations in East Bay communities. The calculated CNEL values reflect noise only from aircraft using SFIA; actual noise measurements taken in East Bay communities would also reflect aircraft using Metropolitan Oakland International Airport, and could be higher.

- Most of the calculated CNEL values for East Bay locations (except Site P in Moraga) are below 50 dBA (Table 54, which lists the values, is on p. 343). These locations are relatively far from SFIA (15-20 miles).

Single-Event Noise

As distance from the Airport increases, the effect of aircraft on average noise levels in the community (i.e., CNEL) declines. Even at great distances from the Airport, however, the single-event noise from individual planes still can annoy and disturb residents under Airport flight tracks.

- Maximum single-event noise levels for four typical aircraft departing from SFIA were estimated for the 27 remote monitoring stations and the 20 study locations (these estimates are shown in Appendix C, in Tables C-8 and C-9). (The maximum noise would be produced if the aircraft passed directly overhead. In most cases, the noise heard at the locations would be lower than the maximum level.) The stations with the highest maximum single-event noise levels are in San Bruno, Millbrae, and Burlingame, closest to the Airport (sites 1, 5, and 8-11). Maximum single-event noise levels range from 87 dBA to 120 dBA at these stations. At the more distant stations in San Francisco, maximum single-event noise levels range from 71 dBA to 95 dBA. These noise levels indicate that individual planes may be noticed by most persons under the flight paths over the peninsula and San Francisco.

Of the locations studied in East Bay communities, those with the highest single-event noise levels are in Berkeley and Oakland (sites F, H, I, K, and L). Maximum single-event noise levels at all of the East Bay study locations range from 67 dBA to 91 dBA. The single-event calculations show that aircraft departing from SFIA can cause annoyance in East Bay communities outside the Airport's CNEL 65 contour.

Of the four aircraft studied, the Boeing 727 (B-727) produced the highest departure noise levels; the Boeing 747-200, a Stage 2 aircraft, and Boeing 737-300 and 767, both Stage 3 aircraft, produced lower noise levels (up to 23 dBA lower). Aircraft such as the B-727 are gradually being replaced by aircraft such as the B-737-300 and B-767. The increased use of quieter aircraft at SFIA will generally result in lower single-event (and cumulative) noise levels in communities near the Airport.

A more detailed discussion of single-event noise in the vicinity of SFIA is presented in Appendix C.

Backblast noise is the noise heard by people located in an area behind an airplane during its takeoff roll. The noise is characterized by a lower frequency and an increase in perceived rumble. It may be perceived as a sequence of two noises: first, the roar at the start of takeoff which decreases in level as the airplane moves further away down the runway, and second, the noise after the airplane is airborne and above the height where the ground reduces the noise (through what is called ground attenuation). At SFIA, backblast is heard principally in the cities of Millbrae and Burlingame, which are located behind Runways 1L and 1R. Because exposed neighborhoods in Millbrae and Burlingame are located on terrain that rises above the runways, they do not benefit from ground attenuation the way that a neighborhood on flat terrain would. The magnitude of the backblast noise may be seen in the CNEL contours in Figure 20, p. 161.

SENSITIVE RECEPTORS

Certain types of land uses are considered to be more sensitive to ambient noise levels than others, due to the amount of noise exposure (in terms of both exposure time and intensity) and the types of activities typically involved with these land uses. Residences, motels and hotels, schools, libraries, churches, hospitals, convalescent and nursing homes, auditoriums, parks, and outdoor recreation areas are generally more sensitive to noise than are commercial and industrial land uses.

In order to identify acceptable noise levels for various types of land uses, cities and counties in California are required to adopt land use noise compatibility guidelines. Because the project would be located on San Francisco land, but much of the noise impact would occur in the cities of Millbrae, Burlingame, and San Bruno, the noise compatibility guidelines for all of these communities are discussed in Section III.A. Land Use and Plans, pp. 82-103. These sets of guidelines, all of which were derived from state guidelines, are similar.

Land uses within the vicinity of SFIA include residential, commercial, and industrial development. Various noise-sensitive land uses, facilities, and activities are exposed to Airport noise or to noise from surface traffic to and from the Airport. Noise-sensitive schools, hospitals, and public facilities within the CNEL 65, 70, and 75 contours for 1990 are listed in Appendix C.

NOISE REGULATIONS, PLANS, AND POLICIES

The passenger facilities expansion at SFIA would be subject to the following noise regulations.

California State Noise Standards

- The State of California Noise Standards established by the California Department of Transportation specifically prohibit an airport proprietor from operating an airport within California if the noise impact area at the airport exceeds zero, unless the airport proprietor has been granted a variance from the law (California Code of Regulations, Title 21, Division 2.5, Chapter 6). From December 31, 1980 until December 31, 1985, California law established 70 dBA CNEL as the maximum standard for areas impacted by airport noise; as of January 1, 1986 that ceiling was lowered to 65 dBA, CNEL.

- SFIA is in compliance with the State Noise Law. However, because SFIA has exceeded the maximum noise ceiling set by these standards since January 1, 1978 in areas near the Airport, it has been required to obtain successive variances from those ceilings to continue operations. The first of these variances was granted on July 8, 1982 and the second was granted on November 25, 1986. The second variance was extended on October 19, 1989 upon the request of SFIA, and further extended on September 19, 1990 at the request of the Airport/Community Roundtable. The Roundtable requested the extension because the SFIA Master Plan and this EIR, when completed, could produce information and mitigation measures that could be incorporated into a new variance.

The 1986 variance contains specific requirements that SFIA make continued progress towards the date when it will be in full compliance with the requirements of the State Noise Standards. Among the conditions of the variance are 1) the use of the goals, objectives and recommendations of the 1980 *Joint Land Use Study* as the framework for mitigation; 2) implementation of the Airport Noise Mitigation Action Plan (described on p. 167); and 3) participation in sound insulation programs and the investigation of certain noise abatement actions./7c/

Existing Airport Programs and Regulations

Existing Airport efforts to mitigate noise exposure include the SFIA Noise Abatement Program, the Airport Noise Abatement Regulation, and the approved noise compatibility program under Federal Aviation Regulations (FAR) Part 150.

Noise Abatement Program

The Airport Noise Abatement Program includes the following actions identified in the Airport Noise Mitigation Action Plan, developed in 1981:

- Noise abatement has been established as a priority function under the Director of Airports, and is administered by a full-time professional staff.
- A noise performance monitoring system has been developed and established, currently including 27 off-Airport stations. A system is currently under development to enable monitoring of flight tracks using aircraft transponder data.
- Airport rules and regulations have been expanded to include noise mitigation actions (discussed below).
- A community information program has been established, including monthly meetings of the SFIA Roundtable, a group that monitors implementation of the noise regulations and programs.
- Runways 10L and 10R have been established informally as the preferential noise abatement departure runways from 1:00 a.m. to 6:00 a.m.
- The Visual Shoreline Departure, involving right turns for aircraft departing on Runways 28L and 28R, is currently in use.
- The Quiet Bridge Approach, involving approaches to Runways 28L and 28R over the San Mateo Bridge and the Bay, is currently in use.
- Airline aircraft use noise abatement climb power reduction for departures, generally known as the "ATA departure procedure."
- Aircraft engine runups are prohibited from 10:00 p.m. to 7:00 a.m. without special permission.

SFIA also participates in an advisory capacity in the implementation of the following off-Airport actions:

- Noise insulation (SFIA provides funding for 20 percent of the cost);
- Avigation easements;

- Neighborhood improvement program; and
- Preventive land use planning.

Noise Abatement Regulation

The Airport Noise Abatement Regulation, adopted in January 1988 and amended in June 1991, contains the following provisions:

- A gradual scheduled phaseout of Stage 2 aircraft, including requirements that at least 25 percent (of each operator's aircraft operations) after January 1, 1989 must be performed using Stage 3 aircraft; at least 50 percent after January 1, 1994; at least 75 percent after January 1, 1999, and 100 percent as of January 1, 2000.
- A requirement that the percentage of Stage 2 operations at SFIA performed by a particular airline cannot increase (during a specified quarter, based on the same quarter during the previous year).
- A scheduled phaseout of Stage 2 aircraft operations during the nighttime, defined as 1:00 a.m. to 6:00 a.m. as of January 1, 1989, and extending to 11:00 p.m. to 7:00 a.m. after January 1, 1993.
- A maximum sideline noise of 103 effective perceived noise level in dB from 11:00 p.m. to 7:00 a.m., as of 1993.

According to staff of the SFIA Noise Abatement Office, to date, all of the requirements of the Regulation have been met by the operators at SFIA./8/

FAR Part 150 Program

In the late 1970s and early 1980s, SFIA was involved in the preparation of a study under the federal Airport Noise Control and Land Use Compatibility Program. The Airport noise exposure map was accepted by the FAA under FAR Part 150, "Airport Noise Compatibility Planning." Subsequently, the SFIA noise compatibility program was accepted by the FAA under FAR Part 150, with the majority of the proposed actions approved. (Most of the actions not approved or determined to require more study involved FAA actions or noise limits.)

<u>Airport Land Use Plan</u>

The environs of SFIA are subject to noise control policies contained in the *Airport Land Use Plan* (San Mateo County Airport Land Use Commission, 1981). The Airport Land Use Commission (ALUC) has adopted noise compatibility standards to evaluate proposed land uses in the Airport noise-affected area. For SFIA, ALUC policy allows residential development without noise insulation in areas up to 65 dBA, CNEL. In areas where noise levels from air traffic at the Airport are between 65 dBA and 70 dBA, CNEL, residential uses are allowed with special noise insulation. These guidelines are similar to the noise compatibility standards adopted by San Francisco and the cities adjacent to the Airport (see discussion of Noise Elements of Master Plans in Section III.A. Land Use and Plans, pp. 82-104).

The ALUC has limited authority to implement its policies and guidelines within the Plan area. The ALUC works with local jurisdictions to achieve consistency between its *Airport Land Use Plan* and the plans and policies of these jurisdictions. The ALUC may review zoning or plan changes within ALUC boundaries, and make advisory recommendations to the local jurisdiction. The ALUC also has review power over any substantive change in development plans made by a public agency owning an airport within its planning boundaries, such as the San Francisco Airports Commission. The ALUC has no authority over actual Airport operations.

Noise Ordinances

San Francisco Noise Ordinance

During construction, powered construction equipment other than impact tools would be required to comply with the San Francisco Noise Ordinance (Article 20 of the City Police Code, Section 2907b), which limits construction noise to 80 dBA at 100 feet. The Noise Ordinance (Section 2908) also prohibits construction work at night from 8:00 p.m. until 7:00 a.m., if noise from such work would exceed the ambient noise level by five decibels at the property line, unless a special permit is authorized by the San Francisco Department of Public Works.

Noise policies for other local agencies are included in Section III.A. Land Use and Plans.

NOTES - Noise

/1/ A decibel (dB) is a logarithmic unit of sound energy intensity. Sound waves, traveling outward from a source, exert a sound pressure level (commonly called "sound level") measured in decibels. A dBA is a decibel corrected for the variation in frequency response of the typical human ear at commonly encountered noise levels.

/2/ L_{eq} is the equivalent steady-state sound level that, in a stated period, would contain the same acoustical energy as the actual time-varying sound level measured during that period.

/3/ L_{dn}, the day-night average sound level, is based on human reaction to cumulative noise exposure over a 24-hour period, and takes into account the greater annoyance of nighttime noise. Noise occurring between 10:00 p.m. and 7:00 a.m. is weighted 10 dBA higher than noise occurring during the daytime.

/4/ CNEL, the community noise equivalent level, is similar to L_{dn}, but incorporates an additional five-decibel penalty (beyond the L_{dn}) for noise occurring between 7:00 p.m. and 10:00 p.m. CNEL and L_{dn} are generally considered to be equivalent for most purposes.

/5/ California Administrative Code, Title 21, Section 5000, et seq., as amended.

/6/ The primary component of cumulative noise levels near SFIA is noise produced by air carrier aircraft. The noise produced by military, commuter, and General Aviation aircraft is a relatively small portion of total cumulative noise levels.

/7/ Aircraft noise characteristics are classified according to federal noise standards specified in FAR Part 36, "Noise Standards: Aircraft Type and Air Worthiness Certification," December 1969, as amended. Stage 2 aircraft include the early B-747s, B-727s, B-737-100s and -200s, and DC-9s. Stage 3 aircraft include later model B-747s, B-757s and B-767s, B-737-300s,-400s and -500s, MD-80s and -90s, DC-10s, MD-11s, and all Airbus aircraft.

● /7a/ Connor, T., *Investigation of Aircraft Departure Noise in Community Areas Behind Runways 1L and 1R at San Francisco International Airport,* Tracor Doc. T86-01-952IU, October 1986.

● /7b/ Kestennor, et al., *Investigation of Low Frequency Noise From Departures on Runways 1L and 1R at San Francisco International Airport,* Tracor Project 076-439 (-01), February 1987.

● /7c/ Noise Variance for San Francisco International Airport, granted by California Department of Transportation, November 25, 1986.

/8/ Ellis, Marvin, Assistant Noise Officer, SFIA Noise Abatement Office, telephone conversation, June 14, 1991.

D. AIR QUALITY

CLIMATE AND METEOROLOGY

The primary factors determining air quality are the locations of air pollutant sources and the amounts of pollutants emitted. Meteorological and topographical conditions, however, are also important. Atmospheric conditions such as wind speed, wind direction, and air temperature gradients interact with the physical features of the landscape to determine the movement and dispersal of air pollutants. The topographical and atmospheric characteristics of San Mateo County tend to promote dispersal of air pollutants generated in the project area to locations downwind. The temperature profile in the atmosphere, and the amount of humidity and sunlight, also affect the resulting concentrations of air pollutants defining the air quality on a given day.

The Bay Area climate is Mediterranean in character, with mild, rainy winter weather from November through March, and warm, dry weather from June through October. There is a relatively high percentage of sunshine away from the immediate coast, particularly in summer. The movements of marine air establish the temperature, humidity, wind, and precipitation throughout the year, which in turn depend upon the location and strength of the dominant Pacific high-pressure system and the coastal temperature gradient. Average temperature increases as distance from the coast increases.

In summer, the Pacific high-pressure system typically remains near the coast of California, diverting storms to the north through the northern tier states and Canada. Subsidence of warm air aloft is associated with the Pacific High; this subsidence creates frequent summer atmospheric temperature inversions and stagnant atmospheric conditions. Subsidence inversions may be several hundred to several thousand feet deep, effectively trapping pollutants in a small volume of air near the ground. Except for late afternoon onshore winds caused by differential heating between the cool ocean and warm land mass, summer wind speeds generally are low and ventilation is relatively poor. The maximum monthly mean temperature during the summer is about 65°F in the project area.

In winter, the Pacific high-pressure system moves southward, allowing ocean-formed storms to move through the region. The frequent storms and infrequent periods of sustained sunny weather are not conducive to smog formation. Radiational cooling during the evening, however, at times creates thin inversions and concentrates carbon monoxide emissions near the ground. The maximum winter monthly mean temperature in the project area is about 49°F.

AIR QUALITY REGULATIONS, PLANS, AND POLICIES

Air quality is controlled through the regulation of ambient standards and enforcement of emission limits for individual sources. The federal Clean Air Act required the U.S. Environmental Protection Agency (EPA) to identify National Ambient Air Quality Standards (NAAQS) for the protection of public health and welfare. NAAQS have been established for ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), inhalable particulate matter (PM_{10}), and lead (Pb). The Clean Air Act Amendments of 1977 further required the states to identify areas that were in nonattainment of the NAAQS and to develop State Implementation Plans (SIPs) that demonstrated how the nonattainment area would be brought into compliance by 1982. Extensions for attainment were granted to 1987 upon EPA approval.

The current NAAQS for particulate matter applies to inhalable particulates (PM_{10}) while the NAAQS it replaced applied to total suspended particulate (TSP). San Mateo County has been designated "Group III," which corresponds to less than a 20 percent chance of being designated nonattainment when more PM_{10} data has been collected./2/

The project lies in San Mateo County, which is in the San Francisco Bay Area Air Basin, an area which has been designated nonattainment for O_3 and CO./2/ Attainment status has been designated for the Basin, however, for NO_2, lead, and
● SO_2./2/ An *Air Quality Plan* for the Basin was prepared in 1991 and is being incorporated into the current California SIP./3/

● The *Bay Area '91 Clean Air Plan* describes the air pollution control strategies necessary to bring the Bay Area into attainment for all of the NAAQS. Strategies were developed on the basis of detailed subregional emission inventories and projections, and mathematical models of pollutant behavior, and consist of stationary and mobile source emissions controls and transportation improvements. The Bay Area Air Quality Management District (BAAQMD), Metropolitan Transportation Commission (MTC), and California Bureau of Automotive Repair (a State agency) have primary responsibility for implementation of these strategies.

California has adopted more stringent ambient standards for the above pollutants, called "criteria" pollutants because the standards satisfy criteria specified in the Clean Air Act. In 1988 California passed the California Clean Air Act, also known as the Sher Bill. This Act calls for the establishment of a program to secure air quality data for each air basin and to inventory and monitor air pollutants. The BAAQMD is the local agency empowered to regulate air pollutant emissions. The BAAQMD regulates air quality through its permit authority over most types of stationary emission sources and through its planning and review activities. The *Bay Area '91 Clean Air Plan* (CAP) describes the Bay Area's current plans for meeting State clean air laws./3/ The goal of the CAP is to improve air quality through the 1990's through tighter industry controls, cleaner cars and trucks, cleaner fuels, and increased commute alternatives. The CAP encourages cities and counties to adopt measures in support of this goal. Identified measures include: developing rules to reduce vehicle trips to major residential developments, shopping centers, and other indirect sources; encouraging cities and counties to plan for high-density development; and clustering development with mixed uses in the vicinity of mass transit stations. These measures would serve to reduce total vehicle miles travelled, thereby improving regional air quality.

Provisions in the CAP will likely affect the Airport in two ways. First, the BAAQMD is considering an indirect source control program, to be adopted in 1994, that would require facilities to implement an indirect source emissions reduction program. Such a program would include measures to reduce the total vehicle miles traveled. Second, the BAAQMD is developing an employee-based trip reduction rule, scheduled for adoption by mid-1992, that would mandate large employers to achieve a specified average vehicle ridership for their employees. Both of these measures would likely be phased in for new and existing developments. SFIA will be required to work with BAAQMD in implementing future rules and regulations governing total vehicle miles travelled, including the indirect source control program and the employee-based trip reduction rule. As discussed on pp. 130-137, SFIA currently seeks to reduce total vehicle trips by offering shuttle services, public transit facilities, and transit subsidies and incentives to employees.

EXISTING AIR QUALITY

The BAAQMD operates a regional air quality monitoring network that provides information on average concentrations of those pollutants for which State or federal agencies have established ambient air quality standards. Table D-1, Appendix D, p. A.137 is a three-year summary of monitoring data for these major pollutants, collected at the BAAQMD's closest monitoring station, which is in San Francisco./4/ Pollutant concentrations are compared with the corresponding State ambient air quality standards, which are more stringent than the corresponding federal standards. Comparisons of these data with those from other BAAQMD monitoring stations reveal that air quality in the vicinity of SFIA is among the best of all the developed portions of the Bay area. Two of the three prevailing winds, westerly and northwesterly, blow off the Pacific Ocean and reduce the potential for San Mateo County to receive pollutants from elsewhere in the region. San Mateo County's air quality problems (primarily CO and PM_{10}) are due largely to pollutant emissions from within the County, which also contribute to air quality problems (primarily ozone) in other parts of the Bay Area.

Ozone (O_3)

The most severe air quality problem in the Bay area is high concentrations of O_3. High levels of O_3 cause eye irritation and can impair respiratory functions. O_3 is not emitted directly into the atmosphere, but is a secondary pollutant produced through photochemical reactions involving hydrocarbons (HC) and nitrogen oxides (NO_x).

Significant O_3 generation requires about one to three hours in a stable atmosphere with strong sunlight. For this reason, the months of April to October are the "ozone season." O_3 is a regional pollutant because O_3 precursors are transported and diffused by wind concurrently with the reaction process. Numerous relatively small sources emitting most of the HC and NO_x are spread throughout the region. Table D-1, Appendix D, p. A.137, shows that no violations have been recorded at the San Francisco monitoring station since 1987.

Carbon Monoxide (CO)

About 87 percent of the CO emitted in the Bay area comes from motor vehicles./5/ Ambient CO levels normally correspond closely to the spatial and temporal distributions of vehicular traffic. CO levels are also influenced by wind speed and atmospheric mixing. Under inversion conditions, CO levels may be more uniformly distributed over an area out to some distance from vehicular sources. Relatively high levels of CO generally found in enclosed areas such as tunnels can impair the transport of oxygen in the bloodstream and thereby aggravate cardiovascular disease and cause fatigue, headaches, and dizziness. The eight-hour CO standard was violated in 1987 and 1988 (see Table D-1, Appendix D, p. A.137). Although no violations of the State one-hour or eight-hour CO standards were recorded in 1989 at the San Francisco monitoring station, relatively high levels would be expected along heavily-traveled roads and near busy intersections. Calculations of CO concentrations near US 101 and busy intersections are presented in Section IV.D, Air Quality.

Inhalable Particulate Matter (PM_{10})

Both State and federal particulate standards now apply to smaller-diameter particulates rather than to total suspended particulates (TSP). TSP refers to dust particles with a diameter of 30 microns or less, while PM_{10} refers to that fraction of TSP with diameters of 10 microns or less. Recent studies have shown that the smaller-diameter particulates represent the health hazard posed by suspended particulate matter.

The largest sources of PM_{10} in San Mateo County include demolition and construction activity, industrial emissions, and vehicular traffic. Table D-1, in Appendix D, p. A.137 shows several violations of both the previous State TSP standard and the current PM_{10} standard over the past three years at the San Francisco monitoring station. A strategy to bring the Bay Area Air Basin into attainment is being drafted and is due for release in June 1991 as part of the "Clean Air Plan."

Nitrogen Dioxide (NO_2)

NO_2 is the brown colored gas readily visible during periods of heavy air pollution. The major sources of NO_2 are vehicular, residential, and industrial combustion. The standards for NO_2 are being met in the Bay area, and the BAAQMD does not expect these standards to be violated in the future.

Sulfur Dioxide (SO_2)

The major source of SO_2 in the Air Basin is combustion of high-sulfur fuels. Ambient standards for SO_2 are being met throughout the Bay area, and the BAAQMD does not expect these standards to be violated in the future.

Lead (Pb)

Ambient Pb levels have dropped dramatically with the increase in the percentage of motor vehicles that run exclusively on unleaded fuel. Ambient levels in San Mateo County are below the ambient standard and are expected to continue to decline.

SENSITIVE RECEPTORS

Land uses such as schools, hospitals, and convalescent homes are considered to be relatively sensitive to poor air quality because the young, the old, and the infirm are more susceptible to respiratory infections and other air quality related health problems than the general public. Agricultural crops, especially broad-leaved produce crops and cultivated flowers, are also sensitive to air pollutants such as O_3, NO_x, and SO_2.

Because people in residential districts are often at home for extended periods, the exposure times to air pollutants are relatively long. Industrial and commercial districts are less sensitive to poor air quality because exposure periods are shorter and workers in these districts are, in general, the healthiest segment of the public. Recreational land uses are moderately sensitive to air pollution. Although exposure periods are generally short in such places, vigorous exercise associated with recreation places a high demand on the human respiratory functions, which air pollution can impair. Noticeable air pollution also detracts from the recreational experience. There are sensitive receptors in the project area. See Appendix D, Table D-2, p. A.137 for a list of sensitive receptor land uses.

NOTES - Air Quality

/1/ Murphy, Michael, BAAQMD, telephone conversation, February 11, 1991.

/2/ California Air Resources Board, "Area Designations for State and National Ambient Air Quality Standards," November 1989.

● /3/ Bay Area Air Quality Management District, Association of Bay Area Governments, and Metropolitan Transportation Commission, *Bay Area '91 Clean Air Plan*, 1991.

/4/ The closest BAAQMD monitoring station is the Arkansas Street station, located in San Francisco approximately ten miles from SFIA. The next-closest monitoring station is in Redwood City, San Mateo County, about 14 miles from SFIA.

/5/ Bay Area Air Quality Management District, *Emissions Inventory Summary Report*, August 1987.

E. ENERGY

TRANSPORTATION ENERGY

Surface Transportation

Existing airport operations generate approximately 31 million passenger and employee vehicle trips per year, including private automobiles, taxis, shuttle buses, and delivery trucks. On the assumption of an average trip length of 20 miles, these trips resulted in about 620 million vehicle miles traveled in 1990./1/ In addition, aircraft servicing and maintenance generate an unknown number of vehicle miles of travel. On the assumptions of a fuel economy in 1990 for the average vehicle fleet in California of about 26 miles per gallon and a 90%/10% distribution between gasoline- and diesel-fuel-powered vehicles, surface traffic for existing Airport operations (not including ground maintenance) consumes about 3.4 trillion British thermal units (Btu) of energy per year, or the equivalent of about 586,000 barrels of oil.

Air Traffic/2,3/

Chevron, PST, and Shell Oil companies distribute aviation fuel at San Francisco International Airport. The fuel is continuously pumped to the Airport by a Southern Pacific line which runs from Richmond to Brisbane and then along the North Access Road to the aviation fuel farm. The aviation fuel farm is in the north field area, east of the Flying Tigers and Japan Air Lines airfreight facility. From there, most of the fuel is distributed throughout SFIA via pipelines to fuel hydrants in the passenger terminal areas. The remaining fuel is distributed by tanker trucks, which service General Aviation operations as well as some commuter airlines.

The capacity of the aircraft fuel distribution system is approximately 150,000 barrels a day. Since fuel demand averages about 50,000 barrels a day over the course of a year, the fuel distribution system has about a three-day capacity.

Chevron supplies all of the airlines, with the exception of TWA, with aviation fuel via a 24-inch main distribution line running from the fuel farm directly to the terminal area. (Union Oil Company of California and PST contract with Chevron to distribute fuel). Chevron supplies a total of about 47,000 barrels a day of aviation fuel with peak demand of approximately 51,000 barrels of aircraft fuel per day in July and August.

Shell Oil Company supplies aircraft fuel to TWA through three four-inch branch lines running from the bulk tank farm to the satellite tank farm and then to the TWA terminals. Shell provides TWA with approximately 3,000 barrels of aircraft fuel per day. The satellite tank facilities (day-storage) are under the clear zone of runway 1L-19R, adjacent to the R-2 service road. These facilities will be deactivated in the near future and will require a new main line sized to distribute fuel directly from the Shell bulk storage tank.

Bulk storage tanks also supply tanker trucks which are utilized by General Aviation and selected commuter airlines. All facilities and rolling stock are owned and operated by oil companies.

BUILDING AND FACILITIES ENERGY

Natural Gas

Currently, SFIA purchases natural gas from third-party suppliers and pays a fee to PG&E to transport the natural gas to its facilities./4/ Two high-pressure mains provide primary service to the site. A 20-inch main connects to one of the high-pressure mains adjacent to the San Bruno Avenue interchange with US 101 (Bayshore Freeway). A 16-inch main connects to another high-pressure main west of the terminal freeway interchange. The terminal area and south field area are serviced by a six-inch line originating from the terminal interchange connection. The north field and east field areas are serviced by an eight-inch line from the San Bruno Avenue connection./5/

The terminals, maintenance and cargo facilities are gas-heated. Total natural gas use at SFIA in 1990 was approximately 2,053,908 therms./6/ The most recent peak maximum monthly consumption was 271,000 therms in February, 1990./4/

Electricity

SFIA is served by Hetch Hetchy Water and Power, a San Francisco City Department. Hetch Hetchy pays a transmission fee to Pacific Gas & Electric (PG&E) to transmit power over PG&E lines from hydroelectric and thermal-electric generation facilities.

PG&E transmits Hetch Hetchy power to the Airport via a high-voltage aerial transmission line along a 100-foot easement running west of and parallel to US 101.

Electricity is distributed to the United Airlines Maintenance Center though PG&E's South San Francisco East Grand Substation, and to the rest of SFIA via PG&E's Millbrae substation and SFIA's substation. Feeders from both substations have a capacity of about 64 MW of electrical power. These substations, which have no other load than SFIA, are connected to SFIA by three 12 kilovolt (kV) feeder lines, which transmit the electricity to other, smaller substations and load centers throughout SFIA via underground conduits. UAL is supplied a separate source of electricity through a 12 kV overhead transmission line in the right-of-way of South Airport Boulevard from the South San Francisco East Grand Substation./7/

The PG&E transformer serving SFIA has a maximum capacity of 46.3 MW./8/ The existing overall peak demand (15-minute period) is about 37.5 MW. On average, SFIA uses about 28.9 MW. SFIA has an arrangement with United Airlines to tap electricity from the airline's cogeneration unit in the event of a PG&E power failure. The connections to the plant are scheduled to be completed in 1991.

A north field substation supplies the north airfield lighting, drainage pump systems, bulk fuel tank farms and other airport related services with 7 MW of capacity./9/ Feeders to this substation operate independently of the feeders that deliver most of the electricity to SFIA, and therefore do not figure into the calculation of the capacity constraint of 64 MW. SFIA is currently connecting and looping this feeder to provide a dual supply with the south field lines.

Each building has emergency lights and power for public evacuation. Two field lighting stations which operate independently of PG&E can supply emergency electricity to the airfield if necessary.

The SFIA Master Plan estimated current annual consumption of electricity at the airport to be 226.4 million kwh. Most of this electricity is used for lighting, air conditioning, and operation of machinery. According to the SFIA Master Plan, over a period of 12 years (1974-1986) electricity consumption grew by about 19 percent./7/

ENERGY PLANS, POLICIES, AND REGULATIONS

Transportation-related energy consumption is not subject to specific controls, although the federal government has mandated fuel economy standards for domestic passenger automobiles.

Building energy consumption is regulated in California under the state Title 24 Building Energy Efficiency Standards. The efficiency standards apply to new construction of both residential and non-residential buildings, and regulate energy consumed for heating, cooling, ventilation, water heating, and lighting. The building energy efficiency standards are enforced through the local building permit process.

Compliance with Title 24 can be achieved through either a "performance" or a "prescriptive" approach. Under the performance compliance approach, a building must be designed to consume no more energy than specified in the appropriate energy "budget." The energy budget is based on the building occupancy and the climatic zone in which the building is located. Under the prescriptive approach, a building design must include specific features that have been determined to achieve an acceptable level of energy efficiency; these specified features include minimum insulation values for walls, floors, and ceilings; energy-efficient HVAC systems, lighting systems, and hot water supply; maximum percentages of glazing (window) areas; weatherstripping of doors and windows; and similar measures. Under the prescriptive approach, a builder can choose from a variety of alternative component packages that achieve the same general level of energy efficiency. There are a few design features that are required under either the performance or the prescriptive approach.

NOTES - Energy

/1/ Twenty miles per trip is the recommended trip length for regional airports contained in the Bay Area Air Quality Management District's *Guidelines for Assessing the Impacts of Projects and Plans*, updated April 1988.

/2/ Corrado, Celeste, Urban Planner, DMJM, telephone conversation with Vance Hendry, SFIA, March 22, 1989.

/3/ Corrado, Celeste, Urban Planner, DMJM, memorandum to Ray Landy, DMJM, July 18, 1989.

/4/ Yazdi, Mohammed, Major Account Representative, Pacific Gas and Electric, telephone conversations, August 15, 21, 22 and 27, 1990.

/5/ SFIA, *Final Draft Master Plan*, Chapter 4.0., November, 1989.

/6/ A therm is equal to 100,000 British thermal units. 1989 annual figures are used as approximations of 1990 figures.

/7/ SFIA, *Final Draft Master Plan*, Chapter 6.0., November, 1989.

/8/ Costas, John, Assistant Administrator, San Francisco International Airport, written communication, June 12, 1990.

/9/ Jacobberger, Donald, Electrical Engineer, SFIA Bureau of Planning and Construction, telephone conversations, August 15, 22, 27, 1990.

F. <u>CULTURAL RESOURCES</u>/1/

PREHISTORY

<u>Past Environment</u>

The San Francisco Bay region has been subject to environmental changes during the past 15,000 years, the most relevant of which have resulted from the worldwide rise of sea levels following the Wisconsin Glacial period./2/ The changes which most affected prehistoric cultural activity in the Bay Area were the alteration of the coastline and the formation of estuaries and marshes./3/

These marshes were important to the prehistoric populations in the area, as they provided a rich and vast range of subsistence resources in the form of fish, shellfish, birds, land and sea mammals, and marsh plants. At the time of European contact, marshlands in the general vicinity of the project area were situated in the San Bruno, Crystal Springs, Mills and Colma Creeks locales. Many of these marshlands have disappeared under fill as a result of nineteenth- and twentieth-century reclamation projects.

<u>Prehistoric Period, 3500 B.C. to 850 A.D.</u>

Evidence of prehistoric populations on the San Francisco Peninsula date to ca. 3500 B.C., with evidence of a pre-Costanoan presence (see Ethnography, following on next page) as late as ca. A.D. 850. Archaeological evidence indicates that the West Bay region was used intensively during prehistoric times; the area was an environmentally favorable locale with a variety of exploitable resources from San Francisco Bay and the nearby foothills. Perennial and intermittent drainages provided potable water and riparian resources Also, north/south travel and trade was accomplished easily, and several passes provided access to the interior San Andreas rift valleys. Hunting and gathering systems were the basis of the native populations' subsistence practices. Parties went out from the main villages to temporary camps within their territory to exploit the various seasonally available resources. Research indicates that intensive use of plant foods (hazelnuts, acorns, tubers and grasses) as well as the exploitation of marine and land animal resources were the basis for native diets.

Little of the prehistoric social and religious organization and structure is known from the West Bay archaeological record. Ethnographic information suggests that clusters of extended families lived habitually in the same area under a "chief" or headman.

While prehistoric archaeological sites are located west of the Bayshore Freeway (US 101), particularly in the vicinity of San Bruno, Crystal Springs and Mills Creeks and on San Bruno Mountain, no archaeological resources are documented within the project area. Moreover, none of the bay-oriented prehistoric shellmound sites recorded by N. Nelson in 1909 or mound sites recorded by amateur archaeologist Jerome Hamilton, who documented shellmounds of San Mateo from 1896 to 1936, lie within the SFIA project area.

Ethnography (850-1769)

The California Indians who occupied the San Francisco Peninsula at the time of European contact are known as the Costanoan. The term Costanoan is derived from the Spanish word "Costanos" meaning coast people. No native name for the Costanoan people as a whole is known to have existed in precontact times. The Costanoans were probably neither a single ethnic group nor a political entity./4/ The term Costanoan also designates a language family consisting of eight languages.

Informational sources for Costanoan ethnographic data are limited primarily to accounts by Europeans during their visits to the coast and by ethnographic accounts collected by anthropologists after the turn of this century.

HISTORY

Spanish Period (1769-1822)

The first Spanish expedition to enter present-day San Mateo County did so in 1769, under the leadership of Gaspar de Portola. According to the records of Fray Juan Crespi, Portola's chronicler, the band of explorers ventured up the seacoast of the Peninsula before crossing Sweeney Ridge and dropping down the eastern slopes of the Coastal Range. After camping below present-day San Andreas Lake, approximately two miles southwest of the project area, Portola and his men traveled as far south as present-day Menlo Park before retracing their steps over the mountain and back along the Pacific shore/5,6,7/.

In November of 1774, Fernando Rivera and Fray Francisco Palou led a second expedition into San Mateo County. In a search for a suitable mission site, Rivera followed an inland route up the Peninsula before intersecting with Portola's earlier trail. Rivera ventured as far as the Golden Gate. The following year, Father Palou made a similar trek with Bruno de Heceta./5,6,7/ Two years later, Juan Bautista de Anza and his chronicler, Fray Pedro Font, led a third expedition up the Peninsula, passing within less than a quarter mile of the project area.

By the early 1790s, outposts loosely supervised by the missions were established throughout the Peninsula. The outposts situated near El Camino Real served as stopovers for visiting padres and travelers, and the route was a trail which transected the open terrain of California./8/

Mexican Period (1822-1848)

During the Mexican period, large tracts of land were placed in the hands of individuals who, to a great extent, engaged in cattle ranching as well as in the hide and tallow trade. Land grants were issued throughout the Peninsula, one of the largest being the 14,639-acre Rancho Buri Buri, which surrounded the project area. The rancho's boundaries ran from South San Francisco's northern border to the middle of Burlingame and from the salt marshes of the Bay to the top of Sweeney Ridge./6,9/

The land of Buri Buri had a long ranching history. For years the mission fathers and the comandantes at the Presidio fought over the land and the right to graze their cattle there. In 1835 Governor Jose Castro officially granted Rancho Buri Buri to Jose Sanchez. The Sanchez family grew wheat, corn and garden vegetables in addition to grazing herds of cattle, horses and sheep. The Sanchez family constructed two adobe houses on its property, just east of present-day El Camino Real on the Burlingame-Millbrae border. Sanchez also built a grist mill near his adobe and a boat landing on a nearby slough. The mill fell into disuse and eventually disappeared; one of its millstones was later found on the Mills Estate in Millbrae. The Sanchez levee and wharf were southeast of present-day Millbrae Avenue, just outside the southern land boundary of SFIA property. The area is currently part of a bayside park.

No roadways, mission outposts or adobe structures from the Spanish or Mission Periods are known to have existed within the project area. However, the Jose Sanchez family constructed a levee and wharf southeast of present-day Millbrae Avenue, just outside the southern land boundary of SFIA property.

Early American Period (1848-1927)

After the signing of the Treaty of Guadalupe-Hidalgo in 1848, California became part of the United States and under the 1851 Gwin Act a commission was established to settle disputes arising over the validity of Mexican land grants. Because many claims were poorly recorded and because of pressure from landless American squatters, the court heard over 800 cases involving 500 land grants and rejected claims totaling 2,500,000 acres. Although the United States government confirmed Sanchez family ownership of Buri Buri, less than 5,000 acres of the original 15,000-acre land grant remained in the family.

By the end of the century, most of that land came into ownership of other parties. In San Mateo County, these other parties consisted of American Easterners such as Charles Lux, Ansel L. Easton and Darius O. Mills who, by 1870, had purchased thousands of acres of Buri Buri. Nevertheless, although Mills owned most of the property within the project area by 1927, the bayside real estate remained largely undeveloped./7,8,10/

The land that was developed within the former Buri Buri rancho boundaries lay near El Camino Real. Throughout the second half of the 1800s, transportation improved around the Peninsula; by the 1850s, El Camino Real had grown into a highway over which wagons and stages traveled. As a result, roadhouses or inns developed along the highway. Two such stagehouses were less than half-a-mile west of the project area: the 14 Mile House at present-day El Camino Real and San Mateo Avenue in San Bruno and the 17 Mile House at present-day El Camino Real and Millbrae Avenue in Millbrae. By 1864, the San Francisco and San Jose Railroad (later Southern Pacific) was steaming down the Peninsula on tracks that at times paralleled the project area and stopping at stations slightly east of El Camino Real and the former roadhouses.

Two years after the railroad arrived, Darius Mills began constructing his Peninsula estate. The Mills estate, which lay three-quarter miles southwest of the project area, was ruined eventually by termite damage and age and was bulldozed to make way for apartments and a shopping center.

The growth of the San Mateo County fishing industry also coincided with the completion of the railroad. The unemployed railroad workers, mostly Chinese, returned to the occupation they had pursued in China - that of shrimp harvesters.

The largest shrimp camp was a few miles to the south of the San Francisco County line on San Bruno Point at the mouth of Colma Creek Slough. Because Colma Creek Slough lies less than half-a-mile north of SFIA it is assumed that when the San Mateo County shrimp industry reached its peak in 1892, producing one quarter of the entire West Coast's output, camps existed in the project area.

Other major shrimp camps below Colma Creek Slough were south of the project area.

> One of the earliest camps settled in the state was situated on the southwest side of Corkscrew Creek at Redwood Slough, close to Redwood City. Evidence reveals it dates back to 1869 . . . Other shrimp camps along the San Mateo County bayshore included one at Broadway Street and the bay off Burlingame and one off little Coyote Point./11/

However, pollution in the Bay, over-harvesting as well as anti-Chinese sentiments, which were reflected in the banning of nets and fishing gear that the "all too successful" shrimpers used, led to a decline in the industry. By 1910 the camps and Chinese fishermen had all but disappeared from the Bay./8/

Oyster harvesting off the salt flats of the project area began as early as 1877. Between 1888 and 1912, the Bay waters off San Mateo County were the "only sources of commercial oysters in California." By the turn of the century, the oyster business also began to collapse as organic and chemical waste polluted the Bay and reduced the oxygen concentrations in the water. As a result, in 1923, the Morgan Oyster Company, an oyster harvesting concern on the County baylands, began selling its holdings to Pacific Portland Cement Company./8/

Clams and other mollusks had for centuries deposited their shells on the undisturbed Bay floor; by the 1930s, dredges were scooping tons of shells from the Bay and converting them into lime powder at the nearby cement factories. However, during the 1960s, rising production costs, aging facilities, higher taxes, tougher environmental controls, and rising tideland values led to a shutdown of this industry./8/

No evidence of Chinese shrimp camps, oyster industry structures or cement company dredging equipment is known to exist near or within the project area.

San Francisco Airport (1927-present)

As the Peninsula's fishing industry was ending, San Francisco's aviation industry was begining. With Crissy Field and Ingleside district sand dunes functioning as sites for takeoffs and landings, the citizens of San Francisco realized that public safety demanded that a permanent airfield be developed outside the city limits. In March of 1927, San Francisco supervisors opted to lease 150 acres belonging to the descendants of Darius Mills for the site of the City's future airport./12,13/

The Mills estate was above the Bay tides, offered hundreds of acres of submerged land which airport engineers could later reclaim and, most important, the site was available immediately. On May 7, 1927, Mayor James Rolph dedicated the Mills Field Municipal Airport of San Francisco.

The airport opened in June of 1927 and for the next ten years it conducted business from a terminal building that "was little more than a two-room wooden shack."/14/ This building was east of US 101, northwest of the present-day Bank of America Building, on a present-day parking lot (see building Number 44 on Figure 2, Chapter II. Project Description, p. 34). When Charles Lindbergh made the second of his two visits to Mills Field airport, a catastrophe occurred. His 32-passenger Boeing aircraft got stuck in the Peninsula mud. Henceforth, the fledgling airport was considered, "a mud hole, just a mud hole."/15/

The Lindbergh incident produced criticism on a local and national level. By 1930, San Francisco supervisors had purchased 1,112 acres of property from the Mills estate and the next year the airfield became known as the San Francisco Municipal Airport.

Between 1934 and 1935, the Works Progress Administration (WPA) put 2,000 people into work-relief programs to lengthen and widen the runways. Hundreds of tons of dirt and rocks were carved from the nearby San Mateo hills. In all, 319 acres of marsh and tidelands were filled.

On the eve of the 1940s, the City and its Public Utilities Commission (designated to regulate citizen-owned utilities) looked forward to the construction of a Coast Guard Air Station and the completion of the Seaplane Harbor at the airport. Then came Pearl Harbor, and the Navy assumed control of the airport and began the fill of another 100 acres. "Airport facilities in general were modified to meet military requirements . . . apron areas were enlarged and strengthened to accommodate multi-engine military aircraft."/13/

While none of the original Mill's Field buildings remain at SFIA, older structures are situated in the vicinity of the Seaplane Harbor. During World War II, the Airport saw the establishment of the Coast Guard Station and the transfer of Pan Am and United Airlines to its property. All three organizations constructed buildings in the early 1940s.

Pan Am's Flying Tiger hangar, built in 1943 is near the Seaplane Harbor.

By the end of the war, "the airport had 700 acres in use, another 2,000 under development, and several 16,000-foot runways."/8/ San Francisco Municipal Airport soon became one of the world's busiest airports. As a result, by the end of the '40s, the Old Bayshore Highway, which ran through the Airport lands, was abandoned and a new Bayshore Freeway (US 101) was constructed further to the west./8,12,15/

During the 1950s and 1960s, the marshlands between the (old) Bayshore Highway and the Bayshore Freeway were developed, complete with hangars, buildings, airport shops and taxiways.

In 1954, after landfill activities, the Central Terminal was erected at the airport. By 1963, the South Terminal was also built. In the spring of 1966, the San Mateo County Historical Association and the public gathered at the airport to bid farewell to the classic California-style terminal, built in 1937, as well as Mills Field's first big hangar, built in 1927. In order for additional runways to be built, both structures were razed that summer./12,14,16-20/

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G. GEOLOGY AND SEISMICITY

GEOLOGY

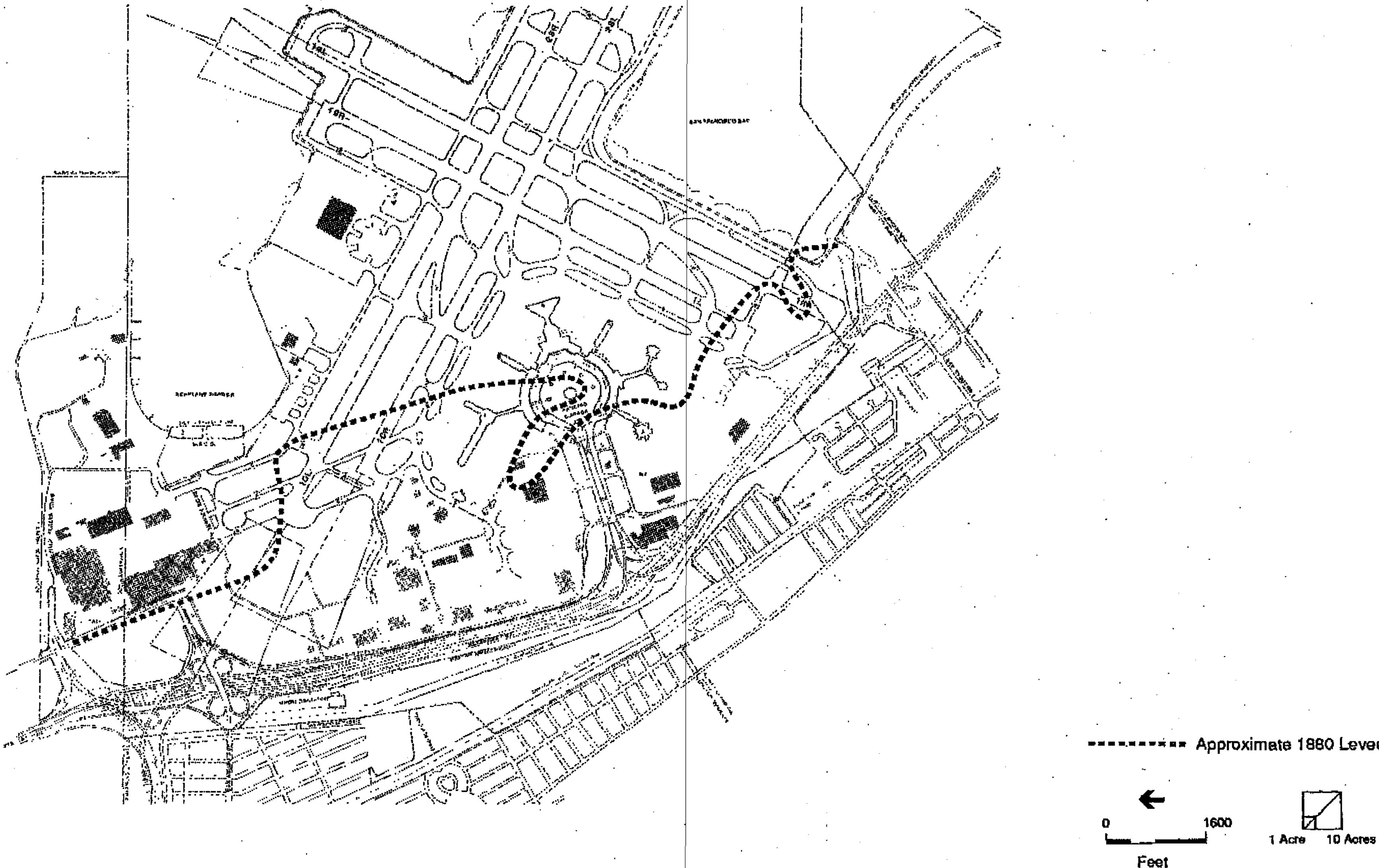
The San Francisco International Airport (SFIA) is located along the western shore of San Francisco Bay. The 2,700-acre area is composed of bay land that was filled and drained to create a relatively broad, flat area that is just above sea level. Groundwater is relatively shallow, generally less than five feet below the ground surface./1/

The area surrounding San Francisco Bay is composed of three types of sedimentary deposits: the most recent (upper) layer is composed of bay mud; under the bay mud are relatively dense silty sands; the lower deposits are older bay muds./2/ Older bay muds are relatively stiff firm clays that contain various amounts of silt, and lenses of sand and gravel. This unit is preconsolidated and is generally suitable for foundation support./1/ Dense silty sand overlies portions of the older bay mud and is generally thicker towards the Bay's margin, and thinner towards the center of the Bay.

Soft bay mud is the uppermost unit, and is generally 30 to 60 feet thick in the project area./1,3,4/ The upper bay mud unit is described by the U.S. Geological Survey as "unconsolidated, water-saturated, dark, plastic, carbonaceous clay and silty clay"/2/. All deposits are Quaternary in age, probably less than 120,000 years old./2/ Bedrock, Cretaceous sedimentary rocks of the Franciscan Complex, probably occurs about 100 feet below the ground surface./1/

Filling at SFIA began as early as 1880 with the construction of a levee, drying and filling in the western one-third of the property. The technique of placing fill on dried land has resulted in low to moderate rates of settlement. The approximate location of the pre-1927 shoreline, indicated in Figure 22, delineates the area that was filled in this manner. The remaining eastern portion of the site was filled by placing material directly over submerged lands, on top of soft bay mud. This fill technique, in combination with the presence of thicker bay mud deposits, created an environment prone to differential settlement./1/

Settlement on the order of feet has occurred since unengineered fill was placed on the site beginning in the last century and settlement will continue, although at a decreasing rate. Settlement has caused ground surface deformation, separation of pavement from



SOURCE: Aerial photograph from San Francisco Public Utilities Commission; and Environmental Science Associates, Inc.

San Francisco International Airport ■

Figure 22
Location of Pre-1927 Shoreline

buildings and movement of underground pipelines. Future settlement is expected to be most severe in the eastern part of the project area, where bay mud is thickest.

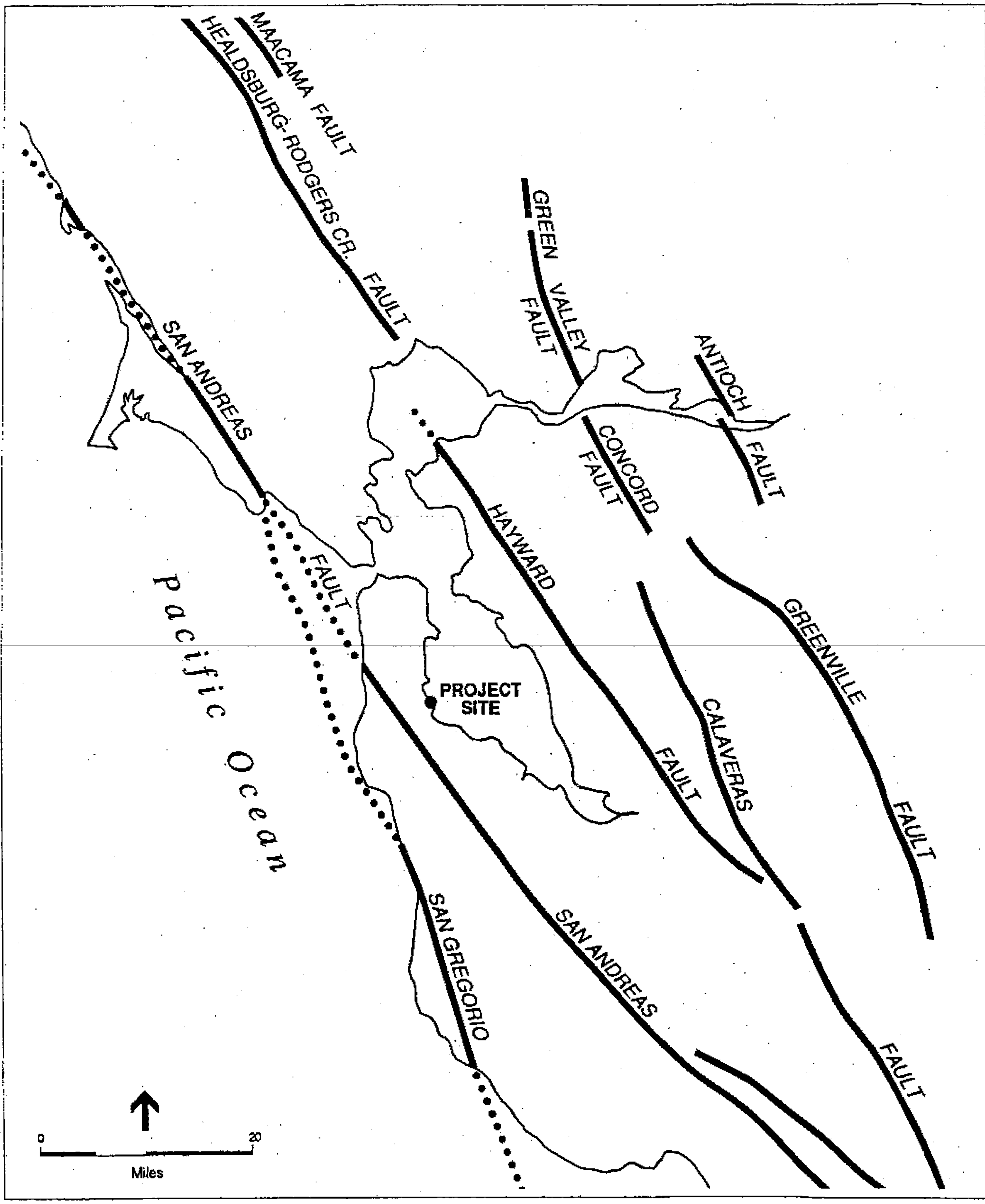
The project area is classified by the U.S. Geological Survey as having "Unstable" slope conditions, as are most areas along the margins of the Bay./5/ Although slopes are less than five percent, the tidelands and marshlands underlain by moist unconsolidated mud are susceptible to lateral spreading, a type of ground movement in which material slides along a relatively flat surface. These soils are also susceptible to seismically induced ground failure.

SEISMICITY

The San Francisco Bay Area is a region of relatively high seismic activity. The area is in Zone 4 (the most hazardous) on the Uniform Building Code's Seismic Zone Map of the United States. According to San Mateo County's Geotechnical Hazards map the potentially active Serra fault is located 2.3 miles west of the site./6/ The main trace of the active San Andreas fault is about three miles west of the Bayshore Freeway, which forms the western boundary of the project area./7/ Other nearby active faults include the Seal Cove - San Gregorio (about ten miles west of the project area), the Hayward (15 miles to the east) and the Calaveras (22 miles to the east) faults./7/ Figure 23 shows the regional faults that are most likely to cause earthquakes that could affect the project area. Table 19, p. 196 lists their maximum credible earthquakes.

Potential seismic hazards in the project area may arise from three sources: fault rupture, liquefaction and strong ground shaking. Since no mapped faults are known to pass through the project area, the potential risk from fault rupture is considered negligible./3/ The site is not within an Alquist Priolo Special Study Zone for fault rupture hazards, as designated by the state./8/ However, the project could be affected by strong ground shaking caused by a major earthquake during the life of the project.

The project area is within a zone of high ground-failure potential as designated by the California Division of Mines and Geology./9/ Earthquakes may trigger ground failure such as liquefaction, lateral spreads and flow failures at the site. Soil liquefaction is the relatively rapid loss of soil shear strength during strong earthquake shaking, which



SOURCE: Environmental Science Associates, Inc.

San Francisco International Airport

Figure 23
Regional Fault Map

TABLE 19: SUMMARY OF MAXIMUM CREDIBLE EARTHQUAKE MAGNITUDES FOR KNOWN ACTIVE FAULTS IN THE SAN FRANCISCO BAY AREA

Fault	Maximum Credible Earthquake Magnitude (Richter Magnitude)
San Andreas	8.5
Seal Cove - San Gregorio	N/A*
Hayward	7.3
Calaveras	7.3

*N/A = Not Available

SOURCE: Contra Costa County General Plan, 1991.

results in the temporary fluid-like behavior of the soil. Soil liquefaction causes ground failure that can damage roads, runways, pipelines, underground cables and buildings with shallow foundations.

Soils that are most susceptible to liquefaction are loose, clean, fine sands, and silts that are free of clay. In addition, these materials must be below the water table (saturated) for liquefaction to occur. Previous geotechnical investigations at the airport have not identified these conditions at selected sites./1,3/ However, San Mateo County has mapped the area as bay mud with "Variable" liquefaction potential. This unit contains, or in places is underlain by, sand lenses that are saturated and may have relatively high liquefaction potential.

Records of historic ground failure patterns indicate that earthquake-induced ground settlement and lateral spreading have occurred in the area south of San Bruno Avenue just west of the Bayshore Freeway, in the project vicinity./10/ Settlement of up to four inches was reported at the airport's wastewater treatment plant after the October 1989 Loma Prieta earthquake./11/ However, no damaging earthquake-induced ground failure was reported at SFIA following this event./12,13/

The northwestern portion of SFIA, the "airside area", is within a tsunami inundation zone, as defined by the San Mateo County Geotechnical Hazards Synthesis Maps./6/ The estimated tsunami run-up at the airport is about four feet for the 100-year event and about six feet for the 500-year event./14/

Historic earthquakes have caused strong ground shaking and damage in the project area and vicinity. The maximum expected ground shaking intensity is Mercalli VIII./15/ This intensity of ground shaking is described as:

> "Damage slight in specially designed structures; considerable in ordinary substantial buildings, with partial collapse; great in poorly built structures. Panel walls thrown out of frame structures. Fall of chimneys, factory stacks, columns, . . . walls. Heavy furniture overturned. Sand and mud ejected in small amounts. Changes in well water . . ."/16/

The Loma Prieta earthquake was the most damaging earthquake to strike the airport since its creation in 1927. This earthquake measured 7.1 on the Richter scale and caused strong ground shaking for about 20 seconds. Although the epicenter was located about 45 miles south of the project area, the airport experienced strong ground shaking equivalent to intensity VII on the Mercalli scale. Mercalli VII is described as:

> ". . . Damage negligible in buildings of good design and construction; slight to moderate in well built ordinary structures; considerable in . . . badly designed structures; some chimneys broken . . ."/16/

The effects of the Loma Prieta earthquake at the airport are reported in *The Earthquake of 1989, a Report on San Francisco International Airport* /12/, contained in Appendix E. The airport claimed more than $25 million in damages. One reinforced concrete building (the Airborne Cargo Building, built in the mid 1960's) was damaged and later demolished. Most buildings, however, remained intact and suffered varying degrees of non-structural damage. Typical damage included toppled furniture, overturned shelving, broken glass, and falling plaster, ceiling tiles and light fixtures. Many overhead water lines burst, flooding waiting areas and public lobbies. Although no deaths were reported, several people were injured during the earthquake, one seriously.

No runway damage or fuel leaks or spills were reported. However, the Airport Fire Department responded to reports of natural gas leaks and chemical spills at the United Airlines Maintenance Center.

The airport shut down immediately following the earthquake. Limited service resumed 13 hours after the main earthquake shock. Full service was restored within three and a half days. Airport facilities had visible cosmetic damage for months following the earthquake, as restoration took place while the airport remained fully functional./12/

Policies

The following policy concerning geohazards is contained in the San Francisco Master Plan, Community Safety Element (1974):

> "Apply a minimum level of acceptable risk to structures and uses of land based upon the nature of use, importance of the use to public safety and welfare, and density of occupancy."/17/

The airport would fall into risk level 3, because it would likely serve as a critical "emergency operations facility" following an earthquake. The Master Plan calls for the following safety standards for structures of this type:

- No structural or mechanical failure.
- Little or no damage to interior furnishings and equipment.
- Must be fully operational immediately following a major earthquake.

BUILDING CODES

California state law (Health and Safety Code, Section 18941.5) requires local jurisdictions to implement, as a minimum, building standards of the 1988 edition of the Uniform Building Code for all new construction and for substantial alterations.

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H. HAZARDOUS MATERIALS

Various types of hazardous materials are used at San Francisco International Airport for the maintenance and operation of the airplanes, the airport property and the supporting facilities. The use, storage and disposal of hazardous materials can create a public health hazard if handled incorrectly. Improperly stored chemicals lead to fire, explosion or contamination of soil or groundwater. Development in certain areas of the Airport could result in human exposure to contaminated soil or groundwater.

DEFINITIONS

A substance may be considered hazardous due to a number of criteria, including toxicity, ignitability, corrosivity, or reactivity. A **hazardous material** is defined as "a substance or combination of substances which, because of its quantity, concentration, or physical, chemical or infectious characteristics, may either (1) cause, or significantly contribute to, an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or (2) pose a substantial present or potential hazard to human health or environment when improperly treated, stored, transported or disposed of or otherwise managed" (Title 22, California Code of Regulations, Section 66084).

Once a hazardous material is ready for discard, it becomes a **hazardous waste.** A "hazardous waste", for the purpose of this report, is any hazardous material that is abandoned, discarded, or (planned to be) recycled (California Health and Safety Code, Section 25124). In addition, hazardous wastes may occasionally be generated by actions that change the composition of previously non-hazardous materials. The same criteria that render a material hazardous make a waste hazardous: toxicity, ignitability, corrosivity, or reactivity.

Toxic, ignitable, corrosive and reactive materials are all subsets of hazardous materials and wastes. For example, if a material is toxic, it is hazardous, but not all hazardous materials are toxic. Specific tests for toxicity, ignitability, corrosivity and reactivity are set forth in Title 22, California Code of Regulations, Sections 66693 - 66708. Each type of hazardous material is defined below.

Toxic substances may cause short-term or long-lasting health effects, ranging from temporary effects to permanent disability, or even death. For example, such substances can cause disorientation, acute allergic reactions, asphyxiation, skin irritation or other adverse health effects if human exposure exceeds certain levels (the level depends on the substance involved). Carcinogens (substances known to cause cancer) are a class of toxic substances. Examples of toxic substances include benzene, which is a component of gasoline and a suspected carcinogen, and methylene chloride, a paint stripper.

Ignitable substances are hazardous because of their ability to burn. Gasoline, hexane and natural gas are examples of ignitable substances.

Corrosive materials can cause severe burns or damage materials; these include strong acids and bases, such as lye or sulfuric (battery) acid.

Reactive materials may cause explosions or generate toxic gases. Explosives, pure sodium or potassium metal (which react violently with water), and cyanides (which react with acids to produce toxic hydrogen cyanide) are examples of reactive materials.

Contamination and contaminants are not necessarily hazardous materials or waste. Soil or water is considered to be contaminated if it contains elevated (above background) levels of a chemical substance, and if the resulting soil or water has the potential to cause human health effects or adversely affect the natural environment.

Even if soil or groundwater at a contaminated site does not have the characteristics of a hazardous material, remediation (clean-up) of the site may be required by the regulatory agencies. Several regulatory agencies usually become involved in overseeing site remediation activities. Clean-up requirements are determined on a case-by-case basis.

REGULATORY FRAMEWORK

Numerous laws and regulations govern the management of hazardous materials and wastes at the federal, state, and local levels. The major laws and regulations that relate directly to conditions in the project area are discussed below; a more complete discussion is provided in Appendix F, pp. A.147-157.

U.S. Environmental Protection Agency

The Environmental Protection Agency (EPA) is responsible for enforcing regulations at the federal level pertaining to hazardous materials and wastes. The primary federal hazardous materials and waste laws are contained in the Resource Conservation and Recovery Act of 1976 (RCRA), and in the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA). These laws require that responsible parties report any known hazardous waste contamination of soil or groundwater to the EPA. For the San Francisco International Airport, reporting must be to the California Department of Health Services, the San Francisco Bay Regional Water Quality Control Board, or the San Mateo County Office of Environmental Health, depending on specific circumstances. Any contamination that threatens public health or the environment must be cleaned up (remediated) by the responsible party according to certain standards set by the EPA.

The federal statutes pertaining to hazardous materials and wastes are contained in the Code of Federal Regulations (40 CFR). The regulations contain specific guidelines for determining whether a waste is hazardous, based on either the source of generation or the properties of the waste. Determination of standards for remediation of soil and groundwater contamination is performed on a case-by-case basis. However, extensive federal guidance exists for determining acceptable levels of residual contaminants in soil and groundwater.

California Department of Health Services, Toxic Substances Control Division

The EPA has delegated much of its regulatory authority to individual states whenever adequate state regulatory programs exist. The Toxic Substance Control Division of the California Department of Health Services is the agency empowered to enforce federal hazardous materials and waste regulations in California, in conjunction with the EPA.

California hazardous materials and waste laws incorporate federal standards, but are more strict in many respects. For example, the California Hazardous Waste Control Law, the state equivalent of RCRA, contains a broader definition of hazardous materials and waste than the federal definition. Some substances not considered hazardous under federal law are considered hazardous under state law. The California Hazardous Substance Account Act, essentially the equivalent of CERCLA, contains a provision for designation of state funds to clean up sites where private funding is unobtainable. State hazardous materials and waste laws are contained in the California Code of Regulations (CCR), Title 26.

The Department of Health Services acts as the lead state agency in some site investigations and remediation projects. The state determines the level and extent of required clean-up, based on the specific site conditions and surrounding land uses. State clean-up standards can be more restrictive than federal standards; both state and federal standards are used to determine clean-up levels.

California Regional Water Quality Control Board, San Francisco Bay Region

The Project Area is located within the jurisdiction of the San Francisco Bay Regional Water Quality Control Board (RWQCB). The RWQCB is authorized by the State Water Resources Control Board to enforce the provisions of the Porter-Cologne Water Quality Control Act of 1969, which incorporates federal water protection laws (see Appendix F). This Act gives the RWQCB authority to require groundwater investigations when the quality of the groundwaters or surface waters of the state have been or could be threatened, and to remediate the site if necessary. Clean-up standards are often more stringent than employed by the RWQCB those used by EPA or the State Department of Health Services depending on the particular contaminant, and are region-specific./2/ The level of required site remediation is determined on a case-by-case basis.

<u>Local Administering Agencies</u>

The San Mateo County Office of Environmental Health and the San Mateo County Department of Public Works are involved directly in the management of hazardous materials and wastes within the Airport. Under a joint agreement, the Airports Commission shares these responsibilities with the County agencies.

The County Office of Environmental Health is designated by the State Water Resources Control Board to enforce the state underground storage tank (UST) program. Permitting of underground storage tank installation and removal is overseen by the Office of Environmental Health. The Office of Environmental Health also issues permits to businesses that store hazardous materials and conducts inspections on a regular basis to ensure compliance with regulatory requirements. The Office of Environmental Health, State Department of Health Services, and RWQCB jointly oversee subsurface investigations and remediation at sites containing hazardous materials.

The SFIA Fire Department, in coordination with the SFIA Facilities, Operations and Maintenance Division, regulates the use and storage of flammable liquids. The Fire Department conducts regular inspections of above-ground storage tanks and facilities in which hazardous materials are used or stored, and reports of those inspections are kept on file. The Facilities, Operations and Maintenance Division follows up on any suspected violations in hazardous material handling.

HAZARDOUS MATERIAL USE AT SFIA

Hazardous materials are used for various purposes throughout the Airport. Their uses focus around maintenance and fueling of airplanes and ground vehicles, and the maintenance of the airport facilities. For the purposes of this EIR, the use of hazardous materials is divided into use at Airport-owned facilities and use at tenant facilities (i.e., facilities that lease space from the Airport). Because of the specific considerations involved with the use of aircraft and motor vehicle fuels, these are discussed below in separate sections.

<u>Airport-Owned Facilities</u>

Most of the hazardous materials used by the Airport and by City and County employees at SFIA are handled by the Facilities, Operations and Maintenance Division of the Airports Commission. The Facilities, Operations and Maintenance Division is responsible for the following areas of airport operation: Environmental Control, Maintenance, Technical Services, Construction Support, Quality Control, and Scheduling and Control.

The Airport facilities in which hazardous materials are used include the Engineering Building, the Maintenance Building, the Water Quality Laboratory and Water Quality Plants, the Central Plant in the center of the parking garage at the terminals, and the custodial offices in the terminals. The Engineering Building (676 McDonnell Road) contains one reproduction shop. The Airport Maintenance Base (682 McDonnell Road) contains offices and maintenance shops. Work operations in this building include wood-working, painting, varnishing, auto maintenance, welding, and soldering. The electrical shop works on a 24-hour schedule. The facility also has an adjacent annex that houses part of the auto shop and the sheet metal shop. The courtyard contains the paving and grounds office, steam cleaner, and gasoline pumps.

The two wastewater treatment plants, at the end of the North Access Road, handle all of the industrial waste and sewage from the Airport. In addition, the plants have a maintenance shop and a water quality testing laboratory.

The Airport has completed and submitted to the County of San Mateo a Hazardous Materials Release Response Plan (Business Plan) in accordance with the Hazardous Materials Release Response Plans and Inventory Law. In addition to emergency response procedures, the plan includes facility diagrams, a hazardous materials inventory and an employee training plan. The hazardous materials stored in the maintenance shops in the Maintenance Building include detergents, industrial cleaners, paints/primers, paint thinners, degreasers, lubricants, oils, solvents, motor oils, sealants, gasoline, kerosene, rust penetrators, herbicides, insecticides, fertilizers and dyes./1/ The water quality laboratory stores and uses a number of chemicals in relatively small quantities for testing purposes. The wastewater treatment plant uses lubricants and degreasers for the operation of the plant, as well as chlorine, acrylamide polymer, aluminum sulfate, ferrous cupric sulfate, and sodium triphosphate for treatment of wastewater.

San Mateo County has reviewed and approved the Airport's Business Plan, with the exception of a few changes that the Airport is currently addressing./2/

Within the last five years the Airport has formalized its safety practices and procedures, and instituted training programs for employees. Employees take part in a safety program with both classroom instruction and written material contained in the

SFIA Employee Safety Practices and Procedures Manual. Employees are informed of California Occupational Safety and Health Administration (Cal/OSHA) regulations for employers and employees regarding safety and accident investigation, and informed of the Airport's safety standards for engineering work and job safe practices for everyday operations. Industrial health issues are discussed, including personal protective equipment and medical surveillance. In addition, the Airport is in the process of instituting a Safety and Hazardous Materials Training Program. This training program provides the employees with basic facts about safety and hazardous materials, including physical properties, material safety data sheets, emergency spill procedures, hazardous waste management, electrical hazard control, and earthquake preparedness, as well as background information regarding the state and federal regulation of hazardous materials. Employees attend safety training at the start of employment and also receive annual refresher courses./3/

Tenant Facilities

As presented in the Project Description, the tenant facilities include airfreight administrative buildings and hangars, base and line maintenance buildings and hangars, General Aviation hangars, airline catering and support buildings and a U.S.Coast Guard facility. For the purposes of this section of the EIR, the facilities that store and use most of the hazardous materials at the airport are summarized.

United Airlines (UAL) Maintenance Center, the only "major" maintenance facility at SFIA, is the largest major maintenance facility in the United States. The operations conducted at UAL aircraft maintenance shops include full overhaul of aircraft engines, airframe maintenance, and upper-level phase checks for the UAL fleet. The types of hazardous materials that are used for these operations include cleaners, solvents, greases/oils/lubricants, paints/primers/thinners, developers, penetrants, adhesives and dyes./4/ In addition, the United Airlines Maintenance Center operates a pre-treatment facility for its industrial wastewater, which uses treatment chemicals such as chlorine and sodium hydroxide. As usual, fuel is stored in underground storage tanks.

Eight airlines operate line maintenance facilities at the Airport. Line maintenance includes routine as well as non-scheduled procedures and relatively low-level maintenance checks. The airlines operating these facilities include American Airlines (the largest), Quantas, Continental, Delta, Pan Am, TWA, Northwest and United Airlines, which operates a smaller line maintenance hangar in addition to its larger facility. Most of the line maintenance facilities also work on aircraft from other airlines that do not have maintenance facilities. Some of the air freight companies also have maintenance operations.

The operations conducted at the line maintenance facilities include aircraft washing, painting and necessary overnight maintenance. Hazardous materials commonly used at these facilities include cleaning solutions, welding gases, defoamers, and deflocculants for pre-treating their industrial waste streams. In addition, most line maintenance facilities have underground storage tanks for motor vehicle fuel./5/

Five rental car companies maintain operations at SFIA: Avis, Budget, Hertz, National and Dollar. As the operations at these facilities are limited to basic car maintenance and car washing, the hazardous materials stored consist of only car wash cleaners, stored above-ground and unleaded gasoline, new oil and waste oil, in underground storage tanks./6/

Airport Regulation of Hazardous Material Use

Following the lead of the Business Plan Act, the Airport has instituted a similar program as part of the Airport tenant regulations. All airport tenants who wish to store hazardous material at any one time equal to at least 500 pounds for solids, 55 gallons for liquids or 200 cubic feet for compressed gases are required to apply for a Hazardous Materials permit and submit a Business Plan to the Airport. Included in the application for the permit must be a Hazardous Materials Disclosure form, Material Safety Data Sheets, an Emergency Response Plan and a Business Map. After receipt of a completed application, inspections of the premises are conducted by the Airports Commission Safety and Fire Departments. The items checked include the construction, suitability, and condition of storage and use facilities, labeling of hazardous materials, organization of storage and suitability, and condition of emergency and spill equipment. A permit is then issued if no violations are identified. Permits are valid for one year, at which time inspections occur again for renewal of the permit. The tenant regulations include specific instructions for reporting unauthorized releases of hazardous materials./7/

The SFIA and the Director of Health Services, San Mateo County, have an agreement regarding the submission of Business Plans. The protocol for implementing both the San Mateo County and SFIA hazardous material inventory, control, and response programs is that business plans are to be submitted to SFIA's Facilities, Operations and Maintenance office for review first. In turn, the Airport files the business plans with the County of San Mateo for review. In addition, representatives from both the Airport and San Mateo County conduct inspections in concert as needed. The Business Plan Act was passed in 1985; thus, the hazardous material permitting program at the Airport is relatively new and has not yet been instituted fully. The Airport has not yet received Business Plans from all of the tenants./8/

The SFIA Fire Department also regulates the storage of hazardous materials. In enforcement of National Fire Protection Association standards and San Francisco Fire Code regulations, the Fire Department conducts regular inspections of facilities for proper handling of hazardous materials. Terminal areas are inspected on a monthly basis, while all other facilities, airport and tenant, are inspected yearly. Violations are issued if hazardous materials are found to be handled improperly. When a violation is issued, a Fire Department inspector will stay until the problem is abated, or the violator will be given up to fifteen days to comply with regulations, at which time the facility will be inspected again for compliance./9/

SFIA Airport-owned facilities have received three citations from Cal/OSHA in the past three years, none of which pertained to the use of hazardous materials. Two citations were issued for improper guarding of machinery. The Airport has purchased and installed the appropriate protective equipment for these machines. The third citation was issued for the inability to produce required heating, ventilating and air-conditioning (HVAC) maintenance and inspection records at the time of the Cal/OSHA visit. These records were later found and the citation abated./10/

FUELS AT SFIA

Motor Vehicle and Generator Fuel Storage

Petroleum fuels are needed for ground service vehicles and for power generators at both Airport-owned and tenant-owned facilities. All underground storage tanks have valid permits from the County of San Mateo. All underground and above-ground tanks must be reported to the Airport Fire Marshal. Appendix F (Tables F-1 and F-2, pp. A.158-159) includes a list of all Airport-owned underground and above-ground storage tanks and their location, capacity, contents and age.

The storage of hazardous materials in underground tanks by tenants is monitored by the Facilities, Operations and Maintenance Division's (FOM) Quality Control Department, in compliance with applicable laws and regulations. As part of the tenant regulations, all storage of hazardous materials in underground tanks must be permitted by the FOM. A permit is not issued unless the applicant demonstrates to the FOM and the Airport Fire Marshal, by the submittal of drawings specifications and other information, that the design and proposed construction of the underground tank is suitable for hazardous-substance storage. All tanks must have an adequate monitoring plan. All tanks are required to have both primary and secondary levels of containment, overflow protection, and monitoring systems. Permittees must carry out maintenance, ordinary upkeep, and minor repairs in accordance with the provisions of the Tenant Improvement Guide, as well as obtain closure permits for any tank closure. Response plans to indicate the procedure for determining, confirming and containing unauthorized releases of hazardous substances must be prepared for all tanks./11/ The Airport instituted the tank permit program in 1985. Appendix F includes a list of all tenant-owned underground storage tanks and their location, capacity, contents, Airport I.D., construction material and installation year. Above-ground storage tanks are not yet as strictly regulated by the government as underground tanks have been, although secondary containment is required. Therefore, the Airport has not instituted a monitoring program for them at this time.

Aviation Fuel Storage and Distribution

Aviation fuel is stored at the Airport in the bulk fuel storage tanks in the North Field area and in smaller day storage tanks in the South Field area. Most aircraft at the

Airport are refueled from a hydrant system, as it is safer than transporting fuel by tanker truck. Fuel from the bulk storage tanks is distributed by pipeline directly to hydrants in the terminal area. Smaller aircraft are refueled by tanker trucks that use the day storage tanks. Because of the recent decrease in use of the day storage tanks, the Airport has decided to remove the tanks. For a complete description of the fuel distribution system, see Section III.E. Energy, pp. 178-79.

The Airport regulates the distribution of jet fuel by requiring the owners of the pipelines to perform pressure tests yearly and file the results with the Quality Control department of SFIA's Facilities, Operations and Maintenance Division. In addition, oil companies are required to monitor for fuel leaks through inventory reconciliation./12/ Chevron, the major supplier and distributor of fuel at the Airport, performs daily pressure checks of the distribution lines in the early morning hours when traffic is light. In addition, the entire system is locked and tested once per month./13/ The individual airlines own the portions of the fuel distribution lines extending to their terminal areas and conduct yearly checks of the hydrant systems.

Fuel Spills

As a means of complying with Federal regulations, all spills of petroleum products that have a potential of reaching waterways and are of sufficient volume to create a visible sheen on the water must be reported to the Airport Authority and the U.S. Coast Guard. A discharge of oil or hazardous substance, (i.e. jet fuel, gasoline) is classified as a spill when the material enters a navigable waterway. A discharge that is contained and does not reach a navigable waterway is not considered a spill under by EPA reporting requirements.

SFIA has established emergency response procedures in the event of any fuel spill, to prevent contamination of water. All fuel spills must be reported to the Airport Communications Department immediately. The Airport then notifies the Fire Department, Water Quality Control and the Safety Office, all of which report to the scene. The first priority is to prevent the fuel from entering the storm drains or any other waterway access. This is accomplished through the use of drain plugs and dikes to eliminate fuel spreading. Spill carts with various spill clean-up and containment supplies are located in the terminal areas. Emergency shut-off switches that can stop the flow of fuel to the entire boarding area in the case of an emergency, such as hydrant pipeline puncture, are located around the periphery of each boarding area. This shut-off system is tested on a monthly basis to assure it is in working order.

In the event that fuel from a spill does reach a storm drain, the industrial wastewater plant is notified. Usually, the fuel-contaminated water can be held at some point in the system by shutting off that section of pipeline. The fuel then can be skimmed off the surface at one of several system-access locations.

In order to minimize the discharge of pollutants into the Bay from the drainage pump stations, oil skimmers have been installed upstream from the drainage pump stations. In the event that a spill occurs which cannot be contained in a retention pond, or occurs on the outer portions of the runways where drainage does not flow to the ponds, the fuel can be recovered from catch basins before reaching the Bay. Contaminated drainage can be held in the catch basins by interrupting the operation of pumps. As a preventive measure, wet well sumps and channels are inspected daily by Airport Stationary Engineers to record pump activities. As required by the Airport's National Pollutant Discharge Elimination System (NPDES) permit, the effluent from drainage stations is monitored monthly.

Airport Airfield Safety Officers (on duty 24 hours a day) have been trained in water-pollution abatement activities and patrol the gate positions, aprons, ramps, taxiways, and runways for water-pollution problems. Citations are issued to alert airline management of a problem and prevent recurrence.

Relatively small fuel spills that occur during aircraft refueling are not uncommon and do not require reports to regulatory agencies. Spills often are the result of a malfunction of the shut-off valve, faulty gauges or operator error. These spills occur about seven to nine times per month and each results in ten to twenty gallons of fuel loss. These spills occur on a tarred surface and are relatively easily contained. After the spill is contained, the fuel on the tarred surface is collected with absorbent material, becoming hazardous waste. These types of fuel spills are relatively minor and are usually cleaned up by the time the Safety Office and Water Quality Control representatives arrive at the scene as it is in the best interest of the airline to continue with service as soon as possible. These spills do not have to be reported to the County, the Regional Water Quality Control Board (RWQCB) or the FAA./14/

In the event of a larger release of fuel, the FAA Regional Office, the Coast Guard and IT Corporation are notified immediately. IT Corporation performs large-scale clean-ups for the Airport. In addition, the California Office of Emergency Services, RWQCB, San Mateo County Health Department and State Fire Marshal are notified.

Two relatively large fuel spills have occurred in the past few years at SFIA. On February 5, 1990, diesel fuel was discovered floating on the water at a drainage pump station during a routine sampling. The fuel was found to have been coming from the FAA Air Landing Strip (ALS) facility where an underground diesel fuel storage tank system used to supply power for the runway lights had malfunctioned, causing a spill. The spilled fuel mixed with rainwater and flowed to the storm catch basin. The estimated quantity of fuel released was 1,500 gallons.

IT Corporation, brought in to clean up the spill, recovered approximately 1,300 gallons of the spilled fuel in liquid form by vacuuming the affected areas; absorbent was used to collect additional material. In order to contain the spill, all the pumps at the drainage station were shut off to prevent the diesel fuel from flowing to the Bay. Contaminated soil was excavated and disposed of at an approved dump site. All appropriate agencies were notified of the spill./15/

On November 18, 1988, a pipeline rupture occurred at SFIA, releasing approximately 83,000 gallons of jet fuel. The rupture occurred when a roto-tiller cut into a buried aircraft fuel line during an excavation. The pre-defined emergency contingency plan was implemented; it included emergency closure of appropriate valves and sounding of alarms to summon Airport emergency units including the Fire Department, Environmental Control and the Airfield Safety Officers.

The jet fuel itself was diverted to a retention pond for recovery and/or treatment at the industrial waste treatment plant. Absorbent material and cleaning chemicals were used to clean up the remaining spill. Some soil and other materials were contaminated; those materials were removed from the area in consultation with the RWQCB, and disposed of at an appropriate landfill.

In order to prevent this type of accident from happening again, the Airport has requested fuel companies to provide it with current accurate locations of all lines, which will be maintained on an electronic geographic information system (GIS). In addition, the Airport requires hand exploratory excavation for existing utilities before heavy machinery is used, and continues to require that emergency contingency plans be walked through prior to the start of construction./16/

HAZARDOUS WASTE GENERATION

Airport operations generate hazardous wastes, primarily in relation to maintenance activities. Two types of wastes are generated: hazardous waste produced from ongoing operations, such as used motor oil and spent cleaning solvents, and wastes produced as part of the remediations of accidental spills, such as a fuel leak.

- Copies of Hazardous Waste Manifests are collected by the California Department of Toxic Substance Control's Manifest Unit, which compiles annual waste volumes by waste category into what are known as the Tanner Lists. Table 19A, "1990 Hazardous Waste Generation By SFIA and Tenants," summarizes these data for SFIA facilities. The volume of waste generated at the Airport in 1990 may be indicative of a typical year, but individual wastestreams could vary widely from year to year. Asbestos-containing waste and contaminated soil from site clean-ups are especially unpredictable. Generally, when asbestos is removed from a source, it is unnecessary to remove it from the same location again. Some generators, such as Budget Rent-a-Car and Hilton Hotels, may not create waste on an ongoing basis, because they have received "one-time-only" EPA generator numbers. One-time-only wastestreams are identified in the footnotes of Table 19A.

Airport Facilities

- Nearly all (97 percent) of the hazardous waste generated by SFIA in 1990 contained asbestos, presumably from asbestos removal projects. The rest of SFIA's hazardous waste was produced by the Airport maintenance shops and the water quality lab.

- Every year, approximately 3.5 tons of hazardous waste are shipped, consisting mainly of waste solvents and a small amount of waste from the water quality lab. Waste oil and waste antifreeze (ethylene glycol) are recycled. A solvent distillation system has been purchased and is being installed at the Airport Maintenance base. The system will recycle waste solvents, leaving only a sludge left to be shipped as hazardous waste.

Tenant Facilities

Hazardous wastes produced by tenants are not closely monitored by the Airport. The tenant is responsible for the proper removal and disposal of its manifested wastes.

The Airport requests copies of hazardous waste manifests from tenants for all shipments of fuel-spill-related hazardous wastes (such as contaminated soil) transported from SFIA. However, not all tenants have complied with the request. In addition, the Airport has recently requested each tenant to submit copies of all waste manifests for all hazardous wastes transported off airport property. As this program has been instituted recently, few manifests have been submitted./7/

The United Airlines Maintenance Center produces the greatest amount of manifested wastes, including solvents, methylene chloride (paint stripper), plating wastes (nickel, cadmium, copper, hexavalent chromium, and cyanides), acids and hydroxides./4/ Common wastes produced by the line maintenance operations include solvents, waste oils, paint sludges, ethylene glycol, and rust-contaminated gasoline./18/ Occasionally, these facilities must dispose of fuel-contaminated soil and absorbent material from
● spills. As shown in Table 19A, United Airlines generated approximately 3,600 tons of hazardous waste in 1990. The bulk of the waste from Trans World Airlines, American Airlines, and Delta Airlines is related to oil, but otherwise their wastes are similar to those of United Airlines line maintenance operations.

The car rental agencies produce ongoing hazardous waste in the form of used oil and other wastes used for vehicle tuneups and minor vehicle repair, and occasionally need
● to dispose of contaminated soils resulting from fuel tank leaks./6/ Fuel suppliers generate volumes of waste similar to the car rental agencies. Hazardous waste generated by the U.S. Coast Guard Air Station, the U.S. Postal Service, and Aircraft Service International are minor (less than 0.03 percent of the total waste generated).

INDUSTRIAL WASTEWATER TREATMENT

Industrial wastewater is collected and treated at SFIA at an independent treatment plant located in the North Field area. The industrial wastewater treatment plant receives wastewater from aircraft service, maintenance, and washing; ground-vehicle service and maintenance; rental-car service; and surface runoff from aircraft-washing areas and polluted portions of aircraft ramps and maintenance areas.

Seventy-five percent of the total wastewater flow to the plant originates from the United Airlines Maintenance Center./19/ The operations at the United Airlines Maintenance Center include aircraft washing, parts cleaning, paint stripping, electroplating, laundry activities and cell testing. The generated wastewater contains heavy metals, solvents and detergents. UAL operates its own pretreatment facility for its industrial waste and submits monthly reports to the Airport. None of the other maintenance shops or car washes have pretreatment facilities, but the majority of them have oil and grease separators./20/

● TABLE 19A: 1990 HAZARDOUS WASTE GENERATION BY SFIA AND TENANTS

Generator /a/	Waste Category /b/	Volume (tons)	Total Volume (tons)
United Airlines	Alkaline solution (pH>=12.5) with heavy metals	16.12	3608.45
	Aqueous solution with <10% organic residues	1516.44	
	Asbestos-containing waste /c/	256.96	
	Other inorganic solid waste	116.03	
	Halogenated solvents	406.96	
	Oxygenated solvents	207.21	
	Hydrocarbon solvents	70.65	
	Unspecified solvent mixture	284.97	
	Waste oil and mixed oil	216.06	
	Off-specification, aged, or surplus organics	5.45	
	Organic solids with halogens	109.36	
	Other organic solids	17.71	
	Unspecified sludge waste	3.47	
	Contaminated soil from site clean-ups /c/	8.20	
	Liquids with halogenated organic compounds >=1000 mg/l	15.98	
	Solids or sludges with halogenated organic compounds >=1000 mg/l	35.88	
	Not reported	321.00	
Trans World Airlines	Halogenated solvents	0.20	316.62
	Oxygenated solvents	0.39	
	Hydrocarbon solvents	0.20	
	Waste oil and mixed oil	5.80	
	Oil/water separation sludge	1.66	
	Unspecified oil-containing waste	212.97	
	Organic liquids (nonsolvents) with halogens	0.41	
	Unspecified organic liquid mixture	0.77	
	Other organic solids	1.20	
	Contaminated soil from site clean-ups /c/	93.02	

(Continued)

● TABLE 19A: 1990 HAZARDOUS WASTE GENERATION BY SFIA AND TENANTS
(Continued)

Generator /a/	Waste Category /b/	Volume (tons)	Total Volume (tons)
American Airlines	Alkaline solution (pH>=12.5) without heavy metals	0.20	149.70
	Unspecified alkaline solution	0.29	
	Asbestos-containing waste /c/	0.84	
	Unspecified solvent mixture	8.00	
	Waste oil and mixed oil	81.70	
	Organic monomer waste	1.34	
	Other organic solids	1.35	
	Other empty containers >=30 gal.	0.50	
	Contaminated soil from site clean-ups /c/	1.20	
	(Acidic) Liquids with pH <=2	0.20	
	Not reported	54.08	
SFIA	Asbestos-containing waste /c/	123.02	126.60
	Halogenated solvents	0.20	
	Hydrocarbon solvents	1.85	
	Unspecified solvent mixture	0.20	
	Waste oil and mixed oil	0.83	
	Other empty containers >=30 gal.	0.50	
Chevron USA	Unspecified oil-containing waste	3.32	24.20
	Other empty containers >=30 gal.	2.00	
	Contaminated soil from site clean-ups /c/	18.53	
	Liquids with polychlorinated biphenyls (PCBs) >=50 mg/l /d/	0.35	
Shell Oil	Other inorganic solid waste	15.92	21.93
	Tank bottom waste	0.50	
	Unspecified organic liquid mixture	1.37	
	Other organic solids	0.02	
	Unspecified sludge waste	3.90	
	Detergent and soap	0.22	

(Continued)

● TABLE 19A: 1990 HAZARDOUS WASTE GENERATION BY SFIA AND TENANTS (Continued)

Generator /a/	Waste Category /b/	Volume (tons)	Total Volume (tons)
Hertz Rent-A-Car	Waste oil and mixed oil	0.18	11.43
	Tank bottom waste	11.25	
Delta Airlines	Oxygenated solvents	0.22	10.80
	Unspecified solvent mixture	0.68	
	Waste oil and mixed oil	9.90	
Budget Rent-A-Car	Tank bottom waste /d/	5.42	6.26
	Gas scrubber waste /d/	0.84	
U.S. Coast Guard Air Station	Oxygenated solvents	0.18	0.88
	Hydrocarbon solvents	0.18	
	Off-specification, aged, or surplus organics	0.02	
	Organic liquids with metals	0.16	
	Not reported	0.34	
Hilton Hotels	Hydrocarbon solvents /d/	0.22	0.22
U.S. Postal Service Airport Mail Facility	Unspecified solvent mixture	0.22	0.22
Aircraft Service International	Oxygenated solvents	0.12	0.12

NOTES:

/a/ Some users generate hazardous wastes at two or more Airport locations separated by public roadways; therefore, they are required to have more than one EPA generator number. Their wastes are separated by EPA generator number on the Tanner Lists, but they have been combined in this table.

/b/ Waste categories are defined by the State of California (CCR, Title 22).

/c/ Some waste streams, such as asbestos and contaminated soils, are usually generated as part of a specific project, and annual volumes of these wastes may be inconsistent from year to year.

/d/ This material was disposed of under a one-time-only EPA generator number.

SOURCE: California Department of Toxic Substance Control, Manifest Unit, Hazardous Waste Information System, 1990.

The treatment of industrial wastewater at the plant consists of preliminary, primary, and secondary treatment, and a disinfection step. Initially, wastewaters are held in an equalization tank, which provides mixing and detention time to avoid fluctuations in flow quality and quantity. Primary treatment consists of the addition of caustic to adjust the pH, and alum to induce coagulation of suspended solids. Then wastewater flows into one of two dissolved-air flotation units where flocculated (fine suspended particles aggregated into a mass) solids float to the top and can be skimmed off. Following pH adjustment, wastewater is pumped through a trickling filter for secondary biological treatment. Finally, the effluent is disinfected by the addition of chlorine. For a complete description of the industrial wastewater system, see Section III.J. Utilities, p. 232.

The Airport currently operates twelve sludge drying beds serving both the sanitary and industrial wastewater plants. The dry sludge is disposed of at Ox Mountain Class III sanitary landfill in San Mateo County. The sludge is sampled and tested four times per year for heavy metals and priority pollutants to assure that it can be disposed of legally at a Class III landfill.

Wastewater treatment plant discharges to San Francisco Bay are regulated by the San Francisco Bay RWQCB, which sets and enforces discharge limitations through NPDES permits. The Airport's current NPDES permit for the industrial wastewater treatment plant was issued in September, 1987. The NPDES permit includes a self-monitoring program defining sampling frequencies for influent, effluent, receiving waters, land observations and overflows and bypasses.

As part of its NPDES permit requirements, the Airport has instituted an industrial and domestic waste monitoring program for its tenants as part of the Tenant Improvement Guide. The Airport has set concentration limits for various constituents of the waste stream. If the wastewater from a specific facility does not meet the prescribed standards, those substances in violation must be removed by some other means, such as a pre-treatment facility, which must be permitted by the Airport and monitored monthly.

As part of the waste-monitoring program, the Airport reserves the right to test samples from the tenant's sewer or storm drain. Any violation discovered as a result is reported to the tenant and must be remediated by the tenant. Accidental discharges must be reported to the Airport immediately so that countermeasures may be taken to minimize damage to the sewer system, treatment plant, treatment processes or receiving waters.

Some stormwater runoff also is handled by the industrial wastewater treatment plant. Stormwater runoff and its handling are discussed in Section III.J. Utilities, pp. 233-35.

The Airport submits to the RWQCB monthly monitoring reports on influent and effluent quality. In general, both water treatment plants at the airport have been in compliance with their NPDES permits over the past several years, although recent violations of NPDES levels for heavy metals have occurred. In response, United Airlines Maintenance Center, as the only base maintenance facility and principal contributor to the plant, has proposed the installation of an additional pre-treatment facility at its Maintenance Center. Nevertheless, RWQCB is considering issuing its own enforcement order to the Airport. UAL plans to run a pilot program with an additional treatment facility, to determine if additional treatment will solve the problem./21/

SOIL/GROUNDWATER CONTAMINATION

Research Methods

The information presented below was compiled from data available from public agencies. On the basis of the public agency records, the current or past presence of soil or groundwater contamination in the Project Area was inferred. For the purposes of this report, past and current owners and occupants of Project Area property were not consulted, nor were soil or groundwater samples collected. Thus, while the information presented below is indicative of the types and possible impacts associated with soil and groundwater contamination, it does not mean that only those sites discussed below are contaminated (nor does it mean that the contaminants discussed are the sole hazardous-material problems at a particular site). In addition, because public agency records are sometimes incomplete, it is possible that remediation of the environmental contamination reported below has already occurred at one or more sites.

Areas of known soil and groundwater contamination exist at the Airport. Aircraft- and motor-vehicle fuel leaks are the cause of most of the contamination at the Airport. The contents of leaking underground storage tanks and pipelines can migrate through soil, and may contaminate groundwater as well. Sixty-eight groundwater monitoring wells have been installed at the Airport in areas of Airport underground storage tanks and along the perimeter of the Airport. Groundwater samples are tested for petroleum hydrocarbon concentrations at least three times per year. The tests have been performed since 1987.

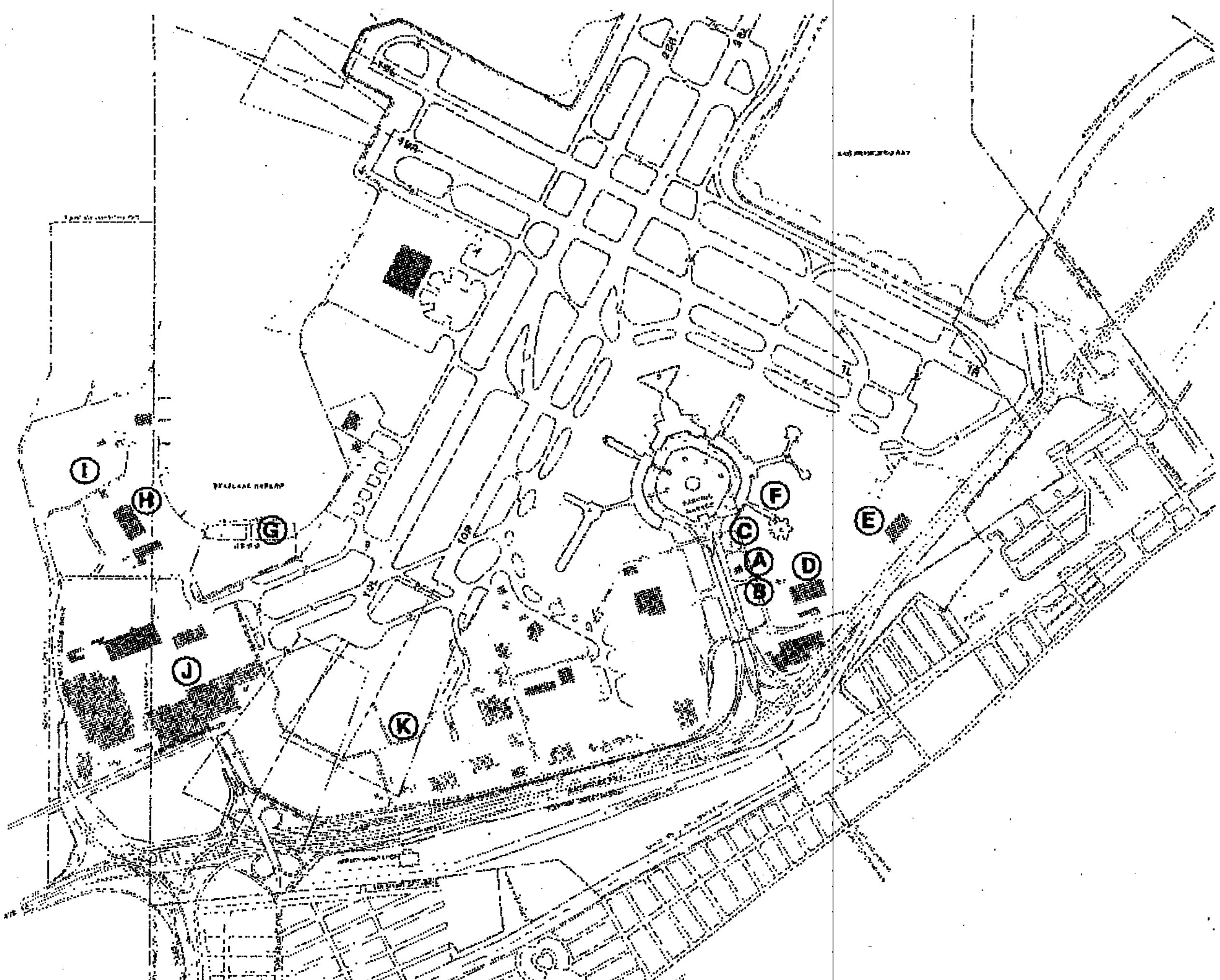
The summaries of contaminated areas below were made from review of data contained in state and local regulatory agency databases and files, and through discussions with regulatory agency personnel.

Areas with Identified Contamination

Areas with identified contamination are described below and shown in Figure 24. Each area is identified by a letter that corresponds to the area's location in Figure 24.

Hertz (A)

In 1986, during an excavation for the installation of two 12,000-gallon storage tanks, gasoline contamination was discovered in soil at the Hertz Car Rental facility. Contaminated soil was excavated at that point. Later that year, the two older tanks that were the cause of the contamination were removed, leading to the discovery that the soil and groundwater below were contaminated. In 1988, monitoring showed continuing contamination, which caused an investigation of the extent of contamination. The extent of contamination appeared to be restricted to within twenty feet of the underground tanks. Quarterly monitoring was performed and results were submitted to the RWQCB and San Mateo County to confirm contamination. Remedial action was taken to remove the floating product from the groundwater in the vicinity of the tanks. Groundwater at the site continues to be monitored and remediated; floating product continues to be removed./22,23,24/



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633

SOURCE: Environmental Science Associates, Inc.

Figure 24
Area of Known Contamination

National Car Rental (B)

In March 1988, an unauthorized fuel release was reported to the RWQCB by National Car Rental. Sampling of a monitoring well at the site revealed contamination of the groundwater. Semi-annual reports have been submitted since 1988 and still reveal levels of petroleum hydrocarbons above state standards./22/

Avis (C)

In 1986, soil contaminated with gasoline hydrocarbons was revealed during excavation for a new tank. Monitoring reports of groundwater through 1987 showed a relatively thin film of gasoline. Avis is still in the process of cleaning up this contamination./23/

Pan Am Hangar (D)

Four underground storage tanks were removed from the Pan Am Service Center in July, 1986. During excavation, both the soil and groundwater were found to be contaminated by petroleum hydrocarbons. Monitoring wells were installed to determine the extent of contamination. Pan Am has not completed clean-up of this site and no clean-up activities are currently being undertaken. Semi-annual status reports are being submitted to the RWQCB and the County of San Mateo./22/ The San Mateo County Department of Health Services and the RWQCB are working together to hasten the clean-up of contaminated areas. These agencies and SFIA are working on a clean-up agreement./25/

TWA Hangar (E)

A tank removal in 1986 at the TWA maintenance facility revealed an area of contaminated soil, which was excavated and transported to a Class I (hazardous waste) treatment, storage and disposal facility./23/

TWA Terminal Area (F)

During the early part of 1990, inventory reports at Shell Oil, an oil distributor at the Airport, indicated an unexplained loss of fuel from an underground pipeline, but the exact location of the leak was not determined readily. After a number of incidences of fuel leaking up to the surface, the leak was located. Shell estimated the loss to be 8,200 gallons. Approximately 6,000 gallons were recovered through excavation, leaving 2,200 gallons yet to be recovered. The contamination is believed to be limited to the concrete. No groundwater contamination as a result of this leak has been detected, but contamination may be discovered in the future./23,25/

U.S. Coast Guard Facility (G)

Two fuel leaks have been reported at the U.S. Coast Guard facility. One tank was removed in 1987 and groundwater monitoring is being conducted at this site. The other tank was removed in 1989. No monitoring of the second site has begun. The County of San Mateo has formally informed the U.S. Coast Guard of the latter's responsibilities for investigation and clean-up of this site. /22/

In the fall of 1990, 17,000 gallons of jet fuel were released at the U.S. Coast Guard facility. The majority of the spilled fuel was recovered because the spill occurred on a paved area, but some fuel ran into the sewer system. The sewer line was closed and this fuel was recovered before it reached the treatment plant. The spill came in contact with an unprotected soil area (of about 500 square feet). Soil sampling has been performed under the oversight of the County of San Mateo to determine the extent of contamination./25/

Flying Tigers (H)

During excavation for a 1986 tank installation, initial groundwater monitoring results indicated that the water contained levels of benzene, toluene and xylene. Further investigation revealed that initial test results were incorrect and the contamination was limited. No further work was required by the San Mateo County Office of Environmental Health./22/

Chevron Tank Farm (I)

There is known hazardous waste contamination in the area of the bulk fuel storage facility./26/

United Airlines Maintenance Center (J)

The United Airlines Maintenance Center appears on the RWQCB Fuel Leaks List. Soil remediation is in process, according to the Airport./26/

North and South Oxidation Ponds (K)

Prior to construction of the Industrial Wastewater Treatment Plant in 1980, industrial wastewaters were transported through ditches to the north and south oxidation ponds, where the wastewater was treated by evaporation. Nothing has been done with the ponds since their deactivation in 1980 and the Airport has no future plans for them.

Other Sites with Reported Contamination

The RWQCB compiles a list of all reported cases of fuel leaks. Included on this list, in addition to selected cases above, are leak reports for these other airport facilities: Chevron, and Unocal. However, further information on these sites was not available./22/ For the purposes of this report, it will be assumed that soil and groundwater contamination may be present at each of these sites.

Other Potential Sources of Contamination at the Airport

To evaluate the potential for contamination of the development sites at the Airport, the previous land use must be considered. The above sites of known contamination are all the result of fuel leakage. However, some of the facilities at the Airport, especially the maintenance facilities, also store hazardous materials other than fuel. There is the potential for site contamination through misuse of these materials or mishandling of hazardous wastes generated by their use. The RWQCB maintains a list of sites, called the North Bay Toxics List, known to have elevated levels of contaminants in soil or groundwater, other than those resulting from fuel leaks. The most recent available North Bay Toxics List (January, 1990) did not include any sites on or around the Airport property. However, it is still possible that past hazardous-material uses, especially around airport maintenance and washing areas, may have caused unidentified soil or groundwater contamination.

Underground storage tanks located at the Airport, listed in Appendix F, Tables F-1 and F-3, pp. A.158 and A.159, are a potential source of soil and groundwater contamination. Recent federal and state law requires upgrading of tank containment and installation of leak detection systems in a phased process that will require a number of years to complete. Unidentified fuel leaks, which will become less likely as new laws are implemented, have the potential to contaminate soil and groundwater in the area. In addition to the sites listed above, one potential source of contamination to the soil and/or groundwater (not identified through review of agency files) that may apply to the parts of the Airport closer to the present shoreline is the underlining heterogeneous fill. The area to the east of the 1880 levee line can be considered artificial fill (see Section III.G. Geology and Seismicity, Figure 22, p. 193). The exact quality of the fill is unknown. In addition to sand materials, other materials such as bricks, bottles, wood and unspecified refuse may have been used. The presence of such materials may be associated with elevated levels of organic and inorganic contaminants, as they have been found in other filled areas around the Bay.

BUILDING MATERIALS

Polychlorinated Biphenyls

A common hazard in older buildings is electrical equipment that contains polychlorinated biphenyls (PCBs). In response to the Toxic Substances Control Act, the Airport removed all PCB-containing equipment from all City-owned buildings as of early 1987. All tenant-owned PCB-containing equipment complies with the current concentration regulations for PCB content. The Airport has records of the locations of all PCB-containing equipment and its PCB concentrations./27/

Asbestos

Limited asbestos surveys have been conducted by the Airport over the past two to three years. In compliance with Division 20, Section 25915 of the California Health and Safety Code, the Airport has prepared an asbestos notification, disclosing all areas where asbestos has been detected. All employees who work in any of the identified areas, and any contractor expected to do work in those areas, have received the notification. The Airport plans to conduct a more thorough asbestos survey of Airport facilities in the near future./8/

The South Terminal received internal damage as a result of the October, 1989 earthquake. Asbestos had been found previously in the South Terminal in materials such as spray fireproofing and pipe lagging. Because of the damage produced by the earthquake, much of the asbestos-containing material previously encapsulated was exposed, allowing the possible release of asbestos fibers. The Airport contracted an abatement company to remove or encapsulate the exposed asbestos-containing material.

In response to concern about asbestos, the Airport is in the process of implementing an asbestos policy and abatement program with the goal of limiting asbestos exposure at the Airport. The Safety Office is responsible for maintaining the asbestos notification program at the Airport. Its duties include maintaining all records pertaining to asbestos, training other departments on request and ensuring that appropriate tenants, employees and contractors receive asbestos notifications. The employee procedures for renovation limit the maintenance and routine operations Airport employees can perform on asbestos-containing materials. The Airport supplies personal protective equipment and special training necessary for asbestos operations. All renovations, demolition and construction must be reviewed by the Safety Office to determine if there is asbestos in the area. Asbestos surveys may be required, and depending on the extent of the renovation, an industrial hygienist may be hired by the project manager to ensure that asbestos specifications are followed. Asbestos policy procedures appear in the *SFIA Employees Procedures and Practices Manual.*

In addition, all tenants are required to submit a disclosure of all known asbestos-containing construction material within their buildings. Notification must also be sent to the employees of the tenant, and warning must be posted.

Air Toxics

The Air Toxics "Hot Spots" Information and Assessment Act of 1987 (AB 2588) requires that a number of permitted air pollution sources, including all larger Publicly Owned Treatment Works (POTWs) in the San Francisco Area prepare and submit to the Bay Area Air Quality Management District (BAAQMD) an emission inventory. AB 2588 requires each POTW to prepare an inventory plan and source test data for its emissions. The BAAQMD then categorizes the facilities as high, medium or low priority, depending on the amount of hazardous materials released from the facility, the toxicity of the substances, the proximity of the facility to potential receptors, and other factors that the BAAQMD judges to be important.

Each facility conducts source tests that have been pre-approved by the BAAQMD. Emissions for the contaminants are then grouped as carcinogens and non-carcinogens. A final total score is finally obtained after a series of calculations. This is the score upon which the facilities are prioritized. As noted above, rankings of high, medium and low priorities are given to the facilities. A high-priority facility is not necessarily a high-risk facility. Only upon completion of a risk assessment will the risks posed by a high-priority facility be characterized accurately. Low-priority facilities are considered, within the limits of current data, to be low-risk facilities.

SFIA submitted its Emission Inventory Report to the BAAQMD in June, 1990. Source testing was performed at the Industrial Wastewater Treatment Plant, the Water Quality Control Plant, and the Central Plant. The total scores calculated from the source data placed the Airport in the category of low priority./28/ No further action has been required of the Airport due to their low priority rating, as the BAAQMD is addressing only those facilities with high risk emissions rates at this time.

NOTES - Hazardous Materials

/1/ Facilities, Operations and Maintenance Division, SFIA, *SFIA Hazardous Materials Release and Response Plan*, June 1, 1989.

/2/ Lack, Richard, Safety Officer, Facilities, Operations and Maintenance Division, SFIA, personal communication, July 3, 1990.

/3/ *SFIA Employee Safety Procedures and Practices Manual*, Airports Commission, City and County of San Francisco.

/4/ *United Airlines Maintenance Center Hazardous Material Business Plan*, 1989. Hazardous materials used at the UAL Maintenance Center were summarized from its Business Plan.

/5/ *TransWorld Airlines Hazardous Materials Business Plan*, 1988. TWA was chosen to represent a typical line maintenance facility at SFIA.

/6/ *National Car Rental Hazardous Materials Business Plan*, 1990. National Car Rental was chosen to represent a typical car rental agency at SFIA.

/7/ City and County of San Francisco, Airports Commission, *SFIA Tenant Improvement Guide*, Appendix F, Hazardous Material Release Response and Inventory Tenant Regulations, July 1, 1982 (revised).

/8/ Leong, Melvin, Assistant Deputy Director, Environmental Control Branch, Facilities, Operations and Maintenance Division, SFIA, conversation, July 12, 1990.

/9/ Pegueros, Manuel, Assistant Inspector, Fire Marshal, SFIA, telephone conversation, July 25, 1990.

/10/ Lack, Richard, Safety Officer, SFIA, telephone conversation, August 9, 1990.

/11/ City and County of San Francisco, Airports Commission, *SFIA Tenant Improvement Guide*, Appendix D, Storage of Hazardous Substances in Underground Tanks, July 1, 1982 (revised).

/12/ Henry, Vance, Quality Control, SFIA Facilities, Operations and Maintenance Division, conversation, August 8, 1990.

/13/ Anderson, Craig, Chevron Tank Farm, SFIA, telephone conversation, August 7, 1990.

/14/ Rodriguez, Mario, Sanitary Engineering Technician, SFIA Facilities, Operations and Maintenance Division, conversation, July 3, 1990.

/15/ SFIA Facilities, Operations and Maintenance Division, Environmental Control Section, SFIA, *Diesel Fuel Spill Recovery*, February 1990.

/16/ SFIA Facilities, Operations and Maintenance Division, Environmental Control Section, SFIA, *Jet Fuel Spill Recovery*, December, 1988.

/17/ Lack, Richard, Safety Officer, SFIA, telephone conversation, August 9, 1990.

/18/ Leong, Melvin, Assistant Deputy Director, Environmental Control Branch, Facilities, Operation and Maintenance Division, SFIA, telephone conversation, August 14, 1990.

/19/ SFIA Industrial Wastewater Treatment Plant, NPDES permit, September 21, 1987.

/20/ Lee, Russell, Environmental Control Branch, SFIA, conversation, July 18, 1990.

/21/ Jang, John, Inspector, Regional Water Quality Control Board, telephone conversation, July 25, 1990.

/22/ Regional Water Quality Control Board, Fuel Leaks List.

/23/ County of San Mateo, Environmental Health Services Division, Underground Storage Tank Files.

/24/ Vance, Henry, Quality Control SFIA Facilities, Operations and Maintenance Division, telephone conversation, April 19, 1991.

/25/ Montufar, Estuardo, Hazardous Materials Specialist, San Mateo County Department of Health Services, telephone conversation, January 15, 1991.

/26/ Costas, John, Planning and Construction, SFIA, letter, May 17, 1990.

/27/ Leong, Melvin, Assistant Deputy Director, Environmental Control Branch, SFIA Facilities, Operations and Maintenance Division, telephone conversation, August 7, 1990.

/28/ SFIA, *Emission Inventory Report*, June 13, 1990.

I. EMPLOYMENT AND RESIDENCE PATTERNS

SFIA EMPLOYMENT AND RESIDENCE PATTERNS

Approximately 33,400 persons, including 6,500 flight-crew personnel, were employed directly due to operations at SFIA in 1990./1,2/ This represents about 11 percent of the 303,600 jobs in San Mateo County./3/ The majority of the employees worked for the airlines as either flight crews or maintenance workers. United Air Lines' maintenance base at SFIA is the largest in the United States and employs over 6,000 maintenance and mechanic workers at SFIA. Total full-time equivalent employment at the maintenance base is approximately 11,500. The employment at SFIA falls into eight employment sector categories: airlines (includes flight crews, passenger service personnel, ramp/aircraft support personnel, ramp maintenance workers, fixed-base maintenance workers, and associated management personnel), government agencies (includes City and County of San Francisco Airport employees, U.S. Postal Service, U.S. Coast Guard, U.S. Customs, USDA, Dept. of Public Health and FAA employees), concessionaires and caterers, General Aviation and services, freight transportation (includes employees of freight airlines, freight forwarders, and trucking firms), ground transportation (includes rental car employees, limo and taxi drivers), Airport Hilton and construction and consulting. Estimates of the breakdown of employment among these categories are presented in Table 20.

The majority of these employees work at the Airport. However, some work in other locations during all or part of the day. Examples of those working part of the day off-site would include airline flight crews, who may be in the air or at another airport, and limo, van and taxi drivers who may be picking up or delivering passengers to sites outside the Airport. Examples of those working all day off-site would include passenger service ticket personnel who work in San Francisco.

SFIA employees live in all of the nine Bay Area counties./4/ The largest number of the workers live in San Mateo County (37.6%), followed by San Francisco (22.9%) and Alameda (12.7%) counties. The distribution of workers' place of residence is presented in Table 21, p. 230.

TABLE 20: SFIA EMPLOYMENT, 1990

Employment Sector	Number of Employees/a/
Airlines	22,400
Government Agencies	2,200
Concessionaires and Caterers	2,700
General Aviation and Services	700
Freight Transportation	2,000
Ground Transportation	2,000
Hotel	300
Construction and Consulting	900
TOTAL/b/	33,400

/a/ Based on "1987 Airport Economic Impact Study", Martin Associates, updated using 1990 activity projections from the *SFIA Final Draft Master Plan* and the SFIA proposed budget for FY 1990-91.

/b/ Total does not add due to rounding.

SOURCE: SFIA; Environmental Science Associates, Inc.

SECONDARY EMPLOYMENT

In addition to the direct airport-dependent employment, the operation of the airport creates indirect employment through firms that supply businesses at SFIA and travelers, and induced employment in various service and retail industries created by the spending of the direct and indirect employees. In a 1987 study, Martin Associates estimated that about 0.5 induced jobs are created for every direct SFIA job, and that about 4.3 indirect and induced jobs are created for every direct SFIA job due to expenditures by visitors to the Bay Area who arrive at SFIA./5,6/

TABLE 21: SFIA EMPLOYEES, PLACE OF RESIDENCE, 1990

County	Number of Employees/a/	Percent
San Mateo	12,550	37.6%
San Francisco	7,650	22.9%
Alameda	4,240	12.7%
Santa Clara	3,280	9.8%
Contra Costa	1,350	4.0%
Marin	1,220	3.7%
Solano	840	2.5%
Sonoma	630	1.9%
Napa	100	.3%
Other	1,510	4.5%
TOTAL	33,400	100.0%

/a/ Based on "1987 Airport Economic Impact Study", Martin Associates, updated using 1990 activity projections from the *SFIA Final Draft Master Plan* and the SFIA proposed budget for FY 1990-91.

SOURCE: SFIA; Environmental Science Associates, Inc.

NOTES - Employment and Residence Patterns

/1/ Estimated employment for 1990 is based on data from a 1987 employee survey conducted for the *1987 Airport Economic Impact Study*, Martin Associates, February 1988, updated to reflect changes in: airport flight operations, total passengers, international passengers, domestic cargo, international cargo, mail and terminal area, and supplemented by employment levels identified in the SFIA proposed budget for FY 1990-91.

/2/ San Francisco Airports Commission, *Proposed Budget: Fiscal Year 1990-91*, San Francisco, California, 1990.

/3/ Association of Bay Area Governments, *Projections - 90: Forecasts for the San Francisco Bay Area to the Year 2005*, Oakland, California, December 1989.

/4/ The residential distribution of employees is based on data from a 1987 employee survey conducted for the *1987 Airport Economic Impact Study*, Martin Associates, February 1988. Projections of 1990 residential distributions are calculated on the sub-employment-section level, i.e., fixed-based maintenance workers in 1990 are assumed to maintain the same geographical distribution as the fixed-based maintenance workers in 1987. Estimated employment for 1990 is based on data from the 1987 employee survey updated to reflect changes in: airport flight operations, total passengers, international passengers, domestic cargo, international cargo, mail and terminal area, and supplemented by employment levels identified in the SFIA proposed budget for FY 1990-91.

/5/ Martin Associates, *1987 Airport Economic Impact Study*, February 1988. The employment multiplier is specific for air transportation and was used in this analysis.

/6/ The secondary employment multiplier from the Association of Bay Area Governments "1982 Input-Output Model and Economic Multipliers for the San Francisco Bay Region: 1988 Update," Oakland, Calif., November 1988, does not identify a secondary employment multiplier specifically for the Air Transportation Sector and was not used in this report. ABAG's closest employment sector is a much broader "Transportation Services Sector" which includes: railroad transportation, water transportation, motor freight transportation, freight warehousing, local and suburban transit and interurban highway passenger transportation, travel agencies and the United State Postal Service. This multiplier was not used in this report.

J. UTILITIES

WATER

San Francisco International Airport (SFIA) is served by the San Francisco Water Department (SFWD). SFWD water is supplied from two sources: water transferred from Hetch Hetchy Reservoir in Yosemite National Park to the Crystal Springs and San Andreas Reservoirs in San Mateo County, and water collected from local runoff in reservoirs in San Mateo and Alameda Counties./1/ Currently, water rationing is in effect for all SFWD customers.

Water distribution to SFIA is supplied via two lines. The main supply is from a 24-inch steel pipe that connects to the 60-inch Sunset supply line and the 60-inch Crystal Springs line No. 2 west of the Bayshore Freeway. The 24-inch line then continues east-west under the freeway and San Felipe Avenue to the airport. The 60-inch lines are supplemented by a 12-inch branch that connects to the 44-inch San Andreas line and the 44-inch Crystal Springs line No. 1. An additional 24-inch steel pipe connects to the site south of the Hilton Hotel and runs east-west under the Bayshore Freeway to the San Francisco Water District's Millbrae yard and connects to the 60-inch Crystal Springs line No. 2 north of El Camino Real./2/

Water pressure at the airport is maintained at approximately 115 pounds per square inch. A booster pump station is used to maintain pressure in the north field area. A 300,000-gallon storage reservoir, also located in the north field area, is maintained for fire use. The United Airlines (UAL) Maintenance Center and the American Airlines superbay hangar maintain individual storage reservoirs.

Water consumption at the airport is estimated to be 1.7 million gallons per day (mgd) with a current maximum total water consumption during the yearly peak month of July of approximately two mgd. Currently, 68 percent of the water demand at SFIA is used by airport tenants. The remaining 32 percent is used by public facilities and airport administration./1/ Consumption during the peak month includes water for irrigation, sewage treatment, and systemwide leakage/3/. The current distribution of water usage is not anticipated to change at SFIA during the next ten years./4/ See, however, Section IV.J Utilities (Water) discussion of conservation methods.

WASTEWATER MANAGEMENT

SFIA owns and operates two separate wastewater collection and disposal systems./3/ One is maintained for sanitary sewage and one is maintained for industrial waste.

Sanitary Sewage Collection and Treatment

Sewage from all SFIA facilities and from aircraft is collected through a network of gravity-flow and forced-flow pipelines. A system of seven lift stations and seven sewage pump stations delivers sewage to the water quality control treatment plant in the north field area./2/

The SFIA-operated water quality control treatment plant separates all solids for drying in sludge beds and eventual removal from the site. The remaining fluids are aerobically treated, sanitized, and transported off site through a 20-inch pipeline under the north field access road to the 54-inch Joint Use Deep Water Outfall. The outfall pipeline is owned jointly by SFIA and the cities of South San Francisco and San Bruno. Burlingame and Millbrae both have rights to its use. The pipeline has a capacity of 60 mgd and current use is 30 mgd./3/

The sanitary sewer capacity is based on 100 percent of the water-system demand./5/ The present system is capable of treating a capacity of 2.2 mgd. At the present water consumption rate of 1.7 mgd, the sanitary sewer system operates at 77 percent capacity. The airport is required to have a National Pollution Discharge Elimination System (NPDES) permit for its sanitary sewage. The NPDES permit is administered by the State of California, through the Regional Water Quality Control Board, for the Environmental Protection Agency. Current federal regulations require that wastewater treatment plants be operated at 90 percent capacity or less.

Industrial Waste Treatment

The industrial waste collection system handles stormwater runoff and waste from industrial activities at SFIA. The collection system at SFIA has two components: treatment facilities and first-flush ponds. Airport-generated waste is collected by an independent system and treated by the industrial waste treatment plant. Six industrial-waste pump stations are utilized to transport industrial wastewater in force mains to the industrial-waste treatment plant in the north field area. Industrial wastewater at the Airport is produced mainly from aircraft maintenance services, car wash, and general cleaning functions. Hazardous and flammable industrial wastes are not discharged into the system and are disposed of off site./1,6/

The collection system consists of two first-flush ponds, pumping stations and their sewerlines. The purpose of the system is to collect and store the first portion of storm runoff from service and parking areas. The industrial waste collection system is designed with the capability of channeling most outside runoff to one location. One first-flush pond is located at the north end and one at the south end of the airfield. On the first flush from a storm, water from areas around the terminal gates drains into a canal leading to the ponds for collection and settlement. The retention ponds are used to prevent jet fuel oil and other industrial wastes from entering the Bay. The runoff from most of the Airport property is collected in the Old Bayshore canal (in the north field area) and the South Airport canal (in the south field area) before flowing into the ponds. Both the North and South First Flush Ponds are concrete lined along the sides and have a bay mud bottom, in compliance with Chapter 23, Section 2540 of the California Code of Regulations. Only at the outer part of the runways, where spills are relatively rare, does the storm water run directly into the Bay. Each drainage discharge station has a catch basin to collect flow. Pumping proceeds when these basins are full.

In dry weather, any flow will run through the Old Bayshore Canal and the South Airport canal to the North and South First Flush Ponds, respectively. From that point, the water is pumped through a pump station to the industrial-wastewater treatment plant.

In wet weather, the first flush is collected and stored in the pond to be pumped and treated at a later time. After the pond is full, the gate is closed. During a prolonged rain, additional runoff from the paved areas is considered generally free of pollutants as most pollutants are washed into the pond with the first flush. The additional runoff flows directly to a drainage station to be discharged to the Bay. The first-flush ponds can hold up to 4.25 million gallons of water and require approximately seven days to process the water through the industrial-waste treatment plant./3/ Routine maintenance is performed on the first-flush ponds and their components. The ponds are inspected regularly to assure they are in good working order. Canals are dredged and the valves and gates exercised regularly./6/

The industrial-wastewater treatment plant has a current capacity of 1.65 mgd and operates between 0.8 and 1.2 mgd depending upon whether water conservation control measures are in force, weather conditions, and aircraft schedules. Approximately 50 percent of the plant's average daily treatment is pavement storm-water runoff that is stored in the two first-flush ponds. The plant is operating between 50 percent and 75 percent capacity./7/

As with the sanitary sewage system, the industrial wastewater system must conform to the provisions of its NPDES permit. The permit sets limits on volume of discharge water and concentration of contaminants in the discharge water. In addition, the Airport must follow a self-monitoring program and report results of the testing to the RWQCB on a monthly basis.

In addition, recent federal regulations (November 1990) expanded the NPDES permitting authority of the RWQCB to include permitting of stormwater discharges to waters from industrial facilities and construction sites that disturb greater than five acres. These regulations are intended to control pollutants (i.e., heavy metals, suspended solids, coliform bacteria) that have degraded waters of the state when they are transported by stormwater runoff from residential, commercial and industrial areas. SFIA will have to abide by these new regulations for their stormwater discharges. The main component of the RWQCBs strategy is source identification, discharge characterization, establishment and operation of pollution controls and reduction activities, and implementing management and monitoring programs for stormwater discharge. SFIA plans to file a notice of intent to be covered under a General Permit for the San Francisco Bay Region (Region 2). SFIA has maintained a monitoring program for its stormwater discharge since 1968.

Solid Waste

The major activity centers at SFIA produce 50 to 100 tons of solid wastes each day. The four major activity centers that generate solid wastes include the passenger terminals; airfreight and airmail-handling facilities; aircraft service centers, and the United Airlines Maintenance Center. The aircraft service centers generally perform line or unscheduled maintenance, while the aircraft maintenance base provides full or scheduled maintenance. Full maintenance generates both solid and hazardous waste.

The Airport contracts with the South San Francisco Scavenger Company to provide solid-waste disposal service. Approximately ten percent of the waste generated is recycled. The remaining solid waste is transported to a transfer station at 180 Oyster Point in South San Francisco, approximately five miles from the airport. Solid waste generated within San Mateo County is disposed of at Ox Mountain Landfill in Half Moon Bay, owned and operated by Browning-Ferris industries.

Additional wastes are generated by other activities such as construction and demolition. Wood material, dirt, broken asphalt, and concrete are usually disposed of in an off-site sanitary landfill. Disposal depends upon the type of material, with some of the materials recycled for other uses./9/

NOTES - Utilities

/1/ SFIA, *Final Draft Master Plan*, Chapter 4.0., November, 1989.

/2/ SFIA, *Final Draft Master Plan*, Chapter 6.0., November, 1989.

/3/ Leong, Melvin M., Superintendent Water Quality Control Plant, San Francisco International Airport, meeting, July 24, 1990.

/4/ Landy, Ray, Project Director, DMJM, telephone conversations, August 9 and August 15, 1990.

/5/ An undefined percentage of daily SFIA water demand is used for irrigation and other nonpotable uses. For planning purposes, however, these uses have not been included and the analysis assumes that 100 percent of the water demand would affect the sanitary sewer system. SFIA, *Final Draft Master Plan*, Chapter 6.0, November, 1989.

/6/ SFIA Facilities Operations and Maintenance - Environmental Control, *First Flush Ponds - Management Plan*, March, 1988.

/7/ SFIA, *Final Draft Master Plan*, Chapter 10.0., November, 1989.

/8/ Leong, Melvin M., Superintendent Water Quality Control Plant, San Francisco International Airport, telephone conversation, June 21, 1991.

/9/ Uccelli, Stephanie, Partner, South San Francisco Scavenger Company, telephone conversation, August 23, 1990.

K. PUBLIC SERVICES

CRASH/FIRE/RESCUE

Crash/Fire/Rescue (CFR) operations include airport fire stations, training areas, and special purpose / VIP / emergency facilities. All require roadway and/or airside access as well as special security considerations./1/

The SFIA Fire Department is part of the San Francisco Fire Department. Currently, there are two CFR stations serving SFIA. Station No. 1, at the junction of Taxiways B and R and adjacent to Butler Aviation, is to the north of the passenger terminal complex. Adjacent to the east side of Station 1 is the CFR support building, which is used for storage of equipment required to maintain CFR operations. Station No. 2 is at the intersection of Runways 10L-28R and 1L-19R adjacent to the American Airlines superbay hangar. CFR also maintains the Building 1000 Contingency Facility, which serves as the current emergency response staging area. In addition to these facilities, CFR maintains a training facility between Plot 42 and the American Airlines superbay hangar for instruction in aircraft crash and rescue./2/

The September 1989 five-year SFIA Capital Projects Plan calls for the construction of a new CFR Station No. 2 approximately 500 feet to the northeast of existing Station No. 2 to reduce the facility's potential to interfere with navigational systems on the airfield. A siting study is currently under way to relocate this facility. As part of the SFIA Master Plan an approximately 15,000-square-foot multipurpose airport operations facility (called the Contingency Facility in the SFIA Capital Projects Plan) is planned to replace the existing Building 1000. The facility would be located on Plot 42 adjacent to Taxiway C for aircraft parking. Landside access would be provided via the realigned North Field access road. The new facility would be a multipurpose operations facility for emergency operations as well as a protected building area to process high-security SFIA arrvials. Additionally, the existing CFR support building would be relocated to the west side of CFR Station 1./3/

The SFIA Fire Department maintains an array of CFR vehicles specifically related to Airport firefighting requirements. Except for specialized equipment, the Department generally maintains one or two backup units for each category of operational equipment. The CFR equipment consists of five Aircraft Rescue and Firefighting units. All of the Aircraft Rescue and Firefighting units have aqueous film-forming foam as the primary agent and both halon and dry chemical as their secondary agents. In addition, they have one rapid-intervention vehicle. Combined, they can provide 16,900 gallons of water. There are two pumper trucks, two aerial ladders and two emergency medical trucks. The Department also maintains a CFR boat and related transport equipment, one water trailer and one hose trailer with approximately five miles of five-inch hose and portable hydrants and fittings. The hose trailer and related equipment are for use in the event of hydrant failure, most likely to be caused by an earthquake, and are capable of pumping salt water directly from San Francisco Bay. In addition to this equipment, the Department maintains one command vehicle, four officers' vehicles, one scuba van, and two light units./4/ (See Appendix H, Table H-3, Apparatus Inventory, p. A.172).

The SFIA Fire Department currently is staffed by 17 professional firefighters and one secretary. There are approximately 2,300 calls for CFR operations per year. Most of these calls are for first aid. The Fire Department maintains response-time goals of two minutes for airfield areas and three minutes for passenger terminal areas. The Department indicated that it meets its goals 100 percent for airfield and 90 percent for landside responses. Traffic can interfere with the response time to the passenger terminal areas.

The SFIA Fire Department has a mutual aid agreement with San Mateo County./5/ When called upon, the County will send up to five engine companies from those available on the San Mateo peninsula. If necessary, City of San Francisco companies can respond as well.

SFIA maintains a medical clinic, in the International Terminal. The clinic occupies about 2,870 sq. ft. and provides two types of medical services to the Airport. The clinic provides emergency services and emergency response, and is a component of SFIA's Emergency Preparedness Program. The Airport Medical Group also manages the mini-ambulance service, has triage capability, and coordinates transportation of ill and injured persons to local medical facilities. The clinic is staffed with two medical doctors, a registered nurse and one x-ray technician on-site from 8:00 a.m. to 1:00 a.m. After 1:00 a.m. there is a registered nurse on duty and at least one physician on 30-minute call./6/

In addition, the clinic provides several services for a fee. These include a general practice providing routine checkups, health care advice and medication-dispensing services. The clinic provides on-site CPR certification and training for SFIA staff and provides a drug-testing service for most of the major airline tenants./6/

For ambulance service, SFIA is served by San Mateo County Emergency Medical Service (EMS). San Mateo County EMS responds to all medical emergencies within Airport property and distributes injured individuals to area hospitals, coordinates ambulance service with private contractors, and provides programs such as the Law Enforcement First Responder Program and the Fire Department First Responder Defibrillation Program to SFIA public safety personnel.

San Mateo County EMS responded to 649 emergency medical service requests in 1989. At that time, response time to the airport was approximately nine minutes. However, San Mateo County EMS has established eight minutes or less as its performance standard. The EMS implemented this response time on January 1, 1991, with performance-based contractual ambulance service./7,8/

Patients are sent to area hospitals on the basis of the patient's medical condition, available hospital ability to accept the patient's condition at the time of the incident, and, if the first two conditions are met, the patient's preference. During both major and minor events, San Mateo County EMS follows the San Mateo County "Medical Incident Response Plan," which provides for contingencies on medical emergencies ranging from single-patient to multiple-casualty incidents from all causes. The Airport is not singled out in this plan.

EMS dispatchers are aware of special plans for road closures that are specific to the Airport. A road closure plan for on-field emergencies is critical because of the need for emergency medical service to enter and depart while operations are under way during an emergency event. This plan has never been exercised in real time under current traffic conditions because there has not been a recent emergency to require implementation./7/

AIRPORT POLICE

SFIA maintains an internal police department with operational capabilities that include: records, internal affairs, tactical, bomb squad, narcotics, and traffic divisions.

Additionally, a detectives department from the San Mateo County Sheriff's Department is included within the operation. The Police Department also operates the five gatehouses that control access onto the airfield.

Police Department facilities include the central administrative offices occupying approximately 4,200 sq. ft. in the mezzanine of the North Terminal. This facility provides administrative and police personnel support services. Additionally, three substations are on the main levels of the North, Central, and South Terminals. The substations provide general police services and assistance to terminal security personnel. The SFIA Police Department also maintains a police firing range on SFIA property.

Currently, the SFIA Police Department comprises 220 staff members, includes sworn officers and unsworn uniformed officers (traffic control and security monitors) and five office staff. The Police Department responds to approximately 100 calls per day. Response time for preflight screening calls is approximately one and one-half minutes. The FAA requires a preflight screening response time of five minutes or less. The response time to other terminal calls is approximately two minutes./9/

The SFIA Police Department does not have formal mutual aid agreements with any police departments, but unofficially engages in mutual aid with nearby Peninsula police departments.

NOTES - Public Services

/1/ SFIA, *Final Draft Master Plan*, Chapter 8.0., November, 1989.

/2/ SFIA, *Final Draft Master Plan*, Chapter 6.0., November, 1989.

/3/ SFIA, *Final Draft Master Plan*, Chapter 10.0., November, 1989.

/4/ Anderson, Milton, Operations and Training Supervisor, San Francisco International Airport, telephone conversations, August 8, 15 and 27, 1990.

/5/ O'Brien, Peter J., Fire Chief, San Mateo County Area Disaster Coordinator and Emmet D. Condon, Fire Chief, San Francisco Fire Department, "Mutual Aid Agreement Between San Mateo County Fire Departments and San Francisco Fire Department."

/6/ Turpen, Louis A, Director, San Francisco International Airport, Memorandum to Airports Commission, April 23, 1990.

/7/ Woods, Doug, EMS Coordinator, San Mateo County, telephone conversations, August 15 and August 24, 1990, and February 27, 1991.

/8/ Woods, Doug, EMS Coordinator, San Mateo County, fax to Jim Nicholas, ESA, August 24, 1990.

/9/ Driscoll, Ron, Chief, SFIA Police Department, telephone conversations, August 22 and 28, 1990.

L. AVIATION SAFETY

The FAA's primary role is to promote the safety and the safe use of airspace. The FAA enforces safety standards for commercial and private carriers, domestically and internationally, that will maintain or improve current levels of aviation safety. Violations are investigated and corrected as appropriate. The FAA constantly assesses the safety of the aviation system and reviews the current state of technology to identify advancements that may improve the safety of the system.

The FAA has primary responsibility for airspace and the safe operation of the national aviation system. The FAA operates the Air Traffic Control System, certifies airline companies and the aircraft they fly, certifies commercial and general aviation pilots, develops the National Plan of Integrated Airport Systems (NPIAS), administers the Airport and Airway Trust Fund, and establishes Federal Noise Standards./1/

Facilities at airports, including SFIA, are subject to and must comply with specific FAA design criteria and standards. The FAA has established a series of criteria, known as Part 77 of the Federal Aviation Regulations, that limit the location and height of structures both on and off airport property. These criteria are intended to prevent buildings and other objects from penetrating the airspace required to effect safe aircraft takeoffs and departures; i.e., from becoming an obstruction to air navigation. Section 77.25 of Part 77 sets forth imaginary surfaces of minimum flight altitudes for civil airports. The specifications of each imaginary surface vary for each runway, depending upon the type of approach used or planned for that runway. Approach surfaces are used to determine height restrictions because airplanes approach runways at a much shallower angle (on the order of 35:1, horizontal to vertical) than the angle at which they depart from runways (on the order of 7:1)./2/ The imaginary surfaces defined by Part 77 include primary surface, approach surface, and transitional surface. These surfaces extend beyond SFIA, over the cities of Burlingame, Millbrae, San Bruno, and South San Francisco. Other FAA design criteria affect the layout of the airfield at SFIA and provide for protection zones at the ends of runways.

The FAA Air Traffic Control System coordinates all domestic air traffic and international air traffic entering U.S. airspace. Airborne aircraft always have priority for airfield operations and, consequently, delays are absorbed by aircraft on the ground awaiting clearance for takeoff from or takeoff to the congested airport. Congestion of airspace is therefore avoided to the greatest degree possible. The immediate airspace at SFIA is referred to as a Terminal Control Area, which "consists of controlled airspace extending upward from the surface.... to specified altitudes, within which all aircraft are subject to... federal aviation regulations"./3/ Pilots who wish to enter this airspace must receive authorization from the FAA Air Traffic Control Tower at SFIA.

AIRCRAFT ACCIDENTS

Five aircraft accidents have occurred at SFIA since 1970. Four of those accidents involved commercial aircraft and resulted in no casualties. The accidents occurred in 1971, 1972, 1980 and 1991. The fifth accident involved a two-seater private plane that crash-landed at SFIA in 1984, resulting in the death of the pilot and passenger./4/

NOTES - Aviation Safety

/1/ California Department of Transportation, Division of Aeronautics, *California Aviation System Plan (CASP), Element III: Policies*, April 1989.

/2/ Section 77.11 of the Federal Aviation Regulations defines restricted locations and dimensions of construction or alteration. They are as follows:

(1) Any construction or alteration of more than 200 feet in height above the ground level at its site.

(2) Any construction or alteration of greater height than an imaginary surface extending outward and upward at one of the following slopes:

(i) 100 to 1 for a horizontal distance of 20,000 feet from the nearest point of the nearest runway of each airport specified in paragraph (a)(5) of this section with at least one runway more than 3,200 feet in actual length, excluding heliports.

(ii) 50 to 1 for a horizontal distance of 10,000 feet from the nearest point of the nearest runway of each airport specified in paragraph (a)(5) of this section with its longest runway no more than 3,200 feet in actual length, excluding heliports.

(iii) 25 to 1 for a horizontal distance of 5,000 feet from the nearest point of the nearest landing and takeoff area of each heliport specified in paragraph (a)(5) of this section.

(3) Any highway, railroad, or other traverse way for mobile objects, of a height which, if adjusted upward 17 feet for an Interstate Highway that is part of the National System of Military and Interstate Highways where overcrossings are designed for a minimum of 17 feet vertical distance, 15 feet for any other public roadway, 10 feet or the height of the highest mobile object that would normally traverse the road, whichever is greater, for a private road, 23 feet for a railroad, and for a waterway or any other traverse way not previously mentioned, an amount equal to the height of the highest mobile object that would normally traverse it, would exceed a standard of paragraph (a)(1) or (2) of this section.

/3/ Federal Aviation Administration, *Airman's Informational Manual*, January, 1990.

/4/ Wilson, Dave, Assistant to the Director of Community Affairs, SFIA Public Relations, telephone conversation, January 11 and February 26, 1991.

IV. ENVIRONMENTAL IMPACTS

INTRODUCTION

An application for environmental evaluation for a development proposal on the site was filed in November 1986. On August 11, 1989 on the basis of an Initial Study, the Department of City Planning, Office of Environmental Review, determined that an Environmental Impact Report (EIR) was required. A formal Notice of Preparation was circulated on July 20, 1990. Issues determined as a result of the Initial Study to require no further environmental analysis included Visual and Biology. Therefore, this document does not discuss these topics (see Appendix A, pp. A.1-16, for the Initial Study).

CUMULATIVE DEVELOPMENT

Four cities in the closest proximity to SFIA are most directly affected by growth and impacts related to growth at SFIA: Millbrae, San Bruno, South San Francisco and Burlingame. For cumulative effects due to SFIA development and other development in these four cities, this EIR combines both a list-based analysis and a summary of projections and/or forecasts contained in planning documents. Other cities in the vicinity of SFIA are, and would continue to be, affected by aircraft noise. Measurable impacts related to issues other than aircraft noise, such as traffic, local air quality, and traffic and construction noise, analyzed in the EIR would not extend to these other cities; thus specific lists of probable future cumulative development in these other cities are not combined with that of SFIA, Millbrae, San Bruno, South San Francisco and Burlingame but is accounted for in an MTC regional travel demand model. The MTC regional travel demand model that, starting in 1990, predicts a four percent growth by 1996 and an eleven percent growth by 2006, is used for overall growth on the freeways to account for through traffic from other parts of the region./1/

For Millbrae, San Bruno and South San Francisco, this EIR evaluates cumulative effects of specific approved projects under construction, approved projects not yet under construction and other reasonably foreseeable future projects. To portray a conservative case, this reasonably foreseeable future development is assumed to be built by 1996 (see Figure 25 below and Table 22, p. 248). Because of the relatively small sizes of the lists in Millbrae and South San Francisco, forecast growth in addition to the list of cumulative development, was assumed on the basis of the MTC regional travel demand model described above. For Millbrae, with one relatively small known development project that is included in the area of impact of SFIA, the full forecast growth of four percent by 1996 and eleven percent by 2006 from the MTC regional travel demand model is used for intersection and freeway ramps, before the list-added-growth is added. For South San Francisco, with two larger developments compared to that in Millbrae, about one-half of the forecast growth rate from the MTC regional travel demand model is used to calculate intersection and freeway-ramp impacts: two percent by 1996 and five percent by 2006, before the list-added growth is included. The list for San Bruno development that is included in the area of impact of SFIA is sufficient, by itself, to address a reasonable development potential until 2006. Therefore, zero percent forecast growth is used for intersections and freeway ramps in each analysis year in San Bruno.

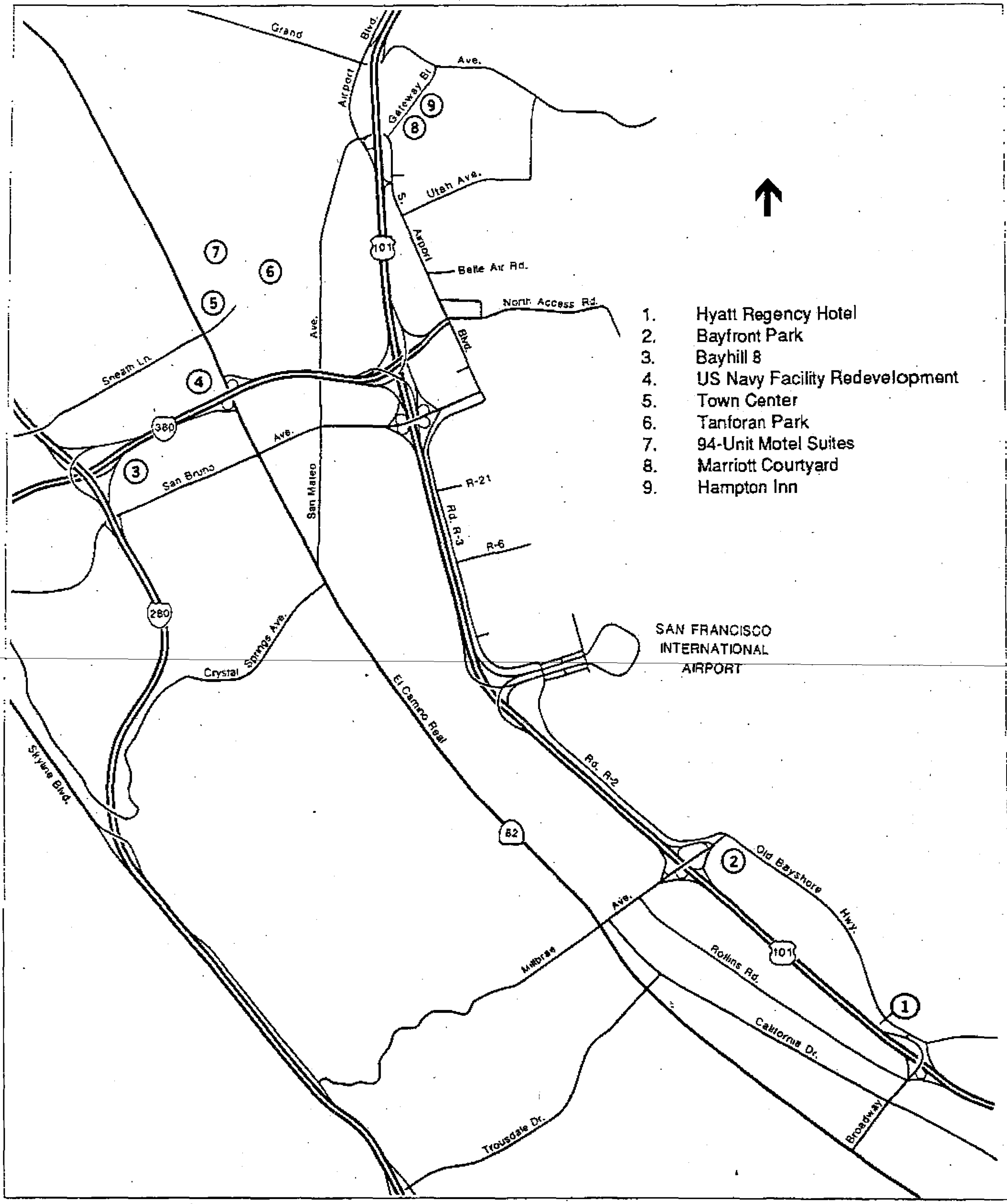
List-added development in the area of impact of SFIA around Burlingame is based on maximum development potential under a planning document (see Table 22)./2/ This is considered to be the maximum potential development in the area. For a conservative analysis, most of this development is assumed to be constructed by 1996. Therefore, zero percent "forecast growth" is used for intersections and freeway ramps each year.

"Forecast growth" as shown in Table 22 is assumed to be the amount of future growth used as a future baseline for analysis of impacts in 1996 and 2000 in this EIR and accounts for most of the cumulative growth in the area. Growth from cumulative lists on this table, or "list-added growth", is assumed to be additional cumulative development used to analyze localized cumulative impacts relevant to the areas affected by the growth.

NOTES - Introduction

/1/ A baseline future growth of 4% and (additional) 11% by 1996 and 2006, respectively, has been assumed for freeway sections in the vicinity of SFIA. These percentages are based on MTC's regional travel demand computer model for growth. This model projects travel demand in the nine-county Bay Area. It is a tool that is commonly used in regional forecast analysis. The growths account for both development in the impact area and regional through-traffic.

/2/ Monroe, Margaret, City Planner, City of Burlingame Planning Department, telephone conversations, April 27, 1990 and January 22, 1991. Other development is potential development under the Burlingame Bayfront Specific Area Plan. The Hyatt Regency Hotel is a project with City Council approval.



SOURCE: DKS Associates

San Francisco International Airport

Figure 25
Locations of List-Added Development

TABLE 22: CUMULATIVE DEVELOPMENT**

	1996 Forcast Growth	1996 Projects	2006 Forcast Growth	2006 Projects
Burlingame /a/	0%		0%	
Hotel Rooms		497 rooms		828 rooms
Restaurants		200,625 gsf*		334,375 gsf
Office Space		267,750 gsf		446,250 gsf
Hyatt Regency Hotel		791 rooms		
Millbrae/b/	4%		11%	
Bay Front Park /c/		2.8 acres		
San Bruno /d,e,f,g/	0%		0%	
Bayhill 8 Office Space		250,000 gsf		
Bayhill 8 Senior Housing		150 du*		
Bayhill 8 Hotel Suites		300 suites		
Tanforan Park		128,300 gsf		
Town Center		109,000 gsf		
94-Unit Motel Suites		94 suites		
US Navy Office Space		107,200 gsf		
US Navy Housing Units		110 du		
South San Francisco /i,j,k/	2%		5%	
Marriott Courtyard		152 rooms		
Hampton Inn		140 rooms		
Freeways /l/	4%	-	11%	-

NOTES:

*du = dwelling units; gsf = gross square feet

** In the traffic analysis, the list-added projects and the adjusted "forecast growth" are applied to local intersections and freeway ramps. The list-added projects are not applied to freeway sections.

/a/ Monroe, Margaret, City Planner, City of Burlingame Planning Department, telephone conversation, April 27, 1990 and January 22, 1991. The Hyatt Regency Hotel is a project with City Council approval. Other development is potential development under the Burlingame Bayfront Specific Area Plan.

/b/ Because one relatively small project is included in the Millbrae list, an additional 4% and 11% forecast growth are predicted for 1996 and 2006, respectively.

/c/ Dragoo, Ron, Assistant Engineer, City of Millbrae, telephone conversation, February 15, 1991.

/d/ Foscardo, George, Director of Planning and Building, City of San Bruno, telephone conversations, April 27, 1990 and January 22, 1991. Projects listed have City Council approval, are in the EIR stage or have been proposed to the City of San Bruno by letter or phone conversation. Navy projects are proposed by way of the Naval Facilities Engineering Command's Westdiv. Master Plan - United States Navy.

(Continued)

●TABLE 22: CUMULATIVE DEVELOPMENT (Continued)

/e/ DKS Associates, for City of San Bruno, *North San Bruno Areawide Traffic Study Final Report*, December 1986.

/f/ DKS Associates, for City of San Bruno, *Tanforan Park - Proposed Median Breaker on El Camino Real*, August 30, 1988.

/g/ DKS Associates, for City of San Bruno, *Bayhill VIII Traffic Study*, May 17, 1989.

/h/ Cordes, Ken, Associate Planner, City of South San Francisco Planning Department, telephone conversation, April 27, 1990.

/i/ Carlson, Steve, Senior Planner, City of South San Francisco Planning Department, telephone conversation, March 27, 1991 and June 17, 1991. The "Precise Plan" approved for Hampton Inn expired in 1990. A new Genentech project, a 225,000-sq.-ft. research and development building, was approved by the Planning Commission on September 21, 1990 and by the City Council on November 14, 1990. The analysis would remain essentially the same with the deletion of the Hampton Inn project and the addition of the Genentech project.

/j/ City of South San Francisco, "Major Projects in South San Francisco," May 1990.

/k/ Because of the relatively small size of the South San Francisco list for cumulative development, an additional two percent and five percent growth has been predicted for 1996 and 2006, respectively.

/l/ A baseline forecast growth factor of 4% and 11% by 1996 and 2006, respectively, has been assumed for freeways in the vicinity of SFIA. These percentages are based on MTC's regional travel demand computer model for growth. This model projects travel demand in the nine-county Bay Area. It is a tool that is commonly used in regional forecast analysis. The growth factors account both for development in the impact area and regional through traffic.

SOURCE: DKS Associates

A. LAND USE AND PLANS

AIRPORT LAND USE

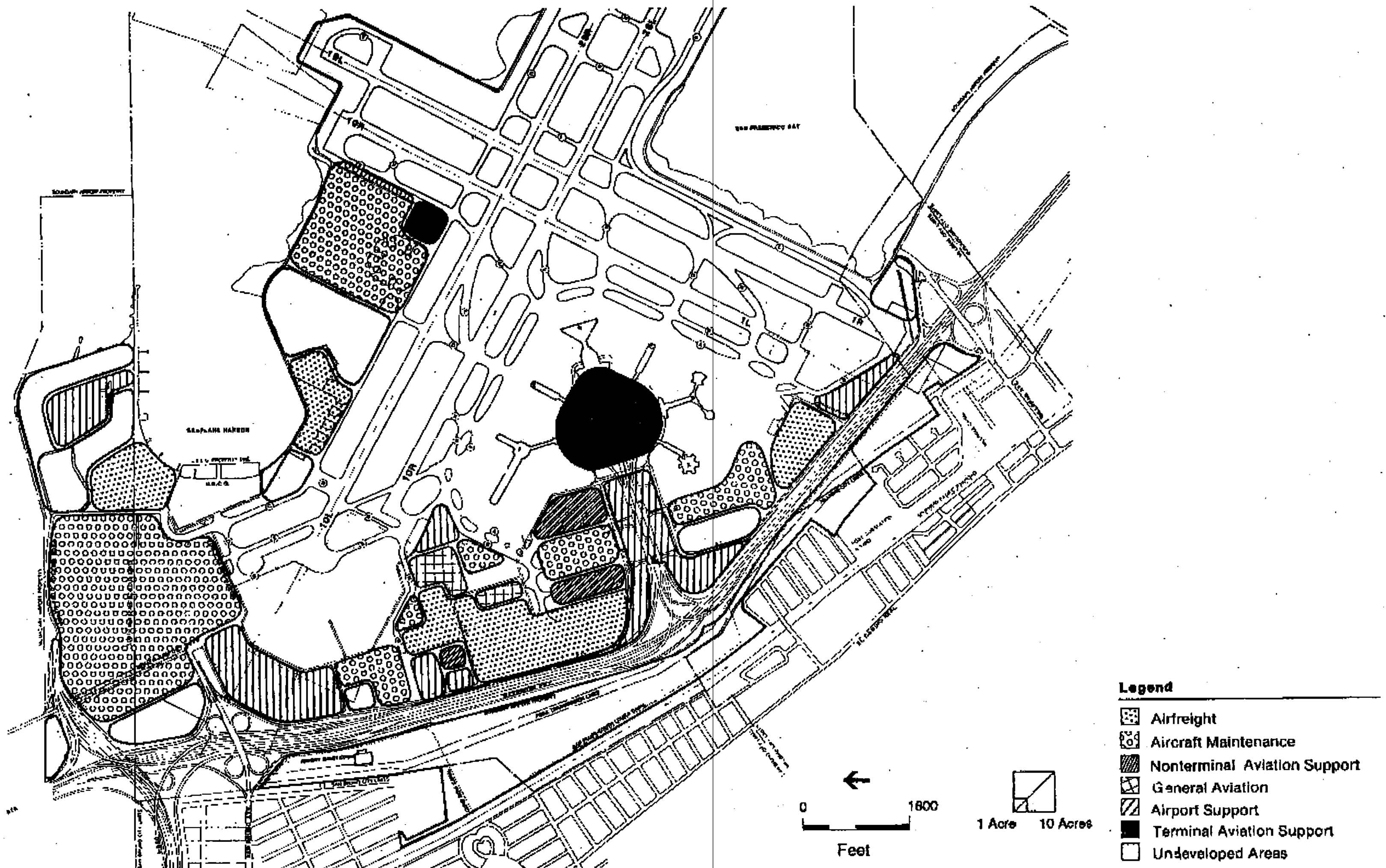
The SFIA Master Plan would not alter land use types at the Airport, but would intensify, reconfigure and/or consolidate existing uses. See Figure 25A below, Airport Land Uses. Several vacant parcels would be developed in Airport uses. The 180-acre West-of-Bayshore site, an identified habitat of the San Francisco garter snake, an endangered species, and red-legged frog, a candidate for the endangered species list, would not be affected by the SFIA Master Plan. Total land area under the Airport's jurisdiction would not increase, nor would additional land area be created by filling of tidelands owned by SFIA. No projects or land use changes are proposed by the SFIA Master Plan on sites within Airport environs cities. Airport-related highway and transit projects under Caltrans and BART jurisdiction could occur within Airport environs cities, however.

Airside Land Uses

Runway expansions and reconfigurations are not included in the SFIA Master Plan; therefore, no runway land use impacts would result directly from near-term or long-term SFIA Master Plan projects. Expansion of runways to accommodate forecast growth in aircraft operations under the SFIA Master Plan, or to mitigate noise, energy consumption or air quality impacts of SFIA Master Plan projects, are not proposed in the SFIA Master Plan. Proposed SFIA Master Plan taxiway reconfigurations would not constitute land use changes.

Landside Land Uses

Terminal land uses would remain concentrated in their present location and would increase by a total of approximately 56 percent (1,476,400 sq. ft. of building area) between 1990 and 2006. Expansion of terminal facilities would displace airline maintenance, airline support and air freight uses currently located in the vicinity of the terminal access road. These uses would be consolidated in the North, West and East Field areas.



SOURCE: San Francisco International Airport Master Plan

San Francisco International Airport

● Figure 25A

SFIA Existing Land Use

Airline-support land uses would be reconfigured to accommodate SFIA Master Plan terminal expansion and other projects in the west and east field areas. Airline-support land uses would increase by approximately 48 percent (39,700 building sq. ft.) under the near-term SFIA Master Plan and would not be affected further under the long-term SFIA Master Plan.

Airline-maintenance land uses would be reconfigured to accommodate other SFIA Master Plan projects (primarily the terminal expansion) and would be further concentrated in the east field area. The proposed East Field Maintenance Hangar would be constructed on a currently undeveloped parcel. Total building area in airline-maintenance use would increase by about seven percent (275,300 sq. ft.) between 1990 and 2006.

General Aviation land uses would be consolidated and relocated from the west field area to the east field area. Building area devoted to General Aviation use would increase marginally under the near-term SFIA Master Plan and would not be affected further under the long-term plan.

Air-freight land uses would remain concentrated in the west and north field areas and would be consolidated into fewer buildings. Total building area in air-freight use would increase by about 90 percent (785,000 sq. ft.) between 1990 and 2006.

Commercial land uses would be reconfigured and expanded under the SFIA Master Plan, including construction of hotel space in the proposed new international terminal. Total building area in commercial use would increase by approximately 37 percent (87,000 sq. ft.) between 1990 and 2006.

Administration/office land uses would increase by approximately 179 percent (226,100 building sq. ft.) under the SFIA Master Plan. Additional administration/office uses would be located in the proposed new international terminal and in a new office building proposed for construction on currently vacant land north of the terminal access road near US 101.

Parking, roadway and pedestrian transportation uses would increase under the SFIA Master Plan. Parking and transportation projects would include construction of a Rental Car Garage / Ground Transportation Center adjoining the terminal complex; installation of an Automated People Mover (APM) along the perimeter of the terminal roadway and extending to Parking Lots D and DD; and construction of additional garages and surface parking lots. SFIA Master Plan roadway projects would include widening of key intra-airport roads, roads R-3 (McDonnell Road), R-6, and North Access Road, construction of bi-level access roads for the proposed Rental Car Garage / Ground Transportation Center, and construction of two new ramps connecting SFIA and US 101.

U.S. Coast Guard facilities would be demolished and reconstructed under the SFIA Master Plan, reducing total Coast Guard building area by about 28 percent to roughly 63,400 sq. ft. Existing SFIA dock facilities (about 10,000 sq. ft.) at the Seaplane Harbor would be demolished and replaced with a multi-use harbor dock facility of approximately 20,000 sq. ft.

AIRPORT ENVIRONS CITIES

Two broad categories of land-use impacts on airport environs cities could result from SFIA Master Plan implementation. The first category of impacts is associated with an increased number of flights that could be accommodated at the Airport due to increased landside facilities. Cities could continue to be limited in the amount of residential uses or other noise-sensitive land uses they would permit under their general plans and related regulations, as a result of additional safety risks and noise. Without this increased number of flights, CNEL noise contours would be smaller than forecast for the SFIA Master Plan and would not limit residential or other noise sensitive land uses to the same degree as would the project. See the discussion in Section III.A. Land Use and Plans, under "Airport Environs Cities Land Use," p. 82. These regulations are detailed in EIR Sections III.C. and IV.C. Noise. The cities closest to the Airport, and those within the 65 dBA, CNEL contour (South San Francisco, San Bruno, Millbrae and Burlingame), would be most affected by airport-related safety and noise regulations.

The second category of potential land-use impacts on environs cities is associated with intensified landside activities at the Airport, which could potentially induce growth or other land-use changes in adjoining communities (again, primarily those closest to SFIA, including South San Francisco, San Bruno, Millbrae and Burlingame). Increases in passenger volumes could induce pressure for hotel, restaurant and other travel-serving development, while increases in SFIA employment could stimulate demand for additional housing and public services in the Airport vicinity. Ground transportation and parking needs of both employees and passengers could also induce growth of roadway, parking and transit land uses in airport environs cities. However, while growth in passenger volumes and employment levels could increase demand for off-site parking, hotel accommodations, food service facilities, etc., the overall result would likely be to speed the development of existing land uses rather than to generate new types of land uses within environs cities.

City of Brisbane, Town of Colma, City of Daly City, City of Foster City, Town of Hillsborough, City of Pacifica, City of San Mateo, City and County of San Francisco

Brisbane, Colma, Daly City, Foster City, Hillsborough, Pacifica, San Mateo and San Francisco are outside the 65 dBA, CNEL contours associated with both near-term and long-term SFIA Master Plan aviation activity levels. Future land uses in these cities would not, therefore, be restricted by noise abatement regulations.

Intensified landside activities at SFIA could stimulate further development of residential, commercial, transportation and/or public service and infrastructure land uses in these cities. However, development induced by SFIA would not likely be distinguishable from background development, and would not likely divide or disrupt established communities.

City of Burlingame

A portion of northern Burlingame currently within the 65 dBA, CNEL contour would remain so under both the near-term and the long-term SFIA Master Plan. Total area within the contour would diminish, however, due to use of quieter aircraft (see Section IV.C. Noise, pp. 331). The portion of Burlingame within the 65 dBA, CNEL contour is currently in industrial use; future uses would continue to be restricted by noise-abatement regulations.

Intensified landside activities at SFIA could stimulate further development of hotel, restaurant, residential, transportation and/or public service and infrastructure land uses in Burlingame. Airport-oriented commercial development is supported by Burlingame General Plan policies. Airport-induced commercial, residential and public infrastructure development would not likely divide or disrupt established communities in Burlingame.

Since aircraft approach zones and flight paths would not be altered by the SFIA Master Plan, Airport Land Use Commissions (ALUC) and Federal Aviation Administration (FAA) building-height and clear-zone regulations currently affecting parts of Burlingame would not change as a result of SFIA Master Plan implementation.

<u>City of Millbrae</u>

A portion of eastern Millbrae currently within the 65 dBA, CNEL contour would remain so under both the near-term and the long-term SFIA Master Plan. Total area within the contour would diminish, however, due to use of quieter aircraft (see Section IV.C. Noise, pp. 331). The portion of Millbrae within the 65 dBA, CNEL contour is primarily residential; future uses would continue to be restricted by noise-abatement regulations.

Intensified landside activities at SFIA could stimulate further development of hotel, restaurant, residential, transportation and/or public service and infrastructure land uses in Millbrae; airport-induced development would not likely divide or disrupt established communities in Millbrae.

Since aircraft approach zones and flight paths would not be altered by the SFIA Master Plan, ALUC and FAA building-height and clear-zone regulations currently affecting parts of Millbrae would not change as a result of SFIA Master Plan implementation.

● SFIA's West of Bayshore parcel is within the City of Millbrae Sphere of Influence. As stated on p. 20, the parcel is habitat for the San Francisco garter snake, an endangered species, and the red-legged frog, a candidate for the endangered species list. The number of San Francisco garter snakes inhabiting the Millbrae or other portion(s) of the West of Bayshore is not known. As stated on p. 20, the West of Bayshore parcel is not included in the SFIA Master Plan Process.

City of San Bruno

A portion of northeastern San Bruno currently within the 65 dBA, CNEL contour would remain so under both the near-term and the long-term SFIA Master Plan. Total area within the contour would diminish, however, due to use of quieter aircraft (see

Section IV.C. Noise, pp. 331). The portion of San Bruno within the 65 dBA, CNEL contour is primarily residential; future uses would continue to be restricted by noise-abatement regulations.

SFIA's West-of-Bayshore parcel is within the San Bruno Sphere of Influence. The area is a habitat for the endangered San Francisco garter snake and red-legged frog, which is a candidate for the endangered species list. The parcel would not be affected by the SFIA Master Plan.

Intensified landside activities at SFIA could stimulate further development of residential, commercial, transportation and/or public service and infrastructure land uses in San Bruno. Such airport-induced development would not likely divide or disrupt established communities.

Since aircraft approach zones and flight paths would not be altered by the SFIA Master Plan, ALUC and FAA building-height and clear-zone regulations currently affecting parts of San Bruno would not change as a result of SFIA Master Plan implementation.

City of South San Francisco

Portions of southern South San Francisco currently within the 65 dBA, CNEL contour would remain so under both the near-term and the long-term SFIA Master Plan. Total area within the contour would diminish, however, due to use of quieter aircraft (see EIR Section IV.C. Noise, pp. 331). Portions of South San Francisco within the 65 dBA, CNEL contour are primarily residential and industrial; future uses would continue to be restricted by noise-abatement regulations.

SFIA is not subject to City of South San Francisco land use and zoning regulations. Implementation of the SFIA Master Plan would result in more intensive development of lands owned by SFIA that are within the city limits of South San Francisco, but would not introduce new land uses. These lands, in the SFIA's north and east field areas, would be further developed in airline-maintenance, air-freight and airport-support uses.

Intensified landside activities at SFIA could stimulate further development of hotel, restaurant, residential, transportation and/or public service and infrastructure land uses in South San Francisco; such Airport development would not likely divide or disrupt established communities.

Since aircraft approach zones and flight paths would not be altered by the SFIA Master Plan, ALUC and FAA building-height and clear-zone regulations currently affecting parts of South San Francisco would not change as a result of SFIA Master Plan implementation.

COUNTY OF SAN MATEO

SFIA is not subject to County of San Mateo land use and zoning regulations. Implementation of the SFIA Master Plan would result in more intensive development of lands owned by SFIA that are within unincorporated San Mateo County, but would not introduce new land uses. Since aircraft approach zones and flight paths would not be altered by the SFIA Master Plan, ALUC and FAA building-height and clear-zone regulations currently affecting the unincorporated County land owned by SFIA would not change as a result of SFIA Master Plan implementation.

County of San Mateo Airport Land Use Commission (ALUC)

As noted, Master Plan projects would not alter aircraft approach zones and flight paths. ALUC building height regulations currently affecting portions of Burlingame, Millbrae, San Bruno, South San Francisco and unincorporated areas of San Mateo County owned by SFIA would not change as a result of SFIA Master Plan implementation.

REGIONAL CONTEXT

As discussed in Section III.A. Land Use and Plans, beginning on p. 82, there are a number of plans by various local, regional, and state agencies that address the provision of facilities to accommodate regional air transportation demand. Most of those plans were developed on the basis of forecasts of regional transportation demand, assessments of the capabilities of facilities in the Bay Area (airports and the facilities for other modes of transportation) to accommodate the forecast demand, and various recommended means of meeting demand (such as facility expansion).

The plans do not all include the same recommended means for meeting forecast demand. For example, the *CASP* recommendations (discussed in Appendix I, p. A.177) include shifting air carrier operations to Metropolitan Oakland International Airport and San Jose International Airport; the FAA Capacity Task Force Study recommendations (discussed in Appendix I, p. A.173) include constructing a new runway at SFIA; and the MTC *Regional Airport Plan* recommendations include the use of an additional air carrier airport in the North Bay. Reasons for the differences include the use of different forecasts of regional demand, different conclusions about the capability of SFIA and other Bay Area airports to accommodate forecast demand, and different approaches to developing the means to meet demand (such as the use of a high-speed rail corridor to meet some of the air transportation demand, or the improvement of airport facilities within an agency's own jurisdiction).

Although some of the plans discussed in Section III.A. Land Use and Plans include different means for meeting regional demand than the improvements included in the SFIA Master Plan, it would be speculative to determine how the implementation of the SFIA Master Plan would affect the implementation of the other plans.

<u>Association of Bay Area Governments (ABAG) and Metropolitan Transportation Commission (MTC)</u>

SFIA passenger forecasts for the near-term Master Plan (42.3 million annual passengers in 1996) and for the long-term Master Plan (51.3 million annual passengers in 2006) exceed MTC/ABAG-recommended allocations for SFIA (27 to 31 million annual passengers in 1997). In 1989, the existing passenger "load" was 30 million, already nearly at the maximum recommended by MTC/ABAG for SFIA.

● MTC's Regional Airport System Plan (RASP) Update is scheduled for completion in 1992. When complete, the RASP Update will provide a body of information on the existing regional system and its operations, expected future requirements, and recommendations for accommodating those future requirements. This information can be used by decisionmakers within the region, including the airports themselves, in guiding capital improvement programs and related policy decisions./1,1a/ SFIA and the other air carrier airports in the region are members of the Regional Airport

Planning Committee (RAPC), and therefore have access to information that becomes available through the RASP Update process regarding the optimization of regional aviation resources and the minimization of overall environmental effects.

No authority currently exists that can enforce the RASP; implementation of its policies and recommendations therefore depends principally on voluntary actions by the airports and airlines. MTC's own authority to implement elements of the RASP is generally indirect, in that MTC has responsibility for environmental review and funding approval on regional ground transportation projects, and authority to prioritize applications from airports within the region for limited California State aeronautics Capital Improvement Projects (CIP) funds (the statewide fund estimate for the next cycle, 1995-96, is only $2.1 million)./1b/ MTC can thus potentially influence regional airport planning and operations primarily through its role in major ground transportation projects affecting specific airports. MTC can also use the RASP to educate and thereby potentially influence other agencies with more direct authority over airport systems and operations in the region (e.g., the FAA, airlines, airports and the U.S. military)./1,1a/

The level of detail in the final RASP, moreover, will likely be at a programmatic level. Cooperation by the airports with the RASP would therefore not eliminate the need for development of individual airport Master Plans./1a/

Bay Conservation and Development Commission (BCDC)

Implementation of the SFIA Master Plan would include construction of a public roadway adjacent to the U.S. Coast Guard sea wall that would permit employees and visitors to access East Field area facilities from the North Field access road. Construction of this roadway would require a BCDC permit since it is within 100 feet of the shoreline.

The SFIA Master Plan also would include alteration or construction of a new multi-use dock facility, adjacent to the U.S. Coast Guard Station at Seaplane Harbor. Its planned use is for shipping and receiving freight, ferry service, and as an alternative means of access and transport in an emergency. Alteration or construction of this dock would require a BCDC permit since it is construction along the shoreline.

OTHER REGIONAL AGENCIES

A discussion of the Bay Area Rapid Transit District (BART) is included in Section IV.B. Transportation.

A discussion of the Bay Area Air Quality Management District (BAAQMD) is included in Section IV.D. Air Quality.

A discussion of the San Francisco Bay Regional Water Quality Control Board (RWQCB) is included in Section IV.J. Public Utilities

A discussion of the FAA is included in Section IV.L Aviation Safety

REGIONAL AVIATION ACTIVITY AND REGIONAL CAPACITY

1996 and 2006 forecasts from the FAA *Terminal Area Forecasts*, the *California Aviation System Plan (CASP)*, and the three primary Bay Area airports are presented in Tables 23-26, pp. 261-264. These forecasts can be compared to the 1987 terminal and airside capacity from *CASP*. Shares of regional forecast totals represented by the respective forecasts are also shown.

These forecasts show that there is future demand for aviation activity in the Bay Area that can be accommodated only by actions such as expanding existing facilities, converting military airfields to airline passenger traffic, or by people changing their mode of travel.

NOTE - Land Use and Plans

- /1/ Steve Kiehl, TRA Airport Consulting, telephone conversation, September 16, 1991.
- /1a/ Roddin, Marc, Manager of Seaport and Airport Planning, Metropolitan Transportation Commission, interview, April 22, 1992.
- /1b/ Roddin, Marc, Manager of Seaport and Airport Planning, Metropolitan Transportation Commission, Record of CIP Advisory Committee Meeting, October 24, 1991.

TABLE 23: TOTAL PASSENGERS: COMPARATIVE SAN FRANCISCO BAY AREA AIR CARRIER AIRPORTS FORECASTS, 1996

Airport	FAA Terminal Area Forecasts/a/ Number (000s)	FAA Terminal Area Forecasts/a/ Percent of Total	California Aviation System Plan/a/ Number (000s)	California Aviation System Plan/a/ Percent of Total	SFIA Master Plan W/ Project Number (000s)	SFIA Master Plan W/O Project Number (000s)	San Jose Int'l Prelim. Forecasts/b/ Number (000s)	Oakland Int'l Airport Master Plan/c/ Number (000s)	1987 Terminal Capacity/e/ Number (000s)
San Francisco International	35,668	67.7%	39,268	68.2%	42,280.0	37,780.0	-	-	51,300.0
San Jose International	9,883	18.7%	9,295	16.2%	-	-	11,529.4	-	18,000.0
Metro Oakland International	6,620	12.6%	8,563	14.9%	-	-	-	7,015.2	8,000.0
Buchanan Field (Concord)	388	0.7%	247	0.4%	-	-	-	-	800.0
Sonoma County (Santa Rosa)	164	0.3%	168	0.3%	-	-	-	-	600.0
TOTAL	52,723	100.0%	57,543	100.0%	59,460.0	-	-	51,582.4/d/	78,700.0

NOTES:

/a/ 1996 FAA and *California Aviation System Plan (CASP)* total passenger forecasts are interpolated from 1995 and 2000 enplanement forecasts, doubled to account for deplanements.

/b/ Unpublished demand forecasts, developed as part of the San Jose International Airport Master Plan Update currently in progress (received May 8, 1990 from Mr. Cary Greene, San Jose International Airport Planning). The Master Plan study is currently assessing whether the forecast levels can be accommodated at San Jose International Airport. 1996 total enplaned and deplaned passenger forecasts are interpolated from 1995 and 2000 forecasts.

/c/ Metropolitan Oakland International Airport draft *Master Plan Update* Preferred Forecast ("Moderate Market Share"), from Exhibit IV.12; enplanement forecasts are doubled.

/d/ Metropolitan Oakland International Airport draft *Master Plan Update* total forecast for the region is imputed from 1996 forecast market share represented by 7,015,000 passengers (13.6%).

/e/ *California Aviation System Plan, Element IV: System Requirements*, 1989, Table IV.2.1

SOURCES: U.S. Department of Transportation, Federal Aviation Administration, April 1989; Caltrans Division of Aeronautics, 1989; *SFIA Final Draft Master Plan*, 1989; San Jose International Airport, 1990; Metropolitan Oakland International Airport draft *Master Plan Update* forecasts, 1988; SFIA Airports Commission, 1990; Environmental Science Associates, Inc., 1991.

TABLE 24: TOTAL PASSENGERS: COMPARATIVE SAN FRANCISCO BAY AREA AIR CARRIER AIRPORTS FORECASTS, 2006

Airport	FAA Terminal Area Forecasts/a/ Number (000s)	FAA Terminal Area Forecasts/a/ Percent of Total	California Aviation System Plan/a,b/ Number (000s)	California Aviation System Plan/a,b/ Percent of Total	SFIA Master Plan W/ Project Number (000s)	SFIA Master Plan W/O Project Number (000s)	San Jose Int'l Prelim. Forecasts/c/ Number (000s)	Oakland Int'l Airport Master Plan/d/ Number (000s)	1987 Terminal Capacity/f/ Number (000s)
San Francisco International	40,567	61.9%	52,770	64.1%	51,330.0	39,760.0	-	-	51,300.0
San Jose International	14,773	22.6%	14,986	18.2%	-	-	18,569.4	-	18,000.0
Metro Oakland International	9,360	14.3%	13,857	16.8%	-	-	-	10,530.4	8,000.0
Buchanan Field (Concord)	530	0.8%	440	0.5%	-	-	-	-	800.0
Sonoma County (Santa Rosa)	248	0.4%	312	0.4%	-	-	-	-	600.0
TOTAL	65,478	100.0%	82,365	100.0%	73,310.0	-	-	66,648.1/e/	78,700.0

NOTES:

/a/ 2006 FAA and *California Aviation System Plan (CASP)* total passenger forecasts are extrapolated from 2000 and 2006 enplanement forecasts, doubled to account for deplanements.

/b/ *CASP* recommended passenger levels for 2005 are 32,100,000 annual passengers for SFIA; 20,300,000 annual passengers for San Jose International Airport; 13,300,000 annual passengers for Metropolitan Oakland International Airport; 420,000 annual passengers for Buchanan Field; 300,000 annual passengers for Sonoma County Airport; and 2,070,000 annual passengers for Travis Airforce Base (Element VI, Report on Action Plan, Table VI-1).

/c/ Unpublished demand forecasts, developed as part of the San Jose International Airport Master Plan Update currently in progress (received May 8, 1990 from Mr. Cary Greene, San Jose International Airport Planning). The Master Plan study is currently assessing whether or not the forecast levels can be accommodated at San Jose International Airport. 2006 total passenger forecasts are interpolated from 2000 and 2010 forecasts.

/d/ Metropolitan Oakland International Airport draft *Master Plan Update* Preferred Forecast ("Moderate Market Share"), from Exhibit IV.12; enplanement forecasts are doubled.

/e/ Metropolitan Oakland International Airport draft *Master Plan Update* total forecast for the region is imputed from forecast 2006 market share represented by 10,530,400 passengers (15.8%).

/f/ *California Aviation System Plan, Element IV: System Requirements*, 1989, Table IV.2.1

SOURCES: U.S. Department of Transportation, Federal Aviation Administration, April 1989; Caltrans Division of Aeronautics, 1989; *SFIA Final Draft Master Plan*, 1989; San Jose International Airport, 1990; Metropolitan Oakland International Airport draft *Master Plan Update* Forecasts, 1988; SFIA Airports Commission, 1990; Environmental Science Associates, Inc., 1991.

TABLE 25: TOTAL FORECAST AIRCRAFT OPERATIONS, SAN FRANCISCO BAY AREA AIR CARRIER AIRPORTS, 1996

AIRPORT	FAA Terminal Area Forecasts/a/	California Aviation System Plan/b/	SFIA Master Plan W/ Project/c/	SFIA Master Plan W/O Project/d/	San Jose Int'l Prelim. Forecasts/e/	Oakland Int'l Airport Master Plan/f/	1987 Airfield Capacity/g/
San Francisco International	498,600	605,900	496,800	470,000	-	-	500,000
San Jose International	481,000	442,789	-	-	492,080	-	565,000
Metro Oakland International	485,200	499,922	-	-	-	538,120	525,000
Buchanan Field (Concord)	323,600	242,089	-	-	-	-	355,000
Sonoma County (Santa Rosa)	185,400	160,738	-	-	-	-	295,000
TOTAL	1,973,200	1,951,438	-	-	-	-	2,240,000

NOTES:

/a/ FAA forecasts generally assumed no expansion of facilties except those "recommended by the regions." 1996 FAA total operations forecasts are interpolated from 1995 and 2000 forecasts.

/b/ *California Aviation System (CASP)* forecasts were based on existing airfield configurations and any known planned airfield improvements (no new runways were assumed for Bay Area Air Carrier Airports. Total operations forecasts are interpolated from 1995 and 2000 forecasts.

/c/ See Table 1 for derivation of 1996 forecast *SFIA Master Plan* total aircraft operations.

/d/ 1996 constrained forecasts of air carrier operations were derived by Ken Eldred Engineering (KEE). Total forecast 1996 operations figure combines KEE air carrier forecasts with interpolated FAA forecasts of commuter, General Aviation and military operations.

/e/ Unpublished demand forecasts, developed as part of the San Jose International Airport Master Plan Update currently in progress (received May 8, 1990 from Mr. Cary Greene, San Jose International Airport Planning). The Master Plan study is currently assessing whether or not the forecast levels can be accommodated at San Jose International Airport. 1996 total aircraft operations forecast is interpolated from 1995 and 2000 forecasts.

/f/ Metropolitan Oakland International Airport draft *Master Plan Update*, Exhibit IV.1. 1996 forecast is interpolated from 1992 and 1997 forecasts.

/g/ *California Aviation System Plan, Element IV: System Requirements*, 1989, Table IV.2.1. According to *CASP*, Annual Service Volume (ASV) is "the annual volume of aircraft operations beyond which the average delay to each aircraft increases rapidly with relatively small increases in aircraft operations (and beyond which levels of service on the airfield deteriorate)....When annual aircraft operations are equal to annual service volume, average...aircraft delays are on the order of one to four minutes. If the number of annual operations exceeds the annual service volume, moderate or severe congestion may occur."

SOURCES: U.S. Department of Transportation, Federal Aviation Administration, April 1989; Caltrans Division of Aeronautics, 1989; *SFIA Final Draft Master Plan*, 1989; San Jose International Airport, 1990; Metropolitan Oakland International Airport draft *Master Plan Update* forecasts, 1988; SFIA Airports Commission, 1990; Environmental Science Associates, Inc., 1991.

TABLE 26: TOTAL FORECAST AIRCRAFT OPERATIONS, SAN FRANCISCO BAY AREA AIR CARRIER AIRPORTS, 2006

AIRPORT	FAA Terminal Area Forecasts/a/	California Aviation System Plan/b/	SFIA Master Plan W/ Project /c/	SFIA Master Plan W/O Project/d/	San Jose Int'l Prelim. Forecasts/e/	Oakland Int'l Airport Master Plan/f/	1987 Airfield Capacity/g/
San Francisco International	538,500	802,300	538,500	482,000	-	-	500,000
San Jose International	691,000	582,152	-	-	582,340	-	565,000
Metro Oakland International	597,200	630,763	-	-	-	633,720	525,000
Buchanan Field (Concord)	419,600	250,626	-	-	-	-	355,000
Sonoma County (Santa Rosa)	248,200	178,820	-	-	-	-	295,000
TOTAL	2,494,500	2,444,661	-	-	-	-	2,240,000

NOTES:

/a/ FAA forecasts generally assumed no expansion of facilties except those "recommended by the regions." 2006 FAA total operations forecasts are extrapolated from 2000 and 2005 forecasts.

/b/ *California Aviation System Plan (CASP)* forecasts were based on existing airfield configurations and any known planned airfield improvements (no new runways were assumed for Bay Area Air Carrier Airports. Total operations forecasts are extrapolated from 2000 and 2005 forecasts. *CASP* recommended total aircraft operations for 2005 are 500,969 total operations for SFIA; 543,100 total operations for San José International Airport; 600,808 total operations for Metropolitan Oakland International Airport; 303,300 total operations for Buchanan Field; 204,949 total operations for Sonoma County Airport; and 48,708 total operations for Travis Airforce Base (Element VI, Report on Action Plan, Table VI-1).

/c/ See Table 1, p. 24, for derivation of 2006 forecast *SFIA Master Plan* total aircraft operations.

/d/ 2006 constrained forecasts of air carrier operations were derived by Ken Eldred Engineering (KEE). Total forecast 2006 operations figure combines KEE air carrier forecasts with extrapolated FAA forecasts of commuter, General Aviation and military operations.

/e/ Unpublished demand forecasts, developed as part of the San Jose International Airport Master Plan Update currently in progress (received May 8, 1990 from Mr. Cary Greene, San Jose International Airport Planning). The Master Plan study is currently assessing whether the forecast levels can be accommodated at San Jose International Airport. 2006 total aircraft operations forecast is interpolated from 2000 and 2010 forecasts.

/f/ Metropolitan Oakland International Airport draft *Master Plan Update*, Exhibit IV.1. 2006 forecast is interpolated from 1997 and 2007 forecasts.

/g/ *California Aviation System Plan, Element IV: System Requirements*, 1989, Table IV.2.1. According to *CASP*, Annual Service Volume (ASV) is "the annual volume of aircraft operations beyond which the average delay to each aircraft increases rapidly with relatively small increases in aircraft operations (and beyond which levels of service on the airfield deteriorate)....When annual aircraft operations are equal to annual service volume, average...aircraft delays are on the order of one to four minutes. If the number of annual operations exceeds the annual service volume, moderate or severe congestion may occur."

SOURCES: U.S. Department of Transportation, Federal Aviation Administration, April 1989; Caltrans Division of Aeronautics, 1989; *SFIA Final Draft Master Plan*, 1989; San Jose International Airport, 1990; Metropolitan Oakland International Airport draft *Master Plan Update* forecasts, 1988; SFIA Airports Commission, 1990; Environmental Science Associates, Inc., 1991.

B. TRANSPORTATION

SFIA MASTER PLAN TRANSPORTATION ASPECTS

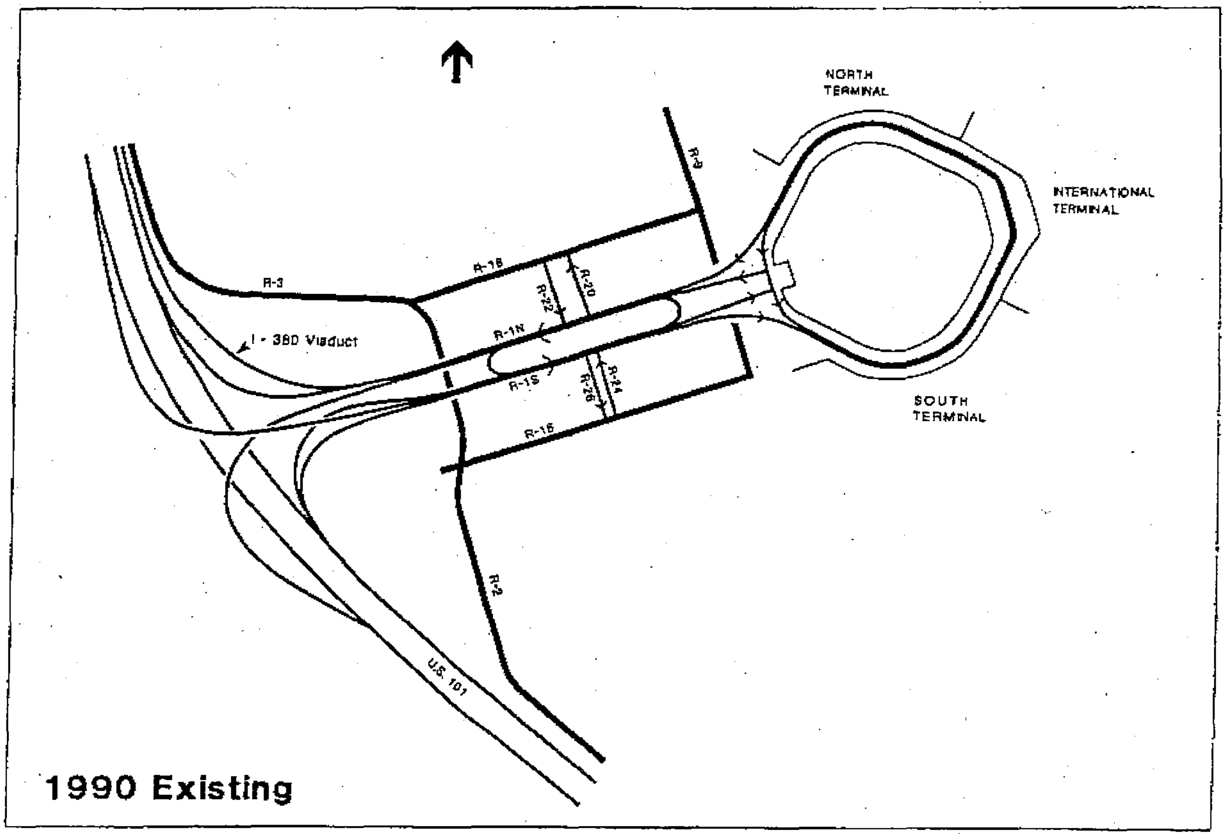
There are proposed changes to transportation infrastructure, including roadway and parking changes and additions included as part of the SFIA Master Plan. These are summarized below.

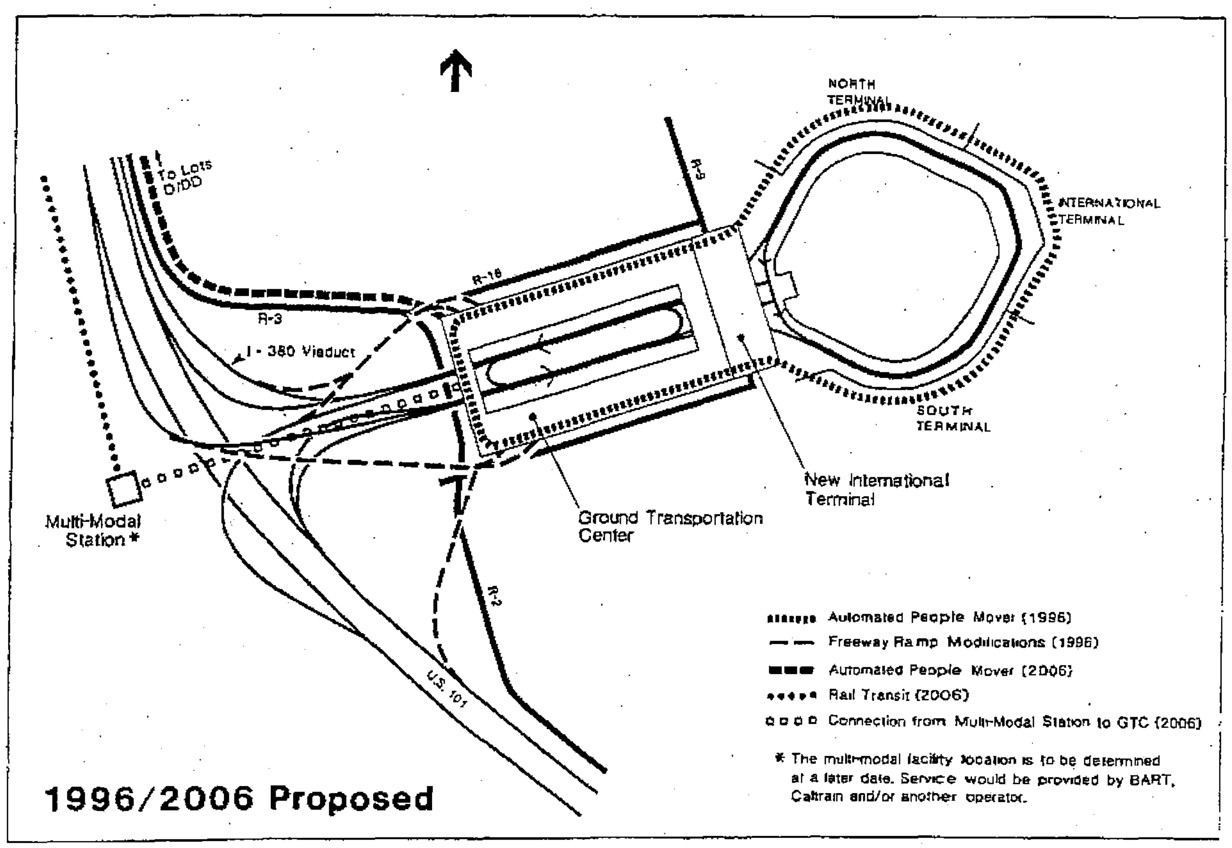
Ground Transportation Center

The proposed Ground Transportation Center (GTC) would centralize the staging areas of buses, vans, regional transit shuttles and rental cars, and provide short-term parking (see Figure 26). A proposed fixed guideway Automated People Mover (most likely light-rail transit) would transport passengers and employees from the GTC to the terminal buildings. The GTC would be constructed as part of the SFIA Master Plan's Near-Term Development Concept, which would be completed in 1996. The Center would be constructed on both sides of and above the terminal access roads (1-N and 1-S) on parcels currently occupied by rental car companies and the Chevron gas station. The Ground Transportation Center would consist of two 5-story parking structures./1/ The October 16, 1989 GTC conceptual layout drawings show GTC levels organized in the following manner:

Level 1	Rental car operations. Direct ramp to/from Freeway.
Level 2	Bus and shuttle van processing and staging. Direct ramp to/from Freeway.
Level 3	Rental car pickup and return. Direct ramp to/from Freeway.
Level 4	Rental car staging and storage, Automated People Mover.
Level 5	Short-term public parking, permit and City / County of San Francisco employee parking.

The GTC proposal provides for a separate, three-level roadway system that would connect to the existing US 101 / I-380 on- and off-ramps via separate ramps from each level. Levels 2 and 3 of the GTC would connect directly to the deplaning and enplaning levels of the proposed new International Terminal. An internal ramp system would permit rental cars (Level 4) and persons who desire short-term public parking (Level 5) to circulate from the Levels 2 and 3 roadway system.





SOURCE: DKS Associates

San Francisco International Airport

Figure 26
Terminal Access

The proposed Automated People Mover would initially have a 20,000-30,000 sq.-ft. interim maintenance facility on the fourth level of the Ground Transportation Center. This interim maintenance facility would remain at the GTC until a permanent facility would be constructed as part of the SFIA Master Plan's Long-Term Development Concept (2006). The Automated People Mover would have stations at each of the seven boarding areas and at four locations on the periphery of the Ground Transportation Center. Its principal purpose would be to distribute passengers from remote parking and rental car facilities quickly and efficiently to the terminal core.

By 2006, the proposed Automated People Mover would serve the relatively remote long-term public and employee parking lots D and DD (see Figure 26, p. 266). The long-term (2006) SFIA Master Plan would accommodate the voter-approved extension of BART to station sites in the vicinity of SFIA./2/ Alternatives for an SFIA BART station currently under consideration include:

- Alternative 3 (and its options) - External SFIA Station. The external station would be located west of U.S. 101 between San Bruno Avenue and Millbrae Avenue. BART passengers would access the Terminal via an extension of the proposed Automated People Mover. Caltrain would operate in the same corridor east of BART and west of U.S. 101, and make use of a multi-modal (BART/CalTrain/SamTrans) station where CalTrain and SamTrans passengers would also be able to access the Terminal via the proposed Automated People Mover. The existing San Bruno CalTrain station would be moved south to the new site. New vehicle access would be provided to the multi-modal station site by ramps from U.S. 101 northbound and southbound. (There would be a Tanforan/San Bruno BART/CalTrain station under I-380, near El Camino Real.)

- Alternative 4 (and its options) - Internal SFIA Subway Station. The internal station would be located below grade underneath the Short Term (SFIA Terminal) parking garage, with pedestrian connections to the existing terminal facility. For this alternative, the proposed Automated People Mover would not be extended to the proposed San Bruno BART/CalTrain station. Rather, CalTrain passengers would transfer to BART at the San Bruno BART/CalTrain station to access the SFIA Terminal, or would board a shuttle bus to access non-Terminal SFIA employment sites. The joint San Bruno BART/CalTrain station would be on the site of the existing San Bruno CalTrain station, south of Angus Avenue.

- Alternative 5 - External SFIA Station via I-380. This alternative would be identical to Alternative 3 but would continue underground from the Tanforan Station and pass under the CalTrain tracks paralleling I-380 on the north side. It would bypass part of San Bruno to the east. The alignment would proceed under I-380 and run south in a cut-and-cover or at-grade profile until it links up with the CalTrain corridor. It would become ground level at the same station designation as in Alternative 3.

- Alternative 6 - Internal SFIA Subway Station with UAL Station. This alternative would be similar to Alternative 5 until just west of US 101 where the alignment continues under the freeway to the Airport. A CalTrain station would be located east of the Tanforan BART Station. (Under Alternative 6A, there would be a CalTrain/BART connection at Tanforan.) A shuttle bus service would transfer passengers between the BART and CalTrain stations. A BART station would be located east of US 101 and south of I-380 near the United Airlines maintenance base with a surface parking lot nearby. The BART line would continue underground to the Airport Station and connect to the same alignment as Alternative 4.

BART would provide service to the SFIA Station every 4-1/2 minutes during peak periods, every 7-1/2 minutes mid-day, and every 20 minutes before 6:00 a.m. and after 7:00 p.m. Two BART lines (routes) would serve the SFIA station before 7:00 p.m. and one line would serve the Station after 7:00 p.m./3/

Although serving different purposes, the Automated People Mover System could be designed to facilitate passenger connections among the multi-model transit station, the terminals, the rental car companies, the parking lots, and the parking garages.

The Automated People Mover would not serve both an SFIA internal BART station and an external (e.g., BART, CalTrain) station. If an SFIA internal BART station is built, the People Mover would not also serve an external BART station. In other words, the People Mover would serve a BART station only if the BART station is located external to the SFIA passenger terminal. With an external BART station, the People Mover would probably serve the station at two-minute headways via a transfer platform with a walk distance of approximately 60 feet./4/

PROGRAMMED AND PLANNED TRANSPORTATION IMPROVEMENTS

Roadway Improvements Programmed by Caltrans

In the vicinity of SFIA, the 1990 Caltrans State Transportation Improvement Program (STIP) lists three programmed improvements:/5/

> I-280 (Junipero Serra Freeway). A northbound auxiliary lane from I-380 to Avalon Drive is scheduled for FY 1992/93. Modified signals and additional turning lanes are to be provided at the San Bruno Avenue interchange.
>
> I-380. On the westbound connector to northbound I-280 there is a programmed improvement to increase the lane width to Caltrans' 12-foot standard. This project is programmed for FY 1992/93.
>
> SR 82 (El Camino Real). Signal modifications and additional turning lanes were programmed at the El Camino Real/San Bruno Avenue intersection for FY 1989/90. This work had not been performed as of May 1991. Completion is now expected by mid-1992.

Caltrans' Traffic Systems Management Plan lists signal coordination on California Drive in Burlingame as a transportation system management (TSM) improvement for FY 1990-91. Each of the above programmed improvements was assumed to be a part of the forecast-growth case for 1996.

Transit Improvements Programmed by BART, CalTrain, and SamTrans

BART is planning a $590 Million (1987 $), 7.1 mile extension of service from the existing terminus at Daly City to SFIA by 2006 (construction beginning in 1994; revenue service by 2000) on the Southern Pacific Railroad alignment near SR 82./6/ Initial passenger service from Daly City to Colma (first station beyond Daly City) is scheduled for 1995, with additional stations at South San Francisco and San Bruno/ Tanforan. As of May, 1991, the BART Board of Directors has not made a formal decision on whether to end heavy rail service west of US 101 and provide connecting light rail/bus service to the SFIA terminal, or to carry heavy rail directly into the SFIA terminal. BART staff has indicated that the Board of Directors has leaned more toward a BART-SFIA station west of US 101, since the long term plan for BART is to continue service further south./7/ Generally, BART will be undertaking capital projects and is considering peak pricing strategies that will allow service frequencies to increase on all lines and enhance the ability of both the existing system and the planned rail extensions to move passengers during peak hours.

Structural and design allowances are being made in the proposed Ground Transportation Center to accommodate both light and heavy rail as well as more frequent bus service. Since a decision has not been made on the connection, and patronage forecasts have not been adopted, this EIR assumes the "2006 with BART" scenario would attract about six percent of air passengers (approximately 6,100 people each day) and about eleven percent of SFIA employees (approximately 4,650 employees each day), based on modified (for employees) mode use tables outlined in the SFIA Master Plan. The employees' BART mode share was modified to account for a larger proportion of BART riders than would be expected from air passengers./8/

The analysis in this EIR considered a rail transit station in the vicinity of SFIA, and the vehicular-traffic results are not dependent on whether the service is BART, CalTrain, or some other transit service. This study frequently refers to a "2006 with BART" scenario, as BART is the only transit operator that has shown interest in providing rail transit service to SFIA.

CalTrain and SamTrans have no capital or operating plans that would alter access to SFIA or the mode share attributed to those modes./9/ An increase in SamTrans use by

SFIA employees (from 3.5 percent today to 4.5 percent in 1996 and 6.0 percent in 2006) has been assumed, based on increased congestion levels' making mass transit more attractive to those employees who have regular work schedules.

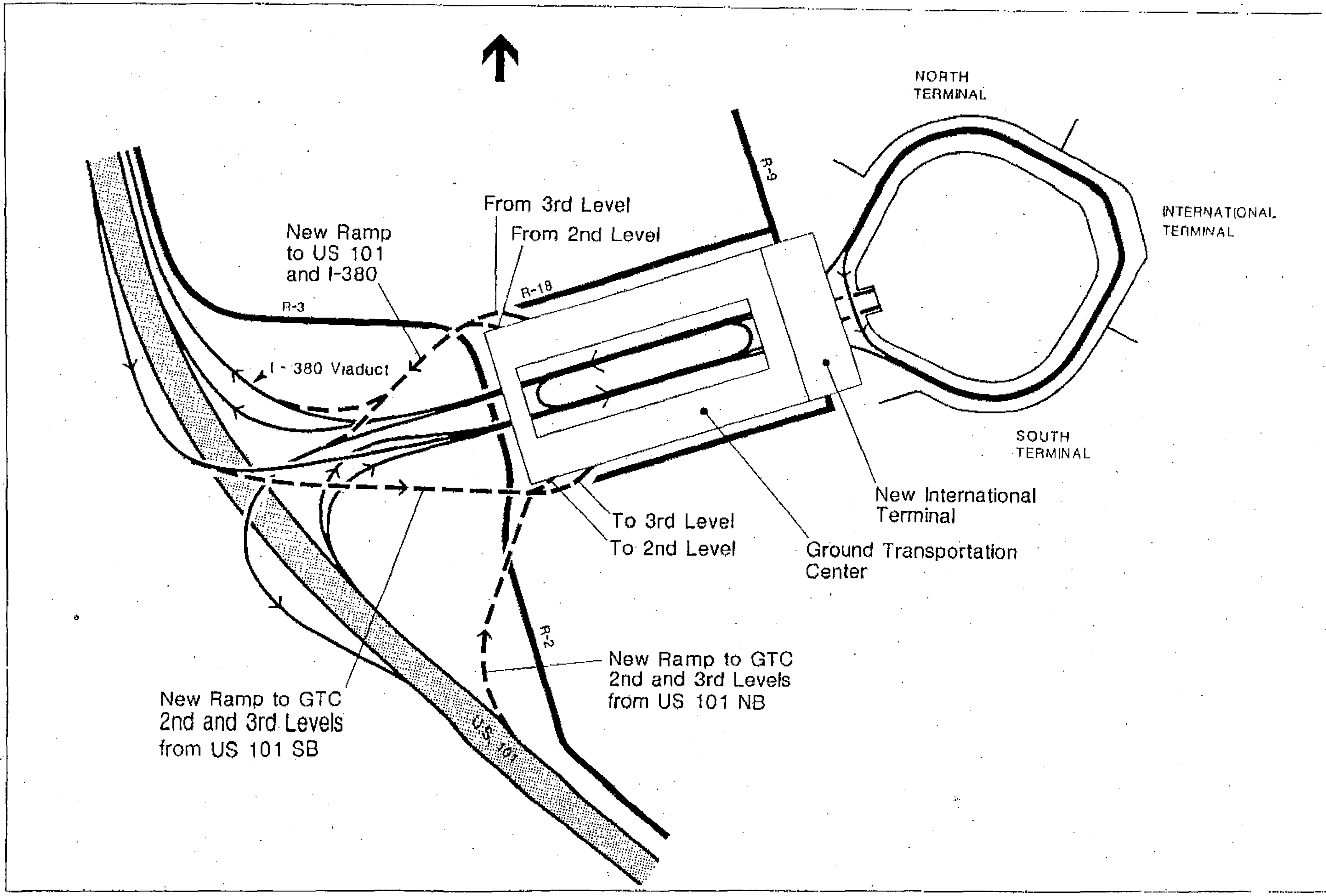
Freeway Interchange Modifications - Part of SFIA Master Plan Project

In order to segregate proposed International Terminal traffic from Ground Transportation Center traffic and traffic using the existing Domestic Terminal roadways, several changes are proposed to the existing US 101 freeway interchange at SFIA. Ground-level traffic using the existing Domestic Terminal roadways would be segregated from traffic going to the GTC and the proposed new International Terminal. Preliminary designs of the GTC (scheduled for completion by 1996) show new ramps leading to both US 101 northbound and US 101 southbound from the GTC's second- and third-level roadways (Figure 27).

1996 Traffic Coming to SFIA from US 101 / I-380.

Access to SFIA from US 101 southbound (e.g., traffic from eastern San Francisco, Brisbane, northern East Bay and other northern areas) would be similar to the current configuration. However, the exit ramp would bifurcate prior to the US 101 overpass, with separate ramps leading to either the Domestic Terminal area or to the GTC and the new International Terminal.

Access to SFIA from US 101 northbound (e.g., traffic from San Mateo, Redwood City or East Bay locations via SR 92) would be altered from the current configuration. Motorists now have a choice of proceeding to either the terminal area or to the garage area via separate lanes that place traffic bound for the arrivals and departures decks in the south (right) lanes of Road 1-S and traffic bound for the garage in the north (left) lanes of Road 1-S. The SFIA Master Plan proposes to have US 101 northbound traffic bound for the Ground Transportation Center or the International Terminal travel on a new elevated roadway (similar to the I-380 westbound viaduct) just west of Road R-2 and east of the Hilton Hotel. Motorists bound for the Domestic Terminal would continue along the existing ramp.



SOURCE: DKS Associates

Figure 27
Freeway Access to
Ground Transportation Center

Access to SFIA from I-380 eastbound (e.g., traffic using I-280 northbound or southbound from western San Francisco, western Daly City, Pacifica, communities in western San Mateo County and portions of Silicon Valley and San Jose) would remain the same via the bifurcated ramp that would also bring US 101 southbound traffic into SFIA.

1996 Traffic Leaving SFIA via US 101 / I-380

Access from the SFIA air passenger terminals to US 101 northbound (e.g., traffic headed toward eastern San Francisco) would be via the existing ramps leading from the Domestic Terminal area and Road 1-N (see Figure 26, p. 266). Motorists on the second and third level of the Ground Transportation Center would not have a direct connection to the US 101 northbound ramp. Instead, they would have to enter the I-380 viaduct and then exit with traffic destined for San Bruno Avenue, where they could connect with the northbound San Bruno Avenue collector road, and then proceed onto a US 101 northbound on-ramp.

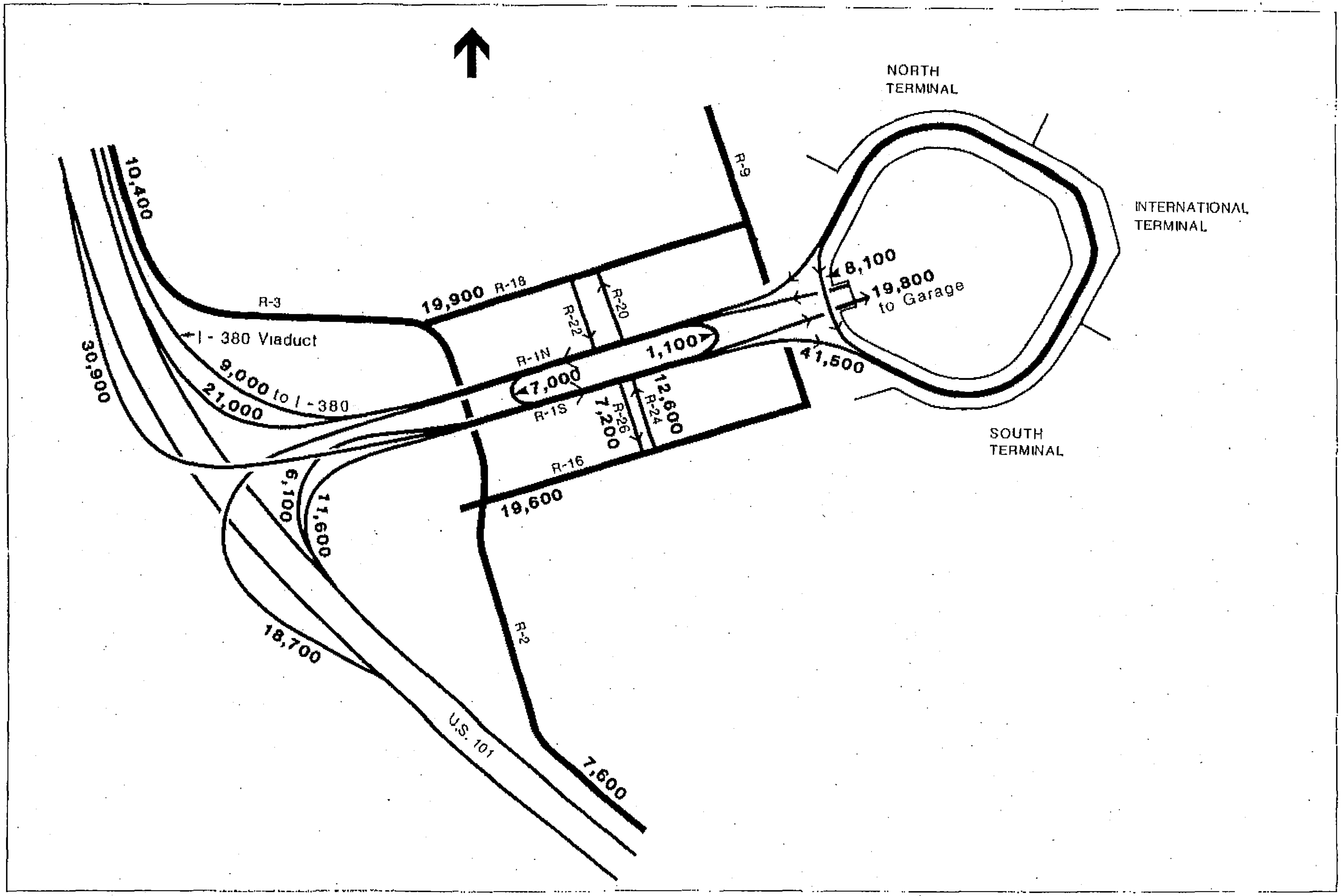
Access from SFIA to US 101 southbound (e.g., traffic headed south to Redwood City or to San Mateo and SR 92) would be provided by ramps from the Domestic Terminal area and the second- and third-level roadways in the Ground Transportation Center.

Access from SFIA to I-380 westbound (e.g., traffic headed to I-280) would continue to be via the I-380 viaduct. The ramps from the terminal buildings would join the I-380 viaduct just west of the Ground Transportation Center. Access would also be provided from a connection to the I-380 viaduct from the second- and third-level roadways in the Ground Transportation Center.

Average daily traffic volumes (ADT's) on the ramps leading in and out of SFIA, and on the SFIA internal roadways, are shown on Figure 28.

FUTURE TRAFFIC CONDITIONS

The analysis of future traffic involved projecting forecast growth (or "background") traffic growth, traffic generated by implementation of the SFIA Master Plan and traffic generated by list-added growth in the traffic impact area. The additional traffic was



273 690

SOURCE: SFIA Landside Operations, Summer 1989 ADT's

San Francisco International Airport

Figure 28
Average Daily Traffic
Volumes on SFIA Roadways

then distributed throughout the affected Bay area and assigned to the roadway network. Impacts were assessed in the a.m. and p.m. peak hours for the following scenarios:

<u>1996</u>

- Forecast Growth (existing traffic + background growth traffic from 1990 to 1996); e.g., No Master Plan Project
- Forecast Growth (1996) + SFIA Master Plan (e.g., the project in 1996)
- Forecast Growth (1996) + Project + List-Added Growth (e.g., projects identified by surrounding municipalities as likely to occur, under review, or under construction before 1996)
- "No project" alternative (discussed separately in the "Alternatives" section). This alternative represents the forecast growth plus the list-added growth plus the growth that would occur at SFIA without the Master Plan project, all as of 1996.

<u>2006</u>

- Forecast Growth (existing traffic + background growth traffic from 1990 to 2006); i.e., No Master Plan Project
- Forecast Growth (2006) + SFIA Master Plan
- Forecast Growth + Project + List-Added Growth (2006)
- "No project" alternative (discussed separately in the "Alternatives" section) (2006)

<u>1996 and 2006 Forecast-Growth Traffic Scenarios</u>

The 1996 and 2006 forecast-growth cases represent the projected background traffic growth without including the project or any other specifically known development that may occur in the surrounding jurisdictions. Background (forecast) traffic accounts for the regional trips that travel entirely through the study area, as well as many of the smaller developments in the surrounding cities that may be approved in the future but are not known at this time. (Some generic local development has been assumed in regional forecasting.)

In order to determine the appropriate background traffic growth factors (i.e., account for growth in the municipalities surrounding SFIA that is not known, general growth expected in San Mateo County, and the increase in South-Bay-to-San-Francisco commute trips), projections were taken from a previous Year 2005 traffic model/10/ and factored based on roadway facility type, the roadway's proximity to SFIA and the amount of development identified by the cities that would affect the roadway under consideration. The background traffic growth factors used are 4 percent from 1990 to 1996, and 11 percent from 1990 to 2006.

The 2005 traffic model, which covered an area from San Francisco to SR 92 on the south (including San Mateo, Burlingame, Millbrae, San Bruno, and South San Francisco), incorporated approved projects, and Metropolitan Transportation Commission (MTC) and Association of Bay Area Governments (ABAG) zonal land use data. Since the model's analysis year was 2005, a straight-line projection was used to determine 1996 and 2006 traffic conditions.

ABAG has compiled projections of housing and employment by census tract throughout the Bay Area (ABAG Projections '87). The MTC traffic model has assigned these land use forecasts to 550 analysis zones, which form the basis for the MTC regional transportation model. The 2005 North San Bruno Areawide Traffic Model was derived from MTC's 550-zone regional transportation model. The MTC model is now 700 zones, but was 550 zones at the time the North San Bruno Areawide Study was completed. The North San Bruno Areawide Traffic model has a base year of 1986 and a forecast year of 2005. It is consistent with the General Plans of communities in San Mateo County, and covers an area greater than the study area of this EIR./10/

The across-the-board 4% (1996) and 11% (2006) increase in forecast-growth traffic resulted in consistent future volumes on freeways and at intersections along arterials. For certain intersections where cities had given lengthy lists of projects, the lists were used to project additional traffic growth, and the 4% and 11% forecast-growth factors were scaled back, in order not to forecast unreasonably high traffic volumes at those intersections. This was done in order to avoid any double counting that would result from having a separate (overestimated) forecast-growth case and list-added-growth analysis. Depending on the city/intersection involved, the 1996 forecast growth was scaled back to 0% or 2%, and the 2006 forecast growth to 0% or 5%. This is discussed further under "List-Added-Growth Assumptions," following. For SFIA-project-oriented intersections and ramps, no forecast-growth factor was applied. The increase in traffic at these locations would be accounted for entirely by the project, or by list-added growth. For freeway segment analysis, the forecast-growth from the traffic model alone was used for the analysis, because list-added-growth traffic would be a statistically insignificant addition to freeway mainline traffic.

1996 Project Traffic

The 1996 SFIA Master Plan Near-Term Development scenario includes new developments within SFIA as well as some existing facility expansions. The net increase in existing development and the new development that would generate traffic include:

- 60,000 sq. ft. Automated People Mover interim Maintenance Facility
- 100,670 sq. ft. Pan Am Maintenance Hangar
- 10,000 sq. ft. Service Station relocation
- 5,800 sq. ft. New Building/Construction/Engineering Offices in proposed International Terminal
- 46,200 sq. ft. United Catering Facility
- 36,280 sq. ft. United Cargo Facility expansion
- 268,700 sq. ft. West Field Cargo/Maintenance Facility
- 226,440 sq. ft. East Field Cargo/Maintenance Facility
- 237,000 sq. ft. North Field Cargo/Maintenance Facility
- 7,500 sq. ft. American GSE
- 1,888 sq. ft. FBO Facility
- 5,000 sq. ft. Multipurpose Facility

The 1996 project traffic scenario makes use of the unconstrained passenger forecast of 42,280,000 annual passengers (a net increase of approximately 12,330,000 from 1990 to 1996), and includes the following SFIA roadway improvements proposed as part of the project:

- widening of Road R-3 (McDonnell Road) from 2 lanes to 4 lanes, from US 101 to San Bruno Avenue
- widening of North Access Road from 2 lanes to 4 lanes

The Automated People Mover would affect traffic movement in that vehicles that previously proceeded directly to the terminal buildings would now go to the Ground Transportation Center, and occupants would then use the Automated People Mover to access the terminal buildings. At the very least, the Automated People Mover would make stops in each of the terminal buildings and on both sides of the Ground Transportation Center. The Automated People Mover would move employees and passengers between the terminal and parking areas.

2006 Project Traffic

The 2006 SFIA Final Draft Master Plan Long-Term Development scenario includes, in addition to the items listed above for near-term growth, the following additional developments for 2006:

- 100,000 sq. ft. Office Building
- 162,000 sq. ft. West Field Cargo/Maintenance Facility
- 132,000 sq. ft. U.S. Postal Facility
- 60,000 sq. ft. Automated People Mover permanent Maintenance Facility (replacement for the interim facility)

The 2006 project traffic scenario makes use of the unconstrained passenger forecast of 51,330,000 annual passengers (a net increase of approximately 21,390,000 from 1990 to 2006), and includes the following SFIA roadway improvements proposed as part of the project:

- widening of Road R-2 from 2 lanes to 4 lanes from Millbrae Avenue to Road R-16

The Automated People Mover would be extended from the Ground Transportation Center to the long term parking area (Lot D). The People Mover would now serve employees and passengers accessing the north area of SFIA. Some reduction in the number of SFIA shuttle van and bus trips would be expected along McDonnell Road, as the Automated People Mover would now provide this service. However, the shuttles that currently exist to move passengers and employees between areas within SFIA would still be necessary, as the Automated People Mover would not be able to access points south of the terminal buildings, and northeast of the United Airlines Maintenance Facility.

List-Added-Growth Assumptions

Assumptions regarding developments in the vicinity of SFIA that could affect the traffic operations in the study area were obtained from the cities of Brisbane, Burlingame, Millbrae, San Bruno, and South San Francisco. Brisbane project locations are over six miles from SFIA, and it is unlikely that these projects would affect the study-area intersections in a statistically significant way, and therefore they were not included in the list-added-growth analysis. The projects shown in Table G-4 in Appendix G, p. A.165, were assumed to be completed by 1996 (locations are shown in Figure 13, Section III.A. Land Use, p. 128).

While lists of other developments were provided by the individual cities, only those developments that would affect the subject intersections with a statistically significant volume of traffic were considered. Additional development is accounted for within the framework of future background ("forecast") traffic growth.

Trip Generation

Project - SFIA Master Plan

The future vehicle trip generation that would result from implementation of the SFIA Master Plan project was determined by first establishing the existing trip characteristics of passenger, cargo and employment activity at SFIA. Airports are not typical traffic generators, compared to other types of development. The peak hours of air traffic activity do not correspond to the peak traffic hours on the adjacent roadway network. Employment activity at an airport is not typical of other relatively large employment centers. Airports, and particularly SFIA, have a relatively large number of maintenance and cargo-related employees who work eight-hour shifts, around the clock. The largest shift ends at mid-afternoon, before the evening peak begins.

For the purposes of this analysis, the base day for trip generation analysis was a Friday in May. The following points explain why a typical Friday in May would be appropriate for traffic analysis at SFIA.

- May is the fourth highest month for both enplanements and deplanements at SFIA (8.6% of the annual passengers at SFIA travel in May)./11,12/

- May is the third highest month for all cargo activity at SFIA./13/
- Friday is the busiest weekday for air passengers at SFIA (14.9% of all weekly passengers)./11/
- SFIA administrative and maintenance employees are not yet at the peak of their vacation season (June, July and August).
- School is still in session, and relatively few local residents are on vacation, which results in higher traffic volumes on local streets and arterials in the surrounding jurisdictions.

While May and Fridays are not typically considered to produce the highest overall traffic generation, it is worth noting that SFIA is the largest employment center in San Mateo County and therefore the primary source of employment-generated traffic in the vicinity of SFIA. Thus, employee and passenger traffic to and from SFIA would be considered the determining factors when analyzing any development in the vicinity of SFIA, and particularly when considering the growth anticipated with the SFIA Master Plan.

Trip generation related to air passenger activity at SFIA represents the overwhelming majority of the total trips generated. The remainder of the trips are employment and cargo related. All trips entering and leaving the SFIA terminal area were accounted for in order to establish a trip rate based on the total number of enplanements. The number of trips per enplanement is typically used as a measure of trip generation for passenger activity at commercial airports.

Employees at SFIA were divided into terminal and non-terminal area employees. Of the 31,000 employees (1990 estimate) at SFIA, approximately 14,000 are terminal related and the remaining 17,000 are non-terminal related (e.g., United Air Lines Maintenance, air cargo facilities, etc.). The 14,000 terminal area employees make 28,000 daily commute person trips (one trip to work, one trip home or to another destination), which, when divided among the modes of travel to SFIA, result in approximately 20,500 daily employee-related vehicle trips in the terminal area. The discussion on "mode split" below illustrates these numeric relationships. It is recognized that employees make miscellaneous midday trips as well, but these occur outside the commute hours (i.e., the peak analysis period) and therefore were not quantified for the analysis.

May typically has 20 percent less air passenger activity than August, when the freeway ramp and SFIA roadway traffic counts are conducted every year. The total number of air passenger vehicle trips counted on a Friday in August 1989 was reduced by 20 percent to correspond to the air passenger and employment activity level that was experienced in May 1989. These figures were provided by the SFIA Office of Landside Operations, SFIA Office of Community Affairs, and the SFIA Master Plan, and from traffic counts conducted in May 1990.

For the purposes of this analysis, the peak hours represent the peak hours on the surrounding roadway network, not the air traffic peak hours. This allowed the impact of the greatest magnitude to be analyzed, as the combined traffic from the surrounding communities and the airport-related traffic during those peak hours represent the highest volumes overall. If air traffic peak hours (mid- day and late evening) were used for automobile traffic analysis, volumes on SFIA roadways would be significantly higher./13/ However, the higher SFIA volumes would combine with considerably less traffic from surrounding cities' roadways, and the analysis would therefore not represent the most conservative scenario and the lowest (most-degraded) reasonable traffic service levels.

The impact analysis following assumes that the estimated future number of air passengers can be handled by the existing runways. If this is not so, the peak-hour ground traffic analyzed in this EIR would actually spread out over a longer period (because runway expansion is not proposed, so the peak air traffic would need to be spread over a longer period). Therefore, the peak-hour traffic impacts presented herein are conservative (worst-case).

Calculation of Terminal Area Trips

The following summarizes the calculation method for air passenger and associated employment activity trip generation at SFIA (numbers are rounded):

- August 1989 daily vehicle trips = 102,500
- August 1989 enplanements = 1.61 Million
- May 1989 enplanements = 1.29 Million
- May:August enplanement ratio = 0.80

- Number of fixed daily employment vehicle trips = 20,500
- Number of variable, passenger-related vehicle trips = 102,500-20,500 = 82,000 (August 1989)
- Adjusted total daily passenger-related vehicle trips for May: 82,000 x 0.80 = 65,600
- 65,600 variable + 20,500 fixed = 86,100 (May)
- 1.29 Million enplanements / 4.43 weeks in May x 14.92% of weekly enplanements on Fridays = 43,500 enplanements on a May Friday
- 86,100 / 43,500 enplanements = 1.98 vehicle trips / enplanement for a Friday in May

This figure corresponds directly with other airport trip generation research performed by Greiner Engineering, Inc. in Tampa, Florida./14/ Greiner published an equation, based on data from 20 major North American airports, that can be used to predict that SFIA has a trip rate of 1.98 trips / enplanement.

In order to convert the vehicle trip rate per enplanement to actual a.m. and p.m. peak hour trips on a Friday in May, the following methods were used:

Convert May 1989 Friday enplanements to May 1996 and May 2006 Friday enplanements by using the ratio of future annual enplanements to existing annual enplanements.

- Friday in May 1989 - 43,446 enplanements
- Friday in May 1996 - 61,353 enplanements
- Friday in May 2006 - 74,486 enplanements

Multiply daily enplanements by 1.98 to get daily number of automobile trips (assumes that trips by employees in the terminal area [airline terminals] increase in proportion to enplanements)

- Friday in May 1989 - 86,023 trips
- Friday in May 1996 - 121,479 trips
- Friday in May 2006 - 147,482 trips

Convert daily vehicle trips on a Friday in May to a.m. and p.m. peak-hour trips

- a.m. peak hour trips make up 4.6% of daily trips (2.7% in / 1.9% out)/15/
- Friday in May 1989 - 3,957 vehicle trips in a.m. peak hour
- Friday in May 1996 - 5,588 vehicle trips in a.m. peak hour
- Friday in May 2006 - 6,784 vehicle trips in a.m. peak hour
- p.m. peak hour trips make up 5.0% of daily trips (2.4% in / 2.6% out)/15/
- Friday in May 1989 - 4,301 vehicle trips in p.m. peak hour
- Friday in May 1996 - 6,074 vehicle trips in p.m. peak hour
- Friday in May 2006 - 7,374 vehicle trips in p.m. peak hour

For this illustration, it is assumed that the 1996 and 2006 mode shares remain unchanged (see Tables 27-29, pp. 283-285), except for the percentage of employees who take SamTrans, which was assumed to increase from 3.5% to 4.5% in 1996, and from 4.5% to 6.0% in 2006. A separate analysis has been performed to include the effects of the BART-SFIA extension, which would result in a reduced number of vehicle trips in 2006 (see Table 30, p. 286).

Calculation of Non-Terminal-Area Trips

Cargo-related, maintenance, and other non-terminal-area-related trips were identified by performing a trip generation study of both the TWA Cargo facility and the Federal Express Cargo facility. These two SFIA cargo facilities were selected because they represent two distinct kinds of cargo carriers. TWA handles a relatively large volume of mail in addition to other cargo packages. Federal Express handles many smaller packages that are delivered in bulk from its regional collection centers. After comparing the trip generation at the TWA and Federal Express Cargo facilities with the trips generated in the vicinity of the other cargo facilities at SFIA (i.e., along McDonnell Road, Roads R-6 and R-21, and North Access Road), we determined that cargo-related trips approximate the Institute of Transportation Engineers' (ITE) trip generation rate of light industrial facilities, as functions of building, square footage./16/

The non-terminal areas of SFIA were divided into the following ITE land use categories:

- Light Industrial - including all cargo, maintenance, aviation services, etc.
- Office - including engineering, aviation administration, police

The planned increases in building sizes for each land use were input into the traffic generation model along with the ITE trip generation rates for each respective land use./16/ This accounts for the additional trips generated by employees and visitors (i.e., deliveries) in the non-terminal areas. Project trip generation for 1996 and 2006 is summarized in Tables 31 and 32, pp. 288 and 289, respectively.

TABLE 27: 1990 MODE SPLIT

	Daily Trips				
	1990 Person-Trips		1990 Vehicle-Trips		Average Vehicle
	Volume	Percent	Volume	Percent	Occupancy
Terminal Area					
Air Passengers					
Auto - Park	22,404	20.1%	13,415	20.5%	1.7
Auto - Drop-off	35,396	31.8%	25,283	38.7%	1.4
Rental Car	19,202	17.3%	13,716	21.0%	1.4
Taxi/Limo	6,052	5.4%	4,386	6.7%	1.4
Shuttle Van	12,012	10.8%	6,192	9.5%	1.9
Shuttle Bus	13,271	11.9%	2,064	3.2%	6.4
SamTrans Bus	2,889	2.6%	258	0.4%	11.2
Subtotal	111,226	100.0%	65,313	100.0%	
Employees - based on 14,000 terminal-area employees					
Auto - Park	23,439	83.7%	19,371	94.6%	1.2
Auto - Drop-off	473	1.7%	348	1.7%	1.4
Other	512	1.8%	371	1.8%	1.4
Shuttle Van	252	0.9%	130	0.6%	1.9
Charter	2,341	8.4%	234	1.1%	10
SamTrans Bus	980	3.5%	33	0.2%	30
Subtotal	27,997	100.0%	20,487	100.0%	
Terminal Area Subtotal	139,223		85,800		
Non-Terminal Area					
Employees - based on 17,000 non-terminal-area employees					
Auto - Park	28,461	83.7%	23,522	94.6%	1.2
Auto - Drop-off	575	1.7%	422	1.7%	1.4
Other	622	1.8%	451	1.8%	1.4
Shuttle Van	306	0.9%	158	0.6%	1.9
Charter	2,842	8.4%	284	1.1%	10
SamTrans Bus	1,190	3.5%	40	0.2%	30
Subtotal	33,996	100.0%	24,877	100.0%	
SFIA TOTAL	173,219		110,677		

SOURCE: DKS Associates, Metropolitan Transportation Commission, and SamTrans.

TABLE 28: 1996 MODE SPLIT

	Daily Trips				
	1996 Person-Trips		1996 Vehicle-Trips		Average Vehicle
	Volume	Percent	Volume	Percent	Occupancy
Terminal Area					
Air Passengers					
Auto - Park	32,875	20.1%	19,686	20.5%	1.7
Auto - Drop-off	52,028	31.8%	37,163	38.7%	1.4
Rental Car	28,232	17.2%	20,166	21.0%	1.4
Taxi/Limo	8,879	5.4%	6,434	6.7%	1.4
Shuttle Van	17,698	10.8%	9,123	9.5%	1.9
Shuttle Bus	19,759	12.1%	3,073	3.2%	6.4
SamTrans Bus	4,302	2.6%	384	0.4%	11.2
Subtotal	163,774	100.0%	96,029	100.0%	
Employees - based on 17,161 terminal-area employees					
Auto - Park	28,384	82.7%	23,458	94.4%	1.2
Auto - Drop-off	580	1.7%	427	1.7%	1.4
Other	628	1.8%	455	1.8%	1.4
Shuttle Van	309	0.9%	159	0.6%	1.9
Charter	2,869	8.4%	287	1.2%	10
SamTrans Bus	1,544	4.5%	51	0.2%	30
Subtotal	34,314	100.0%	24,837	100.0%	
Terminal Area Subtotal	198,088		120,866		
Non-Terminal Area					
Employees - based on 20,839 non-terminal-area employees					
Auto - Park	34,468	82.7%	28,486	94.4%	1.2
Auto - Drop-off	704	1.7%	518	1.7%	1.4
Other	763	1.8%	553	1.8%	1.4
Shuttle Van	375	0.9%	193	0.6%	1.9
Charter	3,484	8.4%	348	1.2%	10
SamTrans Bus	1,876	4.5%	63	0.2%	30
Subtotal	41,670	100.0%	30,161	100.0%	
SFIA TOTAL	239,758		151,027		

SOURCE: DKS Associates, Metropolitan Transportation Commission, and SamTrans.

TABLE 29: 2006 MODE SPLIT (WITHOUT BART TO SFIA)

	Daily Trips				
	2006 Person-Trips		2006 Vehicle-Trips		Average Vehicle
	Volume	Percent	Volume	Percent	Occupancy
Terminal Area					
Air Passengers					
Auto - Park	40,926	20.1%	24,506	20.5%	1.7
Auto - Drop-off	64,769	31.8%	46,263	38.7%	1.4
Rental Car	35,146	17.2%	25,104	21.0%	1.4
Taxi/Limo	11,053	5.4%	8,009	6.7%	1.4
Shuttle Van	22,032	10.8%	11,357	9.5%	1.9
Shuttle Bus	24,597	12.1%	3,825	3.2%	6.4
SamTrans Bus	5,356	2.6%	478	0.4%	11.2
Subtotal	203,879	100.0%	119,542	100.0%	
Employees - based on 19,103 terminal-area employees					
Auto - Park	31,023	81.2%	25,639	94.3%	1.2
Auto - Drop-off	646	1.7%	475	1.7%	1.4
Other	699	1.8%	507	1.9%	1.4
Shuttle Van	344	0.9%	177	0.7%	1.9
Charter	3,194	8.4%	314	1.2%	10
SamTrans Bus	2,292	6.0%	76	0.3%	30
Subtotal	38,198	100.0%	27,188	100.0%	
Terminal Area Subtotal	242,077		146,730		
Non-Terminal Area					
Employees - based on 23,197 non-terminal-area employees					
Auto - Park	37,672	81.2%	31,134	94.3%	1.2
Auto - Drop-off	784	1.7%	577	1.7%	1.4
Other	835	1.8%	605	1.9%	1.4
Shuttle Van	418	0.9%	215	0.7%	1.9
Charter	3,897	8.4%	390	1.2%	10
SamTrans Bus	2,784	6.0%	93	0.3%	30
Subtotal	46,390	100.0%	33,014	100.0%	
SFIA TOTAL	288,467		179,744		

SOURCE: DKS Associates, Metropolitan Transportation Commission, and SamTrans.

TABLE 30: 2006 MODE SPLIT (WITH BART TO SFIA)

	Daily Trips				
	2006 Person-Trips		2006 Vehicle-Trips		Average Vehicle
	Volume	Percent	Volume	Percent	Occupancy
Terminal Area					
Air Passengers					
Auto - Park	38,287	18.8%	22,926	20.2%	1.7
Auto - Drop-off	60,485	29.7%	43,204	38.1%	1.4
Rental Car	35,029	17.2%	25,020	22.1%	1.4
Taxi/Limo	10,997	5.4%	7,969	7.0%	1.4
Shuttle Van	19,958	9.8%	10,288	9.1%	1.9
Shuttle Bus	24,642	12.1%	3,832	3.4%	6.4
SamTrans Bus	2,037	1.0%	182	0.2%	11.2
BART	12,219	6.0%	0	0.0%	n/a
Subtotal	203,654	100.0%	113,421	100.0%	
Employees - based on 19,103 terminal-area employees					
Auto - Park	28,349	74.2%	23,429	94.2%	1.2
Auto - Drop-off	573	1.5%	421	1.7%	1.4
Other	611	1.6%	443	1.8%	1.4
Shuttle Van	535	1.4%	276	1.1%	1.9
Charter	2,674	7.0%	267	1.1%	10
SamTrans Bus	1,261	3.3%	42	0.2%	30
BART	4,203	11.0%	0	0.0%	n/a
Subtotal	38,206	100.0%	24,878	100.0%	
Terminal Area Subtotal	241,860		138,299		
Non-Terminal Area					
Employees - based on 23,197 non-terminal-area employees					
Auto - Park	34,424	74.2%	28,450	94.2%	1.2
Auto - Drop-off	696	1.5%	512	1.7%	1.4
Other	742	1.6%	538	1.8%	1.4
Shuttle Van	650	1.4%	335	1.1%	1.9
Charter	3,248	7.0%	325	0.2%	10
SamTrans Bus	1,531	3.3%	51	0.2%	30
BART	5,103	11.0%	0	0.0%	0
Subtotal	46,394	100.0%	30,211	100.0%	
SFIA TOTAL	288,254		168,510		

SOURCE: DKS Associates, Metropolitan Transportation Commission, and SamTrans.

List-Added Growth

Traffic generation of the proposed list-added land uses was estimated based on standard Institute of Transportation Engineers (ITE) trip generation rates. Table G-4 in Appendix G, p. A.165, summarizes the list-added-projects trip generation for the a.m. and p.m. peak hours.

Trip Distribution

Project - SFIA Master Plan

The trip distribution for project-related traffic was developed based on the 1983 Employee Survey conducted by SamTrans and the 1989 Air Passenger Survey conducted by the Metropolitan Transportation Commission (MTC). These documents note the cities and/or counties of origin for trips destined for SFIA. The trip distributions (shown in Figure 29 for air passengers and Figure 30 for SFIA employees, pp. 290-291) were assumed not to change for the future-year scenarios. The employee and air passenger trip distributions were combined into an overall SFIA trip distribution, which was then compared against the MTC nine-county Bay Area 700-zone model's trip distribution for the SFIA zone. The trip distribution based on survey data was determined to be consistent with MTC's SFIA trip distribution. (Note: in Figure 29, trip percentages for I-280 North, I-280 South and San Bruno Avenue do not total the percentage for I-380 due to rounding. In Figure 30, 6.5 percent of trips are shown for I-380 west of I-280, although I-380 does not extend west of 280. These trips are assumed to dissipate on the western portions of Sneath Lane and San Bruno Avenue.)

List-Added Growth

The trip distribution for each list-added project was determined from MTC's 700-zone Bay Area traffic model. List-added growth traffic was distributed to the network according to the distribution percentages outlined in Table 33, p. 292.

Mode Split

A variety of travel modes are available for both employees and air passengers to get to SFIA: drive alone, carpool, bus transit, shuttle vans, shuttle buses, public transit

(SamTrans), combined use of public transit with CalTrain or BART, rental cars, taxis and limousines.

TABLE 31: PROJECT TRIP GENERATION 1996 A.M. AND P.M. PEAK HOURS

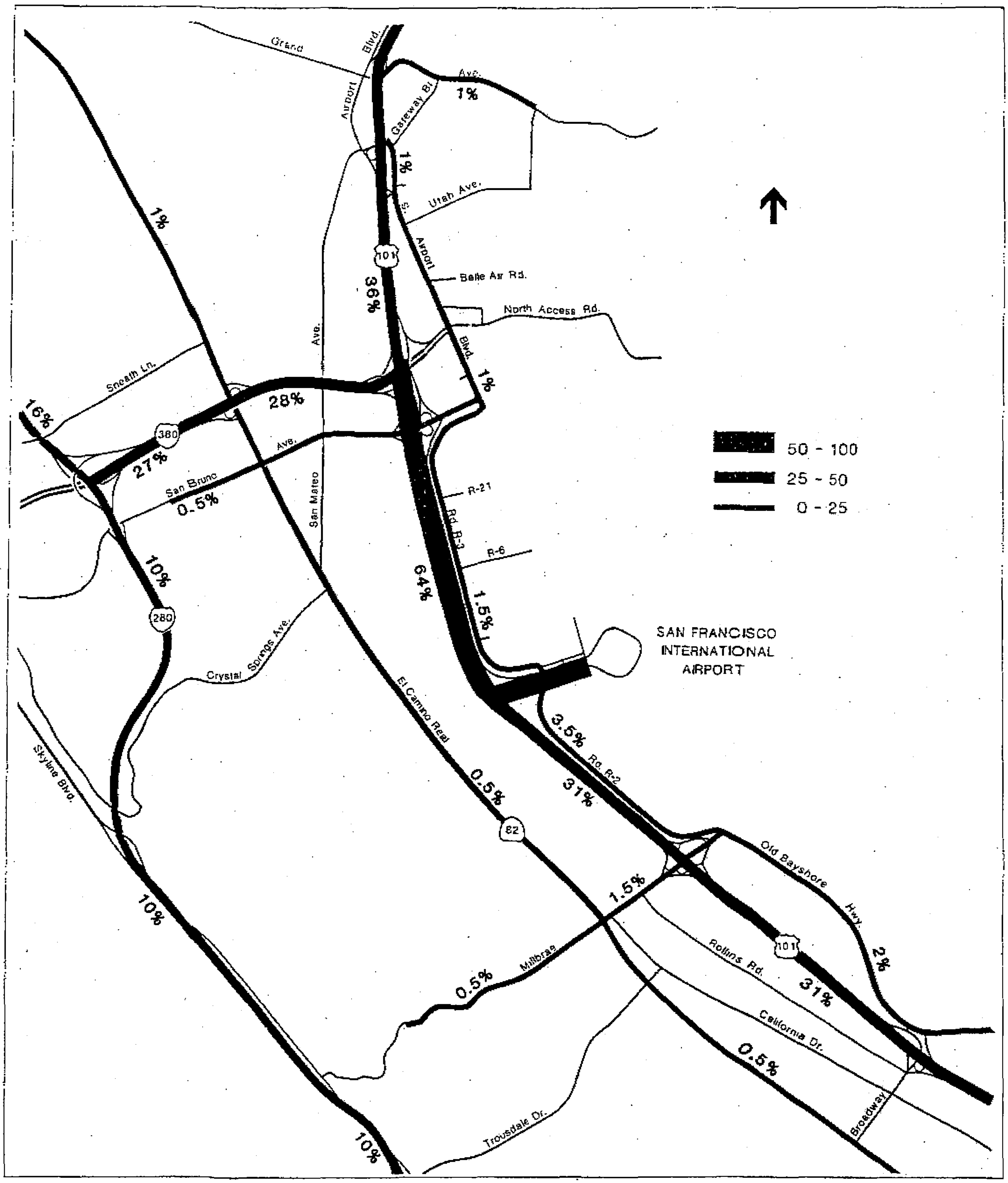
Name		Units	A.M. Peak Hour Rate In	A.M. Peak Hour Rate Out	A.M. Peak Hour Trips In	A.M. Peak Hour Trips Out	A.M. Peak Hour Total Trips	P.M. Peak Hour Rate In	P.M. Peak Hour Rate Out	P.M. Peak Hour Trips In	P.M. Peak Hour Trips Out	P.M. Peak Hour Total Trips
APM Interim Maint. Facility	60.00	KSF	0.85	0.12	51	7	58	0.13	0.91	8	55	63
Pan Am Maintenance Hangar	100.67	KSF	0.85	0.12	86	12	98	0.13	0.91	13	92	105
Service Station Relocate	0.10	KSF	0.85	0.12	0	0	0	0.13	0.91	0	0	0
New Bldg/Const/Engine Office	5.80	KSF	0.46	0.07	3	0	3	0.08	0.42	0	2	3
Unconstrained Growth A.M.	824.00	Enp	1.10	0.88	904	728	1,632					
Unconstrained Growth P.M.	895.00	Enp						0.950	1.030	856	922	1,772
UAL Catering Facility	46.20	KSF	0.85	0.12	39	6	45	0.13	0.91	6	42	48
UAL Cargo Facility Expand	36.28	KSF	0.85	0.12	31	4	35	0.13	0.91	5	33	38
W. Field Cargo/Maint.	268.70	KSF	0.85	0.12	228	32	260	0.13	0.91	35	245	280
American GSE	7.50	KSF	0.85	0.12	6	1	7	0.13	0.91	1	7	8
E. Field Cargo/Maint.	226.44	KSF	0.85	0.12	192	27	219	0.13	0.91	29	206	235
FBO Facility	1.89	KSF	0.85	0.12	2	0	2	0.13	0.91	0	2	2
N. Field Cargo/Maint.	237.00	KSF	0.85	0.12	201	28	229	0.13	0.91	31	216	247
Multipurpose Facility	5.00	KSF	0.85	0.12	4	1	5	0.13	0.91	1	5	6

SOURCES: ITE, DKS Associates

TABLE 32: PROJECT TRIP GENERATION 2006 A.M. AND P.M. PEAK HOURS

Name		Units	A.M. Peak Hour Rate In	Rate Out	Trips In	Trips Out	Total Trips	P.M. Peak Hour Rate In	Rate Out	Trips In	Trips Out	Total Trips
Pan Am Maintenance Hangar	100.67	KSF	0.85	0.12	86	12	98	0.13	0.91	13	92	105
Service Station Relocate	0.10	KSF	0.85	0.12	0	0	0	0.13	0.91	0	0	0
100K Office Building	86.94	KSF	0.46	0.07	40	6	46	0.08	0.42	7	37	43
New Bldg/Const/Engine Office	5.80	KSF	0.46	0.07	3	0	3	0.08	0.42	0	2	3
Unconstrained Growth A.M.	1,428.00	Enp	1.10	0.88	1,567	1,261	2,827					
Unconstrained Growth P.M.	1,552.00	Enp						0.950	1.030	1,474	1,599	3,073
UAL Catering Facility	46.20	KSF	0.85	0.12	39	6	45	0.13	0.91	6	42	48
UAL Cargo Facility Expand	36.28	KSF	0.85	0.12	31	4	35	0.13	0.91	5	33	38
W. Field Cargo/Maint.	268.70	KSF	0.85	0.12	228	32	260	0.13	0.91	35	245	280
American GSE	7.50	KSF	0.85	0.12	6	1	7	0.13	0.91	1	7	8
W. Field Cargo/Maint.	102.00	KSF	0.85	0.12	87	12	99	0.13	0.91	13	93	106
US Post Office	132.00	KSF	0.85	0.12	112	16	128	0.13	0.91	17	120	137
APM Maintenance Facility	60.00	KSF	0.84	0.12	50	7	58	0.12	0.91	7	55	62
E. Field Cargo/Maint.	226.44	KSF	0.85	0.12	192	27	219	0.13	0.91	29	206	235
FBO Facility	1.89	KSF	0.85	0.12	2	0	2	0.13	0.91	0	2	2
N. Field Cargo/Maint.	237.00	KSF	0.85	0.12	201	28	229	0.13	0.91	31	216	247
Multipurpose Facility	5.00	KSF	0.85	0.12	4	1	5	0.13	0.91	1	5	6

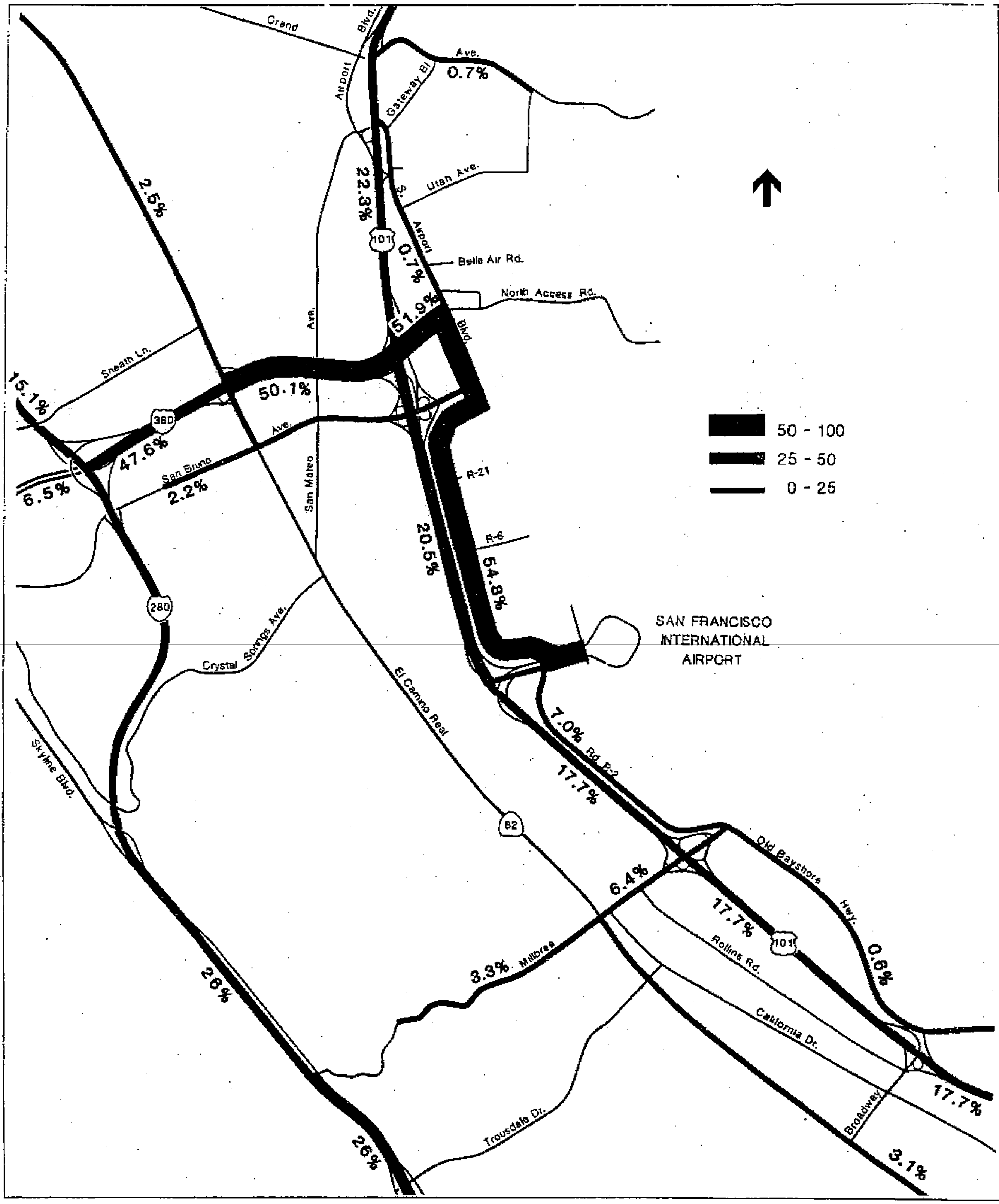
SOURCES: ITE, and DKS Associates



SOURCE: 1985 MTC Air Passenger Survey
1989 San Francisco Airport Commission Air Passenger Survey

San Francisco International Airport

Figure 29
Trip Distribution
of SFIA Passengers



SOURCE: 1983 SamTrans Employee/Employer Survey

San Francisco International Airport

Figure 30
Trip Distribution of
SFIA Employees

TABLE 33: TRIP DISTRIBUTION FOR LIST-ADDED GROWTH

	Percent of Trips Assigned			
To	From Burlingame	From Millbrae	From San Bruno	From South San Francisco
SFIA Terminal Area	3.1%	5.1%	3.1%	2.5%
South San Francisco	2.7	4.0	18.7	31.2
US 101 NB	11.5	21.7	38.0	30.8
El Camino Real (SR 82) NB	1.9	11.1	2.2	2.2
I-280 NB	3.4	9.4	15.9	11.0
I-380 WB	0.2	0.9	3.0	1.7
Burlingame	16.2	10.3	2.4	2.5
US 101 SB	37.5	15.4	8.8	7.9
El Camino Real (SR 82) SB	16.0	9.7	2.3	1.1
I-280 SB	2.3	2.2	1.2	1.0
Millbrae Avenue	4.7	7.4	1.6	0.6
San Bruno Avenue	0.5	2.8	2.9	7.5
TOTAL:	100.0%	100.0%	100.0%	100.0%

SOURCE: MTC 2005 Trip Tables, June 1989.

In order to estimate future transit mode splits, it was necessary to convert vehicle trips, as estimated above, to person-trips, forecast changes in mode use at the person-trip level, then reconvert to vehicle trips. This method was useful in determining a likely number of person trips that would shift to BART in 2006 and the number of vehicle trips that would be removed from roadways in the impact area as a result of BART service to SFIA. Tables 27, 28, and 29, pp. 283-285 illustrate mode split for SFIA person and vehicle trips in 1990, 1996 and 2006. Table 30, p. 286 illustrates mode split for 2006 with the BART to SFIA scenario.

EXISTING TRAFFIC CONDITIONS

The results of the existing traffic conditions analysis, which are described in the setting section, have been summarized in Table 34 for intersections shown on Figure 31, p. 294.

TABLE 34: EXISTING INTERSECTION LEVELS OF SERVICE IN THE VICINITY OF SFIA

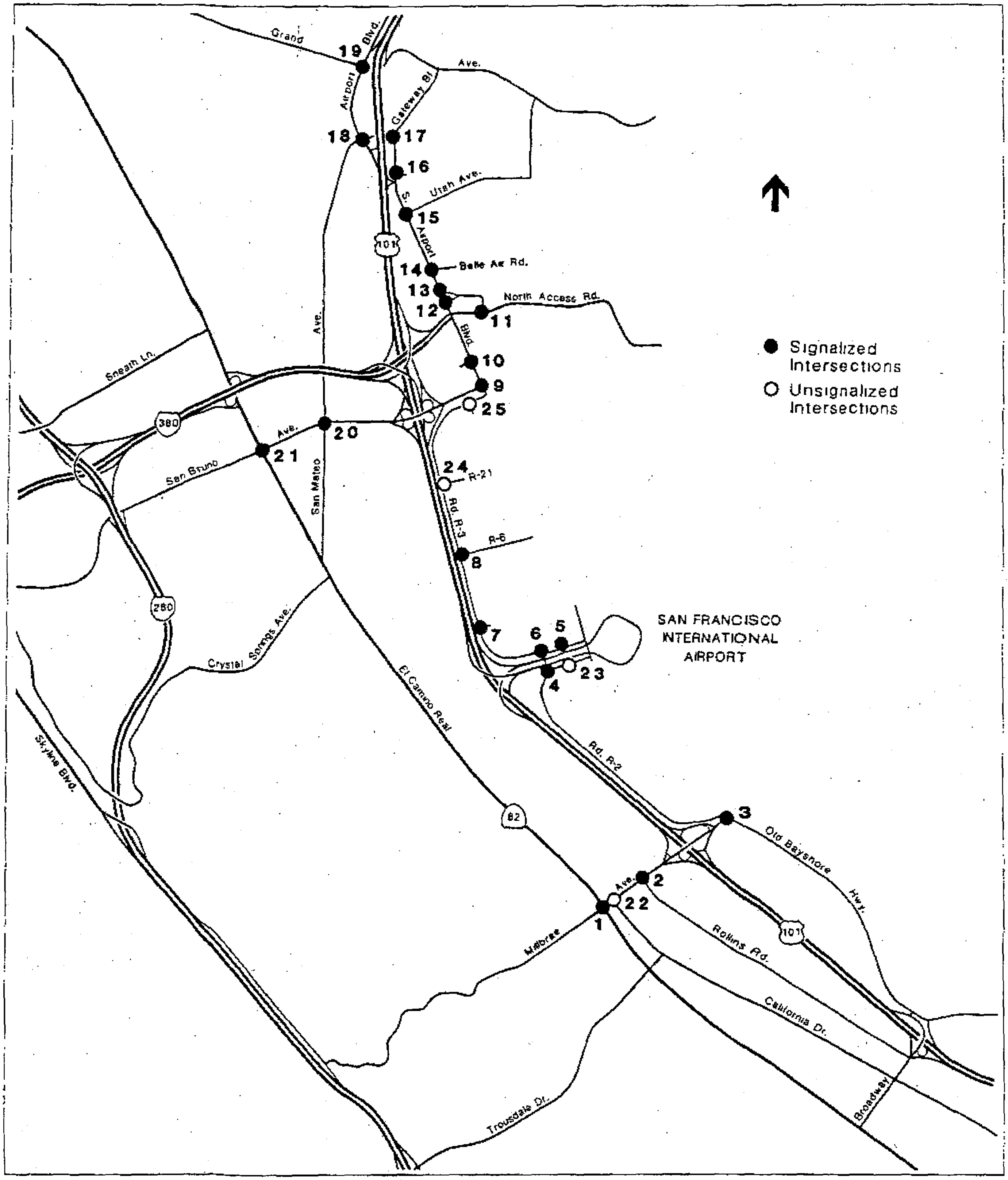
Intersection	A.M. Peak Hour V/C	A.M. Peak Hour LOS	P.M. Peak Hour V/C	P.M. Peak Hour LOS
Signalized				
1. El Camino Real/Millbrae Ave	0.92	E	1.00	F
2. Rollins Rd/Millbrae Ave	0.94	E	0.77	C
3. Old Bayshore Hwy/Millbrae Ave	0.24	A	0.49	A
4. Rd R-2/Rd R-16/Hilton Hotel	0.24	A	0.42	A
5. Rds R-20, R-22/Rd R-18	0.24	A	0.23	A
6. Rd R-3 (McDonnell)/Rd R-18	0.28	A	0.32	A
7. Rd R-3/UAL Cargo	0.15	A	0.18	A
8. Rd R-3/Rd R-6	0.25	A	0.28	A
9. S. Airport Blvd/San Bruno Ave	0.39	A	0.39	A
11. N. Access Rd/N. Access Road E. (101/380 on-/off-ramp)	0.51	A	0.35	A
12. S. Airport Blvd/N. Access Rd S. (101/380 off-ramp)	0.44	A	0.51	A
13. S. Airport Blvd/N. Access Rd N. (101/380 on-ramp)	0.32	A	0.33	A
14. S. Airport Blvd/Belle Air Rd	0.30	A	0.71	C
15. S. Airport Blvd/Utah Ave	0.50	A	0.91	D/E
16. S. Airport Blvd/US 101 NB ramps/ Radisson Hotel	0.52	A	0.52	A
17. S. Airport Blvd/Gateway Blvd	0.30	A	0.45	A
18. Airport Blvd/Produce Ave/ San Mateo Ave	0.37	A	0.71	C
19. Airport Blvd/Grand Ave	0.65	B	0.70	C
20. San Mateo Ave/San Bruno Ave	0.59	A	0.69	B
21. El Camino Real/San Bruno Ave	0.61	B	1.00	F
Unsignalized /a/				
22. California Dr/Millbrae Ave		A/A		A/C
23. Rds R-24, R-26/Rd R-16/b/		> C		> C
24. Rd R-3/Rd R-6		< C		< C
25. Long-Term Parking/Rd R-3		A/C		A/C

NOTES: > C = LOS C or better (e.g., LOS A, B or C); < C = LOS D or worse (e.g., LOS D, E or F). Intersection 10 in Figure 17 in Section III.B was counted for pedestrian volumes only, so does not appear in this table.

/a/ Unsignalized intersection levels of service reflect the delays for left-turning movements from the major street onto the minor street (the first letter), and from the minor street onto the major street (the second letter). They are based on the excess capacity available to make the indicated movement.

/b/ For multi-stop controlled intersections (3-way and 4-way stop signs), the 1985 *Highway Capacity Manual* specifies a total intersection approach volume that corresponds to LOS C.

SOURCE: DKS Associates.



SOURCE: DKS Associates

San Francisco International Airport

Figure 31
Intersections Analyzed

PROJECT IMPACTS

Intersections

The project's impacts on signalized and unsignalized intersection operations were determined by adding traffic generated by the project to 1996 and 2006 forecast-growth traffic volumes and calculating intersection levels of service. Table 35 shows the intersections' levels of service with project traffic in 1996. This table compares 1990 existing conditions to future forecast-growth conditions (e.g., no-project with a maximum of 4 percent background (forecast) growth, and also to future-forecast-growth-plus-project conditions. For some intersections, volume/capacity (V/C) ratios decrease from existing (1990) values to No-Project (1996) values. This is the result of planned intersection improvements, to be completed by 1996, that would offset expected increases in area traffic growth.

1996 Forecast Growth Plus Project

The forecast-growth traffic condition alone in 1996 would cause the intersection of Airport Boulevard at Grand Avenue to degrade from LOS B to LOS D in the a.m. peak hour. No other intersection would experience a LOS grade change as a result of 1996 a.m. peak-hour forecast-growth traffic. The addition of 1996 project traffic to 1996 a.m. peak-hour forecast-growth traffic volumes would cause the level of service (LOS) at two intersections to degrade to LOS F from LOS E: El Camino Real (SR 82) at Millbrae Avenue, and Rollins Road at Millbrae Avenue. The intersection of Airport Boulevard at Grand Avenue would remain at LOS D with 1996 project traffic.

Forecast-growth traffic alone in 1996 would cause the intersection of Rollins Road at Millbrae Avenue to degrade from LOS C to LOS C/D during the p.m. peak hour. The addition of 1996 project traffic to 1996 p.m. peak-hour forecast-growth traffic volumes would cause no degradations in level of service to unacceptable levels (LOS E or F). The LOS at South Airport Boulevard at Utah Avenue would remain at LOS E with the addition of 1996 project traffic. The intersections of El Camino Real at Millbrae Avenue and El Camino Real at San Bruno Avenue would remain at LOS F and LOS E/F, respectively, with the addition of 1996 project traffic, although the poor conditions would occur for a longer period of time.

TABLE 35: 1996 PROJECT IMPACTS - INTERSECTION LEVELS OF SERVICE IN THE VICINITY OF SFIA - A.M. PEAK HOUR

Intersection	1990 Existing V/C	1990 Existing LOS	1996 Forecast Growth V/C	1996 Forecast Growth LOS	1996 With Project V/C	1996 With Project LOS
Signalized						
1. El Camino Real/Millbrae Ave.	0.92	E	0.96	E	1.03	F
2. Rollins Rd./Millbrae Ave.	0.94	E	0.97	E	1.02	F
3. Old Bayshore Hwy./Millbrae Ave.	0.24	A	0.24	A	0.31	A
4. Rd. R-2/Rd. R-16/Hilton Hotel	0.24	A	0.24	A	0.28	A
5. Rds. R-20, R-22/Rd. R-18	0.24	A	0.24	A	0.28	A
6. Rd. R-3 (McDonnell)/Rd. R-18	0.28	A	0.20	A	0.29	A
7. Rd. R-3/UAL Cargo	0.15	A	0.15	A	0.18	A
8. Rd. R-3/Rd. R-6	0.25	A	0.19	A	0.29	A
9. S. Airport Blvd./San Bruno Ave.	0.39	A	0.39	A	0.46	A
11. N. Access Rd./N. Access Road E. (101/380 on-/off-ramp)	0.51	A	0.40	A	0.53	A
12. S. Airport Blvd./N. Access Rd. S. (101/380 off-ramp)	0.44	A	0.45	A	0.60	A/B
13. S. Airport Blvd./N. Access Rd. N. (101/380 on-ramp)	0.32	A	0.33	A	0.34	A
14. S. Airport Blvd./Belle Air Rd.	0.30	A	0.31	A	0.31	A
15. S. Airport Blvd./Utah Ave.	0.50	A	0.50	A	0.50	A
16. S. Airport Blvd./US 101 NB ramps/ Radisson Hotel	0.52	A	0.53	A	0.54	A
17. S. Airport Blvd./Gateway Blvd.	0.30	A	0.29	A	0.29	A
18. Airport Blvd./Produce Ave./ San Mateo Ave.	0.37	A	0.37	A	0.37	A
19. Airport Blvd./Grand Ave.	0.65	B	0.86	D	0.86	D
20. San Mateo Ave./San Bruno Ave.	0.59	A	0.52	A	0.55	A
21. El Camino Real/San Bruno Ave.	0.61	B	0.61	A/B	0.66	B
Unsignalized/a/						
22. California Dr./Millbrae Ave.		A/A		A/C		A/D
23. Rds. R-24, R-26/Rd. R-16/b/		> C		> C		< C
24. Rd. R-3/Rd. R-6		< C		> C		> C
25. Long-Term Parking/Rd. R-3		A/C		A/C		A/D

NOTE: > C = LOS C or better (e.g., LOS A, B or C); < C = LOS D or worse (e.g., LOS D, E or F). Intersection 10 in Figure 17, Section III.B Transportation Setting, was counted for pedestrian volumes only, so does not appear in this table.

/a/ Unsignalized intersection levels of service reflect the delays from left-turning movements from the major street onto the minor street (the first letter), and from the minor street onto the major street (the second letter). They are based on the excess capacity available to make the indicated movement.

/b/ For multi-stop controlled intersections (3-way and 4-way stop signs), the 1985 *Highway Capacity Manual* specifies a total intersection approach volume that corresponds to LOS C.

SOURCE: DKS Associates.

TABLE 35: 1996 PROJECT IMPACTS (Continued) - INTERSECTION LEVELS OF SERVICE IN THE VICINITY OF SFIA - P.M. PEAK HOUR

	Intersection	1990 Existing V/C	1990 Existing LOS	1996 Forecast Growth V/C	1996 Forecast Growth LOS	1996 With Project V/C	1996 With Project LOS
Signalized							
1	El Camino Real/Millbrae Ave.	1.00	F	1.05	F	1.10	F
2.	Rollins Rd./Millbrae Ave.	0.77	C	0.80	C/D	0.84	D
3.	Old Bayshore Hwy./Millbrae Ave.	0.49	A	0.49	A	0.55	A
4.	Rd. R-2/Rd. R-16/Hilton Hotel	0.42	A	0.42	A	0.43	A
5.	Rds. R-20, R-22/Rd. R-18	0.23	A	0.23	A	0.30	A
6.	Rd. R-3 (McDonnell)/Rd. R-18	0.32	A	0.23	A	0.36	A
7.	Rd. R-3/UAL Cargo	0.18	A	0.18	A	0.24	A
8.	Rd. R-3/Rd. R-6	0.28	A	0.19	A	0.23	A
9.	S. Airport Blvd./San Bruno Ave.	0.39	A	0.35	A	0.38	A
11.	N. Access Rd./N. Access Road E. (101/380 on-/off-ramp)	0.35	A	0.22	A	0.24	A
12.	S. Airport Blvd./N. Access Rd. S. (101/380 off-ramp)	0.51	A	0.51	A	0.62	B
13.	S. Airport Blvd./N. Access Rd. N. (101/380 on-ramp)	0.33	A	0.33	A	0.49	A
14.	S. Airport Blvd./Belle Air Rd.	0.71	C	0.73	C	0.73	C
15.	S. Airport Blvd./Utah Ave.	0.91	D/E	0.94	E	0.94	E
16.	S. Airport Blvd./US 101 NB ramps/ Radisson Hotel	0.52	A	0.54	A	0.54	A
17.	S. Airport Blvd./Gateway Blvd.	0.45	A	0.48	A	0.48	A
18.	Airport Blvd./Produce Ave./ San Mateo Ave.	0.71	C	0.73	C	0.73	C
19.	Airport Blvd./Grand Ave.	0.70	C	0.72	C	0.72	C
20.	San Mateo Ave./San Bruno Ave.	0.69	B	0.65	B	0.69	B
21.	El Camino Real/San Bruno Ave.	1.00	F	1.00	E/F	1.01	E/F
Unsignalized/a/							
22.	California Dr./Millbrae Ave.		A/C		A/C		A/D
23.	Rds. R-24, R-26/Rd. R-16/b/		> C		> C		< C
24.	Rd. R-3/Rd. R-6		< C		> C		> C
25.	Long-Term Parking/Rd. R-3		A/C		A/C		A/D

NOTE: > C = LOS C or better (e.g., LOS A, B or C); < C = LOS D or worse (e.g., LOS D, E or F). Intersection 10 in Figure 17, Section III.B. Transportation Setting, was counted for pedestrian volumes only, so does not appear in this table.

/a/ Unsignalized intersection levels of service reflect the delays from left-turning movements from the major street onto the minor street (the first letter), and from the minor street onto the major street (the second letter). They are based on the excess capacity available to make the indicated movement.

/b/ For multi-stop controlled intersections (3-way and 4-way stop signs), the 1985 *Highway Capacity Manual* specifies a total intersection approach volume that corresponds to LOS C.

SOURCE: DKS Associates.

1996 Project + List-Added Growth

The results of the intersection level of service analyses with the addition of list-added growth traffic are shown in Table 36. Table 36 compares 1990 existing LOS to 1996 no-project (forecast-growth) conditions, 1996-forecast-growth-with-project conditions, and 1996-with-project-and-list-added-growth conditions.

The addition of 1996 list-added-growth traffic to 1996 a.m. peak hour project traffic volumes would cause the intersection of El Camino Real at San Bruno Avenue to degrade from LOS B to LOS E (the degradation in level of service is largely attributable to the planned urban development projects in the immediate vicinity of this intersection). LOS F conditions at the Millbrae Avenue intersections at El Camino Real and at Rollins Road would remain, but occur over a longer period of time in the future. List-added-growth in San Bruno would contribute to traffic at Millbrae Avenue and El Camino Real. The intersection of San Mateo Avenue at San Bruno Avenue would degrade from LOS A (existing) to LOS C during the a.m. peak hour with list-added-growth traffic in 1996.

The addition of 1996 list-added-growth traffic to 1996 p.m. peak-hour project traffic volumes would cause the level of service at South Airport Boulevard at Utah Avenue to degrade from LOS E to LOS F. The intersection of San Mateo Avenue and San Bruno Avenue would degrade from LOS B to LOS E with the addition of 1996 list-added growth traffic. Then existing LOS F conditions at El Camino Real at Millbrae Avenue and at El Camino Real at San Bruno Avenue would occur over a longer period of time. South Airport Boulevard at Belle Air Road would degrade from LOS C today to LOS D in 1996 with list-added-growth traffic.

2006 Project

Table 37, p. 301 presents the LOS comparison for the 2006 with-project condition. The table includes the LOS summaries for the 1990 existing, 2006 no-project (forecast-growth), and 2006 with-project cases.

The addition of 2006 forecast-growth a.m. peak hour traffic to 1990 existing conditions would cause the intersections of El Camino Real at Millbrae Avenue and

TABLE 36: PROJECT PLUS LIST-ADDED-GROWTH TRAFFIC (1996) - A.M. PEAK HOUR

Intersection		1990 Existing V/C	1990 Existing LOS	1996 Forecast Growth V/C	1996 Forecast Growth LOS	1996 With Project V/C	1996 With Project LOS	1996 Project Plus List-Added Growth V/C	1996 Project Plus List-Added Growth LOS
Signalized									
1.	El Camino Real/Millbrae Ave.	0.92	E	0.96	E	1.03	F	1.09	F
2.	Rollins Rd./Millbrae Ave.	0.94	E	0.97	E	1.02	F	1.05	F
3.	Old Bayshore Hwy./Millbrae Ave.	0.24	A	0.24	A	0.31	A	0.40	A
4.	Rd. R-2/Rd. R-16/Hilton Hotel	0.24	A	0.24	A	0.28	A	0.28	A
5.	Rds. R-20, R-22/Rd. R-18	0.24	A	0.24	A	0.28	A	0.32	A
6.	Rd. R-3 (McDonnell)/Rd. R-18	0.28	A	0.20	A	0.29	A	0.34	A
7.	Rd. R-3/UAL Cargo	0.15	A	0.15	A	0.18	A	0.18	A
8.	Rd. R-3/Rd. R-6	0.25	A	0.19	A	0.29	A	0.29	A
9.	S. Airport Blvd./San Bruno Ave.	0.39	A	0.39	A	0.46	A	0.48	A
11.	N. Access Rd./N. Access Road E. (101/380 on-/off-ramp)	0.51	A	0.40	A	0.53	A	0.53	A
12.	S. Airport Blvd./N. Access Rd. S. (101/380 off-ramp)	0.44	A	0.45	A	0.60	A/B	0.69	B
13.	S. Airport Blvd./N. Access Rd. N. (101/380 on-ramp)	0.32	A	0.33	A	0.34	A	0.39	A
14.	S. Airport Blvd./Belle Air Rd.	0.30	A	0.31	A	0.31	A	0.36	A
15.	S. Airport Blvd./Utah Ave.	0.50	A	0.50	A	0.50	A	0.55	A
16.	S. Airport Blvd./US 101 NB ramps/ Radisson Hotel	0.52	A	0.53	A	0.54	A	0.68	B
17.	S. Airport Blvd./Gateway Blvd.	0.30	A	0.29	A	0.29	A	0.44	A
18.	Airport Blvd./Produce Ave./ San Mateo Ave.	0.37	A	0.37	A	0.37	A	0.37	A
19.	Airport Blvd./Grand Ave.	0.65	B	0.86	D	0.86	D	0.86	D
20.	San Mateo Ave./San Bruno Ave.	0.59	A	0.52	A	0.55	A	0.78	C
21.	El Camino Real/San Bruno Ave.	0.61	B	0.61	A/B	0.66	B	0.94	E
Unsignalized/a/									
22.	California Dr./Millbrae Ave.		A/A		A/C		A/D		A/D
23.	Rds. R-24, R-26/Rd. R-16/b/		> C		> C		< C		< C
24.	Rd. R-3/Rd. R-6		< C		> C		> C		> C
25.	Long-Term Parking/Rd. R-3		A/C		A/C		A/D		A/D

NOTE: > C = LOS C or better (e.g., LOS A, B or C); < C = LOS D or worse (e.g., LOS D, E or F). Intersection 10 in Figure 17, Section III.B. Transportation Setting, was counted for pedestrian volumes only, so does not appear in this table.

/a/ Unsignalized intersection levels of service reflect the delays from left-turning movements from the major street onto the minor street (the first letter), and from the minor street onto the major street (the second letter). They are based on the excess capacity available to make the indicated movement.

/b/ For multi-stop controlled intersections (3-way and 4-way stop signs), the 1985 *Highway Capacity Manual* specifies a total intersection approach volume that corresponds to LOS C.

SOURCE: DKS Associates.

TABLE 36: PROJECT PLUS LIST-ADDED GROWTH TRAFFIC (1996) (Continued)- P.M. PEAK HOUR

Intersection		1990 Existing V/C	1990 Existing LOS	1996 Forecast Growth V/C	1996 Forecast Growth LOS	1996 With Project V/C	1996 With Project LOS	1996 Project Plus List-Added Growth V/C	1996 Project Plus List-Added Growth LOS
Signalized									
1.	El Camino Real/Millbrae Ave.	1.00	F	1.05	F	1.10	F	1.16	F
2.	Rollins Rd./Millbrae Ave.	0.77	C	0.80	C/D	0.84	D	0.87	D
3.	Old Bayshore Hwy./Millbrae Ave.	0.49	A	0.49	A	0.55	A	0.64	B
4.	Rd. R-2/Rd. R-16/Hilton Hotel	0.42	A	0.42	A	0.43	A	0.43	A
5.	Rds. R-20, R-22/Rd. R-18	0.23	A	0.23	A	0.30	A	0.33	A
6.	Rd. R-3 (McDonnell)/Rd. R-18	0.32	A	0.23	A	0.36	A	0.41	A
7.	Rd. R-3/UAL Cargo	0.18	A	0.18	A	0.24	A	0.24	A
8.	Rd. R-3/Rd. R-6	0.28	A	0.19	A	0.23	A	0.23	A
9.	S. Airport Blvd./San Bruno Ave.	0.39	A	0.35	A	0.38	A	0.42	A
11.	N. Access Rd./N. Access Road E. (101/380 on-/off-ramp)	0.35	A	0.22	A	0.24	A	0.24	A
12.	S. Airport Blvd./N. Access Rd. S. (101/380 off-ramp)	0.51	A	0.51	A	0.62	B	0.76	C
13.	S. Airport Blvd./N. Access Rd. N. (101/380 on-ramp)	0.33	A	0.33	A	0.49	A	0.50	A
14.	S. Airport Blvd./Belle Air Rd.	0.71	C	0.73	C	0.73	C	0.81	D
15.	S. Airport Blvd./Utah Ave.	0.91	D/E	0.94	E	0.94	E	1.04	F
16.	S. Airport Blvd./US 101 NB ramps/ Radisson Hotel	0.52	A	0.54	A	0.54	A	0.67	B
17.	S. Airport Blvd./Gateway Blvd.	0.45	A	0.48	A	0.48	A	0.60	B
18.	Airport Blvd./Produce Ave./ San Mateo Ave.	0.71	C	0.73	C	0.73	C	0.73	C
19.	Airport Blvd./Grand Ave.	0.70	C	0.72	C	0.72	C	0.72	C
20.	San Mateo Ave./San Bruno Ave.	0.69	B	0.65	B	0.69	B	0.96	E
21.	El Camino Real/San Bruno Ave.	1.00	F	1.00	E/F	1.01	E/F	1.30	F
Unsignalized/a/									
22.	California Dr./Millbrae Ave.		A/C		A/C		A/D		A/D
23.	Rds. R-24, R-26/Rd. R-16/b/		> C		> C		< C		< C
24.	Rd. R-3/Rd. R-6		< C		> C		> C		> C
25.	Long-Term Parking/Rd. R-3		A/C		A/C		A/D		A/D

NOTE: > C = LOS C or better (e.g., LOS A, B or C); < C = LOS D or worse (e.g., LOS D, E or F). Intersection 10 in Figure 17, Section III.B. Transportation Setting, was counted for pedestrian volumes only, so does not appear in this table.

/a/ Unsignalized intersection levels of service reflect the delays from left-turning movements from the major street onto the minor street (the first letter), and from the minor street onto the major street (the second letter). They are based on the excess capacity available to make the indicated movement.

/b/ For multi-stop controlled intersections (3-way and 4-way stop signs), the 1985 *Highway Capacity Manual* specifies a total intersection approach volume that corresponds to LOS C.

SOURCE: DKS Associates.

TABLE 37: 2006 PROJECT IMPACTS - INTERSECTION LEVELS OF SERVICE IN THE VICINITY OF SFIA - A.M. PEAK HOUR

Intersection		1990 Existing V/C	1990 Existing LOS	2006 Forecast Growth V/C	2006 Forecast Growth LOS	2006 With Project V/C	2006 With Project LOS
Signalized							
1.	El Camino Real/Millbrae Ave.	0.92	E	1.01	F	1.12	F
2.	Rollins Rd./Millbrae Ave.	0.94	E	1.05	F	1.12	F
3.	Old Bayshore Hwy./Millbrae Ave.	0.24	A	0.21	A	0.31	A
4.	Rd. R-2/Rd. R-16/Hilton Hotel	0.24	A	0.21	A	0.26	A
5.	Rds. R-20, R-22/Rd. R-18	0.24	A	0.24	A	0.31	A
6.	Rd. R-3 (McDonnell)/Rd. R-18	0.28	A	0.20	A	0.37	A
7.	Rd. R-3/UAL Cargo	0.15	A	0.15	A	0.19	A
8.	Rd. R-3/Rd. R-6	0.25	A	0.19	A	0.38	A
9.	S. Airport Blvd./San Bruno Ave.	0.39	A	0.39	A	0.53	A
11.	N. Access Rd./N. Access Road E. (101/380 on-/off-ramp)	0.51	A	0.41	A	0.54	A
12.	S. Airport Blvd./N. Access Rd. S. (101/380 off-ramp)	0.44	A	0.46	A	0.63	B
13.	S. Airport Blvd./N. Access Rd. N. (101/380 on-ramp)	0.32	A	0.34	A	0.35	A
14.	S. Airport Blvd./Belle Air Rd.	0.30	A	0.32	A	0.32	A
~~15.~~	~~S. Airport Blvd./Utah Ave.~~	~~0.50~~	~~A~~	~~0.52~~	~~A~~	~~0.53~~	~~A~~
16.	S. Airport Blvd./US 101 NB ramps/ Radisson Hotel	0.52	A	0.54	A	0.56	A
17.	S. Airport Blvd./Gateway Blvd.	0.30	A	0.33	A	0.34	A
18.	Airport Blvd./Produce Ave./ San Mateo Ave.	0.37	A	0.39	A	0.38	A
19.	Airport Blvd./Grand Ave.	0.65	B	0.88	D	0.88	D
20.	San Mateo Ave./San Bruno Ave.	0.59	A	0.52	A	0.56	A
21.	El Camino Real/San Bruno Ave.	0.61	B	0.61	B	0.67	B
Unsignalized/a/							
22.	California Dr./Millbrae Ave.		A/A		A/D		A/E
23.	Rds. R-24, R-26/Rd. R-16/b/		> C		> C		< C
24.	Rd. R-3/Rd. R-6		< C		> C		< C
25.	Long-Term Parking/Rd. R-3		A/C		A/C		A/D

NOTE: > C = LOS C or better (e.g., LOS A, B or C); < C = LOS D or worse (e.g., LOS D, E or F). Intersection 10 in Figure 17, Section III.B Transportation Setting, was counted for pedestrian volumes only, so does not appear in this table.

/a/ Unsignalized intersection levels of service reflect the delays from left-turning movements from the major street onto the minor street (the first letter), and from the minor street onto the major street (the second letter). They are based on the excess capacity available to make the indicated movement.

/b/ For multi-stop controlled intersections (3-way and 4-way stop signs), the 1985 *Highway Capacity Manual* specifies a total intersection approach volume that corresponds to LOS C.

SOURCE: DKS Associates.

TABLE 37: 2006 PROJECT IMPACTS - INTERSECTION LEVELS OF SERVICE IN THE VICINITY OF SFIA (Continued) - P.M. PEAK HOUR

Intersection	1990 Existing V/C	1990 Existing LOS	2006 Forecast Growth V/C	2006 Forecast Growth LOS	2006 With Project V/C	2006 With Project LOS
Signalized						
1. El Camino Real/Millbrae Ave.	1.00	F	1.11	F	1.20	F
2. Rollins Rd./Millbrae Ave.	0.77	C	0.86	D	0.94	E
3. Old Bayshore Hwy./Millbrae Ave.	0.49	A	0.39	A	0.47	A
4. Rd. R-2/Rd. R-16/Hilton Hotel	0.42	A	0.39	A	0.42	A
5. Rds. R-20, R-22/Rd. R-18	0.23	A	0.23	A	0.34	A
6. Rd. R-3 (McDonnell)/Rd. R-18	0.32	A	0.23	A	0.42	A
7. Rd. R-3/UAL Cargo	0.18	A	0.18	A	0.24	A
8. Rd. R-3/Rd. R-6	0.28	A	0.19	A	0.28	A
9. S. Airport Blvd./San Bruno Ave.	0.39	A	0.35	A	0.42	A
11. N. Access Rd./N. Access Road E. (101/380 on-/off-ramp)	0.35	A	0.22	A	0.24	A
12. S. Airport Blvd./N. Access Rd. S. (101/380 off-ramp)	0.51	A	0.54	A	0.70	C
13. S. Airport Blvd./N. Access Rd. N. (101/380 on-ramp)	0.33	A	0.34	A	0.60	B
14. S. Airport Blvd./Belle Air Rd.	0.71	C	0.75	C	0.76	C
15. S. Airport Blvd./Utah Ave.	0.91	D/E	0.96	E	0.97	E
16. S. Airport Blvd./US 101 NB ramps/ Radisson Hotel	0.52	A	0.55	A	0.56	A
17. S. Airport Blvd./Gateway Blvd.	0.45	A	0.49	A	0.49	A
18. Airport Blvd./Produce Ave./ San Mateo Ave.	0.71	C	0.74	C	0.74	C
19. Airport Blvd./Grand Ave.	0.70	C	0.74	C	0.74	C
20. San Mateo Ave./San Bruno Ave.	0.69	B	0.65	B	0.71	C
21. El Camino Real/San Bruno Ave.	1.00	F	1.00	F	1.02	F
Unsignalized/a/						
22. California Dr./Millbrae Ave.		A/C		A/D		A/E
23. Rds. R-24, R-26/Rd. R-16/b/		> C		> C		< C
24. Rd. R-3/Rd. R-6		< C		> C		< C
25. Long-Term Parking/Rd. R-3		A/C		A/C		B/E

NOTE: > C = LOS C or better (e.g., LOS A, B or C); < C = LOS D or worse (e.g., LOS D, E or F). Intersection 10 in Figure 17, Section III.B. Transportation Setting, was counted for pedestrian volumes only, so does not appear in this table.

/a/ Unsignalized intersection levels of service reflect the delays from left-turning movements from the major street onto the minor street (the first letter), and from the minor street onto the major street (the second letter). They are based on the excess capacity available to make the indicated movement.

/b/ For multi-stop controlled intersections (3-way and 4-way stop signs), the 1985 *Highway Capacity Manual* specifies a total intersection approach volume that corresponds to LOS C.

SOURCE: DKS Associates.

Rollins Road at Millbrae Avenue to degrade from LOS E to LOS F. Airport Boulevard at Grand Avenue would degrade from LOS B to LOS D. The addition of 2006 project traffic to 2006 a.m. peak hour forecast-growth traffic volumes wouldcause the level of service for the California Drive approach right turn only to Millbrae Avenue to degrade from LOS D to LOS E. The intersection of Airport Boulevard at Grand Avenue would remain at LOS D with the 2006 project traffic. The intersections of El Camino Real at Millbrae Avenue, and Rollins Road at Millbrae Avenue, would remain at LOS F, although the poor conditions would occur for a longer period of time.

The addition of 2006 project traffic to 2006 p.m. peak-hour forecast growth traffic volumes would cause the LOS at Rollins Road at Millbrae Avenue, and also for the California Drive approach right turn only to Millbrae Avenue, to degrade from LOS D to LOS E. Both of these are currently LOS C conditions.

The level of service at South Airport Boulevard at Utah Avenue would remain at LOS E and the intersections of El Camino Real at Millbrae Avenue and El Camino Real at San Bruno Avenue would remain at LOS F, with poor conditions occurring for a longer period time during the p.m. peak hour.

2006 Project + List-Added Growth

Table 38 presents the LOS comparisons for the 1990 existing, 2006-no-project, 2006-with-project, and 2006 with-project-and-list-added-growth scenarios.

With the addition of 2006 list-added-growth traffic to 2006 a.m. peak-hour project traffic volumes, the intersection of El Camino Real at San Bruno Avenue would degrade from LOS B in 1990 to LOS E in 2006. The intersection of Airport Boulevard at Grand Avenue would degrade to LOS D; currently it is LOS B. The Millbrae Avenue intersections at El Camino Real and at Rollins Road would degrade from the 1990 LOS E to LOS F, with poor conditions occurring over a longer period of time than before the addition of list-added-growth traffic; the Millbrae Avenue intersections would be affected by list-added-growth in San Bruno, as well as in Millbrae.

The addition of 2006 list-added-growth traffic to 2006 p.m. peak-hour project traffic volumes would cause the level of service at Rollins Road at Millbrae Avenue to degrade

TABLE 38: PROJECT PLUS LIST-ADDED-GROWTH TRAFFIC (2006) - A.M. PEAK HOUR

Intersection	1990 Existing V/C	1990 Existing LOS	2006 Forecast Growth V/C	2006 Forecast Growth LOS	2006 With Project V/C	2006 With Project LOS	2006 Project Plus List-Added Growth V/C	2006 Project Plus List-Added Growth LOS
Signalized								
1. El Camino Real/Millbrae Ave.	0.92	E	1.01	F	1.12	F	1.29	F
2. Rollins Rd./Millbrae Ave.	0.94	E	1.05	F	1.12	F	1.21	F
3. Old Bayshore Hwy./Millbrae Ave.	0.24	A	0.21	A	0.31	A	0.47	A
4. Rd. R-2/Rd. R-16/Hilton Hotel	0.24	A	0.21	A	0.26	A	0.26	A
5. Rds. R-20, R-22/Rd. R-18	0.24	A	0.24	A	0.31	A	0.39	A
6. Rd. R-3 (McDonnell)/Rd. R-18	0.28	A	0.20	A	0.37	A	0.51	A
7. Rd. R-3/UAL Cargo	0.15	A	0.15	A	0.19	A	0.19	A
8. Rd. R-3/Rd. R-6	0.25	A	0.19	A	0.38	A	0.38	A
9. S. Airport Blvd./San Bruno Ave.	0.39	A	0.39	A	0.53	A	0.55	A
11. N. Access Rd./N. Access Road E. (101/380 on-/off-ramp)	0.51	A	0.41	A	0.54	A	0.54	A
12. S. Airport Blvd./N. Access Rd. S. (101/380 off-ramp)	0.44	A	0.46	A	0.63	B	0.73	C
13. S. Airport Blvd./N. Access Rd. N. (101/380 on-ramp)	0.32	A	0.34	A	0.35	A	0.43	A
14. S. Airport Blvd./Belle Air Rd.	0.30	A	0.32	A	0.32	A	0.40	A
15. S. Airport Blvd./Utah Ave.	0.50	A	0.52	A	0.53	A	0.60	B
16. S. Airport Blvd./US 101 NB ramps/ Radisson Hotel	0.52	A	0.54	A	0.56	A	0.77	C
17. S. Airport Blvd./Gateway Blvd.	0.30	A	0.33	A	0.34	A	0.53	A
18. Airport Blvd./Produce Ave./ San Mateo Ave.	0.37	A	0.39	A	0.38	A	0.38	A
19. Airport Blvd./Grand Ave.	0.65	B	0.88	D	0.88	D	0.88	D
20. San Mateo Ave./San Bruno Ave.	0.59	A	0.52	A	0.56	A	0.81	D
21. El Camino Real/San Bruno Ave.	0.61	B	0.61	B	0.67	B	0.99	E
Unsignalized/a/								
22. California Dr./Millbrae Ave.		A/A		A/D		A/E		A/E
23. Rds. R-24, R-26/Rd. R-16/b/		> C		> C		< C		< C
24. Rd. R-3/Rd. R-6		< C		> C		< C		< C
25. Long-Term Parking/Rd. R-3		A/C		A/C		A/D		A/D

NOTE: > C = LOS C or better (e.g., LOS A, B or C); < C = LOS D or worse (e.g., LOS D, E or F). Intersection 10 in Figure 17, Section III.B Transportation Setting, was counted for pedestrian volumes only, so does not appear in this table.

/a/ Unsignalized intersection levels of service reflect the delays from left-turning movements from the major street onto the minor street (the first letter), and from the minor street onto the major street (the second letter). They are based on the excess capacity available to make the indicated movement.

/b/ For multi-stop controlled intersections (3-way and 4-way stop signs), the 1985 *Highway Capacity Manual* specifies a total intersection approach volume that corresponds to LOS C.

SOURCE: DKS Associates.

TABLE 38: PROJECT PLUS LIST-ADDED-GROWTH TRAFFIC (2006) (Continued) - P.M. PEAK HOUR

Intersection	1990 Existing V/C	1990 Existing LOS	2006 Forecast Growth V/C	2006 Forecast Growth LOS	2006 With Project V/C	2006 With Project LOS	2006 Project Plus List-Added Growth V/C	2006 Project Plus List-Added Growth LOS
Signalized								
1. El Camino Real/Millbrae Ave.	1.00	F	1.11	F	1.20	F	1.35	F
2. Rollins Rd./Millbrae Ave.	0.77	C	0.86	D	0.94	E	1.01	F
3. Old Bayshore Hwy./Millbrae Ave.	0.49	A	0.39	A	0.47	A	0.64	B
4. Rd. R-2/Rd. R-16/Hilton Hotel	0.42	A	0.39	A	0.42	A	0.43	A
5. Rds. R-20, R-22/Rd. R-18	0.23	A	0.23	A	0.34	A	0.40	A
6. Rd. R-3 (McDonnell)/Rd. R-18	0.32	A	0.23	A	0.42	A	0.55	A
7. Rd. R-3/UAL Cargo	0.18	A	0.18	A	0.24	A	0.24	A
8. Rd. R-3/Rd. R-6	0.28	A	0.19	A	0.28	A	0.28	A
9. S. Airport Blvd./San Bruno Ave.	0.39	A	0.35	A	0.42	A	0.45	A
11. N. Access Rd./N. Access Road E. (101/380 on-/off-ramp)	0.35	A	0.22	A	0.24	A	0.24	A
12. S. Airport Blvd./N. Access Rd. S. (101/380 off-ramp)	0.51	A	0.54	A	0.70	C	0.86	D
13. S. Airport Blvd./N. Access Rd. N. (101/380 on-ramp)	0.33	A	0.34	A	0.60	B	0.61	B
14. S. Airport Blvd./Belle Air Rd.	0.71	C	0.75	C	0.76	C	0.87	D
15. S. Airport Blvd./Utah Ave.	0.91	D/E	0.96	E	0.97	E	1.10	F
16. S. Airport Blvd./US 101 NB ramps/ Radisson Hotel	0.52	A	0.55	A	0.56	A	0.76	C
17. S. Airport Blvd./Gateway Blvd.	0.45	A	0.49	A	0.49	A	0.66	B
18. Airport Blvd./Produce Ave./ San Mateo Ave.	0.71	C	0.74	C	0.74	C	0.74	C
19. Airport Blvd./Grand Ave.	0.70	C	0.74	C	0.74	C	0.74	C
20. San Mateo Ave./San Bruno Ave.	0.69	B	0.65	B	0.71	C	0.98	E
21. El Camino Real/San Bruno Ave.	1.00	F	1.00	F	1.02	F	1.34	F
Unsignalized/a/								
22. California Dr./Millbrae Ave.		A/C		A/D		A/E		A/E
23. Rds. R-24, R-26/Rd. R-16/b/		> C		> C		< C		< C
24. Rd. R-3/Rd. R-6		< C		> C		< C		< C
25. Long-Term Parking/Rd. R-3		A/C		A/C		B/E		B/E

NOTE: > C = LOS C or better (e.g., LOS A, B or C); < C = LOS D or worse (e.g., LOS D, E or F). Intersection 10 in Figure 17, Section III.B Transportation Setting, was counted for pedestrian volumes only, so does not appear in this table.

/a/ Unsignalized intersection levels of service reflect the delays from left-turning movements from the major street onto the minor street (the first letter), and from the minor street onto the major street (the second letter). They are based on the excess capacity available to make the indicated movement.

/b/ For multi-stop controlled intersections (3-way and 4-way stop signs), the 1985 *Highway Capacity Manual* specifies a total intersection approach volume that corresponds to LOS C.

SOURCE: DKS Associates.

from LOS C today to LOS F. The level of service at South Airport Boulevard and Utah Avenue would degrade from LOS D/E today to LOS F. The intersection of San Mateo Avenue at San Bruno Avenue would degrade from LOS B to LOS E. The El Camino Real intersections at Millbrae Avenue and at San Bruno Avenue would remain at LOS F, and the poor conditions would occur over a longer period of time.

2006 with BART to SFIA

The impacts on intersections of the project with BART to SFIA are shown in Table 39.

If BART were extended to SFIA in 2006, vehicle trips to/from the airport would be reduced. However, none of the study area intersections would experience a change in LOS compared to the 2006-without-BART scenario. In other words, the LOS at each intersection would operate the same during peak hours in 2006 whether or not BART is extended to SFIA. There would be volume reductions at several intersections, but they would not be sufficient to alter any intersection's LOS; either the overall volume reduction would not be great enough, or the reduction would not affect the critical turning movement volume (that which is used to calculate the LOS).

For freeway and ramp LOS analysis (see discussion of Basic Freeway Sections, below), the volume reductions attributable to BART would not affect the LOS. Freeway and ramp LOS analysis is based on volumes per lane, and the threshold levels for an LOS grade change are more than the changes brought about by BART.

The assumed location of the SFIA BART station west of US 101 (BART Alternative 3, p. 267 above) represents the most conservative (least helpful) assumption regarding potential BART ridership and automobile trip reduction. Locating the BART station closer to the SFIA passenger terminals and providing the same automated people mover service, or locating the BART station in a terminal itself (BART Alternative 4, p. 267 above), would result in higher BART patronage than has been assumed in this analysis.

The projected ridership and trip reduction associated with a BART station at SFIA are discussed further in the public transit impacts section of this report.

Basic Freeway Sections

Table 40, p. 309, shows the basic freeway sections' existing levels of service, and Table 41, p. 310, shows the basic freeway sections' levels of service in 1996 and 2006

TABLE 39: PROJECT INTERSECTION IMPACTS IN 2006 WITH BART SERVICE TO THE SFIA VICINITY (INCLUDES FORECAST GROWTH AND LIST-ADDED GROWTH) - A.M. PEAK HOUR

Intersection	1990 Existing V/C	1990 Existing LOS	2006 Project With BART V/C	2006 Project With BART LOS	2006 Project Without BART V/C	2006 Project Without BART LOS
Signalized						
1. El Camino Real/Millbrae Ave.	0.92	E	1.11	F	1.12	F
2. Rollins Rd./Millbrae Ave.	0.94	E	1.11	F	1.12	F
3. Old Bayshore Hwy./Millbrae Ave.	0.24	A	0.30	A	0.31	A
4. Rd. R-2/Rd. R-16/Hilton Hotel	0.24	A	0.25	A	0.26	A
5. Rds. R-20, R-22/Rd. R-18	0.24	A	0.30	A	0.31	A
6. Rd. R-3 (McDonnell)/Rd. R-18	0.28	A	0.33	A	0.37	A
7. Rd. R-3/UAL Cargo	0.15	A	0.19	A	0.19	A
8. Rd. R-3/Rd. R-6	0.25	A	0.36	A	0.38	A
9. S. Airport Blvd./San Bruno Ave.	0.39	A	0.51	A	0.53	A
11. N. Access Rd./N. Access Road E. (101/380 on-/off-ramp)	0.51	A	0.53	A	0.54	A
12. S. Airport Blvd./N. Access Rd. S. (101/380 off-ramp)	0.44	A	0.61	B	0.63	B
13. S. Airport Blvd./N. Access Rd. N. (101/380 on-ramp)	0.32	A	0.34	A	0.35	A
14. S. Airport Blvd./Belle Air Rd.	0.30	A	0.32	A	0.32	A
15. S. Airport Blvd./Utah Ave.	0.50	A	0.53	A	0.53	A
16. S. Airport Blvd./US 101 NB ramps/ Radisson Hotel	0.52	A	0.55	A	0.56	A
17. S. Airport Blvd./Gateway Blvd.	0.30	A	0.34	A	0.34	A
18. Airport Blvd./Produce Ave./ San Mateo Ave.	0.37	A	0.38	A	0.38	A
19. Airport Blvd./Grand Ave.	0.65	B	0.88	D	0.88	D
20. San Mateo Ave./San Bruno Ave.	0.59	A	0.56	A	0.56	A
21. El Camino Real/San Bruno Ave.	0.61	B	0.66	B	0.67	B
Unsignalized/a/						
22. California Dr./Millbrae Ave.		A/A		A/D		A/E
23. Rds. R-24, R-26/Rd. R-16/b/		> C		< C		< C
24. Rd. R-3/Rd. R-6		< C		< C		< C
25. Long-Term Parking/Rd. R-3		A/C		A/D		A/D

NOTE: > C = LOS C or better (e.g., LOS A, B or C); < C = LOS D or worse (e.g., LOS D, E or F). Intersection 10 in Figure 17, Section III.B Transportation Setting, was counted for pedestrian volumes only, so does not appear in this table.

/a/ Unsignalized intersection levels of service reflect the delays from left-turning movements from the major street onto the minor street (the first letter), and from the minor street onto the major street (the second letter). They are based on the excess capacity available to make the indicated movement.

/b/ For multi-stop controlled intersections (3-way and 4-way stop signs), the 1985 *Highway Capacity Manual* specifies a total intersection approach volume that corresponds to LOS C.

SOURCE: DKS Associates.

TABLE 39: PROJECT INTERSECTION IMPACTS IN 2006 WITH BART SERVICE TO THE SFIA VICINITY (INCLUDES FORECAST GROWTH AND LIST-ADDED GROWTH) (Continued) - P.M. PEAK HOUR

Intersection	1990 Existing V/C	1990 Existing LOS	2006 Project With BART V/C	2006 Project With BART LOS	2006 Project Without BART V/C	2006 Project Without BART LOS
Signalized						
1. El Camino Real/Millbrae Ave.	1.00	F	1.19	F	1.20	F
2. Rollins Rd./Millbrae Ave.	0.77	C	0.93	E	0.94	E
3. Old Bayshore Hwy./Millbrae Ave.	0.49	A	0.46	A	0.47	A
4. Rd. R-2/Rd. R-16/Hilton Hotel	0.42	A	0.42	A	0.42	A
5. Rds. R-20, R-22/Rd. R-18	0.23	A	0.32	A	0.34	A
6. Rd. R-3 (McDonnell)/Rd. R-18	0.32	A	0.39	A	0.42	A
7. Rd. R-3/UAL Cargo	0.18	A	0.23	A	0.24	A
8. Rd. R-3/Rd. R-6	0.28	A	0.26	A	0.28	A
9. S. Airport Blvd./San Bruno Ave.	0.39	A	0.40	A	0.42	A
11. N. Access Rd./N. Access Road E. (101/380 on-/off-ramp)	0.35	A	0.24	A	0.24	A
12. S. Airport Blvd./N. Access Rd. S. (101/380 off-ramp)	0.51	A	0.69	B	0.70	C
13. S. Airport Blvd./N. Access Rd. N. (101/380 on-ramp)	0.33	A	0.58	A	0.60	B
14. S. Airport Blvd./Belle Air Rd.	0.71	C	0.76	C	0.76	C
15. S. Airport Blvd./Utah Ave.	0.91	D/E	0.97	E	0.97	E
16. S. Airport Blvd./US 101 NB ramps/ Radisson Hotel	0.52	A	0.56	A	0.56	A
17. S. Airport Blvd./Gateway Blvd.	0.45	A	0.49	A	0.49	A
18. Airport Blvd./Produce Ave./ San Mateo Ave.	0.71	C	0.74	C	0.74	C
19. Airport Blvd./Grand Ave.	0.70	C	0.74	C	0.74	C
20. San Mateo Ave./San Bruno Ave.	0.69	B	0.70	C	0.71	C
21. El Camino Real/San Bruno Ave.	1.00	F	1.02	F	1.02	F
Unsignalized/a/						
22. California Dr./Millbrae Ave.		A/C		A/E		A/E
23. Rds. R-24, R-26/Rd. R-16/b/		> C		< C		< C
24. Rd. R-3/Rd. R-6		< C		< C		< C
25. Long-Term Parking/Rd. R-3		A/C		B/E		B/E

NOTE: > C = LOS C or better (e.g., LOS A, B or C); < C = LOS D or worse (e.g., LOS D, E or F). Intersection 10 in Figure 17, Section III.B Transportation Setting, was counted for pedestrian volumes only, so does not appear in this table.

/a/ Unsignalized intersection levels of service reflect the delays from left-turning movements from the major street onto the minor street (the first letter), and from the minor street onto the major street (the second letter). They are based on the excess capacity available to make the indicated movement.

/b/ For multi-stop controlled intersections (3-way and 4-way stop signs), the 1985 Highway Capacity Manual specifies a total intersection approach volume that corresponds to LOS C.

SOURCE: DKS Associates.

TABLE 40: EXISTING LEVEL OF SERVICE - FREEWAY MAINLINE SEGMENTS

Segment		1990 A.M. Peak Hour/a/			1990 P.M. Peak Hour/b/		
From	To	Total Volume/c/	Vol. Per Lane	LOS/d/	Total Volume/c/	Vol. Per Lane	LOS/d/
U.S. 101 (Bayshore Freeway)							
Willow Rd. (SR 84)	Marsh Road	5,575	1,394	A-C	5,302	1,326	A-C
Whipple Ave.	Holly Street	6,388	1,597	D	6,075	1,519	D
Holly Street	Ralston Avenue	6,773	1,693	D	6,440	1,610	D
Ralston Avenue	Hillsdale Blvd.	7,269	1,817	E	7,102	1,776	E
Hillsdale Blvd.	SR 92	7,859	1,965	F	7,474	1,869	E
3rd Ave.	Poplar/Dore Ave.	8,363	2,091	F	7,953	1,988	F
Broadway	Millbrae Ave.	8,169	2,042	F	7,769	1,942	F
Millbrae Ave.	SFIA	8,517	2,129	F	8,100	2,025	F
SFIA	San Bruno/I-380	9,059	2,265	F	8,616	2,154	F
I-380	Grand Ave.	7,588	1,897	F	7,216	1,804	E
Oyster Pt. Blvd.	Candlestick Park	6,911	1,728	D	6,572	1,643	D
Candlestick Park	Third Street	6,930	1,733	D	6,591	1,648	D
I-280	Army Street	7,046	1,762	E	6,701	1,675	D
I-280 (Junipero Serra Freeway)							
SR 84/SR 114	Farm Hill Blvd.	3,040	760	A-C	3,480	870	A-C
Edgewood Road	SR 92	3,205	801	A-C	3,668	917	A-C
Hayne Road	Trousdale Drive	3,369	842	A-C	3,856	964	A-C
Larkspur Drive	SR 35	4,232	1,058	A-C	4,843	1,211	A-C
San Bruno Ave.	I-380	4,191	1,048	A-C	4,796	1,199	A-C
I-380	Sneath Lane	6,204	1,551	D	7,100	1,775	E
Sneath Ln.	Avalon Drive	6,122	1,531	D	7,006	1,752	E
Serramonte Blvd.	SR 1 South	7,889	1,972	F	9,028	2,257	F
SR 1 North	Alemany/SR 82	5,259	1,315	A-C	6,019	1,505	D
St. Mary's	US 101	6,368	1,592	D	7,288	1,822	E

Key:

LOS	Per-Lane Volume
A-C	up to 1,460
D	1,461 - 1,740
E	1,741 - 1,880 (capacity = 1800)
F	1,881 and above

(Continued)

● TABLE 40: EXISTING LEVEL OF SERVICE - FREEWAY MAINLINE SEGMENTS (CONTINUED)

NOTES:

/a/ For US 101 & I-280, A.M. Peak Hour Volumes shown are for northbound traffic only. Northbound is generally the heavier direction of traffic flow on US 101 and & I-280 during the A.M. Peak Hour and therefore represents the worst-case traffic condition.

/b/ For US 101 & I-280, P.M. Peak Hour Volumes shown are for southbound traffic only. Southbound is generally the heavier direction of traffic flow on US 101 & I-280 during the P.M. Peak Hour and therefore represents the worst-case traffic condition.

/c/ Existing freeway volumes were factored from two-direction peak hour volumes presented in Caltrans' 1988 Volumes on California State Highways, based on actual counts taken by Caltrans on November 3, 1989, on U S 101 at Army Street in San Francisco, and at 3rd Avenue in San Mateo. That is, the distribution in volumes along the entire freeway, from San Francisco to San Mateo, as shown in the 1988 Caltrans book, was assumed to remain the same, but volumes at intermediate points were adjusted to be consistent with the actual 1989 counts at the two endpoints.

/d/ Even in segments where the calculations indicate LOS E or F, field observations show that traffic flows well (LOS D or better).

SOURCE: Caltrans District 4, and DKS Associates.

● TABLE 41: 1996 AND 2006 PROJECT IMPACTS ON FREEWAY MAINLINE SEGMENTS

YEAR 1996		A.M. Peak Hour/a/ Northbound						P.M. Peak Hour/b/ Southbound					
		--Forecast Growth--			--Plus Project--			--Forecast Growth--			--Plus Project--		
From	To	Vol	VPL*	LOS	Vol	VPL	LOS	Vol	VPL	LOS	Vol	VPL	LOS
U.S. 101 (Bayshore Freeway)													
Willow Rd (SR 84)	Marsh Road	5,798	1,450	A-C	6,231	1,558	D	5,514	1,379	A-C	5,970	1,492	D
Whipple Avenue	Holly Street	6,644	1,661	D	7,099	1,775	E	6,318	1,580	D	6,798	1,699	D
Holly Street	Ralston Avenue	7,044	1,761	E	7,476	1,869	E	6,688	1,674	D	7,153	1,788	E
Ralston Avenue	Hillsdale Blvd.	7,560	1,890	F	8,015	2,004	F	7,386	1,847	E	7,866	1,966	F
Hillsdale Boulevard	SR 92	8,173	2,043	F	8,653	2,163	F	7,773	1,943	F	8,278	2,069	F
3rd Avenue	Poplar/Dore Avenue	8,698	2,174	F	9,202	2,301	F	8,271	2,068	F	8,803	2,201	F
Broadway	Millbrae Ave.	8,496	2,124	F	9,027	2,257	F	8,080	2,020	F	8,639	2,160	F
Millbrae Avenue	SFIA	8,858	2,214	F	9,417	2,354	F	8,424	2,106	F	9,013	2,253	F
SFIA	San Bruno Av/I-380	9,421	2,355	F	9,534	2,384	F	8,961	2,240	F	9,096	2,274	F
I-380	Grand Avenue	7,892	1,973	F	8,414	2,103	F	7,505	1,876	E	8,152	2,038	F
Oyster Pt. Blvd	Candlestick Park	7,187	1,797	E	7,683	1,921	F	6,835	1,709	D	7,450	1,862	E
Candlestick Park	Third Street	7,207	1,802	E	7,678	1,920	F	6,855	1,714	D	7,439	1,860	E
I-280	Army Street	7,328	1,832	E	7,775	1,944	F	6,969	1,742	E	7,524	1,881	F
I-280 (Junipero Serra Freeway)													
SR 84/SR 114	Farm Hill Boulevard	3,162	790	A-C	3,472	868	A-C	3,619	905	A-C	3,956	989	A-C
Edgewood Road	SR 92	3,333	833	A-C	3,654	913	A-C	3,815	954	A-C	4,162	1,041	A-C
Hayne Road	Trousdale Drive	3,504	876	A-C	3,834	959	A-C	4,010	1,003	A-C	4,369	1,092	A-C
Larkspur Drive	SR 35	4,401	1,100	A-C	4,742	1,185	A-C	5,037	1,259	A-C	5,406	1,352	A-C
San Bruno Avenue	I-380	4,359	1,090	A-C	4,710	1,177	A-C	4,988	1,247	A-C	5,369	1,342	A-C
I-380	Sneath Lane	6,452	1,613	D	6,642	1,661	D	7,384	1,846	E	7,616	1,904	F
Sneath Ln.	Avalon Drive	6,367	1,592	D	6,551	1,638	D	7,286	1,822	E	7,511	1,878	E
Serramonte Blvd	SR 1 South	8,205	2,051	F	8,383	2,096	F	9,389	2,347	F	9,607	2,402	F
SR 1 North	Alemany Blvd/SR 82	5,469	1,367	A-C	5,643	1,411	A-C	6,260	1,565	D	6,472	1,618	D
St. Mary's	US 101	6,623	1,656	D	6,791	1,698	D	7,580	1,895	F	7,785	1,946	F

(Continued)

TABLE 41: 1996 AND 2006 PROJECT IMPACTS ON FREEWAY MAINLINE SEGMENTS (Continued)

YEAR 2006		A.M. Peak Hour/a/ Northbound Forecast Growth			A.M. Peak Hour/a/ Northbound Plus Project			P.M. Peak Hour/b/ Southbound Forecast Growth			P.M. Peak Hour/b/ Southbound Plus Project		
From	To	Vol	VPL*	LOS	Vol	VPL	LOS	Vol	VPL	LOS	Vol	VPL	LOS
U.S. 101 (Bayshore Freeway)													
Willow Rd (SR 84)	Marsh Road	6,188	1,547	D	6,967	1,742	E	5,885	1,471	D	6,692	1,673	D
Whipple Avenue	Holly Street	7,091	1,773	E	7,910	1,978	F	6,743	1,686	D	7,593	1,898	F
Holly Street	Ralston Avenue	7,518	1,880	E	8,296	2,074	F	7,148	1,787	E	7,955	1,989	F
Ralston Avenue	Hillsdale Blvd.	8,069	2,017	F	8,888	2,222	F	7,883	1,971	F	8,733	2,183	F
Hillsdale Boulevard	SR 92	8,723	2,181	F	9,586	2,397	F	8,296	2,074	F	9,190	2,298	F
3rd Avenue	Poplar/Dore Avenue	9,283	2,321	F	10,191	2,548	F	8,828	2,207	F	9,769	2,442	F
Broadway	Millbrae Ave.	9,068	2,267	F	10,023	2,506	F	8,624	2,156	F	9,614	2,404	F
Millbrae Avenue	SFIA	9,454	2,363	F	10,460	2,615	F	8,991	2,248	F	10,034	2,509	F
SFIA	San Bruno Av/I-380	10,055	2,514	F	10,212	2,553	F	9,564	2,391	F	9,747	2,437	F
I-380	Grand Avenue	8,423	2,106	F	9,387	2,347	F	8,010	2,002	F	9,203	2,301	F
Oyster Pt. Blvd	Candlestick Park	7,671	1,918	F	8,587	2,147	F	7,295	1,824	E	8,428	2,107	F
Candlestick Park	Third Street	7,692	1,923	F	8,562	2,141	F	7,316	1,829	E	8,393	2,098	F
I-280	Army Street	7,821	1,955	F	8,648	2,162	F	7,438	1,860	E	8,461	2,115	F
I-280 (Junipero Serra Freeway)													
SR 84/SR 114	Farm Hill Boulevard	3,374	844	A-C	3,855	964	A-C	3,863	966	A-C	4,374	1,094	A-C
Edgewood Road	SR 92	3,558	889	A-C	4,053	1,013	A-C	4,071	1,018	A-C	4,599	1,150	A-C
Hayne Road	Trousdale Drive	3,740	935	A-C	4,250	1,063	A-C	4,280	1,070	A-C	4,824	1,206	A-C
Larkspur Drive	SR 35	4,698	1,174	A-C	5,224	1,306	A-C	5,376	1,344	A-C	5,936	1,484	A-C
San Bruno Avenue	I-380	4,652	1,163	A-C	5,195	1,299	A-C	5,324	1,331	A-C	5,902	1,475	A-C
I-380	Sneath Lane	6,886	1,722	D	7,249	1,812	E	7,881	1,970	F	8,330	2,083	F
Sneath Ln.	Avalon Drive	6,795	1,699	D	7,148	1,787	E	7,777	1,944	F	8,212	2,053	F
Serramonte Blvd	SR 1 South	8,757	2,189	F	9,098	2,275	F	10,021	2,505	F	10,444	2,611	F
SR 1 North	Alemany Blvd/SR 82	5,837	1,459	A-C	6,169	1,542	D	6,681	1,670	D	7,091	1,773	E
St. Mary's	US 101	7,068	1,767	E	7,390	1,847	E	8,090	2,022	F	8,487	2,122	F

Key:

LOS	Per-Lane Volume (VPL)*
A-C	Up to 1,460
D	1,461 - 1,740
E	1,741 - 1,880 (Capacity = 1880)
F	1,881 and above

/a/ For US 101 & I-280, A.M. Peak Hour Volumes shown are for northbound traffic only. Northbound is generally the heavier direction of traffic flow on US 101 and & I-280 during the A.M. Peak Hour and therefore represents the worst-case traffic condition.

/b/ For US 101 & I-280, P.M. Peak Hour Volumes shown are for southbound traffic only. Southbound is generally the heavier direction of traffic flow on US 101 & I-280 during the P.M. Peak Hour and therefore represents the worst-case traffic condition.

SOURCE: DKS Associates

with forecast-growth and project traffic. List-added-growth traffic is not added for basic freeway sections; it is assumed to be subsumed in forecast growth, for the mainline freeway segments.

1996 Project

The project would cause one freeway section to degrade from LOS D to LOS E during the a.m. peak hour in 1996: US 101 northbound between Whipple Avenue and Holly Street. US 101 northbound between Oyster Point Boulevard and Army Street would degrade from LOS E to LOS F during the a.m. peak hour.

During the p.m. peak hour, two freeway mainline sections would degrade from LOS D to LOS E: US 101 southbound, from Third Street to Candlestick Park and from Candlestick Park to Oyster Point Boulevard. Three freeway mainline sections would degrade from LOS E to LOS F with the addition of 1996 project traffic: US 101 southbound, from Grand Avenue to I-380 and from Army Street to I-280, and I-280 southbound from Sneath Lane to I-380.

2006 Project

Table 41, p. 310 includes freeway mainline LOS for the 2006-with-project conditions.

With the addition of 2006 project traffic, three freeway mainline sections would degrade from LOS D to LOS E during the a.m. peak period: US 101 northbound from Willow Road (SR 84) to Marsh Road; I-280 northbound from I-380 to Sneath Lane; and I-280 northbound from Sneath Lane to Avalon Drive. US 101 northbound between Whipple Avenue and Holly Street would degrade from LOS E to LOS F during the a.m. peak hour. The forecast-growth-traffic alone would have caused two sections of freeway to degrade from LOS D to LOS E: I-280 northbound between St. Mary's and the US 101 interchange; and U.S. 101 northbound between Whipple Avenue and Holly Street.

During the p.m. peak hour, 2006 project traffic would cause the section on I-280 southbound between SR 1 northbound and Alemany Boulevard to degrade from LOS D to LOS E. Forecast growth traffic on U.S. 101 southbound would have caused two sections to degrade from LOS D to LOS E: from Candlestick Park to Oyster Point

Boulevard and from Third Street to Candlestick Park. Both of these sections would degrade to LOS F with the addition of 2006 project traffic. The section of US 101 southbound between Holly Street and Whipple Avenue would degrade from LOS D to LOS F during the p.m. peak hour. The section of U.S. 101 southbound between Army Street and I-280 (Alemany Interchange) would degrade from LOS E to LOS F.

Freeway Ramps

Table 42 presents the freeway ramps' levels of service for existing conditions, and Table 43, p. 315 shows the freeway ramps' levels of service in 1996 and 2006 with forecast-growth-plus-project traffic. The impact of list-added-growth traffic on freeway ramps is shown in Table 44, p. 317. This analysis assumed that the proposed new ramps at the SFIA / US 101 interchange would be constructed as part of the project, as shown in the SFIA Final Draft Master Plan.

1996 Project

In the a.m. peak hour, 1996 project traffic would cause two ramps to degrade from the 1990 existing LOS C to E: I-380 eastbound / San Bruno Avenue off to SFIA Road 1-S, and US 101 northbound off to SFIA Road 1-S. During the p.m. peak hour, 1996 project traffic would cause the ramp from SFIA Road 1-N on to US 101 northbound to degrade from the 1990 existing LOS C to E.

1996 Project + List-Added Growth

For both a.m. and p.m. peak hours in 1996, the only freeway ramp level of service degradation to unsatisfactory conditions due to list-added growth traffic would be during the p.m. peak hour on the South Airport Boulevard on ramp to I-380 WB, which would degrade from LOS D to LOS F. As indicated in Table 44, p. 317, there would be little change in ramp volumes due to list-added-growth traffic, as many of the ramps shown do not serve directions of travel to which list-added-growth traffic was distributed. The ramps' locations were chosen to illustrate project traffic impacts.

2006 Project

In 2006, the project would cause the following level of service degradations to unsatisfactory conditions from 1990 existing levels during the a.m. peak hour:

TABLE 42: EXISTING LEVELS OF SERVICE - FREEWAY RAMPS

Ramp	A.M. Peak Hour/a/ Total Volume	A.M. Peak Hour/a/ Per Lane Vol.	A.M. Peak Hour/a/ LOS/a/	P.M. Peak Hour Total Volume	P.M. Peak Hour Per Lane Vol.	P.M. Peak Hour LOS
US 101 SB off to SFIA Rd. 1-S	900	900	C	862	862	C
I-380 EB/San Bruno Ave. off to SFIA Rd. 1-S	851	851	C	816	816	C
US 101 SB/I-380 EB off to SFIA Rd. 1-S	1,751	876	C	1,678	839	C
US 101 NB off to SFIA Rd. 1-S	986	986	C	849	849	C
Rd. 1-N onto US 101 NB	854	854	B	1,060	1,060	C
Rd. 1-N onto I-380 viaduct WB	355	355	A	653	653	B
Rd. 1-N onto US 101 SB	717	359	A	901	451	A
US 101 NB C/D /b/ off to Millbrae Ave.	793	793	C	936	936	C
US 101 SB C/D off to Millbrae Ave.	1,372	1,372	E	1,139	1,139	D
US 101 SB C/D off to Millbrae Ave. EB; onto US 101 SB	796	398	C	866	433	C
US 101 SB off to Broadway	1,009	1,009	C	994	994	C
Broadway onto US 101 NB	933	933	C	675	675	C
US 101 SB off to San Bruno Ave. extension	241	241	A	187	187	A
San Bruno Ave. extension onto US 101 NB	154	154	A	227	227	A
North Access Rd. onto I-380 WB	159	159	A	166	166	A
US 101 NB off to S. Airport Blvd./Radisson Hotel	1,093	1,093	D	605	605	D
S. Airport Blvd./Radisson Hotel onto US 101 NB	217	217	D	488	488	D
S. Airport Blvd. onto US 101 NB	33	33	A	88	88	A
S. Airport Blvd. onto I-380 WB	158	158	A	1,017	1,017	C
US 101 NB off to San Bruno Ave. Extension	797	797	B	453	453	B
San Bruno Ave. Extension to US 101 SB	351	351	B	711	711	B
N. Access Rd. on to US 101 NB	131	131	B	212	212	B
US 101 SB off to N. Access Rd.	218	218	C	205	205	C
US 101 NB off to N. Access Rd.	518	518	A	406	406	A
I-380 EB off to N. Access Rd.	428	428	A	286	286	A
I-380 EB off to S. Airport Blvd.	886	886	A	569	569	A
I-380 EB off to US 101 SB	3,663	1,832	F	2,225	1,113	B
I-380 WB off to I-280 SB	787	394	A	1,699	850	B
I-380 WB off to I-280 NB	2,046	1,023	B	5,003	2,502	F
I-280 NB on to I-380 EB	2,047	1,024	B	709	355	A
I-280 SB on to I-380 EB	4,305	2,153	F	2,532	1,266	C

NOTE: On freeway ramps, LOS depends not only on volume per lane, but also on design speed. For sharply curving ramps, where design speed is low, LOS can be poor even if volumes per lane are relatively low.

/a/ Defined in the Highway Capacity Manual, Special Report 209, Table 5-5, Transportation Research Board, Washington DC, 1985: indicates capacities based on ramp design speed.

/b/ C/D = Collector/Distributor Road.

SOURCE: DKS Associates.

TABLE 43: 1996 AND 2006 PROJECT IMPACTS ON FREEWAY RAMP LEVELS OF SERVICE

YEAR 1996

	A.M. Peak Hour						P.M. Peak Hour					
	Forecast Growth			Plus Project			Forecast Growth			Plus Project		
Ramp	Vol	Per Lane Vol	LOS/a/	Vol	Per Lane Vol	LOS	Vol	Per Lane Vol	LOS	Vol	Per Lane Vol	LOS
US 101 SB off to SFIA Rd 1-S	900	900	C	1,203	1,203	D	862	862	C	1,125	1,125	D
I-380 EB/San Bruno Ave off to SFIA Rd 1-S	851	851	C	1,400	1,400	E	816	816	C	1,304	1,304	D
US 101 SB/I-380 EB off to SFIA Rd 1-S	1,751	876	C	2,603	1,302	D	1,678	839	C	2,429	1,215	D
US 101 NB off to SFIA Rd 1-S	986	986	C	1,432	1,432	E	849	849	C	1,269	1,269	D
Rd 1-N on to US 101 NB	854	854	B	1,263	1,263	C	1,060	1,060	C	1,663	1,663	E
Rd 1-N on to I-380 viaduct WB	355	355	A	548	548	A	653	653	B	936	936	C
Rd 1-N on to US 101 SB	717	359	A	1,052	526	A	901	451	A	1,355	678	B
US 101 NB C/D off to Millbrae Ave	832	832	D	832	832	D	981	981	D	981	981	D
US 101 SB C/D off to Millbrae Ave WB	1,439	1,439	E	1,439	1,439	E	1,195	1,195	D	1,195	1,195	D
US 101 SB C/D off to Millbrae Ave EB; on to US 101 SB	835	418	D	835	418	D	908	454	D	908	454	D
US 101 SB off to Broadway	1,059	1,059	D	1,059	1,059	D	1,043	1,043	D	1,043	1,043	D
Broadway on to US 101 NB	979	979	D	979	979	D	708	708	D	708	708	D
US 101 SB off to San Bruno Ave. Extension	241	241	A	258	258	A	187	187	A	202	202	A
San Bruno Ave. Extension on to US 101 NB	167	167	A	167	167	A	244	244	A	244	244	A
North Access Rd on to I-380 WB	159	159	A	162	162	A	166	166	A	169	169	A
US 101 NB off to S. Airport Blvd/Radisson Hotel	1,114	1,114	D	1,114	1,114	D	618	618	D	618	618	D
S. Airport Blvd/Radisson Hotel on to US 101 NB	228	228	D	221	221	D	498	498	D	498	498	D
S. Airport Blvd on to US 101 NB	33	33	A	47	47	A	88	88	A	304	304	A
S. Airport Blvd on to I-380 WB	158	158	A	224	224	A	1,017	1,017	C	1,555	1,555	D
US 101 NB off to San Bruno Ave. Extension	829	829	B	836	836	B	471	471	B	479	479	B
San Bruno Ave. Extension to US 101 SB	365	365	B	372	372	B	739	739	B	747	747	B
N. Access Rd. on to US 101 NB	136	136	B	143	143	B	220	220	B	228	228	B
US 101 SB off to N. Access Rd.	227	227	C	234	234	C	213	213	C	221	221	C
US 101 NB off to N. Access Rd.	539	539	A	546	546	A	422	422	A	430	430	A
I-380 EB off to N. Access Rd.	445	445	A	452	452	A	297	297	A	305	305	A
I-380 EB off to S. Airport Blvd.	921	921	B	928	928	B	592	592	A	600	600	B
I-380 EB off to US 101 SB	3810	1905	F	3817	1908	F	2314	1157	B	2322	1161	B
I-380 WB off to I-280 SB	818	409	A	928	464	A	1767	883	B	2103	1051	B
I-380 WB off to I-280 NB	2128	1064	B	2269	1134	B	5203	2602	F	5495	2748	F
I-280 NB on to I-380 EB	2129	1064	B	2446	1223	B	737	369	A	864	432	A
I-280 SB on to I-380 EB	4477	2239	F	4756	2378	F	2633	1317	C	2797	1399	C

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TABLE 43: 1996 AND 2006 PROJECT IMPACTS ON FREEWAY RAMP LEVELS OF SERVICE (Continued)

YEAR 2006	A.M. Peak Hour						P.M. Peak Hour					
	Forecast Growth			Plus Project			Forecast Growth			Plus Project		
Ramp	Vol	Per Lane Vol	LOS/a/	Vol	Per Lane Vol	LOS	Vol	Per Lane Vol	LOS	Vol	Per Lane Vol	LOS
US 101 SB off to SFIA Rd 1-S	900	900	C	1,475	1,475	E	862	862	C	1,381	1,381	E
I-380 EB/San Bruno Ave off to SFIA Rd 1-S	851	851	C	1,893	1,893	F	816	816	C	1,778	1,778	F
US 101 SB/I-380 EB off to SFIA Rd 1-S	1,751	876	C	3,368	1,684	F	1,678	839	C	3,159	1,580	F
US 101 NB off to SFIA Rd 1-S	986	986	C	1,835	1,835	F	849	849	C	1,678	1,678	F
Rd 1-N on to US 101 NB	854	854	B	1,661	1,661	E	1,060	1,060	C	2,198	2,198	F
Rd 1-N on to I-380 viaduct WB	355	355	A	733	733	B	653	653	B	1,164	1,164	C
Rd 1-N on to US 101 SB	717	359	A	1,378	689	B	901	451	A	1,761	881	B
US 101 NB C/D off to Millbrae Ave	888	888	D	888	888	D	1,048	1,048	D	1,048	1,048	D
US 101 SB C/D off to Millbrae Ave WB	1,536	1,536	F	1,536	1,536	F	1,275	1,275	D	1,275	1,275	D
US 101 SB C/D off to Millbrae Ave EB; on to US 101 SB	891	446	D	891	446	D	756	378	D	756	378	D
US 101 SB off to Broadway	1,130	1,130	D	1,130	1,130	D	1,113	1,113	D	1,113	1,113	D
Broadway on to US 101 NB	1,045	1,045	D	1,045	1,045	D	756	756	D	756	756	D
US 101 SB off to San Bruno Ave. Extension	241	241	A	276	276	A	187	187	A	217	217	A
San Bruno Ave. Extension on to US 101 NB	179	179	A	179	179	A	261	261	A	261	261	A
North Access Rd on to I-380 WB	159	159	A	167	167	A	166	166	A	172	172	A
US 101 NB off to S. Airport Blvd/Radisson Hotel	1,147	1,147	D	1,147	1,147	D	634	634	D	634	634	D
S. Airport Blvd/Radisson Hotel on to US 101	227	227	D	227	227	D	507	507	D	507	507	D
S. Airport Blvd on to US 101 NB	33	33	A	50	50	A	88	88	A	349	349	A
S. Airport Blvd on to I-380 WB	158	158	A	246	246	A	1,017	1,017	C	1,705	1,705	F
US 101 NB off to San Bruno Ave. Extension	885	885	B	893	893	B	503	503	B	512	512	B
San Bruno Ave. Extension to US 101 SB	390	390	B	398	398	B	789	789	B	798	798	B
N. Access Rd. on to US 101 NB	145	145	B	153	153	B	235	235	B	244	244	B
US 101 SB off to N. Access Rd.	242	242	C	250	250	C	228	228	C	237	237	C
US 101 NB off to N. Access Rd.	575	575	A	583	583	A	451	451	A	460	460	A
I-380 EB off to N. Access Rd.	475	475	A	483	483	A	317	317	A	326	326	A
I-380 EB off to S. Airport Blvd.	983	983	C	991	991	C	632	632	B	641	641	B
I-380 EB off to US 101 SB	4066	2033	F	4074	2037	F	2470	1235	B	2479	1239	B
I-380 WB off to I-280 SB	874	437	A	1048	524	A	1886	943	B	2398	1199	B
I-380 WB off to I-280 NB	2271	1136	B	2504	1252	B	5553	2777	F	6017	3009	F
I-280 NB on to I-380 EB	2272	1136	B	2718	1359	C	787	393	A	986	493	A
I-280 SB on to I-380 EB	4779	2389	F	5201	2600	F	2811	1405	C	3081	1540	C

/a/ As defined in the *Highway Capacity Manual*, Special Report 209, Table 5-5, Transportation Research Board, Washington DC, 1985.

SOURCE: DKS Associates

TABLE 44: 1996 AND 2006 LIST-ADDED-GROWTH TRAFFIC IMPACTS ON FREEWAY RAMP LEVELS OF SERVICE

	A.M. Peak Hour						P.M. Peak Hour					
	Forecast Growth + Project			Plus List-Added Growth			Forecast Growth + Project			Plus List-Added Growth		
YEAR 1996												
Ramp	Vol	Per Lane Vol	LOS/a/	Vol	Per Lane Vol	LOS	Vol	Per Lane Vol	LOS	Vol	Per Lane Vol	LOS
US 101 SB off to SFIA Rd 1-S	1,203	1,203	D	1,207	1,207	D	1,125	1,125	D	1,134	1,134	D
I-380 EB/San Bruno Ave off to SFIA Rd 1-S	1,400	1,400	E	1,412	1,412	E	1,304	1,304	D	1,337	1,337	D
US 101 SB/I-380 EB off to SFIA Rd 1-S	2,603	1,302	D	2,619	1,310	D	2,429	1,215	D	2,471	1,236	D
US 101 NB off to SFIA Rd 1-S	1,432	1,432	E	1,432	1,432	E	1,269	1,269	D	1,269	1,269	D
Rd 1-N on to US 101 NB	1,263	1,263	C	1,279	1,279	C	1,663	1,663	E	1,670	1,670	E
Rd 1-N on to I-380 viaduct WB	548	548	A	561	561	A	936	936	C	959	959	C
Rd 1-N on to US 101 SB	1,052	526	A	1,052	526	A	1,355	678	B	1,355	678	B
US 101 NB C/D off to Millbrae Ave	832	832	D	832	832	D	981	981	D	981	981	D
US 101 SB C/D off to Millbrae Ave WB	1,439	1,439	E	1,439	1,439	E	1,195	1,195	D	1,195	1,195	D
US 101 SB C/D off to Millbrae Ave EB; on to US 101 SB	835	418	D	835	418	D	908	454	D	908	454	D
US 101 SB off to Broadway	1,059	1,059	D	1,059	1,059	D	1,043	1,043	D	1,043	1,043	D
Broadway on to US 101 NB	979	979	D	979	979	D	708	708	D	708	708	D
US 101 SB off to San Bruno Ave. Extension	258	258	A	258	258	A	202	202	A	202	202	A
San Bruno Ave. Extension on to US 101 NB	167	167	A	167	167	A	244	244	A	244	244	A
North Access Rd on to I-380 WB	162	162	A	162	162	A	169	169	A	169	169	A
US 101 NB off to S. Airport Blvd/Radisson Hotel	1,114	1,114	D	1,163	1,163	D	618	618	D	654	654	D
S. Airport Blvd/Radisson Hotel on to US 101 NB	221	221	A	253	253	D	498	498	D	527	527	D
S. Airport Blvd on to US 101 NB	47	47	A	72	72	A	304	304	A	337	337	A
S. Airport Blvd on to I-380 WB	224	224	A	353	353	A	1,555	1,555	D	1,722	1,722	F
US 101 NB off to San Bruno Ave. Extension	836	836	B	917	917	C	479	479	B	564	564	B
San Bruno Ave. Extension to US 101 SB	372	372	B	417	417	B	747	747	B	866	866	B
N. Access Rd. on to US 101 NB	143	143	B	143	143	B	228	228	B	228	228	B
US 101 SB off to N. Access Rd.	234	234	C	234	234	C	221	221	C	221	221	C
US 101 NB off to N. Access Rd.	546	546	A	546	546	A	430	430	A	430	430	A
I-380 EB off to N. Access Rd.	452	452	A	452	452	A	305	305	A	305	305	A
I-380 EB off to S. Airport Blvd.	928	928	C	926	926	C	600	600	B	600	600	B
I-380 EB off to US 101 SB	3817	1908	F	3817	1908	F	2322	1161	B	2322	1161	B
I-380 WB off to I-280 SB	928	464	A	934	467	A	2103	1051	B	2119	1059	B
I-380 WB off to I-280 NB	2269	1134	B	2277	1138	B	5495	2748	F	5516	2758	F
I-280 NB on to I-380 EB	2446	1223	B	2461	1230	B	864	432	A	879	440	A
I-280 SB on to I-380 EB	4756	2378	F	4767	2384	F	2797	1399	C	2809	1405	C

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Continued

TABLE 44: 1996 AND 2006 LIST-ADDED-GROWTH TRAFFIC IMPACTS ON FREEWAY RAMP LEVELS OF SERVICE (Continued)

	A.M. Peak Hour						P.M. Peak Hour					
	Forecast Growth + Project			Plus List-Added Growth			Forecast Growth + Project			Plus List-Added Growth		
YEAR 2006												
Ramp	Vol	Per Lane Vol	LOS/a/	Vol	Per Lane Vol	LOS	Vol	Per Lane Vol	LOS	Vol	Per Lane Vol	LOS
US 101 SB off to SFIA Rd 1-S	1,475	1,475	E	1,478	1,478	E	1,381	1,381	E	1,390	1,390	E
I-380 EB/San Bruno Ave off to SFIA Rd 1-S	1,893	1,893	F	1,897	1,897	F	1,778	1,778	F	1,811	1,811	F
US 101 SB/I-380 EB off to SFIA Rd 1-S	3,368	1,684	F	3,375	1,688	F	3,159	1,580	E	3,201	1,601	E
US 101 NB off to SFIA Rd 1-S	1,835	1,835	F	1,835	1,835	F	1,678	1,678	F	1,678	1,678	F
Rd 1-N on to US 101 NB	1,661	1,661	E	1,676	1,676	E	2,198	2,198	F	2,206	2,206	F
Rd 1-N on to I-380 viaduct WB	733	733	B	746	746	B	1,164	1,164	C	1,187	1,187	C
Rd 1-N on to US 101 SB	1,378	689	B	1,378	689	B	1,761	881	B	1,761	881	B
US 101 NB C/D off to Millbrae Ave	888	888	D	888	888	D	1,048	1,048	D	1,048	1,048	D
US 101 SB C/D off to Millbrae Ave WB	1,536	1,536	F	1,536	1,536	F	1,275	1,275	D	1,275	1,275	D
US 101 SB C/D off to Millbrae Ave EB; on to US 101 SB	891	445	D	891	445	D	756	378	D	756	378	D
US 101 SB off to Broadway	1,130	1,130	D	1,130	1,130	D	1,113	1,113	D	1,113	1,113	D
Broadway on to US 101 NB	1,045	1,045	D	1,045	1,045	D	756	756	D	756	756	D
US 101 SB off to San Bruno Ave. Extension	276	276	A	276	276	A	217	217	A	217	217	A
San Bruno Ave. Extension on to US 101 NB	179	179	A	179	179	A	261	261	A	261	261	A
North Access Rd on to I-380 WB	167	167	A	167	167	A	172	172	A	172	172	A
US 101 NB off to S. Airport Blvd/Radisson Hotel	1,147	1,147	D	1,196	1,196	D	634	634	D	672	672	D
S. Airport Blvd/Radisson Hotel on to US 101	227	227	D	259	259	A	507	507	D	542	542	D
S. Airport Blvd on to US 101 NB	50	50	A	97	97	A	349	349	A	483	483	A
S. Airport Blvd on to I-380 WB	246	246	A	478	478	A	1,705	1,705	F	1,879	1,879	F
US 101 NB off to San Bruno Ave. Extension	893	893	B	974	974	C	512	512	B	597	597	B
San Bruno Ave. Extension to US 101 SB	398	398	B	443	443	B	798	798	B	917	917	C
N. Access Rd. on to US 101 NB	153	153	B	153	153	B	244	244	B	244	244	B
US 101 SB off to N. Access Rd.	250	250	C	250	250	C	237	237	C	237	237	C
US 101 NB off to N. Access Rd.	583	583	A	583	583	A	460	460	A	460	460	A
I-380 EB off to N. Access Rd.	483	483	A	483	483	A	326	326	A	326	326	A
I-380 EB off to S. Airport Blvd.	991	991	C	991	991	C	641	641	B	641	641	B
I-380 EB off to US 101 SB	4074	2037	F	4074	2037	F	2479	1239	B	2479	1239	B
I-380 WB off to I-280 SB	1048	524	A	1054	527	A	2398	1199	B	2414	1207	B
I-380 WB off to I-280 NB	2504	1252	B	2512	1256	B	6017	3009	F	6038	3019	F
I-280 NB on to I-380 EB	2718	1359	C	2733	1367	C	986	493	A	1001	500	A
I-280 SB on to I-380 EB	5201	2600	F	5212	2606	F	3081	1540	C	3093	1546	C

/a/ As defined in the *Highway Capacity Manual*, Special Report 209, Table 5-5, Transportation Research Board, Washington DC, 1985.

SOURCE: DKS Associates

- US 101 southbound off to SFIA Road 1-S, LOS C to E
- I-380 eastbound / San Bruno Avenue off to SFIA Road 1-S, LOS C to F
- US 101 southbound / I-380 eastbound off to SFIA Road 1-S, LOS C to F
- US 101 northbound off to SFIA Road 1-S, LOS C to F
- Road 1-N on to US 101 northbound, LOS B to E

In 2006, the project would cause the following level of service degradations to unsatisfactory conditions from 1990 existing levels during the p.m. peak hour:

- US 101 southbound off to SFIA Road 1-S, LOS C to E
- I-380 eastbound / San Bruno Avenue off to SFIA Road 1-S, LOS C to F
- US 101 southbound / I-380 eastbound off to SFIA Road 1-S, LOS C to F
- US 101 northbound off to SFIA Road 1-S, LOS C to F
- Road 1-N on to US 101 northbound, LOS C to F
- South Airport Blvd. on to I-380 westbound, LOS C to F

2006 Project + List-Added Growth

Table 44, p. 317 includes freeway ramp LOS for both the 2006-with-project and the 2006-with-project-and-list-added-growth conditions.

No ramp level of service reductions to unsatisfactory conditions would be expected with the addition of list-added-growth traffic in 2006. Although there would be additional volumes on the subject ramps, the LOS for most ramps analyzed would be the same as for the 2006-with-project scenario. The exceptions would be:

A.M. peak hour

- US 101 northbound off to San Bruno Ave. Extension, LOS B to C.

P.M. peak hour

- San Bruno Ave. Extension to US 101 southbound, LOS B to C.

Public Transit Impacts

The proposed project would add to transit loadings on SamTrans in 1996 and 2006. For 1996, it was assumed that the mode split of air passengers would remain constant (see "Mode Split" section above and its associated tables). However, employee travel behavior was assumed to change. A one-percent increase (as percent of total employees) in the percentage of employees who take transit was applied. Although no major significant increase in SamTrans service is planned for 1996, increased highway congestion levels throughout the Bay Area are currently causing the shift of more suburban commuters to mass transit./17/ For 2006, an additional 1.5 percent employee shift from auto to SamTrans was assumed in this analysis. Table 45 summarizes public transit use by person trips in 1990, 1996 and 2006.

If BART were to extend to SFIA by 2006, the project would add to transit loadings on BART, CalTrain and SamTrans. With the completion of BART to the area of SFIA and a transit center west of the Bayshore Freeway providing direct rail service to the terminal / Ground Transportation Center, it would be possible to access SFIA from downtown San Francisco in approximately 34 minutes via BART or 25 minutes via CalTrain./18/ It is projected that these BART and CalTrain linkages would reduce vehicular travel by approximately 11,250 daily, 520 a.m.-peak-hour and 560 p.m.-peak-hour vehicle trips. These vehicle-trip reductions include those by rental cars, taxis/limousines, shuttle vans, and shuttle buses. A portion of the projected BART ridership to SFIA would come from existing SamTrans bus service (Routes 3B, 7B, and 7F). If the BART terminal were inside SFIA, the transect times and vehicle-trip reductions would probably be more favorable than those shown.

A fundamental assumption for the "With BART / Without BART" analysis is that BART could attract six percent of air passenger trips and eleven percent of employee trips on both a daily and peak hour basis. These percentages include the additional CalTrain passengers who would be attracted to SFIA from San Jose and the South Bay, as well as San Francisco and Peninsula cities, via the assumed multi-modal (BART, CalTrain, SamTrans) transit center west of US 101./19/ This level of patronage is reasonable, considering the attractiveness of BART to San Francisco and East Bay business travelers and the opportunity to attract more CalTrain riders via the transit center west of US 101. A 1985 Peninsula Mass Transit Study concluded:

TABLE 45: PUBLIC TRANSIT USE SUMMARY

Year	Mode	% Employee Person Trips	# Daily Employee Person Trips	% Air Passenger Person Trips	# Daily Air Passenger Person Trips
1990	Auto Park	83.7%	51,900	20.1%	22,404
	SamTrans	3.5%	2,170	2.6%	2,889
1996	Auto Park	82.7%	62,852	20.1%	32,875
	SamTrans	4.5%	3,420	2.6%	4,302
2006	Auto Park	81.2%	68,695	20.1%	40,926
	SamTrans	6.0%	5,076	2.6%	5,356
2006/a/ w/BART	Auto Park	74.2%	62,773	18.8%	38,287
	SamTrans	3.3%	2,792	1.0%	2,037
	BART/b/	11.0%	9,306	6.0%	12,219

NOTES:

/a/ Entries for 2006 w/BART do not show associated reductions in person trips in rental cars, taxis/limousines, shuttle vans, or shuttle busses. The discussion in the text does take those reductions into account.

/b/ Includes additional CalTrain ridership.

SOURCE: DKS Associates.

- Attraction of air passenger trips to San Francisco Airport is estimated in the range of 3,000 to 9,000 passengers a day by transit. This represents four to ten percent of all air passengers. Experience elsewhere suggests that 15 percent or 10,000 air passengers would be the maximum potential. Many of these new patrons would be attracted from existing Airport bus service./20/

The transit assumptions made in this analysis are consistent with these conclusions.

The project would also increase the number of persons who arrive at SFIA by the variety of shuttles that serve Bay Area and other Northern California cities. This analysis has assumed that the occupancy of shuttles (average number of riders per shuttle) would not increase beyond 1990 occupancy levels, but the number of shuttle vehicles would increase from 3,340 to 4,884 in 1996, and from 4,884 to 6,056 in 2006 (see Tables 27-30, Section IV.B. Transportation Impacts, pp. 283-286, for mode split and vehicle occupancy analysis). The analysis assumed a worst-case scenario, whereby occupancy levels remained the same and the total number of shuttle vehicle trips to SFIA increased. In order to remain competitive, shuttle operators are likely to convert to larger-capacity vehicles as demand increases, thereby reducing project impacts compared to those projected in this document.

Pedestrian Impacts

The proposed project would change pedestrian circulation at SFIA in 1996 with the opening and operation of the Ground Transportation Center and Automated People Mover. In 2006, the Automated People Mover would be extended north to serve long term parking areas and employment sites.

Air passengers or employees who arrive at the Ground Transportation Center (1996 and 2006) and long-term parking (2006 only) would access the terminals in the following manner:

- walk from parking or transit to the Automated People Mover stop. (APM stops would be provided at all major parking areas and near several SFIA employment sites, as well as the GTC and terminal buildings.)

- make one or more level changes to board the Automated People Mover. (No tickets or fare would be required.)

- ride the Automated People Mover to the appropriate terminal and airline stop. (Skycaps would be necessary to handle baggage at one or several Automated People Mover stops, similar to service provided by the airlines for passengers who are dropped off by car, taxi or shuttle today.)

- make a level change to the departures deck.

The current SFIA proposal is for the Automated People Mover to be routed in front of the terminal buildings at both the upper (departures) and lower (arrivals) levels.

Air passengers and employees who park at the existing short-term lot or who are dropped off at the departures deck would walk to the terminal buildings in the same manner as they do today.

As noted in "Construction Impacts" above, detailed plans for the construction and layout of proposed SFIA facilities have not been developed at this stage. With the projected increase in air passenger activity and employment, and the projected increase in persons taking mass transit to SFIA, there will be a noticeable increase in pedestrian activity at existing areas at SFIA, and at certain new areas at the Airport. Generally, pedestrian impacts may occur at the following locations:

Existing Facilities

- Enplaning/Deplaning Roadway and Terminal

1996 Additions

- Ground Transportation Center (GTC)
- Automated People Mover Stops at the GTC and the Terminal

2006 Additions

- Automated People Mover Stops at the Multi-Modal Station and Lots D/DD
- The Multi-Modal Station, or any BART Station in the vicinity of SFIA

Design review should focus on minimizing any adverse impacts to pedestrians. Since the proposed APM (and BART) will require grade changes (such as escalators), departing air passengers should be afforded the convenience of baggage deposit, or other baggage-handling facility, at the BART station (if not at other BART stations), and at parking areas, prior to their boarding the APM to the terminal. This would increase the efficiency of moving high volumes of pedestrians from the Multi-Modal station or parking areas, via the APM, to the terminal.

Bicycling Impacts

Since the 1983 employee transportation survey did not break out bicyclists as a separate percentage, it is not possible to quantify the number of additional bicycle trips that would be attributed to the project. It is not anticipated that the relative percentage of air passengers and employees using bicycles would increase in future years. Some additional bicycle trips would be generated by the project in 2006, most likely proportional to employment growth at SFIA. The bicycle trips would access SFIA via Old Bayshore Highway and Road R-2 from Millbrae/Burlingame or via McDonnell Road (Road R-3) / North Access Road from San Bruno.

Parking Impacts

There are five proposals to increase on-site parking in the near-term (1996) SFIA Master Plan. These are:

- Expansion and restriping to provide about 2,200 additional spaces in long-term parking Lot D, of which about 2,170 would be for public long-term parking and 30 would be for City employees.
- Development of a multi-story, 3,950-space structure on Lot DD for long-term public parking, City employee parking and tenant parking.
- Dedication of the fifth level of the GTC to accommodate public short-term and airport employee parking, approximately 850 spaces.
- North Terminal roof parking would provide an additional 420 short-term spaces./21/
- Restriping and converting permit and valet parking to public parking would increase the number of public short-term spaces in the (central) garage to about 7,080 (for a net change of about 270 additional spaces). There is no provision for a relocated valet lot in the SFIA Master Plan.

Table 46 summarizes the existing space supply and demand as well as the future supply and demand for the near-term (1996) SFIA Master Plan development scenario. The proposed project would create an additional parking demand for about 11,300 stalls in 1996, giving SFIA a total demand for approximately 35,230 stalls in 1996. With a supply of about 37,480 stalls, there would thus be a surplus of 2,250 spaces in 1996 with SFIA Master Plan near-term development./22/

Other parking additions and changes are included in the long-term (2006) SFIA Final Draft Master Plan, including:

- Expansion of Lot D by 230 spaces, along with the conversion of 708 City employee spaces to long-term public spaces, which would bring the total number of public long-term spaces in Lot D to 6,587 spaces.
- Construction of a five-story, 1,200-space parking structure on Lots C and CC for tenants and employees to help offset the loss of 692 spaces due to construction of the 100,000 sq. ft. office building on Lot C.
- Conversion of the Automated People Mover interim maintenance facility in the GTC to 150 additional short-term public parking spaces, and relocation of the proposed maintenance facility to Lot D.

TABLE 46: NEAR-TERM PARKING SUPPLY AND DEMAND

	1990	1996
Daily Enplanements/a,b,c,d/	57,700	81,651
Employees	31,000	38,000

	1990 Supply	1990 Demand/d/	1990 Diff.	1996 Supply	1996 Demand/d/	1996 Diff.
Public Spaces						
Garage						
Public Short-Term	6,294	4,128	2,166	7,082	6,803	279
Permit/Valet	492	124	368	Included in public short term		
Lot D						
Public Long-Term	3,559	2,801	758	5,649	3,584	2,065
Ground Transportation Center						
Public Short-Term	N/A	N/A	N/A	850	808	43
Lot DD Structure						
Public Long-Term	N/A	N/A	N/A	400	380	20
North Terminal Roof (Short-Term)	N/A	N/A	N/A	420	399	21
Off-Airport	5,170	6,168	(998)	5,170	8,729	(3,559)
Subtotal	15,515	13,221	2,294	19,571	20,702	(1,131)
Employee Spaces						
Garage		See public spaces			Moved to Lot DD	
Lot D	971	794	177	760	737	23
Lot DD Structure	N/A	N/A	N/A	3,554	3,447	107
Other	11,963	8,685	3,278	12,324	9,115	3,209
Subtotal	12,934	9,479	3,455	16,638	13,300	3,338
Other Spaces						
Rental Cars	2,011	965	1,046	1,085	1,047	38
Courtyard	183	186	(3)	0	0	0
Taxi Staging	86	57	29	185	178	7
Subtotal	2,280	1,208	1,072	1,270	1,225	45
TOTAL	30,729	23,908	6,821	37,479	35,227	2,252

NOTES:

/a/ August enplanements are used in this table as August represents the highest month for enplanements of SFIA, and is therefore the peak month for parking demand. August 1996 enplanements based on August 1989 data.

/b/ This table assumes 95 percent occupancy for passengers and 97 percent occupancy for employees and that off-site long-term parking supply remains constant.

/c/ Excess demand represents demand for public spaces that cannot be met off-airport.

/d/ Demand rates based on May 1991 enplanements and May 1991 parking occupancy survey: Public short-term = 0.0981 spaces/enplanement; public long-term = 0.048 5spaces/ enplanement; offsite parking = 0.1069 spaces/enplanement; employee = 0.3500 spaces/ employee.

SOURCE: DKS Associates

TABLE 47: LONG-TERM PARKING SUPPLY AND DEMAND

	1990			2006		
Daily Enplanements/a,b,c,d/		57,700			99,129	
Employees		31,000			42,300	
	1990			2006		
	Supply	Demand/d/	Diff.	Supply	Demand/d/	Diff.
Public Spaces						
Garage						
Public Short-Term	6,294	4,128	2,166	7,082	8,518	(1,436)
Permit/Valet	492	124	368	Included in public short term		
Lot D						
Public Long-Term	3,559	2,801	758	6,587	4,432	2,155
Ground Transportation Center						
Public Short-Term	N/A	N/A	N/A	1,000	950	50
Lot DD Structure						
Public Long-Term	N/A	N/A	N/A	400	380	20
North Terminal						
Roof (Short-Term)	N/A	N/A	N/A	420	399	21
Off Site	5,170	6,168	(998)	5,170	10,597	(5,427)
Subtotal	15,515	13,221	2,294	20,659	25,275	(4,616)
Employee Spaces						
Garage	See public spaces			Moved to Lot DD		
Lot D	971	794	177	52	50	2
Lot DD Structure	N/A	N/A	N/A	3,554	3,447	107
Lot C/CC Structure	N/A	N/A	N/A	600	582	18
Other	11,963	8,685	3,278	11,460	11,307	153
Subtotal	12,934	9,479	3,455	15,666	15,387	279
Other Spaces						
Rental Cars	2,011	965	1,046	1,271	1,317	(46)
Courtyard	183	186	(3)	0	0	0
Taxi Staging	86	57	29	216	224	(8)
Subtotal	2,280	1,208	1,072	1,487	1,541	(54)
TOTAL	30,729	23,908	6,821	37,812	42,203	(4,391)

NOTES:

/a/ August enplanements are used in this table as August represents the highest month for enplanements of SFIA, and is therefore the peak month for parking demand. August 1996 enplanements based on August 1989 data.

/b/ This table assumes 95 percent occupancy for passengers and 97 percent occupancy for employees and that off-site long-term parking supply remains constant.

/c/ Excess demand represents demand for public spaces that exists for parking at the short-term garage but which must find alternative locations as the garage cannot accommodate this demand. It includes also demand that cannot be met off-airport.

/d/ Demand rates based on May 1991 enplanements and May 1991 parking occupancy survey: Public short-term = 0.0981 spaces/enplanement; public long-term = 0.0485 spaces/enplanement; offsite parking = 0.1069 spaces/enplanement; employee = 0.3500 spaces/employee.

SOURCE: DKS Associates

A new vehicular bridge is proposed over San Bruno Avenue that would connect Lots D and DD. The parking structure on Lots C and CC would be constructed in joint development with the proposed new office building on the same parcel. Table 47, p. 326, summarizes the existing and future (2006) parking spaces that would be provided, as well as parking demand.

In 2006, the parking demand from employees and air passengers would be about 42,200 spaces. The total number of spaces provided by the project in 2006 would be about 37,800, a deficit of approximately 4,400 parking spaces./22/

The 2006 deficit could be reduced by about 3,220 spaces with the extension of BART to SFIA (see Table 30, Section IV.B. Transportation Impacts, p. 286 for BART mode split analysis).

As noted in the Setting section, SFIA currently experiences a deficit of parking on many days during peak months of air travel. As garage parking spaces are more difficult to monitor than Lot D parking spaces, SFIA will allow vehicles to circulate in the garage until a space becomes available. In the long-term parking Lot D, closures occur for a period of time and motorists are instructed to find parking at one of the offsite parking facilities. In August, 1990, Lot D was closed 5 times for a total of just over 22 hours./23/

Construction Impacts

Detailed plans for construction of the proposed SFIA facilities have not been developed at this stage. In general, construction of the land uses proposed would generate increases in truck and auto travel to and from SFIA. Additional truck travel would be associated with removal and redistribution of excavation spoils and delivery of construction materials. An associated increase in auto travel by construction workers would also occur. Because of the long-term time frame for buildout and the master plan level of detail, projection of the quantity and nature of transportation effects from construction traffic at a refined level of detail is not feasible.

The intensity and scale of truck travel would depend upon the amount of construction occurring at a given time, as construction of the project would occur on a continuous basis over the next 16 years. Primary effects of truck traffic would be a lessening of the capacities of access streets and haul routes because of the slower movement and larger turning radii of trucks. Historically, SFIA has provided on-site parking and separate haul routes off SFIA roadways for construction vehicles. Construction work hours are typically 7:00 a.m. to 3:30 p.m., which would minimize the impact on p.m. peak hour traffic occurring later in the day.

US 101 would be the primary haul and access routes, with truck traffic entering SFIA via Millbrae Avenue, the Terminal ramps and I-380 / San Bruno Avenue. Temporary parking demand from vehicles used by construction workers, and the impact on local intersections from construction worker traffic, would occur in proportion to the number of construction workers who would use automobiles to reach their work sites.

Impacts on Adjacent Cities

Because of the projected forced-flow traffic conditions on US 101, there is potential for traffic to divert from the freeways to local streets, especially in Millbrae and San Bruno. The proposed four-laning of McDonnell Road (Road R-3) in 1996 and Road R-2 in 2006 would make these reliever routes for employees and air passengers who know the local roadway system. However, use of the alternative routes (Millbrae Avenue to Old Bayshore Highway / Road R-2 to SFIA, and San Bruno Avenue to McDonnell Road (Road R-3) to SFIA) would be constrained by the limited capacity of two intersections, Millbrae Avenue / Old Bayshore Highway and San Bruno Avenue / South Airport Boulevard. Furthermore, these routes would not be signed (except for long-term-parking signage on US 101 southbound, directing motorists to San Bruno Avenue) so the routes through adjacent cities would not serve as attractive alternatives to US 101 for air passengers unfamiliar with the area.

- Effects of Potential Aircraft Delays

- It is possible that because of operational constraints and future delays, there would be changes in the forecast ground traffic using the Airport. Tables J-1 and J-2, in Appendix J, pp. A.179-180, show the existing number of flights per hour in 1990, and the forecast number of flights per hour in 1996 and 2006.

- Using the information on Tables J-1 and J-2, in 1996 and 2006 there would be no more than one hour of delay for any flight under optimum visual flight rules (61 percent of the time). Under less-than-optimum visual flight rules (25 percent of the time), there would be no more than one hour of delay for any flight in 1996, and there would be more than one hour of delay for only five flights in 2006. Under more adverse weather conditions there could be additional delays to flights.

During instrument flight rules (IFR) conditions, which occur about 5.6 percent of the time, the existing SFIA airfield would not accommodate the number of flights forecast per hour in 1996 and 2006 with implementation of the SFIA Master Plan, if such conditions were to persist throughout a 24-hour period. (IFR conditions at SFIA generally occur over shorter periods; a review of SFIA weather summaries for 1990 showed that in the summer, IFR conditions generally occurred only in the early morning and late evening hours.) Even if the forecast flights were spread throughout the entire 24-hour period to maximize use of the airfield, the airfield could not accommodate the total number of daily flights forecast, even assuming that the airfield were to operate at capacity every hour. (Although Appendix J does not include an analysis of the airfield's ability to accommodate flights forecast for 2006 without the SFIA Master Plan, it is likely that the result would be similar to that described here.)

The effects of these delays on surface transportation impacts at or near SFIA cannot be estimated quantitatively. The delays could affect the hourly distribution of trips made by passengers, people going to the Airport to pick up passengers, and employees. It is possible that passengers aware of substantial flight delays would delay their trips to the airport; alternatively, these passengers would experience the aircraft delay in the SFIA terminal building. People travelling to the Airport to pick up arriving or drop off departing passengers might also delay their trips to the Airport, or wait longer in the terminal building for the flight to arrive or depart. The number of airline or airline support employees working during a particular shift might change to accommodate the services needed by delayed aircraft.

The potential change in the hourly distribution of trips could result in the spreading out of peak forecast travel. The estimates of aircraft delay in Appendix J were developed assuming that the 1990 pattern of peak flight schedules would increase proportionally over the next 15 years. If the airlines were to reschedule flights to off- peak hours, such rescheduling would have a similar effect on the hourly distribution of forecast surface vehicle traffic.

The effects of this redistribution of trips on traffic impacts near the Airport would depend on the change in the number of trips during the peak hours on the surrounding roadway network. As noted on p. 280, the peak hours studied in the analysis of traffic impacts represent the peak hours on the network, not the air traffic peak hours. There

- could be more or fewer vehicle trips during the peak hours on the surrounding network, depending on when the aircraft delays occur and how long the delays are.

- If people travelling to the Airport to pick up or drop off passengers wait at the Airport, the demand for parking spaces during certain hours could increase. The turnover of short-term parking spaces in the parking garage and the GTC would be affected by flight delays. Vehicles could be required to circulate for longer periods of time before finding an available space.

- Because the impacts of aircraft delays on surface traffic impacts are not known, no mitigation for such impacts is identified in the EIR.

NOTES - Transportation

/1/ July 18, 1990 phone conversation with Ron Castillo of SFIA Bureau of Planning and Construction indicates that SFIA is considering a possible sixth and seventh level of the GTC, as well as possible reconfiguration of the fourth and fifth level floor plans, primarily related to the amount of rental car facilities. These additions would not result in additional trips to SFIA, since the trip-generation methodology bases future-year trips on air passenger enplanements and additional air cargo and airline service space.

/2/ Development of the "West of Bayshore" site for a BART station is speculative at this time. It is an environmentally sensitive area and lengthy debate may follow if the site is proposed for a BART station. However, a BART-Airport station could be located further to the west in an already developed area of San Bruno, or BART tracks could be brought directly into the terminal area. This transportation analysis identifies the number of employees and air passengers who would take BART given a station west of US 101, which is worst-case, as direct BART terminal service would increase BART ridership and further reduce impacts on the surrounding roadway network.

/3/ BART - San Francisco Airport Extension AA/DEIS/EIR Detailed Definition of Alternatives, Parsons Brinckerhoff Quade and Douglas, March 1991. Available for review in libraries in affected Peninsula cities.

/4/ Letter from John Costas, SFIA Assistant Administrator Planning and Construction, to Barbara Sahm, City and County of San Francisco Environmental Review Officer, May 3, 1991.

/5/ Caltrans, District 4 Adopted 1990 State Transportation Improvement Program (STIP), November, 1990.

/6/ On March 1, 1990, BART and SamTrans signed a comprehensive agreement concerning an extension of BART to Colma and beyond to SFIA. A combined Alternatives Analysis, Draft Environmental Impact Statement and Draft Environmental Impact Report on the SFIA (aka "SFO") extension is underway.

/7/ Presentation, Frank Wilson, BART General Manager, August 8, 1990. Extending BART beyond SFIA to San Jose would entail acquiring land (presumably the Southern Pacific (SP) right-of-way) along a 34-mile alignment and constructing 16 stations, at a cost of $1.53 billion (1987$). The Joint Powers Board (JPB) that is working on the proposed CalTrain downtown San Francisco Extension and on the purchase of the SP right-of-way for CalTrain is also working on this possible acquisition for BART.

/8/ SFIA, *San Francisco International Airport Final Draft Master Plan*, November 1989, p. 10.19, Table 10.4, modified to reflect employees' BART modal share.

/9/ Telephone conversation with Linda Rhine, SamTrans Associate Planner, April 23, 1990.

/10/ City of San Bruno, *North San Bruno Areawide Traffic Study Final Report*, December 1986. The traffic model developed for this study was for an area bounded by SR 92 on the south, Daly City on the north, San Francisco Bay to the east, and the Pacific Ocean to the west.

/11/ SFIA, *San Francisco International Airport Final Draft Master Plan*, November 1989.

/12/ SFIA Office of Community Affairs, Monthly Air Traffic Reports.

/13/ SFIA, *San Francisco International Airport Final Draft Master Plan*, November 1989, p. 7.6, Fig. 7.8.

/14/ Greiner Engineering, Orlando International Airport Development of Regional Impact Application for Development Approval, January 1990.

/15/ SFIA Office of Landside Operations, U.S. 101 Terminal Ramp Tube Counts, August 1989.

/16/ Institute of Transportation Engineers, Trip Generation, 4th Edition, 1988.

/17/ Several news articles in the San Francisco Chronicle in September, 1990 focused on transit patronage.

/18/ An extension of CalTrain from its current terminus at Fourth Street / Townsend Street in San Francisco's South of Market district to Second Street / Market Street in the Financial District is shown in Caltrans' current Short Range Transit Plan. This extension, which is the subject of a separate environmental review, could make CalTrain service to SFIA competitive with BART for those transit patrons familiar with CalTrain's less-frequent schedule.

/19/ Kaiser Engineers and Barton-Aschman Associates, Peninsula Mass Transit Study, March 1985.

/20/ Kaiser Engineers and Barton-Aschman Associates, Peninsula Mass Transit Study, March 1985, p. 96.

/21/ SFIA, SFIA Capital Projects Plan, 1989.

/22/ The demand rates for parking analysis are based on enplanements (based on the May 1991 parking occupancy survey): For public short-term parking, the rate is 0.0981 spaces/ enplanement; for public long-term parking, the rate is 0.0485 spaces/enplanement; for off-site parking, the rate is 0.1069 spaces/enplanement. Employee parking demand is based on the total number of employees; the demand rate for employees is 0.3500 spaces/employee, which reflects the shifting of employees throughout the day. While the 1996 and 2006 tables appear to indicate a net surplus of parking spaces for employees and a net deficit for air passengers, the situation for employees is complicated by the fact that they have fewer options for places to park than do the passengers.

/23/ SFIA Office of Landside Operations, Lot D Closure Reports for 1990, and telephone conversation with Oscar Cabangis, SFIA Office of Landside Operations, February 4, 1991.

C. NOISE

Noise impacts from a project can be categorized as those resulting from construction and those from operational activities. Construction noise would have a short-term effect, while operational noise, primarily from motor-vehicle and air traffic, would continue throughout the lifetime of the project.

CONSTRUCTION

Typical composite noise levels for construction activities, and distances from construction of various noise contours, are presented in Table 48, below. Noise-sensitive areas including the Airport Hilton Hotel exist near the proposed construction and demolition sites. The proposed activities that potentially would have an effect on these sensitive receptors are the demolition and reconstruction of the Pan Am Maintenance Hangar and Pan Am Administrative office, and the construction of the service station and Automated People Mover (APM) Superbay Facility. The Airport Hilton Hotel, Lomita Park Elementary School, and Lomita Park residential area are, respectively, 200 feet, 2,200 feet, and 800 feet from the proposed site of the Pan Am Maintenance Hangar and Administrative office. The Lomita Park Elementary School is 1,600 feet from the proposed site of the new service station and Automated People Mover Maintenance Facility.

On the assumption that pile-driving would be needed for construction, exterior noise levels at the Airport Hilton during demolition and construction of buildings in the vicinity would be approximately 89 dBA; interior noise levels at the hotel would be about 74 to 79 dBA with windows open, and about 57 to 64 dBA with windows closed. Sleeping quarters are usually designed for an approximate noise level range of 34 to 47 dBA./1/ Although construction activities would be likely to occur only during daytime hours, construction noise would still be disruptive to hotel guests; pile-driving activities could preclude sleeping in hotel rooms on the near side of the construction site./1/

The exterior noise level at Lomita Park Elementary School of Millbrae, during construction of buildings at SFIA would be approximately 53 dBA without pile-driving, and about 71 dBA in the presence of pile-driving activities. This

TABLE 48: TYPICAL NOISE LEVELS DURING CONSTRUCTION OF LARGE BUILDINGS

Construction Activity	Noise Level at 50 feet (dBA, Leq)	Approximate Distance (ft.) to Reduce Noise to Given Level (dBA, Leq)		
		60	65	70
Ground Clearing	84	790	450	250
Excavation	89	1,400	800	450
Foundations	78	400	220	130
Erection	85	890	500	280
Finishing (exterior)	89	1,400	800	450

SOURCE: Environmental Science Associates, Inc.

is an increase over the existing noise at the school from US 101, estimated at 49 dBA. Interior noise levels at the school would be below 50 dBA in the absence of pile-driving activities, and about 51 dBA in the presence of pile-driving activities. At 50 dBA, conversations can be maintained in normal speaking levels at a distance of 20 feet./2/

In the Lomita Park residential area, noise from US 101 is about 52 dBA, not accounting for the effect of noise barriers. Noise from project construction would increase the exterior noise level in this area to about 60 dBA without pile-driving and 77 dBA with pile-driving. In the latter case, indoor noise levels would be about 62 to 67 dBA with windows open and 52 to 57 dBA with windows closed.

State Noise Guidelines

The City of Milbrae has no quantative applicable noise ordinances or standards, although the Milbrae General Plan states that "The City should make sure that noise from construction, refuse collection and street sweeping is reduced to the lowest possible level." In lieu of quantitative guidelines for the City of Milbrae, construction noise impacts in Milbrae are assessed using the State Department of Health Services' Recommended Land Use Compatibility Guidelines for Community noise. Under these guidelines, noise levels at Lomita Park Elementary School (71 dBA with pile-driving) would be considered "normally unacceptable," and noise levels in the Lomita Park residential area (77 dBA with pile driving) would be considered "clearly unacceptable." Residential land uses closer to the Airport than the Lomita Park residential area, such as Airport Park, Marina Vista and North Millbrae, would be exposed to higher noise levels during pile driving, which would be considered "clearly unacceptable."

(See Section III.A. Land Use, beginning on p. 82, for a discussion of applicable noise policies.)

FUTURE NOISE ENVIRONMENT

Surface Traffic

Forecast growth levels represent future noise levels including traffic volumes based on MTC growth factors in the project areas. Project noise levels incorporate project-generated traffic into the forecast growth baseline analysis. List-added growth noise levels include additional cumulative traffic due to specific listed-added growth that is reasonably forseeable. See the Introduction to Chapter IV. Environmental Impacts, p. 245 for additional explanation of these terms.

Estimated future afternoon peak-hour noise levels on US 101 and on local roads serving the Airport are presented in Table 49. Traffic volumes which increase noise by 3 dBA or more are noticed by most people./3/ An increase in ambient noise levels of 5 dBA or more is generally considered to be significant. Forecast growth noise levels in 1996 would be at most one decibel greater than existing noise levels; 1996 Project noise levels would exceed forecast growth 1996 noise levels by a maximum of one decibel. The net increase of two decibels would generally not be perceptible. Forecast growth noise levels in 2006 represent a one decibel increase over 1996 forecast growth noise levels; again, 2006 Project noise levels would be a maximum of one decibel greater than the 2006 forecast growth noise levels. This two decibel noise level increase would not be perceptible.

Air Traffic

Operations by Aircraft Type and Time of Day

For aircraft noise, the FAA's threshold of significance is an increase of 1.5 dBA, L_{dn} (L_{dn} is roughly equivalent to CNEL) over any noise-sensitive area within the L_{dn} 65

TABLE 49: PEAK-HOUR NOISE LEVELS ON SELECTED ROAD SEGMENTS

	Noise Levels (dBA, Leq)/a/						
		1996			2006		
Road Segment	1990 Existing	Forecast Growth	Project/b/	List-added Growth/c/	Forecast Growth	Project/b/	List-added Growth/c/
San Bruno Ave. between El Camino Real and San Mateo Ave.	69	69	70	71	69	70	71
Millbrae Ave. between Rollins Road and US 101	74	74	74	75	74	75	75
San Bruno Ave. between San Mateo Ave. and US 101	70	70	70	72	70	70	72
US 101 between San Bruno Ave. and SFIA ramps	81	82	82	83	82	82	83
US 101 between SFIA and Millbrae Ave.	79	79	79	79	79	79	80

/a/ Noise levels are estimated for a receptor at a distance of approximately 50 feet from the road centerline. Vehicle traffic is assumed to be 93 percent automobiles and seven percent trucks on both streets and freeways. Calculations are based on vehicle volume estimates provided by DKS Associates, 1990.
/b/ Includes forecast growth.
/c/ Includes forecast growth plus the project.

SOURCE: Environmental Science Associates, Inc.

contour./4/ As discussed in Section III.C. Noise Setting, p. 153, designated California airports with CNEL 65 contours extending over noise-sensitive areas cannot operate without a variance granted by the California Department of Transportation. For the areas around SFIA, the San Mateo County ALUC has adopted noise compatibility standards that reflect use of the CNEL 65 contour as the threshold of significant adverse impacts.

Tables 50 and 51, pp. 336 - 337, show the forecast number of aircraft operations, by type of operation, time of day, and aircraft type, for an average day of the year in 1996 and 2006. (The estimated number of aircraft operations for an average day in 1990 is shown in Table 18, p. 157.) The forecasts of operations were developed using the SFIA Master Plan unconstrained passenger forecasts (42.3 million in 1996 and 51.3 million in 2006), Master Plan forecasts of load factors, and the FAA forecast to Congress regarding the future national commercial aircraft fleet./5/

As shown by comparing Tables 50, 51, and 18, total average daily aircraft operations are forecast to increase 24% from 1990 to 1996 and 10% from 1996 to 2006. Total passengers (shown in Table 1, p. 24) are forecast to increase 41% from 1990 to 1996 and 21% from 1996 to 2006. Operations are forecast to increase less than passengers because it is assumed that larger aircraft will be serving SFIA in the future and that more passengers would be on each aircraft. These assumptions are made in the SFIA Master Plan "to reflect a potential capacity constrained environment of the future."

As shown in Tables 50 and 51, about 177 aircraft arrivals, or about 34%, are forecast to occur during evening or nighttime hours in 1996, and about 197 arrivals, or about 35%, are forecast to occur during those hours in 2006. About 141 aircraft departures in 1996, or about 27%, and 155 departures in 2006, or about 28%, are forecast to occur during evening or nighttime hours. The percentages of operations occurring during evening and nighttime hours in 1996 and 2006 are assumed to be about the same as in 1990. This analysis assumes that there would be no airfield capacity constraints during any hour in either 1996 or 2006.

It is possible that because of operational constraints and future delays during adverse weather conditions, the percentage of operations during the more sensitive evening and nighttime hours would be higher than forecast for optimum weather conditions by this EIR. Tables J-1 and J-2, in Appendix J, pp. A.179-180 show the existing number of flights per hour in 1990, and the forecast number of flights per hour in 1996 and 2006. According to Tables J-1 and J-2, in 1996 and 2006 there would be no more than one hour of delay for any flight under optimum visual flight rules (86 percent of the time).

From Table J-1 (which reflects conditions 61 percent of the time) there would be an increase of two flights during the 7:00 - 10:00 p.m. evening period (an imperceptible change) and no increase during the nighttime period. From Table J-2 (which

TABLE 50: FORECAST AVERAGE DAILY AIR CARRIER AIRCRAFT OPERATONS BY TYPE OF OPERATION, TIME OF DAY, AND AIRCRAFT TYPE, 1996 /a/

Type of Aircraft/b/	Number of Arrivals				Number of Departures				Total Operations
	Day/c/	Evening/c/	Night/c/	Total	Day/c/	Evening/c/	Night/c/	Total	
Stage 2/d/									
B-727 (all)	40	13	5	58	41	10	7	58	116
B-737(-100,-200)/e/	25	8	3	36	26	6	4	36	72
B-747/f/	3	2	1	6	4	0 /g/	1	5	11
Stage 3/d/									
B-737-300	75	23	9	107	77	18	13	108	215
B-747	16	9	4	29	22	2	5	29	58
B-757 (all)	28	9	3	40	29	7	5	41	81
B-767 (all)	23	13	6	42	32	3	7	42	84
B-7J7/h/	1	0 /g/	0 /g/	1	1	0 /g/	0 /g/	1	2
DC-8-71	4	2	1	7	5	1	1	7	14
DC-10,L-1011(all)	23	14	6	43	32	3	7	42	85
MD-11	3	2	1	6	4	0 /g/	1	5	11
MD-80,-90 series	46	14	6	66	47	11	8	66	132
A-300,A-310	6	2	1	9	6	1	1	8	17
A-320	12	4	1	17	12	3	2	17	34
A-330,A-340	1	1	0 /g/	2	2	0 /g/	1	3	5
BAe-146	30	9	4	43	31	7	5	43	86
F-100	2	1	0 /g/	3	2	1	0 /g/	3	6
Total	338	126	51	515	373	73	68	514	1029

/a/ Average daily aircraft operations are equal to annual operations (takeoffs and landings) divided by 365 and rounded to the nearest whole number. Forecast operations for 1996 were prepared by Ken Eldred Engineering on the basis of *SFIA Master Plan* passenger and FAA national fleet mix forecasts. Air carrier operations, as defined by SFIA, are scheduled commercial jet operations.
/b/ Aircraft types listed in this table are representative, and are not meant to constitute the full range of aircraft that will use SFIA in 1996.
/c/ Day = 7:00 a.m. to 7:00 p.m.; evening = 7:00 p.m. to 10:00 p.m.; night = 10:00 p.m. to 7:00 a.m.
/d/ Classification of aircraft as "Stage 2" and "Stage 3" refers to noise standards established by Federal Aviation Regulations Part 36. Stage 3 aircraft are generally quieter than Stage 2 aircraft.
/e/ Includes operations by DC-9 aircraft.
/f/ Earlier models of the B-747 are classified as Stage 2 aircraft.
/g/ Fewer than 0.5 operations per day (183 operations per year).
/h/ Included to represent a 150-seat, Stage 3 aircraft.

SOURCES: Ken Eldred Engineering; Environmental Science Associates, Inc.

TABLE 51: FORECAST AVERAGE DAILY AIR CARRIER AIRCRAFT OPERATIONS BY TYPE OF OPERATION, TIME OF DAY, AND AIRCRAFT TYPE, 2006 /a/

Type of Aircraft/b/	Number of Arrivals				Number of Departures				Total Operations
	Day/c/	Evening/c/	Night/c/	Total	Day/c/	Evening/c/	Night/c/	Total	
Stage 2/d/									
B-727 (all)	9	3	1	13	9	2	1	12	25
B-737(-100,-200)/e/	5	2	1	8	5	1	1	7	15
B-747/f/	0	0	0	0	0	0	0	0	0
Stage 3/d/									
B-737-300	77	24	9	110	78	19	13	110	220
B-747	20	12	5	37	27	3	6	36	73
B-757 (all)	30	9	4	43	31	7	5	43	86
B-767 (all)	32	19	9	60	45	5	10	60	120
B-7J7 /g/	32	10	4	46	32	8	5	45	91
DC-8-71	1	1	0 /h/	2	1	0 /h/	0 /h/	1	3
DC-10,L-1011(all)	19	11	5	35	27	3	6	36	71
MD-11	5	3	1	9	7	1	2	10	19
MD-80,-90 series	80	25	10	115	81	20	13	114	229
A-300,A-310	5	2	1	8	5	1	1	7	15
A-320	21	6	3	30	21	5	3	29	59
A-330,A-340	4	2	1	7	5	1	1	7	14
BAe-146	30	9	4	43	31	7	5	43	86
F-100	2	1	0 /h/	3	2	0 /h/	0 /h/	2	5
Total	372	139	58	569	407	83	72	562	1131

7597

/a/ Average daily aircraft operations are equal to annual operations (takeoffs and landings) divided by 365 and rounded to the nearest whole number. Forecast operations for 1996 were prepared by Ken Eldred Engineering on the basis of SFIA Master Plan passenger and FAA national fleet mix forecasts. Air carrier operations, as defined by SFIA, are scheduled commercial jet operations.

/b/ Aircraft types listed in this table are representative, and are not meant to constitute the full range of aircraft that will use SFIA in 2006.

/c/ Day = 7:00 a.m. to 7:00 p.m.; evening = 7:00 p.m. to 10:00 p.m.; night = 10:00 p.m. to 7:00 a.m.

/d/ Classification of aircraft as "Stage 2" and "Stage 3" refers to noise standards established by Federal Aviation Regulations Part 36. Stage 3 aircraft are generally quieter than Stage 2 aircraft.

/e/ Includes operations by DC-9 aircraft.

/f/ Earlier models of the B-747 are classified as Stage 2 aircraft.

/g/ Included to represent a 150-seat, Stage 3 aircraft.

/h/ Fewer than 0.5 operations per day (183 operations per year).

SOURCES: Ken Eldred Engineering; Environmental Science Associates, Inc.

reflects conditions 25 percent of the time) flights during the 7:00 - 10:00 p.m. evening hours would increase by about 10 percent in 1996 and by about 12 percent in 2006, and flights during the 10:00 p.m. - 7:00 a.m. nighttime period would increase by about 31 percent in 2006. Overall noise levels would increase on average about one half decibel during the evening hours in both 1996 and 2006. Noise levels would increase about 1.2 decibels during the nighttime hours in 2006. These increases are not perceptible, and are less than the FAA threshold of significance for noise increases. During the evening periods in both 1996 and in 2006, and during the nighttime period in 2006, there would be an increase in the number of single event noise disturbances.

Under more adverse weather conditions, there could be additional delays to flights. During instrument flight rules (IFR) conditions, which occur about 5.6 percent of the time, the existing SFIA airfield would not accommodate the number of flights forecast per hour in 1996 and 2006 with implementation of the SFIA Master Plan, if such conditions were to persist throughout a 24-hour period. Even if the forecast flights were spread throughout the entire day to maximize use of the airfield, the airfield could not accommodate the total number of daily flights forecast, even assuming that the airfield would be operating at capacity every hour). Under such conditions, it is likely that the number of flights occurring during evening and nighttime hours would increase. Under adverse weather conditions, if aircraft delays were to increase due to capacity constraints, noise contours could be somewhat greater than calculated in this EIR.

Operations by aircraft meeting FAA Part 36 Stage 3 noise standards are forecast to account for about 81% of total average daily operations in 1996 and about 96% in 2006 (compared to 64% in 1990). The number of noisier, Stage 2 aircraft serving SFIA has an influence on the size of the Airport CNEL contours. The percentage of operations by these older, noisier jet aircraft is forecast to decrease as the airlines gradually replace them with newer, quieter (Stage 3) aircraft. In addition, the SFIA Noise Regulation (described in Chapter V. Mitigation Measures, p. 411) provides for a gradual phaseout of Stage 2 aircraft.

Since the preparation of the FAA national fleet forecasts and the adoption of the SFIA Noise Regulation, Congress has passed legislation providing for the phasing out of Stage 2 aircraft nationwide./5/ The legislation includes a final deadline of December 31, 1999, for the operation of Stage 2 aircraft, with a possible extension through December 2003 if certain conditions are met. On September 24, 1991, the FAA issued regulations to implement the noise policy. The regulations include the deadlines established by the legislation, with interim deadlines of 55 percent (of an airline's fleet) by 1994, 65 percent by 1996, and 75 percent by 1998./5a/

- As discussed on p. 168, the Airport Noise Abatement Regulation was amended in June 1991 to include a requirement for 100 percent Stage 3 operations as of January 1, 2000. Assuming that aircraft operators serving SFIA comply with the SFIA and federal regulations, there would be no Stage 2 aircraft serving SFIA in 2006. With a 100 percent Stage 3 fleet in 2006, the CNEL contours shown in this section would probably be about one dBA smaller than forecast.

Operational Assumptions

Runway use, the locations of generalized flight tracks, and flight track use are assumed to be the same in 1996 and 2006 as in 1990 (see Section III.C. Noise, p. 153).

SFIA Aircraft Noise Contours -- 1996

The CNEL contours for 1996 with implementation of the SFIA Master Plan are presented in Figure 32./7/ A comparison of Figure 32 with the 1990 CNEL contours in Figure 20, Section III.C. Noise Setting, p. 161 shows that smaller areas of South San Francisco, San Bruno, Millbrae, and Burlingame would be exposed to aircraft noise of 65 dBA, CNEL and above in 1996 than in 1990.

Noise levels in South San Francisco, San Bruno, Millbrae, and Burlingame, which are affected primarily by the noise from departing aircraft, would decrease due to the phasing out of Stage 2 aircraft and their replacement with Stage 3 aircraft (which produce less noise during takeoff). Noise levels in areas southeast of the Airport, which are affected primarily by the noise from arriving aircraft, would have a relatively minor change from 1990 because Stage 2 and 3 aircraft produce similar levels of noise on landing.

On the basis of ABAG growth projections for 1996, there would be about 5,500 people, about 1,500 people, and zero people living in areas of 65-70 dBA, 70-75 dBA, and 75+ dBA, CNEL, respectively. The total number of people living within the 65 dBA, CNEL noise contour would decrease from 14,980 people in 1990 to 7,000 people in 1996.

Table 52, p. 341, includes a summary of the number of people exposed to aircraft noise of CNEL 65 and above in 1990, and in 1996 and 2006 with implementation of the SFIA Master Plan.

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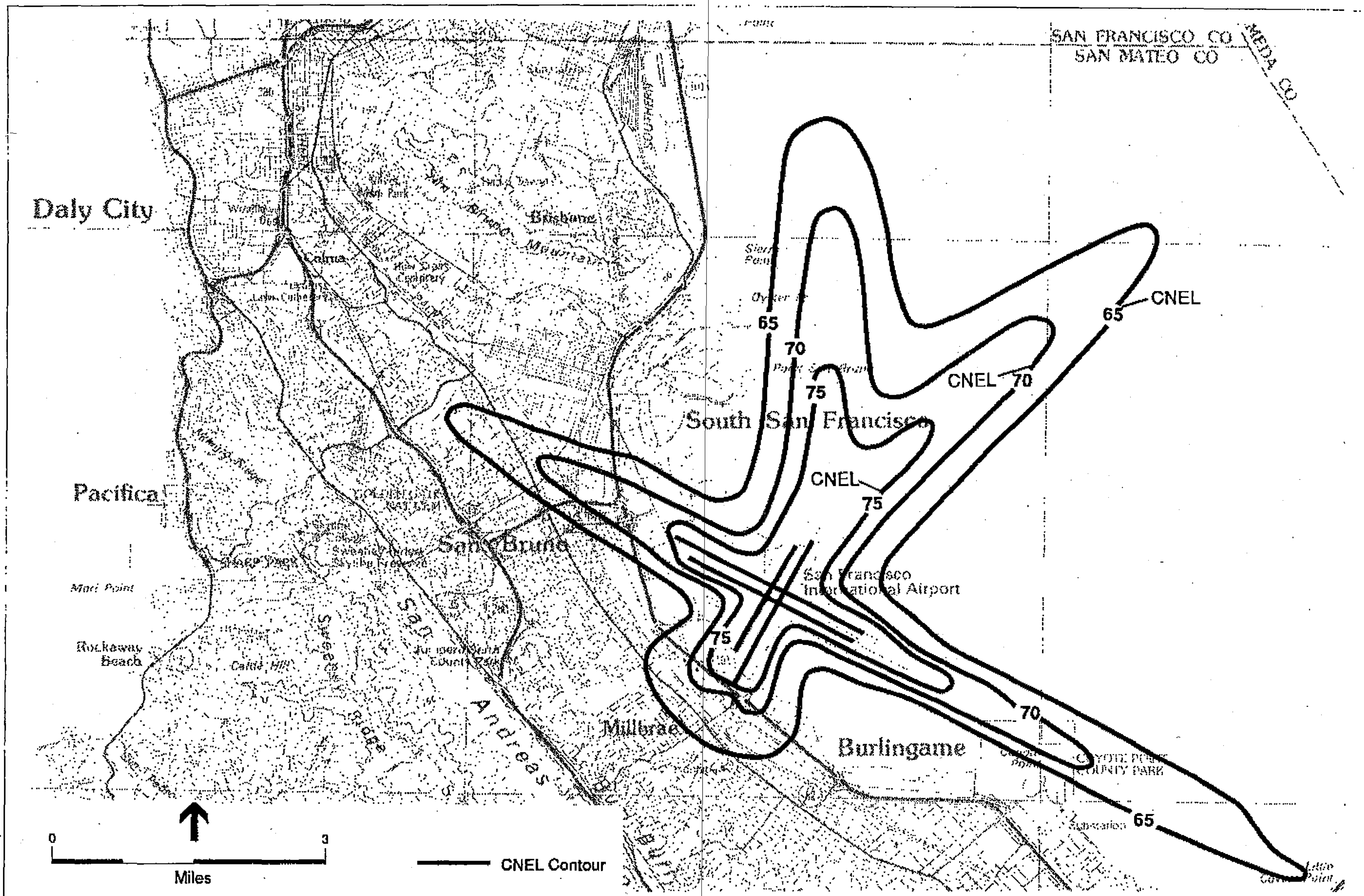


SOURCE: Ken Eldred Engineering and Environmental Science Associates, Inc.

Figure 32
1996 Aircraft Noise Contours

●TABLE 52: ESTIMATED RESIDENT POPULATION/HOUSEHOLDS EXPOSED TO AIRCRAFT NOISE CNEL 65 AND ABOVE, 1990, 1996, AND 2006/a/

Noise Exposure Range (CNEL)/d/	Resident Population/Households Exposed/b,c/					
	Estimated1990		Forecast/e/			
	Population	Households	1996 Pop.	Households	2006 Pop.	Households
CNEL 75+	340	133	0	0	0	0
CNEL 70-75	1,980	777	1,500	618	760	321
CNEL 65-70	12,660	4,939	5,500	2,129	5,840	2,242
Total CNEL 65+	14,980	5,849	7,000	2,747	6,600	2,563

NOTE: Numbers shown reflect only the homes within the CNEL 65 contour. Some homes included in totals may no longer be "impacted" because they have been sound insulated.

/a/ Estimated on the basis of the CNEL contours shown in Figures 20, 32, and 33, pp. 161, 340, and 345.
/b/ Estimated on the basis of 1980 U.S. Census block data, and ABAG population growth factors by census tract. Some of the population growth would occur in new dwelling units with sound insulation installed according to local regulations.
/c/ Estimated on the basis of ABAG Persons Per Household (PPH) statistic for 1990, and projections for 1995 and 2005.
/d/ CNEL= community noise equivalent level.
/e/ Assuming implementation of the SFIA Master Plan.

SOURCE: Environmental Science Associates, Inc.

Comparison of Calculated CNEL Values

Calculated CNEL values at the 27 remote monitoring stations and 20 additional sites selected for this study are presented in Tables 53 and 54, pp. 342-343. (Locations of the stations and study sites are shown in Figure 21, Section III.C. Noise Setting, p. 162.) The tables include CNEL values for 1990, and for 1996 and 2006 with implementation of the SFIA Master Plan. The CNEL values were calculated on the basis of aircraft operations at SFIA only, and do not reflect the noise from aircraft using Metropolitan Oakland International Airport. As explained in Section III.C., Noise Setting, p. 153 and in Appendix C, "Description of Noise and Its Effect on

People," p. A.59, CNEL values are averages of noise over time, and therefore represent the general noise levels in a given area; individual aircraft fly-overs would be louder than the CNEL values and would continue to be noticed. See below for a discussion of single-event noise.

A comparison of CNEL values at the remote monitoring stations shows that:

TABLE 53: COMPARISON OF CALCULATED ANNUAL CNEL VALUES IN DECIBELS AT REMOTE MONITORING STATIONS, 1990, 1996, 2006

		Calculated CNEL Values (dBA)/a/			Increase (Decrease) From 1990	
		Estimated	Forecast			
Station/b/	City Location	1990	1996/c/	2006/c/	1996	2006
1	San Bruno	71.7	71.5	71.7	(0.2)	0.0
2	San Bruno	55.5	53.7	52.9	(1.8)	(2.6)
3	South San Francisco	56.2	53.8	52.1	(2.4)	(4.1)
4	South San Francisco	68.8	68.5	68.9	(0.3)	0.1
5	San Bruno	63.7	62.6	62.3	(1.1)	(1.4)
6	South San Francisco	65.8	64.0	64.3	(1.8)	(1.5)
7	Brisbane	55.3	52.0	49.4	(3.3)	(5.9)
8	Millbrae	71.2	67.9	65.1	(3.3)	(6.1)
9	Millbrae	63.6	60.3	57.1	(3.3)	(6.5)
10	Burlingame	59.8	56.3	53.0	(3.5)	(6.8)
11	Burlingame	63.9	60.5	57.3	(3.4)	(6.6)
12	Foster City	62.5	63.1	63.4	0.6	0.9
13	Hillsborough	50.3	46.8	43.6	(3.5)	(6.7)
14	South San Francisco	54.2	52.3	51.6	(1.9)	(2.6)
15	South San Francisco	62.2	59.1	55.4	(3.1)	(6.8)
16	South San Francisco	57.4	55.6	55.3	(1.8)	(2.1)
17	South San Francisco	60.3	58.8	58.9	(1.5)	(1.4)
18	Daly City	63.1	61.6	61.3	(1.5)	(1.8)
19	Pacifica	58.7	57.1	56.8	(1.6)	(1.9)
20	Daly City	55.7	52.8	51.0	(2.9)	(4.7)
21	San Francisco	53.7	50.9	49.3	(2.8)	(4.4)
22	San Bruno	63.9	60.6	58.5	(3.3)	(5.4)
23	San Francisco	60.9	57.8	55.8	(3.1)	(5.1)
24	San Francisco	59.5	56.3	54.2	(3.2)	(5.3)
25	San Francisco	54.9	51.9	50.0	(3.0)	(4.9)
26	San Francisco	52.9	49.9	48.0	(3.0)	(4.9)
27	San Francisco	40.5	37.9	36.4	(2.6)	(4.1)

/a/ CNEL values calculated using the Integrated Noise Model, and reflect aircraft operations at SFIA only.
/b/ Remote monitoring stations are shown in Figure 23, Section III.C. Noise Setting, p. 195.
/c/ Assuming unconstrained forecasts and implementation of the SFIA Master Plan.

SOURCE: Ken Eldred Engineering.

TABLE 54: COMPARISON OF CALCULATED ANNUAL CNEL VALUES IN DECIBELS AT SELECTED STUDY LOCATIONS, 1990, 1996, 2006

		Calculated CNEL Values (dBA)/a/			Increase (Decrease) From 1990	
		Estimated	Forecast			
Location/b/	City Location	1990	1996/c/	2006/c/	1996	2006
A	SF-Visitacion Valley	59.1	56.2	54.3	(2.9)	(4.8)
B	SF-Mt. Davidson	52.8	50.0	48.3	(2.8)	(4.5)
C	SF-Ingleside	53.7	50.9	49.1	(2.8)	(4.6)
D	Albany	49.6	46.2	43.8	(3.4)	(5.8)
E	Kensington	46.9	43.8	41.5	(3.1)	(5.4)
F	Berkeley	48.7	45.5	43.3	(3.2)	(5.4)
G	Berkeley	41.7	39.1	37.4	(2.6)	(4.3)
H	Oakland	46.0	43.2	41.5	(2.8)	(4.5)
I	Berkeley	42.4	39.9	38.3	(2.5)	(4.1)
J	Orinda Village	40.2	39.8	39.8	(0.4)	(0.4)
K	Berkeley/Oakland	41.5	40.8	40.6	(0.7)	(0.9)
L	Oakland	40.5	39.0	38.3	(1.5)	(2.2)
M	Orinda	39.4	37.0	35.5	(2.4)	(3.9)
N	Walnut Creek	47.2	44.0	41.6	(3.2)	(5.6)
O	Richmond	40.5	37.6	35.5	(2.9)	(5.0)
P	Moraga	52.8	49.4	46.9	(3.4)	(5.9)
Q	Danville	41.1	38.3	36.3	(2.8)	(4.8)
R	Pacifica	49.8	46.8	44.7	(3.0)	(5.1)
S	Pacifica	49.4	46.3	44.2	(3.1)	(5.2)
T	Pacifica	49.8	46.7	44.6	(3.1)	(5.2)

/a/ CNEL values calculated using Integrated Noise Model, and reflect aircraft operations at SFIA only.
/b/ Study locations are shown in Figure 23, Section III.C. Noise Setting, p. 195.
/c/ Assuming unconstrained forecasts and implementation of the SFIA Master Plan.

SOURCE: Ken Eldred Engineering.

- At stations 1-6 and 14-19, located near the departure tracks for Runways 1L and 1R and Runways 28L and 28R, noise levels are forecast to decrease (on average) 1.6 dBA, CNEL from 1990 to 1996 and 2.2 dBA, CNEL from 1990 to 2006. Such decreases would not be perceptible to most people. (At station 4 in South San Francisco, noise levels are forecast to increase 0.1 dBA, CNEL from 1990 to 2006. Such an increase would not be perceptible.)

- At station 7 in Brisbane, located near the "Shoreline Departure" flight path for Runway 28R, noise levels are forecast to decrease 3.3 dBA, CNEL from 1990 to 1996, and 5.9 dBA, CNEL from 1990 to 2006. Such decreases would be perceptible to most people.

- At stations 8-11, located in Millbrae and Burlingame and affected by the back-blast of aircraft taking off on Runways 1L and 1R, noise levels are forecast to decrease (on average) 3.4 dBA, CNEL from 1990 to 1996 and 6.5 dBA, CNEL from 1990 to 2006. Such decreases would be perceptible to most people.

- At station 12 in Foster City, located near the arrival paths for Runways 28, noise levels are forecast to increase 0.6 dBA, CNEL from 1990 to 1996, and 0.9 dBA, CNEL from 1990 to 2006. Such increases would not be perceptible to most people. Noise levels would not decrease in Foster City because the reduction in the noise produced by Stage 3 aircraft as compared to Stage 2 aircraft is much less for landing than for takeoff.

- At stations 20-21 and 23-26, located in Daly City and San Francisco, noise levels are forecast to decrease (on average) 3.0 dBA, CNEL from 1990 to 1996 and 4.9 dBA, CNEL from 1990 to 2006. Such decreases would be perceptible to most people.

A comparison of CNEL values at the selected study locations shows that CNEL values at all locations are forecast to decrease from 1990 to 1996 and 2006. The decrease is caused by the FAA-required phasing out of Stage 2 aircraft at SFIA and greater use of Stage 3 aircraft, which more than offsets the noise from increased numbers of aircraft operations. The average decrease at the study locations is 2.6 dBA, CNEL from 1990 to 1996, and 4.4 dBA, CNEL from 1990 to 2006. In the East Bay communities studied, forecast noise levels in 2006 would all be below 45 dBA, CNEL (except for site P in Moraga; see Table 54, p. 343). As stated previously, the calculated CNEL values reflect noise only from aircraft using SFIA.

Single-Event Noise

As shown in Tables 50 and 51 (pp. 336-337) and Table 18 (p. 157), average daily aircraft operations are forecast to increase from 833 in 1990 to 1,029 in 1996 and 1,131 in 2006. In areas with overflights by aircraft serving SFIA, the number of times single-event noise occurs would increase. However, there would be a decrease in the number of overflights by noisier, low-bypass-engine aircraft such as the B-727. These aircraft are currently present on almost all arrival and departure flight paths at SFIA. In the future the noisiest aircraft overflights to/from SFIA would likely be by B-747 aircraft (about 5 dBA quieter than the B-727). In areas with no overflights by B-747 aircraft, the noisiest aircraft overflights would likely be 10-15 dBA quieter than the B-727 overflights.

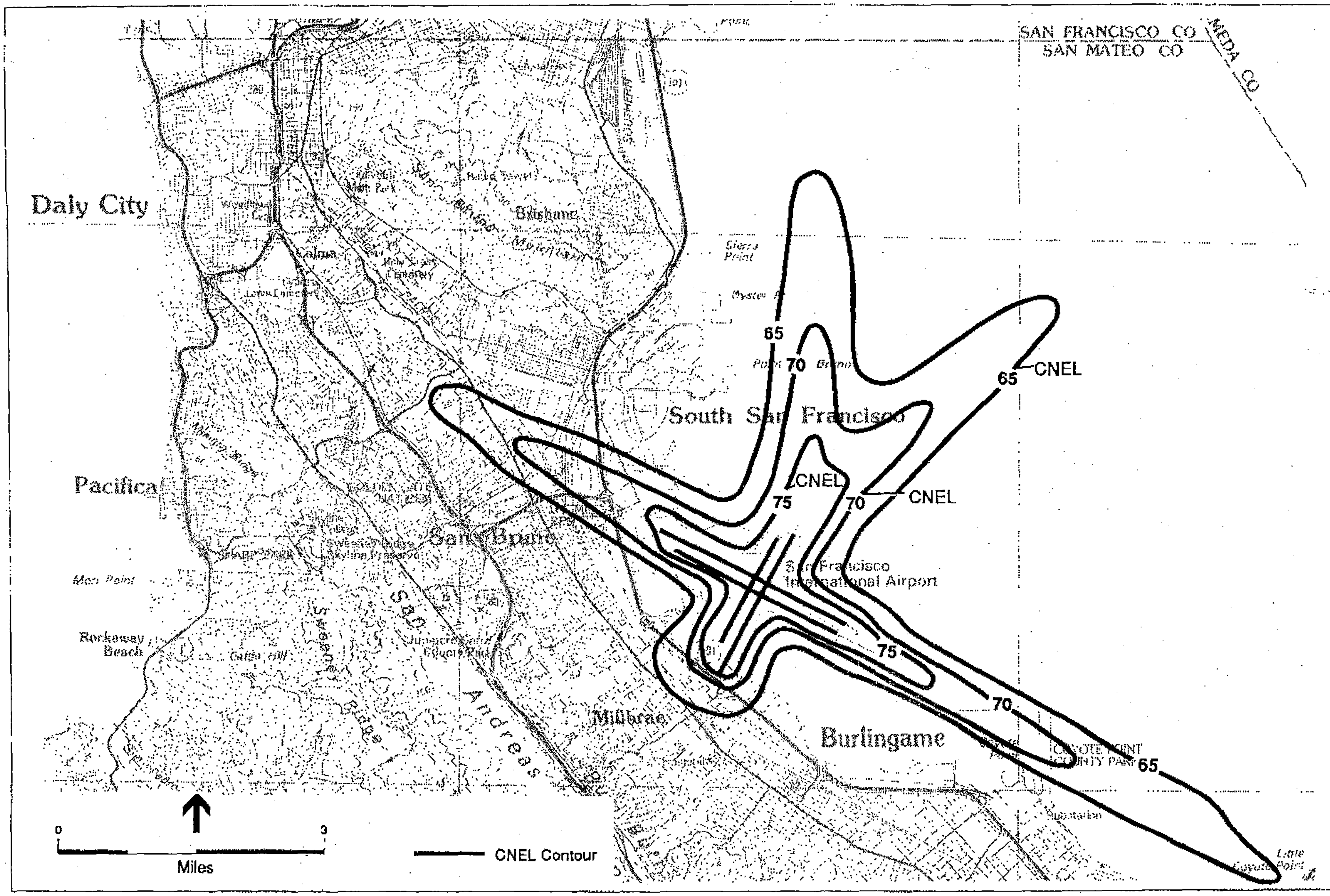
A discussion of typical single-event noise levels in the vicinity of SFIA is presented in Appendix C.

Backblast Noise

The principal change in backblast noise from 1990 to 1996 and 2006 is an average reduction of 3.4 dBA in 1996 and 6.5 dBA in 2006, as shown in Table 53, p. 342 (for Stations 8-11). This reduction is due to the reduction in the number of takeoffs by Stage 2 aircraft, in particular the Boeing 727 and 737-100 and -200. Their contribution to the total backblast noise at SFIA is greater than that of any other aircraft type.

SFIA Aircraft Noise Contours -- 2006

The CNEL contours for 2006 with implementation of the SFIA Master Plan are



SOURCE: Ken Eldred Engineering and Environmental Science Associates, Inc.

Figure 33
2006 Aircraft Noise Contours

presented in Figure 33. A comparison of Figure 33 with the 1990 CNEL contours in Figure 20, Section III.C. Noise Setting, p. 161 and the 1996 CNEL contours in Figure 32, p. 340 shows further reductions in the total area exposed to aircraft noise of 65 dBA, CNEL and above in 2006. In areas of Burlingame and Millbrae there is over a 5 dBA, CNEL reduction from 1990 to 2006. Noise levels in those areas would continue to decrease from 1996 due to the phasing out of Stage 2 aircraft at SFIA.

In areas of South San Francisco there is an increase (0.1 dBA, CNEL for site 4 in Table 53, p. 342) in noise levels from 1996 to 2006. The increase may be due to the forecast increase in flights by relatively large (widebody) aircraft, which usually depart from Runway 28R and fly through the San Bruno gap. The forecast increase in noise levels would not be perceptible.

With or without implementation of the SFIA Master Plan, the number of aircraft takeoffs and landings would increase from 1990 through 2006. The noise from those flights would continue to be noticed by some of the people who live or work within the SFIA "flight corridors," although on average, the noise levels would be noticeably lower in 1996 and 2006 than in 1990.

On the basis of ABAG growth projections for 2006, there would be about 5,840 people, about 760 people, and zero people in areas of 65-70 dBA, 70-75 dBA, and 75+ dBA, CNEL, respectively. The total number of people living within the 65 dBA, CNEL noise contour would decrease from 7,000 people in 1996 (and 14,980 people in 1990) to 6,600 people in 2006.

Summary of Aircraft Impacts

As shown in the CNEL contours for 1990, and for 1996 and 2006 with implementation of the SFIA Master Plan (Figures 20, 32, and 33, pp. 161, 340, and 345), noise levels from aircraft operations at SFIA are forecast to decrease from 1990 through 2006. The number of people exposed to aircraft noise of 65 dBA, CNEL and above is forecast to decrease from 14,980 in 1990 to 6,600 in 2006. Noise levels and single-event noise at almost all remote monitoring stations and study locations are forecast to decrease.

However, noise levels would also decrease in the future without the proposed project because of the phasing out of the noisier, Stage 2 aircraft using SFIA. The effect of the SFIA Master Plan on aircraft noise exposure cannot be determined without comparing forecast aircraft noise levels in 1996 and 2006 with and without implementation of the SFIA Master Plan. (The No-Project Alternative is evaluated in Chapter IX. Alternatives, beginning on p. 439.)

As discussed in Chapter IX. Alternatives, p. 439, implementation of the SFIA Master Plan would remove constraints on capacity imposed by the existing terminal facilities, and allow SFIA to serve an increased number of passengers and aircraft operations. However, the increase in operations allowed by the proposed project would have virtually no effect on cumulative noise levels because the additional operations would all be performed by quieter, Stage 3 aircraft.

CNEL noise contours are "dominated" by the noise produced by Stage 2 aircraft. That is, the calculation of the CNEL values starts with the noisiest aircraft flights that occurred, and adds the noise of the quieter aircraft flights to the noisiest ones. It takes a number of quieter aircraft flights to increase the overall noise level (generally similar to how loud a person's radio would have to play to be heard over the vacuum cleaner). Thus, if there are flights by Stage 2 aircraft at an airport, the noise produced by those flights makes a larger contribution to the CNEL contours than the noise from the Stage 3 aircraft using that airport.

For the forecasts of aircraft operations at SFIA, it was assumed that the airlines serving SFIA will be essentially the same aircraft they are using today, will retire those aircraft at a certain rate, and will add new aircraft as required to serve the remaining unmet demand. On the basis of those assumptions, it is forecast that the same number of Stage 2 aircraft operations will occur at SFIA with or without the SFIA Master Plan, and that with the SFIA Master Plan, the additional operations would all be performed by quieter, Stage 3 aircraft. Because the CNEL noise contours at SFIA will be dominated by Stage 2 aircraft noise, the additional operations by Stage 3 aircraft will not affect the size of the contours (or cumulative noise levels).

Even with the forecast decreases in aircraft noise levels, there still would be people exposed to 65 dBA, CNEL and above in 1996 and 2006. These people would continue to be adversely affected by operation of the Airport. Under the state noise standards, SFIA would continue to be required to operate under a variance granted by the Department of Transportation.

Summary of Combined Traffic and Aircraft Noise Impacts

Both aircraft noise and traffic noise would contribute to overall noise levels in the Airport vicinity, although along major roadways in the Airport vicinity ambient noise levels would be determined primarily by traffic-generated noise. Noise from aircraft overflight would lead to intermittent, short-term increases in ambient noise levels, and would partially determine long-term average noise leyels (CNEL) in areas close to major thoroughfares. In urban environments where traffic noise plays a major role in determining ambient noise levels, daytime average (traffic) noise levels, Leq, are roughly equivalent to 24-hour (traffic) noise levels, CNEL.

As shown in Table 49, p. 334, peak-hour traffic noise levels 50 feet from US 101 would be greater than 80 dBA, L_{eq}, for most (project and no-project) scenarios. Thus, the CNEL from traffic noise would also exceed 80 dBA. Currently, parts of US 101 lie inside the 75 dBA, CNEL aircraft noise contour. Noise from aircraft overflights, although noticeable and possibly intrusive, does not constitute the primary component of average ambient noise levels in the vicinity of US 101. The addition of 75 dBA, CNEL from aircraft would raise the (greater than) 80 dBA, CNEL from traffic by about 1 dBA.

Under the 1996 project and no-project scenarios, US 101 would be within the 70-75 dBA, CNEL aircraft noise contour; thus aircraft noise would have less of an effect on ambient noise levels in the highway vicinity than under existing conditions. Under the 2006 project and no-project scenarios, peak-hour noise levels 50 feet from US 101 would be greater than 80 dBA, L_{eq} (as would traffic CNEL) in areas where the aircraft noise level is in the 70-75 dBA, CNEL range.

Along other roads in the airport vicinity, calculated peak-hour traffic-generated noise levels (and therefore CNEL) would be less than or approximately equal to average daily aircraft noise levels. In areas such as these, traffic noise would still be a major component of average ambient noise levels, but noise from aircraft overflights would have a greater role in determining the average ambient noise level. As distance from the roadways increased, traffic-generated noise would become less noticeable, and the primary noise source would then be the intrusive aircraft overflights. Calculated existing, and 1996-project- and no-project traffic-generated noise levels along San Bruno Avenue are approximately 70 dBA; parts of this road lie within the 75 dBA, CNEL aircraft noise contours. Under these circumstances, the 75 dBA aircraft CNEL would be increased by about 1 dBA to 76 dBA.

On San Bruno Avenue near US 101, noise from aircraft overflight would have an impact in determining ambient noise levels; farther west along San Bruno Avenue, noise impacts from aircraft overflight would diminish, and traffic-generated noise would dominate. By 2006, calculated traffic-generated noise levels would equal or exceed aircraft noise, thus playing the major role in determining ambient noise levels.

Along Millbrae Avenue, calculated existing and 1996-project and no-project-traffic-generated noise levels are approximately equal to aircraft noise. Under the 2006-project and no-project scenarios, calculated traffic-generated noise would exceed aircraft noise by 4 dBA or more, so that the traffic CNEL would be increased by less than 1 dBA.

Along all of these roads in all of these locations, however, single aircraft overflights would be noticed over ambient traffic noise.

<u>Noise Impacts Under FAA and *CASP* Scenarios Compared to the Project</u>

As discussed in Section III.C. Noise Setting, p. 153, future activity at SFIA could be different than forecast in the SFIA Master Plan. The following paragraphs include a summary of projected noise impacts under the *California Aviation System Plan* (*CASP*) forecasts (1989) and Federal Aviation Administration Terminal Area Forecasts (FAA) (1989). A more detailed analysis of the impacts is presented in Appendix C, beginning on p. A.110.

The *CASP* and FAA unconstrained forecasts of annual operations for 1996 and 2006 are shown together with the SFIA Master Plan forecasts in Section III.C. Table 10, p. 64. As shown in Table 10, the SFIA Master Plan forecasts are lower than the *CASP* forecasts, and higher than the FAA forecasts.

If future activity at SFIA is as forecast in the *CASP*, there would be more operations in 1996 and 2006 than forecast in the SFIA Master Plan. Most of the additional operations would be conducted by medium and small aircraft such as the B-757, MD-80, and B-737.

All of the additional operations under the *CASP* scenario would be conducted by quieter, Stage 3 aircraft. It is assumed that Stage 2 aircraft will be phased out at SFIA regardless of future demand for service, because the airlines will retire Stage 2 aircraft as they get older, and the SFIA Noise Abatement Regulation will require the airlines to phase in Stage 3 aircraft at the Airport. The airlines would meet additional demands for service by adding new, Stage 3 aircraft.

The percentages of operations occurring during the more sensitive evening and nighttime hours in 1996 and 2006 are forecast to be the same under the *CASP* as under the SFIA Master Plan forecasts. It is possible that under adverse weather conditions operational constraints and future delays would increase such that operations during the evening and nighttime hours under both *CASP* and SFIA Master Plan would be higher. Thus under adverse weather conditions noise impacts could be greater than analyzed by this EIR.

If future activity is as forecast in the FAA study, there would be fewer operations in 1996 and 2006 than forecast in the SFIA Master Plan and there would be fewer noise impacts.

Runway use, the locations of generalized flight tracks, and flight track use in 1996 and 2006 would be the same under the *CASP* and FAA scenarios as under the SFIA Master Plan forecasts.

The CNEL contours for 1996 and 2006 under the *CASP* forecasts are shown in Appendix C, pp. A.134-136. If future activity is as forecast in the *CASP*, noise levels over the day (as reflected in the contours) would be the same or slightly higher than forecast under the SFIA Master Plan. The difference appears to be less than one dBA, and would not be perceived by people living near the Airport.

If future activity is as forecast by the FAA, noise levels over the day would be the same or slightly lower than forecast under the SFIA Master Plan.

As discussed above, a complete phaseout of Stage 2 aircraft may be implemented as specified in national legislation, or the San Francisco Airports Commission may adopt a date for the elimination of Stage 2 Aircraft prior to 2006. In either case, the CNEL contour values for 2006 under the *CASP* and FAA forecasts would be about one dBA smaller than estimated.

Under the *CASP* scenario, the calculated CNEL values at the 27 remote monitoring stations and the 20 selected study sites would be similar to the CNEL values under the SFIA Master Plan forecasts. Any increases in CNEL values would be one dBA or less.

As discussed above, single-event noise levels would decrease in the future, because of the decrease in the number of overflights by noisier, low-bypass-engine aircraft. This decrease would occur regardless of the future number of operations at SFIA. If future activity is as forecast in the *CASP*, however, aircraft noise from SFIA would be heard more frequently, because the number of flights would be higher than forecast in the SFIA Master Plan.

The *CASP* includes, in addition to the unconstrained forecasts discussed above, a "recommended" set of forecasts. These forecasts reflect the implementation of the following recommendations:

- The redistribution of aircraft operations from SFIA to San Jose International Airport, an expanded Metropolitan Oakland International Airport, and a new air carrier airport.
- The construction of a new runway at Metropolitan Oakland International Airport.
- The relocation of General Aviation (mostly small propeller aircraft) operations from air carrier to General Aviation airports.
- The addition of terminal capacity at air carrier airports.

The number of operations at SFIA under the recommended scenario would be similar to the "constrained" forecast in the SFIA Master Plan (discussed in Chapter IX. Alternatives, p. 439). The types of aircraft serving SFIA would also be similar. Because of the similarities in activity, the noise impacts under the recommended scenario in the *CASP* would be similar to the impacts under the "constrained" forecast in the SFIA Master Plan.

NOTES - Noise

/1/ Cunniff, Patrick E., John Wiley & Sons, *Environmental Noise Pollution*, 1977.

/2/ United States Environmental Protection Agency, *Community Noise*, December 31, 1971.

/3/ San Francisco Department of City Planning, *Downtown Plan Environmental Impact Report (EIR)*, EE81.3, certified October 18, 1984, Vol. 1, pp. IV.J. 1-19, particularly Table IV.J.2, pp. IV.J.9-10.

/4/ United States Department of Transportation, Federal Aviation Administration, Order 5050.4A, "Excerpts From Airport Environmental Handbook," October 8, 1985.

/5/ Federal Aviation Administration, "Report to Congress on Status of the U.S. Stage 2 Commercial Aircraft Fleet," August 1989.

● /5a/ "FAA Eases Plan to Phase Out Noisy Jets Amid Strong Pressure," *The New York Times*, September 25, 1991.

/6/ Federal "Airport Noise and Capacity Act of 1990".

/7/ The CNEL contours reflect noise produced during aircraft takeoff, landing, and flight. Noise produced by aircraft waiting to takeoff (such as aircraft idling on a taxiway) is not reflected in the CNEL contours. Noise from idling aircraft would have a negligible effect on the cumulative totals.

D. AIR QUALITY

CONSTRUCTION

Particulate matter, in the form of fugitive dust, would be generated through building demolition, land clearing, excavation, and grading activities and through movement of trucks and heavy equipment. Fugitive dust emissions would vary according to the level and type of activity, silt content of the soil, and prevailing weather. Construction-related fugitive dust consists of larger-sized particles (greater than ten microns in diameter) as well as the finer particles that account for ambient PM_{10} levels.

The larger-sized particles would be more of a nuisance than a health hazard, except to persons with respiratory problems, and would settle out of the atmosphere close to the project site. The finer particles raised by construction would contribute to background PM_{10} levels to the extent that the State 24-hour average ambient standard, 50 micrograms per cubic meter, could be violated on occasion in the vicinity of construction.

Hydrocarbons (HC), a precursor pollutant for ozone (O_3), would be emitted from asphalt in paving materials. These temporary HC emissions would contribute incrementally to local O_3 levels and, because background O_3 levels in the Bay Area already approach the State one-hour ozone standard, could potentially lead to violations of that standard.

Construction would also involve emissions of criteria air pollutants from construction vehicles and equipment. These emissions would be temporary and would only incrementally contribute to local and regional air quality.

OPERATION

Because of the diverse nature of pollutant sources, air quality studies analyzing the expansion of both landside facilities and airside operations such as those at San Francisco International Airport focus on three main areas: landside vehicular traffic, including employee and passenger traffic and aircraft ground-support equipment operation; airside operations, including aircraft operations and aircraft fueling; and building emissions resulting from the burning of natural gas and the consumption of electricity.

The analysis in this section provides information that could be used to assess the SFIA Master Plan in relation to the thresholds of significance recommended by the Bay Area Air Quality Management District's *Guidelines for Assessing Impacts of Projects and Plans*, revised April 1988. According to these *Guidelines*, "any project or plan which would generate carbon monoxide (CO) concentrations above the State or national carbon monoxide (CO) standards would be of significant effect by definition." A second test of significance states that the level of emissions from a total of direct and indirect sources would be considered significant if emissions of HC, NO_X, SO_X, or PM_{10} equalled or exceeded 150 lb/day. For mobile sources curbside CO concentrations are normally modeled; this second test indicates that 550 lb/day of CO would be considered significant only if it leads to a violation of State standards under Test 1 modeling. Finally, "any project or plan should be considered of significant effect if emission of any criteria contaminant for combined direct and indirect sources reaches or exceeds one percent of county emissions of the contaminant." There are two other tests of significance: one applies only to stationary sources and the other applies to projects that would generate population or employment exceeding regional projections.

Landside Emissions

Vehicular Traffic

Carbon monoxide concentrations normally consist of an area-wide background level, with micro-scale peaks superimposed on local sources. The background concentration is a function of area-wide traffic characteristics, topography, and climatology, while the local concentration is a function of traffic characteristics at the point of interest, such as heavily travelled roads and intersections. For this analysis, worst-case estimates of local CO concentrations were added to background CO concentrations.

Roadside CO concentrations at selected intersections and road segments in the project vicinity were estimated under worst-case atmospheric conditions for both existing traffic levels and future anticipated levels. The results are shown in Table 55.

● TABLE 55: ESTIMATED WORST-CASE EXISTING AND FUTURE CO CONCENTRATIONS IN THE PROJECT VICINITY

	Concentration by Year (ppm)/a,b/						
	1990	1996	1996	1996	2006	2006	2006
Location	Existing	Forecast Growth	+ Project/c/	+List-added Growth/d/	Forecast Growth	+ Project/c/	+List-added Growth/d/
Intersections							
El Camino Real & Millbrae							
1-hour	20.7/e/	16.8	16.8	17.6	13.5	13.5	15.9
8-hour	13.4	10.8	10.8	11.3	8.7	8.7	9.7
El Camino Real & San Bruno							
1-hour	15.2	12.4	12.6	15.7	10.6	10.7	13.0
8-hour	9.5	7.7	7.8	10.0	6.7	6.7	8.3
South Airport & Utah							
1-hour	14.8	11.7	11.7	12.8	9.3	9.4	10.3
8-hour	9.2	7.2	7.2	8.0	5.8	5.8	6.5
Rollins & Millbrae							
1-hour	14.7	12.4	12.6	15.4	10.7	12.3	12.9
8-hour	9.2	7.7	7.8	9.8	6.7	7.9	8.3
Segment							
Bayshore Freeway/f/							
1-hour	10.6	8.7	8.8	9.2	7.5	7.5	7.9
8-hour	6.3	5.1	5.2	5.5	4.5	4.5	4.8

/a/ Estimates were calculated using CALINE4, a computer-based air pollution dispersion model developed by the California Department of Transportation. The eight-hour CO concentrations were assumed to be about 70 percent of the modeled one-hour values. One-hour background CO concentrations used were 5.6 ppm for 1990, 4.7 ppm for 1996, and 3.8 ppm for 2006. Eight-hour background CO concentrations used were 2.8 ppm for 1990, 2.3 ppm for 1996, and 1.9 ppm for 2006. Intersection concentrations correspond to a location approximately 15 feet from the corner of the intersection. Bayshore Freeway concentrations correspond to a point about 250 feet from the center of the northbound lanes.

/b/ ppm = parts per million

/c/ Includes forecast growth, as shown in Table 22, p. 248 and explained on p. 246.

/d/ Includes forecast growth plus project growth.

/e/ Underlined values are in violation of the applicable standard.

/f/ In the p.m. peak hour, northbound Bayshore Freeway between San Bruno Avenue and I-380 volumes were assumed to be 45% of southbound volumes.

NOTE: The State 1-hour CO standard is 20 ppm and the State 8-hour standard is 9 ppm.

SOURCE: Environmental Science Associates, Inc.

- The results indicate that existing CO levels already violate State eight-hour CO standards for the intersections analyzed, but that by 2006, the CO standard would be violated at only one intersection. The eight-hour standard would be violated at three intersections under 1996 traffic conditions. At El Camino Real & Millbrae Avenue, 1996 baseline (without the project) traffic conditions would violate the ambient eight-hour CO standard, and the project would contribute to an increase in the frequency of standard violations. At the other two intersections, El Camino Real & San Bruno Avenue and Rollins Road & Millbrae Avenue, the project on its own would not cause the violation of the standards in 1996, but the project together with projected growth would result in the violation of the eight-hour standard. Cumulative traffic conditions in 2006, including traffic from the project, would cause a violation of the eight-hour standard at El Camino Real & Millbrae Avenue. No other analyzed intersection would exceed ambient standards under cumulative traffic conditions. CO emissions are projected to decrease in the future because of improved engine efficiencies and cleaner burning fuels. The decline in CO concentrations over time apparent at some of the intersections is a result of the expected decline of future emission rates as cleaner new vehicles enter the vehicle mix, and is not an indication that the number of vehicles through the intersection is dropping.

The proposed project at SFIA would generate additional motor vehicle trips which would result in the emission of criteria pollutants. Total vehicular traffic emissions are presented in Table 56.

Ground Support Vehicles

Ground support vehicles are motorized equipment which operate in the gate areas to load and unload aircraft and otherwise prepare aircraft for their next departures. The mix of equipment and duration of service are dependent on the type of aircraft being serviced. Ground support vehicle emissions are shown in Table 57, p. 358.

<u>Airside Emissions/1/</u>

Aircraft Operations

An aircraft's air pollutant emissions are a function of three factors - the various engine emission rates during the different phases of the landing/takeoff operation (LTO) cycle, the amount of time spent in each phase of the LTO cycle, and the number of engines on the aircraft. The LTO cycle is broken down into four distinct phases based on engine speed, including taxi/idle, takeoff, climbout, and approach. The approach and climbout phases begin and end, respectively, when the aircraft reaches a height of approximately 3,000 feet. Three thousand feet is considered the average inversion level in the United States, and it is assumed that aircraft emissions above this mixing

● TABLE 56: ESTIMATED VEHICULAR TRAFFIC EMISSIONS

	Emissions (lb/day)/a/				
Pollutant	1990 Existing	1996 Forecast Growth/b/	1996 Forecast Growth + Project	2006 Forecast Growth/b/	2006 Forecast Growth + Project
CO	83,500	87,800	89,300	77,200	94,500
NO_X	8,000	8,300	9,000	7,400	9,100
HC	4,100	3,600	3,900	2,700	3,200
SO_X	1,000	1,300	1,400	1,400	1,700
PM_{10}	11,300	14,100	15,200	14,700	17,900

/a/ Based on EMFAC7D emission rates, an estimated average speed of 30 miles per hour, and an average trip length of 20 miles, as suggested by the BAAQMD's (revised April 1988) *Guidelines for Assessing the Impacts of Projects and Plans*.
/b/ Forecast growth is shown in Table 22, p. 248 and explained on p. 246.

SOURCE: Environmental Science Associates, Inc.

depth are not pertinent to local air quality./2,3/ The time-in-mode for each LTO cycle depends on the type of aircraft and the amount of congestion at the airport at the time of the aircraft operation. The Environmental Protection Agency has published time-in-mode estimates for large congested metropolitan airports, and SFIA-specific delay estimates were made from the San Francisco Bay Area Airports Capacity Task Force's (1987) "Task Force Capacity Study of SFO, SJC, and OAK International Airports." The time-in-mode assumptions used to calculate aircraft emissions at SFIA are shown in Table 58, p. 359. Delayed aircraft are conservatively assumed to have their engines running throughout this estimated delay period under the SFIA Master Plan future analysis.

It is possible that because of operational constraints and future delays there would be further delays of aircraft with additional engine idling, resulting in additional aircraft emissions. Tables J-1 and J-2, in Appendix J, pp. A.179-180, show the existing number of flights per hour in 1990, and the forecast number of flights per hour in 1996 and 2006.

TABLE 57: ESTIMATED GROUND-SUPPORT VEHICLE EMISSIONS

	Emissions (lb/day)/a,b,c/				
Pollutant	1990 Existing	1996 Forecast Growth	1996 Forecast Growth + Project	2006 Forecast Growth	2006 Forecast Growth + Project
CO	4,500	5,300	6,000	4,800	6,100
NO_X	300	400	400	300	400
HC	500	500	600	500	600

/a/ Ground-support vehicle emissions for existing and future scenarios were quantified using service duration factors from the EPA's AP-42. Factors were not available for all types of aircraft, so similar aircraft were grouped by their approximate passenger capacity. According to Melvin Leong of SFIA, approximately half of the ground-support vehicles use diesel fuel and half use gasoline at SFIA.

/b/ Estimates assume an engine speed (not vehicular speed) of 10 mph and EMFAC7D "heavy truck" diesel and gasoline emission rates, as suggested in the EPA's (1973) *An Air Pollution Impact Methodology For Airports*. Year 2000 emission rates were used for 2006 calculations because no 2006 "heavy truck" emission rates are available.

/c/ Emissions rounded to the nearest 100 lb/day.

SOURCE: Environmental Science Associates, Inc.

According to Tables J-1 and J-2, in 1996 and 2006 there would be no more than one hour of delay for any flight under optimum visual flight rules (86 percent of the time). Under more adverse weather conditions there could be additional delays to flights.

During instrument flight rules (IFR) conditions which occur about 5.6 percent of the time, the existing SFIA airfield would not accommodate the number of flights forecast per hour in 1996 and 2006 with implementation of the SFIA Master Plan, if such conditions were to persist throughout a 24-hour period. Even if the forecast flights were spread throughout the entire 24-hour period to maximize use of the airfield, the airfield could not accommodate the total number of daily flights forecast, even assuming that the airfield were to operate at capacity every hour.

TABLE 58: TIME-IN-MODE ASSUMPTIONS FOR SFIA

	Time-In-Mode (minutes)	
Phase of LTO Cycle	Commercial Carrier, General Aviation	Military Helicopter
Taxi / Idle/a/		
1990 Existing	21.5	15
1996 Forecast Growth	32.0	15
1996 Forecast Growth + Project	37.0	15
2006 Forecast Growth	29.0	15
2006 Forecast Growth + Project	55.0	15
Takeoff/b/	0.5	--
Climbout (to 3,000 feet)	2.2	6.8
Approach (from 3,000 feet)	4.0	6.8

/a/ Time-in-mode estimates for the Commercial Carrier and General Aviation categories during the taxi/idle phase were calculated on the basis of projected annual operations under each scenario and operational delay estimates contained in San Francisco Bay Area Airports Capacity Task Force's (1987) "Task Force Capacity Study of SFO, SJC, and OAK International Airports." The remaining time-in-mode estimates were taken from the Environmental Protection Agency (September 1985) *Compilation of Air Pollutant Emission Factors, Volume II: Mobile Sources* (AP-42).

/b/ Helicopters do not have a takeoff mode.

SOURCE: Environmental Science Associates, Inc., San Francisco Bay Area Airports Capacity Task Force, 1987, "Task Force Capacity Study of SFO, SJC, and OAK International Airports," and Environmental Protection Agency, September 1985, *Compilation of Air Pollutant Emission Factors, Volume II: Mobile Sources* (AP-42).

Under adverse weather conditions, if aircraft delays were to further increase over delays predicted in this EIR, air quality impacts could be somewhat greater than calculated in this EIR, depending on the length of time over which delayed aircraft kept engines idling. A mitigation measure to reduce aircraft idling has been identified in Chapter V. Mitigation Measures, p. 411. In any case, the increase in emissions due to idling aircraft would be minimal, because of the relatively small amount of emissions from idling compared to emissions from landings and takeoffs, and in comparison to all other air-emission sources at the SFIA. In addition, the percentage of time that adverse weather conditions occur is relatively small.

Total existing and projected aircraft operations emissions at San Francisco International Airport are presented in Table 59. Because aircraft engines are maintained constantly, it is assumed that emission rates would be constant over time. Particulate emission rates are not available for most aircraft engines, so particulate emissions are not estimated. Similarly, SO_X emissions are not presented because they are proportionally related to the amount of SO_X present in the aviation fuel (and to the amount of fuel consumed), and are not closely linked to a particular engine type.

The results shown in Table 59 indicate that, in the short-term, CO and HC emissions from aircraft would increase by about 80%, and NO_X emissions would increase by about 40%. In the long-term, aircraft emissions of CO and HC would increase approximately 125% over 1990 levels, and NO_X emissions would increase by about 60%. Although older aircraft with higher emission rates will gradually be replaced by new, "cleaner" aircraft with lower emission rates, the expected increase in delays at SFIA would offset the anticipated decrease in air pollutant emissions brought about by cleaner aircraft./4/

Aircraft emissions are tied to the time-in-mode for each operation. In general, CO and HC emissions are greatest during the low-power phase of the LTO cycle, the taxi/idle phase. For the particular fleet mix at SFIA, a hypothetical increase of one minute in the taxi/idle phase would result in an increase in CO emissions of about 1,200 pounds per day and an increase of about 400 pounds of HC per day. However, NO_X emissions would be relatively unaffected by an increase in taxi/idle time because NO_X emissions are greatest during the high-thrust takeoff and climbout portions.

Fuel Handling and Storage

Emissions from fuel-handling and storage come from the evaporation of liquid from storage tanks during the daily temperature fluctuations and from the displacement of fuel vapors when aircraft tanks are filled. The first is called "breathing loss" and the second is called "working loss." Breathing loss is a function of the type of storage tank, the daily temperature cycle, the wind speed, the fuel vapor pressure, and a number of other variables. Working losses are associated with the refueling of aircraft

TABLE 59: ESTIMATED DAILY AIRCRAFT EMISSIONS AT SFIA, 1990-2006

Pollutant	LTO Phase	Emissions by Year (lb/day)/a,b/ 1990 Existing	1996 Project	2006 Project
CO	Taxi/Idle	23,600	44,600	57,600
	Takeoff	100	100	100
	Climbout	400	400	400
	Approach	1,900	2,000	1,600
	TOTAL/c/	26,000	47,100	59,800
NO_X	Taxi/Idle	1,800	3,700	6,200
	Takeoff	3,300	4,400	4,200
	Climbout	6,600	8,800	8,700
	Approach	1,900	2,500	2,600
	TOTAL/c/	13,600	19,400	21,700
HC	Taxi/Idle	8,800	16,000	19,700
	Takeoff/d/	--	--	--
	Climbout	100	100	100
	Approach	200	300	300
	TOTAL/c/	9,200	16,300	20,100

/a/ The existing and future air carrier fleet mix was determined by Ken Eldred Engineering, Inc., and the commuter, General Aviation, and military fleet mixes were estimated by Environmental Science Associates, Inc. No data on the 1990 SFIA is available yet, so the 1990 fleet mix is based on 1989 operations data. Emission rates and engine types for each aircraft were obtained from one of two sources. The EPA's AP-42 contained emission rates for older aircraft (pre-1985) such as the DC10, and Nick Krull of the Federal Aviation Administration (FAA) provided the remaining factors for the more recent and under-construction aircraft that were not supplied in AP-42, such as the MD11 and the A330/340. Data supplied by Mr. Krull were originally provided to the International Civil Aviation Organization by the engine manufacturer and have not been validated by the FAA. When no data for a particular engine were available, emission rates from a similar engine were assumed.

/b/ Estimates rounded to the nearest 100 lb/day.

/c/ Estimates may not add due to rounding.

/d/ Each of these amounts was less than 50 lb/day.

SOURCE: Environmental Science Associates, Inc.

and appear as density waves around the fueling ports. Both types of emissions are controlled at SFIA through the use of a "closed" fuel distribution system. Fuel is distributed from the storage tanks via pipelines to refueling hydrants located throughout the Airport. A hose joins the hydrant system directly to the aircraft. Since the pathway from the storage tank to the aircraft fuel tank is continuous, there are no links from which vapors can escape. A vapor recovery device, effectively similar to those used at automobile service stations, captures fuel vapors from the hose-aircraft exchange.

There is also the possibility of evaporation of fuel that is spilled during aircraft refueling operations. This loss is assumed to be negligible because the spilled fuel is generally cleaned up promptly by ground crews to prevent fire hazards. For smaller spills, absorbent material is used to recapture the fuel and then is disposed of as hazardous waste. Two large-scale fuel leaks have occurred at the airport in the last few years. Both of these spills were contained through the manipulation of the water drainage system (see the discussion on "Spills" in Section III.H. Hazardous Materials, pp. 211-214). Once in the system, the fuel can be skimmed off before it reaches the Bay.

Building Energy Emissions

Estimated existing and future air pollutant emissions from building natural gas consumption at San Francisco International Airport are shown in Table 60.

Total Air Pollutants

Estimated total existing and future emissions generated at SFIA are shown in Table 61, p. 364. Project-generated emissions would be over the BAAQMD threshold of 150 lb/day for HC, NO_x, SO_x, and PM_{10}. In addition, because CO concentrations were calculated to be in violation of State standards in the future, the BAAQMD threshold of 550 lb/day for CO is applicable; project-generated emissions would be over the BAAQMD threshold for CO./5/

Total air-pollutant emissions at SFIA constitute a relatively large portion of the total emissions in San Mateo County, and implementation of the proposed project at SFIA would generate a net increase in emissions above the BAAQMD threshold of one percent (of Countywide emissions) for all criteria pollutants for both study years.

TABLE 60: ESTIMATED ANNUAL BUILDING ENERGY AIR POLLUTANT EMISSIONS, 1990-2006

	Emissions (lb/year)/a,b/		
Pollutant	1990 Existing	1996 Project	2006 Project
CO	4,000	6,000	6,400
NO_X	23,900	36,000	38,400
HC	1,100	1,600	1,700
SO_X	--	--	--
Particulates	30	50	50

/a/ Only natural gas combustion emissions are included here. Calculations are based on the following existing and future annual natural gas consumption rates:

1990	2.1 million therms
1996	3.1 million therms
2006	3.3 million therms

1990 natural gas usage has been supplied by SFIA. 1996 and 2006 natural gas usage estimated from weighted energy consumption factors and proposed square footages of project facilities.

/b/ Emission rates for the combustion of natural gas were supplied in the South Coast Air Quality Management District's (April 1987) *Air Quality Handbook.*

SOURCE: Environmental Science Associates, Inc.

By 1996, project-generated emissions from all sources would constitute approximately 3.8 percent of the total San Mateo County CO emissions and about 4.7 percent of the total NO_X emissions. By 2006, project emissions would account for a larger percentage of the total County emissions, with CO emissions at 11.7 percent, NO_X emissions at 9.8 percent, HC emissions at 11.6 percent, SO_X emissions at 1.8 percent, and PM_{10} emissions at 4.4 percent of the total County CO, NO_X, HC, SO_X, and PM_{10} emissions, respectively. The BAAQMD one-percent significance threshold is not meant to predict excesses of ambient standards; rather, it is meant to underscore the need for local government to consider incorporation of mitigation measures to reduce the projected emissions.

TABLE 61: TOTAL DAILY AIR POLLUTANT EMISSIONS

Pollutant	Emissions (tons/day) Base	Base + Project	San Mateo County/a/	Net Increase of Project as Percent of County Emissions
1996				
CO	63.2	72.0	232.1	3.8
NO_x	12.5	14.5	42.6	4.7
HC	8.8	10.7	50.0	3.8
SO_x/b/	0.7	0.7	5.7	0.0
PM_{10}/b/	7.0	7.6	49.0	1.2
2006				
CO	55.6	79.9	208.1	11.7
NO_x	11.5	15.7	43.0	9.8
HC	6.5	12.0	47.6	11.6
SO_x/b/	0.7	0.8	5.7	1.8
PM_{10}/b/	7.3	9.0	52.6	4.4

NOTE: N/A - Not Applicable

/a/ California Air Resources Board, *Emission Inventory* (base year 1987) preliminary data.

/b/ Estimate does not include aircraft or ground support vehicle emissions of SO_x and PM_{10}.

SOURCE: Environmental Science Associates, Inc.

Air Emissions Under FAA and *CASP* Scenarios Compared to the Project

There would be fewer aircraft operations assumed under the FAA scenario compared to the SFIA Master Plan in both 1996 and 2006. The fleet mix (under the FAA scenario) would indicate the same number of operations by older aircraft with higher emission rates, and fewer operations by newer aircraft with lower emission rates. Thus, under the FAA scenario, future aircraft emissions would be less than emissions under the SFIA Master Plan.

Because of increased operations under the *CASP* scenario compared to the SFIA Master Plan, estimated aircraft ground-support vehicle emissions would increase over those of the SFIA Master Plan./6/ Aircraft emissions were calculated based on the number of operations and the different fleet mix of the *CASP* scenario. Airside emissions under the *CASP* scenario in 1996 would increase levels of CO, NO_X, and HC by about 93,300 lb/day, 9,200 lb/day and 32,200 lb/day, respectively, over 1996 emissions under the SFIA Master Plan. Airside emissions under the CASP scenario in 2006 would increase levels of CO, NO_X, and HC, by about 99,300 lb/day, 13,500 lb/day, and 28,800 lb/day, respectively, over 2006 emissions under the SFIA Master Plan./3/ Traffic-related air emissions would increase by less than two percent, because while passenger related-traffic would increase by about two percent, terminal-employee-related and United Airline Maintenance Center employee-related traffic would not change.

NOTES - Air Quality

/1/ Unless otherwise indicated, information and methodology on aircraft emissions was derived from the Environmental Protection Agency's *An Air Pollution Impact Methodology For Airports, Phase 1*, January 1973. Data presented in the EPA report was collected by survey from the O'Hare International Airport and the St. Louis Airport, among others.

/2/ Bay Area Air Quality Management District, March 1982, "A Methodology for Estimating Emissions from Aircraft Operations."

/3/ Environmental Protection Agency, September 1985, *Compilation of Air Pollutant Emission Factors, Volume II: Mobile Sources* (AP-42).

/4/ Krull, Nick, Manager of Technology Division, Office of Environment & Energy, Federal Aviation Administration, telephone conversation, August 2, 1990.

/5/ 1996 and 2006 cumulative and cumulative plus project emission inventories were not calculated because the two emission inventory tests of significance address only project-generated emissions and do not assess the significance of cumulative emissions. CO concentrations from project-generated and cumulative traffic at nearby intersections are discussed and presented on pages 345-347.

/6/ The analysis in the EIR assumes up to a maximum average of two hours per landing/takeoff (LTO) cycle that aircraft engines would remain running. This maximum average does not limit the emissions estimates under the SFIA Master Plan future analysis; it does limit the estimated aircraft emissions under the CASP scenario future analysis.

E. ENERGY

CONSTRUCTION

Project construction would consume energy that would be derived primarily from non-renewable sources. Site clearing, building demolition, grading, and excavation would require a relatively large, but unknown, expenditure of gasoline and diesel fuel. Building construction for both the near- and long-term projects would require an additional 3.9 trillion British thermal units (Btu), or the equivalent of about 670,000 barrels of oil./1,2/

OPERATION

Transportation Energy

Surface Traffic

In 1996, Airport operations with the project would generate approximately 44 million passenger, employee, and tenant vehicle trips per year, about a 41% increase over future vehicle trips without the project. On the assumption of an average trip length of 20 miles, these trips would generate about 870 million vehicle miles of travel in 1996. In addition, aircraft servicing and maintenance would generate an unknown number of vehicle miles of travel. On the assumptions of an average fuel economy in 1996 for the California vehicle fleet of about 27.4 miles per gallon and a distribution of 90 percent gasoline-powered vehicles and ten percent diesel-fuel-powered vehicles, surface traffic (not including ground maintenance) would consume annually about 4.5 trillion Btu of energy, an increase of about 1.1 trillion Btu, or the equivalent of about 190,000 barrels of oil.

Air Traffic

On a proportional basis, aviation fuel consumption at SFIA would increase from about 50,000 barrels a day to about 58,000 barrels a day in the near-term and to about 63,000 barrels a day in the long-term. According to the SFIA Master Plan, SFIA's existing fuel distribution system would be capable of handling the increase in demand, though modifications and improvements may be necessary to enhance system efficiency.

Currently, the Airport is in negotiations with existing fuel companies and alternative sources in order to develop specific recommendations for modifications and upgrades to the distribution system.

Fuel consumption is relatively low when aircraft are idling. Most fuel is used during the acceleration/deceleration cycle and during aircraft flight. Thus any energy increase due to increased operational delays in the future would be relatively minor in comparison to the total additional flight operations.

Building and Facilities Energy

Natural Gas

In 1996, natural gas demand at SFIA would be about 3.1 million therms, an increase of about 48 percent over 1990 consumption. This increase in consumption would be about 310 billion Btu of thermal energy, or the equivalent of about 53,000 barrels of oil. Peak consumption, and the month in which natural gas use peaks, are not expected to change. The increase in natural gas use at SFIA from new construction alone would be higher than the figure reported here, but would be partially offset by the proposed demolition of existing structures, leading to the net increase above./3/

In 2006, natural gas demand at SFIA would be about 3.3 million therms, an increase of about 57 percent over 1990 consumption. This increase in consumption would be about 330 billion Btu of thermal energy, or the equivalent of about 56,000 barrels of oil. Peak consumption, and the month in which natural gas use peaks, are not expected to change. The increase in natural gas use at SFIA from new construction alone would be higher than the figure reported here, but would be partially offset by the proposed demolition of existing structures, leading to the net increase above.

The SFIA Master Plan analyzed the existing natural gas distribution system and found that service is adequate throughout the Airport complex for both the near- and long-term SFIA Master Plan projects. The proposed project is not expected to affect the current distribution system nor the quantity of gas used. Energy consumption over the past ten years has been increasingly efficient, especially in space and domestic water heating./3/

New buildings and facilities would generally be more efficient than older buildings in their use of natural gas. Future consumption reported herein was estimated on the basis of past use, to yield a conservative estimate. Actual consumption of natural gas at SFIA in the future probably would be less than the figures presented.

Electricity

The SFIA Master Plan analyzed the effect of the near- and long-term development on the existing airport electrical distribution system, by categorizing each of the proposed new projects by its function and estimating the wattage per square foot for each category. Based on historical data from the Facilities, Operations, and Maintenance Division at SFIA, the total electrical load, for all existing facilities to be demolished, was calculated./4/ The net increase in electrical load was calculated by subtracting the electrical load of demolished facilities from the total estimated electrical load of new facilities.

In the near-term, the decrease in electrical load would be about 4.2 MW, and the increase in electrical load from new facilities would be about 17.7 MW. Therefore, the forecast net near-term electrical load increase would be approximately 13.5 MW. Because less additional construction would be undertaken as part of the long-term plan, the further increase in electrical load would not be as great. The long-term additional decrease in electrical load would be 2.2 MW, and the additional increase would be 3.8 MW, for a net long-term additional increase of 1.6 MW. The total increase in electrical load for both the near- and long-term forecasts would therefore be about 15.1 MW./3/

SFIA has requested an increase in the amount of electrical power from PG&E. SFIA requested an increase of 15 MW to be provided by 1994 and an additional 10 MW to be provided by 2006./5,6/ The requested increase in energy supply would be sufficient to meet the forecast short- and long-term energy requirements of project facilities.

As noted in the SFIA Master Plan, SFIA's current system capacity is about 46.3 MW and the forecast total maximum demand (electrical load) from all proposed facilities is 52.6 MW. Several capital improvement projects not part of the proposed project are planned or have already been started. For example, SFIA is currently in the process of converting all 4 kilovolt (kV) distribution systems into more efficient 12 kV systems./7/ However, these planned and completed projects will not enhance the distribution system's existing total capacity of 46.3 MW.

The increased electrical capacity requested by SFIA in both the near- and long-term exceeds current airport load capacity of 46.3 MW and would require expansion of the existing PG&E substations to meet future demand. PG&E has indicated that an additional transformer bank would be required to handle the increased demand requested by the Airport./5/

Energy Use Under FAA and *CASP* Scenarios Compared to the Project

There would be fewer passengers and aircraft operations assumed under the FAA scenario compared to the SFIA Master Plan in both 1996 and 2006. Estimated transportation and aircraft energy use would decrease compared to energy use under the SFIA Master Plan. If all facilities proposed under the SFIA Master Plan were still built under the FAA scenario, natural gas and electric use would remain the same as under the SFIA Master Plan.

Because of an increase in the number of passengers and an increase in operations under the *CASP* scenario compared to the SFIA Master Plan, estimated transportation and aircraft energy use would increase compared to energy use under the SFIA Master Plan. Traffic-related energy would increase by less than two percent, because while passenger-related traffic would increase by about two percent, non-terminal-employee-related and United Airline Maintenance Center employee-related traffic would not change. Total aircraft energy use under the *CASP* scenario would be the equivalent of about 71,000 barrels of oil a day in 1996 and about 93,000 barrels a day in 2006. Aircraft energy use would increase the equivalent of about 13,000 barrels a day in 1996 and about 30,000 barrels a day in 2006 compared to energy use under the SFIA Master Plan.

NOTES - Energy

/1/ A British thermal unit is the amount of heat required to raise the temperature of one pound of water one degree Fahrenheit at sea level. Btu values reported herein are at-source values, meaning that they include the energy required for production and transmission of the energy to the point of use.

/2/ Construction energy consumption was estimated from average energy costs in Hannon, et al., 1978, "Energy and Labor in the Construction Sector," *Science*, Volume 202.

/3/ SFIA, *Final Draft Master Plan*, November 1989.

/4/ "Electrical Load" refers to the peak electrical demand averaged over a period of 15 minutes during which that peak occurs.

/5/ Yazdi, Mohammed, Major Account Representative, Pacific Gas and Electric, telephone conversations, August 15, 21, 22 and 27, 1990.

/6/ Jacobberger, Donald, Electrical Engineer, SFIA Bureau of Planning and Construction, letter to Mohammed Yazdi, October 11, 1989.

/7/ SFIA, *Five Year Capital Projects Plan*, September 18, 1989.

F. CULTURAL RESOURCES/1/

Major cultural history periods have been discussed in the Setting Chapter, Section III.F, on pp. 183-191.

Prehistoric Resources

Although prehistoric sites are recorded in the region, all of the known sites are upland from the former marsh and tidal lands that characterized the study area in prehistoric times. While high ground may have existed where prehistoric cultural activity could have occurred, such areas appear to have been altered by the history of reclamation and airport development. This does not preclude the possibility that unsuspected archaeological deposits could be discovered by excavations associated with expansion and improvement projects that would extend beneath the artificial fill that covers the site. The thickness of the artificial fill at SFIA varies widely across the site, and on average ranges from about 8 to 16 feet.

Historic Resources

As discussed in the Setting Chapter, remnants of late nineteenth-century / early-twentieth-century Chinese shrimp camps and commercial oyster businesses were likely obliterated by 1930s dredging of the area by the Pacific Portland Cement Company and by early reclamation activities associated with Airport development. According to archival research, the Sanchez Rancho buildings grist mill and wharf all appear to have been removed or disassembled. A review of late-nineteenth- and early-twentieth-century maps indicates that the levee and wharf have long since disappeared; field inspection confirms these findings. There would be relatively little potential that the project would affect historic resources.

Historic Structures

Historic buildings constructed prior to 1946 were identified by referring to early maps and photographs and by conversation with SFIA personnel./2, 3/

Implementation of the SFIA Master Plan would include construction of an Automated People Mover System and parking lot in the vicinity of the original 1927 terminal building. There is currently a parking lot on this site.

None of the buildings United Airlines erected during the war years are currently slated for demolition and the "series of gray wooden buildings and hangars" which Pan Am built "are now gone"./4/ However, Pan Am's Flying Tiger hangar, built in 1943, still stands near the Seaplane Harbor and is scheduled to be leveled during the near-term demolition projects./3,5/

The Coast Guard Station buildings were also constructed during World War II and it appears that most are scheduled for demolition during near-term projects./16/ While some of the structures are modern buildings erected over the past two decades, the main hangar and administration building both date from the early 1940s.

In addition to the structures discussed in the Setting Chapter, two pre-1946 metal structures, Building 1000 adjacent to the Flying Tiger hangar, and the UAL Boiler House across from the Seaplane Harbor, are also slated for destruction during the near-term demolition projects./5/

According to research:

> ". . . The Flying Tiger hangar has no architecturally distinct features or unusual construction systems and was built in a common style, using standard plans. Likewise, the Coast Guard facilities have no unique architectural style and were built in an industrial vernacular fashion using routine plans of the 1940s. The two metal maintenance buildings are also typical of wartime industrial structures and have no singular architectural features. The early 1940s airport hangars and support buildings are representative of common building types throughout the state and county, lack architectural distinction, are not the work of a master architect nor are they associated with important people or significant historical events"./6/

The remaining SFIA buildings are post-1946 structures, most of which were constructed over the past three decades and appear to have no historical significance or importance. Some existing buildings may have elements that pre-date 1946, but have been so extensively altered through additions and renovations they are no longer recognizable as potential historic structures.

NOTES - Cultural Resources

/1/ Chavez, David, Archaeologist, and Jan M. Hupman, historian, David Chavez & Associates, conducted archival research for the Master Plan area and the surrounding vicinity. The report entitled *Cultural Resources Evaluation for the San Francisco Airport Master Plan EIR*, August, 1990, is on file at the Office of Environmental Review, Department of City Planning, 450 McAllister Street.

/2/ Maps

1931 Proposed San Francisco Municipal Airport Map (Baccari 1975).

1937 San Francisco Airport Proposed Ultimate Development Landplane and Seaplane Port Map (Baccari 1975).

1945 San Francisco International Airport Master Plan Map (Baccari 1975).

1945 Sketch of the San Francisco Municipal Airport including extension of filled land areas and extension of pavements (Baccari 1975).

1948 Sketch of the San Francisco Municipal Airport including extension of filled land areas and extension of pavements (Baccari 1975).

1928 Aerial photography of Mills Field (Flynn 1954).

1930s Aerial photography of Mills Field (*The Times* 1967:11A).

1947 Aerial photography of San Francisco Municipal Airport (Golding 1982:33).

/3/ Costas, John, Assistant Administrator of Planning and Construction, San Francisco International Airport, telephone conversation, June 20, 1990.

/4/ Golding, George, "Retiree Recalls SF Airport's Growth," *The Times* (San Mateo newspaper), September 7, 1982, Peninsula Section, 33.

/5/ DMJM, *San Francisco International Airport Final Draft Master Plan*, prepared for the City and County of San Francisco.

/6/ Chavez, David, archaeologist, and Jan M. Hupman, historian, David Chavez & Associates, *Cultural Resources Evaluation for the San Francisco Airport Master Plan EIR*, August, 1990: Sally Woodbridge, architectural historian, was consulted for analysis of the historic structures in this Cultural Resources evaluation report.

G. GEOLOGY AND SEISMICITY

INTRODUCTION TO THE ANALYSIS

This analysis is based, in part, on previous geotechnical investigations conducted for previously proposed or constructed airport projects /1,2,3/. These reports, by PSC Associates, Inc., include:

- *Geotechnical Engineering Investigation for Proposed Additions to Continental Airlines Facilities at Boarding Area "B"*, May 1989.
- *Soils Engineering Investigation, South Terminal Complex Modernization Program (South Terminal West Entrance Building), San Francisco International Airport, City and County of San Francisco*, October 1983.
- *Soils Engineering Investigation, South Terminal Complex Modernization Program (Boarding Area C), San Francisco International Airport, City and County of San Francisco*, October 1983.

These geotechnical investigations included a literature review, study of aerial photographs, drilling and sampling of test borings and laboratory analysis of soil and rock material. Reports contain project-specific estimates of settlement rates and recommendations regarding site preparation, foundation design, basement excavation, dewatering, and drainage.

The project area contains geotechnical and engineering constraints such as relatively high rates of settlement, weak bay mud and high groundwater. Despite these conditions, modern engineering practices and prudent construction methods would be employed to allow construction of the proposed buildings with minimal geological impacts to the project.

GEOLOGY

The settlement of artificial fill over bay mud at SFIA is an ongoing process. Differential settlement can result from different fill thicknesses and differences in the underlying soils. Differential settlement can affect the structural integrity of buildings and utility lines.

The main factors to be considered for foundation design for proposed facilities at SFIA are structural loads, depth of fill, depth of underlying bay mud, bottom elevations of the proposed structure and whether the facility's bottom elevation would extend below the water table. Facilities that require excavation below the water table would require special design and construction techniques. Seepage from adjacent saturated soils can result in hydrostatic uplift and cracking of building foundations.

Prior to project construction, a general soil survey of the terminal area, where the bulk of new construction is planned, would be conducted. This survey may be expanded to include the cargo area. The survey would provide general subsurface soil profiles and recommendations for building and foundation design. Prior to any building construction, a site-specific soils or geotechnical investigation would be conducted to provide detailed soils information and specify design and construction guidelines. The location and scope of these studies would be based on detailed site plans for each building, or group of buildings, and would evaluate the geotechnical feasibility of specific projects.

Construction at the airport could be affected by several subsurface conditions. Variable fill thickness can lead to structural instability if adequate support is not provided by the foundation. Likewise, settlement could damage buildings and infrastructure connections.

Although some older buildings at the airport are supported on shallow foundations, most structures built after 1970 are supported on pile foundations./4/ All substantial, load-bearing structures proposed by the SFIA Master Plan would probably be supported on pile foundations due to soil limitations at the project site./4/ Individual buildings would be engineered on a project specific basis to conform to state and local building requirements. Pile-supported structures would not settle appreciably, but the surrounding pavement and vacant areas would continue to settle. This could cause pavement to sink away from buildings. The changing relative elevations of building and the surrounding land can break utility connections. However, the airport has installed flexible utility connections to allow for settlement in the past, and would continue to do so in the future. Most settlement is expected to occur within 30 years after construction.

Construction excavation at the airport would be affected by high groundwater and weak soils. Dewatering would be required for excavation of basements or other structures below the water table. Excavations in thick, unconsolidated bay mud, such as that at the site, tend to be unstable./2/ Even with shoring, soft sediments in the bottom of excavations may deform. This could cause movement of piles and cracking or failure in adjacent structures. Project construction would comply with all OSHA safety requirements. Adequate shoring would be provided to ensure worker safety and prevent damage to adjacent structures.

During construction, soil would be temporarily exposed to erosion. If dewatering were required, the effluent could contain substantial sediment loads. Sediments from these sources could enter storm drains and/or the Bay.

Construction-related excavation may encounter subsurface pipelines or tanks. Settlement in the project area has caused many subsurface utility lines to move away from their original position. Excavation in the vicinity of known pipelines may be hazardous. A large fuel spill was caused when excavation operations ruptured a fuel pipeline in 1988. Subsurface obstructions could, in many cases, be located with geophysical surveys prior to excavation.

SEISMICITY

Because no active or potentially active faults are known to cross the project area, the risk of fault rupture is relatively low. While the airport is situated on artificial fill that is underlain by weak bay mud, subsurface investigations have not discovered soil conditions particularly susceptible to liquefaction./1/ While seismically induced ground settlement has occurred at the airport, major liquefaction-induced ground failure has not been reported during past earthquakes. However, the project area has not been subject to the maximum expected ground shaking intensity or a long-duration earthquake since airport construction began in 1927 and the possibility of liquefaction in future earthquakes exists.

Effects of the Loma Prieta earthquake, discussed in the Setting section above, provide a general picture of the potential impact of future earthquakes. While this earthquake did not generate the maximum ground shaking expected at the site, the types of impacts are expected to be similar. A larger magnitude earthquake could cause more severe and widespread damage.

Buildings proposed by the SFIA Master Plan would be built according to more stringent seismic requirements than older, existing buildings have been. Buildings designed according to standards of the 1988 edition of the Uniform Building Code (UBC) should perform better than older structures. In addition, proposed buildings would be supported on relatively deep pile foundations./4/ This would greatly reduce the likelihood of damage due to earthquake-induced ground failure or ground settlement.

Existing terminal buildings are built of steel-frame and concrete construction. Most of these structures were remodeled in the 1970's and early 1980's, and all except the South Terminal Boarding Areas 'A' and 'B' are supported on relatively deep pile foundations./5/ They are likely to remain structurally sound during and after a large earthquake.

Existing non-terminal airport facilities range in age, height and type of construction. A review of a building inventory of non-terminal buildings revealed two groups of structures that would be at risk in an earthquake. The first group consists of relatively old buildings, 45 to 55 years old. Many of these structures were constructed of concrete and steel-frame. While most are in good condition, some were classified as being in "poor" condition in a 1978 Land Use Study./6/ All buildings identified as being in poor condition have either been removed or would be removed under the near-term plan.

The second group of buildings at risk in an earthquake are reinforced concrete structures built prior to 1973 (when improved seismic standards were incorporated into the Uniform Building Code). All five of these structures would be removed under the near-term plan.

The major source of seismic hazards at the site would likely be from non-structural building elements. Potential damage and casualties may be caused by falling hazards including non-structural building elements such as suspended ceilings and light fixtures. Other hazards include toppling furniture; overturned shelving; broken glass; falling plaster, ceiling tiles, and light fixtures; and rupture of overhead water pipes.

The project would result in an increase in the amounts of hazardous materials present because of the increased use of fuel and other industrial chemicals. Section III.H, Hazardous Materials Setting describes the nature, location and amount of hazardous materials used and stored on-site. The release of hazardous materials was not a major problem during the Loma Prieta earthquake./7/ A larger earthquake could, however, cause ground failure that could rupture fuel and natural gas pipelines, resulting in leaks and spills and fire hazards.

In addition, airport expansion would attract more employees, passengers and visitors to a potentially hazardous area.

On the basis of estimated total employees, passengers and visitors (excluding passengers who use the airport but never leave the airplane), the number of minor injuries, serious injuries and deaths resulting from an earthquake would increase incrementally with development of the near-term and long-term SFIA Master Plan. Assuming a worst-case scenario, that is an earthquake that occurs at the peak hour, and assuming heavy-construction-type buildings that experience between 10 and 30 percent damage, the Applied Technology Council's/8/ formula estimates the increased risk in the event of a damaging earthquake, presented in Table 62, below.

TABLE 62: ESTIMATED RISK IN A DAMAGING EARTHQUAKE/a/

Year	No. of Minor Injuries	No. of Serious Injuries	No. of Dead
1990 (existing)	141	19	5
1996	177	24	6
2006	201	28	7

/a/ Worst-case scenario, assuming an earthquake that occurs at the peak hour and heavy-construction-type buildings that experience 10 to 30 percent damage.

SOURCE: Environmental Science Associates, Inc.

Therefore, implementation of the project could place up to 60 additional people at risk of minor injury, nine additional people at risk of major injury and two additional people at risk of death during a future major earthquake. These estimates are based on the worst-case incident and may be overestimates. Improved construction techniques in new buildings should, in part, offset the impact of increased people exposed. If improved building design and employee earthquake-response training are incorporated as part of the project, estimated earthquake damage could be lowered to zero to ten percent and would result in a lower increase by 2006 of six additional minor injuries, one additional serious injury and no additional deaths.

The earthquake hazards discussed above currently exist at the site and will continue to exist to some degree following airport expansion. The effectiveness of mitigation measures aimed at reducing earthquake hazards would depend primarily on implementation of safety policies, facility and equipment maintenance, proper training of workers in safety procedures, and the degree to which facility users respect the need for safe use, storage and disposal of hazardous materials. Most of the potential seismic hazards could be mitigated through sound structural design and construction techniques and ongoing inspection and employee training programs.

NOTES - Geology and Seismicity

/1/ PSC Associates, Inc., *Geotechnical Engineering Investigation for Proposed Additions to Continental Airlines Facilities at Boarding Area "B"*, May 1989.

/2/ PSC Associates, Inc., *Soils Engineering Investigation, South Terminal Complex Modernization Program (South Terminal West Entrance Building), San Francisco International Airport, City and County of San Francisco*, October 1983.

/3/ PSC Associates, Inc., *Soils Engineering Investigation, South Terminal Complex Modernization Program (Boarding Area C), San Francisco International Airport, City and County of San Francisco*, October 1983.

/4/ Costas, John, Assistant Administrator, Planning and Construction, San Francisco International Airport, telephone conversation, July 13, 1990.

/5/ Costas, John, Assistant Administrator, Planning and Construction, San Francisco International Airport, telephone conversation, August 9, 1990.

/6/ Joint Land Use Study San Francisco International Airport/San Mateo County Environs Area, working paper IB.1, May 1978.

/7/ Leong, Melvin, Assistant Deputy Director, Environmental Control Branch, Facilities Operations and Maintenance, SFIA, conversation, July 12, 1990.

/8/ Association of Bay Area Governments, *Building Stock and Earthquake Losses - The San Francisco Bay Area Example*, May 1986.

H. HAZARDOUS MATERIALS

CONSTRUCTION

Development at the Airport could result in excavation that exposes workers, the public, and/or the environment to soils, soil gases or groundwater contaminated with hazardous materials. Activities that could lead to the discovery of contaminated soils and/or groundwater include building demolition/ renovation, excavation (grading), dewatering and underground storage tank removal. Each of these activities could involve exposure of workers, the public and/or the environment to contaminated soil, soil gases or hazardous building materials. Depending on the specific site being developed, the chemical compounds that could be encountered would vary, although petroleum fuels are the primary soil and groundwater contaminants at the Airport. (See Table 63, Potential Impacts of Project Activities.)

The general potential impacts associated with construction or demolition included in the Master Plan are identified below. An identification of which of these impacts is specific to each proposed development area is included in the next section.

Exposure to hazardous materials has the potential to cause various short-term or long-term health effects. For particular substances, such effects are described in *Patty's Industrial Hygiene and Toxicology*./1/ In any site remediation, worker and public health and safety requirements must be considered.

Building Demolition or Renovation

Buildings at the Airport may contain two sources of hazards: PCB-containing electrical equipment and asbestos. Both of these are common in older structures. No comprehensive asbestos survey of Airport-owned and tenant-owned structures has been performed. SFIA has maintained a list of those areas in which asbestos has been identified and has distributed this list to all employees. SFIA has a general idea of where asbestos would be expected on the basis of the age of the structures. The SFIA Facilities, Operations and Maintenance Division, removed all PCB-containing equipment in Airport-owned facilities as of 1987./2/ In addition, SFIA maintains records of all tenant-owned PCB-containing equipment./2/ Without development of a

TABLE 63: POTENTIAL IMPACTS OF PROJECT ACTIVITIES

Project Activity	Potentially Contaminated Media/Structures	Potential Impacts
Building demolition or renovation	Soil, building materials, transformers	Health of workers and/or public
Underground storage tank closure	Tank, vapor, soil	Health and safety of workers and/or public
Excavation for development	Soil gases, soil, groundwater, transformers and other electrical equipment	Health of workers, public and/or environment

SOURCE: Environmental Science Associates, Inc.

site, no building-material impacts would be anticipated (other than on-going potential exposure to a hazard). With development at any site that currently has a structure, temporary impacts in the area near building demolition or renovation could occur. Because asbestos and PCBs are not used in modern construction, exposure to potential hazards from building materials would be reduced in the long term as a result of development activities in the area.

If PCB-containing electrical equipment is not handled properly during removal, workers (and possibly the public) could be exposed to PCBs, which are suspected carcinogens. Leaving PCB-containing equipment in renovated structures can cause an increase in the potential for PCB exposure in an accident or transformer fire. Because PCBs are wholly contained within electrical devices, the risk of exposure is relatively low in normal situations. Adherence to proper, legally required procedures for handling PCB-containing equipment during maintenance or replacement would assure that impacts are mitigated.

In accordance with BAAQMD Regulation 11, Rule 2, all asbestos-containing material must be removed prior to demolition of a building. If a structure is to be renovated, exposed asbestos must be sealed (encapsulated) or removed. Workers and the public could be exposed to asbestos fibers that become airborne during removal. If legally required procedures are followed, exposure of workers and the public to asbestos should be below applicable safety standards.

Underground Storage Tank Closure or Removal

Underground storage tanks (USTs) are currently located in several proposed development areas. Underground tanks can either be closed in place or removed. Closing underground storage tanks in place would mitigate exposure of workers and the public to potential hazards (however, the closed USTs may present a long-term source of potential contamination to the environment); removal of USTs may pose both health and safety risks (exposure of workers and the public to the tank contents and vapors is possible). If legally required procedures for UST cleaning and removal are followed, risks can be mitigated. At SFIA, both the Environmental Control Section of the Facilities, Operations and Maintenance Division and the SFIA Fire Department, in addition to the San Mateo Department of Environmental Health Services, supervise UST removals in order to enforce the use of appropriate safety procedures and minimize hazards.

Excavation

In several of the proposed development areas, it is possible that contaminated soil or groundwater would be encountered during excavation. Areas of contaminated soil and/or groundwater from previous fuel leaks, spills, or poor hazardous-material-management practices could be encountered during excavation. In addition, nearly half of the demolition and construction sites contained in the SFIA Master Plan are bayward of the former high tide line and located on artificial fill. However, no history of contamination due to fill materials at the airport has been reported to the appropriate local agencies (RWQCB and San Mateo County Department of Environmental Health) to date, making it unlikely that contamination from fill materials would be an impact in the future.

Site workers and/or the public could be exposed directly to unknown contaminants. Migration of gases and/or dust during construction activities could also affect the nearby public and the environment. Exposure of construction workers, other airport workers or the public to hazardous materials encountered during construction would require mitigation. (See Chapter V. Mitigation Measures, pp. 411-434.)

Dewatering

At most excavation areas at the Airport, dewatering would be required. If the groundwater is contaminated with volatile substances, construction workers could be exposed to vapors, possibly at hazardous levels. Because of the presence of areas of petroleum fuel contamination at the Airport, contamination of any dewatering discharge is likely through the drawing of groundwater to the dewatering area. Dewatering discharges, either through a wastewater treatment plant or directly to the Bay, could violate standards set for protection of surface waters.

SITE-SPECIFIC IMPACTS

Soil and/or groundwater in a given Airport development area may be affected by any of the following:

1. Known on-site sources of contamination. These sources have been detected during some types of site investigation. Information about such sites is presented (when reported) in Chapter III.H. Hazardous Materials Setting.

2. Potential on-site sources of contamination. Available information about potential contamination is described in the Chapter III.H. Hazardous Materials Setting. Contamination may already exist but may not have been discovered; or investigations may indicate that no contamination currently exists, but problems may occur in the future.

3. In relation to specific sites, an off-site potential source may be a reported or potential contamination source adjacent to or upgradient of the site in question. Hazardous materials may migrate via groundwater from other areas and may cause a site to become contaminated. Because groundwater flow at the Airport is assumed to be towards the Bay, sites bayward of a reported or potentially contaminated site are most likely to be contaminated by substance migration.

The following discussion describes known contamination at each proposed development site, potential contamination from current or past on-site land uses, and the potential for soil and groundwater contamination from off-site sources. For each site, it should be noted that chemical compounds may have been introduced by the fill material. Potential contamination at SFIA is described in general terms on the basis of available data from agency files.

Areas of Construction/Demolition - Near Term

Terminal Area

The construction of the new International Terminal Complex would involve demolition and relocation of the United Airlines Facilities and Pan Am Maintenance and Administration Facility. The International Terminal would consist of Boarding Areas A and G. The existing Boarding Area A would be demolished. The construction for the International Terminal would involve demolition and reconstruction of part of Boarding Area B to provide replacement gates during construction of Boarding Area A and, eventually, remodeling of Boarding Area D.

Routine groundwater monitoring performed by the Airport has revealed occasionally elevated levels of petroleum hydrocarbons in samples taken from wells in the area of the Central Plant fuel storage area./3/ The Central Plant is the operating base for the HVAC system and is located in the center of the terminal complex. Six underground tanks are located at the plant to store diesel fuel. No construction is proposed at the Central Plant. Thus there would not be project impacts related to fuel storage at the Plant.

The Pan Am Maintenance Facility, immediately west of proposed Boarding Area A, currently has two USTs and has a history of soil and groundwater contamination (see Area D on Figure 24, p. 219, Section III.H. Hazardous Materials). Boarding Area B is known to have contaminated asphalt due to a jet fuel leak. Remediation of this site is still in progress and the extent of contamination is yet unknown. The car rental agencies all have underground storage tanks and many, including Hertz, National and Avis, have reported tank leaks and groundwater contamination (see Areas A, B, and C respectively, on Figure 24, p. 219, Section III.H. Hazardous Materials Setting). Groundwater flow toward the Bay from the rental car area may carry contamination to the International Terminal Area.

Given the history of soil and groundwater contamination in the proposed International Terminal Complex area, therefore, it is likely that both contaminated soil and groundwater would be encountered during construction, leading to potentially hazardous excavation and dewatering impacts. In addition, portions of Boarding Areas A, B and G lie near or beyond the 1880 levee line in artificial fill. Impacts from excavation for development under the SFIA Master Plan may occur.

The United Airlines and Pan Am facilities may contain PCB-containing electrical equipment and asbestos. Asbestos has already been identified in Boarding Areas A and B. Impacts from building demolition or renovation would require mitigation measures.

Removal of the two Pan Am underground storage tanks would be necessary for demolition and construction of the new facility. If removal of these tanks is performed properly in accordance with applicable laws and regulations, impacts resulting from the removal of these tanks would be mitigated.

Transportation / Car Rental Areas

Construction of the Ground Transportation Center on both sides of the access road would involve demolition and excavation in the area of the existing car rental areas and service station. Underground storage tank leaks and soil and groundwater contamination have been reported in this area. (See areas A,B,C on Figure 24, p. 219.) Groundwater contamination has been reported at the Pan Am Maintenance Facility/3/, which could cause contamination of the adjacent car rental area. Impacts would result from excavation and dewatering in this area, given the history of soil and groundwater contamination.

Construction of the Ground Transportation Center would require the closure and removal of underground storage tanks. No impacts would result if removals were performed according to applicable laws and regulations.

Demolition of the existing car rental agencies could cause impacts from possible PCB-containing equipment and asbestos.

West Field

Master Plan projects in the West Field include demolition and construction of facilities. There are no reported cases of fuel tank leaks in this area. Results of groundwater samples from the Airport's wells in the area of the Airport's Maintenance Facility have indicated the presence of petroleum hydrocarbons. Most of the samples analyzed since 1987 were found to have no detectable levels of Total Petroleum Hydrocarbons (diesel), or levels under 1 part per million (ppm). A few, apparently anomalous, samples were found to have levels of Total Petroleum Hydrocarbon (diesel) up to 11,000 ppm./3/ The underground storage tanks in this area are located at the Airport Maintenance Facility, which is adjacent to the demolition/construction area. Groundwater in this area flows toward the Bay. Therefore, groundwater contamination from the Airport Maintenance Facility area could migrate to the proposed demolition/construction area in the West Field. Dewatering for construction of facilities in the West Field close to the Airport Maintenance Facility could create an impact.

Tenant-owned facilities that are to be demolished in the West Field area may have PCB-containing equipment and asbestos, leading to impacts from demolition.

North Field

Demolition of the U.S. Coast Guard Facilities, Flying Tigers facility and JAL facility, and construction of the new North Field Cargo/Maintenance building are part of the near-term Master Plan. Soil and groundwater contamination is reported at the U.S. Coast Guard facility. (See Area G on Figure 24, p. 219.) There would be impacts resulting from excavation and dewatering due to contaminated soil and groundwater in the immediate area.

No contamination has been reported at the other facilities. Contamination resulting from fuel leaks has occurred at the bulk fuel farm (see Area I on Figure 24, p. 219.) and the United Airlines Maintenance Center. Although these sites are somewhat separated from the demolition / construction area, contaminated groundwater may have migrated to the area, as it is downgradient from the known contaminated areas. Because soil and groundwater at the other facilities are unlikely to be contaminated, excavation and dewatering impacts would not warrant mitigation measures.

The North Field is also an area of artificial fill. Impacts from excavation of contaminated fill could result.

The possibility of PCB-containing electrical equipment or asbestos in those existing facilities could result in impacts from building demolition.

East Field

No reports of contamination in the East Field have been recorded. Contamination by groundwater flow from other sites to the west is a possibility, as the expected direction of flow is east toward the Bay. The past uses of the existing hangar for maintenance purposes could have resulted in some hazardous waste contamination of soil or groundwater. However, the groundwater-monitoring results from the well in this area do not suggest that contaminated groundwater or soil would be encountered. Contamination from construction could be mitigated.

The East Field is also an area of artificial fill. Impacts of development this area could potentially occur at this site from fill contamination.

The Master Plan calls for the demolition of a vacant hangar and the ASII/Evergreen facility in the East Field. Possible hazardous impacts could result from PCB-containing equipment and asbestos in these buildings.

South Field

The Master Plan proposes the construction of a new TWA cargo facility. The existing TWA hangar has a history of an underground storage tank leak. In addition, the 1988 jet fuel pipeline break occurred just to the south of the TWA site. Groundwater sampling results from a well immediately west of the TWA facility have revealed levels of petroleum hydrocarbons above the detection limit over the past three years./3/ Impacts resulting from soil and/or groundwater contamination could occur at this site if dewatering and excavation were to occur.

PCB-containing electrical equipment or asbestos-containing building materials in the existing TWA Hangar could result in demolition impacts.

Areas of Construction/Demolition - Long Term

Boarding Area B

Demolition and reconstruction of the existing "satellite" extension of Boarding Area B would occur in the long term. Soil contamination resulting from a recent jet fuel leak at the TWA terminal (see Area F on Figure 24, p. 219) could result in hazardous excavation impacts. Although all PCB-containing equipment has been removed from all Airport-owned facilities, including the terminal areas, impacts due to known asbestos-containing material could occur during building demolition.

West Field

In the long term, the West Field maintenance facility and the mail facility would be expanded. Long term development impacts in the West Field Area would be the same as those for the near term.

Ground Transportation Center / Car Rental Area

The Master Plan proposes a five-level parking structure and office space at the end of the Ground Transportation Center close to the Route 101 on-ramp. There is no known contamination in this area. In part of the near-term Master Plan, the Chevron service station would have been relocated to this site. The future presence of underground fuel storage tanks on-site would lead to the potential for soil or groundwater contamination. Impacts from excavation and dewatering could result.

PROJECT OPERATION

As discussed in Chapter III.H. Environmental Setting, most of the hazardous materials used at the Airport consist of maintenance materials, motor-vehicle fuel and aircraft fuel. An increase in air traffic and expansion of facilities may result in an increase in the use of hazardous materials. Additionally, an increase in airport activity level would increase number of people potentially exposed to hazardous materials on a day-to-day basis or in the event of an accident.

Hazardous Materials Use

Airport-Owned Facilities

Given the planned expansions, activity at Airport-owned facilities would be anticipated to increase. Functions employing hazardous materials, such as maintenance and wastewater treatment, would require the use of additional hazardous materials, of the same types as are currently in use. The operation of the solvent distillation system would reduce the impact of any increases in hazardous waste production resulting from implementation of the SFIA Master Plan. SFIA has no past citations from Cal/OSHA for improper handling of hazardous materials. With continued application of existing safety programs, and hazardous-waste recycling efforts, impacts could be mitigated.

Tenant Facilities

The United Airlines Maintenance Center, the largest hazardous-material-using tenant facility, currently operates at capacity as far as available hangar space./4/ United Airlines would not obtain new property to allow for expansion under the SFIA Master Plan. Since the SFIA Master Plan does not include expansion of the United Airlines Maintenance Center, operations are not expected to increase proportionally with Airport expansion, and hazardous material use would probably not increase as a direct result of the project.

However, line maintenance facilities would be expanding their operations given the changes proposed in the SFIA Master Plan. In order to accommodate an increase in air traffic, the working capacity would have to increase. Because of the predicted increase in passenger levels, car rental agency activity would be anticipated to increase. An increase in operations at the maintenance facilities and car rental agencies would cause a greater demand for hazardous materials (as well as other maintenance supplies). The amount of hazardous materials stored and used at these facilities would be small compared to the amount used at the United Airlines Maintenance Center. SFIA would continue to implement and enforce the policy in its *Tenant Improvement Guide* concerning the permitting and monitoring of hazardous materials. The Fire Department would continue monitoring the storage of flammable materials in all Airport facilities. An increase would not likely cause a threat to the health of the employees or affect the environment adversely, as long as hazardous materials continued to be handled according to appropriate federal, state and local regulations.

Fuels

Expansion of the Airport would result in an increased demand for aircraft fuel and fueling operations. Implementation of the SFIA Master Plan would require modifications and upgrades, but the current system appears adequate to sustain near- and long-term plans. (See Section IV.J. Utilities). While storage and transmission facilities would not be expanded, fuel use at the Airport would increase proportionally to the increase in air traffic, leading to increased potential for both small and large fuel spills. SFIA would continue to monitor the condition of the distribution pipeline by requiring pressure tests and inventory reconciliation on the distribution lines owned by the oil companies and the airlines. Spill-response measures would continue to be enforced.

Hazardous Waste Generation

As with hazardous materials use, hazardous waste generation would increase somewhat as a result of Master Plan implementation. While the types of waste generated by Airport operations would remain the same, waste from Airport-owned facilities, line maintenance facilities and car rental agencies would increase. With implementation of the new waste manifest collection program, manifested waste streams from the line maintenance facilities would also be monitored by the Airport, to ensure that these wastes would be properly disposed of. The recycling efforts at the Airport-owned maintenance shops would help to reduce the impact of increased hazardous waste.

Industrial Wastewater Treatment

The contribution of all line maintenance facilities to the industrial wastewater treatment plant is relatively small, less than 20 percent of the total volume processed at the plant, in comparison to that from the United Airlines Maintenance Center which contributes about 75 percent of the total./2/ Any substantial increases in operations at the United Airlines Maintenance Center probably would necessitate improvements of its pre-treatment facility./5/ Recent violations of heavy-metal National Pollutant Discharge Elimination System (NPDES) permit limits were assumed to originate from this facility because of its contribution percentage and operations. However, as no expansion of or increase in operations at this facility are proposed as part of the SFIA Master Plan, violations of heavy-metal NPDES permit limits are not expected to result from SFIA Master Plan implementation. In addition, as the treatment plant is currently working well below capacity, it would be able to handle an increase in waste volumes from the maintenance facilities. (See Section IV.J. Utilities, p. 400.)

CUMULATIVE IMPACTS

Disposal of solid wastes in general, and hazardous wastes in particular, is an issue of national importance. Federal and state legislation is attempting to address these issues. As discussed in Chapter III.H. Environmental Setting, the RCRA Hazardous and Solid Waste Amendments of 1984 (HSWA) prohibit the land disposal of untreated wastes as of May, 1990 (the "land ban"). EPA currently has promulgated treatment standards for the applicable hazardous wastes. Treated wastes that meet the standards are not subject to the prohibition and may be land disposed. The law states that if there is insufficient treatment capacity nationwide, the ban date may be extended for up to two years./6/ A number of extensions have been granted./6/

California law, the Hazardous Waste Management Act of 1986, is similar to Federal land ban law. It specifies that after May, 1990, hazardous wastes must be treated to adopted standards for disposal within the state. California law also encourages recycling and reuse, and allows shipment out of state for hazardous wastes that cannot meet treatment standards./7/

Landfill space for hazardous waste is limited. As of mid-1989, there were twenty-four hazardous-waste landfills in the United States that were open to commercial hazardous-waste generators. Of these, seven are located in Western states./8/ On a national level, hazardous-waste landfill space is limited and will grow even more limited as landfill capacities gradually become exhausted. The intent of the land-ban legislation is to address the fundamental error of reliance on land disposal, by forcing waste generators and handlers to seek alternatives.

Because hazardous-waste landfill space is limited, and efficient and environmentally acceptable hazardous-waste treatment and recycling technologies have yet to be fully developed, handling of hazardous waste is becoming an increasingly important problem. Some of the Airport's hazardous wastes can be recycled (oils and solvents), a portion can be treated (spent solvents can be incinerated), and the remainder would be taken to a hazardous waste landfill for disposal. Since the amount of hazardous waste generated by the Airport would increase as a result of the project, and this increased waste generation, along with increases from other development, would exacerbate an existing problematic situation, the SFIA Master Plan would contribute to cumulative hazardous-waste-disposal impacts.

NOTES - Hazardous Materials

/1/ Clayton, G.E. and F.E. Clayton, *Patty's Industrial Hygiene and Toxicology*, third edition, John Wiley & Sons, New York, 1982.

/2/ Leong, Melvin, Assistant Deputy Director, Environmental Control Branch, Facilities, Operations, and Maintenance Division, SFIA, telephone conversation, August 7, 1990, and written correspondence April 16, 1991.

/3/ SFIA Groundwater Monitoring Reports, 1987-1990.

/4/ Ogard, John, Safety Manager, United Airlines Airport Operations, telephone conversation, August 7, 1990.

/5/ Jang, John, Inspector, Regional Water Quality Control Board, telephone conversation, July 25, 1990.

/6/ U. S. Environmental Protection Agency, "Land Disposal Restrictions: Summary of Requirements," Solid Waste and Emergency Response, February 1991.

/7/ Department of Health Services, Toxic Substances Control Division, Alternative Technology Division, "Land Disposal Restriction Newsletter," January, 1988, and "Land Disposal Restrictions Bulletin," September, 1990.

/8/ EI Digest "Industrial Hazardous Waste Management, Environmental Information Limited", February 1989.

I. EMPLOYMENT AND HOUSING

1996

Factors that influence the number of persons directly employed by operations at SFIA include: number of flight operations (e.g., flight crews, ramp and support personnel, ramp maintenance personnel), number of passengers (e.g., ticket-counter personnel, skycaps, food-service workers, rental-car employees), number of international passengers (e.g., customs and agricultural inspectors), amount of domestic cargo (e.g., freight transportation employees), amount of international cargo (e.g., freight transportation employees), amount of U.S. mail (e.g., Postal Service employees), and the size of the terminal (e.g., janitorial services, landscaping). Some employment sectors would not be affected by these factors (e.g., UAL aircraft maintenance base employees, National Weather Service employees, SFIA management) and employment in these sectors is assumed not to change from 1990 levels.

Employment is expected to increase by about 4,600 jobs between 1990 and 1996 to about 38,000. This would represent about 11.6% of the 326,300 employees in San Mateo County./1,2/ The majority of these employees would be the flight-crew and passenger-service personnel employed by the airlines. The distribution for 1996 of jobs among the eight employment sectors is presented in Table 64.

Construction Employment /3/

Construction employment between 1991 and 1996 would generate an average of about 1,400 full-time construction jobs per year. Peak employment would occur in 1993, with approximately 2,400 construction workers employed.

Construction employment in the first two years, 1991 and 1992, would generally be associated with demolition work. The projects supporting the most jobs would be the construction of the people mover (1,600 person-years between 1991 and 1996), the boarding areas (1,500 person-years between 1991 and 1996), and the ramp and elevated roadways connecting to Highway 101 (600 person-years between 1991 and 1996).

TABLE 64: SFIA EMPLOYMENT, 1996

Employment Sector	Number of Employees
Airlines	25,000
Government Agencies	2,700
Concessionaires and Caterers	3,400
General Aviation and Services	700
Freight Transportation	2,400
Ground Transportation	2,500
Hotel	300
Construction and Consulting	900
TOTAL/a/	38,000

/a/ Employment sector subtotals do not add due to rounding.

SOURCE: Environmental Science Associates, Inc.

Housing Demand

The largest number of the new employees are expected to reside in San Mateo County (37.1%), followed by San Francisco (25.4%) and Alameda (11.9%) counties./4/ The 1,220 housing units needed in San Mateo County represent about one-half of one percent of the 1990 housing stock and about four percent of ABAG's estimate of San Mateo County's potential for new housing units between 1990 and 2005./5/ The forecast distribution of 1990-1996 new employees' place of residence and demand for housing is presented in Table 65.

● TABLE 65: NEW SFIA EMPLOYEES, PLACE OF RESIDENCE, 1990-1996

County	Number of New Employees	Percent/a/	Demand for New Housing Units/b/	Percent of County's 1990 Housing Stock
San Mateo	1,710	37.1%	1,220	0.48%
San Francisco	1,170	25.4%	960	0.29%
Alameda	550	11.9%	420	0.08%
Santa Clara	420	9.1%	280	0.05%
Contra Costa	170	3.7%	130	0.04%
Marin	160	3.5%	120	0.12%
Solano	110	2.4%	80	0.07%
Sonoma	100	2.2%	80	0.05%
Napa	10	0.2%	10	0.02%
Other	210	4.6%	160	N/A
TOTAL	4,610	100.0%	3,460	N/A

NOTE: Percent total does not add due to rounding.

/a/ Percentages are based on 1987 Martin Associates Survey of SFIA employees and projected growth rates for each of the employment sectors found at SFIA.
/b/ Based on the ratio of employed residents to households from ABAG's *Projections-90*, and a four-percent vacancy rate.

SOURCE: Environmental Science Associates, Inc.

2006

Employment is expected to increase by about 9,000 jobs between 1990 and 2006, to ● 42,400. This would represent about 12.1 percent of the 349,900 jobs in San Mateo County in 2006./1,6/ The majority of these jobs would be the flight crews and passenger service personnel of the airlines. The distribution of jobs among the eight employment sectors for 2006 is presented in Table 66.

● TABLE 66: SFIA EMPLOYMENT, 2006

Employment Sector	Number of Employees
Airlines	27,200
Government Agencies	3,000
Concessionaires and Caterers	4,100
General Aviation and Services	700
Freight Transportation	3,000
Ground Transportation	3,100
Hotel	300
Construction and Consulting	900
TOTAL/a/	42,400

/a/ Employment sector subtotals do not add due to rounding.

SOURCE: Environmental Science Associates, Inc.

Construction Employment /3/

Construction employment between 1997 and 2006 would generate an average of about 200 full-time construction jobs per year. Peak employment would occur in 2000, with approximately 400 construction workers employed. The project supporting the most jobs would be the construction of the people mover (1,000 person-years between 1997 and 2006).

Housing Demand

The largest number of the new employees are expected to reside in San Mateo County (37.1%), followed by San Francisco (25.9%) and Alameda (11.8%) counties./4/ The 2,450 housing units needed in San Mateo County would represent about one percent of the county's 1990 housing stock and less than nine percent of ABAG's estimate of San Mateo County's potential for new housing units between 1990 and 2005./5/ The forecast distribution of 1990-2006 new employees' place of residence is presented in Table 67.

● TABLE 67: NEW SFIA EMPLOYEES, PLACE OF RESIDENCE, 1990-2006

County	Number of New Employees	Percent/a/	Demand for New Housing Units/b/	Percent of County's 1990 Housing Stock
San Mateo	3,320	37.1%	2,450	0.96%
San Francisco	2,330	25.9%	1,940	0.59%
Alameda	1,060	11.8%	810	0.16%
Santa Clara	780	8.7%	530	0.10%
Contra Costa	330	3.7%	250	0.08%
Marin	300	3.3%	230	0.22%
Solano	210	2.3%	150	0.13%
Sonoma	200	2.2%	160	0.10%
Napa	30	0.1%	20	0.05%
Other	410	4.6%	310	N/A
TOTAL	8,970	100.0%	6,850	N/A

NOTE: Percent total does not add due to rounding.

/a/ Percentages are based on 1987 Martin Associates Survey of SFIA employees and projected growth rates for each of the employment sectors found at SFIA.
/b/ Based on the ratio of employed residents to households from ABAG's *Projections-90*, and a four-percent vacancy rate.

SOURCE: Environmental Science Associates, Inc.

● Housing Demand Impacts

● The significance of the potential impacts on housing resulting from a project-generated increase in employment can be analyzed by comparing the project's share of the local labor force to the proportion of total local housing units used by the project's employees. If proportionally, the proposed project's use of local housing units would be substantially greater than its share of the local labor force, the impact could be considered significant

In order to evaluate the potential impacts that would occur from implementation of the proposed SFIA Master Plan, the percentage of all San Mateo County jobs located at SFIA was compared to the percentage of San Mateo housing units used by SFIA employees (see Table 67A). As shown in Table 67A, in 1990, 11.0 percent of all San Mateo County jobs were located at SFIA, and SFIA employees used about 5.2 percent of all the housing stock in the area. Based on SFIA employment (under the project) and San Mateo total number of jobs, 11.7 percent of all San Mateo jobs would be located at SFIA in 1996. However, SFIA employees would use about 5.5 percent of the San Mateo housing stock. In 2006, about 12.1 percent of all San Mateo County jobs would be located at the airport, and SFIA employees would use about 5.7 percent of San Mateo County's housing stock.

These figures show that in 1990, and in the future with the project, the percentage of San Mateo County housing units used by SFIA employees would be approximately half of the percentage of San Mateo County jobs located at SFIA, and the proposed project would not affect this ratio substantially. Given these results, it can be concluded that no significant impacts on housing would occur as a result of the project.

SECONDARY EMPLOYMENT AND HOUSING DEMAND

New Indirect and Induced Employment

On the basis of the new SFIA employees generated by the project, and the job creation factors noted on p. 229 (0.5 indirect and 3.8 induced jobs per direct SFIA job), it is projected that the project would result in the creation of about 2,310 new induced jobs by 1996, and about 4,490 by 2006. Additionally, the project would likely result in the creation of about 17,520 indirect jobs by 1996, and about 34,100 by 2006, due to additional expenditures by visitors to the Bay Area. The total number of indirect and induced jobs created as a result of the project would be about 19,820 by 1996, and 38,570 by 2006. The total number of all jobs created by the project would be about 24,440 by 1996 and 47,540 by 2006.

TABLE 67A: EMPLOYMENT AND POPULATION PROJECTIONS FOR SFIA AND SAN MATEO COUNTY/a,b/

	1990	Projected 1996	Projected 2006	Absolute Difference 1990 - 1996	Absolute Difference 1990 - 2006
Total SFIA Jobs	33,400	38,000	42,400	4,600	9,000
Total San Mateo County Jobs /c/	303,600	326,300	349,900	22,700	46,300
Total SFIA Employees Living in San Mateo County	12,600	14,300	15,700	1,700	3,200
Total Number of Housing Units in San Mateo County /d/	241,900	256,500	274,000	18,200	32,100
Percent of SFIA Employees Living in San Mateo County	37.6%	37.1%	37.1%	-0.50%	-0.50%
Percent of All San Mateo County Jobs Located at SFIA	11.0%	11.7%	12.1%	0.64%	1.12%
Percent of San Mateo Housing Units Used by SFIA Employees	5.2%	5.5%	5.7%	0.33%	0.52%
Percent of New San Mateo County Jobs Located at SFIA	N/A	20.3%	19.4%	N/A	N/A
Percent of New San Mateo Housing Units Used by New SFIA Employees	N/A	9.3%	10.0%	N/A	N/A

NOTES:

/a/ Methodology for deriving figures in this table is described in a background paper available for review in Department of City Planning files, 450 McAllister Street.
/b/ Totals may not add due to rounding.
/c/ From data provided by the San Mateo County Planning Department.
/d/ Based on results of housing inventory contained in Consolidated Comprehensive Housing Affordability Strategy, Department of Environmental Management, San Mateo County. November 19, 1991.

SOURCE: Environmental Science Associates, Inc.

It is assumed that the indirect and induced jobs created as a result of implementation of the SFIA Master Plan would be located throughout the Bay Area and also outside the region. The specific locations of these jobs within the Bay Area cannot be determined because projections of the number of jobs are based on regional multipliers.

Housing Demand Created by Indirect and Induced Employment

Employees holding the indirect and induced jobs resulting from the project would create additional demands on the Bay Area housing stock. On the basis of the employed residents-to-households ratio shown in Tables 65 and 67 (for the Bay Area) and the number of indirect and induced jobs that would be created as a result of the project, there would be a demand for an additional 14,880 housing units through 1996, and an additional 29,460 units through 2006. (The total housing demand generated by the project would be 19,490 units through 1996, and 38,430 units through 2006.)

Although, as shown above, it is possible to estimate the number of housing units required to house individuals holding the induced and indirect jobs resulting from the project, it is not possible to accurately determine their residence patterns. As stated above, the indirect and induced jobs could be located anywhere in the Bay Area or even in locations adjacent to the Bay Area. This is because some direct, new SFIA employees would live in Concord for example, and would create demand for goods and services in and around the Concord area, as well as other parts of the region, resulting in creation of jobs indirectly related to the new SFIA jobs. This scenario would be repeated all over the Bay Area and beyond. Since the locations of these indirect and induced jobs are unknown, it is not possible to determine the residence patterns of the individuals holding the jobs. As such, it is not possible to determine the extent of impacts on housing that would be experienced by any one local jurisdiction, including San Mateo County.

Indirect and Induced Housing Demand Impacts

The significance of the potential impacts on housing resulting from a project-generated increase in indirect and induced employment can be analyzed by comparing the proportion of Bay Area housing units used by the individuals holding the indirect and induced jobs to the employees' share of the Bay Area labor force. If proportionally, the proposed project's use of the regional housing stock is substantially greater than its share of the regional labor force, the impact could be considered significant.

Based on a comparison of the projections of induced and indirect employment and related housing demand mentioned above with ABAG projections of total Bay Area employment and number of households, the housing impacts resulting from project-generated indirect and induced employment would be insignificant. In 1990, induced and indirect jobs created by the operation of SFIA accounted for approximately 4.5 percent of the Bay Area total number of jobs; these employees used approximately 4.7 percent of total Bay Area housing stock. In 1996, induced and indirect jobs created as a result of the project would account for approximately 0.6 percent of the Bay Area labor force; the employees would use approximately 0.8 percent of the total Bay Area projected housing stock. In 2006, approximately 1.0 percent of all the jobs in the Bay Area would be induced by, or indirectly related to, the proposed project. Employees

- holding these jobs would use approximately 1.3 percent of the Bay Area housing stock. Although the shares of the Bay Area labor force and housing stock represented by SFIA-created induced and indirect employment would increase under the project, the relationship between the employment and housing shares would not change substantially, and the project would not result in proportionally greater demands on housing (relative to employment).

- Thus, impacts on housing created by indirect and induced employment would not be significant.

NOTES - Employment and Housing

/1/ Association of Bay Area Governments, *Projections - 90: Forecasts for the San Francisco Bay Area to the Year 2005*, Oakland, California, December 1989.

/2/ Martin Associates, *1987 Airport Economic Impact Study*, February 1988.

/3/ Estimates of construction employment were based on the following assumptions: 1) Construction would proceed as scheduled in the SFIA Draft Master Plan Table "Summary-Optimum Development Schedule"; 2) Costs are as presented in SFIA Draft Master Plan Tables 11.2, 11.3, 11.4 and 11.5; 3) Percent of total development cost attributable to on-site construction labor is 30% for buildings and 50% for infrastructure development; 4) An average annual construction wage of $43,000 in 1986 constant dollars; 5) Project management and administrative personnel account for 20% of the total person-years; 6) All demolition work would occur in the first two year for all short-term projects, and in 1998 and 1999 for the long-term projects; and 7) project costs are subdivided among buildings based on square footage of new construction / remodeling.

/4/ The residential distribution of employees is based on data from a 1987 employee survey conducted for the *1987 Airport Economic Impact Study*, February 1988. Projection of future residential distributions is calculated on the sub-employment section level; i.e., fixed-base maintenance workers in the future are assumed to maintain the same geographical distribution as the fixed-base maintenance workers of 1987. The sub-employment levels are then summed for all areas.

/5/ County 1990 housing stock estimated from ABAG *Projections-90* from note /1/ above, and an assumed four-percent vacancy rate.

/6/ County employment estimates for 1996 and 2006 are based on a straight-line interpolation of ABAG's employment forecasts for 1995 and 2000, and a straight-line extrapolation of ABAG's employment forecasts for 2000 and 2005.

J. UTILITIES

INFRASTRUCTURE IMPROVEMENTS

With the implementation of the SFIA Master Plan, SFIA would relocate, reroute, or extend utilities to new facilities. These improvements would not increase the capacity of the existing infrastructure except for drainage and electrical improvements. A listing of these changes is shown in Appendix H, Table H-2, p. A.171.

WATER

The SFIA Master Plan projected future demand based on an analysis of each use category for both near- and long-term SFIA Master Plan projects. Water demand factors were developed from an analysis conducted in 1986-1987. It was found that overall SFIA demand for water was about 1.7 million gallons per day (mgd). These factors were applied to the net increase and decrease in areas to be developed. Systemwide impacts were developed and then tested against the current installed facilities.

To project future demand, the water system was analyzed by functional use category for both the near- and long-term Master Plan. Water demand factors were applied to the net increase (decrease) in floor area to develop the systemwide impacts of the scenarios. Specific projects were then tested against the current installed facilities to determine future requirements.

Near-Term Demand/1/

The proposed project would generate an additional near-term demand of 422,278 gallons per day of water to serve the site for a total demand of about 2.1 mgd. This represents an increase of approximately 25 percent over current water consumption. The San Francisco Water Department projects water demand for the Airport to be about 1.9 mgd in 1996. The Water Department assumes implementation of water conservation methods in its projections for future use, especially in the long term. The near-term SFIA Master Plan projection is approximately 0.4 mgd greater than current usage: this could be supplied by the San Francisco Water Department./2/ SFIA could actively implement conservation methods throughout all Airport facilities to reduce this usage./3/ The San Francisco Water Department is reviewing for adoption various permanent conservation methods that include both present and future uses. The methods include low-flush toilets, low-water-use landscaping, industrial recycling, and the individual metering of large or individual water users./2/

The SFIA Master Plan analyzed the SFIA water supply mains and concluded that adequate capacity exists to serve near-term SFIA Master Plan projects. The SFIA Master Plan also concluded that the internal distribution system is adequate and would not require additional mains or up-sizing of existing mains to serve near-term SFIA Master Plan projects. North Access Road, the perimeter roadway system, and building construction under the SFIA Master Plan would require relocation of existing water mains to provide supplies to new buildings or relocation from adjoining future development parcels. (North Access Road improvements are included in the approved SFIA Five-Year Capital Project Plan.)

Long-Term Demand/1/

The proposed project would generate an additional long-term demand over the near-term demand of about 0.3 mgd, or about 0.7 mgd of water over current demand. This represents an increase of 13 percent and 41 percent mgd, respectively. The San Francisco Water Department projects water demand at the airport to be 2.2 mgd in 2006, about 0.2 mgd less than the SFIA Master Plan projection and about 0.5 mgd over current water demand. While the City may be able to meet SFIA's long-term demand for water, water-conservation measures discussed under near-term demand, above, could be implemented./3/

The SFIA Master Plan analysis of the incoming supply mains and internal distribution system indicates that adequate facilities currently exist. New water distribution facilities would not be required to support long-term SFIA Master Plan projects.

WASTEWATER MANAGEMENT

Sanitary Sewer System/1/

Demand for the sanitary sewer is based directly upon 100 percent of the demand for water. The present system is capable of treating 2.2 mgd and is currently operating at 77 percent capacity at a rate of 1.7 mgd.

Near-Term Requirements

On the basis of 100 percent water demand, an increase of 25 percent in sewer service demand could be met by the existing wastewater treatment plant. However, to meet future water demand, and therefore wastewater treatment, the water quality control plant's capacity would need to be increased an additional 0.8 mgd to 3.0 mgd. Once increased and prior to long-term demand, the plant would discharge 2.12 mgd daily and operate at a near-term capacity of approximately 73 percent. The Airport would not be exceeding the discharge limits of its current National Pollutant Discharge Elimination System (NPDES) permit. SFIA indicated that increasing the capacity of the wastewater treatment plant would require two additional sedimentation tanks and one equalization tank./4/ The SFIA Master Plan did not indicate a schedule for the implementation of the sewer plant capacity increase. As indicated previously, several of the proposed terminal changes would require the rerouting, relocation, or extension of sewer lines to access new site locations.

Long-Term Requirements

Long-term SFIA Master Plan projects would increase the water demand and, therefore, sewage treatment requirements by a total of 41 percent over present demand, requiring additional sewer capacity. SFIA has planned to add 0.8 mgd to the sewer capacity. The SFIA Master Plan indicates a long-term increase in daily sewage requirements from the current 1.7 mgd to 2.4 mgd. With a new capacity of 3.0 mgd, the water quality control plant would operate at 80 percent of capacity./4/ The resulting average daily discharge rate of 2.4 mgd projected by the SFIA Master Plan would exceed the existing NPDES permit average dry weather discharge limit of 2.2 mgd. The existing permit expires in January 1995. At that time a revised permit would be required regardless of whether the SFIA Master Plan is adopted as well as of other changes in discharge parameters. The new permit would be required to address the projected increase in discharge rate./5/

Additionally, the new West Field Cargo/Maintenance Facilities sewer lines would be relocated into the new roadways serving those structures.

Industrial Waste Sewer System/1/

Currently, the industrial wastewater treatment plant has a capacity of 1.65 mgd and operates between 0.8 and 1.2 mgd. According to the SFIA Master Plan, the proposed increase in ramp areas and other functions would contribute less than five percent to the industrial waste collection system. The plant is operating between 50 percent and 75 percent capacity. Neither near- nor long-term SFIA Master Plan projects would require additional capacity for the industrial waste sewer system./1/

Selected SFIA Master Plan projects would require local system improvements and rerouting and relocation of both industrial- and storm-drainage collection-system lines. Given the existing capacity, the project's contribution to potential increase of spills, and the historic handling of spills on site (see Section III.H. Hazardous Materials and IV.H. Hazardous Materials), additional impacts would not be expected as a result of the project.

Solid Waste

Solid waste disposal is a problem of growing urgency in many counties. San Mateo County, with a population of approximately 630,000, annually generates one million tons of solid waste. As mentioned in III.J. Utilities Setting, SFIA's major activity centers contribute approximately 18,250 to 36,500 tons of the one million ton annual total for the county. Ox Mountain Landfill, San Mateo County's only landfill, has approximately two years of remaining landfill capacity. Because Browning-Ferris Industries (BFI) was denied a permit for a new County landfill in Apanolio Canyon, BFI is now pursuing an alternate plan involving the expansion of the existing Ox Mountain landfill. Approval of the alternative plan by all involved regulatory agencies would provide the County with approximately 16 years of landfill capacity, taking into consideration growth factors for the entire County. BFI is confident that it will receive all necessary permits to carry out the plan./6/ The expansion area of the Ox Mountain landfill would be the likely disposal site for the solid waste generated at the Airport during the Master Plan period. However, increases in solid-waste generation would still further diminish the finite resource of landfill space. The emergence of new waste-management laws within the state require city and county governments to plan for source reduction, recycling and composting, while ensuring adequate landfill space for materials that cannot be reused. The California Integrated Waste Management Act (AB 939) requires cities and counties to divert 25 percent of solid waste from landfills by 1995 and 50 percent by 2000. Even with the expansion of the Ox Mountain Landfill, the County still will be faced with the task of finding a more long-range solution to its solid waste problem.

NOTES - Utilities

/1/ SFIA, *Final Draft Master Plan*, Chapter 10.0., November, 1989.

/2/ Vasconcellos, Robert, Manager, Water Supply Division, San Francisco Water Department, telephone conversation, July 9, 1990.

/3/ Lougee, Norm, Water Supply Engineer, San Francisco Water Department, telephone conversation, January 29, 1991.

/4/ Leong, Melvin M., Superintendent Water Quality Control Plant, San Francisco International Airport, meeting, July 24, 1990.

/5/ National Pollutant Discharge Elimination System Permit, NPDES No. CA0038318, California Regional Water Quality Control Board, San Francisco Bay Region, January 17, 1990.

/6/ Valbusa, Leno, District Manager, Browning-Ferris Industries, telephone conversation, January 17, 1991.

K. PUBLIC SERVICES

CRASH / FIRE / RESCUE

SFIA Fire Department would be affected by increases in terminal passengers forecast for 1996 and 2006, and proposed construction projects. Most of the SFIA Fire Department responses are for first aid. Should the projected increase in terminal passenger traffic occur, then the SFIA Fire Department would receive a larger number of calls per year. This increase could cause an increase in current response times. The proposed construction projects could increase firefighting response times to the passenger terminal area. The SFIA Fire Department has indicated that an additional station would be required if SFIA Master Plan projects are implemented, because of increases in response times that could result from construction and demolition activities as well as additional passenger and vehicle traffic./1/ This service degradation may also affect the ability of the SFIA Fire Department to respond to a major emergency event.

SFIA Fire Department determines service levels based on the number of calls divided by the total number of passengers to SFIA. This figure can be applied to future increases in passengers to SFIA to determine the level of service./1/ The annual number of passengers is projected to increase by 41 percent by 1996 and 71 percent by 2006 (see Chapter II. Project Description, Table 1, p. 24). The number of calls for by CFR operations can be expected to increase proportionately. Therefore, the current CFR level of service and response times could not be maintained without additional Fire Department staff. In order to provide the existing level of service, seven new staff would be needed by 1996 and a further additional five staff by 2006.

SFIA POLICE

In part of the SFIA Master Plan, the Police Department intends to develop a 3,300-sq.-ft. substation in the existing International or Central Terminal on the main level in the ticketing area.

The SFIA Police Department would be affected by the increase in terminal passenger traffic. The increase in passengers would result in increases in calls; without additional personnel this could result in longer response times. The SFIA Police Department bases its level of service for traffic control on curbside square footage.

Level of service for service calls is based on the annual passenger count provided by SFIA./2,3/ Existing curbspace at SFIA is approximately 8,100 feet./4/ Implementation of the SFIA Master Plan would include the addition of roughtly 3,000 feet of curb space at the new International Terminal, representing an approximate 37 percent increase over current conditions, if no existing curb space is lost due to construction./5/ In order to maintain the existing level of service for traffic control, a similar increase in police staff would be needed.

The 41 percent and 71 percent increases in annual passengers forecast for the near- and long-term, respectively, can be expected to affect the level of service for service calls provided by the Airport police. In order to continue to provide the existing level of police service, the Department would need approximately 106 new staff in the near-term, proportionately among sworn-in officers, unsworn uniformed officers, and office staff. Approximately 78 further additional staff would be needed in the long term.

NOTES - Public Services

/1/ Anderson, Milton, Operations and Training Supervisor, San Francisco International Airport, telephone conversations, August 8, 15, and 27, 1990.

/2/ Driscoll, Ron, Chief, SFIA Police Department, telephone conversations, August 22 and 28, 1990.

/3/ Massola, Bob, Officer, SFIA Police Department, telephone conversation, August 14, 1990.

/4/ SFIA, 1989 Summary of Curb Space at San Francisco International Airport by Terminal and Type of Use.

/5/ Costas, John, Assistant Administrator, Planning and Construction, SFIA, telephone conversation, April 21, 1991.

L. AVIATION SAFETY

Increasing operations at SFIA have the potential to approach and possibly exceed the capacity of the airport. SFIA Master Plan projections would cause the hourly capacity of SFIA to be exceeded for certain hours of the day in both the near-term and long-term. FAA regulations and the Air Traffic Control System limit the level of activity that can occur safely in the airspace of any airport. Therefore, if operations exceed the capacity of the airport for a number of hours during the day, flights would be delayed./1/ FAA would require that flights destined for San Francisco be delayed at departure at other airports until such time as they could be landed safely without leading to excessive congestion of the SFIA airspace.

As operations increase at SFIA, there would be increasing pressure on the existing Air Traffic Control System. Expanding diversity in size and type of aircraft using the airspace contributes to the severity of the safety hazard. The Air Traffic Control System that currently operates in California is one of the busiest and most complex in the world. The FAA is in the process of implementing the National Airspace System (NAS) Plan, which would improve air traffic control and airway facilities services throughout the country. This plan has not been fully implemented yet.

AIRCRAFT ACCIDENTS

The National Transportation Safety Board (NTSB) compiles aviation accident statistics for U.S. carriers. Annual national accident rates are derived on the basis of the number of departures. According to the NTSB statistics, the national average accident rate for the period 1979 through 1989 is 0.392 per 100,000 departures./2/

Aircraft operations at SFIA are projected to increase by 16 percent in the near term and 26 percent in the long term, according to the SFIA Master Plan forecast. As seen in Chapter II. Project Description, Table 1, p. 24, the total number of aircraft operations in the 1990 base year was 427,475. With implementation of the SFIA Master Plan, the total aircraft operations forecast is 496,805 for 1996 and 538,464 for 2006. On the basis of the above figure, the existing accident rate for SFIA at the 1990 aircraft departure level of 213,738 (427,475 landings and departures) would be 0.83 accidents per year. As described in Section III.L. Aviation Safety, the Airport is actually operating at an accident rate below this level. In 20 years of operation, five aircraft accidents have taken place at SFIA.

Implementation of the near-term SFIA Master Plan would increase annual aircraft departures to 248,402 (496,805 landings and departures) and increase the accident rate, based on the NTSB accident rate average, to 0.97 per year. In the long term (2006), the accident rate would increase to 1.0, based on this NTSB statistic, reflecting a 26 percent increase from the base year 1990. As SFIA has maintained a relatively low accident rate (five accidents) over the last twenty years, it would be expected that future accident rates would be lower than those predicted by NTSB statistics, if SFIA maintained its existing record.

NOTES - Aviation Safety

/1/ Wiggins, Jim, Program Manager, Airport Systems Capacity Office, Federal Aviation Administration, February 21, 1991.

/2/ National Transportation Safety Board, Aviation Accident Statistics, 1979-1989, Accident Data Division (SP-30).

M. GROWTH INDUCEMENT

According to SFIA Master Plan forecasts, annual passengers would increase from about 30 million in 1990 to about 42.3 million in 1996 and about 51.3 million in 2006. Under the SFIA Master Plan, approximately 1.4 million square feet of building space would be demolished and about 4.2 million square feet would be constructed by 2006, bringing total SFIA building area to approximately 11.1 million square feet. Air cargo tonnage and total aircraft operations would also increase under the SFIA Master Plan. Existing uses and activities would intensify, and several vacant parcels would be developed in airport uses, but total land area under the airport's jurisdiction would not increase as a direct result of SFIA Master Plan projects. However, if existing airfield capacity proved insufficient to accommodate growth in aircraft operations, pressure to expand SFIA runways could result from SFIA Master Plan implementation.

Under the near-term SFIA Master Plan (1990-1996), SFIA employment would be expected to increase by about 4,600 jobs. The new total would represent about 11.6 percent of the 326,300 employees in San Mateo County. Under the total SFIA Master Plan (1990-2006), SFIA employment is expected to increase by about 9,000 jobs. The new total would represent about 12.1 percent of the 349,900 jobs in San Mateo County in 2006. The majority of these jobs would be the flight crews and passenger service personnel of the airlines. Most of the new employees would be expected to reside in San Mateo County (37.1 percent), followed by San Francisco County (25.9 percent) and Alameda County (11.8 percent). Employment growth at SFIA would generate demand for an estimated 6,850 new housing units in the Bay Area, including 2,450 in San Mateo County and 1,940 in San Francisco.

Increases in SFIA passenger volumes could induce pressure for hotel, restaurant and other travel-serving development, while increases in SFIA employment could stimulate demand for additional housing and public services in airport environs cities. Ground transportation and parking needs of both employees and passengers could also induce growth of roadway, parking and transit land uses in airport environs cities. Airport-induced demand would likely most affect the cities closest to SFIA (Brisbane, South San Francisco, San Bruno, Millbrae and Burlingame); in the other environs cities, SFIA-induced development would not likely be distinguishable from background development.

Off-airport water and sewer infrastructure capacity increases would not be required to support SFIA Master Plan projects. However, water demand would increase by approximately 0.69 mgd by 2006, a 41 percent increase over current demand. Sewage treatment demand would increase in proportion to water demand, necessitating expansion of SFIA wastewater treatment plant capacity by an additional 0.8 mgd to 3.0 mgd. Neither near- nor long-term SFIA Master Plan projects would require additional capacity for the industrial waste sewer system. Increased electrical demand resulting from Master Plan projects would necessitate expansion of an existing PG&E substation. Selected SFIA Master Plan projects would require local system improvements and rerouting and relocation of both industrial and storm drainage collection system lines. None of these infrastructure changes would likely induce growth either at SFIA or environs cities.

V. MITIGATION MEASURES PROPOSED TO MINIMIZE POTENTIAL ADVERSE IMPACTS OF THE PROJECT

In the course of project planning and design, measures have been identified that would reduce or eliminate potential environmental impacts of the proposed project. Some of these measures have been, or would be, adopted by the project sponsor and thus are proposed; some have been identified by this Report but are not proposed as part of the SFIA Master Plan or are not agreed to by SFIA staff. Implementation of some may be the responsibility of public agencies other than SFIA. Measures under consideration or not agreed to by SFIA staff may be required by the Airport Commission as conditions of project approval, if the project were to be approved.

Each mitigation measure and its status are discussed below. Impacts of measures are also discussed as appropriate. The mitigation measures have been separated to identify those that are within the control of SFIA to undertake and implement (identified by the subhead "SFIA") and those that are entirely or partially outside of SFIA's control because they require implementation by another agency or jurisdiction (identified under "Other Agencies").

A. TRANSPORTATION

The mitigations that are identified in this report (as noted in the first paragraph above) have been categorized by:

- Existing-Condition Measures/1/
- Project-Impact Measures (1996 and 2006)
- Cumulative-Impact Measures (1996 and 2006)

The distinction among existing-condition, project-impact and cumulative-impact measures is a result of the context used in the impact analysis evaluation. Existing-condition measures are identified to resolve existing deficiencies. These measures for existing conditions do not address project impacts and would not be considered mitigation measures under CEQA. Project-impact mitigation measures, which focus on streets and intersections, transit services and parking, relate to impacts caused by development of the project.

Cumulative-impact mitigation measures are those that would be generated by changes occurring in the entire Bay Area transportation system; these mitigations require action to be taken at a regional rather than a project level. This three-way breakdown is carried through the following listing using each transportation category (e.g., Intersections, Transit/Ridesharing).

INTERSECTIONS

Existing-Condition Measures Identified In This Report

Other Agencies

- At South Airport Boulevard / Utah Avenue, restripe the westbound movements (east leg) on Utah Avenue from the current single-left, single-through and single-right-turn lanes (three lanes total) to a double-left-turn lane and single-combined-through / right-turn lane (three lanes total). This reconfiguration would improve p.m. peak hour LOS from LOS E (V/C = 0.91) to LOS B (V/C ratio = 0.60). The worst-case degradation, under Project + List-added growth (2006) conditions, would be LOS C (V/C ratio = 0.77), versus LOS F (V/C = 1.10) without this mitigation. **Implementing Agency: City of South San Francisco**

- At El Camino Real / San Bruno Avenue, provide double-left-turn lanes on those approaches where right-of-way can be obtained. The maximum improvement, if all approaches had double-left-turn lanes, would be from LOS F (V/C = 1.00) to LOS D (V/C = 0.89), under p.m. peak-hour conditions. Service levels would still degrade to LOS F conditions under future conditions, even with the recommended improvements (1996, V/C = 1.19; 2006, V/C = 1.23). **Implementing Agencies: Caltrans, City of San Bruno**

Cumulative-Impact Measures (1996) Identified In This Report

Other Agencies

- Monitor intersection operations and, as necessary, coordinate/retime traffic signals on El Camino Real (SR 82) and at all freeway ramp intersections. **Implementing Agencies: Caltrans, Cities of South San Francisco, San Bruno, Millbrae, and Burlingame**

Cumulative-Impact Measures (2006) Identified In This Report

Other Agencies

- Continue monitoring intersection operations and, as necessary, coordinate/retime traffic signals on El Camino Real (SR 82) and at all freeway ramp intersections. **Implementing Agencies: Caltrans, Cities of South San Francisco, San Bruno, Millbrae, and Burlingame**

TRANSIT / RIDESHARING

Project-Impact Measures (1996 and 2006) Identified In This Report

SFIA

- Encourage airlines and travel agencies to provide information to encourage air passengers to take transit (e.g., up-to-date shuttle and bus information distributed with all airline tickets-by-mail (sent to Northern California zip codes) and tickets sold at SFIA and Bay Area airline counters.)

- In order to minimize or eliminate congestion and parking problems identified in the Impacts section by limiting auto use, establish a Transportation System Management (TSM) program for SFIA. The goal of the TSM program would be to attain a reduction in the percentage of air passengers and employees who come to SFIA by single-occupant vehicle of two percent each year for the first five years through 1996, and one percent each year thereafter through 2006. The total change desired by buildout (2006) would be a reduction of 20 percentage points (e.g., 72 percent drive alone to 52 percent drive alone)./2/

  - A TSM Manager would develop the specific program and coordinate it with activities of SFIA, San Mateo County, the City and County of San Francisco, SamTrans, BART, CalTrain, shuttle/van/taxi companies that serve SFIA, and other public agencies whose services or regulatory functions would affect the mode of travel chosen by employees and air passengers. The objective of the TSM program would be to reduce travel throughout the day by private automobile, especially single-occupant vehicles.

  - SFIA TSM Program elements that appear to have relatively high potential for success (see Other Agencies for implementation as appropriate) include:

    For SFIA Employees:

    - Flexible work hours for the major employers, to reduce peaking of traffic in the typical 6:00 - 9:00 a.m. and 3:00 - 6:00 p.m. peak hours;

    - Incentives for transit use (e.g., free or subsidized transit fares / shuttle vouchers);

    - Carpool/vanpool matching through a centralized SFIA matching service (or contracted to RIDES for Bay Area Commuters).

- Provide economic disincentives for SFIA employees who commute by single-occupant vehicles (e.g., increased parking rates).

<u>For SFIA Air Passengers:</u>

- electronic transit/shuttle information in all baggage claim areas;

<u>For SFIA Air Passengers and Employees:</u>

- Pricing of parking (highest for single-occupant vehicles, graduated lower rates for carpools/vanpools) and preferential parking location for carpools/vanpools;

- efficient design of the Ground Transportation Center (GTC)

- electronic transit/shuttle information in the GTC and at Automated People Mover (APM) stops);

- Once it is developed, participate in the San Mateo County TSM program.
- Provide a share (based on SFIA employee and air passenger patronage) of the transit operating costs for SamTrans, CalTrain and BART, each of which is necessary to support increased SFIA operations.
- Work with airlines to design the Automated People Mover / Terminal connections to minimize air passenger pedestrian circulation, with baggage service available where departing air passengers exit the BART station or parking areas.

Other Agencies

- Implement aspects of the TSM program within control of those agencies: **Implementing Agencies: airlines, SamTrans, BART, Caltrans, shuttle/van/taxi companies, other agencies**
- Provide information to encourage air passengers to take transit (e.g., up-to-date shuttle and bus information distributed with all airline tickets-by-mail (sent to Northern California zip codes)) and tickets sold at SFIA and Bay Area airline counters. **Implementing Agencies: airlines, travel agencies**
- Provide economic disincentives for airline employees who commute by single-occupant vehicles (e.g., charge or increase current charges for employee parking). **Implementing Agencies: SFIA, airlines and other SFIA employers**
- Provide incentives for transit use (e.g., free subsidized transit fares / shuttle vouchers). **Implementing Agencies: airlines, other SFIA employers**
- Provide a share (based on air passenger patronage) of the transit operating costs for SamTrans, CalTrain and BART, each of which is necessary to support increased airline operations. **Implementing Agencies: airlines and other SFIA employers**
- Once it is developed, participate in the San Mateo County TSM program. **Implementing Agencies: airlines and other SFIA employers**

Cumulative-Impact Measures (1996) Identified In This Report

Other Agencies

- At as many locations as possible near US 101, I-280 and I-380 interchanges in San Mateo County, create park-and-ride lots for commuters through lot-construction and shared-use agreements with churches and shopping centers. Use uniform signage that clearly indicates lot location from the freeway and arterial roadways. **Implementing Agencies: Caltrans, local governments**

Project-Impact Measures (2006) Identified In This Report

SFIA

- Continue to monitor and implement the TSM Program identified above for 1996.
- To the extent that they are under the control of SFIA, continue to implement all incentives and disincentives identified above for 1996 that encourage air passengers and employees to take mass transit and rideshare, and discourage use of vehicles, especially single-occupant vehicles.
- Continue to provide a share (related to SFIA employee and air passenger patronage) of the transit operating costs for SamTrans, CalTrain and BART identified above for 1996.
- If a decision is made to place the SFIA BART station west of U.S. 101, in lieu of a station in the terminal parking garage, build an exclusive right-of-way, bus or rail connection between the SFIA BART station and the Ground Transportation Center with connecting service to the terminal and major employment areas, and operate service on this facility in a manner coordinated with BART/CalTrain arrivals and departures. It should be noted that any construction on the "West of Bayshore" land could cause potentially significant impacts to two endangered species: the San Francisco garter snake and the red-legged frog. The connection must be designed to accommodate safe passage of bicyclists, with no time restrictions on bicycle access. If direct BART service to the SFIA terminal is chosen, dedicate all necessary rights-of-way, and enhance the Ground Transportation Center to function as the multi-modal transfer facility. Reserve rights-of-way through SFIA for high speed rail service in a corridor east of U.S. 101 and on the "West of Bayshore" land.

Other Agencies

- Continue to implement all incentives and disincentives identified above for 1996 that encourage air passengers and employees to take mass transit and rideshare, and discourage use of vehicles, especially single-occupant vehicles. **Implementing Agencies: airlines, local governments, Caltrans**

Cumulative-Impact Measures (2006) Identified In This Report

Other Agencies

- Concurrently with the extension of BART to SFIA, increase the frequency of CalTrain service, especially during non-commute hours, so that there is minimal transfer time between CalTrain and BART. As an alternative, extend BART south to San Jose in the CalTrain right-of-way and provide MUNI light rail in the Bayshore Freeway / Third Street corridor as a replacement for CalTrain service. **Implementing Agencies: BART, Caltrans, CalTrain, MUNI**

- Extend CalTrain beyond its current location at Fourth and Townsend Streets in the South of Market area of San Francisco to the Financial District at, or near, Second and Market Streets. Although an expensive connection, this would make CalTrain an attractive option to US 101 commuters, thereby retarding the rate at which levels of service worsen on US 101./3/ **Implementing Agencies: Caltrans, CalTrain, Peninsula Commute Service Joint Powers Board**

- Increase SamTrans service to BART and CalTrain stations in San Mateo County to encourage use of both systems, both by reducing headways on existing routes and by adding new routes to serve both residential and employment centers. **Implementing Agency: SamTrans**

- Improve MUNI transit capacity in San Francisco so that new BART and CalTrain riders destined for locations outside the Financial District would find transit a viable alternative. This measure is consistent with MTC's current Regional Transportation Plan./4/ **Implementing Agency: MUNI**

ROADWAYS

Measures Proposed As Part Of The Project (1996)

SFIA

- Widen McDonnell Road (Road R-3) from two lanes to four lanes from U.S. 101 to San Bruno Avenue.

- Widen North Access Road from two lanes to four lanes.

Project Impact Measures (1996) Identified In This Report

SFIA

- Consolidate curb cuts on Road R-2 and McDonnell Road (Road R-3) to ensure that these facilities provide the best possible future levels of service.

- Continue prohibition of parking on all SFIA area roadways. This will eliminate parking overflow from using SFIA roadways and will preserve roadway capacity.

Project-Impact Measures (2006) Identified In This Report

SFIA

- Modify all terminal area / Ground Transportation Center ramps to include an exclusive lane for buses, shuttles and high-occupancy vehicles (HOV) in order to minimize delay for these vehicles and maximize their attractiveness as modes of travel to SFIA. The ramps should be designed so that only minor modifications would be required when exclusive HOV/bus lanes are designated by Caltrans on U.S. 101.

- Continue prohibition of parking on all SFIA area roadways.

Other Agencies

- Modify mainline U.S. 101 to accommodate new ramps that would be required to provide direct service to the U.S. 101 HOV/bus lanes. **Implementing Agencies: Caltrans, SFIA**

Cumulative-Impact Measures (2006) Identified In This Report

Other Agencies

- Designate one lane in each direction on US 101 from San Jose to San Francisco as a High Occupancy Vehicle (HOV) lane, to encourage use of carpools by employees of SFIA and use of shared taxis and shuttles by air passengers. This would be part of the TSM program discussed above under transit/ridesharing, whereby a goal of the TSM program would be to reduce travel throughout the day by private automobile, especially single-occupant vehicles. To minimize air quality impacts, new freeway lanes should not be constructed to satisfy this recommended mitigation measure (other than for the existing six-lane section between San Carlos and the San Mateo / Santa Clara County line, which could be widened to a maximum of eight lanes, including the HOV lane, as noted below. The HOV lanes should be signed to accommodate any vehicle carrying three or more persons, including all buses and airport shuttles. Only those taxis carrying three or more persons should be permitted to use the lanes. **Implementing Agency: Caltrans**

- Install ramp meters and variable message signs on US 101 ramps from San Jose to San Francisco, and on I-280 north of I-380 in an effort to maintain flow and better manage incident response on U.S. 101 and I-280. Maintaining flow along these freeways will help reduce travel times to SFIA through better management of incident responses. **Implementing Agency: Caltrans**

PARKING

Measures Proposed As Part Of Project (1996)

SFIA

- Add approximately 7,000 parking stalls. This would provide adequate parking for both air passengers and SFIA employees, even during peak periods of the year. However, providing sufficient parking would have an air quality impact as both air passengers and SFIA employees would be further encouraged to drive to the airport rather that utilize car pooling, shuttles, or public transit options.

Project-Impact Measures (1996) Identified In This Report

SFIA

- Reallocate parking spaces in the proposed new parking facilities in favor of air passengers, as TSM program elements could be expected to reduce employee parking demand more than air passenger parking demand. Phase the expansion of parking supply at SFIA to allow evaluation of the effectiveness of expanded TSM programs and transit improvements before the addition of parking (adding parking before or simultaneous with TSM programs and transit improvements may itself undermine the relative attractiveness of alternatives to single-occupant automobile travel).

- Monitor parking demand in the garage, Lot D, Lot DD, and the GTC and direct motorists to currently available parking locations through changeable message signs.

- Monitor parking demand throughout the year. When employee or air passenger parking demand exceeds supply twenty days a year, build additional parking spaces to maintain a 5 to 20 day exceedance level. In the event the annual mode split targets of the TSM program outlined under "TSM / TRANSIT / RIDESHARING" above are not being met, no additional parking can be provided at SFIA until the annual target is met, reevaluate the program for possible implementation of other measures to meet targets before providing additional parking.

- To improve access to SFIA parking areas by minimizing weaving and maintaining flow, install variable message signs along all roadways entering SFIA directing vehicles to various SFIA locations. The signs could indicate:

  - GTC, Rental Car Return, Buses and Shuttles - Right Lanes,
  - Short Term Parking, Arrivals and Departures - Left Lanes,
  - Long Term Parking, Air Cargo - Left Lane.

- To improve access to SFIA parking areas by minimizing weaving and maintaining flow, install variable message signs in the short-term garage and the Ground Transportation Center that direct exiting vehicles to use the appropriate exit (toll) gates. The signs could indicate:

- US 101 South to San Jose - Left Lanes,
- US 101 North to San Francisco - Right Lanes,
- I-380 to I-280 - Far Right Lanes.

- To minimize unnecessary circulation and reduce vehicle miles traveled, provide frequent radio broadcasts of parking availability, with signage on U.S. 101, I-280, and I-380 indicating the frequency to which motorists could tune to obtain the information. Update the recording as necessary to manage the flow of traffic to SFIA parking areas, and, when necessary, relatively major private lots or garages.

- To alleviate year-to-year occurrence of parking deficits, use vacant land for temporary overflow parking pending and during the construction of lots and garages.

- Index air passenger and employee parking costs to ensure that parking costs escalate with the costs of all goods and services.

Measures Proposed As Part Of The Project (2006)

SFIA

- Add approximately 930 parking stalls.

Project-Impact Measures (2006) Identified in This Report

SFIA

- Reallocate parking spaces in the proposed new parking facilities in favor of air passengers, as TSM program elements could be expected to reduce employee parking demand more than air passenger parking demand. Phase the expansion of parking supply at SFIA to allow evaluation of the effectiveness of expanded TSM programs and transit improvements before the addition of parking (adding parking before or simultaneous with TSM programs and transit improvements may itself undermine the relative attractiveness of alternatives to single-occupant automobile travel).

- Monitor parking demand in the garage, Lot D, Lot DD, Lot C/CC and the GTC and direct motorists to currently available parking locations.

- Monitor parking demand throughout the year. When parking demand exceeds supply twenty days a year, build additional parking spaces to maintain a 5 to 20 day exceedance level. In the event the annual mode split targets of the TSM program outlined under "TSM / TRANSIT / RIDESHARING" above are not being met, reevaluate the program for possible implementation of other measures to meet targets before providing additional parking.

- Use vacant land for temporary overflow parking during the construction of lots and garages.

- To minimize unnecessary circulation and reduce vehicle miles traveled, continue to provide a radio broadcast of parking availability, with signage on U.S. 101, I-280, and I-380 indicating the frequency to which motorists should tune to obtain the information. Update the recording as necessary to manage the flow of traffic to SFIA parking areas, and, when necessary, relatively major private lots or garages.

Cumulative-Impact Measures (2006) Identified In This Report

Other Agencies

- If the BART San Francisco Airport station is located on the west of Bayshore property, provide only carpool (three-person minimum) and vanpool parking access from the U.S. 101 HOV lanes to the BART SFIA station. For those commuters who do not carpool or vanpool, increased SamTrans service (see Transit mitigations above) would encourage use of SamTrans and CalTrain to access BART. **Implementing Agencies: Caltrans, BART, SamTrans, CalTrain**

BICYCLING

Project-Impact Measures (1996) Identified In This Report

SFIA

- As part of any non-freeway roadway reconstruction (e.g. McDonnell Road (Road R-3)), provide a minimum four-foot striped bicycle travel lane for each direction of travel.

Cumulative-Impact Measures (1996) Identified In This Report

SFIA

- Encourage other agencies identified below to provide the signed bicycle travel lane and or the Class I bikeway described below. If bicycle lanes are provided elsewhere, provide signed bicycle travel lanes on Road R-2 and McDonnell Road (Road R-3).

Other Agencies

- To further encourage cycling as an alternate mode of transportation, not only for travel to SFIA but for all bicycle trips in the US 101 Corridor, provide signed bicycle travel lanes or a Class I bikeway, as appropriate, from the Burlingame Recreation Lagoon west of Coyote Point north along Old Bayshore Highway, South Airport Boulevard and Bayshore Boulevard to existing bike lanes near San Bruno Mountain. Class I facilities could also be developed in wider parts of the Southern Pacific right-of-way (where adequate space exists for both BART and a bikeway) and parallel to U.S. 101 between Candlestick Park and the South San Francisco CalTrain Station. **Implementing Agencies: Caltrans, CalTrain, local governments, SFIA**

Project-Impact Measures (2006) Identified In This Report

SFIA

- As part of any non-freeway roadway reconstruction (e.g., McDonnell Road (Road R-3) or Road R-2), provide a minimum four-foot striped bicycle travel lane for each direction of travel.

Cumulative-Impact Measures (2006) Identified In This Report

SFIA

- To the extent that the multi-modal transfer station (BART, CalTrain, SamTrans) is located on Airport property, include bicycle travel lanes as an integral part of any connection between SFIA and the multi-modal transfer station west of U.S. 101.

● PEDESTRIANS

● Project-Impact Measures (1996) Identified In This Report

● SFIA

● - Incorporate, into the GTC design, safe and convenient walkways, amenities, easy access to transit and other modal transfer points, and other measures that facilitate safe pedestrian movements.

CONSTRUCTION

Project-Impact Measures (1996 and 2006) Identified In This Report

SFIA

- Prior to any major phase of construction, SFIA Landside Operations could prepare and submit a Maintenance of Vehicular and Pedestrian Traffic Plan to the City of San Francisco Department of Traffic and Parking, Caltrans, and/or San Mateo County for their review, to ensure that no adverse impacts would result from SFIA construction activity.

- Construction activities could involve closure of travel lanes, sidewalks and parking lanes / transit-taxi staging areas, especially during construction of the Ground Transportation Center (GTC), due to its proximity to the passenger terminal. It is imperative that during construction of the GTC at least four travel lanes on the arrivals deck and four lanes on the departure deck be left open and usable. During construction of the new ramps proposed for U.S. 101, the same number of travel lanes that exist today could be maintained to mitigate traffic conditions. Safely marked, temporary sidewalks and pedestrian paths may be used in association with lane closures.

- The inventory of public and employee parking should be maintained at all times during lot, garage and building construction. When a building or garage replaces an existing parking lot, make replacement parking spaces ready for use and, if necessary, shuttles available for easy access to the terminal and employment sites.

FREEWAY RAMPS

Cumulative-Impact Measures (2006) Identified In This Report

Other Agencies

- Freeway ramps could be monitored on an ongoing basis to identify where and when ramp widening or ramp design modifications (to increase the design speed) would be necessary. **Implementing Agency: Caltrans**

- A typical mitigation to resolve Level of Service E and F operation on an on-ramp would be to add a lane to the ramp. However, because of the poor operations projected on mainline U.S. 101, it is doubtful whether ramp widening would achieve anything other than increasing the vehicle storage (stacking) capacity of the ramp. Thus, metering US 101 ramps could help to maintain stable flow on the mainline freeway. The studies necessary to implement the ramp meters would consider the appropriate storage room that would be necessary, based on the future vehicle arrival patterns and alternative metering frequencies. Trial operations of the ramp meters under various schemes would be necessary prior to determining the optimal geometry for U.S. 101 ramps. **Implementing Agency: Caltrans**

AUTOMATED PEOPLE MOVER MITIGATIONS

Measures Proposed As Part Of Project (1996)

SFIA

- Construct an Automated People Mover from the new Ground Transportation Center to the SFIA terminal building.

Measures Proposed As Part Of Project (2006)

SFIA

- Extend the Automated People Mover from the Ground Transportation Center to parking Lots D and DD.

Project-Impact Measures (1996 and 2006) Identified In This Report

SFIA

- For passenger convenience, design of the Automated People Mover should strive to minimize air passenger walking distance and, where possible, level changes.

Other Agencies

- Work with SFIA to design the Automated People Mover / Terminal connections to minimize air passenger pedestrian circulation, with baggage-deposit or other baggage handling service available where departing air passengers enter the Automated People Mover from the BART station or parking areas. **Implementing Agencies: airlines**

FREEWAY MAINLINE MITIGATIONS

Cumulative-Impact Measures (2006) Identified In This Report

The widening of U.S. 101 to ten lanes in the vicinity of SFIA is not identified as a freeway traffic mitigation measure, because of overriding considerations related to the Bay Area's air quality. Rather, high-occupancy-vehicle (HOV) lanes could be added to U.S. 101 from San Jose to San Francisco, designated for express buses, airport shuttles and other vehicles carrying three or more persons. Since the mainline freeway section near SFIA is projected to operate at a poor level of service, direct ramps to and from the HOV lanes should be considered prior to construction of the Ground Transportation Center.

Basic freeway sections projected to operate worse than LOS D during peak hours would benefit most from installation of ramp meters and variable message signs that direct motorists to use less-congested roadways. Ramp meters manage (through signals on the freeway ramp) the flow of vehicles onto the freeway in a manner so as not to exceed downstream capacity constraints. They permit vehicles to enter the traffic stream to take advantage of gaps in traffic in the lane adjacent to the ramp. Recent research indicates that 60 percent of all urban freeway congestion is related to "incidents" (i.e., vehicle accidents and disablements). /5/ The rapid clearing of incidents combined with installation of variable message signs on the freeway would reduce congestion levels.

U.S. 101 south of SFIA is expected to become more congested, primarily because of additional employment growth in San Mateo and Santa Clara counties. This congestion is unrelated to growth at SFIA and the proposed project, and is expected to occur independently of SFIA Master Plan improvements. Any further increases in U.S. 101's capacity are not expected, because of limited right-of-way for widening and because of air-quality considerations. Construction of highway reliever routes would also be unlikely because of inter-jurisdictional and environmental concerns. It is likely that increased congestion on U.S. 101 south of SFIA would cause trips to divert to I-280, especially during peak hours./6/

Increased congestion on the Bay Area's freeway system, and transit improvements, would have the effect of shifting motorists to alternate modes of transportation. Shifts to BART and CalTrain could benefit the U.S. 101 corridor. Increased reliance on transit service improvements (e.g., the extension of BART to SFIA and CalTrain to downtown San Francisco) by commuters to jobs along the corridor, both at SFIA and elsewhere, would help reduce future congestion in this corridor. However, SamTrans is not likely to play an effective role without the BART extension and provision of HOV lanes on (or across, for a BART extension to the West of Bayshore land) U.S. 101. A diversion to SamTrans would not be expected to relieve U.S. 101 congestion, as there is difficulty in transit's ability to serve low-density, dispersed employment centers in San Mateo and Santa Clara Counties. There is difficulty in providing enough service to make transit attractive in low-density, dispersed employment centers along the U.S. 101 corridor. In addition, the more likely and more effective shift to Sam Trans for trips <u>through</u> the impact area (between San Mateo / Santa Clara Counties and San Francisco) by SamTrans would be affected adversely if no preferential treatment (e.g. HOV/bus lane) is given to buses.

B. <u>NOISE</u>

AVIATION NOISE

<u>Measures Identified in This Report</u>

SFIA

The following measures are intended to mitigate the noise impacts from the continued operation of the Airport.

- Select the earliest practicable date by which the Airport is to achieve 100 percent Stage 3 operations, and amend the SFIA Noise Abatement Regulation to reflect the phase out date (such an amendment was recently adopted by the Airport Commission with a January 1, 2000 phaseout date). The airlines serving SFIA would be responsible for compliance with the regulation. As discussed in Section IV.C. Noise, p. 331, achieving 100 percent Stage 3 operations would result in a one-dBA reduction to the CNEL contours in 2006.

- Encourage the airlines to use large long-range, two-engine aircraft as an alternative to four-engine aircraft. Aircraft such as the Boeing 767 and Boeing 777 (currently under development) can climb higher and faster than four-engine aircraft. The use of the aircraft would allow more long-range flights to depart on Runways 1L and 1R over the Bay, and would reduce noise levels in areas under departure paths from Runway 28R. An increased number of departures on Runways 1L and 1R would result in an increase in the occurrence of single-event noise in communities under the departure flight paths for those runways, including San Francisco and communities on the Peninsula and in the East Bay. An increased number of departures on Runways 1L and 1R would also result in an increase in the occurrence of backblast noise in communities behind those runways, including Burlingame and Millbrae.

- Encourage FAA to review and, if possible, revise the Quiet Bridge Approach to Runways 28L and 28R. Noise levels at the remote monitoring station in Foster City (station 12) are forecast to increase by about one decibel from 1990 to 2006, primarily because the increased use of quieter, Stage 3 aircraft at SFIA would not substantially reduce landing noise (to which areas of Foster City are exposed). Increasing the distance between approaching planes and Foster City could reduce cumulative and single-event ambient noise levels there, although it would not reduce the number of aircraft landings heard.

- Encourage FAA to study and, if possible, institute the use of a "quiet departure" flight routing for aircraft departing on Runways 1L and 1R. Currently, aircraft departing on Runways 1L and 1R make a left turn over the Peninsula. Requiring the aircraft to travel further north over the Bay before turning could reduce single-event noise over Peninsula communities, but could result in increased overflights and single-event noise in communities further north. In addition, a revised flight routing could conflict with departures from Metropolitan Oakland International Airport.

- Continue voluntary maximum use of the existing preferential runway use procedures at SFIA (nighttime use of Runways 10L and 10R for departures). Use the information in the SFIA Director's Reports to track and discuss actual use of the procedures at Airport/Community Roundtable meetings. If the use of the procedures could be increased, consider taking actions to encourage and promote such increased use. In addition, establish informal (through agreement with the airlines) nighttime preferential use of Runways 19L and 19R for arrivals (to the extent allowed by air traffic and weather conditions). If possible, arrival paths should be designed to minimize the possibility of increased noise levels in East Bay communities. The use of Runways 19L and 19R for arrivals could reduce overflight noise levels in Foster City and communities near the arrival paths for Runways 28L and 28R. Depending on the arrival flight paths used, the use of Runways 19L and 19R for arrivals could result in increased noise levels in East Bay communities. **Implementing Agencies: SFIA, FAA, airlines serving SFIA**

- Use the SFIA PASSUR Tracking System to evaluate actual flight patterns at SFIA and determine the value of existing and proposed noise abatement procedures. Develop regular reports from the PASSUR System for inclusion in the Director's Reports presented at Airport/Community Roundtable meetings.

- Participate with the FAA, California Department of Transportation, local agencies, Bay Area airports staffs, public interest groups, and area residents, conduct a regional study of air traffic control requirements, constraints, and opportunities, with the goal of minimizing noise impacts. The study would involve identifying the flight patterns and routes region-wide that are most environmentally desirable, determining how to establish and coordinate use of the routes while maintaining aircraft safety, and working with area airports, the FAA, and pilots to implement any changes to flight patterns or procedures.

- Complete study on the feasibility of and benefits from a new runway(s) (to replace the existing runways) or extension(s) to the existing runway(s). New runway(s) with a more westerly orientation could reduce overflights of Foster City and result in increased altitudes for aircraft using the Gap Departure route. Extended or new runways could potentially handle departures by long-range, heavy aircraft such as the B-747, with flight paths over the Bay instead of the Peninsula. (Currently, these aircraft primarily use Runway 28R.) New or extended runways might result in an overall reduction in the population within the CNEL 65 contour. If the study results in SFIA decision to pursue runway reconfigurations, work with FAA and other authorities to obtain necessary approvals to permit such reconfigurations. This work would include environmental review under CEQA and, possibly, NEPA. Potential environmental impacts of new or extended runways include: potential shifts in flight patterns that result in increased cumulative or single-event noise levels in certain locations; potential effects on airspace management in the Bay Area, and on flight procedures for (and noise impacts near) San Jose and Metropolitan Oakland International Airports; an increase in the number of operations that could be accommodated during bad weather conditions, and thus, a reduction in aircraft delays (if new runways are separated by 4,300 feet to allow simultaneous landings during adverse weather conditions); the filling of areas of the Bay, with accompanying temporary water-quality impacts and longer-term biological impacts; and increased energy use and pollutant emissions associated with longer aircraft taxiing distances. **Implementing Agencies: FAA, SFIA**

- Work with FAA and airlines to develop a "quiet climb" program (takeoff procedures) to reduce the single-event takeoff noise of Stage 2 aircraft in areas near SFIA. The program could involve delaying the application of climb power (after engine cutback soon after takeoff) until reaching a specified altitude (such as 5,000 feet above the ground) or clearing populated areas. When FAA Advisory Circular 91-53 is updated, review the Circular and determine whether runway-specific and other appropriate procedures can be adopted. **Implementing Agencies: FAA, SFIA, airlines serving SFIA**

- Consider developing and implementing additional restrictions on nighttime operations by Stage 3 aircraft. **Implementing Agencies: SFIA, airlines serving SFIA**

- Work with the FAA and the Foster City Noise Committee to develop noise abatement approach procedures using the LDA/DME planned for installation at SFIA in 1992. Use of such procedures could result in a reduction in cumulative noise levels in Foster City.

  If SFIA is selected for receipt of an MLS, work with the FAA and the Airport/Community Roundtable to review and revise flight procedures, with the goal of using the MLS to reduce single-event and cumulative noise levels.

- Consider increased funding for implementation of noise insulation projects in cities near the Airport.

- With the California Department of Transportation and the FAA, conduct a study involving the use of the C-weighting to quantify backblast impacts, and the development of a standard for evaluating backblast impacts.

- Improve the existing noise barrier for Runway 1R to better contain jet blast. This improvement could result in more aircraft departures on Runway 1R instead of Runways 28L or 28R, and a corresponding reduction in aircraft noise levels under the departure flight paths for Runways 28L and 28R. An increase in departures on Runway 1R could result in an increase in backblast noise in the communities behind the runway.

- Consider the feasibility and benefits of a noise barrier(s) behind Runways 1L or 1R. If barriers are found to be feasible and to reduce noise levels, install the barriers as appropriate.

- Continue to support and participate in the Airport/Community Roundtable to provide an ongoing public forum to address community airport noise issues, and to monitor Airport noise abatement actions.

- Consider the installation of additional noise monitors to help evaluate the effectiveness of existing, and/or develop new, noise abatement procedures.

- Continue to keep track of information on late night air carrier operations by runway and scheduled operations from midnight to 6:00 a.m. as part of the Director's Reports presented at Airport/Community Roundtable meetings. If the percentage of annual total operations performed at night increases such that nighttime cumulative noise levels increase 1.5 dBA, CNEL or more, conduct an investigation to determine the cause of the increase. To the extent allowed by law, implement mitigation measures to offset the increase in nighttime noise levels.

Other Agencies

- Comply with SFIA Noise Abatement Regulation to achieve Stage 3 operations by phase out date. As discussed in Section IV.C. Noise, p. 331, achieving 100 percent Stage 3 operations would result in a one dBA reduction to the CNEL contours in 2006. **Implementing Agency: airlines**
- Use large long-range, two engine aircraft as an alternative to four-engine aircraft. **Implementing Agency: airlines**
- Review and revise, if possible, the Quiet Bridge approach to Runways 28L and 28R. **Implementing Agency: FAA**
- Study and, if possible, institute the use of a "quiet departure" for aircraft departing on Runways 1L and 1R. **Implementing Agency: FAA**

- Conduct a regional study of air traffic control requirements, constraints, and opportunities, with the goal of developing specific measures for minimizing noise impacts. The study would involve identifying the flight patterns and routes region-wide that are most environmentally desirable, determining how to establish and coordinate use of the routes while maintaining aircraft safety, and working with area airports, the FAA and pilots to implement changes to flight patterns and procedures. **Implementing Agencies: FAA, MTC, Regional Airport Planning Committee, SFIA and other airports in the region**

- Implement "quiet climb" program to reduce the single-event noise of Stage 2 aircraft in areas near SFIA. **Implementing Agencies: FAA, airlines**

- ● Implement the planned installation of an LDA/DME at SFIA. Study and, if possible, develop approach procedures using the LDA/DME, with the goal of reducing cumulative noise levels in Foster City. **Implementing Agency: FAA**

- ● Consider SFIA as an early recipient for an MLS. If SFIA is selected, implement the installation of the MLS. Review, and if possible, revise SFIA flight procedures, with the goal of using the MLS to reduce single-event and cumulative noise levels. **Implementing Agency: FAA**

- ● Conduct a study involving the use of the C-weighting to quantify backblast impacts and the development of a standard for evaluating backblast impacts. **Implementing Agencies: FAA, Caltrans**

CONSTRUCTION NOISE

<u>Measures Identified In This Report</u>

SFIA

- The construction contract could require that the project contractor muffle and shield intakes and exhausts, shroud or shield impact tools, and use electric-powered rather than diesel-powered construction equipment, as feasible, so that noise from construction activities is reduced to the fullest extent possible at noise-impacted locations.

- The project sponsor could require that the project contractor predrill holes (if feasible based on soils) for piles to the maximum feasible depth to minimize noise and vibration from pile driving. The actual pounding from pile driving would occur during a five- to eight-minute span per pile.

- The project sponsor could consult with neighboring jurisdictions to determine the time when pile driving would cause the least disturbance to neighboring uses. The project sponsor could require that the construction contractor limit pile driving activity to result in least disturbance.

- The project sponsor could require the general contractor to construct barriers around the site, and around stationary equipment such as compressors, which would reduce construction noise by as much as five dBA, and to locate stationary equipment in pit areas or excavated areas if possible, as these areas could serve as noise barriers.

C. AIR QUALITY

<u>Measures Idenfified in This Report</u>

SFIA

- The project sponsor would require the contractor to sprinkle demolition sites with water continuously during demolition activity; sprinkle unpaved construction areas with water at least twice per day; cover stockpiles of soil, sand, and other material; cover trucks hauling debris, soils, sand or other such material; and sweep streets surrounding demolition and construction sites at least once per day to reduce particulate emissions. The project sponsor would require the project contractor to maintain and operate construction equipment so as to minimize exhaust emissions of particulates and other pollutants, by such means as a prohibition on idling of motors when equipment is not in use or when trucks are waiting in queues, and implementation of specific maintenance programs to reduce emissions for equipment that would be in frequent use for much of the construction period.

- Mitigation measures designed to reduce aircraft emissions would be centered on reducing the time each aircraft spends in the taxi/idle phase within the parameters of FAA regulations. SFIA could adopt operating procedures to provide to each airline that aircraft engines not be started until the aircraft is ready to pull away from the gate. When no gate is immediately available to unload newly arrived aircraft, aircraft engines would be turned off and aircraft would be towed when a gate becomes available. Emissions of carbon monoxide and hydrocarbons would be reduced by approximately 1,200 lbs/day and 400 lbs/day, respectively, for each minute the airport-wide taxi/idle phase average is reduced.

- Measures identified to mitigate traffic impacts would also mitigate air quality impacts. Reducing vehicular traffic through increased ridesharing (carpool, vanpool and transit), and implementing flexible and/or staggered work hours would reduce local and regional emissions of all pollutants.

Other Agencies

- Comply with SFIA operating procedures designed to reduce aircraft emissions. **Implementing Agency: FAA, airlines**

- Measures identified to mitigate traffic impacts would also mitigate air quality impacts. Reducing vehicular traffic through increased ridesharing (carpool, vanpool and transit), and implementing flexible and/or staggered work hours would reduce local and regional emissions of all pollutants. **Implementing Agencies: airlines, travel agencies, local governments, local public transportation providers**

D. ENERGY

Measures Identified In This Report

SFIA

- Install high-efficiency lamps for all parking lot lighting.

- Measures identified to mitigate traffic impacts would also mitigate energy impacts. Reducing vehicular traffic through increased ridesharing (carpool, vanpool and transit), and implementing flexible and/or staggered work hours would reduce local and regional energy use.

- The measure identified to reduce aircraft emissions would also mitigate energy impacts. Reducing aircraft idling time would reduce aviation fuel consumption.

E. CULTURAL RESOURCES

Measures Identified In This Report

SFIA

- Given the potential of the proposed project to adversely affect prehistoric and historic archaeological resources, the project sponsor would retain the services of an archaeologist. The sponsor would submit copies of the general soil survey and site-specific geotechnical investigations prepared for the San Francisco Airport expansion projects for review by the project archaeologist. The project archaeologist would report recommendations to the Environmental Review Officer (ERO). The archaeologist would give consideration to the potential presence of coastal prehistoric sites below existing bay alluvium and remains of Chinese shrimp camps (c. 1870 to c. 1910 A.D.) in evaluating the archaeological sensitivity of individual projects sites and in developing recommendations. An archaeologist should instruct excavation crews of the potential for discovery of cultural and historic artifacts on the site, and of the procedures to be followed if such artifacts are uncovered.

Should evidence of cultural or historic artifacts or features of potential significance, as determined by the project archaeologist, be found during project excavation, the Environmental Review Office (ERO) and the President of the Landmarks Preservation Advisory Board (LPAB) would be notified immediately, and any excavation which could damage such artifacts or features would be halted. The archaeologist would prepare a report to be submitted to the ERO and the President of the LPAB containing an assessment of the potential significance of the find and recommendations for what measures should be implemented, including an appropriate security program, and a program for the preservation and recovery of any potential artifacts/features. Should evidence of prehistoric or historic Native American artifacts be found during excavation, the Native American Heritage Commission would be notified immediately, an action required by state law when Native American remains are found. Also, an appropriate representative of the local Native American group would be retained as needed if burial remains were found. Three copies of written reports documenting results of study, recovery and plan for preservation shall be submitted to the ERO.

Excavation or construction activities which might damage discovered cultural resources would be suspended for a total maximum of four weeks over the course of construction to permit inspection, recommendation and retrieval, if appropriate.

The archaeologist would prepare a draft report documenting the artifacts/features that were discovered, an evaluation as to their significance, and a description as to how any archaeological testing, exploration and/or recovery program was conducted. Copies of the draft reports prepared according to these mitigation measures would be sent first and directly to the Environmental Review Officer and to the President of the Landmarks Preservation Advisory Board for review. Following approval of the report by the ERO and the President of LPAB, a final report is to be sent to California Archaeological Site Survey Office at Sonoma

State University. The Office of Environmental Review shall receive final copies of the final archaeological findings report.

F. GEOLOGY AND SEISMICITY

Measures Proposed As Part Of The Project

SFIA

- All foundation and geotechnical recommendations presented in the general soil survey and site-specific geotechnical investigations would be incorporated into the project.

- Facilities earthquake safety inspections would continue and would be expanded to include all new facilities. Periodic training concerning earthquake preparedness and seismic hazards reduction would be conducted at all new facilities.

GEOLOGY

Measures Identified In This Report

SFIA

- Facilities earthquake safety inspections would continue and would be expanded to include all new facilities. Periodic training concerning earthquake preparedness and seismic hazards reduction would be conducted at all new facilities.

- The airport's emergency response plan would continue to be practiced and would be updated, as necessary, as construction is completed and as the SFIA Master Plan is implemented.

- Where practical, limit excavation to depths above the water table. This would reduce the need for dewatering and special below groundwater engineering design and construction techniques.

- See Mitigation Section G. Hazardous Materials for a measure to locate suspected underground obstructions, particularly fuel or gas pipes, prior to excavation.

- If dewatering were required, temporarily retain groundwater pumped from the site in a holding tank before discharge to allow suspended particles to settle.

- Prepare and implement erosion control plans for any construction activities during the wet season that involve grading or other activities that would expose soil to erosion.

SEISMICITY

Measures Identified In This Report

SFIA

- Prioritize building removal and replacement such that older buildings in poor condition and older (pre-1973) reinforced concrete buildings are replaced first.

- Equip new gas lines with automatic shut-off valves that would be activated in the event of a major earthquake.
- Tie all potentially dangerous non-structural features into structural elements of the building. Secure heavy equipment and other potentially hazardous objects to floors or walls.

G. HAZARDS

SITE INVESTIGATION

Measures Identified In This Report

SFIA

- Perform a site investigation if construction is proposed in areas of known or suspected contamination. A site investigation includes the collection of soil and/or groundwater samples at a site, transportation of the samples to an analytical laboratory, and analysis and reporting.

  The potential for impacts relating to exposure to contamination exists for workers directly engaged in the sampling activity of this measure. Workers could be exposed to contaminants if accidents occur during transportation, or if access to the site where sampling is occurring is not controlled. In general, since relatively small amounts of material are normally sampled, exposure to potential hazards during site investigation is limited, and associated impacts would be localized.

SITE REMEDIATION

Measures Identified In This Report

SFIA

- Perform remediation activities if levels of contaminants found in any site investigation exceed regulatory requirements and/or pose a threat to the public health and the environment as defined by the responsible regulatory agencies. Remediation could be required for both soils and groundwater. Soil remediation methods could include excavation and on-site treatment, excavation and off-site treatment or disposal, or treatment without excavation. Remediation alternatives for clean-up of contaminated groundwater could include in-situ treatment, extraction and on-site treatment, or extraction and off-site treatment and/or disposal. Discharge of treated groundwater to the industrial wastewater treatment plant at the Airport or to San Francisco Bay would require regulatory agency approval.

  Potential impacts could result from remediation activities. Workers, and possibly the public, could come into contact with chemical compounds in soils, soil gases or groundwater during site remediation. The public and the environment could be exposed to airborne chemical compounds migrating from a site under remediation. Accidents during transportation of contaminated soils and/or groundwater could lead to exposure of the public and the environment to the chemical compounds.

- If site remediation is found necessary, a site-specific Safety and Health Plan for hazardous materials and waste operations would be prepared and submitted to the San Mateo County Department of Health Services, Environmental Services Division before site activities would proceed. The site-specific Safety and Health Plan, which would be applicable to all activities at the site prior to completion of site remediation, would establish policies and procedures to protect workers and the public from potential hazards posed by hazardous wastes. The Plan would be prepared according to federal and California OSHA regulations for hazardous waste site Safety and Health plans (if such regulations are not adopted prior to initial site activities, National Institute for Occupational Safety and Health guidelines /7/ would be followed). The site safety officer's log would be made available to the San Francisco Department of Public Health for inspection.

- The site mitigation plan would include a dust control program, to minimize potential public health impacts associated with exposure to contaminated soil dust.

- Reports (including sample locations, chain of custody forms, and laboratory analysis reports) of further site investigations (if any) would be sent to the San Mateo County Department of Health Services, Environmental Services Division.

- A report describing the remediation process in detail and certifying completion of remediation would be prepared by a Registered Environmental Assessor (REA) or registered engineer, and submitted to the San Mateo County Department of Health Services, Environmental Services Division. The report would include copies of hazardous waste transport manifests.

DEMOLITION/RENOVATION

<u>Measures Identified In This Report</u>

SFIA

- Conduct asbestos surveys for all structures planned for demolition or renovation that have not been previously surveyed. For development involving any structure identified to contain asbestos, retain a registered asbestos inspector to inspect buildings after asbestos removal or encasing to ensure adequacy of remediation, proceeding with demolition or renovation only when the quality assurance inspector agrees that asbestos abatement is complete.

- Consult Airport and tenant records of PCB-containing electrical articles before any demolition or renovation occurs. Remove PCB-containing equipment prior to demolition following all regulations for worker safety and disposal in accordance with applicable laws and regulations.

EXCAVATION

Measures Identified In This Report

SFIA

- Reduce excavation impacts in areas of suspected contamination by performing a site investigation and any necessary remedial activities.
- Prior to any excavation, consult Airport records for locations of underground tanks, utility lines and fuel distribution pipes. Tank-locating technologies would be used to determine whether any unrecorded or misrecorded underground tanks, utility lines or fuel distribution pipelines are present on-site. In the case of relatively large excavations, contingency plans would be developed for protection and possible evacuation of workers and nearby public.

DEWATERING

Measures Identified In This Report

SFIA

- Conduct groundwater testing for petroleum hydrocarbons before dewatering is performed at any airport site. Treatment would be applied, in consultation with the RWQCB and/or wastewater treatment plant operators to ensure that all discharges meet applicable quality requirements.

H. UTILITIES

Measures Identified In This Report

SFIA

- Increase the SFIA sewer system capacity to ensure that sewer capacity meet the long-term demand. As part of the near-term buildout phase, design a specific project which would provide for an 0.8 million gallons per day increase, scheduled for implementation and completion before long-term phase improvements begin (i.e., next 5 years).

  Although the San Francisco Water Department projects less water use at SFIA than the SFIA Master Plan projects, they would be able to fulfill the SFIA projected demand. SFIA could implement the water conservation measures to meet the Water Department projections: low-flush toilets, low-water-use landscaping, industrial recycling, and individual metering of large or individual water users.

- As all Cities and Counties are required to reduce waste generation by 25 percent by 1995 and 50 percent by 2000, SFIA could accomplish equivalent levels of reduction by implementing source reduction and recycling measures. Perform Waste Characterization Study to generally identify types and amounts of waste generated from both Airport-owned and tenant-owned facilities. Based on waste composition data, develop source reduction and recycling programs that would target high-volume materials. Possible measures could include source-separated recycling bins for cans, bottles, newspaper and mixed paper in all passenger terminal areas; office paper recycling in all administrative offices; and convenient measures for airlines to separate recyclable materials from passengers flights.

I. PUBLIC SERVICES

Measures Identified In This Report

SFIA

- Review current fire service levels and response times to the passenger terminal area in relationship to the proposed SFIA Master Plan projects. Identify and begin planning for an additional fire substation to be in operation by the time near-term SFIA Master Plan projects have been completed. A potential location would be near the old Pan Am/TWA Hangars which would enable access to all levels of passenger terminals.

- Review current police service levels and response times in relationship to proposed SFIA Master Plan projects and projected passenger levels. Maintain current levels of service.

NOTES - Mitigation

/1/ These measures are not required under CEQA (California Environmental Quality Act) guidelines. They have been included in this report to point out the needs that currently exist for mitigation measures.

/2/ The 20 percent total reduction due to implementation of a TSM program is a goal. The impact analysis takes no credit for reduced trip generation that would result from a successful TSM program.

/3/ An extension of CalTrain from its current terminus at Fourth Street / Townsend Street in San Francisco's South of Market district to the vicinity of Second Street / Market Street in the Financial District is shown in Caltrans' current Short Range Transit Plan. This extension, which is the subject of a separate environmental review, could make CalTrain service to SFIA competitive with BART for those transit patrons familiar with CalTrain's less-frequent schedule.

/4/ Metropolitan Transportation Commission, Regional Transportation Plan for the San Francisco Bay Area, April, 1991.

/5/ "Assessing the Traffic Impacts of Freeway Incidents and Driver Information", *ITE Journal*, August 1990.

/6/ Where two parallel facilities operate or are projected to operate at significantly different levels of service, or where one is recognized to be frequently saturated and the other facility is not, trip diversions occur that tend to maintain flow on the more-saturated facility. An example of facilities in the Bay Area that see this type diversion are I-880 and I-580 in Oakland, San Leandro and Hayward.

/7/ National Institute for Occupational Safety and Health, *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities*, U.S. Department of Health and Human Services, DHHS Publication No. 85-15, October, 1985.

VI. SIGNIFICANT ENVIRONMENTAL EFFECTS THAT CANNOT BE AVOIDED IF THE PROPOSED PROJECT IS IMPLEMENTED

In accordance with Section 21067 of the California Environmental Quality Act (CEQA), and with Section 15040, 15081 and 15082 of the State CEQA Guidelines, the purpose of this chapter is to identify impacts that could not be eliminated or reduced to an insignificant level by mitigation measures included as part of the proposed project, or by other mitigation measures that could be implemented, as described in Chapter V. Mitigation Measures, pp. 411-434.

- The final decision maker for this project, the San Francisco Airports Commission, also will make findings regarding alternatives and mitigation measures and may include in those findings additional determinations regarding significant effects.

This chapter identifies significant impacts that could not be eliminated or reduced to an insignificant level by mitigation measures included as part of the project, as described in Chapter V. Mitigation Measures, pp. 411-434.

The project would have a significant effect on traffic in that it would cause the intersection of California Drive at Millbrae Avenue to degrade from LOS D to LOS E during both the a.m. and p.m. peak hours in 2006. In 2006 during the p.m. peak hour, the project would cause the Rollins Road at Millbrae Avenue intersection to degrade below LOS D, and the Long-Term Parking and Road R-3 intersection to degrade from LOS C to LOS E.

The project would have a temporary, although significant, effect on sensitive receptors during project construction. Interior noise levels at noise sensitive land use areas would exceed the State Department of Health Services' Recommended Land Use Compatibility Guidelines for Community Noise.

The project would have significant air quality effects for the following reasons: Project-related surface traffic would further contribute to existing violations of roadside CO concentrations and would probably lead to an increase in the frequency of standards violations in the project area over future CO levels without the project. Project-related traffic would contribute more than one percent of transportation related emissions resulting from development in the County, based on the BAAQMD *Emissions Summary Report*. Project-generated emissions would be over the BAAQMD threshold of 150 lb/day for HC, NO_x, SO_x, and PM_{10}. In addition, because CO concentrations were modeled to be in violation of State standards in the future, the BAAQMD threshold of 550 lb/day for CO is applicable; project-generated emissions would be over the BAAQMD threshold for CO.

- If the SFIA Master Plan were implemented without consideration or inclusion of mitigation measures described in the Final Environmental Impact Report, Chapter V, pp. 411-434, additional effects would be significant. Implementation of the SFIA Master Plan without consideration or inclusion of mitigation measures will cause levels of service to degrade to "E" or below at Holly Street at Ralston Ave; will cause levels of service to degrade to "E" or below on certain freeway ramps in the vicinity of SFIA; will cause levels of service to degrade to "E" or below on various sections of freeways in the vicinity of SFIA; will cause violations of particulate air quality standards due to dust production during construction; will possibly cause impacts on subsurface cultural resources during construction; will cause sediment from dewatering (if any) and from other construction activities to enter storm drains and/or the Bay; will cause soil to be temporarily exposed to erosion during construction; will expose construction workers, other Airport workers or the public to hazardous wastes if hazards are found in soils or ground water in and around construction areas; will contribute to cumulative traffic increases on US 101 in the vicinity that would further reduce levels of service on some segments of the freeway; and, will contribute to cumulative air quality impacts in San Mateo County and the Bay Area region.

VII. THE RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF THE HUMAN ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

Approval of the project would intensify land uses in the project area. The project would possibly attract new passengers to San Francisco International Airport who otherwise could have used facilities closer to their place of residence or work (e.g., Oakland or San Jose) if those airports had expanded instead of San Francisco International Airport.

The project would include treatment or removal of hazardous materials that may be present in the project area, in compliance with applicable local and state regulations. This would enhance the long-term environmental safety of the project area.

VIII. SIGNIFICANT IRREVERSIBLE ENVIRONMENTAL CHANGES WHICH WOULD BE INVOLVED IN THE PROPOSED ACTION SHOULD IT BE IMPLEMENTED

Construction materials and energy used for project construction would involve use of nonrenewable resources. Continued development would also result in continuing increases in automobile and transit trips. The additional vehicle trips, plus construction activities from new development, would contribute to future cumulative air quality impacts from increases in particulate matter, CO and precursor emissions to ozone. Additional vehicle trips and building operations would contribute to future energy use.

IX. ALTERNATIVES TO THE PROPOSED PROJECT

This chapter identifies alternatives to the proposed project, discusses environmental impacts associated with each alternative, and explains why SFIA staff have rejected these alternatives in favor of the project. The San Francisco Airports Commission could approve an alternative instead of the project if the Commission believed the alternative would be more appropriate.

Three categories of alternatives to the proposed project are examined in this EIR. The three categories are the No-Project Alternative (includes two variants), Onsite Alternative, and Offsite Alternative.

BART service to SFIA in 2006 is not considered as a separate alternative because it is not a change to the project as proposed, but rather an option for serving SFIA that could bring about a change in impacts associated with the project. For this reason, BART service to SFIA is evaluated as an option in Section IV.B. Transportation impacts, above.

A. <u>NO-PROJECT ALTERNATIVE</u>

OVERVIEW

The No-Project Alternative assumes no future development of SFIA landside facilities to meet forecast passenger, cargo and flight operation demand. Under both No-Project Alternative variants, only projects included in the September 1989 SFIA Five-Year Capital Projects Plan (see Appendix B) would be implemented at SFIA during the SFIA Master Plan period (1990 - 2006); these projects would also be implemented under the SFIA Master Plan. Variant 1 reflects the SFIA Master Plan assumption that terminal facilities, and specifically boarding gates, represent the primary capacity constraint at SFIA. Variant 2 reflects the assumption of other agencies -- including Caltrans, MTC and the FAA -- that airfield facilities, airspace and/or ground traffic congestion represent the primary capacity constraints at SFIA. Both variants are based on the existing SFIA facility inventory (Chapter II. Project Description, Table 3).

Two categories of environmental impacts could result from the No-Project Alternative: a) impacts associated with growth in aviation activity at SFIA, and b) impacts associated with unserved demand for expanded aviation services and facilities at SFIA. The second category of impacts is addressed qualitatively under the description of Offsite Alternative. Impacts of demolition and construction associated with SFIA Master Plan projects would be avoided under both variants of the No-Project Alternative.

NO-PROJECT ALTERNATIVE, VARIANT 1 (moderate growth)

Description

No new facility construction, except that which has been approved under the SFIA Five-Year Capital Projects Plan, would occur under this Project Alternative. The impact evaluation is based on SFIA Master Plan "constrained" passenger forecasts, air carrier operations forecasts developed by Ken Eldred Engineering on the basis of SFIA Master Plan "constrained" passenger forecasts, and FAA Terminal Area Forecasts of commuter, general aviation and military aircraft operations./1,2/ These descriptive criteria are compared with SFIA Master Plan forecasts in Tables 68 and 69, pp. 441-446. "Constrained" cargo and mail tonnage forecasts are not available./3/

Growth in aviation activity (passenger counts, cargo tonnage and aircraft operations) would occur under the No-Project Alternative, Variant 1, but to a lesser extent than
● under the SFIA Master Plan "unconstrained" development scenario. The No-Project Alternative, Variant 1 would result in an increase in annual passengers of about 26 percent during the near-term compared to an increase of about 41 percent with the project, and would result in about a 33 percent increase in annual passengers during the long-term compared to about a 71 percent increase in annual passengers with the project. SFIA Master Plan "constrained" forecasts assume that some growth in annual passenger counts would be accommodated by industry-driven increases in the proportion of large aircraft in SFIA's aircraft fleet mix, and by more efficient utilization of aircraft seating (higher "load factors").

TABLE 68: NO-PROJECT ALTERNATIVE (VARIANT 1) COMPARED TO MASTER PLAN: NEAR-TERM (1990-1996)/a/

	Actual 1990	No-Project Variant 1 Forecast 1996	No-Project Variant 1 Net Change 1990-1996 /b/	Total Master Plan Forecast 1996	Total Master Plan Net Change 1990-1996 /b/	Comparison of No-Project Alternative (Variant 1) With Near-Term Master Plan
Total Annual Passengers	29,939,835 /c/	37,780,000 /d/	+7,840,000	42,280,000 /d/	+12,340,000	Annual passengers would increase by about 26% under the No-Project Alternative, Variant 1 compared to about 41% under the Near Term Master Plan.
Total Cargo and Mail Tonnage	558,078 /c/	NA	NA	785,872 /e/	+177,790	Cargo tonnage would increase by about 32% under the Near Term Master Plan. Comparative No-Project, Variant 1 ("constrained") figures are unavailable from either SFIA Draft Near Term Master Plan or FAA Terminal Area Forecasts./a,e/
Annual Aircraft Operations /f/						
Air Carrier	302,460 /g/	338,450 /k/	+35,990	375,105 /o/	+72,645	Air carrier operations would increase by about 12% under the No-Project Alternative, Variant 1 compared to about 24% under the Near Term Master Plan. Commuter operations would increase by about 32% under the No-Project Alternative, Variant 1 compared to about 5% under the Near Term Master Plan./q/ Total operations would increase by about 13% under the No-Project Alternative, Variant 1 compared to about 16% under the Near Term Master Plan.
Commuter	87,266 /h/	115,000 /l/	+28,000	91,700 /p/	+4,000	
General Avaition	35,132 /i/	25,400 /l/	-9,700 /m/	27,300 /p/	-7,800 /m/	
Military	2,617 /c/	3,000 /l/	0 /n/	2,700 /p/	+0 /n/	
Total	427,475 /j/	482,000 /l/	+54,000	496,800 /p/	+69,300	

(Continued)

● TABLE 68: NO-PROJECT ALTERNATIVE (VARIANT 1) COMPARED TO MASTER PLAN: NEAR-TERM (1990-1996)/a/ (Continued)

	Actual 1990	No-Project Variant 1 Forecast 1996	No-Project Variant 1 Net Change 1990-1996 /b/	Total Master Plan Forecast 1996	Total Master Plan Net Change 1990-1996 /b/	Comparison of No-Project Alternative (Variant 1) With Near-Term Master Plan
Building Area (Square Feet)	8,197,683 /r/	New construction limited to SFIA Five-Year Capital Projects Plan /s/		10,702,137 /t/	+2,504,450	SFIA Capital Plan projects would be implemented under both Near Term Master Plan and No-Project Alternative, Variant 1. Whereas no additional construction would occur under the No-Project Alternative, Variant 1, SFIA building area (excluding parking garages and proposed Ground Transportation Center) would increase by about 31% under the Near Term Master Plan.

NOTES:

/a/ No-Project Alternative, Variant 1 is based on the "constrained" development scenario in the *SFIA Final Draft Master Plan*. This scenario assumes that, without implementation of SFIA Master Plan projects, "lack of adequate or restructured facilities will necessitate increased utilization of existing facilities, constraining growth and causing corresponding degradations in levels of service" (*SFIA Final Draft Master Plan*, p. 7.1). Forecasts of "constrained" aviation activity are provided in the SFIA Master Plan only for annual passenger levels, not cargo tonnage or aircraft operations. Aircraft operations forecasts for the "constrained" scenario were subsequently developed by Ken Eldred Engineering and SFIA for this EIR; "constrained" cargo and mail forecasts are not available (see footnote /3/ of this EIR Section).

/b/ Each "Net Change" difference or sum is rounded to reflect accuracy of the forecast figure(s) from which it was derived. Columns may not add due to rounding. Forecast annual aircraft operations totals are similarly rounded to reflect least accurate component forecasts.

/c/ From "San Francisco International Airport Comparative Traffic Report," December 1989. Note: passenger figure represents total enplaned and deplaned passengers, including transfers. 1989 "Total Terminal Passengers," which includes "through" passengers, was approximately 560,580 (about 2%) greater.

/d/ From Table 7.2, *SFIA Final Draft Master Plan*, 1989.

/e/ From Tables 7.7 - 7.11, *SFIA Final Draft Master Plan*, 1989; "constrained" cargo forecasts are not provided. A 1996 "constrained" estimate, based on data from the 1989 Caltrans *California Aviation System Plan (CASP)*, is 846,302 tons. This was interpolated from 1995 and 2000 *CASP* forecasts of enplaned mail and cargo, then doubled to account roughly for deplaned tonnage. This "constrained" estimate is greater than the Master Plan forecast; however, according to SFIA, the Master Plan "unconstrained" cargo forecasts are now considered "extremely low" (conversation with John Costas, July 2, 1990).

/f/ Aircraft operations include all takeoffs and landings. Air carrier operations, as defined by SFIA, are scheduled commercial jet operations. Commuter operations, as defined by SFIA, are "the operations of the trunk carriers' subsidiary airlines operating primarily turbo-prop aircraft." These operations are accounted for at SFIA by two carriers: United Express (affiliated with United Airlines) and American Eagle (affiliated with American Airlines). FAA defines commuter/regional carriers as those which "operate

TABLE 68: NOTES, (Continued)

aircraft with a maximum of 60 seats, provide at least five round trips per week between two or more points, or carry mail" (FAA "Terminal Area Forecasts, FY 1989 - 2005," Appendix B). General Aviation operations at SFIA are those utilizing the Fixed Base Operator (FBO) and Chevron Corporation facilities for agricultural, industrial, recreational, air charter, air ambulance service, aerial photography, police patrol, fire control or Federal, State and local government aviation. Almost all military aircraft operations at SFIA are accounted for by U.S. Coast Guard helicopter activities.

/g/ 1989 air carrier operations total of 302,460 is from 1989 SFIA landing fee reports, which are based on fees paid to SFIA by runway users. SFIA landing fee report air carrier figures are about 2% lower than the FAA tower counts used in the SFIA Comparative Traffic Reports (the latter reported 309,126 air carrier operations for 1989). The SFIA landing fee report figure is cited here because it is used in SFIA Noise Abatement Program reports to the State, and because it is the basis of constrained and unconstrained fleetmix forecasts generated by Ken Eldred Engineering (KEE) for this EIR (conversation with Ken Eldred, August 1, 1990).

/h/ 1989 commuter operations total of 87,266 is from letter dated July 14, 1990 from John Costas, SFIA, and matches the 1989 SFIA landing report figure. The 1989 commuter operations total from FAA tower counts, as reported in the "San Francisco International Airport Comparative Traffic Report," December 1989, was 83,595, which is approximately 4% less than the landing fee report figure. This discrepancy may derive from miscategorization of commuter and air carrier operations; as noted above, the 1989 FAA tower report air carrier figure is greater than the landing report air carrier figure. When air carrier and commuter figures from the respective reports are added, the discrepancy between the two sources is 2,995 operations, or about 0.8% of the total (letter dated July 20, 1990 from Ken Eldred).

/i/ 1989 General Aviation total, from FAA tower counts reported in the December 1989 SFIA Comparative Traffic Report, was 32,137. To reconcile total operations by category with FAA tower counts, the 2,995 operations noted above have been added to the General Aviation category, bringing it to an estimated 35,132 operations in 1989 (as recommended in letter dated August 2, 1990 from Ken Eldred).

/j/ San Francisco International Airport Comparative Traffic Report, December 1989.

/k/ 1996 No-Project, Variant 1 forecasts of air carrier operations were derived by KEE from actual 1989 SFIA fleetmix data, FAA national fleetmix forecasts, and *SFIA Master Plan* "constrained" passenger and aircraft load factor forecasts (letter dated July 20, 1990 from Ken Eldred).

/l/ 1996 No-Project, Variant 1 forecasts of commuter, General Aviation and military aircraft operations figures are from FAA "Terminal Area Forecasts, FY 1989 - 2005," April 1989. 1996 values represent linear interpolation between 1995 and 2000 data points (corresponding FAA 1996 passenger interpolation is 35,169,200, about 2,610,800 or 7% less than the Master Plan "constrained" 1996 passenger forecast). Total 1996 operations figure combines FAA and KEE forecasts.

/m/ Although SFIA and FAA forecast figures differ, both sources reflect a steady decline in General Aviation operations during the Master Plan period.

/n/ Although SFIA and FAA forecast figures differ, both sources reflect little or no change in military aircraft operations during the Master Plan period.

/o/ 1996 *SFIA Master Plan* forecasts of air carrier operations were derived by KEE from actual 1989 SFIA fleetmix data, FAA national fleetmix forecasts, and *SFIA Master Plan* "unconstrained" passenger forecasts and aircraft load factor forecasts (letter dated July 20, 1990 from Ken Eldred).

/p/ *SFIA Master Plan* commuter, General Aviation and military aircraft operations forecasts from July 14, 1990 letter from John Costas, SFIA. The total is a combination of these figures and KEE air carrier operations forecast.

/q/ Forecasts of commuter operations by SFIA, FAA, Caltrans Division of Aeronautics and other agencies vary considerably due to differing assumptions and uncertainties in aviation industry trends (particularly the effects of industry deregulation).

/r/ Existing facility area total is from EIR Project Description Table 3, based on *SFIA Master Plan* Table 6.3 and updated facility information from SFIA.

/s/ SFIA Capital Projects Plan, September 1989. Capital projects included in the *SFIA Master Plan* are listed in EIR Project Description Table 2.

/t/ 1996 facility area total is from EIR Project Description Table 4, based on *SFIA Master Plan* Table 12.5 and updated *SFIA Master Plan* information from SFIA.

SOURCES: U.S. Department of Transportation, Federal Aviation Administration, April 1989; Ken Eldred Engineering, 1990; Caltrans Division of Aeronautics, 1989; SFIA Airports Commission, 1990; Environmental Science Associates, Inc., 1990.

TABLE 69: NO-PROJECT ALTERNATIVE (VARIANT 1) COMPARED TO MASTER PLAN: TOTAL (1990-2006)/a/

	Actual 1990	No-Project Variant 1 Forecast 2006	No-Project Variant 1 Net Change 1990-12006 /b/	Total Master Plan Forecast 2006	Total Master Plan Net Change 1990-2006 /b/	Comparison of No-Project Alternative (Variant 1) With Total Master Plan
Total Annual Passengers	29,939,835 /c/	39,760,000 /d/	+9,820,000	51,330,000 /d/	+21,390,000	Annual passengers would increase by about 33% under the No-Project Alternative, Variant 1 compared to about 71% under the Total Master Plan.
Total Cargo and Mail Tonnage	558,078 /c/	NA	NA	865,404 /e/	+307,326	Cargo tonnage would increase by about 55% under the Total Master Plan. Comparative No-Project, Variant 1 ("constrained") figures are unavailable from either SFIA Draft Master Plan or FAA Terminal Area Forecasts./a,c/
Annual Aircraft Operations /f/						
Air Carrier	302,460 /g/	321,660 /k/	+19,200	411,560 /o/	+109,100	Air carrier operations would increase by about 6% under the No-Project Alternative, Variant 1 compared to about 36% under the Total Master Plan. Commuter operations would increase by about 45% under the No-Project Alternative, Variant 1 compared to about 15% under the Total Master Plan./q/ Total operations would increase by about 10% under the No-Project Alternative, Variant 1 compared to about 26% under the Total Master Plan.
Commuter	87,266 /h/	126,200 /l/	+38,900	100,000 /p/	+12,700	
General Aviation	35,132 /i/	19,400 /l/	-15,700 /m/	24,200 /p/	-10,900 /m/	
Military	2,617 /c/	3,000 /l/	0 /n/	2,700 /p/	0 /n/	
Total	427,475 /j/	470,000 /l/	+42,400	538,000 /p/	+110,900	

(Continued)

TABLE 69: NO-PROJECT ALTERNATIVE (VARIANT 1) COMPARED TO MASTER PLAN: TOTAL (1990-2006)/a/ (Continued)

	Actual 1990	No-Project Variant 1 Forecast 2006	No-Project Variant 1 Net Change 1990-2006 /b/	Total Master Plan Forecast 2006	Total Master Plan Net Change 1990-2006 /b/	Comparison of No-Project Alternative (Variant 1) With Total Master Plan
Building Area (Square Feet)	8,197,683 /r/	No new construction after Five-Year Capital Projects		11,068,250 /t/	+2,870,570	SFIA Capital Plan projects would be Plan implementation/s/ Master Plan and No-Project Alternative, Variant 1. Whereas no additional construction would occur under the No-Project Alternative, Variant 1, SFIA building area (excluding parking garages and proposed Ground Transportation Center) would increase by about 35% under the Total Master Plan.

883
445

NOTES:

/a/ No-Project Alternative, Variant 1 is based on the "constrained" development scenario in the *SFIA Final Draft Master Plan*. This scenario assumes that, without implementation of Master Plan projects, "lack of adequate or restructured facilities will necessitate increased utilization of existing facilities, constraining growth and causing corresponding degradations in levels of service" (*SFIA Final Draft Master Plan*, p. 7.1). Forecasts of "constrained" aviation activity are provided in the Master Plan only for annual passenger levels, not cargo tonnage or aircraft operations. Aircraft operations forecasts for the "constrained" scenario were subsequently developed by Ken Eldred Engineering and SFIA for this EIR; "constrained" cargo and mail forecasts are not available (see footnote /3/ of this EIR Section).

/b/ Each "Net Change" difference or sum is rounded to reflect accuracy of the forecast figure(s) from which it was derived. Columns may not add due to rounding. Forecast annual aircraft operations totals are similarly rounded to reflect least accurate component forecasts.

/c/ From "San Francisco International Airport Comparative Traffic Report," December 1989. Note: passenger figure represents total enplaned and deplaned passengers, including transfers. 1989 "Total Terminal Passengers," which includes "through" passengers, was approximately 560,580 (about 2%) greater.

/d/ From Table 7.2, *SFIA Final Draft Master Plan*, 1989.

/e/ From Tables 7.7 - 7.11, *SFIA Final Draft Master Plan*, 1989; "constrained" cargo forecasts are not provided. A 2006 "constrained" estimate, based on data from the 1989 *Caltrans California Aviation System Plan (CASP)*, is 942,632 tons. This was extrapolated from 2000 and 2006 *CASP* forecasts of enplaned mail and cargo, the top-off portion was adjusted by *CASP*'s tonnage-per-thousand-passenger factor to reflect the "constrained" passenger forecast, then the total was doubled to account roughly for deplaned tonnage. This "constrained" estimate is greater than the Master Plan forecast; however, according to SFIA, the Master Plan "unconstrained" cargo forecasts are now considered "extremely low" (conversation with John Costas, July 2, 1990).

TABLE 69: NOTES, (Continued)

/f/ Aircraft operations include all takeoffs and landings. Air carrier operations, as defined by SFIA, are scheduled commercial jet operations. Commuter operations, as defined by SFIA, are "the operations of the trunk carriers' subsidiary airlines operating primarily turbo-prop aircraft." These operations are accounted for at SFIA by two carriers: United Express (affiliated with United Airlines) and American Eagle (affiliated with American Airlines). FAA defines commuter/regional carriers as those which "operate aircraft with a maximum of 60 seats, provide at least five round trips per week between two or more points, or carry mail" (FAA "Terminal Area Forecasts, FY 1989 - 2005," Appendix B). General Aviation operations at SFIA are those utilizing the Fixed Base Operator (FBO) and Chevron Corporation facilities for agricultural, industrial, recreational, air charter, air ambulance service, aerial photography, police patrol, fire control or Federal, State and local government aviation. Almost all military aircraft operations at SFIA are accounted for by U.S. Coast Guard helicopter activities.

/g/ 1989 air carrier operations total of 302,460 is from 1989 SFIA landing fee reports, which are based on fees paid to SFIA by runway users. SFIA landing fee report air carrier figures are about 2% lower than the FAA tower counts used in the SFIA Comparative Traffic Reports (the latter reported 309,126 air carrier operations for 1989). The SFIA landing fee report figure is cited here because it is used in SFIA Noise Abatement Program reports to the State, and because it is the basis of constrained and unconstrained fleetmix forecasts generated by Ken Eldred Engineering (KEE) for this EIR (conversation with Ken Eldred, August 1, 1990).

/h/ 1989 commuter operations total of 87,266 is from letter dated July 14, 1990 from John Costas, SFIA, and matches the 1989 SFIA landing report figure. The 1989 commuter operations total from FAA tower counts, as reported in the "San Francisco International Airport Comparative Traffic Report," December 1989, was 83,595, which is approximately 4% less than the landing fee report figure. This discrepancy may derive from miscategorization of commuter and air carrier operations; as noted above, the 1989 FAA tower report air carrier figure is greater than the landing report air carrier figure. When air carrier and commuter figures from the respective reports are added, the discrepancy between the two sources is 2,995 operations, or about 0.8% of the total (letter dated July 20, 1990 from Ken Eldred).

/i/ 1989 General Aviation total, from FAA tower counts reported in the December 1989 SFIA Comparative Traffic Report, was 32,137. To reconcile total operations by category with FAA tower counts, the 2,995 operations noted above have been added to the General Aviation category, bringing it to an estimated 35,132 operations in 1989 (as recommended in letter dated August 2, 1990 from Ken Eldred).

/j/ San Francisco International Airport Comparative Traffic Report, December 1989.

/k/ 2006 No-Project, Variant 1 forecasts of air carrier operations were derived by KEE from actual 1989 SFIA fleetmix data, FAA national fleetmix forecasts, and SFIA Master Plan "constrained" passenger and aircraft load factor forecasts (letter dated July 20, 1990 from Ken Eldred). The decline in air carrier operations is assumed due to larger aircraft capacities and higher load factors.

/l/ 2006 No-Project, Variant 1 forecasts of commuter, General Aviation and military aircraft operations figures are from FAA "Terminal Area Forecasts, FY 1989 - 2005," April 1989. 2006 values represent linear extrapolation from 2000 and 2006 data points (corresponding FAA 2006 passenger extrapolation is 40,523,600, about 763,600 or 2% more than the Master Plan "constrained" 2006 passenger forecast). Total 2006 operations figure combines FAA and KEE forecasts.

/m/ Although SFIA and FAA forecast figures differ, both sources reflect a steady decline in General Aviation operations during the Master Plan period.

/n/ Although SFIA and FAA forecast figures differ, both sources reflect little or no change in military aircraft operations during the Master Plan period.

/o/ 2006 SFIA Master Plan forecasts of air carrier operations were derived by KEE from actual 1989 SFIA fleetmix data, FAA national fleetmix forecasts, and SFIA Master Plan "unconstrained" passenger forecasts and aircraft load factor forecasts (letter dated July 20, 1990 from Ken Eldred).

/p/ SFIA Master Plan commuter, General Aviation and military aircraft operations forecasts from July 14, 1990 letter from John Costas, SFIA. The total is a combination of these figures and KEE air carrier operations forecast.

/q/ Forecasts of commuter operations by SFIA, FAA, Caltrans Division of Aeronautics and other agencies vary considerably due to differing assumptions and uncertainties in aviation industry trends (particularly the effects of industry deregulation).

/r/ Existing facility area total is from EIR Project Description Table 3, based on SFIA Master Plan Table 6.3 and updated facility information from SFIA.

/s/ SFIA Capital Projects Plan, September 1989. Capital projects included in the SFIA Master Plan are listed in EIR Project Description Table 2.

/t/ 2006 facility area total is from EIR Project Description Table 5, based on SFIA Master Plan Table 12.5 and updated SFIA Master Plan information from SFIA.

SOURCES: U.S. Department of Transportation, Federal Aviation Administration, April 1989; Ken Eldred Engineering, 1990; Caltrans Division of Aeronautics, 1989; SFIA Airports Commission, 1990; Environmental Science Associates, Inc., 1990.

Impacts

Impacts associated with growth in aviation activity under Variant 1 of the No-Project Alternative would thus be similar to, but less intensive than, impacts associated with growth in aviation activity under the SFIA Master Plan. As noted above, impacts of demolition and construction associated with SFIA Master Plan projects, except those approved under the 1989 SFIA Capital Projects Plan, would be avoided under the No-Project Alternative, Variant 1. Impacts associated with potential unserved demand (under this scenario, the difference between SFIA Master Plan "unconstrained" and "constrained" forecasts) are discussed qualitatively under the Offsite Alternative. Variant 1 of the No-Project Alternative assumes that terminal facilities, and specifically boarding gates, are the primary capacity constraints at SFIA.

The comparisons of vehicle traffic (V/C ratios and LOS) between the No-Project Alternative, Variant 1 and the project in the short-term are shown in Table 70, and the comparisons in the long-term are shown in Table 71, p. 450. The purpose of this table is to compare the impacts of the No-Project Alternative with the project. Thus, the vehicle traffic in these tables includes baseline forecast growth only and not additional list-based cumulative growth.

The *SFIA Five-Year Capital Projects Plan*, the minimum level of infrastructure necessary to support the constrained passenger forecasts, includes two traffic-related construction projects:

- widening of Road R-3 (McDonnell Road) from two lanes to four lanes, from US 101 to San Bruno Avenue, and
- widening of North Access Road from two lanes to four lanes.

Traffic impacts associated with the constrained alternative are as follows:

- On the basis of passenger projections, the No-Project Alternative would have 64 percent (or approximately two-thirds) of the proposed project's impacts in 1996, and 46 percent (or less than one-half) of the project's impacts in 2006.

TABLE 70: 1996 INTERSECTION LEVELS OF SERVICE IN THE VICINITY OF SFIA: NO-PROJECT ALTERNATIVE, VARIANT 1 - A.M. PEAK HOUR

	1990 Existing		No Project		Project	
Intersection	V/C	LOS	V/C	LOS	V/C	LOS
Signalized						
1. El Camino Real/Millbrae Ave.	0.92	E	0.96	E	1.03	F
2. Rollins Rd./Millbrae Ave.	0.94	E	0.97	E	1.02	F
3. Old Bayshore Hwy./Millbrae Ave.	0.24	A	0.24	A	0.31	A
4. Rd. R-2/Rd. R-16/Hilton Hotel	0.24	A	0.24	A	0.28	A
5. Rds. R-20, R-22/Rd. R-18	0.24	A	0.24	A	0.28	A
6. Rd. R-3 (McDonnell)/Rd. R-18	0.28	A	0.20	A	0.29	A
7. Rd. R-3/UAL Cargo	0.15	A	0.15	A	0.18	A
8. Rd. R-3/Rd. R-6	0.25	A	0.19	A	0.29	A
9. S. Airport Blvd./San Bruno Ave.	0.39	A	0.39	A	0.46	A
11. N. Access Rd./N. Access Road E. (101/380 on-/off-ramp)	0.51	A	0.40	A	0.53	A
12. S. Airport Blvd./N. Access Rd. S. (101/380 off-ramp)	0.44	A	0.45	A	0.60	A/B
13. S. Airport Blvd./N. Access Rd. N. (101/380 on-ramp)	0.32	A	0.33	A	0.34	A
14. S. Airport Blvd./Belle Air Rd.	0.30	A	0.31	A	0.31	A
15. S. Airport Blvd./Utah Ave.	0.50	A	0.50	A	0.50	A
16. S. Airport Blvd./US 101 NB ramps/ Radisson Hotel	0.52	A	0.53	A	0.54	A
17. S. Airport Blvd./Gateway Blvd.	0.30	A	0.29	A	0.29	A
18. Airport Blvd./Produce Ave./ San Mateo Ave.	0.37	A	0.37	A	0.37	A
19. Airport Blvd./Grand Ave.	0.65	B	0.86	D	0.86	D
20. San Mateo Ave./San Bruno Ave.	0.59	A	0.52	A	0.55	A
21. El Camino Real/San Bruno Ave.	0.61	B	0.61	A/B	0.66	B
Unsignalized/a/						
22. California Dr./Millbrae Ave.		A/A		A/C		A/D
23. Rds. R-24, R-26/Rd. R-16/b/		>C		>C		<C
24. Rd. R-3/Rd. R-6		<C		>C		>C
25. Long-Term Parking/Rd. R-3		A/C		A/C		A/D

NOTE: >C = LOS C or better (e.g., LOS A, B or C); <C = LOS D or worse (e.g., LOS D, E or F). Intersection 10 in Figure 17, Section III.B, was counted for pedestrian volumes only, so does not appear in this table.

/a/ Unsignalized intersection levels of service reflect the delays from left-turning movements from the major street onto the minor street (the first letter), and from the minor street onto the major street (the second letter). They are based on the excess capacity available to make the indicated movement.

/b/ For multi-stop controlled intersections (3-way and 4-way stop signs), the 1985 *Highway Capacity Manual* specifies a total intersection approach volume that corresponds to LOS C.

SOURCE: DKS Associates.

TABLE 70: 1996 INTERSECTION LEVELS OF SERVICE IN THE VICINITY OF SFIA: NO-PROJECT ALTERNATIVE, VARIANT 1 - P.M. PEAK HOUR (Continued)

	1990 Existing		No Project		Project	
Intersection	V/C	LOS	V/C	LOS	V/C	LOS
Signalized						
1. El Camino Real/Millbrae Ave.	1.00	F	1.05	F	1.10	F
2. Rollins Rd./Millbrae Ave.	0.77	C	0.80	C/D	0.84	D
3. Old Bayshore Hwy./Millbrae Ave.	0.49	A	0.49	A	0.55	A
4. Rd. R-2/Rd. R-16/Hilton Hotel	0.42	A	0.42	A	0.43	A
5. Rds. R-20, R-22/Rd. R-18	0.23	A	0.23	A	0.30	A
6. Rd. R-3 (McDonnell)/Rd. R-18	0.32	A	0.23	A	0.36	A
7. Rd. R-3/UAL Cargo	0.18	A	0.18	A	0.24	A
8. Rd. R-3/Rd. R-6	0.28	A	0.19	A	0.23	A
9. S. Airport Blvd./San Bruno Ave.	0.39	A	0.35	A	0.38	A
11. N. Access Rd./N. Access Road E. (101/380 on-/off-ramp)	0.35	A	0.22	A	0.24	A
12. S. Airport Blvd./N. Access Rd. S. (101/380 off-ramp)	0.51	A	0.51	A	0.62	B
13. S. Airport Blvd./N. Access Rd. N. (101/380 on-ramp)	0.33	A	0.33	A	0.49	A
14. S. Airport Blvd./Belle Air Rd.	0.71	C	0.73	C	0.73	C
15. S. Airport Blvd./Utah Ave.	0.91	D/E	0.94	E	0.94	E
16. S. Airport Blvd./US 101 NB ramps/ Radisson Hotel	0.52	A	0.54	A	0.54	A
17. S. Airport Blvd./Gateway Blvd.	0.45	A	0.48	A	0.48	A
18. Airport Blvd./Produce Ave./ San Mateo Ave.	0.71	C	0.73	C	0.73	C
19. Airport Blvd./Grand Ave.	0.70	C	0.72	C	0.72	C
20. San Mateo Ave./San Bruno Ave.	0.69	B	0.65	B	0.69	B
21. El Camino Real/San Bruno Ave.	1.00	F	1.00	E/F	1.01	E/F
Unsignalized/a/						
22. California Dr./Millbrae Ave.		A/C		A/C		A/D
23. Rds. R-24, R-26/Rd. R-16/b/		> C		> C		< C
24. Rd. R-3/Rd. R-6		< C		> C		> C
25. Long-Term Parking/Rd. R-3		A/C		A/C		A/D

NOTE: > C = LOS C or better (e.g., LOS A, B or C); < C = LOS D or worse (e.g., LOS D, E or F). Intersection 10 in Figure 17, Section III.B, was counted for pedestrian volumes only, so does not appear in this table.

/a/ Unsignalized intersection levels of service reflect the delays from left-turning movements from the major street onto the minor street (the first letter), and from the minor street onto the major street (the second letter). They are based on the excess capacity available to make the indicated movement.

/b/ For multi-stop controlled intersections (3-way and 4-way stop signs), the 1985 *Highway Capacity Manual* specifies a total intersection approach volume that corresponds to LOS C.

SOURCE: DKS Associates.

TABLE 71: 2006 INTERSECTION LEVELS OF SERVICE IN THE VICINITY OF SFIA: NO-PROJECT ALTERNATIVE, VARIANT 1 - A.M. PEAK HOUR

Intersection	1990 Existing V/C	1990 Existing LOS	No Project V/C	No Project LOS	Project V/C	Project LOS
Signalized						
1. El Camino Real/Millbrae Ave.	0.92	E	1.01	F	1.12	F
2. Rollins Rd./Millbrae Ave.	0.94	E	1.05	F	1.12	F
3. Old Bayshore Hwy./Millbrae Ave.	0.24	A	0.21	A	0.31	A
4. Rd. R-2/Rd. R-16/Hilton Hotel	0.24	A	0.21	A	0.26	A
5. Rds. R-20, R-22/Rd. R-18	0.24	A	0.24	A	0.31	A
6. Rd. R-3 (McDonnell)/Rd. R-18	0.28	A	0.20	A	0.37	A
7. Rd. R-3/UAL Cargo	0.15	A	0.15	A	0.19	A
8. Rd. R-3/Rd. R-6	0.25	A	0.19	A	0.38	A
9. S. Airport Blvd./San Bruno Ave.	0.39	A	0.39	A	0.53	A
11. N. Access Rd./N. Access Road E. (101/380 on-/off-ramp)	0.51	A	0.41	A	0.54	A
12. S. Airport Blvd./N. Access Rd. S. (101/380 off-ramp)	0.44	A	0.46	A	0.63	B
13. S. Airport Blvd./N. Access Rd. N. (101/380 on-ramp)	0.32	A	0.34	A	0.35	A
14. S. Airport Blvd./Belle Air Rd.	0.30	A	0.32	A	0.32	A
15. S. Airport Blvd./Utah Ave.	0.50	A	0.52	A	0.53	A
16. S. Airport Blvd./US 101 NB ramps/ Radisson Hotel	0.52	A	0.54	A	0.56	A
17. S. Airport Blvd./Gateway Blvd.	0.30	A	0.33	A	0.34	A
18. Airport Blvd./Produce Ave./ San Mateo Ave.	0.37	A	0.39	A	0.38	A
19. Airport Blvd./Grand Ave.	0.65	B	0.88	D	0.88	D
20. San Mateo Ave./San Bruno Ave.	0.59	A	0.52	A	0.56	A
21. El Camino Real/San Bruno Ave.	0.61	B	0.61	B	0.67	B
Unsignalized/a/						
22. California Dr./Millbrae Ave.		A/A		A/D		A/E
23. Rds. R-24, R-26/Rd. R-16/b/		> C		> C		< C
24. Rd. R-3/Rd. R-6		< C		> C		< C
25. Long-Term Parking/Rd. R-3		A/C		A/C		A/D

NOTE: > C = LOS C or better (e.g., LOS A, B or C); < C = LOS D or worse (e.g., LOS D, E or F). Intersection 10 in Figure 17, Section III.B, was counted for pedestrian volumes only, so does not appear in this table.

/a/ Unsignalized intersection levels of service reflect the delays from left-turning movements from the major street onto the minor street (the first letter), and from the minor street onto the major street (the second letter). They are based on the excess capacity available to make the indicated movement.

/b/ For multi-stop controlled intersections (3-way and 4-way stop signs), the 1985 *Highway Capacity Manual* specifies a total intersection approach volume that corresponds to LOS C.

SOURCE: DKS Associates.

TABLE 71: 2006 INTERSECTION LEVELS OF SERVICE IN THE VICINITY OF SFIA: NO-PROJECT ALTERNATIVE, VARIANT 1 - P.M. PEAK HOUR (Continued)

Intersection	1990 Existing V/C	1990 Existing LOS	No Project V/C	No Project LOS	Project V/C	Project LOS
Signalized						
1. El Camino Real/Millbrae Ave.	1.00	F	1.11	F	1.20	F
2. Rollins Rd./Millbrae Ave.	0.77	C	0.86	D	0.94	E
3. Old Bayshore Hwy./Millbrae Ave.	0.49	A	0.39	A	0.47	A
4. Rd. R-2/Rd. R-16/Hilton Hotel	0.42	A	0.39	A	0.42	A
5. Rds. R-20, R-22/Rd. R-18	0.23	A	0.23	A	0.34	A
6. Rd. R-3 (McDonnell)/Rd. R-18	0.32	A	0.23	A	0.42	A
7. Rd. R-3/UAL Cargo	0.18	A	0.18	A	0.24	A
8. Rd. R-3/Rd. R-6	0.28	A	0.19	A	0.28	A
9. S. Airport Blvd./San Bruno Ave.	0.39	A	0.35	A	0.42	A
11. N. Access Rd./N. Access Road E. (101/380 on-/off-ramp)	0.35	A	0.22	A	0.24	A
12. S. Airport Blvd./N. Access Rd. S. (101/380 off-ramp)	0.51	A	0.54	A	0.70	C
13. S. Airport Blvd./N. Access Rd. N. (101/380 on-ramp)	0.33	A	0.34	A	0.60	B
14. S. Airport Blvd./Belle Air Rd.	0.71	C	0.75	C	0.76	C
15. S. Airport Blvd./Utah Ave.	0.91	D/E	0.96	E	0.97	E
16. S. Airport Blvd./US 101 NB ramps/ Radisson Hotel	0.52	A	0.55	A	0.56	A
17. S. Airport Blvd./Gateway Blvd.	0.45	A	0.49	A	0.49	A
18. Airport Blvd./Produce Ave./ San Mateo Ave.	0.71	C	0.74	C	0.74	C
19. Airport Blvd./Grand Ave.	0.70	C	0.74	C	0.74	C
20. San Mateo Ave./San Bruno Ave.	0.69	B	0.65	B	0.71	C
21. El Camino Real/San Bruno Ave.	1.00	F	1.00	F	1.02	F
Unsignalized/a/						
22. California Dr./Millbrae Ave.		A/C		A/D		A/E
23. Rds. R-24, R-26/Rd. R-16/b/		> C		> C		< C
24. Rd. R-3/Rd. R-6		< C		> C		< C
25. Long-Term Parking/Rd. R-3		A/C		A/C		B/E

NOTE: > C = LOS C or better (e.g., LOS A, B or C); < C = LOS D or worse (e.g., LOS D, E or F). Intersection 10 in Figure 17, Section III.B, was counted for pedestrian volumes only, so does not appear in this table.

/a/ Unsignalized intersection levels of service reflect the delays from left-turning movements from the major street onto the minor street (the first letter), and from the minor street onto the major street (the second letter). They are based on the excess capacity available to make the indicated movement.

/b/ For multi-stop controlled intersections (3-way and 4-way stop signs), the 1985 *Highway Capacity Manual* specifies a total intersection approach volume that corresponds to LOS C.

SOURCE: DKS Associates.

- Air passengers would shift to the other two major commercial airports in the Bay Area, Oakland and San Jose. This would bring about an increase in congestion levels in these areas.

- This alternative would generate approximately 12,900 fewer daily, 600 fewer a.m. peak-hour and 650 fewer p.m. peak-hour trips relative to the project in 1996. This alternative would generate about 33,240 fewer daily, 1,530 fewer a.m. peak-hour and 1,860 fewer p.m. peak-hour trips relative to the project in 2006.

- Relative to the proposed project, highway congestion and transit use would not increase as much in 1996 and 2006. This alternative would degrade the p.m. peak hour levels of service below "D" at one intersection, whereas the project would degrade p.m. peak-hour levels of service below LOS "D" at three intersections in 2006.

There would be fewer aircraft and vehicle related emissions than with the project. See Table 72 for the aircraft emissions of this Alternative compared to the project.

Impacts from aircraft noise would be essentially the same with or without the project (or this alternative) in 1996. This would be due to existing noisier aircraft that would remain in operation under the project or this Alternative. The increased aircraft operations under the project would require additional aircraft; these additional aircraft are assumed to be newer and quieter than existing aircraft based on existing SFIA noise requirements. In 2006 there would be fewer aircraft noise impacts than with the project. By the year 2006, most aircraft operations under the project or this alternative would be performed by the newer, quieter aircraft (and the noise levels reflected in the CNEL contours would be caused primarily by these aircraft), because FAA regulations require a change to use of quieter Stage 3 aircraft by January 1, 2000. Under the project, there would be more operations by these aircraft than under this alternative. (See Figures 34 and 35, pp. 454-455, for the aircraft noise contours for 1996 and 2006, respectively).

Energy impacts would be less than with the project because there would be less construction, there would be less building area to heat, cool and light, and there would be fewer vehicle (including aircraft) trips than with the project.

There could potentially be fewer cultural resource impacts due to this alternative, compared to the project. This is because there would be less excavation for construction or demolition than with the project.

TABLE 72: ESTIMATED AIRCRAFT EMISSIONS AT SFIA, 1990-2006

		Emissions by Alternative (lb/day)/a,b/				
		1990	1996	1996	2006	2006
Pollutant	LTO Phase	Existing	No Project	Project	No Project	Project
CO	Taxi / Idle	23,600	36,000	44,600	27,700	57,600
	Takeoff	100	100	100	100	100
	Climbout	400	400	400	300	400
	Approach	1,900	1,800	2,000	1,400	1,600
	TOTAL/c/	26,000	38,300	47,100	29,500	59,800
NO_X	Taxi / Idle	1,800	2,900	3,700	2,700	6,200
	Takeoff	3,300	3,700	4,400	3,400	4,200
	Climbout	6,600	7,500	8,800	6,900	8,700
	Approach	1,900	2,200	2,500	2,100	2,600
	TOTAL/c/	13,600	16,200	19,400	15,100	21,700
HC	Taxi / Idle	8,800	13,100	16,000	9,400	19,700
	Takeoff/d/	--	--	--	--	--
	Climbout	100	100	100	100	100
	Approach	200	300	300	200	300
	TOTAL/c/	9,200	13,400	16,300	9,700	20,100

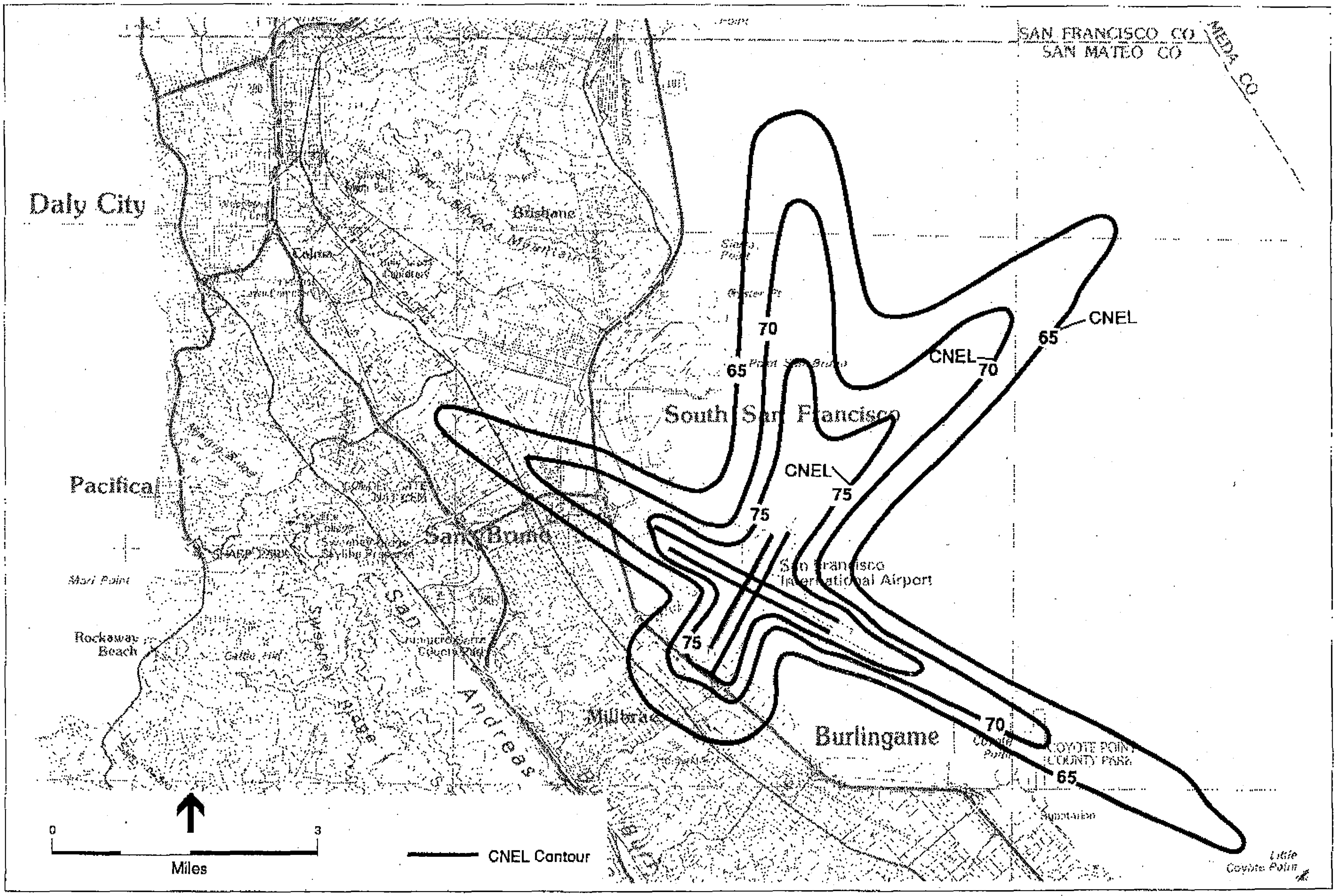
/a/ The existing and future air carrier fleet mix was determined by Ken Eldred Engineering, Inc., and the commuter, general aviation, and military fleet mixes were estimated by Environmental Science Associates, Inc. No data on the 1990 SFIA fleet mix are available yet, so the 1990 fleet mix is based on 1989 operations data. Emission rates and engine types for each aircraft were obtained from one of two sources. The EPA's AP-42 contained emission rates for older aircraft (pre-1985) such as the DC10, and Nick Krull of the Federal Aviation Administration (FAA) provided the remaining factors for the more recent and under-construction aircraft that were not supplied in AP-42, such as the MD11 and the A330/340. Data supplied by Mr. Krull were originally provided to the International Civil Aviation Organization by the engine manufacturer and have not been validated by the FAA. When no data for a particular engine were available, emission rates from a similar engine were assumed.

/b/ Estimates rounded to the nearest 100 lbs/day.

/c/ Estimates may not add due to rounding.

/d/ Each of these amounts was less than 50 lbs/day.

SOURCE: Environmental Science Associates, Inc.

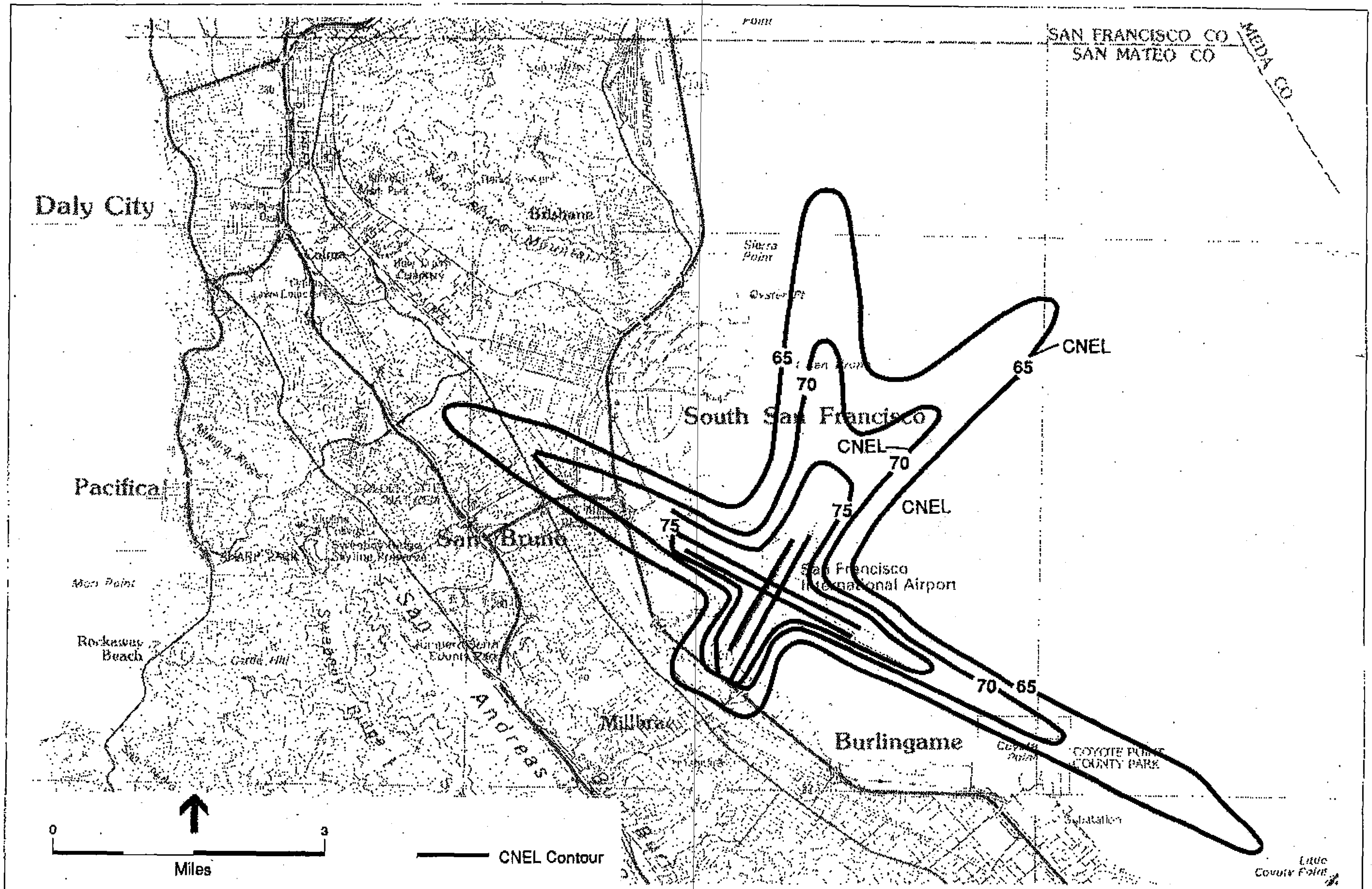


SOURCE: Ken Eldred Engineering and Environmental Science Associates, Inc.

San Francisco International Airport

Figure 34
1996 No Project Alternative
Aircraft Noise Contours

454
892



SOURCE: Ken Eldred Engineering and Environmental Science Associates, Inc.

Figure 35
2006 No Project Alternative
Aircraft Noise Contours

There would potentially be fewer hazardous materials impacts due to this alternative, compared to the project. This is because there would be less aviation fuel used and less maintenance of aircraft than with the project.

Employment would increase by 2,540 people compared to 4,600 people for the project by 1996 and 2,680 people compared to 9,000 people for the project by 2006. This would create a demand for 1,810 housing units compared to 4,610 housing units by 1996 and 1,970 units compared to 8,970 housing units by 2006.

There would be fewer impacts on utilities and public services than with the project because there would be fewer passengers, employees, and aircraft operations. There would be fewer impacts under aviation safety because these impacts are based on total flight operations.

Reasons for Rejection

The sponsor has chosen the Draft SFIA Master Plan as its preferred alternative instead of this alternative because the alternative would not meet the sponsor's objective to accommodate the demand from forecast growth in an orderly manner.

NO-PROJECT ALTERNATIVE, VARIANT 2 (near-no-growth)

Description

As under Variant 1, no new facility construction, except that which has been approved under the SFIA Five-Year Capital Projects Plan, would occur under No-Project Alternative, Variant 2. The impact evaluation is based on annual passenger levels recommended by the 1980 *Regional Airport Plan* (*RAP*), prepared by the Metropolitan Transportation Commission (MTC) and the Association of Bay Area Governments (ABAG)./4/ The RAP recommends a policy limit of 31 million annual passengers (MAP); a similar level (32.1 MAP) is recommended by the 1989 *California Aviation System Plan* (*CASP*), prepared by Caltrans Division of Aeronautics./5/ Existing passenger load is about 30 million annual passengers.

Future cargo and mail tonnage were not forecast for the No-Project Alternative, Variant 2; 1990 levels are assumed for both 1996 and 2006. Air carrier operations forecasts developed by Ken Eldred Engineering for this variant are based on 1990 passenger levels (approximately 30 million annual passengers) and load factor (55.23%). The Ken Eldred Engineering No-Project, Variant 2 air carrier forecasts for 1996 and 2006 reflect only the fleet changes likely to occur through the retirement of aircraft. A moderate decline in air carrier operations could occur as larger aircraft replace those to be retired./6/ Future commuter, General Aviation and military aircraft operations were not forecast for this variant and are assumed to remain at 1990 levels. These descriptive criteria are compared with SFIA Master Plan forecasts in Tables 73 and 74.

Impacts

Impacts associated with aviation activity under Variant 2 of the No-Project Alternative would be similar to impacts of current landside operations at SFIA, combined with a potential reduction in air carrier operations. Impacts of demolition and construction associated with SFIA Master Plan projects, except those approved under the 1989 SFIA Capital Projects Plan, would be avoided under the No-Project Alternative, Variant 2. Impacts associated with potential unserved demand (under this scenario, the difference between SFIA Master Plan "unconstrained" forecasts and near-no-growth in all aviation activity categories) are discussed qualitatively under the Offsite Alternative.

The impacts of the No-Project Alternative - Variant 2 would be similar to the 1996 and 2006 Base Traffic scenarios discussed in Chapter IV, Impacts. This alternative would have approximately nine percent (or one-eleventh) of the proposed project's impact in 1996. It would have approximately five percent (or one-twentieth) of the proposed project's impact in 2006.

There would be fewer aircraft and vehicle related emissions than with the project or with Variant 1.

Impacts from aircraft noise would be less than with the project or with Variant 1 for both 1996 and 2006. Even with the project, aircraft noise impacts would decrease due to quieter aircraft that will be used in the future. With Variant 1, noise impacts would further decrease from project impacts, and with Variant 2, noise impacts would decrease even more.

● TABLE 73: NO-PROJECT ALTERNATIVE (VARIANT 2) COMPARED TO MASTER PLAN: NEAR-TERM (1990-1996)/a/

	Actual 1990	No-Project Variant 2 Forecast 1996	No-Project Variant 2 Net Change 1990-1996 /b/	Total Master Plan Forecast 1996	Total Master Plan Net Change 1990-1996 /b/	Comparison of No-Project Alternative (Variant 2) With Near-Term Master Plan
Total Annual Passengers	29,939,835 /c	31,000,000 /d	+1,060,000	42,280,000 /e/	+12,340,000	Annual passengers would increase by about 4% under the No-Project Alternative, Variant 2 compared to about 41% under the Near Term Master Plan.
Total Cargo and Mail Tonnage	558,078 /c/	558,078	0	735,872 /f/	+177,790	Cargo tonnage would increase by about 32% under the Near Term Master Plan. Comparative No-Project, Variant 2 figures are unavailable; this EIR assumes 0% growth in cargo tonnage.
Annual Aircraft Operations /g/						
Air Carrier	302,460 /h/	295,650 /l/	-6,810	375,105 /m/	+72,645	Air carrier operations would decline by about 2% under the No-Project Alternative, Variant 2 compared to an increase of about 24% under the Near Term Master Plan. Forecasts of commuter, general aviation and military operations under this variant are unavailable; operations in these categories are assumed to remain unchanged. Total operations would decline by about 2% under the No-Project Alternative, Variant 2 compared to an increase of about 16% under the Near Term Master Plan.
Commuter	87,266 /i/	87,266 /i/	0	91,700 /n/	+4,400	
General Aviation	35,132 /j/	35,132 /j/	0	27,300 /n/	-7,800	
Military	2,617 /c/	2,617 /c/	0	2,700 /n/	0	
Total	427,475 /k/	420,665 /l/	-6,810	496,805 /n/	+69,000	

(Continued)

● TABLE 73: NO-PROJECT ALTERNATIVE (VARIANT 2) COMPARED TO MASTER PLAN: NEAR-TERM (1990-1996)/a/ (Continued)

	Actual 1990	No-Project Variant 2 Forecast 1996	No-Project Variant 2 Net Change 1990-1996 /b/	Total Master Plan Forecast 1996	Total Master Plan Net Change 1990-1996 /b/	Comparison of No-Project Alternative (Variant 2) With Near-Term Master Plan
Building Area (Square Feet)	8,197,683 /o/	New construction limited to SFIA Five-Year Capital Projects Plan /p/		10,702,137 /q/	+2,504,450	SFIA Capital Plan projects would be implemented under both Near Term Master Plan and No-Project Alternative, Variant 2. Whereas no additional construction would occur under the No-Project Alternative, Variant 2, SFIA building area (excluding parking garages and proposed Ground Transportation Center) would increase by about 31% under the Near Term Master Plan.

NOTES - TABLES 73 and 74:

/a/ No-Project Alternative, Variant 2 is based on a minimal passenger growth scenario, as recommended by the 1980 *Regional Airport Plan* (*RAP*) of the Metropolitan Transportation Commission (MTC) and the *California Aviation System Plan* (*CASP*) of the Caltrans Division of Aeronautics. These agencies recommend annual passenger levels at SFIA of 31,000,000 and 32,149,000, respectively; the MTC figure is used here.

/b/ Each "Net Change" difference or sum is rounded to reflect accuracy of the forecast figure(s) from which it was derived. Columns may not add due to rounding. Forecast annual aircraft operations totals are similarly rounded to reflect least accurate component forecasts.

/c/ From "San Francisco International Airport Comparative Traffic Report," December 1989. Note: passenger figure represents total enplaned and deplaned passengers, including transfers. 1989 "Total Terminal Passengers," which includes "through" passengers, was approximately 560,580 (about 2%) greater.

/d/ *Regional Airport Plan*, Metropolitan Transportation Commission, 1980.

/e/ From Table 7.2, *SFIA Final Draft Master Plan*, 1989.

/f/ From Tables 7.7 - 7.11, *SFIA Final Draft Master Plan*, 1989.

/g/ Aircraft operations include all takeoffs and landings. Air carrier operations, as defined by SFIA, are scheduled commercial jet operations. Commuter operations, as defined by SFIA, are "the operations of the trunk carriers' subsidiary airlines operating primarily turbo-prop aircraft." These operations are accounted for at SFIA by two carriers: United Express (affiliated with United Airlines) and American Eagle (affiliated with American Airlines). FAA defines commuter/regional carriers as those which "operate aircraft with a maximum of 60 seats, provide at least five round trips per week between two or more points, or carry mail" (FAA "Terminal Area Forecasts, FY 1989 - 2005," Appendix B). General Aviation operations at SFIA are those utilizing the Fixed Base Operator (FBO) and Chevron Corporation facilities for agricultural, industrial, recreational, air charter, air ambulance service, aerial photography, police patrol, fire control or Federal, State and local government aviation. Almost all military aircraft operations at SFIA are accounted for by U.S. Coast Guard helicopter activities.

TABLES 73 and 74 NOTES, (Continued)

/h/ 1989 air carrier operations total of 302,460 is from 1989 SFIA landing fee reports, which are based on fees paid to SFIA by runway users. SFIA landing fee report air carrier figures are about 2% lower than the FAA tower counts used in the SFIA Comparative Traffic Reports (the latter reported 309,126 air carrier operations for 1989). The SFIA landing fee report figure is cited here because it is used in SFIA Noise Abatement Program reports to the State, and because it is the basis of constrained and unconstrained fleetmix forecasts generated by Ken Eldred Engineering (KEE) for this EIR (conversation with Ken Eldred, August 1, 1990).

/i/ 1989 commuter operations total of 87,266 is from letter dated July 14, 1990 from John Costas, SFIA, and matches the 1989 SFIA landing report figure. The 1989 commuter operations total from FAA tower counts, as reported in the "San Francisco International Airport Comparative Traffic Report," December 1989, was 83,595, which is approximately 4% less than the landing fee report figure. This discrepancy may derive from miscategorization of commuter and air carrier operations; as noted above, the 1989 FAA tower report air carrier figure is greater than the landing report air carrier figure. When air carrier and commuter figures from the respective reports are added, the discrepancy between the two sources is 2,995 operations, or about 0.8% of the total (letter dated July 20, 1990 from Ken Eldred).

/j/ 1989 General Aviation total, from FAA tower counts reported in the December 1989 SFIA Comparative Traffic Report, was 32,137. To reconcile total operations by category with FAA tower counts, the 2,995 operations noted above have been added to the General Aviation category, bringing it to an estimated 35,132 operations in 1989 (as recommended in letter dated August 2, 1990 from Ken Eldred).

/k/ San Francisco International Airport Comparative Traffic Report, December 1989.

/l/ 1996 No-Project, Variant 2 forecasts of air carrier operations were derived by KEE from actual 1989 SFIA fleetmix data, FAA national fleetmix forecasts, and actual 1989 passenger and aircraft load factors. The forecast contains only the fleet changes that occur through replacement of retired aircraft (letter dated August 2, 1990 from Ken Eldred). Total combines KEE air carrier forecast and actual 1989 figures for the other categories.

/m/ 1996 and 2006 SFIA Master Plan forecasts of air carrier operations were derived by KEE from actual 1989 SFIA fleetmix data, FAA national fleetmix forecasts, and SFIA Draft Master Plan "unconstrained" passenger forecasts and aircraft load factor forecasts (letter dated July 20, 1990 from Ken Eldred).

/n/ SFIA Master Plan commuter, General Aviation and military aircraft operations forecasts from July 14, 1990 letter from John Costas, SFIA. The total is a combination of these figures and KEE air carrier operations forecast.

/o/ Existing facility area total is from EIR Project Description Table 3, based on SFIA Master Plan Table 6.3 and updated facility information from SFIA.

/p/ SFIA Capital Projects Plan, September 1989. Capital projects included in the SFIA Master Plan are listed in EIR Project Description Table 2.

/q/ 1996 and 2006 facility area totals are from EIR Project Description Tables 4 and 5, based on SFIA Master Plan Table 12.5 and updated Master Plan information from SFIA.

SOURCES: U.S. Department of Transportation, Federal Aviation Administration, April 1989; Ken Eldred Engineering, 1990; Caltrans Division of Aeronautics, 1989; SFIA Airports Commission, 1990; Environmental Science Associates, Inc., 1990.

TABLE 74: NO-PROJECT ALTERNATIVE (VARIANT 2) COMPARED TO TOTAL MASTER PLAN: TOTAL (1990-2006)/a/

	Actual 1990	No-Project Variant 2 Forecast 2006	No-Project Variant 2 Net Change 1990-2006 /b/	Total Master Plan Forecast 2006	Total Master Plan Net Change 1990-2006 /b/	Comparison of No-Project Alternative (Variant 2) With Total Master Plan
Total Annual Passengers	29,939,835 /c/	31,000,000 /d/	+1,060,000	51,330,000 /d/	+21,390,000	Annual passengers would increase by about 4% under the No-Project Alternative, Variant 2 compared to about 71% under the Total Master Plan.
Total Cargo and Mail Tonnage	558,078 /c/	558,078 /c/	0	865,404 /e/	+307,330	Cargo tonnage would increase by about 55% under the Total Master Plan. Comparative No-Project, Variant 2 figures are unavailable; this EIR assumes 0% growth in cargo tonnage.
Annual Aircraft Operations /g/						
Air Carrier	302,460 /h/	286,489 /l/	-15,960	411,560 /m/	+109,100	Air carrier operations would decline by about 5% under the No-Project Alternative, Variant 2 compared to an increase of about 36% under the Total Master Plan. Forecasts of commuter, General Aviation and military operations under this variant are unavailable; operations in these categories are assumed to remain unchanged. Total operations would decline by about 4% under the No-Project Alternative, Variant 2 compared to an increase of about 26% under the Total Master Plan.
Commuter	87,266 /i/	87,266 /i/	0	100,000 /n/	+12,700	
General Aviation	35,132 /j/	35,132 /j/	0	24,200 /n/	-10,900	
Military	2,617 /c/	2,617 /c/	0	2,700 /n/	0	
Total	427,475 /k/	411,504 /l/	-15,960	538,000 /n/	+110,000	

(Continued)

TABLE 74: NO-PROJECT ALTERNATIVE (VARIANT 2) COMPARED TO TOTAL MASTER PLAN: TOTAL (1990-2006)/a/ (Continued)

	Actual 1990	No-Project Variant 2 Forecast 2006	No-Project Variant 2 Net Change 1990-2006 /b/	Total Master Plan Forecast 2006	Total Master Plan Net Change 1990-2006 /b/	Comparison of No-Project Alternative (Variant 2) With Total Master Plan
Building Area (Square Feet)	8,197,683 /o/	New construction limited to SFIA SFIA Capital Plan Projects Plan /p/		11,068,250 /q/	+2,870,570	SFIA Capital Plan projects would be implemented under both the Total Master Plan and No-Project Alternative, Variant 2. Whereas no additional construction would occur under the No-Project Alternative, Variant 2, SFIA building area (excluding parking garages and proposed Ground Transportation Center) would increase by about 35% under the Total Master Plan.

NOTES:

See Table 73.

Energy impacts would be less than with the project or with Variant 1 of this alternative because there would be less construction, there would be less building area to heat, cool and light, and there would be fewer vehicle (including aircraft) trips than with the project or with Variant 1.

There would be fewer cultural resource impacts due to this alternative compared to the project or with Variant 1 of this alternative because there would be less excavation for construction or demolition than with the project or with Variant 1.

Employment would increase by 310 people compared to 4,600 people by 1996 and 610 compared to 9,000 people by 2006. This would create a demand for 220 housing units compared to 4,600 housing units by 1996 and 450 compared to 8,900 housing units units by 2006.

There would be fewer impacts on utilities and public services than with the project. It would not be necessary to increase the sanitary sewer plant as would be required for the project.

Some impacts, such as traffic, employment and housing demand, energy and possibly noise could shift to other Bay Area airports that would absorb some of the demand not served by SFIA under Variant 2. Traffic impacts could be as severe in Oakland and San Jose areas, as freeways in those areas (I-880, I-280 and US101) are congested during peak periods. Housing demand could also be as severe in those areas.

Reasons for Rejection

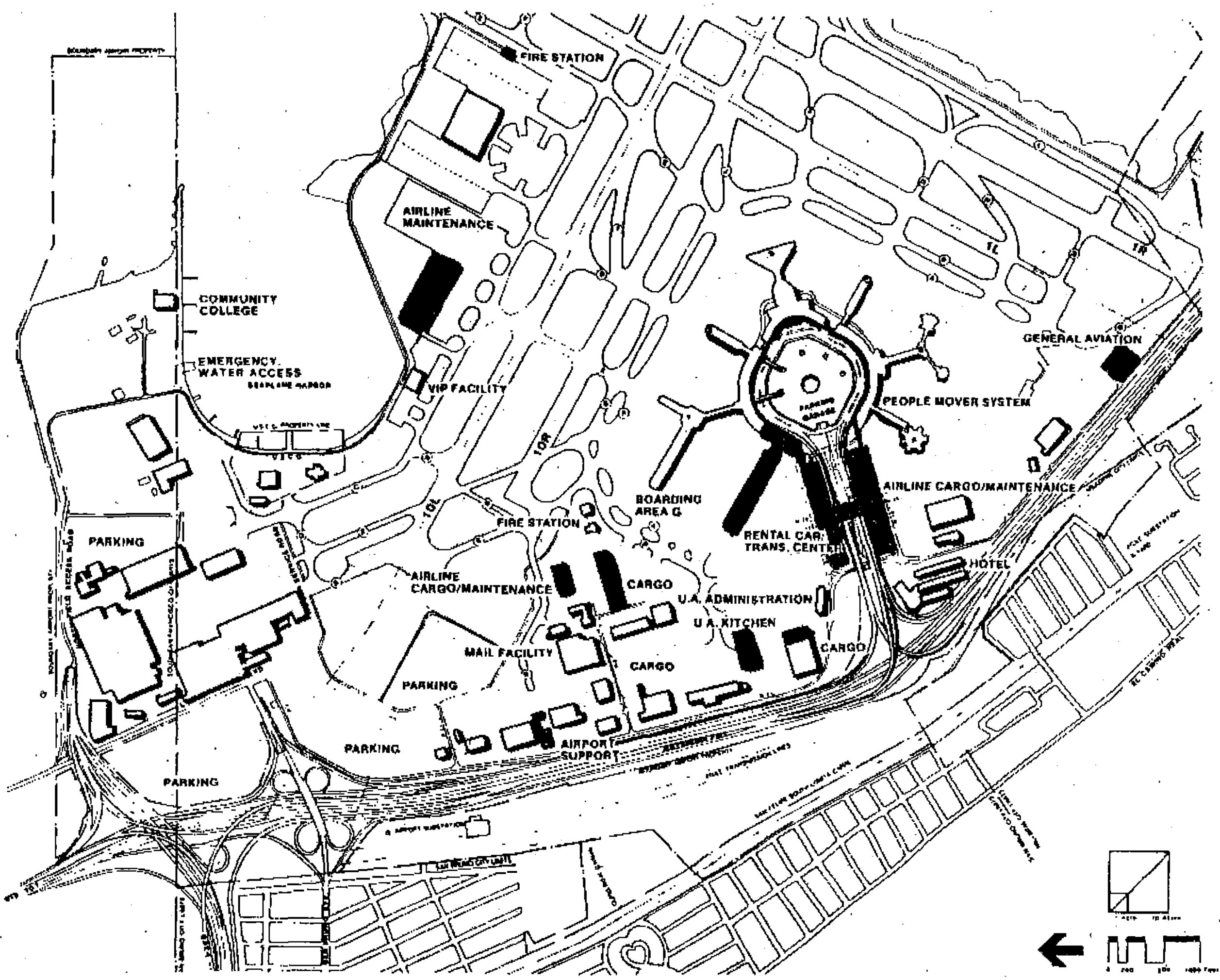
The sponsor has chosen the SFIA Master Plan for analysis as the preferred project instead of this alternative because the alternative would not accommodate the demand from forecast growth.

B. ONSITE ALTERNATIVE (reduced-intensity SFIA landside development)

Description

This Project Alternative is similar to the "Preferred Concept Plan" in SFIA Master Plan Working Paper B except that this Alternative would provide no parking west of Bayshore. This Alternative is hereinafter also referred to as the "Onsite Alternative," and is illustrated in Figures 36 and 37, pp. 464-465./7/

464 902



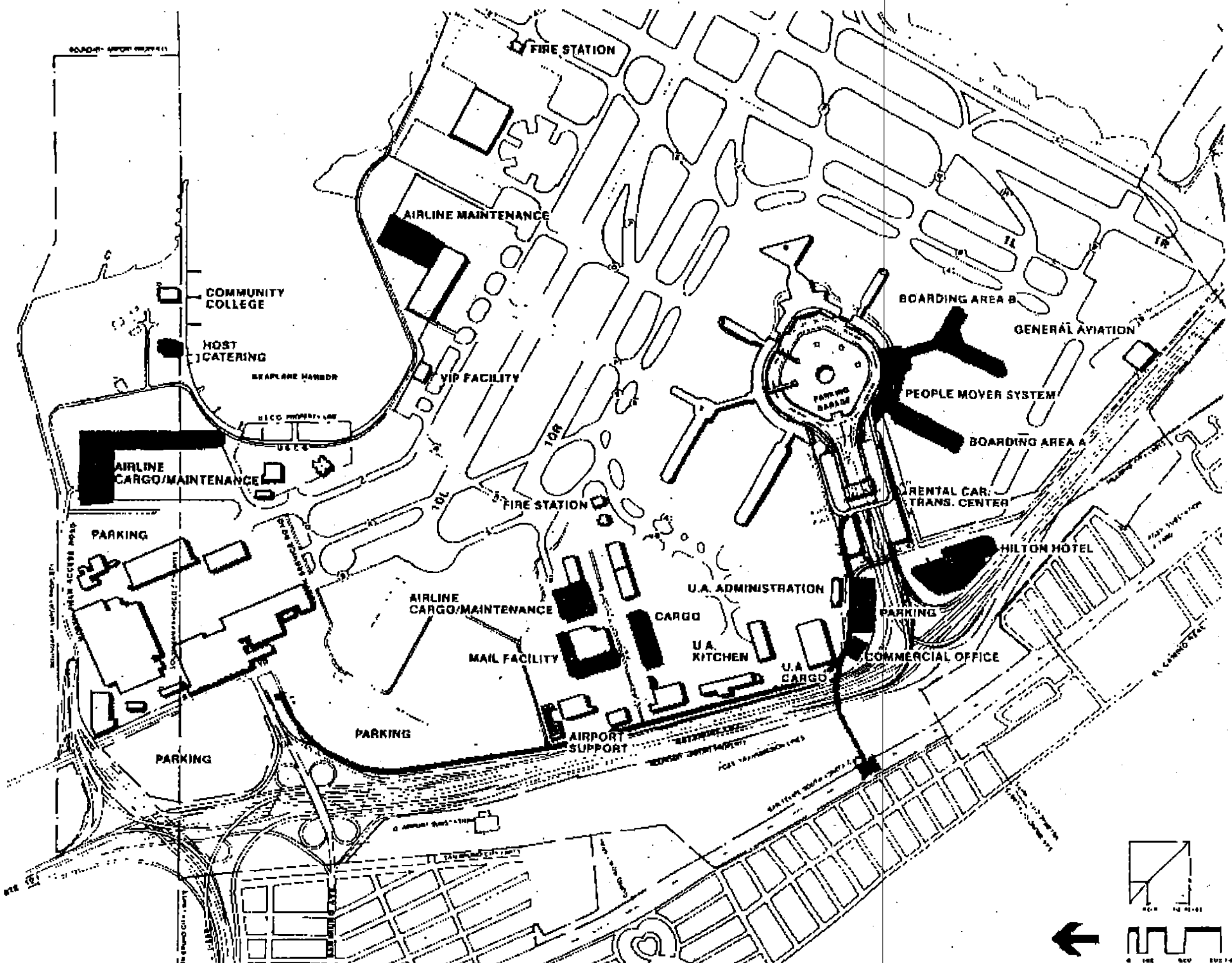
AIRFREIGHT AREA	PREFERRED CONCEPT
Total Cargo Area	1 110,643
Mail	200 000
Total Airfreight	1 310 643
AIRLINE MAINTENANCE	
General	1,227,915
MOC	2,870 950
Total Airline Maintenance	4 098,865
AVIATION & TERMINAL SUPPORT	
Catering	126 690
Airline Administration	126,068
Miscellaneous Support	
Total Aviation & Terminal Support	252,750
GENERAL AVIATION	
FBO & GA Hangar	90,000
AIRPORT SUPPORT	
Airport Administration	90,000
Maintenance Area	106 000
CFR	52 000
Airport Police	6,000
Educational	26 000
Total	280 000
TENANT PARKING	
Short-Term	9 200
Long-Term	5,880
Private	5,218
Total Public	20 298
CITY PARKING	
Total	3 910
RENTAL CAR	
Total	2 610
MISCELLANEOUS	
Vans, Bus, etc	300

■ Facilites Included in Alternative

SOURCE: San Francisco International Airport Master Plan, Working Paper B

Figure 36
Onsite Alternative
Near-Term

465903



AIRFREIGHT AREA	PREFERRED CONCEPT
Total Cargo Area	1 137 038
Mail	300 000
Total Airfreight	1 437 038
AIRLINE MAINTENANCE	
General	1 179 740
MOC	2 946 550
Total Airline Maintenance	4 126 290
AVIATION & TERMINAL SUPPORT	
Catering	95 000
Airline Administration	192 216
Miscellaneous Support	
Total Aviation & Terminal Support	287 216
GENERAL AVIATION	
FBO & GA Hangar	90 000
AIRPORT SUPPORT	
Airport Administration	100 000
Maintenance Area	142 300
CFR	52 000
Airport Police	7 000
Educational	26 200
Total	327 500
TENANT PARKING	
Short Term	10 480
Long Term	8 355
Private	5 218
Total Public	24 053
CITY PARKING	
Total	13 707
RENTAL CAR	
Total	3 000
MISCELLANEOUS	
Vans, Bus, etc.	300

■ Facilites Included in Alternative

SOURCE: San Francisco International Airport Master Plan, Working Paper B

San Francisco International Airport ■

Figure 37
Onsite Alternative
Long-Term

The *Working Paper B* Preferred Concept Plan would not include a new international terminal and, overall, would require less demolition and construction than would the project. Operationally, however, impacts of the Onsite Alternative are based on the same passenger, cargo and aircraft operations forecasts as the SFIA Master Plan (see Tables 68 and 69, pp. 441-446)./8/

The Onsite Alternative and the SFIA Master Plan are both based on SFIA consultants' projections of future demand for airport facilities as well as analysis of ways to improve current operations. According to SFIA projections, the existing International Terminal and Boarding Area "D" would not meet future demand for gates capable of servicing increased numbers of larger aircraft, nor accommodate anticipated increases in international passenger activity and associated Federal Inspection Service (FIS) space requirements./7/

In contrast to the SFIA Master Plan, which proposes to construct a new International Terminal and boarding areas, the Onsite Alternative proposed to convert a portion of the existing adjacent domestic Boarding Area "E" to international use and construct a new Boarding Area "G" to accommodate the displaced domestic passenger and gate capacities. This proposal would require a means of conveyance for passengers and baggage among the boarding areas, ticket counters and customs areas. Concerns about the feasibility and cost effectiveness of a conveyance system contributed to SFIA's rejection of the Onsite Alternative in favor of the SFIA Master Plan.

Other aspects of the Onsite Alternative, such as consolidation of freight and maintenance functions, are similar to those in the SFIA Master Plan in their objectives and magnitude. A similar set of demolition projects would occur under both the project and the Onsite Alternative. Like the SFIA Master Plan, the near-term Onsite Alternative would include construction of a Rental Car Garage / Ground Transportation Center, demolition and construction of new, larger Boarding Areas "A" and "B," and construction of East Field Cargo / Maintenance and North Field Cargo / Maintenance buildings. General aviation hangers, tie-downs and related facilities would be relocated to the southwest corner of the SFIA property./7/

A second Onsite Alternative, incorporating proposed SFIA runway expansions, is not included in this EIR. A preliminary feasibility study for the expansion of SFIA runways, completed in June 1990, includes proposed new runway locations that could conflict with existing uses and proposed SFIA Master Plan projects in the East Field area./9/ Proposals have not been developed based on the feasibility study, nor have SFIA staff proposed to revise the draft SFIA Master Plan to accommodate any of the study's runway locations. Any future proposed runway expansions would require separate environmental review under the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA), and separate approval by the FAA, the Bay Conservation and Development Commission (BCDC) and other agencies that would not be involved in review and action on the landside SFIA Master Plan.

Runway expansion proposals are not included in the SFIA Master Plan because, as stated in its Introduction, "the master plan process addresses airside development only to the extent of its impact on landside constraints and opportunities." According to SFIA, this means that the existing airfield could accommodate SFIA Master Plan-related growth and "doesn't impose a significant constraint or opportunity on the landside plan."/8/ Although runway expansions could potentially mitigate some impacts of SFIA Master Plan projects (for example, by reducing noise impacts on airport environs from SFIA flight operations, and reducing fuel consumption and aircraft emissions associated with aircraft delays), such expansions are not analyzed as Project Alternatives in this EIR. Runway expansions are, however, noted as a potential mitigation measure for SFIA Master Plan aircraft noise impacts; potential adverse impacts of such expansions are discussed briefly in that context.

Impacts

Transportation, noise, air quality, energy, cultural resources, geology, seismicity, hazardous materials and aviation safety impacts would be essentially the same as for the project. There would probably be about the same number of employees, resulting in the same housing demand as with the project. There would probably be fewer construction noise and construction-related air quality impacts than with the project because this Alternative would not include construction of a new International Terminal. Sensitive noise receptors would not be affected for as long as they would be with the project. Utilities and public service impacts would be the same as for the project.

Reasons for Rejection

The sponsor has preliminarily rejected an alternative similar to this one (except for parking provided on the west of Bayshore parcel) during the Master Planning process because it would not meet the sponsor's objective to accommodate the demand from forecast growth in an orderly manner. Without the new International Terminal, crowded conditions could result in the Customs and International Terminal areas. The resultant number of of aircraft gates would be marginal in satisfying forecast demand; and the total available terminal area would be incapable of modification to incorporate an expanded Federal Inspection Service two-stop inspection area. Also contributing to the Airports Commission's preference for the Master Plan over the Onsite Alternative are security concerns and potential patron inconvenience, since some international passengers would be required to travel between the converted international Boarding Area E and the existing international Boarding Area D for customs checks.

C. OFFSITE ALTERNATIVE

Description

Under the range of Offsite Alternatives, potential demand for aviation activity at SFIA not served under the No-Project Alternative variants would be redistributed to other airports (including to local military aviation facilities that could be converted to passenger use and to a potentially newly constructed Bay Area airport) and transportation modes (intercity rail), or would remain unserved. As illustrated in the discussion of No-Project Alternative variants as well as in the discussion of SFIA Master Plan forecasts in Chapter II. Project Description, the amount of unserved demand that could result from not implementing the SFIA Master Plan varies according to forecast assumptions.

Redistribution of aviation demand from SFIA to other airports is recommended by MTC, Caltrans Division of Aeronautics, FAA and the other Bay Area air carrier airports (Metropolitan Oakland International and San Jose International). These agencies differ from SFIA and from one another in their forecasts of future passenger, cargo and aircraft operations, estimates of available and future airport capacities, and recommended actions to best accommodate demand and increase capacities. FAA and

Caltrans assumptions and recommendations for redistribution of future aviation demand in the Bay Area are included in Appendix B. Comparative passenger and aircraft operations levels at San Francisco Bay Area air carrier airports (existing and forecast), and existing terminal and airfield capacities, are presented in Section IV.A. Land Use, Tables 25 and 26, pp. 263-264. Historical passenger share of Bay Area air carrier airports by percentage is shown in Table 75.

As would SFIA, other Bay Area airports would have specific constraints and potential environmental impacts associated with either landside or airside expansion. The offsite expansions summarized and referenced in this EIR would not be exclusively caused by redistribution of demand from SFIA. Potential environmental impacts of action plan recommendations, many of which would require FAA and BCDC approval, airline policy decisions, and/or separate environmental review under CEQA and NEPA, are associated with the regional aviation system as a whole and are therefore addressed only qualitatively in this EIR.

As noted in Section IV.A. Land Use and Plans, MTC is currently updating its Regional Airport System Plan (RASP). Although the Regional Airport System Plan is not due for completion until Spring of 1992, MTC and its consultant, TRA, have generated a preliminary range of alternatives for addressing future regional aviation requirements. MTC's Preferred Alternative, when available, will likely provide the most feasible model for an Offsite EIR Alternative to the SFIA Master Plan. This EIR summarizes the MTC "Preliminary Definition of Air Carrier Airport Alternatives" and qualitatively addresses the impacts of potential unserved demand associated with not implementing the SFIA Master Plan. MTC's preliminary definition includes five categories, from which various elements may be selected ultimately to produce the MTC RASP Preferred Alternative./10/ The five categories are No Action, Airport System Management (ASM), Air Carrier Airport Master Plans, Airport System Optimization and New Technology.

"1. <u>NO ACTION</u>

> "This alternative provides the baseline for comparison of all other alternatives. It is based on the assumption that no additional airside, landside, or ground access capacity is built at the five existing air carrier airports. It also assumes that no major operational or other system management actions are taken, either by the airports, the FAA, the airlines, or other parties.

TABLE 75: HISTORICAL PASSENGER SHARE (PERCENTAGES), BAY AREA AIR CARRIER AIRPORTS, 1960-1990

Year	San Francisco Int'l	Metro. Oakland Int'l	San Jose Int'l	Buchanan Field	Sonoma County	Total
1960	91.8%	6.6%	1.6%	0.0%	0.0%	100.0%
1965	89.0%	9.9%	1.1%	0.0%	0.0%	100.0%
1970	79.2%	11.7%	9.1%	0.0%	0.0%	100.0%
1975	78.3%	10.6%	11.1%	0.0%	0.0%	100.0%
1980	80.1%	9.1%	10.8%	0.0%	0.0%	100.0%
1985	73.8%	12.2%	14.0%	0.0%	0.0%	100.0%
1990	70.7%	12.2%	16.5%	0.3%	0.3%	100.0%

SOURCES: Metropolitan Transportation Commission (MTC) and respective airport records; Environmental Science Associates, Inc.

"Alternative 1 does assume that existing construction projects which are contained in existing approved airport master plans, and which have received environmental approvals, will be built. These include the proposed runway extension at San Jose.

"The purpose of including this alternative is to allow us to evaluate what would happen if demand continues but no additional capacity is provided.

"Elements of the NO ACTION alternative include:

A. Approved projects
B. No other new runway capacity projects
C. No other terminal capacity projects
D. No major ground access improvement
E. No major transit improvements
F. All airport activity (passenger, GA, and cargo) would be constrained by existing facility capacity (including approved projects)
G. No major changes in airport traffic shares or airline scheduling

"Implications of the NO ACTION alternative:

A. Runway/airspace congestion and delay
B. Airport ground access constraints
C. Air fares (supply vs. demand)
D Environmental impacts"/10/

"2. AIRPORT SYSTEM MANAGEMENT (ASM)

"The ASM alternative would seek to maximize the existing airport system without major new construction by using a number of system management strategies aimed at matching supply and demand and making maximum use of existing facility capacity. This alternative would depend on increased cooperation between the airports and the airlines.

"Elements of the ASM strategy include:

A. FAA capacity-increasing measures, including
    - Reduced lateral separation
    - Reduced in-trail separation
    - Airspace improvements
B. Fleet-mix changes (by airlines)
C. Schedule changes (by airlines)
D. Airport congestion pricing (by airports)
E. Some market share shifts between airports to make use of under-utilized capacity (by airlines)
F. Expanded use of Buchanan Field / Sonoma County Airports up to locally approved commercial flight limits
G. Joint use of existing military airports (e.g., Travis AFB)
H. Development of reliever General Aviation airports
I. Improved ground access

"Implications of the ASM alternative:

A. Timing of FAA capacity improvement measures
B. Airport cooperation
C. Airline cooperation
D. Air fares (supply vs. demand)
E. Transit improvements to airports (exclusive of new fixed rail)
F. Joint use agreements with military"/10/

"3. MASTER PLANS

"This alternative would consist of full airport system buildout based upon the most recent airport master plan concepts. Capacity improvements to the airside, landside, and ground transportation systems would be built consistent with these plans. One function of this alternative will be to evaluate whether the five airport master plans will efficiently accommodate regional air travel demand from a capacity and environmental perspective.

"Elements of the MASTER PLANS alternative:

A. Increased runway capacity (OAK)
B. Increased terminal capacity (OAK, SFO, SJC)
C. Increased landside facility capacity (parking, curb space, internal roadway)
D. Mass transit improvements (fixed rail connections)
E. Reduced General Aviation use of air carrier airports (OAK, SJC)
    - GA-based aircraft fleet mix
    - GA-operations fleet mix

"Implications of the MASTER PLAN alternative:

A. Timing and funding
B. Airspace/runway capacity/delay
C. Funding for mass transit improvements
D. Environmental impacts
E. Impacts on general aviation (primarily at SJC, OAK) and development of reliever airports"/10/

"4. AIRPORT SYSTEM OPTIMIZATION

"This alternative would analyze the results of the Airport Master Plan alternative, and seek to correct any deficiencies or problems through the redistribution of air travel demand. The intent would be to optimize the performance of the airport system beyond the Airport Master Plans, if possible, from a variety of perspectives:

- passenger convenience
- airspace utilization
- airport ground access capacity
- environmental impacts
- airline cost
- etc.

"Subalternatives may include analysis of additional runway capacity at an existing air carrier airport, development of a major new air carrier airport, or increased scheduling of air carrier service to satellite General Aviation airports.

"Elements of the AIRPORT SYSTEM OPTIMIZATION alternative:

A. Potential capacity increases at SJC, OAK, SFO or a combination of these
B. Development of new airports (e.g., a new North Bay Airport)
C. New airline service at other General Aviation airports (e.g., Livermore, Napa, etc.)
D. Additional ground access improvements to support system optimization
E. Airspace/procedures improvements

"Implications of the AIRPORT SYSTEM OPTIMIZATION alternative:

A. Timing of new capacity/facilities
B. Funding source/operating agency (for new airport)
C. New General Aviation airport commercial airline service
D. Environmental impacts"/10/

"5. NEW TECHNOLOGY

"This alternative would focus on new air and rail technology to provide alternatives to the major expansion of the existing airport system. The alternatives include both aviation and non-aviation technology.

"Elements of the NEW TECHNOLOGY alternative:

A. Construction of high-speed rail (for California Corridor traffic)
B. Application of Tiltrotor technology (possibly directed to military or General Aviation airports)

C. Use of high-speed commercial transport aircraft
D. Use of future large aircraft

"Implications of the NEW TECHNOLOGY alternative:

A. Potential markets(s)
B. Degree of practical application
C. Effect on airport capacity and delay
D. Timing of new technology
E. Environmental impacts
F. New airport development financing
G. New airspace procedures"/10/

Impacts

● The Offsite Alternative assumes that, without implementation of the SFIA Master Plan, a portion of the future air travel demand the project would have served (the difference between the proposed project passenger levels and those in the No-Project Alternative, Variant 1) would be distributed to the other Bay Area airports and long-distance transportation modes (intercity rail). The transportation impacts in the SFIA vicinity would be the same as those for the No-Project Alternative, Variant 1. Because the assumed "distributed" passenger demand has not been split among the other Bay Area airports and transportation modes, and because a determination of future passenger levels at those facilities is pending the outcome of the RASP Update now underway at the Metropolitan Transportation Commission, a specific identification and calculation of the impacts of the "distributed" SFIA passenger demand and the level of significance of these impacts at these other locations would be premature.

There would be greater transportation impacts around the other airports and transportation centers due to this Alternative. These would cause traffic noise and vehicle-related (including aircraft-related) air quality impacts to increase at these other locations. With this Alternative, construction noise and construction-related air quality impacts could increase around other airports and transportation centers if additional construction were to occur at these other locations.

With this Alternative, vehicle-related and construction-related air quality impacts would be spread over a larger geographic area than with the project. With the use of high-speed railways there could potentially be fewer overall vehicle-related air quality impacts than with the project. It should be noted, however, that air quality around

SFIA is currently better and is predicted to be better in the future than air quality in Oakland, San Jose or Concord. Increases in air quality emissions at these locations could potentially be more significant than increases in emissions around SFIA.

On the assumption that newer, quieter aircraft were used for increased flights at other airports, aircraft noise would probably not increase at these other locations in the long-term due to this Alternative.

Total energy used for this Alternative would be expected to be similar to energy used for the project; it would be used in different locations.

Biological impacts could be greater with this Alternative if there were rare, threatened or endangered species or habitats at the sites of the other airports or transportation centers that could be affected by increased development at these other locations under this Alternative. There would be unknown cultural resource impacts at these other locations.

Hazardous materials impacts due to this Alternative would be expected to be the same as those of the project, except that these impacts would occur in different locations.

Seismic impacts of this Alternative compared to the project would depend on the location of the redistributed trips. It could be anticipated that a more decentralized airway and rail transit system would provide potentially greater travel options in the aftermath of a major seismic event.

Increases in employment would be expected to be the same as for the project, although employment under this Alternative would be spread throughout the Bay Area. Resulting housing demand would be the same as for the project, although the locations of residents would be expected to differ from those under the project.

Impacts on utilities and public services would be similar to those of the project except that other utility companies and other jurisdictions would be affected by this Alternative, as compared to the project. Aviation safety at other airports would expect to worsen proportionally to their increase in total aircraft flights due to the Alternative.

Reasons for Rejection

The sponsor has rejected this alternative because it would not meet the sponsor's objective to accommodate at SFIA the demand from forecast growth.

NOTES - Alternatives

/1/ Eldred, Ken, Ken Eldred Engineering, letter, July 20, 1990.

/2/ U.S. Department of Transportation, Federal Aviation Administration, *Terminal Area Forecasts, FY 1989 - 2005* (FAA-APO-89-5), April 1989.

/3/ Costas, John, Assistant Administrator, Planning and Construction, San Francisco International Airport, letter, August 8, 1990. According to this letter, "...the Master Plan consultants did not analyze a constrained forecast for cargo. All available cargo space at the Airport is presently leased with requests for additional space. Any growth in cargo tonnage processed at the Airport, above current levels, will primarily be the result of increased airline operating efficiencies or new technologies. Neither of these factors can be reasonably forecasted."

/4/ Cited in Metropolitan Transportation Commission, *Regional Transportation Plan for the Nine County San Francisco Bay Area*, April 1980.

/5/ California Department of Transportation, Division of Aeronautics, *California Aviation System Plan (CASP)* (seven elements: Inventory, Forecasts, Policy Plan, System Requirements, Financial, Action Plan, Executive Summary), 1987, 1988 and 1989.

/6/ Eldred, Ken, Ken Eldred Engineering, letter, August 2, 1990.

/7/ SFIA Airports Commission, *Master Plan Working Paper B*, August 1988.

/8/ Costas, John, Assistant Administrator, Planning and Construction, San Francisco International Airport, letter, July 14, 1990.

/9/ *San Francisco Examiner*, Tuesday, July 3, 1990.

/10/ Metropolitan Transportation Commission, Regional Airport Planning Committee, Meeting Minutes, March 1, 1991.

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Honorable Mayor
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City Hall
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Honorable Mayor
City of Half Moon Bay
City Hall
501 Main Street
Half Moon Bay, CA 94019

Honorable Mayor
Town of Hillsborough
Town Hall
1600 Floribunda Avenue
Hillsborough, CA 94010

Honorable Mayor
City of Menlo Park
City Hall - Civic Center
701 Laurel Street
Menlo Park, CA 94025

* Honorable Mayor
City of Millbrae
City Hall
621 Magnolia Avenue
Millbrae, CA 94030

Honorable Mayor
City of Redwood City
City Hall
1017 Middlefield Road
Redwood City, CA 94063

Honorable Mayor
City of San Bruno
City Hall
567 El Camino Real
San Bruno, CA 94066

* Honorable Mayor
City of San Carlos
City Hall
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San Carlos, CA 94070

Honorable Mayor
City of San Mateo
City Hall
330 W. 20th Avenue
San Mateo, CA 94403

Honorable Mayor
City of So. San Francisco
City Hall
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Honorable Mayor
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* Kevin Kelly, Mayor
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John James, Mayor
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City of Millbrae
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* Albert M. Teglia, Councilman
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* Ginny Silva Jaquith, Mayor
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* Tom Huening, Supervisor
SMC Board of Supervisors
Pony #2010

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SAN FRANCISCO INTERNATIONAL AIRPORT MASTER PLAN
Final
Environmental Impact Report

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Volume II: Summary of Comments and Responses

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October 17, 1991, 1:30 p.m. or later, City Hall, Room 282, San Francisco
Draft EIR Public Comment Period: July 11, 1991 to October 21, 1991
Final EIR Certification Date: May 28, 1992

Changes from the text of the Draft EIR are indicated by solid dots (●) at the beginning of each revised section, paragraph, graphic or table. A dot next to the page number indicates that all text on the page is new or substantially revised.

SAN FRANCISCO INTERNATIONAL AIRPORT
● FINAL EIR

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A. INTRODUCTION

This document contains summaries of the public comments received on the Draft Environmental Impact Report (EIR) prepared for the proposed San Francisco International Airport (SFIA) Master Plan project, and responses to those comments. Also included are staff-initiated text changes.

All substantive comments made at the Draft EIR public hearings held in Millbrae on August 27, 1991, and before the San Francisco City Planning Commission on August 29, 1991 and on October 17, 1991, and all written comments received during the Draft EIR public review period from July 11 to October 21, 1991, are presented herein by direct quotation, edited to delete repetition and nonsubstantive material only.

Each comment presented herein is followed by the name of the commenter. Where several comments on one topic are made by the same commenter, the commenter's name is presented once, at the end of the group of comments. Where a commenter makes the same comment more than once, such as in a letter and public hearing testimony, the comment is presented once herein, followed by the dates of the letter(s) and/or hearing(s) in which the comment was made. Endorsements of the comments of a person or agency are listed in Section B of this document, List of Persons Commenting.

Comments and responses are grouped by subject matter and are arranged by topics corresponding in part to the Table of Contents in the Draft EIR. Each group of comments is followed by its set of responses; the order of the responses under each topic follows the order of the comments. As the subject matter of one topic may overlap that of other topics, the reader must occasionally refer to more than one group of comments and responses to review all information on a given subject. Where this occurs, cross references are provided.

Commenters wishing to find the locations of their comments in this document can turn to Section E, List of Topics and Commenters, p. C&R.432. The section lists the topics under which the comments are grouped, and the names of the commenters submitting comments on each topic, in the order presented in this document.

Some comments do not pertain to physical environmental issues, but responses are included to provide additional information for use by decision makers.

These comments and responses will be incorporated into the Final EIR as a new chapter. EIR text changes resulting from comments and responses will also be incorporated into the Final EIR, as indicated in the responses.

B. LIST OF PERSONS COMMENTING

Gary F. Adams, District CEQA Coordinator (for Preston W. Kelley, District Director), California Department of Transportation (written comments, September 10, 1991)

Dennis Argyres, City Manager, City of Burlingame, CA (written comments, September 9, 1991)

Peter E. Bank, President, Rutherford & Chekene (written comments, August 21, 1991)

Belmont City Council (endorsement of City/County Association of Governments of San Mateo County [C/CAG] Airport Land Use Committee [ALUC] recommendations to C/CAG, cited in Ed Everett's written comments, September 6, 1991)

Bruno Bernasconi, San Francisco, CA (public hearing comments, August 27, 1991)

Bob Berry, Berkeley, CA (written comments, August 28, 1991)

Don Bertone, San Francisco Airport Noise Committee (public hearing comments, October 17, 1991)

Bhimje, San Francisco, CA (public hearing comments, August 29, 1991)

Susan Bierman, (then) San Francisco Planning Commissioner (public hearing comments, August 29, 1991)

Gary Binger, Planning Director, Association of Bay Area Governments (written comments, September 18, 1991)

Jessie Bracker, Millbrae, CA (public hearing comments, August 27, 1991 and written comments, August 18, 1991 and August 27, 1991)

Brisbane City Council (endorsement of SamTrans, C/CAG ALUC, and C/CAG comments, cited in Honorable Steven W. Waldo's written comments, September 9, 1991)

Chris Brittle, Manager, Planning, Metropolitan Transportation Commission (written comments, September 16, 1991)

Thomas H. Brown, Manager, Facilities Planning and Design, United Airlines (written comments, October 16, 1991)

Burlingame City Council (endorsement of C/CAG ALUC and C/CAG comments, cited in Dennis Argyres' written comments, September 9, 1991)

Bob Bury, Chair, Inter-City T.S.M. Authority (written comments, September 19, 1991)

C/CAG (endorsement of SamTrans staff comments, cited in Raymond Miller's written comments, September 3, 1991)

C/CAG, ALUC (recommendations to C/CAG, incorporated into Raymond Miller's written comments, September 3, 1991)

Leslie J. Carmichael, Senior Planner, Estero Municpal Improvement District, City of Foster City, CA (written comments, September 20, 1991)

Honorable Roger Chinn, Chairman, Airport/Community Roundtable (written comments, September 6, 1991)

Patricia E. Clark, Belmont, CA (written comments, October 12, 1991)

Jerome A. Copelan, Property & Facilities Director, The Americas, Qantas (written comments, October 14, 1991)

Wendy L. Cosin, Planning and Building Director, City of Pacifica, CA (written comments, September 4, 1991)

County of San Mateo Board of Supervisors (comments attached to written comments by Paul M. Koenig, Director, Department of Environmental Management, County of San Mateo, September 6, 1991)

Carol Danville, Glen Park Association (public hearing comments, October 17, 1991)

Donald J. de la Pena, Director of Community Development, City of Menlo Park, CA (endorsement of C/CAG comments, September 11, 1991)

David Deakin, San Francisco, CA (written comments, August 29, 1991)

Honorable Jack Drago, Mayor, City of South San Francisco, CA (written comments, September 10, 1991)

Douglas Engmann, (then) San Francisco Planning Commissioner (public hearing comments, August 29, 1991 and October 17, 1991)

Ed Everett, (then) City Manager, City of Belmont (written comments, September 6, 1991)

David Few, Burlingame, CA (public hearing comments, August 27, 1991)

Honorable Janet Fogarty, Mayor, City of Millbrae, CA (public hearing comments for the Millbrae City Council, August 27, 1991, and written comments, September 6, 1991)

George D. Foscardo, Director of Planning and Building, City of San Bruno, CA (written comments, September 9, 1991 and September 10, 1991)

Carol E. Gamble, Esq., San Francisco, CA (written comments, October 18, 1991)

Richard D. Gee, Deputy General Manager, Planning and Engineering, SamTrans, and Deputy Executive Director, San Mateo County Transportation Authority (written comments, August 28, 1991, September 9, 1991, and September 20, 1991) (SamTrans staff comments endorsed by the Inter-City Transportation Systems Management [TSM] Authority, cited in Bob Bury's written comments, September 19, 1991; by the Citizens Advisory Committee of the San Mateo County Transportation Authority, cited in Richard Gee's written comments, September 9, 1991; by C/CAG, cited in Raymond Miller's written comments, September 3, 1991; by the San Mateo County Transportation Authority, cited in Richard Gee's written comments, September 20, 1991; and by the Brisbane City Council, cited in Honorable Steven W. Waldo's written comments, September 9, 1991)

Barbara Giel, Chairman, San Francisco Foreign Flag Carriers (written comments, September 10, 1991)

Sandy Hesnard, Environmental Planner, California Department of Transportation, Division of Aeronautics (written comments, September 5, 1991)

Jack Hickethier, Burlingame, CA (public hearing comments, August 27, 1991)

Curt Holzinger, San Francisco, CA (public hearing comments, August 29, 1991, and October 17, 1991, and written comments, October 18, 1991)

Stanford M. Horn, San Francisco, CA (written comments, September 3, 1991)

Honorable Fred Howard, City of Pacifica, Pacifica City Council Representative, Airport/Community Roundtable, representing the Pacifica Noise Abatement Committee (public hearing comments, August 27, 1991, and written comments, September 7, 1991)

Wayne Hu, (then) San Francisco Planning Commissioner (public hearing comments, August 29, 1991 and October 17, 1991)

Korbey G. Hunt, Properties Manager, Alaska Airlines (written comments, September 10, 1991)

Inter-City T.S.M. Authority (endorsement of SamTrans comments, cited in Bob Bury's written comments, September 19, 1991)

Diane Jones, Analyst, California State Lands Commission (written comments, August 14, 1991)

Shelley Kessler, Coordinator, SFO Airport Labor Coalition (written comments, September 11, 1991)

Carol Kocivar, President, West of Twin Peaks Central Council (written comments, September 27, 1991)

Paul M. Koenig, Director, Department of Environmental Management, County of San Mateo (written comments, September 6, 1991)

Bruce Krell, President, Forest Hill Association (written comments, October 9, 1991)

Charles J. Kroupa, San Francisco, CA (public hearing comments, August 29, 1991 and October 17, 1991, and written comments, October 17, 1991)

Joan A. Kugler, Planning Project Manager, South and West Bay Projects, Extension Planning Department, BART (written comments, September 12, 1991)

Alyn I. Lam, San Francisco, CA (written comments, August 15, 1991)

Harvey E. Levine, Hallgrimson, McNichols, McCann & Inderbitzen, for Sierra Point Associates (written comments, September 10, 1991)

James D. Lowe, Transit Planner, MUNI (written comments, August 3, 1991)

Jerome S. Lukas, San Francisco, CA (written comments, October 14, 1991)

Leonard Lundgren, Legislative Advocate, Lakeside Property Owners Association (written comments, August 27, 1991)

Steven A. McAdam, Assistant Executive Director for Governmental Affairs, San Francisco Bay Conservation and Development Commission (written comments, August 5, 1991)

Menlo Park City Council (endorsement of C/CAG comments, cited in Donald J. de la Pena's written comments, September 11, 1991)

Honorable Raymond Miller, Chairman, C/CAG (written comments, September 3, 1991) (Comments endorsed by the Menlo Park City Council, cited in Donald de La Pena's written comments, September 11, 1991; by the Brisbane City Council, cited in Honorable Steven Waldo's written comments, September 9, 1991; and by the Burlingame City Council, cited in Dennis Argyres' written comments, September 9, 1991)

James Morales, (then) San Francisco Planning Commissioner (public hearing comments, August 29, 1991)

Stan Moy, Partner, Finger & Moy Architects (written comments, October 15, 1991)

National Organization of Minority Architects (written comments, September 10, 1991)

David C. Nunenkamp, Deputy Director, Permit Assistance, State of California, Governor's Office of Planning and Research (written comments, August 29, 1991)

James J. Palma, San Jose, CA (written comments, September 30, 1991)

Debbie Pilas-Treadway, Staff Analyst, Native American Heritage Commission (written comments August 1, 1991)

Dehnert C. Queen, Founder and CEO, Small Business Development Corporation (public hearing comments, August 29, 1991, and written comments, October 17, 1991)

San Mateo County Transportation Authority (endorsement of C/CAG ALUC recommendations to C/CAG and SamTrans staff comments, cited in Richard Gee's written comments, September 20, 1991)

San Mateo County Transportation Authority, Citizens Advisory Committee (endorsement of SamTrans staff comments, cited in Richard Gee's written comments, September 9, 1991)

Edward Sewell, (then) San Francisco Planning Commissioner (public hearing comments, August 29, 1991)

Charles L. Smith, Berkeley, CA (written comments, July 1991)

Duane Spence, Airport Mitigation Coalition (written comments, September 9, 1991)

Duane Spence, Peninsula Litigation Coalition (public hearing comments, August 27, 1991)

Peter Straus, Director of Service Planning, MUNI (written comments, August 3, 1991)

Maria Gracia Tan-Banico, Associate Planner, City of Daly City, CA (written comments, August 23, 1991)

Onnolee Trapp, Transportation Director, Leagues of Women Voters of San Mateo County (public hearing comments, August 27, 1991, and written comments, August 27, 1991)

Timothy E. Treacy, Chairman, San Francisco Airport Noise Committee (written comments, October 9, 1991) (Comments also incorporated into Carol E. Gamble's written comments, October 18, 1991)

TREE, Palo Alto, CA (written comments, September 29, 1991)

Honorable Robert H. Treseler, Councilman, City of Millbrae, CA (written comments, September 6, 1991)

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Rose Urbach, San Bruno, CA (public hearing comments, August 27, 1991)

Honorable Steven W. Waldo, Mayor, City of Brisbane, CA (written comments, September 9, 1991)

Jim Wheeler, Loma Prieta Chapter Transportation Committee, Sierra Club (written comments, October 11, 1991)

Arthur Wong, City Engineer, City of South San Francisco (written comments, August 26, 1991)

Edwin Works, San Bruno, CA (public hearing comments, August 27, 1991)

PROJECT DESCRIPTION

The Notes for this section begin on p. C&R.44.

PROJECT SPONSOR OBJECTIVES AND APPROACH

Comments

". . . SFO has opted to make itself the Regional Airport for the Bay Area. SFO has done so in spite of declarations made fifteen years ago that it would limit passenger levels to an "ultimate" 31 million (FEIS Vol. I Ch. I & III [Landrum & Brown, *San Francisco International Airport, Environmental Impact Assessment Report, Airport Improvement Program,* 1975]). MTC, California's designated official Bay Area planning agency, states in the DEIR that development of SFO should 'be consistent with the Regional Plan' and then recommends that SFO adhere to passenger assignments of between 27 and 31 million passengers per year for the years 1994 through 2000 (DEIR Vol. I Ch. III Table 14). Even SFO's proposed offsite development alternative recognizes a potential 'redistribution to other airports' as feasible (DEIR Vol. I Ch. I §D). Never-the-less, SFO has blithely initiated an expansion program to increase capacity in order to accommodate 42.3 and 51.3 million passengers by 1996 and 2006, respectively. . .

"There really doesn't seem to be much innovation in this expansion plan. I sense that the primary objective of this proposed expansion is to develop large terminal buildings in order to 'harvest' rental and concession revenues for San Francisco's depleted coffers." (Alyn Lam)

"The bottom line is, evidently, for San Francisco, they are greedy for a monetary position. The more flights, the more money, the more intake it is for their treasury." (Bruno Bernasconi)

". . . I am a little . . . disappointed in [the Airports Commissioners'] approach to this, and that is: It's the traditional way. Demand is going to increase 70 percent in the future. We have to expand to deliver it. We are really not going to consider regionally how we can address it. And what is even worse, even if you're looking at it from a competitive point of view, really, it's a big business maker for San Francisco. We want to keep it. We want to keep all business here.

"It's a head-in-the-sand approach. If you look at the freeway congestion, I can't imagine anybody who is going to want to go to San Francisco International Airport in the year 2006. You're not going to be able to get there. It's going to be totally impossible. If you look at BART -- BART, out of 160,000 trips, BART is going to take care of 10,000 of them.

"From a competitive point of view, there is no analysis of, gee, in order to be able to compete and keep these passengers, we are going to have to do something different, like we have an interest, a real interest in seeing transit developed or these new off-site registrations and get people into buses to come to San Francisco International. It's, gee, you're going to have to do that because that is required mitigations. San Francisco International is going to go out of business if they keep along this particular path. There is just no creativity, no forward looking kind of activity. I am very disappointed in it. . .

". . .[I]t is essential for the airport to explain in greater detail -- and we never got the Draft Master Plan to review. We just have the EIR -- what the goals of the airport are, where they are trying to go, how they fit into regional planning, and where they want to be. What kind of airport do we want to be in the future?" (Commissioner Engmann)

"It could be economically disastrous for the SFIA to provide the proposed expansion of facilities if the problems created make it impossible to fully utilize the airport facilities. . . . To use a well-known slogan, 'Since we're neighbors, let's be friends,' and let all concerned agencies work together for a mutually satisfactory resolution of problems." (Onnolee Trapp, Leagues of Women Voters of San Mateo County)

"The only reason I can think of to expand San Francisco Airport operations is to expand the complications of operating it so that the people working there can hire more helpers and run larger departments. I realize this is not a politically correct statement, but I also think it is good for someone to come out and say it like it is.

"The politically astute people with offices to enlarge who work for the airport authority have cleverly engineered the entire setup, including charging San Mateo County a billion dollars to expand someone else's dream - BART." (Patricia Clark)

"It's like in L.A., where Burbank becomes the airport of choice." (Commissioner Sewell)

". . .[A]round the U.S. and beyond, virtually every city is working on or has recently completed major airport improvements. Could San Francisco's planners . . . see merit in allowing our job- and revenue-producing airport, alone among all the world's major terminals, to deteriorate? Our runways date to 1927 and our terminals to 1954; there shouldn't be anything sinful about bringing them up-to-date as other cities seem to have no debate about doing." (Stanford Horn)

Response

The group of comments above invites clarification of Airports Commission objectives for the SFIA Master Plan; questions the SFIA Master Plan's approach to meeting its objectives; and challenges the integrity of unstated Airports Commission objectives for the SFIA Master Plan. Responses to these issues are presented in three parts.

Clarification of SFIA Airports Commission Master Plan Objectives

CEQA does not require that an EIR evaluate the objectives of a project sponsor and in practice, such an evaluation is not generally undertaken unless it is necessary to properly scope the EIR and/or carry out the EIR's purpose. This purpose is ". . .to provide public agencies and the public in general with detailed information about the effect which a proposed project is likely to have on the environment; to list ways in which the significant effects of such a project may be minimized; and to indicate alternatives to such a project" (Section 21061). Thus, the primary concern of an EIR is not why the project sponsor seeks approval for a particular project but rather, what effects the project as defined would have on the environment, and how those effects might feasibly be reduced or avoided. The statement of project sponsor's objectives thus helps to explain, first, what "project" is evaluated in the EIR and second, how mitigations and alternatives in the EIR relate to the project.

Under CEQA, if mitigation measures or alternatives would substantially reduce or lessen any significant effects that the project would have on the environment but would prevent the basic objectives of the project from being met, those mitigation measures or alternatives might not be considered "reasonable" or appropriate for inclusion in the EIR. However, alternatives that would "impede to some degree" the attainment of project objectives, or would be more costly, can still be within a "range of reasonable alternatives" to the project (CEQA *Guidelines*, Section 15126(d)). In situations such as the SFIA Master Plan EIR, wherein the project sponsor is also the Lead Agency, the agency's particular policies and goals for the project necessarily influence which mitigations and alternatives are considered "reasonable" (these issues are discussed further below, under Alternatives, on pp. C&R.86-100 herein). Because the SFIA Master Plan objectives are broadly stated (making it difficult to determine which mitigations and alternatives would meet or only "impede to some degree" those objectives), and because of the nature of questions and concerns expressed in comments on the DEIR, additional discussion of project sponsor / Lead Agency objectives appears warranted.

As stated in the SFIA *Final Draft Master Plan* (p. 2.1), and summarized in the EIR (p. 18), the SFIA Master Plan "...provides San Francisco International Airport with a comprehensive set of plans, guidelines, policies, and conditions which will serve as a framework for decision-making and implementation of landside facilities over the next 15 years. Accordingly, the purpose of the master plan is twofold:

1. To provide a coordinated development plan that will consolidate and relocate many of the existing landside facilities in order to increase the efficiency and cost effectiveness of landside operations.

2. To respond to the projected economic growth of the Bay Area and ensure that the future development required to meet that demand at the airport is implemented in a manner compatible with the plan."

These two objectives could be more simply characterized as <u>increasing efficiency of SFIA landside facilities</u> and <u>expanding SFIA landside facilities to meet forecast increases in air travel demand</u>. The projects contained in the SFIA Master Plan are not generally identified with just one or the other of these basic objectives; most are implicitly represented as addressing both, although the terminal expansion and related projects are linked directly with travel-demand-growth forecasts.

Since World War II, policies of the federal government have strongly supported development of public-use airports and expansion of existing airports' capacities (see Attachment D of C&R Appendix A, "Summary of Federal Regulatory History"). Determining future facility requirements on the basis of forecast air travel demand is standard practice in airport master planning. According to the FAA,

"The goal of a master plan is to provide guidelines for future airport development which will satisfy aviation demand in a financially feasible manner, while at the same time resolving the aviation, environmental, and socio-economic issues existing in the community."/1/

The master planning approach undertaken by SFIA -- which included issues identification, public meetings and consultations, data collection and facility inventory, demand forecasting, determination and refinement of facility requirements, and development of budgets, plans and schedules -- was generally consistent with basic guidelines for the preparation of individual airport master plans set forth by the FAA in its Advisory Circular No. 150/5070-6A, pursuant to provisions of the 1982 Airport and Airway Improvement Act. (Note: SFIA received no financial assistance from the federal government for preparation of the SFIA Master Plan.) The relationship of individual airport master planning to regional, state and federal aviation system planning is discussed below, under Regional Planning and Coordination, General, on pp. C&R.56-60 herein.

Research and analysis regarding the status of major airport improvements nationally and internationally, and regarding levels of debate in other cities about proposed airport improvements, are beyond the legally mandated scope of the SFIA Master Plan EIR. It should be noted that airside development is not addressed in the SFIA Master Plan, except where necessary to accommodate proposed landside projects (thus, several taxiway modifications, and no runway projects, are included in the SFIA Master Plan).

Preventing deterioration of SFIA is not, as implied by a commenter, among the stated objectives of the SFIA Master Plan (quoted above, on p. C&R.11 herein). Upkeep and improvement of existing facilities, including runways, is undertaken routinely through SFIA's Five-Year Capital Projects Plans process (EIR, pp. 27 & 28 and Appendix B, Table B-4). Modernization and expansion, or bringing SFIA landside facilities "up-to-date" relative to forecast demand, is among the stated objectives of the SFIA Master Plan.

With regard to the comment that "SFO has opted to make itself the Regional Airport for the Bay Area," it may be noted that SFIA's current (1990) share of the Bay Area passenger market is approximately 71 percent (EIR, p.120); passengers from all parts of the Bay Area (as well as outside the Bay Area) use SFIA. As stated in the *Final Draft Master Plan* (pp. 2.4 and 7.2), the Airports Commission assumes that, "Because of its relationship to the central business district and its importance as an interactive gateway, SFIA will continue to be the preferred destination airport for the Bay Area." The Airports Commission further assumes that, "While Oakland may in the future increase its handling of international freight, SFIA will continue to be the airport of choice for international cargo through 2006" (SFIA *Final Draft Master Plan*, p. 2.4). Forecasts from federal, state, and regional agencies, as well as from the respective master plans, show SFIA maintaining from about 58 percent to 71 percent of the region's passenger market through 2005./2/ (Comparative regional aviation forecasts are discussed further below, under Regional Forecasts and Capacities, on pp. C&R.66-73 herein.)

Thus, applying a "majority of total annual passengers" criterion, SFIA could be described as "the Regional Airport for the Bay Area" at present and for the foreseeable future. However, it should be noted that four other Bay Area airports currently provide air carrier service and are considered regional airports. Moreover, as shown in EIR Table 75 (p. 470), SFIA's market share, which was nearly 92 percent in 1960, has been decreasing steadily. According to a preliminary draft consultant report presented to the MTC Regional Airport Planning Committee (RAPC),

"Although SFO is planning for significant growth in passenger traffic (much of it international), combining the individual airport master plan forecasts reveals a future shift in passenger market share away from SFO [SFIA] and toward OAK [Metropolitan Oakland International Airport] and SJC [San Jose International Airport]. Under the unconstrained forecast for 2010, SFO's regional market share would fall from its 1990 level of 71% to 61%. Under the constrained forecast, SFO's share of the region's total passengers would decrease to 56% by the year 2010."/2/

Thus, while SFIA is planning for substantial growth over the next 15 years, the other Bay Area Airports are planning for much higher <u>rates</u> of growth, starting from much lower base levels. The 1990 FAA Terminal Area Forecast, one of a number of alternative future air carrier forecasts, extrapolated to 2010 by the MTC RAPC, yielded the following 1990-2010 passenger growth for the five Bay Area Air Carrier Airports: SFIA -- 48 percent; Metropolitan Oakland International Airport (MOIA) -- 92 percent; San Jose International Airport (SJIA) -- 138 percent; Concord (Buchanan Field) -- 408 percent; and Sonoma County -- 32 percent./2/

The international air passenger market is a key component of SFIA Master Plan expansion objectives. As noted in EIR Table 1, p. 24, SFIA forecasts a 96 percent increase in international passengers between 1990 and 2006, compared to a 68 percent increase in domestic passengers over the same period. The physical SFIA Master Plan centers on a new international terminal and additional aircraft gates, although international passengers represented fewer than 12 percent of SFIA's total passengers in 1990. (According to MTC

RAPC "high" forecasts, total annual international passengers for the Bay Area would increase between 1990 and 2010 by about 136 percent, from 3,765,473 to 8,877,264. SFIA's share would decrease from about 97.6 percent of the Bay Area total in 1990 to about 94.5 percent in 2010.)/2/ Even with the forecast increase in international air traffic, international passengers would represent only approximately 14 percent of total SFIA passengers in 2006.

As correctly stated by one commenter, the Metropolitan Transportation Commission (MTC) is the nine-county Bay Area regional transportation planning agency. However, MTC at present does not have authority to fully implement every regional aviation plan and policy (see further discussion below, under Regional Airport System Plan (RASP) Update, on pp. C&R.60-66 herein)./3/ Regarding the commenter's reference to SFIA expansion plans that exceed MTC's previously recommended limits, the EIR notes on pp. 118, 119 and 258 that the 1980 MTC-adopted *Regional Airport Plan* (RAP) contained recommended passenger shares for the respective Bay Area airports and recommended a limit of 31 million annual passengers (MAP) for SFIA as a matter of policy. MTC's allocations were based on regional forecasts that have been surpassed by actual passenger traffic; MTC has since revised its forecasts and recommended allocations (most recently in 1986 and 1987)./4/ As noted in the EIR (page 258), MTC is currently updating the entire RAP, which is now being called the Regional Airport System Plan (RASP). It is acknowledged that the SFIA Master Plan would be inconsistent with both MTC's 1980-recommended policy limit and with MTC's subsequently revised regional market share recommendations. (The 1986/87 MTC forecasts and passenger traffic assignments, and the issue of SFIA Master Plan consistency with the MTC RAP, are discussed further below, under Regional Airport System Plan (RASP) Update, pp. C&R.60-66 herein.)

According to SFIA Administration staff, the 1976 Final Environmental Impact Statement (FEIS) referenced by the commenter is not known to have stated that SFIA would limit annual passengers to a certain number. The forecasts used in that document indicated SFIA's reaching 31 million annual passengers by 1990, and this forecast has been realized./5/ The forecasts in the 1976 FEIS may be assumed to reflect the Airports Commission's analysis of conditions and data then available; the Commission's expectations have since shifted in response to changing conditions and data availability.

Several commenters express concern that increased traffic or other problems resulting from SFIA Master Plan implementation would prevent the full utilization of expanded SFIA facilities. In effect, one commenter contends, SFIA would not compete effectively for the forecast passenger demand that the SFIA Master Plan is intended to serve, because the SFIA Master Plan does not creatively address ground-access constraints. Another commenter suggests that underutilization of expanded airport facilities could be economically disastrous [for adjacent communities].

Although the EIR transportation analysis found that cumulative impacts on levels of service (LOS) at selected intersections and freeway ramps would result from implementation of the SFIA Master Plan (EIR, pp. 4-5 & pp. 295-319), the analysis did not conclude that resultant freeway congestion in 2006 would make it "impossible" to get to SFIA, as one commenter suggests./6/ The EIR does not draw conclusions regarding the effects of congestion on SFIA's ability to meet demand, and did not identify traffic impacts severe enough to cause SFIA to "go out of business"; it includes a range of transit mitigation measures (SFIA Master Plan traffic impacts, and the degree to which they could be mitigated by BART, off-airport terminals and other transit mitigation measures, are discussed below under Traffic Mitigation, pp. C&R.158-165 herein). However, as suggested by the commenters, it is reasonable to assume that lack of capacity (or "bottlenecks") in any of a number of locations or functional areas could constrain future SFIA passenger volumes, cargo activities, or other operations. Computer models have been developed to help study relationships between ground access to airports and travellers' airport choice; one of these, called ACCESS, was developed for MTC for evaluation of airport system plan alternatives as well as rail transit extension planning. Based on MTC's *1990 Air Passenger Survey* data, ACCESS is being used in the MTC RASP Update process (ACCESS was previously based on 1985 data)./3/ The basic premise of the commenters' argument, that quality of ground access strongly affects an airport's competitive position in a multi-airport region, is supported by preliminary results of the ACCESS model runs for the MTC RAPC Update (this is discussed further below, under Alternatives, pp. C&R.90-93 herein, and under Transportation, pp. C&R.135-136 herein).

This phenomenon could be represented by the SFIA Master Plan's "constrained" forecast, under which passenger demand:

". . . may be impacted in the future by . . . increasing impact of capacity constraints, particularly during IFR [instrument flight rule] conditions, consolidation of the airline industry, and certain improvements that may occur at competing Bay Area airports which would result in greater convenience and capacity at those airports . . . . The constrained forecast describes the possible effect on future passenger levels if additional and restructured existing [SFIA] airport facilities are not available to satisfy demand (SFIA *Final Draft Master Plan*, p. 7.3).

(Note that the "constraints" reflected in this scenario are mostly related to the airfield and airport facilities. However, the lack of ground access capacity could produce a similar result).

Potential impacts of the SFIA Master Plan's "constrained" future scenario are analyzed in the EIR as Variant 1 of the No-Project Alternative (pp. 439-456), and discussed further below, under Alternatives, pp. C&R.86-93 herein.

If the commenters' concerns (that SFIA Master Plan expansion-related ground-access problems could severely constrain utilization of SFIA) were to be realized, it would in effect mean that SFIA would have "overbuilt." Impacts of SFIA Master Plan overbuilding or underutilization, whether due to constrained access, inflated forecasts, or other factors, would likely be of concern under CEQA only if overall regional or cumulative impacts would worsen, or adverse environmental impacts would merely be shifted to other locations, as a result.

The EIR provides an approximation of "worst case" SFIA Master Plan operational impacts by assuming full utilization of expanded airport facilities. (It is an "approximation" because it is based on numerous professional judgments, estimates and forecasts, including SFIA Master Plan forecasts of passenger, cargo, and/or aircraft operation levels. As discussed below under Activity Patterns and Forecasts, on pp. C&R.30-38 herein, such forecasts necessarily contain margins of error and uncertainty; actual future activity levels at SFIA could easily be lower than forecast for the SFIA Master Plan.) Therefore, relative to SFIA Master Plan impact levels identified in the EIR, underutilization of airport facilities would be expected to reduce the overall severity of both direct operational impacts (e.g., traffic, noise, air quality, employment) and indirect operational impacts (e.g., housing demand and related services). Construction impacts would not be reduced. It would be difficult to demonstrate causal relationships between an underutilized or over-expanded SFIA, and environmental impacts at locations outside the SFIA vicinity (for example, worsened traffic congestion in other parts of the Bay Area). Thus, while it might not be prudent to effectively "overbuild" SFIA, that outcome would not likely result in identifiable environmental effects more severe than those estimated in the EIR for the project.

With regard to one commenter's concern that underutilization of expanded SFIA facilities could be economically disastrous [for adjacent communities], it should be noted that CEQA does not require analysis of economic or social issues unless those issues are related to or caused by physical changes to the environment (CEQA *Guidelines*, Section 15131). It may also be noted, however, that if the proposed SFIA Master Plan improvements are financed with revenue bonds, payment of the bonds would be backed by Airport revenues, with the airlines covering debt payment costs not recovered from other Airport users (for further information on airport economics, see discussion below under Project Costs on pp. C&R.26-28 herein and in C&R Appendix A, Attachment D, Background to Airport Operations).

Integrity of Unstated Airports Commission Objectives for the SFIA Master Plan

Several commenters expressed concern that the primary objectives of the SFIA Master Plan are actually to expand Airport departments, to generate money for the Airport from landing fees, or to generate money for the City of San Francisco from rental and concession revenues. According to SFIA Administration staff, the San Francisco Charter establishes the San Francisco Airports Commission as a financially self-supporting enterprise fund department of the City and County of San Francisco. The Airport Airline Lease and Use Agreements, effective July 1, 1981, require the Airport to retain all revenues on the Airport with two exceptions (49 U.S.C. App. Section 2210 (a) (12)). First, the Airport reimburses the City for direct services provided by City departments to the Airport. Second, the Airport pays the City a portion of its yearly concession revenues in accordance with an established formula related to the indirect services provided to the concessionaires that operate at the Airport.

As one commenter points out, implementation of the SFIA Master Plan would generate employment and likely lead to expansion of some Airport departments. However, these are not among the stated or evident objectives of the SFIA Master Plan and, according to CEQA, would more appropriately be considered effects of the project. Department expansion is not subject to environmental review under CEQA, since it would not itself result in physical effects on the environment or adverse effects on people. Employment effects are subject to review under CEQA requirements; SFIA Master Plan employment effects are evaluated in the EIR (pp. 394-399) and discussed further below, under Employment and Housing, on p. C&R.351-368 herein. The relationship between SFIA and financing of BART is discussed below, under Transportation Mitigation, on p. C&R.156 herein.

Regarding the comment that the San Francisco City Planning Commissioners "never got the Draft Master Plan to review," as noted herein under Public Participation in the Master Planning Process on pp. C&R.19-20, copies of the Draft SFIA Master Plan Working Papers and Response to Comments documents were available to the public during the SFIA Master Plan development process. Copies of the SFIA Final Draft Master Plan and Working Papers were made available to the Department of City Planning and the Mayor's Office, and are available for review in the San Francisco Department of City Planning files at 450 McAllister Street. The comment that "all concerned agencies should work together for a satisfactory resolution of problems" is further addressed below, under Regional Planning and Coordination, pp. C&R.56-85 herein and EIR Process, pp. C&R.393-413 herein.

PUBLIC PARTICIPATION IN MASTER PLANNING PROCESS

Comments

". . .[A]t each stage of this process, the concerns of San Francisco residents have been raised over a four-year period, at public hearings and meetings, both orally and in writing. (The last public hearing on the [SFIA] Master Plan working papers, in August, 1989, was attended by approximately one hundred neighborhood representatives, representatives of organizations such as the Sierra Club and San Francisco Tomorrow, and individual residents.) At each stage, we have been assured by SFIA administration and staff (and from time to time also by the Airports Commission) that our concerns would be addressed at the NEXT stage. Sadly, we've been through the entire Master Plan working document process and we're at the last stages of the DEIR process now, and our concerns still have not been dealt with." (Carol Gamble)

". . . For four years, representatives of the neighborhoods in San Francisco have come before various bodies, have appeared in various hearings throughout the city asking to be represented in a meaningful way, asking to have our concerns addressed in a meaningful way, in both the

Master Plan documents and in the Draft EIR. At each hearing, at each meeting, we have been assured that we will be given that kind of consideration.

"After four years, we are still asking that our concerns be addressed in a meaningful way in these documents. It is distressing. It is troubling. It is difficult to respond to questions from the members of our association, about the motivation of the airport indicated in this manner.

"It is difficult to understand that an agency can be operating in good faith and still require the residents of the city to come back time and again to make the same requests.

"I hope that this commission will take these matters seriously, will defer any further action, and will direct the staff to do that which it was obligated to do many years ago." (Carol Danville, Glen Park Association)

"I have another question that may not be related specifically to the EIR, but given that there is an Airport Noise Committee appointed by the Board of Supervisors... testimony was that they have spent a great deal of time discussing the issues and attended the Airports Commission hearings... There may be a response from the airport, maybe if their concerns were addressed in their plan for the airport, not just in this Master Plan, but in the use of the airport and the development of the airport... I don't understand when there is a formal committee established that somehow they are not able to get their input directly into the airport, and that they have to use our body, our commission, to get a response. And maybe the response was made. I am not saying there was not a response at all. From what we are hearing today, there appears to be a problem." (Commissioner Hu)

Response

The SFIA Master Plan development process, beginning in 1986, included publication of three Working Papers for review and comment by interested parties and the general public. The Airports Commission held several public meetings (a list of those meetings is available in the San Francisco Department of City Planning EIR file at 450 McAllister Street) and subsequently published "Response to Comment" documents for each of the three Working Papers. The EIR process incorporated public participation opportunities as required by CEQA, including publication of a Notice of EIR Preparation (July 9, 1990); circulation of the Draft EIR (published July 11, 1991); an extended public comment period (July 11, 1991 through October 21, 1991); three public hearings during the public review period; and publication of this Comments and Responses document. Thus, as the commenters indicate, numerous opportunities have been available for public participation in the SFIA Master Planning and associated EIR process (the latter is discussed further below, under EIR Process, pp. C&R.393-413 herein). The main point of the commenters, however, is that this participation has not, in their view, yielded meaningful results (their concerns "still have not been dealt with").

The SFIA Master Plan process reflects the larger, complex set of forces affecting the Airport generally. SFIA must comply with various government regulations protecting the public health, safety and welfare (such as noise regulations, building codes, etc.), and must meet the statutory requirements of CEQA for environmental review of projects, such as the SFIA Master Plan, that could result in significant adverse environmental effects. SFIA is not legally required to resolve all public concerns in the manner requested or desired by the public. Thus, in pursuing the Airports Commission's twofold objectives, quoted previously on p. C&R.11 herein,

> ". . . the Master Plan attempts to balance the competing requirements of airport tenants, passengers, surrounding communities, and the general public. The plan continues to address the concerns of those in the airport environs and attempt to balance their needs with the public demand for utilization of this facility [SFIA]. Invariably, conflicting needs and requirements will result that will require resolutions. The Master Plan and EIR process has been designed to facilitate resolution of these conflicts" (SFIA *Final Draft Master Plan,* p. 2.1).

PROJECT CHARACTERISTICS

Facilities and Site Plan

Comments

". . .The other thing is, if you look at LAX, how big a final product will this be relative to the size of LAX today? I'd be very curious, just so we get some order of magnitude." (Commissioner Sewell)

"Planning Concepts: Can anything at all be salvaged from this Master Plan? Why does SFO, particularly with apron areas 'cleared' on either side of its entry roads, insist on enclosing its 'horseshoe-shaped' terminals? Why not open them up into a gigantic 'U' in order to reduce traffic concentration and improve air quality? Why do the rental cars have to be located in the proposed terminal area along the entry roads when clientele are already being 'bussed' out of the existing terminal area? Why not move the TWA freight facility into the proposed West Field Cargo Area and locate the rental cars along the south access road?

"Why is a large administration building needed at all in this age of computers and sophisticated communication links? All administrative support staff should be located outside the terminal area. Why can't a separate truck access route be provided for the West Field Cargo Area as it is for the North Field Area? Lastly, why can't the full potential of the existing terminal buildings be developed by renovating the existing mezzanine level into ticketing areas with bridge connections from the existing garage?" (Alyn Lam)

"Maintenance Operations Center ('MOC'). It cannot be assumed that there will be no modernization, renovation or expansion of the only 'major' maintenance facility at SFIA (Summary, pg. 9). United has more than twenty years remaining on its land lease for MOC facilities and will undoubtedly be required to accommodate, over time, its growth as a company and changes in its aircraft fleet. United has requested that the City add approximately eight (8) acres to its current 128 acre MOC site to support a limited expansion of this facility. Current estimates are that approximately 175,000 square feet of hangar space will be added in the near term. . .

"Airport Support Area Facilities. We believe it is important that the extent of United facilities being demolished to accommodate Master Plan development be correctly identified (II.C. Table 8, pg. 54). This should have a significant influence on a reviewer's perception of the 'net gain' in support facility construction actually being proposed by the Master Plan. United facilities being demolished which are not on Table 8 include:

- A four aircraft bay hangar
- A two aircraft bay hangar
- A stores/warehouse building
- A training/administration building
- An aircraft sanitary waste disposal building
- A flight kitchen
- Thirty aircraft parking hardstands
- Employee parking facilities -- 5,000 spaces

"Most of these displaced facilities must be relocated to other locations on SFIA, and sized to accommodate United's activity and employment levels of the future.

". . .[T]he list of new development (IV, B., pg. 276) should be revised as follows:

- The 226,440 square foot East Field Cargo/Maintenance Facility should be sized at 262,000 square feet and identified as an Aircraft Maintenance Hangar consistent with the Master Plan.

- United's flight kitchen should be sized at 120,000 square feet in lieu of 46,200 square feet.

- United plans to construct a new cargo facility of 231,000 square feet in the West Field Area.

- United plans to construct a new stores/ground equipment maintenance building of 80,000 square feet in the West Field Area.

- The 100,670 square foot Pan Am Maintenance Hangar should be removed from the listing.

"Terminal Area. As is the case with the MOC, the North Terminal building will require modernization, renovation and expansion over the twenty years remaining on United's lease for this facility. As noted in the Master Plan, this expansion does not create additional aircraft gates, but provides for enhanced passenger and baggage handling capabilities. The data in II.C. (pg. 26) of the DEIR should reflect approximately 500,000 square feet of new North Terminal construction, and the remodeling of approximately 300,000 square feet of the existing North Terminal complex in the near term.

"NOTE: The listings, areas, square footages and other data in II.C., Section 1.0, Figures 4, 5 and 6, Tables 4, 5, 6 and 7 (pp. 41-50) should reflect the information outlined in 1., 2., and 3. above with respect to new construction, demolished structures, and remodeled spaces.

"Automated People Mover System. The statement in the DEIR regarding routing of the APM system (II.C., Sec. 9, Pg. 55) is not consistent with what is shown in the Master Plan. United, and we can speak here for all the airlines serving SFIA, believes the concept described in the Master Plan is the more viable solution." (Thomas Brown, United Airlines)

Response

The Los Angeles Department of Airports is expecting to award a contract for the Master Plan of Los Angeles International Airport (LAX) in November 1992./7/ The future growth of LAX is currently being guided by an April 11, 1991 document prepared by the City of Los Angeles, Department of Airports - Facilities Planning Bureau entitled, "Proposed Plan for LAX Development To The Year 2000". The proposed Master Plan includes a new

International Terminal, Ground Transportation Center, airport-wide people mover system, modified access roadways, and new cargo building, much as does SFIA's Master Plan. The preliminary estimate in current dollars is $1.5 billion./8/ Following (Table C&R.1) are the existing and forecast service levels and facilities at LAX compared to the SFIA Master Plan.

TABLE C&R.1: COMPARISON OF ACTIVITY AT LOS ANGELES INTERNATIONAL AIRPORT AND SFIA

	LAX		SFO
	Existing 1990	Master Plan 2000	Master Plan 2006
Total Aircraft Operations (thousands)	623.8	N/A	538.5
Total Passengers (millions)	45.8	65.2	51.3
Domestic	36.0	47.6	44.1
International	9.8	17.6	7.2
Aircraft Gates	120	149	103
Domestic	102	122	77
International	18	27	26
Passenger Terminals (million sq. ft.)	3.74	5.74	4.10
Domestic	2.10	2.60	2.10
International	1.64	3.14	2.00
Cargo (acres)	234	316	120
Public Parking spaces (thousands)	26	34	21

SOURCE: "Proposed Plan For LAX Development To The Year 2000", April 11, 1991; SFIA Draft Master Plan, November 1990; SFO and LAX Airport Staff.

As noted above, under Public Participation in Master Planning Process, pp. C&R.18-20 herein, the development of the SFIA Master Plan, including the physical layout of project components, provided opportunity for public participation. The "Preferred Plan" reflects the input from that process, as well as the Airport's efforts to reconcile numerous identified facility requirements with site constraints, including limited available land for facility expansion and/or reconfiguration. Suggested options to reconfigure buildings differently should be addressed to the Airports Commission, as the options would no likely change the overall environmental impacts of expansion proposed under the SFIA Master Plan.

The Master Plan presented a conceptual alignment for the APM system within the terminal complex (terminal roof or backside of terminal). The EIR identifies a more definitive and feasible alignment based on further studies by Airport staff (circumference of terminal roadway). Any concerns the airlines may have about the alignment of the APM system should be addressed to the Airports Commission and staff./9/

Also, Sections I and II of the EIR describe the projects contemplated in the SFIA Draft Master Plan. The proposed expansion of United Airlines Maintenance Operations Center and the North Terminal are not included in the SFIA Master Plan. Section II, Table 8, p. 54 of the EIR lists miscellaneous demolition. Primary demolition projects are identified in Figures 5 and 7. These projects are aggregated and accounted for under functional areas in Tables 4 through 7. This includes United's demolished facilities as shown in the SFIA Master Plan and listed above in the United Airlines comments. The text, figures, and tables (pp. 39-51) of the EIR identify the SFIA Master Plan's replacement facilities, collectively for all airlines, by identifying development projects under each functional area. Consequently, exclusive facility replacement for any one airline may not be identified. However, the SFIA Master Plan replacement for United's flight kitchen and expansion of cargo facilities are as requested by United in letters dated October 28, 1988 and August 18, 1989 commenting on the SFIA Master Plan./9/

The projects listed in Section IV, p. 276 of the EIR are a specified list for analyzing project traffic impacts in 1996. The list is not all-inclusive and the areas indicated do not necessarily represent gross new development but rather "The net increase in existing development and the new development that would generate traffic". That is, the numbers shown on p. 276 of the EIR are in most cases the incremental addition, not the total space proposed for the function in the future. The EIR need not address impacts from already-existing facilities.

The EIR analyzes the physical environmental impact of the approved SFIA Draft Master Plan. Any comments or concerns United may have about the appropriateness of the SFIA Master Plan should be expressed to the Airports Commission and staff.

Phasing

Comments

"Master Plan: SFO proposes to 'shotgun' in 56 major projects between now and 1996 with only 11 to follow in the succeeding ten years (DEIR Vol. II CH. XI Table B.1). The obvious flaw in this so called schedule is that there is no phasing or sequencing of projects in order to test logic and feasibility. . ." (Alyn Lam)

". . . [I]f you did this plan to accommodate demand to the year 2006, when realistically would there be a phase-in for that starting? I think most people had hoped that after the phase completed in '88, that that might have held us for a while. I think I would be very curious to know, is the plan that -- something like this is done in the year 2006. Is that it for the next five years, ten years or what? And if it's only something that would be good for another five years, to what extent is this the right level for a 15-year period?" (Commissioner Sewell)

Response

According to SFIA Administration staff, the SFIA Master Plan program is designed to satisfy the air passenger demand and corresponding facility requirements for the airport over the next 15 years until 2006 (Chapters 7 and 8); these facility requirements were translated into a physical development plan (Chapters 9 and 10). The Master Plan contemplates the construction of terminals, cargo buildings, airline maintenance buildings, ground-transportation facilities, access roadways, light rail system and miscellaneous airport support facilities. The SFIA Master Plan (Chapter 10, pp.. 10.34, 10.35, fig. 10.3) describes the development schedule and phasing for the Master Plan program, based upon the anticipated need for these facilities (Chapter 10, fig. 10.23). The program is expected to start after certification of the Environmental Impact Report by the City of San Francisco Planning Commission and program approval by the San Francisco Airports Commission. The current program start date is estimated to be Summer, 1992.

PROJECT COSTS

Comments

"First of all, there is no information in here about costs, either in direct costs in terms of construction or transportation or in mitigation measures required under the law of CEQA and everybody else." (Dehnert Queen)

"Certainly this is going to be very expensive. I thought the person who asked for the costs has a good point and we should have something in here about that." (Commissioner Bierman)

"This is a public project. And I believe the public is entitled to know what the costs are and how they are to be met. I think the EIR ought to evaluate the proposed capital budget for this project. If I remember, San Francisco city government operates -- I believe the Mayor and Board of Supervisors have to approve the budget for this expansion. I think they would be most interested in how feasible this project is." (Charles Kroupa)

"The San Francisco Mayor and the Board of Supervisors rule annually on the airport's capital budget. While the airport probably will garner the necessary money for this project from federal subventions, assessments on airlines, and from revenue bonds, the faltering worldwide economy, decreasing passenger revenues, and rampant airline bankruptcies, coupled with the Master Plan's optimistic forecast, nonetheless, raise the issue of who might get stuck with bailing out this project. And, obviously, the City and County of San Francisco would step in to rescue the airport from imminent default on its revenue bonds by pledging San Francisco's own general obligation bonding and taxing capacity to the jeopardy of other projects and programs benefitting San Franciscans directly. Because this expansion is so huge and because it is a public project, San Franciscans and their elected representatives are entitled to a comprehensive financing plan. None has been presented." (Charles Kroupa, letter of 10/17/91 and public hearing of 10/17/91)

Response

SFIA Master Plan program costs are identified in the EIR (p. 76) and the SFIA Master Plan (pp. 11.1, 11.2). The SFIA Master Plan lists the budgetary development cost for each project in the Master Plan program. The total program cost in 1989 dollars (design, construction, and administration) is $1.68 billion. The current estimated total program cost, escalated to the time of construction, is approximately $2.2 billion. The issue of the cost of the mitigation measures identified in the EIR is addressed on p. C&R.386 herein.

CEQA does not require evaluation of project costs. As noted in the CEQA *Guidelines* (Section 15124), the project description "should not supply extensive detail beyond that needed for evaluation and review of the environmental impact" (emphasis added). Economic issues are not to be treated as environmental effects (*Guidelines*, Section 15131).

The San Francisco Airports Commission is a financially self-supporting enterprise fund department of the City and County of San Francisco. The Airport/Airline Lease And Use Agreements, effective July 1, 1981, require the Commission to use Airport revenue bonds to pay for the SFIA Master Plan construction projects. No General Fund money from San Francisco would be pledged or would be available to fund the program. In the unlikely event of a default on Airport bonds, the City would have no obligation whatsoever to the Airport's revenue bond holders./10/

In conjunction with the Airport's planned refunding of a previously issued bond, an independent contractor has determined that the Airport would not have difficulty making debt service payments on the anticipated SFIA Master Plan bonds./11/ The debt service for Master Plan projects would be covered by revenues received from Airport tenants. Under the terms of the Airport's Lease & Use Agreements with fifteen major airlines, the Airport is allowed to charge landing fees and terminal rental rates sufficient to insure that total annual revenue equals total annual expenses. These agreements extend to 2010. The carriers that have signed these Agreements account for more than 80 percent of the Airport's passenger traffic. On the basis of the independent contractor's projections, Airport staff expect that landing fees will increase to $2.15 (1992 dollars) per 1,000 pounds landing weight. This fee level is significantly below the rates charged at most major foreign international airports and compares favorably to an existing fee of $3.15 at LaGuardia and $2.20 at JFK./12/ The independent contractor's analysis also shows that although the SFIA Master Plan program would increase airline fees, these fees would still represent only approximately three percent of the airlines' fare revenue from the San Francisco market. By comparison, the airlines currently spend 48 percent of fare revenue on labor, 17 percent on fuel, three percent on advertising and five percent on food.

SFIA is required under the Airport/Airline lease agreement to charge landing fee rates to ensure that total revenues equal total expenses. SFIA does not contribute to the City of San Francisco General Fund above and beyond reimbursements./13/

ACTIVITY PATTERNS AND FORECASTS

Passenger Origins and Preferences

Comments

"In my mind, what is the most important information, and Commissioner Engmann also touched on it, is who uses the airport. But I would go one step beyond that. It's not only who, but why they use the airport. Is it because only certain services are provided? Is it because of convenience of access? Is it because of marketing by the airlines? Why do the individuals use the airport? Where do they live?

"It seems to me that any accurate analysis of the impacts would do some type of survey of the customer usage of the airport so that we would have a base of information from which to make some determinations as to how to mitigate impacts caused by that high level of usage that is projected over the next several years." (Commissioner Morales)

"The population of San Francisco has been shrinking for 30 years or more. However, the population is growing in the overall Bay Area, which is not well serviced by this isolated airport crammed into an overbuilt, even full, peninsula." (Patricia Clark)

Response

According to SFIA Administration staff, 86.7 percent of total passengers using SFIA in 1990 had domestic destinations, and 13.3 percent had international destinations. Of the total passengers, 21.3 percent had Southern California destinations (Los Angeles area, San Diego, Santa Barbara, and Palm Springs)./14/

The MTC *1990 Air Passenger Survey* provides limited information on the link between passenger origins and destinations./15/ (A copy of this survey is available for review in the San Francisco Department of City Planning files, and at the MTC/ABAG Library in Oakland.) Table 2.10 on p. 34 of the survey shows that about 70 percent of SFIA passengers had "domestic (U.S. outside California) and international" destinations, and about 30 percent had California destinations. Of the SFIA passengers with domestic and international destinations, about 34 percent were from San Francisco, 19 percent from San Mateo County, 13 percent from Santa Clara County, and 12 percent from Alameda County (the remaining 22 percent were from other Bay Area counties and outside the region). Of the SFIA passengers with California destinations, about 47 percent were from San Francisco, 20 percent from San Mateo County, nine percent from Santa Clara County, and seven percent from Alameda County (the remaining 17 percent were from other Bay Area counties and outside the region).

About 56 percent of Metroplitan Oakland International Airport (MOIA) passengers had California destinations, and about 44 percent had domestic and international destinations. Of the passengers with California destinations, about 42 percent were from Alameda County. Of the passengers with domestic and international destinations, about 53 percent were from Alameda County.

About 54 percent of San Jose International Airport (SJIA) passengers had domestic and international destinations, and about 46 percent had California destinations. About 82 to 83 percent of passengers (regardless of destination) were from Santa Clara County.

Table 9.1 on p. 85 of the MTC *1990 Air Passenger Survey* shows that about 36 percent of total Bay Area passengers had California destinations; about 59 percent had domestic destinations; and about five percent had international destinations. The percentages were roughly the same for each Bay Area county./15/

These data indicate that passengers using SFIA and MOIA come from a variety of locations, while most passengers using SJIA come from Santa Clara County. Passenger choice of airports is related to a variety of factors, the most important of which appear to be convenience of access and available levels of air service. Research by MTC and others has shown that flight frequencies are an especially important factor in residents' airport choice and are critically important to nonresident business travellers./3/ Currently, flight frequencies vary considerably among the region's air carrier airports, with SFIA offering the greatest frequency of flights to the greatest number of destinations.

It stands to reason that, in a hypothetical multiple-airport region with uniform levels of, and costs for, ground access and air service, passengers would use the airport nearest their origin and/or destination. This would result in less severe traffic and associated impacts than would the more realistic situation, in which many passengers, for a complex variety of reasons, do not use the closest airport. Additional information on Bay Area air passenger characteristics and preferences has been developed for MTC by Mr. Greig Harvey, in conjunction with ACCESS, an airport-passenger-choice and ground-access computer package being used to help evaluate MTC RASP Update alternatives. Preliminary model results are discussed below, under Alternatives, pp. C&R.90-92 herein.

The results of the MTC *1990 Air Passenger Survey* were not available when the Draft SFIA Master Plan EIR was in preparation (the *Survey* was released in August, 1991, when the DEIR was out for public review). These results would alter some of the trip distribution patterns, but would not substantively alter the impact analysis in the EIR (this is discussed further below under Transportation, p. C&R.121 herein, and in C&R Appendix A).

Issues related to regional population patterns, air travel demand, and service requirements are also discussed below under Regional Planning and Coordination, pp. C&R.56-85 herein.

Forecast Methodologies and Validity

Comments

"Over the 15-year period, as you look at patronage being up 70 percent over that period of time, that was pretty much an assumption that you were given and you did your analysis after that? . . .Did we take any independent analysis to say whether or not we agree with that 70 percent projection? How reasonable is it? Obviously, there is an awful lot of international demand that generates a larger airport. If you just looked at domestic demand or domestic growth in this area 15 years from now, how does the population growth impact the need for a larger airport? I would be very surprised if we would expect that the Bay Area would be 70 percent larger 15 years from now." (Commissioner Sewell)

". . .The passenger and the cargo forecast in the Master Plan are highly simplistic, and what they amount to is simply a straight line projection of the 1980 population, employment, and economic growth and the commensurate airport business growth. And a project this size needs a much more sophisticated analysis and forecast." (Charles Kroupa, public hearing of 10/17/91)

"The passenger and cargo forecasts -- the reason for this whole projection in the first place -- are totally simplistic. If they prove to be reasonable, it will be by accident. When you strip away the statistical gobbledygook, all they amount to is a straight-line projection of 1980's population, employment and economic growth, and of commensurate airport-business growth. (See Master Plan, page 7.1 et seq.) The present recession already has discredited such folly.

"The 1980's was a unique consumer market for air passengers. Deregulation fostered cut-throat price competition, which boosted passenger volume enormously. The resulting shakeout has resulted in bankruptcy or assimilation for all but the most wily and aggressive carriers; and with the current recession, it seems only a handful of U.S. carriers will be flying by the mid '90's. Nonetheless the Master Plan extrapolates the airlines' halcyon prosperity of the '80's unabated into perpetuity." (Charles Kroupa)

Response

The passenger forecasts prepared for the SFIA Master Plan, completed in 1987 and supplemented in 1989, made use of linear regression and time series trend analyses, not "straight-line projection" of 1980's population, employment and economic growth. These methods are generally discussed in the Forecasts section of the SFIA Master Plan (Chapter 7); the EIR provides a summary discussion of the SFIA Master Plan's forecast methods and assumptions on pp. 61-72.

As described in the EIR on pp. 22-26, SFIA Master Plan projects were developed on the basis of forecast growth in all aviation activity categories except general aviation and military operations. Domestic passenger totals were forecast to grow by 68 percent, and international passenger totals by 96 percent, between 1990 and 2006 (EIR, Table 1, p. 24). However, it should be noted that, while the SFIA Master Plan anticipated continued growth in annual passenger totals through 2006, it forecast declining rates of growth in passenger traffic for the region as a whole and SFIA in particular (SFIA *Final Draft Master Plan,* Tables 7.1 and 7.2; Figures 7.1 - 7.5).

Forecasting is an art as well as a science, without reliable means of evaluating results except in retrospect. Aviation activity forecasts involve complex assumptions, variables, and judgments regarding the appropriateness of alternative methodologies. Thus, results of air carrier forecasts by different persons or agencies can vary considerably, as illustrated in graphs prepared by TRA Consulting for the MTC RASP Update. These graphs show that forecasts of SFIA passenger and cargo activity from the SFIA Master Plan are not outside the presented range of forecasts for SFIA from a variety of sources. As is also apparent from these figures, substantial "disagreement among experts" exists regarding forecasts of passenger and cargo demand for SFIA (this is also true of forecasts of aircraft operations, as discussed in the EIR on pp. 61-72, and below under Airfield Capacity and Delay, pp. C&R.46-55 herein). Aviation activity forecasts from different sources for the region as a whole are similarly varied./2/

CEQA *Guidelines*, Section 15151, does not require that the decision-making body acting on an environmental impact report correctly solve a dispute among experts. All that is required is that in substance, the EIR provide information from all sides of the issue in question, particularly where opinion and not fact is at issue. However, the EIR must respond to the most significant questions presented. The SFIA Master Plan EIR addresses the environmental effects of implementing facilities projects proposed under the SFIA Master Plan which, in turn, was developed on the basis of aviation activity forecasts prepared by Airports Commission consultants. The EIR does not draw conclusions as to the validity of SFIA's forecast assumptions and methods, or "reasonableness" of the forecast results. For comparison, however, the EIR (pp. 61-72) summarizes forecast results from other sources, including the FAA and Caltrans Division of Aeronautics, and generally discusses how project impacts could differ under forecast scenarios other than those identified for the SFIA Master Plan. Thus, the other expert opinions on passenger growth are provided in the EIR.

In comparing existing Bay Area aviation forecasts, and assembling forecasts for consideration in the MTC RASP Update, TRA Consulting observed several trends that could affect air travel in the San Francisco region. Air travel trends considered most important include: international travel growth, domestic travel growth, the national economy, maturation of markets, airline yield, demographics and per capita travel, and telecommunications. According to preliminary Draft MTC RASP Update working papers, international air travel now represents about nine percent of total regional air carrier passenger traffic but (particularly to Pacific Rim nations) ". . . will be a very high growth market for the next 10-20 years . . . offsetting any weakness in the domestic market."/2/ As pointed out above, under Project Sponsor Objectives and Approach, on pp. C&R.13-14 herein, an important element of SFIA Master Plan objectives (and an assumption in SFIA Master Plan passenger forecasts) is that SFIA should and will capture a majority of the international component of total passenger growth.

According to preliminary Draft MTC RASP Update working papers, underlying some of the air travel growth projections for the Bay Area may be the effect of airline "hubbing," which inflates the actual Bay Area activity figures as connecting passengers change planes in Bay Area airports. San Francisco, Oakland, and San Jose have each become hub airports to a certain extent (United at SFIA, Southwest at MOIA, and American at SJIA). Another factor that could affect air travel demand, as noted by the commenter and the Draft RASP Update, is "maturation of markets." After rapid growth in the 1970s and early 1980s, some of the travel markets to and from the Bay Area appear now to be experiencing growth only in proportion to overall population and economic growth./2/

The historical downward trend in airfares may be slowed or reversed due to potential increases in fuel and labor costs; rising airfares could act to dampen air travel demand. Similarly, "decreasing population growth, a slowing in the growth in real disposable income, and a decreasing number of first-time flyers suggest a slower air travel growth rate in the future." Finally, the Draft RASP Update points out that advances in telecommunications may affect air travel demand by providing alternatives to business travel, particularly through video conferencing./2/

It is possible, as pointed out by one commenter, that some of the above factors could cause actual future passenger and aviation activity levels to be lower than forecast in the SFIA Master Plan. If the Master Plan were to be implemented, the effective result could be an "overbuilt" Airport. The implications of this are discussed above, under Project Sponsor Objectives and Approach, pp. C&R.15-17 herein; in sum, overall environmental effects would likely be less severe than for the project.

As another commenter correctly noted, the Bay Area's population is not expected to grow 70 percent in the next fifteen years. Passenger traffic can grow faster than population (or, per capita rates of air travel can increase) for a variety of reasons, many of which are identified above.

<u>Cargo Forecasts</u>

<u>Comment</u>

"... [T]here was an article, I think, in the <u>San Francisco Business Times</u> about the airport's ability to attract cargo traffic vis-a-vis its efforts in attracting passenger traffic, and concerns that cargo traffic was not getting a top priority at the airport and how that was essential to San Francisco businesses. And I would like just a brief analysis of cargo versus passenger and the relative importance of cargo traffic and what that means in terms of, particularly, traffic that passes around the airport." (Commissioner Engmann)

Response

It is difficult to analyze clearly cargo versus passenger traffic, for reasons that will be described below. However, it is important to remember that although cargo business is significant, the emphasis at SFIA has been on development of passenger services. The following discussion of cargo activities at SFIA and issues to consider in planning for growth in cargo and passenger services will be helpful in responding to this comment.

The EIR (p. 35) describes air freight, or cargo, operations at SFIA as being of two types: all-cargo and top-off. All-cargo carriers, which transport freight only, do not require access to the passenger terminal. Top-off carriers require proximity to the passenger terminal because they use excess capacity in scheduled passenger flights for transporting freight.

Table C&R.2 below, provided by SFIA Administration staff, shows the relationship between top-cargo and all-cargo tonnage and aircraft operations (landings) at SFIA in 1989 and 1991. SFIA does not regularly tabulate statistics on all-cargo versus top-off cargo traffic. The data in the table were extracted from landing fee reports and other operational data. /5/

The table shows that nearly all (98 percent) landings that included cargo were top-off. In terms of cargo tonnage in 1989 and 1991, roughly 73-79 percent was top-off, and the rest (21-27 percent) was all-cargo.

On-Airport All-cargo carriers, whose facilities are in the north and east field areas (see Figure 2, p. 34 in the EIR), include Flying Tigers (Federal Express), Japan Airlines (JAL), DHL and Evergreen. Most top-off carrier operations are concentrated in the north side of the passenger terminal in the west field area; the remaining facilities are adjacent to the South Terminal. Most of the top-off carriers lease space in shared facilities such as Cargo Building 7, or sub-lease space from another carrier. All-cargo and top-off carrier functions at SFIA together occupy approximately 868,000 square feet of building area. Of the 2.9 million square feet of new building area proposed for the near-term and long-term SFIA

Master Plan, approximately 785,000 square feet, or about 27 percent, would be used for additional air-freight area.

As the EIR notes, on p. 24, total cargo and mail tonnage is forecast to grow by about 32 percent between 1990 and 1996 and by a total of about 55 percent between 1990 and 2006. This growth can be described more exactly by looking at three basic categories: domestic cargo, international cargo and mail. Domestic cargo is forecast to increase by 45 percent (or 96,000 metric tons) by 1996 and by a total of about 55 percent (or 117,700 metric tons) by 2006. International cargo is forecast to increase by 14 percent (or 31,950 metric tons) by 1996 and by a total of about 46 percent (or 108,950 metric tons) by 2006. Mail cargo is forecast to increase by 47 percent (or 49,844 metric tons) by 1996 and by about 75 percent (or 80,922 metric tons) by 2006.

These forecasts reflect an assessment of past trends in the overall cargo market and in the division of market share among Bay Area airports. The SFIA Master Plan notes that SFIA's market share for domestic air freight has declined in the past ten years from 95 percent to 70 percent of the regional total, even though the overall regional market has grown by 37 percent. It is expected that this trend will continue, with the market share decreasing to 54 percent. The SFIA Master Plan anticipates that international air freight will continue to be the major growth component of air freight at SFIA, and that SFIA will continue to be the airport of choice in the Bay Area for international cargo.

TABLE C&R.2: COMPARISON OF ACTIVITY FOR ALL-CARGO AND TOP-OFF CARGO CARRIERS, 1989

	All-Cargo Carriers	All Major & Commuter	All-Cargo %	Top-Off Cargo %
# Landings	4,228	191,721	2.2%	97.8%
Total Freight/Mail (tons)	128,130	618,990	20.7%	79.3%
On	63,384	311,078	---	---
Off	64,746	307,912	---	---
		1991		
# Landings	3,921	190,361	2.1%	97.9%
Total Freight/Mail (tons)	178,733	653,009	27.4%	72.6%
On	80,536	319,755	---	---
Off	98,197	333,254	---	---

SOURCE: San Francisco International Airport, 1992

It is difficult to describe comprehensively or quantify the needs of and growth in cargo operations as opposed to passenger operations. A recent (August 1991) "Air Cargo Study" was issued by the California Department of Transportation, Division of Aeronautics, as an element of Phase II of the California Aviation System Plan (CASP). This report describes the difficulty of analyzing this situation by noting that when air cargo was deregulated in 1978, airlines were no longer required to submit or collect monthly statistics.

It is difficult to quantify the actual effects cargo activities have on general passenger traffic and/or surface vehicle traffic because good statistics are not available comparing the percentage of cargo that is carried all-cargo to that which is carried top-off. The CASP does point out some important considerations for understanding cargo versus passenger business. Airport cargo activities do compete with passenger activities in three major areas: airspace, ground access facilities and on-airport facilities.

The primary problem in the competition for air space is the need for noise abatement. The nature of the air cargo business requires that most cargo flights take place between 7:00 p.m. and 7:00 a.m. This will be increasingly true as trade increases between North America and Asia. At SFIA, cargo planes depart for the Far East between midnight and 5:00 a.m. to meet strict arrival windows. There are also passenger flights that must meet these windows. Competition for these time slots will increase as international flights, especially those to the Far East, increase. This need for scheduled nighttime departures coincides with the time when airport noise is the most disturbing.

Competition for ground-access facilities and on-airport facilities is discussed in the "Air Cargo Study" in conjunction with a "Ground Access Study", which is also part of the CASP report. The report notes that SFIA has reached its capacity to provide efficient cargo facilities on the Airport grounds and has waiting lists for its cargo facilities. The report discusses the SFIA Master Plan's call for additional air-freight area, but also explains two general options that are being considered state-wide to deal with this need. These are off-airport cargo facilities and all-cargo airports./16/

There is a movement toward off-airport cargo facilities in several airports around the U.S. At SFIA, Emery Worldwide has 30,000 square feet approximately three miles from the airport, and other carriers (Nippon Cargo Airlines, British Airways, Quantas) use the warehouse facilities of a third party located off-Airport./16/

The CASP report discusses the use of sites for cargo airports that are separated from passenger airports. "The thought is that the aviation resource already in place should be used for the good of the California aviation system. The facts, however, indicate that this issue is far more complex than it appears."/16/ The report notes disadvantages of this concept by stating that "passenger carriers handle approximately 80 percent of total air cargo volume and that it would be impractical and uneconomical to spin off the freighter activities to locate them at a remote all-cargo airport." However, in support of this idea the report cites reduced air space congestion and road congestion at the existing airports, economic development of the new sites, and lower costs./16/

APPROVALS REQUIRED

SFIA Powers and Responsibilities

Comments

". . . [T]he airport seems to be an arcane, autonomous, proprietary enterprise, answerable primarily, if not exclusively, to no one but its customers, the airlines. The EIR should expose in detail the airport's powers, authority, and autonomy, and its responsibilities to San Francisco government, San Mateo County government and other government entities, and to the general public." (Charles Kroupa, letter of 10/17/91 and public hearing of 10/17/91)

"Page 167, Noise Abatement Program: . . .
"The SFIA Roundtable is an advisory forum only. It has no authority. The Roundtable made 12 suggestions to the Airport Commission when the current airport noise regulations were being evaluated for adoption. Eleven of the twelve were rejected. This has been the Airport Commission's pattern in response to the Roundtable. Suggestions are usually completely ignored. . .

"Page 169:
"With no authority in ALUC or the Roundtable, it is standard policy for the airport commission to overturn or ignore any policies initiated by these bodies." (Duane Spence, Airport Mitigation Coalition)

"Also, when you look at the development of this, and I don't know what the right forum is, but as we look at Mission Bay and some of the office buildings -- and those projects have made certain, or planned to make certain contributions to economic development, job opportunity, whatever -- to what extent can we be involved with the developer of this big project to look at the various populations of San Francisco participating in a project as huge as this?" (Commissioner Sewell)

Response

As one commenter points out, SFIA is a relatively autonomous enterprise and one that does have responsibility to its tenants, the airlines. But SFIA is responsible also to a wide range of other organizations, agencies, and individuals, including the Federal Aviation Administration, the California Department of Transportation, various regional and local agencies, and the general public. As noted in the EIR (p.18), SFIA is owned by and under the jurisdiction of the City and County of San Francisco; the governing body of SFIA, the Airports Commission, is appointed by the Mayor of San Francisco. With regard to the SFIA Master Plan, SFIA's powers and responsibilities are identified in the EIR under SFIA Master Plan Approval Process (pp. 73-76), Land Use and Plans (pp. 78-124 and pp. 250-264), and applicable portions of EIR technical sections. SFIA powers, limitations and responsibilities are further explained in C&R Appendix A, Attachment D, Background to Airport Operations and above, under Project Sponsor Objectives and Approach, Public Participation in Master Planning Process, and Project Costs (pp. C&R.12, 17, 19-20, 26-28 herein).

As noted in the EIR on p. 167, the Airport /Community Roundtable is a community group that monitors SFIA implementation of SFIA's Noise Abatement Program, which includes actions identified in the 1981 Airport Noise Mitigation Action Plan. The commenter is correct in stating that the SFIA Roundtable is an advisory forum only. As explained in the EIR on pp. 168-169, the San Mateo County Airport Land Use Commission (ALUC) has authority regarding noise compatibility standards for land uses near SFIA, but has no authority over actual Airport operations.

The actions by SFIA in response to concerns expressed by the Airport /Community Roundtable or the ALUC are within the EIR's scope only to the extent that they are related to the physical environmental impacts of the SFIA Master Plan or the identification or adoption of specific mitigation measures. Responses to comments regarding noise impacts and mitigation measures appear below, on pp. C&R.194-313 herein.

As noted in the EIR on pp. 73-74, the Final EIR on the SFIA Master Plan will be presented to the San Francisco City Planning Commission for certification as to accuracy, objectivity, and completeness. The Planning Commission does not have approval authority over the SFIA Master Plan itself, because this authority rests solely in the Airports Commission. This relationship is unlike the Planning Commission's jurisdiction over private developers who need building permits or conditional use permits. The Planning Commission's powers vary from project to project, depending on the specific conditions, requirements of the City Charter, etc.; in the case of privately sponsored projects and some conditional use authorization for public projects, the Planning

Commission may have power to require changes in the project itself. However, with respect to the SFIA Master Plan, the Planning Commission is empowered only to decide on matters of CEQA compliance.

For clarification of approvals necessary, the following changes are made in Section II.E. of the EIR, under Master Plan Approval Process. The first sentence of the last paragraph on p. 73 is amended to read as follows:

> Publication of the DEIR will be followed by a 45- to 60-day public comment period, including at least one public hearing on the Draft EIR before the San Francisco City Planning Commission (<u>the certifying body of</u> the "lead agency" under CEQA).

The following text is added to the EIR, at the end of the first paragraph on p. 74:

> Approval of the SFIA Master Plan is a separate action from EIR certification, and will include public hearings to be held by the Airports Commission.

<u>Concerned Agencies</u>

<u>Comment</u>

"The proposed project is considered to be of major magnitude. It will have significant transportation impacts on the surrounding freeway network and on the arterial street network of surrounding communities. We have met with the Airport's consultant regarding proposals to modify existing highway facilities in Caltrans right-of-way. To date, we have seen only conceptual plans which do not consider Caltrans Design Standards and/or policy. Please contact Caltrans District 4, Project Development-Peninsula Branch regarding design details for highway facilities, and/or for any proposals that may affect existing Caltrans highways and/or right-of-way." (Preston Kelley, Caltrans)

<u>Response</u>

The comment above is consistent with, and further clarifies, the first paragraph on p. 75 of the EIR. Further relevant action is the responsibility of the Airports Commission and SFIA staff following action on the Master Plan.

Comment

"... Under the California Environmental Quality Act (CEQA), the City and County of San Francisco is the Lead Agency and the [State Lands] Commission is a Trustee Agency.

"The State acquired sovereign ownership of all tidelands and submerged lands and beds of navigable waterways upon its admission to the United States in 1850. The State holds these lands for the benefit of all the people of the State for the statewide public trust purposes of waterborne commerce, navigation, fisheries, water-related recreation, habitat preservation, and open space. The landward boundaries of the State's sovereign interests are generally based upon the ordinary high water marks of these waterways as they last naturally existed. Thus, such boundaries may not be readily apparent from present day site inspections. The State's ungranted sovereign interests are under this jurisdiction of the State Lands Commission.

"The proposed project is located on historic and/or existing tidelands and submerged lands granted in trust by the Legislature to the City and County of San Francisco pursuant to Chapter 987, Statutes of 1943, as amended. Uses involving granted tidelands must be consistent with the public trust and the applicable granting statutes. The City, as grantee, has the day-to-day administration of these lands and the [State Lands] Commission retains oversight authority. A permit from the Commission will, therefore, not be required.

"We would appreciate being kept informed of this project as well as other proposed projects involving the use of tidelands and submerged lands affecting this grant." (Diane Jones, State Lands Commission)

Response

The following text is added to the EIR, as a new paragraph at the end of p.74:

> The proposed SFIA Master Plan project is located on historic and/or existing tidelands and submerged lands granted in trust by the California Legislature to the City and County of San Francisco pursuant to Chapter 987, Statutes of 1943, as amended. Uses involving granted tidelands must be consistent with the public trust and the applicable granting statutes. The City, as grantee, has the day-to-day administration of these lands and the State Lands Commission retains oversight authority. A permit from the State Lands Commission will, therefore, not be required. /20b/

The following footnote is added to the EIR, p. 77:

/20b/ Jones, Diane, State Lands Commission staff, letter, August 14, 1991.

Comment

"The [Bay Conservation and Development] Commission has jurisdiction over all areas subject to tidal action of San Francisco Bay and all areas within 100 feet of the Bay. From the information contained in the Draft EIR, it appears that the only facilities proposed by the draft Master Plan within the Commission's jurisdiction are the dock in Seaplane Harbor and portions of improvements to the North Field Access Road. Most other proposed improvements would be located outside the Commission's jurisdiction, but within an area designated in the Bay Plan for airport priority use.

"The Commission will consider applications for any work within its jurisdiction based on the policies of the McAteer-Petris Act and the Bay Plan. In considering the proposed dock in Seaplane Harbor, the Commission must find, among other things, that the use of the dock would be water-oriented, that the dock itself would be the minimum size necessary to achieve its purpose, that there was no feasible upland location for some or all of the dock, that the placement of the dock would minimize any harmful effects on fish and wildlife resources, water quality, and marshes and mudflats, and that any significant impacts on the Bay would be mitigated.

"In considering the expansion of the roadway, we understand that all work would occur on existing land. Therefore, the Commission must find that the use of the roadway would be consistent with the airport priority use designation and that the maximum feasible public access consistent with the project would be provided. All other proposed improvements outside the Commission's jurisdiction but within the Airport appear to be generally consistent with the airport priority use designation of the Bay Plan." (Steven A. McAdam, San Francisco Bay Conservation and Development Commission)

Response

The comment above is consistent with, and further clarifies, text on pp. 74, 117-118, and 259 of the EIR; the proposed multi-use harbor dock facility is noted on pp. 54 and 56 of the EIR. The following text is added to the EIR, at the end of the third full paragraph on p. 74:

In considering the proposed dock in Seaplane Harbor, BCDC must find, among other things, that the use of the dock would be water-oriented, that the dock itself would be the minimum size necessary to achieve its purpose, that there was no feasible upland location for some or all of the dock, that the placement of the dock would minimize any harmful effects on fish and wildlife resources, water quality, and marshes and mudflats, and that any significant impacts on the Bay would be mitigated./20a/

In considering the expansion of the roadway, BCDC must find that the use of the roadway would be consistent with the airport priority use designation and that the maximum feasible public access consistent with the project would be provided. All other proposed improvements outside BCDC's jurisdiction but within the Airport appear to be generally consistent with the airport priority use designation of the Bay Plan./20a/

The following footnote is added to the EIR, p. 77:

/20a/ McAdam, Steven A., San Francisco Bay Conservation and Development Commission, letter, August 5, 1991.

Other Agency Jurisdiction

Comment

"The California Department of Transportation, Division of Aeronautics, has reviewed the above-referenced document with respect to the Division's area of expertise as required by CEQA. Since no runway extension, relocations or additions are included in this proposal, the State Airport Permit for San Francisco International Airport should not be affected. . ." (Sandy Hesnard, Department of Transportation, Division of Aeronautics)

Response

The comment above is consistent with, and further clarifies, text on p. 75 of the EIR. The following text is added to the EIR, at the end of the second paragraph on p.75:

Since no runway extensions, relocations or additions are included in the SFIA Master Plan, the State Airport Permit for San Francisco International Airport should not be affected by the project. /20c/

The following footnote is added to the EIR, p. 77:

/20c/ Hesnard, Sandy, California Department of Transportation, Division of Aeronautics, letter, September 5, 1991.

NOTES - Project Description

/1/ U.S. Department of Transportation, Federal Aviation Administration, Advisory Circular No. 150/5070-6A, June 1985.

/2/ Metropolitan Transportation Commission (MTC), Regional Airport System Plan (RASP) Update, preliminary draft working paper, "Chapter 6. Aviation Demand Forecasts," Draft presented by MTC's outside consultant, TRA Airport Consulting, at the December 4, 1991 quarterly meeting of the MTC Regional Airport Planning Committee (RAPC). Comparative Bay Area air carrier airport passenger forecasts were compiled from the respective airport master plans; the MTC RAPC; FAA San Francisco 1986 HUB Forecast; 1991 FAA National Forecast; 1990 FAA Terminal Area Forecast; and the 1989 Caltrans California Aviation System Plan (CASP).

/3/ Roddin, Marc, Manager of Seaport and Airport Planning, Metropolitan Transportation Commission, interview, April 22, 1992.

/4/ Brittle, Chris, Manager, Planning, Metropolitan Transportation Commission, letter to Barbara Sahm, September 16, 1991.

/5/ Costas, John, Assistant Administrator, Planning and Construction, San Francisco International Airport, letter, March 9, 1992.

/6/ Major U.S. airports such as LaGuardia and Washington National continue to operate despite severely congested ground access conditions.

/7/ Shoenfeld, W.M., LAX Deputy Executive Director, January 15, 1992 memo to LAX Board of Airport Commissioners.

/8/ Wells, Rick, Facilities Planning Bureau, Los Angeles International Airport, telephone conversation with SFIA staff, February 12, 1992.

/9/ Costas, John, Assistant Administrator, Planning and Construction, San Francisco International Airport, letter, March 6, 1992.

/10/ Board of Supervisors Master Bond Resolution #34-92 adopted January 6, 1992.

/11/ John F. Brown & Company, "Traffic and Engineering Report," February 28, 1992.

/12/ Buchbinder, Alan, Senior Financial Analyst, Port Authority of New York and New Jersey, telephone conversation with SFIA staff, February 3, 1992.

/13/ Costas, John, Assistant Administrator, Planning and Construction, San Francisco International Airport, interview, April 9, 1992.

/14/ Costas, John, Assistant Administrator, Planning and Construction, San Francisco International Airport, telephone conversation, October 2, 1991.

/15/ Metropolitan Transportation Commission, *1990 Air Passenger Survey*, August 1991.

/16/ California Department of Transportation, *California Aviation System Plan (CASP), Executive Summary*, August 31, 1991.

AIRFIELD CAPACITY AND DELAY

The Notes for this section begin on p. C&R.55.

RELATIONSHIP TO PROPOSED SFIA IMPROVEMENTS

Comments

"I didn't understand from the beginning why this doesn't deal with runways. Maybe there is some magic answer if you are going to have this much more traffic.

"One of my questions is, how does San Francisco Airport compare with other major airports in terms of delays? I think I have read that we are bad about flights being on time. If we are increasing by 2006 this much, I don't know how it can happen without increased runways. It seems to me we need to know how much more often planes will have to land, what is the spacing between the planes. If the planes are coming that often, even if they aren't louder, does the noise increase because the planes, two or three are coming in at once. Maybe it's in here. I have not read every word of this. I have tried to look at the kind of things I think will be a problem.

"It's hard for me to understand, I guess the Airport Commission makes the decision as to whether to expand or not. But for the public to support this expansion, I don't think they or a planning commission, for instance, have the information they will need." (Commissioner Bierman)

"There is no mention of -- there is no renouncement in effect of a new runway. I cannot fathom a $1.7 billion expansion proposal with no runway extensions or additional runways proposed. The FAA's policy is to encourage airports to develop to the capacity of their facilities. If they have a huge amount of the capital improvements in their land side facilities, terminals, et cetera, and the main point of congestion constriction -- the stricture point is the capacity of the runways, I am sure the FAA will encourage runway expansion. I think that ought to be examined in this EIR, albeit it isn't mentioned as part of the airport's capital improvement program." (Charles Kroupa)

". . . [T]he Master Plan deals with so-called land-side development only; that is, consideration of additional runways to deal with increased traffic is the subject of a separate study, the Runway Reconfiguration Study. The DEIR accepts an assumption in the Master Plan that additional or lengthened runways at SFIA are not necessarily dictated by implementation of the Master Plan. The Committee questions this assumption, notes the on-going Runway Reconfiguration Study (which does consider new and lengthened runways at SFIA) and points out that additional environmental problems for San Francisco will be created by the addition of new or lengthened runways at SFIA. The DEIR should not simply accept the Master Plan assumptions in this respect." (Timothy Treacy, Airport Noise Committee)

Response

In 1989, SFIA had approximately 70 delays per 1,000 operations. Of 22 airports studied, those that had more delays were the three New York area airports (Kennedy, Newark, and LaGuardia International Airports), and Chicago O'Hare International Airport. Seven percent of SFIA operations were delayed 15 minutes or more in 1989; the airports with a higher percentage of delays were Newark, LaGuardia, and O'Hare. SFIA was one of 21 airports exceeding 20,000 hours of annual aircraft delay in 1988./1/

Nationally, weather was the primary cause of operations delayed 15 minutes or more in 1989. Terminal air traffic volume was the second most frequent cause of delays nationally. (The percent of total delays caused by terminal volume increased from 9 percent in 1988 to 29 percent in 1989.) Other causes of aircraft delays nationally included air traffic center volume, runway construction, and equipment interruptions./1/

The primary objective of the SFIA Master Plan is to provide the basis for implementing changes in the use of all Airport-owned landside facilities to improve the efficiency and cost-effectiveness of Airport operations (p. 1.1 of the SFIA Master Plan, emphasis added). The SFIA Master Plan evaluated the airside facilities (runways) and determined that runway extensions or additional runways were not necessary and that "the airfield capacity appears adequate to accommodate all of the scheduled air carrier traffic" (p 7.15 of the SFIA Master Plan). As discussed on p. C&R.51 herein, the EIR independently evaluated airfield capacity (pp. 65-72 of the EIR and Appendix J, pp. A.179-180) to determine "whether there could be airfield constraints that could cause additional environmental effects" (p. 72 of the EIR).

There are no federal monies contemplated, nor will federal monies be used for the development of, landside facilities under the SFIA Master Plan. Consequently, the FAA has neither approved nor disapproved the SFIA Master Plan for the purpose of receiving federal funding.

The FAA is co-sponsoring airport capacity task forces at major airports to assess how airport development and new technology could "optimize" capacity on a site-specific basis. The Bay Area Airports Capacity Task Force Study, completed in 1987, is discussed on pp.68 -70 and A.173 -A.177 of the EIR. Table I-1 on p.A.174 lists the Task Force's Recommended Action Plan for SFIA. The improvements included in the Action Plan range from airfield construction to air-traffic-control improvements, the installation of navigational aids, and user improvements (such as regional redistribution of air traffic, discussed on pp. C&R.77-84 herein) . The construction of a new runway at SFIA is listed as a recommended improvement "for which the benefits in delay reduction must be evaluated in terms of its environmental and economic consequences by groups outside the task force" (EIR p.A.177).

With regard to the Runway Reconfiguration Study, between 1977 and 1981 San Francisco Airport participated in a Joint Land Use Study with San Mateo County and Cities surrounding the airport. The purpose of the study was to define and solve the problems created by aircraft noise on residential areas. A number of solutions were proposed and many have been implemented under the Airport Noise Mitigation Plan and through the efforts of the Airport / Community Roundtable. One solution proposed during the Joint Land Use Study was a reconfiguration of the Airport runway system. However, it was never adopted or evaluated, primarily because of its potential impact on the Bay.

Since that time, the runway reconfiguration solution has been brought up several times. Consequently, on December 8, 1988, the San Mateo County Regional Planning Commission / Airport Land Use Commission (RPC/ALUC) voted to request the Airport to study a reconfiguration of the runway system as a potential noise abatement measure. They passed the following motion:

"The Regional Planning Commission endorses the initiation of a study to determine the feasibility of a runway reconfiguration at San Francisco International Airport as a noise abatement measure; provide that such endorsement shall not imply advanced approval of any findings of the study particularly any recommendation for the future filling of San Francisco Bay."

On December 13, 1988 the Airport/Community Roundtable unanimously voted to request the Airport to undertake this study.

On January 17, 1989, the Airports Commission considered the request of RPC/ALUC and the Roundtable and voted to undertake this feasibility study in the following resolution:

"That this Commission, in support of its policies for mitigating and abating aircraft noise on surrounding communities, wishes to undertake a study of reconfiguring the Airport's runway system to determine whether such reconfiguration will abate noise on surrounding communities, and to determine the cost and benefits thereof."

The primary objective of the study was to determine runway alternatives that would eliminate noise impact on surrounding communities within the criteria set forth by the State of California Noise Standards, Title 21 (zero impacted homes in the 65 CNEL noise impact boundary.) Secondary objectives include a) mitigation of single event, overflight, and backblast noise, b) minimization of other environmental impacts and economic costs, and c) enhancement of airspace/airfield safety and broad based economic benefits./2/

The study has three phases, each requiring Commission approval to proceed to the next phase:

Phase I Determine if noise impacts can be abated by reconfiguring the runways; preliminary identification of alternatives;

Phase II Develop engineering concepts and more detailed analysis of alternative(s) selected by Commission for further study; and

Phase III Preparation of environmental impact documents./2/

According to SFIA staff, the first phase of the study took approximately six months to complete. During the study there were nine public meetings, two of which were public workshops. The Phase I Draft report was completed and distributed in July 1990. It identified four possible runway reconfigurations that potentially could achieve the primary objective of the study. Many secondary objectives were achieved but not all. None of the alternatives would increase the maximum capacity of the existing runway system. The Airport/Community Roundtable held a public workshop at its regularly scheduled meeting on August 1, 1990 to review the preliminary results of the report and receive further input from the public. On the basis of comments made at the meeting and by members of the Roundtable on December 8, 1990, the Roundtable requested the Airport to conduct additional analysis under the Phase I portion of the study, to further identify the noise mitigation benefits of the proposed alternative runways. This additional scope of work is currently being defined. If the Commission approves additional work, the Airport can redirect its resources to continue with additional analysis in the Phase I report.

SFIA staff notes that the Draft Phase I report does not conclude overall feasibility (technical, environmental, economic/financial) of reconfiguring the runway system. If upon completion of Phase I, the noise mitigation benefits of the proposed alternative runways warrant further study, as determined by the Airport Community Roundtable and the San Mateo City / County Association of Governments / Airport Land Use Commission (formerly RPC/ALUC), the Airports Commission, by request of these bodies, will consider proceeding with the next phase of the study to determine feasibility in further detail. If the benefits do not warrant further analysis, the study will conclude.

The EIR indicates how often planes would land every hour on the average day of the peak travel month in 2006 (Appendix J) to carry the forecast passenger traffic within the present conditions of airfield capacity. Aircraft separation is under the sole jurisdiction of the FAA. The FAA has to consider not only air traffic entering SFIA but traffic operating to, from, and transiting the airports located throughout the Bay Area. Different weather conditions warrant different flight rules (IFR, VFR) and different standards for aircraft separation. Aircraft separation can be controlled by time, distance, altitude and speed with all these factors operating simultaneously. The FAA's aircraft separation criteria were considered in the EIR's evaluations of runway capacity.

AIRFIELD CAPACITY, AIRCRAFT DELAY, AND ENVIRONMENTAL EFFECTS

Comments

"...The DEIR treats the issue of airfield capacity and the cumulative effects of more flights inadequately. There is legitimate concern that the Master Plan improvements will lead to a situation of increased delay and congestion, thereby increasing demand for more airfield capacity through additional runways or other changes. Although the Master Plan states that capacity is sufficient until the year 2006, the DEIR should independently assess and verify this statement. Cumulative impacts of more flights on capacity needs examination." (Timothy Treacy, Airport Noise Committee)

"... Although the airport claims that airfield capacity is sufficient, the DEIR should independently verify this claim... " (Curt Holzinger)

"One other thing that also is not discussed in here, and. . .there is no mitigation. . .and that is the relationship between runway capacity, delays and the further impacts on the environment. If you talk about some of the delays that they anticipate in the year 2006 in terms of airplanes stacking up, that has a direct effect on people, the parking capacity, the transportation capacity, people are waiting longer, it tends to congest the airport a lot more.

"One of the mitigations for that might be, in fact, increasing runway capacity. That may not be the only mitigation, certainly not the only mitigation. There is no discussion of that relationship as to how delays in the airport . . . as people are waiting longer, might affect the transportation and other aspects of that, which I think there should be some discussion on since they're not talking about runway expansion. Basically all we're talking about is expanding off site, and when they expand off site with existing runways and accommodating increased demand, it's going to cause increased delays." (Commissioner Engmann)

Response

The EIR (pp. 65-72) includes summaries of analyses of airfield capacity and delay prepared for the SFIA Master Plan, San Francisco Bay Area Airports Task Force Study, and California Aviation System Plan. It also independently evaluates the ability of the existing runway system to accommodate arriving and departing aircraft on an hourly basis in 1996 and 2006 (Appendix J, pp. A.179-180).

The EIR analysis in Appendix J is based on a conservative assumption that the 1990 pattern of peak flight schedules would increase proportionally over the next 15 years. Under this assumption, the existing runway system is able to accommodate the forecast level of aircraft operations in the future during good weather conditions (61 percent of the time) with 2.2 percent of the total daily (average day peak month) flights delayed, and during less-than-optimal weather conditions (25 percent of the time) with 5.7 percent of the flights delayed.

These potential delays could be further reduced or eliminated if airlines were to reschedule flights to off-peak hours. Current trends in the domestic airline industry indicate that the industry will be dominated by four to five major airlines that will transport the majority of future passengers in the U.S. This transition is now occurring by way of mergers and bankruptcies. This domination and consolidation would reduce the large number of airlines that now schedule unprofitable flights during peak hours to maintain a competitive market presence. Thus, delays may be reduced as an indirect result of market forces.

The effects of average aircraft delays, as estimated in the FAA Capacity Task Force study, on aircraft noise, air pollution, and fuel consumption at SFIA are discussed in the EIR, in Sections IV.C., Noise, IV.D., Air Quality, and IV.E., Energy (beginning on pp. 335, 357. and 367, respectively). As the commenter suggests, there is no discussion in the EIR of the relationship between aircraft delays and transportation impacts. Accordingly, the following is inserted at the end of the Transportation Impacts section on p. 328 of the EIR:

Effects of Potential Aircraft Delays

It is possible that because of operational constraints and future delays, there would be changes in the forecast ground traffic using the Airport. Tables J-1 and J-2, in Appendix J, pp. A.179-180, show the existing number of flights per hour in 1990, and the forecast number of flights per hour in 1996 and 2006.

Using the information on Tables J-1 and J-2, in 1996 and 2006 there would be no more than one hour of delay for any flight under optimum visual flight rules (61 percent of the time). Under less-than-optimum visual flight rules (25 percent of the time), there would be no more than one hour of delay for any flight in 1996, and there would be more then one hour of delay for only five flights in 2006. Under more adverse weather conditions there could be additional delays to flights.

During instrument flight rules (IFR) conditions, which occur about 5.6 percent of the time, the existing SFIA airfield would not accommodate the number of flights forecast per hour in 1996 and 2006 with implementation of the SFIA Master Plan, if such conditions were to persist throughout a 24-hour period. (IFR conditions at SFIA generally occur over shorter periods; a review of SFIA weather summaries for 1990 showed that in the summer, IFR conditions generally occurred only in the early morning and late evening hours.) Even if the forecast flights were spread throughout the entire 24-hour period to maximize use of the airfield, the airfield could not accommodate the total number of daily flights forecast, even assuming that the airfield were to operate at capacity every hour. (Although Appendix J does not include an analysis of the airfield's ability to accommodate flights forecast for 2006 without the SFIA Master Plan, it is likely that the result would be similar to that described here.)

The effects of these delays on surface transportation impacts at or near SFIA cannot be estimated quantitatively. The delays could affect the hourly distribution of trips made by passengers, people going to the Airport to pick up passengers, and employees. It is possible that passengers aware of substantial flight delays would delay their trips to the airport; alternatively, these passengers would experience the aircraft delay in the SFIA terminal building. People travelling to the Airport to pick up arriving or drop off departing passengers might also delay their trips to the Airport, or wait longer in the terminal building for the flight to arrive or depart. The number of airline or airline support employees working during a particular shift might change to accommodate the services needed by delayed aircraft.

The potential change in the hourly distribution of trips could result in the spreading out of peak forecast travel. The estimates of aircraft delay in Appendix J were developed assuming that the 1990 pattern of peak flight schedules would increase proportionally over the next 15 years. If the airlines were to reschedule flights to off-peak hours, such rescheduling would have a similar effect on the hourly distribution of forecast surface vehicle traffic.

The effects of this redistribution of trips on traffic impacts near the Airport would depend on the change in the number of trips during the peak hours on the surrounding roadway network. As noted on p. 280, the peak hours studied in the analysis of traffic impacts represent the peak hours on the network, not the air traffic peak hours. There could be more or fewer vehicle trips during the peak hours on the surrounding network, depending on when the aircraft delays occur and how long the delays are.

If people travelling to the Airport to pick up or drop off passengers wait at the Airport, the demand for parking spaces during certain hours could increase. The turnover of short-term parking spaces in the parking garage and the GTC would be affected by flight delays. Vehicles could be required to circulate for longer periods of time before finding an available space.

Because the impacts of aircraft delays on surface traffic impacts are not known, no mitigation for such impacts is idenitified in the EIR.

SFIA AND MTC ESTIMATES OF AIRFIELD CAPACITY

Comments

". . . I want to add to the Committee's comments requesting more accurate forecasts a statement of concern that the data on operations capacity contained in the SFIA Master Plan documents and in the DEIR do not comport with the Metropolitan Transportation Commission (MTC) data recently added to the DEIR on SFIA operations (departures and arrivals) for the Master Plan period. The MTC data projects that operations at SFIA will exceed present capacity well before the year 2006 (the end of the Master Plan period), while the Master Plan documents state that airport capacity is sufficient to handle the enormous expansion proposed up to the year 2006. This discrepancy must be addressed both in order to project as accurately as possible the consequences of airport expansion on the health and quality of life of San Francisco residents (and even on property values in the affected parts of our City and County), and to identify and assess the utility of available alternative means of mitigation. . . " (Carol Gamble)

"The DEIR treats the issue of airfield capacity and the cumulative effects of more flights inadequately. . . In Attachment B, which was provided by your office, the M.T.C. Regional. Airport System Plan Update suggests that in fact airfield capacity will be exceeded during the Master Plan period. In that document, Exhibit 4.23 shows SFIA annual service volume to be 500,000 operations per year, with 86.1% of that volume currently in use. Since the Master Plan projects an increase of over 100,000 operations, the volume would appear to be exceeded before the year 2006." (Curt Holzinger)

". . . [I]n the new data that was provided from MTC -- and this gets to the question of capacity -- the airport has argued that capacity, airfield capacity at the airport, is adequate through the year 2006, for the Master Plan period. In the information provided by MTC on the chart in Appendix B on Page 4.23, that information indicates that the annual service volume, which is described as the annual runway capacity of San Francisco International Airport, is 500,000 aircraft, 500,000 operations. And, currently, it is operating at 86 percent capacity.

"The Master Plan says that there will be an increase of over 100,000 operations. If you take the MTC data and the Master Plan data, this would indicate that the annual service volume of the airfield will be exceeded, i.e., there is a capacity problem here that has not been addressed. We raised this issue two years ago, and it is still not addressed." (Curt Holzinger, Airport Noise Committee)

Response

As correctly stated by the commenters, Exhibit 4.23 of Attachment B, C&R Appendix A, "MTC Regional Airport System Plan" (excerpts), shows an estimated annual service volume for SFIA of 500,000 operations. The annual service volume for SFIA was also estimated at 500,000 operations in the California Aviation System Plan (CASP), as noted on p. 72 of the EIR. With these estimates of annual service volume used as a measure of airfield capacity, the numbers of aircraft operations forecast for 2006 with the SFIA Master Plan would exceed SFIA airfield capacity. According to the CASP, increases in aircraft operations beyond the annual service volume result in rapid increases in aircraft delays, and deterioration of levels of service on the airfield (as stated on p. 66 of the EIR.)

In the CASP, however, ". . . it is recognized that for many airports . . . the peak hour . . . capacity is a more important and relevant measure of an airport's airfield capacity than the annual service volume. . . " (p.66 of the EIR). For that reason, peak-hour capacity was growth trends over the last 15 years, and makes reference to an Association of Bay Area Governments (ABAG) study suggesting that the region's growth rates are likely to continue. According to the SFIA Master Plan,

"In order to adjust to such growth patterns in a region as dynamic and economically healthy as the Bay Area, the infrastructure must be continually upgraded and extended to avoid congestion and inefficiencies.

"San Francisco International Airport is a key element of this infrastructural improvement program. Recent widenings and ramp additions to the Bayshore Freeway adjacent to the Airport have improved ingress and egress for both passenger and cargo traffic. However, if the Airport is to be capable of handing the additional traffic generated by the area's current scale of economic growth, these improvements must be matched by significant restructuring of circulation systems, parking, and passenger/cargo handling facilities within the Airport properties.

"Clearly, San Francisco International Airport is reactive to and acts only as a conduit to serve the economic growth of the Bay Area." (SFIA *Final Draft Master Plan* , p. 7.1)

As pointed out above, under Project Sponsor Objectives and Approach (p. C&R.8-18 herein), CEQA does not require analysis of economic or social impacts unless they are related to or caused by physical changes to the environment: "[T]here must be a physical change resulting from the project directly or indirectly before CEQA will apply" (State CEQA *Guidelines*, Section 15131). The EIR therefore does not analyze, nor draw conclusions regarding, the regional economic role of SFIA and its Master Plan. Similarly, the EIR does not critique the SFIA Master Plan's broadly-stated assumptions regarding future economic growth in the Bay Area. (It may be noted that the latest preliminary ABAG employment growth forecasts for the 1990s are scaled back relative to the employment forecasts for the 1990s contained in ABAG's *Projections '90*. However, the reduction in expected regional job growth is not statistically significant.)/1/

While not required in the EIR, an analysis of SFIA's role in the regional economy could be conducted by the Airports Commission in its capacity as the decision-making body of the Lead Agency (the City and County of San Francisco), if the Airports Commission decides to approve the SFIA Master Plan (and the EIR has been certified). According to CEQA, "[a] public agency may approve a project even though the project would cause a significant effect on the environment if the agency makes a fully informed and publicly disclosed decision that: (a) There is no feasible way to lessen or avoid the significant effect. . . and

(b) specifically identified expected benefits from the project outweigh the policy of reducing or avoiding significant environmental impacts of the project" (CEQA *Guidelines*, Section 15043).

Regional Future of Air Travel in California

Broad-based research, analysis and policy planning for the regional and state aviation systems are the subjects of the in-progress ABAG/MTC Regional Airport System Plan (RASP) Update and the Caltrans California Aviation System Plan (CASP), respectively (these plans are discussed in the EIR on pp. 108, 112-114 and 258). Additional information on how SFIA and the SFIA Master Plan fit into the regional and state aviation systems is provided below, under Regional Airport System Plan (RASP) Update, Regional Forecasts and Capacities, and Decentralization/Redistribution of Aviation Activity; Capacities and Plans of Other Regional Airports (pp. C&R.60-66, C&R.66-73 and C&R.75-85 herein).

According to the Federal Aviation Administration (FAA), airport planning in the United States is performed at several levels above the individual airport master planning level. The National Plan of Integrated Airport Systems is a ten-year plan, published biennially by the FAA, that lists public-use airports considered to be in the national interest and eligible for federal planning and development funding. Statewide Integrated Airport Systems Planning "identifies the general location and characteristics of new airports and the general expansion needs of existing airports to meet statewide air transportation goals."/2/ This function is performed in California by the Caltrans Division of Aeronautics, which prepares the CASP. Regional/Metropolitan Integrated Airport Systems Planning "identifies airport needs for large regional/metropolitan areas. Needs are stated in general terms and incorporated into statewide system plans."/2/ This function is performed in the San Francisco Bay Area by the Metropolitan Transportation Commission (MTC), which prepares regional airport plans in conjunction with ABAG and incorporates resulting policies into the Regional Transportation Plan. Airport master plans, according to the FAA, "are prepared by the operators of individual airports, usually with the assistance of consultants. They detail the specific long-range plans of the individual airport within the framework of statewide and regional/metropolitan system plans."/2/

According to the above-summarized FAA guidance, the SFIA Master Plan was prepared at the appropriate level: by the airport operator and its consultants. However, the SFIA

Master Plan is not formally "within the framework of statewide and regional/metropolitan system plans." This situation derives at least partly from lack of coordination and integration among the regional, state and federal planning levels. In relation to the Bay Area, regional and state aviation planning processes are not formally coordinated; consistency among the regional and state plans is not readily apparent, and neither the regional nor the state aviation planning agency has complete authority to fully implement all plan policies. In an effort to better coordinate aviation planning in California, a "plan for planning" concept is being developed by the Caltrans Division of Aeronautics and the Regional Transportation Planning Agencies Aviation System Planning Committee. The "plan for planning" concept has three basic objectives: 1) coordinate aviation system planning at the state and regional levels, including inter-regionally; 2) Make the best use of scarce system planning funds, in coordination with the FAA; and 3) encourage the equitable distribution of system planning funds throughout the state./3/ Obstacles to the implementation of comprehensive regional and state aviation system plans are discussed further below, under Regional Forecasts and Capacities (pp. C&R.70-73 herein). Thus, in theory, individual airport master planning in a complex, multi-airport region such as the Bay Area should be integrated with aviation planning at the regional, state and federal levels, and each should address problems appropriate to that level. In practice, without this degree of coordination, airport operators (by virtue of their site-specific knowledge and hands-on experience) generally perform the detailed facilities inventory and requirements analyses required for individual airport master planning.

It is not known whether a consortium capable of independent and comprehensive master planning for SFIA could be assembled, nor how such a body would be managed and financed. Other large metropolitan regions, such as Los Angeles and New York, conduct planning for multiple airport development within the auspices of a municipal or regional agency or authority which has decision-making power over several airports within the region. A regional agency similar to the Port Authority of New York and New Jersey, which operates a multi-airport system in a region also characterized by congested airspace and ground transportation conditions, could potentially be established for the Bay Area in the future. Even if the political conditions existed for establishment of such an authority in the Bay Area, the practical need for individual airport master planning would not likely be completely eliminated (however, the objectives of the individual airport operators could differ under a regionally controlled system from their objectives under the existing structure).

Existence of a Bay Area airport authority, moreover, would not necessarily lead to the outcome desired by the commenter--that is, a comprehensive Master Plan for SFIA that would also be [the most] "environmentally sound." If the authority could optimize system-wide resources by, for example, facilitating diversion of aircraft from more-congested to less-congested airports within the system, overall environmental effects of regional aviation operations could potentially be reduced. But in developing airport and regional master plans, such an authority, as do the individual airports currently, would need to balance environmental soundness with numerous other planning concerns and criteria (i.e., fiscal and economic factors; airline industry trends and airline business decisions over which the airports have minimal influence; government regulations; demand forecasts; levels of service to customers; relations with surrounding governments and communities; and competition with other airports, regional "hubs," technologies and inter-city travel modes).

The second commenter's assertion that SFIA is the Bay Area's designated Regional Airport is likely incorrect as no regional, state or federal authority is known to have made such a designation. As explained above, under Project Sponsor Objectives and Approach (pp. C&R.8-18 herein, SFIA is the region's largest airport in terms of passenger traffic and is larger than all of the other air carrier airports in the region combined. However, three other airports -- Metropolitan Oakland International Airport (MOIA), San Jose International Airport (SJIA) and Sonoma County Airport -- provide air carrier service to the Bay Area and can therefore also be considered Regional Airports.

REGIONAL AIRPORT SYSTEM PLAN (RASP) UPDATE

<u>Comments</u>

". . .As the regional transportation planning agency, MTC must develop and adopt a Regional Airport System Plan. The last regional airport plan was adopted in 1980, and the forecasts have been periodically reviewed and updated since that time . . . MTC is now engaged in the comprehensive review and updating of the 1980 plan. The new RAP will examine airport system alternatives for 2005 and 2010." (Chris Brittle, Metropolitan Transportation Commission)

". . .[I]n the project summary and then again in the alternatives, it does talk about MTC and other agencies thinking some of this business should go to other airports. But it doesn't flesh that out. We don't know what the traffic impacts are on San Jose or on Oakland. We don't know if their traffic is so bad that we are wrong to say it should go there. It could be that it would be very advantageous for it to go there. But in this document, you can't tell that.

"It seems to cry out for a regional EIR, a regional discussion of airports. I would think MTC would almost be demanding that, or the state, somebody in control. I don't think it should be just be up to one individual airport who maybe can make more money. . . The stuff just isn't in here to make an unbiased decision. The Airport Commission, with this data, is just thinking about themselves and not the good of the other people. I think they will have to take that posture because they don't have the information." (Commissioner Bierman)

"First of all, the EIR essentially views this project in isolation. It views it as a separate project and makes just a cursory mention that other airports in the region are planning to expand. I think the entire picture of the entire region ought to be examined. Oakland and San Jose have equally, if not greater, ambitions for expansion than San Francisco. The FAA is encouraging smaller airports to expand for general aviation use. There are some proposed military base closures. And the future use of those air fields, we don't know.

"I think the entire regional picture ought to be examined before this EIR is adopted. This EIR chose not to examine that. Consequently, I think we ought to wait until the Regional Planning Committee of the Metropolitan Transportation Commission issues its revised Regional Airport Plan and an EIR is done on that. That will examine the entire regional picture, hopefully. And I think in that context, we can then examine the expansion plans of the San Francisco Airport. . .

"With the expansion of the various airports in the bay region, what we are . . . doing is creating a nice revenue generator. We are creating something to boost the economy of the bay region. But we are not looking at the effects of that in their entirety." (Charles Kroupa)

". . .I believe that the plan and the EIR approval should be withheld until a thorough investigation can be made by a regional agency, such as MTC, and pending the issuance of MTC's Regional Airport Plan, which should be forthcoming next year. To approve this EIR prior to that plan, I think, would be very premature." (Charles Kroupa, public hearing of 10/17/91)

". . .Considering the multiple impacts detailed in the EIR for the SFIA alone, it is imperative that regional coordination must be involved for all airports, and that the Regional Airport Plan needs to be updated before expansions take place." (Onnolee Trapp, Leagues of Women Voters of San Mateo County)

"On page 4 a sentence reads 'Those plans [the Caltrans CASP, the FAA Capacity Task Force Study and the MTC RAP] do not include the same recommended means for meeting forecast demand.' After reading statements further along in the report, I suspect that the sentence means that only the SFIA report recommends use of the plan as outlined in the report, that all other reports conclude that SFO is a poor place to expand air service due to the overcrowded, overbuilt conditions, and the overwhelmed situation of ground transportation in and out of the area. . . " (Patricia Clark)

Response

The second paragraph on p. 108 of the EIR has been split into two paragraphs and revised as follows:

> *Regional Airport Plan (RAP)*. This Plan was prepared by MTC and ABAG to guide future aviation growth in the Bay Area, was adopted as an element of the MTC *Regional Transportation Plan* in March, 1975, and was subsequently revised as part of the 1980 edition of MTC's *Regional Transportation Plan* ./52,53/ Forecasts developed for the 1980 *Regional Airport Plan* have been periodically reviewed and revised./53a/ An update of the 1980 *Regional Airport Plan* , known as the Regional Airport System Plan (RASP) Update, is currently in progress and slated for publication by the end of 1992. An Environmental Impact Report on the RASP Update is scheduled for completion in early 1993./53b/
>
> The RASP Update [ ] will include historical, current and forecast levels of aviation activity in the Bay Area, data on Bay Area aviation facilities, capacities and requirements, including ground access, terminals, airfields, airspace, etc.; environmental and other constraints affecting the regional airport/aviation system; and a range of alternatives [ ] for coordinating regional aviation planning, investments in capacity-increasing and other airport projects, and operations. The RASP Update will examine airport system alternatives for 2005 and 2010./53a/

The following notes are added to p. 123 of the EIR:

/53a/ Brittle, Chris, Manager, Planning, Metropolitan Transportation Commission, letter to Barbara Sahm, September 16, 1991.

/53b/ Roddin, Marc, Manager of Seaport and Airport Planning, Metropolitan Transportation Commission, interview, April 22, 1992.

The following text replaces the last paragraph on p. 258 of the EIR:

MTC's Regional Airport System Plan (RASP) Update is scheduled for completion in 1992. When complete, the RASP Update will provide a body of information on the existing regional system and its operations, expected future requirements, and recommendations for accommodating those future requirements. This information can be used by decisionmakers within the region, including the airports themselves, in guiding capital improvement programs and related policy decisions./1, la/ SFIA and the other air carrier airports in the region are members of the Regional Airport Planning Committee (RAPC), and therefore have access to information that becomes available through the RASP Update process regarding the optimization of regional aviation resources and the minimization of overall environmental effects.

No authority currently exists that can enforce the RASP; implementation of its policies and recommendations therefore depends principally on voluntary actions by the airports and airlines. MTC's own authority to implement elements of the RASP is generally indirect, in that MTC has responsibility for environmental review and funding approval on regional ground transportation projects, and authority to prioritize applications from airports within the region for limited California State aeronautics Capital Improvement Projects (CIP) funds (the statewide fund estimate for the next cycle, 1995-96, is only $2.1 million)./1b/ MTC can thus potentially influence regional airport planning and operations primarily through its role in major ground transportation projects affecting specific airports. MTC can also use the RASP to educate and thereby potentially influence other agencies with more direct authority over airport systems and operations in the region (e.g., the FAA, airlines, airports and the U.S. military)./1,la/

The level of detail in the final RASP, moreover, will likely be at a programmatic level. Cooperation by the airports with the RASP would therefore not eliminate the need for development of individual airport Master Plans./1a/

The following note replaces footnote /1/ on p. 260 of the EIR:

/1/ Steve Kiehl, TRA Airport Consulting, telephone conversation, September 16, 1991.

The following notes are added on p. 260 of the EIR:

/1a/ Roddin, Marc, Manager of Seaport and Airport Planning, Metropolitan Transportation Commission, interview, April 22, 1992.

/1b/ Roddin, Marc, Manager of Seaport and Airport Planning, Metropolitan Transportation Commission, Record of CIP Advisory Committee Meeting, October 24, 1991.

As required under CEQA (*Guidelines* Section 15125), the EIR (pp. 107-110, 257-258) addresses inconsistencies between the SFIA Master Plan and the existing (1980) ABAG/MTC Regional Airport Plan (RAP). The EIR notes that the regional plan is in the process of being updated, but does not discuss the potential inconsistency of the SFIA Master Plan with the yet-to-be-completed RASP Update. Similarly, the SFIA Master Plan EIR analysis does not incorporate results of the RASP EIR analysis, since the latter is not yet even started. Discussion in the EIR of the specific contents of these unpublished documents would be speculative.

According to MTC staff, in comments on the SFIA Master Plan EIR (listed and responded to on pp. C&R.66-71 herein), ". . .the Regional Airport System Plan will be looking at in which SFO's share of regional traffic will most likely vary between the current 70 [percent and] a lower share of about 55 [percent], reflecting a substantial redistribution of air service to other airports."/4/ As pointed out by one commenter, if such air service redistribution were to occur, it would likely result in traffic impacts different from those identified for the SFIA Master Plan, including more severe traffic impacts in San Jose and Oakland. The potential traffic impacts resulting from redistribution of some future SFIA air passenger demand and aircraft operations to other airports in the region are discussed qualitatively in the EIR on pp. 473-474, under the Offsite Alternative. On the basis of limited information available during analysis of the SFIA Master Plan EIR Offsite Alternative, and the extent of disagreement among experts regarding future airport system capacities and air travel demand in the Bay Area, quantified traffic impacts for a regional redistribution scenario (or other regional airport system scenarios) cannot be reasonably ascertained for inclusion in the SFIA Master Plan EIR, given its timetable for completion. (These issues are further discussed below, under Decentralization/Redistribution of Aviation Activity; Capacities and Plans of Other Regional Airports, and Offsite Alternatives: Regional Redistribution, pp. C&R.75-85 and C&R.88-93 herein.)

According to CEQA standards for adequacy of an EIR (CEQA *Guidelines*, Section 15151), "An EIR should be prepared with a sufficient degree of analysis to provide decisionmakers [in this case, the San Francisco Airports Commission] with information which enables them to make a decision which intelligently takes account of environmental consequences" of the project (in this case, the SFIA Master Plan). As the certifying body of the Lead Agency, the San Francisco City Planning Commission may have to make a determination on the EIR's adequacy in the absence of analysis from the completed RASP Update and its EIR.

As correctly pointed out by one commenter, a detailed examination of the entire regional aviation picture, including other planned airport expansions and potential military base closures, is not included in the EIR; these items are addressed in the EIR at a general level for two reasons. First, the purpose of the EIR is to examine, and identify ways to avoid or reduce, the environmental effects of *the project,* which is defined as the SFIA Master Plan. Second, as with the RASP Update, the master plans or CEQA analysis of the master plans of the other major air carrier airports are in progress, making detailed analysis of their effects speculative. Draft data and information are available, however; some elements have been incorporated into this document and C&R.Appendix A. Although various possible civilian-aviation-use scenarios for Travis Air Force Base, Hamilton Air Force Base/Army Airfield, Moffett Field Naval Air Station, Alameda Naval Air Station, and other facilities have been studied by the FAA, MTC, Caltrans Division of Aeronautics and other groups, actual closure and reuse plans, and the overall regional and cumulative effects of implementing those plans, are not fully known at this time.

The commenter is also correct in stating that the EIR does not address the effects, in their entirety, of boosting the economy of the Bay Area through expansion of various airports in the region. According to CEQA requirements, airport expansion as a revenue generator, like other broad economic objectives and impacts, does not need to be evaluated in the EIR unless that would directly or indirectly result in a physical change to the environment (CEQA *Guidelines*, Section 15131). However, the role of airports (particularly that of SFIA) in the region's economy could be an important consideration for the City of San Francisco Airports Commission if it approves the SFIA Master Plan on the basis of findings that economic, social or other benefits outweigh the significant environmental effects of the project (see discussion above, under Regional Planning and Coordination, General, pp. C&R.56-60 herein).

One commenter's understanding, that the Caltrans CASP, the FAA Capacity Task Force Study and the MTC Regional Airport Plan "conclude that SFO is a poor place to expand air service due to the overcrowded, overbuilt conditions, and the overwhelmed situation of ground transportation in and out of the area," is partially correct, in that all three studies identify airfield facilities, airspace congestion, and/or ground traffic congestion as the primary capacity constraints at SFIA, in contrast to the SFIA Master Plan, which addresses terminal facilities, and boarding gates in particular, as SFIA's primary capacity constraint (*SFIA Final Draft Master Plan,* pp. 7.4, 7.10-12 and EIR, pp. 257-258, 439). However, none of the three studies appear to conclude that "overcrowded, overbuilt conditions" in the area (Airport environs cities) is a major determinant of whether SFIA is a good place to expand air service.

REGIONAL FORECASTS AND CAPACITIES

Comments

"For clarification, the current regional airport plan air passenger forecasts and airport traffic assignments are different than those shown on page 110 (see attached excerpts for the MTC Regional Transportation Plan).

"The regional air passenger forecasts were last revised in 1986, and the airport traffic assignments were last revised in 1987. Note that the actual 1990 airport traffic shares for the Bay Area airports (page 120) are quite close to the recommended traffic allocations in the regional airport plan, i.e., the traffic allocations associated with a Bay Area traffic level of 43 Million Annual Passengers (MAP).

"The current regional airport plan recommends that Oakland and San Jose Airports serve a larger share of regional air traffic as air travel demand increases in the future. These recommendations stem from extensive previous analysis showing this strategy is essential to: balance available runway and airspace capacity (i.e., reduce excessive aircraft and passenger delays), provide more convenient and accessible air service to the Bay Area's population, provide noise relief to Bay Area residents, and to minimize vehicle travel and air pollution for ground trips to and from Bay Area airports. One of the reasons the Plan is now being revised is to coordinate ongoing airport master plan proposals for SFO, Oakland and San Jose Airports. San Francisco's master plan, for example, proposes to serve 51.3 MAP in 2006, whereas the current policy limit in the regional airport plan is 31 MAP; similar conflicts with the regional airport plan exist at the other Bay Area airports. The question of how much additional airport capacity is needed and the optimum share of traffic for each airport is the subject of the current Regional Airport System Plan update due to be completed in . . . 1992. Airport system alternatives for the update study are now being defined through discussions with the ABAG/MTC Regional Airport Planning Committee (RAPC). San Francisco Airport's Master Plan should be consistent with the regional plan.

"MTC's 'expected' forecast for the Bay Area is 62.6 MAP in 2005 and 70.7 MAP in 2010; these projections employ different methodologies than either the FAA forecast or the CASP forecast.

However, the ABAG/MTC Regional Airport Planning Committee has also recommended that the plan update consider the long-term (20-25 year) capacity implications of an air passenger demand level of 84 MAP -- which is similar to the forecast in the California Airport System Plan.

"In terms of airport system alternatives, the Regional Airport System Plan update will be looking at alternatives in which SFO's share of regional air traffic will most likely vary between the current 70% to a lower share of about 55%, reflecting substantial redistribution of air service to other airports. The Master Plan forecasts would be more consistent with retention of the current share." (Chris Brittle, Metropolitan Transportation Commission)

"The DEIR points out (pg. 258) that SFIA passenger forecasts for the near-term (42.3 million annual passengers in 1996) and for the long-term (51.3 million annual passengers in 2006) exceed MTC/ABAG-recommended allocations for SFIA (27 to 31 million annual passengers in 1997). The Regional Airport Plan is currently being updated. In view of the major regional impacts of the expansion sought in the Master Plan, we recommend any decision await the development, public debate and final approval of the Regional Airport Plan. The magnitude of the proposed expansion makes conformity with the Regional Airport Plan imperative." (Gary Binger, Association of Bay Area Governments)

Response

The following text is added to the bottom of Table 14 on p. 110 of the EIR:

> Source: Metropolitan Transportation Commission, *Regional Transportation Plan*, 1980.

The first paragraph following Table 14 on p. 110 of the EIR is amended as follows:

> A comparison of MTC's 1980 Regional Airport Plan-recommended shares of regional passenger traffic with actual 1989 shares for the five Bay Area air carrier airports is presented in the discussion of regional aviation activity and regional capacity issues, beginning on p. 118.

The following text and tables are added after the first paragraph following Table 14, on p.110 of the EIR:

Tables 14A and 14B, below, reflect the most recent MTC regional airport plan passenger forecasts (revised in 1986) and airport traffic assignments (revised in 1987). Anticipated total regional air passenger demand in the most recent forecasts is higher than in MTC's 1980 Regional Airport Plan forecasts, and the most recent forecasts are extended to 2005 (whereas the previous forecasts extended to 2000). The recommendation that SFIA's passenger share should decrease relative to shares of the airports at Oakland, San Jose and Concord as total Bay Area air passenger demand increases, is inherent in both the 1980 and the 1986-1987 Regional Airport Plan airport traffic assignments.

[TABLE 14A]

PROJECTED BAY AREA AIR PASSENGER DEMAND
(Millions of annual passengers - on & off)

Time Frame	Total Bay Area Air Passengers
1995	40.8 - 46.8
2005	48.7 - 58.7

Source: Metropolitan Transportation Commission, *Regional Transportation Plan for the Nine-County San Francisco Bay Area,* 1988.

[TABLE 14B]

AIRPORT TRAFFIC ASSIGNMENTS
(Millions of annual air passengers - on & off)

	Level 1		Level 2		Level 3	
Airport	Demand	Share	Demand	Share	Demand	Share
San Francisco	19.9	78.7%	30.0	69.3%	31.0	55.1%
Oakland	2.6	10.1	6.0	13.9	15.0	26.6
San Jose	2.8	11.2	7.0	16.2	10.0	17.8
Buchanan Field	--	--	0.3	0.6	0.3	0.5
Total	25.3	100.0%	43.3	100.0%	56.3	100.0%

Level 1 represents the 1981 traffic level and traffic distribution among the airports. Levels 2 and 3 represent shares derived from policies in the RAP and airport master plans. Air passenger assignments for intermediate levels of Bay Area demand may be determined by interpolation between the three levels of demand shown in the table.

Source: Metropolitan Transportation Commission, *Regional Transportation Plan for the Nine-County San Francisco Bay Area,* 1988.

In 1990, SFIA's actual passenger level (about 30.4 MAP) and regional share (about 70.4 percent) were relatively close to MTC's recommendations for SFIA's component of regional passenger demand Level 2, shown in Table 14B. At regional demand Level 2 (43.3 MAP for the region), MTC recommended 30 MAP and 69.3 percent of the regional passenger market for SFIA. The actual regional total in 1990 was about 43.8 MAP. Thus, SFIA's 1990 passenger level and regional market share were consistent with MTC's most recent (1987) airport traffic assignments.

However, the passenger levels and market shares anticipated in the SFIA Master Plan are not consistent with MTC's airport traffic assignments. As shown in Table 14B, MTC assumed a 13 MAP or 30 percent increase in total passengers for the region between demand Levels 2 and 3, but recommended that SFIA's passenger total increase by only one MAP (to 31 MAP) and that its market share decline from 69.3 percent to 55.1 percent of the regional total. The SFIA Master Plan, in contrast, assumes that SFIA would serve between 70.5 and 72.8 percent of regional passenger demand at Level 3, or 56.3 MAP. (The basis of this comparison is SFIA Master Plan Table 7.1, "Total Passengers -- Regional San Francisco-Oakland-San Jose Area Passenger Forecasts" and Table 7.2, "Total Passengers--San Francisco Airport Passenger Forecasts." Forecasts in SFIA Master Plan Table 7.1 show the 56.3 MAP level being reached between 1994 and 1995; according to SFIA Master Plan Table 7.2, SFIA's "unconstrained" passenger total would be about 39.7 MAP in 1994 and about 41 MAP in 1995. Thus, the data in the two tables reflect an expected regional share under the SFIA Master Plan of 70.5 to 72.8 percent for a regional passenger level of 56.3 MAP, MTC's Level 3).

MTC's most recent (1986) regional air passenger demand forecasts and most recent (1987) airport traffic assignments are being revised as part of the RASP Update.

A range of forecasts of total air passenger traffic for the Bay Area as a whole in 2005 and 2010 was compiled in the RASP Update process by extrapolating or interpolating as necessary from the respective airport master plans; the MTC/RAPC (forecasts done for the RASP); FAA San Francisco 1986 HUB Forecast; 1991 FAA National Forecast; 1990 FAA Terminal Area Forecast; and 1989 Caltrans CASP./5/ (Note: EIR Table 10, p. 64, provides comparisons of 1996 and 2006 SFIA Master Plan forecasts in several categories of aviation activity with CASP and 1989 FAA Terminal Area Forecasts for SFIA in the same categories.)

Of the regional forecasts compiled for the RASP Update, the CASP forecasts are the highest: about 80 MAP in 2005 and 90 MAP in 2010. The combined airport master plan forecasts total about 79 MAP in 2005 and 89 MAP in 2010 for the region (SFIA's Master Plan forecasts were adjusted to provide figures for 2005 and 2010). It can be seen that this pair of aggregated master plan forecasts is close to the CASP's pair of regional forecasts for

2005 and 2010; however, the CASP forecasts reflect more growth at SFIA and MOIA, and less at SJIA, than do the combined Master Plan forecasts./5/

Two sets of forecasts, low and high, were developed by MTC/RAPC and TRA Airport Consulting for the RASP Update. The MTC/RAPC high forecasts are about 75 MAP for 2005 and about 85 MAP for 2010; low forecasts are about 62 MAP for 2005 and about 71 MAP for 2010 (these "low" forecasts are referenced by the commenter as MTC's "expected" forecast for the Bay Area). The FAA Terminal forecasts for the region, about 64 MAP in 2005 and about 72 MAP in 2010, are close to the MTC/RAPC low forecasts.

The commenter from MTC is correct in stating that the SFIA Master Plan market share assumptions contrast with previous MTC RAP recommendations. SFIA Master Plan market share assumptions would also contrast with future RASP Update recommendations if the commenter's expectations (as MTC's Planning Manager) are correct. The forecasts surveyed for the RASP Update from federal, state, and regional agencies, as well as from the respective master plans, show SFIA maintaining from about 58 percent to 71 percent of the region's passenger market through 2005. (Some of these forecasts show constant market shares in the future because they used existing market shares to apportion forecast total Bay Area air passengers among the air carrier airports, rather than considering market shares to be a study variable.)

It is acknowledged in the EIR (p. 258) that the SFIA Master Plan is not consistent with the 1980 MTC RAP. As noted in the previous response (p. C&R.63 herein), the major Bay Area air carrier airports are participants in the RASP Update process through their membership in the RAPC and/or staff attendance at RAPC meetings. However, MTC cannot compel the airports and the airlines providing service in the region to bring their operations, or their respective master plans, into conformance with the previous RAP or the RASP Update.

Reducing or eliminating inconsistencies between the SFIA Master Plan and the existing MTC RAP (or the future RASP Update) is not mandated by CEQA. The CEQA *Guidelines* (Section 15125(b)) require that the setting of the EIR "shall discuss any inconsistencies between the proposed project and applicable general plans and regional plans," including regional transportation plans. Further, the *Guidelines* recommend that, "Where individual projects would run counter to the efforts identified as desirable or approved by agencies in the regional plans, the Lead Agency should address the inconsistency between the project plans and the regional plans. As a result of this analysis, Lead Agencies may be able to find ways to modify the project to reduce the inconsistency" (CEQA *Guidelines*, Section 15125, Discussion).

The EIR, pp. 82-118 and pp. 253-259, discusses inconsistencies between the SFIA Master Plan and policies of applicable general plans (City of Brisbane, City of Burlingame, Town of Colma, City of Daly City, City of Foster City, Town of Hillsborough, City of Millbrae, City of Pacifica, City of San Bruno, City of San Mateo, City of South San Francisco, City and County of San Francisco, and County of San Mateo), and applicable plans and policies of state and regional agencies (ABAG, MTC, other airport master plans, Caltrans and the San Francisco Bay Conservation and Development Commission (BCDC)). Consistency of the SFIA Master Plan with applicable policies and plans of the Bay Area Rapid Transit District (BART), the Bay Area Air Quality Management District (BAAQMD) and the San Francisco Bay Regional Water Quality Control Board (RWQCB) are discussed in the EIR on pp. 134-136, pp. 267-270 and pp. 320-323 (BART), pp. 172-173 and pp. 354-364 (BAAQMD), and pp. 233-235 and p. 402 (RWQCB).

While the term "shall" in CEQA *Guidelines* Section 15125 indicates that discussion in the EIR of inconsistencies between a project and applicable plans is <u>mandatory</u> under CEQA, use of the term "should" indicates that addressing those inconsistencies is <u>advisory</u> and use of the term "may" indicates that finding ways to reduce the inconsistencies is a <u>permissive</u> element under CEQA. Public agencies are advised to follow CEQA provisions identified by "should" in the absence of compelling reasons to take another approach. Permissive elements are left fully to the discretion of the public agencies involved (CEQA *Guidelines*, Section 15005). Inconsistencies between a project and applicable plans and policies do not in themselves constitute significant physical environmental effects under CEQA; however, the presence of such conflicts may indicate or correspond to significant physical environmental effects, and may point to possible mitigations or alternative approaches that would avoid or reduce those effects.

<u>Comment</u>

"Finally, members of the Planning Commission at the August 29th hearing raised the matter of a regional discussion of airports, including SFIA, Oakland and San Jose. The Committee agrees with this criticism. The SFIA Master Plan and its EIR should include consideration for future activities at all three airports, incorporating at the least:

"1. Forecast passenger and cargo demand for the whole Bay Region based upon rigorous macro-economic analysis which incorporates a realistic and thorough examination of the Bay Region's participation in the United States, Pacific Rim, Latin American and European economies.

"2. Forecast passenger and cargo demands for individual air-carrier airports based upon thorough micro-economic analysis.

"3. Inventory all existing buildings, facilities and equipment at all airports (including military) in the region which might be capable of servicing air carriers.

"4. Inventory present use of airspace in the Region by altitude, time-of-day, day-of-week, season-of-year and weather conditions.

"5. Analyze present management practices and resource husbandry at individual air-carrier airports, and specify action necessary to optimize them. . .

"7. Create a plan for airspace use by altitude, time-of-day, day-of-week, season-of-year and in view of weather conditions which minimizes flight over urban areas. Useable airspace over non-urban areas seems to be a significant constraint on airport operations in the Bay Area.

"8. Using Item 7 above, match Items 2, 3, 4, and 5 to determine local excess and shortfalls vis-a-vis forecast passenger and cargo requirements.

"9. Create policies based on Items 3, 6 [moved to comments and responses on Alternatives (see pp. C&R.96-97 herein)], 7, and 8 which optimize use of existing infrastructure, and which optimize benefits from new management practices and from new and replacement construction at the lowest cost.

"10. Develop a cost-benefit analysis, capital budget and regionwide plan for implementing Item 9." (Timothy Treacy, Airport Noise Committee)

Response

CEQA does not require that the SFIA Master Plan EIR create a regional airspace plan, a regional airfield, air terminal and airport ground access infrastructure plan, or associated budgetary plans. The EIR could be required to evaluate these items if they were defined as part of the project. However, as noted previously, the EIR's purpose is to evaluate potential effects of the SFIA Master Plan (the project as proposed), and to identify feasible mitigation measures and alternatives that would avoid or substantially reduce any significant effects identified. The City of San Francisco Airports Commission, as the project sponsor and the decision-making body of the Lead Agency under CEQA, could elect not to approve the project (even if the EIR has been certified by the Planning

Commission), or could require substantial revisions to the project, including expansion of the SFIA Master Plan to make it more regional or comprehensive in scope. This action could not be takenby the Planning Commission, which in this situation is empowered only to evaluate the adequacy of the EIR under CEQA.

Many of the tasks outlined by the commenter have been, or are being, undertaken by the individual airports in their master planning efforts, the FAA, the Northern California Airspace Users Working Group, Caltrans, or MTC. Both the MTC RASP Update and the Caltrans CASP are comprehensive ongoing planning programs; coordination between state and regional planning efforts is being improved (as noted above, under Regional Planning and Coordination, General, pp. C&R.58-60 herein).

However, even as coordination of the regional and state comprehensive planning programs improves, the problem of implementation remains. Caltrans, which currently has a limited role in statewide aviation operations, has identified barriers to implementation of the CASP and the development of an Integrated Airport System for California. From Caltrans' perspective: 1) policy/financial issues need to be separated from the ownership/operation function, since airport owners currently have relatively little incentive to respond to state, regional or national goals; 2) legislation mandating state and regional oversight of airport master plans and grant programs is needed to insure consistency with CASP and regional airport plans; and 3) funding levers are needed to provide that oversight, but there is currently no direct state or regional role in federal funding decisions./6/ To remedy these problems, Caltrans recommends consideration of legislation requiring that all federal funding for airport capital improvements be channeled through Caltrans, and advocates a more significant state role in funding airport ground access and capital improvement projects./6/ The outcome of this Caltrans initiative is unknown at this time.

AIR PASSENGER DATA AND REGIONAL TRAFFIC IMPACTS

Comment

"One of the biggest problems I have with this EIR is that there is no analysis as to where the people are coming from. While you can discuss what the impacts can be with or without the project in a very localized area, there's absolutely no impact -- you can't analyze what an alternative might be, if, for example, they opened up an airport at Hamilton Air Force Base as to what the impacts are going to be on the Golden Gate Bridge and traffic through San Francisco, for any policy-maker to be able to analyze what the impact is of following the MTC's recommendation of having Oakland expand and therefore perhaps create a decrease in traffic that is going cross the San Mateo Bridge and the Bay Bridge, all of which is tremendously important in terms of the future of San Francisco's ability to accommodate office workers who want to commute into town.

"I find that a really big deficiency in the EIR, both in terms of traffic impacts and policy planning, as to trying to make some tradeoffs, given the fact that this EIR describes really, you know, the worst case. I mean, it's like reading the downtown EIR. And that is the freeways are going to be jammed to capacity on 101 starting in 2006. And basically the answer to this EIR is, well, we only contribute marginally to it, so there is nothing we can do about it, so let's just add -- we are going to expand and not really worry about it, which is, I think, the approach to this.

"I don't think we can take that approach. I think we have got to look at -- I am a big supporter of regional planning in this area. But it's very hard to do regional planning when there is no analysis in here about where the people are coming from to take the planes and what alternatives there might be to serve those people, and, correspondingly, what should be the role of San Francisco Airport, should it be an international connecting airport, or should it service local flights down to L.A.

"And maybe that data has been collected and it is not in here. But to me, when you're talking about a huge regional project like this, it's deficient not to look at the regional-wide transportation impacts. It's certainly not helpful for policy-makers to try and make those kinds of decisions." (Commissioner Engmann)

<u>Response</u>

The fundamental concern expressed by the commenter appears to be that, because of the regional nature of the SFIA Master Plan project, a regional understanding of passenger travel patterns and the related regional traffic impacts is needed to understand the potential effectiveness of mitigation measures and alternatives. As noted on pp. C&R.39-40 herein, the San Francisco City Planning Commission must make a determination on the EIR's adequacy on the basis of CEQA standards. While CEQA requires that an EIR provide decision-makers with information that allows them to make a decision which intelligently takes account of environmental consequences (CEQA *Guidelines*, Section 15151), it also states in the same section that "An evaluation of the environmental effects of a proposed project need not be exhaustive, but the sufficiency of an EIR is to be reviewed in light of what is reasonably feasible."

Regional airport planning within the Bay Area is under the purview of MTC and Caltrans. However, as explained previously, these agencies do not have the authority to require airports in the region to fully implement regional and state aviation plans. Individual airports have the authority to implement their own development plans whether or not these plans are consistent with regional or state planning efforts. Given that the plans of MOIA and SJIA are still under development and/or environmental review, and that there are no adopted development plans for Hamilton Air Force Base, it would be speculative to analyze cumulative impacts from potential future airport development in these locations at this time. If "a particular impact is too speculative for evaluation, the agency should note its conclusion and terminate discussion of the impacts" (CEQA *Guidelines*, Section 15145).

The traffic analysis in the EIR does identify significant impacts and mitigation measures for several regional transportation links from San Francisco to Redwood City. In addition, on pp. C&R.133-34 herein, the EIR examines capacity on the Golden Gate and Bay Bridges. In general, the area of traffic-impact analysis was limited to locations where the traffic impacts of the SFIA Master Plan could be expected to be measurable or statistically significant.

The reasons for limiting the scope of the EIR traffic analysis are discussed further below, under Transportation Setting and Impacts, Regional Traffic Impacts (p. C&R.133 herein). Information from the 1990 MTC Air Passenger Survey is summarized in C&R.Appendix A and above, under Project Description, Activity Patterns and Forecasts (pp. C&R.28-30 herein).

DECENTRALIZATION/REDISTRIBUTION OF AVIATION ACTIVITY; CAPACITIES AND PLANS OF OTHER REGIONAL AIRPORTS

<u>Comments</u>

"The DEIR notes that the Metropolitan Transportation Commission in its Regional Airport Transportation Plan has determined that 31,000,000 passengers per year is San Francisco Airport's 'fair share' of regional air traffic. The DEIR should address as an alternative, diverting domestic air travelers to other regional airports to accommodate San Francisco's increase in international air travel." (Janet Fogarty, Mayor, City of Millbrae)

"Please consider the following recommendations: . . .

> "Decentralization of SFO is necessary for the 1990's and 21st Century. Airport branches are needed on the ocean shore at Half Moon Bay to service the Peninsula; in the north bay at Hamilton Airfield to service Marin, Sonoma and Napa Counties; and in the South Bay at Moffett Airfield to further service the Peninsula. Impact from traffic, noise, pollution and population along Highways U.S. 101, 380, 280 and CA I should not increase." (Leonard Lundgren, Lakeside Property Owners Association)

"The EIR must address the issue of sharing in the region's air traffic growth with other regional airports, including Oakland and San Jose airports. In other words, Oakland and San Jose should receive their fair share of the region's air traffic growth rather than expanding SFIA to handle the brunt of the growth and the accompanying impacts." (George Foscardo, City of San Bruno)

"Also, as we look at the airport plans for San Jose and Oakland, to what extent does this major expansion impact plans in those other areas, or is this a plan selfishly by itself?" (Commissioner Sewell)

"It is respectively requested that approval be given to the plan for the expansion of the San Francisco International Airport. This matter is now pending before you and the announced hearing date is October 17, 1991. For convenience and reliability I am of the opinion that there exists only one first class airport in the San Francisco Bay Area. The excellent service level has continued since 1932. The airport at Oakland has always been a step behind San Francisco International Airport. At San Jose anything can happen there, such as:

"1. Certain citizens of the City of San Jose complain about commercial airplane noise and the. . . managers approval, on a test basis, of a police helicopter. I have no problem with noise from any type of aircraft but helicopters whether military to news broadcasting are a problem. Commercial airplanes are descending to San Jose International Airport over my home (South of San Jose International Airport) most of the time and I have no noise problem. When it is raining or there is the threat of rain the commercial airplanes are climbing and over the last twenty-five years there has been a substantial reduction in noise. . .

"4. The prevailing wind at San Jose International Airport is from the North and these . . . managers are proposing to locate a stadium for the Giants (national professional baseball team) in North San Jose. If the Giants come to San Jose would there be an issue as to whether flights from San Jose International Airport would be restricted during the time for home games.

"And, 6. Pricing for tickets out of San Jose is not competitive. American says the fliers would pay the price for the convenience to fly out of San Jose. Yes, if you are the President of Apple but not a retired person." (James Palma)

Response

Determining the extent to which future Bay Area air passenger traffic could be more evenly distributed among air carrier airports than at present is a complex problem that encompasses numerous "disagreements among experts." This issue is currently under investigation as part of the MTC RASP Update process; according to MTC comments on the SFIA Master Plan EIR (see pp. C&R.66 herein), "[t]he question of how much additional airport capacity is needed and the optimum share of traffic for each airport is the subject of the current Regional Airport System Plan update due to be completed in . . . 1992 . . . One of the reasons the Plan is now being revised is to coordinate ongoing airport master plan proposals for SFO, Oakland and San Jose Airports."/4/ As noted above, under Regional Airport System Plan (RASP) Update, (pp. C&R.60-66 herein), the EIR cannot incorporate the final results of this effort because the work is still in progress. However, a discussion of the difficulties involved in merely *defining* an optimum share or regional redistribution scenario is included here to help illustrate why impact evaluation for such a scenario is speculative at this time.

Even if the optimum share or regional redistribution scenario and its environmental effects could be reasonably ascertained prior to completion of the RASP Update, the "feasibility" of this scenario as an Offsite Alternative for the SFIA Master Plan EIR must still meet CEQA criteria (CEQA *Guidelines*, Sections 15364 and 15126(d)). Feasibility, in this context, means "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors." This and related issues are discussed further below, under Offsite Alternatives: Regional Redistribution, (pp. C&R.88-93 herein).

The EIR (pp. 439-463) includes two variants of the No-Project Alternative: one that assumes little or no future growth in passenger traffic at SFIA, and one that assumes a moderate level of growth even without facility expansion. The Offsite Alternative (EIR pp. 468-475) is an extension of the second No-Project variant; it explores the possibility that some air passenger demand not met at SFIA (due to the absence of expanded facilities) could be redistributed (without any specified intervention in the market) to other airports or other transportation modes. However, the EIR (p. 473) notes that the Offsite Alternative is not sufficiently defined to permit specific identification and calculation of associated impacts at this time.

To evaluate how future air passenger traffic could be distributed or redistributed among Bay Area airports, numerous variables need to be understood individually and in relation to each other. These variables may be grouped roughly into three major categories: air travel demand, airport capacity (including airport access), and air service supply. These are subjects of ongoing study, not only for planning and policy documents such as the CASP and the RASP Update, but also to support the day-to-day business operations and strategic planning decisions of airports and airlines. Many of the questions about demand, capacity and supply that would need to be studied in developing an optimum share or regional redistribution scenario are posed in the public comments on the EIR. The EIR, in conformance with CEQA requirements for evaluation of the project and a range of reasonable alternatives, does not attempt to answer in detail a majority of these questions; the listing below is included to illustrate the complexity of defining a regional redistribution or optimum shares scenario.

The starting point for this inquiry is essentially: if the air passenger demand that is forecast in the SFIA Master Plan were to materialize, and it were not provided for at SFIA, what would happen to it? This question may be more broadly framed as: how much, how fast and where can passenger demand within the region be expected to increase or decrease in the future, and why? These questions lead to others regarding the nature of air travel demand, such as: what makes passengers choose to travel by air in the first place, and what makes them select one airport versus another? If they actually prefer a particular airport, why? Are they most concerned about location, convenience of access, airfares, flight schedules, or other considerations? What factors underlie the existing patronage patterns of the various airports in the region? Where are people coming from and going, and why? Do SFIA demand forecasts and those of the other airports reflect passenger preferences for the specific airport, or could total regional demand be considered relatively flexible, flowing in one direction or another in response to various capacity/access and supply/cost conditions?

These questions lead to further questions about air travel demand characteristics, such as: how do various types of passengers (business, tourist; resident, non-resident; older, younger; high- or low-income; etc.) differ from one another in their behaviors and preferences? How might passenger demand be affected by changes in the overall economy, airfares, traffic congestion near airports, availability of alternative technologies such as teleconferencing, or availability of alternative transportation modes, such as high-speed rail? How much delay will different types of air passengers tolerate--on their way to the airport, at the terminal, on the runway, or waiting to land at their destination? How does air passenger demand vary by time of day, week, month, or year? What are the characteristics of demand for air cargo services, and how does this relate to passenger demand, airport capacities and airline services? (Background information on air travel demand characteristics is included in C&R. Appendix A, Attachment D, Background to Airport Operations.)

Another set of questions one might ask concerns airport access and capacity. First, if in the future, more Bay Area air passengers would be willing to go to airports other than SFIA (whether they actually prefer SFIA or not), would those passengers be able to get to the other airports as conveniently, and if so, could their air travel needs be as well accommodated? How are people getting to and from the respective airports at present? To what extent do ground access conditions in the region (roadway congestion, lack of convenient transit services) or parking availability limit utilization of airport capacities? How, why and where might those problems worsen in the future? What are the existing physical capacities of Bay Area airports (terminals, gates, runways and airspace)? How much unused capacity, of what type, exists at present airports in the region, including SFIA? What is each airport's maximum capacity? If one more plane, or one more passenger, wanted to use an airport beyond that "maximum capacity," what would happen -- more congestion, more delay, an increase in the duration of the peak hours of operation? How efficiently are the various aviation resources in the region being used at present? What are the obstacles to utilizing or expanding airport capacities?

These questions, also, lead to further airport access and capacity questions, such as: how are the functions (general aviation, air carrier, cargo, heliport, military, etc.) of different airports within a region established and how are those roles changed over time? How do airports finance their operations and capital improvements? How do airports coordinate with one another? How do the airports' physical capacities and management practices relate to airline service decisions? How do government regulations, such as air traffic controls, affect existing or potential capacities of airport landside facilities? (Information on airport operations and related government regulations is included in C&R. Appendix A, Attachment D, Background to Airport Operations.)

On the air service supply side, one might ask: if demand could be considered flexible and the respective airports could provide sufficient capacities, would the appropriate air services be available to support a regional redistribution scenario? To what extent can airports or local government agencies affect the business decisions of airlines? How does air passenger demand affect the services offered by airlines, and vice versa? What other factors (competing services, operating costs, aircraft load factors, etc.) determine the types and frequencies of service offered by the airlines? How do the airlines decide what capacity airplane to utilize for a particular flight at a specified airport on a given day? What have been, and will be, the effects of changes to government regulation of the airline industry? What are the implications for the Bay Area of the trend toward hub-and-spoke operations by the airlines? How do conditions and regulations at destination airports (domestic and overseas) influence flight schedules to and from Bay Area airports, and how might those conditions change in the future? How do changes in the overall economy affect airline service decisions? (Information on airport operations and related government regulations is included in C&R.Appendix A, Attachment D, Background to Airport Operations.)

As noted previously, many of the above questions have been, or are currently being, researched extensively. Comparative passenger forecasts were discussed in the EIR (pp. 61-64) and above, under Project Description, Activity Patterns and Forecasts, and Regional Forecasts and Capacities (pp. C&R.28-38 and C&R.66-73 herein). SFIA airfield capacity issues are discussed in the EIR (pp. 65-72). Capacities of airports region-wide have been assessed as part of the RASP Update./7/

The RASP Draft Inventory chapter summarizes the existing physical, operational, environmental, and policy conditions for each public-use and military airport in the region, and for the system as a whole. The preliminary draft Capability Assessment working paper compares each airport's existing capacity with existing levels of demand, and provides an analysis of potential constraints on future aviation activity at each airport. The preliminary

Draft RASP Update working paper's comparison of runway capacity with demand found that "The commercial service airports are constrained considerably in the peak hour. Demand for runway access exceeds capacity in IFR [poor weather] conditions."/7/ (See C&R.Appendix A, Attachment B, MTC Exhibit 4.23 for percentage of annual runway capacity currently used at each airport.) Other factors MTC is considering in its analysis are the frequency of IFR conditions, and the potential for IFR conditions locally or at other airports to affect capacity/demand relationships at Bay Area airports./8/. The preliminary draft Capability Assessment working paper's comparison of "landside" (including passenger terminal) capacity with demand found that SJIA "...has a terminal capacity shortfall"; SFIA "...has insufficient domestic and international terminal capacity"; and MOIA "...has an adequate terminal capacity availability."/7/

The Draft RASP Update constraints analysis notes that "There are additional factors beyond the airports' physical capacity...which place limitations on how much activity can and will take place at each airport." The constraints are categorized as airspace-, environmental-, physical-, and policy-related.

Airspace constraints "...relate to regional airspace issues." The airspace used by the Bay Area airports overlaps, and procedures are in place where flights from one airport "interact" with (operate in the same airspace as) flights from another airport. Because SFIA has the largest share of the region's air traffic, SFIA has been established at the top of the "user's hierarchy." This designation means that the operations of other airports in the region (in the airspace) must conform with the operations at SFIA./7/

Environmental constraints are those related to the natural environment, such as wildlife, wetlands, and San Francisco Bay. According to the MTC RASP Update preliminary draft Capability Assessment working paper, two of the major commercial airports, Oakland and San Francisco, are situated on the Bay, and host a variety of wildlife. Development at Oakland is also affected by the presence of non-Bay wetland areas. Wetlands exist to a lesser degree at other airports as well. Construction of new runways which affect wetlands or require Bay fill will meet with public opposition that may be strong and well organized./7, 8/

Physical constraints include such things as "limited airport size or the presence of physical barriers to growth." The constraints analysis notes that SFIA "is constrained by the absence of sufficient land area for a new runway and passenger terminal development," but has undeveloped parcels that could accommodate support facilities. MOIA "has considerable land area" for development, but also has "significant areas of environmentally sensitive property." Future development at SJIA is "highly constrained," given the airport's location and small site./7/

Policy constraints "...include noise, safety, and other community compatibility issues." The constraints analysis notes that noise regulations are in place at SFIA, MOIA, and SJIA. SJIA has a curfew on all operations from 11:30 p.m. to 6:30 a.m.; "[t]his limits the total daily activity which can occur at the airport, and also creates some congestion during the morning hours. If continued into the future, the curfew will constrain activity at the airport and cause increased congestion within the available operating time envelope."/7/ The RASP preliminary Draft Capability Assessment working paper includes further discussion of the constraints on future development at the airports in the region (see C&R.Appendix A, Attachment B, pp. 37 through 44).

Capacity expansion plans of the two other major air carrier airports in the region, MOIA and SJIA, are the subject of their respective ongoing master planning efforts. The Port of Oakland is proceeding with plans to increase existing landside capacity to match existing airside capacity as part of its "2002 Airport Development Program." According to the Port of Oakland, the proposed development has been designed to minimize impacts on wetlands and other biotic communities. Some of the components of the "2002 Airport Development Program" include:

- construct up to twelve additional aircraft gates;
- reconfigure access roads serving the passenger terminal complex;
- construct a new parking garage;
- enhance airline and airfield support facilities; and
- improve and expand existing and displaced air cargo operations./9/

Minor airside improvements, such as a taxiway bypass and an extension of Runway 29/11, are also being explored as part of that plan./9/

The master plan process for SJIA has been extended by at least two years, in order to respond to the direction of the San Jose City Council (the process would now be complete or nearly complete under the original schedule). Through the master plan process, begun in 1988, SJIA and its consultants developed a range of development alternatives and selected a preferred plan. In January 1991, the Airport took the plan to the San Jose City Council. After a series of contentious public meetings, the City Council (in May 1991) decided not to endorse any of the master plan alternatives. The Council directed the Airport to address a specific list of additional issues and develop three or four master plan alternatives incorporating those issues. The San Jose City Council has directed the Airport to begin work on the master plan EIR, which is to address all of the master plan alternatives in equal detail. A preferred plan will then be selected, incorporating the results of the environmental review. It is expected that this process will take about two years to complete./10/ A memorandum from the San Jose Director of Aviation to the City Council outlining the current master plan work program is included in C&R.Appendix A, Attachment C. According to the Draft RASP Update, the SJIA Master Plan may include the following:/7/

Airfield

Extension of runway 12L-30R to 8,900 feet (included in previously adopted master plan and also the subject of a recent Draft EIR/Environmental Assessment)/8/
Reworking of the taxiways
Pavement management rehabilitation work on the airfield.

Terminal

Reconstruction of passenger terminal C and construction of new passenger terminal B
Construction of a new air traffic control tower (in progress).

Parking

Construction of new parking garages.

General Aviation (GA)

Relocation of all GA to west side of airport
Reduction in total number of GA based aircraft.

Air Freight

New air cargo facilities.

Other

Installation of a fuel farm.

Roadway

Terminal area roadway improvements.

On the basis of the above discussion, references in the second full paragraph on p. 469 of the EIR to the "MTC RAP" are changed to "MTC RASP." The first paragraph under Impacts, p. 473 of the EIR, is revised to read as follows (new text is underlined and deletions are shown by brackets):

> The Offsite Alternative [ ] assumes that, without implementation of the SFIA Master Plan, a portion of the future air travel demand the project would have served] (the difference between the proposed project passenger levels and those in the No-Project Alternative, Variant 1) would be distributed to the other Bay Area airports and long-distance transportation modes (intercity rail). The transportation impacts in the SFIA vicinity would be the same as those for the No-Project Alternative, Variant 1. Because the assumed [ ] "distributed" passenger demand has not been split among the other Bay Area airports and transportation modes, and because a determination of future passenger levels at those facilities is pending the outcome of the [ ] RASP Update now underway at the Metropolitan Transportation Commission, a specific identification and calculation of the impacts of the [ ] "distributed" SFIA passenger demand and the level of significance of these impacts at these other locations would be premature.

NOTES - Regional Planning and Coordination

/1/ Brady, Ray, Director of Research, Association of Bay Area Governments, telephone conversation, April 14, 1992.

/2/ U.S. Department of Transportation, Federal Aviation Administration, Advisory Circular No. 150/5070-6A, June 1985.

/3/ Kemmerly, Jack D., Chief, Division of Aeronautics, California Department of Transportation, letter (with attachment), March 3, 1992, to Mr. Herman Bliss, Manager, Airports Division, Federal Aviation Administration.

/4/ Brittle, Chris, Manager, Planning, Metropolitan Transportation Commission, letter to Barbara Sahm, September 16, 1991.

/5/ Metropolitan Transportation Commission (MTC), Regional Airport System Plan (RASP) Update, "Chapter 6. Aviation Demand Forecasts," preliminary draft working paper presented by the consulting team (TRA Airport Consulting) at the December 4, 1991 quarterly meeting of the MTC Regional Airport Planning Committee (RAPC).

/6/ California Department of Transportation materials provided to the March 16, 1992 Regional Airport Planning Committee Meeting, Metropolitan Transportation Commission, Oakland, California.

/7/ Metropolitan Transportation Commission, Draft MTC Regional Airport Plan Inventory and Definition of Alternatives, TRA Airport Consulting, May 1991.

/8/ Roddin, Marc, Manager of Seaport and Airport Planning, Metropolitan Transportation Commission, personal communication, April 24, 1992.

/9/ Meyer, Loretta, Supervisor, Environmental Review, Port of Oakland, letter, January 30, 1992.

/10/ Greene, Cary, Airport Planner, San Jose International Airport, telephone conversation, September 25, 1991.

ALTERNATIVES

The Notes for this section begin on p. C&R.100.

REDUCED LEVEL OF EXPANSION

Comments

"Only three alternatives are analyzed in the DEIR: the no-project alternative, the on-site alternative and the off-site alternative. It would be helpful if another alternative were included that would serve more passengers than the no-project alternative but less than the Master Plan." (Gary Binger, Association of Bay Area Governments)

"The EIR must address the issue of project alternatives, which includes reducing the Airport expansion to the degree that would be consistent with the mitigation measures and their time frame of implementation." (George Foscardo, City of San Bruno)

Response

According to the CEQA *Guidelines*, (Section 15126(d)), an EIR must describe "a range of reasonable alternatives to the project, or to the location of the project, which could feasibly obtain the basic objectives of the project... The range of alternatives ... is governed by the 'rule of reason' that requires the EIR to set forth only those alternatives necessary to permit a reasoned choice. The key issue is whether the selection and discussion of alternatives fosters informed decision-making and informed public participation. An EIR need not consider an alternative whose effect cannot be reasonably ascertained and whose implementation is remote and speculative."

The EIR (pp. 439-475) actually evaluates four alternatives, not three, as stated by the commenter. These include two variants of the No-Project Alternative, an Onsite Alternative, and an Offsite Alternative. The analysis emphasizes the No-Project Alternatives and the Onsite Alternative as the more "reasonable" in the range of possible alternatives because their effects can be reasonably ascertained. This is not among the characteristics of the Offsite Alternative, as discussed below, under Offsite Alternatives: Regional Redistribution, pp. C&R.88-93 herein.

The three on-airport feasible alternatives examined in the EIR are variants of a "reduced scale" alternative, although the Onsite Alternative reduces the scale of construction only, not longer-term Airport operations. The No-Project Alternative, Variant 1 (moderate growth), which would serve more passengers than the No-Project (near-no-growth) alternative but fewer than the SFIA Master Plan, is the closest to that requested by the commenter.

A major California court case on the range of alternatives that must be included in an EIR is Village Laguna of Laguna Beach v. Board of Supervisors (4th Dist., 1982) 134 Cal. App. 3d 1022, 1028 [185 Cal.Rptr. 41, 44], in which the Court emphasized that the alternatives considered must be kept to a manageable number. The project in question was a proposed land development that would include up to 28,000 homes, but probably 20,000. The Court noted that "there are literally thousands of 'reasonable alternatives' to the proposed project. Certainly, if the building of zero homes and 25,000 homes are reasonable alternatives to the proposed 20,000 dwelling unit plan, then the building of 1,000, 16,000, 22,500 and 20,001 homes are reasonable alternatives. But, no one would argue that the EIR is insufficient for failure to describe the 20,001 home alternative."/1/

As noted on p. 74 of the EIR, the SFIA Master Plan is a composite of proposed projects that are evaluated together in a Program EIR. Its various components could be implemented relatively flexibly, in accordance with changing requirements and conditions perceived by the project sponsor. Some components could be left unimplemented, but development could not exceed the overall amount included in the Master Plan (and evaluated in the EIR), within the Plan period. Thus, numerous variants of the Master Plan program as a whole could be considered "reasonable alternatives," ranging from minimal construction (which would result in impacts slightly more severe than those of the No-Project Alternative, Variant 1), to nearly all the construction assumed for the project (which would result in impacts slightly less severe than those of the full Master Plan program). Thus, although the EIR does not evaluate every conceivable variation of the project, it does extensively analyze both ends of a range of "reasonable alternatives" to the SFIA Master Plan.

The phasing of mitigation measures is discussed below, under Mitigation, General, pp. C&R.385-390 herein. As noted above, the SFIA Master Plan is a composite of proposed projects that could be implemented relatively flexibly. This flexibility makes possible, but does not guarantee, phasing of development or an overall reduction in the scale of Master Plan development, as suggested by the second commenter. CEQA does not require, however, that the scale or timing of a project be "consistent with mitigation measures" (full mitigation of significant impacts). When an EIR has identified significant adverse environmental effects (as it has for the SFIA Master Plan), CEQA does require for project approval that the Lead Agency's decision-making body (the San Francisco Airports Commission) make written Findings that disclose and justify any significant impacts that would not be mitigated (see discussion below, under Adequacy/Feasibility of Alternatives and EIR Process, pp. C&R.97-100 and 393-413 herein).

OFFSITE ALTERNATIVES: REGIONAL REDISTRIBUTION

Comment

"The EIR would benefit from an expanded discussion of regional airport system alternatives including the compatibility of SFO airport improvement proposals with improvement proposals being developed in other ongoing airport master plan studies at Oakland and San Jose Airports. The DEIR should provide some discussion of how airline and airport facility investments and airline service decisions (such as creating new airline 'hubs' for connecting flights) could either reinforce or change air service patterns at Bay Area airports." (Chris Brittle, Metropolitan Transportation Commission)

Response

To determine if the EIR's examination of an offsite (regional airport system) alternative is adequate under CEQA, three questions need to be addressed. First, should an offsite alternative be included in the EIR at all -- is it necessary for a "range of reasonable alternatives" that would eliminate or reduce one or more significant effects of the proposed project? Second, can the environmental effects of such an alternative be "reasonably ascertained"? Finally, is the alternative feasible, or is its implementation "remote and speculative"?

Should the EIR include an offsite alternative to the SFIA Master Plan? As noted in the previous response, CEQA states that the range of alternatives an EIR must investigate is governed by the "rule of reason." But CEQA also requires that "the discussion of alternatives shall focus on alternatives capable of eliminating any significant adverse environmental effects or reducing them to a level of insignificance, even if these alternatives would impede to some degree the attainment of the project objectives, or would be more costly"(CEQA *Guidelines*, Section 15126(d)(3)).

Interpreted literally, the Airports Commission's two-fold objectives for the SFIA Master Plan (noted in the SFIA Master Plan on p. 2.1 and in the EIR on p. 18) would preclude consideration of an offsite alternative, since both objectives are framed as desired outcomes *at the Airport*. The first objective is "to provide a coordinated development plan that will *consolidate and relocate many of the existing landside facilities* in order to increase the efficiency and cost effectiveness of landside operations" (emphasis added). The second objective is, "To respond to the projected economic growth of the Bay Area and ensure that the future development required to meet that demand *at the airport* is implemented in a manner compatible with the plan" (emphasis added).

However, if the emphasis of the second SFIA Master Plan objective is shifted to "*respond to the projected economic growth of the Bay Area and . . . meet that demand*," an offsite alternative could potentially be considered that would avoid or reduce significant effects of the project, in conformance with CEQA. Because the possibility exists that future regional air travel demand could be met by different means than proposed in the SFIA Master Plan, and with potentially less severe overall environmental effects, an offsite alternative is included in the EIR (pp. 468-474).

Can the environmental effects of the alternative be "reasonably ascertained"? CEQA states that "an EIR need not consider an alternative whose effect cannot be reasonably ascertained"(CEQA *Guidelines* (Section 15126(d)). With respect to the SFIA Master Plan Offsite Alternative, a prior question is whether the alternative can first be defined well enough to permit reasoned analysis of its potential environmental effects. As discussed above, under Decentralization/Redistribution of Aviation Activity; Capacities and Plans of Other Regional Airports (pp. C&R.75-85 herein), defining an "optimum shares" or "regional redistribution" scenario for the airports in the Bay Area is a complex problem, requiring numerous guesses and assumptions as well as hard data collection and analysis. Identifying the impacts of a speculative alternative necessarily involves even more uncertainty than defining the alternative itself. Moreover, to permit a comparison between the impacts of a regionally defined Offsite Alternative and the impacts of the SFIA Master Plan, the setting and impacts of the latter would have to be defined equally broadly. Because substantial disagreement among experts currently exists regarding future Bay Area aviation system requirements and the ways to meet those requirements, the EIR's definition and analysis of the SFIA Master Plan Offsite Alternative are general and qualitative.

The in-progress Regional Airport System Plan (RASP) Update involves an extensive research and analysis effort by MTC, its consultants, and affiliated agencies and individuals that is aimed at addressing the region's future aviation needs. This effort may eventually produce a "Preferred Plan" of sufficient detail to use (or adapt for use) as an alternative means of serving SFIA Master Plan-forecast growth in air travel demand. Although neither the completed RASP nor the findings of the RASP EIR are yet available and it would be speculative to discuss their specific contents, preliminary draft working papers and other preliminary data suggest that the net regional environmental effects (particularly traffic-related effects) under a "redistribution" scenario may be found to be less severe than the net regional effects under a "combined airport master plans" scenario. The likelihood that the RASP Update will result in this conclusion is underscored by MTC's comments on the SFIA Master Plan EIR, including reference to "extensive previous analysis" showing that a redistribution strategy "is essential to: balance available runway and airspace capacity (i.e., reduce excessive aircraft and passenger delays), provide more convenient and accessible service to the Bay Area's population, provide noise relief to Bay Area residents, and minimize vehicle travel and air pollution from ground trips to and from Bay Area airports."/2/ If the RASP Update and its associated EIR analysis reach this conclusion, they would not contradict, but would instead elaborate and quantify, the qualitative impact analysis presented in the SFIA Master Plan EIR under the Offsite Alternative.

Preliminary results of three computer model runs using ACCESS, a software package developed for MTC's use in analyzing airport access and airport competition in a multiple airport region, appear to advance the process of defining a reasonable "optimum shares" or "regional redistribution" scenario for existing and possible additional Bay Area airports./3/ The ACCESS model is being used by MTC to assist in refining and evaluating the RASP Update alternatives. Developed for MTC by Greig Harvey of Deakin, Harvey, Skabardonis, Inc., ACCESS:

". . . is a tool for studying policies and trends that influence 1) the distribution of air travellers among airports; and 2) the patterns of use for airport access modes. It permits the user to quickly and easily analyze current patterns of airport choice and access mode use, and to test the effects of alternative traveler and service attributes. . . .ACCESS incorporates a set of models of airport choice developed for the San Francisco Bay Region, using data from a survey of air travellers as well as a detailed representation of ground access and airline service at each airport. . . . The models and passenger sample are used with a database of access and airline service characteristics to obtain mode and airport choice probabilities for each traveling party. . . . By modifying the database, the user can assess the effects of a variety of scenarios involving different traveller characteristics, airport access services, airline services, and even airport locations."/4/

In addition to studying the effects that airport location and other access variables have on passengers' airport choice, the model can help to forecast the traffic (and air quality) effects of various future airport system scenarios by calculating total Vehicle Miles Traveled (VMT).

Like any demand model, ACCESS must be interpreted by reference to the supply characteristics postulated./5/ For example, the model "runs" on alternative BART extensions are based on assumptions as to speed, fare basis, number of stops, etc. If other assumptions are used, the results will differ accordingly.

For the RASP Update, ACCESS has so far been run on three regional scenarios, using 1990 existing conditions data (including the 1990 MTC Air Passenger Survey) and MTC/Regional Airport Planning Committee (RAPC) passenger forecasts for 2010./6/ The scenarios explore "maximum" passenger shares for the three major air carrier airports, (referred to herein as "the first model run"), potential "maximum" passenger shares for civilian air carrier service jointly with military traffic at Travis Air Force Base (referred to herein as "the second model run"), and alternative airport BART extensions (not discussed herein). The potential applicability and limitations of the ACCESS model with respect to evaluation of SFIA Master Plan traffic impacts are discussed below under Transportation, p. C&R.135-36 herein.

The three model runs assumed a 2010 regional air passenger total of about 75 Million Annual Passengers (MAP). This is the MTC/RAPC "high" 2010 forecast (84.76 MAP), less transfer passengers (who do not use ground transportation in the Bay Area). The assumed distribution of passenger origins in 2010 was derived from the passenger origins within eight geographic areas (mainly within the Bay Area), slightly modified to reflect anticipated differential population growth rates (i.e., East Bay counties are expected to grow faster than others).

The first model run was intended to establish the hypothetical upper boundary ("Maximum Share") of each of the three major Bay Area airports' passenger markets, by geographic area of passenger origin and for the region as a whole, in 2010. This was accomplished by instructing ACCESS to eliminate differences in the levels of air service available at the three airports. The ground access conditions inherent in the database were not altered. For the region as a whole in 2010, "Maximum Shares" were found to be roughly 50 percent for SFIA, 27 percent for Metropolitan Oakland International Airport (MOIA) and 23 percent for San Jose International Airport (SJIA) (The "natural market" for Oakland could be higher than 27 percent, but it is constrained by ground-access conditions, primarily Bay Bridge congestion and the temporary loss of the I-880 / I-80 connection due to earthquake damage at Cypress Street.)/3,5/ Calculated VMT for this hypothetical scenario totaled about 3.8 million miles per day, compared to about 4.3 million miles per day when the 1990 shares of the airports (71 percent at SFIA, 12 percent at MOIA, and 17 percent at SJIA) are projected to 2010. This model run assumed that airlines served each of the three major airports approximately equally; this is not now the case.

As a variant of the first model run, more-realistic 2010 passenger shares ("Equilibrated Shares") for the three major air carrier airports were derived by applying "adequate yield" (passenger load factor) criteria to eliminate flights that are assumed to be uneconomical for the air carriers. That is, for this variant, some differences in the level of available air service were introduced. From the standpoint of identifying the potential environmental effects (especially traffic and related air quality effects) of "redistributing" future air passenger demand from SFIA to MOIA and SJIA, the "Equilibrated Shares" scenario provides the most useful output from the completed ACCESS runs./5/ In other words,this part of the model run provides a view of how passengers' patterns of airport choice might look in the future if air carrier levels of service at the three major Bay Area airports were more similar to each other than at present, but not absolutely equal. "Equilibrated Shares" were found to be about 60 percent for SFIA, 21 percent for MOIA and 19 percent for SJIA. Calculated VMT for this scenario totaled about 4.0 million miles per day.

The second model run generated 2010 "maximum shares" for the respective major Bay Area airports, with an equal level of air service provided at Travis Air Force Base (equal to air service at SFIA, MOIA, and SJIA -- that is, each of the four airports would provide 25 percent of the regional air-carrier service). The results showed that Travis could attract as much patronage as MOIA or SJIA does now./3/

Discussions of the potential effects of airline hubbing strategies, and of other trends in the aviation industry, are included in Activity Patterns and Forecasts (pp. C&R.28-38 herein), and Attachment D: Background to Airport Operations, in C&R Appendix A herein.

Is the Offsite Alternative feasible? As noted previously, CEQA's definition of feasible is "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors" (CEQA *Guidelines*, Section 15364). As discussed above, under Regional Planning and Coordination (p. C&R.58-64 herein), even if the completed RASP Update "Preferred Plan" constitutes an "environmentally superior" alternative for the region (relative to the SFIA Master Plan, combined with other airports' development plans), MTC would not be fully empowered to implement every component of the RASP./3/ If SFIA and the other airports were to agree to bring their master plans into conformance with the RASP, such agreement would not ensure successful implementation of the RASP either, because the airports are subject to government regulation of their operations (primarily by the Federal Aviation Administration (FAA)) and have extremely limited control over airline business decisions. Attachment D in C&R Appendix A herein contains a discussion of the limited powers granted to airport owners, the potential areas of control airports do have, the requirement that airport restrictions be reasonable and not discriminate unjustly, and the meaning of "unreasonable" and "discriminatory" when applied to restrictions imposed at several U.S. airports.

Thus, while an offsite alternative is discussed in the EIR, it is discussed at a general level with primarily qualitative analysis, due to the wide range of assumptions necessary to define the alternative and ascertain its environmental effects, and due to the limited feasibility of the alternative.

ALTERNATIVE POLICIES / MANAGEMENT SYSTEMS

<u>Noise</u>

<u>Comment</u>

". . .Broad alternatives to the SFIA Master Plan need to be analyzed to see if there are not alternatives that would greatly reduce the impacts of noise. . .

"Why has this EIR not even mentioned limiting the hours of airport operations? It seems like an obvious alternative to analyze in this Master Plan EIR. It would be an environmentally superior alternative under which the project objective would still be achievable.

"We suggest that the EIR needs to analyze an alternative that would limit [nighttime] arriving and departing flights to near zero (except perhaps for emergency situations). The night flights are somewhat low now -- why not analyze a Master Plan alternative that would allow people in the surrounding cities to sleep?" (Fred Howard, Pacifica Noise Abatement Committee)

Response

EIR project alternatives should not only be "capable of eliminating any significant adverse environmental effects or reducing them to a level of insignificance"; they must also, except the "No-Project" alternative, generally meet the objectives of the project. In the case of the SFIA Master Plan EIR, none of the alternatives meeting the basic project objectives would substantially reduce noise impacts. Both variants of the No-Project Alternative in the EIR would reduce the impacts of aircraft noise, as they assume reduced levels of aircraft operations in comparison with the SFIA Master Plan. The Onsite Alternative assumes the same future levels of passenger traffic and aircraft operations as the Master Plan, so it does not provide for substantially reduced aircraft noise impacts. The Offsite alternative, while potentially reducing aircraft noise impacts near SFIA (relative to the SFIA Master Plan), would not likely result in a net regional reduction in aircraft noise effects.

Mitigation measures, in contrast to project alternatives, are more focused means of reducing project impacts, and may also be included to reduce the impacts of project alternatives. The EIR (pp. 424-426) contains a range of measures to mitigate the aircraft noise impacts that would result from the project. Limiting night-time arriving and departing flights to zero or near-zero, as the commenter suggests, would be essentially the same as a curfew, which is a mitigation measure discussed below, under Aircraft Noise Mitigation (pp. C&R.268-71 herein).

System Optimization

Comment

"The EIR alludes to some items in the mitigation and/or alternatives which I think ought to be investigated further, and that is, just very briefly, a system management plan to determine how existing equipment facilities and systems can be optimized to their fullest use. I think that ought to be a subject of a separate investigation so that the decision-makers on this know exactly what they're dealing with, so they know if there is an alternative to do a better system management, they know it's available and they can encourage that." (Charles Kroupa)

Response

As referenced by the commenter, Airport System Management (ASM) is listed in the EIR (p. 469) among the preliminary range of alternatives to address future aviation requirements in the region, as developed for the MTC RASP Update. This strategy would aim at "matching supply and demand and making maximum use of existing facility capacity." In its preliminary form, this list of measures does not constitute a feasible alternative to the SFIA Master Plan. (The evaluation of RASP Alternatives is still in progress; the extent to which ASM will be incorporated into MTC's "Preferred Plan" is unknown at this time.) However, even if they were more fully developed and integrated, most of the listed ASM measures would not be within SFIA's control to implement nor meet the objectives of the SFIA Master Plan, and therefore they would not likely constitute a reasonable project alternative.

The emphasis of the listed ASM measures is on avoiding major new construction by maximizing existing airside facilities in the region. Most of the ASM measures would either require changes in FAA policies or increased cooperation between the airports and the airlines. Some of the measures proposed, such as market share shifts between airports, fleet mix changes and flight schedule changes (by airlines) would be outside of the airports' control while others, such as development of reliever General Aviation airports or joint use of existing military airports, would likely require establishment of planning partnerships and implementation measures by government agencies. The only listed ASM measure that could potentially be implemented by SFIA, congestion pricing, could help to increase the efficiency of *landside* facilities (by spreading the airline peak demand for terminal gates) but would not be within SFIA's ability to implement in the near term (see discussion of financial incentives on pp. C&R.279 herein).

Revising the existing aircraft gate lease structure is a system management measure that could potentially reduce the need for SFIA Master Plan projects that aim to increase terminal capacity. This is not among the listed ASM measures, and is not in SFIA's control to implement in the near-term (see the discussion of exclusive-use leases in Attachment D, C&R Appendix A, herein).

With respect to optimization of efficiency at an individual airport, and with regard to maximizing efficiency of its existing landside facilities and operations, SFIA already has several advanced system management programs in place. For example, SFIA has a computerized maintenance control system for all airport equipment, operating systems, and facilities. The maintenance control system identifies, on a weekly basis, what facility/equipment/system needs service, what service is needed, and what resources are required (materials and labor). Work orders are then produced and work is scheduled and performed by the Airport's Facilities Operation and Maintenance staff./7/

ALTERNATIVE TECHNOLOGIES

<u>Comment</u>

"Finally, members of the Planning Commission at the August 29th hearing raised the matter of a regional discussion of airports, including SFIA, Oakland and San Jose. The Committee agrees with this criticism. The SFIA Master Plan and its EIR should include consideration for future activities at all three airports, incorporating at the least: . . .

"6. Analyze and forecast the extent to which video conferencing, alternate transportation modes (e.g., high-speed rail) and other technology might reduce the need for air transport." (Timothy Treacy, Airport Noise Committee)

<u>Response</u>

At a regional or state planning level, the potential benefits of new technologies such as videoconferencing or high-speed rail may be incorporated in actual plans and policies. At the individual airport planning level, however, such new technologies may be considered remote, exogenous influences on the aviation market, whether beneficial (relieving excess air service demand) or detrimental (competing with airports and airlines). As explained above, under Reduced Level of Expansion and Offsite Alternatives: Regional Redistribution, (pp. C&R.86-93 herein), CEQA does not require an EIR to consider an alternative "whose effect cannot be reasonably ascertained and whose implementation is remote and speculative" (CEQA *Guidelines*, Section 15126(d)). The EIR (pp. 472-473) includes the "New Technology" category in its summary of the preliminary range of alternatives developed for the MTC RASP Udate, but because it does not meet the above-cited CEQA implementation criterion, "New Technology " is not considered a reasonable alternative to the project for the purposes of environmental review.

ADEQUACY/FEASIBILITY OF ALTERNATIVES

Comments

"As to the required exploration of alternatives to this vast expansion plan, the DEIR appears simply to repeat the conclusions of SFIA administration and staff that there are no viable alternatives. This approach to exploring alternatives certainly cannot be what the California legislature contemplated for an environmental impact report on a major project such as this." (Carol Gamble)

"The DEIR section on alternatives is particularly weak, with no meaningful discussion of viable options. Furthermore, in many cases, the DEIR simply accepts the Airport's assessment about the inadequacy of alternatives. The Committee believes the DEIR should provide independent, unbiased examination of options, so the public and decision makers are adequately informed." (Timothy Treacy, Airport Noise Committee)

". . .The alternatives offered seem to be restricted to Offsite: the MTC Regional Plan, Onsite: some vague, illusory FAA runway development plan, and no development at all (DEIR Vol. I Ch. §D). These alternatives are not even economic alternatives, much less environmental impact mitigating alternatives. Consequently, there simply is no way to determine when any of the proposed mitigating measures are to be applied. I get the feeling again that no real mitigation is ever intended." (Alyn Lam)

"While the use of other airports in the Bay Region to handle future air passenger growth is identified as an alternative, the basis for its rejection needs to be expanded." (Roger Chinn, Airport/Community Roundtable)

"Finally, reading through the alternatives, I was struck -- now, I am not familiar with EIR's and what is an adequate EIR. In the alternatives, if you read the alternatives that are explored to this project, there is a description called 'reason for rejection'. Each of these says the sponsor has rejected this. Basically, that is what the EIR is saying. I would look to the EIR to explore alternatives that maybe the sponsor hasn't considered, alternatives that might shed new light on it. To say, well, gee, we can do no growth and the airport doesn't want to do that, therefore that is not a viable alternative, it seems to me it's not quite fulfilling the role, at least as I anticipate, of any EIR. I think we ought to have some real alternatives examined, not simply put something out and say: Well, the airport has already rejected this, therefore it's not a viable alternative." (Curt Holzinger)

"The alternatives, I think, are given pretty short shrift. It's kind of like developer responses which say: We have rejected this idea because it doesn't meet the demand. To me, that is not adequate for a public agency, particularly when other public agencies are recommending something different. There has got to be a better analysis and a better discussion as to why and what are the policy purposes so policy-makers can make decisions about the tradeoffs and the choices. It's not like a developer saying: I've got this land and I've got to build a 30-story building. It's in my economic interest to do so. Sorry, I am not going to consider any other alternatives.

"This is the city. The city has got to say: The reason we have made this choice and we made these tradeoffs, and here are costs and here are the benefits, therefore these are why we rejected the alternatives. Otherwise, how is the public going to be able to -- or other policy-makers going to be able to -- have any kind of understanding of what the decision points are here?" (Commissioner Engmann)

"I agree with Doug, that the alternatives are pathetic and not fair to decision-makers. They may be fair to San Francisco Airport Commission, but not to the region." (Commission Bierman)

Response

The EIR does not simply repeat the conclusions of the SFIA Administration and staff that there are no viable alternatives to the SFIA Master Plan. In accordance with CEQA requirements, the EIR considers a range of reasonable alternatives and identifies why the alternatives were rejected by the project sponsor in favor of the proposed project (CEQA *Guidelines*, Section 15126(d)). As explained above, under Decentralization/Redistribution of Aviation Activity; Capacities and Plans of Other Regional Airports, Reduced Level of Expansion, and Offsite Alternatives: Regional Redistribution (pp. C&R.75-85, 86-88 and 88-93 herein), and acknowledged in the EIR (pp. 468-475), viable alternatives *may* exist which would, on a regional level, be "environmentally superior" to the SFIA Master Plan combined with other airports' master plans. However, CEQA does not require an EIR to consider an alternative "whose effect cannot be ascertained reasonably and whose implementation is remote and speculative." CEQA also requires that project alternatives be described that "could feasibly obtain the basic objectives of the project" or, would only "impede to some degree the attainment of the project objectives. . . ."(CEQA *Guidelines*, Section 15126(d)).

The quality and scope of the EIR alternatives analysis is constrained, first, by the nature of the project objectives (which are defined in terms of the SFIA site itself), and second, by the complexity of the regional system. The EIR does not, and cannot, provide a Regional Aviation System Plan, and because the RASP Update has not been completed, the EIR does not, and cannot, evaluate the environmental impact of the RASP or its alternatives in relation to the impacts of the SFIA Master Plan. (It is not known at this time how well the completed RASP could be adapted to serve as an EIR alternative to the SFIA Master Plan, since the former is a regional plan, and the latter is an individual airport plan. The objectives, geographic scopes and levels of detail in the respective plans would likely differ substantially.)

As one commenter correctly points out, the alternatives considered in the EIR (except for the No-Project variants) would not substantially reduce the environmental effects of the project. The Onsite Alternative would primarily result in reduced construction effects, which are not considered as important as the longer-term operational effects of the project. The Offsite alternative could potentially reduce net regional environmental effects in comparison to the project, but this cannot be ascertained reasonably at this time. The Offsite alternative would also merely shift some effects to locations other than the SFIA vicinity. The commenter's statement that the alternatives are not "economic" is unclear; CEQA does not require economic analysis of project alternatives or that alternatives be economically comparable to the project.

The Airports Commission is required under CEQA (*Guidelines,* Section 15091) to consider alternatives and mitigation measures that would "substantially lessen or avoid" significant adverse environmental impacts (Public Resources Code, Section 21002), and when rejecting them as infeasible, supporting the rejection with substantial evidence (CEQA *Guidelines,* Section 15091). Further, if the EIR shows there to be unavoidable significant impacts resulting from the SFIA Master Plan, or if mitigation measures adopted by the Airports Commission would not reduce impacts below a level of significance, the Airports Commission must, under CEQA (*Guidelines*, Section 15093) fully disclose its rationale for project approval (through a Statement of Overriding Considerations). Through this process, the "tradeoffs" involved in the Commission's decision would be disclosed to the public.

NOTES - Alternatives

/1/ Remy, Michael H., Tina A. Thomas, and James G. Moose, *Guide to the California Environmental Quality Act (CEQA)*, 1991 Edition, Solano Press Books, Point Arena, California, 1991.

/2/ Brittle, Chris, Manager, Planning, Metropolitan Transportation Commission, letter to Barbara Sahm, September 16, 1991.

/3/ Roddin, Marc, Manager of Seaport and Airport Planning, Metropolitan Transportation Commission, interview, April 22, 1992.

/4/ Harvey, Greig, *ACCESS: Models of Airport Access and Airport Choice for the San Francisco Bay Region* (Deakin, Harvey, Skabardonis, Inc.), December, 1989.

/5/ Harvey, Greig, telephone and facsimile communications, March 4-6, 1992.

/6/ Data runs provided by Marc Roddin, Manager of Seaport and Airport Planning, Metropolitan Transportation Commission, March 4, 1992.

/7/ Costas, John, Assistant Administrator, Planning and Construction, San Francisco International Airport, letter, February 28, 1992.

WEST OF BAYSHORE LANDS

The Notes for this section begin on p. C&R.103.

Comments

"West of Bayshore Airport Lands should be declared very valuable Open Space lands separating surrounding Cities from Airport in perpetuity as protection against further vehicle and Pollution problems and listed as a necessity against more Pollution." (Jessie Bracker)

"West of Airport Lands being currently used for Airport, lies a large needed Open Space surrounding the Easterly sides of San Bruno and Millbrae cities. As a Mitigation Action to insure protection against further Vehicle and Airport Pollution Problems those lands should be designated, as a necessary requirement, Open Space in Perpetuity and many trees should be planted there for purpose of helping to lessen the Pollution and Noise problems created because of this large Airport...

"...[T]here is nothing in your document that tells of those lands planned for the possible BART station -- that they are the habitat lands of the endangered San Francisco garter snake, and especially where they plan to put the tail track storage area." (Jessie Bracker, letter of 8/27/91 and public hearing of 8/27/91)

"The BART Station should not be placed in or near vacant Airport Lands west of 101 Hwy because of added Traffic Vehicle Pollutants, new roads that would have to be built and Parking lots that would have to be built, all generating more Pollutants which would make a farce of the purported reason for getting BART in the first place, which was to have cleaner air. BART is the only one that would benefit..." (Jessie Bracker)

"There is no discussion of a potential ballpark at that location. It may or may not be a reality, but it may be something that needs to be mentioned, just as the ballpark had to be mentioned in the Mission Bay EIR." (Commissioner Engmann)

"West of Bayshore Area. The development of this 180 acre property for airport-related purposes is essential to the long term development of SFIA. The final EIR should state the intent of the City to (a) proceed with the necessary environmental studies; (b) take the required mitigation measures; and (c) reserve the remaining available site for future SFIA development." (Thomas Brown, United Airlines)

Response

Page 20 of the EIR indicates that the "West of Bayshore site" is not included in the SFIA Master Plan Project Area. The EIR Project Description further states, "This site was removed from the SFIA Master Plan process because it is a habitat for the San Francisco garter snake, an endangered species, and the red-legged frog, a candidate for the endangered species list." According to the SFIA Master Plan, forecast long-term demand (until 2006) for aviation services would be satisfied at SFIA without the use of the West of Bayshore site. SFIA would not be precluded from developing the site; however, development of the West of Bayshore site for Airport (or other) use would be subject to additional CEQA review and regulatory approval by responsible agencies such as the California Department of Fish and Game. The environmental studies and mitigation measures mentioned by one commenter would be a part of that CEQA review. No development of the West of Bayshore site is proposed as part of the SFIA Master Plan Project.

One commenter suggests that the West of Bayshore site be designated as permanent Open Space "as protection against further . . . pollution," presumably to mitigate the project's pollution impacts and to prevent additional pollution impacts (due to site development) from occurring. Because the site is currently vacant and is not planned for development, the designation of it as Open Space would not mitigate the project's air or noise pollution impacts, as identified in the EIR. A discussion of the effectiveness of tree planting in mitigating air pollution appears in Air Quality Mitigation, p. C&R.332 herein. The designation of the West of Bayshore site as mitigation for the site's own development would not be appropriate because, as noted above, site development is not a part of the project. (The removal of the site from the SFIA Master Plan has already eliminated the potentially significant impacts that would occur as the result of the site's development under the SFIA Master Plan.)

Several alternative BART station locations and layouts, including alternatives located on the West of Bayshore site , are under consideration for the construction of a BART extension./1/ Discussions of the BART station alternatives and the Alternatives Analysis/DEIS/DEIR are in the SFIA Master Plan EIR (pp. 269 and 415) and in BART

Extension to SFIA, pp. C&R.139-145 herein. The AA/DEIS/DEIR discusses the potential impacts of a BART station and associated access structures on the West of Bayshore site. A decision on the BART - San Francisco Extension "preferred alternative" will be made by a committee composed of representatives of BART, MTC, and SamTrans./2/ The public comment period for the BART AA/DEIS/DEIR was initiated in March, 1992.

The BART AA/DEIS/DEIR indicates that construction of some of the San Francisco Airport BART Extension alternatives would result in significant impacts on the San Francisco garter snake, San Francisco forktailed damselfly, and the California red-legged frog, endangered species that occur on the West of Bayshore site. The San Francisco Airport BART Extension could also result in impacts on wetlands located on the West of Bayshore site. These impacts would depend on the preferred alternative selected, the actual design of the facilities, and results of an accurate delineation of the wetland areas./1,3/ The BART AA/DEIS/DEIR indicates that a total of approximately 35 acres of wetlands exist on the West of Bayshore site and states that, "[a]t worst, 10 to 15 acres of wetlands would be eliminated, while at best only 3 to 5 acres would be affected."/3/

The characteristics and impacts of a BART station west of US 101 are discussed in the SFIA Master Plan EIR only to the extent they relate to the characteristics and impacts of the SFIA Master Plan. BART station characteristics and impacts are not evaluated in the SFIA EIR because the siting and construction of the station are not part of the Master Plan. The SFIA Master Plan EIR acknowledges the presence of endangered species on the West of Bayshore site but it is not a function of the SFIA Master Plan EIR to mitigate the effects of the proposed BART extension. BART station siting and construction are actions under the authority of BART (and MTC and SamTrans), not the Airports Commission.

The West of Bayshore site is not currently under consideration as a ballpark site. A ballpark was considered in the Mission Bay EIR because the ballpark was a pending proposal and was on the City of San Francisco ballot. Consequently, discussion of such a development proposal in this EIR would not be appropriate.

NOTES - West of Bayshore

/1/ BART - San Francisco Airport Extension AA/DEIS/DEIR, March 1992.

/2/ Wallsten, Karen, Senior Planner, Parsons Brinckerhoff Quade & Douglas, Inc., telephone conversation, March 13, 1992.

/3/ BART - San Francisco Airport Extension AA/DEIS/DEIR, March 1992, pp S-20, and 5-20 to 5-24.

LAND USE AND PLANS

The Notes for this section begin on p. C&R.111.

LAND USE REGULATIONS APPLICABLE TO SFIA

Comments

"The draft EIR states that the Airport is not subject to county of San Mateo and adjacent cities land use and zoning regulations. . ." (Richard Gee, SamTrans)

"The Federal Government has given much aid to this Airport. They added more than $12 million by 1945 with Massive Improvements. How much of the Land and Fill was paid for with Federal Money?? As many as 2,000 people a day were employed by WPA and other relief agencies 1933-1940 working at the Airport. In World War II the Military took over the Airport Supervision and completed Massive Improvements by 1945. By War's end the Airport had 700 acres in use and another 2,000 acres under Development. Consequently SFIA emerged as a major crossroads of the World. Isn't it true that if Federal Government helped purchase land for Airport it must be kept for use of that Airport only? No ball parks." (Jessie Bracker, letter of 8/27/91 and public hearing of 8/27/91)

Response

The first comment refers to a statement in the second paragraph on p.78 of the EIR. The statement is taken directly from the SFIA Master Plan, and is supported by information in the SFIA Master Plan (pp. 3.1-3.2) regarding the powers and responsibilities of Airport Land Use Commissions (ALUCs). The ALUC for San Mateo County is discussed on pp.103-105 of the EIR.

Article 3.5, Section 21674 (e) of the State Aeronautics Act (which establishes the Airport Land Use Commission "to provide for the orderly growth of airports and surrounding areas") states, "The powers of the commission [ALUC] shall in no way be construed to give the commission jurisdiction over the operation of any airport."

The second comment requests an account of parcels purchased with federal dollars and whether such land must remain in Airport use. According to the Federal Aviation

Administration (FAA), the title holder for each parcel of land at SFIA has not been determined, including whether such parcel(s) were purchased with federal dollars (but owned by SFIA) or whether title is still held by the Federal Government./1,2/

Title to specific parcel(s) of an airport's land may or may not be required prior to the implementation of an approved master plan. Whether any portion of SFIA property is restricted to Airport land uses can be determined after researching the federal branch that purchased the parcel(s), the terms and conditions of the purchase agreement (including any agreements with the City and County of San Francisco), and the authority for the purchase. Such research could produce an account of the parcel(s) affected by the proposed SFIA Master Plan, from which a determination could be made as to whether such parcel(s) would be restricted to Airport uses./1,2/

As shown in the Project Description section of the EIR, the SFIA Master Plan does not include any "non-Airport" (non-aviation-related) uses. Therefore, an assessment of federal restrictions on land use is not relevant to the assessment of environmental effects in the EIR.

EXISTING LAND USE

Comment

"P. 21 Fig 1 - does not show that some Airport lands are <u>within</u> <u>Millbrae</u>. Map P. 83, Fig. 11 - several designated land uses are shown incorrectly for City of Millbrae, for instance - 1) Airport lands within City of Millbrae are zoned Open Space. 2) Land you show as electric utilities is part of that Airport Open Space Lands and P.G. and E. Towers for Electric Lines. The P.G. and E. Substation is adjacent to that and you show it as Vacant. 3) There is also a Kennel and a Private Tennis Club Courts in that same land parcel you show Vacant. 4) There is a Sheltering Pines Convalescent Hospital at north side of area just across the R.R. Tracks from west side of that where you show Single Family. 5) There is a small Power Unit Bldg. located just South adjacent to Marina Vista <u>Park</u> alongside Bay St. that supplies power to Airport. 6) There is a Sewer-Lift Station at Madrone and Bay St. 7) There is a Storm Drainage Pump Station just north of City Boundary Line in Airport field, across from Lomita Park School by Lomita Canal.

"P. 75 last of par 4 - should add - <u>and Southwest</u> - just after "West" because elsewhere in text it states Millbrae <u>lies</u> "<u>Southwest</u>"; and east of Millbrae St., Airport lands are also habitat of the endangered San Francisco Garter Snake and of the red legged frog within City of Millbrae Boundary lines all along Lomita Canal.

"P. 92-93 - says nothing about Airport lands zoned Open Space in Millbrae and nothing about the snake and frog habitat nor Millbrae's Sphere of Influence on any Airport Lands, also on Pages 255 and 256 - you left out the same things but yet wrote about all 3 as for San Bruno area! Why? There are more of the Snakes located in Millbrae." (Jessie Bracker)

Response

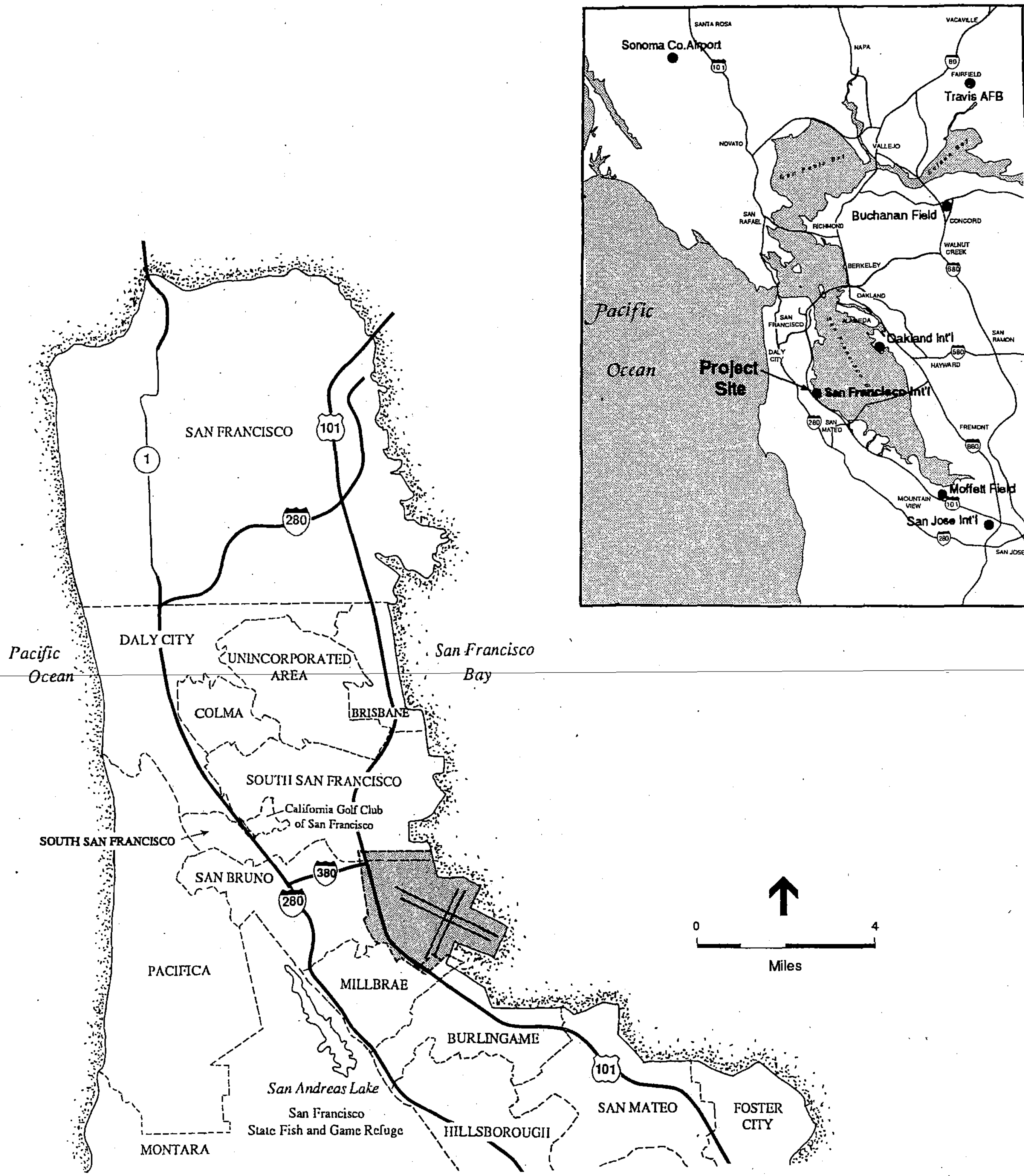
Figure 1, Project Location, on p. 21 of the EIR is revised to depict the approximate area of the City of Millbrae that is within the SFIA boundary.

Figure 11, Existing Land Use and City Boundaries Adjacent to SFIA, on p. 83 of the EIR is intended to depict existing land uses. The legend and shaded areas on Figure 11 are intended to illustrate the predominant existing land use for the areas covered. The zoning designations for those areas may differ from the existing land use. Figure 11 is not intended to show the City of Millbrae's zoning designations.

In some instances, a particular legend designation may be meant to represent multiple land uses. To clarify the land use designations depicted on Figure 11, the "Electric Utilities" designation in the legend is revised to "Electric Utility Facilities."

The comments regarding the P.G. and E. substation, kennel and private tennis club, power unit building, sewer-lift station, and storm drainage pump station are correct. However, these land uses are not the predominant use within the respective areas depicted on Figure 11. The Sheltering Pines Convalescent Hospital is added to Figure 11.

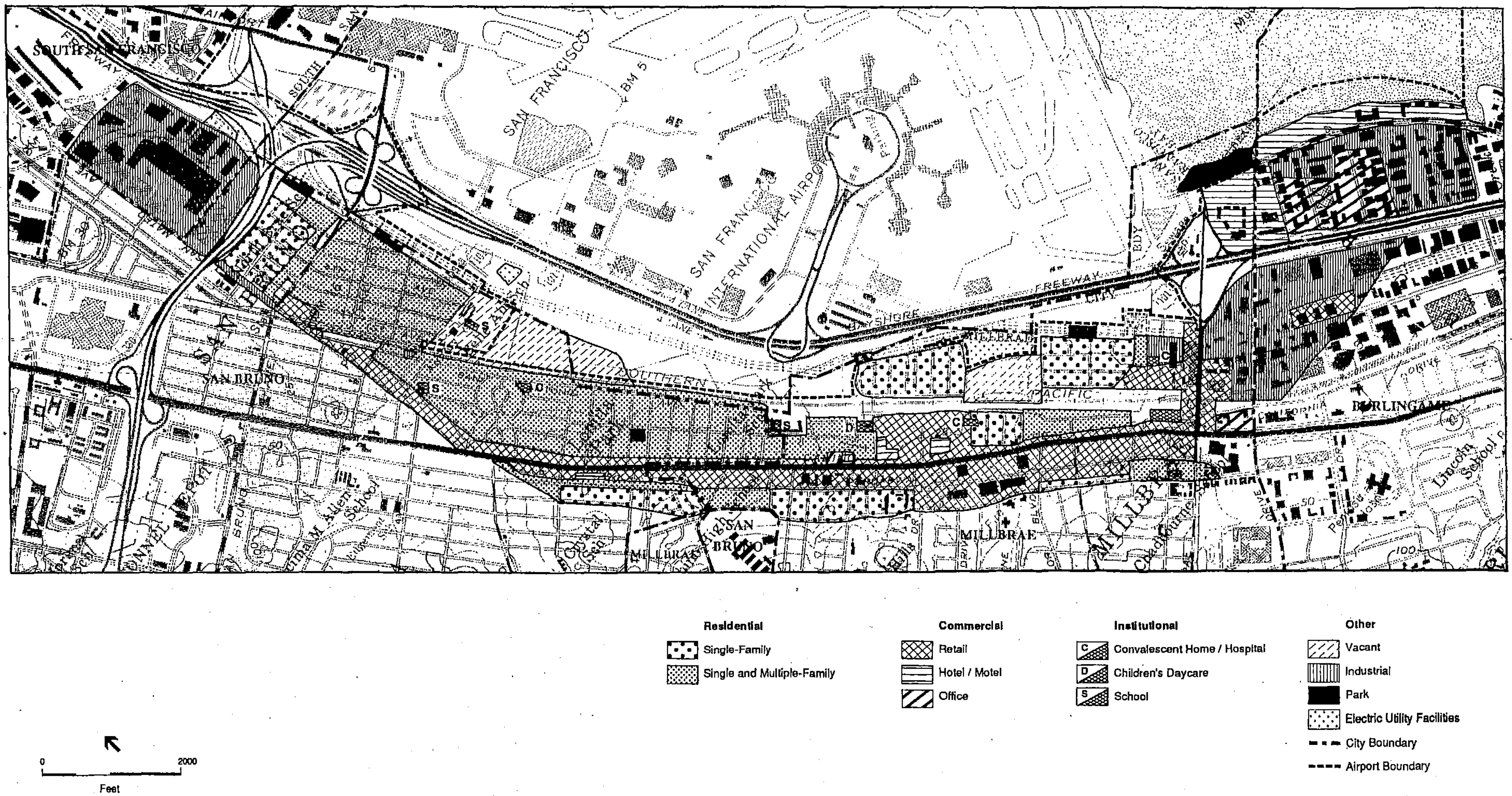
The commenter requests the addition of the words "and Southwest" after the word "West" in the last sentence of paragraph 4 on p. 75 of the EIR. The word "West" is part of the title "West of Bayshore" and is not referring to a direction but a portion of SFIA property. The title "West of Bayshore" should be consistent throughout the EIR, and therefore, is not changed on p. 75.



SOURCE: Environmental Science Associates, Inc.

San Francisco International Airport ■

Figure 1
Project Location



SOURCE: Environmental Science Associates, Inc.

Figure 11
Existing Land Use and
City Boundaries Adjacent to SFIA

The commenter notes that the City of Millbrae lands within the Airport boundary are zoned Open Space by the City of Millbrae and within the City of Millbrae's Sphere-of-Influence, and that there are more [San Francisco Garter] snakes located in [the part of the West of Bayshore site in] Millbrae [than in the remainder of the site]. To further clarify the discussion of the existing land use conditions in the environs of SFIA, the following sentences are appended to the first paragraph on p. 93 of the EIR:

> SFIA lands within the City of Millbrae are designated Industrial/Utility east of US 101, and designated Open Space west of US 101, by the City of Millbrae General Plan. These lands are zoned Industrial east of US 101, and zoned Open Space west of US 101, by the City of Millbrae Zoning Ordinance./26a/ These SFIA lands are within the City of Millbrae's Sphere-of Influence.

On p. 255 of the EIR, the following paragraph is inserted after the fifth paragraph :

> SFIA's West of Bayshore parcel is within the City of Millbrae Sphere of Influence. As stated on p. 20, the parcel is habitat for the San Francisco garter snake, an endangered species, and the red-legged frog, a candidate for the endangered species list. The number of San Francisco garter snakes inhabiting the Millbrae or other portion(s) of the West of Bayshore is not known. As stated on p. 20, the West of Bayshore parcel is not included in the SFIA Master Plan Process.

The following note is inserted after note /26/ on p. 121 of the EIR:

/26a/ Ironside, Robert, Millbrae Director of Community Development, telephone conversation, March 5, 1992.

GENERAL PLAN NOISE ELEMENTS

Comments

"Although we agree that the Pacifica Noise Element may state that aircraft noise is not considered a problem for Pacifica (pp. 94-95), the noise element is over 10 years old and in obvious need of revision. The activities of our committee of the past three years is evidence that airport noise is now (in 1991) considered a problem in Pacifica. . ." (Fred Howard, Pacifica Noise Abatement Committee)

". . . [T]he description of community setting, land use, and noise compatibility for the City of Pacifica as included in the DEIR is incomplete. Although the DEIR correctly states that our Noise Element does not recognize aircraft noise as a problem, the City of Pacifica has been participating in the Airport Roundtable for many years and has repeatedly expressed concern about aircraft noise. In particular, our response to the Notice of Preparation and our response to working papers for the Master Plan indicated a concern about the noise impacts which would result from the planned increase in the number of flights. The DEIR should be revised to acknowledge that the City has serious concerns about aircraft noise, particularly in regard to single-event noise impacts and overflight patterns." (Wendy Cosin, City of Pacifica)

Response

Both comments refer in part to the statement on p. 94 of the EIR that ". . . aircraft noise is not considered a problem for Pacifica." The EIR's discussion of the environmental setting for Land Use and Plans is primarily based on adopted plans and policies such as the Noise Element of the General Plan for the City of Pacifica. Responses to the Notice of Preparation, participation in the Airport/Community Roundtable, and other community involvement meetings indicate that the City of Pacifica and the Pacifica Noise Abatement Committee have "serious concerns" regarding existing aircraft noise levels and the potential single-event noise levels and overflight patterns under the SFIA Master Plan. The last paragraph on p. 94 of the EIR is revised as follows (revisions are underlined):

> The <u>adopted</u> Noise Element of the General Plan states that aircraft noise is not considered a problem for <u>the City of</u> Pacifica./29/ The SFIA 1976 65 dB CNEL contour did not cross into Pacifica's city limits. <u>However, participation in the Airport/Community Roundtable (see p. 167) and at other community meetings concerned with aircraft noise has indicated that noise, particularly single-event noise levels and overflight patterns, is currently perceived as a problem by some City of Pacifica residents./29a/</u>
>
> <u>Nevertheless,</u> the primary source of surface noise in Pacifica is the arterial / collector street system. According to the Noise Element of the 1980 City of Pacifica General Plan: . . .

The following note is inserted after note /29/ on p. 121 of the EIR:

/29a/ Cosin, Wendy, Planning and Building Director, City of Pacifica, telephone conversation, March 5, 1992.

NOTES - Land Use and Plans

/1/ Cross, David, Federal Aviation Administration, telephone conversation, March 5, 1992.

/2/ Hopkins, Les, Federal Aviation Administration, telephone conversation, March 9, 1992.

TRANSPORTATION SETTING AND IMPACTS

The Notes for this section begin on p. C&R.151.

SETTING

Roadway Network

Comment

"On page 127 the document states that Millbrae Avenue is 'a four-lane arterial running east-west from I-280 to Old Bayshore Highway. It provides access to SFIA for areas west and south of SFIA. . .'

"As anyone who has travelled on Millbrae Avenue from I-280 to Old Bayshore Highway can tell you, the road is two lanes, winding, steep, and peppered with stop signs for most of the distance. It passes through residential areas where high speed, high volume traffic would not be appropriate." (Patricia Clark)

Response

The first sentence of the third paragraph on p. 127 of the EIR is changed as follows (new text is underlined and deletions indicated by brackets):

> Running east - west, Millbrae Avenue is a [ ] two-lane arterial between I-280 [ ] and El Camino Real and a six-lane arterial between El Camino Real and Old Bayshore Highway.

Existing Ground Transportation Services

Comment

"P. 131 AC/BART Plus passes, etc. Technically, passage on MUNI or AC Transit is not free; the passenger pays seven dollars twice monthly in addition to BART fare for the privilege of riding the bus lines involved. More importantly, the BART Plus Pass is not valid for passage on SamTrans lines 7F/7B - it is only worth a 50¢ credit toward passage. It is therefore of limited value for SFO tripmaking.

"A separate joint SamTrans/MUNI pass arrangement is, however, currently at the discussion stage which is expected to offer users a discount on the order of $10 from the combined $75 price of passes ($30 MUNI, $45 SamTrans SF/SFO). (SamTrans prices may rise shortly.)" (Peter Straus and James Lowe, MUNI)

<u>Response</u>

The BART Plus Pass is currently good for full credit on SamTrans lines 7B and 3B, and $0.85 credit on SamTrans line 7F. Therefore, the BART Plus Pass could be used for trips to SFIA. A separate SamTrans/MUNI pass would also make trips to SFIA more accessible.

The last two sentences in the third paragraph on p. 131 of the EIR are changed to:

> SamTrans recently entered into a fare-coordination agreement with BART that provides free rides on <u>some</u> SamTrans buses <u>(and credits on others)</u> to passengers who present semi-monthly AC/BART Plus passes. These passes, <u>subject to additional monthly fees,</u> are good for free passage on MUNI routes also.

SFIA MASTER PLAN TRANSPORTATION ASPECTS

<u>On-Airport Circulation (GTC/APM/Roadways)</u>

<u>Comments</u>

"The Division supports the proposed plans for an Automated People Mover (APM) system at San Francisco International Airport. However, we do note that it appears that with the exception of private automobile passenger drop-off, vehicles that previously proceeded directly to the terminal buildings (taxi/limo, shuttle van, shuttle bus and Sam Trans bus) would now go to the Ground Transportation Center, with the occupants then using the Automated People Mover to access the terminal buildings.

"Will all curb side drop-off be discontinued for these alternative modes of travel? If so, we suggest that further consideration be given to the potential impact on the shuttle, bus and taxi/limo services if private vehicles are still allowed to drop-off passengers at the curb." (Sandy Hesnard, Department of Transportation, Division of Aeronautics)

"Terminal Roadway System. The Master Plan correctly states on Pg. 10.9 that 'additional planning will be required to determine the optimum design' of the roadway system. The schematic design depicted in the DEIR (IV.B., pgs. 265-272) should not be taken as a final configuration of the new roadway system required to interconnect the existing and new terminals with Highway 101 and other roads." (Thomas Brown, United Airlines)

". . . There are some comments on widening the road R-3, which is commonly called McDonnell Road, between 101 and San Bruno Avenue. Now, I am not sure I understand that, because R-3 doesn't run between 101 and San Bruno Avenue. But the road seems awful narrow now. . ." (Edwin Works)

Response

The functions and operations of the Ground Transportation Center (GTC) and the Automated People Mover (APM) are described on DEIR pp. 265-268. The GTC would house most of the ground transportation vehicles, including shuttle vans. The objective of the GTC and APM (Light Rail System) is to provide a comparable level of service to patrons who use this system to access the terminals and to those who drive to the terminal curbside. For the convenience of Airport patrons, the Light Rail System would be designed to operate on the upper and lower level roadways in front of the terminals. It would connect and transport passengers, meeters/greeters and employees to and from the terminals, Ground Transportation Center, hotel, remote parking lots, aircraft maintenance and cargo facilities and future mass transit facilities. The DEIR analyzed the APM and the GTC with the understanding that the design was conceptual, and has not been finalized. The Caltrans commenter is correct in stating that private automobiles would retain passenger pick-up/drop-off privileges at curbside directly in front of the air passenger terminal buildings. The impacts associated with this configuration are that private auto use would continue to be encouraged, and shuttle, transit and other alternative transportation modes might be discouraged. The EIR anticipates no measurable impact of the APM on the modal split for passengers and employees entering and leaving the Airport in the future (pp. 283-285, Tables 27-29). The final design of the APM and the GTC should consider providing at least equivalent service levels for all modes, and if possible, incentives for using alternative modes (e.g., HOV lanes directly into the GTC, preferential treatment of transit, etc.).

The roadway design described in the EIR (Figure 27) diagrammatically represents the roadway configuration to interconnect the existing and new terminals with US 101 and other roads. Although the design and configuration of the roadway connections to US 101 are under the jurisdiction of the California Department of Transportation, the Airport would participate in the design and fund this project. The configuration analyzed in the EIR is the result of a joint effort between the Airport staff and Caltrans during the past three years. The final design would be subject to Caltrans approval. The EIR (pp. 265-272) and Master Plan (pp. 10.8 - 10.9) describe the traffic circulation and rationale of the Terminal Roadway System.

Road R-3, which is also known as McDonnell Road, is a two-lane connector roadway that runs between San Bruno Avenue and Road R-18, near the US 101 interchange. It would be widened to four lanes as part of the near-term (1996) Master Plan.

On-Airport Parking

Comment

"...We are also working with SFIA staff on a joint public/employee parking facility immediately adjacent to the MOC [Maintenance Operations Center] (Lot DD) which would, in part, support future additional MOC employee parking requirements...

"Lots C and CC. Due to space restrictions and already existing traffic congestion in the terminal area, United is opposed to the use of Lots C and CC for commercial development and automobile parking (II.C., Section 11, pg. 58), unless necessary to accommodate those businesses already at SFIA being displaced from existing leaseholds. Parking 1,200 cars in this restricted area near the terminal will not serve to relieve either parking or traffic problems at SFIA...

"Parking. The parking provisions described in the DEIR (II.C., Section 9, pg. 56; IV.B., pg. 324; and Tables 46 and 47, pg. 325 and 326) need to be adjusted to reflect the following:

> "United plans to develop, in conjunction with SFIA, the entire ground level of Lot DD, the capacity of which is 3,500 spaces, in order to replace the present United employee parking lots being demolished as listed in Paragraph 2 above [Airport Support Area Facilities, p. C&R.21 herein].
>
> "United plans to construct parking deck(s) above our existing MOC West Lot in order to increase the capacity of this lot from the present 1,750 spaces to approximately

4,000 spaces. Again, a majority of these additional spaces will serve to replace those being demolished as part of Master Plan development.

"Due to the configuration of the new International Terminal, it will not be possible to park cars on the roof of the North Terminal. The Master Plan deleted this parking [capacity]." (Thomas Brown, United Airlines)

Response

The parking garage DD would be developed as noted in the EIR (p. 27, second paragraph; p. 57, Table 9; p. 58, first paragraph) to support replacement parking and serve additional MOC employee parking requirements. This project is also described in the Master Plan (pp. 10.9 and 10.10). The relation of this garage to potential BART passenger needs is discussed on p. C&R.143 herein.

The commercial development and a parking structure project for Lot C-CC are intended to provide replacement space for Airport tenants that would be displaced because of the Master Plan program. The expansion of Lot D would require the relocation of the Bank of America facility to the Lot C-CC commercial office building. This building would house other aviation-related businesses, such as charter operations and aviation-support/airline-administration offices. United Airlines submitted a letter dated August 18, 1989, commenting on the SFIA Master Plan Working Paper C (p. II-70 of the "Response to Comments and Addendum to Master Plan Working Paper C") stating, "In any case, both Lot C and CC should be reserved for vehicle parking requirements." Vehicle parking is one of the proposed uses for this location.

Any comments or concerns United Airlines may have about the appropriateness of features of the SFIA Master Plan should continue to be expressed to the San Francisco Airports Commission and Staff. The EIR analyzes physical environmental impacts.

The parking provisions described in the EIR reflect the SFIA Master Plan and do not need to be adjusted. The SFIA Master Plan includes replacement for demolished facilities as United Airlines requested in its letters of October 28, 1988 and August 18, 1989. These replacement facilities include parking as described in the SFIA Master Plan (Chapter 10, Fig. 10.4 and 10.5) and the EIR (p. 39). The EIR states, "Projects under functional Parking categories 1.0 through 10.0 are summarized in Tables 4 to 7, pp. 46-49, and are presented in further detail in Appendix B . . ." The parking garage on Lot DD is intended to replace

United employee parking that is not otherwise being replaced at relocated facility sites. Lot DD would be developed as necessary for the garage DD parking facility described in the EIR (p. 58, Section. 11.0 Parking Facilities).

The SFIA Master Plan does not contemplate the construction of parking decks above the MOC West Lot. The SFIA Master Plan includes replacement for demolished tenant facilities and parking. This project was not requested by United Airlines during development of the SFIA Master Plan (United Airlines October 28, 1988 and August 18, 1989 letters - Comments on Master Plan Working Papers B and C, respectively).

The Airport staff eliminated the proposed North Terminal roof parking project in the early stages of the SFIA Master Plan study. The North Terminal roof parking had been intended to provide close-in additional parking for terminal employees and had not been intended to replace parking for demolished tenant facilities. The New International Terminal concept, as presented in the third Master Plan Working Paper and as adopted in the SFIA *Draft Final Master Plan,* physically precludes development of the North Terminal roof parking. However, it does provide additional close-in terminal parking on the top floor of the Ground Transportation Center adjacent to the New International Terminal.

The analysis for the DEIR assumed that the projects in the previously approved SFIA Capital Projects Plan (dated 1989) would be built. The 420 parking spaces on the roof of the North Terminal are part of this plan, and were therefore assumed to be existing by the build-out year of the 5-year Capital Projects Plan (1994).

If the Master Plan would preclude the provision of these 420 public parking spaces, then the following impacts would occur:

- In 1996, the projected parking deficit for public short-term spaces would increase from 1,131 to 1,551 (a 37 percent increase). The projected total parking surplus would decrease by 420 spaces, from 2,252 to 1,832, but the surplus is projected only for Airport employees and not air passengers. Vehicles would circulate for a longer time in the short-term garage or the Ground Transportation Center before finding a parking space.

- In 2006, the projected parking deficit for public short-term spaces would increase from 4,616 to 5,036 spaces (a 9 percent increase). The overall parking deficit at SFIA would increase from 4,391 to 4,811 spaces. With the BART station at SFIA, the parking deficit would increase from 1,171 to 1,591 spaces.

Please see the responses on pp. C&R.177-183 herein, for further discussion on parking deficits and suggested mitigation measures.

ASSUMPTIONS

Comments

"The EIR indicates several highway segments and local intersections will deteriorate to Level of Service F as a result of projected future air traffic growth resulting from the master plan. MTC has reviewed the traffic data and assumptions in the DEIR and finds the methodologies and assumptions to be reasonable, given the air passenger forecast, including such factors as the air passenger and employee mode split, the projected use of the proposed BART extension to SFO, and the impact of the BART extension on airport parking requirements." (Chris Brittle, Metropolitan Transportation Commission)

". . .In summary, it is my view that both local and regional agencies develop EIR reports that justify large-scale, high-density development projects while the MTC and city agencies develop EIR reports that justify the large-scale transit system extensions required to transport people from counties where they can afford to live to counties where they work. Unfortunately, the land use plans are expensive (costly) to the public as are the transportation projects developed. Moreover, the transportation plans are inefficient and generally obsolete about the time they are completed. In sum, the participating local and regional agencies use one another's data in their planning activities, and thus, white elephants are set in concrete.

"If anybody wishes to question this statement, I refer you to the referenced reports that I have prepared and delivered to both local and regional officials. The public record shows that these reports have been wholly ignored by elected officials and/or deleted from EIR reports - with rare exception in their entirety.

"The SFO Master Plan DEIR is inextricably linked to the MTC's Regional Transportation Plan DEIR because of MTC's definition of future land use and transportation plans and BAAQMD's Clean Air Plan in terms of the draconian Transportation Control Measures (TCMs) required to address the serious environmental problems created by the high density land use and transportation projects.

"Certification and implementation of the policies and projects defined by ABAG, the MTC and BAAQMD and SFO Airport will have substantial impact upon the future of the Bay Area for well into the 21st Century. For example page 16.8 of MTC's RTP EIR states:

> 'The Project would require an irreversible commitment of financial resources to the development of the Project elements . . the Project would require an irreversible commitment to satisfying mobility needs primarily through automobile accessibility.'

"In short, the Project defined in MTC's RTP EIR establishes that Bay Area transportation requirements are programmed to be 'solved' with an expected increase in the use and density of automobiles in already high traffic areas - and once the Project is underway, it is irreversible. What happened to the 'transit first' policy and the strict requirements codified in the Clean Air Act. The BAAQMD's EIR is also fatally flawed because it merely 'reacts' to land use and transportation plans in a manner much like a frazzled mother reacts to the antics of an errant child. The SFO Airport EIR is even worse. It attempts to define a large-scale project in a vacuum - much like the errant child thinks only of itself." (Dehnert Queen, Small Business Development Corporation)

Response

The MTC comment is noted, with appreciation.

The EIR, under CEQA guidelines, is intended to determine potential impacts of the project and to identify feasible measures to mitigate its impacts; this information is presented in the EIR. Certification of the EIR would not constitute justification or approval of the project.

Regional impacts of the SFIA Master Plan are discussed throughout the EIR, for example on pp. 68-72 (potential impacts); pp. 257-260; pp. 320-322; pp. 306-313, including Table 41; pp. 320-322; pp. 339-351, including Tables 53-54; and pp. 362-365, including Table 61.

Regional impacts of the SFIA Master Plan are further addressed in the responses on pp. C&R.133-137 herein.

Under CEQA, it is not the role of this EIR to comment on the quality of EIRs on other projects.

FUTURE TRAFFIC CONDITIONS

Cumulative Growth

Comment

"The DEIR has taken the anticipated growth in communities immediately adjacent to it and utilized that in connection with its own growth as factors for projecting future circulation conditions. We believe that this clearly underestimates the impacts on the 101 corridor. A large percentage of the traffic problem on the 101 corridor will be north of the airport and most of the off airport development will occur north of the airport in the cities of Brisbane and San Francisco. The cities immediately adjacent to the airport are largely built out and there is more growth projected in Brisbane than in all those cities combined. While the uses on some 600 acres of that is undetermined, a development agreement exists dating back to 1984 which will permit approximately 1.7 million square foot commercial development and 1100 hotel rooms. These impacts should be reviewed.

"The DEIR states as fact that for every on airport job that is created, one half a job is created immediately off airport. In doing traffic projections, the increase in on airport employment was used, but no factor was made for the additional one half person generated off airport by the airport expansion. If it is true that the airport expansion will create this additional half job, it should be factored in for traffic impact purposes." (Stephen Waldo, Mayor of Brisbane)

Response

Assumptions regarding developments in the vicinity of SFIA that might affect the traffic operations in the study area (the area in which local intersections could be affected by the SFIA Master Plan) were obtained from the cities of Brisbane, Burlingame, Millbrae, San Bruno, and South San Francisco, and reviewed with respect to the project's potential impacts on study-area intersections. Brisbane project locations are over six miles from SFIA, so that it is unlikely that these projects would affect the study area intersections in a statistically significant way. Therefore, they were not included in the list-added-growth analysis. However, Brisbane development's cumulative impacts on US 101 were considered, as the forecast growth factors (in effect, additions to the list-added growth) came from the North San Bruno Areawide Traffic Model (a year-2005 travel-demand model).

As stated on p. 275 of the EIR, the year-2005 traffic model, which covered an area from San Francisco to SR 92 on the south (including San Mateo, Burlingame, Millbrae, San Bruno, South San Francisco and Brisbane), incorporated approved projects, and Metropolitan Transportation Commission (MTC) and Association of Bay Area Governments (ABAG) zonal land use data. Since the model's analysis year was 2005, a straight-line projection was used to determine 1996 and 2006 traffic conditions.

ABAG has compiled projections of housing and employment by census tract throughout the Bay Area (ABAG Projections 1987). The MTC traffic model has assigned these land use forecasts to 550 analysis zones, which form the basis for the MTC regional transportation model. (The MTC regional transportation model that was used in the analysis was based on ABAG's Projections 1987. The DEIR incorrectly states that ABAG's Projections 1985 were used. [The EIR has been corrected to read "1987" on all appropriate pages.] The most recent version of the MTC regional model uses ABAG's Projections 1990, which differs only slightly from Projections 1987 in housing and employment figures. The results of the analysis would not be expected to change if the more recent version of the model was used, as the model was used only for trip distribution and background growth factor purposes.)

The year-2005 North San Bruno Areawide Traffic Model was derived from MTC's 550-zone regional transportation model. The MTC model now contains 700 zones, but contained 550 zones at the time the North San Bruno Areawide Study was completed. The North San Bruno Areawide Traffic model has a base year of 1986 and a forecast year of 2005. It is consistent with the General Plans of communities in San Mateo County, and covers an area greater than the local-intersection study area of the EIR.

The traffic analysis accounts indirectly for additional off-site jobs generated by the Airport. The forecast growth factors derived from the year-2005 traffic model were used to forecast traffic growth in the larger (San Francisco to San Mateo) area around the Airport, which includes the local-intersection study area.

Trip Generation

Comment

"P. XI-A-165 Table G-4 - Vehicle Trip Generator - Shouldn't the two Hotels, Clarion and Westin and Hertz Car Rental have been added there?" (Jessie Bracker)

Response

All of the uses mentioned by the commenter were already in existence when the EIR traffic counts were taken; thus, the EIR setting analysis included the traffic generated by these uses (and other existing hotels).

The traffic-impact analysis included the lists of approved (but not yet built) projects for the cities of South San Francisco, San Bruno, Millbrae and Burlingame. Each of these cities' planning departments had been consulted and asked to provide the list of projects that they wanted to include in the analysis. The analysis was performed in 1990; it is not unusual for project lists to change as projects are cancelled or changed in some way and new projects are proposed.

The forecast growth analysis for years 1996 and 2006 takes into account the unforeseen factors by using forecast growth factors. The forecast growth factors are based on general plan buildout information, which includes the maximum amount of potential development for each municipality. If a project was not recognized in the list-added-growth analysis, it would be (implicitly) included in the forecast growth analysis.

TRAFFIC IMPACTS

At Specific Locations

Comments

"In reviewing the traffic impacts section it was noted that additional traffic generated on Highway 101 will cogenerate or force traffic onto other north-south corridors such as El Camino Real. The EIR evaluates impacts to segments of Highway 101 from Whipple Avenue in Redwood City to Holly in San Carlos and includes a segment from Hillsdale Boulevard north.

However, the EIR fails to analyze the impacts upon the segment of Highway 101 lying within Belmont. Segments both north and south of Belmont are analyzed and the entire segment along Highway 101 within Belmont is completely overlooked." (Ed Everett, (then) City Manager, City of Belmont)

"The Draft EIR indicates that the intersections at El Camino Real / Millbrae Avenue, California Drive / Millbrae Avenue and Rollins Road / Millbrae Avenue will all drop to LOS F during A.M. and P.M. peak periods by 2006 if SFIA's master plan is accomplished in the time frame conceived. The report does not adequately address the Old Bayshore Highway / Millbrae Avenue interchange. However it does note the additional congestion on 101 will increase the use of parallel roadways to access SFIA, including Old Bayshore Highway which is now impacted with parallel traffic destined for the airport. How will these trips diverted from 101 increase with implementation of each phase of the SFIA Master Plan? What will be the impact on the service level of the Millbrae / Old Bayshore intersection?. . ." (Dennis Argyres, City Manager, City of Burlingame)

Response

The DEIR analyzed segments along US 101 both south and north of SFIA. Although not every segment was covered in the analysis, the DEIR presented a sampling of freeway segments. The freeway mainline analysis was recalculated to include the US 101 segments immediately north and south of Ralston Avenue in Belmont.

Currently the segment of US 101 between Holly Street and Ralston Avenue operates at LOS D in both the a.m. and p.m. peak hours. In 1996, with the addition of forecast-growth traffic, the Holly Street to Ralston Avenue segment of US 101 would degrade from LOS D to LOS E during the a.m. peak hour and remain at LOS D during the p.m. peak hour. With the addition of project traffic, this US 101 segment would continue to operate at LOS E during the a.m. peak hour and degrade from LOS D to LOS E during the p.m. peak hour.

The segment of US 101 between Ralston Avenue and Hillsdale Boulevard currently operates at LOS E in both the a.m. and p.m. peak hours. In 1996, with the addition of forecast-growth traffic, the Ralston Avenue and Hillsdale Boulevard segment would degrade from LOS E to LOS F during the a.m. peak hour and would remain at LOS E in the p.m. peak hour. With the addition of project-generated traffic, this US 101 segment would operate at LOS F during both the a.m. and p.m. peak hours.

In 2006, with forecast growth traffic, the US 101 segments immediately north and south of Ralston Avenue would operate at LOS E during the a.m. peak hour and LOS F during the p.m. peak hour. With the addition of project traffic, these segments would operate at LOS F during both the morning and afternoon peak hours. Tables 40 and 41 are revised as follows to reflect the additional analysis of these freeway segments.

The segments of US 101 in Belmont would experience the same kinds of increases in traffic as would those in San Mateo and San Carlos. Freeways that are projected to operate at LOS F in the future would actually experience longer peak periods to spread out the projected demand, so that the volume-to-capacity ratio on the freeway remains below 1.0 (the theoretical maximum operating point).

In the EIR, the Old Bayshore Highway / Millbrae Avenue intersection is analyzed for future conditions in 1996 and 2006, with forecast growth, with the near-term and long-term development of the project and with list-added growth. Figures 29 and 30 (EIR pp. 290-291) show the distribution of traffic along Old Bayshore Highway in the future. The traffic analysis projected that fewer than one percent of airport employees and two percent of air passengers would use Old Bayshore Highway in the future. These percentages do take into account, however, trips that would have used the freeway but are now projected to divert to parallel roadways because of congestion or perceived travel-time advantages. The intersection level of service summaries presented in Tables 35 through 39 (EIR pp. 296-308) account for the additional trips that would divert off US 101 onto Old Bayshore Highway and other parallel roadways.

During the a.m. peak hour in 1996, the project would add 336 trips at the Old Bayshore Highway / Millbrae Avenue intersection, including 39 additional vehicles onto Old Bayshore Highway. During the p.m. peak hour in 1996, the project would add 364 trips at the Old Bayshore Highway / Millbrae Avenue intersection, including 43 additional vehicles onto Old Bayshore Highway. During the a.m. peak hour in 2006, the project would add 514 trips at the Old Bayshore Highway / Millbrae Avenue intersection, including 64 additional vehicles onto Old Bayshore Highway. In the p.m. peak hour in 2006, the project would add 554 trips at the Old Bayshore Highway / Millbrae Avenue intersection, including 70 additional vehicles onto Old Bayshore Highway.

TABLE 40: EXISTING LEVEL OF SERVICE - FREEWAY MAINLINE SEGMENTS

Segment		1990 A.M. Peak Hour/a/			1990 P.M. Peak Hour/b/		
From	To	Total Volume/c/	Vol. Per Lane	LOS	Total Volume/c/	Vol. Per Lane	LOS
U.S. 101 (Bayshore Freeway)							
Willow Rd. (SR 84)	Marsh Road	5,575	1,394	A-C	5,302	1,326	A-C
Whipple Ave.	Holly Street	6,388	1,597	D	6,075	1,519	D
Holly Street	**Ralston Avenue**	**6,773**	**1,693**	**D**	**6,440**	**1,610**	**D**
Ralston Avenue	**Hillsdale Blvd.**	**7,269**	**1,817**	**E**	**7,102**	**1,776**	**E**
Hillsdale Blvd.	SR 92	7,859	1,965	F	7,474	1,869	E
3rd Ave.	Poplar/Dore Ave.	8,363	2,091	F	7,953	1,988	F
Broadway	Millbrae Ave.	8,169	2,042	F	7,769	1,942	F
Millbrae Ave.	SFIA	8,517	2,129	F	8,100	2,025	F
SFIA	San Bruno/I-380	9,059	2,265	F	8,616	2,154	F
I-380	Grand Ave.	7,588	1,897	F	7,216	1,804	E
Oyster Pt. Blvd.	Candlestick Park	6,911	1,728	D	6,572	1,643	D
Candlestick Park	Third Street	6,930	1,733	D	6,591	1,648	D
I-280	Army Street	7,046	1,762	E	6,701	1,675	D
I-280 (Junipero Serra Freeway)							
SR 84/SR 114	Farm Hill Blvd.	3,040	760	A-C	3,480	870	A-C
Edgewood Road	SR 92	3,205	801	A-C	3,668	917	A-C
Hayne Road	Trousdale Drive	3,369	842	A-C	3,856	964	A-C
Larkspur Drive	SR 35	4,232	1,058	A-C	4,843	1,211	A-C
San Bruno Ave.	I-380	4,191	1,048	A-C	4,796	1,199	A-C
I-380	Sneath Lane	6,204	1,551	D	7,100	1,775	E
Sneath Ln.	Avalon Drive	6,122	1,531	D	7,006	1,752	E
Serramonte Blvd.	SR 1 South	7,889	1,972	F	9,028	2,257	F
SR 1 North	Alemany/SR 82	5,259	1,315	A-C	6,019	1,505	D
St. Mary's	US 101	6,368	1,592	D	7,288	1,822	E

Key:

LOS	Per-Lane Volume
A-C	up to 1,460
D	1,461 - 1,740
E	1,741 - 1,880 (capacity = 1800)
F	1,881 and above

(Continued)

TABLE 40: EXISTING LEVEL OF SERVICE - FREEWAY MAINLINE SEGMENTS (CONTINUED)

NOTES:

/a/ For US 101 & I-280, A.M. Peak Hour Volumes shown are for northbound traffic only. Northbound is generally the heavier direction of traffic flow on US 101 and & I-280 during the A.M. Peak Hour and therefore represents the worst-case traffic condition.

/b/ For US 101 & I-280, P.M. Peak Hour Volumes shown are for southbound traffic only. Southbound is generally the heavier direction of traffic flow on US 101 & I-280 during the P.M. Peak Hour and therefore represents the worst-case traffic condition.

/c/ Existing freeway volumes were factored from two-direction peak hour volumes presented in Caltrans' 1988 Volumes on California State Highways, based on actual counts taken by Caltrans on November 3, 1989, on U S 101 at Army Street in San Francisco, and at 3rd Avenue in San Mateo. That is, the distribution in volumes along the entire freeway, from San Francisco to San Mateo, as shown in the 1988 Caltrans book, was assumed to remain the same, but volumes at intermediate points were adjusted to be consistent with the actual 1989 counts at the two endpoints.

SOURCE: Caltrans District 4, and DKS Associates.

As shown in the tables, critical-movement traffic at the Old Bayshore Highway / Millbrae Avenue intersection is projected to increase by 29 percent in the a.m. peak hour and 12 percent in the p.m. peak hour, with the addition of project traffic in 1996. With list-added growth (i.e., development in Burlingame), the critical-movement traffic would increase by another 12 percent in the a.m. peak hour and an additional 16 percent in the p.m. peak hour. In 2006, the percentage of project-generated additional traffic would be comparable to that in 1996. The additional list-added-growth traffic, however, would increase the critical turning movements at this intersection by another 50 percent in the a.m. peak hour and 36 percent in the p.m. peak hour. These relatively large increases in critical movements would not cause this intersection to operate at an unacceptable level of service in the future, as there is sufficient excess capacity today to accommodate additional traffic.

TABLE 41: 1996 AND 2006 PROJECT IMPACTS ON FREEWAY MAINLINE SEGMENTS

YEAR 1996		A.M. Peak Hour/a/ Northbound						P.M. Peak Hour/b/ Southbound					
		--Forecast Growth--			--Plus Project--			--Forecast Growth--			--Plus Project--		
From	To	Vol	VPL*	LOS	Vol	VPL	LOS	Vol	VPL	LOS	Vol	VPL	LOS
U.S. 101 (Bayshore Freeway)													
Willow Rd (SR 84)	Marsh Road	5,798	1,450	A-C	6,231	1,558	D	5,514	1,379	A-C	5,970	1,492	D
Whipple Avenue	Holly Street	6,644	1,661	D	7,099	1,775	E	6,318	1,580	D	6,798	1,699	D
Holly Street	**Ralston Avenue**	**7,044**	**1,761**	**E**	**7,476**	**1,869**	**E**	**6,688**	**1,674**	**D**	**7,153**	**1,788**	**E**
Ralston Avenue	**Hillsdale Blvd.**	**7,560**	**1,890**	**F**	**8,015**	**2,004**	**F**	**7,386**	**1,847**	**E**	**7,866**	**1,966**	**F**
Hillsdale Boulevard	SR 92	8,173	2,043	F	8,653	2,163	F	7,773	1,943	F	8,278	2,069	F
3rd Avenue	Poplar/Dore Avenue	8,698	2,174	F	9,202	2,301	F	8,271	2,068	F	8,803	2,201	F
Broadway	Millbrae Ave.	8,496	2,124	F	9,027	2,257	F	8,080	2,020	F	8,639	2,160	F
Millbrae Avenue	SFIA	8,858	2,214	F	9,417	2,354	F	8,424	2,106	F	9,013	2,253	F
SFIA	San Bruno Av/I-380	9,421	2,355	F	9,534	2,384	F	8,961	2,240	F	9,096	2,274	F
I-380	Grand Avenue	7,892	1,973	F	8,414	2,103	F	7,505	1,876	E	8,152	2,038	F
Oyster Pt. Blvd	Candlestick Park	7,187	1,797	E	7,683	1,921	F	6,835	1,709	D	7,450	1,862	E
Candlestick Park	Third Street	7,207	1,802	E	7,678	1,920	F	6,855	1,714	D	7,439	1,860	E
I-280	Army Street	7,328	1,832	E	7,775	1,944	F	6,969	1,742	E	7,524	1,881	F
I-280 (Junipero Serra Freeway)													
SR 84/SR 114	Farm Hill Boulevard	3,162	790	A-C	3,472	868	A-C	3,619	905	A-C	3,956	989	A-C
Edgewood Road	SR 92	3,333	833	A-C	3,654	913	A-C	3,815	954	A-C	4,162	1,041	A-C
Hayne Road	Trousdale Drive	3,504	876	A-C	3,834	959	A-C	4,010	1,003	A-C	4,369	1,092	A-C
Larkspur Drive	SR 35	4,401	1,100	A-C	4,742	1,185	A-C	5,037	1,259	A-C	5,406	1,352	A-C
San Bruno Avenue	I-380	4,359	1,090	A-C	4,710	1,177	A-C	4,988	1,247	A-C	5,369	1,342	A-C
I-380	Sneath Lane	6,452	1,613	D	6,642	1,661	D	7,384	1,846	E	7,616	1,904	F
Sneath Ln.	Avalon Drive	6,367	1,592	D	6,551	1,638	D	7,286	1,822	E	7,511	1,878	E
Serramonte Blvd	SR 1 South	8,205	2,051	F	8,383	2,096	F	9,389	2,347	F	9,607	2,402	F
SR 1 North	Alemany Blvd/SR 82	5,469	1,367	A-C	5,643	1,411	A-C	6,260	1,565	D	6,472	1,618	D
St. Mary's	US 101	6,623	1,656	D	6,791	1,698	D	7,580	1,895	F	7,785	1,946	F

(Continued)

TABLE 41: 1996 AND 2006 PROJECT IMPACTS ON FREEWAY MAINLINE SEGMENTS (Continued)

YEAR 2006		A.M. Peak Hour/a/ Northbound Forecast Growth			A.M. Peak Hour/a/ Northbound Plus Project			P.M. Peak Hour/b/ Southbound Forecast Growth			P.M. Peak Hour/b/ Southbound Plus Project		
From	To	Vol	VPL*	LOS	Vol	VPL	LOS	Vol	VPL	LOS	Vol	VPL	LOS
U.S. 101 (Bayshore Freeway)													
Willow Rd (SR 84)	Marsh Road	6,188	1,547	D	6,967	1,742	E	5,885	1,471	D	6,692	1,673	D
Whipple Avenue	Holly Street	7,091	1,773	E	7,910	1,978	F	6,743	1,686	D	7,593	1,898	F
Holly Street	**Ralston Avenue**	**7,518**	**1,880**	**E**	**8,296**	**2,074**	**F**	**7,148**	**1,787**	**E**	**7,955**	**1,989**	**F**
Ralston Avenue	**Hillsdale Blvd.**	**8,069**	**2,017**	**F**	**8,888**	**2,222**	**F**	**7,883**	**1,971**	**F**	**8,733**	**2,183**	**F**
Hillsdale Boulevard	SR 92	8,723	2,181	F	9,586	2,397	F	8,296	2,074	F	9,190	2,298	F
3rd Avenue	Poplar/Dore Avenue	9,283	2,321	F	10,191	2,548	F	8,828	2,207	F	9,769	2,442	F
Broadway	Millbrae Ave.	9,068	2,267	F	10,023	2,506	F	8,624	2,156	F	9,614	2,404	F
Millbrae Avenue	SFIA	9,454	2,363	F	10,460	2,615	F	8,991	2,248	F	10,034	2,509	F
SFIA	San Bruno Av/I-380	10,055	2,514	F	10,212	2,553	F	9,564	2,391	F	9,747	2,437	F
I-380	Grand Avenue	8,423	2,106	F	9,387	2,347	F	8,010	2,002	F	9,203	2,301	F
Oyster Pt. Blvd	Candlestick Park	7,671	1,918	F	8,587	2,147	F	7,295	1,824	E	8,428	2,107	F
Candlestick Park	Third Street	7,692	1,923	F	8,562	2,141	F	7,316	1,829	E	8,393	2,098	F
I-280	Army Street	7,821	1,955	F	8,648	2,162	F	7,438	1,860	E	8,461	2,115	F
I-280 (Junipero Serra Freeway)													
SR 84/SR 114	Farm Hill Boulevard	3,374	844	A-C	3,855	964	A-C	3,863	966	A-C	4,374	1,094	A-C
Edgewood Road	SR 92	3,558	889	A-C	4,053	1,013	A-C	4,071	1,018	A-C	4,599	1,150	A-C
Hayne Road	Trousdale Drive	3,740	935	A-C	4,250	1,063	A-C	4,280	1,070	A-C	4,824	1,206	A-C
Larkspur Drive	SR 35	4,698	1,174	A-C	5,224	1,306	A-C	5,376	1,344	A-C	5,936	1,484	A-C
San Bruno Avenue	I-380	4,652	1,163	A-C	5,195	1,299	A-C	5,324	1,331	A-C	5,902	1,475	A-C
I-380	Sneath Lane	6,886	1,722	D	7,249	1,812	E	7,881	1,970	F	8,330	2,083	F
Sneath Ln.	Avalon Drive	6,795	1,699	D	7,148	1,787	E	7,777	1,944	F	8,212	2,053	F
Serramonte Blvd	SR 1 South	8,757	2,189	F	9,098	2,275	F	10,021	2,505	F	10,444	2,611	F
SR 1 North	Alemany Blvd/SR 82	5,837	1,459	A-C	6,169	1,542	D	6,681	1,670	D	7,091	1,773	E
St. Mary's	US 101	7,068	1,767	E	7,390	1,847	E	8,090	2,022	F	8,487	2,122	F

(Continued)

TABLE 41: 1996 AND 2006 PROJECT IMPACTS ON FREEWAY MAINLINE SEGMENTS (Continued)

Key: LOS Per-Lane Volume (VPL)*

LOS	Per-Lane Volume (VPL)*
A-C	Up to 1,460
D	1,461 - 1,740
E	1,741 - 1,880 (Capacity = 1880)
F	1,881 and above

/a/ For US 101 & I-280, A.M. Peak Hour Volumes shown are for northbound traffic only. Northbound is generally the heavier direction of traffic flow on US 101 and & I-280 during the A.M. Peak Hour and therefore represents the worst-case traffic condition.

/b/ For US 101 & I-280, P.M. Peak Hour Volumes shown are for southbound traffic only. Southbound is generally the heavier direction of traffic flow on US 101 & I-280 during the P.M. Peak Hour and therefore represents the worst-case traffic condition.

SOURCE: DKS Associates

Level of Service

Comments

". . .It's not really clear how this ground transportation center is going to work and what its capacity is and what the potential impact of that getting into overcapacity, flooding the roadways that are going into the airport. Anybody who has gone to the airport knows how overloaded the access roads happen to be." (Commissioner Engmann)

"As I was coming down tonight, speaking about environment, how are they going to accommodate the traffic coming and going out of this airport? They built a few ramps; even the few ramps are outdated today. One comes into the airport for either departure or arrival, you are playing Russian roulette in order to get into the proper lane if you're coming from San Francisco or from the southern part of the Peninsula." (Bruno Bernasconi)

"I just drove to the airport recently, Monday night. It's not easy as you get to the airport. I wasn't frightened because I know how to do it. But with the traffic increasing, I notice some of the ramps, they are already at F. And it's my old argument, aren't you ever going to say double F, triple F. It's F now. That means it's bad. That is why it's a little frightening when you try to get over. Some people . . . just from San Francisco take that -- at San Bruno there is an exit. Some of us still do [use] the old exit. As those two merge and people are whizzing, it's scary. How much worse is that going to be with this kind of increase? I don't think this document tells all those things." (Commissioner Bierman)

"The Draft EIR states that the proposed airport expansion will result in an increase of vehicular traffic from approximately 110,700 daily in 1990 to 151,000 daily in 1996 (an increase of 36.4 percent) and to 179,700 in 2006 (an increase of 62.3 percent). Similar increases would occur during peak-hour traffic.

"With a rail extension to the vicinity of SFIA, it is projected that SFIA would generate 168,000 vehicular traffic daily in 2006. This would still amount to an increase of 52 percent over 1990 traffic.

"Highway 101 from Third Avenue to I-380 currently operates at Level of Service (LOS) F during peak hours. Route 101 between Millbrae Avenue and Airport Interchanges is currently carrying an average Daily Traffic of 265,000 vehicles. The airport expansion would cause further deterioration of level of service on the freeways and on the arterial streets in the surrounding communities. The Airport projects proposed for 1996 would cause El Camino Real at Millbrae Avenue and Rollins Road at Millbrae Avenue to operate below LOS E during the a.m. peak hour." (Richard Gee, SamTrans)

Response

Tables 42 through 44 (pp. 314-318 of the EIR) summarize the ramp volumes and service levels for the existing and future conditions. The issue of merging and driver confusion would be improved with the addition of the Ground Transportation Center. The access to and egress from the Ground Transportation Center is described in further detail on pp. C&R.114-115 herein.

The Ground Transportation Center (GTC) would improve the merging of vehicles coming into SFIA. By separation of the traffic streams by function (e.g., buses, taxis, shuttles, drop-offs, etc.), the flow of vehicles would be better maintained. The GTC would reduce driver confusion, as vehicles would not be competing for the same space on the entry roadways. Signs directing motorists to specific locations would be posted at spots well ahead of the GTC entry ramps.

By provision of separate entry ramps into different levels of the GTC, vehicles entering the GTC would be separated from the main traffic stream heading on the ground level for the arrival and departure roadways. While more vehicles would be using the GTC and internal roadway system, there would be less merging and lane changing, and therefore less driver confusion.

The last comment correctly summarizes the information presented in the EIR. Although large increases in traffic are projected, several mitigation measures were formulated that would contribute to minimizing the impacts. For SFIA traffic, mitigation measures are presented in Section V of the EIR that address intersections, roadways, transit and parking, which collectively would minimize the impacts of SFIA traffic.

The traffic level of service on US 101 is already at LOS F along many segments, and the SFIA Master Plan would add traffic to congested segments. However, with or without the SFIA Master Plan, US 101 would require mitigation measures to address existing deficiencies and future congestion resulting from forecast and list-added growth in the region. Several mitigation measures are presented in Section V of the DEIR for freeway mainline segments and freeway ramps. Along with the previously mentioned mitigation measures for intersections, roadways, transit and parking, and with the suggested TSM measures, freeway congestion impacts and the required mitigation measures have been addressed.

Intersection impacts in the local study area have been identified and several intersections would require mitigation measures. The intersections of Millbrae Avenue with Rollins Road and El Camino Real require mitigation today to address existing deficiencies during the a.m. peak hour. Both of these intersections currently operate at LOS E during the a.m. peak hour. The additions of forecast growth and list-added growth contribute in a statistically significant way to the level of service deterioration projected in the future. The increases resulting from the SFIA Master Plan would also contribute to the LOS degradation, but to a lesser extent. Tables 36 and 38 of the EIR (pp. 300, 304, respectively) show the impacts of the project compared to those of the forecast and list-added growth that would occur in any event.

Indirect Impacts

Comments

". . . There will also be adverse economic impacts in San Mateo County and the cities in the airport vicinity if the projected vehicular traffic impacts occur. . ." (Onnolee Trapp, Leagues of Women Voters of San Mateo County)

". . . Adding of the required over-6,800 dwelling units in the area of the airport would make life in nearby cities such as Millbrae unbearable due to, especially, water and transportation problems." (Patricia Clark)

Response

It is true that growth in enplanements (independent of the SFIA Master Plan), and implementation of the SFIA Master Plan itself, would contribute to worsening of traffic in San Mateo County as a whole and the Airport's immediately neighboring cities. Most of the worsening of traffic would be the result of forecast and list-added growth. It would therefore be speculative to try to quantify the Master Plan's (secondary) adverse economic impacts in the County and the neighboring cities.

As the location of the "required" dwelling units would be diffuse and unpredictable, it would be speculative to try to quantify the water and transportation problems noted in the second comment. It is a matter of individual judgment as to whether "life in nearby cities such as Millbrae" would be "unbearable."

REGIONAL TRAFFIC IMPACTS

Freeways

Comments

"About freeways, our Downtown Plan EIR talks about the need for increased freeway lanes, increased bridges. There is nothing in here, it seems to me, that fits in with that. It talks about need for more ramps. Maybe the increase isn't that much as compared with our office traffic. Maybe our 19 or 20 million or 25 million office increase makes this seem infinitesimal on the freeway. I'd like more information on that." (Commission Bierman)

". . . [Y]ou said that commute problems plague Highway 101. I don't know when you found problems getting to the airport, but I go there regularly and can't recall an airport-generated freeway problem. The alternative that your remarks imply is to force San Franciscans to go to Oakland via the Bay Bridge, the truncated Nimitz Freeway, and Hegenberger Road at commute times, hardly a better choice. . ." (Stanford Horn)

Response

The transportation impact analysis for the EIR focuses on the area which would be most affected by Airport growth. Traffic impacts are shown for US 101 as far south as Willow Road (SR 84) and as far north as Army Street. Traffic impacts on I-280 are shown as far south as Woodside Road (SR 84) and as far north as the US 101 interchange. Farther from the Airport, traffic increases due to the Airport would be lower in magnitude as traffic diffuses onto other routes, and still lower as percentages of total traffic growth.

The Mission Bay EIR (superseding the *Downtown EIR*) identifies potential impacts of projected downtown growth at regional screenlines as follows: Bay Bridge (I-80), Golden Gate Bridge (US 101), US 101 (at the San Francisco / San Mateo County line), and I-280 (at the San Francisco / San Mateo County line). At the Bay Bridge, the *Mission Bay EIR* showed an increase of only 250 vehicles (three percent) in the p.m. peak hour between 1990 and 2000; this low increase is because demand on the Bay Bridge would be constrained by the estimated capacity of 9,700 vehicles, so that almost all new trips were assumed to be shifted to public transit (BART and AC Transit). By comparison, additional (worst-case) calculations for the SFIA Master Plan EIR show a total increase of up to 670 vehicles on the Bay Bridge in the p.m. peak hour between 1990 and 2006; this assumes a modest mode shift, as described in the *Downtown EIR*, but does not reflect capacity constraints on the Bay Bridge. Since the Bay Bridge is at capacity during the p.m. peak hour, the Airport trips would likely displace non-Airport vehicle trips (e.g., those by downtown commuters) which are more easily diverted to alternative modes or travel periods. Similarly, Airport growth between 1990 and 2006 is projected to add up to 480 vehicles to the Golden Gate Bridge during the p.m. peak hour, whereas the *Mission Bay EIR* projected a 700-vehicle-trip increase (11 percent) between 1990 and 2000, taking into account capacity limitations and resulting shifts to public-transit modes. Again, the likely effect of the Airport traffic growth would be to shift still more downtown commuters to public transit and alternative times, since they are more easily shifted than Airport users.

On the basis of standard methods of calculation from the *1985 Highway Capacity Manual*, the existing level of service on US 101 between Hillsdale Boulevard (San Mateo) and Grand Avenue (South San Francisco) is E-F (EIR Table 40), indicating congestion during a.m. and p.m. peak hours. However, as noted in the EIR (p. 150), field observations show that traffic flows well (LOS D or better), even during peak periods.

Table 40 is modified as follows, to reflect this:

> Footnote /d/ is indicated next to the column heading for LOS for both the a.m. and the p.m. peak hours.
>
> Footnote /d/ is added as follows:
>
> > /d/ Even in segments where the calculations indicate LOS E or F, field observations show that traffic flows well (LOS D or better).

In 1988, MTC sponsored a research project (elaborating on work sponsored by the National Science Foundation from 1983 to 1985) that led to the creation of an Airport access and choice model called ACCESS. The model, created by Greig Harvey of Stanford University and Deakin, Harvey, Skabardonis, Inc., is a tool for studying policies and trends that influence the choice of airports by air passengers in a region and the patterns of use for airport access modes. ACCESS used the 1985 MTC air passenger survey and considered such factors as flight choices, travel times, value of time for business and non-business travellers, hotels, parking fees, and rail and shuttle services. The software is capable of estimating the number of passengers who would use each Bay Area airport, the passenger's county of residence, the total vehicle miles travelled, and the impacts of extending BART to any of the airports. The ACCESS model has several useful applications in regional transportation analysis (MTC, ACCESS Models of Airports Access and Airport Choice for the San Francisco Bay Region, Version 1.2, December 1989)./1/

Clearly, in any given year, the actual distribution of enplanements over the Bay Area's airports, and over time of day at each airport, would determine the generated ground traffic in the vicinity of each airport, and its distribution over the course of the day.

The ACCESS model forecast about 7,600 daily BART riders to SFIA in 2010, using a forecast of 40 million annual passengers. The DEIR estimates the BART ridership to be about 12,000 air passengers and 9,000 Airport employees each day in 2006, using a forecast of 51 million annual passengers. This works out to roughly the same proportion of air passengers using BART; however the comparison does not consider Airport employees, as the ACCESS model does not treat Airport employees, and can therefore not be considered (by itself) to be a general-purpose travel-forecasting model.

For the purposes of this EIR, several important features would enhance the model and its reported results to date. As noted, the model does not take into account Airport employees, who make up over 30 percent of SFIA trips. Also, it is configured for Airport conditions in August 1985 (but has been run for 1990 and future projections with appropriate adjustments). The model would have to be updated continually (as would any forecasting model) to reflect the changes in airline competition, ground access, air travel trends, trip purposes, vehicle occupancy, aircraft load factors and aircraft changes. For example, if one airline offers a discount fare in a heavily travelled market (e.g., San

Francisco to Los Angeles) but offers the flights only out of Oakland Airport, then significant shifts in air passenger behavior would be observed. The updated model would have to consider the airport's capacity to support additional flights, or the number of gates each airline may operate at each airport.

Downtown San Francisco Arterials

Comment

"pp. 125-152 Environmental Setting: Transportation [and] pp. 265-330 Environmental Impacts: Transportation, General Comment. Any major facility such as SFO has broad regional impacts, not just impacts in the immediate proximity of the facility. It appears to us that a major flaw in the transportation analyses is the apparent treatment of impacts on the roadway system as localized to San Mateo County.

"In fact, a significant amount of travel to and from SFO is associated with San Francisco trip-ends. This is clearly suggested by materials such as Table 41 (pp. 310-311) which show project impacts in the northernmost freeway link evaluated -- 101 south of Army -- as being reduced from LOS E to LOS F as an impact of the project. It follows as probable that such impacts carry into San Francisco north of Army Street as well -- and we believe the critical linkages in terms of capacity constraints are north, not south, of Army Street.

"Impacts of traffic growth on major arteries within the City -- such as but not limited to US-101, I-280, CA-1 (19th Avenue), Portola/Market, etc.) -- should be evaluated and mitigated as appropriate." (Peter Straus and James Lowe, MUNI)

Response

The study area for detailed transportation analysis is sufficiently broad to identify the primary impacts of the Airport. It is true that an important amount of travel to and from the Airport is associated with San Francisco trip ends. However, the net impacts of the Airport relative to total traffic volumes decline with distance from the Airport, particularly within San Francisco, for two reasons. First, traffic disperses off the mainline freeway onto arterial streets for access to ultimate destinations within city neighborhoods. Second, traffic increases due to the Airport begin to overlap with traffic increases due to non-Airport growth, which would occur with or without Airport growth. For example, some of the Airport-generated trips would be by new downtown or Mission Bay commuters or visitors already accounted for in downtown growth projections. In the absence of Airport expansion, these trips would still be generated but would be made to other locations; this would not necessarily cause a net increase in US 101 mainline freeway volumes relative to the No-Project alternative.

For similar reasons, potential traffic impacts on city arterials such as 19th Avenue, Portola/Market, etc. were not analyzed in the EIR. It would not be possible to quantify reliably the dispersion of traffic to individual arterials within San Francisco, and net traffic increases of the project would not likely be statistically significant on these routes.

CALTRAIN

Comment

". . . I have had an alternative plan to take Caltrain rail service directly to the airport passenger terminals for over five years now. I have taken it to the MTC, the Joint Powers Board, this body, and the Board of Supervisors, and have had it buried every time. . .

". . . [T]hey're trying to say they're going to set it up where it's just going to be a skeleton and then get down to the meat later. I think that makes it [this EIR] fatally flawed right off the bat. . .

"I'd also like to point out that our plan takes Caltrain type service. It will actually be a PCC type car, or equivalent, directly to the airport passenger terminals in a loop, which will provide direct service to the airport passenger terminals from downtown San Francisco, downtown San Jose and the Peninsula. And then Phase 2, across the Dumbarton Bridge into the East Bay, into the Hannigan proposal, which will take you to Sacramento and Los Angeles and points east.

"I have already documented, using the MTC's own numbers and the City and County's numbers, that our proposal can be built in three years instead of 11 years and save taxpayers in excess of $2.7 billion. And by now it's even probably higher than that.

"I would also like to point out that during the EIR process, from what this document says, is that the Airport Commission asked SamTrans: Is there anybody else interested in doing this? And they said 'no.'

"Well, they know full well that we have been arguing this, that we have had a letter of intent in to take over the Caltrain operation. And in recent days, June 30th was the day that the letter of intent for the JPB to take over Caltrain expired. And I went to the JPB and I said: I want a letter of no prejudice so that we may formally discuss takeover of Caltrain from SP. And they just fobbed it off.

"The next thing I knew, Mr. Hsieh at the Board of Supervisors quietly sneaked through another little piece of paper without any public hearing whatsoever and made it so that they can just continue playing their games.

"Well, this document lays out the numbers fairly well, and I am no longer willing to play the nice guy, okay? We are going to do this one the hard way. There is a better plan. The vehicular transportation systems in here are out of scale. It's not going to work. I just want to put it on record that you'll have a substantial number of documents come in. If you don't address them this time, I guarantee we are going to go to court. There is a better way." (Dehnert Queen)

Response

The alternative transit system being advocated by the commenter is a regional rail system that extends CalTrain service north to Justin Herman Plaza in downtown San Francisco and, in later phases, extends service across the Dumbarton Bridge for service to the East Bay and across the Golden Gate Bridge into Marin and Sonoma Counties.

Under the alternative transit proposal, the currently proposed BART extension from Daly City to the Airport vicinity would be eliminated and, instead, the CalTrain route would loop (above ground) through the Airport. The savings in time and cost of construction that are claimed for the alternative transit proposal are due to eliminating the BART extension. The decision as to whether to extend BART service to the Airport is a regional issue, more appropriately addressed in the ongoing BART SFIA Extension Alternatives Analysis/Draft EIR/EIS.

The SFIA Master Plan considers a multi-modal station west of the Airport along with a fixed guideway transit system (Automated People Mover or APM) to connect this station to Airport destinations. The station could be served by both BART and CalTrain. Therefore, the SFIA Master Plan does not preclude the regional aspects of the alternative transit proposal. If there are comparable patronage levels for either the BART extension or the alternative transit proposal, impacts of the SFIA Master Plan would not be significantly different under either regional transit alternative.

The SFIA Master Plan would preclude the CalTrain aerial loop through the Airport that is included in the alternative transit proposal. Instead, Airport travellers would use the proposed APM for access from CalTrain at the multi-modal station to final Airport destinations. The aerial loop envisioned in the alternative transit proposal would add travel time to all regional trips on CalTrain. Also, as a regional system it would not serve the majority of SFIA employment locations (e.g., United Airlines Maintenance Facility); unless stations were provided at each passenger terminal building, most air passengers would still have to transfer to the APM or walk to their final destinations. Non-terminal-area Airport employees would also have to transfer to the APM to reach their employment locations. Therefore, the aerial loop is viewed as potentially penalizing all non-Airport transit users while benefiting only a portion of the Airport travellers. The APM system proposed in the SFIA Master Plan provides the flexibility to serve both BART and CalTrain passengers to the Airport without penalizing through travelers, and the flexibility to serve more Airport destinations directly with frequent service than does the aerial loop.

BART EXTENSION TO SFIA

Comments

"Since the DEIR was prepared two additional BART extension alternatives were added to those previously under study by MTC: Alternative 5 (I-380 corridor to an 'external' BART station on the airport's West of Bayshore property) and Alternative 6 (I-380 corridor to an 'internal' station under the Airport's main garage). The decision on which alignment will be the preferred alignment to SFO will be a joint decision by MTC, BART, and SamTrans. This study assumes the Airport will finance, construct and operate an Automated People Mover system to the 'External' SFO BART/CalTrain Station if this alignment is selected as the preferred alternative. Potential airport contributions to the capital and operating cost of the proposed BART extension will be evaluated by MTC in the ongoing BART extension study." (Chris Brittle, Metropolitan Transportation Commission)

"Since the writing of the Master Plan DEIR, two additional BART extension alternatives have been developed. Descriptions of the new alternatives are given below and should be included in the alternatives descriptions on page 267.

"Alternative 5 - External SFIA Station via I-380. This alternative would be identical to Alternative 3 but would continue underground from the Tanforan Station and pass under the CalTrain tracks paralleling I-380 on the north side. It would bypass part of San Bruno to the east. The alignment would proceed under I-380 and run south in a cut-and-cover or at-grade profile until it links up with the CalTrain corridor. It would become ground level at the same station designation as in Alternative 3.

"Alternative 6 - Internal SFIA Subway Station with UAL Station. This alternative would be similar to Alternative 5 until just west of Highway 101 where the alignment continues under the freeway to the airport. A CalTrain station would be located east of the Tanforan BART Station. A shuttle bus service would transfer passengers between the BART and CalTrain stations. A BART station [would] be located east of U.S. 101 and south [of] I-380 near the United Airlines maintenance base with a surface parking lot nearby. The BART line would continue underground to the Airport Station and connect to the same alignment as Alternative 4." (Joan Kugler, BART)

"As you may be aware, the BART Extension Study Policy Committee added another alternative to their study at about the same time the DEIR was published. Titled 'Alternative 6', this new alignment includes a station to serve commuters located in the vicinity of the United Airlines Maintenance facility and a station located in the existing SFO main parking structure. As the station at the UAL Maintenance Facility will be serving the commute market, potential traffic impacts to South San Francisco streets, primarily South Airport Boulevard, should be discussed." (Jack Drago, Mayor, City of South San Francisco)

". . . [BART] is only discussed in relation to local intersections and parking demand; a discussion of the impacts on freeway segments would also be warranted." (Chris Brittle, Metropolitan Transportation Commission)

"However, increasing the track for BART from Colma to the area of Highway 101 at a cost of nearly ONE BILLION DOLLARS to be PAID BY THE PEOPLE OF SAN MATEO COUNTY for an airport serving SAN FRANCISCO is the most outrageous local boondoggle ever to have come to my attention." (Patricia Clark)

"Caltrans supports SFIA's plans for an Automated People Mover (APM) system to circulate people and their luggage between airport terminals, parking facilities, as well as to serve Lot D, Lot DD, and the maintenance area. We recommend that both routes connect directly to a

CalTrain/BART station west of Highway 101, in order to provide direct public transit access to the largest number of people. This is particularly important during hours of congestion on the adjacent highway/freeway and street network.

"The perceived disadvantage of transferring between modes at a station external to an APM would be offset by the much greater convenience provided by the APM in distributing passengers throughout the various terminals. Frequent and direct access to the maintenance area, the largest employment center in San Mateo County, via an APM from a CalTrain/BART station should provide a sufficient incentive to attract a significant number of daily commuters.

"Conversely, an internal BART station may not encourage transit usage by maintenance employees, and would require airport passengers to carry luggage great distances, both horizontally and vertically.

"The encouragement of convenient public transit access to both the terminals and the maintenance area is consistent with Caltrans policy to reduce vehicle miles traveled (VMT) on the State Highway System." (Preston Kelley, Caltrans)

"The DEIR does not identify any potential impacts from the proposed Automated People Mover on the Lomita Park residential area in San Bruno. If either pedestrian or vehicular access is provided to the APM from the Lomita Park area via Huntington Avenue, then in essence, Huntington Avenue and Lomita Park become another direct access point to the airport. Passengers could be dropped off on Huntington, walk a very short distance across BART and CalTrain platforms and access the APM to the airport. This would avoid Highway 101 at a significantly adverse impact on the Lomita Park residential area." (George Foscardo, City of San Bruno)

<u>Response</u>

Two additional BART extension alternatives have been developed since the preparation of the DEIR. The alternatives descriptions on page 267 of the EIR are augmented to include the following (inserted after the second bulleted item):

- Alternative 5 - External SFIA Station via I-380. This alternative would be identical to Alternative 3 but would continue underground from the Tanforan Station and pass under the CalTrain tracks paralleling I-380 on the north side. It would bypass part of San Bruno to the east. The alignment would proceed under

I-380 and run south in a cut-and-cover or at-grade profile until it links up with the CalTrain corridor. It would become ground level at the same station designation as in Alternative 3.

- Alternative 6 - Internal SFIA Subway Station with UAL Station. This alternative would be similar to Alternative 5 until just west of US 101 where the alignment continues under the freeway to the Airport. A CalTrain station would be located east of the Tanforan BART Station. (Under Alternative 6A, there would be a CalTrain/BART connection at Tanforan.) A shuttle bus service would transfer passengers between the BART and CalTrain stations. A BART station would be located east of US 101 and south of I-380 near the United Airlines maintenance base with a surface parking lot nearby. The BART line would continue underground to the Airport Station and connect to the same alignment as Alternative 4.

The impacts on intersections of the project with these alternatives to SFIA are similar to those stated on p. 306 of the EIR. If BART were extended to SFIA in 2006, vehicle trips to/from the Airport would be reduced. With either of the two additional alternatives, none of the study area intersections would experience a change in LOS compared to the 2006-without-BART scenario.

BART Alternative 5 patronage would be similar to that under BART Alternative 3, as the stations are in the same locations. The public-transit impacts of 2006-with-BART Alternative 5 scenario would be the same as those stated in the 2nd paragraph on p. 320 of the EIR. The project would add to transit loadings on BART, CalTrain, and SamTrans. Direct rail service (APM) between the terminal Ground Transportation Center and a transit center west of the Bayshore Freeway would provide linkages between the Airport and BART and CalTrain. These linkages would reduce vehicular travel by approximately 11,250 daily, 520 a.m. peak-hour, and 560 p.m. peak-hour vehicle trips.

The patronage estimates for BART Alternative 6 show that the number of daily air passengers using transit as access to/from the Airport would be slightly greater than for BART Alternatives 3 and 5, approximately 400 additional trips (Metropolitan Transportation Commission, *BART San Francisco Airport Extension Alternatives Analysis / Draft EIS/EIR Patronage Forecast Results*, Draft, July 1991). Since BART Alternative 6 would serve the UAL maintenance facility, the use of BART by these employees would increase. However, the connection between CalTrain and BART would be moved from San Bruno (the existing San Bruno CalTrain station) to Tanforan, thereby decreasing other work trips on BART in this area. The vehicular travel reductions would be approximately the same as those under scenarios with an external BART station.

The design of BART Extension Alternative 6, which is still conceptual and not final, would provide a parking lot near the United Airlines Maintenance Facility. This parking facility would be located in Lot DD, which is proposed in the SFIA Master Plan to be a long-term-passenger- and employee-parking garage. A potential problem that could arise would be that BART provides free parking at its commuter stations, whereas the new garage on Lot DD at SFIA would be a fee parking lot. Also, it has not been determined whether there is sufficient space for two parking structures, or how a joint parking structure would operate.

The impacts on local roadways in South San Francisco resulting from a potential BART station and parking garage near the United Airlines Maintenance Facility are more appropriately addressed in the BART to SFO AA/DEIS/DEIR (on pp. 4-1 to 4-66). Impacts that are associated with the SFIA Master Plan are addressed in this EIR.

Impact of BART on Freeways

The impact of the BART extension on freeways in the vicinity of the Airport would be to slightly increase traffic volumes south of the Airport and to reduce them north of I-380./1/ Under scenarios with BART alternatives which have a CalTrain/BART connection at San Bruno, the northbound freeway volumes on US 101 would have increases between 450 and 600 vehicles south of the Airport and have reductions of about 200 vehicles north of the Airport during the a.m. peak hour. These changes would not result in changes to LOS. (The ongoing study of the BART San Francisco Airport Extension includes traffic analysis for the a.m. peak hour only. The MTC regional travel model used in the BART study provides travel projections for the a.m. peak hour.) Under the scenario with BART Alternative 6A (CalTrain/BART connection at Tanforan) the northbound freeway volumes on US 101 would have a slight increase (about 70 vehicles) south of the Airport and a slight decrease (about 100 vehicles) north of the Airport.

With and without the BART extensions, the northbound freeway level of service would be LOS F between the Broadway and Millbrae Avenue exits on US 101 during the a.m. peak hour. The northbound freeway level of service during the a.m. peak hour between Oyster Point Boulevard and Candlestick Park would be LOS F without a BART extension and LOS D with a BART extension. Contributing to this LOS D would be the planned reopening of I-280 and SR 480 within San Francisco, and other TSM program elements./2/

Costs of BART

The preliminary estimates of capital costs for the BART extension from Colma range from $627 million to $1,168 million, depending on the alternative./3/ The estimates of costs are part of the BART San Francisco Airport Extension Alternatives Analysis (AA) study, which is ongoing and being conducted by MTC, BART, SamTrans and the Urban Mass Transit Administration (UMTA). The AA study provides information about the financing structure of the proposed BART extension and is separate from this EIR. The *BART San Francisco Airport Extension Alternatives Analysis / Draft EIS/EIR* was released in March 1992, and is undergoing public review as of early May 1992.

APM/BART Connection

At the time of preparation of the SFIA Master Plan DEIR, only two BART extension alternatives were known to be under serious consideration; it was expected that the SFIA Automated People Mover (APM) would be designed to accommodate either alternative. Therefore, the SFIA Master Plan EIR does not analyze in detail the localized impacts of the APM west of US 101 (or east of US 101, as the APM design is still conceptual). It would be speculative to attempt to quality the impacts of the APM at this time, given that the design is only conceptual. (See p. C&R.114 herein.)

The APM would connect the BART station, if it were located west of US 101, to the Ground Transportation Center (GTC). At the GTC, air passengers would continue on the APM to the terminal buildings. Airport employees might have to change to an APM travelling to the long-term parking area (Lot DD). Master Plan concepts now undergoing refinement could allow for separate trains from the BART station, one going only to the GTC and returning, the other making the entire loop, thus allowing employee trips to the Lot DD areas without changes. If the BART station were located internal to SFIA, Airport employees would not have to transfer to a separate APM, and air passengers would still be able to access the APM to circulate throughout the terminal buildings.

The level of detail for the APM/BART connection in this EIR is conceptual and design has not yet detailed all services that would be provided at this connection. The EIR notes that departing air passengers could benefit from the convenience of a baggage-handling facility at the BART station prior to boarding the APM to the terminal. Arriving air passengers could also benefit from the convenience of picking up baggage at the BART station, but since departures are more time-sensitive to air travelers, more benefit would be gained by providing baggage service for departing air passengers than arriving air passengers. It is not currently known whether baggage handling would be accommodated for both arriving and departing passengers at the SFIA BART station; most likely this will be determined when a more accurate BART-to-SFIA passenger profile is developed. The information presented in this EIR is based on what is currently known about the APM and the SFIA BART station alternatives. If a BART extension is chosen following the ongoing BART SFIA Extension study, the detailed design of an APM/BART connection would consider feasible types of services to the patrons.

APM Connection Between BART and SFIA

The APM connection between a BART external station west of US 101 and SFIA would require an exclusive right-of-way for the APM. This APM connection would have visual impacts for motorists on US 101, neighborhood impacts, and possible ecosystem impacts, but would not likely have adverse impacts on traffic or noise. If a BART extension is chosen following the BART SFIA Extension Study, the design of the connection would involve an analysis of these impacts.

Impacts on Lomita Park

The extension of the Automated People Mover (APM) and the location of the BART station have not been finalized as yet. The BART alternatives, and the connection to the APM, are discussed in detail in the response on pp. C&R.141-142 herein. The Lomita Park area of San Bruno would most likely not become a drop-off area for air passengers, even if the APM is extended to a west-of-Bayshore BART station. The APM connection in the Ground Transportation Center (GTC) would be better suited for passengers being dropped off, particularly if there was direct access to the GTC from HOV lanes on US 101.

Since access to CalTrain and the free areas of BART would not be restricted, it would be possible for non-transit-riders to come into the mass-transit station and then take the APM into the Airport. Motorists on US 101 would most likely continue into the Airport to drop off passengers rather than exit the freeway toward the mass-transit station. While potential neighborhood impacts would result if the mass transit station were used as a drop-off area for SFIA, it is likely that residents of the Lomita Park neighborhood would be the only non-transit-riders who would find this access to SFIA convenient.

PEDESTRIAN AND BICYCLE ACCESS

Comments

"This letter comments on the Draft Environmental Impact Report (DEIR) for the San Francisco International Airport Master Plan, specifically to the lack of attention and consideration related to pedestrian and bicycle access in the Master Plan.

"There are only brief mentions of bicycle access on pages 136/7 and 323 of the text of the DEIR. The apparent perspective expressed in the DEIR seems to be something like 'Getting to the airport on foot or on a bicycle is such a pain in the ass that practically nobody would ever want to do it, so we don't have to think about providing for pedestrian or bicycle access.'

"For most of the period from 1975 to 1979 I used to commute between Berkeley, Oakland Airport, and San Francisco Airport. Sometimes I drove a car. Sometimes I would take my bicycle with me on BART from Berkeley and Daly City, and then I would pedal 9 miles downhill and downwind to the obscure aircraft hangar by the bay where I used to work overnight. Sometimes, instead of pedaling back uphill and upwind to the Daly City BART station in the morning, I would load my bike on the C-47 aircraft that I had just unloaded and then fly with it over to the Oakland airport maintenance base. From there I would pedal either 3 miles to the Coliseum BART station or 12 miles back to Berkeley if I was too late to avoid BART's peak period bicycle prohibition. At other times I loaded my bicycle on top of the freight in airfreight trucks, and then drove or rode as a passenger in the trucks. Occasionally I would combine taking buses and walking as a commute. In the course of the more than three years that I did variations on this commute I learned a great deal about using bicycles to get to and from airports.

"Aside from my commuting, on other occasions I have brought my bicycle packed in a box in a car to an airport, then taken the bicycle with me as excess baggage on a flight, then assembled the bicycle and pedaled away from the airport. I would have preferred to have been able to ride my bicycle to the airport, and then at the airport been able to pack the bicycle in the box.

"There have been yet other occasions where my preferred mode of ground transportation would have been to have left my bicycle parked at the airport, but I didn't have a safe place to park it to await my return flight.

"I believe that the airport's Master Plan should realize that providing for bicycle and pedestrian access is allowing for the most environmentally benign means for people to get to and from the airport, and that it is desirable and cost effective to provide better pedestrian and bicycle access. I would suggest the following measures to facilitate bicycle and pedestrian access:

"First, provide a bicycle and pedestrian path parallel to the old Bayshore Highway frontage road between San Bruno Avenue and Millbrae Avenue, with a separate path leading to the general area of the passenger terminals. (My route to the airport from Daly City BART was via or parallel to Mission, El Camino Real, Mission Road, Grand Avenue, Airport Boulevard, South Airport Boulevard to the North Access Road). If I had to go to the terminal I would come down South Airport Boulevard to the old Bayshore Highway frontage road, then follow the main entrance road into the terminal. I would have preferred having a separate path to get to the terminal. If demand develops, it might also be desirable to provide a pedestrian and bicycle path on a new structure over the freeway in the general area of the Airport interchange, leading to the general area of El Camino Real near the San Bruno / Millbrae City Limits.

"The other necessity is a safe and secure place to park bicycles. The minimum bicycle parking facility would be covered for weather protection, and would have controlled access to prevent bicycle theft and vandalism. Probably the most inexpensive way to provide such parking would be to have a caged in area by a parking lot exit, with the lot attendants controlling access to the cage. The lot attendants could also rent out tools and provide boxes for those bicyclists who wanted to pedal to the airport, then pack their bikes and ship them as excess baggage on departing flights. An air hose would be useful for those bringing their bicycles on arriving flights, as it seems to be a general practice to let some air out of the tires to allow for the pressure changes in airplanes.

"On a longer term basis it could be very desirable for the airport to offer inexpensive space to try and attract a business operation that could serve potential bicyclist patrons who might be attempting to use the airport. That business could provide safe and secure bicycle parking for both airport employees and passengers, provide boxes and boxing services to those bicyclists bringing their bicycles with them on flights, not to mention selling, renting and servicing bicycles to airport patrons. Perhaps the business could offer other services to attract customers, and have the bicycle facilities be a sideline. (An athletic club with showers, lockers and exercise equipment could attract customers who had to spend some time between flights.) Perhaps instead of charging high rent the lease terms should require the business to be open for long hours to assure more public service.

"Once bicycle access and parking facilities are in place, they should be publicized. Perhaps the airport already has some place where airline patrons can safely leave their bicycles over a few days or weeks, but we just don't know about those facilities. Can I now legally park my bicycle with safety and security at the airport? How?

"Given an initial capital cost of well over $10,000 for each additional automobile parking space in new parking structures, it seems like providing for pedestrian and bicyclist access would be a desirable and cost effective strategy, even if only a few potential airport patrons were to shift to a pedestrian or bicycle mode of airport ground access.

"I believe the Master Plan and the DEIR should address pedestrian and bicyclist access with much more detail, responding to the issues listed in this letter." (Bob Berry)

"One of the most obvious, and ready-made, places for safe bicycle parking is with existing parking lots or garages where an attendant is present.

"An attendant-operated lot is recognized as probably the safest place for bicycle parking because the bicycles are always under surveillance. Having an attendant just for the bicycles would be too expensive, so bicycle parking must fit into parking for automobiles.

"Some lots which have provided bike parking have allowed the bicycles to be fastened to a railing. Others have actually made up locked cages for bikes, with controlled access to the cage.

"A nominal fee of 25 to 50 cents per day would be nearly sufficient to cover the same rental income as for an automobile parked in the same amount of space -- about 300 square feet (15' x 20') needed for each automobile and the turning area it needs (14 bicycles can be put in the same space as is needed for an automobile).

"The owners of parking lots and the owners of buildings with parking lots should see the benefits of providing bicycle parking, as it makes best use of existing space, reduces the need for more parking in short supply, and is good public relations. Bicycles can be fitted into odd-shaped areas which often go to waste with automobile parking. . .

"The bicycle organizations should lobby with individual parking lot operators and governmental agencies for this first step toward safe bicycle parking." (Charles Smith)

". . .And I notice there are quite a few bikers, that people use bicycles to transport themselves back and forth to work. I am not sure that that was addressed at all in any studies that I have looked through so far." (Edwin Works)

Response

Several bicycling and pedestrian mitigation measures are identified in Section V of the EIR. These include:

- Providing a minimum four-foot striped bicycle travel lane for each direction of travel on McDonnell Road;
- Providing signed bicycle travel lanes or a Class I bikeway, as appropriate, from the Burlingame Recreation Lagoon west of Coyote Point north along Old Bayshore Highway, Road R-2, McDonnell Road (Road R-3), South Airport Boulevard and Bayshore Boulevard to existing bike lanes near San Bruno Mountain. Class I facilities could also be developed in wider parts of the Southern Pacific right-of-way (where adequate space exists for both BART and a bikeway) and parallel to US 101 between Candlestick Park and the South San Francisco CalTrain Station; and
- Including bicycle travel lanes as an integral part of any connection between SFIA and the multi-modal transfer station (BART, CalTrain, SamTrans) west of US 101.

No bicyclists were noted in any of the recently conducted air passenger surveys (traffic, parking and mode-split surveys were conducted for the EIR). The reasons for this are most likely that it is inconvenient or impractical for air passengers to get to the Airport on bicycles. There are a large number of vehicles coming into and out of the Airport throughout the day, including automobiles, vans, taxis, limousines, trucks and buses. Added to this fact is that the Airport is located in a very confined and remote space that limits the access and egress. The SFIA Master Plan is designed to maximize the use and efficiency of the confined space in which the Airport lies. Because of the relatively remote location required for a major airport, the commute distances for bicyclists and pedestrians are fairly large. The nearest neighborhoods around the Airport are over 2 miles from the internal Airport property, by way of San Bruno Avenue or Millbrae Avenue.

When BART is extended to SFIA, it is expected that its normal bicycle provisions would prevail. BART provides bicycle lockers at its stations and allows bicycles on board trains during off-peak hours. This service would help both air passengers and airport employees. Because BART is being extended to SFIA, bicyclists could bike to BART from their residences or offices and take BART for the remainder of their journey. Bicycle provisions would have to be implemented at the SFIA BART station and also on the automated people mover (APM). The APM design, although not formalized at this time, could consider bicycle access so that bicyclists could take their bikes to the terminal or employment location at SFIA.

Bicycle parking in the short-term parking garage would not be feasible. The short-term garage accommodates over 6,000 vehicles on busy days. The potential for conflicts between bicycles and circulating vehicles would provide too great a safety risk for both modes. Parking-lot attendants would be hard pressed to provide tools and boxes for bicyclists while still controlling the flow of vehicles within the garage. Many airports, including SFIA, have adjacent service stations which have many of the necessary items that bicycle travelers require, such as an air hose, tools, and trained mechanics who could assist with minor repairs.

Of the Airport employees, only a few bicyclists were observed during the surveys. Currently these bikers make use of the surface roadways and secure their bicycles at their place of employment. The suggested bikeways noted in the mitigation measures section of the EIR would serve the employment areas of SFIA as well as the passenger terminals. TSM program elements include provision of shower and changing facilities, secure places for bicycles and protected bikeways. United Airlines, the largest Airport tenant, currently has 40 bicycle racks at its maintenance/administration and employee-parking facilities. TSM provisions are the responsibility of the individual employer and would be based on the demand for these services and the exact requirements of the TSM program. (A discussion of the Airport's TSM program is on pp. C&R.171-173 herein.)

Regarding pedestrian access to SFIA, several factors have to be considered, including sidewalks, walk distance and safety. The distances to the terminal buildings are important. The terminal buildings at SFIA are set back from the freeway by approximately one-half mile, and from the nearest neighborhoods by well over two miles of walking distance. These factors would lead to a long and tiring walk, even if protected walkways were to be provided. There is no way to shorten the walk distances without moving terminals or neighborhood locations, and thereby compromising aviation, vehicular and pedestrian safety.

For Airport employees who choose to walk to and from work, safety measures noted in Section V of the EIR address the impacts to pedestrians. Employees may elect to walk along San Bruno Avenue or Millbrae Avenue to get to the Airport from the surrounding neighborhoods or nearby parking areas, and therefore need to be protected from vehicular traffic. Currently, sidewalks exist along San Bruno Avenue and McDonnell Road, where most of the employment at SFIA is located. For example, United Airlines provides an elevated protected walkway above McDonnell Road directly into its maintenance facility, so that employees do not have to cross the traffic on the roadway. The Automated People Mover (APM) would serve to separate pedestrians from vehicular traffic by providing direct access between the Ground Transportation Center and the air passenger terminal area (in 1996) and the long-term parking area (in 2006).

NOTES - Transportation Setting and Impacts

/1/ Metropolitan Transportation Commission, written communication to DKS Associates, February 24, 1992.

/2/ Metropolitan Transportation Commission, written communication, op. cit., based on information from Parsons Brinkerhoff, 1991.

/3/ Metropolitan Transportation Commission, *Train to Plane*, Issue No. 3, October, 1991.

TRANSPORTATION MITIGATION

GENERAL

Comments

"The Master Plan should not move forward unless all the necessary transportation improvements are funded by the Airport. The Draft EIR should fully discuss the capital costs for all transportation improvements." (Raymond Miller, C/CAG)

"SFIA must assist in funding the planned improvements at the I-280/I-380 interchange as a mitigation to help reduce the substantial impact SFIA traffic will cause on this area.

"SFIA must contribute funds for improvements to San Bruno arterials pursuant to the North San Bruno Area Wide Traffic Study as a mitigation to help reduce the substantial impact SFIA traffic will cause on San Bruno arterial streets, including San Bruno Avenue, El Camino Real, Huntington Avenue, and San Mateo Avenue.

"SFIA must contribute funds for a proportionate share of maintaining San Bruno arterials as a result of the substantial traffic created by SFIA." (George Foscardo, City of San Bruno)

"C/CAG has endorsed the attached comments from the San Mateo County Transit District (SamTrans) staff regarding traffic and transportation impacts. C/CAG strongly supports the SamTrans staff position that transportation projects by other implementing agencies should not be considered as mitigation for the SFIA expansion without the concurrence of the implementing agency, and that an assessment should be made of the cumulative effectiveness of the transportation mitigation measures which can be accomplished by the Airport, together with an indication of the trip demands that cannot be accommodated." (Raymond Miller, C/CAG)

"Many of the mitigations listed in the draft EIR are ascribed to others as implementing agencies without indication of concurrence by those agencies. Mitigation measures should not be included in the EIR until written concurrence by the implementing agencies (other than SFIA) have been obtained. The EIR should also include the probability of implementation of the mitigations within the time frame of the Airport expansion, an assessment of the cumulative effectiveness of the measures and the number of trip demands that cannot be accommodated. The Airport expansion should be reduced to the degree that would be consistent with the mitigation measures and their time frame of implementation. This process and proposal is in keeping with the Congestion Management Plan requirements which was approved by the voters in November 1990 in conjunction with State Proposition 111." (Richard Gee, SamTrans)

"The Board concurs with the comments of C/CAG and SamTrans staff that indicate transportation projects by implementing agencies other than the City and County of San Francisco should not be considered mitigation for airport expansion without the concurrence of the implementing agency." (County of San Mateo Board of Supervisors)

"We find the proposed mitigations to be inadequate, vague and many are probably not implementable by the Airport. . .The EIR should include an assessment of the cumulative effectiveness of the mitigation measures that can be implemented within the time frame of the planned Airport expansion and the number of trip demands that cannot be accommodated. The expansion should be confined to the degree that would be consistent with the mitigations." (Richard Gee, SamTrans)

"The EIR must include the probability of implementation of the mitigations within the time frame of the Airport expansion, an assessment of the cumulative effectiveness of the measures and the number of trip demands that cannot be accommodated. This process and proposal is in keeping with the Congestion Management Plan requirements which was approved by the voters in November 1990 in conjunction with State Proposition 111." (George Foscardo, City of San Bruno)

"We request that the following mitigation measures identified in the DEIR be adopted by the Airport Commission either for their own implementation or to actively promote the implementation by the appropriate jurisdiction:

> "Encourage airlines and travel agencies to encourage passengers to take transit.
>
> "Provide SFIA employees with incentives for transit use.
>
> "Provide economic disincentives for SFIA employees to commute by single-occupant vehicles.
>
> "Provide a share of the transit operating costs for SamTrans, CalTrain and BART, each of which is necessary to support increased SFIA operations.

"Work with airlines to design the Automated People Mover/Terminal connections to minimize air passenger pedestrian circulation, with baggage service available where departing air passengers exit the BART station or parking areas.

"If a decision is made to place the SFIA BART station west of U.S. 101, in lieu of a station in the terminal parking garage, build an exclusive right-of-way, bus or rail connection between the SFIA BART station and the Ground Transportation Center with connecting service to the terminal and major employment areas, and operate service on this facility in a manner coordinated with BART/CalTrain arrivals and departures.

"Concurrently with the extension of BART to SFIA, increase the frequency of CalTrain service, especially during non-commute hours, so that there is minimal transfer time between CalTrain and BART. As an alternative, extend BART south to San Jose in the CalTrain right-of-way and provide MUNI light rail in the Bayshore Freeway/Third Street corridor as a replacement for CalTrain service.

"Increase Sam Trans service to BART and CalTrain station in San Mateo County to encourage use of both systems, both by reducing headways on existing routes and by adding new routes to serve both residential and employment centers.

"Improve MUNI transit capacity in San Francisco so that new BART and CalTrain riders destined for locations outside the Financial District would find transit a viable alternative.

"Monitor parking demand throughout the year. In the event the annual mode split targets of the TSM program outlined under 'TSM/Transit/Ridesharing' are not being met, no additional parking can be provided at SFIA until the annual target is met, reevaluate the program for possible implementation of other measures to meet targets before providing additional parking." (Joan Kugler, BART)

"The mitigation measures recommended in the Draft EIR for the San Francisco International Airport are inadequate. This Draft EIR should not be approved until adequate measures are developed which will mitigate the unacceptable air quality and traffic impacts. Rather than doing its planning as an isolated facility, SFIA should become a member of the San Mateo County Community and coordinate expansion plans with the surrounding communities and transportation agencies." (Jim Wheeler, Sierra Club, Loma Prieta Chapter)

"3. Participation in Capital Costs of Transit Expansion

"The Airport should participate in the capital costs of required transit infrastructure to serve Airport passengers and employees i.e. BART Extension." (Robert Treseler, City of Millbrae).

"The DEIR proposes that SFIA share in the operating costs of BART, SamTrans, etc. in proportion to the increased number of passengers and employees. The DEIR does not propose any share in the construction cost for BART. Because the proposed BART extension would significantly relieve SFIA expansion traffic impacts and because available Federal funding for the extension may be insufficient, SFIA should contribute funds for constructing BART to or near SFIA and for reducing the associated impacts of the BART extension." (George Foscardo, City of San Bruno)

"3. Participation in Capital Costs of Transit Expansion

"Another mitigation should be the Airport's participation in the capital costs of required transit infrastructure to serve Airport passengers and employees.

"If BART is extended to the Airport, the Passengers Facility Charge may be used to extend BART from a multi-modal commuter station to an internal airport station in a direct link. The Passenger Facility Charge may be used to contribute to the construction of a Caltrain multi-modal station to serve the Airport.

"It should be noted that the EIR mentions in passing that an internal SFO-BART station would generate more BART passengers than an external station (pg. 306), but the assumptions for the BART modal split are extremely low (pg. 269), and such assumptions are not explained.

"It should be noted that such transit improvements would all be on Airport property, so would be on-site mitigation measures." (Janet Fogarty, Mayor, City of Millbrae)

"Mitigations Proposed by SFIA"	"SamTrans Staff Comments"
"8. Requiring SFIA to provide a share of SamTrans, CalTrain and BART operating costs.	"Depending on the amount of funding provided by SFIA, this could be a factor in the expansion of transit service to the Airport." (Richard Gee, SamTrans)

"The most significant mitigation measures available to reduce vehicular traffic congestion and emissions would be to provide adequate transit services for passengers and employees. Pages 413-416 list mitigation measures related to Transit/Ridesharing. SFIA proposes to provide a share (based on patronage) of transit operating costs for SamTrans, CalTrain, and BART, and, if the SFIA BART is built west of 101 rather than in the terminal, to build an exclusive right-of-way, bus, or rail connection between said BART station and the proposed Ground Transportation Center. It would be equally appropriate for SFIA to also provide a share (based on projected patronage) of the capital costs necessary to provide the needed transit services by SamTrans, CalTrain, and BART, in order to provide the means for increased operating capacity of the transit providers; the proposed mitigation would then be more realistic." (Onnolee Trapp, Leagues of Women Voters of San Mateo County, letter of 8/27/91 and public hearing of 8/27/91)

"The DEIR assigns the responsibilities of several mitigation measures involving capital expenditures (such as rail extensions) to other agencies. It is important to note that SFIA can fulfill its obligation to mitigate the project impacts by contributing financially to the proposed traffic mitigations with capital as well as operating costs." (Joan Kugler, BART)

Response

Several comments noted that SFIA should be responsible for implementing and financing all of the mitigation measures, or that several mitigation measures should be removed unless agreements (i.e., written concurrence) have been reached with the implementing agencies cited. Also, many comments mentioned that mitigation measures should be implemented within the time frame of the planned airport expansion, or identified as not being able to be so implemented.

It is the responsibility of the EIR to identify feasible mitigation measures, even those measures that are not within the jurisdiction of the Lead Agency (in this case, the Airports Commission). The EIR has done just that. The mitigation measures presented in Section V are feasible and address the impacts of the proposed project. The identified entity or agency for implementation does not necessarily have to be the Lead Agency or the project sponsor, as not all impacts are solely or even primarily attributable to the project; many are attributable to forecast general areawide growth (non-Airport) and/or list-added projects (those specific projects that are currently known and identified by each individual municipality as scheduled for completion in the near future). Written concurrence does not have to be obtained from the implementing agency prior to identification of a feasible mitigation measure.

Furthermore, the EIR is not responsible for identifying the funding source or the amount of funding required to implement the mitigation measures, so long as the measures are feasible from technical, planning and engineering standpoints. In the case of the proposed SFIA Master Plan, SFIA is prohibited (by Section 3.691 of the Airports Commission Charter) from contributing to the construction, operating, or maintenance costs of any off-Airport transportation improvements.

The Airports Commission is obligated to consider the severity of the impacts of the proposed project and the availability of alternatives and mitigation measures (including both of which bracket the El Camino corridor, were evaluated. Mitigation measures for impacts in the El Camino Real corridor are identified in Section V of the EIR, on pp. 412 and 413. Given the expected numbers of through vehicles on El Camino Real north of San Bruno Avenue and south of Millbrae Avenue, the project's impacts would not be measurable at intersections beyond (north of) San Bruno Avenue and (south of) Millbrae Avenue.

The programmed improvements of Caltrans, BART, CalTrain and SamTrans can be used as project mitigations as well as mitigations for forecast growth and list-added-growth impacts. The programmed improvements would contribute to mitigating the impacts generated by each of these. The BART programmed improvement of extending to SFIA is related directly to the Airport expansion. While there is an existing need for BART and other transit services at SFIA, the programmed improvements would contribute significantly to alleviating project impacts.

The EIR includes several mitigation measures that deal directly with project-generated traffic on facilities that are included in the San Mateo County and San Francisco County Congestion Management Programs. Impacts to freeway mainline segments and ramps are addressed in Section V of the EIR. Project impacts on downtown arterials in San Francisco are not identified in the EIR as the contribution that the project makes is indiscernible. With the availability of many parallel arterials to choose from, airport shuttles, buses, taxis, and private vehicles would disperse throughout the downtown roadway network and spread the impact over many streets.

The fact that the mitigation measures identified in the EIR would not necessarily reduce the project impacts to a level of insignificance does not negate their value as mitigation measures. The Airports Commission, in its considerations of project approval, would be required to issue Statement of Overriding Considerations for any residual significant impacts of the project.

For the remaining comments regarding the El Camino Real Corridor and Vicinity, please see the responses on p. C&R.157 herein.

Millbrae

Comments

"The first has to do with the fact that the EIR says that the impact on the Rollins Road-Millbrae Avenue intersection is not mitigable. And we feel that with the proper concern for the impacts on the jurisdictions neighboring the airports that that can be mitigated in consultation with the City of Millbrae. And we have some ideas on that matter that we would like to share." (Janet Fogarty, Mayor of Millbrae)

"Although significant [transportation] effects on Millbrae streets would result from Airport expansion, no mitigations by the Airport are proposed. Mitigation by others is unacceptable lacking assurance that another agency would implement the mitigation.

"We request appropriate contributions to the improvement of the Millbrae Avenue / Rollins Road intersection, improvement of Millbrae Avenue, between Hwy. 101 and El Camino Real; and analysis of and appropriate improvement of the intersection of Old Bayshore and East Millbrae Avenue, and contribution to required signal improvements.

"We do not agree that degradation of California / Millbrae and Rollins / Millbrae intersections are unavoidable effects (pg. 435). Appropriate mitigation should be proposed." (Janet Fogarty, Mayor, and Robert Treseler, City of Millbrae).

"P. 417 - Top of page - There are already 6 lanes on Millbrae Ave. to El Camino Real." (Jessie Bracker)

Response

For comments regarding feasibility and funding of mitigation, please see the response on pp. C&R.156-158 herein.

The intersection of Old Bayshore Highway and Millbrae Avenue is not projected to deteriorate to an unacceptable level and would not require mitigation as a result of the project. No traffic signal upgrading would be required. The intersection is projected to operate at either LOS A or LOS B during the peak hours in 2006. For other information on this and other Millbrae intersections, please see pp. C&R.123-126, 131-132, 157-159 herein.

The comment regarding the number of lanes on Millbrae Avenue is correct. Accordingly, the first bulleted item on p. 417 of the EIR is deleted.

HOV Lanes

Comments

"The document fails to mention any financing mechanisms for the proposed mitigations. San Francisco International Airport (SFIA) improvements which affect State facilities should be mitigated by SFIA, or the lead agency. The document needs to address impacts on State facilities due to the project and cumulative area development. Mitigation measures must be discussed. For example, who will fund improvements such as High Occupancy Vehicle Lanes (HOVLs), freeway and highway (Route 101 and 82) modification, widening, and construction of freeway ramps?

"We have the following questions and comments regarding details of mitigation measures:

"High Occupancy Vehicle Lanes (HOVLs):

"Please state if the City and/or Traffic Authority are planning to fund the construction of an HOVL (Second to last paragraph on p. 417). Caltrans does not unilaterally decide whether to construct/implement HOVLs. Other agencies, such as the Federal Highway Administration (FHWA), Metropolitan Transportation Commission (MTC), and the local traffic authority are also involved. Caltrans policy is against converting an existing mixed flow lane to HOVL.

"The suggestion that the proposed HOVL be for 3+ occupancy from San Francisco to San Jose is not compatible with the existing HOVL along US 101 in San Mateo and Santa Clara Counties. In Santa Clara County, these HOV facilities are for 2+ occupancy in Santa Clara. The policies of HOVL occupancy are incompatible.

"Proposed HOVLs from San Francisco to existing HOVLs along Route 101 beginning at Whipple Avenue are not in MTC's Master Plan.

"Referring to the discussion on page 421, in the last paragraph, if ramps need redesign/widening as a result of this project's build out, the improvements should be funded by the project proponents and should be conditioned to identify funding responsibility.

"For cumulative impacts, more realistic mitigation measures are recommended for implementation. The concept of a 3+ HOVL facility is not a valid mitigation measure, since it is not programmed or funded." (Preston Kelley, Caltrans)

"Mitigations Proposed by SFIA"	"SamTrans Staff Comments"
"6. Create HOV lanes out of existing traffic lanes on Highway 101.	"This is not a valid mitigation by the Airport as SFIA has no control on its implementation. In addition, Caltrans policy prohibits the conversion of existing mixed flow lanes into HOV lanes." (Richard Gee, SamTrans)

Response

The authors of the DEIR recognize that Caltrans policy currently prohibits the conversion of mixed-flow lanes to HOV lanes and that current HOV facilities along US 101 in Santa Clara County are for 2+ occupancy. Previous San Mateo County transportation plans and State Transportation Improvement Plans (STIP) included the implementation of HOV lanes in San Mateo County. Currently, the San Mateo County Congestion Management Program (CMP) includes only auxiliary lanes along US 101 throughout San Mateo County. The auxiliary lane projects are identified as part of the County's Transportation Authority Program, but are not in the CMP Capital Improvements Plan, the 1990 STIP or the 1991 Transportation Improvement Program (TIP). It is important to note that under CEQA, the EIR is not required to address funding. See p. C&R.156 herein for additional discussion of the funding issue.

The intent of the mitigation measures described in Section V of the DEIR is to provide reasonable and implementable measures that address forecast growth, project and list-added-growth impacts. High Occupancy Vehicle (HOV) lanes are a reasonable mitigation measure.

HOV lanes would encourage carpools by employees of SFIA and use of shared taxis and shuttles by air passengers. This would be part of a Transportation System Management (TSM) program designed to reduce travel throughout the day by private automobiles, especially single-occupant vehicles. The HOV lanes should be signed to accommodate any vehicle carrying three or more persons, including all buses and airport shuttles. Only those taxis carrying three or more persons (including the driver) should use the HOV lanes.

The City of San Francisco Transportation Authority is not likely to have any involvement in the decision-making process regarding HOV lanes as it is out of the Authority's jurisdiction. Agencies other than Caltrans that would be involved include MTC and the San Mateo County Transportation Authority.

The differences between implementing 3+ occupancy HOV lanes and 2+ occupancy HOV lanes are hard to quantify without a traffic model of the entire corridor. A 3+ occupancy HOV lane would not serve many taxis coming to SFIA, which often carry only one passenger. Shuttle vans and buses would still benefit from either a 3+ or 2+ HOV lane but a 3+ HOV lane would probably be less congested than a 2+ HOV lane and therefore travel times would improve for these vehicles. The Bay Area, except for the bridges, has mostly 2+ HOV lanes, or is planning for 2+ rather than 3+ HOV lanes. A travel demand model for the US 101 corridor in San Mateo County would predict which type of HOV lane would have the most success, based on the traffic volumes in the mixed-flow lanes and the levels of congestion experienced.

Airport Access and Circulation

Comments

	"Mitigations Proposed by SFIA"	"SamTrans Staff Comments"
"3.	Widening two SFIA roads.	"This would only benefit the internal Airport circulation without mitigation of the traffic on the freeways and local agencies' streets.
"10.	Modify freeway ramps to serve the Ground Transportation Center, and providing direct ramp connections to the HOV lanes.	"To be viable, written approval should be obtained from Caltrans and included in the EIR.
"11.	Installing variable message signs internal to the Ground Transportation Center and Short-Term Garage.	"This measure would be a benefit to internal Airport traffic circulation with little effect on the freeways and local streets." (Richard Gee, SamTrans)

"P. 12 - How can a new Ground Transportation Center be called a Mitigation to Neighboring vicinities?" (Jessie Bracker)

"Increased Traffic - The new traffic circulation proposed in the EIR would sufficiently handle all the vehicles and bus traffic for the entire facility, old and new." (Stan Moy, Finger & Moy Architects)

Response

Widening the SFIA internal roadways and installing variable message signs in the Ground Transportation Center would mitigate internal airport circulation. It would also help circulation on local area roadways and freeways as traffic would not back up onto the freeways and local roadways from the airport internal roadways. The mitigation is directed mainly, however, at dealing with the impacts to SFIA internal circulation.

Direct ramps to the Ground Transportation Center from HOV lanes would allow buses, shuttles, taxis and carpools preferred access into the airport and perhaps encourage more passengers and employees to use the HOV lanes. It is a reasonable mitigation measure that would require the cooperative efforts of many agencies and entities. It is identified as an implementable mitigation measure even though prior agreements have not been made.

The Ground Transportation Center (GTC) is not referred to in the EIR as a "mitigation to neighboring vicinities." It is designed to serve internal SFIA circulation, and the access to and egress from US 101 and I-380. Neighboring facilities, such as roadways in Burlingame, Millbrae, San Bruno and South San Francisco would benefit from the GTC's operation as vehicles would be less inclined to back up onto local roadways, park on them, or divert on and off of them.

Widening US 101

Comment

"Mitigations Proposed by SFIA"	"SamTrans Staff Comments"
"7. Widen Highway 101 to eight lanes south of San Carlos.	"The widening has been completed. Because of its distance from SFIA, the widening has no significant mitigation of the traffic in the Airport area." (Richard Gee, SamTrans)

Response

The commenter correctly notes that the mitigation measure has been implemented since the preparation of the DEIR. Increases to the capacity on US 101 in San Mateo County help both airport and non-airport traffic. Having an eight-lane freeway throughout the County, and not a combination of an eight-lane and six-lane freeway, helps to reduce the number of bottlenecks and potential for congested areas. Also, as most freeway congestion is incident related, having an additional through lane helps keep traffic moving even when there is an incident blocking one or more lanes.

General

Comments

"That the mitigation measures [should] convincingly demonstrate the ability to mitigate the increased number of trips to be generated not only at the Airport, but on the local roads and freeway segments so important to our overall transportation system." (Bob Bury, Chair, Inter-City TSM Authority)

"The Transportation Impacts section does not adequately describe the mitigation of airport surface traffic impacts other than the impact of the proposed BART extension. . ." (Chris Brittle, Metropolitan Transportation Commission)

Response

Mitigation measures to address surface traffic impacts are identified on pp. 412-424 of the EIR. Impacts that could not be eliminated or reduced to an insignificant level are discussed on p. 435 of the EIR. Further information can be found in the responses on pp. C&R.156-158 herein.

CONGESTION MANAGEMENT PLAN

Comments

"C/CAG believes San Francisco International Airport should be subject to the requirements of the San Mateo County Congestion Management Plan. C/CAG requests the San Francisco

Airports Commission to prepare a plan to mitigate all projected traffic increases, which is consistent with the San Mateo County Congestion Management Plan prepared by C/CAG in July 1991." (Raymond Miller, C/CAG)

"2. <u>Congestion Management Program</u>

"The Airport should participate in the San Mateo County Congestion Management Program." (Robert Treseler, City of Millbrae)

"Also, along the same lines, we would like to work together with the airport within the San Mateo County City County Association of Governments Congestion Management Plan to provide a forum for producing a deficiency plan. Because under the congestion management plan, the impacts that are associated with transportation will be greater than Level F on the surrounding roads, and a deficiency plan will be called for by state law." (Janet Fogarty, Mayor of Millbrae)

"The Board concurs with the comment of the City/County Association of Governments of San Mateo County (C/CAG) that San Francisco International Airport should be subject to the requirements of the San Mateo County Congestion Management Plan. The Board supports C/CAG's request that the San Francisco Airports Commission prepare a plan to mitigate all projected traffic increases in San Mateo County, which is consistent with the San Mateo County Congestion Management Plan." (County of San Mateo Board of Supervisors)

"2. <u>Congestion Management Program</u>

"In addition, the Airport should participate in the San Mateo County Congestion Management Program. Airport passenger trips, as well as employee trips will be included in the Congestion Management Plan. The CMP could serve as the forum to develop the necessary Deficiency Plan to provide off-site mitigation for the increased congestion the Airport expansion will cause on San Mateo County freeways and arterials." (Janet Fogarty, Mayor of Millbrae)

"Specific mitigation measures that need greater elaboration include:

- airport coordination activities with local agencies, including the San Mateo County Congestion Management Agency (CMA), to establish and maintain traffic LOS standards on key freeways and airport access routes as well as participation with the

CMA in the development of deficiency plans to address unacceptable levels of service at intersections near the Airport." (Chris Brittle, Metropolitan Transportation Commission)

"The [San Mateo County Transportation] Authority believes that the Airport should definitely be subject to the Congestion Management Plan for San Mateo County." (Richard Gee, SamTrans)

" . . . Mitigations addressing cooperative funding of needed improvements like participation in the San Mateo County Congestion Management Plan should be included in the Final EIR." (Dennis Argyres, City of Burlingame)

Response

The state law requiring the adoption of Congestion Management Plans ("CMP") took effect on August 1, 1990 (Cal. Gov't. Code Section 65088 et seq.). The law requires each county that includes an urbanized area to adopt and annually update a CMP (Section 65089a). The CMP must contain (1) a designation of a CMP roadway system; (2) traffic level of service standards; (3) transit level of service standards; (4) a trip reduction and travel demand analysis; (5) land use impact analysis; and (6) a seven-year capital improvement program (Section 65089b).

Once the CMP is adopted, cities and counties must take certain actions to conform to the CMP. These include (1) adopting and implementing a trip reduction and travel demand ordinance; (2) adopting and implementing a land use analysis program; and (3) maintaining the established levels of service and performance standards (Section 65089.3). If service and performance standards are not met, the city or county must adopt a deficiency plan for those individual segments or intersections which fail to meet the standards and implement an action plan for improvements (Section 65089.3). The State Controller is required to withhold specified transportation apportionments to a city or county which is not in conformance with the CMP (Section 65089.3).

The San Mateo County CMP calls for land use restrictions and a trip reduction ordinance that would force private employers to comply with CMP trip reduction objectives such as staggered work hours, telecommuting, parking management programs, and required use of public transportation. In accordance with the CMP, San Mateo County adopted its Transportation System Management ("TSM") ordinance in September, 1990 (Ordinance

No. 03261, adopted September 11, 1990, codified as Part II, Division V, Sections 5870-5876 of San Mateo County Ordinance Code).

The CMP statute itself does not contain specific requirements related to the compliance of property owners within a particular city or county with the applicable CMP for the city or county. Rather, the statute describes only the responsibilities of the cities and counties in developing the plans, and assumes that cities and counties will achieve the goals contained in their CMP's by adopting ordinances that apply to local employers. Indeed the San Mateo County CMP, adopted by the City/County Association of Governments of San Mateo County (C/CAG) discusses SFIA only with respect to the County's TSM program. Therefore, whether the CMP applies to the San Francisco Airport depends more generally on whether San Mateo County can legally adopt ordinances that affect operations of the Airport.

The San Francisco City Attorney has taken the position that the application of the San Mateo County TSM ordinance to the Airport would violate state law (letter from Louise Renne, San Francisco City Attorney, to Michael Murphy, San Mateo County Deputy County Counsel, dated June 21, 1990). The City Attorney has stated that a local ordinance is invalid if it conflicts with state law or occupies a subject of statewide concern; she takes the position that the operation of the Airport is a matter of statewide concern because it is subject to extensive federal regulations as well as comprehensive state laws. In addition, the City Attorney has pointed out that, by virtue of state law authorizing a local agency to "regulate the use of the Airport and facilities and other property or means of transportation within or over the Airport," the operation of the Airport has been vested solely in the City and County of San Francisco by virtue of state law.

In response to San Francisco's legal position, San Mateo County agreed specifically to exclude the San Francisco Airport from its TSM ordinance, in exchange for the commitment of the Airport to implement a comprehensive TSM program for Airport employees (San Mateo County TSM ordinance, Chapter 21, Section 5872). In response, the Airport, in preparing a trip-reduction ordinance, is adding to its TSM activities that have been in place for many years. Most of these activities have been organized by airport tenants and have included ridesharing and transit-incentive programs. This ordinance, which is expected to be completed in 1992, will require large Airport employers with 100 or more employees to appoint a transportation coordinator and establish policies that would increase use of transit alternatives by 20-25% over the next five years. This goal is consistent with San Mateo County's TSM goals.

The Airport also participates in other Countywide efforts aimed at reducing traffic congestion. The Airport has representatives on the County's TSM committee, and on the City/County Association of Governments task forces for congestion management and implementation of the Bay Area Air Quality Management District Clean Air program. The Airport also has a representative on a Samtrans subcommittee which is working to improve its service scheduling for better transit service to the Airport.

TRANSPORTATION SYSTEM MANAGEMENT

Comments

"Although we disagree that the proposed incentives and disincentives to promote public transportation are adequately addressed, we do feel that the airport's support of the Transportation Systems Management plan is well founded. We would like to see that folded into the Transportation Systems Management plan for San Mateo County so that we can work together to help alleviate some of the traffic." (Janet Fogarty, Mayor of Millbrae)

"The significant effects of Airport expansion on regional highways are identified, however the DEIR suggests mitigation measures be implemented by other agencies. The Airport should participate in mitigation of the traffic impacts caused by the expansion.

"The following are suggested mitigation measures in which the Airport may participate:

"1. Transportation System Management Program

"I recommend the Airport be included in the San Mateo County TSM Program. The Airport employers should meet the 25% TSM goal to mitigate the impact of the increase in employee traffic if this cannot be demonstrated as effectively accomplished already." (Robert Treseler, City of Millbrae)

"On page 413, the DEIR proposes various aspects of Transportation System Management. The TSM must be part of the San Mateo County TSM program and not that of the City and County of San Francisco." (George Foscardo, City of San Bruno)

"The significant effects of Airport expansion on regional highways are identified, however the DEIR suggests mitigation measures be implemented by other agencies. The Airport should participate in mitigation of the traffic impacts caused by the expansion.

"The following are suggested mitigation measures in which the Airport may participate:

"1. Transportation System Management Program

"Although we disagree that the proposed incentives/disincentives are adequate, we support the Airport's participation in Transportation System Management and recommend the Airport be included in the San Mateo County TSM Program. The San Mateo County TSM Program requires all employers to meet a goal of a 25% reduction in employee trips. The Airport, and its tenants are the largest employers in San Mateo County, and destined to grow larger under the Airport Master Plan. The Airport employers should meet the 25% TSM goal to mitigate the impact of the increase in employee traffic." (Janet Fogarty, Mayor of Millbrae)

"In regard to another issue, the DEIR recognizes that vehicular traffic will increase. A mitigation measure should be included to require the Airport to reduce trips through transportation systems management (TSM). The Airport could also consider participating in one of the existing San Mateo County groups with a Joint Powers Agreement to implement a TSM Program." (Wendy Cosin, City of Pacifica)

"Mitigations Proposed by SFIA"	"SamTrans Staff Comments"
"4. Establish a TSM Program for SFIA.	"Airport staff has informed us that a TSM Program is underway. However, we are not aware of any activities of coordinated overall TSM programs by SFIA. Addition of parking in the Airport would be inconsistent with the goals of TSM." (Richard Gee, SamTrans)

"Specific mitigation measures that need greater elaboration include...

"– defining a workable and effective commute alternatives program for airport employees given past experience which has shown how difficult it is for a majority of employees with different shifts and work hours to use carpools and transit." (Chris Brittle, Metropolitan Transportation Commission)

"That the TSM Program Evaluation, as a mitigation measure, [should] be based on the same level of commitment and participation currently required of business and as prescribed in the San Mateo County TSM Plan administered by the San Mateo County Transportation Authority." (Bob Bury, Chair, Inter-City TSM Authority)

Response

As noted on p. C&R.168 herein, SFIA is not required by law to participate in the San Mateo County Transportation System Management (TSM) Plan. Nonetheless, the Plan contains many elements in which SFIA could participate. Chapter 4 of the TSM Plan contains evaluation tables for various TSM techniques and their applicability in San Mateo County. The following TSM techniques were listed as having a high applicability to San Mateo County and a medium or high chance of reducing congestion:

- Freeway Ramp Metering along US 101;
- Park and Ride Lots at various locations;
- Shuttle Buses along the US 101 and El Camino corridors;
- Transportation Coordinators at large employment concentrations;
- Long Range Planning/Cooperation among public and private agencies; and
- Development Review/Enforcement of TSM requirements.

Many other TSM program elements were listed as having medium applicability for San Mateo County with medium or high potential for reducing congestion. Section V of the EIR contains many of these same TSM suggestions.

SFIA is currently preparing a trip reduction ordinance. It would require large airport employers (100+ employees) to appoint a transportation coordinator and establish policies that would increase transit use. The County's TSM goal of having 25 percent of all employees commute to work by means other than a single-occupant automobile within the next five years is also under consideration. Given the nature of airport employment, with different shifts throughout the day, it may be difficult to achieve the 25 percent goal. However, SFIA should make every effort to reach this goal. It is important to note that the Bay Area Air Quality Management District (BAAQMD) is currently working on a regional air quality plan which would establish average vehicle ridership rules for individual municipalities, which would supersede the 25 percent goal. The BAAQMD rules are expected to be finalized in a report by the fall of 1992.

SFIA currently has one transportation coordinator, in the Landside Operations Division, who is overseeing the development of the Airport's TSM program and its Trip Reduction Ordinance. The SFIA Trip Reduction Ordinance must be approved by the Airports Commission before it is implemented. The Trip Reduction Ordinance would require airport tenants with more than 100 employees to implement TSM program elements in order to meet specified goals. The employers would be able to choose the most appropriate measures for their employees (e.g., transit incentives, ridesharing organizations, etc.) in order to meet the goals. With so many different employers at the airport, the coordinator could establish TSM program elements for smaller employers (fewer than 100 employees) and help merge the efforts of several employers into a single SFIA TSM program.

The TSM elements that SFIA would use include:

- Staggered Work Hours;
- Telecommuting (e.g., employees working at home one day (or more) a week);
- Compressed Work Weeks (e.g., four 10-hour days);
- Ridesharing;
- Increasing transit attractiveness (e.g., information availability, shuttles, reduced-fare cards, etc.);
- Priority for high-occupancy vehicles (HOV);
- Establishing congestion management goals, monitoring and enforcing them;
- Incorporating TSM features into physical design (e.g., lockers for bicycles, shower and changing facilities, bicycle paths, pedestrian paths, HOV lanes); and
- Incorporating TSM features into SFIA employers' policies (e.g., parking rates and spaces favorable to carpools and vanpools, subsidies to employees for transit fares, transportation coordinator contact with employees).

The role of the transportation coordinator is to tailor the appropriate TSM program elements to the needs of the employer. SFIA currently has a representative on San Mateo

County's TSM Committee, which should ensure that the County's concerns are being addressed by employers at SFIA. (See also pp. C&R.168-169, herein)

The first task listed under the third bulleted item on p. 413 is revised as follows (revisions are underlined):

> A TSM Manager would develop the specific program and coordinate it with activities of SFIA, <u>San Mateo County</u>, the City and County of San Francisco, SamTrans, BART, CalTrain, shuttle/van/taxi companies that serve SFIA, and other public agencies whose services or regulatory functions would affect the mode of travel chosen by employees and air passengers. The objective of the TSM program would be to reduce travel throughout the day by private automobile, especially single-occupant vehicles.

TRANSIT MITIGATION

<u>Transit Service, General</u>

<u>Comments</u>

"To achieve pedestrian and transit sensitive development for SFIA, public and private agencies must plan and coordinate more efficient, effective, and reliable transit and transportation systems." (Preston Kelley, Caltrans)

"<u>Mitigations Proposed by SFIA</u>"	"<u>SamTrans Staff Comments</u>"
"14. Generally enhancing transit services.	"This measure calls for increased transit service by BART, CalTrain, MUNI Metro and SamTrans." (Richard Gee, SamTrans)

<u>Response</u>

The comments are consistent with the information provided in the EIR.

MUNI Service to SFIA

Comment

"p. 320 SF MUNI SFO Service via 19th Avenue. MUNI, SamTrans, MTC and SFO staff have been exploring the feasibility of extending MUNI's 28-NINETEENTH AVENUE service south thru Daly City and via 280 to the airport. The extension proposal has obvious benefits for regional travel in general and for employees and travelers in particular. (The extension would also serve other major destinations along the way, such as Seton and Serramonte.) The implementation of this proposal would probably be in conjunction with the discontinuance or restructuring of SamTrans' 3B line.

"It is important to note that this service is not seen as competitive with BART as few riders from western San Francisco neighborhoods, where significant numbers of Airport employees do live, could be expected to utilize local transit to reach BART to take BART to SFO; this would typically be a time-consuming and circuitous, three-transfer/four-ride trip, including the connector from the proposed BART SFO Station site to SFO destinations.

"Because of its potential attractiveness to riders for whom BART would not be a realistic option, the 28-to-SFO proposal may have value as mitigation to western SF traffic impacts.

"p. 416 Mitigation Measures: Other Agencies. Improving MUNI capacity to BART/CalTrain as a possible mitigation measure is desirable for trips to/from the Financial District. However, as noted above, expecting people from western neighborhoods to ride to BART or CalTrain to get [to] the airport is unrealistic. A much more realistic mitigation measure is discussed above.

"The 28-extension proposal should be identified as a potential mitigation measure in this section. However, committed funding sources to implement this proposal--or any other involving improvements to MUNI service--have not been identified." (Peter Straus and James Lowe, MUNI)

Response

Extending MUNI's 28-NINETEENTH AVENUE bus line to SFIA would provide a useful transit connection from the airport to neighborhoods in western San Francisco. By reducing the number of transfers required to make this trip it would make transit a more attractive option. This line currently terminates at the Daly City BART station, and with the proposed extension of BART to SFIA, only one transfer would be required. However, until the BART extension has been completed, extending this line would serve as a valuable link for both air passengers and airport employees. Even after the completion of the BART extension to SFIA, the extension of the 28-NINETEENTH AVENUE would continue to serve airport employees, who otherwise would not have good access to public transit. MUNI has no plans to extend the 28-NINETEENTH AVENUE line at this time; its short range transit plan states that the extension of this line is under consideration.

APM Connection to Transit

Comments

"P. 13 - Under additional measures to address impacts (to be added) . . . If BART is built to Airport Internal Station, Airport commits responsibility to serve Millbrae Caltrain Station with Free Shuttle Bus service for people going to Airport from the South of County. . .

"P. 323 - mentions baggage handling at BART Station to get to Airport but not from Airport to BART to go home. It has to go both directions, you know! . . .

". . .Also although document says Passenger "Bags" can be taken care of to get to Airport. There is no way to get the Bags from Airport to Bart (if station isn't internal at Airport!) . . ." (Jessie Bracker)

"On page 415, reference is made to provision of 'an exclusive right-of-way, bus or rail connection between the SFIA BART station and the Ground Transportation Center.' It is critical that this mitigation be detailed. David Calver from Parsons Brinckerhoff stated that the proposed Automated People Mover (APM) system to be constructed by SFIA was definitely a dedicated rail line, not a bus line." (George Foscardo, City of San Bruno)

"Mitigations Proposed by SFIA"	"SamTrans Staff Comments"
"1. Build a new Ground Transportation Center, served by a People Mover that distributes air passengers and employees to the terminal buildings.	"This would be an effective mitigation only if BART is extended to the vicinity of SFIA with a convenient connection to the CalTrain. Without the rail service, the People Mover would only benefit internal Airport traffic. . .

"9. Requiring an exclusive right-of-way rail or bus facility to connect SFIA to the BART Station west of 101.	"This would be desirable if the BART Station is located west of 101 along with a CalTrain cross-platform transfer facility." (Richard Gee, SamTrans)

Response

The BART extension to SFIA is discussed on pp. C&R.139-145 herein. Many of the details have yet to be designed, and are still in the planning, or conceptual stage. These details include baggage handling on BART trains and at BART stations, the extension of the Automated People Mover to the BART station (if it is located west of US 101), and connections to CalTrain stations in Millbrae and San Bruno (particularly if the BART station is not a joint BART/CalTrain station). As noted in another response, BART baggage handling is more important for departing passengers (because of flight schedules) than for arriving passengers. Additional discussion on the subject of baggage handling appears on p. C&R.144 herein.

The Ground Transportation Center (GTC) would serve as an important mitigation measure regardless of the BART extension to SFIA. The GTC would serve rental cars, buses, shuttles, parking, and the new International Terminal as well as the Automated People Mover. Improving internal circulation at SFIA could reduce traffic backups onto US 101. The People Mover would provide access to all areas of SFIA, and provide a connection to any mass transit station that comes into the vicinity of SFIA. The consolidation of these functions would make the GTC an efficient multi-modal transit center, both in 1996 when the near-term development has been completed and in 2006 when the long-term development and the mass transit station have been completed.

The exclusive right-of-way between SFIA and the west-of-US-101 property would be important if the BART station were to be located west of US 101. If a joint CalTrain/BART station were to be built west of US 101, then CalTrain commuters would also benefit from the direct connection into SFIA. However, even without CalTrain service, the right-of-way would be necessary to provide unrestricted access between SFIA and the BART station.

CalTrain Service

Comments

"On page 5 the report states 'The proposed project would affect existing transit and shuttle services to SFIA such as that both systems would require expansion to serve the increased demand.' It is already true that transit services in particular do not meet the needs of passengers and persons passing the airport to go into or out of San Francisco. Increasing the length of the CalTrain run into downtown San Francisco would increase CalTrain's ridership and make it a real boon for people who would prefer not to drive to work." (Patricia Clark)

"I was told that the Master Plan of the Airports Commission is diligently working towards trying to see if we can have more public transit use to the airport. It has been actively working on this. I was told that they are really interested and anxious about . . . the possibility of a CalTrain station at the airport, much of which is not clear from the Environmental Impact Report." (Commissioner Engmann)

"Attached is a copy of a report delivered as part of my presentation to the Department of City Planning/Embarcadero Plaza Advisory Committee on March 26, 1991. [The report is available in the files at the San Francisco Department of City Planning.] This report summarizes the contents of numerous detailed reports that have been delivered to the Department of City Planning on prior occasions regarding my proposed extension of rail service via an aerial loop extending from the CalTrain Right-of-Way directly to the SFO Airport Passenger Terminals. Please note that page 16 of my March 26, 1991 report documents (using MTC and City and County of San Francisco data) that my Transit Link System proposal provides superior service compared to BART in that it can be built in three rather than eleven years and save taxpayers more than $2.7 billion." (Dehnert Queen, Small Business Development Corporation)

Response

The Master Plan includes a transit (APM) connection to a multi-modal station west of the Airport. The EIR notes that this station should include both BART service (if it is extended) and CalTrain service. It is true that if CalTrain service were extended into downtown San Francisco, CalTrain would be attractive to a larger number of Airport travellers. An aerial loop is not proposed in the Master Plan nor is it proposed as a mitigation measure in the EIR, since it would penalize non-airport travellers and would not effectively serve enough Airport destinations (see response on pp. C&R.138-139).

Airport Staff confirm that there has been no consideration by SFIA of plans to bring CalTrain into the terminal area (East of Bayshore).

The Airport has indicated that it would connect the Automated People Mover to any form of mass transit that comes into the "West of Bayshore" property on the west side of US 101. CalTrain, BART, SamTrans and other transit riders would benefit from this connection. In addition, discussions with CalTrain and SamTrans regarding shuttle service from the Millbrae CalTrain station have taken place previously. SamTrans bus line 3B currently provides transfer service from the Millbrae CalTrain station to SFIA.

The Airport is prohibited from providing competing service with public transit operators, and therefore has not pursued plans to provide free shuttles for airport employees. Airport tenants are presumably not subject to the Airport's charter, and could provide shuttle services as part of any TSM program.

Encouraging Transit Use, Improving Service

Comments

"...[O]ne way of mitigating the traffic impacts is to, 'encourage passengers to use transit.' Once again, I don't think there is a meaningful analysis of how we are going to encourage passengers to do that. Would giving some incentives, some rebates in terms of ticket prices if the person is using mass transit or perhaps some expedited check-in service for those who use transit, would those work? Those are the types of things that I think should be analyzed in this document." (Commissioner Morales)

"Specific mitigation measures that need greater elaboration include: ...

- development of a pricing policy for parking which reduces auto access to the airport and encourages the use of transit and other high occupancy vehicle services.

- preferential access for public transit operators to the terminal curbside to place public transit on a competitive footing with auto access." (Chris Brittle, Metropolitan Transportation Commission)

"Traditional reliance on the automobile must be discarded, and SFIA staff must work with the mass transit agencies to develop alternatives to the automobile. This applies to airport employees as well as travelers. SFIA staff should work with SamTrans staff to modify airport buses so they can handle carry-on luggage. Also, SFIA staff should be working with CalTrain staff to improve CalTrain service. This should include more frequent trains, better access to downtown San Francisco, and shuttle service between SFIA and the nearest CalTrain station." (Jim Wheeler, Sierra Club, Loma Prieta Chapter)

"P. 414 - Economic disincentives for Single Occupants should not happen. That is discrimination on Workers." (Jessie Bracker)

"Mitigations Proposed by SFIA"	"SamTrans Staff Comments"
"5. Adding park and ride lots on Highway 101.	"This is not a valid mitigation by the Airport as SFIA has no control of its implementation. If SFIA has definite locations and intends to finance the projects, more information should be provided." (Richard Gee, SamTrans)

Response

Many of the mitigation measures are aimed at encouraging transit use to the Airport and increasing the occupancy of vehicles coming to the Airport. These measures would be achieved by many different programs, operated by the Airport and by public and private agencies. The EIR identifies these measures as a way of mitigating the impacts related to the project and to the other growth that would occur in the region. The specific components of these programs would be worked out later among the implementing agencies.

Some of the components, which would fall under a Transportation System Management (TSM) program, include: a parking pricing strategy which encourages carpooling and discourages single-occupant vehicles, baggage handling capabilities on public-transit vehicles and at public-transit stations, and economic incentives for transit use or for carpooling of airport employees (this is not discrimination, as alternative modes of transportation are readily available from most locations in the Bay Area). Elements of TSM programs are discussed in the response on pp. C&R.171-173.

Providing preferential access for public-transit operators is being considered within the framework of the GTC design, HOV lanes and incentives for transit usage. Whether access to the terminal curbside would still be allowed or concentrated in the GTC, preferential treatment of transit operators would still be encouraged. Page 413 of the EIR mentions many transit/ridesharing mitigation measures.

Improving transit service and encouraging its use are implementable mitigation measures that would alleviate the impacts generated by the project and the other growth in the area.

Park-and-ride lots are a suggested mitigation measure that would serve to alleviate congestion along the US 101 corridor. With or without the airport project, congestion on US 101 is projected to worsen. This mitigation measure would reduce airport traffic impacts as employees would make use of the lots rather than continue individually into the congested airport area. Also, commuters to San Francisco who travel along congested segments of US 101 would benefit from the park-and-ride lots. Exact locations for park-and-ride lots have not been identified, but that does not discount their potential value as an implementable mitigation measure.

<u>Transit Use and Proposed Parking in SFIA Master Plan</u>

<u>Comments</u>

"We have some concerns regarding the five proposals to increase on-site parking in the near-term SFIA Master Plan, as outlined on page 324. We would rather have employers develop incentives to encourage people to use transit or ridesharing rather than to drive alone." (Preston Kelley, Caltrans)

"The EIR should address alternatives to adding 7,000 parking stalls to accommodate the airport expansion. Providing far fewer stalls would utilize a market base approach to assist or induce airport users to choose other modes of transit. Assistance and inducements for employers and employees to use other transit modes such as car pooling or van pooling, etc. would be a progressive alternative to encouraging and accommodating auto traffic through the provision of additional parking spaces. The mitigation measures to decrease traffic generation are totally inadequate. Many alternatives are available to reduce and mitigate traffic impacts which are commonly being used in other jurisdictions and are being required of private developers." (Ed Everett, (then) City Manager, City of Belmont)

"Mitigations Proposed by SFIA"	"SamTrans Staff Comments"
"2. Adding stalls in Airport parking facilities (7,000 by 1996, 930 more by 2006).	"This would be counter to any traffic mitigation by encouraging the use of private vehicles to the Airport. This does not mitigate the increased traffic on the freeways and local streets." (Richard Gee, SamTrans)

"Parking at SFIA should be discouraged. Employees who drive alone should be charged for parking. The short-term parking garage fees should be increased dramatically for parking longer than five hours. The construction schedule of the People Mover should be accelerated so the entire system would be operational by 1996. United Airline employees and other airport employees would be able to use CalTrain or SamTrans to get to the External Station and then take the People mover to their workplace. This would negate the requirement for additional parking spaces." (Jim Wheeler, Sierra Club, Loma Prieta Chapter)

"The recommendation of adding 7,000 parking stalls is of great concern as it is inconsistent with TSM goals here in the San Mateo County as well as those goals and 'rules' soon to be adopted by the Bay Area Air Quality Management District." (Bob Bury, Chair, Inter-City TSM Authority)

Response

Increasing the parking at SFIA can be implemented so that TSM goals are still met and the use of single-occupant vehicles is discouraged. Several areas have to be looked at in conjunction with one another, and not just increasing parking in and of itself.

The parking demand analysis that was conducted for the EIR used demand ratios based on 1991 levels of enplanements and employees. A straight line projection was used to estimate the future parking demand. This provides a worst-case scenario, as reductions in the parking demand ratios were not considered in the future, when BART and other transit services that do not exist today are made available.

The projected parking deficit in 2006 is for air passengers and not employees (no parking space deficit is forecast for 1996). However, the potential for successful implementation of carpool and vanpool programs and increased transit ridership lies mainly with Airport employees. Also, the extension of BART to SFIA would result in a reduction in the demand for parking spaces of 3,220 spaces (see discussion in EIR on p. 327). With the

BART station, there would be a projected deficit of only 1,171 spaces instead of 4,391 spaces. If the employees, rather than the air passengers, were faced with the parking deficit, long-term trip reduction goals would be achieved. In order for this to occur, the allotment of parking spaces would have to be altered so that fewer spaces are assigned to airport employees and the corresponding number reassigned to air passengers. Parking spaces in the proposed new parking facilities should therefore be reallocated in favor of air passengers, as TSM program elements could be expected to reduce employee parking demand more than air passenger parking demand. The expansion of parking supply at SFIA should be phased to allow evaluation of the effectiveness of expanded TSM programs and transit improvements before the addition of parking (adding parking before or simultaneous with TSM programs and transit improvements may itself undermine the relative attractiveness of alternatives to single-occupant automobile travel).

Add the following mitigation measure on EIR p. 418, as the first bulleted item under Project-Impact Measures (1996) Identified in This Report (SFIA):

> Reallocate parking spaces in the proposed new parking facilities in favor of air passengers, as TSM program elements could be expected to reduce employee parking demand more than air passenger parking demand. Phase the expansion of parking supply at SFIA to allow evaluation of the effectiveness of expanded TSM programs and transit improvements before the addition of parking (adding parking before or simultaneous with TSM programs and transit improvements may itself undermine the relative attractiveness of alternatives to single-occupant automobile travel).

Add the identical mitigation measure on EIR p. 419, as the first bulleted item under Project-Impact Measures (2006) Identified in This Report (SFIA).

For air passengers, there are a number of mitigation measures suggested that would help alleviate the demand for parking spaces at SFIA. The parking mitigation measures, the parking pricing policy, the transit/ridesharing measures, HOV lanes on US 101, dedicated ramps into the GTC, roadway improvements, and the GTC design are all measures that would reduce unnecessary inter-lot and intra-lot circulation and reduce the total number of vehicle miles traveled by air passengers. The parking pricing policy, as noted by the mitigation measures on p. 414 of the EIR, would be adjusted so that carpool and high occupancy vehicles have preferential parking rates and spaces. If the trip reduction goals set forth on p. 413 of the EIR are not met, then the parking pricing policy would be adjusted until they are achieved. This market based incentive approach would discourage people from using a single-occupant vehicle and parking at SFIA.

Table 45 on p. 321 of the EIR shows the projected transit use in the future. With the extension of BART to SFIA, the percentage of single-occupant automobiles would decrease from 83.7 percent today to 74.2 percent in 2006 for employees, and from 20.1 percent today to 18.8 percent in 2006 for air passengers This fact, combined with the use of the Automated People Mover, a CalTrain connection to BART, and other TSM measures, would reduce the demand for parking at SFIA in a statistically significant way. Another methodology for conducting parking analysis would have been to apply the reduced automobile mode shares to the future parking demand ratios. However, it was decided to conduct a worst-case analysis and not adjust the future parking demand ratios.

By provision of additional parking spaces at SFIA to meet the demand, overall circulation throughout the Airport area, including local roadways and neighborhoods, would be reduced. The number of days on which the long-term parking lot is closed would be reduced, as sufficient parking would be provided. This would negate the need for vehicles to circulate into the Airport and then, upon getting turned away, travel to one of the off-Airport parking lots, which do not plan any capacity increases in the future. One measure suggested in the EIR, the use of low-frequency radio broadcasts, and signs along nearby freeways, would be useful in directing motorists to the nearest available parking location, thus minimizing circulating vehicles (this has proven successful around the Oakland - Alameda County Coliseum and along I-80 in the Sierra during the winter).

Realistically, people would still drive and park at the Airport. A number of measures have been suggested that, in combination, would alleviate the parking demand at SFIA. None of these measures individually would have major effects on traffic generation, but in combination they would all contribute towards the goals of trip reduction and parking reduction at SFIA.

Off-Site Registration

Comments

"I personally think that the mitigation section is the worst mitigation section I have ever seen in an EIR. I don't think it's the fault of the Planning Department, but it's an indication of how hopeless it is for the Airports Commission to deal with mitigations. For example, one mention of one mitigation that really might work, and that would really perhaps encourage people not to take cars, and that is the off-site registration. I don't know what they call it, the off-site facilities where you can check actually your baggage and take a bus, like they can do from the Marin Airporter, other particular locations. That is mentioned once, but not really mentioned as a significant mitigation. That might be explored." (Commissioner Engmann)

"Specific mitigation measures that need greater elaboration include:

- assistance in the planning and development of off-airport terminals (page 114 discusses this concept, but it is not listed on pages 12-13 which summarize potential transportation mitigation measures)." (Chris Brittle, Metropolitan Transportation Commission)

"The DEIR mentioned an off-site passenger facility as an alternative, but there was little serious discussion of the impact this alternative would have on reducing the significant impacts of the full expansion. Greater consideration should be given to this alternative." (Janet Fogarty, Mayor, and Robert Treseler, City of Millbrae)

Response

In response to these comments, the following discussion of the potential for off-site air terminals to mitigate traffic congestion in the vicinity of the Airport is added at the end of EIR Appendix G, p. XI.A.167:

OFF-SITE AIR TERMINALS

Technical Aspects

The term "off-airport terminal" encompasses a variety of possible arrangements to get air passengers to (and from) an airport from remote locations. Depending upon the layout of the airport, characteristics of travellers, origins and destinations of travellers, and space available at remote locations, some or all of the following services could be provided:

- Scheduled coach or van express service from a remote location;
- Competitively priced (or free) parking;
- Comfortable waiting area;
- Ticket sales;
- Seat selection; and
- Baggage check-in.

The first three of these are the minimum characteristics of an "off-airport terminal". There is really little difference between this level of service and typical airport express transit service. On the basis of this definition, SFIA already has some level of off-airport terminal capability. The Marin Airporter has the most extensive service. It runs coaches from several locations. The Larkspur Landing location had, until 1991, provided space for airline ticket agents from United and American Airlines to sell tickets, check in bags, and have customers select seats. The basic coach service and one airline ticket agent still remain. Other airporter services to SFIA are described in Section III (Environmental Setting) of the EIR, on pp. 130 - 134.

Issues Affecting Feasibility

The potential effectiveness of diverting auto traffic to the off-Airport operation would depend on a number of factors, including:

- Frequency and reliability of bus or limo service;
- Accessibility of the remote location;
- Adequacy and price of parking, versus Airport parking characteristics;
- Efficiency of check-in services (if any) versus that of the airline terminal service; and
- Density of the market near the off-Airport terminal.

The recent experience of the Marin Airporter at the Larkspur Landing terminal , where ticketing and baggage check services were added to an established airport express transit service, highlights several issues relating to off-airport terminal operation. When ticketing and baggage check-in services were added, the following difficulties arose:

- Since coaches left every half-hour, passengers tended to arrive with about ten minutes to spare. This put a severe burden on the check-in agents who were not adequately equipped to handle such peaking of traffic.

- The ticket service was used mostly as a local ticket office rather than a convenience for same-day airline passengers. There was also a conflict between handling of ticket purchasers who were not flying that day and baggage check-in operations.

- The service did not really attract additional patronage to the Marin Airporter.

Eventually, baggage check-in operations were curtailed, and one of the airlines closed its ticket office.

In the Los Angeles area, the Van Nuys FlyAway Service is operated by the Los Angeles Department of Airports. This is an express bus service from the San Fernando Valley to Los Angeles International Airport which has seven air carriers providing ticketing at the terminal; baggage cannot be checked. This service recently reduced fares from nine dollars to four dollars. Apparently, this reduction did not have an immediate effect on the number of airline passengers using the service; however, airport employees found it to be a convenient service. Recent reports indicate that air passenger service is up.

Potential Effectiveness in Mitigating Airport Traffic Congestion

Additional off-Airport terminal capacity for SFIA would need to accomplish some, or all, of the following:

- Provide additional frequency at existing off-Airport locations;
- Seek out current gaps in off-Airport terminal operation, and encourage new service in this market. This would include opening new terminals and starting new coach services.
- Determine the level of bonus services such as baggage check-in and ticketing that could reasonably be provided, and the potential to attract new riders as a result of this additional service; and
- Identify the level to which users of additional off-Airport terminal services would be diverted from private automobiles, or other transit services.

Caltrans is currently funding a research project at the Institute for Transportation Studies at the University of California at Berkeley, titled: Feasibility Study for a California Off-Airport Terminal Demonstration Program. In part of this research project, air passenger survey data taken by the Metropolitan Transportation Commission (MTC) will be evaluated to determine current gaps in express transportation services to Bay Area airports. Should the results of this research indicate that a potential market for additional off-Airport terminals exists, SFIA would then be in a position to participate in efforts to increase the level of off-Airport terminal activity.

If off-Airport terminal services were initiated successfully, it would have the potential to reduce vehicle congestion at Airport approaches and regional routes to and from the airport. It is impossible to quantify the effects of such actions without a specific service under consideration.

Institutional Feasibility

The San Francisco Airports Commission charter (Section 3.691) prohibits the Airport from offering a transit service to an off-Airport terminal. SFIA cannot operate a transit system in competition with existing ground transportation services. As a result of this prohibition, SFIA has not been able to take advantage of a Caltrans demonstration project relating to off-Airport terminals. Therefore, for SFIA to engage directly in any activity related to implementing an off-Airport terminal would involve an amendment to the Airport's charter.

Alternatively, it might be possible for Caltrans to work with a private operator or an existing transit agency (e.g., SamTrans, AC Transit) to improve transit/off-Airport terminal services to SFIA.

On the basis of available information, it appears that adding off-Airport terminal capacity could reduce automobile travel to the Airport. As noted above, however, the Airport is prohibited by charter from offering, or being involved in such services. If additional services are to be offered, it would have to be the work of private- or public-transit operators. These operators would make decisions on whether to provide additional service, based on the potential profitability of the service.

Off-Airport terminals are part of the transit system to the Airport. Several mitigation measures related to increasing transit mode share are already suggested in the EIR. Any efforts to increase transit mode share would increase the attractiveness to private businesses to expand on or implement new off-Airport terminal services.

High-Speed Rail

Comment

"Mitigations Proposed by SFIA"	"SamTrans Staff Comments"
"12. Requiring right-of-way reservation for future high speed rail.	"There is no information in the EIR on the location of the corridor, financing, or who will be the implementing agency. This should not be included as a mitigation for the traffic generated by SFIA until more details are available." (Richard Gee, SamTrans)

Response

The right-of-way reservation through SFIA, referenced on pages 13 and 415 of the EIR, is for the BART extension if an SFIA internal station is chosen. The "West of Bayshore" property adjacent to US 101, across from SFIA, could also be considered for high-speed rail if BART were to be extended further south, or CalTrain were to be linked to BART at this location. See also the earlier response re implementation, on pp C&R.156-158.

The mitigation measure suggested on page 415 of the DEIR that mentions reserving right-of-way for future high-speed rail comes from several documents. In July 1991, the State Department of Transportation (Caltrans) Division of Rail published a report entitled California Rail Passenger Development Plan 1991 Through 1996 Fiscal Years, as required by Section 14036 of the Government Code. The report concluded that in order to provide a fully integrated rail system in the California Corridor, service ultimately should be provided to the Central Valley along with Southern Pacific, Sante Fe, and Union Pacific Rail Lines. The Southern Pacific portion of this rail system would be adjacent to SFIA along the US 101 corridor in San Mateo County.

In the California Transportation Commission's Eighth Annual Report to California Legislature, dated December 1991, high-speed rail was identified as an effective alternative to the state's airports and interregional highway system. The Commission, on the basis of a recommendation from its Technical Advisory Committee on Aeronautics, requested the Department of Transportation to include in its high-speed ground-transportation study a feasibility study analyzing linking high-speed rail lines to airport terminals.

A 1992 University of California Berkeley study on high-speed rail, sponsored by Caltrans and the federal Department of Transportation, concluded that high-speed trains could be traveling between San Francisco and Los Angeles in only two-and-a-half hours by early in the next decade. The study was conducted by UC's Institute of Urban and Regional Development, and established several potential routes that the trains could take. According to a recent article in the *San Francisco Chronicle* (March 12, 1992), the trains could cruise at lower speed and run on existing rail lines on the Peninsula. This would allow trains to leave San Francisco over a right-of-way shared with the existing Peninsula commuter trains and stop near San Francisco International Airport and Palo Alto.

The multi-modal connection among BART, Caltrans, SamTrans and the Airport would be enhanced with a connection to high-speed rail service. The suggested mitigation measure points out that high-speed rail is a viable issue that is currently being addressed by Caltrans and the California Transportation Commission.

PEDESTRIANS AND BICYCLES

Comments

"On page 136, the document states: 'Other than for the movement of air passengers and employees between the main garage and the terminal buildings, there is little pedestrian movement among the various buildings at SFIA.' Pedestrian movement should become a major mode of transportation as the SFIA Master Plan strives 'to provide a coordinated development plan that will consolidate and relocate many of the existing landside facilities in order to increase the efficiency and cost effectiveness of landside operations. . .' (page 18).

"We strongly urge adoption of pedestrian-sensitive development policies which would encourage walking and transit uses. The proposed 960,000-square-foot, multi-level Rental Car Garage/Ground Transportation Center, for example, should be multi-modal in nature, stressing pedestrian facilities and amenities, an APM system, and transit services, not predominantly for automobile/rental car shops, garages, and parking spaces as the document proposes on page 55.

"The document should more aggressively promote integrating pedestrian facilities than the statement on page 323 indicates. It states: 'Design review should focus on minimizing any adverse impacts to pedestrians.' Future site plans and designs of all buildings and facilities should foster pedestrian and transit services, so that figures for transit usages could be much greater than those stated on pages 138 and 320. Page 138 states that according to a 1983 Sam Trans Employee Survey, less than five percent of SFIA employees use any mode of public transportation for their commute. This survey is dated, and should be reconducted to evaluate the current travel patterns of airport employees and patrons. Page 320 states, 'BART could attract six percent of air passenger trips and eleven percent of employee trips on both a daily and peak hour basis.' " (Preston Kelley, Caltrans)

"Mitigations Proposed by SFIA"	"SamTrans Staff Comments"
"13. Providing bicycle travel lanes.	"In view of the large transportation demand to be generated by SFIA, bicycle lanes would not be a significant mitigation." (Richard Gee, SamTrans)

Response

Pedestrian considerations should permeate every facet of the SFIA Master Plan project. While pedestrian amenities would be beneficial in the GTC, pedestrians are not expected to spend more than a few minutes in the building at any given time. The GTC would house many different services, and facilitate the movement of people throughout SFIA. The following is inserted after the first bulleted item on p. 421 of the EIR:

PEDESTRIANS

Project-Impact Measures (1996) Identified in this Report

SFIA

- Incorporate, into the GTC design, safe and convenient walkways, amenities, easy access to transit and other modal transfer points, and other measures that facilitate safe pedestrian movements.

Bicycle lanes would attract more people, particularly airport employees, to use bicycling as a commute mode. The Class I bikeways would provide a protected bike path that would make bicycling safer and more attractive throughout the airport area. Although the number of air passengers and airport employees who would actually bike to SFIA might be relatively small, every mitigation measure that contributes towards reducing automobile trips is valuable. With respect to the effectiveness of bicycle mitigations, their significance is a matter of opinion.

FLIGHT DISTRIBUTION

Comment

"Mitigations about having the airlines distribute their flights in perhaps a better pattern is not discussed at all, and the impact it might have on peak traffic. That is not discussed. There is really no crunch mitigations, things that really would be meaningful, discussed in here that the Airports Commission could have some control over. I would like to see that." (Commissioner Engmann)

Response

SFIA does not have the legal right to designate flight hours for individual airlines using the Airport. A discussion of legal restrictions on Airport Administration appears in Attachment D of C&R Appendix A, "Background to Airport Operations."

Appendix J of the EIR (pp. XI. A.179-A.180) includes a comparison of forecast hourly activity at SFIA in 1996 and 2006 with potential airfield capacity during visual flight conditions. The forecasts of hourly activity were developed assuming that the relative distribution of activity throughout the day would be the same in 1996 and 2006 as in 1990.

According to Tables J-1 and J-2 in Appendix J, in 1996 and 2006 there would (86 percent of the time) be no more than one hour of delay for any flight, under all visual conditions.

During less-than-optimal visual conditions, though, some flights would be delayed into other hours of the day because of airfield capacity constraints. During instrument flight conditions (5.6 percent of the time), the SFIA airfield could not accommodate the number of flights per hour forecast in 1996 and 2006.

The delays to aircraft during these conditions could be sufficient (and frequent enough) to prompt the re-scheduling of flights to off-peak hours. Staggering the flight distribution would have some impact on traffic in the vicinity of SFIA, but not much on commute peak-hour traffic on the regional transportation system. Peak flight hours at SFIA are in the early morning, generally during the early part of the morning commute, and in the early to late evening, after the afternoon commute period. Many international flights arrive during the middle of the day and leave during the evening. Domestic flights are spread throughout the day, generally based on travel-time demand, and desired landing time, considering time-zone changes and other factors. To be conservative, the analysis of traffic impacts in the EIR superimposed the SFIA-generated vehicular peak-hour traffic and the peak-hour traffic on the adjacent road network, even though they do not occur at the same time. The peak periods have increased on US 101; staggering the flight distribution schedule would contribute to extending the peak periods even further. Most airport employees would not be affected by a flight distribution change, particularly maintenance workers who work set shifts throughout the day.

Air passengers might be encouraged to use their automobiles even more because of the perception that their flights are during "off-peak" periods. This could result in increased automobile use and associated impacts, which are counter to all of the mitigation measures presented in the EIR.

IMPACTS OF MITIGATION MEASURES

Comments

(5e) P. 13 - Under additional measures to address impacts (to be added) . . .

"City and County of San Francisco, Cities and County of San Mateo Co, and Airport stop promoting foreign trade into this area.

"On p. 13 - Under Additional Measures to address impacts; from listed impacts measures to be addressed that I believe <u>should be dropped</u>. --- 2<u>nd</u> (Park and ride lots on 101 <u>should be erased</u>) - 3rd(HOV lanes) should <u>not</u> be created because they cause more traffic problems and more pollution because everyone but select few are not allowed to use traffic lanes otherwise available to all and that is discrimination. (<u>In my belief</u>) 6th Requiring exclusive rights-of-way rail or Bus facility that connects SFIA to BART's planned station <u>west</u> of US 101 -<u>should be dropped</u>. That is only one of alternatives being studied and would be cause of much more traffic vehicle trips into area which in turn causes more Pollution - 9th Requiring right-of-way reservations for future high speed rail - should be dropped. Such station would bring even more congested Traffic and worse Pollution to an already overburdened area.

"P. 14 - 7th and 8th should be dropped - because it is not safe!" (Jessie Bracker)

"In my opinion many of the suggested Mitigation Measures listed would not be Mitigation Measures but instead would be additions to the Pollution Problem and should be listed as such. Some of those are - 1) Add more lanes and widen roads in the immediate vicinity of S.F.O. - 2) Provide Park and Ride Lots along Hwy 101 - 3) Create high occupancy-vehicle lanes on Hwy 101 from San Jose to San Francisco. - 4) Connect BARTs planned Station West of Highway 101 to Airport." (Jessie Bracker)

"On the top of page 415, the DEIR states: 'At as many locations as possible near US 101, I-280 and I-380 interchanges in San Mateo County, create park-and-ride lots for commuters through lot-construction and shared-use agreements with churches and shopping centers. Use uniform signage that clearly indicates lot location from the freeway and arterial roadways. Implementing Agencies: Caltrans, local governments.'

"Most of the sites available to implement this mitigation would be located in San Bruno. Thus, this mitigation could heavily impact San Bruno and add more cars to local streets. In effect, the mitigation will produce other substantial impacts which are themselves not properly identified nor adequately mitigated." (George Foscardo, City of San Bruno)

Response

Park-and-ride lots are a suggested mitigation measure that would serve to alleviate congestion along the US 101 corridor. With or without the Airport project, congestion on US 101 is projected to worsen. This mitigation measure would address Airport traffic impacts, as employees would make use of the lots rather than continue individually into the congested Airport area.

Exact locations for park-and-ride lots have not been identified, but that does not discount their value as an implementable mitigation measure. If the implementing agencies decide to create park-and-ride lots along the US 101 corridor, careful attention needs to be paid to the impacts that the lots create. Park-and-ride lots are usually located near freeway ramps and adjacent to freeways, thus minimizing impacts to local roadways and neighborhoods. Park-and-ride lots along the US 101 corridor do not have to be located in the immediate SFIA vicinity in order to be effective; they should be located carefully where Airport employees or other commuters on similar schedules would meet, park and then carpool or vanpool to their work location. The locations could potentially be throughout the Bay Area, depending on schedules and residential locations.

The responses on pp. C&R.162-163 herein explain the pros and cons of HOV lanes. They do not discriminate against workers, as existing mixed-flow lanes would still be available, as well as alternative transportation modes. Also, HOV lanes can be used by all motorists during most of the day.

Widening roadways in the vicinity of SFIA is being done on Airport property and would not cause adverse impacts to local areas outside the Airport. The SFIA internal roadways (Roads R-2 and R-3) would not attract traffic from outside the Airport, as these roadways would not be used for trip diversion when US 101 is congested. The roads would continue to serve only Airport traffic, and are being widened to ensure that access and circulation among different areas of the Airport are maintained. Queuing and congestion along Airport roadways would disrupt the overall circulation throughout the Airport, including the terminal area and parking locations.

Exclusive right-of-way for a rail or bus connection from SFIA to a BART station west of US 101 would be a meaningful mitigation measure only if the BART and/or CalTrain station were to be located there. Detailed discussion of the BART alternatives, access to BART stations, potential for joint airport/commuter stations and impacts of BART are discussed in the response on pp. C&R.139-145 herein.

Other mitigation measures that would have impacts of their own include increasing the transit service on CalTrain, BART, MUNI and SamTrans. The impacts to each transit operator would have to be addressed in light of capital cost improvements, service frequencies, availability of existing services and the associated costs to provide additional services.

AIRCRAFT NOISE SETTING AND IMPACTS

The Notes for this section begin on p. C&R.265.

AIRCRAFT OPERATIONS FORECASTS

Comments

"Page 335:
"Historically, 65% load factors have prevailed over the years because there is no incentive for the airlines to improve. An assumption by the DEIR that significant changes in load factors will occur, and significantly influence total operations, is overly optimistic and appears to be an attempt to minimize the impact of the growth in operations." (Duane Spence, Airport Mitigation Coalition)

"The growth in aircraft size appears to be higher than current industry trends would indicate." (Chris Brittle, Metropolitan Transportation Commission)

Response

Page 335 of the EIR discusses the method used to develop forecast operations at SFIA. Forecasts of annual and average day operations by aircraft type were developed specifically for the EIR because no detailed operations forecasts were developed for the SFIA Master Plan. As noted in the EIR, the forecast of operations developed for the EIR was based on the SFIA Master Plan forecasts of passengers and load factors. Pages 61-65 of the EIR include a list of some of the key assumptions made in developing the SFIA Master Plan forecasts.

As noted in Table 10 on p. 64 of the EIR, the average load factor was forecast in the SFIA Master Plan to increase (from about 50 percent in 1986, the survey period) to about 59 percent in 1996 and about 65 percent in 2006. On p. 7.11 of the SFIA Master Plan, it is noted that "average load factors at other airports range from 40 percent at large, lower-utilized airports to as high as 65 percent at airports that have limited peak hour capacity." The SFIA Master Plan concludes that SFIA has limited peak hour capacity on the basis of the airfield capacity analysis on pp. 7.13-7.15.

When mentioning prevailing load factors, the commenter may be referring to airline (rather than airport) load factor statistics. According to Federal Aviation Administration (FAA) statistics for airlines in domestic and international service, total revenue passenger load factors for all airlines were about 63 percent for federal fiscal year 1990 (October 1, 1989-September 30, 1990), and about 62 percent for fiscal year 1991. Flights serving international destinations had higher load factors than domestic flights: 67 percent compared to 61 percent (in fiscal year 1991)./1/ FAA forecasts show systemwide passenger load factors increasing to about 64 percent in fiscal year 2001./2/

The FAA's estimated airline load factors reflect the proportion of the airlines' aircraft seating capacity (total seats on all aircraft) that is sold and utilized: that is, how full the aircraft are./1/ Airport load factors typically reflect the proportion of the total seats on all aircraft serving the airport filled by passengers *boarding the aircraft at the airport.* "Through" passengers - those passengers who stay on the plane for travel to the next destination (or beyond) - are not counted in the airport "boarding" load factor.

These through passengers must be added to the SFIA load factor in order to compare it to the airline load factor. Although there is no information in the SFIA Master Plan on through passengers, it is likely that adding them to the forecast 65 percent "boarding" load factor (for 2006) would produce a load factor higher than the load factor forecast by the FAA. (It should be noted, however, that airlines have a major economic incentive to increase their load factors, and that the 65 percent "prevailing" load factor mentioned by the commenter is not necessarily the airlines' upper limit.)

A direct comparison of the airline and SFIA load factors may not be valid, however. Systemwide airline load factors may be different from the load factors for a particular airport. For example, the proportion of international flights at a particular airport may be higher than the proportion of international flights nationwide; because load factors for international flights are typically higher than those for domestic flights, the airport's overall load factor would be higher than the systemwide airline load factor. Other factors that may influence an individual airport's load factor include the extent of competition at the airport, types of travellers served, and constraints on airside and landside capacity (which would result in increased load factors because the airport would have to serve a given number of passengers with fewer flights than would serve those passengers systemwide). As stated above, it is assumed in the SFIA Master Plan that load factors would increase due to limited airside capacity.

Table 10 of the EIR also shows the SFIA Master Plan forecast of aircraft size (defined as average seats per aircraft) during the average day of the peak month of aircraft activity. This forecast, which was based on a generalized mix of aircraft, was not used directly in developing the detailed mix of aircraft operations forecast for the EIR.

Rather, the forecast of operations was developed by use of the FAA forecast for the entire fleet of aircraft nationwide. The types of aircraft used in the FAA forecasts were condensed to correspond more closely with the types of aircraft operating at SFIA in 1990 (and to better reflect the forecasts of international passengers prepared by SFIA in 1987). These aircraft were categorized as "long range" and "medium and short range."

The passenger and load factor forecasts developed for the SFIA Master Plan were used to determine the total number of aircraft seats needed. Because the number of SFIA passengers is forecast to increase, and the FAA national forecast shows some of the older aircraft being retired, additional aircraft will be needed at SFIA in 1996 and 2006 to provide enough seats to serve forecast passengers. Within each of the range categories listed above, it was assumed that increases in the number of aircraft needed to serve future passengers would be proportional to FAA-forecast increases within the same range category of the national fleet. In this way, both the existing mix of aircraft at SFIA and national trends in aircraft acquisition were considered in the forecasts.

Operations by long-range aircraft (which are typically larger than short-range aircraft) accounted for about 25 percent of total operations at SFIA in 1990. This proportion is higher than that for the number of long-range aircraft in the national fleet (about 17 percent in 1989, as estimated by the FAA)./3/ (If the proportion of total operations performed nationally by long-range aircraft were known, it would probably be lower than 17 percent, because long-range aircraft typically fly fewer, longer flights than short-range aircraft.)

On the basis of this analysis, the EIR used an estimate of 179 average seats per aircraft in 1989 (used to represent 1990 activity), and forecasts of 186 seats in 1996, and 192 in 2006. The forecast increase in seats from 1989/90 to 1996 is about one seat per year; the forecast increase from 1996 to 2006 is 0.6 seat per year.

Pages 61-65 of the EIR include a discussion of other forecasts developed for SFIA. A comparison of those forecasts with the SFIA Master Plan forecasts is shown in Table 10, p. 64. As shown in the table, the number of aircraft operations forecast in the California

Aviation System Plan (CASP) is higher than the number forecast in the SFIA Master Plan. The CASP forecasts of operations are higher because they are based on a smaller average aircraft size and lower load factors.

Appendix C of the EIR includes an analysis of the sensitivity of cumulative noise impacts to differences in the number of aircraft operations. The analysis compared the SFIA Master Plan forecasts to forecasts prepared by the FAA and CASP, and included the development of CNEL contours and calculation of CNEL values. The number of operations in the FAA forecast was lower than the number in the SFIA Master Plan forecast. The noise analysis concluded that the higher number of operations forecast by the CASP would not have a substantial effect on cumulative noise levels. The main reason is that the CASP forecast includes more operations by small aircraft, which are generally the quietest aircraft in the fleet.

Therefore, even if future aircraft sizes and load factors are lower than forecast in the SFIA Master Plan and the EIR, there would not be a substantial change in cumulative noise levels from those shown in the EIR. However, the number of single events (flight frequency) would increase, though these additional flights would be performed by generally quieter aircraft.

SFIA FLIGHT PROCEDURES AND RUNWAY USE

Relationship to Information Presented in DEIR

Comments

"The discussion of flight tracks is inadequate. There is no explanation of how departures are handled at SFO. The DEIR states that flight tracks on Figure 19 (p. 159) were developed through discussions with the SFIA ATC personnel, reviewing radar data, and a review of the Standard Instrument Departures (SIDs). The Figure explains that the flight corridors it depicts are actually up to several miles wide and actual flight patterns are more widely disbursed [sic] than shown. What then is the point of having the figure?

"Actual SIDs can be accurately plotted. Only limited deviation from the centerline of the published SID is tolerated and aircraft weight, pilot technique, and weather conditions would rarely, if ever, be an excuse for a substantial deviation from the published track once the pilot has accepted his clearance which is done prior to takeoff. Aircraft flying on SIDs can be, and are, expected to be on the track. In contrast, Figure 19 tracks are composites which no pilot is required to fly as depicted nor would a pilot be able to do so. Figure 19 mixes fixed route departures with radar vectored departures and provides a map that says you can expect to find aircraft flying anywhere in the airport vicinity.

"The fact is that all aircraft departing SFO on an IFR clearance are given and have accepted a departure clearance. It would be either in the form of a published SID or a verbal clearance to accept radar vectors. Often, and particularly during high volume traffic periods, while departing on a SID, ATC will modify the clearance for an aircraft and begin giving radar vectors. From that point on, the aircraft is no longer flying the SID. These distinctions are important to be made because it is when radar vectors are used, the track over the ground changes from a well defined area to essentially anywhere in the airport vicinity. . .

"Figure 19 shows that 32% of flights use a routing [that] closely follows the 'Shoreline Departure,' but that cannot be. That routing uses Runway 28 to depart and 28 was only in use about 7.6% of the time in 1989. If the Shoreline were used for 1/3 of all 28 departures, that would only be 2.53% of the time. Actual use of the Shoreline is numerically insufficient to create a noise impact area. This gross misrepresentation of traffic on the Shoreline results in a misrepresentation of traffic volumes on the other routes as well." (Stephen Waldo, Mayor of Brisbane)

"Figure 19 on page 159, Generalized Flight Tracks:
"This figure erroneously shows 32% of departures as using the Shoreline Departure from Runways 28. This is not true. Between 90 and 95% of departures currently use Runways 1. This should be represented in the diagram. Of departures using Runways 28, now less than 9% of total operations, only a small minority use the Shoreline Departure (0.3%)." (Duane Spence, Airport Mitigation Coalition)

<u>Response</u>

Figure 19 on p. 159 of the EIR shows generalized flight tracks for aircraft using SFIA. Pages 158 and 160 of the EIR include a discussion of Figure 19 and of some of the Standard Instrument Departures (SIDs) used at the Airport. Appendix C of the EIR includes a complete set of the SIDs used at SFIA.

Aircraft departing from SFIA use the services of several FAA air traffic control facilities, including the Airport Traffic Control Tower (ATCT) at SFIA, the Bay Terminal Radar Approach Control (TRACON) facility at Metropolitan Oakland International Airport (MOIA), and the Oakland Air Route Traffic Control Center (ARTCC) in Fremont. The ATCT at SFIA provides services for arriving aircraft within about five miles of the Airport. The Bay TRACON provides services in an area generally extending south to about Gilroy, west to near the Farallon Islands, north to Concord, and east to Livermore, and up to about 17,000 feet. The Oakland ARTCC provides services in areas of "controlled airspace" (airspace designated by the FAA, within which aircraft may be subject to air traffic control) not served by the ATCT./4,5/ The ARTCC has a service area extending south to Paso Robles, California, east to the middle of Nevada, north to the Oregon/California border, and west across the Pacific Ocean./4/

Prior to departure from SFIA, the aircraft pilot files a flight plan through the Oakland Automated Flight Service Station at MOIA. Among the information entered on the flight plan are the route of flight and the flight destination. If the pilot knows the appropriate SID for the route of flight, the pilot includes the SID on the flight plan. The computer at the Flight Service Station assigns the SID in some cases, on the basis of the runway and general flight route. Noise abatement ("preferential routing") is taken into consideration when the SID is assigned./4/

The pilot calls "Clearance Delivery" 30 minutes before takeoff to obtain clearance of the flight plan. Ground Control at the ATCT will clear the pilot to taxi to the appropriate runway. Local Control at the ATCT gives the pilot clearance to take off. After the aircraft is in the air, the pilot reports to the Bay TRACON for instructions. The pilot follows the instructions of the TRACON until the aircraft is out of the TRACON service area, when it is "handed off" to the ARTCC./4/

A vector is a radar heading issued to an aircraft to provide navigational guidance. Among other procedures, vectoring is used by air traffic controllers to maintain the required separation among aircraft./6/

Almost all of the airline aircraft departures from SFIA are assigned and use SIDs. According to ATCT staff, the ATCT uses vectoring for fewer than five percent of operations at SFIA. Airspace congestion, the topography of the area, and noise-abatement procedures limit the opportunities to use vectoring. A situtation in which vectoring is used to separate aircraft is if two aircraft are flying on the same SID and it appears that the second aircraft will overtake the first. According to ATCT staff, vectoring is used at specific times for specific situations such as the one noted here; when it is used, it is of short duration./4/

The Bay TRACON uses vectoring for more SFIA operations than does the ATCT. For example, departures on Runways 1 and 28 headed for destinations in the Pacific Northwest are vectored when they reach the shoreline of the Pacific Ocean. The TRACON does not normally vector departing aircraft over the City of San Francisco, however. According to the TRACON, vectoring is not used for aircraft beyond five miles north of SFIA, because vectoring does not provide for efficient use of the airspace after that point./7/

As stated on p. 158 of the EIR, SIDs are coded descriptions of aircraft routes. These routes are preplanned, "standard" air-traffic-control departure procedures. Two aircraft following the same SID would not necessarily follow the same flight path, however. Aircraft have widely varying performance characteristics, and climb and turn at different rates. Wind, visibility, and other weather conditions can affect aircraft performance. Pilot decisions may also be a factor; the majority of the SIDs at SFIA are "pilot navigation" SIDs, which require the pilot to be primarily responsible for navigation on the SID route./6/

As an example, the EUGEN Four SID instructs aircraft to make a turn after reaching 1,600 feet altitude and a distance of 4 nautical miles from a beacon at the Airport. Because of the varying climb rates of different aircraft types and the varying weights of aircraft of the same type, each aircraft will reach 1,600 feet altitude at a different distance from the Airport. The turns the aircraft make will consequently be spread over a wide area.

Figure 19 is not meant to depict specific SIDs. Rather, the figure is meant to show where aircraft actually fly, in general, on average. (The flight paths must be consolidated into "generalized" tracks because the model used to develop the Community Noise Equivalent Level (CNEL) contours does not have the ability to process every one of the discrete paths flown by all of the aircraft using the Airport.) The generalized departure tracks on the figure were developed from SFIA's PASSUR system flight track data showing the actual paths of departing aircraft. As noted in the discussion presented above, these paths represent aircraft following SIDs and radar vectors. An aircraft departing from SFIA would not necessarily fly exactly one of the departure tracks shown in the figure. As the SFIA flight track data show, aircraft departing SFIA travel over wide areas in the airport vicinity. (An exhibit showing a sample of the SFIA flight track data is available for review in the Department of City Planning files.)

To clarify the EIR's description of the development of the generalized flight tracks, the first sentence in the fourth paragraph on p. 158 is revised as follows (revisions are underlined and deletions shown in brackets):

> The flight tracks shown in the figure were developed through discussions with SFIA Airport Traffic Control Tower personnel; a review of Airport [] <u>flight track</u> data; and a review of standard instrument departures (SID) published by the FAA.

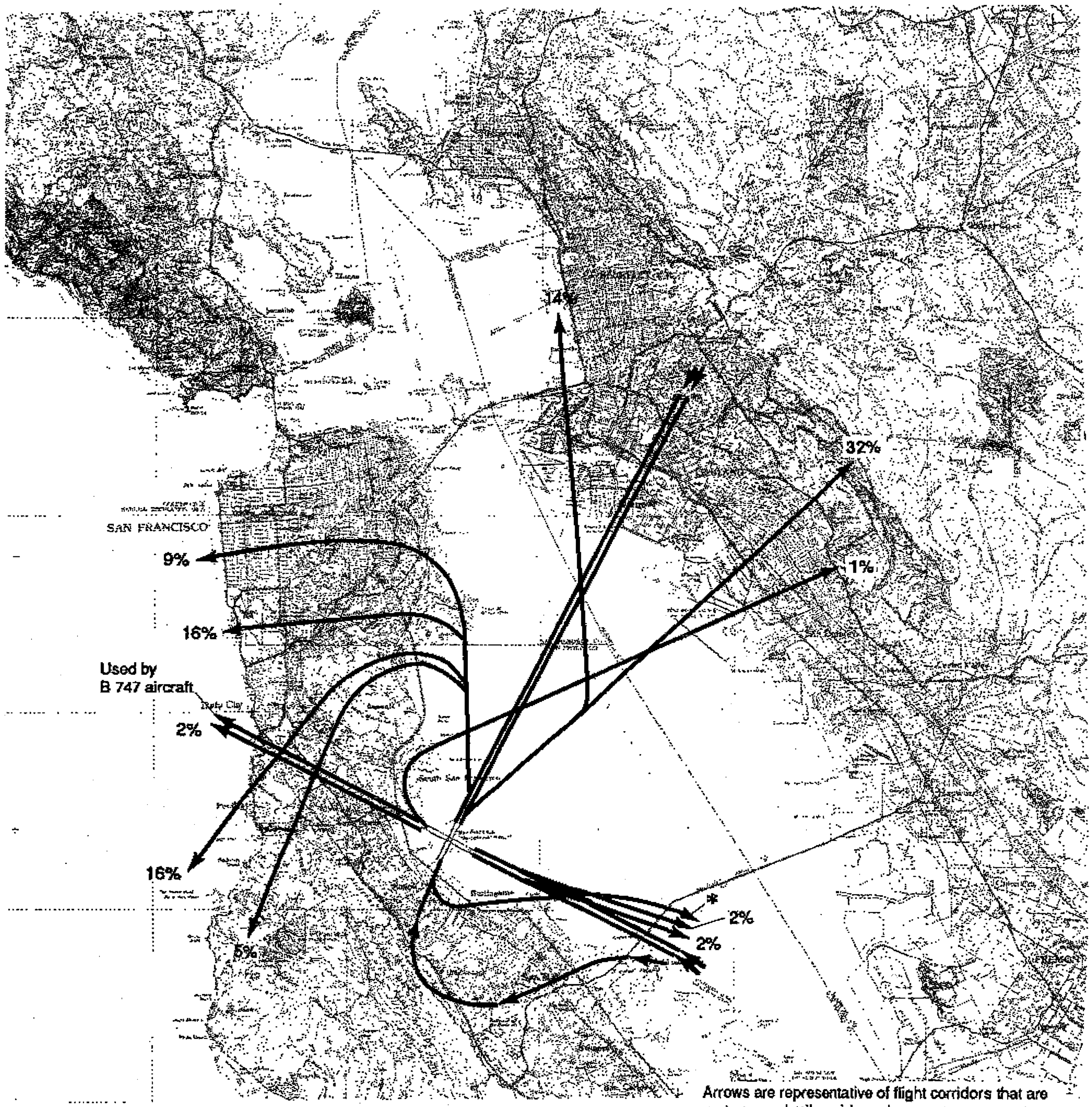
Some of the percentages assigned to the departure tracks in Figure 19 are incorrect. The "Shoreline Departure" from Runway 28R (the track that makes a right turn over the Bay) was used by aircraft other than B-747s approximately 1 percent of the time in 1990. The departure track from Runway 1R heading east over the East Bay was used approximately 32 percent of the time in 1990. Figure 19 on p. 159 of the EIR is revised to show the correct percentages. The CNEL noise contours shown in the EIR were developed using the correct percentages.

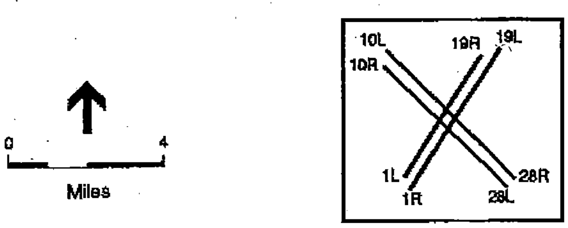
<u>Federal Control Over SFIA Procedures</u>

<u>Comment</u>

"Three years ago, Mr. Turpen promised noiseless aircraft. That is what he was alluding to. Reduce[d] noise aircraft. Nothing of the sort. I asked, Can you tell me how these planes are flying so low over this neighborhood? You know what, he is hiding behind, Mr. Turpen is hiding behind the FAA. I am given the answer, the airport has no jurisdiction over flight plans. The flight plans are dictated by FAA. I have been repeatedly and repeatedly told that.

"I want to see whether the EIR says there is any control of the airport of the flight plans. There must be. Who is he trying to kid? Now, this is just blatant lies, as far as I know. The airport has to work together with the FAA. The FAA has to work together with the airport. If they don't, let's scrap this complete extension if they can't work with the FAA to regulate the flight plans." (Bhimje)





Arrows are representative of flight corridors that are up to several miles wide and encompass a greater area than shown by these lines and arrows. Actual aircraft flight patterns are more widely dispersed than shown.

Percentages shown represent average annual use of the tracks by departing air carrier aircraft (except B 747's) during the daytime. Actual use of a track on a particular day depends on what runways are being used.

* Used by fewer than 1% of departing aircraft.

SOURCE: Ken Eldred Engineering and Envirionmental Science Associates, Inc.

Figure 19
Generalized Flight Tracks

Response

According to SFIA Administration staff, the authority to regulate flight patterns or routes of aircraft is vested exclusively in the FAA. Federal law provides that: "No state or political subdivision thereof and no interstate agency or other political agency of two or more states shall enact or enforce any law, rule, regulation, standard, or other provision having the force and effect of law relating to rates, routes, or services of any air carrier having authority under subchapter IV or this chapter to provide air transportation."/8/ (Emphasis added.) The purpose of these federal laws is to provide a uniform and efficient system for the use of the air space. The imposition of local regulations governing aircraft flight patterns would serve to frustrate flight scheduling and navigational patterns nationwide, thus hindering commerce, aviation safety, and the general management by the FAA of the National Air Traffic Network.

The responsibilities of the FAA (and aircraft pilots, who make the ultimate decisions regarding the operation of, or procedures used by, a particular flight) do not, however, preclude SFIA from working with those parties to develop noise abatement procedures, including preferential runway use, flight track locations, flight track procedures, and aircraft takeoff and landing procedures./9/ SFIA has already undertaken such efforts, as evidenced by the existing SFIA Noise Abatement Program and Airport Noise Abatement Regulation, described on pp. 167-168 of the EIR. Pages 424-426 of the EIR include noise mitigation measures, among which are measures involving flight procedures. Responses to comments regarding specific mitigation measures are on pp. C&R.267-295 herein.

AIRCRAFT OPERATIONAL ASSUMPTIONS

Comments

"As you are aware, noise impacts to our city are of serious concern. It is acknowledged in the Draft Airport Master Plan that a significant portion of the increased traffic resulting from the project will be serving the Pacific Rim. Most aircraft departing for these destinations use the Gap Departure Route and overfly our city at relatively low altitudes. It is unclear whether the projected noise contours in the DEIR were developed using existing runway usage figures or whether the potential increase in Gap Departures was included. If that potential increase was not included in the development of projected noise levels, the Noise Contour maps would not accurately reflect the future noise environment. Either way, a summary of the assumptions used in developing projected noise levels would be helpful for readers of the document." (Jack Drago, Mayor, City of South San Francisco)

"The DEIR states that runway use is assumed to be the same in the future as in 1990. Additional information should be provided to document whether or not this is correct. In particular, if international traffic, especially to the Pacific Rim, is expected to increase more than other types of traffic, how might this affect runway use and the times of aircraft departures?" (Wendy Cosin, City of Pacifica)

". . Increasing use of radar vectors on departure in the mid-1980's increased the overflights of Brisbane, which previously was completely out of any flight path. The use of radar vectors created both a safety and noise problem for Brisbane. It appears that the Master Plan's increased numbers of departures is likely to produce even more intense use of radar vectors and hence more overflights of our community which is not overflown when a SID is being used. . ." (Stephen Waldo, Mayor of Brisbane)

"Mr. Kroupa touched briefly on the issue of where will the new flights be accommodated. In San Francisco, we have always been told that as more aircraft use the airport, the planes have to fan out further and further north, which would imply that the bulk of the increase in new flights is also going to happen further north up the Peninsula. The noise analysis does not make that assumption at all. They assume that it will be a proportional increase along all the existing tracks, which strikes me as a fundamental flaw, or else we have not been told the facts for the last four years, since airplanes started appearing over these neighborhoods." (Curt Holzinger)

"The noise analysis provided in the DEIR is based on several assumptions which seem to reflect optimum operating conditions, rather than real conditions; thus skewing the results. For example, the analysis assumes that nighttime operations remain constant (page 335), while the DEIR shows that 25% of the time there is a 31% increase in nighttime operations (page 338). This fact points to important impacts which are given inadequate analysis.

"Moreover, runway and flight track usage are also assumed to stay constant (page 339). This assumption conflicts with explanations this Committee has been given about the increased air traffic over San Francisco. The Committee has been told many times that as flight tracks near the airport fill up, planes move further north into the city. This suggests that future increases in air traffic cannot be spread proportionally among flight tracks; but may in fact be concentrated in areas further from the airport. The DEIR needs to address these concerns and provide more complete information about the noise analysis and its underlying assumptions." (Timothy Treacy, Airport Noise Committee)

"The assumptions which underlay the existing noise analysis should be made explicit and more complete. It appears that at least some of these assumptions are inadequate, and subject to question. For example, the analysis states that night time operations, runway use, and flight path use remain constant; yet the DEIR also shows that 25% of the time there will be a 31% increase in night operations (page 338); it proposes to use Runways 1L/1R more than now, and the assumption that flight path usage will remain constant directly conflicts with explanations I have received from the airport and FAA as to where additional flights must be directed due to airspace limitations." (Curt Holzinger)

Response

As shown in Table 1, p. 24 of the EIR, international passengers using SFIA are forecast to increase by a greater percentage than domestic passengers (96 percent from 1990 to 2006, compared to 68 percent). As also shown in Table 1, however, domestic passengers would still constitute the majority of all SFIA passengers (86 percent in 2006, compared to 88 percent in 1990). In addition, domestic passengers would also constitute the majority of the increase in passengers: 83 percent of the increase from 1990 to 2006.

The table showing runway use on p. 157 of the EIR shows the percentage of all aircraft departures or arrivals using the various runways at SFIA. For the development of the CNEL noise contours, runway uses were estimated for several categories of aircraft. Boeing 747s (B-747s) were assigned to a separate category in these estimates. For 1990, it was estimated that 100 percent of the B-747 aircraft departing for long-haul destinations (over 1,500 miles from SFIA) used Runway 28R during the daytime. All of these aircraft followed the Gap Departure path.

As stated on p. 339 of the EIR, runway uses were assumed to be the same in 1996 and 2006 as in 1990. Therefore, as flights increase over time, use of the various departure routes would increase proportionately. Thus, the forecast increase in Gap departures is reflected in the CNEL contours for 1996 and 2006.

It is possible that some of the international passengers in 1996 and 2006 would not be flying on B-747 aircraft. Long-range, two-engine aircraft such as the B-767 could increasingly serve SFIA-Pacific Rim routes. These aircraft have performance characteristics that allow them to use Runways 1L and 1R for takeoff. To the extent that future international passengers are served by these aircraft, use of Runway 28R and the Gap Departure could be less than shown in the CNEL contours.

Table C-1A is inserted after Table C-1 on p. A.45 of the EIR (Appendix C) showing runway use by time of day and aircraft category for 1990 (and assumed for 1996 and 2006). The percentages in the table were developed on the basis of SFIA runway use data for 1989.

As stated on p. 339 of the EIR, it was assumed that the use of flight tracks in 1996 and 2006 would be the same as it was in 1990. Several of the commenters challenge this assumption, stating that the forecast increase in flights would result in increased use of vectoring procedures, and/or a change in flight patterns.

The use of radar vectoring procedures is discussed on pp. C&R.199-200 herein. As noted in that discussion, vectoring is currently used for a small percentage of SFIA departures, for specific purposes. The conditions under which aircraft depart SFIA limit the opportunities to use vectoring.

According to the Bay TRACON, if SFIA traffic becomes more congested, the length of time vectoring is used could increase, but the number of planes vectored within a particular time would probably not increase, and aircraft would not be vectored to (or "fanned out" among) flight tracks further north on the Peninsula. According to the TRACON, it is more likely that aircraft would be held on the ground during more congested periods./7/ Given the conclusions of the TRACON, it would be speculative to assume that the use of vectoring would increase substantially in the future (with or without the SFIA Master Plan improvements).

TABLE C-1A: 1990 AND ASSUMED FUTURE RUNWAY USE BY AIRCRAFT CATEGORY AND TIME OF DAY

		Percent Departures by Runway End								
Type	Time/a/	1R	1L	10L	10R	19L	19R	28L	28R	Total
B-747 Short Range/b/	Day	25%	24%	1%	0%	1%	0%	0%	49%	100%
	Evening	25%	24%	1%	0%	1%	0%	0%	49%	100%
	Night	25%	25%	10%	0%	0%	0%	0%	40%	100%
B-747 Long Range/c/	Day	0%	0%	0%	0%	0%	0%	0%	100%	100%
	Evening	0%	0%	0%	0%	0%	0%	0%	100%	100%
	Night	0%	0%	20%	0%	0%	0%	0%	80%	100%
All Others/d/	Day	46%	46%	2%	2%	0%	0%	2%	2%	100%
	Evening	46%	46%	2%	2%	0%	0%	2%	2%	100%
	Night	41%	41%	8%	8%	0%	0%	1%	1%	100%

/a/ Day= 7:00 a.m. to 7:00 p.m.; Eve.= 7:00 p.m. to 10:00 p.m.; Night= 10:00 p.m. to 7:00 a.m.

/b/ With destinations of 1,500 miles or fewer from SFIA.

/c/ With destinations greater than 1,500 miles from SFIA.

/d/ All other airline aircraft.

SOURCE: Ken Eldred Engineering and Environmental Science Associates, Inc., based on SFIA runway use data for 1989.

As noted on p. C&R.200, aircraft departing SFIA travel over wide areas in the Airport vicinity. This characteristic of SFIA departures was factored into the operational assumptions, including locations and use of flight tracks, used to develop the CNEL contours in the EIR. The characteristic is reflected also in the SFIA noise monitoring data, against which the CNEL contours were compared to confirm the validity of the contours. Because available information indicates that flight track locations and uses are likely to be similar in 1996 and 2006 to their locations and uses in 1990, the CNEL contours for 1996 and 2006 incorporate the level and location of aircraft "fanning" likely to occur in those years.

Two commenters challenge the assumption in the EIR (stated on p. 335) that the percentages of operations occurring during evening and nighttime hours will be the same in 1996 and 2006 as 1990, and refer to the EIR's analysis of the effects of potential airfield capacity constraints. It is assumed in the EIR that the percentages of evening and nighttime operations will be the same in the future because the CNEL contours in the EIR were developed on the assumption that airfield capacity constraints would not result in a substantial increase in evening or nighttime flights. These assumptions about nighttime flights were made on the basis of the EIR's analysis of the effects of potential airfield capacity constraints (presented on pp. 335 and 338 and in Appendix J of the EIR).

As noted in the discussion of the capacity analysis on pp. 335-336 of the EIR, during optimal weather conditions (61 percent of the time), there would be an increase of two flights during the evening and no flights during the nighttime; during less-than-optimal weather conditions (25 percent of the time), there would be an increase of up to 31 percent of flights during the nighttime in 2006. The EIR also states (p. 336) that these increases in flights would not result in perceptible increases in cumulative noise levels. In addition, it should be noted that the capacity analysis employs several conservative assumptions that may result in an overstatement of the effects (such as a proportional increase in flights during peak hours, discussed on p. C&R.51 herein).

It should also be noted that the noise measurement data from the SFIA remote monitoring stations reflect aircraft operations during all types of weather conditions, including poor weather conditions (when there would most likely be aircraft delays). As demonstrated in the EIR, the 1990 CNEL contours agree substantially with the measurement data. On the basis of this agreement and the results of the capacity analysis, the EIR's use of the "average day" (good weather) to develop the CNEL contours is appropriate.

SHIFT TO STAGE 3 AIRCRAFT

Assumptions Behind Shift to Stage 3

Comments

". . .Also, the environmental document must comprehensively discuss what leads to the conclusion that larger, quieter aircrafts will be used in the future. If this assumption does not take place, it is possible that the CNEL may remain the same or may increase." (Maria Gracia Tan-Banico, City of Daly City)

"Another issue is, on Page 339, as I understand it, the San Francisco Airport Commission can take a stronger role in forcing the phase-out of Stage 2 aircraft. And the continual granting of waivers and variances, notwithstanding Lou Turpin's commendable stand on the 707 Q, which we are all thankful that he held the line on that one. The Stage 2 aircraft really are the culprits. The 727 is worse than a 747." (David Few)

"From the Roundtable's experience, it is clear that the only remaining action involving aircraft operations that will result in significant noise reduction is the attainment of a 100% Stage 3 fleet at San Francisco International Airport (SFO). While some opportunities for reduction in noise exposure may exist through additional modifications in flight tracks, preferential runway usage, etc., that reduction will be modest. Thus, community land use actions will be the only way of mitigating residual noise impacts after the benefits of Stage 3 are fully realized." (Roger Chinn, Airport/Community Roundtable)

"The DEIR attempts to provide assurances through its proposed mitigations that aircraft noise impacts resulting either from the project or from present operations will be within acceptable levels due to technological improvements expected to occur during this period. The achievement of these improvements depends on airline investment in alternative aircraft. . ." (Onnolee Trapp, Leagues of Women Voters of San Mateo County)

". . .From an environmental point of view, SAIA members have already invested US $ billions on new aircraft designed to reduce the noise impacts on surrounding communities and decrease our use of fossil fuels, while still providing the high level of safety the traveling public deserves." (Jerome Copelan, San Francisco Association of International Airlines)

Response

Federal Aviation Administration regulations, codified at 14 C.F.R. Part 36, established a federal noise certification program in 1969 for new aircraft designs. Since 1975, Part 36 has contained three levels of regulation; each level corresponds to established noise limits. Each level is identified as a "Stage" and applies to the dates applications for type certification are submitted to the FAA. The most stringent level is Stage 3, which applies to aircraft for which applications for type certification were submitted after November 1975. The less stringent Stage 2 level applies to aircraft for which applications for type certification were submitted between December 1969 and November 1975. Stage 1 aircraft do not have to meet any noise limits. All of the aircraft currently operating at SFIA must meet either Stage 2 or Stage 3 noise limits.

Requirements of both the Federal government and the Airport will result in the use of quieter aircraft in the future. The Airport Noise and Capacity Act of 1990 mandates the phaseout of Stage 2 aircraft at airports nationwide by 2003./10/ In addition, the San Francisco International Airport Noise Abatement Regulation, adopted in February 1988 and amended in June 1991, contains the following provisions (paraphrased):

A gradual scheduled phase-out of Stage 2 aircraft, including requirements that at least 25 percent of each operator's aircraft operations after January 1, 1989 must be performed using Stage 3 aircraft; at least 50 percent after January 1, 1994; at least 75 percent after January 1, 1999, and 100 percent as of January 1, 2000. (Section 4(B))

A requirement that the percentag of Stage 2 operations at SFIA performed by a particular airline cannot increase during a specified quarter, based on the same quarter during the previous year. (Section 4(B)1e)/11/

SFIA Administration staff state that at the present time, 65 percent of the total operations at SFIA use Stage 3 aircraft, which is well in advance of the 50 percent requirement for individual operators that must be achieved by January 1, 1994./12/

The language on pp. 338-339 of the EIR does not reflect developments in 1991 that resulted in established deadlines for the phasing out of Stage 2 aircraft at SFIA (and nationwide). The last paragraph on p. 338 and the first paragraph on p. 339 of the EIR are revised as follows (revisions are underlined, deletions are indicated by brackets):

> Since the preparation of the FAA national fleet forecasts and the adoption of the SFIA Noise Regulation, Congress has passed legislation providing for the phasing

out of Stage 2 aircraft nationwide./5/ The legislation includes a final deadline of December 31, 1999, for the operation of Stage 2 aircraft, with a possible extension through December 2003 if certain conditions are met. [ ] On September 24, 1991, the FAA issued regulations to implement the noise policy. The regulations include the deadlines established by the legislation, with interim deadlines of 55 percent (of an airline's fleet) by 1994, 65 percent by 1996, and 75 percent by 1998./5a/

[ ] As discussed on p. 168, the Airport Noise Abatement Regulation was amended in June 1991 to include a requirement for 100 percent Stage 3 operations as of January 1, 2000. Assuming that aircraft operators serving SFIA comply with by the SFIA and federal regulations, there would be no Stage 2 aircraft serving SFIA in 2006. [ ] With a 100 percent Stage 3 fleet in 2006, the CNEL contours shown in this section would probably be about one dBA smaller than forecast.

The following note is inserted after note /5/ on p. 352 of the EIR:

/5a/ "FAA Eases Plan to Phase Out Noisy Jets Amid Strong Pressure," *New York Times*, September 25, 1991.

As discussed in the EIR (pp. 339, 346-347), cumulative noise levels are forecast to decrease from 1990 to 1996 and 2006 because of the phasing out of Stage 2 aircraft at SFIA. The use of expanded sound insulation programs to mitigate residual noise impacts is discussed on pp. C&R.282-287 herein.

Page 335 of the EIR explains the conclusion that larger aircraft will be used in the future. Operations are forecast in the SFIA Master Plan to increase less than passengers because it is assumed that larger aircraft will be serving SFIA in the future and that more passengers would be on each aircraft. According to Airport staff, this trend is evidenced by current purchases and future orders by SFIA airlines of the B-747-400, the largest passenger aircraft manufactured in the U.S. This aircraft is considered to be the primary fleet plane to serve the Pacific Rim and other international markets.

The airlines are, in fact, investing in new quieter aircraft. According to Mr. John Casey, Avmark, Inc., at the beginning of 1990, the five major aircraft manufacturers had a backlog of 3,224 orders of Stage 3 type aircraft, and by January 1, 1991, that backlog had increased to 3,674 aircraft./13/

Relationship to Aircraft Size and Projected Noise Levels

Comments

"At several locations (pp. 6 and 165, as examples) it is stated that increased use of newer, quieter (Stage 3) aircraft should result in decreased single event levels. The statement may be correct, but it depends upon whether or not the take-off weights and the number of engines of the Stage 3 aircraft in 1996 and 2006 are equal to or less than those of aircraft used in 1990. This analysis follows from inspection of the Stage 2 versus Stage 3 noise level limits shown in the FAA's Advisory Circular (AC No.: 36-1D; Appendix 1, pp. 28 to 32), and the expectation in the EIR of more seats per aircraft and greater load factors, i.e., heavier aircraft (Table 10)[1]. ["(1) Table 10 should include data for 1990."] Most readers probably are unfamiliar with and don't have copies of the FAA figures, so copies might be provided in the EIR." (Jerome Lukas)

"Page 339:

"The expectation stated in the DEIR that stage 3 planes will diminish the noise impact of the existing fleet mix of Stages 2 and 3 is not consistent with the further stated conclusion that the fleet will consist of larger aircraft. Larger stage 3 planes can be louder than smaller stage 2 planes. Analysis is needed." (Duane Spence, Airport Mitigation Coalition)

"The DEIR relies heavily on Stage [III] aircraft being quieter than Stage [II] aircraft to account for lower noise levels. However, it is known that some Stage III aircraft are noisier than stage II, and produce noise levels which will be significant. This fact, the aircraft types involved, their expected flight paths and noise levels should be disclosed. . ." (Curt Holzinger)

"Mitigation through use of Stage III aircraft is suggested in the DEIR. The DEIR assumes that newer Stage III aircraft are quieter than older Stage II aircraft. While this assumption may have some validity, Table C-5 in the DEIR discloses that Stage III 747 aircraft are only marginally quieter than Stage II 727-200, one of the noisiest in the existing fleet. Stage III aircraft will continue to have significant impacts, especially single event, which are not disclosed." (Bruce Krell, Forest Hill Association)

"Mitigation through use of Stage III aircraft is suggested in the DEIR. The DEIR assumes that newer Stage III aircraft are quieter than older Stage II aircraft. While this assumption may have some validity, Table C-5 in the DEIR discloses that Stage III 747 aircraft are only marginally quieter than Stage II 727-200, one of the noisiest in the existing fleet. Stage III aircraft will continue to have significant impacts, especially single event, which are not disclosed." (Carol Kocivar, West of Twin Peaks Central Council)

"To arrive at the conclusion that noise levels will decrease, the DEIR relies heavily on newer aircraft being quieter than existing aircraft. While this may generally be true, some Stage III aircraft will sound just as loud as Stage II aircraft, meaning that significant impacts may remain. For example, Table C-5 in the DEIR shows that even at a distance of several miles from the airport, the Stage III, 747 aircraft is only 2 to 3 decibels quieter than the Stage II 727-200, an aircraft identified as the loudest in the existing fleet, and cause of many noise impacts. Since a 3 decibel difference is considered barely perceptible, these noisy Stage III aircraft will continue to have significant impacts which are not disclosed. . ." (Timothy Treacy, Airport Noise Committee)

"Please identify the specific aircraft compared to state, on page 165, '. . . Stage 3 aircraft produced . . . (up to 23 dBA lower).' " (Jerome Lukas)

Response

Stage 2 and Stage 3 aircraft must meet noise limits established at three measurement points, known as "takeoff," "sideline," and "landing." The Stage 2 and Stage 3 noise limits for each of the measurement points generally increase as the weight of the aircraft increases. Because of this relationship between the noise limits and aircraft weight, a heavier Stage 3 aircraft may actually be noisier than a lighter Stage 2 aircraft.

The Stage 3 noise limits for takeoff are lower for 2-engine aircraft than 3-engine aircraft, and lower for 3-engine than 4-engine aircraft. The difference in noise limits accounts for the higher climb performance that can be achieved (at a given aircraft weight) by an aircraft with fewer engines. (The aircraft with fewer engines can climb faster because it is required to have enough engine power to continue to fly with one engine not working.)

As a general rule, for the same type of engine and noise control technology, the noise of a larger aircraft is greater than that of a smaller aircraft. The noise of a two-engine aircraft is less than that of a four-engine aircraft of the same weight. (Information documenting this relationship is available for review in the Department of City Planning files.)

Tables 17, 50, and 51 on pp. 156, 336, and 337, respectively, of the EIR show the average daily air carrier operations estimated for 1990 and forecast for 1996 and 2006 with the SFIA Master Plan. The operations forecasts reflect SFIA Master Plan assumptions about aircraft load factors and aircraft size (as discussed on pp. C&R.194-197 herein).

The operations are shown by type of aircraft, with the aircraft types categorized as Stage 2 or Stage 3. As shown in the tables, the Stage 3 aircraft forecast to operate at SFIA in 1996 and 2006 range in size from the BAe-146 to the B-747-400; the Stage 2 aircraft range from the DC-9 to the B-747. (The B-747 -100, -200, and -300 are classified as Stage 2 in the tables. However, many of these aircraft have been or will be recertificated as Stage 3.)

As shown in Tables 17, 50, and 51, the number of average daily operations by Stage 2 aircraft is forecast to decrease from 299 in 1990 to 199 in 1996 and 40 in 2006. Most of the operations forecast for 1996 and 2006 would be performed by Stage 3 aircraft that are quieter than the Stage 2 aircraft they would be replacing. These aircraft would produce lower single-event noise levels in communities near the Airport.

The Part 36 "sideline" measurement is the most appropriate basis for the comparison of the noise produced by various aircraft (because the "takeoff" measurement test permits a power cutback, and the "sideline" measurement test requires takeoff at full power). A comparison of the sideline noise levels for the aircraft serving SFIA shows that all of the Stage 3 aircraft serving the Airport are quieter than the Stage 2 aircraft. (This conclusion is based on a comparison of only the heaviest aircraft within each type.)

Operations by the B-747-400 are forecast to increase from 35 in 1990 to 73 in 2006; operations by the Stage 2 B-747-200 are forecast to decrease from 20 in 1990 to 0 in 2006.

On p. 344 of the EIR, it is stated that the noisiest aircraft overflights to and from SFIA would likely be by B-747 aircraft. To the extent that total operations by B-747-400 aircraft increase in the future, residents under the departure path for Runway 28R would experience an increase in the occurrence of the single-event noise produced by those aircraft. If current aircraft design trends continue, however, many of the aircraft used for long-range operations (the type performed by the B-747) will be quieter, two-engine aircraft (including aircraft currently under development, such as the Boeing 777). In that case, residents under the departure path for Runway 28R would experience a reduction of both single-event and cumulative noise (below what is forecast in the EIR).

As stated in the EIR, the increased use of Stage 3 aircraft at SFIA will result in lower cumulative noise levels. These lower noise levels are depicted in the CNEL contours shown on pp. 161, 340, and 345 of the EIR. The noise produced by large Stage 3 aircraft was taken into account in development of the contours.

The B-747-200 used as an example in Tables C-4 through C-9 of the EIR (pp. A.54-A.57 in Appendix C) is a Stage 2 aircraft, not a Stage 3 aircraft as stated by the commenters.

To clarify the comparison of the maximum single-event noise produced by selected aircraft, the first sentence of the fifth paragraph on p. 164 of the EIR is revised as follows (revisions underlined):

> Maximum single-event noise levels for <u>four</u> typical aircraft departing from SFIA were estimated for the 27 remote monitoring stations and the 20 study locations.

The second paragraph on p. 165 of the EIR is revised as follows (revisions underlined, deletions are indicated by brackets):

> Of the <u>four</u> aircraft studied, the Boeing 727 (B-727) produced the highest departure noise levels; the Boeing <u>747-200, a Stage 2 aircraft, and Boeing</u> 737-300 and 767 [ ], <u>both</u> Stage 3 aircraft, produced lower noise levels (up to 23 dBA lower). Aircraft such as the B-727 are gradually being replaced by aircraft such as the <u>B-737-300</u> and B-767. The increased use of quieter aircraft at SFIA will <u>generally</u> result in lower single-event (and cumulative) noise levels in communities near the Airport.

<u>Relationship to CNEL Contours and Land Use</u>

<u>Comment</u>

"On page 2 the report states that airlines will be required to use higher capacity aircraft. In a separate information release, the airport recently announced that future aircraft would be quieter to allow development (the suggestion was for new housing) of previously unusable land around the airport. This is an important point, as that part of the peninsula is already at or above capacity in residents and services." (Patricia Clark)

Response

SFIA's Director of Community Affairs has no knowledge of the information release mentioned by the commenter./14/ The potential for development of new housing in areas previously within the CNEL 65 contour would depend on the availability and current use of the land, the General Plan designation and zoning established by the community, and other factors. It is not possible to determine whether the forecast decrease in the size of the CNEL 65 contour from 1990 to 2006 would allow the development of additional housing in the SFIA environs.

AIRCRAFT NOISE CONTOURS AND CNEL IMPACTS

Aircraft Noise Contour Maps

Comments

"Re: Noise - Page XI-A-50-53 Noise diagrams shown are so different from Noise Contour lines adopted for Millbrae area which are so bluntly rounded. Which is correct?" (Jessie Bracker, letter of 8/27/91 and public hearing of 8/27/91)

"P. XI-A-50 to A-53 - Noise - If those diagrams are correct of Typical noise cone ends, how can Contour Line Maps of noise in Millbrae be correct?" (Jessie Bracker)

"Figure 20 (Page 161, Volume I) titled '1990 Aircraft Noise Contours' should conform with the Fourth Quarter 1990 Noise Report prepared by San Mateo County. Revising the 1990 map will maintain consistency with previously published Airport Noise Contour maps." (Arthur Wong, City of South San Francisco)

"Environmental Impacts: A great amount of environmental data has been included as extraneous 'filler' in this DEIR. Results generated by computer models or simulations can always be challenged as to the assumptions made and the algorithms used. Actual data gathered from fixed monitors, whether continuous or not, can always be challenged as 'not being representative.' I challenge the overall logic of both the aircraft noise and air quality impact data." (Alyn Lam)

Response

As discussed on p. A.48, Appendix C of the EIR, the contours shown on pp. A.50-A.53 represent the sound exposure levels (SEL) produced by four representative aircraft. Each set of SEL contours represents the single-event noise created by one aircraft; the CNEL contours shown on pp. 161, 340, and 345 of the EIR represent the average cumulative noise levels produced by all of the aircraft serving SFIA. The shape of the SEL contours is related to the fact that they represent the noise produced by one aircraft landing on and departing from one runway, and exhibiting one set of performance characteristics. The long narrow spike in the contour represents the landing noise; the rounder part of the contour represents takeoff noise. The generic nature of the SEL contours is explained on p. A.48, Appendix C of the EIR. To clarify that discussion of the SEL contours, the following sentences are added to the end of the first paragraph on p. A.48 of the EIR:

> Each SEL contour represents the noise produced by one aircraft landing on and taking off from one runway. The long, narrow end of the contour represents the noise produced during landing; the rounder end of the contour represents the noise produced during takeoff.

There are two ways to estimate the cumulative noise from aircraft operations in the vicinity of SFIA: the use of computer models, and direct measurement at the 27 remote monitoring stations. Computer models are used to estimate the historic, existing, and future noise environment (under forecast and alternative scenarios); the direct noise measurements are used to validate the computer estimates, and to provide primary input to the quarterly update of the noise impact boundary reported to the California Department of Transportation. (Direct noise measurements can be used to provide information on only historic and existing noise levels; computer modelling must be used to estimate future noise levels and to compare existing and future noise levels.)

As stated on p. 160 of the EIR, the CNEL contours developed for 1990 (and 1996 and 2006 under the SFIA Master Plan and alternatives) were calculated by the Integrated Noise Model (INM). The INM is used for almost all studies of civil airport noise in the United States. The results of the INM were compared with the measured CNEL values at SFIA's 27 remote monitoring stations, to determine the accuracy of the model. The results of the comparison are discussed on p. 163 of the EIR.

As also stated on p. 163, the calculated CNEL values at the remote monitoring stations, and the corresponding CNEL contours, may differ from the comparable calculated data presented to the State on a quarterly basis (including the Fourth Quarter Noise Report prepared by SFIA), because of adjustments made by the computer model used to prepare CNEL contours for submission to the State. These contours are required to be constructed from the actual measurement data to determine the Airport impact area, which is bounded by the CNEL 65 contour. Because of this difference in approach, modifying the CNEL contours in the EIR to match the contours presented to the State (as requested by the commenter) may result in greater inaccuracy in the EIR contours in locations far from the monitoring stations.

CNEL Impacts - Population and Dwelling Units

Comment

"It would also be helpful if the noise impact information is reported both in terms of population and dwelling units within various noise contours." (Chris Brittle, Metropolitan Transportation Commission)

Response

Table 52, Estimated Resident Population Exposed to Aircraft Noise CNEL 65 and Above, 1990, 1996, and 2006, on p. 341 of the EIR is replaced by the following table, which includes the estimated number of dwelling units within each of the CNEL contours.

CNEL Impacts - Sensitive Receptors

Comments

"P. XI-A-58 - Table C-10 Regarding Noise Sensitive in 65 to 70 CNEL contour, you left out - Homes areas in Millbrae, City Hall, Library, Millbrae Nursery School and 2 Convalescent Hospitals." (Jessie Bracker)

TABLE 52: ESTIMATED RESIDENT POPULATION/HOUSEHOLDS EXPOSED TO AIRCRAFT NOISE CNEL 65 AND ABOVE, 1990, 1996, AND 2006/a/

Noise Exposure Range (CNEL)/d/	Resident Population/Households Exposed/b,c/					
	Estimated1990		Forecast/e/			
	Population	Households	1996 Pop.	Households	2006 Pop.	Households
CNEL 75+	340	133	0	0	0	0
CNEL 70-75	1,980	777	1,500	618	760	321
CNEL 65-70	12,660	4,939	5,500	2,129	5,840	2,242
Total CNEL 65+	14,980	5,849	7,000	2,747	6,600	2,563

NOTE: Numbers shown reflect only the homes within the CNEL 65 contour. Some homes included in totals may no longer be "impacted" because they have been sound insulated.

/a/ Estimated on the basis of the CNEL contours shown in Figures 20, 32, and 33, pp. 161, 340, and 345.
/b/ Estimated on the basis of 1980 U.S. Census block data, and ABAG population growth factors by census tract. Some of the population growth would occur in new dwelling units with sound insulation installed according to local regulations.
/c/ Estimated on the basis of ABAG Persons Per Household (PPH) statistic for 1990, and projections for 1995 and 2005.
/d/ CNEL= community noise equivalent level.
/e/ Assuming implementation of the SFIA Master Plan.

SOURCE: Environmental Science Associates, Inc.

"...I have a child in Lincoln school, and in February, during one of these episodes of bad weather, the children had to hold their ears during class while they were in the classroom because of the noise. And the school secretary told us that a number of children had to go home because of stomach aches and because of headaches directly related to the noise. And I don't know if our schools are covered in the Environmental Impact Report. But I would certainly encourage interested parties to take a close look at our schools and what it's doing to our children while they're sitting in the classroom and trying to learn. The teachers cannot be heard over the noise of those planes taking off down the Peninsula." (Jack Hickethier)

TABLE C-10: SENSITIVE RECEPTORS WITHIN 65 to 70 and 70 to 75 dBA, CNEL NOISE CONTOURS/a/

1990 Existing Base

70-75 dBA Contour

Millbrae Nursery School
Millbrae Serra Convalescent Hospital
Sheltering Pines Convalescent Hospital

65-70 dBA Contour

Chadbourne School
Fire Station
Belle Air School
Avalon School
Taylor School*
Green Hills School*
South San Francisco High School*
Los Cerritos School*
El Rancho School*
Alta Loma School*
Lincoln School*
Millbrae City Hall
Millbrae City Library

1996 Project and No-Project Alternative

65-70 dBA Contour

Chadbourne School
Mills High School*
Peninsula Hospital*
Fire Station*
Belle Air School*
Avalon School*
South San Francisco High School*
Los Cerritos School*
Millbrae Nursery School
Millbrae Serra Convalescent Hospital
Sheltering Pines Convalescent Hospital
Millbrae City Hall
Millbrae City Library

TABLE C-10: SENSITIVE RECEPTORS WITHIN 65 to 70 and 70 to 75 dBA, CNEL NOISE CONTOURS/a/ (CONTINUED)

2006 No Project Alternative

<u>65-70 dBA Contour</u>

Avalon School*
South San Francisco High School*
Los Cerritos School*
Sheltering Pines Convalescent Hospital*

2006 Project

<u>65-70 dBA Contour</u>

South San Francisco High School
Los Cerritos School
Southwood School
Avalon School*
Sheltering Pines Convalescent Hosptial*
Millbrae Serra Convalescent Hospital*

NOTES:

/a/ Other than residences.

*On border of contour.

SOURCE: Enviornmental Science Associates, Inc.

<u>Response</u>

Table C-10, Sensitive Receptors Within 65 to 70 dBA, CNEL Noise Contours, on p. A.58, Appendix C of the EIR is replaced by the above table, which includes the schools, hospitals, and public facilities noted by the commenters (additions to the table are shown in boldface type). The residential areas mentioned in the first comment are already reflected in the estimates of residential population exposed to aircraft noise of CNEL 65 and above (Table 52, p. 341 of the EIR).

The effects of overflights on human activities are discussed in Appendix C of the EIR and on p. C&R.249 herein.

CNEL Impacts - Specific Locations

Comments

"Page 253 says Brisbane is in the 65 CNEL contour and the following page says it is not.

"Bottom of p. 343 there is no discussion of impact on Brisbane's monitoring station (#7) or San Francisco's station near Candlestick (#23). The DEIR states that CNEL will decrease in all 'selected study locations' due to quieter planes; however, in light of what we suspect will be greater use of radar vectors to handle additional traffic under the plan, we think some analysis of these locations as well as Brisbane's 'bowl effect' geography is warranted." (Stephen Waldo, Mayor of Brisbane)

"It should be noted that the CNEL noise exposure levels are expected to be reduced at all the monitor locations by the year 2006 with the exception of Monitor 4 in South San Francisco and Monitor 12 in Foster City. Since Stage 3 aircraft are not quieter on landing, there will be increases in the CNEL in Foster City in 1996 and 2006. This is the only location where this will occur." (Roger Chinn, Airport/Community Roundtable)

"On page 343 where the results of Table 53 are summarized, it should be noted that the Foster City remote monitoring station is one of two stations where noise is projected to increase. . ." (Leslie Carmichael, City of Foster City)

Response

The last sentence of the third paragraph on p. 253 of the EIR is revised to remove Brisbane from the list of cities within the 65 dBA, CNEL contour (deletion is indicated by brackets):

> The cities closest to the Airport, and those within the 65 dBA, CNEL contour ([ ] South San Francisco, San Bruno, Millbrae and Burlingame), would be most affected by airport-related safety and noise regulations.

The following sentence is added at the end of the first bulleted item on p. 343 of the EIR:

> (At station 4 in South San Francisco, noise levels are forecast to increase 0.1 dBA, CNEL from 1990 to 2006. Such an increase would not be perceptible.)

The following is inserted before the second bulleted item on p. 343 of the EIR:

> At station 7 in Brisbane, located near the "Shoreline Departure" flight path for Runway 28R, noise levels are forecast to decrease 3.3 dBA, CNEL from 1990 to 1996, and 5.9 dBA, CNEL from 1990 to 2006. Such decreases would be perceptible to most people.

The following is inserted after the second bulleted item on p. 343 of the EIR:

> At station 12 in Foster City, located near the arrival paths for Runways 28, noise levels are forecast to increase 0.6 dBA, CNEL from 1990 to 1996, and 0.9 dBA, CNEL from 1990 to 2006. Such increases would not be perceptible to most people. Noise levels would not decrease in Foster City because the reduction in the noise produced by Stage 3 aircraft as compared to Stage 2 aircraft is much less for landing than for takeoff.

The following replaces the third bulleted item on p. 343 of the EIR (revisions are underlined):

> At stations 20-21 and 23-26, located in Daly City and San Francisco, noise levels are forecast to decrease (on average) 3.0 dBA, CNEL from 1990 to 1996 and 4.9 dBA, CNEL from 1990 to 2006. Such decreases would be perceptible to most people.

Discussions of the existing and potential use of radar vectors to handle SFIA aircraft departures are on pp. C&R.199-200 and 206 herein. On the basis of the information on those pages, it is not appropriate or necessary to reanalyze the impacts at the noise monitors in Brisbane due to vectoring.

Table C-3 on p. A.47, Appendix C of the EIR shows the measured CNEL at the monitoring station in Brisbane (Station 7) to be 2.0 dBA higher than the calculated CNEL. This difference could be due to a number of factors, including the topography of the area. Partly because the computer model used to develop the CNEL contours in the EIR does not account for topographical differences, the model results were compared with the noise measurement data to determine whether the model needed to be adjusted. It was determined that the difference at the Brisbane monitoring station was not great enough to warrant an adjustment to the computer model.

CNEL Impacts - Project v. No-Project

Comments

"There are mixed messages in the section on Noise (IV.-C). This section continually determines that the Project will result in a decrease in noise (both CNEL and single-event noise). This conclusion is reached primarily because future operations would use more Stage 3 aircraft.

"But, how can the project be credited with decreasing noise levels. The document states that 'Noise levels would also decrease in the future without the proposed project because of the phasing out of the noisier, Stage 2 aircraft using SFIA' (DEIR, p. 346).

"What is really needed in this EIR is an analysis of the increased aircraft flights caused by the project. The EIR states (on pp. 346-347) that 'The effect of the SFIA Master Plan on aircraft noise exposure cannot be determined without comparing forecast aircraft noise levels in 1996 and 2006 with and without implementation of the SFIA Master Plan. (The No-Project Alternative is evaluated in Chapter IX, Alternatives, beginning on p. 439)'.

"What happens when one reads the alternatives is that we learn very little (page 452).

> " 'The increased aircraft operations (in 1996) under the project would require additional aircraft'.
>
> " 'In 2006 there would be fewer aircraft noise impacts (with the No-Project Alternative - Variant 1) than with the project.'

"Under No-Project Alternative, Variant 2 (near no-growth) we learn even more about the project in comparison to alternatives (page 457).

> " 'Even with the project, aircraft noise impacts would decrease due to quieter aircraft that will be used in the future. With Variant 1, noise impacts would further decrease from project impacts, and with Variant 2, noise impacts would decrease even more.'

"This information clearly indicates that the project really will increase noise levels and noise impacts. It is only the change to quieter aircraft (not a part of the project) that will help to stabilize or decrease future noise levels.

"The residents of Pacifica have anxiously awaited the quieter aircraft and are not pleased that the SFIA Master Plan will increase the number of flyovers and partially or fully nullify the benefits of the quieter planes.

"It is unfortunate that the noise analysis did not more clearly point out the fact that the project will increase future noise levels -- not decrease them. If the analysis had acknowledged more clearly that the project will be increasing future noise levels (not compared to 1991, but when compared to the No-Project scenarios) maybe more mitigations could have been identified that would have helped address the concerns of residents of Pacifica. . . " (Fred Howard, Pacifica Noise Abatement Committee)

Response

The EIR does not state that the proposed SFIA Master Plan would result in a decrease in noise. Rather, as the EIR acknowledges, "Noise levels would also decrease in the future without the proposed project because of the phasing out of the noisier, Stage 2 aircraft using SFIA." (EIR, p. 346)

The EIR acknowledges that average daily aircraft operations are expected to increase with or without the project. Page 344 notes a possible increase in average daily operations of 196 by 1996 and 298 by 2006 with the project. As noted on p. 347 of the EIR, ". . . implementation of the SFIA Master Plan would . . . allow SFIA to serve an increased number of passengers and aircraft operations." The increase in operations allowed by the implementation of the SFIA Master Plan (over the No-Project Alternative, Variant 1) is shown in Tables 68 and 69, pp. 441-446 of the EIR.

The comparison of aircraft noise levels with and without the project is analyzed in Appendix C of the EIR, discussed in the Alternatives section of the EIR (pp. 452, 457), and summarized on p. 347 of the EIR: ". . . the increase in operations allowed by the proposed project would have virtually no effect on cumulative noise levels because the additional operations would all be performed by quieter, Stage 3 aircraft." The EIR acknowledges (on p. 344) that in areas with overflights by aircraft serving SFIA, the number of times single-event noise occurs would increase, but that there would be a decrease in the number of overflights by noisier, low-bypass engine aircraft.

Tables 10 and 11 in the "Addendum to Noise Analysis" report in Appendix C show calculated CNEL values under the SFIA Master Plan "constrained" and "unconstrained" scenarios. (The constrained scenario corresponds to the No-Project, Variant 1 alternative analyzed on pp. 440-456 of the EIR; the unconstrained scenario corresponds to the proposed SFIA Master Plan.) Under the constrained scenario, there would be 881 average daily aircraft operations in 2006, compared to 1,131 under the unconstrained scenario, and 833 in 1990.

By comparison of the results in Tables 10 and 11, the increases in CNEL values with the SFIA Master Plan over the CNEL values without the SFIA Master Plan can be determined. The increases at the SFIA remote monitoring stations range from 0.6 to 1.2 dBA, with an average increase of 0.9 dBA. The increases are similar at the selected study locations. An increase of 0.9 dBA is considered imperceptible; thus, the conclusion on p. 347 of the EIR (that the increase in operations allowed by the project would not affect cumulative noise levels) is correct.

The issues of increases in single-event noise with the project and aircraft overflights in Pacifica are discussed on pp. C&R.234-248 herein.

SINGLE-EVENT NOISE

Setting

Comments

". . .Some years ago, I think it must have been three or four years ago, I attended these meetings when Mr. Turpen first unleashed his planes over our neighborhoods, over the Excelsior District and Bernal Heights. We complained and complained. For a whole year after that, I kept calling the noise abatement number that he lists in the white pages of the telephone book. I got only answers, well, we wrote down your complaints. That's all we got.

"Even now, every day, I am woken up every single night. I would like to know Mr. Turpen's telephone number so I can call him and wake him once a night. That is all I ask. So that I can ring his home phone, I don't wish to speak to him, just wake him once every night." (Bhimje)

"It seems like I am talking, singing an old, old song, because I have been trying to work within the system for over 25 years. We do still get a lot of noise after midnight. And even though it seems like noise has been shifted, it's the numbers because now the operations have increased so considerably." (Rose Urbach)

"I am mostly concerned with noise pollution. If this plan ever goes into effect, I am going to have to wear earmuffs. . . .The noise I am speaking about comes in at all hours of the day, night, and early a.m. It's continuous. One has to live under this umbrella of noise to really understand it. It's such a deafening noise that one cannot carry on a conversation in the living room without being interrupted by overflights.

"This started several years ago. Because I can understand the people in the Peninsula, they were having their problems, and, in the meantime, they shifted the noise up to the southern part of San Francisco. Prior to that, we only had very little overflights and the noise was bearable. But today, it isn't." (Bruno Bernasconi)

"Since 1987, our neighborhood has experienced a significant increase in commercial jet aircraft overflights from planes departing and arriving [at] the Airport. Our greatest concern is with the single-event noise generated by departing aircraft, which has contributed to an environmental deterioration in our neighborhood. This is particularly a problem early in the morning from 6:30 a.m. on." (Bruce Krell, Forest Hill Association)

" . . . The dramatic increase in the number of flights since 1980, the increased number of flights over Pacifica to southern California and the Far East, our finding that aircraft take shortcuts (over Pacifica) to southern California destinations, and the canyon topography of Pacifica (which holds and resonates noise from planes) are all factors that have changed the nature of aircraft noise over Pacifica since 1980. These concerns need to be analyzed in the EIR and appropriate mitigations need to be recommended. . . . " (Fred Howard, Pacifica Noise Abatement Committee)

<u>Response</u>

The comments relate primarily to the commenters' perceptions of existing noise problems near SFIA. Pages 153-170 of the EIR contain a discussion of the noise environment near SFIA in 1990; pp. 164-165 specifically address single-event noise in the vicinity of SFIA. The data and information used as the basis for the discussion of the noise setting in the EIR were collected from SFIA records and noise measurement data.

The role of the EIR is to assess the future environmental impacts of a project. As discussed in the Noise Impacts section of the EIR (pp. 331-352), future cumulative noise levels with or without implementation of the SFIA Master Plan would not be substantially different from existing levels. With or without the project, there would be an increase in the number of flights (and the frequency of single events), but the levels of single-event noise would decrease in most locations. Noise levels experienced today would be maintained or would decrease in the future because the additional flights would be performed by Stage 3 aircraft.

Adequacy of CNEL as Descriptor of "Noise Problem"

Comments

". . . [T]here are significant omissions [in the DEIR]. I congratulate Barbara Sahm on recognizing the major one, and that is that the noise analysis that is provided in the existing Draft EIR is inadequate. It is absolutely inadequate. It is based on a metric called the CNEL, which is an average measure. The issue in the area, in the Bay Area, if you talk to people on the Peninsula, here, everywhere, the issue related to aircraft noise is the single aircraft flying over that is incredibly loud. If you only look at the average measure, that doesn't show up.

"To put it in very graphic terms, this plan anticipates an increase of about 100,000 flights per year, from around 300,000 to 400,000. What the current document says in terms of noise analysis is -- and this is paraphrasing in a nutshell -- the newer aircraft are slightly quieter than the older aircraft, therefore the over-flights will be slightly quieter. Great. But we have 100,000 more. So, if you go from 90 decibels to 85, it may not show up in the CNEL. It doesn't show up in the metric at all, in the measurement. But you have added 100,000." (Curt Holzinger)

". . .I agree with the 'Airport Noise Committee's' objections to the Draft:

"1. The 'CNEL' is an inadequate standard for measuring noise impact." (David Deakin)

"We do not believe that the DEIR adequately analyzes noise impacts which will result from the increased number of flights. The DEIR fails to acknowledge that single-event noise levels are not recognized in the CNEL contours and that perceived noise levels will increase. . ." (Wendy Cosin, City of Pacifica)

"The CNEL method of noise measurement is not sensitive to the frequency of single-event noise and does not accurately represent increases in operations. This method however, has a one-for-one relationship to a change in decibel reading of each noise event. . ." (Maria Gracia Tan-Banico, City of Daly City)

"For unstated reasons, the DEIR limits consideration of the noise issue to the 65 CNEL contour. This contour is simply one measure of the noise problem with limited uses and applications. Other measurements of the noise generated by overflying jet aircraft, such as single event measurements (SNEL) are we submit, more meaningful criteria of the environmental issue. The 65 CNEL contour is arbitrarily set as the definition of the noise problem and the reviewed mitigation measures are discussed only in relation to the 65 CNEL contour. . .

"The CNEL is a measurement of the average noise level in an area. It forms the basis of the noise analysis in the DEIR. However, this method of noise measurement has several well documented flaws, and certain noise impacts are excluded, or understated by the CNEL measure. For example:

It does not describe single events, which cause sleep disturbance,
It is not a good measure of either low or high frequency sound,
It does not account for background noise variations,
It does not look at seasonal variations,
It does not address the frequency of aircraft overflights.

"Due to these flaws, it is possible to greatly increase both the number of overflights and the total amount of noise energy in an area, without any change being reflected in the CNEL number. This may happen, for example, if additional overflights are each slightly quieter than the existing average overflight. Obviously, the addition of hundreds of overflights constitutes a significant impact (even if each individual flight is slightly quieter); yet the CNEL measure would show no impact.

"The Committee finds that the CNEL measure is deficient and can not disclose all significant impacts. The noise analysis should be expanded and supplemented with additional noise descriptors." (Timothy Treacy, Airport Noise Committee)

"We view attempts of the DEIR to address the noise issue (DEIR, pages 331, et seq.) as completely inadequate. The DEIR recognizes that implementation of the Master Plan will result in additional aircraft operations. But the DEIR then attempts to limit consideration of this increase to a discussion of its impact on the Airport's CNEL contour without reference to any impacts elsewhere. This is an unreasonable limitation for which there is no legal basis, or any other justification, to so limit the scope of the DEIR. . .

"CNEL forms the basis of the DEIR noise analysis. In this regard, the DEIR omits any consideration of single noise events (SNEL). The noise problem with overflights across San Francisco neighborhoods is created by individual aircraft and not some statistical average, which is what CNEL is. . ." (Bruce Krell, Forest Hill Association)

"CNEL forms the basis of the DEIR noise analysis. In this regard, the DEIR omits any consideration of single noise events (SNEL). The noise problem with overflights across San Francisco neighborhoods is created by individual aircraft and not some statistical average, which is what CNEL is. . ." (Carol Kocivar, West of Twin Peaks Central Council)

". . . I think the only way we are going to stop this is that enough angry people in Bernal Heights, enough angry people in Excelsior District, and we will start, if this plan goes through, civil disobedience of the type that is there in Atlantic City, the Pro Lifers. We will make sure that the airport becomes nonfunctional. We will be peaceful, but we will make sure that if you don't stop this right now and have a proper analysis in terms which the public can understand -- all this mumbo-jumbo of decibels. Let's find out. Let's compare noises.

"He has promised all sorts of noise studies: I will read the EIR. I will give you a detailed set of measures that will enable the EIR to be understandable to the people. I will do that for you. I don't have zillions of hours of time to analyze on your behalf or on the behalf of the airport so the airport can spend another million dollars hiring another expert to just do some more mumbo-jumbo. This is all mumbo-jumbo.

"I expect a lot of angry people in Bernal Heights and Excelsior District already, let alone with the expansion." (Bhimje)

Response

The CNEL method of noise measurement calculates average noise levels over a 24 hour period, with weighting applied to equivalent sound levels measured during the nighttime hours of 10:00 p.m. to 7:00 a.m. Because it measures the noise that occurs over a 24-hour period, CNEL takes into account the frequency of single-event noise occurrences during that period, together with the sound resulting from each single aircraft flyover. However, because it calculates average noise levels, it does not explicitly identify noise levels from single aircraft flyovers (sound exposure levels, or SEL), although it incorporates them in the calculation.

The computer model used for the noise analyses in the EIR calculates the noise at a fixed location on the ground from each aircraft flight. When used to calculate the noise level from a single flight (in this case, defined as SEL) at the location, the model computes the contribution to the noise level of each "segment" of the flight as it travels along a specified path. When used to calculate the cumulative noise level (CNEL), the model adds the SELs, or single-event levels, calculated for each flight during a 24-hour day, and weights evening and nighttime flights. It then divides the total daily sound exposure by the number of seconds in a day, and converts the result to get CNEL. By definition, then, CNEL reflects the total noise energy produced by all flights.

The "conversion" of the sum of single-event noise levels to CNEL mentioned above is required because CNEL is calculated using a logarithmic scale (a logarithmic scale is used to describe sound levels because sound pressures extend over a very large range). Because CNEL is calculated logarithmically, each flight is not counted equally when all of the flights are added. Two general rules of thumb to use when thinking about "adding" noise levels are 1) adding two equal noise levels produces a total noise level 3dB higher than one of the noise levels, and 2) adding two noise levels that are substantially different produces a total noise level the same as (or slightly higher than) the higher of the two levels.

Because CNEL is calculated logarithmically, it is "dominated" by the noise produced by Stage 2 aircraft. If Stage 2 aircraft are serving an airport, it generally takes a relatively large number of additional flights by Stage 3 aircraft to increase the cumulative noise levels near that airport. Page 347 of the EIR describes how the CNEL contours for SFIA operations are affected by the forecast increases in Stage 3 aircraft operations, and the expected phase-out of Stage 2 aircraft.

The general concern of the commenters seems to be that, because the noise from each aircraft flight is heard separately, CNEL "hides" these "single-event" noise levels by adding them logarithmically, and the CNEL 65 contour is not an appropriate indicator of noise impacts. As explained in the EIR (p. 164), single-event noise caused by aircraft overflights can be disturbing to persons even at considerable distances outside the

CNEL 65 contour. However, the extent to which any individual single event affects persons depends on a variety of factors, including the sensitivity of the listener, the level of background noise during the single event, the duration of the event, the time of day and the attitude toward the source of the noise. There is no consensus among experts on the appropriate descriptor to be used to quantify single-event noise and the method to evaluate its impacts, and there is no standard that is generally applied to single-event noise.

The Day-night Sound Level (Ldn) and its variations (e.g., CNEL) have generally been adopted in federal and state regulations and guidelines as the most effective descriptor in evaluating environmental noise with respect to people. (See Appendix C of the EIR, Description of Noise and its Effects on People.) As explained on p. 153 of the EIR, CNEL is the only standard that has been adopted by the State of California in its regulation of airport noise. As a result, SFIA is not required to evaluate noise exposure in relation to single events.

It is also important to note that the State of California has been specifically prohibited from regulating single-event noise exposure levels. In the case of Air Transport Association of America v. Crotti, (N.D. Cal 1975) 389 F Supp. 58, the Federal District Court (Northern District, California) held that the state's effort to regulate single-event noise was an unlawful exercise of the police power into the exclusive federal domain of control over aircraft flights and operation and air space management and utilization.

Recent case law supports the use of 65 cnel data in evaluating airport-related noise impacts. In a recent case from the United States Court of Appeals involving the Seattle-Tacoma International Airport, No. 90-70253 Seattle Community Council Federation v. Federal Aviation Administration, 92 D.A.R. 4813 (9th Cir., April 9, 1992), the Court supported the decision of the FAA to use the 65 Ldn (comparable to CNEL) contour, rather than single-event noise data, as the threshold of significance for determining whether to prepare an Environmental Impact Statement for an FAA decision to alter aircraft flight paths. In a similar case from the United States Court of Appeals involving the Louisville, Kentucky airport, No. 91-3222 Communities, Inc. v. Busey v. Skinner, 1992 U.S. App. LEXIS 1746 (5th Cir. Feb. 13, 1992), the Court affirmed the FAA's decision to use the 65Ldn, rather than single-event noise data, to determine its statutory obligations under the National Environmental Policy Act, the National Historic Preservation Act or the Airport and Airway Improvement Act with reference to single-event information. (1992 WL 23222 at p. 4.)

SFIA staff note that, notwithstanding the above factors, the Airport's efforts to reduce aircraft noise have had and will continue to have the effect of reducing the level of single-event noise occurring both inside and outside the 65 CNEL contour. The Airport Noise Regulations have had the effect of excluding the proposed operation of a retrofitted Boeing 707 aircraft. This has resulted in the FAA's withholding of approximately $70,000,000 of Airport Improvement Funds from San Francisco. Since 1981, the Airport Community Roundtable has repeatedly placed the single-event issue, in one form or another, on its agenda throughout over 100 Roundtable meetings. Finally, the Airport has recently acquired a passive radar detection system which tracks flights to and from the Airport, and allows a better understanding of single-event noise. Additional information on the Airport's programs and regulations to reduce aircraft noise is contained in the EIR, pp. 167-169.

There is a detailed discussion of single-event noise in Appendix C of the EIR. This discussion provides information on the noise levels of individual aircraft flying over various sites in the central Bay Area. The information is summarized on pp. 164-165 of the EIR, but perhaps not clearly referenced in that text. The first sentence in the last paragraph on EIR p. 164 is expanded as follows (revisions are underlined):

> Maximum single-event noise levels for five typical aircraft departing from SFIA were estimated for the 27 remote monitoring stations and the 20 study locations <u>(these estimates are shown in Appendix C, in Tables C-8 and C-9)</u>.

<u>Duration of Flight</u>

<u>Comment</u>

". . . [O]n the decibel levels that you have on some of the charts, I see a lot of decibel levels and a lot of figures that really don't mean a lot to me. Living in area impacted by the noise, one of the concerns that we have is not just how loud it is, but how long it takes to disappear.

"Airplanes -- a 727 taking off may take 30 seconds. A 747 taking off maybe takes three minutes for its sound to disappear. So I'd like to see some kind of a chart that is understandable to me that would display a time versus decibel level." (Edwin Works)

Response

Appendix C to the EIR contains a lengthy description of Noise and its Effects on People. Figure 4 of the description shows the time history of a typical single-event sound. A 727 or 747 taking off represents a single event. Figure 5 of the description shows an example of the time history versus decibel level of the ambient noise in a suburban neighborhood as well as for discrete events such as aircraft overflights.

The duration of a single aircraft noise event at a particular location is related to the speed of the aircraft and the noise produced by the aircraft at that location (which is related to the noise produced by the aircraft and the aircraft's distance from the location). A listener's sensitivity to the noise and some of the other factors listed in the previous response also influence the listener's perception of the duration of the event. Thus, there is no one "duration curve" for each type of aircraft serving the Airport and all locations. Relatively speaking, though, heavier aircraft such as the B-747 that take longer to gain alititude would produce events of longer duration than lighter aircraft such as the B-727.

As stated in the previous response, the calculation of the single-event noise levels produced by aircraft serving SFIA (and shown in Tables C-4 through C-9 in EIR Appendix C) incorporated each segment of the aircraft flight as it traveled past a specified location. Thus, the duration of the flight is accounted for in the single-event noise information presented in the EIR.

Description of Future Flight Activity

Comments

"Frequency has to be addressed in the new analysis, and I'm assuming there will be some new noise analysis. There should be a very thorough investigation of where these flights are, what the noise levels produced will be." (Curt Holzinger)

"By using percentages of operations, especially for noise sensitive hours, the report avoids stating the sharp increases in the actual numbers of operations. Many statistics and totals are based on 1989, or older, data, which unfairly diminishes the true impact that airport expansion will have on the environment. . .

"Appendix pages A.50-A.53:

"Figures C-1 to C-4, single event sound exposure contours, are of no value without being overlaid on scale maps of the airport and environs. Even after doing so, supporting text must be added to make sense of the information in the diagrams." (Duane Spence, Airport Mitigation Coalition)

"The City of San Bruno should be provided an easily understandable list of single-event activities and distribution of type of aircraft and times of day each occur over the City projected for 1996 and 2006." (George Foscardo, City of San Bruno)

"In particular, we are requesting that existing and future single-event noise activity be described based on the distribution of aircraft by time of day and runway use. The City of Pacifica's primary concern is the single-event noise characteristics generated by Runway 28 departures. Additional information regarding runway assignments by aircraft type is needed to further analyze the single-event noise level issue. Detailed information on aircraft type is particularly important since the large Stage 3 aircraft can be noisier than the Stage 2 aircraft. Therefore, utilization of Stage 3 aircraft is not necessarily an effective mitigation, especially for single-event noise problems. This request is consistent with the City of Pacifica's response to the Notice of Preparation, at which time we requested that the EIR include a definitive forecast of aircraft operations by aircraft type, time of operation, number of aircraft, and departure routes." (Wendy Cosin, City of Pacifica)

"The analysis in the report documents that overflight noise is audible in Burlingame on a regular basis. The analysis noted that while the fleet mix was going to change to include quieter airplanes, the total number of flights was going to increase.

"Therefore, the absolute number of overflights is going to be greater. What the report did not document was the absolute number of overflights by zone/area and time of day. They did note that the peak usage periods at the airport will be elongated because there will be more flights into and out of the facility. No comparative numbers for present with future were provided.

"The report also did not document the change in size of airplanes. The quieter planes are quieter because each engine produces less noise. However a Stage 3 plane with five engines may make as much noise as the present noisiest Stage 2 airplane. Therefore, in looking at single event noise we need to know the mix of planes by size flying overhead as well as the number.

"The analysis needs to be expanded to address the distribution of overflight activity documenting the size of plane and frequency by time of day comparing the present with the future, 1996 and 2006. Elongation of peak periods should also be addressed. . ." (Dennis Argyres, City of Burlingame).

"The importance of aircraft weight is acknowledged in footnotes for Tables C8 and 9. However, to demonstrate the magnitude of the single event noise level reductions, I think the EIR should include a table showing the weights, noise levels, and typical numbers of departures and arrivals in 1990 and, say, 2006, from aircraft most likely near specific monitor locations: Heavy 747, 747 sp, A330-340, and MD11 are most likely in the "Gap" for example (see Table 18 and Figure 19, or Table C-2). The single event contours (C-1 to C-4) simply don't provide the information needed by residents in San Bruno or Foster City, as examples, to understand how their environment is expected to change. . .

"On page 6 of the EIR it is acknowledged that the increased number of flights will be noticeable. I think the possible effects on people of this 'noticeable' increase should be discussed in greater detail in Appendix C. This discussion might account for times when the increases are most likely or most frequent. For example, a sharp rise in nighttime or early morning cargo flights might be expected as a result of recent federal legislation. What types are the cargo aircraft and what is the most frequent expected departure route; what city or which residential areas are likely to be affected; and what are the anticipated effects on sleep, speech interference, and/or annoyance? Alternative approaches might be to consider the most common aircraft in 2006 - MD80 or 90 - or the worst case - heavy aircraft departing on 28 right." (Jerome Lukas)

". . .To accurately represent the noise impact on Daly City residents, the DEIR must contain data on frequency of noise events. The DEIR should include a simulation of the noise events on an average day for areas within Daly City affected by single-event noise. This information should be broken down into time of day so that one could see when the increased number of flights will occur. This data is available since the simulation was necessary to prepare the CNEL noise contour map for the SFO Master Plan. . ." (Maria Gracia Tan-Banico, City of Daly City)

". . .The decision not to respond over a two-year period to the reasonable requests for information, for a reasonable and adequate Draft EIR, the decision not to respond to that information was made by the Department of City Planning staff. We have contacted them several times. I have provided that letter [of September 15, 1989], and you will see that our comments and requests for information and data have not substantially changed over a two-year period, and the information is still not provided.

"The major areas that are still lacking are disclosure of noise impacts over the City and County of San Francisco, including single event information, numbers of aircraft expected to fly over the City and County of San Francisco, the noise levels expected, and the locations of those aircraft." (Curt Holzinger, Airport Noise Committee)

". . .The DEIR should add to the CNEL and SEL analysis currently presented. Neither of these analyses is sufficient for a fair assessment of the noise problem. The DEIR should disclose the number and location of additional flights expected over San Francisco, the expected flight paths, the time of day and the expected noise levels. A comparison between ambient noise levels and aircraft noise levels should also be provided." (Curt Holzinger)

"It is clear from the DEIR that we may expect increased overhead flights with attendant increased noise if the Master Plan proposed by the Airport is implemented. . .

"Aircraft departure and landing patterns that will cross San Francisco neighborhoods are inadequately discussed. The DEIR depicts flights tracks on Figure 19, then states that the flight corridors depicted are actually several miles wide. There is no analysis of the volume of increased flights, the extent that they will cross San Francisco neighborhoods, the frequency of the increased flights, nor the times the increased flights may be anticipated." (Bruce Krell, Forest Hill Association)

"Aircraft departure and landing patterns that will cross SF neighborhoods are inadequately discussed. The DEIR depicts flights tracks on Figure 19, then states that the flight corridors depicted are actually several miles wide. There is no analysis of the volume of increased flights, the extent that they will cross SF neighborhoods, the frequency of the increased flights, nor the times the increased flights may be anticipated." (Carol Kocivar, West of Twin Peaks Central Council)

". . . All operational data of overflying jet aircraft, such as numbers, times, elevations, etc., are excluded from consideration by the DEIR; yet this data will have serious environmental implications for San Francisco." (Timothy Treacy, Airport Noise Committee)

Response

As noted in earlier responses (see, for example, p. C&R.231), the EIR does explain that single-event noise can cause disturbance (EIR p. 164). The EIR also describes forecast increases in the number of flights by as many as 300 per day (EIR p. 344). Earlier responses also note that there is no standard applied by regulatory agencies to single-event noise.

The EIR and Appendix C do contain information regarding the single-event noise that can be expected in 1996 and 2006. First, Table 17 (p. 156 of the EIR), Table 50 (p. 336 of the EIR) and Table 51 (p. 337 of the EIR) show the existing and forecast average daily operations of the aircraft using the Airport by type of operation, time of day and aircraft type. Second, Figure 19 (p. 159 of the EIR) shows the generalized flight tracks and flight track use of aircraft using the Airport, and p. 339 of the EIR states that the flight tracks and flight track use are assumed to be the same in 1996 and 2006 as in 1990. (Information on existing and assumed future runway use by aircraft type is shown in Table C-1A on p. C&R.207, and has been inserted into the EIR.) Third, Tables C-8 and C-9, pp. A.56-A.57, Appendix C of the EIR show the typical maximum calculated sound exposure levels at the remote monitoring stations and remote study locations for representative aircraft using the Airport. As stated in the notes to C-8 and C-9, the sound exposure levels take into account the weight of the aircraft by assuming trip lengths (which are associated with aircraft weight) that are most frequently used by these aircraft.

An individual interested in the maximum amount of single-event noise that typically would be expected to occur in his or her community on an average day could use this information in the following manner: 1) first, the individual could refer to Tables 17, 50, and 51 to determine the total number of average daily flights that occurred in 1990 and are expected to occur in 1996 and 2006, and the times of day those flights did or are expected to occur (and could subtract the numbers in Table 17 from those in Table 50 or 51 to determine the increase from 1990 to 1996 or 2006); 2) second, the individual could refer to the generalized flight tracks and flight track use shown on p. 159 of the EIR to determine the percentage of daily flights (on average) that would be expected to fly over his/her community in 1996 and 2006; 3) finally, the individual could refer to Tables C-8 and C-9 to determine the typical maximum calculated single-event exposure levels that would be expected to result from representative aircraft making these flights. This process would enable the individual to determine, for an average day of the year, the maximum number of single event flights that are expected to fly over his or her community during the day, evening and night and the maximum amount of single-event noise that would be generated from those flights.

The forecasts for aircraft operations by type and time of day are contained in EIR Tables 50 and 51 and do include cargo aircraft. The flight tracks shown on EIR Figure 19 are expected to resemble the flight tracks in 1996 and 2006. By use of this information provided on flight tracks, average daily operations, and typical maximum calculated sound exposure levels, it is possible to estimate the maximum frequency and magnitude of single events during the day, evening or night on an average day of the year.

SFIA staff note that the Airport Noise and Capacity Act of 1991 mandates the transition to Stage 3 aircraft. The Act does not specify the time of day the aircraft will fly. However, the SFIA Noise Regulations contain limitations on the nighttime and early morning operations of aircraft./10/

Information regarding the single-event occurrences over the City and County of San Francisco is contained in the EIR. First, Tables C-8 and C-9, pp. A.56-A.57, Appendix C of the EIR show the typical calculated maximum sound exposure levels at 27 remote monitoring stations and selected study locations. Six of the remote monitoring stations and three of the study locations are in San Francisco. Second, Tables 17, 50, and 51 (pp. 156, 336-337 of the EIR) provide information on the average daily operations in 1990 and the expected daily operations of aircraft in 1996 and 2006. Third, information on the expected flight paths of aircraft using the airport is contained on pp. 157-159 of the EIR, and the EIR assumes that these flight paths will be similar in 1996 and 2006. By reference to Tables 50 and 51 and assumption of similar runway use and flight tracks, it is possible to estimate the frequency and magnitude of the sound exposure levels at the San Francisco monitoring stations in 1996 and 2006.

The typical calculated maximum sound exposure levels shown on Tables C-8 and C-9 include those for one remote monitoring station in the City of Pacifica and three selected study locations in the City of Pacifica. These tables demonstrate the typical maximum sound exposure that could occur as a result of aircraft overflights over the City of Pacifica. The maximum number of overflights that could occur on an average day in 1996 and 2006 (and the increase over the number of flights that occurred in 1990) can be determined by reference to Tables 17, 50, and 51 and the generalized flight tracks shown on p. 159 of the EIR.

This response details ways in which a person at a general location could obtain general information about the potential single-event noise levels at that location. The information in the EIR does not and cannot provide an accurate indication of the exact number of flights, types of aircraft, times of flight, or single-event noise levels that would actually be experienced in a specific location. The reasons for this include: 1) information on aircraft operations used in noise analysis (such as shown in Tables 50 and 51 in the EIR) is based on the "average" day of the year, and derived from annual forecasts; 2) assumed average runway and flight track uses are based on operating conditions over the entire year, not on any one particular day; 3) aircraft flight tracks used for noise analysis (such as those shown in EIR Figure 19) are generalized and are meant to represent the "average" paths flown by aircraft that are actually dispersed over wide areas; and 4) calculated SEL values (such as those shown in EIR Appendix C) reflect the noise levels that would be produced by a representative aircraft of a representative weight, following an assumed flight path and a standard set of flight procedures. Because of these factors, it would be speculative to determine, and misleading to present detailed information in the EIR on, future flight activity over a specific location (such as the tables and numbers requested by the commenters).

Several of the commenters refer to the "sound exposure contours" in the EIR, Figures C-1 through C-4 in Appendix C. Each of the SEL contours represents one aircraft landing on and taking off from one runway, travelling straight in and out. The contours were included in Appendix C of the EIR to show generally how the noise produced by the aircraft serving SFIA varies by aircraft type. Because the contours are generic, they are not a good indicator of the actual single-event noise levels experienced at a particular location near SFIA. As stated on p. A.48, Appendix C of the EIR, the actual single-event noise levels experienced near SFIA would depend on specific factors related to Airport and aircraft operations.

Several commenters request that information on operations by aircraft type be provided in the EIR because Stage 3 aircraft can be noisier than Stage 2 aircraft. The noise produced by Stage 2 and Stage 3 aircraft is addressed under Shift to Stage 3 Aircraft, pp. C&R.212-215.

Impacts of Increase in Overflights

Comments

"In the DEIR, it is important to distinguish between evaluations that involve analysis, impact and mitigation. Unless noise factor analyses are carried forward and specific impacts are identified, mitigations are not considered. This is the case with single-event and backblast noise; impacts are not documented in the Draft EIR and as a result mitigations are not specified. In contrast, there is an analysis of the Community Noise Equivalent Level (CNEL) and impacts are identified and mitigations are offered. . .

"Single-Event Noise Impacts. Single-event impacts have been repeatedly identified as being the most onerous to the communities near the Airport, particularly during nighttime hours.

"- The impacts of single-event noise are not included in Appendix C or in the text. Noise from Stage 3 aircraft is likely to exceed ambient noise levels in residential neighborhoods by 30 to 60 dBA; this is significant.

" -Average daily aircraft operations from 1990 to 2006 will increase by nearly 300 per day which is equal to an additional 110,000 operations per year. This, together with the single-event analysis, indicates that there are important impacts that are not identified." (Roger Chinn, Airport/Community Roundtable)

"Though the DEIR claims the noise levels will decrease from the present through 2006 because of the phasing out of Stage 2 aircraft, for many people and locations, the DEIR also states that single event noise occurrences will increase.

" 'The increase in aviation activity allowed by the project would have virtually no effect on overall noise levels because the additional flights would be performed by the quieter aircraft. The increase would contribute to single event noise in a noticeable way although each noise event would be somewhat quieter than at present.' (p. 6).

" 'In areas with overflights by aircraft serving SFIA, the number of times single-event noise occurs would increase.' (p. 344).

"It is misleading to state that noise levels will be reduced when specifically talking about CNEL because frequently people assume that 'noise level' and 'noise problem' are one and the same. Clearly the 'noise problem' is created by individual aircraft and not some statistical calculation which is what CNEL is. The noise problem will be increased under the SFIA plan by virtue of the increasing numbers of aircraft operations." (Stephen Waldo, Mayor of Brisbane)

". . . [W]e are particularly concerned about single-event noise and overflights. We feel that the issue of single-event noise levels was not adequately analyzed and that additional mitigation measures should be provided. . .

". . .Especially given the significant increase in daily aircraft operations, single-event noise will likely exceed ambient noise levels in residential neighborhoods by 30-60 dBA. Given this potentially significant environmental impact, additional analysis is needed to fully disclose likely impacts. . .

"The DEIR also inadequately describes the noise impacts which result from aircraft flying out of the established flight paths. As has been previously indicated by the City of Pacifica, noise impacts have been created throughout the City due to overflights from north to south. Rather than heading south over the ocean after departing through the San Bruno gap, aircraft cross the length of the City. The increase in the number of flights will exacerbate this problem. . ." (Wendy Cosin, City of Pacifica)

"The EIR does not clearly point out the noise impacts on areas of Pacifica caused by the GAP departure route. The northern areas of Pacifica (especially the Fairmont district) are severely affected by aircraft noise from the GAP departure route. This route, which serves many of the flights to the Far East, is characterized by very large aircraft that are full of fuel. Because this area of Pacifica is more than 600 feet above sea level, the aircraft are quite low when they pass over. Although we have not made noise measurements as part of this response, the peak noise levels from this route in northern Pacifica are certainly higher than 80 decibels (dBA) and probably reach or approach 90 dBA for the loudest flights. The EIR contains no description of this type of impact on Pacifica -- nor does the EIR determine if an increase in this type of single-event noise would be a significant environmental impact. Many individuals in northern Pacifica are certain that any increase in the number of these flyovers would be a significant adverse impact of the project. Although the Stage 2 aircraft are the worst, the Stage 3 aircraft will still cause speech interference and sleep disturbance. . .

"Secondly, the City of Pacifica is, of course, the furthest city west of the airport. And one of the problems that we have is, of course, the transcontinental air flights that fly over the northern part of Pacifica, which is called Fairmont. Through our analysis, we found that we will have at least a 20 to 25 percent increase in the evening flights. We strongly feel that the measurements of the CNEL at 65 in that area is not adequate enough. Because the ambient noise does drop at night because we are out close to the ocean and that the 65 CNEL is even greater -- maybe not in the measurement, but in the impact -- in the homes in the Fairmont area.

"...You'll be having about another 200 to 300 increased flights over the City of Pacifica, run down the spine of Pacifica, which then affects another close to maybe 1,000 homes. In Fairmont, you're affecting 1,500 homes. You're affecting better than 1,000 homes down in the very, very quiet part of Park Pacifica, which is the southern end and inland quite a bit, and surrounded by hills. We strongly feel that the increase in flights will increase the impact of noise in that area." (Fred Howard)

"This noise analysis raises two concerns relevant to Daly City. The impact of an increased number of flights, albeit with quieter aircraft, must be addressed by the EIR..." (Maria Gracia Tan-Banico, City of Daly City)

"...We are concerned that the increased traffic may result in more aircraft straying out of their assigned areas, causing additional noise over Foster City." (Leslie Carmichael, City of Foster City)

"Daly City, Foster City, Hillsborough, Millbrae, South San Francisco, and San Bruno all have legislated aircraft 'noise elements.' San Bruno even has a specific 'noise insulation' provision. Noise 'footprints' indicate that all these communities adjacent to SFO are impacted (DEIR Vol. II CH. XI Figs. 1-3). Presently, 14,980 people live within the 65 CNEL contour with the total only being reduced to 6,600 by 2006. SFO doesn't dare allow increased noise impact in these communities.

"Who then will be impacted by the expected 300 additional daily flights in 2006, not-with-standing all the nice, neat calculations generated by the models, if assumptions as to quieter aircraft conversion rates are wrong? A look at the Standard Instrument Departure (SID) charts (DEIR Vol. II Ch. XI Tables 8-11) confirms that it will be San Francisco! The location of fixed aircraft noise monitoring sites 23-27 substantiate that the Visitacion Valley, Portola, Excelsior, Bernal Heights, Glen Park, Diamond Heights, Miraloma Park, St. Francis Woods, Forest Hills and, even Pacific Heights and the Marina Districts of San Francisco will all bear the brunt of the additional aircraft noise generated by the proposed SFO expansion. There are no nice, neat contours drawn to clearly illustrate this potential noise impact." (Alyn Lam)

"Within this limited scope, our Committee has reviewed the DEIR and is disappointed at the result. The Committee is concerned with the issue of noise generated by departing and arriving jet aircraft overflying San Francisco as they come and go from SFIA. Unfortunately, the DEIR omits any consideration of this noise problem, or indeed even recognition of the problem, insofar as it impacts San Francisco, a problem that it appears without question will substantially increase as the Master Plan is implemented. The noise problem referred to has had since 1987, at least, substantial environmental impact on San Francisco. This impact will be increased as the Master Plan is implemented. We believe that the DEIR is deficient in law in failing to adequately address the environmental issue of noise in any meaningful way. . .

"Loud single event noise has been identified as a major impact in San Francisco, particularly during the evening and nighttime hours. The DEIR notes that the 300 additional flights per day will contribute to and increase the number of single noise events, although each event may be slightly quieter. (page 6, 164) Although the DEIR provides little information about single event impacts, the data which is disclosed points to significant impacts which are downplayed. For example, the sound exposure level (SEL) analysis shows that some of the aircraft (including Stage III aircraft), will produce noise in excess of 80 decibels SEL in San Francisco. This noise level is described by the Environmental Protection Agency as loud enough to awaken 20% of the population. (EPA Comments on FAA Notice on Airport Noise Compatibility Planning, January 18, 1989) The DEIR does not disclose this impact, the frequency of these overflights, the expected flight paths, or other information which is needed to assess these impacts. Moreover, the DEIR fails to document how much louder these overflights are than ambient noise levels. . ." (Timothy Treacy, Airport Noise Committee)

"Since late 1986 and early 1987 my neighborhood has been subjected to increased aircraft traffic from San Francisco International Airport. The Master Plan acknowledges this impact, stating 'As a result of changing flight patterns, the city experiences overflight noise from aircraft departing runways 1L/1R. Beginning in late 1986 and early 1987, some neighborhoods began complaining of additional flights and increasing noise from aircraft overflying San Francisco.' (Page 3.10)

"In spite of this acknowledgement, the DEIR does not adequately disclose either the existing or expected additional noise impacts in San Francisco. This lack of disclosure precludes the development of any mitigations. . ." (Curt Holzinger)

". . .The noise problem with overflights across San Francisco neighborhoods is created by individual aircraft and not some statistical average, which is what CNEL is. The noise problem will increase under the Airport plan simply because of the large increase in aircraft operations." (Bruce Krell, Forest Hill Association)

". . .The noise problem with overflights across San Francisco neighborhoods is created by individual aircraft and not some statistical average, which is what CNEL is. The noise problem will increase under the SFIA plan simply because of the large increase in aircraft operations." (Carol Kocivar, West of Twin Peaks Central Council)

"The second paragraph of p. 344 indicates that the noisiest areas without B-747 overflights would likely be 10-15 dBA quieter than B-727 overflights. FAA Advisory Circular 36-3F shows the takeoff noise differential between the B-727 and the Stage 3 MD-80 in various configurations. Only with the loudest 727 and the quietest -80 figures for takeoff power could you get that type of differential. Additionally, takeoff noise and overflight noise are not the same. Sideline noise would provide a more appropriate comparison, and, unfortunately, the differential between the two aircraft is almost insignificant." (Stephen Waldo, Mayor of Brisbane)

"If this plan goes into effect -- and I understand that there are going to be about 3,000 flights -- no, 1,100 flights average per day -- God almighty, as I said before, we are going to have to use earmuffs." (Bruno Bernasconi)

". . .If you overload our skies, which are already overloaded, with more airplanes competing for valuable airspace, we are all going to pay a price. And if that issue can't even be addressed in a Draft EIR, where is it going to be addressed?" (Don Bertone)

"What is happening, if you develop a new city, or like Southampton or Foster City, or if you develop a large project, an office park like Bishop Ranch in the Diablo Valley, and you just totally ignore what happens to the waste products of that, you just figure that you flush the toilet and the effluent goes away, the garbage truck comes along and picks up the solid waste and is disposed of, you never think about it again. What happens here is that the airports of the region will expand and the waste product is a noise that we're going to have overhead. I think we ought to look at it in that context." (Charles Kroupa)

Response

The EIR contains a large amount of information on the environmental effects of increased aircraft traffic. For example, information on noise, air safety, and air quality is contained in the section of the EIR on Environmental Impacts.

As in the group of comments addressing the adequacy of CNEL, above (pp. C&R.228-230), many of the commenters believe that the standard for judging the noise "impacts" of the SFIA Master Plan should be single-event noise and frequency of flights, not CNEL. The comments made in this group, in addition, state that on the basis of a single-event standard, the SFIA Master Plan would "increase the noise problem" and result in significant noise impacts.

As stated in the response to comments regarding the adequacy of CNEL, CNEL has been adopted by the FAA, other federal agencies, and the State of California as the standard for determining the significance of aircraft noise impacts. This cumulative noise standard has been upheld in the courts. There is no standard that is similarly applied to single-event noise. Therefore, the EIR relies on CNEL as the standard for assessing the noise impacts of the SFIA Master Plan.

Notwithstanding the use of CNEL as the standard for assessing noise impacts, the EIR does provide general information on potential single-event noise levels near SFIA. The sound exposure levels shown on Tables C-8 and C-9 (pp. A.56-A.57, Appendix C of the EIR) from single-event noise represent the maximum exposure levels that could occur from the overflight of the representative aircraft. As acknowledged in the EIR, the single-event noise reflected in these tables has an impact on persons outside the CNEL 65 contour (see EIR p. 164). However, as a result of the transition to quieter, Stage 3 aircraft, with or without the project, the level of single-event noise experienced by persons outside the 65 CNEL contour is expected to decrease. The change in the maximum frequency of single-event noise events from 1990 to 1996 and 2006 with the project can be determined by reference to Tables 17, 50, and 51 and the flight tracks shown on pp. 157 through 159.

Two commenters refer to expected SEL values in their communities (San Francisco and Pacifica). In San Francisco, estimated maximum SEL values at the remote monitoring sites (21, 23-27) range from 71 dBA (for the B-737-300) to 97 dBA (for the B-727-200). (According to Table 9 in the description of Noise Effects in Appendix C of the EIR, an outside noise level of 80 dB is loud enough to awaken 10 percent of the population, contrary to the commenter's statement.) In Pacifica, estimated maximum values at remote monitoring site 19 range from 79 to 98 dBA. In the future, with or without the project, the typical sound exposure levels experienced in these locations would decrease to the lower end of the ranges noted, because of the increased use of Stage 3 aircraft.

Regarding the comments about flight activity over Pacifica, it is true that some aircraft departing SFIA do fly south (or southwest) over Pacifica, but these aircraft take off from Runways 1, not 28 (as the commenter states). These aircraft departures are generally represented by the two "left-turn" tracks from Runway 1L shown in Figure 19 of the EIR (p. 159). the noise produced in Pacifica by these aircraft is reflected in the measured and calculated CNEL and SEL values for remote monitoring station 19 and selected study sites R,S, and T (shown in Tables 53, 54, C-3, C-8, and C-9 in the EIR). With or without implementation of the SFIA Master Plan, the number of flights over Pacifica, by these and other aircraft, would increase, but the noise levels produced by the aircraft would be generally lower (as shown in EIR Tables 53 and 54). (It should also be noted that aircraft flying over Pacifica are typically at altitudes of 2,500 feet and above.

Several comments refer to the difference between ambient and aircraft noise levels. The "ambient" noise levels recorded by the SFIA Remote Monitoring System are "community" noise levels, reflecting what people in the community hear. The data are intended to (but do not necessarily) exclude aircraft noise levels. Annual "community" noise levels in 1990 at most of the remote monitoring stations averaged around 59 dBA, CNEL (levels were substantially higher at two locations). In quiet residential areas, ambient noise levels were probably substantially lower than those recorded, especially at night. As the commenters state, aircraft flying over these quieter areas at night would produce noise levels substantially higher (potentially up to 50 or 60 dBA) than ambient noise levels. The expected phase out of Stage 2 aircraft at SFIA would result in generally lower aircraft noise levels (and less of a difference between aircraft ambient levels) in areas near SFIA.

One commenter challenges the EIR's conclusions regarding the decrease in noise in areas without B-727 overflights. FAA Advisory Circular 36-3F shows the estimated maximum A-weighted sound levels at the takeoff noise measurement position to be about 8 dB greater for the B-727-200 than those estimated for the MD-80. This difference is less than the 10-15 dB typical difference between the A-weighted sound exposure levels for those aircraft used in the Integrated Noise Model (INM), which is the basis for the 10-15 dB difference stated on p. 344 of the EIR. The Advisory Circular and INM show different noise levels for the two aircraft because the data used for the Circular 36-3F figures were based on different operational flight procedures for the aircraft. The B-727 data used in Circular 36-3F were estimated from certification tests in which the airplane used a significant power cutback near the takeoff measurement point to enable it to comply with Part 36 Stage 2 requirements (this cutback is not used in normal operation conditions.) The MD-80 data used in Circular 36-3F were obtained using full take-off power. In contrast, the data used in the INM are based on normal airline operational procedures (full takeoff power) for both airplanes, resulting in the 10-15 dB typical difference. (The use of full takeoff power as the basis for the noise levels in the INM is similar to the "sideline" noise measurement referred to by the commenter.) Therefore, the 10-15 dB typical difference stated on p. 344 of the EIR is correct.

The EIR impacts analysis states (p. 339) that runway use, the locations of generalized flight tracks, and flight track use are assumed to be the same in 1996 and 2006 as in 1990. Therefore, the increased 300 flights per day in 2006 under the SFIA Master Plan are expected to follow the generalized flight tracks shown in Figure 19 of the EIR. (The majority of the increased flights would not end up over San Francisco, as one commenter asserts.) However, it is incorrect to assume that all aircraft would follow the flight tracks in Figure 19, and that aircraft that did not follow those tracks would not be following established procedures. Figure 19 shows generalized flight tracks developed on the basis of the wide corridors of paths that aircraft actually follow. The flight tracks used by aircraft departing the Airport are within the exclusive control of the FAA. (See also pp. C&R.197-201 regarding flight tracks, pp. C&R.201-203 regarding FAA control over takeoffs, pp. C&R.203-208 for a discussion of runway use, and pp. C&R.299-300 regarding mitigation of single-event noise impacts.)

Health Impacts of Overflights

Comments

"**Sleep disturbance is shown in the appendices -- but is given very little discussion in the EIR.** This is a very real concern for the residents of Pacifica. Because of the very low background noise levels in Pacifica at night (hourly average noise levels are usually 40 dBA or lower) the overflight of the aircraft (with noise levels of 55 to 80+ dBA) can disturb many residents. As seen in the EIR Appendix C (Figures 10, and 11) sleep disruption can occur at a frequency of 30 to 40 percent when noise levels reach 55 to 70 dBA. **Clearly, the increase in overflight associated with the project will cause considerable sleep disruption in Pacifica on a regular basis. Why was this impact shown in the Appendix as a matter of general knowledge, but not thoroughly analyzed in the EIR?** Is it not common knowledge that nighttime and early morning noise levels are the most annoying to people?

"The definitions of CNEL and Ldn clearly acknowledge this when they penalize (by adding a 10 dBA penalty) noise levels between the hours of 10 p.m. and 7 a.m." (Fred Howard, Pacifica Noise Abatement Committee)

". . .I agree with the 'Airport Noise Committee's' objections to the Draft: . . .

"3. The impact of single event overflights has to be fully disclosed and evaluated: The health risks of four 70 db overflights in the course of sleeping hours for example; disturbed sleep is stressful as much as interrupted sleep. What does hundreds of overflights do to children's learning concentration and development? . . .

"These flaws must be addressed in any Draft to make it acceptable." (David Deakin)

<u>Response</u>

As explained above, there are considerable differences in how people are affected by single-event noise. Factors such as the type of noise heard, time of day, orientation of the receptor relative to the noise source, reduction provided by the structure if the people are indoors, and individuals' sensitivity (as well as other factors) influence the effects of single-event noise on people.

Appendix C includes an extensive discussion of noise and its effects on people (referenced on p. 153 of the EIR). The information from that discussion, together with the information in the EIR, facilitate an understanding of the types of effects that single-event noise will have on individuals who experience it. For example, Appendix C Figure 10 in the discussion of Noise and its Effect on People shows the probability of a noise-induced sleep change as a function of sound exposure levels. Tables 50 and 51 of the EIR (p. 336-337) show the number of nighttime arrivals and departures of particular aircraft that are expected to occur in 1996 and 2006, and Table C-8 (p. A.56, Appendix C) shows maximum sound exposure levels from these aircraft. By application of these figures, it is possible to determine the effects that single-event noise occurring in 1996 and 2006 will have on sleep changes.

Impacts of Capacity Constraints

Comment

"Table J-2 in the Appendix shows that more operations will take place during sensitive evening and nighttime hours due to airfield capacity constraints. By 2006, a 31% increase in night flights is expected to occur 25% of the time. This points to impacts which are the result of capacity problems, but which are not further analyzed, and for which no mitigations are proposed. . ." (Timothy Treacy, Airport Noise Committee)

Response

The conclusions of the EIR's analysis of potential capacity constraints (pp. 335 and 338, and Appendix J) were that such constraints could result in increases in evening and nighttime operations, but that most (at least 86 percent) of the time, the resulting increases in cumulative noise levels would not be perceptible. It was also concluded that during the most adverse weather conditions, which occur about 6 percent of the time, the potential increases in evening and nighttime flights could result in an increase in the size of the 1996 and 2006 CNEL contours (EIR p. 338). (This conclusion was based on the assumption that the adverse weather conditions would occur over the entire 24-hour period. Adverse weather conditions at SFIA would more likely occur over shorter periods./15/)

Given the small percentage of the time in which substantial increases in evening and nighttime flights would occur, the CNEL contours developed for the EIR do not reflect increased evening or nighttime operations as a result of capacity constraints.

BACKBLAST NOISE

Adequacy of CNEL as Descriptor of "Noise Problem"

Comments

"We [Peninsula Litigation Coalition] take exception to the fact that in the DEIR they are using the CNEL metric as a measure of the noise that emanates from the airport. The CNEL metric is an insensitive measure of noise impact and noise annoyance. It attempts to deal with separate events by mathematically converting them into an equivalent steady state noise level.

"If the true noise signature of SFIA was steady state, the CNEL would still not adequately reflect the impact on the surrounding population. As established, the CNEL filters out the preponderant low frequencies which characterize the tailpipe noise of departing aircraft. The failure to record these low frequencies promotes the illusion that the major noise problem -- namely, backblast, is no problem." (Duane Spence, Peninsula Litigation Coalition)

". . .CNEL is almost a meaningless criteria for most of Burlingame and Millbrae. It is a single event backblast and take off issue that concerns the local community." (David Few)

"Page 161:

"The major noise impact from SFIA, **backblast**, is artificially diminished by the use of inappropriate metrics in Figure 20. CNEL contours are generated from noise monitor data that use the A-weighted sound spectrum. The monitors are designed to filter out the low frequencies that dominate the backblast spectrum. Furthermore, as is well known, the CNEL metric is extremely insensitive to changes in single event noise and number of flights. It is meaningless to cite the CNEL as the measure of backblast impact. . .

"Page 167, Noise Abatement Program:

"The 27 monitors are positioned and aimed to record overflight noise, not on-airport generated **backblast**. They all use the A-weighted sound spectrum and thereby further ignore backblast events by not recording the low frequencies." (Duane Spence, Airport Mitigation Coalition)

Response

The CNEL contours developed for the EIR were calculated using the the A-weighted sound level metric (A-weighted decibels, or dBA). As noted in Appendix C of the EIR (in the report "Description of Noise and Its Effects on People"), the A-weighting de-emphasizes low frequency sounds. The A-weighting is described in the California Noise Standards (Section 5001.(m)) as modifying ". . . the frequency response . . . to account approximately for the frequency characteristics of the human ear."/16/

Backblast noise, described on p. 165 of the EIR as ". . . characterized by a lower frequency and an increase in perceived rumble," is known to cause more house vibration and rattle than that associated with overflight noise of the same A-weighted sound level. Houses "respond" to low-frequency backblast noise in a way that enhances the human perception of these sounds.

It is correct that the noise monitors operated by SFIA use the A-weighted sound level as the basis for measurement.. The use of such monitors is in accordance with Section 5080.3 of the State Noise Standards./16/

According to SFIA Administration staff, the question of whether the 'A' weighted noise metric is inappropriate was addressed by the Airport's Consultants, Tracor Applied Sciences, in their 1987 study, *Investigation of Low Frequency Noise From Departures on Runways 01L and 01R at San Francisco International Airport.*/17/ The report concluded that the results of the study did not justify a change from the A-weighted noise metric in aircraft noise monitoring, because, while the A-weighting underestimated loudness (by about 4 dB), it adequately represented perceived noise levels. ("Loudness" refers to the human judgement of intensity of a sound; "perceived noise level" refers to a subject assessment of the perceived "noisiness" of aircraft noise.) A copy of this report is available for public review at the SFIA Noise Abatement Offices.

As discussed on pp. 163 and 165 of the EIR, the topography of the exposed neighborhoods in Millbrae and Burlingame (where backblast noise is principally heard) prevents those neighborhoods from benefitting from the ground attenuation (lessening) of noise that is assumed in the calculation of CNEL. The calculation of CNEL in those neighborhoods was therefore adjusted for the EIR, to more accurately reflect noise levels there (see pp. C&R.258-259 herein for a discussion of this adjustment).

As shown on Figure 21, p. 162 of the EIR, Monitors 8-11 in Burlingame and Millbrae are located behind Runways 1L and 1R, in the general areas where the backblast noise from departures on Runways 1 is heard. The specific locations of noise monitors must meet the requirements of Section 5072 of the State Noise Standards./16/

A discussion of the CNEL metric with relation to single-event noise is on pp. C&R.228-233 herein.

Historical Shift in Runway Use

Comments

"As to noise, we are very concerned that the trend is toward increased backblast single event noise, particularly for people of Millbrae...

"There is on Page 157, Table 18, showing a percentage of departures on Runway 1 increasing from 75 percent to 87 percent. And this increases the backblast noise in Millbrae and surrounding communities. We are very concerned that this noise is not measured and not mitigated and that there is a shift in airport noise because of that, because it is a shift away from the noise that is measured within the 65 CNEL."

"Table 18, page 157, shows the percentages of departures on Runway 1 increasing from 75.3% in 1985 to 87.4% in 1989. Obviously, this increases the backblast noise in Millbrae. Can this trend be explained; and is it necessary that residents be subjected to such a high percentage of departures which generate the single-event backblast noise? This is a shift in airport noise, something opposed by the Airport Round Table." (Janet Fogarty, Mayor of Millbrae)

"FAA Crosswind Criteria for Departures on Runways 1. The text should include a section that explains the FAA's rationale for changing the crosswind component for Runways 1 departures, from 15 knots to 20 knots, and indicate how this change has increased the number of Runways 1 departures and, therefore, has increased the backblast noise problem." (Raymond Miller, C/CAG)

"Table 18, page 157, shows the percentage of departures on Runway 1 increasing from 75.3% in 1985 to 87.4% in 1989. Obviously, this increases the backblast noise in Millbrae. Is it necessary that residents be subjected to such a high percentage of departures which generate the single-event backblast noise? This is a shift in airport noise, contrary to pronouncements by the Airport Round Table." (Robert Treseler, City of Millbrae)

"The backblast noise into the hillside communities of Hillsborough, Millbrae, and Burlingame, although a continuing problem for years, has become the major problem of on-airport generated noise since the operational pattern of SFIA was shifted from 67% runway 1 departures to 95% or more (see enclosures). This has had the effect of shifting overflight **(measured)** noise from the gap cities to **(unmeasured) backblast** noise in the hillside communities behind runway 1. [The following is from the summary attached to enclosures showing air carrier departures:]

"Director's Reports for January, February, May and September 1990:

"Documentation to show Runways 1 usage at or above 91%.

"Runway usage summary:

"Shows increase of Runways 1 departures from 1972 through 1977.

"Net results:

"66% (all departures) used Runways 1 in 1972 and over 91% in 1990.

"Not only 91%, but the total number of operations has grown. Thus the number of Runways 1 departures has changed by a factor of 2-3 times more than in 1972.

"Such shifting of noise is in direct violation of the 'Airport Noise Variance Action Plan' 1982, Condition I, B(3)d which states that unless increased use of the Shoreline Departure is made a part of the action plan, the communities behind runways 1 will continue to be severely impacted. The present use of the Shoreline Departure has fallen to a negligible 0.3% of total departures." (Duane Spence, Airport Mitigation Coalition)

"The DEIR states that 75 percent of departures used Runways 1 Left and 1 Right in 1985, and today between 90 and 95 percent use Runways 1, resulting in backblast into the hillside communities. The shift of departure operations on to Runways 1 has effectively shifted measured overflight noise to unmeasured backblast noise. In spite of this noise shift, SFIA is still out of compliance with the state noise standards, and judging by the expansion plans presented, there is no indication that they ever will be in compliance. . . . " (Duane Spence, Peninsula Litigation Coalition)

Response

As cited in the SFIA Joint Land Use Study, Runways 1L and 1R have historically been the preferential runways for departures. "The purpose of the preferential runway use program is to provide for maximum overwater operation in order to minize overflight of the surrounding communities."/18/ The preferential use of Runways 10 for departures during certain nighttime hours was established in the Airport Noise Mitigation Action Plan, which incorporated the results of the Joint Land Use Study./19/

The FAA, by order of Lyn Helms, FAA Administrator (Order No. 8400.9, November 9, 1981) established the nationwide runway crosswind component criteria as 20 knots./20/ According to SFIA staff, the purpose of that order is to set safety and operational criteria which must be followed in the evaluation and/or approval of runway uses.

The increase in Runway 1 departures from 1985 to 1989 is indicated in Table 18, p. 157 of the EIR, but there has been no increase in backblast noise over this same period. State law (California Noise Standards, Title 21) requires SFIA to file quarterly noise reports. The San Francisco International Airport CNEL Quarterly Reports October 1, 1985 through December 31, 1985 and October 1, 1990 through December 31, 1990 measured noise levels at four relevant remote monitoring stations (RMS 8,9,10 and 11). Backblast noise levels decreased by 0.3 to 4.1 dBA. During the same period, these reports indicate that Stage 3 aircraft operations, as a portion of total operations, increased 25 percent.

(See pp. C&R.251-253 herein for a discussion of the extent to which CNEL, and the A-weighted noise level, measure backblast noise.)

The documentation of runway use from 1972 through 1977 provided by the commenter matches information on (1977) runway use in the Joint Land Use Study (it is not known whether the documentation matches actual use in previous years)./18/ The Director's Reports referred to by the commenter are Airport/Community Roundtable reports (prepared by the SFIA Noise Abatement staff) of monthly runway use for November and December 1989 and March and July 1990./21/ The information on runway use from these various sources show a trend toward increased use of Runways 1L and 1R for departure, from about 62 percent in the mid-1970s to over 90 percent in late 1989 and 1990.

This information is consistent with the runway use trends shown in the EIR. The historical runway uses shown in Table 18 on p. 157 of the EIR represent annual use by all air carrier aircraft, over all daytime and nighttime hours. As shown in Table 18, about 87 percent of all departing air carrier aircraft used Runways 1L and 1R in 1989. Page 158 of the EIR discusses the use of Runways 28L and 28R and 10L and 10R for departing aircraft.

It is correct that the number of air carrier (and total) aircraft operations has increased since the 1970s, and that the number of aircraft departures on Runways 1L and 1R has increased. By use of historical aircraft operations and runway use statistics, it is possible to estimate that in 1977, there were about 93,740 air carrier aircraft departures on Runways 1L and 1R./18/ By use of information on pp. 24 and 157 of the EIR, it is estimated that in 1989, there were about 132,200 air carrier aircraft departures on Runways 1L and 1R. The increase in departures on Runways 1L and 1R was about 41 percent, not 2-3 times, as the commenter suggests. (Statistics from 1972 cannot be compared directly to 1989 because the runway use figures are for all aircraft, not just air carrier aircraft. However, the number of air carrier aircraft operations in 1972 was just just 4,000 higher than in 1977./18/)

It is not known what the 1982 "Airport Noise Variance Action Plan" mentioned by the commenter is./21/ As discussed on p. C&R.262 herein, the first Airport Noise Variance was granted in July 1982. The Airport Noise Mitigation Action Plan, published in 1981, does include the increased use of the Visual Shoreline Departure as a mitigation measure./19/ Use of the Shoreline Departure has decreased from 1980 to 1989 (from about 10 percent to about 1 percent of air carrier aircraft departures) because of the greater use of Runways 1L and 1R for departures and the use of the Shoreline Departure when it is "suitable for the intended direction of flight" (which it would not be for B-747 aircraft heading to Asia)./18/

The response to comments regarding SFIA compliance with the State Noise Standards is on pp. C&R.262-265 herein.

Affected Areas

Comments

"I am a resident of the Ray Park area in north Burlingame, and, in the current environment, really feel the effect of two things -- first of all, the backblast from flights taking off over the bay, and especially -- I believe it's Runway 19 takeoffs which occur in times of bad weather. And I think those pilots use El Camino as their guiding path down the Peninsula. It's hard to imagine the noise being much worse than it is right now, quite frankly. It depends, of course, and the weather -- impacts the severity of the problem." (Jack Hickethier)

"The DEIR avoids discussing the major noise problems of SFIA, which are **backblast noise and single event impacts**. The hillside communities which suffer the most impact from exhaust noise of departing aircraft are Hillsborough, Millbrae, and Burlingame.

"The town of Hillsborough should be included when discussing impacted cities, e.g. pages 165 and 166. It is not cited in the DEIR as being impacted, yet, table C-8, page A.56 of the appendix shows single event noise levels of 107 dB at monitor location 13 in Hillsborough. This monitor is located about 4 miles from the airport, and is not subject to overflight noise, just **backblast . . .**)

"Page 161:

". . .In truth, the amphitheater effect of the hills behind runways 1, as well as the fact that low frequencies are not attenuated by the atmosphere, cause significant annoyance 6 to 8 miles from the runway 1L and 1R departure thresholds." (Duane Spence, Airport Mitigation Coalition)

Response

Backblast noise is addressed in the EIR on pp. 163, 165, and 344. On p. 165 of the EIR, it is noted that ". . . backblast is heard principally in the cities of Millbrae and Burlingame, which are located behind Runways 1L and 1R." Information on calculated CNEL values and maximum sound exposure levels at the remote monitoring stations (on pp. 342 and A.56 of the EIR) shows that the station in Hillsborough (No. 13) experiences cumulative and single-event noise levels substantially lower than the levels calculated for the stations in Millbrae and Burlingame (Nos. 8-11). Although the location of Hillsborough relative to the Airport suggests that it does experience backblast noise, Hillsborough is not mentioned in the list of cities affected because of the lower cumulative noise levels experienced.

The incorporation of terrain into the calculation of CNEL values (to reflect backblast heard/felt near SFIA) is discussed on pp. C&R.258-259 herein.

As shown on p. 157 of the EIR, Runways 19L and 19R were used for 0.3 percent of all aircraft departures in 1989. Because of the configuration of SFIA's runways, Runways 19L and 19R are used only when absolutely necessary (probably during bad weather, as the commenter states). Implementation of the SFIA Master Plan would not result in a change in this use of Runways 19L and 19R for departures.

Adjustment to CNEL Contours

Comment

"Burlingame, along with several other cities, asked that the Draft EIR address the issue of backblast noise. This noise is very low frequency noise. In some cases it cannot be heard but can be felt. Because of its low frequency much of this kind of noise is not reflected in a CNEL measurement. In fact the effects of backblast noise are difficult to identify.

"The Draft EIR document did address backblast. The noise contours for Millbrae and Burlingame were adjusted by .9 dBA CNEL to reflect the impact of this type of noise. The report, however, failed to address any mitigations. The report contained no documentation of how the .9 dBA figure was determined to be the appropriate amount. The method used to arrive at the backblast impact should be documented." (Dennis Argyres, City of Burlingame)

Response

A discussion of the low-frequency characteristics of backblast noise and their relation to the CNEL metric is on pp. C&R.251-253 herein. A discussion of mitigation measures to address backblast noise is on pp. C&R.287-289, 291-293 herein.

Page 163 of the EIR notes the adjustment made to the Integrated Noise Model to improve the representation of the backblast noise from takeoffs on Runways 1L and 1R. The adjustment to the INM was not 0.9 dBA, as the commenter suggests; p. 163 states that the difference between calculated and measured CNEL values after the adjustment was 0.9 dBA. The adjustment to the model increased CNEL values by about 13 dBA.

To document the basis for making the adjustment to the computer model, the second bulleted item on p. 163 of the EIR is revised as follows (revisions are underlined, deletions are indicated by brackets):

> At stations 8-11, located in Millbrae and Burlingame, the calculated CNEL values are 0.9 dBA higher on average than the measured values. The difference would be greater without a modification to the Integrated Noise Model (INM) to improve its representation of the "back blast" from takeoffs on Runways 1L and 1R [ ]. (Without the modification the calculated CNEL values would be about 13 dB lower than the measured values.) The modification involved removing the excess ground attenuation in the model, which is inappropriate to this terrain, and changes to the INM computer program algorithm representing the noise during takeoff ground roll. These changes were based on data obtained by Tracor (in its investigation of low-freqency noise at SFIA) and on data on noise radiation over water in Boston./7a,7b/

The following end notes are inserted after note /7/ on p. 170 of the EIR:

/7a/ Connor, T. *Investigation of Aircraft Departure Noise in Community Areas Behind Runways 1L and 1R at San Francisco International Airport,* Tracor Doc. T86-01-952IU, October 1986.

/7b/ Kestennor, et al., *Investigation of Low Frequency Noise From Departures on Runways 1L and 1R at San Francisco International Airport,* Tracor Project 076-439 (-01), February 1987.

Impacts

Comments

"Low-Frequency Noise (Backblast) Impacts. The low-frequency noise or backblast problem has been well documented by people in the community and by the frequency-band analyses conducted by CALTRANS and by TRACOR several years ago. While acknowledged in Section III of the DEIR (Environmental Setting), there is only a mention of a possible reduction in impact, as measured in CNEL, in Section IV. We know more than this about low-frequency noise impacts." (Roger Chinn, Airport/Community Roundtable)

Response

As indicated in the EIR, p. 344, the forecast change in backblast noise from 1990 to 1996 and 2006 for Stations 8 and 11 is an average reduction of 3.4 dBA in 1996 and 6.5 dBA in 2006. "This reduction is due to the reduction in the number of takeoffs by Stage 2 aircraft, in particular the Boeing 727 and 737-100 and 200. Their contribution to the total backblast noise at SFIA is greater than that of any other aircraft type."

As discussed on p. C&R.259 herein, the analysis of backblast impacts in the EIR is based on studies of backblast noise at SFIA, including the work by Tracor mentioned by the commenter.

NOISE REGULATIONS

Comments

"San Francisco International Airport Noise Variance. The text should include a section on the Airport's noise variance from the State of California Noise Standards that explains why a variance is required and includes the content of the current variance, which was approved by the State Division of Aeronautics in November of 1986, and is still in effect. This section should also indicate that even with the expected decrease in noise and the shrinking of the 65 dB CNEL contour, the Airport will still need a variance in 2006." (Raymond Miller, C/CAG)

". . .It appears as though the standards set by the current Variance for SFIA will become the operating standard instead of reducing the need for the Variance itself. SFIA would need a Variance in 2006 to operate under the proposed methods of operation contained in the Master Plan." (George Foscardo, City of San Bruno)

"SFIA has a variance granted by the State of California because the airport does not comply with the noise standards established by the state for airports. The Draft EIR did not address the noise variance and how the increase in activity would affect the ability of SFIA to meet these state standards in the future. The document should describe the state standards assuming implementation of the master plan and should include an analysis of whether these standards can/will be met in the future. If a variance is going to continue to be required, will it be the same, greater or less?. . ." (Dennis Argyres, City of Burlingame)

". . .The fact that a Variance will continue to be needed under the proposed Master Plan should also be addressed directly and adds further justification for provision of additional mitigation programs." (Wendy Cosin, City of Pacifica)

"The subject of the Variance under which the Airport is operating is treated very lightly. We feel the DEIR is deficient without discussion of the State Aeronautics Act requirement for zero noise impact by 1986; and Variance requirements which include the airport proprietor taking bona fide measures to achieve the noise standards. It appears that the Variance would be needed at least through 2006, even with quieter aircraft, except perhaps for the no project alternative. We suggest that the inability of the Airport to operate within State law, without a Variance, is a significant impact that merits discussion and mitigation. An appropriate mitigation could be commitment to accelerated noise insulation programs for all impacted dwellings as a bona fide measure." (Janet Fogarty, Mayor, and Robert Treseler, City of Millbrae, letter of 9/6/91, and Janet Fogarty, public hearing of 8/27/91)

"The Draft Environmental Impact Report (DEIR) not only is important to the California Environmental Quality Act (CEQA) process, but the proposed mitigation actions could be made a part of the Airport's current Variance application that is pending before the California Department of Transportation (CALTRANS), Division of Aeronautics (DOA). The matter of the Variance is presently under consideration by the Roundtable." (Roger Chinn, Airport/Community Roundtable)

"In conclusion, the airport is not now in compliance with state noise standards. The airport has consistently stated that its basic goal is compliance with the State Noise Standards with a priority for the reduction of noise impacts by on-airport actions. Judging by the proposed expansion of operations and facilities and the lack of mitigating measures, it is not obvious that they could ever achieve compliance in the future. . .

"Page 168: Stage 2 phaseout:

"The FAA will allow 4 years beyond the 100% compliance date of the year 2000--this should be mentioned. On page 338, the year 2006 is mentioned for 96% compliance. This is inconsistent.

"The maximum sideline noise of 103 dB as of 1993 is actually higher than the SFIA level of 102 dB which was proposed and then withdrawn in 1979. It is of interest to note the following comments regarding maximum noise limits made by Federal authorities:

"Department of Transportation, FAA letter from Clark Onstead, Chief Counsel, dated January 1980 concerning the Joint Land Use Study:

> 'We are also aware of the fact that SFO attempted to establish a maximum noise limit based on AC 36-3 several months ago, but gave up the effort when the airlines objected. I continue to think this decision was premature.'

"Aviation Monitor, June 22, 1979

> 'It may be especially significant to note that both the Bakes CAB letter and the Wesler FAA letter have singled out one example of a noise control use restriction.'
>
> '. . .an airport might decide to limit arrivals between the hours 11:00 p.m. and 7:00 a.m. to aircraft types which create a noise level of no more than 98 EPNdB under Part 36 test procedures at the Part 36 approach reference location. Similarly, departures might be restricted to aircraft type which create a noise level of no more than 89 EPNdB under the departure procedures. . .In this manner the local airport operator can decide which aircraft will be permitted to operate and which will be banned.' " (Duane Spence, Airport Mitigation Coalition)

Response

The EIR does include a discussion of the State Noise Standards and the current SFIA noise variance on p. 166. In order to provide more detail on the current variance, the last three paragraphs on p. 166 of the EIR are replaced with the following:

> The State of California Noise Standards established by the California Department of Transportation specifically prohibit an airport proprietor from operating an airport within California if the noise impact area at the airport exceeds zero, unless the airport proprietor has been granted a variance from the law (California Code of Regulations, Title 21, Division 2.5, Chapter 6). From December 31, 1980 until December 31, 1985, California law established 70 dBA CNEL as the maximum standard for areas impacted by airport noise; as of January 1, 1986 that ceiling was lowered to 65 dBA, CNEL.
>
> SFIA is in compliance with the State Noise Law. However, because SFIA has exceeded the maximum noise ceiling set by these standards since January 1, 1978 in areas near the Airport, it has been required to obtain successive variances from those ceilings to continue operations. The first of these variances was granted on July 8, 1982 and the second was granted on November 25, 1986. The second variance was extended on October 19, 1989 upon the request of SFIA, and further extended on September 19, 1990 at the request of the Airport/Community Roundtable. The Roundtable requested the extension because the SFIA Master Plan and this EIR, when completed, could produce information and mitigation measures that could be incorporated into a new variance.

The 1986 variance contains specific requirements that SFIA make continued progress towards the date when it will be in full compliance with the requirements of the State Noise Standards. Among the conditions of the variance are 1) the use of the goals, objectives and recommendations of the 1980 *Joint Land Use Study* as the framework for mitigation; 2) implementation of the Airport Noise Mitigation Action Plan (described on p. 167); and 3) participation in sound insulation programs and the investigation of certain noise abatement actions./7c/

The following end note is inserted after note /7/ on p. 170 of the EIR:

/7c/ Noise Variance for San Francisco International Airport, granted by California Department of Transportation, November 25, 1986.

According to SFIA Administration staff, compliance with the variance as well as the Airport Noise Regulation are both expected to result in a considerable decrease in the number of impacted (uninsulated) dwelling units within the 65 CNEL contour by the year 2000. These objectives are expected to result with or without the SFIA Master Plan. However, if there continue to be impacted dwelling units within the 65 CNEL contour in 2006, the Airport will continue to require a variance from the State noise standards.

Page 347 of the EIR notes that "... SFIA would continue to be required to operate under a variance granted by the Department of Transportation."

Pages 333-351 of the EIR discuss the noise impacts of the proposed SFIA Master Plan; pp. 346-347 summarize the aircraft noise impacts. It is noted that 1) cumulative and single-event noise levels under the project would decrease at almost all locations (and, on p. 343, that any increases in noise levels would not be perceptible to most people); 2) these noise levels would also decrease without the project; and 3) the increase in flights allowed by the project "would have virtually no effect on cumulative noise levels" as measured by CNEL. Although SFIA would still be required to operate under a variance, the continued need for the variance cannot be attributed specifically to the project, as travel using SFIA would increase even with none of the proposed new facilities (see the No-Project Alternative, Variant 1, pp. 440-456 of the EIR). Because people would continue to be affected adversely by operation of the Airport in 1996 and 2006, mitigation measures have been identified on pp. 424 and 425 of the EIR.

The inclusion of these mitigation measures as conditions of the new variance is a decision that is made by the State Division of Aeronautics under the provisions of the State Noise Standards, and as such, is not within the scope of this EIR.

The Airport Noise and Capacity Act of 1990 provides that no person may operate a Stage 2 aircraft after December 31, 1999./10/ Waivers may be granted to permit operation of 15 percent of an air carrier's fleet at Stage 2 levels through the year 2000 if such a waiver is found to be in the public interest.

In addition, the SFIA Noise Abatement Regulation, adopted in February 1988, as amended in June, 1991, requires that beginning Jan. 1, 2000, 100 percent of the operator's operations at SFIA must be performed using Stage 3 aircraft./11,12/

The SFIA regulation requires a transition to Stage 3 aircraft sooner than the federal regulations require. The SFIA regulation was written and promulgated prior to the Airport Noise and Capacity Act of 1990 and is protected under a 'grandfathering' clause.

The CNEL contours for 1996 and 2006 (on pp. 340 and 345 of the EIR) were developed on the basis of assumptions regarding the percentage of Stage 3 aircraft that would be operating at SFIA. At the time the CNEL contours were developed, regulations for the implementation of the Airport Noise and Capacity Act of 1990 had not been promulgated, and SFIA had not amended its Noise Regulation. As noted on p. 339 of the EIR, "If the phaseout of Stage 2 aircraft [by 2000] is implemented. . . there would be no Stage 2 aircraft serving SFIA in 2006. . . [and] the CNEL contours shown in this section would probably be about one dBA smaller than forecast." (An update to the EIR text on pp. 338-339 to reflect the recent federal and SFIA regulatory developments is shown on pp. C&R.210-211 herein.)

The measure of 103 referred to on p. 168 of the EIR refers to EPNL (Effective Perceived Noise Level) dB, not dBA. The EPNL metric contains a pure tone penalty algorithm that is not present in the SEL metric and the EPNL metric weights low frequency noise more heavily than does the A-frequency-weighted SEL. Therefore, the EPNL measure tends to be a more conservative metric which results in a higher number than the SEL measurement.

According to Airport staff, the EPNL metric was used for the maximum sideline noise measurement in order to exclude many more noisy aircraft from the Airport. Use of the more liberal SEL measure would have excluded only the noisiest aircraft, such as the BAC Concorde.

The measure of 102 dB referred to by the commenter should be referred to as 102 dBA.

NOTES - Aircraft Noise Setting and Impacts

/1/ U.S. Department of Transportation, *Air Carrier Traffic Statistics Monthly,* 1991.

/2/ Federal Aviation Administration, *FAA Aviation Forecasts, Fiscal Years 1990-2001,* March 1990.

/3/ Federal Aviation Administration, *Report to Congress, Status of the U.S. Stage 2 Commercial Fleet,* August 1989.

/4/ McClenahan, James, Assistant Air Traffic Manager, San Francisco International Airport, telephone conversation, March 2, 1992.

/5/ Landrum & Brown, *Air Space Element, California Aviation System Plan,* prepared for the California Department of Transportation, Division of Aeronautics, August 31, 1991.

/6/ Federal Aviation Administration, *Airman's Information Manual,* 1990.

/7/ Weinum, Chuck, Assistant Manager of Plans and Programs, Bay TRACON, telephone conversation, March 13, 1992.

/8/ 49 U.S.C.A. Section 1305 (a)(1).

/9/ Dyer, Richard G., Airport Environmental Specialist, California Department of Transportation, Division of Aeronautics, telephone conversation, February 26, 1992.

/10/ 49 U.S.C. App. Section 2125 et seq.

/11/ San Francisco Airports Commission, Resolution No. 88-0016, January 22, 1988; Resolution 91-0099, June 4, 1991.

/12/ San Francisco International Airport *CNEL Quarterly Report,* April 1 1991, to June 30, 1991, "Summary of Statistical Information," Item 7.

/13/ Casey, John, Avmark, Inc., telephone conversation with SFIA staff, February 1992.

/14/ Costas, John, San Francisco International Airport, letter, March 9, 1992.

/15/ Based on ESA review of National Oceanic and Atmospheric Administration monthly summaries for 1990.

/16/ California Administrative Code, Title 21, Section 5000, et seq., as amended.

/17/ Tracor Applied Sciences, *Investigation of Low Frequency Noise From Departures on Runways 01L and 01R at San Francisco International Airport,* Project No. 076-439 (-01), February, 1987.

/18/ Joint Powers Board, *Joint Land Use Study, Final Technical Report,* March 1980.

/19/ San Francisco International Airport, *Airport Noise Mitigation Action Plan (ANMAP),* April 7, 1981.

/20/ Federal Aviation Administration Order No. 8400.9, November 9, 1981.

/21/ Carbone, Dave, City/County Association of Governments of San Mateo County, staff to the Airport/Community Roundtable, telephone conversation, March 11, 1992.

AIRCRAFT NOISE MITIGATION

The Notes for this section begin on p. C&R.312.

SUGGESTED MITIGATION MEASURES

Air Traffic Flow Control

Comment

"Add a separate mitigation measure that indicates the FAA will use air traffic flow control as a noise abatement measure to ensure large numbers of aircraft will not arrive [at] or depart the airport at the same time." (Raymond Miller, C/CAG)

"We agree with the Airport Land Use Commission's (ALUC) comment that the Draft EIR should address air traffic flow control by the FAA as a noise mitigation measure to reduce noise impacts and to analyze the feasibility of a curfew or mandatory preferential runway use during the nighttime hours to reduce noise impacts." (Leslie Carmichael, City of Foster City)

Response

According to SFIA Administration staff, air traffic flow control is a Federal Aviation Administration (FAA) procedure developed and used nationally to reduce the acceptance rate of aircraft landing at airports in instrument flight conditions. All air traffic arriving at or departing SFIA, from or to any destination, is under the direct control of the FAA Oakland Center, which initiates "gateholds" for all airports in Northern California and most of Nevada. The object of the system is to insure proper spacing of aircraft in flight. Extended use of flow control results in air traffic arrival delays for in-bound aircraft, especially when conditions require such techniques late at night.

The use of air traffic flow control would not mitigate noise impacts around SFIA because it would not reduce the number of flights using the Airport, or affect the paths used by arriving and departing aircraft. Thus, it is not appropriate to include air traffic flow control in the EIR as a mitigation measure.

The limits on SFIA's authority to regulate the use of air traffic control procedures are discussed on p. C&R.280 herein.

Curfew / Controls on Nighttime Operations

Comments

". . .Mitigations by the airport to address the impact of single event noise and increases in single event noise should be included through such programs as expanded insulation programs and operational and navigational adjustments such as runway assignments, reciprocal curfews for some destinations or curfews on some operations." (Dennis Argyres, City of Burlingame).

"The text should analyze the feasibility of a nighttime curfew on airport operations and the feasibility of a mandatory preferential runway use program in the nighttime hours, as an alternative to a curfew." (Raymond Miller, C/CAG)

"Appendix J indicates that nighttime flights can be assumed to increase 25% -- from 129 flights per night now to 162 flights per night in the year 2006. Each of the 162 flights would have a statistical probability of disturbing the sleep of each residence they fly over. We would like to see night flyovers of Pacifica eliminated or at least strictly controlled; as to total per night and frequency within any hour.

"Other airports have been forced to limit the hours of their arriving and departing flights in acknowledgment of the problems of aircraft noise at night. . .

"We suggest that the EIR seriously consider an alternative (which must be environmentally superior to the project) that would have hourly flights as shown below (these can be compared to Appendix J-2.)

Hour	Number of Flights
0000	0
0100	0
0200	0
0300	0
0400	0
0500	0
0600	56
0700	90
0800	120
0900	102
1000	95

1100	115
1200	120
1300	110
1400	98
1500	98
1600	104
1700	93
1800	108
1900	120
2000	120
2100	120
2200	0
2300	0
Total	1,669

"At the very least, we believe that limits need to be added on night flights. How many are acceptable during one hour at 10 p.m.?; at 3 a.m.? As we read the EIR now there are no such limits other than the overall limitation on daily CNEL. Such a daily limitation ignores many other measures that can reduce the noise impacts of the SFIA Master Plan." (Fred Howard, Pacifica Noise Abatement Committee)

"**Pages 335 and A.179:** . . . Furthermore, the DEIR states that no increase in traffic during the evening and nighttime hours, (from 7:00 p.m. to 7:00 a.m.) is expected as a result of the expansion plan. If this is to be included as a mitigation measure, then it should be guaranteed that no increases in nighttime operations will occur." (Duane Spence, Airport Mitigation Coalition)

Response

The San Francisco International Airport Noise Abatement Regulation, adopted in January 1988 (San Francisco Airports Commission Resolution No. 88-0016), as amended in June 1991 (San Francisco Airports Commission Resolution No. 91-0099, June 4, 1991) referred to by the EIR, p. 168, provides for a nighttime restriction on Stage 2 operations, defined as 1:00 a.m. to 6:00 a.m. as of January 1, 1989 and extending to 11:00 p.m. to 7:00 a.m. after January 1, 1993. As part of the regulation, all airlines operating at SFIA have agreed in writing to abide by the program to the extent permitted by atmospheric conditions and the FAA. The EIR (pp.167-168) addresses current nighttime restrictions on airport operations, including the Regulation, nighttime preferential runway use, and a prohibition of aircraft engine run-ups from 10:00 p.m. to 7:00 a.m. without special permission.

SFIA's current restrictions still permit Stage 3 aircraft to operate at night. Accordingly, the following mitigation measure is inserted after the fifth bulleted item on p. 425 of the EIR:

> Consider developing and implementing additional restrictions on nighttime operations by Stage 3 aircraft. **Implementing Agencies: SFIA, airlines serving SFIA**

The assumption that there would be no increase in the proportion of total operations occurring during nighttime hours (stated on p. 335 of the EIR) is not a mitigation measure. Responses to comments regarding aircraft operations assumptions are on pp. C&R.206-208 herein.

For responses to comments regarding preferential runway use and expanded sound insulation programs, please see pp. C&R.271, 286-287 herein.

<u>Mandatory Preferential Runway Use</u>

<u>Comments</u>

". . .Mitigations by the airport to address the impact of single event noise and increases in single event noise should be included through such programs as expanded insulation programs and operational and navigational adjustments such as runway assignments, reciprocal curfews for some destinations or curfews on some operations." (Dennis Argyres, City of Burlingame).

"The text should analyze the feasibility of a nighttime curfew on airport operations and the feasibility of a mandatory preferential runway use program in the nighttime hours, as an alternative to a curfew." (Raymond Miller, C/CAG)

"Mitigating Measures We Propose: . . .

> "Institute a total departure curfew from 12 midnight to 7:00 a.m. on runways 1L and 1R." (Duane Spence, Airport Mitigation Coalition)

"We understand the assumption that aircraft-generated noise will decrease in the future due to the replacement of noisy aircraft with quieter aircraft. The trend toward increased use of Runway 1, however, subjects Millbrae residents to increased single-event and backblast noise. Mitigation for these impacts should be included; e.g. increased participation in and acceleration of residential noise insulation by the Airport, and a reduction in the use of Runway 1." (Janet Fogarty, Mayor, City of Millbrae)

Response

The FAA and airlines are responsible for the safety of aircraft operations and have the authority, by law, to decide ultimately which runway to use. The Airport cannot mandate the use of a specific runway, as this is within the control of the FAA and pilot who evaluate atmospheric conditions, which constantly change, to determine operational safety and the appropriate runway to use.

The Airport does, however, have a policy for preferential runway use. A description of this policy can be found in Airports Operation Bulletin (AOB) 88-03. The runway use policy is informal (not officially approved by the FAA), and is implemented through agreement between SFIA and the airlines (as part of the Airport Noise Regulation)./1/ Page 425 of the EIR includes a mitigation measure intended to maximize use of the current preferential runway use procedures. To provide mechanisms to reinforce maximum use of the procedures, the first bulleted item on p. 425 of the EIR is revised as follows (revisions are underlined):

> Continue voluntary maximum use of the existing preferential runway use procedures at SFIA (nighttime use of Runways 10L and 10R for departures). Use the information in the SFIA Director's Reports to track and discuss actual use of the procedures at Airport/Community Roundtable meetings. If the use of the procedures could be increased, consider taking actions to encourage and promote such increased use. **Implementing Agencies: SFIA, FAA, airlines serving SFIA**

(A revision to the same measure to include the use of Runways 19L and 19R for arrivals is shown on pp. C&R.281-282 herein.)

Curfews and expanded sound insulation programs are discussed on pp. C&R.268-270, 282-287 herein.

Navigational Aids

Comments

"Another thing. They could develop a microwave system to successfully implement 92 percent of arrivals landing on Runways 19 Left and 19 Right. It would allow 60 to 80 percent of departures to use quiet shoreline from Runways 28 Left and Right. . ." (Duane Spence, Peninsula Litigation Coalition)

"Add a separate mitigation measure to address installation of navigation equipment to assist in reducing noise impacts over populated areas (e.g., installation of LDA/DME, MLS, improved ILS, etc.)." (Raymond Miller, C/CAG)

"It would also be appropriate to discuss the possible uses of new types of approach and departure guidance equipment (i.e. LDA and Microwave Landing System) that could be used to provide more precise aircraft guidance to minimize the variations in flight paths that currently result in overflights of local communities." (Jack Drago, Mayor, City of South San Francisco)

"There are no mitigations noted for the expected increase in noise exposure, as measured by CNEL, at Foster City. A potential mitigation may include the installation of a Localizer Type Directional Aid (LDA) for approaches to Runway 28R." (Roger Chinn, Airport/Community Roundtable)

"The advantages and disadvantages of using navigational aids such as LDA/DME (Localizer-Type Directional Aid/Distance Measuring Equipment), MLS (Microwave Landing System), or improved ILS (Instrument Landing System) for noise mitigation should be evaluated. If these aids can be used to separate aircraft in bad weather, they should be able to be used to route aircraft farther from shore during good or bad weather in order to reduce noise impacts." (Leslie Carmichael, City of Foster City)

"Mitigation measures involving navigational equipment to assist in reducing noise impacts over populated areas should be added to the DEIR." (George Foscardo, City of San Bruno).

Response

According to SFIA Administration staff, a meeting was held in the Foster City Community Center on January 15, 1992 by the Foster City Noise Committee chaired by Mr. Roger Chinn. Airport and FAA officials were in attendance. The FAA stated that a Localizer Directional Air/Distance Measuring Equipment (LDA/DME) will be installed at SFIA by August 1992. It is proposed that LDA/DME will be used in both bad and good weather potentially to reduce the noise impacts at Foster City.

The Microwave Landing System (MLS) is still in the development stage with limited experimental testing at several airports (Europe, Canada, U.S.A.). Such a system can be operated only when the airborne equipment has been produced and installed on the aircraft. At present, there is no cockpit unit or instrument developed and commercially available for airline usage. The FAA reports that the Request For Proposal (RFP) was issued in February 1992. The FAA does not expect a prototype to be delivered for at least 12-18 months, with unit deliveries expected in 1997-98. SFIA is being evaluated as an early recipient for such an airport-based system. The FAA, MLS Development Team will also be monitoring and evaluating the implementation of the LDA/DME.

The Instrument Landing System (ILS) is a navigational aid used primarily during inclement weather when there is little or no visual contact with the runways. It provides the airline pilot with information on direction and elevation while approaching the runway for landing. The system uses a fixed, at-grade, localizer, and inner and outer markers which send signals to precision instruments in the cockpit for the pilot to interpret. The pilot can then adjust the aircraft's heading and descent rate to land accurately and safely on the runway. By its very nature the ILS is a fixed azimuth and elevation precision aircraft approach system. There is no new technology for ILS Systems (e.g., offset ILS) nor is new technology being pursued. MLS is slated to replace ILS eventually.

The following mitigation measures are inserted after the fifth bulleted item on p. 425 of the EIR:

> Work with the FAA and the Foster City Noise Committee to develop noise abatement approach procedures using the LDA/DME planned for installation at SFIA in 1992. Use of such procedures could result in a reduction in cumulative noise levels in Foster City.

If SFIA is selected for receipt of an MLS, work with the FAA and the Airport/Community Roundtable to review and revise flight procedures, with the goal of using the MLS to reduce single-event and cumulative noise levels.

The following mitigation measures are inserted after the second bulleted item on p. 426 of the EIR:

Implement the planned installation of an LDA/DME at SFIA. Study and, if possible, develop approach procedures using the LDA/DME, with the goal of reducing cumulative noise levels in Foster City. **Implementing Agency: FAA**

Consider SFIA as an early recipient for an MLS. If SFIA is selected, implement the installation of the MLS. Review, and if possible, revise SFIA flight procedures, with the goal of using the MLS to reduce single-event and cumulative noise levels. **Implementing Agency: FAA**

Monitoring of Flight Patterns

Comments

"The mitigation measures should include use of Passive Aircraft Surveillance Radar to provide computer tracking and records of flight patterns in order to monitor and report on whether aircraft are actually staying in assigned areas." (Leslie Carmichael, City of Foster City)

"The use of PADIS to monitor flight tracks is of dubious value. The FAA has not made obviously mitigating track changes over the last 15 years--why would they do so in the next 15 years? This is wishful thinking, not a mitigating measure." (Duane Spence, Airport Mitigation Coalition)

Response

Page 425 of the EIR includes a mitigation measure calling for accelerated installation of a Passive Aircraft Detection Instrument System at SFIA. According to SFIA Administration staff, the PASSUR System was installed at SFIA in December 1991. It is operational and under evaluation. Basically, it is designed for aircraft identification, track, noise, and altitude monitoring. These capabilities are specific to the system in use at SFIA.

Accordingly, the second bulleted item on p. 425 of the EIR is replaced with the following:

> Use the SFIA PASSUR Tracking System to evaluate actual flight patterns at SFIA and determine the value of existing and proposed noise abatement procedures. Develop regular reports from the PASSUR System for inclusion in the Director's Reports presented at Airport/Community Roundtable meetings.

According to SFIA Administration staff, aircraft do not have 'assigned areas'. Rather they have 'flight clearances', which authorize certain departure procedures, enroute airways and assigned altitudes. These clearances are in the exclusive control of the Federal Aviation Administration (FAA).

Radar tracking data (such as the data available through the SFIA PASSUR system) provide information on the actual paths followed by arriving and departing aircraft. Such data are valuable because they allow for evaluation of the effectiveness of established noise abatement flight procedures; they also allow for "testing" of the effectiveness of proposed procedures. The mitigation measure on p. 425 of the EIR (as revised herein) provides for regular presentation and review (at Airport/Community Roundtable meetings) of the data produced by SFIA's PASSUR system. Reviewing the data in a forum such as the Airport/Community Roundtable could lead to proposals for, and development and implementation of, new or revised noise abatement flight procedures.

<u>Distribution of Noise Throughout Region</u>

<u>Comments</u>

"...We feel the mitigation measures are flawed... Some of the things we could suggest as mitigations would be [to], first of all, determine the total noise energy contained in all single event incidents and develop operational patterns that would equitably distribute that noise throughout the entire region." (Duane Spence, Peninsula Litigation Coalition)

"Mitigating Measures We Propose:

> "Develop a regional airport plan to distribute air traffic more equitably among the bay area airports." (Duane Spence, Airport Mitigation Coalition)

"I wish to God they would shift some of these flights down to San Jose. They could use them. They got the space. Our space is so condensed that it's terrible to even consider 1,100 flights per day in this area. So, without hogging this mike, I wish that this would be forwarded to the commission on the noise pollution." (Bruno Bernasconi)

Response

Page 425 of the EIR includes a mitigation measure calling for a regional study of air traffic control requirements, constraints, and opportunities, with the goal of minimizing noise impacts. Implementation of the commenter's suggestion would have to occur within such a context, because such a "redistribution" of noise would be related to runway use, flight track use, airspace management, and the operation of the Bay Area airports.

Noise Allocation System

Comment

"Mitigating Measures We Propose: . . .

"Adopt a noise banking system in which all airlines have a noise allocation. They would be permitted to use it in a number of ways--spend it, trade it, sell it, bank it. This was originally proposed during the Joint Land Use Study in the late 1970's by Bakes of the CAB. Since the airport's only method to increase flight capacity is to saturate runway 1 where the low frequency noise is not properly taken into account, this would put the airlines in the position of thinking very seriously about their effects on the community. This would be a benefit to all communities." (Duane Spence, Airport Mitigation Coalition)

Response

Generally, the intended effects of a noise allocation system (as described on p. IIIB-15 of the Joint Land Use Study, and as implemented by other U.S. airports) include the increased use of Stage 3 aircraft and the shifting of aircraft operations from nighttime to daytime hours./2/ These purposes are already being achieved by the Airport Noise Regulation, described on p. 168 of the EIR.

A discussion of the preferential use of Runways 1L and 1R is on pp. C&R.270-271 herein.

Construction of New Runways / Runway Extension

Comments

"**Mitigating Measures We Propose:** . . .

> "Overflight noise in Foster City due to approaches to runways 28L and 28R could be greatly reduced, if not eliminated, by construction of two additional runways, 26L and 26R. These new runways would allow planes aligned with the runway centerlines to be a half-mile or more off shore as they pass Foster City." (Duane Spence, Airport Mitigation Coalition)

". . .[O]ne of the mitigations that they paid only lip service to is moving the threshold of 1 L and 1 R 3,500 feet down the runway and extending the runway on out in the bay, which was in one of the plans that they paid for. It doesn't look like they're doing any more than just continuing to think about it . . . The point is, moving that threshold down, further away from Highway 101, would be a mitigating effort if they were to go ahead and do that . . . Create more wetland." (David Few)

Response

Runway reconfiguration alternatives that would reduce noise impacts are already being considered as part of the SFIA Runway Reconfiguration Study. This study is described on pp. C&R.48-50. Completion of the study is identified as a mitigation measure on p. 425 of the EIR.

Construction of two additional runways, 26L and 26R, would reduce overflight noise of arriving aircraft over Foster City as well as single-event noise exposure. Depending upon site location, this measure could also either reduce or increase the 65 CNEL noise impact boundary on those communities to the north of the Airport.

The 20 degree westerly shift in aircraft departing 26L or 26R could make it difficult for these aircraft to follow the designated shoreline departure route (an adopted noise mitigation procedure whereby aircraft make a right turn as soon as feasible after takeoff to fly east of San Bruno Mountain adjacent to the shoreline). This could cause aircraft to overfly cities that are currently avoided by aircraft using this procedure, thereby increasing the 65 CNEL impact boundary. However, if the runways were constructed far enough to the south, the mitigating effects of the Shoreline Departure procedure could be enhanced, which would reduce the 65 CNEL impact boundary. In addition, the noise impact boundary could be reduced further because aircraft departing through the San Bruno gap would be flying at a higher altitude.

Depending on the new runway heading and how far south the runways were sited, construction of these runways could also affect FAA airspace management for Bay Area arriving and departing flights (aircraft arrivals into Oakland and aircraft departures from San Jose). Since this measure proposes additional runways, the separation distance from the existing runway system (28L/28R) would follow existing FAA standard criteria and for ILS operations (4,300') to maintain airfield safety. (This separation would allow simultaneous landings during adverse weather conditions and would reduce aircraft delays during the occurrence of such conditions.) Airport staff estimates this would require constructing runways on approximately 120 acres of Bay fill at a construction cost of approximately $750 million. The amount of Bay fill could affect approximately 400 acres of Bay habitat. On the basis of the probable location of runway 26L and 26R, increased aircraft taxiing distance from the terminals to this runway system would increase the airlines' annual taxi/fuel costs by approximately $40 million.

The fourth bulleted item on p. 425 of the EIR is revised as follows (revisions are underlined and deletion is indicated by brackets):

> Complete study on the feasibility of and benefits from a new runway<u>(s)</u> <u>(to replace the existing runways)</u> or extension(s) to the existing runway(s). <u>New runway(s) with a more westerly orientation could reduce overflights of Foster City and result in increased altitudes for aircraft using the Gap Departure route. Extended or new runways could potentially</u> [ ] handle departures by long-range, heavy aircraft such as the B-747, with flight paths over the Bay instead of the Peninsula. (Currently, these aircraft [ ] <u>primarily</u> use Runway 28R.) <u>New or extended runways might result in an overall reduction in the population within the CNEL 65 contour.</u> If the study results in an SFIA decision to pursue runway reconfigurations, work with FAA and other authorities to obtain necessary approvals to permit such reconfigurations. This work would include environmental review under CEQA and, possibly, NEPA. <u>Potential environmental impacts of new or extended runways include: potential shifts in flight patterns that result in increased cumulative or single-event noise levels in certain locations; potential effects on airspace management in the Bay Area, and on flight procedures for (and noise impacts near) San Jose and Metropolitan Oakland International Airports; an increase in the number of operations that could be accommodated during bad weather conditions, and thus, a reduction in aircraft delays (if new runways are separated by 4,300 feet to allow simultaneous landings during adverse weather conditions); the filling of areas of the Bay, with accompanying temporary water-quality impacts and longer-term biological impacts; and increased energy use and pollutant emissions associated with longer aircraft taxiing distances.</u>
> **Implementing Agencies: FAA, SFIA**

Financial Incentives for Higher Load Factors

Comment

"Mitigating Measures We Propose: . . .

"Provide financial incentives and disincentives for departures that are not full. Empty seats make noise with no off-setting benefits to anyone. Penalties should be levied on those empty seats." (Duane Spence, Airport Mitigation Coalition)

Response

There are clauses in the SFIA Airline Lease and Use Agreements that prevent the Airport from charging additional rates and other charges to the airlines, and from changing the method used to calculate the landing fee (the fee airlines pay to use the Airport)./3,4/ In addition, the economics of airline operation are geared toward high load factors, and the airlines already have strong financial incentives to operate full aircraft.

Return to Pre-1985 Runway Use

Comment

"Mitigating Measures We Propose: . . .

" 'Unshift' the backblast noise from runways 1, by returning to pre-1985 levels of departures on runways 1L and 1R." (Duane Spence, Airport Mitigation Coalition)

Response

Shifting runway use back to the pre-1985 distribution would result in a substantial increase in the total population affected by cumulative and single-event noise levels, because departure paths would shift from areas over the Bay to areas over the Peninsula. Thus, it would not be an appropriate mitigation measure to include in the EIR.

Increased Use of Quiet Shoreline Departure

Comment

"Mitigating Measures We Propose: . . .

"Increase the departures using the Quiet Shoreline from runways 28 on a regular and mandatory basis." (Duane Spence, Airport Mitigation Coalition)

Response

As noted on p. 167 of the EIR, the use of the visual Shoreline Departure (the procedure to which the commenter is referring) is currently part of SFIA's Airport Noise Abatement Program. Page C&R.293 herein includes a discussion of the limits on the use of the Shoreline Departure.

According to SFIA Administration staff, the authority to regulate flight patterns or routes of aircraft is vested exclusively in the Federal Aviation Administration. Federal law provides that: "No state or political subdivision thereof and no interstate agency or other political agency of two or more states shall enact or enforce any law, rule, regulation, standard, or other provision having the force and effect of law relating to rates, routes, or services of any air carrier having authority under subchapter IV or this chapter to provide air transportation."/5/ (Emphasis added.) The purpose of these federal laws is to provide a uniform and efficient system for the use of the air space. The imposition of local regulations governing aircraft flight patterns would serve to frustrate flight scheduling and navigational patterns nationwide, thus hindering commerce, aviation safety and the general management by the Federal Aviation Administration of the National Air Traffic Network.

Establishment of Nighttime Sideline Noise Limit

Comment

"Mitigating Measures We Propose: . . .

"Institute a total sideline noise level of 98 dB with 89 dB for night operations to be sure only the quiet planes operate in and out of SFIA." (Duane Spence, Airport Mitigation Coalition)

Response

As noted on p. 168 of the EIR, SFIA (under the Noise Abatement Regulation) will have a maximum nighttime sideline noise level limit of 103 EPNdB (effective perceived noise level), as of 1993. Page C&R.264 herein includes a discussion of the choice of the effective perceived noise level as the metric for the noise limit. The SFIA Noise Abatement Regulation also includes a phaseout of all Stage 2 aircraft operations by 2000 and an earlier (1993) prohibition on Stage 2 aircraft operations between 11:00 p.m. and 7:00 a.m.

The 98 EPNdB limit on all aircraft operations suggested by the commenter (it is assumed the commenter means EPNdB, not dB) would prohibit operations by almost all Stage 2 aircraft-- a prohibition which would be already be achieved during nighttime hours as of 1993 and during all hours as of 2000. The 98 EPNdB limit would also prohibit operations by the larger Stage 3 aircraft, effectively eliminating international operations. The 89 EPNdB nighttime limit suggested by the commenter would be tantamount to a curfew, because it would prohibit operations by almost all aircraft. Curfews are discussed on pp. C&R.268-270 herein.

Increased Use of Runways 10 and 19

Comment

"Mitigating Measures We Propose: . . .

"Initiate the use of runway 19 landings (from up and down the bay, not over the Eastbay) and 10 takeoffs." (Duane Spence, Airport Mitigation Coalition)

Response

The first bulleted item on p. 425 of the EIR is revised as follows (revisions are underlined):

> Continue voluntary maximum use of the existing preferential runway use procedures at SFIA (nighttime use of Runways 10L and 10R for departures). In addition, establish informal (through agreement with the airlines) nighttime preferential use of Runways 19L and 19R for arrivals (to the extent allowed by air traffic and weather conditions). If possible, arrival paths should be designed to minimize the possibility of increased noise levels in East Bay communities. The use of Runways 19L and

19R for arrivals could reduce overflight noise levels in Foster City and communities near the arrival paths for Runways 28L and 28R. Depending on the arrival flight paths used, the use of Runways 19L and 19R for arrivals could result in increased noise levels in East Bay communities. **Implementing Agencies: SFIA, FAA, airlines serving SFIA**

Scheduled Departures to Minimize Use of Vectors

Comment

". . .Scheduling departures to minimize the need for radar vectors should be explored as a mitigation." (Stephen Waldo, Mayor of Brisbane)

Response

As discussed on p. C&R.199 herein, vectoring procedures are used less than five percent of the time at SFIA, and are used only when required for specific air traffic control purposes. In addition, neither the use of radar vectors nor the scheduling of aircraft departures is within the authority or control of the Airport.

Accelerate, Expand Noise Insulation Programs

Comments

". . .Mitigations by the airport to address the impact of single event noise and increases in single event noise should be included through such programs as expanded insulation programs and operational and navigational adjustments such as runway assignments, reciprocal curfews for some destinations or curfews on some operations. . .

". . .What mitigation programs can be implemented to reduce the number of impacted uses? How can they be funded and what levels of funding are necessary? Will all adjacent communities with residential uses located within the 65 dBA CNEL or greater contour be included? Can the retrofit of all these units be accomplished within the SFIA Master Plan planning period?" (Dennis Argyres, City of Burlingame).

". . .Mitigation for this [increased backblast] should include an increased commitment by the airport to residential noise insulation such that there will be no homes within the 65 CNEL by the year 2006. The master plan proposes 6,000 homes will still be within the 65 CNEL by that date." (Janet Fogarty, Mayor of Millbrae)

"Add a separate mitigation measure that indicates the San Francisco Airports Commission will continue to provide matching funding to local agencies to continue their airport noise insulation projects, and that the Commission will expand its financial commitment, as needed, to accelerate the noise insulation projects, until all noise impacted homes within the 65 dB CNEL noise contour and above have been insulated by the end of 2006...

"<u>Local Agency Airport Noise Insulation Projects</u>

"The text should include a section on the ongoing aircraft noise insulation projects in several cities and an unincorporated area of the County near the Airport (Country Club Park). This section should indicate the total number of homes within the 65 dB CNEL and higher noise contours to be insulated and the number of homes insulated as of December 1990. It should also explain the funding structure of these projects, and indicate the overall noise insulation program that could be drastically accelerated if the Airports Commission substantially increases its funding commitment." (Raymond Miller, C/CAG)

"...I agree with the 'Airport Noise Committee's' objections to the Draft: ...

"4. Mitigation measures must be acknowledged. The necessity of a sound insulation aspect needs to be part of the report; existing, traditional and proposed flight patterns need to be disclosed as a basis for allocation.

"These flaws must be addressed in any draft to make it acceptable." (David Deakin)

"The noise impacts in the DEIR are not fully examined nor are appropriate mitigations provided ... An accelerated and stable level of funding for residential acoustical treatment -- regardless of whether or not funds are available from the FAA -- must be considered as a mitigation for both cumulative and single-event noise impacts. The insulation program is not even identified in the Draft EIR as a noise mitigation...

"The information in Appendix C and in the text fails to establish that single-event noise levels, even from Stage 3 aircraft, are likely to exceed ambient noise levels in residential neighborhoods by 30-60 dBA. The EIR must provide adequate mitigation measures for single-event noise levels, such as an expanded acoustical treatment program, with consideration given to the need for insulation outside the 65 CNEL noise contour." (George Foscardo, City of San Bruno)

"Millbrae residents are subject to extreme backblast and single event noise levels. Therefore, we feel strongly about the need for mitigation of aircraft-generated noise and increased noise levels from project-generated surface vehicles.

"The trend toward increased use of Runway 1, however, subjects Millbrae residents to increased single-event and backblast noise. Mitigation for these impacts should be included; e.g. increased participation in and acceleration of residential noise insulation by the Airport, and a reduction in the use of Runway 1." (Robert Treseler, City of Millbrae)

"It is also noted in the EIR that the Noise Impact Area, as defined by the 65 dB CNEL contour, will still contain noise sensitive land uses by the end of the planning period in the year 2006. As the intent of the State Noise Standards and the Noise Variance process is to eliminate this type of exposure, some additional mitigation measures should be added to eliminate this exposure by the end of the planning period. While the Airport has provided continued support to the Noise Insulation Programs in affected communities, it would be appropriate, due to the proposed airport expansion, for the Airport to use all its financial resources to strengthen its financial commitment to the program with the goal of completely eliminating this exposure by the end of the planning period." (Jack Drago, Mayor, City of South San Francisco)

"In recognition of the significance of increased single-event noise levels, the DEIR should propose additional mitigation measures. . .Additional mitigation programs could include provision of an enlarged and accelerated noise insulation program. San Francisco International Airport should guarantee a minimum level of funding for noise insulation programs even if Federal money no longer becomes available. The program should also be expanded without Federal money to provide insulation services to areas affected by single-event noise which are not within the 65 CNEL noise boundary. The importance of SFIA's commitment to the program over and above the basic FAA program cannot be over stressed." (Wendy Cosin, City of Pacifica)

"Add a separate mitigation measure that indicates the San Francisco Airports Commission will expand its financial commitment, as needed, to accelerate local agency noise insulation projects until all noise impacted homes, within the 65 dB CNEL noise contour and above, have been insulated by the end of 2006." (County of San Mateo Board of Supervisors)

"This action is not mentioned as a mitigation. Acoustical treatment programs are underway in several communities, but the increasing impacts that will occur in the future suggest that a substantially larger program will be needed. A larger program should be identified as a key mitigation.

"An expanded land use program might contain the following elements:

" -An expanded area of eligibility to address single-event noise exposure.

" -Commitment to a continuous, long-term program.

" -A minimum funding level available with or without federal funds.

" -Where acceptable, to include land use conversions as well as acoustical treatment." (Roger Chinn, Airport/Community Roundtable)

"I have also inquired about the home insulation program for aircraft noise and how it applies to residents of Burlingame and have gotten pretty unsatisfactory responses to that. And I will continue to try to pursue that, but it seems like Burlingame has been quite passive in that regard, and particularly those of us who live in the north Burlingame area and are most affected by the backblast issue and the flight patterns in severe weather." (Jack Hickethier)

"Millbrae residents are subject to extreme backblast and single event noise levels. Therefore, we feel strongly about the need for mitigation of aircraft-generated noise and increased noise levels from project-generated surface vehicles.

"We understand the assumption that aircraft-generated noise will decrease in the future due to the replacement of noisy aircraft with quieter aircraft. The trend toward increased use of Runway 1, however, subjects Millbrae residents to increased single-event and backblast noise. Mitigation for these impacts should be included; e.g. increased participation in and acceleration of residential noise insulation by the Airport, and a <u>reduction</u> in the use of Runway 1." (Janet Fogarty, Mayor, City of Millbrae)

"An impact is shown in terms of the location of the 65 dBA CNEL contour in Burlingame. Because there is an acknowledged impact, a mitigation program sponsored by the airport or air carriers should be proposed. Some kind of retrofit program designed for this specific kind of noise [backblast noise] could be included for those homeowners and noise sensitive uses outside the 65 dBA CNEL contour who are particularly vulnerable to this type of noise exposure." (Dennis Argyres, City of Burlingame).

Response

As explained on p. 166 of the EIR, the San Francisco Airport is currently operating under an extension of a variance from the State of California noise standards established by the State Department of Transportation and set forth in Title 21, Division 2.5, Chapter 6 of the California Code of Regulations. This variance, granted in November, 1986 pursuant to Article 5, section 5050 of Chapter 6, was extended on October 19, 1989 and further extended on September 19, 1990. The variance contains specific requirements for reducing the numbers of dwelling units within the 65 CNEL contour. As shown in revised Table 52 on p. C&R.219, the total number of dwelling units within the 65 CNEL contour is expected to be about 2,600 in 2006, not 6,000, as stated by one commenter (there would be an estimated 6,600 people within the CNEL 65 contour in 2006). However, because many, if not all, of those dwelling units will have been insulated by that time, the total number of those units that will be considered "impacted" is expected to be far less than 2,600.

Among other requirements in the variance, the Airport must provide or arrange to provide up to 20 percent of the funding for a noise-insulation/noise-easement program for residences and schools that are located within the 65 dB or greater CNEL contour area. The Airport provides this insulation funding through procedures established by the Aviation Safety and Noise Abatement Act of 1979, 49 U.S.C. 2101 et seq. This Act authorizes airport operators and units of local government to apply for assistance from the FAA for the implementation of noise insulation projects in areas that qualify for such projects under the Act. Under this Act, local governments can receive federal funding for up to 80 percent of the insulation project, providing that the remaining 20 percent is provided by the local community. The Airport currently provides this 20 percent local share for the participating communities in accordance with the requirements of the noise variance.

The Airport provides funding support for these programs in Millbrae, San Bruno, South San Francisco and Daly City. Any increased funding for these programs by the Airport would require the cities to increase their own programs and receive approval for those programs from the FAA. The Airport does not run these programs itself, because it believes it is appropriate for the cities and individual homeowners to decide what homes will be insulated. As a result, the Airport is somewhat dependent on the local communities to establish insulation programs, receive federal funding and apply to the Airport for the matching amounts.

The following mitigation measure is inserted after the fifth bulleted item on p. 425 of the EIR:

> Consider increased funding for implementation of noise insulation projects in cities near the Airport.

The San Francisco International Airport Noise Abatement Regulation, adopted in January 1988 (San Francisco Airports Commission Resolution No. 88-0016) and amended in June 1991 (San Francisco Airports Commission Resolution 91-0099, June 4, 1991) was also adopted to meet the requirements of the variance. The regulation provides for a continual reduction of cumulative noise resulting from aircraft operations with (1) a 100 percent phase out as of January 1, 2000 and (2) a requirement that the percentage of Stage 3 operations at SFIA performed by a particular airline cannot decrease during a specified quarter, based on the same quarter during the previous year.

SFIA staff expect that these programs will result in a considerable decrease of impacted dwelling units within the 65 CNEL contours by the year 2000. However, if there continue to be impacted dwelling units within the 65 CNEL in 2006, the Airport will continue to require a variance from the State noise standards.

Surface traffic noise is discussed on p. C&R.314 herein.

<u>Research Methods for Measuring and Quantifying Backblast Impacts</u>

<u>Comment</u>

"While South San Francisco is not significantly impacted by backblast noise from departing aircraft, a number of local communities are impacted. While there is no current standardized method for measuring low frequency backblast impacts, the problem is serious enough that the Airport should make a commitment to researching possible methods for measuring and quantifying backblast impacts. It would then be possible to measure changes in impacts and implement those that prove to be most feasible." (Jack Drago, Mayor, City of South San Francisco)

Response

The following mitigation measure is inserted after the fifth bulleted item on p. 425 of the EIR:

> With the California Department of Transportation and the FAA, conduct a study involving the use of the C-weighting to quantify backblast impacts, and the development of a standard for evaluating backblast impacts.

The following mitigation measure is inserted after the second bulleted item on p. 426 of the EIR:

> Conduct a study involving the use of the C-weighting to quantify backblast impacts and the development of a standard for evaluating backblast impacts. **Implementing Agencies: FAA, Caltrans**

Noise Barriers / Landscaping

Comments

"P. XI-A-174 Table I-1-2 Recommended Action Plan Improve Noise Barrier for RW 1R. It should be added also improve Noise Barrier for RW 1L too." (Jessie Bracker)

"P. XI-A-174 Table I-1, Item 2 reads - "Improve Noise Barrier for RW 1R." - Install Noise Barrier for RW 1L should be added.

"Since Concourse A is going to be extended a long way toward Hwy 101 and many new Departure Gates are to be added there just across the Freeway 101 from Millbrae Homes areas; and with new Taxiways, the highest and best sound reducing Noise Baffle Fence and/or Sound Barrier wall must be constructed from Hilton Hotel going South all the way to past RW 1R along the East side of the Hwy 101 as a Noise Mitigation. Trees and bushes also should be added wherever possible to help clean Pollution from the Air and help alleviate noise." (Jessie Bracker, letter of 8/27/91 and public hearing of 8/27/91)

Response

The improvement of the noise barrier for Runway 1R listed on p. A.174, Appendix C of the EIR was recommended by the FAA Airports Capacity Task Force to increase capacity at SFIA. On p. 10 of the Task Force Study, it is noted that aircraft departing on Runway 1R cannot apply full thrust at the beginning of their takeoff roll because the jet blast would affect freeway traffic on US 101. Improvement of the barrier's containment of jet blast would allow more long-haul aircraft to take off on Runway 1R (instead of Runway 28R)./6/ Although it is not likely that this improvement would reduce noise levels in the communities behind Runways 1L and 1R, it could reduce noise levels under the departure paths for Runway 28R. Consequently, the following mitigation measure is inserted after the fifth bulleted item on p. 425 of the EIR:

> Improve the existing noise barrier for Runway 1R to better contain jet blast. This improvement could result in more aircraft departures on Runway 1R instead of Runways 28L or 28R, and a corresponding reduction in aircraft noise levels under the departure flight paths for Runways 28L and 28R. An increase in departures on Runway 1R could result in an increase in backblast noise in the communities behind the runway.

It is not known whether the installation of additional noise barriers or vegetation behind Runways 1L or 1R would be feasible, or whether barriers would reduce noise impacts. The following mitigation measure is inserted after the fifth bulleted item on p. 425 of the EIR:

> Consider the feasibility and benefits of a noise barrier(s) behind Runways 1L or 1R. If barriers are found to be feasible and to reduce noise levels, install the barriers as appropriate.

A response related to the effects of vegetation on air quality is on p. C&R.332 herein.

Aircraft Takeoff Procedures

Comment

"Please consider the following recommendation:

"Aircraft must attain high altitude upon take off from SFO, because of noise and pollution that affects the San Francisco Bay Area." (Leonard Lundgren, Lakeside Property Owners Association)

Response

A mitigation measure is included on p. 425 of the EIR that identifies a "quiet climb" program to reduce the takeoff noise of Stage 2 aircraft in areas near SFIA.

The attainment of high altitude would require the use of full power during aircraft "climbout" (soon after takeoff). For Stage 3 aircraft with high-bypass engines, the reduction in noise from the increase in altitude outweighs the additional noise produced by the engines operating at full power. For aircraft with low-bypass engines, overall noise may actually increase because the aircraft cannot gain enough altitude to offset the noise produced by the engines operating at full power. This difference between the two categories of aircraft is reflected in the ATA Departure Procedure, which is outlined in FAA Advisory Circular 91-53 (and noted on p. 167 of the EIR). For aircraft with high-bypass engines, the ATA Procedure involves continued climb at full power; for aircraft with low-bypass engines, the procedure involves a cutback in engine thrust.

A draft update to Circular 91-53 contains three alternative takeoff procedures. Under the draft Circular, takeoff procedures at a particular airport could be designated by runway and aircraft type. At SFIA, aircraft with low-bypass engines could continue to climb at full power when departing on Runway 1L or 1R and climbing over the Bay; such a procedure would result in the aircraft flying over East Bay communities at a higher altitude. Accordingly, the fifth bulleted item on p. 425 of the EIR is revised as follows (revisions are underlined and deletion is shown in brackets):

> Work with the FAA and airlines to develop a "quiet climb" program (takeoff procedures) to reduce the single-event takeoff noise of Stage 2 aircraft in areas near SFIA. The program [ ] <u>c</u>ould involve delaying the application of climb power (after engine cutback soon after takeoff) until reaching a specified altitude (such as 5,000 feet above the ground) or clearing populated areas. <u>When FAA Advisory Circular 91-53 is updated, review the Circular and determine whether runway-specific and other appropriate procedures can be adopted</u>. **Implementing Agencies: FAA, SFIA, airlines serving SFIA**

Participation in the Airport/Community Roundtable

Comments

"Add a separate mitigation measure that indicates the Airports Commission, through the Director of Airports, will continue to support and participate in the Airport/Community Roundtable to continue to provide an ongoing public forum to address community airport noise issues and to monitor airport noise abatement actions implemented by the Director of Airports, the FAA, and the airlines." (Raymond Miller, C/CAG)

"We agree with the ALUC's comment that a separate mitigation measure should be added that indicates the Airports Commission, through the Director of Airports, will continue to support and participate in the Airport/Community Roundtable to continue to provide an ongoing forum to address community airport noise issues and to monitor airport noise abatement actions implemented by the Director of Airports, the FAA, and the Airlines." (Leslie Carmichael, City of Foster City)

Response

The following mitigation measure is inserted after the fifth bulleted item on p. 425 of the EIR:

> Continue to support and participate in the Airport/Community Roundtable to provide an ongoing public forum to address community airport noise issues, and to monitor Airport noise abatement actions.

Increased Use of "Less Noisy Backblast" Aircraft

Comment

"...They could eliminate the suggestion for long range and faster climb-out aircraft. We need less noisy backblast aircraft..." (Duane Spence, Peninsula Litigation Coalition)

Response

The increased use of faster climb-out aircraft is identified as mitigation because it would help to reduce noise levels under the departure paths for Runway 28R. The increased use of Stage 3 aircraft at the Airport is resulting in less backblast noise (as discussed on pp. C&R.255 herein); the total phaseout of Stage 2 aircraft required by the Airport Noise Regulation would likely result in further reductions in backblast noise.

Adoption of Noise Metric Based on Single Events

Comment

"...They should abandon the CNEL as a metric and adopt a more realistic measurement based on single events." (Duane Spence, Peninsula Litigation Coalition)

Response

The adoption and use of CNEL as the basis for the evaluation of noise impacts, and the absence of other adopted standards, are discussed on pp. C&R.230-233 herein. The adoption of a metric other than CNEL would be the responsibility of the FAA and/or Caltrans, and would require substantial amendment of the State Noise Standards.

Aircraft Engine Runups

Comment

"P-13- under Additional Measures to address impacts. (to be added) . . .

"All extended-time Aircraft Engine Runups be done as close to East side of Airport as possible (by the Bay)." (Jessie Bracker)

"Although aircraft engine runups between 10:00 p.m. and 7:00 a.m. require special permission, it is never denied. It should be noted here that these engine runups sometimes continue for up to one hour's duration. Even though four engines on one plane may each have engine runup tests, the total is counted as 1 runup." (Duane Spence, Airport Mitigation Coalition)

Response

According to SFIA Administration staff, all Airport engine run-ups are performed in the north and east sides of the Airport adjacent to the bay (19L and 28R run-up area). These areas are the farthest locations from the surrounding communities. This run-up policy is described in Airport Operations Bulletin-85-06. This policy was the subject of an Airport/Community Roundtable workshop and was reviewed and accepted by the Roundtable members.

Shift Southbound Flights Out of San Bruno Gap

Comment

"An additional mitigation measure which should be considered is to shift southbound flights departing from Runway 28 out of the San Bruno Gap. We understand that this has been previously considered, however, a summary of the status of the proposal should be provided as well as consideration of its feasibility." (Wendy Cosin, City of Pacifica)

Response

The EIR preparers are not aware of any proposals to shift southbound departures from Runways 28 out of the San Bruno Gap.

The EIR preparers are also not aware of many southbound flights that depart on Runways 28. As shown from a review of the SIDs in Appendix C of the EIR, most of the SIDs for departures on Runways 28L and 28R require aircraft to proceed for at least six nautical miles (from a navigational aid at the Airport) before turning. The SIDs that allow earlier turns are the Quiet One Departure, used for flights to northern destinations, and the Shoreline Eight Departure, used for flights to northern and eastern destinations. Aircraft flight routes are chosen in large part on the basis of the final flight destinations.

Regarding the shifting of departures out of the Gap: the SFIA preferential runway system has essentially moved as many flights as possible out of the Gap.

Measures Used at Other Airports

Comment

"Moreover, while labelling the transfer of a burden from one community to another a 'mitigation', the DEIR omits seriously to consider any of the existing, effective approaches to mitigating the effects of increased operations that have been adopted at other major airports in the United States and around the world. Creative new approaches to the problems of noise and safety that arise with increased airport operations in limited airspace are entirely absent." (Carol Gamble)

Response

The impacts of the noise mitigation measures in the EIR are discussed on pp. C&R.300-309 herein. The measures in the EIR include the phasing out of Stage 2 aircraft, flight procedures, preferential runway use, the use of radar tracking data, a regional study, a study of the benefits of runway reconfiguration, and a "quiet climb" program for Stage 2 departures. These are the types of measures that are used effectively at other U.S. airports./7/ Other measures used at other airports are suggested and addressed elsewhere in this section.

Additional Noise Monitors

Comment

". . .The need for additional noise monitors has been previously discussed and should also be recognized in the DEIR due to the proposed significant increase in air traffic." (Wendy Cosin, City of Pacifica)

Response

Aircraft noise monitors would not directly mitigate noise, but could potentially serve to provide the Airport with information to help evaluate the effectiveness of existing or develop new noise abatement procedures. Accordingly, the following measure is inserted after the fifth bulleted item on p. 425 of the EIR:

Consider the installation of additional noise monitors to help evaluate the effectiveness of existing, and/or develop new, noise abatement procedures.

Noise Variance Conditions

Comment

"Add a separate mitigation measure that addresses the Airport's noise variance pending before the State Division of Aeronautics." (Raymond Miller, C/CAG)

Response

To the extent that the mitigation measures included in the EIR reduce cumulative noise levels, the measures would reduce SFIA's need for a variance. It would be speculative to conclude that the measures would eliminate the need for a variance, as the effectiveness of some measures depends on the outcomes of studies, and compliance with some measures cannot be mandated by the Airport.

The inclusion of EIR mitigation measures as conditions of the new variance is a decision that is made by the State Division of Aeronautics under the provisions of the State Noise Standards, and as such, is not within the scope of this EIR./8/ The variance is discussed on pp. C&R.262-263 herein.

IMPACTS IDENTIFIED FOR MITIGATION

CNEL

Comment

"May I also indicate that we are quite positive that this airport will do the job to benefit most of the people. We can't do it to all. We are quite positive that the airport will increase in its size. It's only going to have to; otherwise we will have some serious problems . . . in landing and takeoffs. But we feel that we could be a good neighbor, even though we are that far . . . away from the airport, and we can work together.

"I have only been acquainted with the airport for 20 years, since I first moved to Pacifica. And we have been able to mitigate quite a few things. We feel with the noise insulation program that we applied for the Fairmont area, that that will help mitigate some of the impact of noise. But we hope that we can work with you, alongside of you, to benefit both San Francisco and the area and jobs and everything else, and would also take care of the concerns of cities furthest away from the airport that had no indication -- for 15 years we were not getting any noise in the back of the valley. But because they changed their flight pattern, we have gone from -- we took a monitor out there, and we had a zero ambient noise. But then when the plane flew over at night, it jumped quite high. And we are very quiet back there.

"We are not saying that we don't want you to fly back there, but we are saying: Can we resolve the problem in the ambient noise and also the CNEL?" (Fred Howard)

<u>Response</u>

As stated on pp. 153 and 334 of the EIR, the 65 CNEL contour is established as the threshold of significant adverse impacts by both the FAA and the California State Noise Standards. Under such a standard, there would be a reduction in noise impacts in 1996 and 2006 with or without the project (see pp. 339-344 of the EIR). Estimates of these reductions are shown in Tables 53 and 54, pp. 342-343 of the EIR, and include several Pacifica sites. As noted on p. 347 of the EIR, however, there would still be people exposed to 65 dBA, CNEL and above in those years. To the extent that these persons are "impacted," as described in the State of California Noise Standards, SFIA would continue to be required to operate under a noise variance. The number of overflights from aircraft serving SFIA would increase during the analysis years, as described on p. 344 of the EIR and in EIR Appendix C. However, the shift to Stage 3 aircraft would result in noticeably lower single-event noise levels.

Some of the SFIA noise programs currently in place (and described on pp. 167 and 168 of the EIR) are intended to reduce cumulative noise impacts. Several of the mitigation measures on pp. 424-426 of the EIR -- including commitment to a phasing out of Stage 3 aircraft, increased use of Runways 1L and 1R for departures, revision of the Quiet Bridge Approach, mitigation implemented as the result of regional or runway reconfiguration studies, and a quiet climb program -- could also result in reduced CNEL impacts if they were implemented. Measures addressed in the responses herein that could reduce or minimize CNEL impacts include the installation of navigational aids, the continued nighttime preferential use of Runways 10L and 10R for departures and the use of 19L and 19R for arrivals, and the improvement of the noise barrier behind Runway 1R.

Mitigation for single-event noise impacts is discussed on pp. C&R.299-300 herein.

Backblast Noise

Comments

"Add a separate mitigation measure that addresses the backblast noise problem from aircraft departures on Runways 1, other than studying runway reconfiguration alternatives." (Raymond Miller, C/CAG)

"The low-frequency noise or backblast problem has been well documented by people in the community and by the frequency-band analyses conducted by Caltrans and by Tracor several years ago. While acknowledged in Section III of the Draft EIR in the Environmental Setting, the impact discussion in Section IV only mentions a possible reduction, as measured in CNEL. No specific mitigations are identified for the backblast problem." (George Foscardo, City of San Bruno)

"No specific backblast noise mitigations are identified." (Roger Chinn, Airport/Community Roundtable)

"Millbrae residents are subject to extreme backblast and single event noise levels. Therefore, we feel strongly about the need for mitigation of aircraft-generated noise and increased noise levels from project-generated surface vehicles." (Janet Fogarty, Mayor, and Robert Treseler, City of Millbrae)

Response

As stated on pp. 153 and 334 of the EIR, the 65 CNEL contour is established as the threshold of significant adverse impacts by both the FAA and the California State Noise Standards. (The adequacy of CNEL as a descriptor of backblast noise is discussed on pp. C&R.251-253 herein.) Under such a standard, there would be a reduction in noise impacts in 1996 and 2006 with or without the project. On p. 344 of the EIR, it is noted that backblast noise would decrease from 1990 through 2006.

The phasing out of Stage 2 aircraft by 2000 and the continued preferential use of Runways 10L and 10R for nighttime departures would help to reduce backblast noise. Depending on the outcome of regional and runway reconfiguration studies, the mitigation measures resulting from those studies could help to reduce backblast noise. All of these measures are identified in the EIR (pp. 424-426).

Noise barriers could help to reduce the backblast problem; barriers are discussed on p. C&R.289 herein. Surface traffic noise is discussed on p. C&R.314 herein.

Increase in Nighttime Operations

Comments

"Add a separate mitigation measure that addresses the possible increase in nighttime operations due to air traffic/capacity delays." (Raymond Miller, C/CAG)

"Mitigation measures must be offered to reduce the potentially significant impacts from the possible increase in nighttime operations due to air traffic / capacity delays." (George Foscardo, City of San Bruno)

"There is no mitigation directed at a possible increase in nighttime operations due to air traffic/capacity delays." (Roger Chinn, Airport/Community Roundtable)

Response

The following mitigation measure is inserted after the fifth bulleted item on p. 425 of the EIR:

> Continue to keep track of information on late night air carrier operations by runway and scheduled operations from midnight to 6:00 a.m. as part of the Director's Reports presented at Airport/Community Roundtable meetings. If the percentage of annual total operations performed at night increases such that nighttime cumulative noise levels increase 1.5 dBA, CNEL or more, conduct an investigation to determine the cause of the increase. To the extent allowed by law, implement mitigation measures to offset the increase in nighttime noise levels.

Single Event Noise

Comments

"Substituting large two-engine aircraft with large four-engine aircraft is the only mitigation directed at single-event noise impacts." (Roger Chinn, Airport/Community Roundtable)

". . .[S]ince the DEIR is currently inadequate in its disclosure of noise impacts over San Francisco, no viable mitigations have been proposed. I hope that the responses to these and other comments will suggest further mitigations." (Curt Holzinger)

". . .[T]here are a couple of issues I really would like to express some concern about. No. 1, I feel that the single event [noise impact] in the Environmental Impact Report does not – it speaks of it, but it does not go any further and talk about mitigating that problem." (Fred Howard)

". . .Based on this average day simulation, the DEIR must include mitigation measures to offset the adverse impact of the increased frequency of single-event noise." (Maria Gracia Tan-Banico, City of Daly City)

Response

As stated on pp. 153 and 334 of the EIR, the 65 CNEL contour is established as the threshold of significant adverse impacts by both the FAA and the California State Noise Standards. (The adequacy of CNEL as a descriptor of single-event noise and the adoption of CNEL as the State standard are discussed on pp. C&R.230-233 herein.) Under such a standard, there would be a reduction in noise impacts in 1996 and 2006 with or without the project. On p. 344 of the EIR, it is noted that 1) in areas with overflights by aircraft serving SFIA, the number of times single-event noise occurs would increase, and 2) there would be a decrease in the number of flights by noisier, low-bypass-engine aircraft such as the B-727.

As stated on p. 344 of the EIR, the phasing out of Stage 2 aircraft by 2000 would help to reduce single-event noise. The continued preferential use of Runways 1L and 1R for daytime departures and 10L and 10R for nighttime departures would continue to minimize single-event noise in areas under the departure paths for Runways 28L and 28R. Increased use of large, long-range two-engine aircraft as an alternative to the B-747 would reduce the single-event noise under flight paths used by the B-747. Revisions of flight procedures and the use of the PADIS to determine the effectiveness of the procedures could further reduce-single event noise. Depending on the outcome of regional and runway reconfiguration studies, the mitigation measures resulting from those studies could help to reduce single-event noise. All of these measures are identified in the EIR (pp. 424-426).

POTENTIAL EFFECTIVENESS AND IMPACTS OF MEASURES IN DEIR

Comments

". . .I agree with the 'Airport Noise Committee's' objection to the Draft: . . .

"2. Noise level reductions based upon new aircraft is an assumption not a mitigation measure. . .

"These flaws must be addressed in any draft to make it acceptable." (David Deakin)

"Page 167, Noise Abatement Program: . . .

"Runways 10L and 10R (for noise abatement between 1:00 and 6:00 a.m.) are used only when airlines voluntarily elect to use them. Although using alternate departure runways is contrary to SFIA's preferential runway use doctrine, no violations are ever issued to the transgressing airlines. . .

"Page 424, Mitigation Measures, Aviation Noise: . . .

"Voluntary use of preferential runways 10, from 1:00 a.m. to 6:00 a.m. will not be effective mitigation until their use is mandatory. Single noise events cause the backblast problem and constantly disrupt the sleep of tens of thousands of citizens. San Diego, an International Airport, has a curfew from 11:00 p.m. to 7:00 a.m. The nighttime noise relief at SFIA of changing runways (when conditions permit) still is only voluntary and only for the hours of 1:00 a.m. to 6:00 a.m. This was initially proposed in 1980 as a first step, yet the hours have not been extended to give additional nighttime noise relief (Joint Land Use Plan, adopted 1980). . .

"The Visual Shoreline Departure from runways 28L and 28R accounts for only 0.3% of departures. This certainly cannot be considered a mitigation measure. . .

"The Quiet Bridge Approach is regularly ignored by in-bound flights. Numerous Roundtable meetings have been directed to this mitigation with no results. . .

"Climb power reductions using the 'ATA departure procedure' is of no value whatsoever in mitigating the major noise problem of SFIA, **backblast**. Backblast is generated on-airport. . .

"A 'quiet climb' program does not address the major SFIA noise problem, **backblast**. This program, at best, is minor mitigation compared with the backblast problem. . .

"Until a regional study by FAA, Caltrans, and other agencies is finished and new flight routes are in actual use, the inclusion of this paragraph is not a mitigating measure. It is wishful pie-in-the-sky thinking." (Duane Spence, Airport Mitigation Coalition)

"Another mitigation that is referenced is the runway reconfiguration study, which was a separate study. It really came out of a request on the Peninsula to look at alternative runways, if they can help resolve the noise problem in different areas. This is listed as a mitigation in here, and the study is not done. In fact, the Airport Community Roundtable asked for more information. If you want to call it a possible mitigation, that is fine. But let's not call it a mitigation if the study is not even done." (Curt Holzinger)

"Completion of the Runway Reconfiguration Study should not be identified as a mitigation measure, since that action by itself, will not mitigate single-event and backblast noise impacts." (Roger Chinn, Airport/Community Roundtable)

"The Airport Noise Committee has reviewed the proposed runway reconfigurations, and our analysis revealed several issues which required further study. There is currently no agreement among noise affected parties that any reconfiguration under study will actually mitigate noise, rather than simply shift it elsewhere. In fact, the study concludes that under any configuration where large aircraft are shifted onto Runway #1 for departure; these aircraft cannot reach sufficient altitude to lower noise levels over San Francisco (Runway Reconfiguration Study, Phase 1, pgs. 6-18). Given the lack of consensus and incompleteness of the study, we find no justification for the DEIR calling it a 'mitigation.' " (Timothy Treacy, Airport Noise Committee)

"Runway extensions studies have been done to various extent since 1976. To date, no effective noise solutions have been achieved.

"On the contrary, the studies have shown that extending runways only increases the operational capacities of the airport." (Duane Spence, Airport Mitigation Coalition)

". . .Identifying the consequences of the airport's expansion proposals and analyzing possible mitigation efforts are among the most important aspects of the DEIR to residents of South-Central San Francisco, from Little Hollywood to St. Francis Wood. . .

"It is both interesting and troubling to note that the only proposals labelled 'mitigation' involve the shifting of operations (and the noise and safety concerns inherent in any operation) from one runway to another. In practical terms, the result of this shift of operations is a shift of noise and safety concerns from one community to another. This is an approach that has often been followed by SFIA, with the cooperation of the FAA. Relieving one community at the expense of another is not, however, a 'mitigation'. The label 'mitigation' is cleverly used in the DEIR, but its use is both inaccurate and misleading." (Carol Gamble)

"Another major area of question is with the mitigation section of the Draft EIR. You will recall that last time I mentioned that one of the mitigations proposed in the draft is to put more aircraft onto Runway No. 1. There is no evidence in the Draft EIR which supports that that is, indeed, a mitigation. It references a runway reconfiguration study, which was conducted by the airport, but which was not concluded, and the Airport Community Roundtable requested more information before making a decision as to if, indeed, that was a mitigation or simply a noise shift. It is the position of our committee that to move more aircraft onto Runway No. 1 is simply a noise shift which will put even more aircraft over the City and County of San Francisco." (Curt Holzinger, Airport Noise Committee, public hearing of 10/17/91)

"The DEIR proposes to 'mitigate' noise by placing even more departing aircraft onto Runways IL/IR, and it references the Runway Reconfiguration Study as an additional 'mitigation.' Neither of these proposals has been shown to actually reduce noise, the appearance of a noise reduction is rather, the result of a noise shift. The DEIR should provide supporting evidence that these proposals will mitigate noise, and if mitigation is achieved in one location, it should explicitly disclose where noise levels and frequency of overflight will increase." (Curt Holzinger)

"No mitigations for the single event impacts are proposed. . .The DEIR shows that usage of Runway #1 for departures increased from 75% in 1985 to 87% in 1989 (page 158). This shift has increased backblast noise behind the runway and overflight of the northern peninsula, worsening noise exposure in those areas. In spite of this recent experience, even greater use of Runway #1 is listed as a noise 'mitigation.' The DEIR provides no analysis to support this mitigation, and consequential impacts are ignored. The Committee finds this 'mitigation' to be a noise shift, and absent further data, references to it should be removed. Furthermore, the Airport and other public agencies have wisely pursued a policy against this type of noise shift." (Timothy Treacy, Airport Noise Committee)

"Increased use of Runway #1 is the principal noise mitigation proposed in the DEIR. Use of Runway #1 has increased from 75% in 1985 to 87% in 1989 according to page 158 of the DEIR. This change has resulted in greatly increased overflight noise in San Francisco. The DEIR provides no analysis to support this alleged mitigation, which is in reality a noise shift from areas in San Mateo County to San Francisco. Consequently, further use of Runway #1 cannot be relied upon as mitigation." (Bruce Krell, Forest Hill Association)

"Increased use of Runway #1 is the principal noise mitigation proposal in the DEIR. Use of Runway #1 has increased from 75% in 1985 to 87% in 1989 according to page 158 of the DEIR. This change has resulted in greatly increased overflight noise in SF. The DEIR provides no analysis to support this alleged mitigation, which is in reality a noise shift from areas in San Mateo County to San Francisco. Consequently, further use of Runway #1 cannot be relied upon as a mitigation." (Carol Kocivar, West of Twin Peaks Central Council)

"Revise Mitigation Measure No. 2 on page 424 in the Draft EIR, by deleting the reference to increase the use of Runways 1 for departures of long-range aircraft." (Raymond Miller, C/CAG)

"By using an increased use of Runways 01 for departures as a mitigation measure, the current high use of that runway and the existing impacts are ignored." (Roger Chinn, Airport/Community Roundtable)

"In the report on Page 424, they refer to a mitigating effort as encouraging the airlines to switch to two-engine aircraft which then they can take off of Runway 1 L and 1 R. That is in violation of the original scheme, which was that that would not alleviate the noise in one area to by moving it to another." (David Few)

"The EIR mentions that, as a mitigation to noise, aircraft will be diverted farther north over the Peninsula, which means practically all of the additional aircraft that will be handled by SFO from this expansion proposal, roughly a 70 percent expansion, if I read that correctly, in aircraft operations. Those aircraft will be -- all that 70 percent additional is going to be going over San Francisco. That is diverting the noise, which is against the tacit agreement which has been in effect for quite some time. That noise will not be diverted to the new communities throughout the bay region." (Charles Kroupa)

"Another area of real concern that is in the existing Draft EIR is with what are called mitigations. Several of the mitigations are a shift of noise. As we understand it, the Airports Commission and the Airport Community Roundtable have a policy against solving one area's problems at the expense of another.

"I will be very brief here. You will hear reference or read reference to: Let's put the aircraft on to Runway No. 1 so they can go up the bay. Those planes go up the bay and then they turn over the northern Peninsula. You have moved noise from the gap up the bay and over the Peninsula. It's a shift. Three of the mitigations which are listed in this document are a shift. I do not think that is an acceptable mitigation. We have got to come up with something better than that.

". . .For example, if the mitigations in the DEIR are followed, large heavy 747 aircraft would depart on Runways IL/IR and might overfly San Francisco. This possible impact needs further explication and assessment." (Curt Holzinger)

"Moreover, the only mitigation proposed to address this problem [noisy Stage III aircraft] is to shift more aircraft onto Runway #1; a plan which merely shifts noise from one place to another." (Timothy Treacy, Airport Noise Committee)

"Page 424, Mitigation Measures, Aviation Noise:
"The realities of long range, two-engine aircraft as an alternative to four-engine aircraft is not a mitigating factor. The continuing and constant use of side-by-side departures on runways 1L and 1R would still have the net effect of four engines at maximum thrust. The use of larger, more fuel laden planes using runways 1 would further exacerbate the major problem, **backblast**, behind those runways. This is no mitigation measure.

"Even if the FAA did study and revise the use of the 'quiet departure' for runways 1 departures, this does not reduce the major noise problem, **backblast**. It encourages more runways 1 departures. This is not a mitigation measure." (Duane Spence, Airport Mitigation Coalition)

Response

It is assumed in the EIR (pp. 338-339) that the proportion of total operations performed by Stage 3 aircraft would increase from 1990 to 2006. The complete phaseout of Stage 2 aircraft is listed as mitigation measures (for SFIA and airline implementation) on pp. 424-425 because the noise impacts analysis in the EIR does not reflect a 100-percent-Stage-3 fleet at SFIA. When the EIR noise analysis was prepared, the Airport Noise Regulation had not been amended to include a January 2000 phaseout date.

SFIA's current preferential runway use program is informal./1/. The use of any noise abatement procedure, whether formal or informal, is limited by the variability of wind and weather conditions, safety factors, and air traffic levels and patterns. (It is stated on p. IVB-28 of the Joint Land Use Study, for example, that wind conditions prohibit nighttime Runways 10 takeoffs about 40 percent of the year./2/) Air traffic controllers and the aircraft pilots (because of their responsibilities for ensuring flight safety) have the option of choosing a procedure other than the noise abatement procedure if they think it necessary for aircraft safety. See pp. C&R.270-271 herein for further discussion of preferential runway use.

Data on nighttime (1:00 a.m. to 6:00 a.m.) runway use in 1989 show that about 70 percent of B-747 aircraft, and about 50 percent of all other aircraft, departed on Runways 10L or 10R. Because Runways 28L and 28R are used as the preferential arrival runways, the resulting "head-to-head" traffic flow may limit the number of aircraft that can depart on Runways 10L or 10R during busy periods. The revision of the preferential runway use procedure described on p. 425 of the EIR to include arrivals on Runways 19L and 19R (see pp. C&R.281-282 herein) could allow for increased use of Runways 10L and 10R for departures.

The Visual Shoreline Departure is already in use at SFIA. (Limits on its use are discussed on p. C&R.293 herein.) The departure is not identified as a mitigation measure in the EIR.

When following the Quiet Bridge Approach to Runway 28R, aircraft proceed to the high stand of the San Mateo Bridge, and then make a visual landing. A similar procedure is followed by aircraft using the Tiptoe Approach to Runway 28L. The path followed to reach the San Mateo Bridge would depend on the air traffic control instructions given to the pilot./1/

The mitigation measure on p. 424 of the EIR regarding the Quiet Bridge Approach is intended to improve the effectiveness of the approach. Other mitigation measures in the EIR (or these responses) that could improve the effectiveness of the Quiet Bridge Approach include use of the PASSUR radar tracking system, and installation of navigational aids.

The inclusion of climb-power reductions as a mitigation measure in the EIR is not intended to reduce backblast impacts.

Because of the possibility that a regional study could <u>lead to</u> the mitigation of noise impacts, completion of the study is identified as a mitigation measure in the EIR. It is not stated in the EIR that the study would mitigate noise impacts. When making its findings on the impacts remaining after mitigation measures are implemented, the Airports Commission could not assume that the study would reduce noise impacts to a level of insignificance.

The reasons for including the Runway Reconfiguration Study as a mitigation measure are discussed on p. C&R.306 herein. As discussed on p. C&R.49 herein, SFIA believes that Phase I of the Reconfiguration Study has (so far) produced four potential runway reconfigurations that would achieve the primary objective of the study (the reduction of cumulative noise impacts). Many secondary objectives (listed on p. C&R.49 herein) were achieved, but not all.

Depending on the results of the Runway Reconfiguration Study (discussed on pp. C&R.49-50 herein), it is possible that aircraft (including B-747s) could be departing on different runways and along different headings (paths) than they do currently, increasing the occurrence of single-event noise in some areas. The main objective of the Runway Reconfiguration Study, however, was to reduce noise impacts as defined by the State Noise Standards (and a secondary objective was to reduce single-event noise impacts). Any runway reconfiguration chosen as a result of the study, then, would by definition result in a reduction of such noise impacts.

Because of the possibility that the Runway Reconfiguration Study could <u>lead to</u> the mitigation of noise impacts, completion of the study is identified as a mitigation measure in the EIR. It is not stated in the EIR that the Study would mitigate noise impacts. When making its findings on the impacts remaining after mitigation measures are implemented, the Airports Commission could not assume that the Study would reduce noise impacts to a level of insignificance.

The extension of a runway as a mitigation measure would be implemented only if the Runway Reconfiguration Study found it to be effective in reducing noise impacts. The FAA Airports Capacity Task Force Study did show that extending Runways 19L, 19R, 28L, or 28R would result in reduced aircraft delays (as shown in Table I-1, p. A.174, Appendix I of the EIR).

Several commenters refer to a policy or policies against shifting noise from one community to another. It is the position of members of the Airport/Community Roundtable that any shift in noise from one community to another should be prohibited. "Noise" as defined in this position is any kind of noise, including single-event noise (levels and frequency) and backblast noise./1/

Condition III.F. of the SFIA Noise Variance states, "[The] Airport shall not knowingly permit or authorize and shall oppose any activity which results in a shifting of aircraft generated noise from one community to another within the airport environs." Although "noise" is not specifically defined in this Condition, in the State Noise Standards (in accordance with which the variance was granted) "noise impact" is defined in terms of CNEL./8/

Pages 424-425 of the EIR identify nine noise mitigation measures for SFIA to implement. Additional mitigation measures are identified on pp. C&R.267-295 herein. Of those measures, the only measure explicitly involving a potential shift of operations "from one runway to another" is the use of large long-range, two-engine aircraft as an alternative to the B-747.

As stated on p. 344 of the EIR, "... the noisiest aircraft overflights to / from SFIA would likely be by B-747 aircraft..." All B-747 aircraft on long-range flights and about one-half of all other B-747 aircraft departed on Runway 28R in 1989 (and would, it is assumed, depart on Runway 28R in 1996 and 2006). Almost all of these departing aircraft follow the Gap Departure route, which takes them over Peninsula communities at relatively low altitudes.

If a B-747 aircraft departing on Runway 28R were replaced by a long-range two-engine aircraft (such as a B-767) departing on either Runway 28R or Runways 1L or 1R, a relatively noisy Stage 3 aircraft that climbs relatively slowly would be replaced by a quieter Stage 3 aircraft that climbs faster. If the two-engine aircraft were to depart on Runway 28R, communities under the Gap or Shoreline Departure routes would still experience noise, but the level would be lower. If the aircraft were to depart on Runways

1L or 1R, communities under the Runway 28R flight paths would not hear the noise from the aircraft.

Part of the noise would be shifted to communities under the flight paths for Runway 1L or 1R, including the upper and middle Peninsula, San Francisco, and Pacifica for flights headed to destinations west, southwest or south of SFIA. However, the aircraft would be at higher altitudes when flying over those communities, and the noise produced (even at the same altitude) would be lower than that from the B-747. Therefore, there would be an overall reduction in (cumulative and the level of single-event) noise.

The result would be an overall reduction in noise, and not just a shift (as claimed by the commenters), because high noise levels would be taken from the most highly affected areas and replaced with lower noise levels elsewhere. This strategy is consistent with SFIA's noise reduction efforts, which consider as a priority relief for people within the CNEL 65 contour. Although others may be affected by the results of such efforts, the impacts to those people would not be as great as the benefits to those now experiencing high cumulative noise levels.

This reduction can be demonstrated by using the information in Table C-8 on p. A.56, Appendix C of the EIR. The table shows the maximum sound exposure levels at the remote monitoring stations for four representative aircraft using SFIA (including the B-747-200 and B-767). Monitor No. 4 in South San Francisco is directly under the Gap Departure route; when a B-747-200 departs on Runway 28R, the sound exposure level at Monitor No. 4 could be as high as 103 dBA. Replacing the B-747 with the B-767 on Runway 28R could reduce the noise at Monitor No. 4 to 89 dBA. Monitor No. 24 in San Francisco is near the departure flight paths for Runway 1L. If the B-767 departure were shifted to Runway 1L, there would be no noise produced by it at Monitor No. 4, but the sound exposure level at Monitor No. 24 could be as high as 81 dBA. The reduction achieved by switching to the B-767 and shifting runways could be 21 dBA or more./9/

It is correct that replacing B-747 with B-767 aircraft (as identified in the EIR) could lead to an increase in the use of Runways 1L and 1R, and result in 1) an increase in the occurrence of single-event noise in communities under the departure paths for Runways 1L and 1R (those along the northern Peninsula, and San Francisco) and 2) an increase in the occurrence of backblast noise in the communities behind Runways 1L and 1R. Accordingly, the following is added to the second bulleted item on p. 424 of the EIR:

An increased number of departures on Runways 1L and 1R would result in an increase in the occurrence of single-event noise in communities under the departure flight paths for those runways, including San Francisco and communities on the Peninsula and in the East Bay. An increased number of departures on Runways 1L and 1R would also result in an increase in the occurrence of backblast noise in communities behind those runways, including Burlingame and Millbrae.

The increased use of long-range aircraft is not the only mitigation measure identified to address noisy Stage 3 aircraft; please see pp. C&R.269, 271, 273-274, 280-282, 286-287, 289-290 herein.

Possible revision of the flight routing for aircraft departing on Runways 1L and 1R is identified as a mitigation measure on p. 424 of the EIR. The measure is intended to reduce cumulative and single-event noise levels in communities on the Peninsula; it is not intended to reduce backblast noise.

The measure is described and assessed incorrectly in the EIR. Accordingly, the fourth bulleted item on p. 424 and the ninth bulleted item on p. 425 of the EIR are revised as follows (revisions are underlined and deletions shown by brackets):

> Encourage the FAA to study and, if possible, [ ] institute the use of [ ] a "quiet departure" []flight routing[] for aircraft departing on Runways 1L and 1R. Currently, aircraft departing on Runways 1L and 1R [ ] make a left turn over the Peninsula. Requiring the aircraft to travel further north over the Bay before turning could reduce single-event noise over Peninsula communities, but could result in increased overflights and single-event noise in communities further north. In addition, a revised flight routing could conflict with departures from Metropolitan Oakland International Airport.
>
> Study and, if possible, [ ] institute the use of [ ] a "quiet departure" for aircraft departing on Runways 1L and 1R. **Implementing Agency: FAA**

Mitigation measures for single-event impacts are discussed on pp. C&R.299-300 herein. Responses to comments regarding increases in backblast noise are on pp. C&R.251-260 herein.

GENERAL

<u>Comments</u>

". . .What mitigation programs can be implemented to reduce the number of impacted uses? How can they be funded and what levels of funding are necessary?. . ." (Dennis Argyres, City of Burlingame).

". . .There is just a woeful lack of detail and analysis as to how mitigation measures would work. For example, one of the suggestions to mitigate the noise is to, 'encourage the airlines to use different types of aircraft that have the ability to take off at a very sharp angle and thus not have to spend much time over residential areas.' The question is, how do we encourage the airlines to do that? Are there specific suggestions, incentives, penalties that could be imposed? And how successful would those incentives or penalties be, based upon, perhaps, examples from other jurisdictions?" (Commissioner Morales)

"Potential Noise - The noise problems will be mitigated through the improvement and expansion of the Airport's already successful noise program." (Stan Moy, Finger & Moy Architects)

"The third mitigation measure on page 424 should include an estimated date for completion of review and revision of the Quiet Bridge Approach." (Leslie Carmichael, City of Foster City)

"Pages 425 and 426 list measures to mitigate noise impacts; included are measures to work with several agencies and groups to 'conduct a regional study of air traffic control requirements, constraints, and opportunities, with the goal of minimizing noise impacts.' This mitigation should be undertaken before proceeding with any other aspect of the project, since 'the study would involve identifying the flight patterns and routes regionwide that are most environmentally desirable, determining how to establish and coordinate use of the routes while maintaining aircraft safety.' The SFIA <u>must</u> take into account future expansions at other airports in the region, including the possibility of airport development in areas of rapid growth not presently served by a regional airport facility. . ." (Onnolee Trapp, Leagues of Women Voters of San Mateo County)

"Pages 425 and [4]26 list measures to mitigate noise impacts. Included are measures to work with several agencies and groups to 'conduct a regional study of air traffic control requirements, constraints and opportunities, with the goal of minimizing noise impacts.' This mitigation should be undertaken before proceeding with any other aspect of the project, since, 'the study would involve identifying the flight patterns and routes region-wide that are most environmentally desirable, determining how to establish and coordinate use of the routes while maintaining aircraft safety.' The airport must take into account future expansions of other airports in the region, including the possibility of airport development in areas of rapid growth not presently serviced by regional airport facility. Considering the multiple impacts detailed in the EIR for the airport alone, it's imperative that regional coordination must be involved.

"Well, we call on you for cooperating with the other jurisdictions in the area to work these things out and reconsider this plan and perhaps even alter your expansion plans." (Onnolee Trapp, San Mateo County Leagues of Women Voters, public hearing of 8/27/91)

"Pages 335 and A.179:

"There are very serious problems in the DEIR with suggested noise mitigation measures, one of which is the fact that most measures are only voluntary. No mitigation measures are proposed in the DEIR that are mandatory or binding. Therefore, they are not under the control of the Airports Commission to effect noise mitigation. For instance, any use of runways 10 for late night departures between 1:00 a.m. and 6:00 a.m. is optional...

"Page 424, Mitigation Measures, Aviation Noise: ...

"In general, the SFIA mitigation paragraphs are actually requests to other entities and agencies to accomplish some actions. Nothing is mandatory, therefore nothing can be concluded as to whether the actions will be done, or what their results would be. For the purpose of the DEIR, they are not mitigating measures." (Duane Spence, Airport Mitigation Coalition)

Response

Section 15050(e) of the CEQA *Guidelines* states that "The exercise of discretionary powers for environmental protection shall be consistent with express or implied limitations provided by other laws." SFIA cannot implement mitigation measures which it has no authority (under the powers granted to it by law) to implement. As stated in the responses to various suggested noise mitigation measures (pp. C&R.267-295 herein), and implied in the discussion of airport proprietors' rights and obligations in Appendix A herein, there are limits to SFIA's ability to directly implement certain noise mitigation measures. Those limits are reflected in the categorization of the noise mitigation measures by implementation responsibility (see pp. 424-425 of the EIR).

For example, as implied in C&R Appendix A and described on p. C&R.279 herein, there are limits on SFIA's ability to require or influence the use of long-range, two-engine aircraft at the Airport (through regulation or financial incentives). Because of those limits, increased use of such aircraft would be implemented by the airlines, not SFIA. SFIA could "encourage" the airlines' use of such aircraft at SFIA , through rulemaking, airline agreements, and/or financial incentives.

Under CEQA (*Guidelines*, Section 15091), mitigation measures may be adopted or rejected by the Airports Commission as part of the written findings for each significant effect. Mitigation measures adopted become conditions of project approval, and are binding. The noise mitigation measures not directly under the control of SFIA (such as FAA revision of flight procedures) cannot be adopted by the Airports Commission in its findings.

Given that some of the noise mitigation measures identified in the EIR are not within SFIA's control, the commenter is correct in asserting that conclusions cannot be made as to the likely implementation or effectiveness of those measures. This absence of knowledge regarding the effectiveness of the noise mitigation measures must be taken into consideration by the Airports Commission in its findings.

CEQA does not require that an EIR include information on the costs and potential financing of mitigation measures. Please see p. C&R.386 herein for further discussion of this issue.

The review and revision of the Quiet Bridge Approach and the completion of a regional air traffic study are not within the authority of SFIA. Therefore, implementation of these measures cannot be mandated by the Airports Commission as a condition of project approval.

NOTES - Aircraft Noise Mitigation

/1/ Carbone, David, staff to the Airport/Community Roundtable, telephone conversation, March 11, 1992.

/2/ Williams, Platzek & Mocine et al., *Joint Land Use Study, San Francisco International Airport / San Mateo County Environs Area*, prepared for the Joint Powers Board, March 1980.

/3/ U.S. Department of Transportation, Secretary's Task Force on Competition in the U.S. Domestic Airline Industry, *Airports, Air Traffic Control, and Related Concerns (Impact on Entry)*, February, 1990.

/4/ Airline Lease and Use Agreements, San Francisco International Airport.

/5/ 49 U.S.C. App. Section 1305 (a) (1).

/6/ U.S. Department of Transportation, Federal Aviation Administration, *San Francisco Bay Area Airports Task Force Capacity Study of SFO, SJC, and OAK International Airports* (prepared jointly by FAA, Bay Area international airports staffs, Air Transport Association, and the airlines serving the San Francisco Bay Area), 1987.

/7/ Federal Aviation Administration, Office of Environment and Energy, *Airport Noise Control Strategies,* Report No. FAA-EE-86-02, May 1986.

/8/ California Administrative Code, Title 21, Section 5000, et seq., as amended.

/9/ The B-767 is not a direct replacement for the B-747, because the B-767 is a smaller aircraft. If an aircraft of similar size (such as the planned B-777) were used, the noise levels produced would probably be about 4 dBA higher than those produced by the B-767.

OTHER NOISE

SURFACE TRAFFIC NOISE

Comment

". . .Whether or not aircraft noise reduction is achieved, the report states (p. 6) that 'surface traffic due to the project would increase noise levels on local roads by a maximum of one decibel over baseline conditions' for both 1996 and 2006. NO MITIGATION is proposed for this environmental impact." (Onnolee Trapp, Leagues of Women Voters of San Mateo County)

Response

Humans can hear noise level changes of only about three dBA or more. A noise level increase of one dBA would not be audible to the human ear and, so, there would be no noticeable effects on ambient noise levels. Therefore, no mitigation measures would be needed for the change in ambient noise levels due to increased surface traffic along local roads.

CONSTRUCTION NOISE

Impacts

Comments

"IV-331 Environmental Impacts Re: Construction Noise - Clearly impacts of construction on Millbrae were completely overlooked and left out of Document. I can't help wondering why? A lot of Millbrae homes are much closer to Construction Sites planned for, than those homes in Lomita Park, San Bruno which have been included in text." (Jessie Bracker, letter of 8/27/91 and public hearing of 8/27/91)

"On page -- Chapter IV-331 - Environmental Impacts - 'Construction' and Noise - Noise sensitive areas - are named in 1st par. of page 6 and 1st par. (middle of), also found on page 333. Sites named are incomplete. Airport Park, Marina Vista, and North Millbrae Subdivisions of homes were not named and must be because they are closer to much of the Development areas than Lomita Park is so noise levels there from Construction would have to be higher than from Lomita Park where text says it would be unacceptable (clearly). Millbrae nursery school also should be included." (Jessie Bracker)

Response

The list of sensitive receptors on p. A.58 of the EIR (Appendix C) in Table C-10, is revised (the revised table is shown on p. C&R.220 herein) to include Millbrae Nursery School (and other uses found in responding to other comments about sensitive uses). This list contains only schools, hospitals and other public facilities in the vicinity of the Airport. The commenter is correct in stating that residential land uses in Airport Park, Marina Vista and North Millbrae subdivisions, closer to the Airport than Lomita Park, would be exposed to high noise levels from construction activities. Table 48 on p. 332 of the EIR shows the approximate distances at which construction noise would be reduced to certain levels. Generally, external noise levels over 65 dBA, L_{eq}, are not considered compatible with residential land uses. Pages 332 and 333 of the EIR state that noise levels at Lomita Park Elementary School and in the Lomita Park residential area would be above recommended standards. Residential land uses in Airport Park, Marina Vista and North Millbrae subdivisions, closer to the Airport than the Lomita Park sensitive receptors, would be exposed to noise levels above recommended standards during excavation, pile driving, and finishing operations. Because construction activities are temporary, noise generated by construction activities would not have a long-term effect on ambient noise levels in the region.

The second sentence of the first paragraph on p. 6 of the EIR is replaced with the following:

> Nearby noise sensitive areas include residential land uses, schools and hospitals.

The following sentence is added to the end of the paragraph on pp. 332-333 of the EIR.

> Residential land uses closer to the Airport than the Lomita Park residential area, such as Airport Park, Marina Vista and North Millbrae, would be exposed to higher noise levels during pile driving, which would be considered "clearly unacceptable."

Mitigation

Comments

". . .Millbrae's general plan reads: City should make sure that noise from construction is reduced to the lowest possible level. All mitigation measures possible must be used." (Jessie Bracker, letter of 8/27/91 and public hearing of 8/27/91)

"P. 14 and 15 - Mitigate Construction Noise Impacts - All measures possible must be included." (Jessie Bracker)

Response

Noise control policies and ordinances, such as the Airport Land Use Plan (San Mateo County Airport Land Use Commission, 1981) and the San Francisco Noise Ordinance, which prohibits construction work at night, have limited authority over actual Airport operations. Page 426 of the EIR lists feasible mitigation measures that could be implemented as a condition of project approval. Construction noise levels could be substantially attenuated by these mitigation measures.

AIR QUALITY

SETTING

The Notes for this section begin on p. C&R.337.

Existing Air Quality at SFIA

Comments

"P. 174 - Pollution readings are taken in San Francisco! - Surely for this document actual readings must be taken by Terminals, Aprons, and Taxiways and ends of Runways 1. . .

"With reference to all pages in the text regarding Pollution and to Summary - Pollution Readings for this Document should be taken at Airport; not in San Francisco. Summary reads 'The increase in traffic will increase Pollutant Emissions!' " (Jessie Bracker)

"The evaluation of air quality is based on data from air monitoring station equipment which is not located at SFIA. Air quality should be measured and continuously monitored by equipment located at SFIA. This is a more realistic approach to determining impacts and offering proper mitigations." (George Foscardo, City of San Bruno)

Response

The Bay Area Air Quality Management District (BAAQMD) air quality monitoring station closest to SFIA is located in San Francisco. Although atmospheric conditions, such as wind direction, wind speed and temperature, influence the dispersal of air pollutants generated by SFIA, ambient concentrations at the nearest monitoring station provide an indication of existing air quality in the area. The air pollutant data presented in Table D-1 on page A.137 (Appendix D) of the EIR are, therefore, shown to provide the reader with a general idea of ambient air pollutant concentrations in the area. As pointed out in the EIR (p. 174), air quality in San Francisco and San Mateo Counties is generally better than that in, for example, the East Bay and the South Bay.

The data in Table D-1 were not used to estimate the emissions generated by the project. Although future air quality monitoring at the Airport would give accurate air pollutant concentrations after project buildout, future project emissions cannot be estimated using present air quality monitoring data. Project emissions are generally calculated using established emission factors. Future emission factors developed by the Environmental Protection Agency (EPA), California Air Resources Board (ARB) and BAAQMD were used to estimate total emissions from various Airport operations. Roadside CO concentrations (existing and future) were modeled using the CALINE4 approved and recommended air quality modeling program, developed by Caltrans. Background concentrations were obtained from BAAQMD contour maps. Air quality impacts of the project were determined by comparing these estimated emissions and concentrations to the significance thresholds established by BAAQMD. Thus, the project impacts were evaluated and mitigation measures identified, on the basis of established procedures and practices. The proximity of air pollutant data monitoring stations does not affect the estimated project impacts on air quality.

Sensitive Receptors

Comment

"P. XI-A-138 - Table D-2 - Air Quality Sensitive Receptors Within 1/4 m. of Airport Property line. - 2 Convalescent Hospitals, 1 Millbrae Nursery School, should be added." (Jessie Bracker)

Response

Table D-2, p. A.138 (Appendix D) of the EIR is revised (revisions are shown in bold text) to include the two convalescent hospitals and Millbrae Nursery School.

TABLE D-2: AIR QUALITY SENSITIVE RECEPTORS

Within 1/4 mile of Airport Property Line

Sheltering Pines Convalescent Hospital
Millbrae Serra Convalescent Hospital
Millbrae Nursery School
Residential areas (West of US 101)
Belle Air School (San Bruno)
Lomita Park School (Millbrae)

Within 1/2 mile of Airport Property Line

Residential areas (West of US 101)
Churches
Capuchino High School (San Bruno)
Happy Hall School (Childcare Center - San Bruno)
Saint Dunstan School (Millbrae)

Within 1 mile of Airport Property Line

Churches
Decima M. Allen School (San Bruno)
Edgemont School (San Bruno)
El Crystal School (San Bruno)
City Park (San Bruno)
Glen Oaks School (Millbrae)
Green Hills Country Club
Green Hills School (Millbrae)
Highlands School (Millbrae)
Taylor Jr. High School (Millbrae)
Former Chadbourne School (now vacant, will become senior citizens center/home) (Millbrae)
Mills High School (Millbrae)
Spring Valley School (Millbrae)
Peninsula Hospital
Lincoln School (Burlingame)
Parkside Jr. High School (San Bruno)
City of San Bruno Public Library
Ray Park (Burlingame)
Residential Areas (W. of El Camino Real)

SOURCE: Environmental Science Associates, Inc.

Plans and Regulations

Comment

"Now lets take a hard look at air quality. In the early 1970's, SFO declared that 'Airport management along with neighboring communities will together have to devise and implement strategies to improve air quality to within acceptable limits' (FEIS Vol. III Part 2-Comments II-2-17 and III-1-20). These strategies were to be 'evaluated as part of a future control plan' in order to minimize air pollution (FEIS Vol. III Part 1-Comments II-9-3). Where is that plan? Where are those controls? Where is the air quality data that would have facilitated intelligent planning?" (Alyn Lam)

Response

The strategies and plans identified by the commenter are the State of California's "Transportation Control Strategies" and "Air Quality Implementation Plans" for critical regions, which called for the minimization of total vehicle miles traveled to improve regional air quality./1/ An analysis of total vehicle miles traveled was required to demonstrate compliance with these strategies and plans; any increase in VMT was not consistent with them.

Plans, policies and programs are updated, revised or modified as more information becomes available. The current Plan (*The Bay Area '91 Clean Air Plan*), by aiming to reduce air pollutant emissions through a combination of permits and indirect source controls, seeks to reduce VMT and thereby improve local and regional air quality./2/ Pages 172 -173 of the EIR discuss current air quality regulations, plans and policies. To reflect the new information, the third sentence of the fourth paragraph on p. 172 of the EIR is revised as follows (revisions are underlined and deletions shown in brackets):

> An Air Quality Plan for the Basin was prepared in [] 1991 and [] is being incorporated into the current California SIP./3/

The first sentence of the fifth paragraph on p. 172 is revised as follows:

> The [] *Bay Area '91 Clean Air Plan* describes the air pollution control strategies necessary to bring the Bay Area into attainment for all of the NAAQS [].

The first full paragraph on p. 173 of the EIR is deleted. The last two sentences of the second full paragraph on p. 173 of the EIR are replaced with the following:

> The *Bay Area '91 Clean Air Plan* (CAP) describes the Bay Area's current plans for meeting State clean air laws./3/ The goal of the CAP is to improve air quality through the 1990's through tighter industry controls, cleaner cars and trucks, cleaner fuels, and increased commute alternatives. The CAP encourages cities and counties to adopt measures in support of this goal. Identified measures include: developing rules to reduce vehicle trips to major residential developments, shopping centers, and other indirect sources; encouraging cities and counties to plan for high-density development; and clustering development with mixed uses in the vicinity of mass transit stations. These measures would serve to reduce total vehicle miles travelled, thereby improving regional air quality.

The third full paragraph on p. 173 of the EIR is replaced with the following:

> Provisions in the CAP will likely affect the Airport in two ways. First, the BAAQMD is considering an indirect source control program, to be adopted in 1994, that would require facilities to implement an indirect source emissions reduction program. Such a program would include measures to reduce the total vehicle miles traveled. Second, the BAAQMD is developing an employee-based trip reduction rule, scheduled for adoption by mid-1992, that would mandate large employers to achieve a specified average vehicle ridership for their employees. Both of these measures would likely be phased in for new and existing developments. SFIA will be required to work with BAAQMD in implementing future rules and regulations governing total vehicle miles travelled, including the indirect source control program and the employee-based trip reduction rule. As discussed on pp. 130-137, SFIA currently seeks to reduce total vehicle trips by offering shuttle services, public transit facilities, and transit subsidies and incentives to employees.

The following note replaces note /3/ on p. 177 of the EIR:

/3/ Bay Area Air Quality Management District, Association of Bay Area Governments, and Metropolitan Transportation Commission, *Bay Area '91 Clean Air Plan*, 1991.

While the 'plan' referred to by the commentor dealt with State-wide transportation/air-quality issues, the EIR authors judge that the intent of the comment was to evaluate strategies to be implemented by the Airport. Some of the mitigation measures identified in the EIR to reduce transportation impacts could also reduce air quality impacts. For a discussion of transportation/air-quality strategies to be implemented by the Airport, please refer to responses regarding transportation mitigation measures on pp. C&R.152 et seq. herein.

BAAQMD formulates air quality plans on the basis of conclusions drawn from a wide body of data. BAAQMD has compiled emissions inventories for various air pollutants over the years. Some sources of air pollution are measured directly, but most are estimated based on source characteristics, throughput rates, partial sampling, and scientific or engineering calculations. These emissions inventories, combined with future projections of growth and emissions reductions attainable through control systems, provide the basis for future planning efforts./2/

IMPACTS

Impacts of Increased Flights

Comment

". . .If you overload our skies, which are already overloaded, with more airplanes competing for valuable airspace, we are all going to pay a price. And if that issue can't even be addressed in a Draft EIR, where is it going to be addressed." (Don Bertone)

Response

The EIR addresses project impacts in detail. Emissions from aircraft operations are estimated on p. 361 of the EIR, emissions from vehicular traffic on p. 357 of the EIR, ground support vehicle emissions on p. 358 of the EIR, and building emissions on p. 363 of the EIR. On p. 436 of the EIR, it is concluded that the project would have an unmitigable significant adverse impact on air quality.

It is not known if the commenter is referring specifically to impacts of increased flights on air quality. The commenter may also be referring to impacts on aircraft noise levels and aviation safety; accordingly, this comment is duplicated on p. C&R.245 herein (aircraft noise) and p. C&R.375 herein (air traffic safety), and responded to in those contexts.

Impacts of Vehicle Emissions

Comment

"33,400 employees now commute daily to SFO with an additional 8,900 expected by 2006 (DEIR Vol. I Ch. I). Two-thirds of them will drive alone (DEIR Vol. I Ch. III §B). Highways

380 and 101 carry the bulk of the vehicular traffic into the terminal area (DEIR Vol. 1 Ch. IV Figs. 29-30) with on-airport intersections numbers 4, 5, 6, 7, 8, 9, 24, and 25, hindering peak hour traffic flow (DEIR Vol. I Ch. IV §B). None of these intersections, with the exception of that into the remote parking lot, show any deterioration of traffic flow between now and 2006. Isn't it strange then that CO, NO_X, SO_X, PM_{10} levels from vehicle emissions all will deteriorate significantly during the same period? (DEIR Vol. I Ch. IV §D Tables 56-57). Perhaps vehicle emission standards are to be revised downward in the interim. The need for valid continuous air quality monitoring is obvious." (Alyn Lam)

Response

Table 39 on p. 308 of the EIR shows the traffic flow conditions (LOS and V/C ratios) at the intersections noted in the comment. The commenter is, in effect saying that project-generated traffic alone would not result in a degradation of the LOS at intersections nos. 4-9 and 24 in the table. The V/C ratios would increase at these intersections, however, reflecting the increase in SFIA-generated and cumulative total traffic. The fact that LOS would not degrade also reflects the road-widening improvements proposed by SFIA, shown on pp. 276-277 of the EIR. With the addition of two lanes on Road R-3, North Access Road and Road R-2, these roads could accommodate more traffic. However, the projected increase in traffic is large enough that the volume of traffic relative to the increased roadway capacity would increase, but the LOS (categories) would not degrade. Similarly, the air pollutant emissions could increase, even though the LOS does not.

The estimated emissions in Tables 56 and 57 in the EIR (pp. 357-358) were calculated on the basis of the emission factors current when the DEIR was prepared, and the traffic volumes used to evaluate traffic flow conditions. Footnote /a/ in Table 56 on p. 357 of the EIR shows the basis of the calculation of emissions from project-generated traffic. Footnotes /a/ and /b/ in Table 57 on p. 358 of the EIR show the basis of the calculation of emissions from ground-support vehicles. Procedures and methodologies established by EPA were followed to calculate project-generated emissions.

The value of air quality monitoring is discussed above, on pp. C&R.317-318 herein.

Carbon Monoxide Impacts

Comments

"Page 436 reads: 'Project generated emissions would be over the BAAQMD threshold for carbon monoxide.'" (Jessie Bracker, public hearing of 8/27/91 and letter of 8/27/91)

"Landside emissions. Vehicular traffic in regard to tables. [Table 55] Results indicate that existing carbon monoxide levels already exceed the state eight-hour CO standards, and the state eight-hour CO concentration standard would be violated under almost all scenarios for the intersections examined. The table also shows a state violation for one-hour periods at El Camino and Millbrae Avenue. Carbon monoxide is a slow, silent killer, and exceedances or any happening must not be taken lightly nor added to for safety of people. . . The increase in traffic will increase pollutant emissions, according to the summary. . ." (Jessie Bracker)

"The Bay Area Air Quality Management District has recently revised its recommendations for estimating future CO ambient background levels. These revisions will significantly affect the CO concentration analysis in Table 55 and the conclusions reached in that table." (Chris Brittle, Metropolitan Transportation Commission)

Response

Page 175 of the EIR includes a brief description of the health effects of CO. Table D-1 on p. A.137 (Appendix D) of the EIR shows eight-hour CO standard violations for 1987 and 1988. To clarify the discussion of existing CO emissions, the sixth sentence in the first paragraph on p. 175 of the EIR is revised as follows (revisions are underlined and deletions indicated by brackets):

> The eight-hour CO standard was violated in 1987 and 1988 (see Table D-1, Appendix D, p. A.137). Although no violations of the State one-hour or eight-hour CO standards [] were recorded in 1989 at the San Francisco monitoring station [], relatively high levels would be expected along heavily traveled roads and near busy intersections.

CO non-attainment regions are classified into 'severe,' 'serious,' and 'moderate,' depending on the projected date of attainment. The San Francisco Bay Area Air Basin is non-attainment for CO. Monitoring stations in San Francisco County and San Mateo County did not record CO standard violations in the past two years, but stations in San Jose and

Vallejo recorded eight-hour standard violations. The Air Basin is categorized as 'serious,' because it is projected that the Air District would be in attainment for CO by 1997. /2/ The BAAQMD does not expect any CO standard violations after 1997. In the future, CO emissions from motor vehicles are expected to decrease substantially, due to improved engine efficiencies and cleaner-burning fuels.

All of the estimates in Table 55 on p. 355 of the EIR are revised to incorporate the most recent information regarding emission factors, background concentrations and roll-back factors provided by the BAAQMD.

The revised table (Table 55) shows a decrease (from the original DEIR table) in existing and future one-hour and eight-hour CO concentrations at all of the intersections. On the basis of the revised table, the first paragraph on page 356 of the EIR is replaced with the following:

> The results indicate that existing CO levels already violate State eight-hour CO standards for the intersections analyzed, but that by 2006, the CO standard would be violated at only one intersection. The eight-hour standard would be violated at three intersections under 1996 traffic conditions. At El Camino Real & Millbrae Avenue, 1996 baseline (without the project) traffic conditions would violate the ambient eight-hour CO standard, and the project would contribute to an increase in the frequency of standard violations. At the other two intersections, El Camino Real & San Bruno Avenue and Rollins Road & Millbrae Avenue, the project on its own would not cause the violation of the standards in 1996, but the project together with projected growth would result in the violation of the eight-hour standard. Cumulative traffic conditions in 2006, including traffic from the project, would cause a violation of the eight-hour standard at El Camino Real & Millbrae Avenue. No other analyzed intersection would exceed ambient standards under cumulative traffic conditions. CO emissions are projected to decrease in the future because of improved engine efficiencies and cleaner burning fuels. The decline in CO concentrations over time apparent at some of the intersections is a result of the expected decline of future emission rates as cleaner new vehicles enter the vehicle mix, and is not an indication that the number of vehicles through the intersection is dropping.

Health Effects

Comment

"Please consider the effects of the health of human beings. We're jeopardized already." (TREE)

TABLE 55: ESTIMATED WORST-CASE EXISTING AND FUTURE CO CONCENTRATIONS IN THE PROJECT VICINITY

	Concentration by Year (ppm)/a,b/						
	1990	1996	1996	1996	2006	2006	2006
Location	Existing	Forecast Growth	+ Project/c/	+List-added Growth/d/	Forecast Growth	+ Project/c/	+List-added Growth/d/
Intersections							
El Camino Real & Millbrae							
1-hour	20.7/e/	16.8	16.8	17.6	13.5	13.5	15.9
8-hour	13.4	10.8	10.8	11.3	8.7	8.7	9.7
El Camino Real & San Bruno							
1-hour	15.2	12.4	12.6	15.7	10.6	10.7	13.0
8-hour	9.5	7.7	7.8	10.0	6.7	6.7	8.3
South Airport & Utah							
1-hour	14.8	11.7	11.7	12.8	9.3	9.4	10.3
8-hour	9.2	7.2	7.2	8.0	5.8	5.8	6.5
Rollins & Millbrae							
1-hour	14.7	12.4	12.6	15.4	10.7	12.3	12.9
8-hour	9.2	7.7	7.8	9.8	6.7	7.9	8.3
Segment							
Bayshore Freeway/f/							
1-hour	10.6	8.7	8.8	9.2	7.5	7.5	7.9
8-hour	6.3	5.1	5.2	5.5	4.5	4.5	4.8

/a/ Estimates were calculated using CALINE4, a computer-based air pollution dispersion model developed by the California Department of Transportation. The eight-hour CO concentrations were assumed to be about 70 percent of the modeled one-hour values. One-hour background CO concentrations used were 5.6 ppm for 1990, 4.7 ppm for 1996, and 3.8 ppm for 2006. Eight-hour background CO concentrations used were 2.8 ppm for 1990, 2.3 ppm for 1996, and 1.9 ppm for 2006. Intersection concentrations correspond to a location approximately 15 feet from the corner of the intersection. Bayshore Freeway concentrations correspond to a point about 250 feet from the center of the northbound lanes.

/b/ ppm = parts per million

/c/ Includes forecast growth.

/d/ Includes forecast growth plus project growth.

/e/ Underlined values are in violation of the applicable standard.

/f/ In the p.m. peak hour, northbound Bayshore Freeway between San Bruno Avenue and I-380 volumes were assumed to be 45% of southbound volumes.

NOTE: The State 1-hour CO standard is 20 ppm and the State 8-hour standard is 9 ppm.

SOURCE: Environmental Science Associates, Inc.

Response

From an air quality standpoint, the health effects on the public would be evaluated on the basis of the violation of ambient standards for criteria air pollutants, and the types and amounts of air toxics emitted by the project. Ambient air quality standards were established to set conservative concentration levels above which the public would be exposed to unhealthy levels of air pollutants. Pages 174-176 of the EIR briefly discuss the adverse health effects of criteria air pollutants. The EIR includes evaluations of the project's contribution to ambient air quality standard violations and to total area-wide emissions, and thus considers the health effects of the project. Dispersion modeling for CO concentrations also indicates ambient standard violations at some intersections, as shown in the revised Table 55 on p. C&R.326 herein. Table 61 on p. 364 of the EIR shows that the proposed project would generate a net increase in criteria air pollutant emissions above one percent of County-wide emission totals -- a criterion used by BAAQMD to determine if a proposed project would have a significant air quality effect on the environment./3/

Health effects from air toxics are classified as either carcinogenic or non-carcinogenic, depending on the overall estimate of cancer risk. Please refer to p. C&R.328 herein for a discussion of air toxic emissions at SFIA.

Impacts of Proposed Parking

Comment

"What is going to happen if they are going to add 7,000 more parking spaces? For God sakes, it's not only our resources being chewed up because we haven't any -- and I am talking about gasoline -- all this air traffic coming in is going to cause nothing but smog. And that in itself is very bad -- well, it's a bad environment as far as people's health is concerned." (Bruno Bernasconi)

Response

The proposed number of parking spaces was estimated on the basis of a parking demand analysis that used demand ratios from past years to project future parking demand. It is likely that insufficient parking spaces would result in increased traffic circulation throughout the Airport area, including local roadways and neighborhoods. Providing adequate parking spaces to meet the demand would reduce local vehicular air pollutant emissions, by reducing overall circulation.

For a discussion of the proposed parking spaces, transportation impacts, and mitigation measures to reduce vehicular traffic to SFIA, please refer to pp. C&R.181-183 herein.

For a discussion of airside emissions from increased flight operations, please refer to pp. 356-365 of the EIR.

Health Risk Assessment

Comment

"P. XI-A-157 See Air Toxics Hot Spots - Health Risk Assessments must be done." (Jessie Bracker, letters of 8/18/91 and 8/27/91)

"...There is another place that says air toxic hot spots health risk assessments must be done. They weren't done by the airport..." (Jessie Bracker)

Response

The Air Toxics Section on pp. 224-225 of the EIR includes a brief discussion of health-risk assessments, to provide some background information on air toxics regulations, policies and procedures. On p. 225 of the EIR, it is stated that SFIA submitted its Emissions Inventory Report to the BAAQMD in June 1990. The Airport was categorized as low priority, indicating that it is a low-risk facility and, it is stated, no future action has been required of SFIA. Contrary to the commenter's statement, the EIR does not say that SFIA should do a health-risk assessment; the BAAQMD has confirmed that SFIA itself is not required to conduct a health-risk assessment./4/ A health-risk assessment was conducted by United Airlines, because of potential air toxic emissions from its service facilities that include fuel tanks and repair shops with painting and plating operations. The results of the study, completed in January 1991, are available at the BAAQMD's offices.

Emissions of criteria ("non-hazardous") pollutants are discussed on pp. C&R.322-325 herein, and illustrated in Table 59, on p. 361 of the EIR.

Significant Impacts

Comments

"The DEIR recognizes on Page 436 that the project would have significant air quality effects. In fact, the estimates in Table 72, Page 453, show that aircraft emissions alone by 2006 would generate more than twice the carbon dioxide, 1.4 times the nitrous oxide, and 2.1 times the hydrocarbons than if there were no expansion project. When aircraft emissions, building energy emissions, ground support vehicle emissions, and other vehicular traffic emissions are added, we concur with your conclusion that it must be that the project will have significant environmental effects that cannot be avoided if the proposed project is implemented." (Onnolee Trapp, San Mateo County Leagues of Women Voters, public hearing of 8/27/91)

"The Draft EIR estimates that the air quality will deteriorate because of the increased ground and air traffic. Bay Area air pollution levels are already unacceptable, and SFIA should not be allowed to increase air pollution levels. Adequate mitigation measures must be implemented to decrease SFIA air pollution below present levels." (Jim Wheeler, Sierra Club, Loma Prieta Chapter)

"The DEIR recognizes (p. 436) that 'the project would have significant air quality effects. . .' and that 'project-related surface traffic. . .would probably lead to an increase in the frequency of standards violations in the project area over future CO levels without the project. Project-generated emissions would be over the BAAQMD threshold of 150 lb/day for HC, NO_x, SO_x, and PM_{10}. In addition, . . . project-generated emissions would be over the BAAQMD threshold for CO.'

"In fact, the estimates in Table 72, p. 453, show that aircraft emissions alone by 2006 would generate more than twice the CO, 1.4 times the NO_x, and 2.1 times the HC than if there were no expansion project. When aircraft emissions, building energy emissions, ground support vehicle emissions, and other vehicular emissions are added, we concur that the conclusion must be that the project will have 'significant environmental effects that cannot be avoided if the proposed project is implemented.' " (Onnolee Trapp, Leagues of Women Voters of San Mateo County)

Response

On page 436 of the EIR, it is concluded that the project would have significant unavoidable air quality effects. The comments, then, are consistent with the information in the EIR. Please refer to pp. C&R.332-337 herein for responses relating to air quality mitigation.

ODOR

Comments

"We did not notice any discussion of objectionable odor from fuel exhausts. On those occasions when the wind is toward Millbrae from the Airport, the odor is very noticeable. As this would be expected to increase, some mitigation should be described." (Janet Fogarty, Mayor, and Robert Treseler, City of Millbrae)

"Page 171, D. Air Quality:
"The analysis of existing air quality problems does not discuss the odor of kerosene that prevails over the entire surrounding communities during warm, relatively calm days. . ." (Duane Spence, Airport Mitigation Coalition)

"The San Francisco airport already 'stinks' - If these expansion projects go ahead, I expect the air will be unbearable." (TREE)

Response

The perception of, and sensitivity to, odor differs from person to person, depending on the type and intensity of the odor. Some people find certain types and intensities of odors more objectionable than others. Odor impacts are mainly annoyance, irritation and discomfort. The health effects of odors are too speculative at this point to be included in the EIR.

Aviation fuel is odorous and presents the potential for a nuisance, depending on the quantity emitted and on weather conditions. According to the BAAQMD, however, there is no history of any odor complaints from SFIA or its operations./5/ The Air District does not use any specific thresholds for evaluating odor, and inspects sites on the basis of complaints received. As no complaints have been received by the Air District, odor issues were not discussed in the EIR.

Prevailing winds at the Airport are from the west-northwest (about 26 percent of the time), with wind speeds of about 14 miles per hour. Winds from the west (about 18 percent of the time), have speeds of about 14 miles per hour. Winds from the northwest (about 10 percent of the time) have speeds of about 13 mph, while winds from the west-southwest (about five percent of the time) have speeds of about 10 mph. Southwesterly winds occur about 4 percent of the time, with an average speeds of about 9 mph./6/ These winds would likely disperse any odorous emissions in the project area towards the Bay and away from residential areas. Because of the prevailing winds, sensitive receptors, such as nearby residential land uses, would not likely be exposed to odor impacts for extended periods of time over much of the year.

VISIBILITY

Comment

"...[V]isibility is restricted by the jet engine emissions which can be seen by the naked eye as brown-colored exhaust streaming from each engine. Besides the effect of these particles on lungs, outdoors, and other surfaces upon which they precipitate, the fact remains that the visibility of the entire region is adversely affected at the present level of operations. Increased pollution from airport expansion and the accompanying surface vehicles will become a crucial problem." (Duane Spence, Airport Mitigation Coalition)

Response

Visibility can be affected by air pollutants such as nitrogen dioxide and suspended particulates. Nitrogen oxides, emitted by aviation fuel combustion processes, as well as by automobiles and building heating systems, are oxidized and become nitrogen dioxide (NO_2) in the atmosphere. NO_2 has a whiskey-brown color. Haze, normally consisting of NO_2, fine dust and smog, has the potential to reduce and limit visibility. The particulates associated with jet engine exhaust generally are of the larger type, which settle down quickly and contribute more to local soiling problems than to area-wide visibility reduction./7/

Wind conditions determine, to a large extent, the effect of air pollutants on local visibility. Protected inland valleys would have more of a visibility problem from air pollutant emissions than locations where there is a strong regular air movement. Under calm, stable conditions, the pollutants would not be dispersed quickly and visibility-reducing particles would remain in the atmosphere. At SFIA, however, calm and stable wind conditions occur mostly at night, and most of the Airport operations occur during the day. Prevailing daytime winds at the Airport are from the west-northwest (about 26 percent of the time). Other winds are from the west (about 18 percent of the time), the northwest (about 10 percent of the time), the west-southwest (about five percent of the time), and the southwest (about 4 percent of the time). These winds would likely disperse the visibility-reducing particles and nitrogen dioxide gases from the vicinity of SFIA over much of the year. Haze has been identified as a regional problem in some parts of the Bay Area; the project could incrementally contribute to area-wide reductions in visibility due to smog-induced haze.

MITIGATION

Tree Planting

Comment

"Mitigations must be offered to help reduce the adverse air quality impacts on the region. A mitigation must be considered for SFIA to contribute funds to affected cities such as San Bruno for street tree planting programs to help upgrade the air quality adjacent to the airport, as well as planting of trees along and within the I-380 right-of-way to upgrade the air quality and create a scenic corridor as identified in the San Bruno General Plan." (George Foscardo, City of San Bruno)

Response

Although the planting of trees along I-380 could make a contribution to the visual quality of this corridor, it would not likely improve regional air quality conditions appreciably. Trees would absorb CO_2 and release oxygen as part of the photosynthetic process, but they would not be expected to make a substantial difference to local CO levels, given the air pollutant contribution from motor vehicle exhausts. Air-quality impacts can be mitigated and conditions improved by reducing motor vehicle emissions, as motor vehicle emissions generate the most air pollutants, especially CO.

Transportation Mitigation for Air Quality Impacts

Comments

"In view of the fact that San Mateo County already has levels of emissions that must be lowered in order to achieve the air quality requirements of the BAAQMD, and that a significant part of that reduction must be achieved by reduction in vehicular emissions, and that the recently adopted Congestion Management Plan (CMP) specifies Level of Service (LOS) standards for highways and arterials as well as for transit services, and that these levels of service can be achieved only through a reduction in the number and percentage of vehicular trips for all types of travel, therefore, the proposed expansion of SFIA should be reexamined, and realistic mitigations must be devised to alleviate effects that will cause adverse environmental impacts, primarily in the vicinity of the airport, but also extending to other parts of the Bay Area. However, the DEIR states (p. 5) that 'the proposed project would cause further deterioration of levels of service on the surrounding freeway network, and decreases in levels of service on the arterial street network in surrounding communities.' " (Onnolee Trapp, Leagues of Women Voters of San Mateo County, letter of 8/27/91 and public hearing of 8/27/91)

"We are concerned about air quality effects both from ground transportation and from the aircraft themselves. And we feel that there may be better efforts to reduce the air quality impacts on the local areas, especially through the use of encouragement of public transportation, which has been raised before you already.

"We also think that the airport should be encouraging new affordable housing near the airport as a mitigation measure to improve air quality by reducing automobile trips. The Master Plan shows that by 2006 there will be a need for 6,850 new housing units generated by airport expansion. This is identified as an environmental impact, but there is no discussion of mitigation measures." (Janet Fogarty, Mayor of Millbrae)

"Significant air quality effects from project-related surface traffic are classified as unavoidable. To an extent this may be true but greater attention should be given to formulating mitigation for both aircraft and surface-related air quality impacts.

"Suggested mitigation measures:

"1. Significant diversion of automobile traffic to public transit could be a mitigation measure to improve air quality.

"2. Encouragement of new affordable housing near the Airport could be a mitigation measure to improve air quality by reducing automobile trips. However, we are not suggesting building under existing flight paths which we believe to be unsafe." (Janet Fogarty, Mayor of Millbrae)

"Pages 4-6 - Differences in amount of vehicle trips and amounts of Pollution that would be added because of BART being put West of 101 by R.R. Tracks - or because of BART being an Internal Airport Terminal Station - should have been studied. It's very important and should be documented. I'm sure the Internal BART Station would be cause of lots less vehicle trips and therefore lots less Pollution and should be seen as a mitigation to Pollution Problems, versus the External BART Station West of Freeway which would be cause of a great many vehicle trips and lots more added Pollution!, - (Especially Carbon Monoxide) (which is CO, a "slow silent death" killer and exceedances that are already happening must not be taken lightly nor added to. That also puts added Pollution, into Safety Category!" (Jessie Bracker)

"The Regional Groups such as MTC and BAAQMD, which are under a court order to reduce air pollution, should make strong recommendations to the operators of attendant-operated parking facilities to provide bicycle parking. This would bring air quality benefits with little additional cost.

"Among the prime new candidates to use bicycle parking are those persons who have short commutes along routes with few hills." (Charles Smith)

"The EIR would benefit from a discussion of the regional (ozone) and local (carbon monoxide) reductions that would be achieved by increased use of transit and ridesharing modes by air passengers and airport employees. Also, the Airport should be aware of transportation control measures (TCMs) adopted by MTC in February 1990 as Contingency Measures for the 1982 Bay Area Air Quality Plan and proposed TCMs in the BAAQMD's 1991 Clean Air Plan to meet state air quality standards which may affect the transportation impacts discussed in the DEIR." (Chris Brittle, Metropolitan Transportation Commission)

Response

Please refer to pp. C&R.152 et seq. herein for responses to comments on traffic mitigation measures, including comments on the San Mateo County Congestion Management Plan, Transportation System Management (TSM), and bicycle measures.

Section V.C., pp. 426-427 of the EIR, lists mitigation measures to reduce the severity of the air quality impacts of the project. As noted on p. 427 of the EIR, measures identified to mitigate traffic impacts would also mitigate air quality impacts.

Transportation mitigation measures, by seeking to reduce congestion and enhance the free flow of traffic along access routes, would also serve to mitigate air quality impacts, by reducing auto emissions from excessive idling and delays at crowded intersections and roadways. Motor vehicles are the primary source of air pollutants in the Bay Area. Any reduction in vehicle-miles traveled would reduce vehicle emissions, thereby reducing the quantity of air pollutants emitted. An effective way to achieve trip reductions is through the increased use of public- and mass-transit options. The public, cumulatively, would make a substantial difference to air quality if it chose alternate modes of transport instead of driving alone. Some of the Transportation Control Measures (TCMs) which would help to reduce the number of people driving alone are: improving area-wide transit service, improving access to transit services, constructing carpool and express buslanes along freeways, requiring employer-based trip reductions, improving bicycle access and facilities, providing incentives for alternate modes of transport, and implementing market-based strategies. The EIR, on p. 427, identifies trip reduction measures that would improve air quality.

As indicated in the responses to comments regarding transportation mitigation, SFIA has an Airport-wide transportation coordinator, who is currently preparing a trip reduction ordinance, which would require each large Airport employer to appoint a transportation coordinator and establish policies that would increase transit use. SFIA seeks to reduce total vehicle trips by using TSM elements which include: telecommuting, compressed work weeks, ridesharing, increasing transit attractiveness, priority for high-occupancy vehicles (HOV), incorporating TSM features into physical design (e.g., lockers for bicycles, shower and changing facilities, bicycle paths, pedestrian paths, and HOV lanes) and incorporating TSM features into SFIA employers' policies (e.g., parking rates and spaces favorable to vanpools and carpools, subsidies to employees for transit fares, and transportation coordination contact with employees). These elements would be consistent with the San Mateo Congestion Management Plan, and with TCMs proposed by MTC.

The commenter's suggested mitigation measure to divert automobile traffic to public transit is consistent with the mitigation measures identified in the EIR.

Residential development close to an Airport is constrained by noise from Airport operations and, so, encouraging affordable (or any price range) housing near the Airport may not be a feasible measure to mitigate air quality impacts on the environment. If new affordable housing near the Airport were to be occupied by Airport employees, there would be a net reduction in vehicle miles traveled by them. On the other hand, if the employees chose not to live close to the Airport, then this measure would not necessarily reduce their vehicular emissions. If the occupants of the new affordable houses do not work at SFIA, and have to drive longer commute distances, then it would increase their vehicular emissions. This would have a detrimental effect on local air quality. A regional policy of encouraging residential construction close to transit corridors would reduce vehicular emissions, even if employees living in such residences were some distance from their places of employment. Issues of affordable housing that relate to this project are discussed on pp. C&R.362-363 herein.

The traffic impacts from alternative BART station locations are addressed on pp. C&R.139-145 herein. On p. 306 of the EIR, it is stated that if BART were extended to SFIA in 2006 (with a station west of US 101), vehicle trips to and from the Airport would be reduced, but none of the study area intersections would experience a change in LOS. It is also stated that locating the station closer to the Airport would result in a higher BART patronage than assumed in the EIR. Higher BART patronage would likely result in lower project-generated emissions. Locating the BART station within SFIA would affect the location of a CalTrain/BART connection, however, and possibly result in decreases in CalTrain patronage.

The 1991 Clean Air Plan prepared by the BAAQMD estimates the percent reduction of CO, and ozone precursors HC and NO_X, from various TCMs on an Air Basin-wide basis./8/ Employer-based trip reductions are estimated to generate about a 3.7 percent reduction each in HC and NO_X, while improving transit services would reduce HC and NO_X emissions by about 1.3 percent each. Carpool incentives would generate a saving of about 0.3 percent each of HC and NO_X, and market-based measures, such as smog fees and gas taxes, would provide a reduction of about 15 percent of NO_X and about 23 percent of HC.

These reductions are on an areawide basis; the specific reductions that could be achieved at the Airport would depend on the effectiveness of the TCMs/TSMs actually implemented.

For a discussion of airside emission impacts of increased flight operations, please refer to pp. 356-365 of the EIR, and Table 59 on p. 361 therein. See also p. C&R.322 herein.

Impacts of Mitigation Measures

Comment

". . .In my opinion, many of the suggested mitigation measures listed would not be mitigation measures, but, instead, would be additions to the pollution problem and should be listed as such. The BART station should not be placed in or near the vacant airport lands west of 101 highway because of added traffic vehicle pollutants, new roads that would have to be built, and parking lots that would have to be built -- all generating more pollutants, which would make a farce of the purported reason for getting BART in the first place -- which was to have cleaner air. BART is the only one that would benefit." (Jessie Bracker)

Response

The potential effectiveness of transportation mitigation measures, and thus, their relation to air quality, is discussed on pp. C&R.191-193 herein.

NOTES - Air Quality

/1/ Landrum & Brown, *San Francisco International Airport, Environmental Impact Assessment Report, Airport Improvement Program,* 1975.

/2/ Bay Area Air Quality Management District, Association of Bay Area Governments, and Metropolitan Transportation Commission, *Bay Area '91 Clean Air Plan,* 1991.

/3/ Bay Area Air Quality Management District, *Guidelines for Assessing Impacts of Projects and Plans,* 1985.

/4/ Steve Hill, Bay Area Air Quality Management District, telephone conversation, February 13, 1992.

/5/ Rochelle Walker, Bay Area Air Quality Management District, telephone conversation, February 13, 1992.

/6/ California Air Resources Board, *California Surface Wind Climatology,* 1984.

/7/ Association of Bay Area Governments, *Aviation Effect on Air Quality,* 1971.

/8/ Bay Area Air Quality Management District, Association of Bay Area Governments, and Metropolitan Transportation Commission, *Addendum to the Bay Area '91 Clean Air Plan,* 1991.

CULTURAL RESOURCES

MITIGATION

Comment

"The concern of the Native American Heritage Commission is in those places where the prehistoric sites underlie areas which have been previously developed and thought to be free of cultural resources. When an older structure is replaced with a modern building, or an old underground water or sewer line is upgraded to meet present needs is when the problem of impacting such a location takes place. When a foundation is dug to comply with the building codes and requirements of today, or utility lines are buried to meet health and safety standards, previously undisturbed soil becomes impacted.

"The Native American Heritage Commission recommends that the mitigation measures covering cultural resources use the language found in the California Environmental Quality Act, Appendix K. CEQA, Appendix K gives directions to follow in the event any previously undetected archaeological sites that are inadvertently discovered during any phase of construction. Use of the language in Appendix K, or reference to the standardized procedures therein, helps to eliminate costly delays and assures more adequate protection of such cultural resources. I would also recommend that you contact and work closely with the appropriate Native American groups in the area during the initial planning stages. They may be able to offer input regarding sites in the area.

"The Native American Heritage Commission has prepared a pamphlet for use by lead agencies, planners, developers, and property owners. It provides an easy-to-read breakdown of the California Codes pertaining to Native American human remains and their disposition. I have included a copy of this brochure for your information." (Debbie Pilas-Treadway, Native American Heritage Commission)

Response

In response to the concerns expressed by the Native American Heritage Commission regarding the mitigation measure on p. 428 of the EIR, the following sentence is inserted after the last sentence in the first paragraph:

> An archaeologist should instruct excavation crews of the potential for discovery of cultural and historic artifacts on the site, and of the procedures to be followed if such artifacts are uncovered.

The first sentence of the second paragraph on p. 428 is revised as follows (revisions are underlined):

> Should evidence of cultural or historic artifacts or features of potential significance, as determined by the project archaeologist, be found during project excavation, the Environmental Review Office (ERO) and the President of the Landmarks Preservation Advisory Board (LPAB) would be notified immediately, and any excavation which could damage such artifacts or features would be halted.

State law requires that the Native American Heritage Commission be notified if burial remains or related artifacts are found. The following, added on to the mitigation measure in the EIR, would exceed present legal requirements but would help protect all Native American artifacts that might be found. The following is added to p. 428 of the EIR before the last sentence in the second paragraph:

> Should evidence of prehistoric or historic Native American artifacts be found during excavation, the Native American Heritage Commission would be notified immediately, an action required by state law when Native American remains are found. Also, an appropriate representative of the local Native American group would be retained as needed if burial remains were found.

In response to the commenter's request that the mitigation measures use the language found in Appendix K of the CEQA *Guidelines,* it should be noted that the appendices to the *Guidelines,* including Appendix K, are advisory rather than mandatory. The retention of an archaeologist and the participation of the ERO, LPAB, and Native American Heritage Commission (as appropriate) would help to assure adequate protection for cultural resources on the project site.

HAZARDOUS MATERIALS AND WASTES

The Notes for this section begin on p. C&R.350.

RADIOACTIVE MATERIALS

Comment

"One last illustration on the DEIR's thoroughness should suffice. There is copious documentation on hazardous wastes and toxic materials. There are even maps showing spills. I found, however, absolutely no mention of the transport and storage of radioactive materials. Like illicit drugs, there must be 'tons' of these materials transported through SFO each day. Is this a deliberate omission?" (Alyn Lam)

Response

Radioactive materials are not actually used to an appreciable extent at Airport facilities, but many common carriers do transport radioactive materials through the Airport by ground and air. No statistics are available to indicate quantitatively the extent of radioactive material shipments. A large portion of the radioactive materials passing through SFIA are for medical uses such as radiopharmaceuticals. According to SFIA administration staff, transportation of radioactive materials is considered a high priority by the Airport, and almost none of these materials are stored at the Airport.

Radioactive material is a specific type of hazardous material and, as such, was not deliberately omitted from the EIR. Radioactive elements such as tritium (^{3}H) or carbon-14 (^{14}C) emit a type of high-energy radiation, called ionizing radiation. Although there are inherent hazards associated with exposure to ionizing radiation such as cancers and genetic damage, simple and effective protective measures may be taken to prevent exposure. Regulations that apply to most hazardous materials were described in the EIR under Hazardous Materials Regulatory Framework (pp. 202-205, A.147-A.157). Radioactive materials are regulated through the Nuclear Regulatory Commission and, in California, the Radiologic Health Branch of the Department of Health Services.

There are two sets of regulations applicable to radioactive materials shipped by air: the 1) U.S. Department of Transportation (DOT) Regulations, and 2) International Air Transport

Association Dangerous Goods Regulations. In 49 CFR, DOT specifies how radioactive materials are to be transported according to the type and quantity of radioactivity. These regulations are in addition to those contained in 10 CFR and 39 CFR, promulgated by the Nuclear Regulatory Commission and the U.S. Postal Service, respectively. The Dangerous Goods Regulations forbid the air transport of specific radioactive cargo such as explosives and pyrophoric (spontaneously ignitable in air) radioactive materials.

DOT sets minimum standards for package design and labeling, specifies thermal and radiation level limitations, requires provisions for contamination control, and provides temporary storage procedures. The radiation level may exceed 200 millirem per hour (mrem/hr) on the external surface of a package only under very specific circumstances. (The estimated total radiation exposure per capita is about 160 mrem/yr or 0.02 mrem/hr from all sources. Of this total, 49 percent is from naturally occurring background radiation and 46 percent is from medical and dental uses./1/) During temporary storage, individual packages must be placed in small groups of limited radioactivity separated by a specific distance. Radioactive materials are not permitted aboard passenger-carrying aircraft unless they are intended for research, medical diagnosis, or treatment, in which case restrictive quantity limits and packaging requirements apply.

Specific regulatory requirements on packaging depend on the radioisotope shipped and its concentration. Most shipments of radioactivity (96.5 percent) are classified as type A, which require type A packaging. These containers are usually made of fiberboard, wood, or steel, and are designed to withstand moderately rough handling conditions.

Type B shipments account for 90 percent of the radioactivity shipped, but less than 3.5 percent of the radioactivity shipments. Type B shipments require Type B packaging, which is considerably stronger than Type A packaging. Type B packages must be capable of withstanding a 9-meter fall onto a hard surface, a 1-meter drop onto the upraised end of a 15-centimeter steel bar, a 30-minute exposure to 1,475°F (for fissionable materials), and submersion under one meter of water for eight hours./1/

No significant impacts are expected as a result of possible increases in radioactive shipments through the Airport.

WASTES PRODUCED BY SFIA TENANTS

Comment

"On page 214 the Draft EIR states 'Hazardous wastes produced by tenants are not closely monitored by the Airport. The tenant is responsible for the proper removal and disposal of manifested wastes.' The 1991 San Mateo County Hazardous Waste Management Plan identifies three of San Mateo County's fifteen largest hazardous waste generators as SFIA tenants, with United Airlines Maintenance Operations alone generating over 4,000 tons of hazardous waste per year. Admittedly, San Mateo County has little control over import, storage or disposal of hazardous materials and wastes at SFIA.

"The DEIR does not quantify nor address the current level or kinds of wastes produced by SFIA airline and business tenants, nor does it identify expected increases for each tenant due to the projected Airport expansion. Hazardous materials and waste siting should be generally located, the transportation of hazardous materials and wastes should be planned, and the EIR should identify impacts and offer appropriate mitigations for increased generation and handling of hazardous materials and hazardous waste." (George Foscardo, City of San Bruno)

Response

The EIR does not attempt to quantify hazardous materials use or hazardous waste generation at all SFIA-related facilities under current operating conditions or as a result of the project. The commenter has correctly pointed out discrepancies between the EIR and the *1991 San Mateo County Hazardous Waste Management Plan* (which was published after preparation of the DEIR). According to the *1992 San Mateo County Hazardous Waste Management Plan*, the United Airlines Maintenance Center generated the second greatest quantity of hazardous waste in San Mateo County in 1986. The *Plan* states that United Airlines Maintenance Operations created 4,144.91 tons of waste in that year (4,027 tons the following year). The *Plan* also indicates that the County's twelfth largest hazardous waste generator in 1986 was the TWA Maintenance Center, which generated 302.91 tons of waste. The PSA Maintenance Center was among the top twenty generators, producing at least 75 tons./2/

San Mateo County obtained the 1986 data from the California Department of Toxic Substance Control's Manifest Unit, which compiles the data directly from state copies of hazardous waste manifests into the Hazardous Waste Information System (Tanner Lists). Twelve of SFIA's tenants appear on the 1990 Lists, along with SFIA Administration. EIR Table 19A, added here, summarizes the most current data available from these Lists and is inserted following p. 215 of the EIR.

In light of this data, which is the most accurate information available at this time, several text changes are incorporated into the EIR. First, following the first paragraph under "Hazardous Waste Generation" on p. 214 of the EIR, of the EIR, the following paragraph is inserted:

> Copies of Hazardous Waste Manifests are collected by the California Department of Toxic Substance Control's Manifest Unit, which compiles annual waste volumes by waste category into what are known as the Tanner Lists. Table 19A, "1990 Hazardous Waste Generation By SFIA and Tenants," summarizes these data for SFIA facilities. The volume of waste generated at the Airport in 1990 may be indicative of a typical year, but individual wastestreams could vary widely from year to year. Asbestos-containing waste and contaminated soil from site clean-ups are especially unpredictable. Generally, when asbestos is removed from a source, it is unnecessary to remove it from the same location again. Some generators, such as Budget Rent-a-Car and Hilton Hotels, may not create waste on an ongoing basis, because they have received "one-time-only" EPA generator numbers. One-time-only wastestreams are identified in the footnotes of Table 19A.

The first two sentences in the paragraph under "Airport Facilities" on p. 214 are replaced with the following text:

> Nearly all (97 percent) of the hazardous waste generated by SFIA in 1990 contained asbestos, presumably from asbestos removal projects. The rest of SFIA's hazardous waste was produced by the Airport maintenance shops and the water quality lab. Every year, approximately 3.5 tons of hazardous waste are shipped, consisting mainly of waste solvents and a small amount of waste from the water quality lab.

The fourth sentence in the second paragraph on p. 215 of the EIR is replaced by the following sentence:

> As shown in Table 19A, United Airlines generated approximately 3,600 tons of hazardous waste in 1990. The bulk of the waste from Trans World Airlines, American Airlines, and Delta Airlines is related to oil, but otherwise their wastes are similar to those of United Airlines line maintenance operations.

TABLE 19A: 1990 HAZARDOUS WASTE GENERATION BY SFIA AND TENANTS

Generator /a/	Waste Category /b/	Volume (tons)	Total Volume (tons)
United Airlines	Alkaline solution (pH>=12.5) with heavy metals	16.12	3608.45
	Aqueous solution with <10% organic residues	1516.44	
	Asbestos-containing waste /c/	256.96	
	Other inorganic solid waste	116.03	
	Halogenated solvents	406.96	
	Oxygenated solvents	207.21	
	Hydrocarbon solvents	70.65	
	Unspecified solvent mixture	284.97	
	Waste oil and mixed oil	216.06	
	Off-specification, aged, or surplus organics	5.45	
	Organic solids with halogens	109.36	
	Other organic solids	17.71	
	Unspecified sludge waste	3.47	
	Contaminated soil from site clean-ups /c/	8.20	
	Liquids with halogenated organic compounds >=1000 mg/l	15.98	
	Solids or sludges with halogenated organic compounds >=1000 mg/l	35.88	
	Not reported	321.00	
Trans World Airlines	Halogenated solvents	0.20	316.62
	Oxygenated solvents	0.39	
	Hydrocarbon solvents	0.20	
	Waste oil and mixed oil	5.80	
	Oil/water separation sludge	1.66	
	Unspecified oil-containing waste	212.97	
	Organic liquids (nonsolvents) with halogens	0.41	
	Unspecified organic liquid mixture	0.77	
	Other organic solids	1.20	
	Contaminated soil from site clean-ups /c/	93.02	

(Continued)

TABLE 19A: 1990 HAZARDOUS WASTE GENERATION BY SFIA AND TENANTS (Continued)

Generator /a/	Waste Category /b/	Volume (tons)	Total Volume (tons)
American Airlines	Alkaline solution (pH>=12.5) without heavy metals	0.20	149.70
	Unspecified alkaline solution	0.29	
	Asbestos-containing waste /c/	0.84	
	Unspecified solvent mixture	8.00	
	Waste oil and mixed oil	81.70	
	Organic monomer waste	1.34	
	Other organic solids	1.35	
	Other empty containers >=30 gal.	0.50	
	Contaminated soil from site clean-ups /c/	1.20	
	(Acidic) Liquids with pH <=2	0.20	
	Not reported	54.08	
SFIA	Asbestos-containing waste /c/	123.02	126.60
	Halogenated solvents	0.20	
	Hydrocarbon solvents	1.85	
	Unspecified solvent mixture	0.20	
	Waste oil and mixed oil	0.83	
	Other empty containers >=30 gal.	0.50	
Chevron USA	Unspecified oil-containing waste	3.32	24.20
	Other empty containers >=30 gal.	2.00	
	Contaminated soil from site clean-ups /c/	18.53	
	Liquids with polychlorinated biphenyls (PCBs) >=50 mg/l /d/	0.35	
Shell Oil	Other inorganic solid waste	15.92	21.93
	Tank bottom waste	0.50	
	Unspecified organic liquid mixture	1.37	
	Other organic solids	0.02	
	Unspecified sludge waste	3.90	
	Detergent and soap	0.22	

(Continued)

TABLE 19A: 1990 HAZARDOUS WASTE GENERATION BY SFIA AND TENANTS (Continued)

Generator /a/	Waste Category /b/	Volume (tons)	Total Volume (tons)
Hertz Rent-A-Car	Waste oil and mixed oil	0.18	11.43
	Tank bottom waste	11.25	
Delta Airlines	Oxygenated solvents	0.22	10.80
	Unspecified solvent mixture	0.68	
	Waste oil and mixed oil	9.90	
Budget Rent-A-Car	Tank bottom waste /d/	5.42	6.26
	Gas scrubber waste /d/	0.84	
U.S. Coast Guard Air Station	Oxygenated solvents	0.18	0.88
	Hydrocarbon solvents	0.18	
	Off-specification, aged, or surplus organics	0.02	
	Organic liquids with metals	0.16	
	Not reported	0.34	
Hilton Hotels	Hydrocarbon solvents /d/	0.22	0.22
U.S. Postal Service Airport Mail Facility	Unspecified solvent mixture	0.22	0.22
Aircraft Service International	Oxygenated solvents	0.12	0.12

NOTES:

/a/ Some users generate hazardous wastes at two or more Airport locations separated by public roadways; therefore, they are required to have more than one EPA generator number. Their wastes are separated by EPA generator number on the Tanner Lists, but they have been combined in this table.

/b/ Waste categories are defined by the State of California (CCR, Title 22).

/c/ Some waste streams, such as asbestos and contaminated soils, are usually generated as part of a specific project, and annual volumes of these wastes may be inconsistent from year to year.

/d/ This material was disposed of under a one-time-only EPA generator number.

SOURCE: California Department of Toxic Substance Control, Manifest Unit, Hazardous Waste Information System, 1990.

The last sentence of the second paragraph on p. 215 that begins "The car rental agencies produce. . ." begins a new third paragraph. After this sentence the following text is inserted:

> Fuel suppliers generate volumes of waste similar to the car rental agencies. Hazardous waste generated by the U.S. Coast Guard Air Station, the U.S. Postal Service, and Aircraft Service International are minor (less than 0.03 percent of the total waste generated).

Two text changes have been incorporated in an effort to clarify statements in the EIR regarding hazardous materials use. The last sentence in the first paragraph on page 390 under "Tenant Facilities" is amended as follows (revisions are underlined):

> Since the SFIA Master Plan does not include expansion of the United Airlines Maintenance Center, operations there are not expected to increase <u>proportionally</u> with Airport expansion, and <u>hazardous material use would probably not increase as a direct result of the project</u>.

The second complete sentence on p. 391 beginning "The amount of hazardous materials. . ." is re-worded as indicated (revisions are underlined and deletions shown in brackets):

> The amount of hazardous materials [ ] stored and used at these facilities [ ] <u>would</u> be small compared to [ ] <u>the amount</u> used at the United Airlines Maintenance Center [ ].

No significant impact is expected as a result of the incremental increases in hazardous waste generation that may accompany the expansion of the Airport, because federal, state, and local laws and regulations would mitigate the impacts of increased hazardous waste generation. Hazardous Waste Minimization Plans required by Senate Bill 14 and additional on-site recycling as mentioned in the EIR (p. 392) would also tend to offset increases in hazardous waste generation.

ASBESTOS

<u>Comment</u>

"Then there is the little matter of asbestos. There are at least 32 demolition projects in the proposed expansion totaling roughly 16% of SFO's existing building area. At least 10 of these projects are necessary in order to permit the construction of the new terminals (DEIR Vol. I CH.

XI Table B.1/DEIR Vol. I CH. II Fig. 5). Both the EPA and BAAQMD are responsible for asbestos removal in the Bay Area. The Asbestos Emergency Response Act (AHERA) gives the EPA authority to regulate (DEIR Vol. II CH. XI A-157). Furthermore, under Subpart M §§61.145 and 61.146 of the Clean Air Act, the EPA must be notified in writing of intentions to demolish any facility." (Alyn Lam)

Response

According to SFIA administration staff, the Airport's policy is to remove any asbestos found when demolishing buildings in accordance with state and federal laws, including complying with notification and reporting requirements of responsible agencies (*San Francisco International Airport Tenant Improvement Guide* and *Airport Rules and Regulations*). As stated on pp. 223-224 of the EIR, the Airport plans to conduct additional surveys of asbestos at its facilities in the near future and is in the process of implementing an asbestos policy and abatement program.

In order to clarify information provided in the EIR, the following paragraph is added between the first and second full paragraphs on p. A.157 of Volume II: Appendices:

> Because the EPA has delegated the enforcement responsibility of all National Environmental Standard Hazardous Air Pollutants (NESHAP) requirements, including asbestos, to the BAAQMD, the BAAQMD is responsible for regulating the removal of friable asbestos of one percent or more. Although it was necessary at one time to notify the EPA of any intentions to demolish buildings, this is no longer required. Instead, BAAQMD must be notified ten days prior to a demolition, regardless of whether or not the buildings are known to contain asbestos. This requirement also applies to the removal of asbestos from areas of at least 100 square or linear feet./1/

The following sentences are added in place of the first sentence of the second full paragraph on p. A.157 of Volume II: Appendices:

> The Asbestos Hazards Emergency Response Act (AHERA) has also given EPA the authority to regulate abatement methods and establish standards for exposure levels during and following abatement activities, but AHERA only applies to public and non-profit private schools (K-12). AHERA spells out accreditation standards for the training of personnel involved in asbestos abatement at these schools, and in November 1992, the EPA is expected to implement regulations recently mandated by Congress that extend the training provisions of AHERA to those working on other public and commercial projects./2/

A new paragraph is begun at "Some state regulations on asbestos are. . ." in the second full paragraph on page A.157 of Volume II: Appendices.

The following is inserted at the end of p. A.157 of Volume II: Appendices:

NOTES - Hazardous Materials Regulatory Setting

/1/ Bernardo, Naomi, Air Quality Technician, Bay Area Air Quality Management District, telephone conversation, February 10, 1992.

/2/ Lanier, Don, Compliance Monitor, Environmental Protection Agency, telephone conversation, February 10, 1992.

The above comment was written in the context of a discussion of the jurisdiction of NEPA over the implementation of the project. The EPA has ministerial authority over asbestos removal. It does not have any discretionary authority; therefore, the involvement of the EPA in asbestos removal does not contribute to a need for an EIS. Federal jurisdiction is discussed further under EIR Process, pp. C&R.410-413 herein.

NOTES - Hazardous Materials and Wastes

/1/ Eisenbud, Merril, *Environmental Radioactivity*, 3rd ed., Orlando: Academic Press, Inc., 1987.

/2/ *1992 San Mateo County Hazardous Waste Management Plan*, January 1992.

EMPLOYMENT AND HOUSING

SFIA EMPLOYMENT

The notes for this section begin on p. C&R.368.

United Airlines

Comment

"...As a point of information, the MOC [Maintenance Operations Center] employs 12,000, not the 6,000 as referenced in the DEIR." (Thomas Brown, United Airlines)

Response

Comment noted. The number presented in the EIR represents maintenance and mechanic workers only. (The correct employment figure was used for the EIR analyses.) Accordingly, the fourth sentence of the first paragraph on page 228 should read as follows (revisions are underlined):

> United Air Lines' maintenance base at SFIA is the largest in the United States and employs over 6,000 maintenance and mechanic workers at SFIA. Total full-time equivalent employment at the maintenance base is approximately 11,500.

Provision of Jobs for Area Residents

Comments

"From a business point of view, improved facilities and service levels will generate additional jobs for community residents and increased revenues for local businesses and governmental bodies..." (Jerome Copelan, San Francisco Association of International Airlines)

"Finally, on the subject of jobs, your commission allows only enough new office space to be built each year to house about 2000 new jobs. In a city that graduates more than 12,000 high school and college students annually, do you realize that your policies force 80 percent of your city's most ambitious and talented young people to not dare think about starting their careers here and contribute to our city. I know of no other planners in the world who force their next generation out. Do you believe that, too, is good planning for the benefit of your constituents? . . . a policy you now wish to extend to the airport?" (Stanford Horn)

Response

The first comment is consistent with information presented on pp. 394-399 of the EIR. Table 67 on p. 398 of the EIR shows that implementation of the proposed SFIA Master Plan improvements would result in an additional 8,970 SFIA jobs by 2006. It is estimated in Table 67 that the new jobs would be filled by residents of all nine Bay Area counties. Estimates for induced employment (which is related to the revenues mentioned by the commenter) are discussed on p. C&R.358 herein.

The Office Growth Limitation Ordinance (Ordinance No. 414-85) was approved by the San Francisco Board of Supervisors on September 10, 1985. Proposition M, the Accountable Planning Initiative, was approved by San Francisco voters on November 14, 1986. Ordinance No. 414-85 limited the growth of office developments larger than 50,000 square feet in San Francisco to a total of 2.85 million square feet over a period of three years. Proposition M, which amended Section 320(g)(1) of the City Planning Code, lowers the threshold for office projects subject to the annual limit from 50,000 square feet to 25,000 square feet of additional office space. Proposition M also added Section 321.1 to the City Planning Code which changed the total growth limitation amount from 2.85 million square feet of office space over three years to 950,000 square feet in one year.

It is true that the San Francisco Planning Commission, in accordance with the Office Growth Limitation Ordinance and Proposition M, limits office space development, and potentially, the number of jobs that can be created. However, those measures were not established by the City Planning Commission as stated by the commenter.

Regarding the SFIA Master Plan, the Planning Commission is responsible only for certifying the EIR; the Airports Commission has the authority to approve the project. The project approval process is discussed on pp. C&R.38-45 herein.

EMPLOYMENT AND HOUSING DEMAND

Direct Employment and Housing Demand

Comments

". . . Even excluding the visitor induced jobs the addition of demand for 10,226 or 6,850 units should be treated as a significant adverse impact as well. The reason for treating this as adverse is that the Bay Area is already in an annual housing deficit, building fewer housing units than it needs to meet current demand. There is ample data available to the EIR drafters on this issue and that data needs to be viewed in the context of the impact of the airport expansion. According to the EIR, thirty-seven percent (37.1%) of the current SFIA work force resides in San Mateo County. Direct and Indirect housing demand in the County is 3,675 new units; the direct, indirect and visitor induced units (arbitrarily using the same 37%) equals 14,210 new dwelling units needed in the County over the next fifteen years.

"The DEIR, at Vol. 1, page 397, states that the new housing demand of 2,450 units is less than nine percent (9%) of ABAG's estimate of San Mateo County's potential for new housing units between 1990 and 2005. The DEIR does not discuss whether that potential will be met, what constraints will interfere with meeting that potential, whatever other projects are already relying on that housing potential, and what SFIA can do to assure that at least the nine percent needed for its future direct employees will be constructed.

"San Mateo County has a housing supply deficit, particularly for low and moderate income persons. The project would create a need for an estimated 2,450 -- which is 35 percent of the projected 6,850 total units. They need that many -- 2,450 additional dwelling units in San Mateo County, mostly for flight crews and passenger service personnel. Employment is expected to increase by 8,900, from 33,400 to 42,300, or 27 percent, leaving 2,050 persons unaccounted for in terms of housing." (Onnolee Trapp, San Mateo County Leagues of Women Voters, public hearing of 8/27/91)

"San Mateo County has a housing supply deficit, particularly for low and moderate income persons. The project would create a need for an estimated 2450 (35% of 6850 total units) additional dwelling units in San Mateo County, mostly for flight crews and passenger-service personnel. Employment is expected to increase by 8,900, from 33,400 to 42,300, or 27%, leaving 2050 persons unaccounted for in terms of housing. . . " (Onnolee Trapp, Leagues of Women Voters of San Mateo County)

Response

This response addresses a variety of issues involving the housing impacts that would occur in San Mateo County as a result of the direct employment created by the proposed project. (Indirect demands are addressed in the next response.) First, information from the EIR about projected direct employment and housing needs through 1996 and 2006 is summarized. This responds specifically to the commenter's concerns regarding additional dwelling units that would be needed in San Mateo County as a result of SFIA Master Plan implementation. Second, as requested by one commenter, criteria for determining the significance of the identified housing impacts are discussed. Third, as one commenter also requested, the need for the EIR to analyze development constraints relative to project-generated housing demand is addressed.

Direct Employment and Housing Demand Projections

The EIR (Tables 65 and 67, pp. 396, 398) states that 4,610 direct jobs would be created by 1996, and 8,970 by 2006, as a result of the proposed SFIA Master Plan project. The additional employment created at SFIA would, in turn, result in an increased demand for housing in the area. On the basis of existing ratios of employed residents to households, and residence patterns for current SFIA employees, it is expected that a total of 3,460 housing units would be required through 1996, and 6,850 by 2006, to house the new, direct SFIA employees. It is projected that San Mateo County's share of this demand would be 1,220 units by 1996, and, as stated by a commenter, 2,450 by 2006.

Housing Impacts and Significance Criteria

The following text is added after Table 67 on p. 398 of the EIR:

Housing Demand Impacts

The significance of the potential impacts on housing resulting from a project-generated increase in employment can be analyzed by comparing the project's share of the local labor force to the proportion of total local housing units used by the project's employees. If proportionally, the proposed project's use of local housing units would be substantially greater than its share of the local labor force, the impact could be considered significant.

In order to evaluate the potential impacts that would occur from implementation of the proposed SFIA Master Plan, the percentage of all San Mateo County jobs located at SFIA was compared to the percentage of San Mateo housing units used by SFIA employees (see Table 67A). As shown in Table 67A, in 1990, 11.0 percent of all San Mateo County jobs were located at SFIA, and SFIA employees used about 5.2 percent of all the housing stock in the area. Based on SFIA employment (under the project) and San Mateo total number of jobs, 11.7 percent of all San Mateo jobs would be located at SFIA in 1996. However, SFIA employees would use about 5.5 percent of the San Mateo housing stock. In 2006, about 12.1 percent of all San Mateo County jobs would be located at the airport, and SFIA employees would use about 5.7 percent of San Mateo County's housing stock.

These figures show that in 1990, and in the future with the project, the percentage of San Mateo County housing units used by SFIA employees would be approximately half of the percentage of San Mateo County jobs located at SFIA, and the proposed project would not affect this ratio substantially. Given these results, it can be concluded that no significant impacts on housing would occur as a result of the project.

Identification of Development Constraints

CEQA (*Guidelines*, Section 15131) does not require that market feasibility factors, such as the identification of constraints that may prevent a community from realizing its full development potential, be analyzed in an EIR. Although San Mateo County may need to identify these constraints, such identification would be best accomplished through a market feasibility study. The analysis in the EIR regarding future housing demands in San Mateo County provides local decision-makers with information that may used in the preparation of a housing market feasibility study, if such a study were to be done.

Indirect Employment and Housing Demand

Comments

"The DEIR fails to take into account the impact of the indirect and visitor induced employment created by the airport expansion envisioned in the Master Plan on the surrounding communities

TABLE 67A: EMPLOYMENT AND POPULATION PROJECTIONS FOR SFIA AND SAN MATEO COUNTY/a,b/

	1990	Projected 1996	Projected 2006	Absolute Difference 1990 - 1996	Absolute Difference 1990 - 2006
Total SFIA Jobs	33,400	38,000	42,400	4,600	9,000
Total San Mateo County Jobs /c/	303,600	326,300	349,900	22,700	46,300
Total SFIA Employees Living in San Mateo County	12,600	14,300	15,700	1,700	3,200
Total Number of Housing Units in San Mateo County /d/	241,900	256,500	274,000	18,200	32,100
Percent of SFIA Employees Living in San Mateo County	37.6%	37.1%	37.1%	-0.50%	-0.50%
Percent of All San Mateo County Jobs Located at SFIA	**11.0%**	**11.7%**	**12.1%**	**0.64%**	**1.12%**
Percent of San Mateo Housing Units Used by SFIA Employees	**5.2%**	**5.5%**	**5.7%**	**0.33%**	**0.52%**
Percent of New San Mateo County Jobs Located at SFIA	**N/A**	**20.3%**	**19.4%**	**N/A**	**N/A**
Percent of New San Mateo Housing Units Used by New SFIA Employees	**N/A**	**9.3%**	**10.0%**	**N/A**	**N/A**

NOTES:

/a/ Methodology for deriving figures in this table is described in a background paper available for review in Department of City Planning files, 450 McAllister Street.
/b/ Totals may not add due to rounding.
/c/ From data provided by the San Mateo County Planning Department.
/d/ Based on results of housing inventory contained in Consolidated Comprehensive Housing Affordability Strategy, Department of Environmental Management, San Mateo County. November 19, 1991.

SOURCE: Environmental Science Associates, Inc.

and the region. It also fails to make conclusions as to the significance of its direct impacts on housing. The DEIR's logic seems to be as follows:

"A. the existing employees at SFIA are distributed throughout the nine Bay Area counties;

"B. the future housing needs of new employees will be a tiny fraction of the housing needs of the San Mateo County and Bay Area (8,970 new employees; 6,850 new housing units);

"THEREFORE, the SFIA expansion will not have a significant impact on the environment.

"This silent logic is bolstered by limiting the DEIR's review of impacts to direct employees expected to be generated by the expansion. But the DEIR (at Vol. 1, page 229) raises two additional factors that make the actual impact on housing (as well as on traffic, transportation and air pollution) far greater. The DEIR states that:

"a. one half of an indirect employee should be assumed for every direct job created, and

"b. an additional 4.3 direct and induced jobs will be created for every new direct job at SFIA due to expenditures by additional visitors facilitated by the expansion.

"The DEIR Environmental Impact chapter does not consider either of these two impacts identified in the Environmental Setting portion.

"If .5 indirect job is generated by each new expansion job, the total new employee impact must be increased by 4,485 for a total of 13,455 new workers. Using the DEIR's ratio .76 housing units per employee the true new housing demand generated by the expansion of SFIA is 10,226 housing units.

"If 4.8 additional jobs are generated by the expansion (.5 + 4.3) the total new employee impact must be increased by 43,056 for a total of 52,026 new workers. Using the DEIR's ratio .76 housing units per employee the true new housing demand generated by the expansion of SFIA is 39,540 housing units.

"The addition of demand for 39,540 new housing units in the next 15 years is clearly a significant environmental impact...

"The nine percent estimate [of San Mateo County's potential for new housing units] jumps to 14 to 15 percent when direct and indirect employment impacts are considered and up to 50 percent when visitor induced employment is allocated to San Mateo County." (Harvey Levine for Sierra Point Associates)

"Secondary impacts of housing demand for new employees should be addressed." (Ed Everett, City Manager, City of Belmont)

"The report also states that for every direct San Francisco Airport job, there is five-tenths of induced job and, ultimately, due to passenger spending, 4.3 direct and induced jobs for every direct airport job. These employment projections will most heavily impact housing and traffic in

San Mateo County." (Onnolee Trapp, San Mateo County Leagues of Women Voters, letter of 8/27/91 and public hearing of 8/27/91)

Response

This response addresses a variety of issues regarding projected indirect and induced employment and impacts on housing that would occur as a result of the SFIA Master Plan improvements. First, projections of indirect and induced employment resulting from the SFIA Master Plan are discussed. Second, factors affecting the potential supply and demand of housing are explained. Third, the approach used to analyze housing impacts is explained and related to other policy issues.

Several of the comments include estimates of indirect and induced employment resulting from implementation of the SFIA Master Plan. The EIR states (on p. 229) that the operation of the Airport creates indirect and induced employment. The commenters correctly note that Section IV.I of the EIR, Employment and Housing, does not include estimates of the indirect and induced employment created as a result of the SFIA Master Plan. Although the basic calculations could be derived from information in the Draft EIR, the following text is inserted after Table 67 on p. 398 of the EIR (and following the text inserted regarding housing demand impacts, shown on pp. C&R.354-355):

SECONDARY EMPLOYMENT AND HOUSING DEMAND

New Indirect and Induced Employment

On the basis of the new SFIA employees generated by the project, and the job creation factors noted on p. 229 (0.5 indirect and 3.8 induced jobs per direct SFIA job), it is projected that the project would result in the creation of about 2,310 new induced jobs by 1996, and about 4,490 by 2006. Additionally, the project would likely result in the creation of about 17,520 indirect jobs by 1996, and about 34,100 by 2006, due to additional expenditures by visitors to the Bay Area. The total number of indirect and induced jobs created as a result of the project would be about 19,820 by 1996, and 38,570 by 2006. The total number of all jobs created by the project would be about 24,440 by 1996 and 47,540 by 2006.

It is assumed that the indirect and induced jobs created as a result of implementation of the SFIA Master Plan would be located throughout the Bay Area and also outside the region. The specific locations of these jobs within the Bay Area cannot be determined because projections of the number of jobs are based on regional multipliers.

Housing Demand Created by Indirect and Induced Employment

Employees holding the indirect and induced jobs resulting from the project would create additional demands on the Bay Area housing stock. On the basis of the employed residents-to-households ratio shown in Tables 65 and 67 (for the Bay Area) and the number of indirect and induced jobs that would be created as a result of the project, there would be a demand for an additional 14,880 housing units through 1996, and an additional 29,460 units through 2006. (The total housing demand generated by the project would be 19,490 units through 1996, and 38,430 units through 2006.)

Although, as shown above, it is possible to estimate the number of housing units required to house individuals holding the induced and indirect jobs resulting from the project, it is not possible to accurately determine their residence patterns. As stated above, the indirect and induced jobs could be located anywhere in the Bay Area or even in locations adjacent to the Bay Area. This is because some direct, new SFIA employees would live in Concord for example, and would create demand for goods and services in and around the Concord area, as well as other parts of the region, resulting in creation of jobs indirectly related to the new SFIA jobs. This scenario would be repeated all over the Bay Area and beyond. Since the locations of these indirect and induced jobs are unknown, it is not possible to determine the residence patterns of the individuals holding the jobs. As such, it is not possible to determine the extent of impacts on housing that would be experienced by any one local jurisdiction, including San Mateo County.

Indirect and Induced Housing Demand Impacts

The significance of the potential impacts on housing resulting from a project-generated increase in indirect and induced employment can be analyzed by comparing the proportion of Bay Area housing units used by the individuals holding the indirect and induced jobs to the employees' share of the Bay Area labor force. If proportionally, the proposed project's use of the regional housing stock is substantially greater than its share of the regional labor force, the impact could be considered significant.

Based on a comparison of the projections of induced and indirect employment and related housing demand mentioned above with ABAG projections of total Bay Area employment and number of households, the housing impacts resulting from project-generated indirect and induced employment would be insignificant. In 1990, induced and indirect jobs created by the operation of SFIA accounted for approximately 4.5 percent of the Bay Area total number of jobs; these employees used approximately 4.7 percent of total Bay Area housing stock. In 1996, induced and indirect jobs created as a result of the project would account for approximately 0.6 percent of the Bay Area labor force; the employees would use approximately 0.8 percent of the total Bay Area projected housing stock. In 2006, approximately 1.0 percent of all the jobs in the Bay Area would be induced by, or indirectly related to, the proposed project. Employees holding these jobs would use approximately 1.3 percent of the Bay Area housing stock.

Although the shares of the Bay Area labor force and housing stock represented by SFIA-created induced and indirect employment would increase under the project, the relationship between the employment and housing shares would not change substantially, and the project would not result in proportionally greater demands on housing (relative to employment).

Thus, impacts on housing created by indirect and induced employment would not be significant.

Jobs / Housing Balance

Comments

"When we have looked at other large projects, Mission Bay, there was an awful lot of discussion about the jobs, housing balance. When you look at a project this size, to what extent should that be an issue that we should be looking at it?" (Commissioner Sewell)

"The EIR suggests the expansion project will contribute to a jobs/housing imbalance in San Mateo County. The Airport should indicate how it will mitigate this impact." (Jack Drago, Mayor, City of South San Francisco)

"The impacts of massive job creation in an area that already has a huge jobs/housing imbalance cannot be overlooked. As a possible mitigation, the Airport should consider building housing on SFIA property. We are not suggesting building under flight paths which we believe to be unsafe, but rather in locations away from both danger and noise. While it is unheard of for civilian airports, virtually all military airbases have housing situated and constructed to be safe, comfortable and conveniently located on site." (Stephen Waldo, Mayor of Brisbane)

Response

By creating more jobs in San Mateo County, implementation of the proposed SFIA Master Plan would likely create a more balanced situation between jobs and housing in the County. In evaluating the jobs/housing balance of a community, the number of employees and housing units in the community, as well as the number of employees per housing unit, must be known. A balanced situation occurs when a community has the same number of jobs as housing opportunities.

Given the existing number of jobs and housing units, and number of employees per housing unit, San Mateo County currently has a jobs/housing imbalance. There is a shortage of jobs (based on the number of existing housing opportunities) needed to achieve a jobs/housing balance (see Table C&R.3). On the basis of ABAG projections of jobs and housing units in the County in the years 1996 and 2006, it is expected that San Mateo County's jobs/housing imbalance will continue. Because implementation of the SFIA Master Plan would increase the number of jobs in the County, it would potentially create a more balanced situation between jobs and housing. It is likely that some current San Mateo county residents would switch from commuting out of the County for work to working at SFIA as a result of the additional jobs available at SFIA in the future.

Because by creating more jobs, the project would help to correct the jobs-housing imbalance that currently exists in San Mateo County. No mitigation is required.

TABLE C&R.3 REQUIRED AND PROJECTED NUMBER OF JOBS TO ACHIEVE HOUSING BALANCE IN SAN MATEO COUNTY

Year	Number of Housing Units/a/	Required Number of Jobs /b/	Projected Number of Jobs/c/
1990	241,910	322,320	303,600
1996	256,880	342,260	324,200
2006	274,020	365,100	358,530

NOTES:

/a/ Based on results of housing inventory contained in Consolidated Comprehensive Housing Affordability Strategy, Department of Environmental Management, San Mateo County, November 19, 1991.
/b/ Number of jobs needed to house individuals living in the housing units available in San Mateo County. Based on an employee-household ratio of 1.33 from ABAG's Projections 90.
/c/ From ABAG's Projections 90.

SOURCE: Environmental Science Associates, Inc., Association of Bay Area Governments.

Housing Affordability

Comments

". . .[T]here is an analysis on Page 397 of housing demand created by the airline workers. But that demand is not broken down in any way according to the salaries of those airline workers and then the housing which they would be able to afford. I think there should be that level of detail so that we know truly what the impact is of these additional workers on the housing market, both in and around the airport and in San Francisco. I note that there is a sizable number of those workers who live in San Francisco." (Commissioner Morales)

"The DEIR states implementation of the SFIA Master Plan would add about 4,600 new jobs by 1996 or about 8,900 new jobs by 2006 (pg. 10). This would create a demand for 3,460 dwelling units by 1996 or 6,850 units by 2006. The DEIR projects 2,450 of these units would be in San Mateo County, 1,940 in San Francisco and 810 in Alameda County. Decision makers need to know the projected income of these employees and how housing that is affordable to them will be provided. Most airport employees cannot afford to live in San Mateo County." (Gary Binger, Association of Bay Area Governments)

"The Airport should develop an employee assistance program to enable Airport employees to find more affordable housing near their jobs." (Robert Treseler, City of Millbrae)

"By 2006 there would be 9,000 new jobs and the need for 6,850 new housing units generated by Airport expansion. This is identified as an environmental impact; however there are no mitigations discussed or proposed.

"Suggested mitigation measures:

"1. Encouragement of new affordable housing near the Airport, in areas which would not jeopardize Airport operations.

"2. The Airport should commit to developing an employee assistance program to enable Airport employees to find more affordable housing near their jobs." (Janet Fogarty, Mayor, City of Millbrae)

Response

Housing Affordability

Individuals holding jobs created as a result of the SFIA Master Plan project would create additional demand for housing in the Bay Area. This increased housing demand would be within the projected additional housing supply in the Bay Area, as shown in Table 67A. As such, construction of SFIA-employee-related housing would not result in additional physical impacts to the environment, as it is expected that this housing would be constructed with or without the demand created directly by project employees.

The additional demand for housing resulting from the project could potentially have negative socio-economic impacts directly related to housing affordability. Under guidelines established by the U. S. Housing and Urban Development Department, housing is affordable when families use 30 percent or less of their income on housing-related expenses. New SFIA employees would create additional demands on housing supply, possibly resulting in an increase in the area's housing prices. However, as shown by historical evidence, increases in household incomes would lag behind increases in housing prices. /1/ If historical trends in the relationship between housing prices and household incomes in the Bay Area hold true in the future, a large number of Bay Area residents, including an undetermined number of SFIA employees, would incur housing expenses that, under the housing affordability standards mentioned above, would not be "affordable."

Under CEQA (Guidelines, Section 15131), social and economic impacts may be addressed in an EIR, but are relevant only to the extent that they are related to the physical impacts of a project. As a result, no affordability analysis has been prepared as part of this response and no mitigation measures for housing affordability would be required. Depending on the extent of housing affordability problems that may be experienced in the future by SFIA employees, these individuals may choose to live in outlying parts of the region or communities outside of the Bay Area. If this were to occur, the extended commuting distance traveled by these individuals would result in additional physical impacts. Without further analysis of future wage and housing price levels in the region as a whole, it would be difficult to determine the number of individuals that would choose to live in the outskirts of the Bay area and to quantify the extent of these potential physical impacts.

MITIGATION

Demand for Housing and Support Services

Comments

"The Draft EIR briefly addresses employment and residence patterns in the Environmental Setting Chapter, and employment and housing in the Environmental Impacts Chapter. The text indicates employment is expected to increase by about 4,600 jobs between 1990 and 1996. This would represent about 11% of the 341,690 employees in San Mateo County. An 11% increase is also expected between 1996 and 2006. The Draft EIR also indicates the largest number of new employees are expected to reside in San Mateo County (37.1%) and those employees will create a demand for 2,450 new housing units in San Mateo County.

"The Draft EIR does not propose any mitigation measures to address the employment and housing demands in San Mateo County or any other county. The demand for housing is already high in San Mateo County and the housing costs are very high. In addition, there is an extremely small amount of available land in the County on which to build new housing. These issues should be fully addressed in the Draft EIR and feasible, implementable mitigation measures should be identified to address the anticipated impacts." (Raymond Miller, C/CAG)

"The Board's [County of San Mateo Board of Supervisors] major concern is the projected increases in employment and housing in San Mateo County, as a result of the implementation of the proposed Master Plan. The Draft EIR indicates there will be 3,320 new employees in San Mateo County and a demand for 2,450 new housing units in the County by 2006, as a result of the implementation of the Master Plan. The demand for housing is already high in San Mateo County and the housing costs are very high. In addition, there is an extremely small amount of available land in the County on which to build new housing.

"The Draft EIR does not propose any mitigation measures to address the anticipated employment and housing impacts in San Mateo County. The Board of Supervisors requests the projected employment and housing demands in San Mateo County, as a result of the implementation of the proposed Master Plan, be thoroughly analyzed in the Draft EIR and feasible mitigation measures, implemented by the City and County of San Francisco, be identified to address the anticipated impacts." (Paul Koenig, County of San Mateo, and County Board of Supervisors)

"We did not notice discussion of the indirect effects of the project. We understand that direct employment resulting from the project would have a multiplier effect. We would appreciate discussion of that effect and mitigation, if required for indirect employment effects." (Janet Fogarty, Mayor, City of Millbrae)

"Instead of mitigating this significant impact, SFIA is currently opposing new housing on the Peninsula. In 1986 SFIA challenged an EIR for a housing project in South San Francisco, effectively killing that project. On August 6, 1991, the Airport Commission approved an SFIA sponsored agreement to prohibit housing east of Interstate 101.

"The Airports Commission attempted to justify this action on the basis of protecting a necessary departure route. However, the SFIA's own noise studies show that a portion of the area covered by the agreement (Sierra Point) is <u>not</u> noise impacted, nor is it underneath a departure route. (See V.1, pp. 161, 340 and 345) Sierra Point is one of the last large parcels available for housing that is both near the airport and outside the area of noise impact.

"Given the serious shortage of housing resulting from the Master Planned expansion, it is incumbent on SFIA, as a mitigation measure for its impacts on San Mateo County in the area of housing, to modify its stance against housing on the east side of Highway 101 and its agreement with South San Francisco.

"If SFIA believes it must protect its approach and departure routes, it can continue to monitor housing proposals in the environs of the airport for noise insulation and impact. Developers are more than willing to work with the SFIA to provide a portion of the housing that will be generated by growth at the airport. SFIA, as a mitigation for its housing impact, should meet them half way." (Harvey Levine for Sierra Point Associates).

"An appropriate mitigation must be provided to address the increased demand for housing as a result of the proposed expansion of SFIA and the new employees associated with the growth. With San Bruno abutting SFIA, it can be reasonably and logically assumed that a large demand for the additional housing will impact San Bruno, not San Francisco. The airport should contribute to a San Bruno housing reserve fund which would help provide a variety of housing services and opportunities to San Bruno residents." (George Foscardo, City of San Bruno)

"The Draft EIR documents that there will be an increase in employment at the airport as a result of the growth in passenger and freight activities. Many of these people will seek housing and support services such as child care within the adjacent communities. Meeting these needs will affect these neighboring communities in a variety of ways. In addition to local roadway access to SFIA, these impacts include demand for lesser cost housing, provision of child care and health care services and demand for other personal and commercial services. The Draft EIR does not address how the airport proposes to mitigate the impacts created by these effects. How will SFIA assist local communities to provide these services and make them available and viable? Can some or all of these support services for employees be included on airport lands?" (Dennis Argyres, City of Burlingame)

Response

As shown in Tables 65 and 67 in the DEIR, the San Mateo County housing demand from new SFIA employees would be less than one percent of total 1990 County housing stock, not a significant impact. Also, as shown by Table 67A, it is estimated that new SFIA employees would use approximately 9.3 percent of San Mateo County's housing stock that would be created between 1990 and 1996. By 2006, it is projected that SFIA employees would use approximately 10 percent of the housing stock that would be created between 1990 and 2006. The potential direct, indirect and induced employment opportunities and the associated housing demand that would result from implementation of the SFIA Master Plan are further described on pp. C&R.355-360 herein. As discussed on those pages, the implementation of the SFIA Master Plan would not result in a significant impact on housing relative to the direct and indirect employment created. Therefore, no mitigation measures for the project 's impacts on housing are required. Child care and health care services are social and economic impacts and thus are not covered in EIRs. which analyze physical environmental effects. The Airport could, of course, volunteer to support housing or child care, but these would not be considered mitigation of significant effects as defined by CEQA.

The comment regarding the Sierra Point Property has been submitted by counsel to Sierra Point Associates, a property owner interested in the development potential of property on Sierra Point, located in the Cities of South San Francisco and Brisbane, north of the Airport.

The commenter is incorrect in stating that the Airport is opposed to the construction of new housing on the Peninsula. According to SFIA Administration staff, it is the policy of the Airport to further the goals set forth in the state law relating to land uses in the vicinity of the Airport. in Cal. Pub. Util. Code § 21670. These goals include (1) the promotion of orderly development of areas surrounding airports to prevent the creation of new noise and safety problems and (2) the adoption of land use measures that minimize the public's exposure to excessive noise and safety hazards within areas around public airports to the extent that these areas are not already devoted to incompatible uses. (Cal. Pub. Util. Code § 21670 (a) (1) and (2)).

In furtherance of these goals, the Airport has worked closely with the Airport Land Use Commission to create an Airport Land Use Plan that reduces the possibility of incompatible development in areas near the Airport (EIR, page 168, 169). In addition, the Airport has worked with communities near the Airport to provide funding for local noise insulation programs. For example, the City of South San Francisco has been operating an Aircraft Noise Insulation Project pursuant to The Aviation Safety and Noise Abatement Act of 1979, 49 U.S.C. 2101 et seq. This Act authorizes airport operators and units of local government to apply for assistance from the Federal Aviation Administration (FAA) for the implementation of noise insulation projects in areas that qualify for such projects under the Act. Under this Act, local governments can receive funding for up to 80 percent of the insulation project, providing that the remaining 20 percent is paid by the local community. The Airport has been providing this 20 percent share to local communities as part of the requirements of its variance from the California state noise standards.

The commenter incorrectly characterizes the agreement between the Airport and South San Francisco. The City and County of San Francisco, operating through the San Francisco Airports Commission, entered into this agreement in August, 1991. The purpose of the agreement was to further the longstanding policies of state law and the Airport to discourage the construction of incompatible uses on land that may be affected by airport noise.

Under this agreement, the Airport has agreed to (1) set aside a total of $10,000,000 to be used by South San Francisco over a ten year period in connection with the City's existing Noise Insulation Project and (2) provide other assistance to South San Francisco in connection with its noise insulation project. The agreement does not prohibit housing east of US 101. Rather, as a condition to the Airport's obligations under the Agreement, the City of South San Francisco will have to exercise its discretion in taking the necessary land use actions to prevent the construction of noise-sensitive land uses, including housing, on property in South San Francisco located east of US 101. If the City chooses to take these actions and the agreement takes effect, the Airport has the opportunity to review and comment on the proposed project. If the City chooses to allow the use, the Airport is no longer obligated to provide funding provided in the agreement. /2/

The reference to the 1986 challenge to an EIR for a housing project in South San Francisco appears to refer to the mixed use project called Shearwater proposed for Sierra Point in 1986. The Airport Land Use Commission opposed the project because it would result in the construction of housing that would be impacted by aircraft overflights. The Airport also challenged in court the environmental impact report prepared for the project. The project eventually did not proceed.

The commenter notes that a portion of the area covered by the Agreement is not noise impacted or under a departure route. The comment is noted in that a portion of the area is not within the 65 CNEL contour.

The commenter is incorrect in stating that the SFIA Master Plan is expected to result in a serious shortage of housing. As explained in the EIR, implementation of the SFIA Master Plan is not expected to result in a significant housing impact (EIR, pp. 394-399 and pp. C&R.354-360). Even if the SFIA Master Plan were expected to result in a serious housing shortage, the mitigation measure proposed in the comment would not necessarily result in the increased availability of housing near the Airport to serve new Airport employees. The decision on whether housing will be located east of US 101 is up to the cities with jurisdiction over those properties, not the Airport. Therefore, this mitigation measure will not be added to the EIR.

NOTES - Employment and Housing

/1/ State of California, Senate Office of Research, <u>Grasping at the Dream, California Housing: Who Can Afford the Price? June 1990.</u>

/2/ Agreement for Aircraft Noise Mitigation, Between City and County of San Francisco Acting By and Through the Airport Commission and City and of South San Francisco. August 29, 1991.

PUBLIC UTILITIES

The Notes for this section begin on p. C&R.373.

WATER USE

Comments

"Under utilities and water regarding housing, the report documents approximately 3,460 more dwellings will be needed in surrounding cities where water usage is already rationed and the people already living there can't use as much water as they need. The water problem should be solved before any more added growth occurs anywhere in the area." (Jessie Bracker, public hearing of 8/27/91 and letter of 8/27/91)

"I do think that we've got to focus on the issue of water -- water, water, water. We want more housing, we want the airport to get bigger. We want more of everything. Yet we have no water to give to anyone. We are penalized if we do not use enough water, and we are penalized if we use too much water. So, I think the water is our No. 1 issue. People don't seem to address it. I think it's really No. 1." (Rose Urbach)

"P. 10 - Utilities and Water - Report documents approximately 3,460 more dwellings needed in surrounding cities where Water Use is rationed. Report Documents on p. 10, Housing/Water, 3,460 more dwellings will be needed if Plan is carried out. How is it such growth can be projected to be needed everywhere when the people already living here can't have enough water for their usage needs? There should be a Moratorium on all growth in area until that problem is resolved! Too much growth is at the root of most of the areas existing problems in the already built up areas of Cities named on p. 12, that will be most affected because of their proximity to the Airport and listed as needing to provide housing for Project Employees! The Water problem should be solved before growth is added." (Jessie Bracker)

"The master plan would generate need for an additional 0.42 million gallons per day of water, in the near term, and 0.69 million gallons per day in the long term. The document does not state whether this includes the additional water needed by the new residents of the 6,800 housing units added to Millbrae, San Bruno and South San Francisco.

"If anyone wishes to look realistically at the situation, this is the place to do it. Water is rationed. It will continue to be rationed for the foreseeable future. Who of us is going to give up his ration of water so that the airport can be expanded?" (Patricia Clark)

Response

Given the existing mandatory and voluntary water rationing programs throughout the Bay Area, the comments express concern regarding the ability of local municipalities to supply water for the additional housing units projected to be needed in the Bay Area as a whole as a result of the SFIA Master Plan (3,460 near-term, 6,850 long-term, as shown on pp. 396 and 398 of the EIR).

In general, long-term water supply planning is not based on current drought conditions. For the various watersheds that supply water to the San Francisco Bay Area, long-term supply planning is based on an average water yield that would result from the occurrence of drought, non-drought, and abnormally high rainfall years over time.

Water supply planning to address existing and projected water shortages within the state is being conducted by regulatory agencies and water suppliers. Specifically, water allocation, distribution, and/or conservation programs are currently being discussed by the San Francisco Water Department (which supplies water to SFIA and San Mateo County), the California Department of Water Resources, and the Federal government (through the Central Valley Project)./1/ Changes in the distribution and allocation of water and the implementation of conservation programs may or may not alleviate urban water shortages within the planning horizon of the SFIA Master Plan.

The estimates in the EIR for additional near- and long-term water demand that would be generated by the project (pp. 400-401) include only the direct water demand generated by SFIA facilities, and do not include the additional demand from the forecast housing units needed for new SFIA employees. The San Francisco Water Department would supply most of the additional water demand generated by SFIA facilities and the additional housing units in San Francisco and San Mateo County. The total capacity of water currently available to the San Francisco Water Department is approximately 341 million gallons per day (mgd), of which SFIA uses 1.7 mgd.

In addition to supplying water to the City of San Francisco, the San Francisco Water Department supplies water to approximately 30 other cities and communities, including cities in San Mateo, Santa Clara, and Alameda Counties./2/ These cities and communities, termed herein "suburban water users," together receive up to a maximum of 184 mgd of water based on an existing agreement with the San Francisco Water Department./2,3/ Water rationing programs imposed in the City of San Francisco are extended in-kind to the suburban water users./4/

Implementation of the SFIA Master Plan would increase water consumption at SFIA to approximately 2.4 mgd (using the demand estimate on p. 401 of the EIR). The estimated demand for additional water supplies by the 4,390 housing units that would be needed long-term in San Mateo County and San Francisco is between 0.4 and 0.8 mgd./4/

SFIA current and long-term projected levels of water demand represent 4/10 of one percent and approximately 7/10 of one percent, respectively, of current water supply. The EIR (pp. 400-401) indicates that the San Francisco Water Department has included SFIA in its projections, and has assumed that SFIA would implement water conservation measures to reduce water usage. The demand for additional water supplies to accommodate 4,390 housing units long-term in San Mateo and San Francisco Counties represents 3/10 of one percent of the daily San Francisco Water Department supply during a non-drought year.

Long-term water supply planning to accommodate projected growth in population and residences (as envisioned in the general plans of Bay Area cities and counties) is controlled by the various public works departments, city planning agencies, the California Department of Water Resources, and other regional and local growth/infrastructure planning agencies. The potential growth in water demand by residential water users resulting from the hiring of additional employees under the SFIA Master Plan would be encompassed by the long-term water supply planning (and subject to the growth controls) of the city and county planning/permitting agencies in which such growth may occur.

In general, water supply planning to accommodate residential growth that may result from the implementation of the SFIA Master Plan has not been considered explicitly by cities within the SFIA environs./2/ The factors that determine whether sufficient water supply exists to accommodate potential residential growth associated with the SFIA Master Plan vary among the suburban water-user cities./2/ Discussions with suburban water users' representatives indicate that water supply does not appear to be the factor limiting new residential growth in the SFIA environs./2/ For example, the availability of developable land was cited by representatives of the Cities of Burlingame, Millbrae, and San Bruno as a primary constraint to new residential growth. If water supply becomes a constraint to the approval of residential construction, new residential construction may be restricted by local planning controls such as the issuance of building permits.

The ability of local municipalities in California to meet growth in water demand beyond existing water supplies (assuming drought conditions do not persist) appears to rely on a combination of the following water supply strategies: more efficient collection and distribution of existing surface water supplies, including the possibility of some redistribution of agricultural supplies, installation of water-conservation devices, use of groundwater sources, conservation oriented water consumption habits (including retention of existing habits), and water reclamation./2,5/ For example, thirty percent of the pre-drought water demand for cities in San Mateo County served by the California Water Service Company has been saved through the existing conservation measures. Some of these conservation measures will result in long-term reductions in water demand./6/

Additional water supplies would be needed for the residences constructed as a result of growth induced by the SFIA Master Plan. The locations of such residences would be diffuse and are unknown at this time.

POWER SUPPLY

Comment

"P. 7 - Electricity and Gas - have already been greatly increased within last two years at P.G. and E. Millbrae Substation and in Airport West of Bayshore lands north of Madrone Street. Was that taken into account in this text?" (Jessie Bracker, letters of 8/18/91 and 8/27/91)

Response

The 15 Mega Watt (MW) and additional 10 MW power capacities referred to on p. 7 of the EIR are SFIA-requested increases in the amount of electrical power supplied from PG&E. As discussed on p. 180 of the EIR, the PG&E transformer serving SFIA has a maximum capacity of 46.3 MW. The forecast total maximum electrical load from all proposed facilities is 52.6 MW (EIR p. 368). Therefore, an additional transformer bank would be needed to accommodate the additional demand. (As stated on p. 369 of the EIR, PG&E has indicated that substation expansion would be needed.) It is not known exactly what modifications the comment refers to. However, both the Millbrae substation and a substation known as the airport substation (owned by PG&E on SFIA property) were modified recently to increase electrical transmission capacity. Although the work performed was intended to increase the amount of power the transmission lines could carry, the work was not in response to the potential future expansion of the Airport./7/ As shown by the improvements discussed on pp. 368-369 of the EIR, modifications to electrical systems are an ongoing part of SFIA operations.

NOTES - Public Utilities

/1/ The California Department of Water Resources is currently considering changes to the Delta water quality goals and other water distribution and allocation programs statewide. The Central Valley Project, which supplies approximately 20 percent of water in California, is being considered for re-authorization by the U.S. Congress, and is also under consideration for transfer to the State of California./8/ During the Central Valley Project re-authorization process, the existing water allocation, pricing, distribution programs and guidelines may or may not be changed. The San Francisco Water Department is considering a review of its watershed management and water reclamation practices./9/ These potential changes in the underlying watershed management practices in California could affect the amount of water available during drought conditions or to serve future growth in the Bay Area.

/2/ Melissa Adams, City of Millbrae Water Conservation and Resources Manager, telephone conversation, April 27, 1992; Robert Bradford, San Francisco Water Department, telephone conversation, April 15, 1992; Ralph Kirkup, City of Burlingame Public Works Director, telephone converstation, April 27, 1992; Lee Ritzman, City of San Bruno Director of Public Works, telephone conversation, April 21, 1992; Sheri Saisi, City of Burlingame Planning Department, telephone conversation, April 27, 1992; Barney Tume, California Water Service Company, telephone conversation, April 27, 1992.

/3/ *San Mateo County General Plan,* 1986, Section 10, Water Supply.

/4/ *San Mateo County General Plan,* 1986, Section 10, Water Supply, Table 10.11, Projected Domestic Water Demand. Estimate indicated is based on a water consumption rate of 100-190 gallons per day per housing unit, multiplied by 6,850 housing units.

/5/ Ralph Kirkup, City of Burlingame Public Works Director, telephone conversation, April 27, 1992.

/6/ Barney Tume, California Water Service Company, telephone conversation, April 27, 1992.

/7/ John Holt, Pacific Gas and Electric Supervising Transmission Engineer, telephone conversation, April 20, 1992.

/8/ California Water Education Foundation, *California Water Map*, 1987.

/9/ Robert Bradford, San Francisco Water Department, telephone conversation, April 15, 1992.

AIR TRAFFIC SAFETY

The Notes for this section begin on p. C&R.377.

Comments

". . .[N]eighborhood safety issues are suggested by the potential large increase in overflights, incoming and outgoing, over our San Francisco neighborhoods. . .

"In addition to the foregoing, the DEIR makes no mention of how an increase of up to 40% in air traffic from SFIA will be managed in the skies around the Bay Area. As does the Master Plan, the DEIR simply dismisses this matter as within the purview of the FAA. Irrespective of the FAA's jurisdiction, or responsibilities, the increased air traffic still creates environmental concerns." (Timothy Treacy, Airport Noise Committee)

"Furthermore, due to the existing and expected increased traffic in the skies over our neighborhood, we are concerned about the safety of our skies, a consideration not addressed at all in the Master Plan or DEIR." (Bruce Krell, Forest Hill Association)

"We are additionally concerned about aircraft and neighborhood safety issues." (Carol Kocivar, West of Twin Peaks Central Council)

". . .If you overload our skies, which are already overloaded, with more airplanes competing for valuable airspace, we are all going to pay a price. And if that issue can't even be addressed in a Draft EIR, where is it going to be addressed?" (Don Bertone)

Response

Pages 242-244 and 407-408 of the EIR include a discussion of aviation safety at SFIA, including the role of the FAA in the management of the airspace, FAA design criteria and standards, the air traffic control system, and aircraft accidents. It is noted on p. 408 that implementation of the SFIA Master Plan could lead to an increase in the accident rate, but that the number of future accidents could be less than estimated (based on the national average accident rate) because of SFIA's historical safety record.

As noted on pp. C&R.198-201 herein, SFIA is within the service area of the Bay Terminal Radar Approach Control (TRACON) facility. The Bay TRACON provides air traffic services to, and thus is responsible for the safe management of the airspace within, the entire Bay region. According to the Airspace Element of the California Aviation System Plan, the Bay TRACON would have adequate capacity to support the annual and typical-hour SFIA and regional operations forecast for 2005. The CASP concluded, however, that the Bay TRACON would be capacity-constrained during peak hour conditions. (As shown on p. 64 of the EIR, the CASP forecasts of operations are substantially higher than the FAA or SFIA Master Plan forecasts.) /1/

The safe operation of the airspace immediately surrounding SFIA is the responsibility of the Airport Traffic Control Tower. The estimates of airfield capacity at SFIA (discussed in the EIR and on pp. C&R.46-55 herein) incorporate air traffic safety requirements and procedures that would be used by the SFIA ATCT. The potential capacity shortfall at SFIA during adverse weather conditions reflects the fact that air traffic control rules limit the number of aircraft that can land and take off at SFIA./2/

The FAA Aviation System Capacity Plan ". . .is intended as a comprehensive 'ground-up' view of aviation system requirements and development."/3/ As well as identifying recommended capacity improvements at individual airports, the Plan identifies new terminal airspace procedures that will increase capacity at some airports in the system; outlines programs to provide new technology to increase airspace capacity and improve airspace efficiency; and outlines programs designed to increase en route airspace capacity. The aviation system capacity requirements identified in the Plan incorporate FAA standards for air traffic safety. Implementation of the capacity improvements in the Plan could result in benefits to aircraft operations at SFIA and in Bay Area airspace./3/

Given the role of the FAA in the safe operation of the airspace, the capacity of the Bay TRACON to handle increases in regional aircraft operations, the application of safety-based rules to the operation of the SFIA airfield, and FAA plans to improve aviation system capacity, the implementation of the SFIA Master Plan would not result in reduced safety in neighborhoods subjected to SFIA overflights.

NOTES - Air Traffic Safety

/1/ Landrum & Brown, *Air Space Element, California Aviation System Plan,* prepared for the California Department of Transportation, Division of Aeronautics, August 31, 1991.

/2/ U.S. Department of Transportation, Federal Aviation Administration, *San Francisco Bay Area Airports Task Force Capacity Study of SFO, SJC, and OAK International Airports* (prepared jointly by the FAA, Bay Area international airports staffs, Air Transport Association, and the airlines serving the San Francisco Bay Area), 1987.

/3/ U.S. Department of Transportation, Federal Aviation Administration, *1990-91 Aviation System Capacity Plan,* September 1990.

GROWTH-INDUCING IMPACTS

Comment

"The DEIR fails to address the increased demand for child care activities as a growth inducing impact. This issue must be addressed and adequate mitigation measures offered." (George Foscardo, City of San Bruno)

Response

The demand for child care in San Francisco has emerged within the last few years as a planning issue. Further research and analysis will be required in order to identify new approaches for producing affordable programs to meet the growing demand for child care services. Because provision of child care services involves consideration of a broad scope of variables (e.g., social, economic and cultural aspects within a community) it is regarded as a planning issue, not an environmental impact issue subject to the provisions of the California Environmental Quality Act (CEQA). This interpretation was upheld in a recent State Court of Appeal decision, *San Franciscans for Reasonable Growth et al. v. City and County of San Francisco* [209 Cal. App. 1502, 1516 (1989)].

The importance of this issue has been recognized, however. As part of adoption of the Downtown Plan in 1985, the City Planning Code was amended to incorporate Section 314, "Child Care Requirements for Office and Hotel Development Projects." Section 314 requires developers and employers to provide space for child care facilities in development of new office and hotel projects containing 50,000 square feet or more, or pay an in-lieu fee to the City's Affordable Child Care Fund.

While Section 314 itself is an innovative program for responding to child care needs, other planning efforts are under way. The Mayor's Office, in conjunction with the Department of City Planning, the Child Care Law Center (a non-profit organization) and a multitude of City and community groups, have joined forces with the objective of developing a comprehensive plan containing a full program of implementing strategies to increase child care services in the City. It is anticipated, ultimately, that goals and policies with respect to childcare would be incorporated into the City's Master Plan.

WATER QUALITY

AIRCRAFT FUEL DUMPING

Comment

"Flights into San Francisco airport run the risk of having to dump fuel in our ecologically fragile Bay due to technical problems. And airplanes of the future using this airport would be larger and hold more fuel than present planes. Flights into San Jose would seldom find the Bay the only option when fuel dumping was necessary." (Patricia Clark)

Response

According to SFIA Administration staff, the dumping of aircraft fuel might occur as a result of an aircraft engine or mechanical failure (e.g., faulty landing gear) that occurs on take-off, during flight, or approach to an airport. In order for the aircraft to land safely, fuel must be jettisoned to reduce the aircraft's weight below the maximum permitted landing weight (e.g., in the case of an engine failure) or to further reduce the risk of fire (e.g., in the case of a wheels-up landing).

The Federal Aviation Administration's (FAA's) procedure for fuel dumping is covered in the FAA *Air Traffic Control Handbook* (Document No. 7110.65F), Section 6, which provides guidelines for aircraft routing, altitude assignment, separation criteria and information dissemination. The FAA Airport Traffic Control Tower at SFIA and the Bay Terminal Radar Approach Control Center (TRACON) direct aircraft, unless impractical for safety reasons, to fly out over the Pacific Ocean in order to jettison fuel. The other large civil and military airfields within the Bay Area environs (San Jose International Airport, Metropolitan Oakland International Airport, Moffett Naval Air Station, and Alameda Naval Air Station) that have aircraft arrivals and/or departures over the Bay likely follow similar procedures.

CONSTRUCTION IMPACTS

CUMULATIVE CONSTRUCTION ACTIVITIES

Comment

"When we also look at several of the projects that are on our own drawing board or that could be on our drawing board, to what extent does this project analysis impact that? For example, when we look at Mission Bay over that 15-year period of time, when we look at this airport expansion, when we look at the possibility of a south Bayshore plan and other things, to what extent are -- whether it be quality of life, whether they be goods and services, whether they be the employment pool, whether they be housing, et cetera, et cetera, et cetera, -- to what extent can San Francisco cope with projects that are as enormous as those kinds of projects over a similar time frame?

"I began to wonder just how big a nightmare could this project be. Again, if you look at them in isolation, you can begin to say: Gee, we can deal with that. But I wonder to what extent they become a bit differently evaluated in the context of these other big projects.

". . .Phoenix has gone through just a fantastic experiment with their own airport. When I look at some of the ideas in here, the idea for the rental car garage, that is right out of what Phoenix did, several other things are right out of Phoenix. I know that was one of those round-the-clock projects that was reasonably well managed and was done in just a very, very short period of time. Again, I don't necessarily think that the question of time maybe is an issue in this impact.

"I guess my question is, to what extent do we have any connection or any input to the body that would decide things like time frame? I think we have all been looking at . . .the airport as one of those never-ending sagas, and perhaps hoped that construction would be over. When you look at this 11-year thing, it really begins to boggle the mind. I guess the question is, what is the proper forum to deal with the question of time frame for a project like this?

"Maybe relating to the early comment, as we look at Baghdad by the Bay, to what extent does a major project like this over 11 years become another one of those straws to break the camel's back? To what extent does a project over an 11-year period as massive as this going to have an impact on flight of people from San Francisco? To what extent does this really become the thing where people say, 'I am not going to' -- and people of reasonably important means relative to the tax base -- to what extent does this become the thing that really gets people to look at living in other places." (Commissioner Sewell)

Response

This EIR analyzes not only the impacts of this project on the environment, but also the impacts of the project in conjunction with other cumulative development. Most development impacts of the SFIA Master Plan would be located within San Mateo County and its cities. For example, construction noise would have local impacts within the City of Millbrae, only. The transportation effects from development in San Francisco are reflected in the traffic level of service analysis of freeway segments in the years 1996 and 2006, and are considered as part of the future base growth. Future base growth considers future development from San Francisco and other cities and counties.

Quality-of-life issues are fairly subjective. Decision makers may consider quality-of-life issues in their consideration of whether to approve this project or one of the alternatives (including either of the No-Project Alternatives). As other projects come forward for approval, quality-of-life issues and other concerns may be weighed in the decision-making process for each project. Quality-of-life issues are not related specifically to the California Environmental Quality Act (CEQA) but are one of the criteria that may be used by decision makers during a project's approval process. (Quality-of-life issues are discussed in the response on pp. C&R.383-384 herein.)

It is not possible to estimate whether incremental impacts of this or any other project, or whether the combination of effects from all projects, may change the quality of life such that some people may desire to reside in or work in San Francisco no longer. Numerous other factors determine whether people are satisfied with their place of residence or employment, including crime, the number and location of homeless people, perceived quality of amenities (including parks, schools, roads) and infrastructure (including transit systems and streets), availability of desired services, proximity to employment and housing, and other similar concerns. Even if some people may decide to reside or work in San Francsico no longer due to development and its resulting impacts, others may choose to live or work in San Francisco due to individual preferences for perceived amenities.

The City and County of San Francisco is the lead agency. For this project, the decision-making body that determines the adequacy of the EIR is the City Planning Commission;

the decision-making body that acts on whether to approve the project or one of its alternatives (including either of the No-Project Alternatives) is the Airports Commission. Thus the City Planning Commission has no decision-making role over the time frame for project implementation. However, the City Planning Commission may forward to the Airports Commission any concerns that it may have over construction duration or other project impacts.

QUALITY OF LIFE

Comment

"And to show you a little bit more, one out of every eight people in the United States lives in California. And San Mateo County has the highest density population following Alameda, San Francisco, and Los Angeles. I am just trying to show what the density picture is in San Mateo County. And when you talk about the United States as a whole, you can see, again, we are overdeveloped with homes and also with our airport. We must level off if we want to consider any kind of quality of life." (Rose Urbach)

"I appreciate the balancing act the planning commission must perform. However, existing overflight conditions in southern and western neighborhoods are currently mocking the City Planning Code's stated intent of preserving the character and quality of San Francisco's neighborhoods. Further, all of the Planning Commission's efforts to develop architectural controls maintaining scale and open space are folly if aircraft overflights make those homes and spaces intolerable." (David Deakin)

". . .[O]ur skies are saturated as it is. Our skies are no longer friendly. Our bay is being chewed up by not only greedy realtors but also the airport. Little by little, if this keeps up, we will not have a bay, we will be across, joining Oakland. Hopefully, this won't happen." (Bruno Bernasconi)

Response

Quality-of-life issues are fairly subjective. The Airports Commission may consider quality-of-life issues in its consideration of whether to approve the project or one of the alternatives (including either of the No-Project Alternatives).

It is not possible to estimate whether population density or aircraft overflight impacts of this project may change the quality of life such that some people may find it intolerable to continue residing in or working in the urban areas of San Mateo and San Francisco Counties. Numerous other factors besides overflight noise and population density determine whether people are satisfied with their place of residence or employment. Such factors include crime, the number and location of homeless people, perceived quality of amenities (including parks, schools, roads) and infrastructure (including transit systems and streets), availability of desired services, proximity to employment and housing, and other similar concerns. Even if some people may decide to reside or work in San Francsico no longer due to its density or due to aircraft overflights, others may choose to live or work in San Francisco due to individual preferences for perceived amenities.

This project would not include any development within San Francisco Bay and thus would not contribute to the filling of the Bay so as to connect San Mateo County with Oakland.

MITIGATION, GENERAL

SCOPE

Comments

". . .[A]s Commissioner Sewell alluded to, the airport and the large companies that use the airport are, in a sense, like our downtown developers. And with our downtown developers who are building large projects with lots of workers, the city imposes a number of mitigation measures, whether that be in housing or transportation. I think there needs to be an analysis of what type of mitigation measures should be imposed, either directly on the airport or on the employers who would use airport space. I would like to see some analysis of perhaps even using some of the assumptions behind the downtown commercial office space projects and the mitigation measures that are imposed, just transfer some of those over to the airport and see what the cost would be to the airport or to the airline companies that use the airport." (Commissioner Morales)

". . . [W]e applaud the full disclosure that is in the EIR. There are a lot of problems that the EIR discloses. We are very concerned, though, that, as comprehensive as it is, it is not comprehensive in mitigation measures proposed to meet those very substantial significant effects.

"The airport must, as a proprietor, accept the willingness and show the intention to mitigate those significant impacts if they plan to continue their future expansion. This is probably the largest project San Mateo County will see in the near future, and it will have substantial impact on the ability of the region to accommodate any other growth." (Janet Fogarty, Mayor of Millbrae)

Response

Mitigation measures identified in an EIR must relate to potential environmental impacts that would result from implementation of the project. Mitigation measures for the downtown area of San Francisco, some of which have since been codified (or written into law), are based on the potential effects of development downtown. For example, the five-dollar-per-square-foot Transit Impact Development Fee (TIDF) (Ordinance 224-81) was implemented due to transit impacts caused by cumulative office development within greater downtown San Francisco. These impacts were disclosed in EIRs for office development downtown and the TIDF mitigation was tied directly to the lessening of such impacts. Thus such a measure cannot simply be transferred to the Airport without first showing within the SFIA Master Plan EIR or some other study that similar effects on MUNI would occur at SFIA as a result of the SFIA Master Plan. Mitigation measures in the SFIA Master Plan EIR must be based on the potentially significant effects of this project. Such mitigation measures are included on pp. 411-434 of the EIR. Additional measures are included in responses to comments on specific topics above.

As stated above, this EIR discloses a number of potentially significant effects and measures to mitigate them. Given the general nature of the comment that is concerned about the EIR not being comprehensive in mitigation measures, it is not possible to respond in a specific manner about additional measures without knowing more specifically what the concerns may be. Comments on specific EIR topics are covered under specific topics, above.

An EIR must not only disclose significant effects, it must include feasible mitigation measures to lessen the impacts of any significant effects. However, there is no requirement under the California Environmental Quality Act (CEQA) that a lead agency implement mitigation measures if they are not feasible (CEQA *Guidelines* Section 15091). The lead agency may approve a project without mitigating all significant impacts if the agency determines that "the benefits of a proposed project outweigh the unavoidable adverse environmental effects" (CEQA *Guidelines* Section 15093). In other words, the lead agency may find that implementation of the project is more important due to its social or economic considerations than any environmental degradation that may result from its implementation.

FEASIBILITY AND COSTS

<u>Comment</u>

". . .[S]ome of the mitigation measures just talk about increasing Caltrain service, SamTrans, and I guess basically increasing the activities and services of other public entities. But there is no price tag associated with what it would cost to, in fact, increase those other public services. I think we need to have an assessment of those public costs to see if they are, in fact, feasible mitigation measures." (Commissioner Morales)

Response

The costs of mitigation measures may be included as necessary in the Findings on the EIR. To increase public services such as CalTrain and SamTrans, there would be a fiscal cost to implementing agencies. The City and County of San Francisco does not have authority to implement mitigation measures under the jurisdiction of other agencies. These other agencies would have to consider whether they would implement the identified measures based on their own budgets and other potential constraints. (See following response.)

IMPLEMENTATION AND ACCOUNTABILITY

Comments

"Many of the mitigations listed in the draft EIR, particularly the traffic mitigations, are ascribed to others as implementing agencies without indication of concurrence by those agencies. Mitigation measures identified in the DEIR which do not have written concurrence by the implementing agencies (other than SFIA), in effect, do not adequately mitigate impacts.

"Mitigations which require amendments to existing agreements or contracts with SFIA, which require amendments to the Charter for San Francisco, which require voter approval to be implemented, or which require other similar actions must be clearly identified in the EIR. The likelihood of such changes must be noted or, in effect, any such mitigations do not adequately mitigate substantially adverse impacts. . .

"The EIR must identify these potentially significant impacts and offer adequate mitigations, including identifying funds for mitigations, responsible agencies for mitigations, written agreements for mitigations, and any agreements or amendments to charter arrangements needed to provide adequate mitigation measures." (George Foscardo, City of San Bruno).

"Mitigating Measures: This is the first of the two most important aspects of an EIR, yet of the nine categories of mitigating measures, ranging from transportation to public services, SFO has not made any real commitments for which it can be held accountable (DEIR Vol I CH. V). The only so-called mitigating measures under the direct control of SFO that involve actual construction are the parking additions, access road widenings, marking of high-occupancy vehicle lanes, channelizing traffic lanes, and the marking of bicycle lanes all of which would have been done under the expansion anyway. I must admit though, the thought of an additional 20 million passengers complete with luggage strapped to their backs pedaling furiously along Highway 101 in order to catch a flight does provide a certain humorous counterpoint to this rather serious business.

"Beyond the above, SFO offers only passive half-measures such as encouraging disincentives, collecting and disseminating information, and possibly cost-sharing with other agencies. It would appear that SFO and, of course, the public is at the mercy of the plans and budgets of BART, SAMTRANS, CALTRANS, FAA and the adjacent communities to provide the intersection modifications, highway access ramp monitoring, highway widenings, bus/train transit link development, air quality monitoring, and aircraft noise abatement procedures. I simply must ask why most of these proposed mitigation measures are not already in place and functioning. It really is a shame that so little thinking and imagination has been used. All real commitment seems absent." (Alyn Lam)

"The EIR does not stipulate who will be responsible for implementing the list of traffic mitigations. A mitigation monitoring program indicating the actions to be taken and the responsible parties should be included." (Ed Everett, City Manager, City of Belmont)

"The DEIR proposes various mitigation measures to minimize adverse impacts of the project. Many of the proposed mitigations would alleviate only situations that are internal to the airport. Some of these, in fact, would negate other efforts, and would promote, not reduce, increases in vehicular traffic. Some proposed mitigations depend entirely on other agencies for both capital and operating expenses, but there is no documentation of agreements having been made with said agencies in order to vallidate the proposed mitigations. . .

"We call on the SFIA to cooperate with governmental agencies in the neighboring jurisdictions to develop meaningful mitigations to alleviate the detrimental environmental impacts of the proposed project, to delay development of the project until adequate mitigations can be assured, and, as a last resort, to reduce the scope of the project to reduce the adverse impacts. The description (Chapter VI, pages 435-436) of significant environmental effects that cannot be avoided if the proposed project is implemented convincingly documents reasons that SFIA must reconsider and alter the expansion plans set forth in this proposed Master Plan." (Onnolee Trapp, Leagues of Women Voters of San Mateo County)

Response

If the project were to be approved, and if measures identified in the EIR to mitigate potentially significant effects were not implemented, the project would result in a significant effect on the environment due to any such unmitigated impacts. Thus the project could not be approved without findings of overriding consideration for the potentially significant effects that would not be mitigated. When the lead agency for project approval is different from the decision-making body for implementation of a mitigation measure, the lead agency would have no authority over implementation of such a mitigation measure. The forum for determining whether the SFIA Master Plan or any other development project should pay a specific fee amount to an agency as an appropriate means of mitigating operating deficits for other agencies rests with the other agencies. In the absence of a fee requirement or other mitigation measures under the jurisdiction of other agencies, the EIR identifies on p. 435 that, for those potentially significant impacts that could not be mitigated to a less-than-significant level by measures included as part of the project, the SFIA Master Plan would have a significant effect on the environment.

CEQA does not require that detail regarding disclosure of all actions or voter approval required to implement a measure be included in an EIR. Nor does CEQA require that the likelihood of such actions be included, because such an assessment would be speculative in nature. CEQA does not require that identification of funds available for mitigation measures be included in an EIR. (See CEQA *Guidelines* Sections 15126(c), 15096(g).)

After each mitigation measure this EIR notes which agencies would be responsible for implementing it. Mitigation measures identified in the EIR are identified by the EIR authors and not by SFIA. During the comment period on the Draft EIR, the public had the opportunity to suggest adding mitigation measures to the EIR that had not been previously identified by EIR authors. See specific comments and responses on mitigation measures, above, for measures added to the EIR as a result of public input. Any mitigation measure that would be the responsibility of SFIA to implement could be required as a condition of project approval. All feasible mitigation measures under SFIA jurisdiction would have to be implemented. (See CEQA *Gui delines* Section 15091.)

If the project were to be approved, SFIA would consider impacts of any mitigation measure before considering their adoption.

The function of an EIR is to disclose potentially significant effects of development and to identify measures to mitigate those effects. Proposed mitigation measures have not yet been implemented because this EIR is the forum for identifying significant effects and measures to lessen those effects. This is the first time that some effects have been objectively analyzed and disclosed. Once a measure is required by law to be implemented it would no longer be considered a mitigation measure. For example, the Transit Impact Development Fee (TIDF) for downtown San Francisco is no longer considered to be a mitigation measure for downtown office development because it is required to be implemented for certain projects.

A mitigation monitoring program must be adopted at the time of project approval (as required by AB3180). It is not necessary to include details of this program in the EIR. If the project is approved, then a monitoring program will be required for those mitigation measures that are to be implemented. Because the Airports Commission has not yet deliberated on project approval, or decided which measures to include (if the project or one of the alternatives were to be approved), it is premature to include a monitoring program at this time.

SIGNIFICANT EFFECTS

Comments

"There is a famous old remark - 'We're damned if we do and damned if we don't' - which I think fits this situation exactly in relation to my opinions. The Document covers a vast amount of information. And yes it is a fantastic Airport but - The Noise and Pollution problem is seemingly devastating to many unless these problems can be much more efficiently mitigated than is suggested within these documents." (Jessie Bracker, letter of 8/27/91 and public hearing of 8/27/91)

"The Leagues of Women Voters are concerned about the environmental impacts of the proposed extension of the airport and particularly concerned about the projected 71 percent increase in annual passengers by 2006 with the resulting increases in vehicular traffic on Highway 101 and ramps and arterials, feeders, and intersections in adjacent cities, with concommitant increases in noise and air pollutants, both during construction and on a cumulative basis." (Onnolee Trapp, San Mateo County Leagues of Women Voters, public hearing of 8/27/91)

"On Page 438, I found that to be the most enlightening statement in the whole document to me. I would like to read it so everyone knows that it is in there if they didn't get to read it. It says: 'Significant irreversible environmental changes which would be involved in the proposed action, should it be implemented -- additional vehicle trips, plus construction activities from new development, would contribute to future cumulative air quality impacts and particulate matter, carbon monoxide, and precursor emissions to ozone.' I thought you did very well on that paragraph. I want to compliment you for digging that out." (Jessie Bracker, letter of 8/27/91 and public hearing of 8/27/91)

"SFIA contributes significantly to the adverse air quality of the region. With the proposed expansion and associated increases in traffic, approval of local developments could be negatively impacted due to cumulative air quality impacts created by SFIA." (George Foscardo, City of San Bruno)

"Significant air quality effects from project-related surface traffic are classified as unavoidable. This issue should be revisited." (Robert Treseler, City of Millbrae)

Response

The comments are consistent with the information presented in the EIR. Implementation of the SFIA Master Plan would have significant effects on the environment. This project could thus not be approved unless the San Francisco Airports Commission were able to make findings of overriding consideration in the project-approval process.

EIR PROCESS

PUBLIC PARTICIPATION

EIR Availability and Readability

Comments

"I know that many public officials have also conscientiously studied the SFIA DEIR, which is a lengthy challenge to read and carefully analyze in the context of all the variables addressed. It was also somewhat of a challenge for me, as a member of the public not on the distribution list, to obtain a copy to read. When I telephoned the Airport Commission office, I was informed that it was only available in the Commission office, and not in public libraries; in fact, it is in public libraries in seven cities. This kind of disincentive to public participation in the EIR process is undesirable." (Onnolee Trapp, Leagues of Women Voters of San Mateo County)

"I live in San Bruno and am directly impacted by the noise in San Bruno. And I have a couple of concerns not directly related to the Environmental Impact Report, but more related to the availability of the Environmental Impact Report. I did a little checking around to try to find out who had Environmental Impact Reports. Now, out of the cities of San Bruno, South San Francisco, and Millbrae, which is approximately 100,000 people, there were four copies of the Environmental Impact Report that were generally available to the public. Out of that, one copy is a circulating copy, meaning you can check it out. I was not able to check out a copy that I could take home and look at. I think that's something that needs to be addressed. We need more copies available at our local libraries and more circulating copies that people can take home and look at. I went to Operation Landside at the airport. They do not have any -- didn't know anything about it. I finally ended up at the airport engineering office, and they told me that I had to go to the library. The report is very long and does need to be taken home, where somebody can sit down and digest it for a while.

"I found some parts of the report, that, when I finally did find one that I could look at, were unreadable. Volume II specifically Report 64-91, Figures 1 through 3, were almost unreadable as to the decibel levels.

". . . I think people at the airport are directly impacted, because I work at the airport. I'd like to see Environmental Impact Reports and construction reports available to people at the airport at some centralized location -- and people know that they're there." (Edwin Works)

Response

The public was notified of the publication and availability of the SFIA DEIR by notices published on July 11, 1991 in both the *San Mateo Times* and *San Francisco Independent.* In addition, signs were posted regarding DEIR availability in public areas of the Airport. In accordance with the California Environmental Quality Act (CEQA), *Guidelines* Section 15087, the published public notice and posted signs also provided information regarding the location where copies of the DEIR were available for public review, the time period that public comments would be accepted, and where and when the two public hearings would be held.

As to the first comment, we apologize for any misinformation given by the Airports Commission office that indicated that no copies of the DEIR were located at local public libraries and that copies of the DEIR were located only at the Commission office. As correctly noted by the commenter, copies of the DEIR were located at local libraries; however, 14 libraries had copies of the DEIR for public review and not 7, as the commenter indicated. In addition, copies of the DEIR were available without charge for distribution to the public at the San Francisco Department of City Planning.

A list of the locations where copies of the DEIR was deposited for public review is included in the back of the DEIR under the heading of "X. DEIR Distribution List." The 14 libraries to which a copy of the DEIR was distributed included:

1) San Francisco Main Library - Civic Center, San Francisco (2 copies);

2) Environmental Protection Agency (EPA) Library, 215 Fremont Street, San Francisco;

3) Stanford University Library, Stanford;

4) Government Publications Dept., San Francisco State University, 1630 Holloway Ave., San Francisco;

5) Hastings College of the Law - Library, 200 McAllister Street, San Francisco;

6) Institute of Government Studies, University of California, 109 Moses Hall, Berkeley;

7) San Mateo County Library, 25 Tower Road, San Mateo;

8) City of Brisbane Library, 250 Visitacion Avenue, Brisbane;

9) City of Burlingame Library, 480 Primrose Road, Burlingame;

10) Foster City Library, 600 Foster City Boulevard, Foster City;

11) City of Millbrae Library, 1 Library Avenue, Millbrae;

12) City of Pacifica Library, 104 Hilton Way, Pacifica;

13) City of San Bruno Library, 701 Angus Avenue West, San Bruno; and

14) City of South San Francisco Library, West Orange Library, 840 West Orange Avenue, South San Francisco.

In total, there were 14 or more copies distributed for public review at the 14 different library locations. There were initially about 250 individual copies of the DEIR sent without charge to known interested parties, agencies, local governments, elected officials, companies, and the media. In addition, about another 145 individuals, agencies and companies received a Notice of Availability of the DEIR and could request a copy if interested. After the initial distribution, another 85 copies of the DEIR were requested and distributed without charge, including copies of the DEIR which were picked up by people at the Department of City Planning. In total, approximately 340 copies of the DEIR were distributed for public review. The initial distribution list is included in the last pages of the DEIR under "X. DEIR Distribution List."

CEQA requirements regarding public review of a draft EIR are discussed in *Guidelines* Section 15087. Section 15087 provides in pertinent part the following:

Section 15087. Public Review of Draft EIR

"(a) The lead agency shall provide public notice of the availability of a draft EIR. . . Notice shall be given to all organizations and individuals who have previously requested such notice and shall also be given by at least one of the following procedures:

"(1) Publication at least one time by the public agency in a newspaper of general circulation in the area affected by the proposed project.

"(2) Posting of notice by the public agency on and off the site in the area where the project is to be located.

"(3) Direct mailing to owners of property contiguous to the parcel or parcels on which the project is located as those owners are shown on the latest equalized assessment roll....

"(d) Public agencies shall use the State Clearinghouse to distribute draft EIRs to state agencies for review and should use areawide clearinghouses to distribute the documents to regional and local agencies.

"(e) To make copies of EIRs to the public, lead agencies should furnish copies of the draft EIRs to public library systems serving the area involved. Copies should also be available in the offices of the lead agency."

As the lead agency complied with the above CEQA requirements regarding adequate notice, requesting public comments, noting the location where the document could be reviewed, distributing numerous copies of the document for public review, and indicating where and when scheduled public hearings would be held, the DEIR was adequately available for public review.

As to the readability or legibility of the DEIR document, to the best knowledge of the distributing agency, copies of the DEIR were legible when distributed to the local libraries for public review. If a page within a copy of the DEIR was inadvertently blurred when photocopied, as indicated by one commenter, we apologize; however, there were other copies of the DEIR available for review. In addition, the last pages of the DEIR indicated where other copies of the DEIR were available for review and in the alternative, the reader could have called or written the lead agency and requested a copy of the DEIR be sent to him or her.

Opportunities for Public Comment

Comments

"Notice: Although a 45-60 day review period may seem adequate. (DEIR Vol. I Ch.II §E) it is not considering the delay in the distribution of the DEIR to the public and the questionable public notice. It is my understanding that the only notice published was in the San Mateo Times. It was only by word-of-mouth that I became aware that a DEIR has been issued. Considering the scope and the $1.7 billion "price tag" on the proposed expansion, the two public meetings that were scheduled to be held on the evening of August 27th in Burlingame and the afternoon of August 29th in San Francisco seemed woefully inadequate. Afternoon meetings, particularly, are difficult for most people to attend. I get the distinct feeling that public input is being deliberately discouraged." (Alyn Lam)

"First, I want to thank you and to ask you, Ms. Sahm, to take our thanks to the Planning Commission for showing concern and having a meeting on the Peninsula. When I met with Mayor Agnos a few weeks ago, he said that the City of San Francisco wanted to be neighborly to its Peninsula neighbors. And we are encouraged. This shows that intent to be neighborly." (Janet Fogarty, Mayor of Millbrae)

". . . I am very concerned with . . . staff's suggestion, that the response period be closed now, that additional information, which you have requested about the mitigations and alternatives, which arguably, . . . are probably the most important aspects of a Draft EIR, that that be put off until later. My understanding is, if that is put off to later, the public may not comment on those. The public hearing is closed. I do not think that is fair to the public, to our committee, and to the community at large, or to the decision-makers." (Curt Holzinger, Airport Noise Committee)

". . .I don't find that any neighborhoods have been properly notified. This is probably because this plan doesn't place an airport in any of the San Francisco neighborhoods. But, nonetheless, one of the worst impacts that this airport expansion will do will bring all of the noise and pollution into the neighborhoods.

"Nobody has come forth. There have been no mobs coming down, as there was on the Hazardous Waste Plan. Nobody seems to know what is going on, yet public comment period is about to be closed. This is a much more serious problem. This isn't a building going up on the corner of such and such. This is the Airport Master Plan to go into the next century. And to simply close public comment, based on the fact that all the facts are supposedly in would really be appalling. And I don't think it should fly at all today." (Don Bertone)

". . .It's amazing to me, after the publicity that we had on the last hearing, the lack of interest, aside from city officials, that the department and I personally have received on the project, despite a newspaper editorial and a story that was somewhat controversial. . .This may be evidence of two things. Either the public doesn't care or the public doesn't know enough about it to really care, and that presents an interesting challenge to the Airports Commission in terms of dealing with this particular project -- and that is, it will be controversial." (Commissioner Engmann)

". . .The two most important parts of the plan, as they affect the citizens of San Francisco, the effects of the plan expansion, and the proposed mitigation, have been put off for further action by the staff, and public comment will be foreclosed. These two aspects of the Draft EIR are of most significant import to those of us who live and work in the city." (Carol Danville, Glen Park Association)

Response

A total of 102 days were provided for public review of, and comment on the SFIA DEIR. CEQA generally requires a public review period of between 30 and 90 days, except in unusual circumstances (*Guidelines,* Section 15087(c)). Public notice of the publication and availability of the SFIA DEIR was published in the *San Francisco Independent* and the *San Mateo Times* on July 11, 1991, and posted in public areas of the Airport. Although there were originally two scheduled public hearing dates, ultimately three public hearings were held. For the convenience of Peninsula residents, the first public hearing was held the evening of August 27, 1991 at the Clarion Hotel in Millbrae. The second scheduled public hearing was held in San Francisco on August 29, 1991. This public hearing was extended to the evening of October 17, 1991 by the City Planning Commission. The public comment period was also extended from September 10, 1991 to October 21, 1991, or four days after the last public hearing date. Thus, the DEIR comment period was 102 days, July 11, 1991 to October 21, 1991, --during which written comments were accepted. It should be noted that CEQA does not require public hearings as part of the environmental review process, although the use of public hearings is encouraged (*Guidelines,* Section 15087(g)). (See also the response to the previous comment on the EIR availability and readability.)

Participation of Oakland and San Jose Airports

Comment

". . .It's very difficult for me to try and evaluate the quality of the data or the correctness of the data. There are times, as we do with other EIR's, we ask competitors about the EIR and the information, and not necessarily evaluating San Francisco Airport's business plan, but more so about the data. I don't know if we -- it doesn't appear that we have a great deal of comments from Oakland or San Jose Airports, but maybe we should, as a regional analysis, ask for their input and comments." (Commissioner Hu)

Response

Airports in the region had the opportunity to provide comments on the DEIR, as did the public in general. During the approximately three and one-half month public comment period, no comments were received from any of the other Bay Area airports. Caltrans Division of Aeronautics submitted comments regarding the DEIR. However, these comments were specific to SFIA and did not mention the Bay Area's other regional airports. The Metropolitan Transportation Commision (MTC) provided indirect comments regarding the interests of the other Bay Area airports. It should also be noted that MTC is currently updating the Regional Airport System Plan, in which all of the airports within the region are addressed. In fact, substantial preliminary data and analysis from MTC on the Regional Plan are included within this document under Project Description, Regional Planning and Coordination and Alternatives, pp. C&R.8-45, 56-100 herein, because the material became available after preparation of the DEIR.

PLANNING COMMISSION CONTINUATION OF COMMENT PERIOD

Requests for Additional Data and Discussion

Comment

"I would like to suggest that we continue the hearing until we are able to, first, get the comments from the other regional agencies.

"Second, that we have some of the regional data that we talked about. I personally think that is very important in terms of where people are coming from and the potential environmental impacts of the regional transportation systems.

"Thirdly, until you feel comfortable or perhaps members of the public or the commission itself can come up with some more meaningful potential mitigation measures that might be discussed, as I think all the commissioners have suggested, and maybe the Airports Commission would like to have a joint hearing with us if we want to get into the substance of it, or at least perhaps more than just one person from the Airports Commission staff might want to come so we can discuss this a little more in depth. I don't know whether that is September or October, when we can get a package like that together for us to discuss." (Commissioner Engmann)

"At the last hearing [August 29, 1991], I think commissioners made a myriad of requests from the staff for additional information to include in the EIR. As I understand it, there are approximately five reports that have been provided . . . particularly relating to regional traffic information of airport origin that I had felt strongly about should have been included, and which, I understand, will be included in the Draft EIR.

"I further understand that much of the material, or at least some of the material that we requested relating to alternatives, additional mitigations, and other general comments, such as response to the ballpark down in that area, are more appropriately included in the Responses and Comments, and won't be included in the EIR, but included in the Responses and Comments, which does get incorporated into the Final EIR. . ." (Commissioner Engmann)

<u>Response</u>

Barbara Sahm, the Environmental Review Officer, stated at the August 29 public hearing: "Commissioners, if you are talking about providing some of the additional information, it would be appropriate, and I think important, to make this information available to the public before the Commission holds the hearing and give the public at least a couple of weeks to digest the information.

"I would like to suggest if we can continue this to the 17th, that I endeavor to get the additional information that the Commission is interested in having available by October 1 so that the public has two and a half, nearly three weeks to review the material. Some of it is indeed in the file, but I'm sure not all of it is."

At the August 29, 1991 City Planning Commission public hearing, the Commissioners decided to continue the SFIA DEIR public hearing to October 17, 1991 and extend the written comment period from September 10, 1991 to October 21, 1991, to permit time for review and comment on the additional materials requested by the Planning Commission. On October 4, 1991 Barbara Sahm transmitted the promised package of additional materials to the Planning Commissioners, to public libraries that had copies of the Draft EIR, and all persons who had commented on the DEIR prior to October 4, 1991. The information responded to the various requests made by the Commissioners during the August 29, 1991 public hearing. The October 17, 1991 public hearing was held 13 days after the additional information was distributed The public written comment period closed on October 21, 1991, 17 days after the information was distributed. The information transmitted to the Planning Commissioners and others on October 4, 1991 is included in this document as C&R Appendix A. It should be noted that the provision of the additional information and additional time to review this information is not required by CEQA, but was provided as a courtesy to the Planning Commission and the interested public.

The following is a brief description of the additional information provided in the October 4, 1991 transmittal package.

The material referred to as "Attachment A" in the October 4, 1991 informational package references the 1990 Air Passenger Survey prepared by MTC, released for public use in August 1991. Although not reproduced here, the survey is on file with the Department of City Planning and available for public review there or at MTC offices. The Air Passenger Survey covers passengers arriving at the three major Bay Area airports. As was noted in the discussion, it was not used in the DEIR because it was not available until after the draft was published. The DEIR, however, does explain the surveys used, as well as assumptions and methodology used that formed the project passenger and employee trip distribution noted on pp. 287-292. The report also summarizes the Airport's information on the proportion of flights heading generally for international, domestic and Southern California destinations. The MTC survey also provides some limited information on links between the passenger survey information (where people are coming from to get to the Airport) with the flight destination information (where people who use the Airport are going).

"Attachment B" noted in the transmitted materials includes portions of work in progress on the Regional Airport System Plan. It is being prepared under contract by TRA Airport Consulting for MTC. The Plan Update, originally expected for release in 1991, is now expected to be completed sometime in late 1992. So far, information available to the public includes information on preliminary forecasts of growth at the various regional airports, an inventory of present facilities and their capacities, and a draft discussion of alternative regional planning scenarios. The preliminary aviation demand forecasts were not used in the SFIA DEIR because they were not finalized at the time the DEIR was published.

"Attachment C" referenced in the transmitted materials contains additional information on the status of San Jose International Airport expansion plans.

"Attachment D" of the package is a brief explanation of airport operations and the regulatory framework for airport operations. While this information was not specifically requested by the Planning Commissioners, it is useful in the context of the SFIA Master Plan EIR. The provided information is commonly known to those who run airports, but for those who simply use airports, it presents a useful summary of airport information. It includes information on the extent to which the local operator can control airport activities, a brief discussion of airport economics, and a summary of Federal regulatory history.

"Attachment E" provided in the package includes copies of comment letters received by the lead agency from regional agencies such as MTC, ABAG and Caltrans Division of Aeronautics as of October 4, 1991 regarding the DEIR up to the time of transmittal.

EIR ADEQUACY

Scope of Information Included

Comments

"But my biggest concern is making sure that all of the information that is reasonably available on the project that relates to its environmental impact be included in the document somewhere. I am not so much concerned as to whether it's in the body of the EIR or whether it's in the Responses and Comments, but that it be included so that future decision-makers can make an appropriate decision with all of the information that is in there...

"...The EIR process is a process of trying to provide as much information to decision-makers that are going to make the final decisions on this project, which won't be the Planning Commission. It will be the Mayor, the Airports Commission, and the Board of Supervisors and any other regional agencies that might have impact or have a decision in this process. And that's what I had meant to say..." (Commissioner Engmann)

"Please include and address the comments in this letter as well as the issues, facts and the alternative land use and transportation proposal raised in the document referenced herein in both the 'Comments and Responses' section of the Draft EIR and the Final EIR. Furthermore, I ask that you reproduce this letter and the enclosed 'alternative' in their entirety (no summaries) in the Draft EIR and the Final EIR. Substantiation is provided by the documents listed in the attached 'Major Substantiating Documents and Report.'

"It is my position that local and regional agencies have failed to address the issues, fatal flaws and alternative proposals contained in the attached list of reports [on the following page] and that they must be addressed in this EIR. . .

"It is my position that under CEQA Guidelines cited below, the Transit Link System proposal must be formally studied as part of the SFO Master Plan DEIR or through a Supplemental DEIR. . . [Mr. Queen cites CEQA Guidelines §15088, 'Evaluation of and Response to Comments', and emphasizes the requirement that the Lead Agency make a good-faith effort to respond to all comments using a reasoned approach.]

"During the course of the past two years I have submitted detailed 'Public Comments' to the Lead Agency charged with preparing the respective EIRs detailed in the attached reports listing. In every case the Lead Agency has chosen to not address the issues, alternatives and detailed comments presented, and thus, I have wasted a great deal of time, and in many cases hundreds of hours, preparing these comments to no avail.

"For this reason I am not submitting detailed comments regarding the SFO Master Plan DEIR. I would, however, repeat my public testimony given at the August 29, 1991 Public Hearing: The SFO Master Plan DEIR does not contain any data pertaining to costs or an analysis of socioeconomic impacts associated with the project per the requirements cited below:

"Under Section 15131 of the CEQA Guidelines, et al (quote):

> "<u>Financial Analysis - Socio-Economic Impact</u>
>
> "Governmental bodies have established the interpretation of state and federal EIR and EIS statutes and guidelines where socio-economic and financial impacts are not addressed as legitimate project issues.
>
> "However, CEQA provides that socio-economic considerations shall be included in an EIR if a 'chain and effect to actual physical changes can be demonstrated' (Section 15131).
>
> "It is my position that socio-economic impacts must be considered because the proposed project elements created this 'chain and effect to actual physical changes' in that implementation of any alternative in the EIR will result in the 'timing and type of redevelopment' in terms of:

Major Substantiating Documents and Reports

REF:	TYPE:	ADDRESSEE	TITLE / SUBJECT / DESCRIPTION	DATE	PAGES
# 1	Study:	Mayor Agnos, Supervisors, Registrar of Voters, District Attorney	*"Analysis, Waterfront Transportation Projects (Prop B-Sales Tax Increase), Fraudulent Misrepresentation of Fact."*	October 16, 1989,	4 pages.
# 2	Study:	Mayor Agnos, Supervisors, et al	*"A Unifying Theory of Political Corruption/Constitutional Means for Politically Eliminating It."*	February 1990,	28 pages.
# 3	Study:	Mayor Agnos, Supervisors, Planning Commission,	*"Fiscal, Financial & Social Evaluation of the Mission Bay and Related (Publicly-Funded) Infrastructure Projects, Misrepresentation of Fact, 34 Fatal Flaws."*	June 1990,	54 pages.
# 4	Letter:	Mayor Agnos, Supervisors, Planning Commission, et al	*"Mission Bay Ballot Issue, Fraudulent Misrepresentation of Fact, 34 Fatal Flaws."*	August 14, 1990,	3 pages.
# 5	Proposal:	Mayor Agnos, Supervisors, Planning Commission	*"San Francisco Public Housing Policy."*	August, 1990,	1 page.
# 6	Letter:	Mayor Agnos, Supervisors, Planning Commission	*"Planning Department's & Planning Commission's Flawed EIR Process."*	October 29, 1990,	12 pages.
# 7	Proposal:	Mayor Agnos, Supervisors, MTC, et al	*"Privately Funded Nat'l Small Business, Sports, Convention, Housing Transit Center / Integrated (Regional) Transit System, (Update 8.1)",*	Nov. 1, 1990,	36 pages.
# 8	Letter,	Mayor Agnos, Supervisors, Planning Commission	*"Fatal Flaws, Compliance Gov. Code 65009, Mission Bay Dev. Agreement, w/Substantiating Documents."*	Nov 15, 1990,	300+ pages.
# 9	Letter,	Mayor Agnos, Supervisors,	*"Improper Taking, Eminent Domain, Misuse of Fed Funds."*	December 10, 1990,	5 pages.
#10	Letter:	Mr. Joe Cheung, Dept of Public Works,	*"Fatal Flaws, Waterfront Transportation Project EIS, 34 Fatal Flaws."*	December 23, 1990,	30 pages.
#11	Letter:	Mayor Agnos, Supervisors, Planning Commission	*"Unresolved Fatal Errors, Mission Bay EIR Certification, 34 Fatal Flaws, et al."*	January 7, 1991,	6 pages.
#12	Letter:	Mr. Hank Dittmar, MTC,	*"New Rail Starts Program (Resolution 1876 Update)."*	January 14, 1991	
#13	Presentation,	Dept. City Planning	*"SBDC's Land Use & Transportation Proposals:* "Dept. City Planning/Embarcadero Citizen Advisory Committee, Save Taxpayers $2.7 billion"	March 26, 1991,	20 pages.
#14	Brochure:	Mayor Agnos, Supervisors, et al	*"Declaration For Renewing Economic and Social Freedom."*, (Synopsis)	May 20, 1991,	2 pages.
#15	Report:	MTC	*"Public Comment, MTC's Regional Transportation Plan (RTP) Draft EIR, w/Alternative Proposals"*	June 14, 1991,	14 pages.
#16	Letter:	Mayor Agnos, Supervisors, MTC	*"Non-Profit Housing Project, Abandon Public Easement, Rail Commerce ROW, 2nd & King Streets"*	June 24, 1991,	7 pages.
#17	Report:	MTC, BAAQMD	*"Summary/Analysis of MTC's Bay Area Travel Forecasts (Models), Facts Suppressed in EIRs, Hearings, Media."*	July 14, 1991,	14 pages.
#18	Report:	BDCD, MTC	*"Public Comment on the BCDC's Bay Plan Amendments No. 3-91, re Stopping Dredging, Kill Ocean Commerce."*	July 18, 1991,	11 pages.
#19	Letter:	Assemblyman Byron Sher,	*"AB 1509, BCDC's Bay Plan, Stopping Dredging, Kill Ocean Commerce."*	July 21, 1991,	2 pages.
#20	Brochure:	General Public	*"Brief Position Paper,"* Dehnert C. Queen, Candidate for Mayor,	July 29, 1991,	1 page (plus Substantiating Excerpts).
#21	Report:	MTC, BAAQMD,	*"Public Comment, BAAQMD's Clean Air Plan (CAP) Draft EIR."*	August 19, 1991,	5 pages.
#22	Letter:	Fed. Judge T.E. Henderson,	*"Ruling: Bay Area Transportation/Environmental Plans Inadequate; Request TRO."*	Aug. 21, 1991,	5 pages.
#23	Report:	BART, MTC	*"Public Comment, BART's Fremont to Warm Springs Extension Draft EIR, w/Alternative Proposal."*	August 26, 1991,	13 pages.
#24	Pro Per Suit:	Superior Court,	*"Dehnert C. Queen v Democratic Central Committee, CA Constitution Art II, Sec 6(b), (Stop Endorsements)."*	August 28, 1991,	3 pages.
#25	Letter:	League of Women Voters, et al,	*"Brief Biography / Major Issues."*	September 6, 1991,	2 pages.
#26	Letter:	The Honorable John Seymour	*"Facts, Considerations, Alternatives Regarding Bay Dredging and Disposal."*	September 13, 1991,	3 pages.
#27	Letter:	Mssr. Weir, Schroder, MTC	*"TIP, RTP/EIR, Notice, Failure to Comply with Federal/State Statutes."*	September 13, 1991,	3 pages.

"• . . .private and/or public development plans to include high-rise offices, retail, multi-family residential and medical facilities.

"• . . .specific area plans being redesignated from (low density) industrial parcels to (high density) residential and/or commercial (office space) use in areas compatible with the elements of the project.

"• . . .general area plans being redesignated from (low density) industrial parcels to (high density) residential and/or commercial (office space) use in areas compatible with the elements of the project.

"• . . .substantial increase (70 percent) in air passengers.

"• . . .substantial increase (?) in transportation and other infrastructure facilities.

"Authority cited: 'Socioeconomic Report for the Bay Area 1991 Clean Air Plan EIR, p.1, footnote #1.

"Discussion: Implementation of the project would result in increased population density, increased vehicular traffic, air and water (environmental) impacts, and increased demands for additional infrastructure (water, sewer, power, etc.) and thus, the cost of the total project, definition of its elements, funding sources, construction considerations, the socio-economic impacts relative to redefined land use, the displacement of residents and companies, the displacement/replacement of job categories/skill levels/wages, increased density, and transportation elements including ALL transportation alternatives and many other factors are presented in a very cursory and generally unclear manner or not addressed at all." (Dehnert Queen, Small Business Development Corporation)

"Full Disclosure: The second of the two most important aspects of an EIR is full disclosure. Public input from an uninformed public is meaningless! There are 'hints' throughout this entire DEIR that it is not complete. For example, under Alternative B: Onsite (DEIR Vol. I CH. I Pg. 16) the report states that 'A second Onsite Alternative incorporating proposed SFIA runway expansions is not included in this EIR. A preliminary feasibility study for the expansion of SFIA runways completed in June, 1990, includes proposed new runway locations that could conflict with existing uses and proposed Master Plan projects in the East Field Area.' If this refers to the report developed by Greiner Engineering of Tampa, FL. (DEIR Vol I CH. IV §B) it certainly will! It is rumored that not only are new runways proposed for construction in San Francisco Bay but the existing runways will also be lengthened and extended into the Bay." (Alyn Lam)

"The fact of the matter is, all of us, various representatives from different parts of the city, put in a lot of time for free on the Airport Noise Committee. We search the facts. We spend a lot of time. We come up with comments. We mail them into the EIR, whoever is supposed to be dealing with it. Yet, none of them are addressed or even acknowledged. What's the point of having an advisory committee to do the work for the City and County if the very people who are supposed to be dealing with this, that are supposed to be the experts, don't even get their comments acknowledged in an EIR? This needs to be addressed over again." (Don Bertone)

Response

A wide array of information is included in the EIR. Detailed information provided includes project description; airfield capacity and delay information; discussion of regional planning and coordination; land use and plans; transportation setting, impacts and mitigation; aircraft noise setting, impacts and mitigation; air quality; cultural resources; discussions on hazardous material and waste; employment and housing; public utilities; air traffic safety; geology and seismicity; energy issues; public services; water quality; growth-inducing impacts; construction impacts; general mitigation; significant effects; and the quality of life. Feasible alternatives were also reviewed and evaluated.

A commenter noted that documents identified on a list he submitted should have been evaluated in the EIR. However, most of the documents referred to are not relevant to the SFIA EIR. Typical documents listed include "Fiscal, Financial & Social Evolution of the Mission Bay," " A Unifying Theory of Political Corruption," and "San Francisco Public Housing Policy." Notwithstanding, a few of the documents indicated may have been indirectly incorporated into the EIR via final versions of reports referenced in the list. In addition, relevant documents referenced in the commenter's list are likely to have been considered in the EIR, via review and comments provided by appropriate agencies in their review of the DEIR.

As the commenter rightly noted, the lead agency must evaluate and respond to comments received during the comment period regarding the DEIR and that response should be made in good faith using a reasoned approach. The commenter, however, stated this in conjunction with a statement indicating that the "Transit Link System proposal must be formally studied as part of the SFO Master Plan DEIR or through a supplemental DEIR." It should also be noted that CEQA requires that only feasible alternatives need be addressed in the EIR document. Thus, the SFIA EIR is not required to evaluate all conceivable peninsula transit systems. It need only consider systems which are "reasonably foreseeable." Examples of such "reasonably foreseeable" systems include the BART extension to SFIA, and improvements in CalTrain and various bus transit systems, which were considered. As the "Transit Link System" is not a "reasonably foreseeable" project pursuant to CEQA regulations, this proposal need not be examined in the SFIA EIR, because the analysis would be speculative and premature.

Contrary to a commenter's indication, the quote provided by the commenter is not a recitation of CEQA *Guidelines* Section 15131, but may be his summary of same. For the record, CEQA *Guidelines* Section 15131 is titled "Economic and Social Effects" and states the following in pertinent part:

Section 15131. Economic and Social Effects

"Economic and social information may be included in an EIR or may be presented in whatever form the agency desires."

"(a) Economic or social effects of a project shall not be treated as significant effects on the environment. An EIR may trace a chain of cause and effect from a project through anticipated economic or social changes resulting from the project to physical change caused in turn by the economic or social changes. The intermediate economic or social changes need not be analyzed in any detail greater than necessary to trace the chain of cause and effect. The focus of the analysis shall be physical change.

"(b) Economic or social effects of a project may be used to determine the significance of physical changes caused by the project....

"(c) Economic, social and particularly housing factors shall be considered by public agencies together with technological and environmental factors in deciding whether changes in a project are feasible to reduce or avoid the significant effects on the environment identified in the EIR. If information on these factors is not contained in the EIR, the information must be added to the record in some other manner to allow the agency to consider the factors in reaching a decision on the project."

Nonetheless, and contrary to one commenter's indication, some socio-economic impacts are addressed in the SFIA EIR in the chapters entitled "Employment and Residence Patterns," "Employment and Housing," and "Growth Inducing Effects" in accordance with CEQA requirements (CEQA *Guidelines* Section 15131). Again, as to alternatives considered, only feasible alternatives need to be addressed in the EIR per CEQA requirements.

The additional package of informational material transmitted on October 4, 1991 to the City Planning Commissioners and other persons who had commented on the DEIR as of October 4, 1991 was intended to contain only information requested by Commissioners at the August 29, 1991 public hearing. This information was not provided to respond to all public comments received as of that date. This "Comments and Responses" document is the appropriate vehicle for responses to all the comments received during the full comment period, both written and oral. Comments made by the Airport Noise Committee are responded to in this document within sections dealing specifically with airport noise (please refer to pp. C&R.194-313 herein.)

EIR Is Inadequate

Comments

"The Master Plan, I regret, is a shame and the DEIR, as presented, is a sham. The DEIR fails both as a full disclosure document and as a plan for mitigating adverse environmental impacts. The fault can't be assessed against local planning ministries alone. They are a product of local political policies promulgating confusion, circumvention, and cover-up. Those of us in business have been extremely short-sighted when it comes to the future of long-established Bay Area institutions. Bay Area environmental advocates are equally to blame. They have been off fighting for whales, porpoises, spotted owls, redwoods etc. and not covering their collective backside." (Alyn Lam)

"I will be brief and to the point. At the last meeting [the August 29 public hearing on the DEIR], there was a general sense, from both the commissioners and the public, that the Draft EIR was not adequate. It is still not adequate. I have reviewed the additional information which was provided for public review, and it did not address the questions that were raised by this committee, by our committee. It did not address the questions that were raised over two years ago when the notice of preparation was sent out." (Curt Holzinger, Airport Noise Committee)

Response

The San Francisco City Planning Commission is responsible for certifying the SFIA EIR. As such, the Planning Commission has the responsibility of determining the adequacy, objectivity, and completeness of the EIR prior to its certification.

The additional package of informational material transmitted on October 4, 1991 to the City Planning Commissioners and other persons who had commented on the DEIR as of October 4, 1991 was intended to contain only information requested by the Commisioners at the August 29, 1991 public hearing. This information was not provided to respond to all public comments received as of that date. This "Comments and Responses" document is the appropriate vehicle for responses to all the comments received during the full comment period, both written and oral. Comments made by the Airport Noise Committee are responded to in this document within sections dealing specifically with airport noise (please refer to pp. C&R.194-313 herein.)

EIR Is Adequate

Comments

"I urge you to recommend approval of the 'Draft of the Environmental Impact Report (EIR) for the San Francisco International Airport Master Plan'. Rutherford & Chekene supports this Environmental Impact Report as being comprehensive, objective and even-handed.

"Since 1970, Rutherford & Chekene has furnished structural, civil, and geotechnical engineering services for many expansion and addition projects for San Francisco International Airport, and for many of the Tenant airlines. These included the South Terminal Modernization & Expansion that was completed in 1987. Based on our knowledge of SFO, we believe this Draft EIR for the San Francisco International Airport Master Plan deserves the unanimous approval by the City of San Francisco." (Peter E. Bank, Rutherford and Chekene, C.E.)

"After a preliminary review of the draft EIR for the SFIA Master Plan, we have found the results to be consistent with our analysis of specific conditions at the site. The current and projected figures relating to employment levels, transportation, parking, hazardous materials, and housing reflect similar views to ours. In analyzing the impacts of the SFIA Master Plan as portrayed in the EIR, we would like to state that we are in agreement with the findings." (Shelley Kessler, Coordinator, Airport Labor Coalition)

"On behalf of the National Organization of Minority Architects, we are informing you that we support the EIR and that we concur with the mitigating solutions suggested by the consultants. Any additional points that we have are minor and would require, in our opinion, no additional study.

"We recommend that the Department of City Planning accept and approve the draft EIR and issue a final report expeditiously." (National Organization of Minority Architects)

Response

These comments are noted.

FEDERAL JURISDICTION

Comment

"The discussion on noise mitigation (DEIR Vol. I CH. V Pg. 425) also mentions a runway study which 'If the study results in SFIA decision to pursue runway reconfigurations, work with FAA and other authorities to obtain necessary approvals to permit such reconfigurations. This work would include environmental review under CEQA and, possibly, NEPA.' This last declaration is the key to this entire sham!

"Terminals cannot function without runways and vice versa. There seems to be an attempt here to 'split' the proposed SFO expansion into two separate series of projects and to avoid federal Environmental Protection Agency (EPA) involvement and the development of an Environmental Impact Statement (EIS) as required by the National Environmental [Policy] Act (NEPA). Observe that within this DEIR there is absolutely no mention of supporting runway, taxiway, or apron development and no federal FAA funding ties.

"The EPA, however, must necessarily be involved! Daily aircraft operations are expected to increase by 298 or 36% between now and 2006 (DEIR Vol. I CH. III Table 17 / Vol. I CH. IV Table 51). Likewise, vehicle traffic to SFO is expected to increase by 69,067 trips per day or about 62% by 2006 (DEIR Vol I CH. IV §B Tables 27-29). The EPA shares responsibility with the Bay Area Air Quality Management District (BAAQMD) for increases in vehicle and aircraft emissions.

"Then there is the little matter of asbestos. There are at least 32 demolition projects in the proposed expansion totaling roughly 16% of SFO's existing building area. At least 10 of these projects are necessary in order to permit the construction of the new terminals (DEIR Vol I CH. XI Table B.1/DEIR Vol. I CH. II Fig. 5). Both the EPA and BAAQMD are responsible for asbestos removal in the Bay Area. The Asbestos Emergency Response Act (AHERA) gives the

EPA authority to regulate (DEIR Vol. II Ch. XI A-157). Furthermore, under Subpart M §§61.145 and 61.146 of the Clean Air Act, the EPA must be notified in writing of intentions to demolish any facility.

"The FAA and EPA are not the only other federal agencies involved in the proposed expansion. The Corps of Engineers also has a say in the expansion of the existing sewage treatment plant that will be necessary to support the new terminal buildings and which passes treated sewage into Bay waters.

"Add to the above the fact that SFO has already violated the Bay Area Regional Plan, a very strong argument can be made that there is not only a significant federal interaction at SFO and but that there is also a need for federal intervention to preserve regional environmental planning and that this necessitates a separate EIS as required by NEPA. If I were a bond underwriter, I certainly would take an interest in the completeness of the environmental approval process for this expansion!

"Now why would SFO and the FAA work so hard to avoid compliance with NEPA? Suppose the hypersonic ramjet technology which was tested so effectively in the new Aurora spy plane during the Gulf War was now ready for incorporation into an advanced SST design. Wouldn't it be nice to have a safe, centrally located, all-weather airport from which to initiate Pacific Rim service in, say, five or ten years? If I were a Washington based politico with a strong Bay Area constituency composed of environmental advocates, I certainly would like to find out what is going on!" (Alyn Lam)

<u>Response</u>

The project does not fall within the jurisdiction of the National Environmental Policy Act (NEPA). There is no direct involvement of any Federal agencies such as the Federal Aviation Administration (FAA), Environmental Protection Agency (EPA) or Army Corps of Engineers.

The SFIA Master Plan does not include plans for any new runways or runway expansion and implementation of the Plan will not use any federal funding. See pp. 61-72 of the EIR and pp. C&R.50-53 herein ("Airfield Capacity, Aircraft Delay, and Environmental Effects") for a full discussion of the capacity of existing runways and the indication that new or expanded runways would not be needed to accommodate anticipated future growth.

Contrary to the commenter's statement, the Bay Area Air Quality Management District (BAAQMD) is responsible for regulating and reviewing any increases in vehicle and aircraft emissions at SFIA. In California, the EPA has delegated its enforcement responsibility to the California State Air Resources Board, which in turn has delegated enforcement responsibility in the Bay Area to BAAQMD. EPA's role remains setting national air quality standards. Thus, the EPA is not responsible for regulating any increases in vehicle and aircraft emissions associated with the airport expansion plans.

Also contrary to the commenter's statement, BAAQMD is the responsible agency regulating the removal of asbestos at SFIA because the U.S. EPA has delegated its enforcement responsibility for all National Environmental Standard Hazardous Air Pollutants (NESHAP) requirements to BAAQMD, as a result of revisions to NESHAP: Asbestos made on November 20, 1990, noted in a letter from the U. S. EPA - Region IX to all contractors dated March 18, 1991. As a result of this delegation of authority to BAAQMD, although it was previously necessary to notify the EPA of any intentions to demolish buildings, this requirement is no longer in effect. Instead, BAAQMD must be notified ten days prior to a demolition, regardless of whether or not the buildings are known to contain asbestos. This requirement also applies to the removal of asbestos from areas of at least 100 square or linear feet. Asbestos issues, including non-applicability of the Asbestos Hazard Emergency Response Act (AHERA) to the proposed project, are discussed in greater detail on p. C&R.349 herein.

The Regional Water Quality Control Board (RWQCB) is the appropriate agency to review any expansion of any existing sewage treatment plant needed to support airport expansion plans. The Army Corps of Engineers would become involved in the airport expansion only if any sewage treatment plant expansion plans included plans to physically intrude the plant building into wetland areas or increase discharges into the wetlands creating an increase in sediment. Put simply, the Corps of Engineers becomes involved when wetlands are subject to fill and dredge operations.

Also contrary to the commenter's statement, SFIA has not "violated" any bay area regional plans. The commenter's use of the word "violation" implies that a legal statute or regulation has not been adhered to. Regional plans are policy documents designed to guide local government and cannot be legally enforced. Therefore, by definition, a regional plan cannot be "violated." It is assumed that the "Bay Area Regional Plan" the commenter is referring to is MTC's Regional Airport Plan. The SFIA Master Plan may appear inconsistent with some parts of MTC's Regional Airport Plan. One area is the projected future airport market share. Under the SFIA Master Plan, the Airport would retain close to its current airport market share; MTC forecasts that SFIA's market share will steadily decline. However, as the MTC's projections are policy recommendations and cannot be imposed on any of the region's airports, inconsistencies between the SFIA Master Plan and MTC's Regional Airport Plan would not affect the validity of SFIA Master Plan or the adequacy of the SFIA Master Plan EIR.

The SFIA Master Plan project has been promulgated by the Airport to accommodate future growth that would occur with or without runway expansion. If runway expansion were proposed, additional environmental review would be required. (Please also see responses to comments on airfield capacity and delay, pp. C&R.46-55 herein.)

EIR COSTS AND TIME

<u>Comment</u>

"Time: This process has already taken a year and a half to study. Meanwhile other airports are attracting SFO business away from San Francisco. Any further delay will only cause more economic damage, which we can ill afford.

"Cost: Money spent on the EIR process does not contribute to permanent improvements to the City or to revenue to help run programs, or to pay for City services. Enough money has been spent on process. We should now put our plans into action, not more debate and rhetoric." (Stan Moy, Finger & Moy Architects)

<u>Response</u>

The EIR process is required by law and includes an important forum for public input into the evaluation of the environmental effects of a project's implementation. To put the costs of the EIR process in perspective, recent estimates indicate that the San Francisco International Airport Master Plan EIR process will cost approximately 0.06 percent, or much less than one tenth of one percent, of the estimated cost to implement the SFIA Master Plan recommendations. (This estimate does not include the public costs of the EIR process; if the public costs were included, the total cost would still be a negligible fraction of the cost of implementing the SFIA Master Plan.)

SUPPORT FOR SFIA MASTER PLAN

Comments

"Alaska Airlines supports development of the New International Terminal at San Francisco. The completion of this project will provide facilities essential to meet the increasing international and domestic traffic demand in the Bay Area.

"The terminal expansion will assure that the Airport continues to act as an important contributor to the local economy by providing additional direct employment and indirect revenue. We also view the Airport and City's commitment to this project as a validation of our efforts to develop a low noise, fuel efficient fleet to serve your community." (Korbey Hunt, Alaska Airlines)

"On behalf of the San Francisco Foreign Flag Carriers (SFFFC), representing 15 major international airlines serving San Francisco, we support wholeheartedly the Airport's plan for improving facilities for the travelling public.

"The airlines will play a vital role in bringing to fruition these improvements. Our carriers have played a leading role - and will continue to do so - in providing aircraft that are quieter, more efficient and more compatible with the environment. We will continue to employ the highest technology available and utilize whatever procedures necessary to achieve optimum effectiveness in reducing noise and air pollution in the years to come.

"For the best service to the flying public, maximum safety and the most acceptable environmental solution, SFFFC urges the timely implementation of the SFIA Master Plan." (Barbara Giel, San Francisco Foreign Flag Carriers)

"On behalf of SAIA, I wish to express our support for the Airport's Master Plan and urge certification of the Environmental Impact Report at the earliest possible time. We encourage the development of improved facilities and look forward to the increased level of service we will be able to offer our cargo and passenger customers." (Jerome Copelan, San Francisco Association of International Airlines)

". . .United strongly supports the need for additional development at SFIA, especially with respect to international arrival and departure facilities, and we believe that the conceptual plan outlined in the SFIA Master Plan for such development serves as an appropriate basis for detailed planning of these needed improvements. . .

"Finally, United believes that the development proposed in the SFIA Master Plan is necessary to sustain the economic vitality of air transportation in the Bay Area, and to preserve SFIA's role as the primary U.S. gateway to the Pacific Rim." (Thomas Brown, United Airlines)

"Accordingly, if you desire to keep San Francisco Airport the number one (1) airport in the San Francisco Bay Area (it was disclosed today that the best place to visit in the world is San Francisco) the plan for the approval of the expansion should be given expeditiously. There is a distribution of wealth when people come to visit your city." (James Palma)

". . .During the past 10 years of our company history, we have witnessed a severe decline of business and economic opportunity here in the City. The survival of SFO and its ability to compete, is vital to the economic well being of the entire region." (Stan Moy, Finger & Moy Architects)

<u>Response</u>

These comments are related to the project approval process. The EIR is an informational document and is a tool for the Airports Commission to use when deliberating on project approval. For the SFIA Master Plan, the EIR must be certified by the San Francisco City Planning Commission, a different decision-making body from that for the project approval process. The Airports Commission, in its deliberations, may approve the project or one of the alternatives, including the No-Project Alternative. Any support for the project or one of the alternatives should be expressed to the Airports Commission.

ERRATA

Comment

". . .On Page 110, there is a discussion about MTC's analysis that doesn't have a page number. I couldn't find it later." (Commissioner Engmann)

Response

In the response to comments under Regional Planning and Coordination, Regional Forecasts and Capacities (p. C&R.67 herein), a revision is made to the first paragraph following Table 14 on p. 110 of the EIR. The revision includes the page number requested by the commenter.

D. STAFF-INITIATED CHANGES

EIR COVER

The August 27, 1991 public hearing location noted on the cover and title page of the Draft EIR is revised to read as follows (revision is underlined):

> Draft EIR Public Hearing Dates:
> August 27, 1991, 7:30 p.m., Clarion Hotel, <u>Millbrae</u> . . .

I. SUMMARY

The second sentence, p. 4, is revised to read as follows (new text is underlined):

> Both projects require <u>San Francisco Bay Conservation and Development Commission</u> (BCDC) approval.

On p. 4, the sentence preceding the heading "TRANSPORTATION" is moved into the first full paragraph on the page, following the second sentence. The revised paragraph reads as follows (inserted text is underlined and deleted text is shown by brackets):

> There are a number of plans by various local, regional, and state agencies that address the provision of facilities to accommodate regional air transportation demand. Most of those plans were developed on the basis of forecasts of regional transportation demand, assessments of the capabilities of facilities in the Bay Area (airports and the facilities for other modes of transportation) to accommodate the forecast demand, and various recommended means of meeting demand (such as facility expansion). <u>Those plans do not include the same recommended means for meeting forecast demand.</u> The California Aviation System Plan (CASP), forecasts expansion at SFIA to about 52,770,000 passengers in 2006 (three percent over the SFIA Master Plan). The Federal Aviation Administration (FAA) forecasts indicate that SFIA expansion would be less than predicted in the SFIA Master Plan.
>
> [ ]

On p. 15, the phrase "(includes three variants)" at the end of the paragraph just after the heading "D. ALTERNATIVES" is deleted.

II. PROJECT DESCRIPTION

General clarification: Existing facilities at SFIA that were previously occupied by Pan Am, which is no longer in business, are being used by United Airlines. No projects have been removed from the SFIA Master Plan as a result of Pan Am's departure from the industry. According to Airports Commission staff, the reconfigured and expanded facilities originally designated for Pan Am under the SFIA Master Plan would be used by other airlines.

The last sentence on p. 20 of the EIR is revised to read as follows (new text is underlined and deleted text is shown by brackets):

> Within the nine-county San Francisco Bay region are <u>four</u> air carrier <u>or commercial service</u> airports (SFIA, Metropolitan Oakland International, [ ] San Jose International <u>and Sonoma County Airport</u>), four U.S. military airfields (one of which is closed), [ ] <u>21 public use</u> General Aviation airfields, <u>20 private use General Aviation airfields and numerous heliports, most of them for medical or military use</u>[ ]./7/

On p. 41, the heading "<u>Proposed Facility Projects in Buildings</u>" and the subheading "1.0 Terminal Facilities: SFIA Master Plan Projects" are moved to the top of p. 50. The text preceding and following the headings is combined into one paragraph, as follows:

> Near-term and long-term SFIA Master Plan projects would together result in demolition of about 1.4 million square feet of existing building area and construction of about 4.2 million square feet of new building area, for a net increase of about 2.9 million square feet of building area. This total net change for combined SFIA Master Plan near-term and long-term projects represent a 35 percent increase from the existing 1989 SFIA building area total of about 8.2 million square feet. About 0.8 million square feet of existing building area would be remodeled and about 7,340 net new parking stalls would be added under combined near-term and long-term SFIA Master Plan projects.

On p. 72, in the second paragraph under the heading "Assumptions for Evaluation of Environmental Effects," the last three sentences are moved to follow the first sentence, and the third and fourth sentences are revised and made a separate paragraph. The revised text reads as follows (new text is underlined and deleted text is shown by brackets):

> As discussed in Section II.C. Project Characteristics, p. 22, the landside improvements proposed under the project are designed to accommodate the forecasts of activity developed in the SFIA Master Plan. <u>If future activity occurs as forecast in the SFIA Master Plan, airport landside facilities with the project would not constrain the activity such that the constraints cause additional environmental effects. If future activity occurs</u>

as forecast under the CASP, however, SFIA landside facilities with the project may constrain the activity such that the constraints cause additional environmental effects. Those effects cannot be estimated specifically.

According to SFIA, the existing airfield could accommodate SFIA Master Plan-related growth. This EIR evaluates whether the existing airfield [ ] could accommodate the forecast growth, [ ] and whether there could be airfield constraints that could cause additional environmental effects. [ ]

Note /7/ on p. 76 of the EIR is revised to read as follows:

/7/ Metropolitan Transportation Commission, Draft Regional Airport System Plan Update Inventory, May 22, 1991. Military airfields include: Hamilton Air Force Base/Army Airfield (surplus); Travis Air Force Base; Alameda Naval Air Station; and Moffett Field Naval Air Station (potential surplus). Public use General Aviation airfields include: Hayward Air Terminal, Livermore Municipal Airport and Oakland North Airfield in Alameda County; Buchanan Field and Byron Airport in Contra Costa County; Gnoss Field in Marin County; Napa County [ ] Airport and Parrett Field in Napa County; Half Moon Bay and San Carlos Airports in San Mateo County; Palo Alto, Reid-Hillview and South County Airports in Santa Clara County; Nut Tree and Rio Vista Airports in Solano County; and Cloverdale, Healdsburg, Petaluma, Santa Rosa Air Center, Sonoma Sky Park and Sonoma Valley Airport [ ] in Sonoma County. Private use General Aviation airfields include: Fremont (closed), Meadow Lark and Sky Soaring Airports in Alameda County; Antioch and Delta Airports in Contra Costa County; Marin [ ] Airport and Commodore Seaplane Base in Marin County; Calistoga (closed), Inglenook Ranch, Moskowite, Mysterious Valley [ ] and Pope Valley Airports in Napa County; [ ] Blake, Garabaldi, Maine Prairie, Travis Air Force Base Aero Club, Vaca-Dixon (closed), and Vacaville Airports in Solano County; and Graywood and [ ] Sea Ranch [ ] Airports in Sonoma County.

III. ENVIRONMENTAL SETTING

A. Land Use and Plans

Figure 11, p. 83, is revised to include "United States Geological Survey;" after "SOURCE:".

Figure 12, p. 106, is revised to include "San Mateo County Airport Land Use Commission;" after "SOURCE:".

On p. 111, the last sentence in the section pertaining to the Metropolitan Oakland International Airport Master Plan update, just before the heading, "San Jose International Airport (San Jose Airport)," is deleted. The following paragraph is added:

> Fluctuations in the aviation industry, as well as potential environmental controversy and other institutional changes, caused the Port of Oakland to re-scope the Master Plan update program and scale back the plan time frame, a process which has culminated in the development of the 10-year 2002 Airport Development Program. Among the projects under consideration in the 2002 Airport Development Plan are the modification of existing terminal facilities, widening of existing airport access roads and construction of new airport access roads, construction of a ground transportation center/parking structure and remote parking lots, enhancements and additions to existing airline support and air cargo facilities, improvements to taxiway and runway facilities, and restoration of wetlands as mitigation for a previous 33-acre fill on Oakland Airport lands. The improvements to the airfield facilities are intended to enhance the current level of safe and efficient operations of aircraft and would not expand the overall capacity of the Oakland Airport airfield.

The last paragraph on p. 111 and the first full paragraph on p. 112 (both pertaining to the San Jose International Airport Master Plan update) are replaced by the following text:

> San Jose International Airport, owned and operated by the City of San Jose, is also updating its Master Plan, a process that began in 1988 and will likely continue for another two years (through 1994). According to demand forecasts, total annual aircraft operations at San Jose Airport are expected to increase by 90 percent between 1988 and 2010./58/ Land availability is considered a more important constraint at San Jose Airport than airspace capacity./59/
>
> San Jose Airport staff and consultants are currently in the process of defining and scoping four Master Plan alternatives that have been identified for consideration by the San Jose City Council. An EIR will be prepared on the four alternatives, and selection of a preferred alternative will occur after completion of the EIR (expected in mid-1993). The first of the four alternatives would accommodate all of the air carrier demand projected for San Jose Airport in the Master Plan technical analysis. The second alternative, prepared by Citizens Against Airport Pollution, is an environmental-performance-based alternative that would, at most, allow limited expansion at San Jose Airport. The third, or moderate growth alternative, would fall between the first and second alternatives in terms of the amount of expansion it would allow at San Jose Airport. The fourth alternative is the No-Project alternative, defined as continuation of the existing (1980) Master Plan. Any of the four alternatives may ultimately be selected as the preferred alternative for San Jose Airport./59a/

The first paragraph, p. 113, is revised as follows (new text is underlined and deleted text is shown by brackets):

Phase II of the *CASP* [ ] comprised in-depth studies of issues related to air cargo, airport ground access and airspace utilization. These three Phase II [ ] *CASP* [ ] studies, and an Executive Summary, were published in August, 1991./61, 61a, b, c, d/

The second sentence in the second paragraph, p. 114, is revised, and a new sentence is added, as follows (new text is underlined and deleted text is shown by brackets):

Two Northern California facilities (Mather Air Force Base and Hamilton Air Force Base) and two Southern California facilities (Norton Air Force Base and George Air Force Base) [ ] were included in the [ ] first phase of this review./60/ A report on possible conversion of these four bases to civilian aviation was published by Hodges & Shutt, a consultant to the Caltrans Division of Aeronautics, in May 1991./60a/

In the first sentence of the last paragraph on p. 114, the phrase, "to be completed in 1991," is deleted.

The following notes are added on p. 123:

/59a/ Greene, Cary, Airport Planner, San Jose International Airport, telephone conversation, May 6, 1992.

/60a/ Hodges & Shutt, *Executive Summary: Study for Possible Conversion of Military Airbases to Civilian Aviation*, California Department of Transportation, May 14, 1991.

/61a/ Wilbur Smith Associates, Inc., in association with Landrum & Brown, Manalytics, and Communiquest, Inc, *Executive Summary: California Aviation System Plan Airspace Element, Air Cargo Study, Ground Access Study,* prepared for the California Department of Transportation, Division of Aeronautics, August 31, 1991.

/61b/ Landrum & Brown, in association with Communiquest, Inc, *Final Report: California Aviation System Plan Airspace Element,* prepared for the California Department of Transportation, Division of Aeronautics, August 31, 1991.

/61c/ Manalytics, in association with Communiquest, Inc, *Final Report: California Aviation System Plan Air Cargo Study,* prepared for the California Department of Transportation, Division of Aeronautics, August 31, 1991.

/61d/ Wilbur Smith Associates, Inc., *Final Report: California Aviation System Plan Ground Access Study,* prepared for the California Department of Transportation, Division of Aeronautics, August 31, 1991.

B. Transportation

On Figure 13, p. 128, the identifier for R1-N is revised to point to the inside roadway (the westbound portion of the terminal access loop road) rather than to R-18.

On Figure 16, p. 141, the reference on the bottom right corner of the map is revised to read:

> The existing and future number of parking spaces are shown in tables 16, 46 and 47.

C. Noise

In the last sentence on p. 155, "Table 18" is changed to "Table 17."

In the first sentence on p. 157, the phrase "about 140" is revised to read "143" and the phrase "about 118" is revised to read "118."

On p. 158, the last sentence of the second paragraph is revised as follows (new text is underlined):

> See Appendix C, Table C-2, p. A.46 for estimates of actual nighttime runway use.

On p. 160, second-to-last paragraph, the figure "12,670 people" is changed to "12,660 people."

On Figure 20, p. 161, the numeral "75" in the lower right is revised to lie on the innermost contour line.

On p. 163, the second bulleted item is revised as follows (new text is underlined and deletions are shown by brackets):

- At stations 8-11, located in Millbrae and Burlingame, the calculated CNEL values are 0.9 dBA higher on average than the measured values. The calculated values would be substantially lower than the measured values [ ] without a modification to the Integrated Noise Model to improve its representation of the "back blast" from takeoffs on Runways 1L and 1R by removing the excess ground attenuation in the model, which is inappropriate to this terrain. (Without the modification the calculated CNEL values would be 10-15 dB lower than the measured values.)

On p. 164, the third paragraph is revised as follows (new text is underlined and deletions are shown by brackets):

> Most of the calculated CNEL values for East Bay locations (except Site P in Moraga) are below 50 dBA (Table 54, [ ] which lists the values, is [ ] on p. 343). These locations are relatively far from SFIA (15-20 miles).

In the second-to-last sentence on p. 164, "84 dBA" is changed to "87 dBA."

In the first sentence on p. 165, the phrase "(sites H, I, K, and L)" is changed to "(sites F, H, I, K, and L)."

In the first full sentence on p. 168, "February 1988" is changed to "January 1988." In the second bulleted item following that sentence, "Stage 3" is changed to "Stage 2." The first bulleted item following that sentence is revised as follows (new text is underlined and deletions are shown by brackets):

- A gradual scheduled phaseout of Stage 2 aircraft, including requirements [ ] that at least 25 percent (of each operator's aircraft operations) after January 1, 1989 must be performed using Stage 3 aircraft; at least 50 percent after January 1, 1994; at least 75 percent after January 1, 1999, and 100 percent as of January 1, 2000.

H. Hazardous Materials

On p. 210, in the third-to-last sentence of the second paragraph, the reference to "Appendix X" is changed to "Appendix F."

On p. 211 at the end of the first paragraph (continued from p. 210), "Section III.E. Energy, p.---" is changed to "Section III.E. Energy, pp. 178-79."

On p. 217 at the end of the second paragraph, "Section III.J. Utilities, p.---" is changed to "Section III.J. Utilities, pp. 233-35."

IV. ENVIRONMENTAL IMPACTS

Introduction

The beginning of the third full sentence on p. 246 is revised to read, "For Millbrae, with one relatively small known development project. . ."

On Table 22, p. 248, a double asterisk (**) is added immediately after the title "CUMULATIVE DEVELOPMENT" in reference to the existing note identified by a double asterisk. Under note /l/ on p. 249, in the last sentence, the word "growths" is changed to "growth factors."

A. Land Use and Plans

On p. 250, the last two sentences of the first paragraph are revised to read as follows (new text is underlined and deletions are shown by brackets):

> [ ] No projects or land use changes are proposed by the SFIA Master Plan on sites within Airport environs cities. <u>Airport-related highway and transit projects under Caltrans and BART jurisdiction could occur within Airport environs cities, however.</u>

Figure 10, p. 251, is renamed "Figure 25A." The references in the Table of Contents and on p. 250, second sentence, are also changed to "Figure 25A."

On p. 258, in the first sentence of the last paragraph, "1991" is changed to "1992."

B. Transportation

On p. 287, the following sentences are added following the last sentence of the second paragraph (pertaining to SFIA Master Plan trip generation):

> (Note: in Figure 29, trip percentages for I-280 North, I-280 South and San Bruno Avenue do not total the percentage for I-380 due to rounding. In Figure 30, 6.5 percent of trips are shown for I-380 west of I-280, although I-380 does not extend west of 280. These trips are assumed to dissipate on the western portions of Sneath Lane and San Bruno Avenue.)

The last sentence, p. 292, is revised to read as follows:

The results of the existing traffic analysis, which are described in the setting section, have been summarized in Table 34 <u>for intersections shown</u> on Figure 31, p. 294.

D. <u>Air Quality</u>

On Table 55, p. 355, note /c/ is revised as follows (new text is underlined):

/c/ Includes forecast growth<u>, as shown in Table 22, p. 248 and explained on p. 246.</u>

On Table 56, p. 357, a note indicator "/b/" is added after the headings of the second and fourth columns ("1996 Forecast Growth"and "2006 Forecast Growth"). A note is added to the end of the table as follows:

/b/ Forecast growth is shown in Table 22, p. 248 and explained on p. 246.

I. <u>Employment and Residence Patterns</u>

In the second sentence of the second paragraph, p. 394, "11%" is changed to "11.6 percent" and "341,690 employees" is changed to "326,300 employees."

The total in Table 64 on p. 395 is changed to 38,000.

Table 65 on p. 396 is revised to include an additional note and to read as follows:

TABLE 65: NEW SFIA EMPLOYEES, PLACE OF RESIDENCE, 1990-1996

County	Number of New Employees	Percent /a/	Demand for New Housing Units/b/	Percent of County's 1990 Housing Stock
San Mateo	1,710	37.1%	1,220	0.48%
San Francisco	1,170	25.4%	960	0.29%
Alameda	550	11.9%	420	0.08%
Santa Clara	420	9.1%	280	0.05%
Contra Costa	170	3.7%	130	0.04%
Marin	160	3.5%	120	0.12%
Solano	110	2.4%	80	0.07%
Sonoma	100	2.2%	80	0.05%
Napa	10	0.2%	10	0.02%
Other	210	4.6%	160	N/A
TOTAL	4,610	100.0%	3,460	N/A

NOTE: Percent total does not add due to rounding.

/a/ Percentages are based on 1987 Martin Associates Survey of SFIA employees and projected growth rates for each of the employment sectors found at SFIA.

/b/ Based on the ratio of employed residents to households from ABAG's *Projections '90*, and a four-percent vacancy rate.

SOURCE: Environmental Science Associates, Inc.

In the first sentence under "2006" on p. 396, "42,300" is changed to "42,400," "11.1 percent" is changed to "12.1 percent" and "382,380" is changed to 349,900."

The total in Table 66, p. 397, is changed to 42,400. A note /a/ is added after the total and at the bottom of the table, as follows:

/a/ Employment sector subtotals do not add due to rounding.

Table 67 on p. 398 is revised to include an additional note and to read as follows:

TABLE 67: NEW SFIA EMPLOYEES PLACE OF RESIDENCE, 1990-2006

County	Number of New Employees	Percent /a/	Demand for New Housing Units/b/	Percent of County's 1990 Housing Stock
San Mateo	3,320	37.1%	2,450	0.96%
San Francisco	2,330	25.9%	1,940	0.59%
Alameda	1,060	11.8%	810	0.16%
Santa Clara	780	8.7%	530	0.10%
Contra Costa	330	3.7%	250	0.08%
Marin	300	3.3%	230	0.22%
Solano	210	2.3%	150	0.13%
Sonoma	200	2.2%	160	0.10%
Napa	30	0.1%	20	0.05%
Other	410	4.6%	310	N/A
TOTAL	8,970	100.0%	6,850	N/A

NOTE: Percent total does not add due to rounding.

/a/ Percentages are based on 1987 Martin Associates Survey of SFIA employees and projected growth rates for each of the employment sectors found at SFIA.

/b/ Based on the ratio of employed residents to households from ABAG's *Projections '90*, and a four-percent vacancy rate.

SOURCE: Environmental Science Associates, Inc.

M. Growth Inducement

In the second sentence of the second paragraph, p. 409, "11 percent" is changed to "11.6 percent" and "341,690 employees" is changed to "326,300 employees." In the following sentence, "11.1 percent" is changed to "12.1 percent" and "382,380 jobs" is changed to "349,900 jobs."

IX. ALTERNATIVES TO THE PROPOSED PROJECT

On Table 68, pp. 441-43, the word "Total"is replaced by "Near Term" in the rightmost column heading, so that the heading reads "Comparison of No-Project Alternative (Variant 1) With Near Term Master Plan."

On p. 447, the second paragraph is moved to follow the first sentence in the last paragraph on p. 440 and is revised (new text is underlined and deletions are shown by brackets). The last paragraph on p. 440, including the inserted, revised sentence, reads as follows:

> Growth in aviation activity (passenger counts, cargo tonnage and aircraft operations) would occur under the No-Project Alternative, Variant 1, but to a lesser extent than under the SFIA Master Plan "unconstrained" development scenario. [ ] The No-Project Alternative, Variant 1 would [ ] result in an increase in annual passengers of about 26 percent during the near-term compared to an increase of about 41 percent with the project, and would [ ] result in about a 33 percent increase in annual passengers during the long-term compared to about a 71 percent increase in annual passengers with the project. SFIA Master Plan "constrained" forecasts assume that some growth in annual passenger counts would be accommodated by industry-driven increases in the proportion of large aircraft in SFIA's aircraft fleet mix, and by more efficient utilization of aircraft seating (higher "load factors").

On Table 73, pp. 458-460, in the second and third column headings, "Variant 1" is changed to "Variant 2." The word "Total" is replaced by "Near Term" in the rightmost column heading, and "Variant 1" is changed to "Variant 2," so that the heading reads, "Comparison of No-Project Alternative (Variant 2) With Near Term Master Plan."

On p. 463, the sentence under the heading "Reasons for Rejection" is revised as follows (new text is underlined and deletions are shown by brackets):

> The sponsor has chosen the SFIA Master Plan for analysis as the preferred project instead of this alternative because [ ] the alternative would not accommodate the demand from forecast growth.

On p. 470, the column spacing is adjusted to match the appropriate headings.

On p. 475, the sentence under the heading "Reasons for Rejection" is revised as follows (new text is underlined and deletions are shown by brackets):

> The sponsor has rejected this alternative because it would not meet the sponsor's objective to accommodate at SFIA the demand from forecast growth [ ].

XI. APPENDICES

In Appendix C, Noise, "Description of Noise and its Effects on People," by Kenneth McK. Eldred, a portion of the Draft EIRs were distributed with a duplicate page headed "3. INTERFERENCE WITH HUMAN ACTIVITIES AND ANNOYANCE" and a duplicate Figure 7, and were missing Table 5 and Figure 8. The duplicate pages are deleted. Table 5, two paragraphs of text, and Figure 8, as included herein, are inserted following Figure 7.

In the list of tables under "APPENDIX G: TRANSPORTATION," p. A.161, Table G-4 is corrected to read "Cumulative Trip Generation."

On Tables G-5 and G-6, pp. A.166-67, the "A.M. Peak Hour" and "P.M. Peak Hour" headings are adjusted to indicate the correct columns, as shown on previous Table G-4, p. A.165 (each peak hour heading covers five columns: "Rate In," "Rate Out," "Trips In," "Trips Out" and "Total Trips").

TABLE 5

Steady A-weighted Sound Levels that Allow Communication with 95 Percent Sentence Intelligibility Over Various Distances Outdoors for Different Voice Levels

VOICE LEVEL	COMMUNICATION DISTANCE (Meters)					
	0.5	1	2	3	4	5
Normal Voice	72	66	60	56	54	52
Raised Voice	78	72	66	62	60	58

For indoors, the effects of masking normally-voiced speech are summarized in Figure 8, which assumes the existence of a reverberant field in the room. This reverberant field is the result of reflections from the walls and other boundaries of the room. These reflections enhance speech sounds so that the decrease of speech level with distance found outdoors occurs only for spaces close to the talker indoors. For typical living rooms, the level of the speech is more or less constant throughout the room at distances greater than 1.1 meters from the talker. The distance from the talker at which the level of speech decreases to a constant level in the reverberant part of the room is a function of the acoustic absorption in the room. The greater the absorption, the greater the distance over which the speech will decrease and the lower the level in the reverberant field for a given vocal effort. The absorption in a home will vary with the type and amount of furnishings, carpets, drapes and other absorbent materials, being generally least in bathrooms and kitchens and greatest in living rooms and bedrooms.

As shown in Figure 8, the maximum sound level that will permit relaxed conversation with 100 percent sentence intelligibility throughout the room is 45 dB. People have a considerable capability to vary their voice levels to overcome noise and achieve desired communication. This ability works well over a range of levels of steady noises, but is less useful if the interfering noises are intermittent. Figure 9 shows necessary voice levels limited by noise conditions. The communication distance is given on the ordinate, the sound level and the parameters are voice level. At levels above 50 dB, people raise their voice level as shown by the "expected" line if communications are not vital or by the "communicating" line if communications are vital. Below and to the left of the"normal voice line, communications are at an Articulation Index of 0.5, 98 percent sentence intelligibility. At a shout, communications are possible except above and to the right of the "impossible" area line.

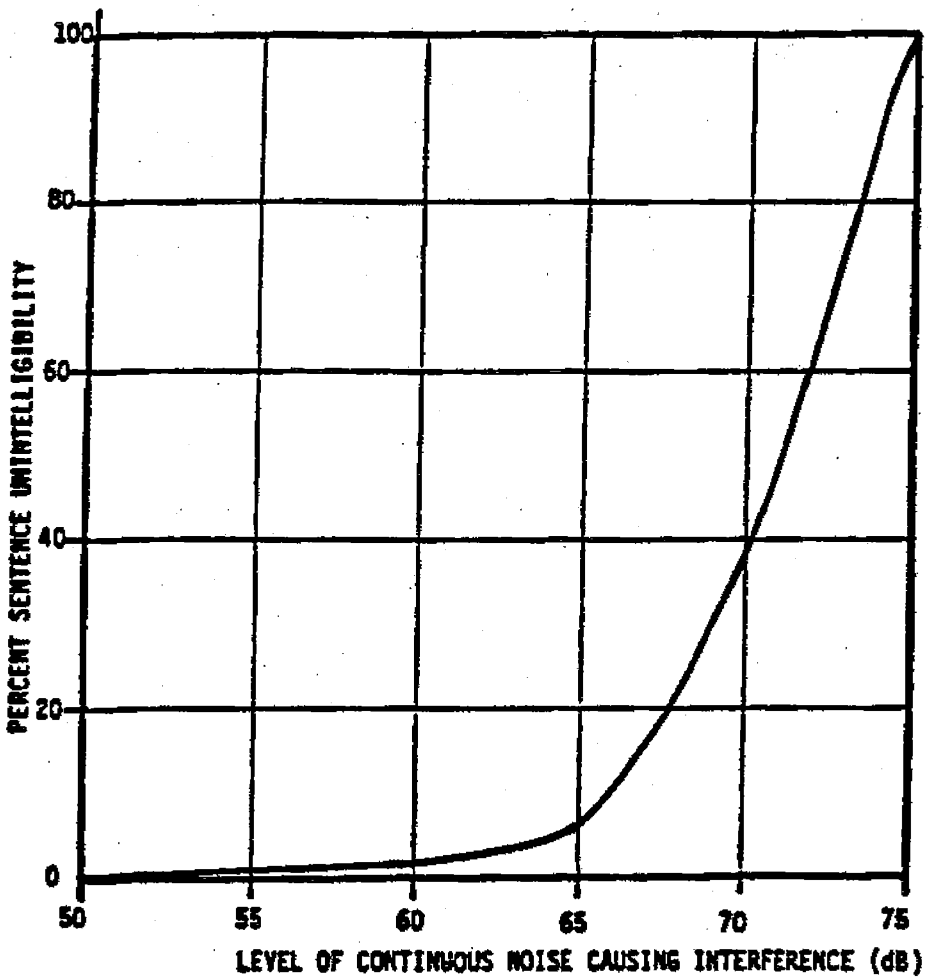


Figure 8: **Criteria for Indoor Speech Interference for Relaxed Conversation Distance in a Typical Living Room.**

E. LIST OF TOPICS AND COMMENTERS

Topic and Commenter	Page

Topic and Commenter | **Page**

C&R APPENDIX A: BACKGROUND INFORMATION ON THE SAN FRANCISCO INTERNATIONAL AIRPORT MASTER PLAN DRAFT EIR

This Appendix contains the following documents:

- Memorandum from Barbara Sahm, Environmental Review Officer for the San Francisco Department of City Planning, to the San Francisco City Planning Commissioners, October 4, 1991

- Discussion of Metropolitan Transportation Commission (MTC) *1990 Air Passenger Survey* (Attachment A, MTC *1990 Air Passenger Survey* is available for review in San Francisco Department of City Planning files)

- Attachment B, MTC Regional Airport System Plan, Selected Regional Forecasts (May 1991), and Draft Inventory and Alternatives Definition (Draft Report - May 1991)

- Attachment C, Work Program for the Airport Master Plan and Noise Program, San Jose International Airport (Memorandum from the Director of Aviation to the Mayor and City Council, City of San Jose, June 6, 1991)

- Attachment D, Background to Airport Operations

- Attachment E, Letters from Regional Agencies Commenting on the Draft EIR

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MEMORANDUM

October 4, 1991

To: City Planning Commissioners

From: Barbara W. Sahm, Environmental Review Officer

Re: Background Information on the San Francisco International Airport Master Plan Draft EIR

Attached is a package of materials in response to requests made by Commissioners at the August 29 public hearing on the SFIA Master Plan DEIR. The package includes a brief discussion and explanation of some of the information in the attached documents, with the documents identified as "Attachment X".

Attachment A is the 1990 Air Passenger Survey prepared by MTC, released for public use in August 1991. It covers passengers arriving at the three major Bay Area airports. As noted in the discussion, it was not used in the Draft EIR because it was not available until after the Draft was published. The Draft EIR explains the surveys used, as well as the assumptions and methodology that formed the project passenger and employee trip distribution on pages 287 - 292.

The discussion that precedes the attachments also summarizes the Airport's information on proportion of flights heading generally for international, domestic and Southern California destinations. The MTC 1990 Passenger Survey also provides some limited information on links between the passenger survey information (where people are coming from to get to the airport) with the flight destination information (where people who use the airport are going).

Attachment B includes portions of the work, now in progress, on the Regional Airport System Plan. It is being prepared under contract by TRA Airport Consulting for MTC. The Plan Update, originally expected in 1991, is now expected to be complete sometime in late 1992. So far, the material that is available to the public includes information on preliminary forecasts of growth at the various regional airports, an inventory of present facilities and their capacities, and a draft discussion of alternative regional planning scenarios. The preliminary aviation demand forecasts were not used in the Draft EIR on the SFIA Master Plan because they were not finalized at the time the Draft EIR was published, and are not yet finalized for use. The Draft EIR does include summaries of activity levels for the San Francisco Airport as forecast by the Caltrans Division of Aeronautics (CASP) and the Federal Aviation Administration (FAA), in addition to growth estimated by SFIA consultants preparing the draft Master Plan, on pages 61 - 72. Attachment B includes the draft forecasts of growth at Oakland and San Jose Airports.

Attachment C is additional information on the status of San Jose Airport expansion plans.

Attachment D is a brief explanation of airport operations and the regulatory framework for airport operations, prepared at my request by ESA. While this information was not specifically requested, it seemed useful in the context of the SFIA Master Plan EIR. It is information generally known and obvious to those who run airports, but is a useful summary for those of us who simply use airports. It includes information on the extent that the local operator can control airport activities and a brief discussion of airport economics. An appendix summarizing Federal regulatory history is also provided.

Attachment E includes copies of letters of comment on the Draft EIR by regional agencies--MTC, ABAG and Caltrans Division of Aeronautics. These agencies, and many nearby cities and counties have been very cooperative in submitting their letters of comment as close to the original end of comment period of September 10.

I hope this information will be useful to the Commission in completing its comments on the Draft EIR on the SFIA Master Plan. The EIR files include other documents, such as relevant portions of General Plans from cities surrounding the Airport, that can be made available to the Commission upon request. If you have any questions about the attached materials in the package or about material referenced in the DEIR, please call me. My number is 558-6378.

INTRODUCTION

The *SFIA Master Plan Draft EIR* traffic analysis made use of several surveys that have been conducted in the past decade. The Metropolitan Transportation Commission (MTC) conducts a comprehensive survey of air passengers at the three Bay Area airports every five years./1/ The City and County of San Francisco Airports Commission conducts an annual survey at SFIA each May. The most recent survey of San Francisco International Airport (SFIA or SFO) employees is the San Mateo County Transit (SamTrans) *SFO Airport Employee/Employer Survey, September 1983*.

MTC's *1990 Air Passenger Survey* results were released in August 1991, and were not available for use in the *SFIA Master Plan Draft EIR*.

In the *SFIA Master Plan Draft EIR*, the trip distribution analysis for project-related traffic was based on survey data. Project trip distribution assumptions, methodology, and estimates are outlined on pages 287-292 of the Draft EIR. The 1983 SamTrans survey was used for the distribution of SFIA employees. The 1989 San Francisco Airports Commission survey was used for the air passenger distribution. (This methodology implies that the distribution of passenger origins will not change significantly in the future.) Use of these surveys provided the most conservative estimate of project-generated traffic, as the surveys showed the highest percentage of automobile use. The analysis for the Draft EIR included a comparison of both of the surveys to other MTC and San Francisco Airports Commission surveys, in addition to the MTC 700-zone Bay Area multi-purpose trip model. The trip distribution data that were used were found to be consistent with the MTC model.

Further survey data were collected by DKS Associates in the summer of 1990, to obtain vehicle classification information. The survey covered automobiles (single-occupant and carpools), shuttles, buses, taxis and limousines. The vehicle occupancy data were used to convert air passenger trips to vehicle trips; traffic analysis is based typically on vehicle trips.

The entire MTC *1990 Air Passenger Survey* is presented in Attachment A. A summary of the survey results is presented on pages 17 through 22 of the survey.

COMPARISON OF MTC 1990 AIR PASSENGER SURVEY WITH SFIA MASTER PLAN DRAFT EIR

Comparisons of the recently released MTC *1990 Air Passenger Survey* (August 1991) with the surveys used in the *SFIA Master Plan Draft EIR* traffic analysis and DKS estimates of resulting person trips are shown in Tables 1, 2 and 3 on the following three pages. The MTC 1985 and 1990 surveys are internally similar with respect to the origins of air passengers in the Bay Area. The 1989 San Francisco Airports Commission survey, however, shows more people arriving from Alameda, Contra Costa, Marin, Napa, San Francisco and Sonoma counties, and fewer people arriving from San Mateo, Santa Clara and Solano Counties, than the MTC survey does. The largest differentials (MTC results first, Airports Commission second) are for air passengers coming from Santa Clara (21 percent versus 8 percent) and Marin (4 percent versus 13 percent).

The MTC surveys are also internally similar with respect to mode choices, with a decrease in taxi use and an increase in airport shuttle use between 1985 and 1990. The 1989 San Francisco Airports Commission survey, however, shows a higher percentage in the use of both private automobiles and public transit, and a lower percentage in the use of rental cars and airport shuttles, than the MTC surveys.

If the trip distribution patterns for the proposed SFIA Master Plan were recalculated using the MTC *1990 Air Passenger Survey*, which shows a relatively higher percentage of trips coming from San Mateo and Santa Clara Counties, increased impacts could be experienced on U.S. Highway 101 and U.S. Interstate 280 (I-280), particularly south of SFIA. The number of trips affected are shown in Tables 1 and 2, for the a.m. and p.m. peak hours, respectively.

The number of project-generated trips to and from Santa Clara County would be 21.5 percent of the total project-generated trips if the MTC *1990 Air Passenger Survey* data were used, as compared to the 8 percent figure used in the *SFIA Master Plan Draft EIR* (San Mateo County trips would be 14.5 percent of the total, as compared to the Draft EIR's 12.0 percent). The difference of 400 or 500 vehicles during each peak

TABLE 1: ORIGINS OF AIR PASSENGERS - AM PEAK HOUR

County	1985 MTC Survey Percent Passengers	1985 MTC Survey 1996 Person Trips/a/	1985 MTC Survey 2006 Person Trips/a/	1990 MTC Survey Percent Passengers	1990 MTC Survey 1996 Person Trips/a/	1990 MTC Survey 2006 Person Trips/a/	1989 SFIA Survey Percent Passengers	1989 SFIA Survey 1996 Person Trips/a/	1989 SFIA Survey 2006 Person Trips/a/
Alameda	13.6%	222	384	15.4%	251	435	19.0%	310	537
Contra Costa	6.7%	109	189	7.2%	118	204	11.0%	180	311
Marin	5.2%	85	147	4.6%	75	130	13.0%	212	368
Napa	0.7%	11	20	1.4%	23	40	2.0%	33	57
San Francisco	30.4%	496	859	28.0%	457	792	31.0%	506	876
San Mateo	14.0%	228	396	14.5%	237	410	12.0%	196	339
Santa Clara	18.0%	294	509	21.5%	351	608	8.0%	131	226
Solano	1.3%	21	37	2.1%	34	59	0.5%	8	14
Sonoma	2.5%	41	71	2.7%	44	76	4.0%	65	113
Out of Region	7.6%	124	215	2.4%	39	68	n/a	0	0

NOTES:

Airport employees were not surveyed by either MTC or SFIA.
Totals may not add to 100% due to rounding.

/a/ DKS calculation of distribution of SFIA Master Plan-generated trips, based on air passenger survey figures.

SOURCE: DKS Associates, 1991

TABLE 2: ORIGINS OF AIR PASSENGERS - PM PEAK HOUR

	1985 MTC Survey			1990 MTC Survey			1989 SFIA Survey		
County	Percent Passengers	1996 Person Trips/a/	2006 Person Trips/a/	Percent Passengers	1996 Person Trips/a/	2006 Person Trips/a/	Percent Passengers	1996 Person Trips/a/	2006 Person Trips/a/
Alameda	13.6%	241	418	15.4%	273	473	19.0%	337	584
Contra Costa	6.7%	119	206	7.2%	128	221	11.0%	195	338
Marin	5.2%	92	160	4.6%	82	141	13.0%	230	399
Napa	0.7%	12	22	1.4%	25	43	2.0%	35	61
San Francisco	30.4%	539	934	28.0%	496	860	31.0%	549	953
San Mateo	14.0%	248	430	14.5%	257	446	12.0%	213	369
Santa Clara	18.0%	319	553	21.5%	381	661	8.0%	142	246
Solano	1.3%	23	40	2.1%	37	65	0.5%	9	15
Sonoma	2.5%	44	77	2.7%	48	83	4.0%	71	123
Out of Region	7.6%	135	234	2.4%	43	74	n/a	0	0

NOTES:

Airport employees were not surveyed by either MTC or SFIA.
Totals may not add to 100% due to rounding.

/a/ DKS calculation of disribution of SFIA Master Plan-related trips, based on air passenger survey figures.

SOURCE: DKS Associates, 1991

TABLE 3: COMPARISON OF AIR PASSENGER SURVEYS: GROUND TRANSPORTATION MODES

	1985 MTC Survey	1990 MTC Survey	1989 SFIA Survey
Private Car	47.1%	46.0%	49.4%
Rental Car	19.5%	19.6%	13.6%
Hotel Shuttle	5.8%	4.0%	9.9%
Public Transit	0.9%	1.2%	6.2%
Taxi	10.8%	6.1%	8.6%
Luxury Limo	2.3%	2.6%	2.5%
Airporter/Other	13.6%	20.5%	9.9%
TOTAL	100.0%	100.0%	100.0%

NOTE: Airport employees were not surveyed by either MTC or SFIA. Totals may not add to 100 percent because of rounding.

SOURCE: DKS Associates, 1991

hour, if spread evenly over the 16 total lanes of U.S. 101 and I-280 between Santa Clara County and the Airport, would add about 1 car to each lane every 2.0 to 2.5 minutes, a statistically insignificant addition. These trips had been assigned to other parts of the Bay Area for the *SFIA Master Plan Draft EIR* traffic analysis; recalculation of the trip distribution using the MTC *1990 Air Passenger Survey* data would therefore result in a correspondingly slight reduction in impacts to those other areas.

Overall, the calculated intersection levels of service would not be expected to differ, and the freeway segments and ramps north of SFIA would probably not experience better levels of service as a result of the use of MTC *1990 Air Passenger Survey* data. As noted above, the freeway mainline segments on U.S. 101 and I-280 south of SFIA would have slightly more traffic, and as a result, the volume-to-capacity ratios would most likely increase, but not in a statistically significant way, relative to estimates in the *SFIA Master Plan Draft EIR* traffic analysis. This would not change the overall conclusions of the latter study; therefore, the mitigation measures identified would still be applicable and no new mitigation measures would be necessary.

PASSENGER DESTINATIONS

According to SFIA staff, 86.7 percent of total passengers using SFIA in 1990 had domestic destinations, and 13.3 percent had international destinations. Of the total passengers, 21.3 percent had Southern California destinations (Los Angeles, San Diego, Santa Barbara, and Palm Springs)./2/

The MTC *1990 Passenger Survey* provides limited information on the link between passenger origins and destinations. Table 2.10 on page 34 of the survey shows that about 70 percent of SFIA passengers had "domestic and international" destinations, and about 30 percent had California destinations. Of the SFIA passengers with domestic and international destinations, about 34 percent were from San Francisco, 19 percent from San Mateo County, 13 percent from Santa Clara County, and 12 percent from Alameda County (the remaining 22 percent were from other Bay Area counties and outside the region). Of the SFIA passengers with California destinations, about 47 percent were from San Francisco, 20 percent from San Mateo County, 9 percent from Santa Clara County, and 7 percent from Alameda County./1/

About 56 percent of Metropolitan Oakland International Airport passengers had California destinations, and about 44 percent had domestic and international destinations. Of the passengers with California destinations, about 42 percent were from Alameda County. Of the passengers with domestic and international destinations, about 53 percent were from Alameda County./1/

About 54 percent of San Jose International Airport passengers had domestic and international destinations, and about 46 percent had California destinations. About 82 to 83 percent of passengers (regardless of destination) were from Santa Clara County./1/

Table 9.1 on page 85 of the survey shows that about 36 percent of total Bay Area passengers had California destinations; about 59 percent had domestic destinations; and about 5 percent had international destinations. The percentages were roughly the same for each Bay Area county./1/

NOTES - MTC 1990 Survey

/1/ Metropolitan Transportation Commission, *1990 Air Passenger Survey*, August 1991.

/2/ John Costas, Assistant Administrator, San Francisco International Airport, telephone conversation, October 2, 1991.

COMPONENTS AND STATUS OF THE RASP

The Regional Airport Planning Committee (RAPC) advises the Association of Bay Area Governments (ABAG) and the Metropolitan Transportation Commission (MTC) on aviation matters and is preparing the *MTC Regional Airport System Plan* (RASP) Update with MTC staff and Seattle-based TRA Airport Consulting. (The recently published *1990 Air Passenger Survey*, summarized above, was also prepared under RAPC auspices.)/1/ The updated RASP is expected to be completed in 1992./2,3/ The RASP and 1980 *Regional Airport Plan* are discussed on pages 108 through 110 of the Draft EIR.

The RAPC has 13 members representing ABAG, the Bay Area Council, the Bay Conservation and Development Commission (BCDC), Buchanan Field (Concord), Caltrans Division of Aeronautics, the Federal Aviation Administration (FAA), MTC, the Port of Oakland (Metropolitan Oakland International Airport), San Francisco International Airport, San Jose International Airport, and selected Bay Area cities and counties./1/ The RAPC has been meeting quarterly during the RASP Update preparation process; the most recent meeting was September 6, 1991.

The previous Metropolitan Transportation Commission *Regional Airport Plan* was completed in 1980. The update currently in progress is intended to include an inventory, forecasts of aviation demand, a definition of alternatives, an evaluation of alternatives, an EIR, and revisions to the system plan./4/

Elements of the RASP that have been completed to date include drafts of Chapter IV, "Inventory and Capability Assessment," and Chapter VII, "Airport System Alternatives Definition." The Aviation Demand Forecasts element has not been completed because the forecasts are being refined; air carrier and general aviation forecasts are expected to be completed in December 1991. (Selected preliminary forecasts are illustrated in Attachment B, along with the inventory and alternatives draft chapters of the RASP Update.) As of September 1991, the Evaluation of Alternatives element was in progress.

SUMMARY OF RASP INVENTORY AND CAPABILITY ASSESSMENT

The RASP Draft Inventory and Capability Assessment documents the existing physical, operational, environmental, and policy conditions for each airport in the system, and for the system as a whole. In addition, the chapter presents information on the constraints and capabilities of the airports and the airport system. These constraints and capabilities directly affect the system's ability to meet current and future aviation demand in the region./4/

Inventory

The inventory includes all public use and military airports in the region (see MTC Exhibit 4.1 on page 4, Chapter IV in Attachment B). Private airfields are included in less detail because less information is available about private-use facilities. The inventory also contains information about public-use airports that have been closed completely, and military airfields that are inactive (closed to military operations but still able to be used), such as Hamilton Field. Although currently closed, these facilities are important aviation resources that should be considered in planning for the regional aviation system./4/

The regional airport system includes some 25 public-use civil airports, four military airports, and 20 private-use facilities (three of which are closed). The commercial service airports in the region include San Francisco International, Metropolitan Oakland International, San Jose International, Buchanan Field (Concord), and Sonoma County Airport./4/

Many changes have occurred since the last MTC Regional Airport Plan revision in 1980. The number of facilities has increased. Some have shifted in type of ownership and category of use. Since 1980, two additional commercial service airports have commenced scheduled passenger service: Sonoma County and Buchanan Field./4/

MTC Exhibit 4.23 (pages 51 through 54, Chapter IV in Attachment B) summarizes the inventory of Bay Area public-use airports.

Capability Assessment

The RASP capability assessment includes a comparison of airports' existing capacity with their existing levels of demand, and an analysis of potential constraints on future activity at each airport.

Capacity and Demand

The comparison of runway capacity with demand found that "The commercial service airports are constrained considerably in the peak hour. Demand for runway access exceeds capacity in IFR [poor weather] conditions."/4/ (MTC Exhibit 4.23 in Attachment B shows the percentage of annual runway capacity currently used at each airport.) The comparison of "landside" (including passenger terminal) capacity with demand found that:

- San Jose International Airport "...has a terminal capacity shortfall";
- SFIA "...has insufficient domestic and international terminal capacity"; and
- Oakland International Airport "...has an adequate terminal capacity availability."/4/

Constraints

The analysis of constraints notes that "There are additional factors beyond the airports' physical capacity...which place limitations on how much activity can and will take place at each airport." The constraints are categorized as airspace-, environmental-, physical-, and policy-related./4/

Airspace constraints "...relate to regional airspace issues." The airspace used by the Bay Area airports overlaps, and procedures are in place where flights from one airport "interact" with (operate in the same airspace as) flights from another airport. Because SFIA has the largest share of the region's air traffic, SFIA has been established at the top of the "user's hierarchy." This designation means that the operations of other airports in the region (in the airspace) must conform with the operations at SFIA./4/

Environmental constraints are those related to the natural environment, such as wildlife, wetlands, and San Francisco Bay.

> "Two of the major commercial airports, Oakland and San Francisco, are situated on the Bay, and host a variety of wildlife. Development at Oakland is also affected by the presence of non-Bay wetland areas. Wetlands exist to a lesser degree at other airports as well. Construction of new runways which affect wetlands or require Bay fill will not meet with general favor. Public opposition to capacity increasing measures may be strong and well organized."/4/

Physical constraints include such things as "limited airport size or the presence of physical barriers to growth." The constraints analysis notes that SFIA "is constrained by the absence of sufficient land area for a new runway and passenger terminal development," but has undeveloped parcels that could accommodate support facilities. Metropolitan Oakland International Airport "has considerable land area" for development, but also has "significant areas of environmentally sensitive property." Future development at San Jose International Airport is "highly constrained," given the airport's location and small site./4/

Policy constraints "...include noise, safety, and other community compatibility issues." The constraints analysis notes that noise regulations are in place at SFIA, Metropolitan Oakland International Airport, and San Jose International Airport. San Jose International Airport has a curfew on all operations from 11:30 p.m. to 6:30 a.m.:

> "This limits the total daily activity which can occur at the airport, and also creates some congestion during the morning hours. If continued into the future, the curfew will constrain activity at the airport and cause increased congestion within the available operating time envelope."/4/

The RASP Inventory and Capability Assessment includes further discussion of the constraints on future development at the airports in the region (see pages 37 through 44, Chapter IV in Attachment B).

DEFINITION OF AIRPORT SYSTEM ALTERNATIVES

As noted above, one of the elements of the RASP that has been completed is the Airport System Alternatives Definition, included in Attachment B to this packet.

The RASP Air Carrier System Alternatives include:

- No New Action
- Airport System Management (ASM)
- Airport Master Plans
- Airport System Optimization
- New Technology/4/

Implications of each of the System Alternatives are also identified in the RASP Airport System Alternatives Definition. "Implications" are defined as areas that could be affected by the implementation of an alternative. The following implications will be addressed in the RASP evaluation of alternatives:

- Runway/airspace congestion and delay
- Airport ground access constraints
- Environmental impacts
- Air Fares (supply vs demand) / Airline Competition
- Safety
- Timing of improvements and other actions
- Airport / airline cooperation
- Joint use agreements with the military
- Public transportation improvements to airports
- Funding
- Impacts on general aviation
- Operating agencies
- Potential markets / practical application
- Noise / land use compatibility / encroachment protection
- Passenger convenience/4/

The evaluation of the Regional Airport System Alternatives, and selection of a preferred plan, will take into consideration such factors as the relationship between capacities, demand forecasts, and efficiency (delays); the distribution of demand and supply; environmental effects (bay or wetland fill, noise, air quality); economic benefits; construction costs; ground access and public transportation; safety and emergency response; and the ability of MTC to implement./4/ As noted above, criteria for evaluating the System Alternatives are still being refined./2,3/

RASP LIMITATIONS

When complete, the *MTC Regional Airport System Plan* (RASP) Update will provide a body of information on the existing regional system and its operations, expected future requirements, and recommendations for accommodating those future requirements. This information can be used by decisionmakers within the region, including the airports themselves, in guiding capital improvement programs and related policy decisions./3/

No regional authority currently exists to enforce the RASP. MTC's authority to implement elements of the RASP is generally indirect, in that MTC has responsibility for environmental review and funding approval on regional ground transportation projects. MTC can thus potentially influence airport planning through its role in major ground transportation projects affecting specific airports. MTC and the RASP can also potentially influence other agencies that affect regional airport systems (e.g., FAA, airlines, airports, U.S. military). Implementation of a majority of RASP elements, however, depends on voluntary actions by the airports and airlines.

Other large metropolitan regions, such as Los Angeles and New York, conduct planning for multiple airport development within the auspices of a municipal or regional agency or authority which has decision-making power over several airports within the region. Attachment D of this packet contains a discussion of the ability of airport operators to influence airline service and air travel demand.

The level of detail in the final RASP, moreover, will likely be at a programmatic level, rather than a project-specific level. Cooperation by the airports with the RASP would therefore not eliminate the need for development of individual airport Master Plans.

NOTES - MTC Regional Airport System Plan Update

/1/ Metropolitan Transportation Commission, *1990 Air Passenger Survey*, August 1991.

/2/ Marc Roddin, Metropolitan Transportation Commission Staff Liaison, telephone conversation, September 16, 1991.

/3/ Steve Kiehl, TRA Airport Consulting, telephone conversation, September 16, 1991.

/4/ TRA Airport Consulting, *MTC Regional Airport System Plan, Draft Inventory and Alternatives Definition*, May 1991.

SUMMARY AND STATUS OF METROPOLITAN OAKLAND INTERNATIONAL AIRPORT (MOIA) MASTER PLAN

The Port of Oakland is proceeding with plans to match existing landside capacity with existing airside capacity as part of its Terminal Expansion Program. Minor airside improvements, such as a taxiway bypass, are also being explored as part of that plan. The MOIA Master Plan is currently being re-evaluated by the Port of Oakland. While the MOIA Master Plan calls for expansion of airside capacity, some of the components of the Plan may be delayed until more studies on the Airport's capacity are completed. Constraints facing the Port are discussed briefly above, in the summary of the Inventory and Capabilities section of the *Draft MTC Regional Airport Plan Inventory and Definition of Alternatives* (TRA Airport Consulting, May 1991). According to that document:

> "Oakland's plans involve meeting growth in air carrier operations by improving airside capacity and acting on many landside improvements. The air cargo market is important to them as is the general aviation market. Plans include:
>
> - Construct new air carrier runway with parallel taxiway
> - Expand terminal to 42 gates
> - Construct parking garage
> - Terminal roadway improvements
> - Develop additional 100 acres for air cargo
> - Develop expanded GA apron and tie-downs
> - Construct new ARFF facility
> - Construct new international arrivals facility
> - Construct BART connection."/1/

SUMMARY AND STATUS OF SAN JOSE INTERNATIONAL AIRPORT MASTER PLAN

Constraints on expansion of San Jose International Airport are discussed briefly above, in the summary of the Inventory and Capabilities section of the *Draft MTC Regional Airport Plan Inventory and Definition of Alternatives* (TRA Airport Consulting, May 1991). According to that document:

> "Future plans at San Jose International include work on both the air side and land side of the airport. Their master plan should be completed by mid-1991.

Airfield

- Extend runway 12L-30R to 8,900 feet (included in previously adopted master plan)
- Reworking of the taxiways
- Pavement management rehabilitation work on the airfield.

Terminal

- Reconstruction of passenger terminal C and construction of new passenger terminal B
- Construction of a new air traffic control tower.

Parking

- Construct new parking garages.

General Aviation

- Relocation of all GA to west side of airport
- Reduce total number of GA based aircraft.

Air Freight

- New air cargo facilities.

Other

- Installation of a fuel farm.

Roadway

- Terminal area roadway improvements."/1/

The master plan process for San Jose International Airport has been extended by at least two years, in order to respond to the direction of the San Jose City Council. (The process would now be complete or nearly complete under the original schedule.)/2/

Through the master plan process, begun in 1988, San Jose International Airport and its consultants developed a range of development alternatives and selected a preferred plan. In January 1991, the Airport took the plan to the San Jose City Council. After a series of contentious public meetings, the City Council (in May 1991) decided not to endorse any of the master plan alternatives. The Council directed the Airport to address a specific list of additional issues and develop three or four master plan alternatives incorporating those issues./2/

The San Jose City Council has directed the Airport to begin work on the master plan EIR, which is to address all of the master plan alternatives in equal detail. A preferred plan will then be selected, incorporating the results of the environmental review. It is expected that this process will take about two years to complete./2/

A memorandum from the San Jose Director of Aviation to the City Council outlining the current master plan work program is included in Attachment C.

DEVELOPMENT PLANS FOR HAMILTON AIR FORCE BASE

The *Draft MTC Regional Airport Plan Inventory and Definition of Alternatives* contains the following background information on Hamilton Air Force Base:

> "Hamilton Field, formerly Hamilton Air Force Base, is owned and operated by the United States Army, but currently accommodates some activity by the U.S. Coast Guard Strike Team. This unit is on call for emergencies and uses the airfield as required. They do not base any aircraft here. The U.S. military currently uses housing at the field for personnel from all branches and from the U.S. Coast Guard. A single, 8,000 foot runway is located on the site, with no air traffic control tower. Roadway access to the base is facilitated by nearby State [sic] Highway 101 and local bus service to the main gate by the Golden Gate Transit Company.
>
> "Many groups have interest in the future of Hamilton Field as it is also in a well developed area of the region, located in Marin County. Hamilton Field has property which includes many wetland areas, and as redevelopment of the land is considered, their preservation may be a prominent concern. The land is valuable and there is possible pressure to sell the land for other development. If there is a rise in the number of flights, there is a potential for neighborhood objection to noise levels."/1/

According to Mr. Charles Gallagher, head of the Hamilton Re-Use Committee, Hamilton Field could function as a regional airport for the North Bay without becoming an air carrier airport. The Hamilton Re-Use Committee will present a plan based on this concept to the public in the Fall of 1991./3/ Certification by the FAA of Hamilton Field as a Part 139 airport would allow only smaller commuter aircraft (up to 30 seats) to operate out of Hamilton. These commuter craft could potentially serve as feeders for the American Airlines hub at San Jose International Airport. Other potential reliever airports include Travis Air Force Base in Napa County (joint military-civilian use is proposed) and Moffett Field in Santa Clara County./3/

On September 12, a development team submitted plans to the City of Novato to build 1.400 homes and as much as 1.2 million square feet of commercial space at Hamilton Field. The project would be developed on about 350 acres at the base./4/

NOTES - Development Plans of Selected Bay Area Airports

/1/ TRA Airport Consulting, *MTC Regional Airport System Plan, Draft Inventory and Alternatives Definition*, May 1991.

/2/ Cary Greene, Airport Planner, San Jose International Airport, telephone conversation, September 25, 1991.

/3/ Charles Gallagher, Hamilton Re-Use Committee, telephone conversation, September 19. 1991.

/4/ "Developer's Big Plans For Novato," article in *San Francisco Chronicle*, September 11, 1991.

ATTACHMENT B

MTC REGIONAL AIRPORT SYSTEM PLAN

SELECTED REGIONAL FORECASTS

TRA Airport Consulting

May 1991

DRAFT INVENTORY AND ALTERNATIVES DEFINITION

(Includes: Chapter IV, "Inventory and Capability Assessment"

Chapter VII, "Airport System Alternatives Definition")

TRA Airport Consulting

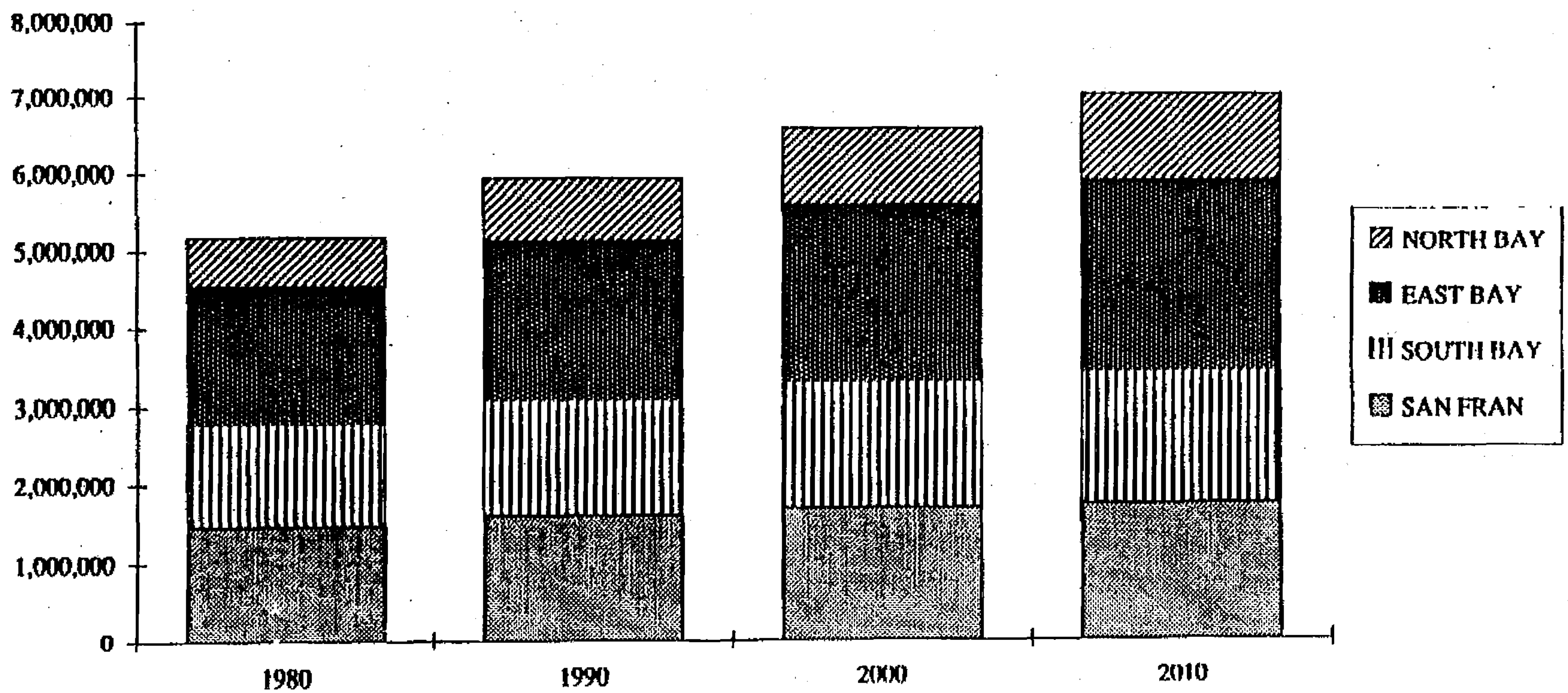
Draft Report - May 1991

MTC

Regional Airport System Plan Update

1428R.A.27

REGIONAL POPULATION FORECASTS



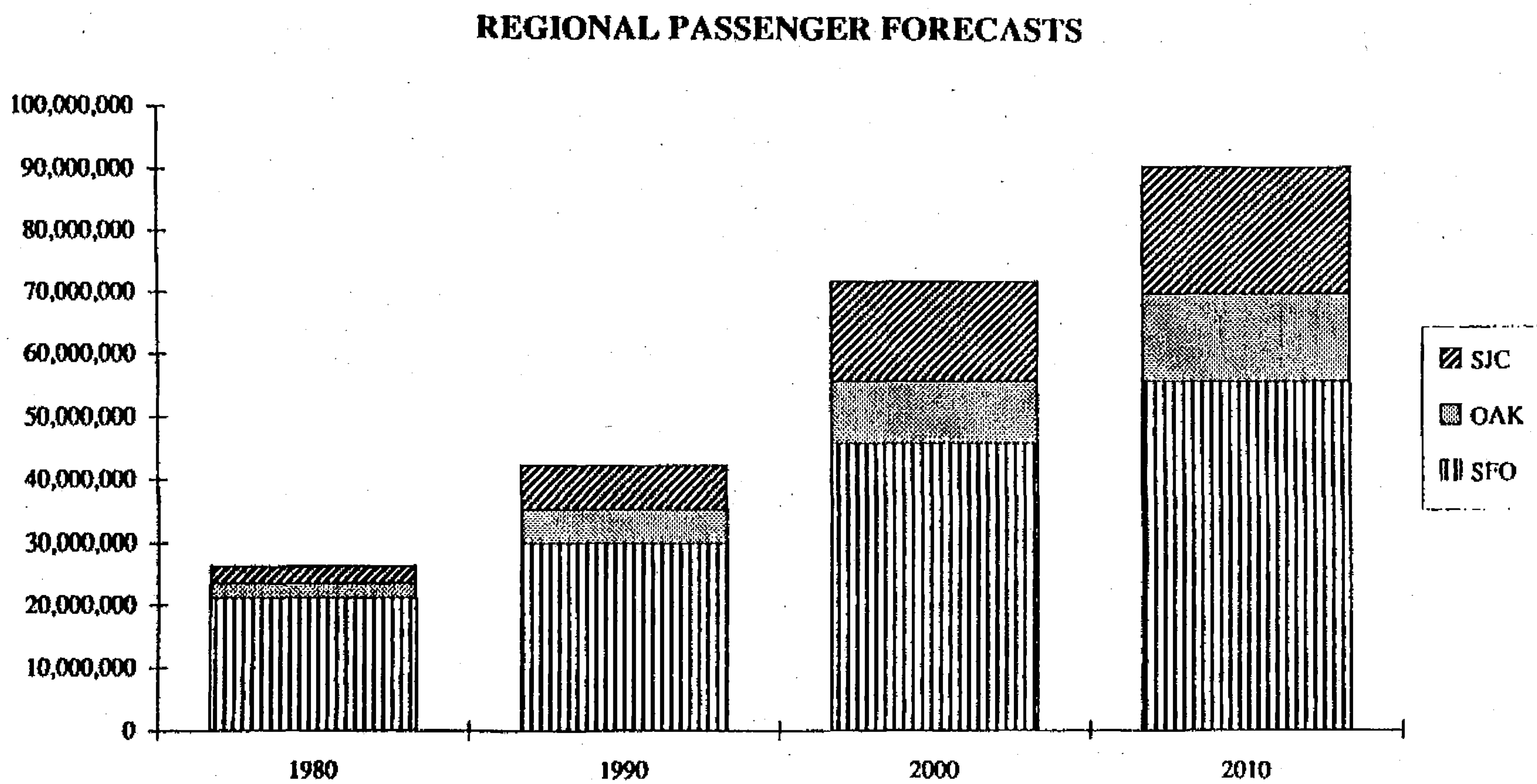
NOTES: Forecasts are from Association of Bay Area Governments, Projections 1990.

SOURCE: TRA Airport Consulting, Draft MTC Regional Airport System Plan, May 1991.

NORTH BAY	Napa, Solano and Sonoma Counties
EAST BAY	Alameda and Contra Costa Counties
SOUTH BAY	Santa Clara County
SAN FRANCISCO	Includes Marin County

MTC

Regional Airport System Plan Update



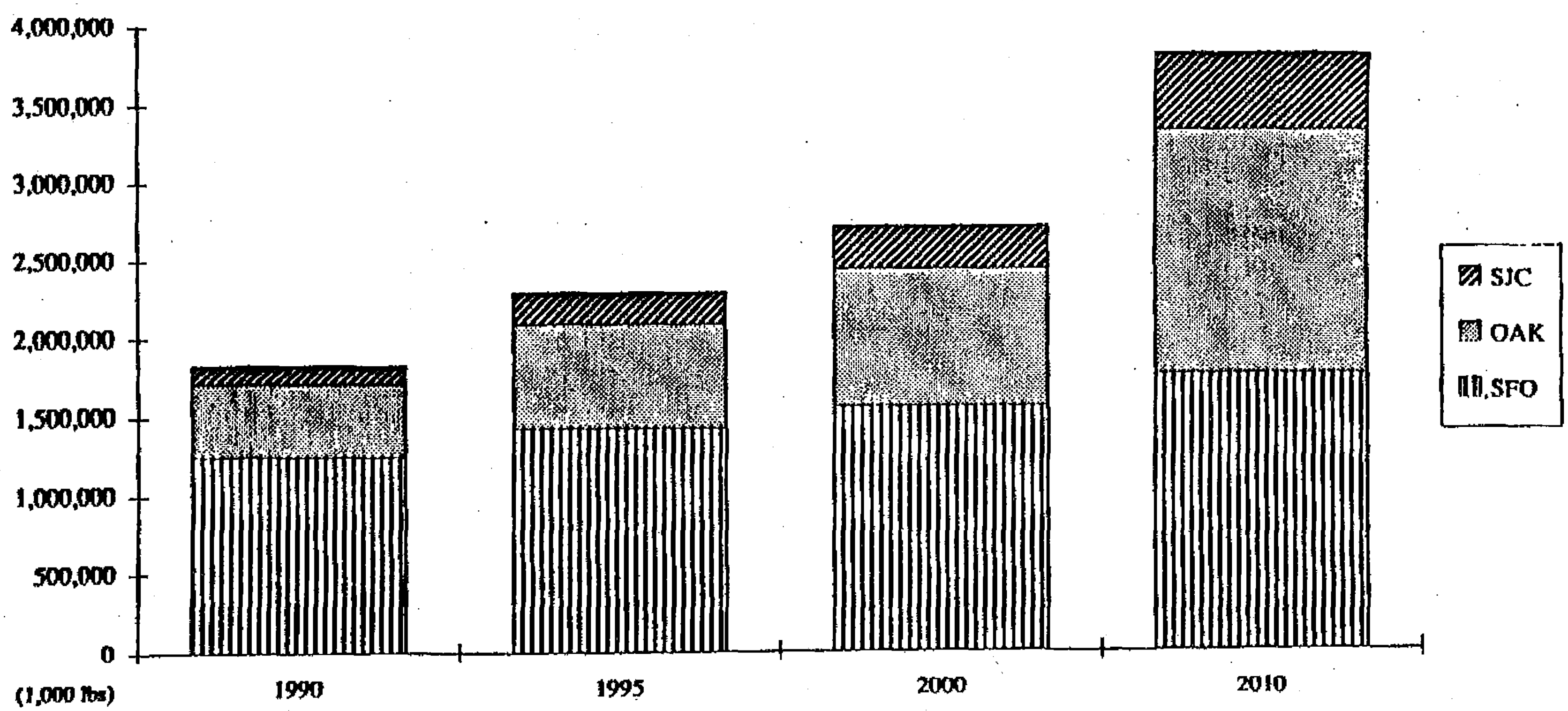
SOURCE: TRA Airport Consulting, Draft MTC Regional Airport System Plan, May 1991.

Cal#.4.2628

MTC

Regional Airport System Plan Update

REGIONAL AIR CARGO FORECASTS



SOURCE: TRA Airport Consulting, Draft MTC Regional Airport System Plan, May 1991.

1428/R.A.29

MTC

Regional Airport System Plan

DRAFT

Inventory and Alternatives Definition

Prepared by
TRA Airport Consulting

May 1991

CHAPTER IV

INVENTORY and CAPABILITY ASSESSMENT

INTRODUCTION

This chapter documents the existing physical, operational, environmental, and policy conditions for each airport in the system, and for the system as a whole. In addition, the chapter presents information on the constraints and capabilities of the airports, and the airport system. These constraints and capabilities directly affect the system's ability to meet current and future aviation demand in the region.

Physical conditions data includes such items as airport ownership, location, and size; number and length of runways; airport classification; number and type of based aircraft; amount of passenger terminal facilities; and presence of an air traffic control tower. Operational conditions data includes items such as total annual and peak hour operations; air carrier, commuter, and general aviation operations; annual passenger enplanements; and annual air cargo volume. Environmental conditions include information about the natural and human environment near each airport, noise sensitive land uses, wildlife habitat, and wetlands. Policy conditions information includes current airport master plan, capital improvement program, and other policy opportunities and constraints which affect the development and operation of individual airports and the airport system as a whole.

Finally, the chapter presents information about the technical constraints and capabilities which affect the airport system. These include landside (vehicle access and parking, terminal, and related facilities) and airside (aircraft parking, taxiways, and runways) capacity and regional airspace.

The inventory includes all public use and military airports in the region. Private airfields are included in less detail because less information is available about private use facilities. This inventory also contains information about public use airports which have been closed completely and military airfields which are inactive (closed to military operations but still able to be used), such as Hamilton Field. Although currently closed, these facilities are important aviation resources which should be considered in planning for the regional aviation system.

This chapter catalogues current data (in most cases 1990) on the physical facilities and operations at the airports under consideration. Historic data on operations, passengers, air cargo, and based aircraft for the period 1980 through 1990 is included in Chapter V (Historical Airport Data). This data will be drawn upon for trend documentation and in preparation of the aviation system forecasts (see Chapter VI).

The system will first be characterized, with reference made to the 1980 MTC System Plan to identify major changes in the past decade. A look at the facilities and operations for the year 1990, including a capacity analysis, is then presented to be the basis for alternatives development and analysis.

Much of the information used in this inventory was derived from The California Aviation System Plan (Element 1: Inventory published August 1990), by the California Department of Transportation Division of Aeronautics. Other data sources included the most recent individual airport master plans and capital improvement programs, current and historic FAA Airport Master Records (FAA 5010 forms), FAA activity statistics, and the individual airports. The most current information available has been used. In most cases this represents conditions in the year 1990.

A survey of the airport operators provided planning documents as well as information about site specific conditions which could impact future capacity. A follow up survey gave the airports an opportunity to be involved in the MTC planning process.

THE REGIONAL AIRPORT SYSTEM

The regional airport system includes some 25 public use civil airports, 4 military airports, and 17 private use facilities. All of the airports in the system are listed below.

Of the 25 public use airports there are 5 with commercial airline service while the other 20 are general aviation airports. These are mapped in Exhibit 4.1. "Commercial service" airports are defined by the National Plan of Integrated Airport Systems (NPIAS) as those which have scheduled airline service and enplane more than 2,500 passengers annually. General Aviation airports by definition do not have scheduled service, and only serve general aviation aircraft.

The commercial service airports in the region process not only people but also air cargo. The largest three are the only ones to have an appreciable number of all cargo operations. These airports are noted in Exhibit 4.4. The 16 private use, private ownership general aviation airports are displayed in Exhibit 4.6.

There are 12 public use airports which currently have helicopter activities and/or services, shown in Exhibit 4.3 along with the region's heliports which are listed below. These include all 5 of the commercial service airports and 7 general aviation airports denoted below by an "H". Facilities serving primarily as gliderports are designated with a "G" and are illustrated in Exhibit 4.5. FAA Air Traffic Control towered airports are indicated by a star and are mapped in Exhibit 4.2. Please see also Exhibit 4.23 for the complete airport system data inventory.

❑ Commercial Service Airports:

San Francisco International ☆ **H**
Metropolitan Oakland International ☆ **H**
San Jose International ☆ **H**
Buchanan Field (Concord) ☆ **H**
Sonoma County ☆ **H**

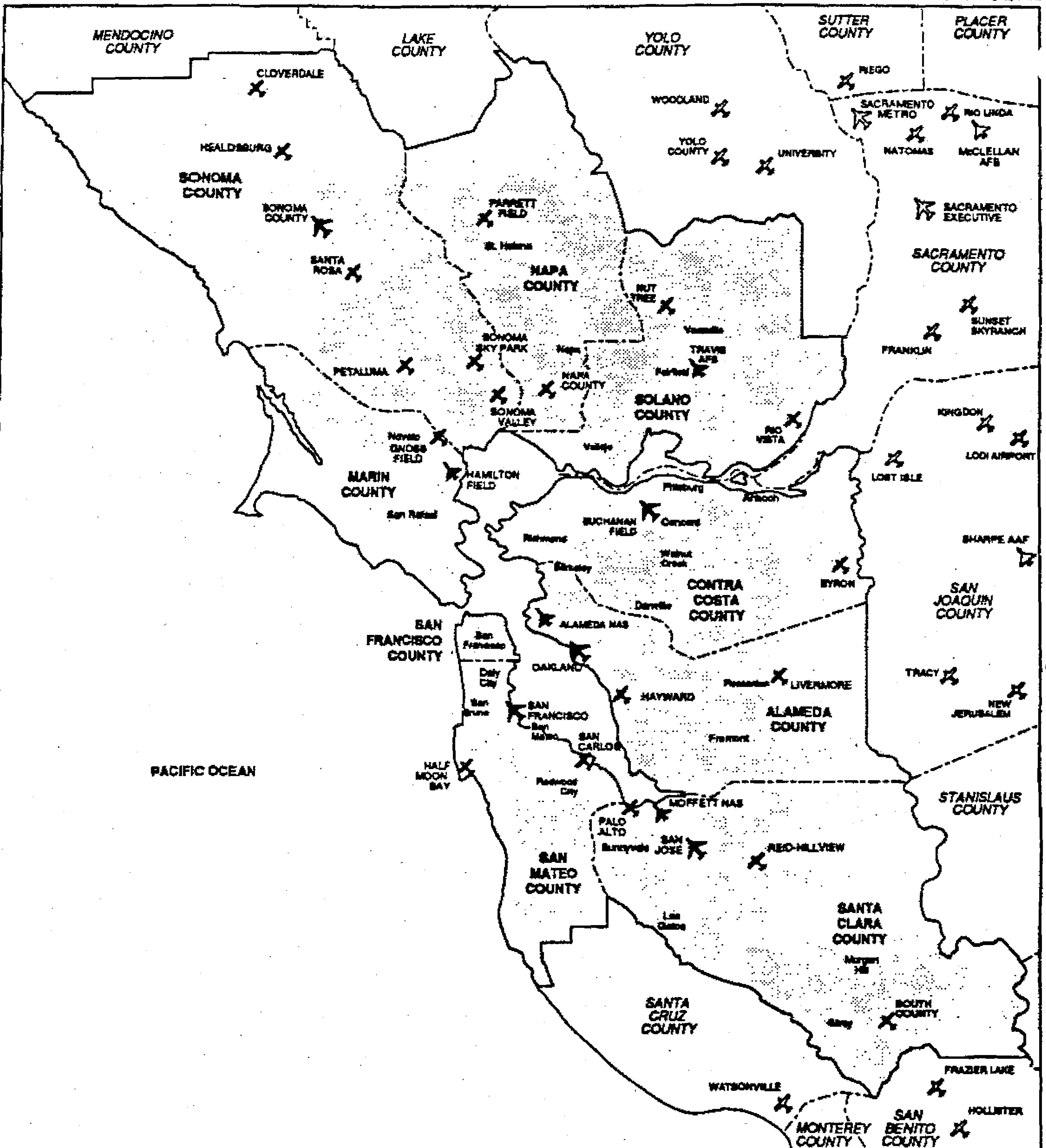
❑ General Aviation Airports (public use):

Byron
Cloverdale Municipal
Gnoss Field **H**
Half Moon Bay **H**
Hayward Air Terminal ☆ **H**
Healdsburg Municipal
Livermore Municipal ☆ **H**
Napa County ☆ **H**
Nut Tree
Oakland (North Field) ☆
Palo Alto ☆
Parrett Field
Petaluma Municipal
Reid-Hillview ☆ **H**
Rio Vista
San Carlos ☆
Santa Rosa Air Center
Sonoma Sky Park
Sonoma Valley
South County

❑ Military Airports:

Alameda NAS ☆ **H**
Hamilton Field
Moffett Field (NAS) ☆ **H**
Travis AFB ☆

Source: Modified from MTC Graphics.



LEGEND

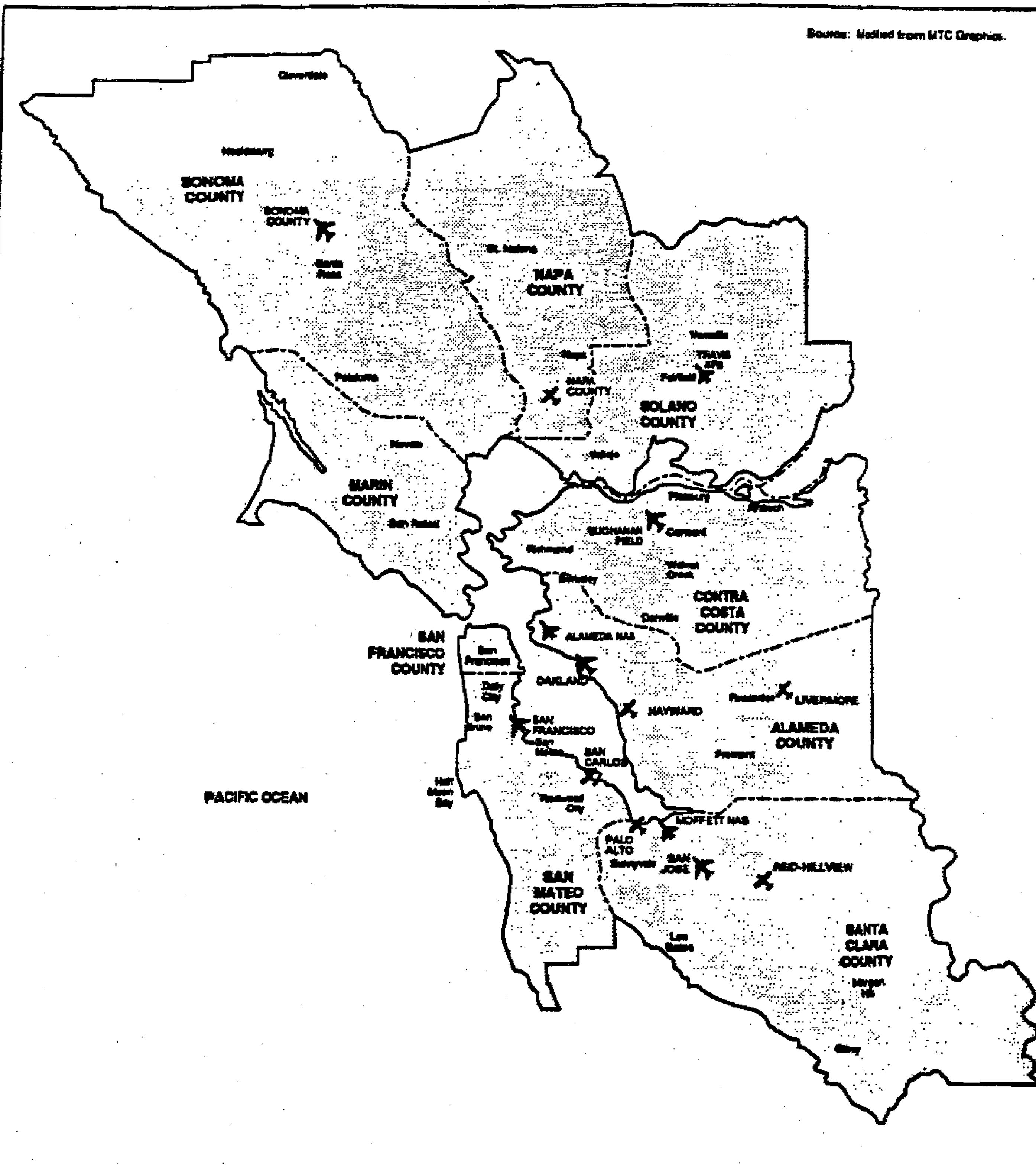
Airports Inside Study Region	Airports Outside Study Region
Air Carrier	Air Carrier
General Aviation	General Aviation
Military	Military

MTC

Regional Airport System Plan

Exhibit 4.1

THE AIRPORT SYSTEM PUBLIC USE FACILITIES



LEGEND

- Air Carrier
- General Aviation
- Military

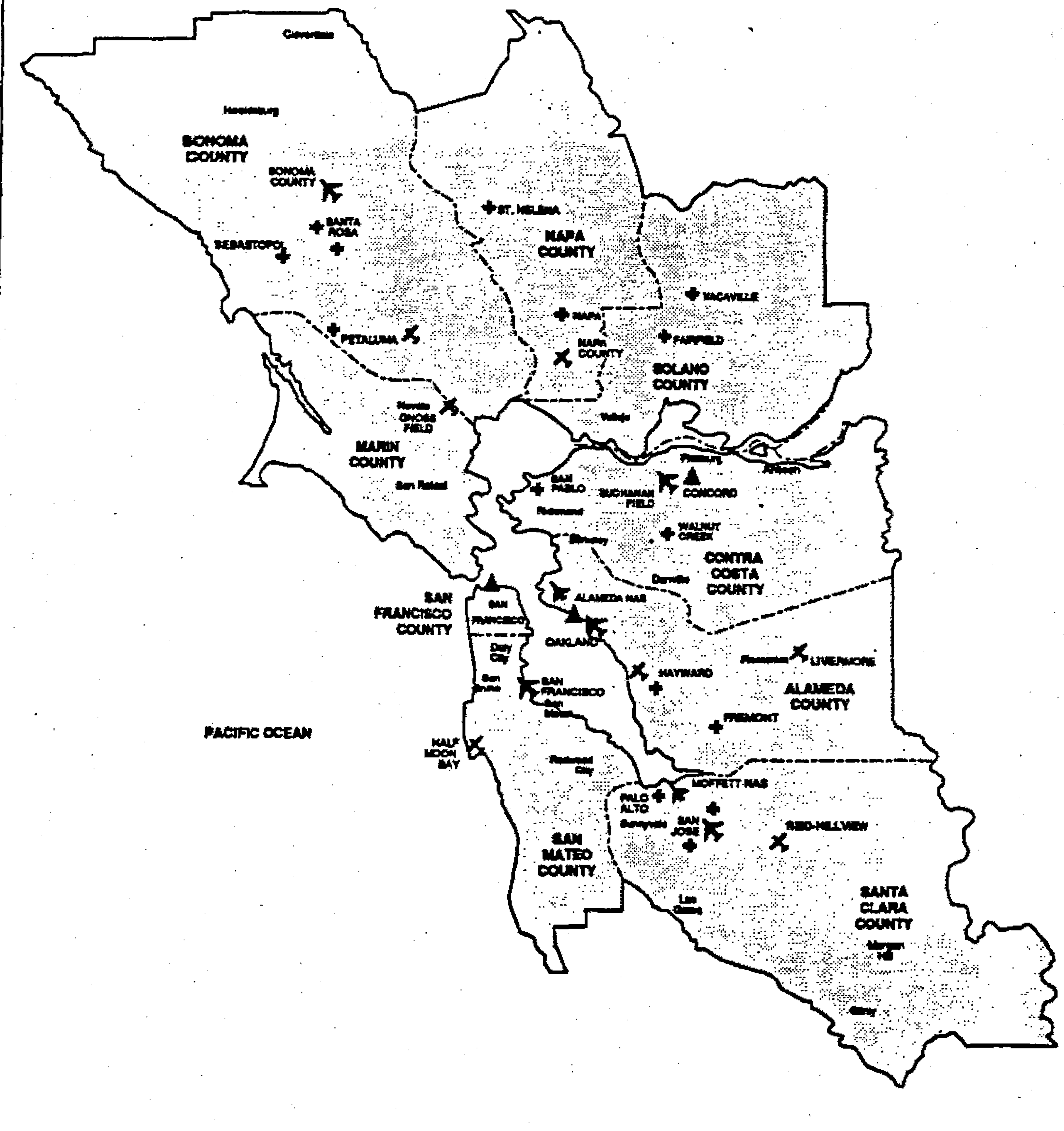
MTC

Regional Airport System Plan

Exhibit 4.2

TOWERED AIRPORTS

Source: Modified from MTC Graphics.



LEGEND

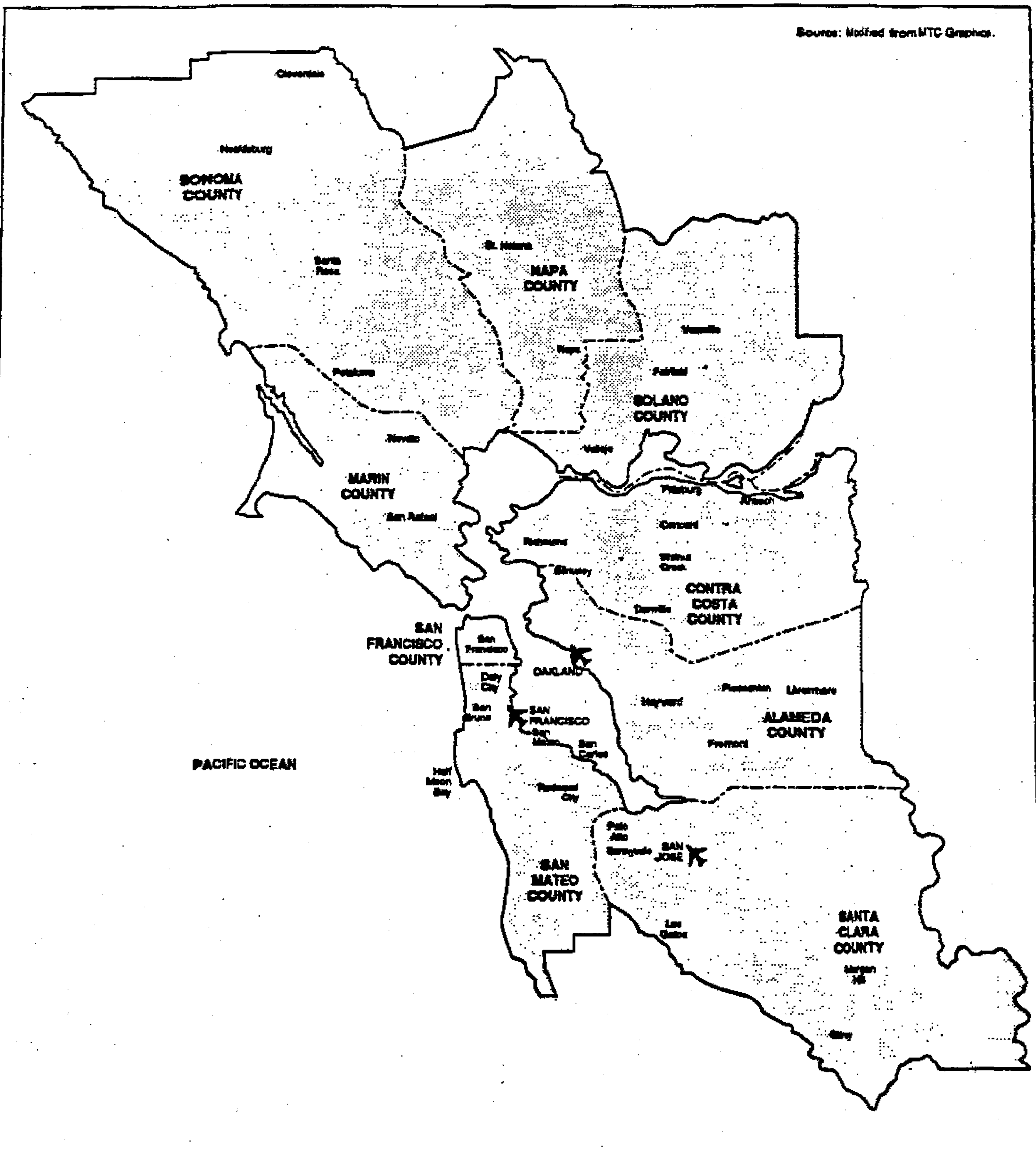
Airports with Helipads	Facilities with Helipads
Air Carrier	Hospitals
General Aviation	Military Centers
Military	Other

MTC

Regional Airport System Plan

Exhibit 4.3

HELICOPTER FACILITIES



LEGEND

Air Carrier

MTC

Regional Airport System Plan

Exhibit 4.4

AIR CARGO AIRPORTS

❑ Private Use Airports

Antioch
Blake
Calistoga Airpark (Closed) G
Commodore Center Seaplane Base
Delta
Fremont (Closed)
Garibaldi
Graywood
Inglenook Ranch
Maine Prairie
Marin
Meadowlark
Moskowite
Mysterious Valley
Pope Valley
Sea Ranch
Sky Soaring G
Travis AFB Aero Club
Vaca-Dixon (Closed)
Vacaville Gliderport G

❑ Public Use Heliports

Port of San Francisco Heliport (Closed)

❑ Military Heliports

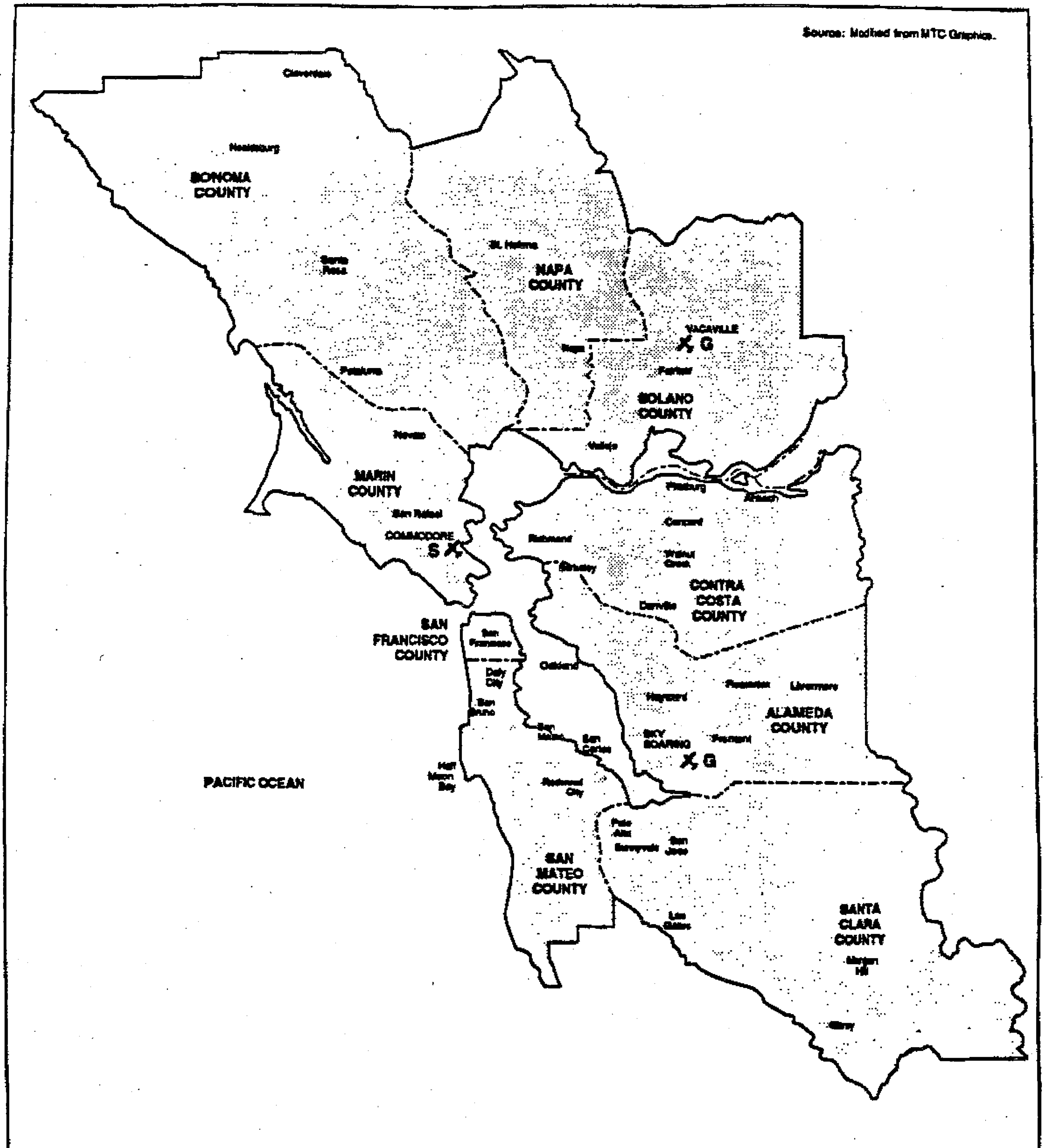
Crissy Army Airfield
Naval Hospital Oakland
Naval Weapons Station Concord

❑ Medical Heliports

Brookside Hospital
Community Hospital
John Muir Memorial Hospital
North Bay Medical Center
Palm Drive Hospital
Petaluma Valley Hospital
Queen of the Valley Hospital
Saint Helena Hospital Site II
Saint Rose Hospital
San Jose Medical Center
Santa Rosa Memorial Hospital
Stanford University Hospital
Vaca Valley Hospital
Valley Medical Center
Washington Hospital

❑ Other Heliports

These airports are part of a complex regional transportation network. The regional highway system and the public transportation system are each mapped to show their relation to the air transportation system. Exhibit 4.7 shows the regional highways, and Exhibit 4.8 shows regional rail transportation.



LEGEND

Private Use Facilities

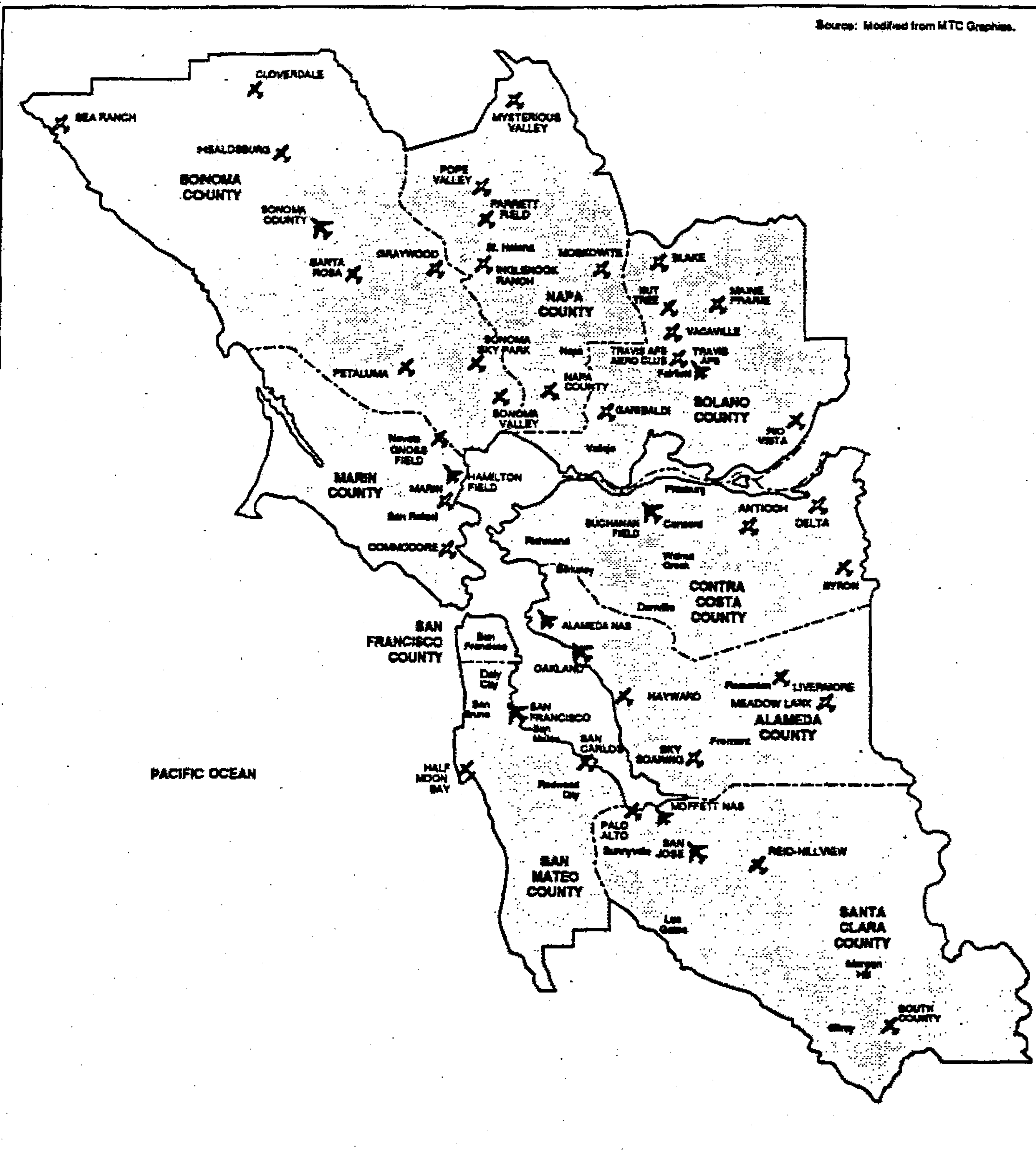
✈	General Aviation
G	Gliderports
S	Seaplane Bases

MTC

Regional Airport System Plan

Exhibit 4.5

SPECIAL USE AIRPORTS



LEGEND

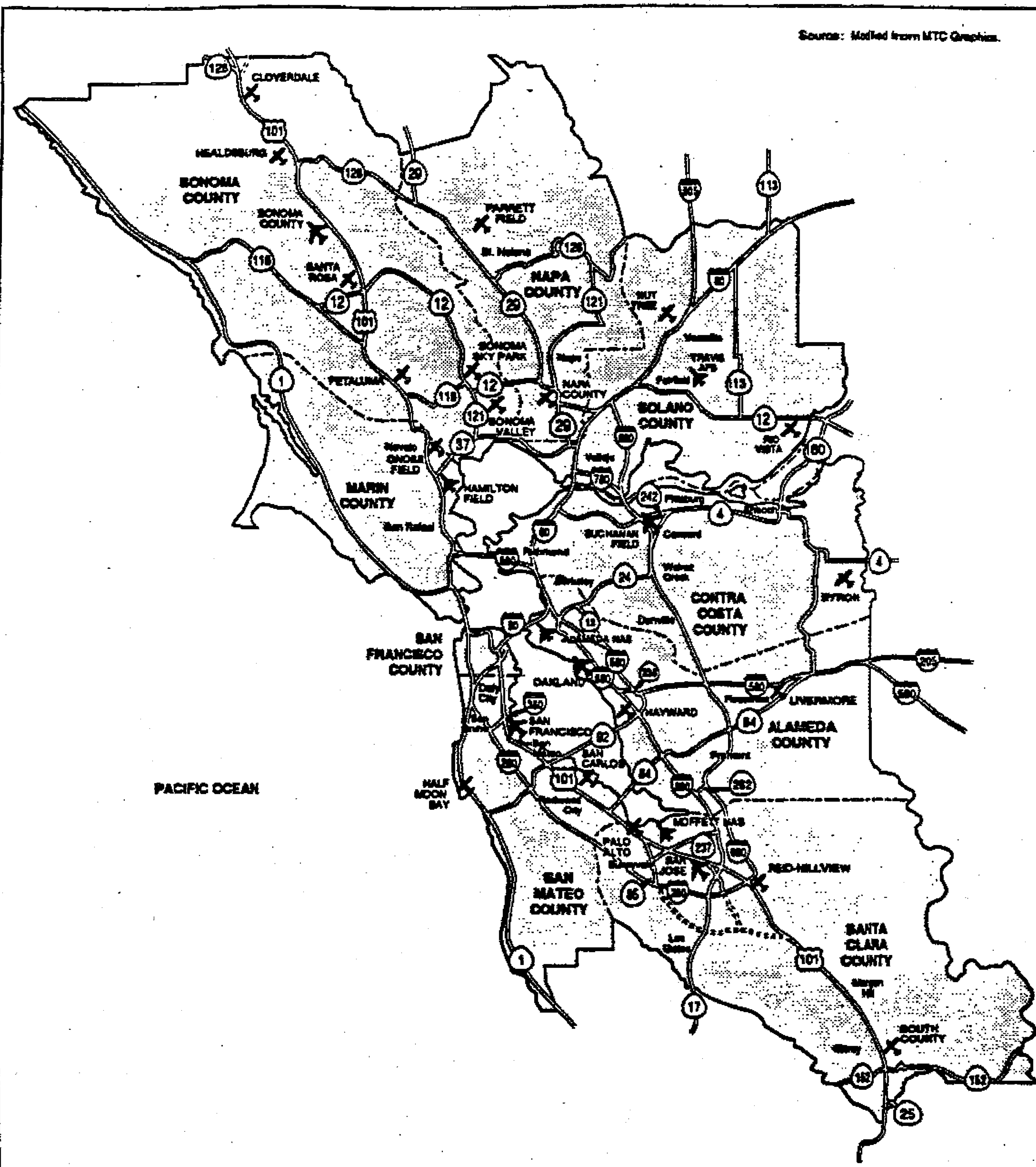
- Air Carrier
- General Aviation
- Military
- GA Private Use

MTC

Regional Airport System Plan

Exhibit 4.6

THE AIRPORT SYSTEM PUBLIC AND PRIVATE USE FACILITIES



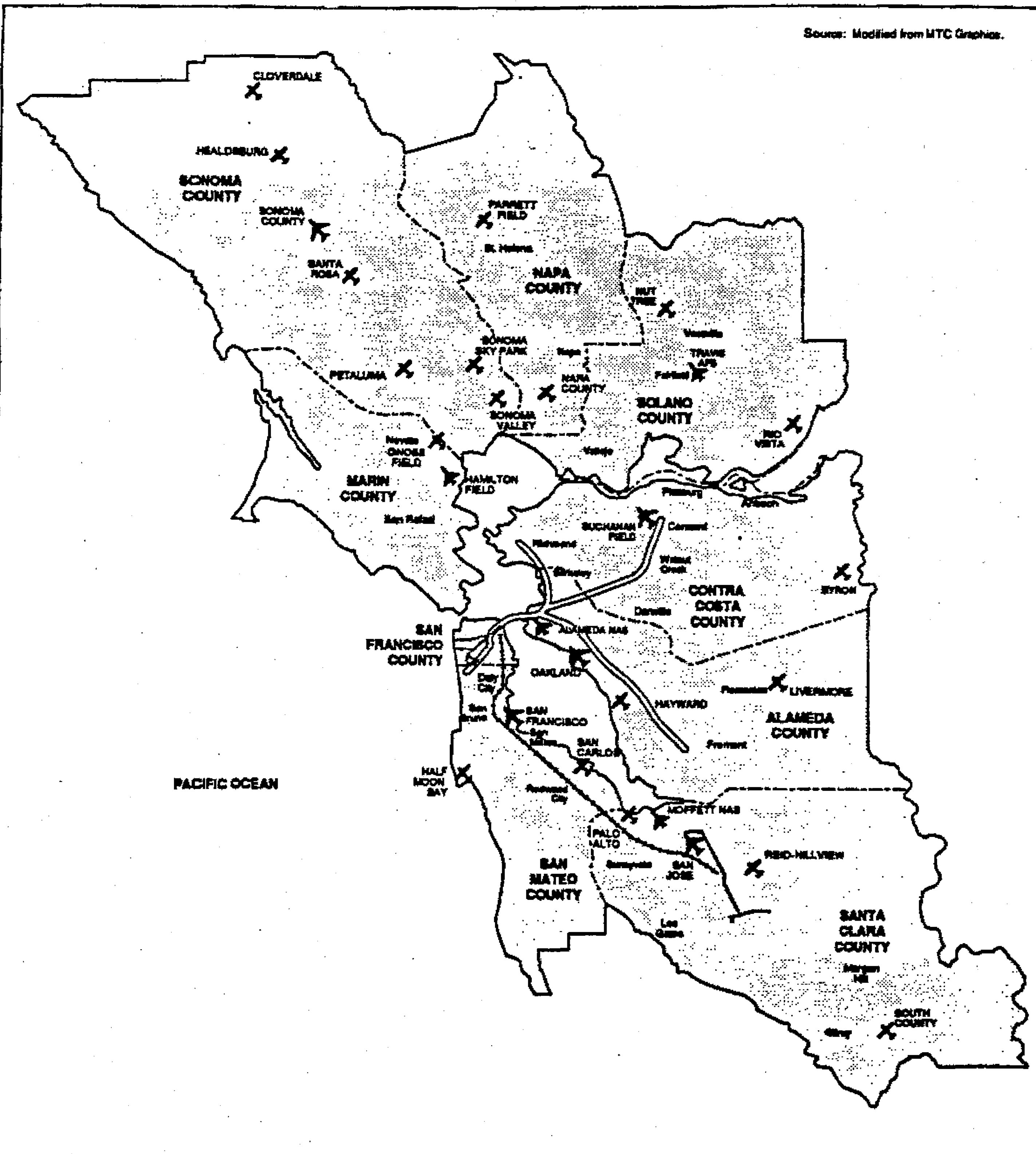
LEGEND	
	Highway - Existing
	Highway - Planned/Under construction
	Air Carrier
	General Aviation
	Military

MTC

Regional Airport System Plan

Exhibit 4.7

REGIONAL HIGHWAYS



LEGEND

- Bay Area Rapid Transit (BART)
- CalTrain
- San Francisco Municipal Railway (Muni Metro)
- Santa Clara Light Rail Transit (SCLRT)
- Air Carrier
- General Aviation
- Military

MTC

Regional Airport System Plan

Exhibit 4.8

RAIL TRANSIT

The 4 military airfields in the region are publicly owned but restrict access. They are part of the airport system and are also mapped in Exhibit 4.1. The uncertainty of their status as active military facilities holds them poised for possible joint use conversion or perhaps complete demilitarization. Travis AFB already has a joint use agreement with Solano County which provides for commercial airline service. Private use airports and facilities currently closed are acknowledged because there may be the option for public use and/or acquisition. An example of such an acquisition can be seen in Clark County, Nevada, where the County acquired a closed private use airport which now serves as a reliever for McCarren International Airport in Las Vegas. Byron Airpark in Contra Costa County, another example, was in 1980 a private airstrip, and today is a growing public use general aviation airport.

Helicopter facilities are projected to be an increasingly important component of the national air transportation system in the future. There are two categories: (1) heliports, which are areas with full helicopter servicing available, and (2) helistops, which are pads strictly for takeoffs and landings. The only publicly owned heliport in the region developed for public use, the Port of San Francisco heliport, located on the waterfront at Piers 30-32, is closed to use. Five of the public use airports have designated helicopter takeoff-landing areas. Also, a number of private heliports and helistops dot the region. These facilities are owned and used by various groups including hospitals, corporations, and the media. In addition, there are several publicly owned military rotorcraft facilities which also limit access by the general public. Helicopter facilities in the region are shown in Exhibit 4.3.

The active gliderports in the system are privately owned, private use airports. There are two: Sky Soaring (formerly Sky Sailing), near Fremont, California, and Vacaville Gliderport near Vacaville, California. Calistoga Airpark in Northern Napa County has recently closed.

The one seaplane base in the region, Commodore Center in Marin County, changed from public use to private at the end of March, 1991. It is currently used for training and sightseeing. A second seaplane facility located adjoining San Francisco International Airport is planned. Special use facilities, those for gliders and for seaplanes, are pointed out in Exhibit 4.5.

Many changes have occurred since the last MTC Regional Airport Plan revision. The number of facilities has increased. Some have shifted in type of ownership and category of use. The 1980 plan recognized 3 commercial airports, 17 public use general aviation airports, and 20 private general aviation airfields (discounting small air strips). The same four military facilities remain today. There were 5 publicly owned heliports: Emeryville Municipal (Alameda), Alameda County Parking Garage (Alameda), Richmond Police Helistop (Contra Costa), and U of C Richmond Field Station (Contra Costa). Eleven private heliports and 5 medical heliports also served the region.

Since 1980 two additional commercial service airports now provide scheduled passenger service: Sonoma County and Buchanan Field. A net gain of two public use general aviation airports and a decrease from 20 to a current 17 private use airstrips shows the static nature of the general aviation market in this decade. In that same time period there has been a reduction in the number of public helicopter landing areas, while the region has seen a tremendous increase in the number of medical heliports from 5 to 15.

AIRPORT FACILITIES

This section is devoted to discussion of the physical facilities at each airport, and is divided into the following groups: commercial service airports; general aviation airports; military airports; and private use general aviation airports. Exhibit 4.23 provides a summary of facility information including: airport classification, number of runways, length of the longest runway, identification of instrument approach, presence of an Air Traffic Control Tower, presence of rotorcraft facilities, and the airport size, in acres.

Ground accessibility is discussed for the airports and illustrated in Exhibit 4.7, the regional highway system, and Exhibit 4.8, the public transportation system.

Commercial Service Airports

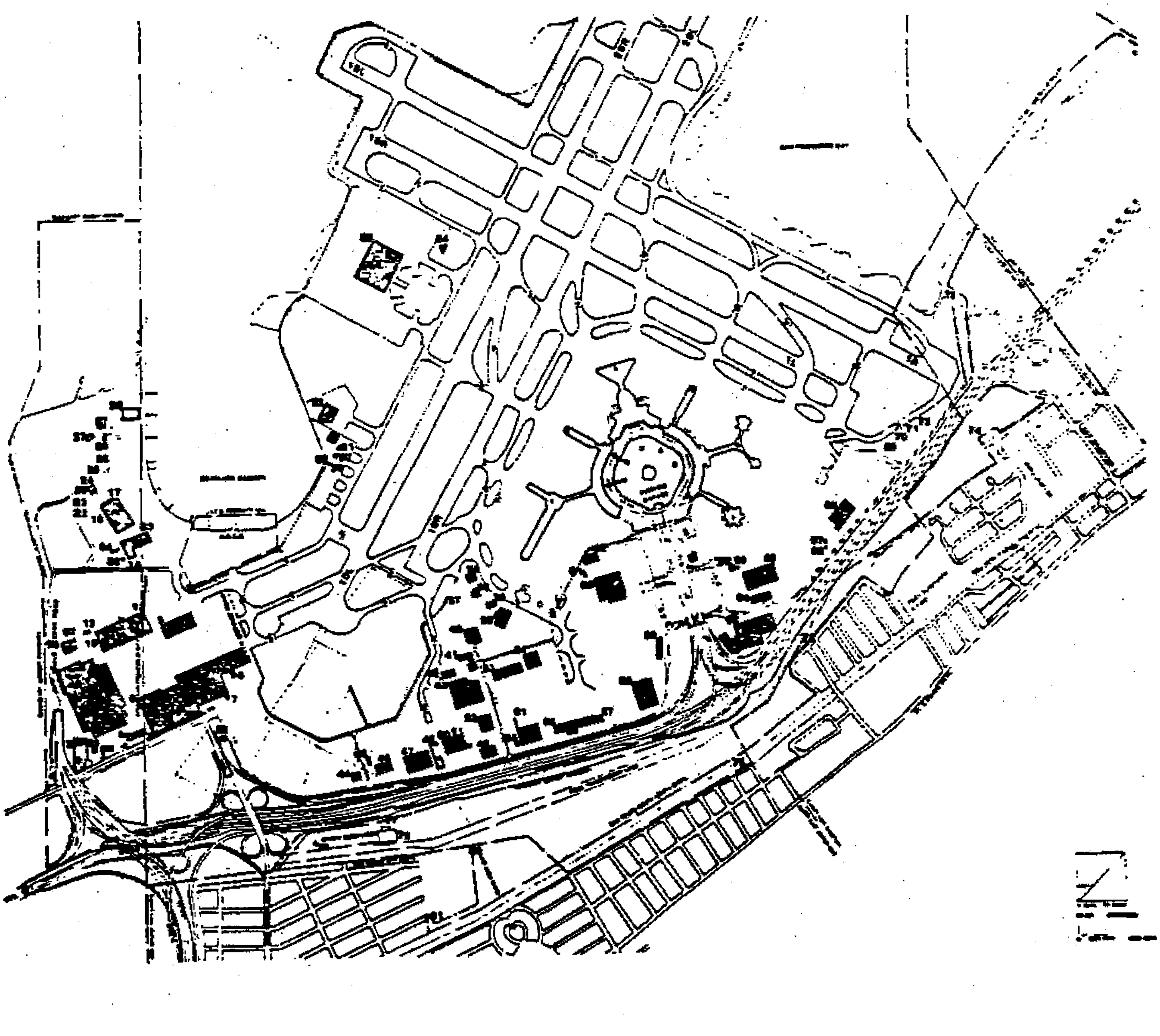
SAN FRANCISCO INTERNATIONAL AIRPORT

San Francisco International is the dominant airport in the region, serving over 70% of the total regional passengers in 1990. It began in 1926 as a modest 160 acre site located well outside the city, and has grown to claim a total site of some 5,270 acres. The site, located on the west shore of San Francisco Bay, consists of both upland and submerged saltwater bayland. The airfield system occupies approximately 1,700 acres, land partially consisting of reclaimed tidelands. Undeveloped areas are several and include: the Bayshore Parcel, 180 acres sited near the freeway; the San Bruno Interchange Parcel, 18 acres west of the United Airlines maintenance hanger; the North Field Parcel, a 150 acre parcel on the north field, north of Flying Tigers and JAL airfreight operations; and the east Field Parcel, a crash/fire/rescue practice area accessible by taxiway C.

San Francisco International Airport has two sets of intersecting parallel runways: 28R-10L, 11,870 feet; 28L-10R, 10,600 feet; 1R-19L, 8,901 feet (with a 600 foot displaced threshold); and

Exhibit 4.9

San Francisco International Airport



1L-19R, 7,001 feet. Each is 200 feet wide. They are surfaced with asphalt concrete. Three of the four runways are equipped with Instrument Landing Systems (ILS). An air traffic control tower is situated in the center of the main terminal building.

The airport has by far the largest passenger terminal complex in the region. There are 2.6 million sq. ft. of space serving 80 passenger terminal gates configured as 6 piers. The North terminal contains 2 boarding piers, and the South terminal has 4, including the International terminal.

The buildings surround a five level central public parking garage which has 6,765 stalls. Of these 6,088 are dedicated for short term parking, 223 for valet parking, 128 for taxi staging, and 328 for permit parking. An uncovered lot accessible by shuttle bus has 3,250 long term parking spaces.

Air Freight facilities utilize about 90 acres at San Francisco International, and provide for 34 aircraft parking spots. General Aviation Fixed Based Operators (FBO's), businesses providing general aviation services at an airport, can accommodate 40 based aircraft, and there are 6 private GA parking places. The passenger terminal can accommodate some 70-80 commercial jet aircraft, and there are 9 remote aircraft hardstands, which are aircraft parking places on the apron.

Surface access for San Francisco International is provided by public transit, airporter, limousine, hotel shuttle, and rental car in addition to the private automobile. Rail transportation is not a very convenient access mode at this time. The nearest Bay Area Rapid Transit (BART) station is Daly City, 8 miles away linked to the airport only by a public bus line. The CalTrain runs parallel to the U.S. 101 corridor and comes close to the airport but does not provide direct connection for passengers and employees.

Numerous support facilities including aviation support such as flight kitchens, maintenance hangars, and warehouses, and airport support including crash/fire/rescue, fuel farms, water treatment plants, and a Hilton hotel also occupy space at San Francisco International Airport.

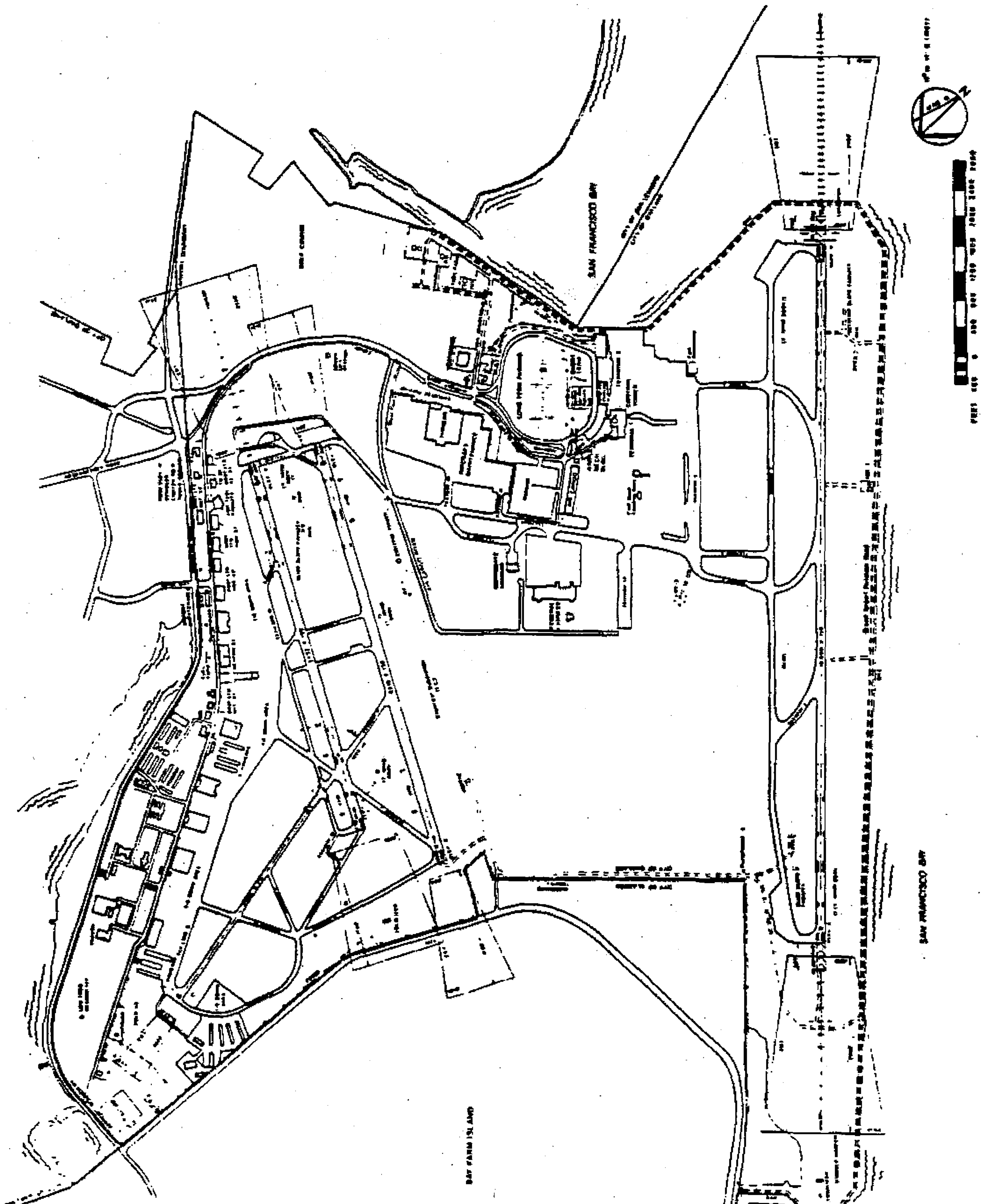
METROPOLITAN OAKLAND INTERNATIONAL

With its humble beginnings as a dirt strip in 1927, the Metropolitan Oakland International Airport has evolved into a 4 runway commercial service airport occupying some 2,600 acres of upland and wetland adjoining the east side of San Francisco Bay. The airport has experienced rapid growth in the past few years, and in 1990 served 13% of the region's passengers. Oakland airport is laid out almost as two separate airports, with commercial service occurring at South Field and general aviation activities occupying North Field.

South field consists of a single transport category runway, runway 11-29, 10,000 feet in length and 150 feet with a parallel taxiway. North field has three runways: 9R-27L, which is

Exhibit 4.10

Metropolitan Oakland International Airport



6,212 feet long and 150 feet wide; 9L-27R, which is 5,452 feet long and 150 feet wide; and 15-33, a short crosswind runway which is 3,366 feet long and 75 feet wide. The air carrier runway, 11-29 at South Field is approximately 6,400 feet from the closest general aviation runway, runway 9-27. There is one designated helicopter takeoff/landing area.

Oakland's passenger terminal complex has two unit terminals containing 20 second-level aircraft gates. The terminal also includes one international arrival gate and a recently expanded international arrivals building large enough to accommodate a 747 and can process 500 peak hour arriving passengers. Surface vehicle parking at the passenger terminal can accommodate some 6,300 vehicles. Public spaces are limited to 4,490: 805 in the short term lot, 3,485 in long term parking, all open air.

Having become the region's hub for overnight small package cargo, Oakland has a large area (some 64 acres) devoted to air cargo activity, including the Federal Express Metroplex facility and an apron area used for belly cargo, both located west of the terminal building. Another 100 acres of air cargo development is forecast for the next 16 years.

Oakland's north field is one the region's largest and busiest general aviation facilities, with a capacity of 641 based aircraft, and occupying 980 acres.

Oakland has two air traffic control towers. One, serving South Field, is located within passenger terminal 1. The second, which serves North Field, is located adjoining the cross-airport dike.

The airport may be reached by private auto and rental car. Alternative means of access include public transit with AC Transit and Air-BART service, and private operators including Greyhound, taxi, limousine, and courtesy van services. The BART Coliseum Station, 3 miles from the airport, is linked by frequently scheduled Air-Bart vehicles to both terminals at the South Airport.

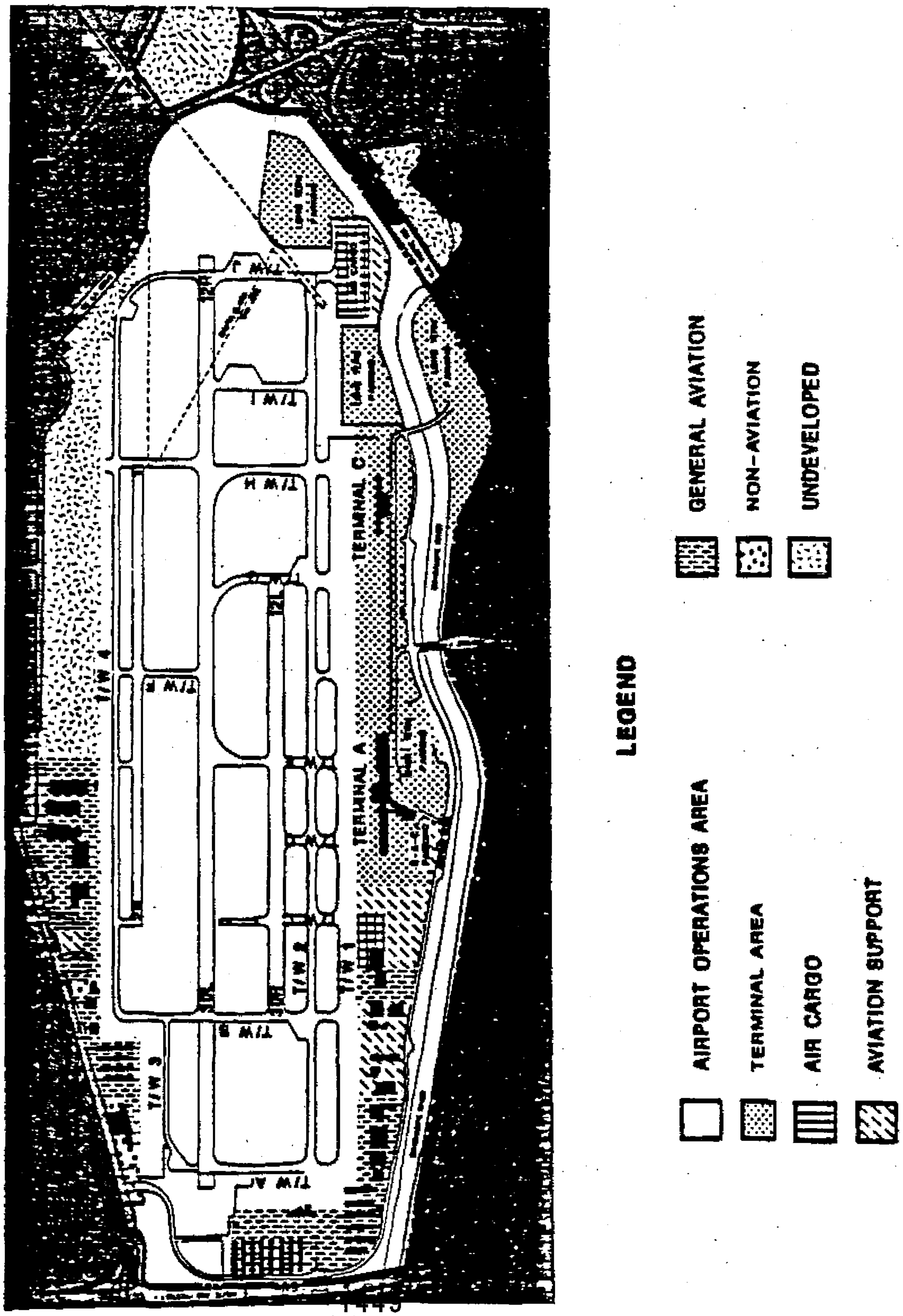
SAN JOSE INTERNATIONAL

San Jose International Airport occupies some 1,050 acres adjoining U.S. 101 on the north, Route 880 to the south, Guadalupe Parkway on the east, and the city of Santa Clara on the west. About 45 acres of airport property are now undeveloped.

There are three parallel runways, one used for air carrier aircraft, one used for commuter and general aviation aircraft, and one used primarily by general aviation. The general aviation runway, 11-29, is 4,600 feet long and 100 feet wide. The air carrier center runway is designated 12R-30L, and is 8,900 feet long and 150 feet wide. The commuter/general aviation runway, designated 12L-30R, is 4,419 feet long and 150 feet wide.

Exhibit 4.11

San Jose International Airport



San Jose now has two unit terminals (A and C) with a total of 32 gates. Of these, all 15 at Terminal A are second level loading bridges, while 16 of the 17 at terminal C are ground level gates.

A combination of surface and structure parking provide 8,250 total parking spaces at the passenger terminal. There is an 1,100 space short term lot in front of terminal C, and a 2,000 space short term parking garage adjacent to terminal A. Three long term surface parking lots provide 4,600 parking spots.

San Jose is also a busy general aviation airport, with 680 existing based aircraft. The general aviation facility also includes the San Jose Jet Center, the San Jose State University aviation program, and several other FBO and support activities, including the base of the Hewlett Packard Company's 7-aircraft fleet.

San Jose has a limited amount of space available for air cargo. Approximately 7 acres of dedicated air cargo apron is located at the northeast corner of the airport. On the southeast side of the airport there is aircraft parking space and an Air Freight Building used jointly by the commercial airlines for processing belly-cargo.

Ground access to San Jose International is possible by private or rented automobile, airport van service, shuttle, taxi, limousine, and bus. The Santa Clara Light Rail Transit (SCLRT) is about one and a half miles from the airport but is not directly connected in any way to the terminal. The CalTrain allows access to the city of San Jose but is quite a distance from the airport as well.

BUCHANAN FIELD (Concord)

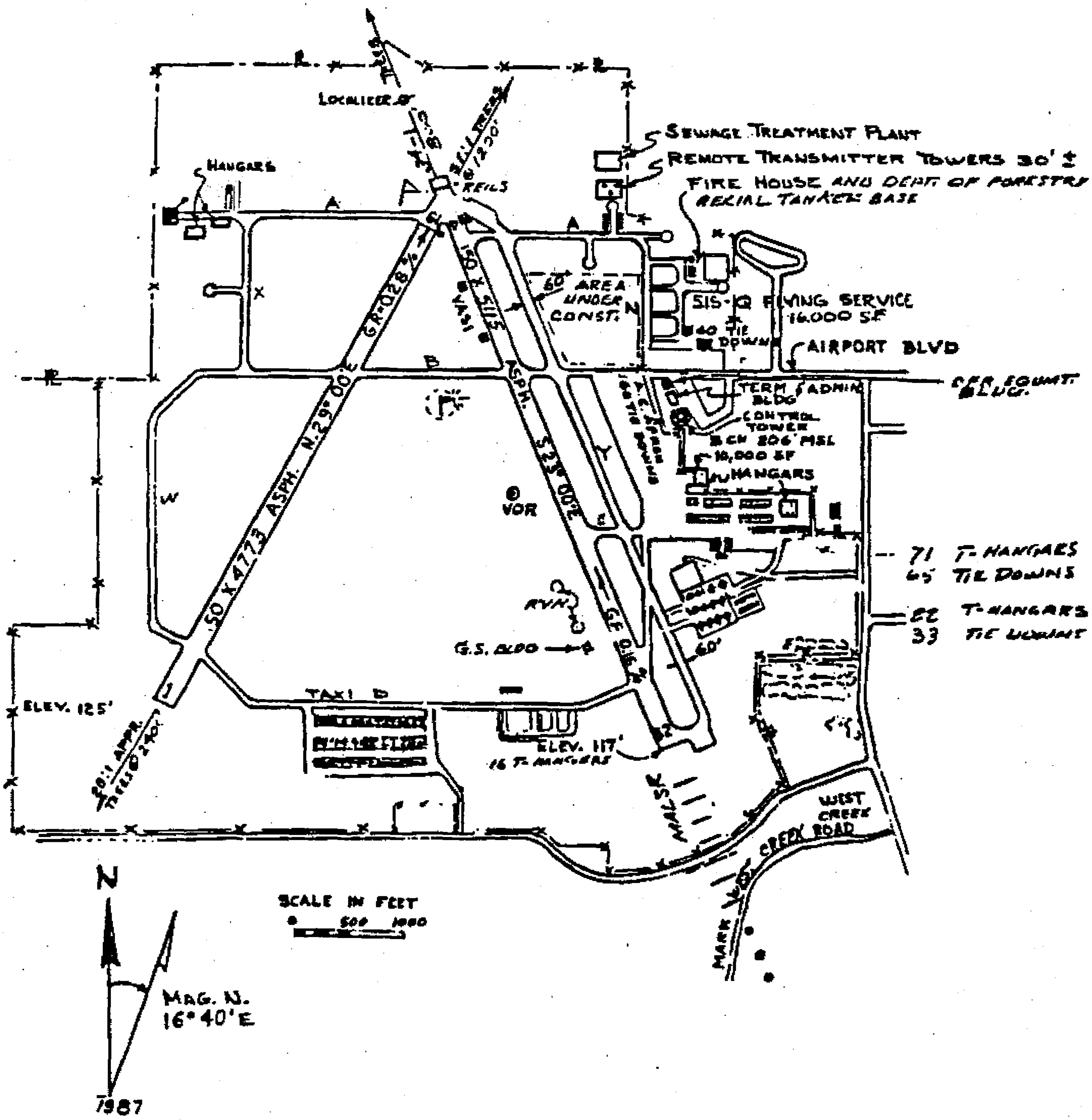
Ground was broken in 1942 for an airport to serve Contra Costa County. Before construction could be completed, though, the Federal Government built two runways there to serve the war effort. Today, Buchanan Field has two pairs of parallel runways on a 530 acre site located near Concord, California.

Runway 19R-1L is the primary runway, 4,400 feet in length and 150 feet in width. The other major runway, 14L-32R is 3,951 feet long and 150 feet wide. Each has a 600 foot minimum safety area. Runway 1R-19L is 2,768 feet in length and 75 feet in width and runway 14R-32L is 2,800 feet long and 75 feet wide. The runway surfaces are asphalt concrete.

The primary runway and that lying parallel to it are equipped with medium intensity runway lights (MIRL), and 19R-1L has runway end identifier lights (REIL) as well. The other runways are not lighted. Non-precision landings are guided onto runway 19R-1L by a visual approach slope indicator (VASI). A terminal building provides processing facilities for the based airlines,

Exhibit 4.12

Sonoma County Airport



and there is an air traffic control tower. Adjacent to the terminal there is a 60,000 square foot open auto parking area.

In addition, there are three designated helicopter take off/landing areas at Buchanan Field, identified on the taxiways. Two are located on the east side of the airport, and one is placed on the west side.

The airport is accessible by Interstate 680 and State Route 4. There is public transit service to Buchanan Field as well as taxi service and rental cars available. One line of BART extends to Concord, about a mile away, but does not provide direct access to the airport.

SONOMA COUNTY

Sonoma County Airport has served Santa Rosa, California and nearby community since 1939, with interim service for the U.S. Army during WWII. It currently occupies 940 acres.

Two crossed asphalt concrete runways support general aviation and air carrier activity. Runway 14-32 is the primary runway, 5,115 feet long, 150 feet wide, and ILS equipped. Runway 1-19, 5,002 feet long and 150 feet wide, has no lighting system but accommodates non-precision landings with Very-High-Frequency Omnirange equipment (VOR). There are two designated helicopter takeoff/landing areas on site.

The airport has an air traffic control tower, and a small terminal for commuter and air carrier traffic. A limited number of auto parking places are available nearby.

Sonoma County is directly accessible by auto on U.S. Highway 101. Ground transportation services available include public transit, taxi, and rental car.

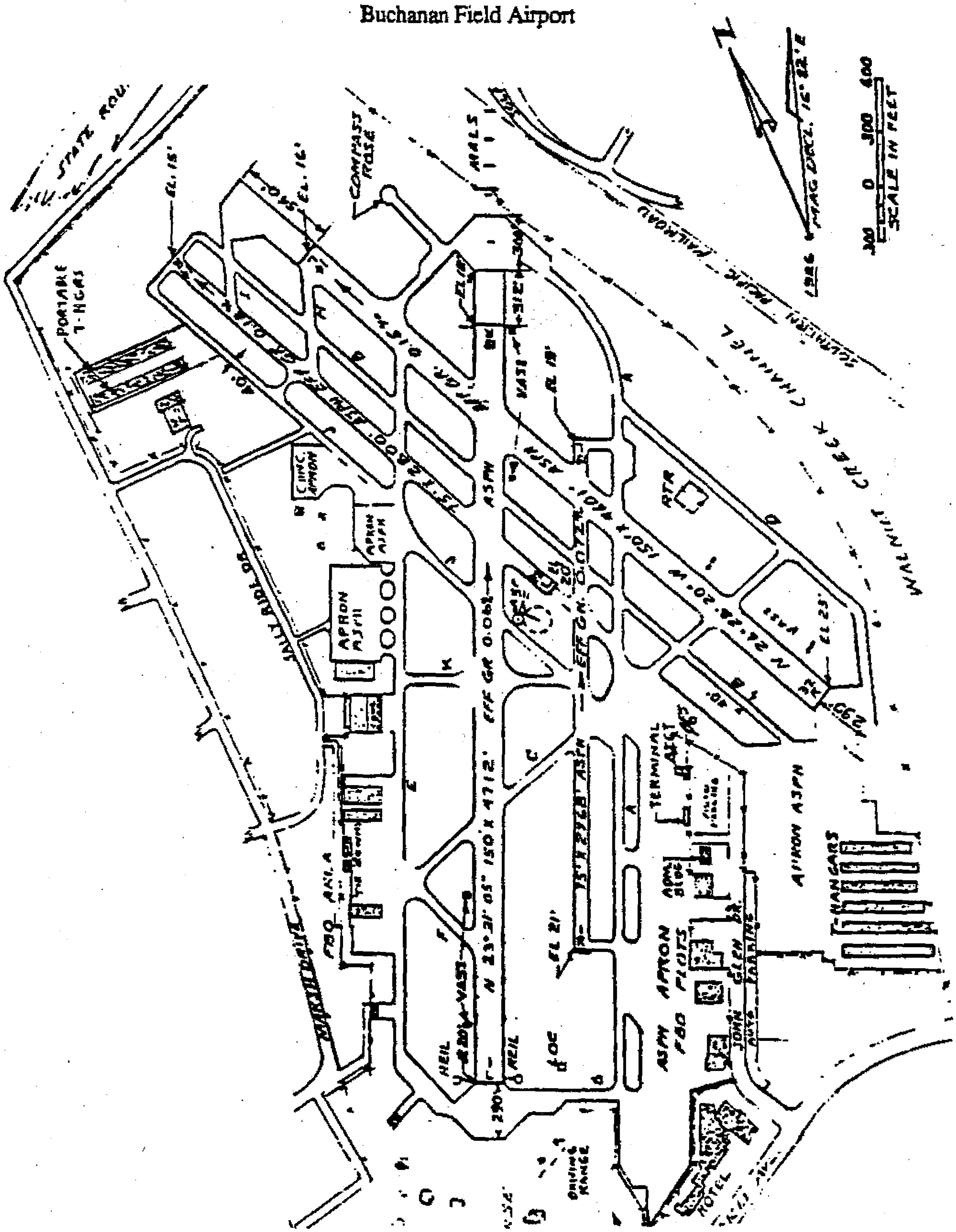
General Aviation Airports

The airports in this group by definition do not host scheduled air carrier or commuter service, and also do not have air cargo activity. Most of the facilities accommodate private or corporate aircraft and limited air taxi service.

The general aviation airports are generally much smaller than the commercial use airports. A few GA airports, such as Hayward (543 acres), Napa County (735 acres), Livermore (510), and Santa Rosa Air Center (500), compare in acreage with Buchanan Field (578 acres), but most of the others are between 50 and 250 acres. Refer to Exhibit 4.23 for the size of each airport. General aviation runway lengths generally range between 2,000 and 3,500 feet, which is typical for the size and design aircraft attracted to use these airstrips. Three airfields have significantly longer runways: Half Moon Bay (5,000 feet), Hayward (5,024), and Napa County (5,931). These airports could accommodate smaller commercial passenger jets such as the Boeing 727 and 737,

Exhibit 4.13

Buchanan Field Airport



and MD-80 series aircraft. Santa Rosa Air Park has a 7,000 foot runway, a length which can accommodate larger air carrier aircraft such as the Boeing 757. Exhibit 4.23 details the length of the longest runway at each facility. Precision instrument approaches are possible at very few general aviation airports, and the majority have no air traffic control tower.

Ground access to the region's general aviation airports is primarily by private automobile. Exhibit 4.7, that depicting the regional highways system, shows the alignment of these facilities along major highway corridors such as U.S. Highway 101.

Military Airports

Four military installations maintain airfield facilities in the region. These are the Naval Air Station at Alameda, located near Oakland in Alameda County; Hamilton Field in Novato, Marin County; Moffett Naval Air Station between Mountain View and Sunnyvale in Santa Clara County; and Travis Air Force Base, southwest of Sacramento in Solano County.

NAVAL AIR STATION (NAS) ALAMEDA

Naval Air Station Alameda provides support services to Naval aviation activities. Berthing space at two piers accommodates aircraft carriers, and ship maintenance is also accomplished at Alameda. The Naval Air Rework Facility Alameda allows for repair and revamping of Navy jet and turboprop aircraft.

The NAS at Alameda is contains 2,479 acres of property owned by the U.S. Navy: 1,521 acres upland, and 958 acres of submerged tideland in San Francisco Bay. In addition, 155 acres are leased from the City of Alameda.

The airfield has two crossed ILS equipped runways: one 8,000 feet in length, 200 feet in width; the other 7,200 feet long, 200 feet wide. Two helicopter landing areas are provided. The airfield at Alameda NAS includes 469,700 square yards of aircraft parking apron and 7 aircraft maintenance hangers. There is an air traffic control tower on site.

NAS Alameda is located in a well developed areas and is easily accessible by ground transportation. Interstate 880 provides an easy approach, and AC Transit bridges the 3 mile distance from the BART City Center station.

HAMILTON FIELD

Hamilton Field, formerly Hamilton Air Force Base, is owned and operated by the United States Army. The airfield is no longer actively used by the Army, but currently accommodates some activity by the U.S. Coast Guard Strike Team. This unit is on call for emergencies and uses the airfield as required. They do not base any aircraft here. The U.S. military currently uses housing at the field for personnel from all branches and from the U.S. Coast Guard.

A single, 8,000 foot runway is located on the site, with no air traffic control tower.

Roadway access to the base is facilitated by nearby State Highway 101 and local bus service to the main gate by the Golden Gate Transit Company.

NAVAL AIR STATION MOFFETT FIELD

Naval Air Station Moffett Field is an airfield used primarily by P-3 Navy Antisubmarine aircraft to facilitate their patrol of Pacific Coast waters, but also serves the Ames Research Laboratory at the National Aeronautics and Space Administration (NASA).

The 2,263 acre site has two parallel runways separated by 625 feet and fully instrumented. One is 9,200 feet long and 200 feet wide; the other is 8,124 feet long (7,517 feet with displaced threshold) and 200 feet wide. There are 4 aircraft maintenance hangars and 472,300 square yards of aircraft parking apron.

There is an air traffic control tower in operation at Moffett Field.

The facility can be reached easily by State Highway 101, and is linked to an intricate highway network nearby. Public transit serves the front gate of Moffett Field.

TRAVIS AIR FORCE BASE

Travis Air Force Base is an active military airfield when duty calls. The base was heavily used to transport military personnel back from the Persian Gulf conflict. The facility has 2 parallel 11,000 foot runways and significant passenger processing facilities.

State Route 12 and Interstate 80 provide ground access for Travis AFB.

__Private Use General Aviation Airports__

Over half of the private general aviation airports in the region are airfields made up of a short, unpaved runway (1,500 - 3,700 feet). The balance, hard surface runways, vary in length from 1,700 feet to 2,600 feet. All are without navigational aids. Minimal aircraft storage and support facilities are generally provided.

The Commodore Center Seaplane Base is located in lower Marin County. It has a 10,000 foot takeoff/landing area length.

BASED AIRCRAFT

This section presents based aircraft fleet mix data for the following groups of airports in the system: commercial service airports, public use general aviation airports, military airports, and heliports. The distribution of the based rotorcraft and of the total based aircraft by county is then illustrated.

The existing based aircraft are categorized as: single engine piston, multi-engine piston, jet, rotorcraft, and other. Single engine piston aircraft are typically privately owned airplanes used for recreation or training. Multi-engine piston may be aircraft used for this purpose as well as for corporate charter, and for air taxi or commuter flights. The jets based at the public use airports are mostly small business jets. Based rotorcraft are generally helicopters used in Emergency Medical Services (EMS) as well as commercial applications. A complete set of numbers is provided in the data summary table, Exhibit 4.23.

Commercial Service Airports

Most of the air carrier airports in the region are home to a significant number of general aviation aircraft. Concord, with 635, and San Jose, with 680, have the greatest number of based aircraft. Sonoma County airport has 454 based aircraft. Oakland, which has lost significant numbers of based general aviation aircraft in the past 10 years, now has 409 based aircraft, all of which are located at North Field. San Francisco, the exception to the above statement, has very few based general aviation aircraft (29) as most of the airport is devoted to passenger and air cargo activities.

Of the five commercial service airports in the region, San Jose is perhaps the dominant corporate/business airport, having the greatest number of twin engine piston powered aircraft, business jets, and rotorcraft. Oakland North Field has a similar focus reflected in their based aircraft mix, yet South Field has no based aircraft. San Francisco caters to the commercial aviation market as noted above.

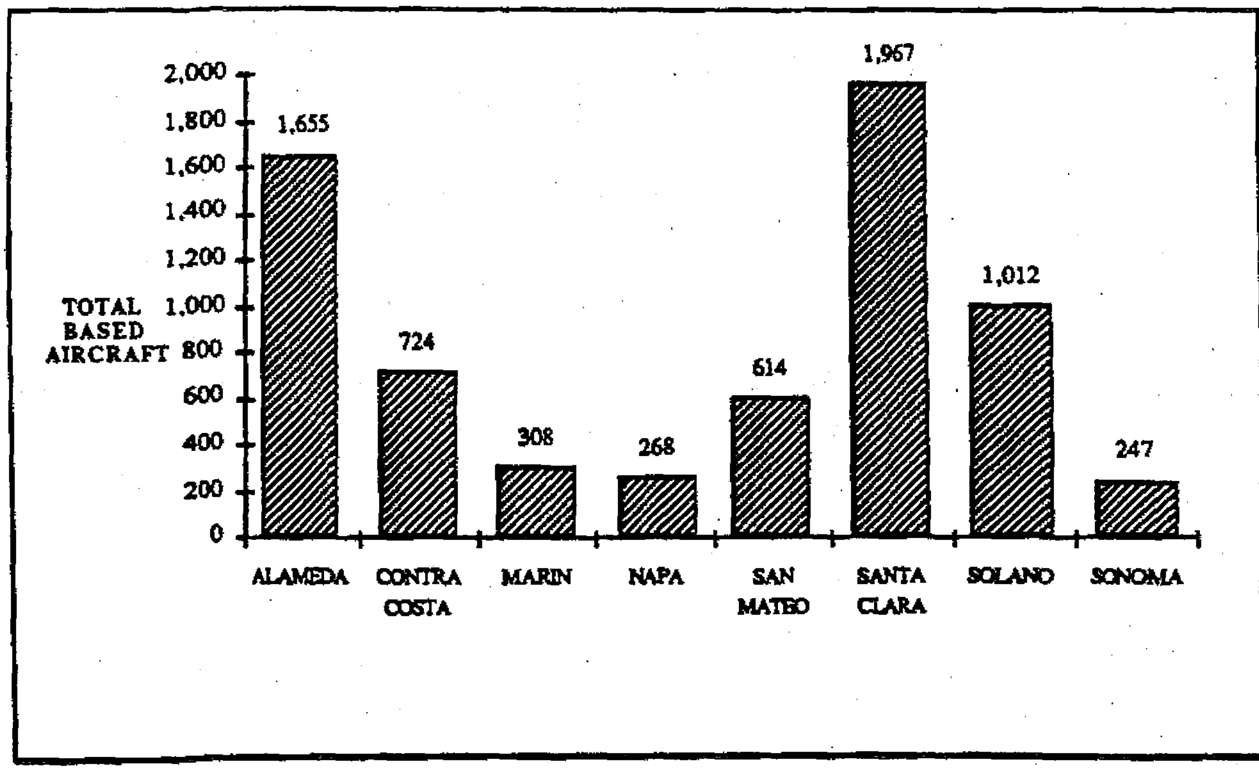
General Aviation Airports

The number of based aircraft at the general aviation airports varies widely by facility. Several airports have over 600 based aircraft, most of which are single engine piston airplanes. Only Hayward, Livermore, and Santa Rosa Air Center have more than one based jet aircraft. Gnoss Field has one; the balance have none at all. The small number of rotorcraft in the system are based at a few GA airport locations across the region, including Hayward, Gnoss, Napa County, Half Moon Bay, and Livermore. Few of the public use general aviation airports have based gliders except Byron, which has 24 gliders in the mix of based aircraft. At Sky Soaring, a prominent gliderport, 20 of the 23 based aircraft are gliders. The seaplane base in Marin County, Commodore Center, has 3 based aircraft.

Hayward Air Terminal has the largest number of twin engine aircraft, while Oakland has the most jets and rotorcraft. Of the 50 based jet aircraft in the system Oakland has 68% (34), while Hayward has some 18% of the total system's multi-engine GA aircraft (114 of 636). This reflects these two airports' importance to corporate and business aviation users. The chart below, Exhibit 4.14, displays the distribution of general aviation based aircraft by county, and clearly shows the dominance of Alameda and Santa Clara Counties in general aviation activity.

Exhibit 4.14

DISTRIBUTION OF BASED GENERAL AVIATION AIRCRAFT BY COUNTY (1990)



Military Airports

The aircraft based at the military facilities are quite varied in type and capability. The number may change at any time due to the state of the national defense. NAS Moffett Field, for example, functions primarily as a base and practice field for pilots of the P-3, the Lockheed Orion anti-submarine aircraft. Thus of the over 121 based aircraft (1988), about 74 are the P-3. Sixteen of these based aircraft are helicopters. NAS Alameda is home to some 56 U.S. Navy aircraft (1988) including approximately 16 Douglas A-4 Skyhawks, attack aircraft carried shipboard, 13 of the Vought A-7 Corsair II, also an attack jet, and 10 Douglas KA-3B Skywarriors, a refueling aircraft. The total includes 12 based helicopters. Hamilton Field currently has no based aircraft. Though it is used by the U.S. Coast Guard, they do not base any vehicles there.

Heliports

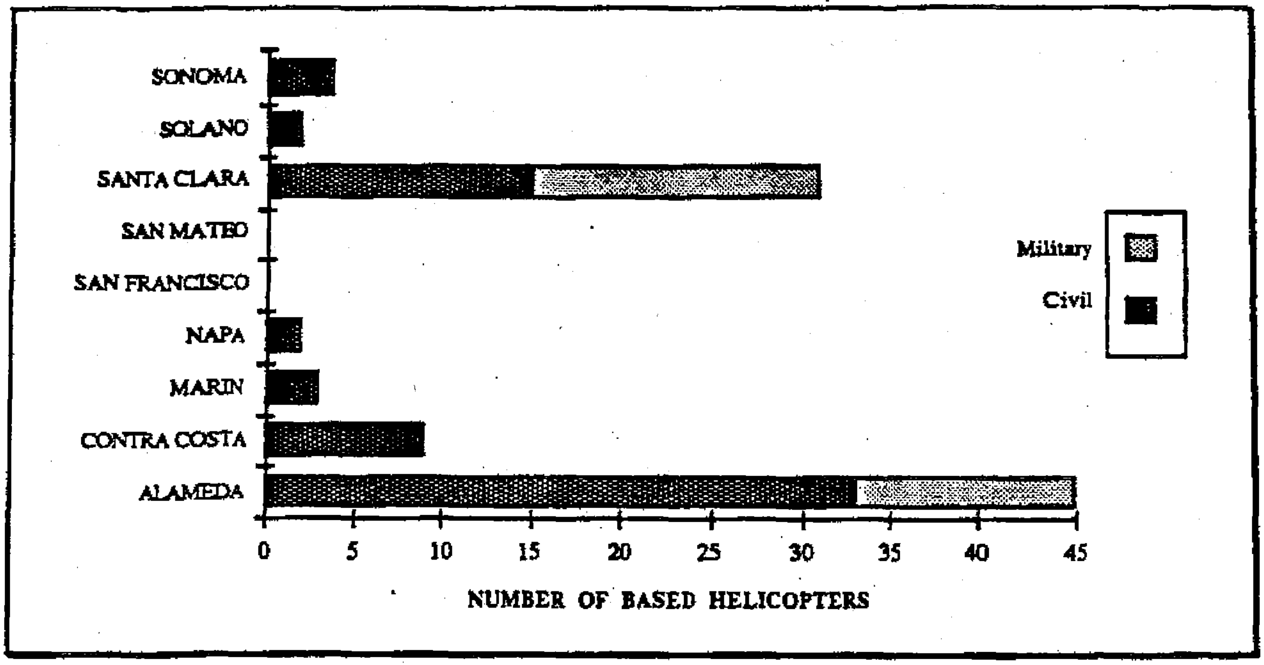
There are rotorcraft based at several of the airports in the region, with based operators serving a variety of clients. Many of the operators provide aircraft leasing services or flight services to these varying customers. The role of these based rotary-wing aircraft may include rescue, Emergency Medical Services (EMS), aerial inspection and photography, training, and corporate shuttle.

There are EMS operators in the region including CALSTAR (California Shock/Trauma Air Rescue) with its Aerospatiale AS-344 Twin Star based at Hayward Air Terminal, and Life Flight, which has its MBB BK-117 based at Stanford University Hospital.

The location of these based aircraft throughout the region illustrates in part the potential for quick response in the event of a natural disaster or large scale emergency. The largest number of based rotorcraft are housed at Oakland's North Field, San Jose International, Buchanan Field, and Hayward Air Terminal. Exhibit 4.15 shows the distribution of helicopters based at public use airports by county, and includes military helicopters. The rather limited number of public use heliports and private heliports region-wide suggests that few helicopters are unaccounted for in this survey, and this rotorcraft distribution will be representative of that overall. Exhibit 4.15 reveals that Alameda and Santa Clara Counties have by far the greatest number of based rotorcraft. This may be due to the nature of the activities in these counties; major military facilities are located there in addition to various corporate headquarters based in Alameda County and the high-tech business corridor in Santa Clara County. San Mateo and San Francisco counties have a scarce supply of based helicopters as do Solano and Napa counties.

Exhibit 4.15

DISTRIBUTION OF BASED ROTORCRAFT BY COUNTY (1990)



AIRPORT ACTIVITY

Information about airport activity was collected for the year 1990 to document current levels and to provide a basis for forecasting. Airport activity information listed here includes enplaned passengers, annual aircraft operations, peak hour operations, and annual air cargo volume. The numbers are catalogued in Exhibit 4.23.

Commercial Service Airports

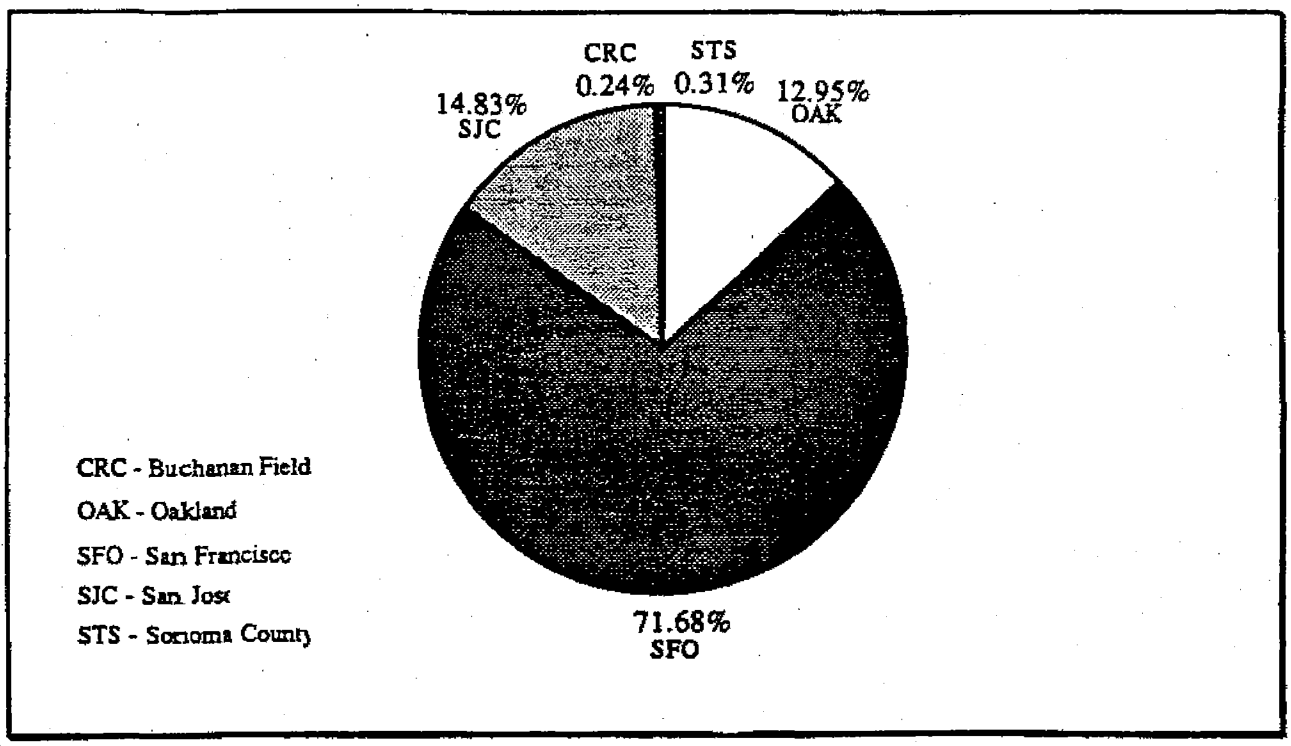
By definition the commercial service airports have air carrier operations on the airfield. An air carrier is an airline with scheduled transport of passengers or cargo. An air taxi is a carrier hired for transport using small aircraft (60 seats or less). Air taxi service with published flight schedules is referred to as commuter air carrier service. Commuter service is frequently referred to as *regional* service.

Commercial service airports maintain records of the number of enplaned passengers as a measure of the air carrier activity at the airport. The enplanement count encompasses scheduled air carriers, including commuters, but does not contain transfer passengers. The five commercial service airports enplaned 21,175,645 passengers in 1990. San Francisco International Airport enplaned 15,177,669 passengers, which is 71.7% of the region's total. San Jose enplaned 3,140,000 passengers (14.8% of the region's total) and Oakland enplaned 2,742,000 passengers (12.9%). Buchanan Field and Sonoma County enplaned 50,000 and 65,765 passengers respectively, accounting for the remaining 0.6% of the region's total annual passengers. The distribution of passenger enplanements is illustrated in Exhibit 4.16.

Exhibit 4.16

AIR CARRIER PASSENGER ENPLANEMENTS (1990)

DISTRIBUTION BY AIRPORT



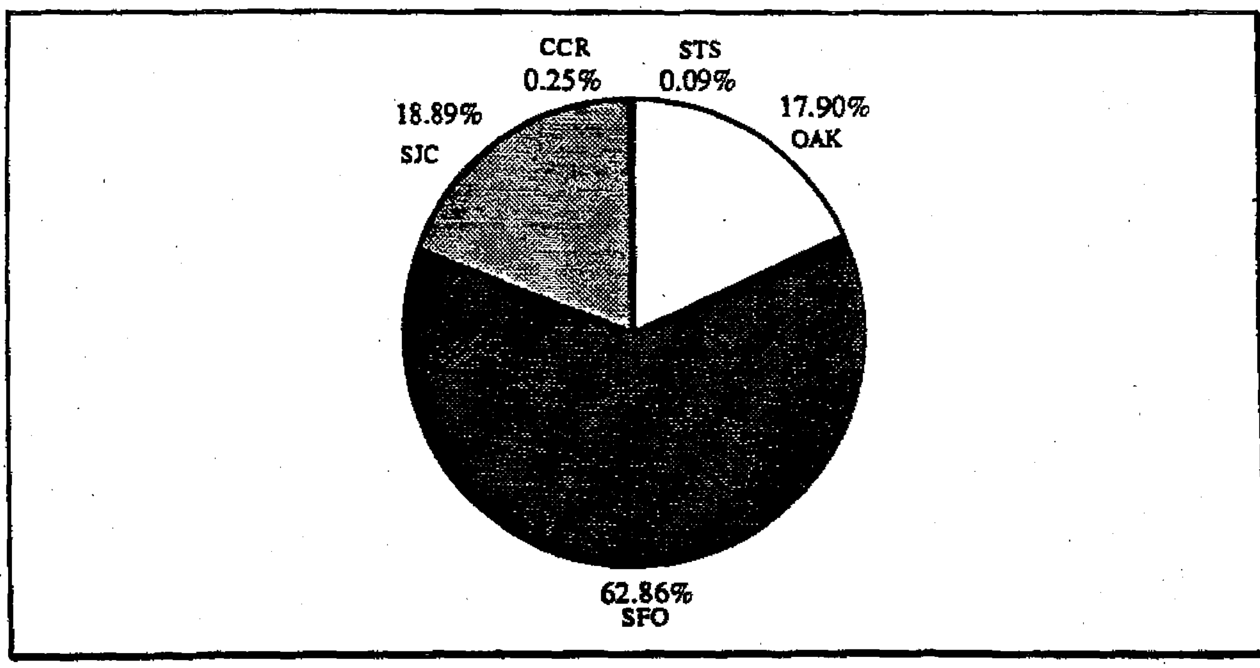
In 1990 San Francisco had over 430,000 operations. More than 90% of these were either commercial passenger flights or commuter operations. Although this still made SFO the busiest airport in the region, its share of the region's air carrier operations was only 65%, compared to its nearly 72% of the region's total passengers. Similarly its share of commuter/air-taxi plus air carrier operations was 58% of the total. Two factors may account for this: (1) many of SFO's international and other longer distance flights use larger passenger capacity aircraft; (2) SFO flights tend to have have higher load factors. In other words, SFO serves more passengers on more flights with larger aircraft and at higher load factors.

San Jose saw a total of 95,778 air carrier operations in 1990 (19.5% of the region's total) while Oakland South Field had 74,000 (15.1% of the total for the region). Concord, with 1,285 air carrier operations, accounted for 0.3% of the total, and Sonoma County, with 439 air carrier operations, had 0.1% of the region's total. Exhibit 4.17 shows the distribution of air carrier operations by airport.

Exhibit 4.17

AIR CARRIER OPERATIONS (1990)

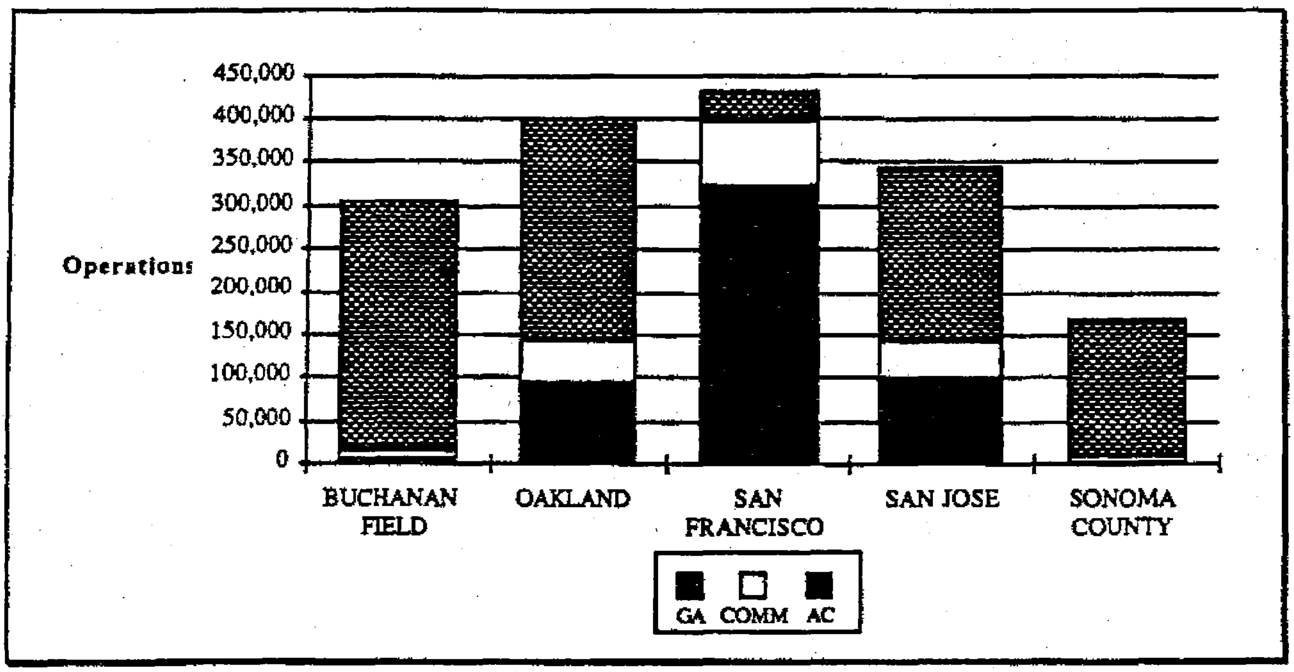
DISTRIBUTION BY AIRPORT



The following chart, Exhibit 4.18, displays the breakdown of total 1990 operations by type for the five commercial service airports. San Francisco has the highest volume of operations overall, including the greatest number of commuter and air taxi flights. Many of these flights provide regional connections for commercial air carrier operations. The total number of operations at Oakland International follows next behind that of San Francisco International. Most of the operations at Buchanan Field and Sonoma County are clearly devoted to general aviation, with some regional traffic and few air carrier movements per facility.

Exhibit 4.18

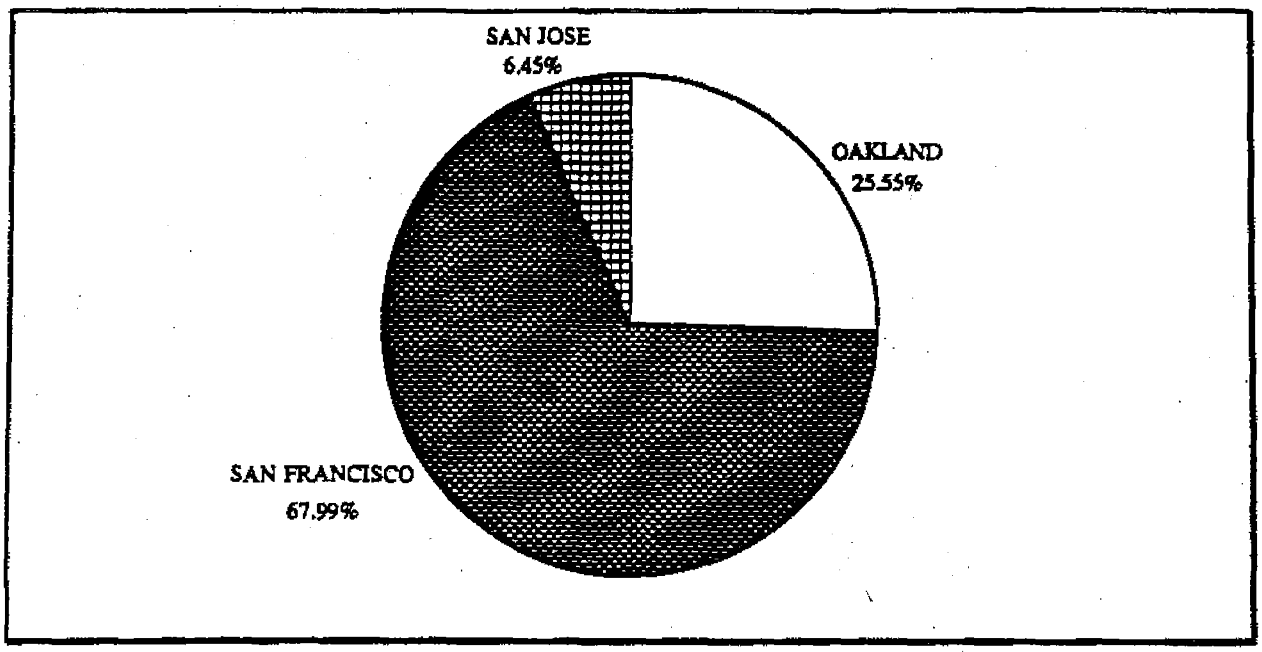
OPERATIONS BREAKDOWN BY AIR CARRIER AIRPORT (1990)



Air cargo activity for the year 1990 is concentrated at San Francisco and Oakland, with nearly 94% of the region's total air cargo processed at these two airports. The primary difference between the two is that most of San Francisco's cargo is belly and traditional air cargo, while Oakland has focused on overnight small package cargo operations, evident by the large presence of Federal Express. This is reflected in the numbers of all cargo operations at each airport. San Jose processes less air cargo (some 60,000 tons, or about 6% of the region's total). Concord and Sonoma County have very little air cargo activity, levels mostly attributable to local demand for overnight package services such as Federal Express and UPS. They have no appreciable all cargo operations. The air cargo activity split is illustrated in Exhibit 4.19.

Exhibit 4.19

DISTRIBUTION OF AIR CARGO (Tons, 1990)



General Aviation Airports

A few of the facilities have significant levels of operations. Hayward, Livermore, and Reid-Hillview had over 200,000 operations each in 1990. Gnoss, Napa County, Nut Tree, San Carlos, and South County have over 100,000 annual movements. Others, such as Byron, Cloverdale, Parrett Field, Rio Vista, and Sonoma Sky Park, have fewer than 20,000 annual operations. These airports also have small numbers of based aircraft.

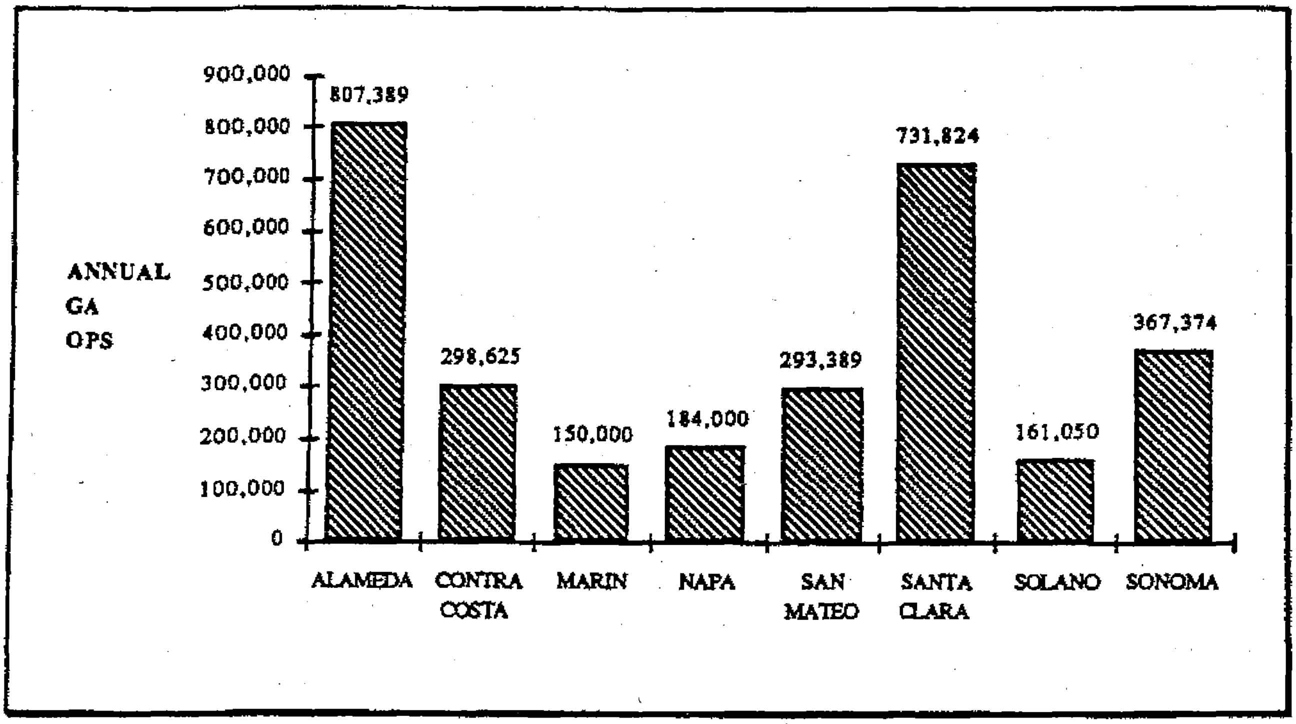
Exhibit 4.20 shows the distribution of general aviation operations by county. Comparison with Exhibit 4.14 illustrating the based aircraft distribution by county is somewhat revealing. Santa Clara County has the greatest percentage of based aircraft, but does not match the number of general aviation operations in Alameda County.

Military Airports

Awaiting data

Exhibit 4.20

DISTRIBUTION OF GENERAL AVIATION OPERATIONS BY COUNTY (1990)



CAPACITY

Comparison of existing facility capacity and existing levels of demand make it possible to assess the individual airports' ability to accommodate growth in activity. The capability analysis includes airside facility capacity and landside facility capacity. Airside facility capacity measures include peak hour runway capacity and annual runway capacity, expressed as annual service volume. Landside capacity components include based aircraft capacity, passenger terminal capacity, and air cargo capacity. Generally accepted methodologies exist for determining runway capacity, but methods for determining overall passenger terminal or air cargo facility capacity are not fully developed.

Airside Facilities

Airport airside capacity may be limited by a number of factors, including runway capacity, taxiway capacity, or gate capacity. The FAA has established standards for in-trail and lateral separations of aircraft which take into account air traffic control capabilities, fleet mix, and airfield configuration, and these affect the airside operational capacity. Operational constraints also include the length of the runways and the structural integrity of their pavement system. Larger aircraft need lengthy runways, and repeated utilization by heavier aircraft requires substantial runway strength.

The Annual Service Volume (ASV) is defined by the FAA Advisory Circular on Airport Capacity and Delay (FAA AC 150/5060-5) as *a reasonable estimate* of an airport's annual capacity. Differences in the number of runways and their configuration, runway use, aircraft mix, and weather are incorporated within the ASV value. The capacities at the commercial service airports in the region thus differ widely. Oakland and San Francisco have the highest annual capacities, each at or just in excess of 500,000 operations per year. The air carrier runway at Oakland has an ASV of 147,870 aircraft, North Field has 352,130. San Jose may accommodate 355,000 operations annually, and Concord and Sonoma County have service volumes of approximately 300,000 operations each.

Total peak hour capacity is noted as another constraint on the airport throughput. Both the capacities in visual flight conditions,VFR and instrument flight conditions, IFR have been included because dramatic reductions result from severe weather conditions. San Francisco exemplifies this significant change as it moves from 105 aircraft per hour VFR to 33 aircraft IFR. Similarly, San Jose has its airspace capacity restricted to a single instrument approach during IFR conditions.

As a region the general aviation airports are currently utilizing about 50% of the total annual airside capacity. The situation varies airport to airport. Byron, Cloverdale, Rio Vista, and Sonoma Sky Park are operating at less than 10% of their annual runway capacity. These airports have relatively low numbers of based aircraft as well. Other, larger airports are using much more of their runway capacity, including Gnoss Field at 65%, Livermore at 90% and San Carlos at 68%. The other general aviation airports range from 25% to 55% of their annual runway capacity. The commercial service airports are using over 80% of the available airside capacity.

The approach of the aircraft activity level to the annual service volume in the case of the commercial airports and at select general aviation airports signals a need to examine possible capacity expansion. Average aircraft delay will increase rapidly as the ASV is approached.

The commercial service airports are constrained considerably in the peak hour. Demand for runway access exceeds capacity in IFR conditions. To design exclusively for the peak hour has long been recognized in transportation to be excessive. The existing condition indicates, though, that substantial delays occur in the peak hour.

Landside Facilities

Landside facility considerations other than based aircraft capacity are addressed for the air carrier airports only. Landside activity limitations include the passenger terminal size, number of auto parking spaces, vehicular access, and aircraft parking capacity. To date insufficient research has been done to establish standards for passenger terminal capacities.

Current passenger capacity estimates at the three large commercial service airports are: 30 million for San Francisco, 8.5 million for Oakland, and 11.8 million for San Jose. San Jose has a terminal capacity shortfall. Single level Terminal C which houses nine airlines plus two commuter carriers is operating above design capacity, with some functions temporarily located at non-terminal building sites. San Francisco International has insufficient domestic and international terminal capacity. The passenger terminal at Oakland has immediate baggage handling and security shortfalls, but with the recent addition of 5 new gates has an adequate terminal capacity availability.

Ease of vehicular access and auto parking are also rather important capacity considerations. Measures include on site roadway level of service and curbside congestion. Roadway level of service is a measure of traffic flow conditions designated by the letters A through F, with A the highest level or best condition on the scale. San Jose has a current roadway Level of Service A. They are lacking in rental car parking, though. Oakland has considerable congestion at the passenger loading/unloading areas. Terminal access roadways at San Francisco International are inadequate in the peak periods when congested conditions develop around the terminal curbside, but seem to have sufficient long term and short term public parking space. Regional access is being improved by the work on U.S. Highway 101.

The based aircraft capacity at these facilities is ample, for the most part. This number is a total of the open tiedowns, shelters, t-hangers, and conventional hangers available for based aircraft parking. Concord, Sonoma County, Oakland, and San Jose have a relatively comparable number of spaces for based aircraft. The range is from 641 at Oakland, to 729 at Buchanan field. Oakland is at 64% of its based aircraft capacity and San Jose is feeling some pressure, currently operating at close to 100% of its based aircraft capacity. San Francisco International differs, offering 46 general aviation based aircraft places available (the 29 existing based aircraft represent 63% of capacity). Three of these commercial facilities, San Jose and San Francisco excluded, can currently support significant increases in their based general aviation activity.

The general aviation element of the airport system is currently at just under 80% of the total based aircraft capacity. Those airports having the highest occupancy rates are Byron (115.6%), Gnoss Field (97.2%), Hayward (127.8%), Nut Tree (103.8%), San Carlos (90.7%), and South County (130.7%). At the other end of the spectrum are Half Moon Bay at 56.6% of capacity, Napa County at 46%, and Santa Rosa Air Center at 38.3%.

Of more importance than total system capacity, however, is the regional distribution of available capacity in relation to demand. Santa Clara County, for example, has a total of only 463 based aircraft vacancies, and faces the potential loss of the general aviation capacity of Reid-Hillview and San Jose (with 806 and 670 based aircraft spots respectively). Alameda County's three general aviation airports are also heavily used, and have high based aircraft capacity utilization rates. This is rather important for Alameda is home to 26% of the based aircraft capacity in the region. Hayward Air Terminal is well beyond its capacity of 521 based aircraft and Livermore has 75% of its 773 spaces filled, while Oakland North Field has some room to grow, currently at 64% of based aircraft capacity. Buchanan Field and Byron serve Contra Costa County. Byron is currently over capacity and Buchanan Field sits at 87.1% filled. Available based aircraft parking may soon not meet the overall regional demand. Areas such as Santa Clara County may find themselves aircraft parking poor if certain circumstances prevail.

CONSTRAINTS

Previous sections outlined existing airport facilities, levels of airport activity, numbers of based aircraft, and the airports' physical capability to accommodate current and future demand. There are additional factors beyond the airports' physical capacity, however, which place limitations on how much activity can and will take place at each airport. These constraints are airspace, environmental, physical, and policy.

Airspace constraints relate to regional airspace issues. The nine-county region contains over 50 airports which in 1990 generated over 4,000,000 operations. This translates to almost 11,000 operations in the region every day. The region's five commercial service airports enplaned over 21,000,000 total passengers in 1990, making it the sixth busiest region in the nation. With this level of aviation activity the regional airspace is congested and complex. From an air traffic standpoint all of the region's airports are interrelated, and affect each other. In planning for the total airport system it is therefore necessary to evaluate the airspace environment.

Environmental constraints as discussed here are those related to the natural environment, including such things as wildlife, wetlands, and San Francisco Bay. Two of the major commercial airports, Oakland and San Francisco, are situated on the Bay, and host a variety of wildlife. Development at Oakland is also affected by the presence of non-Bay wetland areas. Wetlands exist to a lesser degree at other airports as well. Construction of new runways which affect wetlands or require Bay fill will not meet with general favor. Public opposition to capacity increasing measures may be strong and well organized.

Physical constraints may be manifested in a variety of ways, including such things as limited airport size or the presence of physical barriers to growth such as highways, railroads, rivers, or buildings.

Policy constraints include noise, safety, and other community compatibility issues. In the face of such constraints, individual facilities may find it difficult to expand in order to meet growing demand. Land and airside expansion may be questioned by the interests for the environment and of the community. Neighborhoods affected by overflight noise will be reluctant to allow growth which will promote substantial increases in commercial aircraft activity, and the noise which may some with that activity. Terminal expansion, for example, may be viewed by residents affected by aircraft noise as a vehicle for bringing many more flights overhead with the additional passenger processing capability, and opposed as strongly as runway capacity increases. Other constraints on airport utilization include restrictions placed upon air traffic due to community concern. These additional qualifications may supersede the theoretical operating capacities discussed above.

These constraints have historically shaped the growth and development of the entire regional airport system, and will continue to do so in the future. This section identifies limitations on current operations and addresses factors potentially constraining future airport development and growth. These constraints are discussed in some detail for the individual commercial service airports and more generally for the military, general aviation, and heliport.

Airspace Constraints

Safety is the greatest concern in aviation and to maintain safe conditions limitations have been imposed by the FAA in order to manage the regional airspace. New technological advancements, when developed and implemented, may allow for more aircraft to be safely processed within the terminal areas.

There is a substantial amount of interaction among the operations at the numerous airports in the region, requiring an established user's hierarchy for normal (non-emergency) conditions. The air traffic pattern at San Francisco International is dominant because the volume of air carrier traffic generated as a percentage of the total is so much greater than that of the other airports, and traffic associated with other facilities must conform.

The operations at military facilities in the region can cause flight delays into and out of nearby commercial airports as the FAA recognizes the importance of United States defense requirements. Civil flights will have to yield to military operations. The proximity of Alameda NAS to Oakland will affect Oakland operations though a minimal number of interruptions will occur in a year.

Other conflicts due to proximity are several. In instrument conditions, conflict between aircraft simultaneously approaching Hayward and Oakland will result in a delay to that using Hayward Air Terminal.

Flight in the region is regulated by various controls and restrictions identified by the FAA. These may hinder flight in the region.

Controlled airspace is identified in the following ways:

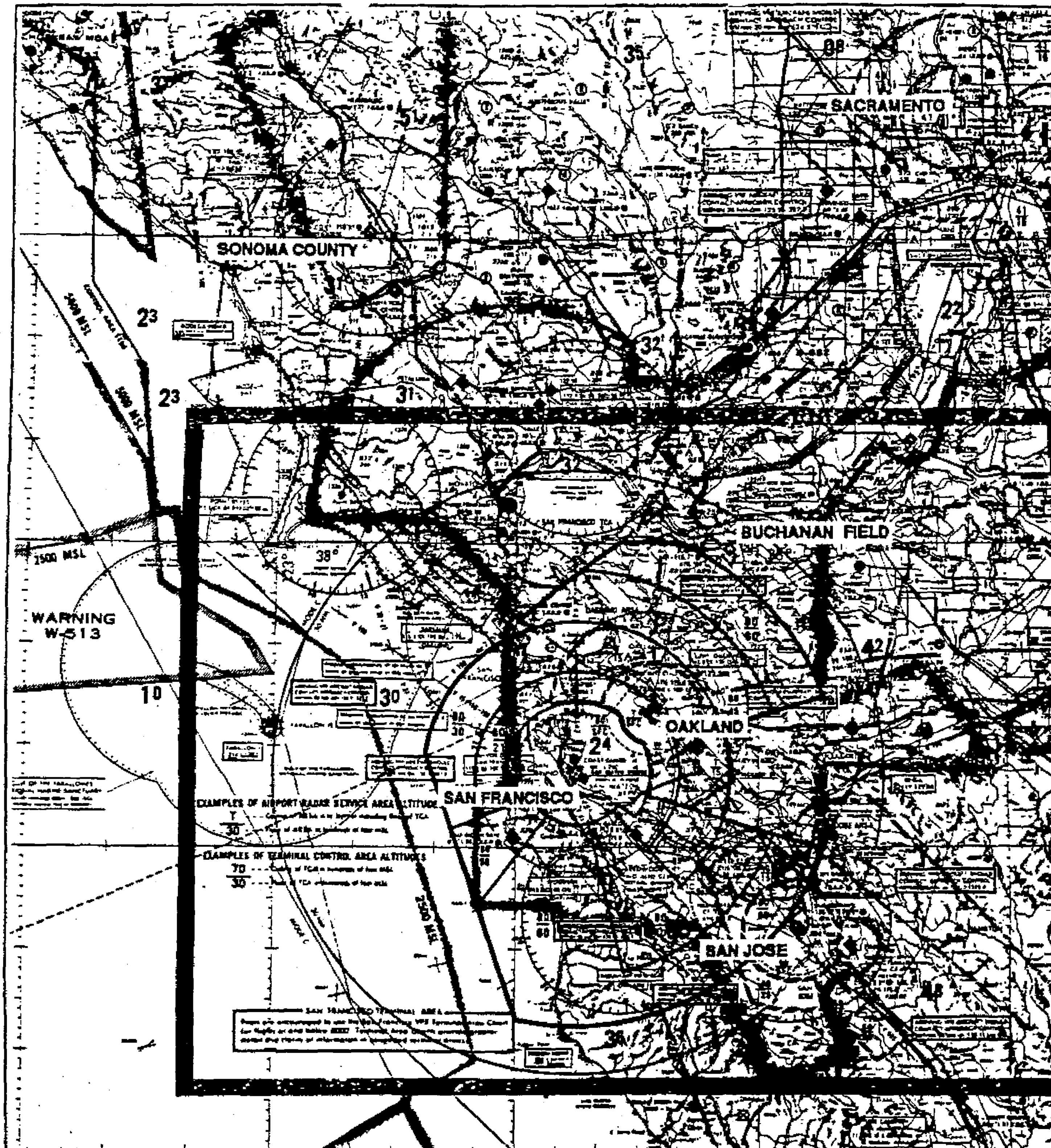
- Terminal Control Areas (TCA): [permission and communication required, speed restricted]
- Terminal Radar Service Areas (TRSA) : [no permission required, communication required, speed restricted]
- Airport Radar Service Areas (ARSA): [permission required, speed restricted]
- Control Zones: [permission req'd, contact req'd IFR, speed restricted]
- Control Areas: [permission req'd, contact req'd IFR, speed restricted]
- Transition Areas: [permission req'd, contact req'd IFR, speed restricted]
- Continental Control Areas: [permission and communication required IFR, speed restricted]
- Positive Control Areas: [entry prohibited VFR , permission and communication required IFR]

Special Use Airspace includes:

- Alert Areas: [no permission to enter, communication required IFR, speed restrictions]
- Controlled Firing Areas: [speed restricted]
- Military Ops Areas: [restricted entry]
- Prohibited Areas: [no entry permitted]
- Restricted Areas: [permission required, speed restricted]
- Warning Areas: [communication required IFR]

In the study region, San Francisco is a Terminal Control Area. Oakland and San Jose are Airport Radar Service Areas. The airspace is mapped in Exhibit 4.21.

The chart in Exhibit 4.22 indicates the type of airspace for airports in the study region.



Source: NOAA-San Francisco Sectional Aeronautical Chart.

MTC

Regional Airport System Plan

Exhibit 4.22

AIRSPACE

Exhibit 4.22

TYPE OF AIRSPACE BY AIRPORT

MAJOR COMMERCIAL SERVICE AIRPORTS	CONTROL ZONE	In or TCA	Under ARSA	STANDARD INSTRUMENT DEPARTURE	STD. TERMINAL ARRIVAL ROUTE
BUCHANAN FIELD	Y				Y
OAKLAND INT'L	Y	Y	Y	Y	Y
SAN FRANCISCO INT'L	Y	Y		Y	Y
SAN JOSE INT'L	Y		Y	Y	Y
SONOMA COUNTY	Y			Y	
GA/MILITARY AIRPORTS					
ALAMEDA NAS	Y	Y	Y		
BYRON					
CLOVERDALE MUNICIPAL					
GNOSS FIELD	Y				
HAMILTON AFB	Y	Y			
HALF MOON BAY		Y			
HAYWARD AIR TERMINAL	Y	Y	Y		
HEALDSBURG MUNICIPAL	Y				
LIVERMORE MUNICIPAL	Y				
MOFFETT FIELD	Y	Y	Y		
NAPA COUNTY	Y			Y	
NUT TREE	Y				
PALO ALTO	Y	Y			
PARRETT FIELD					
PETALUMA MUNICIPAL	Y				
REID-HILLVIEW	Y				
RIO VISTA MUNICIPAL	Y				
SAN CARLOS	Y	Y			
SANTA ROSA AIR CENTER	Y				
SKY SOARING	Y	Y			
SONOMA SKY PARK	Y				
SONOMA VALLEY	Y				
SOUTH COUNTY					
TRAVIS AFB	Y				

SOURCE:
Adapted from CALTRANS CASP Inventory, August, 1990

Environmental, Physical, and Policy Constraints

Future growth will be limited by on site development constraints, qualified here. Constraints on facility expansion will be noted for the major commercial airports and the others for whom the issue is quite significant.

SAN FRANCISCO

The San Francisco International Airport plays an important role in the community, and in working toward being a good neighbor has had to restrict its activities in several ways. Regulation has long been instituted at San Francisco International to control the noise affecting the community. Most recent noise abatement regulation was instituted in 1988 by the Airports Commission, and restricts airport noise by requiring conversion by operators to quieter Stage 3 aircraft and limiting nighttime use by aircraft other than Stage 3 type. The Airports Commission is now studying the possible modification of the runway configuration to relieve noise impacts on incompatible areas.

Additionally, SFO is constrained by the absence of sufficient land area for a new runway and passenger terminal development. The airport is landlocked by the Bayshore Freeway (Highway 101) to the west, and San Francisco Bay to the north, east, and south. Any major new runway development would likely involve Bay fill. There are a number of undeveloped areas on site, identified already in the facilities section of this chapter, which could be used for support facilities. Future development at the airport is limited to these parcels or to redevelopment of existing facilities.

OAKLAND

Metropolitan Oakland International Airport has no curfew and no limit on the number of daily or annual operations. It does enforce noise abatement procedures to reduce noise impacts on the residential communities around the airport.

Although Oakland airport has considerable land area which could accommodate development of passenger, air cargo, general aviation, or other facilities, the airport has significant areas of environmentally sensitive property. These areas have created development constraints at Oakland in the past. These include habitat for endangered species at the west end of runway 11-29; scattered wetland areas throughout the airport; several open water areas; and scattered wildlife habitat related to these wetlands. Although these areas do not significantly constrain passenger terminal development, they may limit the long term development of air cargo, aircraft maintenance, and other support facilities.

In addition, Oakland is constrained by the presence of San Francisco Bay to the southeast, southwest, and northwest of the primary air carrier runway. Extension of this runway would involve Bay fill. Construction of an additional air carrier runway at South Field would involve either Bay or wetland fill, or both. Either of these options may face strong political opposition.

SAN JOSE

San Jose International Airport has established a number of operational restrictions to address the noise and safety issues, and to reduce the airport's impacts on adjoining communities. In addition to noise abatement flight tracks and arrival and departure procedures, San Jose has established a curfew which limits the hours of airport operation. The airport is closed between the hours of 11:30 PM and 6:30 AM. This limits the total daily activity which can occur at the airport, and also creates some congestion during the morning hours. If continued into the future, the curfew will constrain activity at the airport and cause increased congestion within the available operating time envelope.

San Jose International Airport is located within an intensely developed urban area and operates on an extremely limited site. The 1,050-acre site is not sufficient to accommodate all aviation demands. As a result, future development will involve difficult choices between competing sectors, including passenger facilities, air cargo development, and general aviation.

Because of its location and limited size, San Jose is highly constrained by existing development. The runway system is limited in length by the Bayshore freeway (highway 101) on the north and Interstate 880 on the south. To the west and east the airport is limited by urban development and the Guadalupe River, respectively. The passenger terminal area is also highly constrained by the size and shape of the land available between the runways and the airport access road and the river. In addition, the presence of high rise towers in the vicinity of the airport will constrain the airport in its planning for facility improvements and operational expansion.

CONCORD

Nestled in the northern part of Contra Costa County, Buchanan Field has, by County policy, placed limitations on both its general aviation and commercial airline capacity. The total number of based aircraft is limited to a maximum of 850 spaces, a level forecasted in the Master Plan for the year 2005. Along with this restriction on growth of general aviation activity, air carrier and commuter airline service are limited. Air carrier service is capped by policy at 7 flights daily, and the commuter service is held at a similar level, leaving the enplaned passenger potential at less than 180,000 in the year 2010, according to their Master Plan. Pavement strength and runway length will create their own restrictions on air carrier possibilities, they noted. Physical restraints prevent runway extension.

SONOMA COUNTY

The County of Sonoma has placed restrictions on its airport operations and facilities development in order to meet its goal of safe and compatible air service. Commercial air carrier flights at Sonoma County Airport, involving commuter and scheduled airline service, are restricted in number and in combination by the County. Of the 21 commercial departures permitted daily, scheduled air carriers may use only up to 14 of the 21 available slots, and commuters may utilize up to 13 of the total number of departure spaces available. Aircraft used in eight departure slots held for scheduled airlines are required to have 50 seat capacity. Length of runway, for new or existing construction, is held at 5,000 feet, and runway strengthening is deemed undesirable, with a 95,000 pound limit therefore on gross takeoff and landing weight.

Military Airports

Alameda NAS is in a highly developed area which almost precludes future facility expansion. Possible development on the Alameda Estuary nearby could encroach on operations. Also, office development in downtown Oakland may obstruct Alameda NAS airspace. Airspace capacity is also realistically a concern when considering any growth in their operations. The community is concerned with the activities at this military facility, and has limited approaches to Runway 7-25.

Many groups have interest in the future of Hamilton Field as it is also in a well developed area of the region, located in Marin County. Hamilton Field has property which includes many wetland areas, and as redevelopment of the land is considered, their preservation may be a prominent concern. The land is valuable and there is possible pressure to sell the land for other development. If there is a rise in the number of flights, there is a potential for neighborhood objection to noise levels.

NAS Moffett Field is surrounded by communities, which makes it difficult for it to be a completely compatible neighbor. Close to 900 units of Navy and Air Force family housing on site could be affected by additional aircraft operations.

Travis AFB is in the less densely populated area of northern Solano County, near the city of Fairfield. The joint use agreement between the County of Solano and the U.S. Air Force limits the number of operations to twelve per calendar day. Scheduled air carrier operations only are permitted. This agreement was established in 1971.

General Aviation Airports

Many of the same issues facing the larger airports will be met by the smaller ones. Noise is the major environmental issue even in neighborhoods surrounding facilities catering to small aircraft. Communities are also concerned for safety and air and water quality. The airports may also be landlocked. Those most affected are listed here.

- Fremont
- Gnoss
- Hayward
- Reid-Hillview
- San Carlos

Heliports

The Bay Area has a rather negative public perception of heliports and helicopters. The noise generated by helicopters is slightly different from that of conventional aircraft and is easily recognizable. Rotorcraft often fly overhead at lower altitudes making them more conspicuous. Noise abatement procedures and operator-community cooperation can perhaps over come the difficulties of the helicopter's disrepute.

Airport Plans / Capital Improvement Programs (CIP'S)

The master plans of each airport have been reviewed to identify future improvements and anticipated facility expansion by airport. Examination of their capital improvement programs (CIP's) will provide clues to the funding levels and areas in which they are focused. Plans and policies of agencies at varying levels of government who may affect future change are also identified.

Airport Plans

Detailed information about the regional air carrier airports' master plans is provided, with a summary of general aviation airport plans.

SAN FRANCISCO

San Francisco International Airport plans to accommodate future growth by expanding and improving passenger and cargo processing facilities and maintenance facilities. Less emphasis has been placed on airfield modifications. Their Master Plan, completed in November of 1989, identifies various improvements for initiation in the near term, Fiscal Year 1989- 1996, and the long term, Fiscal Year 1997 - 2006.

Near Term

Terminal

• The International Terminal will be replaced by a new facility with a consolidated airport administration space.

Ground Transportation

• A Ground Transportation Center (GTC) will be developed to consolidate ground transportation activities currently scattered curbside. The new structures, one on each side of the airport entry road will be connected to the terminal area by an automated people mover system.

Airline Maintenance Facilities

• Existing Pan Am maintenance/administration facility will be relocated to the north due to construction of new Boarding Area A.

• An East Field maintenance hanger complex to be located on a presently undeveloped parcel will allow for consolidation of aircraft maintenance facilities.

General Aviation Facilities

• Existing GA facilities and the fixed based operators are to be relocated form the West Field to the East Field in order to reconfigure air freight operations.

Air Freight

• West Field and North Field apron and ground access will be restructured to allow for more room to process air freight.

Parking

• Additional short term public parking will be made available with the construction of the Ground Transportation Center.

• At two sites long term public parking will be added.

Roadway

• New two level roadway system will be constructed to serve the International Terminal and the GTC.

• The CALTRANS interchange will better separate incoming traffic.

Airfield

• Installation of a Microwave Landing System.

• Extension of Taxiway L to Runway 19L.

• Extension of Taxiway V to Taxiway L.

• Construction of high speed exit taxiway Z at Runway 19L and Taxiway F.

• Construction of high speed exit taxiway Y at Runway 10L and Taxiway L.

Long Term

Terminal

• Replace eastern section of Boarding Area B

Public Transportation

• Extend APM to Lot D - long term public parking

• Connect APM to possible BART station on west of Bayshore parcel

Air Freight

• Added air freight/maintenance facilities in the West Field area

• Addition to U.S. Mail Processing Facility

Commercial/Office

• Develop commercial office building on site

Airfield

• Expand South Terminal ramp area to accommodate reconfiguration of Boarding Area B.

• Realign Taxiways A and B.

OAKLAND

Oakland's plans involve meeting growth in air carrier operations by improving airside capacity and acting on many landside improvements. The air cargo market is important to them as is the general aviation market. Plans include:

- Construct new air carrier runway with parallel taxiway
- Expand terminal to 42 gates
- Construct parking garage
- Terminal roadway improvements
- Develop additional 100 acres for air cargo
- Develop expanded GA apron and tie-downs
- Construct new ARFF facility
- Construct new international arrivals facility
- Construct BART connection

SAN JOSE

Future plans at San Jose International include work on both the air side and land side of the airport. Their master plan should be completed by mid-1991.

Airfield
- Extend runway 12L-30R to 8,900 feet (included in previously adopted master plan)
- Reworking of the taxiways.
- Pavement management rehabilitation work on the airfield.

Terminal
- Reconstruction of passenger terminal C and construction of new passenger terminal B.
- Construction of a new air traffic control tower.

Parking
- Construct new parking garages.

General Aviation
- Relocation of all GA to west side of airport.
- Reduce total number of GA based aircraft.

Air Freight

• New air cargo facilities.

Other

• Installation of a fuel farm.

Roadway

• Terminal area roadway improvements .

BUCHANAN FIELD

The Buchanan Field master plan is a balanced response to anticipated general aviation and air carrier/commuter demand. They have focused their efforts on best utilizing available land on site, respectful of the existing airport configuration. No runway extension has been suggested, but there will be work done on the taxiway system. This master plan was completed in 1988.

Airfield

• Redesign taxiway system leading to Runway 32-L and nearby multi-taxiway intersection.

• New Taxiway M parallel to Runway 1L-19R.

General Aviation

• Increase GA parking from 629 spaces to 849 based aircraft parking spaces

• Increase transient aircraft parking form 37 to 69 spaces.

• Add other hangar spaces and tiedowns

Terminal

• Construction of an airline terminal on the west side of the airport to accommodate 180,000 annual enplaned passengers and a restaurant. There would be 700 adjacent auto parking spaces.

Other

• Crash/fire/rescue building

• A fuel farm

SONOMA COUNTY

Forthcoming

County, Other Plans

Sonoma County is recommending removing Santa Rosa Air Center from use because it is not compatible with is surroundings. The county is home to a fair number of the region's based aircraft. Consideration is also being given currently to the closing of Reid-Hillview in Santa Clara County.

Capital Improvement Programs

Forthcoming

Exhibit 4.23

MTC REGIONAL AIRPORT SYSTEM PLAN UPDATE – PUBLIC USE AIRPORTS INVENTORY

MAJOR COMMERCIAL SERVICE AIRPORTS	OWNERSHIP	LOCATION (COUNTY)	AIRPORT CLASS.	NUMBER OF RUNWAYS	LENGTH OF LONGEST RUNWAY	INSTRUMENT APPROACH	ATC TOWER	ROTORCRAFT FACILITIES	AIRPORT SIZE IN ACRES	AUTO PARKING LOT CAPACITY
BUCHANAN FIELD	PUBLIC	CONTRA COSTA	TRANSPORT	4	4,400	NON-PRECISION	YES	3 HELIPADS	578	
OAKLAND (S. FIELD)	PUBLIC	ALAMEDA	TRANSPORT	1	10,000	PRECISION	YES	HELIPAD	1,600	6,300
SAN FRANCISCO INT'L	PUBLIC	SAN MATEO	TRANSPORT	4	11,870	PRECISION	YES	OPS	5,270	9,338
SAN JOSE INT'L	PUBLIC	SANTA CLARA	TRANSPORT	3	8,899	PRECISION	YES	OPS	1,050	8,250
SONOMA COUNTY	PUBLIC	SONOMA	GU	2	5,115	PRECISION	YES	2 HELIPADS	940	
COMMERCIAL SUB-TOTAL									9,438	23,888
GA/MILITARY AIRPORTS										
ALAMEDA NAS	MILITARY	ALAMEDA	MILITARY	2	8,000	PRECISION	YES	2 HELIPADS	1,521	
BYRON	PUBLIC	CONTRA COSTA	BU	2	2,600	NONE	NO		305	
CLOVERDALE MUNICIPAL	PUBLIC	SONOMA	BU	1	3,155	NONE	NO		58	
GNOSS FIELD	PUBLIC	MARIN	BU	1	3,300	NONE	NO	OPS	90	
HALF MOON BAY	PUBLIC	SAN MATEO	BU	1	5,000	NONE	NO	OPS	325	
HAMILTON FIELD	MILITARY	MARIN	MILITARY	1	8,000	PRECISION	NO			
HAYWARD AIR TERMINAL	PUBLIC	ALAMEDA	TRANSPORT	2	5,024	PRECISION	YES	2 HELIPADS	543	
HEALDSBURG MUNICIPAL	PUBLIC	SONOMA	BU	1	2,707	NONE	NO		50	
LIVERMORE MUNICIPAL	PUBLIC	ALAMEDA	TRANSPORT	2	4,005	PRECISION	YES	OPS	510	
MOFFETT NAS	MILITARY	SANTA CLARA	MILITARY	2	9,200	PRECISION	YES	OPS	2,263	
NAPA COUNTY	PUBLIC	NAPA	GU	3	5,931	NON-PRECISION	YES	OPS	735	
NUT TREE	PUBLIC	SOLANO	BU	1	3,818	NON-PRECISION	NO	OPS	227	
OAKLAND (N. FIELD)	PUBLIC	ALAMEDA	TRANSPORT	3	6,211	PRECISION	YES	OPS	960	
PALO ALTO	PUBLIC	SANTA CLARA	BU	1	2,500	NONE	YES	OPS	182	
PARRETT FIELD	PRIVATE	NAPA	BU	1	3,217	NONE	NO		80	
PETALUMA MUNICIPAL	PUBLIC	SONOMA	GU	1	3,600	NON-PRECISION	NO	OPS	220	
REID-HILLVIEW	PUBLIC	SANTA CLARA	BU	2	3,100	NON-PRECISION	YES	OPS	179	
RIO VISTA MUNICIPAL	PUBLIC	SOLANO	BU	2	3,080	NON-PRECISION	NO		141	
SAN CARLOS	PUBLIC	SAN MATEO	BU	1	2,600	NONE	YES		110	
SANTA ROSA AIR CENTER	PRIVATE	SONOMA	GU	1	7,000	PRECISION	NO		900	
SONOMA SKY PARK	PRIVATE	SONOMA	BU	1	2,500	NONE	NO		27	
SONOMA VALLEY	PRIVATE	SONOMA	BU	2	2,700	NONE	NO		79	
SOUTH COUNTY	PUBLIC	SANTA CLARA	BU	1	3,100	NONE	NO		179	
TRAVIS AFB	MILITARY	SOLANO	MILITARY	2	11,000	PRECISION	YES			
GA SUB-TOTAL									9,344	0
SYSTEM GRAND TOTAL									18,782	23,888

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MTC REGIONAL AIRPORT SYSTEM PLAN UPDATE -- PUBLIC USE AIRPORTS INVENTORY

MAJOR COMMERCIAL SERVICE AIRPORTS	SGL ENGINE PISTON EXISTING BASED AIRCRAFT	MULT-ENGN PISTON EXISTING BASED AIRCRAFT	JET EXISTING BASED AIRCRAFT	ROTOR-CRAFT EXISTING BASED AIRCRAFT	OTHER EXISTING BASED AIRCRAFT	TOTAL EXISTING BASED AIRCRAFT	BASED AIRCRAFT CAPACITY	PERCENT OF CAPACITY USED
BUCHANAN FIELD	510	103	12	9	1	635	729	87.1%
OAKLAND (S. FIELD)	0	0	0	0	0	0	0	0.0%
SAN FRANCISCO INT'L	8	15	6	0	0	29	46	63.0%
SAN JOSE INT'L	490	160	18	12	0	680	670	101.5%
SONOMA COUNTY	355	90	5	2	2	454	667	68.1%
COMMERCIAL SUB-TOTAL	1363	368	41	23	3	1,798	2,112	85.1%
GA/MILITARY AIRPORTS								
ALAMEDA NAS	0	5	39	12	0	56		
BYRON	55	1	0	0	33	89	77	115.6%
CLOVERDALE MUNICIPAL	18	0	0	0	0	18	24	75.0%
GNOSS FIELD	269	35	1	3	0	308	317	97.2%
HALF MOON BAY	88	2	0	0	0	90	159	56.6%
HAMILTON FIELD	0	0	0	0	0	0		
HAYWARD AIR TERMINAL	540	114	6	6	0	666	521	127.8%
HEALDSBURG MUNICIPAL	56	2	0	0	0	58	80	72.5%
LIVERMORE MUNICIPAL	521	53	3	2	1	580	773	75.0%
MOFFETT NAS	0	18	80	16	7	121		
NAPA COUNTY	198	23	0	2	0	223	485	46.0%
NUT TREE	172	20	0	1	0	193	186	103.8%
OAKLAND (N. FIELD)	260	90	34	25	0	409	641	63.8%
PALO ALTO	519	35	0	1	0	555	629	88.2%
PARRETT FIELD	41	4	0	0	0	45	76	59.2%
PETALUMA MUNICIPAL	150	5	0	1	0	156	200	78.0%
REID-HILLVIEW	571	64	0	2	0	637	806	79.0%
RIO VISTA MUNICIPAL	49	4	0	1	0	54	70	77.1%
SAN CARLOS	414	81	0	0	0	495	546	90.7%
SANTA ROSA AIR CENTER	47	47	6	0	0	100	261	38.3%
SONOMA SKY PARK	40	4	0	0	0	44	49	89.8%
SONOMA VALLEY	175	6	0	1	1	183	140	130.7%
SOUTH COUNTY	88	7	0	0	0	95	144	66.0%
TRAVIS AFB						0		
GA SUB-TOTAL	4312	624	169	73	42	5220	6260	83.4%
SYSTEM GRAND TOTAL	5675	992	210	96	45	7,018	8,372	83.8%

SOURCE:
FAA 5010 Forms; CALTRANS

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MTC REGIONAL AIRPORT SYSTEM PLAN UPDATE -- PUBLIC USE AIRPORTS INVENTORY

MAJOR COMMERCIAL SERVICE AIRPORTS	ANNUAL ENPLANED PAX a	ANNUAL AIR CARRIER OPS b	ANNUAL AIR CARRIER OPS CAPACITY	% ANNUAL AIR CARRIER CAPACITY USED	ANNUAL COMM./A.T. OPS c	ANNUAL G.A./MIL. OPS d	ANNUAL CARGO OPS e	TOTAL ANNUAL OPS	ANNUAL SERVICE VOLUME	RATIO OF TOTAL ANNUAL OPS TO A.S.V.
BUCHANAN FIELD	50,000	1,285			13,958	289,625	0	304,868	355,000	85.9%
OAKLAND (S. FIELD)	2,742,211	90,746			30,410	0	12,000	121,156	147,870	81.9%
SAN FRANCISCO INT'L	15,177,669	318,658			78,866	32,729	736	430,253	500,000	86.1%
SAN JOSE INT'L	3,140,000	95,778			48,550	199,672	3,862	344,000	355,000	96.9%
SONOMA COUNTY	65,765	439			10,593	158,374	0	169,406	295,000	57.4%
COMMERCIAL SUB-TOTAL	21,175,645	506,906			182,377	680,400	16,598	1,369,683	1,652,870	82.9%
GA/MILITARY AIRPORTS										
ALAMEDA NAS								0		
BYRON						9,000		9,000	230,000	3.9%
CLOVERDALE MUNICIPAL						20,000		20,000	230,000	8.7%
GNOSS FIELD						150,000		150,000	230,000	65.2%
HALF MOON BAY						70,000		70,000	260,000	26.9%
HAMILTON FIELD								0		
HAYWARD AIR TERMINAL						254,869		254,869	490,000	52.0%
HEALDSBURG MUNICIPAL						31,500		31,500	200,000	15.8%
LIVERMORE MUNICIPAL						230,000		230,000	255,000	90.2%
MOFFETT NAS								0		
NAPA COUNTY						172,000		172,000	360,000	47.8%
NUT TREE						144,000		144,000	250,000	57.6%
OAKLAND (N. FIELD)					23,493	257,720		281,213	352,130	79.9%
PALO ALTO						215,584		151,000	280,000	53.9%
PARRETT FIELD						12,000		12,000	230,000	5.2%
PETALUMA MUNICIPAL						65,000		65,000	230,000	28.3%
REID-HILLVIEW						196,568		196,568	400,000	49.1%
RIO VISTA MUNICIPAL						17,050		17,050	230,000	7.4%
SAN CARLOS						190,660		190,660	280,000	68.1%
SANTA ROSA AIR CENTER						30,000		30,000	230,000	13.0%
SONOMA SKY PARK						12,000		12,000	230,000	5.2%
SONOMA VALLEY						50,500		50,500	200,000	25.3%
SOUTH COUNTY						120,000		120,000	230,000	52.2%
TRAVIS AFB										
GA SUB-TOTAL	0				23,493	2,260,251	0	2,219,160	5,627,130	39.4%
SYSTEM GRAND TOTAL	21,175,645	506,906			205,870	2,940,651	16,598	3,588,843	7,280,000	49.3%

SOURCE:

a. Airport Traffic Records, 1990; MTC Airport Activity and Noise Trends, October, 1990

b., c., d. Airport Traffic Records, 1990; CALTRANS CASP Inventory, October, 1990

e. Individual airports

MTC REGIONAL AIRPORT SYSTEM PLAN UPDATE -- PUBLIC USE AIRPORTS INVENTORY

MAJOR COMMERCIAL SERVICE AIRPORTS	PEAK HOUR OPS VFR f	PEAK HOUR OPS IFR g	TOTAL PEAK HOUR CAPACITY VFR	% OF PEAK HOUR CAPACITY USED VFR	TOTAL PEAK HOUR CAPACITY IFR	% OF PEAK HOUR CAPACITY USED IFR	ANNUAL AIR CARGO (TONS) h
BUCHANAN FIELD							180
OAKLAND (S. FIELD)			54	0.0%	48	0%	234,506
SAN FRANCISCO INT'L	115	97	103	111.7%	53	183%	624,110
SAN JOSE INT'L	113	91	150	75.3%	40	228%	59,196
SONOMA COUNTY							0
COMMERCIAL SUB-TOTAL		188	307	61.2%	141	133%	917,992
GA/MILITARY AIRPORTS							
ALAMEDA NAS							
BYRON							
CLOVERDALE MUNICIPAL							
GNOSS FIELD							
HALF MOON BAY							
HAMILTON FIELD							
HAYWARD AIR TERMINAL							
HEALDSBURG MUNICIPAL							
LIVERMORE MUNICIPAL							
MOFFETT NAS							
NAPA COUNTY							
NUT TREE							
OAKLAND (N. FIELD)							
PALO ALTO							
PARRETT FIELD							
PETALUMA MUNICIPAL							
REID-HILLVIEW							
RIO VISTA MUNICIPAL							
SAN CARLOS							
SANTA ROSA AIR CENTER							
SONOMA SKY PARK							
SONOMA VALLEY							
SOUTH COUNTY							
TRAVIS AFB							
GA SUB-TOTAL							0
SYSTEM GRAND TOTAL		188	307	61.2%	141	0.4%	917,992

SOURCE:
f., g. Individual Airports; Airport Master Plans
h. AOCI Traffic Report, Calendar Year 1990

5/22/91

Chapter VII

Airport System Alternatives Definition

Introduction

The objective of the definition of regional airport system alternatives is not only to identify the range of policy choices being faced by the region, but also to provide a basis for evaluating their feasibility as well as their possible consequences. The set of alternatives should offer a range of visions of the future, defined in sufficient detail to provide a basis for comparing them, choosing between them, and identifying the actions needed to implement them. While these alternatives must be founded in what is technically possible, they should not be unduly constrained by existing political or institutional agendas, for to accept such constraints may result in foregoing the best long-term solution in the interests of short-term expediency. Rather, such constraints should be recognized in the way the alternatives are defined and evaluated. The evaluation process should identify implementation pathways which could actually eliminate current constraints by building political constituencies for institutional change, where such change is needed.

Central to this approach is the requirement to quantitatively evaluate the alternatives, in order to provide a basis for choosing between them. This evaluation must address all those issues of concern to the broad array of interests in the process. For this to be possible, and for the evaluation to produce credible results, the alternatives must be defined in sufficient detail, both in terms of their specific elements as well as the actions that must be taken to implement them.

The Apogee Study

A previous study by Apogee Research, Inc., included extensive focus group discussions with a broad range of airport users, operators, and the general public. On the basis of these discussions, six strategic policy approaches were developed, as follows (Apogee Research, Regional Airport System Plan Update: Summary of Findings and Policy Alternatives, December 7, 1990):

Plan One: No New Action

This policy envisages a continuation of the current status quo, with no significant new capacity and steadily increasing congestion everywhere. Market forces would tend to shift traffic growth from SFO to OAK and SJC.

Plan Two: Centralize Aviation Activity

This policy encourages future growth to be concentrated at SFO, in order to minimize the spread of adverse impacts. Resources would be directed at improving ground access to SFO, and additional Bay fill to increase capacity and reduce noise impacts would be considered.

Plan Three: Limited Decentralization

This policy encourages growth at OAK and SJC by improving ground access to those airports. Capacity increases at SFO would be limited to increased operational efficiency, improved ATC technology, and the use of larger aircraft.

Plan Four: Greater Decentralization

This policy seeks to expand capacity at other airports in the region, including new airport sites well outside the urban area, and limits the growth at SFO, OAK, and SJC.

Plan Five: Alternatives to Aviation

This policy encourages the development of high-speed rail services or other modes of transportation as a way to reduce the need for expanding airport capacity. Resources would be directed at developing intermodal links, with growth of the existing airports limited by noise restrictions and opposition to further Bay fill.

Plan Six: Ground Transportation Focus

This policy would emphasize improving ground access to all airports and allow the growth of each airport to be determined by market forces.

These policy alternatives can be thought of as providing a strategic perspective on the development of the regional airport system. While they do not identify the specific projects and implementation actions that are necessary for a quantitative evaluation of alternatives, they articulate broad goals for the future state of the airport system. Those early alternatives were then translated into specific, implementation-oriented alternative plans, as presented below.

These policy alternatives are intended to represent the interests of different interest groups in the regional airport planning process, as expressed through the focus groups. The alternatives were prepared to encompass a wide enough range of options to ensure that each constituency should feel that at least some of the alternatives (or elements thereof) are responsive to their concerns.

Air Carrier and General Aviation Airports

The regional airport system is not a homogeneous set of facilities, but rather consists of two broad categories of airport that serve two very different types of traffic. Of the some thirty airports in the region, a small number, currently five, serve the needs of the commercial air carriers. The largest, San Francisco International, handles more air carrier traffic than all the others combined. While the three largest air carrier airports also serve a varying amount of general aviation traffic, the greater number of airports serve only general aviation traffic.

Because of the widely differing requirements of air carrier and general aviation activity, and the implications for airport development, it is useful to consider the two types of airport separately when defining alternatives for a regional system. Thus the complete range of system alternatives will consist of one set of Air Carrier Airport System

Alternatives and another set of General Aviation Airport System Alternatives. Of course, these two sets of alternatives interact in some respects, and some air carrier airport system alternatives may be inconsistent with some general aviation airport system alternatives. However, by evaluating each set in terms of how well the alternatives perform for their respective market, interaction problems can be addressed in selecting between the alternatives in each set, once they have been evaluated.

The following two sections describe the air carrier airport system alternatives and the general aviation airport system alternatives. Each alternative description includes a summary statement, a list of its major elements, the actions needed to implement the alternative, and a list of implications. The implications are explained at the end of the alternative descriptions.

AIR CARRIER SYSTEM ALTERNATIVES

1. **No New Action**

Description

This alternative provides the baseline for comparison of the other air carrier system alternatives. It is based on the assumption that no new major additional airside, landside, ground access, or public transportation capacity is built at the five existing air carrier airports. It also assumes that no new major operational actions or other airport system management actions are taken, either by the airports, the FAA, the airlines, or other parties. The existing five air carrier airports would continue to be operated and maintained, with annual funding provided to maintain the existing airside and landside facilities, but with no enhancement of capacity. Growth in airport activity (passenger, GA, and cargo) would be constrained by current airspace and the capacity of existing facilities (including approved projects)

Alternative 1 does assume that existing construction projects which are contained in existing approved airport master plans, and which have received environmental approvals, will be built. These include the following projects:

1. Runway Extension at San Jose
2. Passenger Terminal Expansion at San Francisco
3. Minor Bag Claim, Ticketing, Passenger Lobby, and International Arrival Facility Projects at Oakland

The purpose of including the no new action alternative is to evaluate what would happen if demand continues but no additional capacity is provided, and to compare this no action scenario with alternatives which do increase capacity. As this alternative would include no actions to affect the air travel market or the existing distribution of supply or demand, the airlines could take unilateral steps under this alternative to balance supply and demand at the five air carrier airports. These steps could include adjusting their schedules, fleet mix changes, and shifting their service between the airports. For comparison of the air carrier system alternatives, however, these airlines actions are not considered in the no new action alternative.

Elements

A. Only currently approved projects would be developed

B. No other new runway capacity projects

C. No other new terminal capacity or other support facility projects

D. No other new ground access or public transit improvement projects designed to serve the airports

E. No regional actions to encourage significant changes in airline schedules, fleet mix, or distribution of traffic among airports

Actions Needed to Implement

A. Design and construction of currently approved projects

B. Annual capital improvement programming for maintenance of existing facilities

C. Annual renewal of airport operating budgets

Implications

A. Runway/airspace congestion and delay

B. Airport ground access constraints

C. Air fares (supply vs demand)

D. Environmental impacts

E. Airline competition

F. Safety

G. Passenger convenience

2. Airport System Management (ASM)

Description

The ASM alternative would seek to maximize the effectiveness of the existing airport system without major new construction by using a number of system management strategies aimed at matching supply and demand and making optimum use of existing facility capacity. This alternative would depend on increased cooperation between all participating airports and airlines. This alternative would rely on measures to increase groundside access and public transit to airports to take full advantage of existing runway and terminal capacity.

In order to relieve congestion, this alternative would also include encouragement of passenger traffic dispersal from the three major air carrier airports to Concord and Sonoma County, and possibly other airports in the region, within their existing capacity to accommodate it. Given the current distribution of airport capacity and demand, this alternative would inevitably result in some redistribution of demand among airports. This could require a variety of political and physical development decisions at a number of levels of government. This alternative could possibly result in greater emergence of individual airport roles among the three major air carrier airports. One example could be for each of the three largest air carrier airports to focus on the following roles:

SFO: International and Tourist Traffic
SJC: California/West Coast Corridor Traffic
OAK: East-West Domestic Traffic

Another possible result of this alternative could be reduced facility duplication consistent with these emerging airport roles (eg. centralization of certain functions, such as F.I.S., cargo, etc., at one airport). Present examples of this trend are the concentration of international facilities at SFO and overnight air cargo activity at OAK.

Elements

A. FAA Measures to Enhance Capacity, including:

* Revised standards for converging runway operations
* Reduced in-trail separation
* Airspace improvements
* Improved approach and departure procedures
* Improved navigation/electronics

B. Fleet Mix Changes

- * Airline shifts to larger aircraft during peak periods, on heavily travelled routes, at the most congested airports, etc.
- * Eliminate turbo-prop aircraft from the air carrier runways or congested airports

C. Schedule changes/congestion pricing

- * Shifts of traffic away from peak periods

E. Construction of off-airport terminals and improved bus service

F. Improved rail links (BART) to airports

G. Improved links between airports, such as ferry service between OAK and SFO

H. Encourage GA activity to relocate away from major air carrier airports

I. Joint use of military airfields (such as Travis AFB)

<u>Actions Needed to Implement</u>

A. FAA completion of research and development, and ATC implementation of new standards and operational procedures

B. Airline implementation of training and equipment programs to support new standards and procedures

C. Development of regional capacity allocation program

D. Development of regional program of pricing, noise budgets, or other incentives to reduce peak period demand

E. Coordinated airport and airline marketing of specialized roles of each airport

F. Development of regional airport ground access improvement program with appropriate funding and regulatory/operating authority

G. Develop pricing, leasing, and other mechanisms to encourage GA to relocate from congested air carrier airports to GA relievers

H. Provide funding for improvements at GA airports to accommodate relocated GA from major air carrier airports

I. Develop minimal passenger processing facilities at joint use airports

<u>Implications</u>

A. Timing of FAA capacity enhancement measures

B. Airport cooperation

C. Airline cooperation

D. Air fares (supply vs demand)

E. Transit improvements to airports

F. Joint use agreements with military

G. Safety (airport and airspace capacity)

H. Passenger convenience

3. Master Plans

Description

This alternative would meet identified future demand by expanding airport system capacity as proposed in the most recent individual airport master plan concepts. Capacity improvements to the airside, landside, ground transportation, and public transit systems would be built consistent with those updated master plans. According to those currently proposed master plans (OAK and SJC) regional air passenger market shares would shift as follows:

Potential Shift in Regional Passenger Market Share

Airport	1990 Market Share	2007 Market Share
SFO	72%	61%
OAK	13%	16%
SJC	15%	23%

One function of this alternative will be to evaluate whether the individual airport master plans will efficiently accommodate regional air travel demand from a capacity and environmental perspective. This alternative will examine whether the updated master plans are based on consistent assumptions, and, if they are not, will outline actions needed to achieve a regional balance of demand and capacity.

Elements

A. Increased Runway Capacity

* New parallel runway at OAK

B. Increased Terminal Capacity

* New international terminal at SFO
* Major terminal development at OAK
* Development of Terminals B and C at SJC

C. Increased Landside Support Facility Capacity

* Auto Parking
* Terminal curbs and roadways
* Airline support facilities
* Airport support facilities
* Fuel facilities

D. Ground Access/Public Transportation Improvements at SFO, OAK, SJC

* Improvements to freeways, interchanges, and other surface streets serving airports
* BART extension to SFO
* Future BART connection to OAK

E. Reduced GA use of air carrier airports:

* Reduced GA operations at OAK
* Reduced GA operations and based aircraft at SJC

Actions Needed to Implement

A. Completion of master plan approval process (including FAA)

B. Environmental approval/mitigation

C. Airspace studies

D. Funding process

E. Design and construction

F. Public Acceptance

Implications

A. Timing and funding of improvements

B. Airspace capacity

C. Runway capacity/delay

D. Funding of transit improvements

E. Environmental impacts/public concensus

F. Impacts on General Aviation (primarily SJC and OAK)

4. Airport System Optimization

Description

This alternative would meet forecast regional passenger demand by construction of significant new capacity, but would depart from alternative 3 by seeking to optimize the performance of the system as a whole. This alternative would include possible redistribution of regional passenger traffic to optimize the existing airport system (as well as develop new ones) and better distribute supply according to the regional distribution of demand. Among the factors used to achieve optimization of the airport system are:

* Passenger convenience
* Airspace utilization
* Airport ground access capacity
* Environmental impacts
* System cost

There are two sub-alternatives for accomplishing this: (1) major regional airport growth would be either focussed (providing major capacity increases at SFO, OAK and SJC); or (2) future capacity enhancement would be decentralized (providing for growth at a fourth major air carrier airport in the region). The focussed concept would add significant capacity at the existing airports by construction of new outboard runways into the bay at SFO and/or OAK, and a new parallel runway at SJC. This alternative could result in the following redistribution of regional passenger market share: SFO: 50% OAK: 25% SJC: 25%. The decentralized concept would include construction of a fourth major air carrier airport at either Travis AFB, another existing airport, or at a new site. This option would also result in a major redistribution of regional passenger market share. Included as a possible element of either sub-alternative would be the development of additional commuter airline service at Concord, Sonoma County, and other outlying GA airports.

Elements

A. Capacity increases at SFO, SJC, OAK, :

* New outboard runway at SFO
* New outboard runway at OAK
* New parallel runway at SJC

B. Develop fourth major air carrier airport:

* Travis AFB
* Other existing airport
* New site

C. Develop new/expanded airline service at other airports (Concord, Sonoma County, Livermore, Napa, etc.)

D. Terminal expansions to support runway capacity growth

E. Ground access/public transit improvements to support airport growth

F. Airspace/procedures improvements to support airport growth

Actions Needed to Implement

A. SFO/SJC/OAK airport runway capacity expansion:

- Airspace studies/procedural changes
- Environmental approvals (including required mitigation)
- Property acquisition (where necessary)
- Funding process
- Design and construction

B. Terminal capacity expansion:

- Environmental approvals/mitigation
- Funding process
- Design and construction

C. Ground access/public transit development:

- Financial feasibility studies and corridor/engineering studies
- Environmental approvals/mitigation
- Funding process
- Design and construction

D. Develop existing airport as fourth air carrier airport:

- Develop or expand joint use agreement (if military)
- Airspace studies/procedural changes
- Property acquisition/land banking (where necessary)
- Environmental approvals/mitigation
- Funding process
- Design and construction
- Determine operating entity
- Develop noise/land use compatibility/height hazard plans

E. Develop new airport:

* Site selection process
* Airspace studies/procedural changes
* Property acquisition/land banking
* Environmental review and approvals process (including mitigation)
* Funding process
* Design and construction
* Determine/establish operating entity
* Develop noise/land use compatibility/height hazard plans

Implications

A. Timing of improvements

B. Funding sources

C. Operating agencies (new airports)

D. Environmental impacts

5. New Technology

Description

This alternative would focus on new air and rail technology alternatives to supplement the existing airport system. The alternatives include both aviation and non-aviation technology.

Elements

A. Construction of high-speed ground transportation (primarily forintra-California Corridor Traffic), such as conventional rail, MAGLEV, automated highway, or other technology. This element would act to reduce demand for air travel by diverting air passengers to the new ground transportation mode.

B. Application of Tiltrotor aircraft technology

This element would also reduce conventional air travel demand by diverting air passsenger traffic away from traditional air transport. This element is primarily seen as an alternative for the shorter haul air traffic routes, such as those under 500 miles. This element could lso require facility improvements at reliever airports served by tiltrotor aircraft.

Actions Needed to Implement

A. Continuation of R&D efforts for both tiltrotor and high speed ground transportation

B. Development of commercial application of the technology

C. Airspace studies/procedural changes (tiltrotor element)

D. Creation of appropriate operating agency

E. Corridor/engineering studies (ground transportation element)

F. Financial feasibility studies

G. Property assembly/acquisition (ground transportation element)

H. Environmental approvals/mitigation

I. Identify facility requirements to serve tiltrotor activity

J. Funding process

K. Design and construction

Implications

A. Potential markets

B. Practical application

C. Capacity and delay

D. Timing of new technology

E. Environmental impacts

F. Airspace procedures

G. Financing

GENERAL AVIATION SYSTEM ALTERNATIVES

1. No Action

<u>Description</u>

The No Action GA alternative provides the baseline for comparison of the others, and would consist of no increase in capacity at any of the General Aviation airports. In addition, no regional action would be taken to prevent the potential closure of existing GA airports, such as Reid-Hillview. Total regional airport system capacity would be limited by existing airport facilities at each airport, and possibly reduced due to GA airport closures. The existing general aviation airports would, however, be maintained to provide safe, functional facilities.

<u>Elements</u>

A. Preserve existing airport facilities

B. Protect airports from encroachment by adjoining community:

   * Maintain/enhance land use compatibility
   * Maintain height hazard/safety zoning and planning

<u>Actions Needed to Implement</u>

A. Provide adequate funding for operation and maintenance of the airports in the system

B. Maintain and regularly update noise/land use compatibility and height hazard/safety plans

<u>Implications</u>

A. Capacity and delay

B. Safety

C. Financing

D. Noise/land use compatibility

2. General Aviation Airport Master Plans

Description

This alternative would meet identified future demand by developing the general aviation airport system as proposed within the current individual airport master plans. This alternative would provide a full range of GA support services, and would have all necessary navigational aids and instrumentation to provide for the pilot training needs of the region. These airports would provide some excess facility and service capacity to replace those lost due to the anticipated displacement of general aviation activities at the large air carrier airports such as SFO, OAK, and SJC. These airports would also provide for displaced GA activities in the event that Reid-Hillview or other airports were to close. In addition, this alternative could allow for selected GA airports to be used to meet demand for decentralized commuter activity close to users homes.

Elements

A. Develop facilities at selected airports to support these activities

- Runways/taxiways
- Apron/aircraft parking/hangars
- Instrumentation/navigation
- Lighting, FBO facilities, etc

B. Develop facilities for displaced recreational GA at selected airports

Actions Needed to Implement

A. Development of mechanism to allocate capacity expansion among airports and identify required facilities at each airport. Identify potential future losses in GA capacity

B. Airspace studies/procedural changes

C. Environmental approvals/mitigation

D. Funding process

E. Develop/implement noise/land use compatibility/height hazard plans

F. Project engineering/design

* Runway construction
* Support facility construction
* Ground access improvements

<u>Implications</u>

A. Funding of improvements

B. Airport/community compatibility

C. Environmental impacts

3. General Aviation Airport System Optimization

Description

This alternative would expand certain existing GA airports and develop new GA airports on the periphery of the urban area in locations where land use compatibility and aviation safety problems can be avoided or minimized. Because remote sites would be preferable, this alternative could also involve improvements to local streets and highways to provide ground access to the new airports. Supporting infrastructure, including sewer, water, power, aviation fuel, etc., would also need to be provided. These new airports could also support limited passenger service by commuter airlines.

By locating new GA capacity at the edge of the urban area where community impacts can be minimized, this alternative could provide for the relocation of existing GA activity from close-in urban airports which are either threatened due to existing impacts on the surrounding urban community or pressured by expanding air carrier passenger and cargo activity. An example of this concept would be accelerated development of the improvements planned at Byron airport.

Elements

A. Select sites and develop new GA airports in compatible locations

B. Provide sufficient facility capacity for future GA demand as well as GA displaced from existing close-in airports (OAK, SJC, Reid-Hillview)

C. Develop new facilities at specialized airports for training/business aviation activities

D. Develop facilities to relieve air carrier airports

E. Acquire sufficient property and ensure land use compatibility to protect airport from possible future urban encroachment

F. Restrict further investment at airports with little likelihood of achieving community acceptance

Actions Needed to Implement

A. Site selection studies

B. Establish development/operating entity

C. Develop noise/land use compatibility/height hazard plans

D. Land assembly/acquisition

E. Environmental approvals/mitigation

F. Funding process

G. Design/construction

H. Develop utility infrastructure

I. Develop/improve ground access links

Implications

A. Timing of development

B. Funding of development

C. Airport operating authority

D. Environmental impact

E. Compatibility/encroachment protection

Description of Implications

Included with each airport system alternative as described above is a list of implications. The list identifies major items which could be affected by the alternative. For example, a no action alternative could lead to increased congestion and delay, and cause passenger inconvenience. Another alternative which provided increased capacity may improve passenger convenience, but could cause impacts on the natural and human environment. Identification of major implications at this stage of the planning process was done to assist in the development of the alternative eveluation methodology.

Runway/airspace congestion and delay

A major consideration in evaluating the airport system alternatives is to how well each alternative meets existing and future demand. Alternatives which do not provide capacity improvements sufficient to meet forecast levels of demand may result in significant congestion and delay on runways, taxiways, and apron areas, in terminal facilities, on the landside of the terminals, or elsewhere. Alternatives which do not account for the structure and capacity of the regional airspace may create airspace conflicts, with related safety and delay implications. These implications are discussed separately below.

Airport ground access constraints

Ground access to the region's airports is becomming an increasingly complex issue. Future increases in air travel demand at the five air carrier airports will increase the already heavy strain on the region's existing ground transportation system. At certain locations near the largest airports peak hour surface access congestion and delay creates significant inconvenience to air passengers. Growing uncertainty about how long it will take to reach the airport requires passengers to plan greater and greater lead time before flight departures. The growing problem with airport ground access results in passenger inconvenience, decreased productivity, inefficient use of the airport system, and regional environmental impacts. Some of these related implications are also discussed below.

Environmental Impacts

Each of the airport system alternatives will have some impact on the environment. Alternatives which provide facilities to accommodate airport system growth will have direct on-site impacts, growth-inducing impacts on the region, and impacts such as air quality and noise from the operation of a larger and busier system. Those which redistribute air traffic among the region's airports may reduce noise in one area but increase it in another. The severity of this noise impact will be related to factors such as the type, density, and location of land uses near the airports.

Those alternatives which do not provide for growth, or which provide insufficient capacity to meet future demand, may cause indirect environmental impacts resulting from airport congestion and delay or increased use of alternative forms of travel such as highways.

Air Fares (supply vs demand)/Airline competition

One of the potential implications of differing approaches to meeting future demand may be the effect on air fares and airline competition. Given a free market, if demand far exceeds supply the price will rise until a balance is achieved between supply, demand, and price. Lack of sufficient terminal space can effectively block out new carriers, reducing competition among airlines. One of the regional implications of the system plan is therefore related to the potential effect on competition and ticket prices, and the related issue of equal access to the nation's air transportation system. Alternatives which do not provide for any increase in air traffic demand could cause regional increases in ticket prices and result in a decreasing ability of low and moderate income persons to access the air transportation system. Lack of airline competition could also affect level of service and ticket prices.

Safety

One of the implications of regional airport system development decisions will relate to aircraft safety, both on the ground and in the air. Growing public concern over safety is in part related to increasing congestion at airports and in the airspace around them. As congestion increases the potential for pilot, air traffic controller, air navigation, communication, and other system error increases. With this comes a growing potential for accidents. Regional airport system alternatives that do not effectively address existing and future airport or airspace congestion may contribute to this safety concern.

Timing of improvements or other actions

Timing is listed as an important implication under many of the airport system alternatives. This factor could be significant as it relates to the ability of MTC and the region to implement selected alternatives and actions. This issue relates to the length of time it may take to complete site selection processes, environmental approvals, construction projects, FAA research activities and other actions, development of new technologies, creation of necessary organizational structures, and development of the political will of the region to take action. For example, selection of a site and construction of a new air carrier airport may ease the region's congestion, but could take 10 years or more to complete. If this alternative were selected in the plan, it may be also necessary to include interim measures to meet growing demand until such time as the new airport can be built and put into service. Timing is therefore an important implication of choosing this alternative.

FAA capacity enhancement measures and new technology may also be elements of the regional plan, but there may be considerable time before they are implementable. Again, the timing of these elements of the regional airport system plan is a critical aspect in eveluating how well they will serve the region.

Airport/airline cooperation

Several elements of the alternatives will require the cooperation of both airports and airlines for their implementation. Examples include decisions to shift traffic between airports, shifts in aircraft fleet mix, and changes in airline schedules. As such elements are further defined and evaluated in the planning process this factor needs to be recognized as beyond the direct control of MTC.

Joint use agrements with the military

Civil use of military airport facilities will require the development and/or enhancement of joint use agreements with the appropriate military sponsors and/or participation in the FAA's Military Airports Program (MAP). As an example, Travis Air Force Base currently has a civil/military joint use agreement which allows up to 12 daily operations with civil aircraft. Expansion of this agreement to allow significantly more flights would be necessary in order to develop Travis as a significant passenger service facility. This would also be the case for other existing military facilities. In addition, passenger processing facilities would need to be built or improved. The Military Airports Program is one potential source of funds for such passenger improvements.

Public transportation improvements to airports

As mentioned above in relation to ground access, airport expansion and growth in passenger and cargo traffic will put additional pressure on the region's surface transportation system. Those alternatives that provide for airport expansion in areas where existing ground transportation systems are near or at capacity must also consider the need for public transportation system improvements to supplement or provide alternatives to traditional private vehicle ground access systems serving the airports. Specific examples which are already recognized and under study are a potential BART extension to SFO, future BART connection to OAK, and a future connection between SJC and the San Jose light rail line.

Funding

Most elements of every alternative will have some cost, including airport improvements, airspace changes, airline actions, ground access improvements, and public transportation projects. The funding implications of specific elements relate to the overall cost and the timing and availability of funds.

Impacts on general aviation

A number of actions at the five air carrier airports could have significant impacts on the continued existance and viability of general aviation at those airports. Significant expansion of passenger and cargo activities will likely increase the existing pressure for GA activities to relocate. The fate of general aviation at the air carrier airports therefore raises a related issue of how to address GA which is displaced. Let 'em eat jet blast!

Operating agencies

Where joint use facilities or new airports are proposed operating agencies would need to be designated or established.

Potential markets/practical application

This applies primarily to the use of new technology. The effectiveness of new technology to address the region's air travel demand will be affected by the potential market for and the degree and timing of practical application of such technology. For example, the effective use of conventional high speed rail within the California corridor as an alternative to air travel will be constrained by factors as:

1. The portion of the total market which can be diverted from air to rail.

2. The degree and timing of actual application of the technology.

3. The comparative cost, comfort, speed, and safety of rail travel as related to air travel.

Noise/land use compatibility/encroachment protection

A critical issue in evaluating alternatives for the region will be how well noise and land use compatibility between airports and surrounding communities can be achieved or maintained. It may be possible to accommodate significant increases in demand at a particular airport but only at great expense in terms of impacts to adjoining communities. Thus there can be major trade-offs between efficiently meeting future demand and minimizing human impacts.

A related issue is that of encroachment. How well an airport or system of airports functions can be significantly affected by non-airport actions. Urban development near airports can create operational, environmental, and development limitations and hamper the airports' ability to operate efficiently and safely, and to meet demand. If public funds are to be effectively invested in airport facilities the public must provide for the protection of that public investment from encroachment by non compatible land uses. Both the noise and encroachment issues can be addressed in part by noise, height hazard, and safety planning and zoning.

Passenger convenience

Passenger convenience relates to the ease of movement to and through a passenger terminal facility. Factors include ease of access to the airport, parking cost and location in relation to the terminal, passenger walking distances, and relative amount of terminal congestion and delay. Passenger convenience is an important measure in evaluating the performance of passenger processing facilities. In addition to selection of airlines, flights, and schedules, overall passenger convenience is an important factor in a passenger's selection of an airport in a multiple airport system.

HIGH-SPEED RAIL ALTERNATIVE

SAN FRANCISCO-LOS ANGELES/SAN DIEGO

Market Size and Capture

SF-LA/SD market:	30% of total SF region air market
1990 Est. demand:	12.6 million passengers
2010 Est. demand:	26.7 million passengers

2010 market capture:	10% = 2.7 million
	25% = 6.7 million
	36% = 9.6 million

Alternative 1:

Trip length:	422 miles
Estimated speed:	125 MPH
Travel time:	5 hr.
Est. passengers:	3-3.8 million

(Source: Caltrans and Parsons, Brinkerhoff, 1990)

Alternative 2:

Trip length:	413 miles
Estimated speed:	185 MPH
Travel time:	3 hr. 15 min.
Est. passengers:	5.3-7.9 million

(Source: Caltrans and Parsons, Brinkerhoff, 1990)

OTHER MARKET SHARE PROJECTIONS

California-Nevada high-speed train: 25% by the year 2000
(Source: Canadian Institute of Guided Ground Transport using previous work by Barton-Aschman Associates, 1989)

Detroit-Chicago HSGT train: 65% by the year 2020
(Source: Argonne National Lab, 1989)

LA-San Francisco MAGLEV train: 38% by the year 2000
(through 2030)
(Source: U.S. Federal Railroad Administration, 1990)

EXISTING NEW YORK-WASHINGTON AMTRAK RAIL SERVICE

Trip length:	225 miles

Amtrak Metroliner

Maximum speed:	125 MPH
Travel time:	2 hr. 35 min.
Fare (one way):	$74
Air fare (oneway):	$73
Capacity (each way):	17 trains per weekday
	280 seats per train
	4,760 seats per day
	9,520 total seats per day
	2.5 million weekday seats per year
	3.5 million total seats per year

Regular Amtrak Service

Travel time:	3 hr. 10 min.
Fare (one way):	$59 ($83 round trip)
Air fare (one way):	$73
Capacity (each way):	15 trains per day
	280 seats per train
	4,200 seats per day
	8,400 total seats per day
	3.0 million total seats per year

1990 Market share:	36%

ATTACHMENT C
WORK PROGRAM FOR THE AIRPORT MASTER PLAN AND NOISE PROGRAM
SAN JOSE INTERNATIONAL AIRPORT

Memorandum from the Director of Aviation
to the Mayor and City Council
City of San Jose
June 6, 1991

COUNCIL AGENDA: June 25, 1991
ITEM: 9Ir

CITY OF SAN JOSE - MEMORANDUM

TO: Honorable Mayor and City Council

FROM: Ralph G. Tonseth
Director of Aviation

SUBJECT: AIRPORT MASTER PLAN AND NOISE PROGRAM

DATE: June 6, 1991

APPROVED

DATE 6-20-91

COUNCIL DISTRICT: City-Wide

RECOMMENDATIONS

1. That Council approve the attached work program implementing the Council's May 21, 1991 action on the Airport Master Plan and Noise Program.

2. That Council approve Amendment No. 2 to the consultant contract agreement with TRA for the Airport Master Plan Update project extending the termination date to June 30, 1993 and modifying the scope of services and associated budget.

3. That Council approve Amendment No. 1 to the consultant contract agreement with David J. Powers & Associates for an Environmental Impact Report and Environmental Assessment for the Airport Runway Extension project modifying the scope of services and increase the associated budget by $24,925.

BACKGROUND

The Airport Master Plan Update project has been underway since November, 1988 under a Grant Agreement with the Federal Aviation Administration and with the assistance of the consulting firm of TRA. Since the completion of the draft Alternatives Analysis (Task 6) in December, the Master Plan Update project has essentially been on hold to allow for public review and City Council consideration of a recommended long range development plan. On May 21, 1991, the Council approved a set of recommendations to provide direction for the remainder of the project. Major approved items include:

- Direction to initiate preparation of an Environmental Impact Report (EIR) which fully evaluates Alternative 6 (the staff project case), an Alternative 8 (as submitted to the Council by the Citizens Against Airport Pollution), and an Alternative 9 (a new moderate growth alternative to be formulated). A recommended alternative will not be selected until completion of the environmental review process.

- Direction to include in the EIR process the evaluation of a number of specific noise mitigation measures, and incorporating language making noise mitigation an explicit objective of the Master Plan, with analysis of a noise ordinance in the initial phase of the EIR.

- Creation of a Council-appointed task force to review regional general aviation issues and report to Council with recommendations in November, 1991.

- Direction to amend existing consultant agreements to immediately begin studies of the extension of Runway 12R/30L and to suspend studies of the extension of Runway 12L/30R and instead include this project as part of the Master Plan Update process.

- Direction to report to Council on a monthly basis, and to the Transportation and Development Committee on a regular basis, on the status of the Master Plan Update and Noise Mitigation Program.

This direction significantly impacts the previously approved project work program, budget, and schedule. In order to begin implementing Council direction, a comprehensive work program/schedule (exhibit attached) and two amended consultant contract agreements have been prepared for Council approval.

ANALYSIS

A list and summary of the major work program elements addressing all issues associated with the Airport Master Plan and Noise Program, generally corresponding to the attached exhibit, is presented below:

I. Airport Master Plan Update

A. Environmental Impact Report/Environmental Assessment (EIR/EA)

1. Consultant Selection

Given the increasing focus on environmental issues associated with Airport growth, staff determined in late 1990 that the project EIR/EA should be prepared by an environmental firm reporting directly to the City rather than by a subcontractor to the Master Plan Update consultant (TRA). The Airport and Planning Departments have jointly conducted a consultant selection process, a consultant has been tentatively selected, preparation of a detailed scope of services and budget will occur over the next month, and a contract agreement is anticipated to be presented for Council action in August. (The recommended amendment to the TRA contract agreement includes deletion of the EIR/EA from its scope of services.)

2. Scoping and Evaluation of Alternatives

The EIR/EA will fully evaluate Master Plan Update Alternatives 6, 8, and 9. For new Alternative 9 (moderate growth), staff proposes to initially formulate the scenario with input from citizen groups and subsequent review by the Airport Master Plan Advisory Committee (AMPAC) along with any needed refinements to Alternatives 6 and 8 and a No Project Alternative. All alternatives will be presented at a formal EIR scoping hearing and subsequently presented to the Council for endorsement prior to initiating detailed environmental analysis. The attached work program reflects an optimistic completion of scoping by the end of 1991.

3. Evaluation of Mitigation Measures

As part of the EIR process, staff identified ten specific potential noise mitigation measures for evaluation: noise ordinance; triggers; accelerated Phase 2 aircraft phase-out; hush house; accelerated/improved land use mitigation measures; additional land use mitigation measures; alternative flight tracks and approach/departure procedures; improved noise monitoring and reporting; sound attenuation policy/ordinance for new development; and real estate disclosure policy/ordinance. Council subsequently directed that noise mitigation be an explicit objective of the Master Plan.

For the noise ordinance measure, which Council directed for the initial phase of the EIR, staff will coordinate with the City Attorney's Office. Analysis of forthcoming Federal regulations implementing the Airport Noise and Capacity Act of 1990 will feed into the evaluation.

For noise monitoring and reporting, staff has begun an investigation of an upgrade to the Airport's monitoring system. Staff is also developing a revised format and content for the monthly Airport Noise Reports and a new annual report as directed by Council.

In addition to evaluating noise mitigation measures, staff also intends to evaluate potential surface traffic mitigation measures as well.

4. Completion/Certification

It is anticipated that the expanded EIR will take an additional 12-18 months to complete. Upon Planning Commission certification, expected in early 1993, selection of a preferred development alternative will be submitted for Council consideration.

B. Update of Analysis To Date

Given the expanded schedule for the Master Plan Update, staff and the project consultant will update all base year data from 1988 to 1990, and review all technical analyses (including demand forecasts) and revise as needed. Also, pursuant to Council direction, the Goal and Objectives task will be revised to add noise mitigation as a specific objective, and the Alternatives Analysis task will be supplemented with the addition of Alternatives 8 and 9. All revisions will be reviewed with AMPAC. As the existing contract agreement with the Master Plan Update consultant (TRA) terminates on June 30, 1991, Amendment No. 2 is needed to allow the consultant to continue its services to the City.

C. Economic Analysis

In conjunction with the environmental evaluation of Alternatives 6, 8, and 9, a consultant study of the economic impact of the various alternatives will be conducted. Staff will initiate the consultant selection process within the next month, with a contract agreement presented for Council action by October. One early product will be a comprehensive update to the City's 1986 Airport Economic Impact Study.

D. Remaining Master Plan Update Tasks

Upon selection of a preferred development alternative in early 1993 (following completion of the EIR), the project consultant will conduct the remaining Master Plan Update tasks, consisting of the Implementation Program, Airport Layout Plans, and final documentation. Review by AMPAC will be maintained throughout the program. It is anticipated that the final Master Plan Update will be presented for adoption by Summer 1993.

This proposed Master Plan Update schedule is optimistic and contingent upon successful discussion with Airport tenants (airlines, FBO's), other government agencies (FAA, City of Santa Clara), and community organizations (Chamber of Commerce, CAAP).

II. Master Plan Process Ordinance

Pursuant to Council direction, preparation of a City ordinance on amendments to the Airport Master Plan will be initiated by staff and the City Attorney's Office as part of the Master Plan Update's Implementation Program task. Adoption can occur as soon as possible, and must precede the adoption of the Master Plan.

III. General Aviation Task Force

Staff is currently preparing a minor consultant contract to facilitate Task Force meetings and discussions. The Task Force will initiate its activities upon completion of Council appointments and report to Council with recommendations in November, 1991.

IV. Runway 30L Extension

A. Design

The design studies for the Runway 30L Extension are currently being initiated by the Public Works Department utilizing the consultant (HNTB) already under contract to prepare the design for the extension of Runway 30R (suspended by Council on May 21, 1991). An amendment to the HNTB contract agreement will be presented to Council by Public Works in the Fall. Project design will be complete by January, 1992.

B. EIR/EA

The recommended amendment to the contract agreement with David J. Powers & Associates (previously preparing the EIR/EA for the Runway 30R extension) would allow the EIR/EA to be initiated. A second amendment will be brought forward to cover subsequent phases of EIR/EA preparation. Completion and Planning Commission certification is anticipated in December, 1991.

C. Project Construction

Once adequate environmental studies for Runway 30L have been performed and the EIR/EA has been accepted as complete, and project design is complete, the City can proceed to bid the project. This schedule anticipates that Public Works would conduct a bid and award process with Council action occurring in early 1992. Construction could then be anticipated to extend through mid-1993 under this schedule.

V. Airport Noise Program

A. Noise Monitoring System and Modified Noise Reports

Refer to item I-A-3 above. Revised monthly reports should begin in August 1991.

B. Analysis of Federal Noise Regulations

Refer to item I-A-3 above. Pending issuance of the Federal regulations this Summer, the analysis should be available in early Fall 1991.

C. Engine Run-up Operational Changes

Refer to item I-A-3 above. A report on the engine run-up issue should be available by September, 1991.

D. Good Neighbor Program and Stage 3 Airline Compliance

Staff activities on an airline "good neighbor" program and a Stage 3 aircraft compliance goal are currently being developed and should be available for review in August, 1991.

VI. General

A. Document for All Recommendations

Staff will prepare a file of information on the Airport Master Plan Update and Noise Program for public review at the City Clerk's Office. The file, which would include the Administration's reports to the Committee of the Whole and public hearings and related documents, will be available in July and include all documents and information requested by Council.

B. Reports to Council and Transportation & Development Committee

Staff proposes to prepare a monthly report on the Airport Master Plan Update and Noise Program for review by the Transportation & Development Committee which will be reported to the full Council as a General Government cross-referenced item on the following Council agenda.

COORDINATION

These recommendations have been coordinated with the City Manager's Office and City Attorney's Office.

COST IMPLICATIONS

The Airport 1991-92 CIP includes funding for consultant costs associated with the Master Plan Update EIR/EA, Economic Impact Study, General Aviation Task Force, and Runway 30L Extension, as well as for a new noise monitoring system, hush house preliminary design, and Runway 30L construction.

The recommended amendment to the contract agreement with TRA (Master Plan Update) includes no change to the existing contract cost ($842,282) at this time. Further refinements to TRA's work scope, and/or budget, may be proposed as a future, additional contract amendment.

The recommended amendment to the contract agreement with David J. Powers & Associates (Runway 30L Extension EIR/EA) changes the contract cost from $59,250 to $84,175, an increase of $24,925.

BUDGET REFERENCE (Runway 30L Extension EIR/EA)

Fund:	520
Responsibility:	520-80074443
Budget Document:	Airport 1990-91 Adopted Capital Budget, Page 25, Item 29

Ralph G. Tonseth
Ralph G. Tonseth
Director of Aviation

RGT:kph

Attachment

WORK PROGRAM ELEMENTS	1991		1992				1993			
	3	4	1	2	3	4	1	2	3	4
I. AIRPORT MASTER PLAN UPDATE										
A. EIR/EA										
1. Consultant Selection	X									
2. Scoping Of Alternatives (6, 8, 9)	X	X								
3. Evaluation Of Alternatives (6, 8, 9)		X	X	X	X	X				
4. Evaluation Of Mitigation Measures*	X	X	X	X	X	X				
5. Completion/Certification						X	X			
B. Update Of Analysis To Date	X	X	X							
C. Economic Analysis (1990 and EIR Alternatives)	X	X	X	X	X					
D. Implementation Program							X	X		
E. Airport Layout Plan Package								X	X	
F. Final Documentation And Adoption								X	X	
II. MASTER PLAN PROCESS ORDINANCE						X				
III. GENERAL AVIATION TASK FORCE	X	X								
IV. RUNWAY 30L EXTENSION										
A. Design	X	X								
B. EIR/EA	X	X								
C. Bid And Award			X							
D. Construction				X	X	X	X	X	X	
V. AIRPORT NOISE PROGRAM										
A. Noise Monitoring System	X	X	X	X						
B. Modified Noise Reports	X	→	→	→	→	→	→	→	→	→
C. Analysis Of Federal Noise Regulations	X									
D. Engine Run-up Operational Changes	X									
E. Good Neighbor Program	X	→	→	→	→	→	→	→	→	→
F. Stage 3 Airline Operations	X	→	→	→	→	→	→	→	→	→
VI. GENERAL										
A. Document For All Recommendations	X									
B. Regular T & D Committee Reports	X	→	→	→	→	→	→	→	→	→
C. Monthly Council Reports	X	→	→	→	→	→	→	→	→	→

* Evaluation of a noise ordinance will occur at the earliest possible time

ATTACHMENT D

BACKGROUND TO AIRPORT OPERATIONS

BACKGROUND TO AIRPORT OPERATIONS

INTRODUCTION

The regulatory history of the aviation industry indicates that there has always been federal control over aspects of airport operations./1,2/ Legislation established federal regulatory control over:

- the development and operation of domestic air routes (through control of the airspace, and rules over where aircraft fly and the procedures pilots use);
- the control of air traffic (through the development and operation of airport traffic control towers and other navigation/communication facilities); and
- the development and operation of airports (through conditions attached to federal funding of airport construction, among other rules)./1,2/

Historically, the operations of commercial airlines, including their decisions about what markets (cities and airports) to serve, were also regulated. The Airline Deregulation Act of 1978 lifted many of the federal economic controls over the airlines, including control over the establishment or discontinuance of domestic service at most U.S. airports./1,2/

Recent federal legislation has emphasized the need to develop and increase airport capacity; the connection between airport noise problems and local opposition to capacity increases; and the possibility that local airport access restrictions (for noise purposes) "could impede" the operation and continued development of the national air transportation system./3,4/

The agencies most involved with the current regulation of SFIA activities are the Federal Aviation Administration and the California Department of Transportation, Division of Aeronautics. Some of the ways the FAA controls the operation of SFIA (and other airports) include:

- The FAA operates the SFIA Traffic Control Tower, from which it controls aircraft landings and takeoffs on the Airport's runways, and the movement of aircraft in the airspace around SFIA.

- The design, location, and construction of airside and landside facilities at SFIA must comply with federal standards (particularly if federal funds are used).
- In order to receive federal funding, SFIA must comply with specified "grant assurances" (conditions), including the requirement to make the airport "...available as an airport for public use on fair and reasonable terms and without unjust discrimination, to all types, kinds, and classes of aeronautical users."/5,6/

Appendix A includes a summary of federal legislative history, a discussion of the key legislation governing the operation of airports, and a discussion of the functions of the FAA and the Division of Aeronautics.

EXTENT OF LOCAL CONTROL OVER AIRPORT OPERATIONS

Given the extent of federal and state regulatory control over airport operations, there is a question as to what airport owners are able to do to regulate the use of their facilities.

The question has been raised in the context of restrictions some airports have imposed in order to reduce congestion or noise problems. Examples of such restrictions include requiring that some users shift their flights to other (less busy) airports; setting a limit on the number of flights per hour; prohibiting flights by aircraft that do not meet an airport's noise standards; and setting user fees that "more realistically" reflect the costs imposed on an airport during certain times (such as congested peak hours, or nighttime hours)./1/

These and similar restrictions imposed by airport owners have been challenged in court. The following paragraphs discuss the limited powers granted to airport owners, the potential areas of control airports do have, the requirement that airport restrictions be reasonable and not discriminate unjustly, and the meaning of "unreasonable" and "discriminatory" when applied to restrictions imposed at several U.S. airports.

There is disagreement among airport operators, airlines, and regulatory agencies regarding the limits of local airport control. The following discussion, therefore, does not offer any conclusions about the ability of an airport such as SFIA to restrict or divert airline flights.

LIMITS OF LOCAL CONTROL

There are a number of laws and court decisions that specify or limit the powers of an airport owner. Through federal and state legislation, certain powers have been granted to the Federal Aviation Administration, the U.S. Department of Transportation, and the California Department of Transportation, Division of Aeronautics. The functions (and regulatory powers) of these agencies are discussed in Appendix A.

Section 1305 of the Federal Aviation Act of 1958 allows a local government to own and operate an airport. Under most circumstances, local governments have "police powers" that allow them "...to legislate in broad areas of scope including economics, the environment, morality, law and order, and peace and quiet..." Historically, the Supreme Court has superseded local police powers "...only when Congress exhibits a clear and manifest purpose to do so."/7/

A local government acting as an airport owner, however, is not able to use all of its police powers to run and regulate airport operations (because certain powers have been granted to the federal government, as noted above). "While section 1305 allows local authorities to operate airports as proprietors [owners], the grant [of power] is limited..."/7/

Under the state Public Utilities Code, the State of California has authority over "the space above the land and waters of this state." The Code also establishes the "right of flight" within this airspace. The right of flight includes "the right of safe access to public airports."/8/

POTENTIAL AREAS OF CONTROL: NOISE, CONGESTION, AND OPERATING EXPENSES

Purposes for which airport owners have been allowed to impose restrictions include the reduction of noise, the reduction of ground congestion, and the recovery of airport operating expenses./7/

Noise

"...the Supreme Court recognizes that noise control is a necessary area excluded from federal jurisdiction and left to local authorities."/7/ Many U.S. airports, including

SFIA, have successfully imposed restrictions for noise-reduction purposes. The enforcement of some of these restrictions has resulted in the denial of access (use of the airport) to certain types of aircraft.

Airports' powers to impose noise restrictions may have been limited by the Airport Noise and Capacity Act of 1990, however. Under the Act, new aircraft or noise restrictions on Stage 3 ("quiet") aircraft must be approved by the Secretary of Transportation. The Secretary has indicated that the Department of Transportation might challenge new airport noise restrictions that the Department considers too much of an economic hardship on the airlines (by requiring the airlines to retire noisy aircraft sooner, for example), or too restrictive on the operation of the airport system nationwide./4,9/

Congestion

The following excerpt from a legal commentary outlines potential means of relieving airport congestion:

> "The two principal methods that have been upheld to relieve airport congestion are perimeter rules and peak-period landing fees. Perimeter rules seek to relieve congestion at an airport by restricting incoming and outgoing flights to destinations within a certain distance of the facility... Peak period landing fees seek to relieve congestion during the time of the day when airlines are most likely to schedule flights by making the times when the airport is operating at a lower capacity more financially attractive..."/7/

Operating Expenses

Airports may impose restrictions (in the form of fees) in order to recover operating expenses:

> "...few owners would operate an airport if they were unable to recapture most, if not all, of their operating expenses. Thus, Congress provided that airport operators could maintain a fee and rental structure that made the airport as self-sustaining as possible. In interpreting Congress' provisions, courts liberally construe what constitute 'expenses' in providing facilities and services to airport users."/7/

TESTS FOR LOCAL AIRPORT RESTRICTIONS: "REASONABLE" AND "NONDISCRIMINATORY"

The tests established by legislation and applied by courts to airport restrictions have involved two key requirements: the restriction must be "reasonable"; and the restriction must not discriminate "unjustly."/7,10/

Under the Airport and Airway Improvement Act of 1982, any airport that receives federal funds must "...make its facilities available on 'fair and reasonable terms and without unjust discrimination.'" An airport, for example, cannot impose a restriction that discriminates unjustly against a class of users, such as general aviation aircraft, or a particular user, such as a specific airline./7/

The Federal Anti-Head Tax Act allows airports to collect "reasonable" fees for the use of their facilities. "Reasonable" fees, given the language of the Airport and Airway Improvement Act, are fees that "accurately reflect the cost of operating the facility."/7/

In the context of the application of these requirements to the areas where airport owners have control, an airport owner can impose a noise restriction if it is needed to mitigate an airport noise problem and if it is not "unreasonable, arbitrary, discriminatory, or a burden on interstate commerce." "Courts will uphold perimeter rules and peak-period fees [established by multi-airport authorities] as long as the restrictions are reasonable, nonarbitrary, and nondiscriminatory rules that advance the local interest."/7,10/

Interpretations of "Reasonableness" and "Discrimination"

The following discussion of the use of a special fee structure at Boston Logan International Airport addresses the question of what makes an airport restriction reasonable.

> "The most recent [court] decision...occurred in late 1989 in *New England Legal Foundation v. Massachusetts Port Authority*. In that case, the Massachusetts Port Authority (Massport), which owns and operates Logan Airport in Boston, wanted to maximize the efficient use of its facilities. It adopted a phased plan which began with a...fee structure consisting of two elements [a standard fee and an additional charge based on aircraft weight]. ...the effect of...the plan was to increase drastically the cost per landing of small aircraft while decreasing that of large aircraft. The resulting formula departed from the traditional method of calculating landing fees, and several groups consisting of small aircraft users brought a legal challenge against the fee structure."/7/

The final court ruling on the case upheld the Department of Transportation's ruling against Massport. From the ruling and Department of Transportation decision on the case, it has been concluded that:

- A "reasonable" fee or charge "fairly and rationally reflects the cost to comparably situated users" (the court found that the fee put a disproportionate share of airport costs on small aircraft); and
- The charge must be developed through a "nonarbitrary" methodology, and must accurately reflect airport costs ("...the court believed that Massport's fee structure was unreasonable because its methodology for allocating costs was 'not scientifically derived'")./7/

"The issues of discrimination and reasonableness are frequently interconnected." In a case involving local noise control regulations that prevented certain aircraft from operating at John F. Kennedy International Airport, the court determined that the Port Authority of New York and New Jersey used reasonable procedures to establish an acceptable level of aircraft noise. Since the procedures were reasonable and the restriction was "rationally related to a legitimate state interest," the court determined that the noise restriction was not discriminatory./7/

In a case involving the perimeter rule imposed by the FAA which prohibited air carriers from operating nonstop flights between Washington National Airport and any airport more than 1,000 miles away, "The court held that an airport proprietor may make reasonable regulations concerning the efficient use of navigable airspace,..." In a case involving a perimeter rule established for LaGuardia Airport, an important factor was that "long-distance air traffic was not prohibited from entering New York area airports but was only diverted from one airport to another..."/7/ An additional factor in both cases was that the airports were part of a multi-airport system operated by one authority, which had the ability to accept the (diverted) air traffic at another airport in the system./10/

> "The court noted that while all regulations tend to discriminate in some way, the important inquiry is whether the discrimination is reasonable in light of the legitimate objectives the proprietor seeks to achieve. After noting that the control of ground congestion is a legitimate proprietary function, the court agreed with the authority's belief that the perimeter rule would keep LaGuardia from experiencing delays and congestion."/7/

In a case involving SFIA and its denial of access (introduction of service) to an aircraft operated by Burlington Northern Air Freight, the FAA charged that SFIA had discriminated unjustly and unreasonably against the airline, mainly because SFIA allowed noisier aircraft (than the Boeing Q-707 denied access) to use the Airport. The Ninth Circuit Court of Appeals recently ruled in favor of the FAA. Because the FAA found that SFIA had violated its grant assurances, the FAA has withheld federal funds from SFIA since Fiscal Year 1986./10/

AIRPORT ECONOMICS

AIRPORT BUSINESS OPERATIONS

The following summary of selected aspects of airport administration and finance is included to show the extent to which the airlines serving SFIA "share the risks and responsibilities for airport operations."/1/

Sources of Operating Revenue

According to a standard text on airport management:

> "At large air carrier airports, the main sources of operating revenue are air carrier landing fees, concession fees, and charges for the use of terminal areas and hangars. At large commercial airports, landing fees (usually based on the weight of the airplane) pay for the use of airfield facilities. Concession contracts provide revenue for the use of terminal areas... Airlines pay rent for leased areas..., usually based on the amount of area rented... These sources provide an airport's operating revenue... "/1/

Funding of Airport Development Projects

The following paragraph describes the means of funding airport development projects:

> "Airport construction, development, and improvement require large amounts of capital. Airports obtain this capital from a number of sources, including the sale of bonds and state and federal grants. There are three basic kinds of bonds: general obligation, revenue, and hybrid, such as self-liquidating general obligation bonds."/1,2/

Most of the capital needed for SFIA development projects has been raised through the sale of revenue bonds, which "are backed by the revenue to be generated by the facilities."/1/

"At the federal level, grants are available under the [Airport and Airway Safety and Capacity Expansion Act of 1987] for airport improvements, ATC facilities and equipment, and airspace system operation and maintenance."/1/

Airport and Airline Assumption of Risk

At airports such as SFIA, the airlines assume some of the responsibilities and risks of airport operation:

> "The large and medium-size publicly owned airports typically operate in conjunction with privately-owned airlines. This public/private character distinguishes the financial management and operation of these airports from those of organizations that are either completely publicly owned or completely privately owned... The risks and responsibilities of airport operations for air carrier airports are shared between the airport operator and the airlines that use the airport. Terms and conditions of the relationship between the airport and the airlines are contained in legal documents known as airport use agreements."/1/
>
> "In some cases [such as the airport use agreements used at SFIA], airlines agree to pay any costs of operating an airport or servicing its debt that are not recovered from other users. This is known as the residual cost approach to pricing; its implementation transfers a significant portion of the financial risk to the airlines, since they agree to make up the operating deficits."/1,11/

If the proposed SFIA Master Plan improvements are financed with revenue bonds, payment of the bonds would be backed by Airport revenues, with the airlines covering debt payment costs not recovered from other Airport users.

AIRLINE DEREGULATION, HUBBING, AND COMPETITION

The nature of the airline service provided at SFIA and the other Bay Area airports is influenced by the development of the hub-and-spoke route system. The ability to "manage" or influence service and demand at these airports is also influenced by hubbing, and by the presence of barriers to market entry.

Deregulation and Hubbing

Hubbing is defined as follows:

> "Hubbing is an operational system in which flights from numerous points arrive at and then depart from a common point within a short time frame so that passengers arriving from any given point can connect to flights departing to all other points..."/12/

Most air travel within the U.S. involves hubbing operations./13/ "...an airport in a hub and spoke system where a carrier or carriers elect to crossconnect passengers on a large scale" is a "connecting hub."/12/ Some of the airports currently used as connecting hubs include Denver Stapleton International Airport, Dallas / Fort Worth International Airport, Atlanta Hartsfield International Airport, and Memphis International Airport.

SFIA is not a connecting hub airport; most of the passengers using the Airport are coming from or going to locations in the Bay Area. However, United Airlines uses the Airport as a hub for connections among its international, Hawaii, long-haul domestic (such as to Chicago or Washington), and intrastate flights. San Jose International Airport is currently used as a connecting hub by American Airlines. Metropolitan Oakland International Airport is not used as a connecting hub.

Airline Competition

During the decade following deregulation, the domestic airline industry underwent "significant structural and operational change," expanding from 30 large air carriers in 1978 to 38 carriers in 1984, then, through a series of mergers and acquisitions, consolidating into 8 large carriers (in 1988-1989)./12/

In the past several years, concerns have been raised about the competitiveness of the airline industry, and the potential need for "reregulation." The Secretary of Transportation commissioned a high-level task force to conduct a comprehensive assessment of airline competition. The assessment addressed, among other topics, the industry and route structure and the existence of barriers to airline entry into markets./12/

Industry and Route Structure

The DOT Task Force study of market structure found that:

- Competitive airline service to more destinations is provided to more people by more airlines.
- Airline concentration has increased at larger airports, and decreased at smaller airports.

- There has been a "dramatic increase" in the number of markets served nationwide.
- "The hubbing process by its very nature requires a large volume of frequent service and this leads naturally to a relatively high degree of concentration. Moreover, once hubs are established, carriers have a strong incentive to attempt to increase their control of traffic at their connecting hubs.
- "Virtually all non-hubbing carriers have stopped competing with nonstop service in city pairs involving a highly concentrated connecting hub. The number of nonstop competitors in city-pairs involving concentrated hubs, therefore, is essentially limited to carriers that hub at either end point.
- "In view of the substantial load factor advantage enjoyed by dominant carriers at highly concentrated connecting hubs, in the absence of price deviations which could cause such differences, any expansion of service can be expected to involve the least risk where a carrier already has a high degree of concentration and the most risk where another carrier has a high degree of concentration...this would seem to encourage carriers to expand service by extending dominance at existing hubs or creating new hubs rather than by trying to compete at another carrier's hub."/12/

Barriers to Market Entry

"Generally, barriers to entry are practices or conditions that may impede a firm's ability to enter a market."/14/ If there are barriers (see following examples) to the entry of airlines at San Jose International Airport and Metropolitan Oakland International Airport, or if the practices used to operate SFIA favor the airlines' continuation or expansion of service at SFIA, it would be more difficult to change or "manage" the service provided at each of the three airports.

The Task Force Study of potential barriers to market entry "...addresses the availability of airport gates and associated facilities and services that are necessary for air carriers to serve an airport." The study found that "...gate facilities are a potential barrier to entry into both the aviation industry and into individual markets for firms already in the industry... Without gate facilities, an air carrier is effectively barred from serving a specific market."/11/

Three factors found to contribute to the lack of gate facilities at airports are the unavailability of gate capacity, the use of exclusive-use leases, and the airlines' right to approve airport decisions.

Underutilized Gate Capacity. "There is very little underutilized terminal and gate capacity at the large airports today... An airline requires at least one full-service gate to serve an airport in a minimum fashion, say as a spoke operation. It needs 5-10 adjacent gates to start a hub... Overall, short run gate capacity is very limited." A survey conducted in 1989 found that SFIA had no gates available at that time, and would have 4 gates available 180 days later./11/

Exclusive-Use Leases. "The 1983 Report to Congress identified...[that] airport facility areas...are typically leased to carriers on an exclusive basis for extended periods of time, usually 15 to 30 years..." At an airport with long-term, exclusive-use leases, an airline trying to introduce service would have to sublease gates from the leaseholder, probably at a higher cost./11/

SFIA has standardized long-term (10-30-year) exclusive-use contracts. "This contract is the result of a 1981 lawsuit against the airport by the airlines."/15/ As of 1990, 20 of the 65 carriers serving the airport leased gates under this contract, and the remaining carriers subleased gates from the airlines, or leased gates from the airport on a month-to-month basis. All gates at SFIA are currently used by some carrier./15/

San Jose International Airport also has long-term exclusive-use leases on airport facilities./16/

Majority-In-Interest. In many airport leases, certain airlines are "given the right, through what is called a 'majority-in-interest' (MII) clause, to approve certain airport decisions... The matters subject to MII approval...generally...involve major decisions that affect airport costs, such as capital improvements or expansions, added debt, and new bond issues. The 'interest' power also varies, and can range from absolute veto power to simply requiring project reviews./11/

> "The prevalence of MII tends to be correlated with the type of financing for airports. Under the residual cost method [used at SFIA], airlines take a substantial risk, generally as guaranteeing payment of all airport costs not covered by non-airline sources of revenue. In return, they are charged landing fees and rates for space that are calculated after all other sources of revenue are taken into account. If car rental, parking, and concession income goes up, an airline's costs for use of space can go down. The airlines assume financial risks and the airlines have an interest in seeing that the airport is operated to minimize the residual costs to be covered by the air carriers."/11/

The signatory carriers at SFIA and San Jose International Airport operate under residual cost use agreements, with the right of MII approval. As of Spring 1989, SFIA needed airline approval for large capital projects, adjustments in landing fees or terminal rates, new bond sales, or additional rates, fees, or charges./11/

"Many use agreements contain a 'no additional rates, fees, or charges' clause that prevents the airport from raising new revenue for airport development by levying fees on airlines, unless specifically authorized..." In a 1989 survey, SFIA reported that it had restrictions on charging additional rates, fees, and charges, and was prevented from changing the method of calculating landing fees./11/

AIR TRAVEL DEMAND

General Characteristics

The factors that are usually considered when analyzing or forecasting air travel demand include:

- Purpose of trip. "...most people use air transportation as a means to achieve some other purpose... Consequently, when trying to estimate passenger demand, it is necessary to go into all the various reasons that make a destination city attractive... Passengers can be divided into categories by looking at the purpose of their trip. Typically the simplest of the divisions is into tourist or business travel..."/13/
- Variability. "Passenger demand for any mode of transportation varies greatly by the hour of the day, the day of the week, and in most markets by the season of the year." For example, in a vacation travel market, the demand may be significantly higher during the summer than in the other seasons of the year./13,17/
- Passenger origins and destinations.
- Population of the region served by the airport. "The size and composition of the area's population - and its potential growth rate - are basic ingredients in creating demand for air transportation services."/18/
- Employment of the region served by the airport.
- Disposable income.
- Regional economy. "In addition to overall national and regional economic activity, this factor includes consideration of specific, identifiable, local activity that distinguishes the geographic area served by the airport from the aggregate conditions across the region. This factor is particularly important in connection with business travel by commercial and general aviation and with air freight traffic."/18/

- Price of airline travel.

- Frequency of service, defined as the convenience of travel between two points. "The larger the number of flights the more convenient are the departure and arrival times likely to be."/17/

- Level of service, such as the use of frequent flyer programs, or an airline or airport's on-time performance record.

- Overall travel time./13,17/

- External factors, such as fuel price changes, changes in the regulatory environment, and the granting of new routes for international service./18/

- Local aviation actions. "The types of ground access and support services provided, user charges, and plans for future development can each affect future growth of aviation demand."/18/

Demand and Service in a Multiple-Airport Region

In the San Francisco Bay region, travelers have more than one airport from which to choose:

> "Airport choice occurs in metropolitan areas that are served by more than one airport. In such areas, it may happen that a traveler can choose between a closer airport with access travel advantages and a farther airport with schedule frequency advantages."/17/

A model used to study airport choice for travel between the San Francisco and Los Angeles metropolitan areas considered the total travel time, the schedule frequency, and the air fare. The results of the model showed that "...business travel is more sensitive to schedule frequency and less sensitive to fares than nonbusiness traffic."/17/

The 1990 Air Passenger Survey conducted by the Metropolitan Transportation Commission (MTC) found that "The most commonly cited determinant of airport choice, regardless of air party characteristics, was closeness to residence, hotel or business." The survey also found that "San Francisco and Oakland airports...have a greater portion of respondents [than San Jose] citing service competition [flight availability, frequency, and fares] as their main reasons for choosing one of the two airports."/19/ Other MTC survey results can be found in Attachment A to this packet.

NOTES - Background

/1/ Taneja, Nawal K., *Introduction to Civil Aviation*, Lexington Books, 1987.

/2/ Smith, Donald I., John D. Odegard, and William Shea, *Airport Planning and Management*, Wadsworth Publishing Company, 1984.

/3/ Airport and Airway Safety and Capacity Expansion Act of 1987, Public Law 100-223, House Report and House Conference Report.

/4/ Airport Noise and Capacity Act of 1990.

/5/ Horonjeff, Robert, and Francis X. McKelvey, *Planning and Design of Airports*, McGraw Hill, Third Edition, 1983.

/6/ Federal Aviation Administration, "Part V, Assurances, Airport Sponsors," grant assurances under the Airport Improvement Program, October 1, 1990.

/7/ Pennington, William, "Airport Restrictions: A Dilemma of Federal Preemption and Proprietary Control," in *Journal of Air Law and Commerce*, Volume 56, Number 3, Spring 1991.

/8/ "State Aeronautics Act," Division 9, Public Utilities Code, State of California.

/9/ "FAA Eases Plan to Phase Out Noisy Jets Amid Strong Pressure," *New York Times*, September 25, 1991.

/10/ Daphne Fuller, Staff Attorney, Federal Aviation Administration, telephone conversation, October 1, 1991.

/11/ U.S. Department of Transportation, *Secretary's Task Force on Competition in the U.S. Domestic Airline Industry, Airports, Air Traffic Control, and Related Concerns (Impact on Entry)*, February 1990.

/12/ U.S. Department of Transportation, *Secretary's Task Force on Competition in the U.S. Domestic Airline Industry, Industry and Route Structure*, Executive Summary, February 1990.

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/14/ United States General Accounting Office, *Airline Competition: Effects of Airline Market Concentration and Barriers to Entry of Airlines*, April 1991.

/15/ California Public Utilities Commission, *Fares, Service, and Terminals, Staff Final Report on Airline Service Within California*, March 7, 1990.

/16/ Steve Grossman, Deputy Director of Finance, San Jose International Airport, telephone conversation, September 25, 1991.

/17/ "Transportation Demand Analysis," handout accompanying presentation by Adib Kanafani, University of California - Berkeley, Course in Airport Systems Planning and Design, April 30 through May 3, 1990.

/18/ Federal Aviation Administration, Advisory Circular 150/5070-6A, "Airport Master Plans," June 1985.

/19/ Metropolitan Transportation Commission, *1990 Air Passenger Survey, San Francisco Bay Area*, August 1991.

APPENDIX A: SUMMARY OF FEDERAL REGULATORY HISTORY

FEDERAL REGULATORY HISTORY

The federal government has regulated the aviation industry in the United States from the early days of domestic air service. In addition to economic and safety controls on the airlines, regulation has included rules for the development and operation of the domestic airway system, the control of air traffic, and the development and operation of airports. The following "highlights" of federal regulatory history are included to show the extent and complexity of the regulatory framework within which SFIA and other U.S. airports operate.

Early Regulation (1925-1934)

Federal regulation of the aviation industry began with the Air Mail Act of 1925 (the Kelly Act) and the Air Commerce Act of 1926. The Kelly Act resulted in the transfer of airmail operations from the Post Office Department to private carriers. (Regular air passenger service was not established before 1925; most regularly scheduled air services were airmail flights conducted by the Post Office Department.) The Air Commerce Act "...initiated the development of civil airways and navigational aids and provided for safety regulations requiring that airplanes, pilots, and navigational facilities be registered, examined, and certificated." The Air Commerce Act made the aeronautics branch of the Department of Commerce responsible for "...promoting and fostering the development of commercial aviation as well as for regulating the business aspects of air transportation."/1,2/

"Until the early 1920s, a substantial number of airports in the United States had been privately owned and operated." Congress concluded, in developing the Air Commerce Act, that "...the control and operations of airports were... the responsibility of municipal authorities."/1,2/

> "...the Air Mail Act of 1934 (the Black-McKellar Act)...set up a threefold control of the air transport industry: (1) airmail contracts were to be awarded by the Post Office Department; (2) the Interstate Commerce Commission was put in charge of setting 'fair and reasonable' airmail rates; and (3) the Department of Commerce was made responsible for the regulation of safety and the maintenance, operation, and development of the airway system... The act also established the five-man Federal Aviation Commission to study federal aviation policy and recommend future policy. The most important recommendation of this commission was the creation of a separate agency for economic regulation of the civil air transport industry."/1,2/

Civil Aeronautics Act of 1938

The Civil Aeronautics Act of 1938 established economic regulation of the airlines:

> "The Civil Aeronautics Act of 1938 placed the development, regulation, and control of air carriers under the jurisdiction of the Civil Aeronautics Authority (later known as the Civil Aeronautics Board, or CAB). This authority, for the first time, subjected the airlines to rigorous economic regulation. Carriers that wanted to offer commercial service were now required to obtain from the CAB a Certificate of Public Convenience and Necessity, specifying the points to be served and the services to be provided... The CAB exercised complete power to determine 'fair and reasonable' rates for the transportation of passengers, property, and mail. The CAB also had the power to regulate competition; to decide on consolidations, mergers, and acquisitions..."/1,2/

An Air Safety Board within the CAB was created to promulgate Civil Air Regulations. However, enforcement of the regulations was the responsibility of the aeronautics division of the Commerce Department. The aeronautics division was also "...made responsible for the operation of the airways and control towers and the administration of funds for the development of airports."/1/

> "The prohibition against federal construction of airports, a part of the Air Commerce Act of 1926, had been omitted... The Civil Aeronautics Act directed the administrator to make a field survey of existing airports and present a recommendation to Congress in 1939 on whether the government should participate in the construction, improvement, development, or maintenance of the national system of airports."/2/

The administrator recommended that the "...development and maintenance of an adequate system of airports was in the national interest..."/1/ Congress appropriated $40 million for the development of airports in 1940./2/

Transportation Act of 1940

The Transportation Act of 1940 established the Civil Aeronautics Board (replacing the Civil Aeronautics Authority) and the Civil Aeronautics Administration (CAA, which was the predecessor to the Federal Aviation Agency, which later became the Federal Aviation Administration). The CAB was responsible for economic regulation; the CAA was responsible for safety regulation. The CAA's authority was extended during World War II to include air traffic control of all airways./2/

World War II

World War II affected U.S. airport development:

> "...defense considerations led to the decision to upgrade existing airports and to develop new airports... Congress... appropriated specific funds to construct and improve airports that were considered vital for national defense. After the war, the Federal Airport Act of 1946 increased the size of the airports program by providing $500 million over the next 7 years. The recipients of federal funds were required to comply with the new standards established by the CAA, such as site location, airport layout, lighting, and the safety of approaches."/1,2/

The air traffic control system was upgraded after World War II, including the establishment of approach control facilities, use of long-range radar, establishment of an accurate navigation system and installation of instrument landing systems, and improvements in communications equipment. The Office of Air Traffic Control was established in 1956./1/

Federal Aviation Act of 1958

The Federal Aviation Act of 1958 amended and replaced the Civil Aeronautics Act of 1938:

> "The new act established the Federal Aviation Agency (FAA) as a separate government agency...Its functions were to regulate airspace; to acquire, operate, and develop air navigation facilities; and to prescribe air traffic rules for all aircraft. The safety regulations became known as the Federal Aviation Regulations (FARs). Although regulation of safety was under the jurisdiction of the FAA, investigation of civil aircraft accidents was still the responsibility of the CAB. The CAB's economic regulatory authority was left unchanged."/1,2/

The FAA was also given the authority to approve the siting of airports and to administer airport development funds./1/

Creation of Department of Transportation (DOT)

The U.S. Department of Transportation was created in 1966:

> "...to provide total transportation planning, policy guidance, and protection of the public interest - with the aim of achieving an integrated national transportation system based on economic criteria rather than on modal preferences... The FAA (now Federal Aviation Administration) was reorganized and became part of the DOT. In the area of air safety, the FAA administrator was given cabinet-level functions, powers, and duties. The Air Safety Board became the National Transportation Safety Board..."/1,2/

Airport Development in the 1970s

In the 1970s, Congress authorized funding for airport development:

> "In 1970, the Airport and Airway Development Act and the Airport and Airway Revenue Act were passed to allow for the expansion, improvement, and funding of airways and airport systems... The Airport Development Aid Program (ADAP), part of the Airport and Airway Development Act, allowed an expenditure of $2.5 billion for the improvement of existing airport facilities and for the construction of new airports. Under the Airport and Airway Revenue Act, the Airport and Airway Trust Fund was established with money collected from the users of the system."/1,2/

Airline Deregulation Act of 1978

The Airline Deregulation Act was "...intended 'to amend the Federal Aviation Act of 1958, to encourage, develop and attain an air transportation system which relies on competitive market forces to determine the quality, variety, and price of air services and for other purposes.'" Former policy had been "'...oriented towards the creation and governmental promotion of an air transportation system and the protection of the air transport industry through essentially public utility-type regulation.' It was often interpreted as allowing or even requiring anticompetitive policies."/2/

Under the Civil Aeronautics Act of 1938, the CAB granted certificates to airlines for proposed service "...only if it found that the...service was 'required by the public convenience and necessity.' The board also had to find that the airline was 'fit, willing, and able' to perform the service..." Certificates were granted through "complicated and time-consuming procedures." Under deregulation, airlines are still required to obtain certificates of fitness from the Department of Transportation, but other controls over airline entry into (and exit from) most domestic markets have been eliminated. (Service to certain small communities is regulated under the Essential Air Service program.)/1/

Deregulation was achieved in phases. Passenger airline operations were deregulated as of October 1978. The CAB's authority to assign air routes ceased in 1982; authority relating to rate making was terminated in 1983. The CAB ceased to exist as of January 1985; its remaining responsibilities (such as the regulation of international transportation) were transferred to the Department of Transportation. (DOT approval of airline mergers ceased in 1988; mergers are subject to the antitrust laws administered by the Department of Justice.)/1,2/

Airport and Airways Improvement Act of 1982

Funding authorization for airport development under ADAP (established by the 1970 Airport and Airway Development Act) expired in 1980. The Airport and Airways Improvement Act of 1982, enacted to implement the FAA's National Airspace System Plan for Facilities, Equipment and Associated Development, authorized funding for airport development under the Airport Improvement Program (AIP)./1,2/

Recent Legislation

Airport and Airway Safety and Capacity Expansion Act of 1987

The Act amends the Airport and Airway Improvement Act of 1982 "for the purpose of extending the authorization of appropriations for airport and airway improvements, and for other purposes." Concerns expressed by Congress during the drafting of the legislation include the large, unspent balance in the Airport and Airway Trust Fund, the need for continued development of the national airport and airway system (especially airport capacity and air traffic control modernization), and the need to make further progress in achieving airport noise compatibility./3/

The Act:

- Authorizes $8.7 billion through Fiscal Year 1992 for the Airport Improvement and Noise Abatement Programs;
- Authorizes $5.3 billion through Fiscal Year 1992 for the FAA's Facilities and Equipment programs, to implement the FAA's plan for the modernization of the air traffic control system;
- Sets forth formulas for the apportionment of federal funds;
- Amends the federal grant assurances regarding the provision of access on a nondiscriminatory basis, the protection of terminal airspace, the requirement that airport revenues must be spent on the airport, and the disposal of land purchased with federal funds for noise mitigation;
- Permits the issuance of a Letter of Intent to fund an airport project in future years;
- Provides that if an airport is not making reasonable progress toward developing or implementing a noise compatibility program, 10 percent of the funds apportioned to the airport shall be made available to local government for noise mitigation programs;
- Provides for a higher federal share for the funding of noise projects at certain airports;

- Requires the FAA Administrator "to conduct a study of innovative noise abatement proposals that are not currently eligible for federal assistance";
- Includes provisions and requirements for certain individual airports;
- Modifies existing law regarding the Essential Air Service program; and
- Extends excise taxes through December 31, 1990, with a "trigger" that the 1990 taxes be reduced if the total appropriations for airport improvements, facilities and equipment, and research, engineering and development are less than 85 percent of the total amounts authorized for these programs./3/

Airport Noise and Capacity Act of 1990

Among the findings in the Act are that

> "(1) aviation noise management is crucial to the continued increase in airport capacity; (2) community noise concerns have led to uncoordinated and inconsistent restrictions on aviation which could impede the national air transportation system; (3) a noise policy must be implemented at the national level;"/4/

The Act requires that the Secretary of Transportation "shall issue regulations establishing a national noise policy..." The policy "...shall be based on a detailed economic analysis of the impact of the phaseout date for Stage 2 aircraft on competition in the airline industry..." The Act establishes December 31, 1999 as the phaseout date for Stage 2 aircraft (for turbojet aircraft with a maximum weight of more than 75,000 pounds), with a possible waiver through 2003. The noise policy shall include a schedule for phased-in compliance, with interim deadlines./4/

On September 24, 1991, the FAA issued the regulations required by the Act. FAA's initial proposed rule would have required the phasing out of each airline's Stage 2 aircraft according to the following schedule: 25 percent by the end of 1994; 50 percent by 1996; 75 percent by 1998; and 100 percent by the year 2000. However, the airline industry argued for a more flexible approach, and the Secretary of Transportation "...ordered that the timetable be made more flexible out of concern for the economic viability of the airlines." As a result, the rule "...allows airlines, if they choose, to move toward compliance by first increasing the numbers of quieter aircraft in their fleets, rather than by starting right away to eliminate the noisier ones." The adopted deadlines are that 55 percent of an airline's entire fleet must be Stage 3 aircraft by 1994, 65 percent by 1996, and 75 percent by 1998./5/

The Act also requires that the national policy include a "program for reviewing airport noise and access restrictions on operations of Stage 2 and Stage 3 aircraft." Any airport noise or access restriction on the operation of Stage 3 aircraft effective after October 1990 is prohibited unless "...it has been agreed to by the airport proprietor and all aircraft operators" or has been approved by the Secretary of Transportation. A restriction on Stage 2 aircraft is allowed only if the airport operator conducts a cost-benefit analysis of the restriction and allows adequate time for public comment. Compliance with these provisions is tied to the receipt of federal funds and the eligibility to impose and collect "passenger facility charges."/4/

FUNCTIONS OF REGULATORY AGENCIES

The regulatory history presented in the previous section provides the framework for the current regulation of SFIA. The agencies most involved with the regulation of SFIA activities are the Federal Aviation Administration and the California Department of Transportation, Division of Aeronautics. Information on these agencies' functions is included to show the extent to which the operation of SFIA is subject to federal and state regulation.

<u>Federal</u>

Federal Aviation Administration

The FAA participates directly and indirectly in the operation of the Airport through its establishment and operation of the air traffic control (ATC) system; its regulation of aircraft and airlines, airport design and construction, and day-to-day aspects of airport management; and its administration of funds. The FAA performs the following functions:

- "Encourages the establishment of civil airways, landing areas, and other air facilities;
- "Designates federal airways; acquires, establishes, operates, and conducts research and development; and maintains air navigation facilities along such civil airways;
- "Makes provision for the control and protection of air traffic moving in air commerce;
- "Undertakes or supervises technical development work in the field of aeronautics and the development of aeronautical facilities";

- Develops and enforces the Federal Aviation Regulations, including the following:
  - aircraft noise certification (Part 36)
  - airport noise compatibility programs (Part 150)
  - rules for funding eligibility and fund procurement (Part 152)
  - acquisition of U.S. land for airports (Parts 153, 154)
  - release of federal airport property for public use (Part 155)
  - reporting actions relating to construction, alteration, activation, and
  - deactivation of airports (Part 157);

- "Provides for aircraft registration;

- "Requires notice and issues orders with respect to hazards to air commerce"; and

- "Issues operating certificates to airports serving air carriers [under FAR Part 139]."/1,6/

The FAA also develops the National Plan of Integrated Airport Systems and directs the federal airport aid program. "In this connection it performs the following functions:

- "Provides advisory assistance on airport planning, design, construction, management, operation, and maintenance;

- "Develops and establishes standards, government planning methods, and procedures (for airport planning, design, and construction, and management, operations, and maintenance);

- "Develops and recommends principles for incorporation in state and local legislation"; and

- "Secures compliance with statutory and contractual requirements relative to airport operation practices, conditions, and arrangements."/2,6/

Department of Transportation

As discussed on page A-5 above, the Department of Transportation regulates air service to small communities under the Essential Air Service program, and enforces economic controls on international air transportation.

<u>State</u>

The California Department of Transportation, Division of Aeronautics issues permits for the operation of airports in the state. (State permitting is conducted separately from the federal certification of airports under FAR Part 139.)/7/

Any changes to "airside" facilities at an airport require a revision to the state permit. Changes to landside facilities, such as those proposed under the SFIA Master Plan, do not require a revision to the permit./7/

The Division of Aeronautics conducts yearly inspections for compliance with the permit. The Division also enforces the Federal Aviation Regulations, which were adopted by the state under the State Aeronautics Act. The Code gives authority to the Division to develop additional regulations under Title 21 of the California Code of Regulations./7/

NOTES - Appendix A

/1/ Taneja, Nawal K., *Introduction to Civil Aviation*, Lexington Books, 1987.

/2/ Smith, Donald I., John D. Odegard, and William Shea, *Airport Planning and Management*, Wadsworth Publishing Company, 1984.

/3/ Airport and Airway Safety and Capacity Expansion Act of 1987, Public Law 100-223, House Report and House Conférence Report.

/4/ Airport Noise and Capacity Act of 1990.

/5/ "FAA Eases Plan to Phase Out Noisy Jets Amid Strong Pressure," *New York Times*, September 25, 1991.

/6/ Horonjeff, Robert, and Francis X. McKelvey, *Planning and Design of Airports*, McGraw Hill, Third Edition, 1983.

/7/ Gargas, Dan, Aviation Consultant, Caltrans Division of Aeronautics, telephone conversation, September 19, 1991.

ATTACHMENT E

LETTERS FROM REGIONAL AGENCIES

COMMENTING ON THE DRAFT EIR

MTC

METROPOLITAN
TRANSPORTATION
COMMISSION

September 16, 1991

Ms. Barbara Sahm
Environmental Review Offices
450 McAllister Street, Sixth Floor
San Francisco, CA 94102

Dear Ms. Sahm:

The MTC staff have reviewed the San Francisco International Airport (SFO) Master Plan DEIR. The DEIR is a detailed and comprehensive document addressing proposed improvements at the Airport to the year 2006. The environmental document discusses forecasted traffic activity, airport development plans, and environmental impacts related to transportation, noise, air quality and other issues. As the regional transportation planning agency, MTC must develop and adopt a Regional Airport System Plan. The last regional airport plan was adopted in 1980, and the forecasts have been periodically reviewed and updated since that time (see below). MTC is now engaged in the comprehensive review and updating of the 1980 plan. The new RAP will examine airport system alternatives for 2005 and 2010.

MTC recently transmitted information to you under separate cover including: results of the 1990 MTC Air Passenger Survey at SFO, Oakland, and San Jose Airports, a memo to the Regional Airport Planning Committee on recommended regional air passenger forecasts (February 22, 1991), and a handout to the same committee on the preliminary airport system alternatives (distributed at the September 6, 1991 RAPC meeting). Specific MTC staff comments on the San Francisco International Airport Master Plan DEIR are provided below:

<u>Forecasts and Regional Traffic Allocations</u>

- The EIR would benefit from an expanded discussion of regional airport system alternatives including the compatibility of SFO airport improvement proposals with improvement proposals being developed in other ongoing airport master plan studies at Oakland and San Jose Airports. The DEIR should provide some discussion of how airline and airport facility investments and airline service decisions (such as creating new airline "hubs" for connecting flights) could either reinforce or change air service patterns at Bay Area airports.

- For clarification, the current regional airport plan air passenger forecasts and airport traffic assignments are different than those shown on page 110 (see attached excerpts for the MTC Regional Transportation Plan).

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- The regional air passenger forecasts were last revised in 1986, and the airport traffic assignments were last revised in 1987. Note that the actual 1990 airport traffic shares for the Bay Area airports (page 120) are quite close to the recommended traffic allocations in the regional airport plan, i.e., the traffic allocations associated with a Bay Area traffic level of 43 Million Annual Passengers (MAP).

- The current regional airport plan recommends that Oakland and San Jose Airports serve a larger share of regional air traffic as air travel demand increases in the future. These recommendations stem from extensive previous analysis showing this strategy is essential to: balance available runway and airspace capacity (i.e., reduce excessive aircraft and passenger delays), provide more convenient and accessible air service to the Bay Area's population, provide noise relief to Bay Area residents, and to minimize vehicle travel and air pollution for ground trips to and from Bay Area airports. One of the reasons the Plan is now being revised is to coordinate ongoing airport master plan proposals for SFO, Oakland and San Jose Airports. San Francisco's master plan, for example proposes to serve 51.3 MAP in 2006, whereas the current policy limit in the regional airport plan is 31 MAP; similar conflicts with the regional airport plan exist at the other Bay Area airports. The question of how much additional airport capacity is needed and the optimum share of traffic for each airport is the subject of the current Regional Airport System Plan update due to be completed in the Spring of 1992. Airport system alternatives for the update study are now being defined through discussions with the ABAG/MTC Regional Airport Planning Committee (RAPC). San Francisco Airport's Master Plan should be consistent with the regional plan.

- MTC's "expected" forecast for the Bay Area is 62.6 MAP in 2005 and 70.7 MAP in 2010; these projections employ different methodologies than either the FAA forecast or the CASP forecast. However, the ABAG/MTC Regional Airport Planning Committee has also recommended that the plan update consider the long-term (20-25 year) capacity implications of a air passenger demand level of 84 MAP--which is similar to the forecast in the California Airport System Plan.

- In terms of airport system alternatives, the Regional Airport System Plan update will be looking at alternatives in which SFO's share of regional air traffic will most likely vary between the current 70% to a lower share of about 55%, reflecting substantial redistribution of air service to other airports. The Master Plan forecasts would be more consistent with retention of the current share.

<u>Transportation Impacts</u>

- The EIR indicates several highway segments and local intersections will deteriorate to Level of Service F as a result of projected future air traffic growth resulting from the master plan. MTC has reviewed the traffic data and assumptions in the DEIR and finds the methodologies and assumptions to be reasonable, given the air passenger forecast, including such factors as the air passenger and employee mode split, the projected use of the proposed BART extension to SFO, and the impact of the BART extension on airport parking requirements.

- Since the DEIR was prepared two additional BART extension alternatives were added to those previously under study by MTC: Alternative 5 (I-380 corridor to an "external" BART station on the airport's West of Bayshore property) and Alternative 6 (I-380 corridor to an "internal" station under the Airport's main garage). The decision on which alignment will be the preferred alignment to SFO will be a joint decision by MTC, BART, and SamTrans. This study assumes the Airport will finance, construct and operate an Automated People Mover system to the "External" SFO BART/CalTrain Station if this alignment is selected as the preferred alternative. Potential airport contributions to the capital and operating cost of the proposed BART extension will be evaluated by MTC in the ongoing BART extension study.

- The Transportation Impacts section does not adequately describe the mitigation of airport surface traffic impacts other than the impact of the proposed BART extension (and this is only discussed in relation to local intersections and parking demand; a discussion of the impacts on freeway segments would also be warranted).

- Specific mitigation measures that need greater elaboration include:

  - airport coordination activities with local agencies, including the San Mateo County Congestion Management Agency (CMA), to establish and maintain traffic LOS standards on key freeways and airport access routes as well as participation with the CMA in the development of deficiency plans to address unacceptable levels of service at intersections near the Airport

  - assistance in the planning and development of off-airport terminals (page 114 discusses this concept, but it is not listed on pages 12 - 13 which summarize potential transportation mitigation measures)

  - development of a pricing policy for parking which reduces auto access to the airport and encourages the use of transit and other high occupancy vehicle services

  - preferential access for public transit operators to the terminal curbside to place public transit on a competitive footing with auto access

  - defining a workable and effective commute alternatives program for airport employees given past experience which has shown how difficult it is for a majority of employees with different shifts and work hours to use carpools and transit

<u>Noise</u>:

- The growth in aircraft size appears to be higher than current industry trends would indicate.

- It would also be helpful if the noise impact information is reported both in terms of population and dwelling units within various noise contours.

Air Quality:

- The Bay Area Air Quality Management District has recently revised its recommendations for estimating future CO ambient background levels. These revisions will significantly affect the CO concentration analysis in Table 55 and the conclusions reached in that table.

- The EIR would benefit from a discussion of the regional (ozone) and local (carbon monoxide) reductions that would be achieved by increased use of transit and ridesharing modes by air passengers and airport employees. Also, the Airport should be aware of transportation control measures (TCMs) adopted by MTC in February 1990 as Contingency Measures for the 1982 Bay Area Air Quality Plan and proposed TCMs in the BAAQMD's 1991 Clean Air Plan to meet state air quality standards which may affect the transportation impacts discussed in the DEIR.

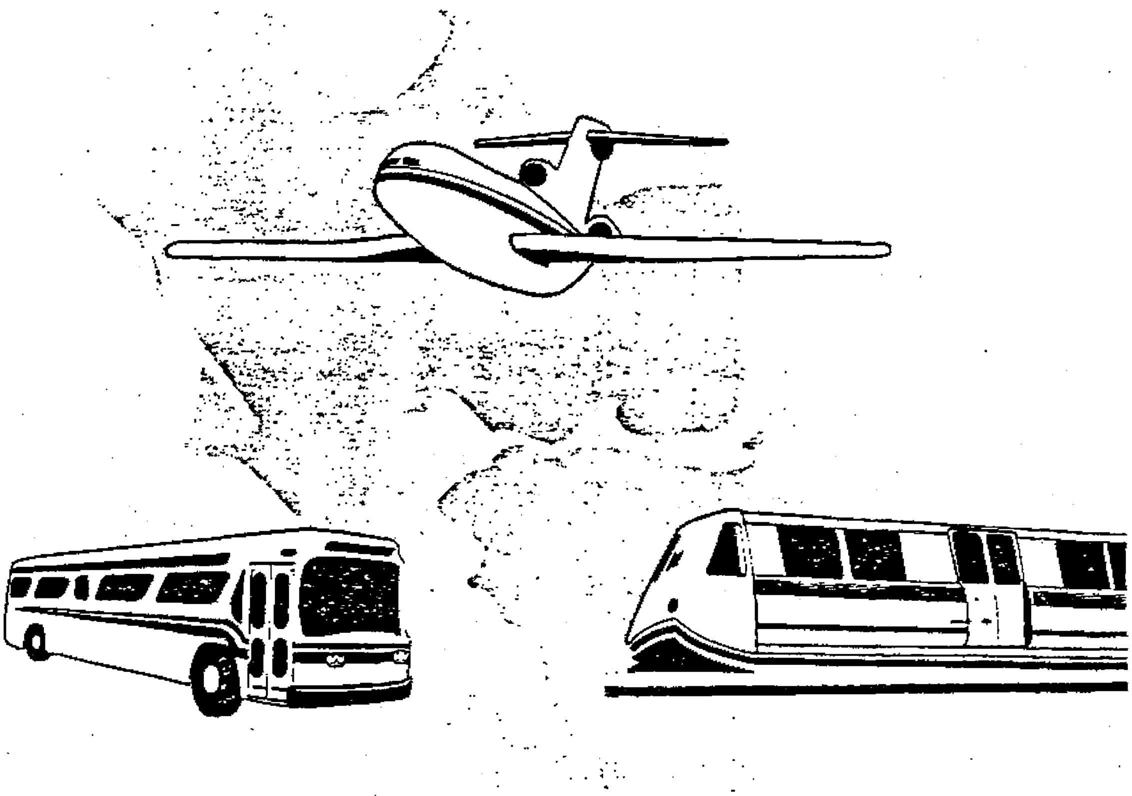
Should you have any questions about these comments, we would be pleased to provide additional information.

Sincerely,

Chris Brittle

Chris Brittle
Manager, Planning

CB:jlr
8942p/11



Regional Transportation Plan

For the Nine-County San Francisco Bay Area

1988

MTC
METROPOLITAN
TRANSPORTATION
COMMISSION

THE REGIONAL AIRPORT PLAN

In 1977, the Regional Airport Planning Committee (RAPC), a joint advisory committee of MTC and ABAG, began a major review of the Regional Airport Plan (RAP)--which provides long-range guidelines for development of air passenger, air cargo, and general aviation facilities in the Bay Area. The airport map following this text locates the facilities identified in the RAP. In accordance with Policy 5.6, the RAP shall guide MTC in its decisions concerning airport plans and development proposals. The RAP has the following major provisions:

- Expansion of the major air carrier airports. Airline service at San Francisco International Airport, Metropolitan Oakland International Airport, and San Jose Municipal Airport should be consistent with the regional plan and with master plans prepared for these airports. The regional plan recommends that airport improvement programs and local land use decisions be guided by the regional projections of air passenger demand and airport traffic assignments shown below:

PROJECTED BAY AREA AIR PASSENGER DEMAND
(Millions of annual passengers - on & off)

Time Frame	Total Bay Area Air Passengers
1995	40.8 - 46.8
2005	48.7 - 58.7

AIRPORT TRAFFIC ASSIGNMENTS
(Millions of annual air passengers - on & off)

Airport	Level 1 Demand	Level 1 Share	Level 2 Demand	Level 2 Share	Level 3 Demand	Level 3 Share
San Francisco	19.9	78.7%	30.0	69.3%	31.0	55.1%
Oakland	2.6	10.1	6.0	13.9	15.0	26.6
San Jose	2.8	11.2	7.0	16.2	10.0	17.8
Buchanan Field	--	--	0.3	0.6	0.3	0.5
Total	25.3	100.0%	43.3	100.0%	56.3	100.0%

Level 1 represents the 1981 traffic level and traffic distribution among the airports. Levels 2 and 3 represent shares derived from policies in the RAP and airport master plans. Air passenger assignments for intermediate levels of Bay Area demand may be determined by interpolation between the three levels of demand shown in the table. The RAP recommends a redistribution of additional airline service to Oakland and San Jose airports--although with the changes that have occurred in airline regulation, local agencies will find it more difficult to effect such changes in airline service. Also, the plan recognizes the potential for scheduled airline jet service at smaller, community airports which have historically handled general

ABAG
ASSOCIATION OF BAY AREA GOVERNMENTS
Mailing Address: ■ P.O. Box 2050 ■ Oakland, CA 94604-2050

City & County of S.F.
Dept. of City Planning
SEP 19 1991
OFFICE OF ENVIRONMENTAL REVIEW

September 18, 1991

Barbara Sahm
The Environmental Review Officer
City and County of San Francisco
450 McAllister Street, Sixth Floor
San Francisco, CA 94102

RE: DEIR for San Francisco International Airport Master Plan

Dear Ms. Sahm:

Thank you for sending the Draft Environmental Impact Report on the above project for our review. ABAG staff comments are directed to the DEIR's analysis of possible impacts to the jobs/housing balance, the analysis of alternatives, and the interrelationship that should exist between the San Francisco Airport and regional airport planning.

The DEIR states implementation of the SFIA Master Plan would add about 4,600 new jobs by 1996 or about 8,900 new jobs by 2006 (pg. 10). This would create a demand for 3,460 dwelling units by 1996 or 6,850 units by 2006. The DEIR projects 2,450 of these units would be in San Mateo County, 1,940 in San Francisco and 810 in Alameda County. Decision makers need to know the projected income of these employees and how housing that is affordable to them will be provided. Most airport employees cannot afford to live in San Mateo County.

Only three alternatives are analyzed in the DEIR: the no-project alternative, the on-site alternative and the off-site alternative. It would be helpful if another alternative were included that would serve more passengers than the no-project alternative but less than the Master Plan.

The DEIR points out (pg. 258) that SFIA passenger forecasts for the near-term (42.3 million annual passengers in 1996) and for the long-term (51.3 million annual passengers in 2006) exceed MTC/ABAG-recommended allocations for SFIA (27 to 31 million annual passengers in 1997). The Regional Airport Plan is currently being updated. In view of the major regional impacts of the expansion sought in the Master Plan, we recommend any decision await the development, public debate and final approval of the Regional Airport Plan. The magnitude of the proposed expansion makes conformity with the Regional Airport Plan imperative.

Thank you for the opportunity to comment on this DEIR. If you have any questions, please contact Ann Berry at 464-7919.

Sincerely,

Gary Binger
Planning Director

C&R.A.159

STATE OF CALIFORNIA - BUSINESS, TRANSPORTATION AND HOUSING AGENCY PETE WILSON, Governor

DEPARTMENT OF TRANSPORTATION
DIVISION OF AERONAUTICS
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September 5, 1991

Ms. Barbara W. Sahm
City and County of San Francisco
450 McAllister Street, Sixth Floor
San Francisco, CA 94102

Dear Ms. Sahm:

The City & County of San Francisco's DEIR for the
San Francisco International Airport Master Plan; SCH #90030535

The California Department of Transportation, Division of Aeronautics, has reviewed the above-referenced document with respect to the Division's area of expertise as required by CEQA. Since no runway extension, relocations or additions are included in this proposal, the State Airport Permit for San Francisco International Airport should not be affected. We do, however, offer the following comments for your consideration.

The Division supports the proposed plans for an Automated People Mover (APM) system at San Francisco International Airport. However, we do note that it appears that with the exception of private automobile passenger drop-off, vehicles that previously proceeded directly to the terminal buildings (taxi/limo, shuttle van, shuttle bus and Sam Trans bus) would now go to the Ground Transportation Center, with the occupants then using the Automated People Mover to access the terminal buildings.

Will all curb side drop-off be discontinued for these alternative modes of travel? If so, we suggest that further consideration be given to the potential impact on the shuttle, bus and taxi/limo services if private vehicles are still allowed to drop-off passengers at the curb.

Thank you for the opportunity to review and comment on this proposal.

Sincerely,

Sandy Hesnard

SANDY HESNARD
Environmental Planner

cc: State Clearinghouse
San Francisco International Airport

City and County of San Francisco
Department of City Planning

SAN FRANCISCO INTERNATIONAL AIRPORT MASTER PLAN
Final
Environmental Impact Report

86.638E
SCH #90030535

Volume III: Appendices

Draft EIR Publication Date: July 11, 1991
Draft EIR Public Hearing Dates:
August 27, 1991, 7:30 p.m., Clarion Hotel, Millbrae
August 29, 1991, 1:30 p.m. or later, City Hall, Room 282, San Francisco
October 17, 1991, 1:30 p.m. or later, City Hall, Room 282, San Francisco
Draft EIR Public Comment Period: July 11, 1991 to October 21, 1991
Final EIR Certification Date: May 28, 1992

Changes from the text of the Draft EIR are indicated by solid dots (●) at the beginning of each revised section, paragraph, graphic or table. A dot next to the page number indicates that all text on the page is new or substantially revised.

SAN FRANCISCO INTERNATIONAL AIRPORT
● FINAL EIR

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SAN FRANCISCO INTERNATIONAL AIRPORT
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XII. APPENDICES

City and County of San Francisco **Department of City Planning**

NOTICE THAT AN
ENVIRONMENTAL IMPACT REPORT
IS DETERMINED TO BE REQUIRED

Date of this Notice: August 11, 1989

Lead Agency: City and County of San Francisco, Department of City Planning
450 McAllister Street - 6th Floor, San Francisco, CA 94102

Agency Contact Person: Barbara W. Sahm Telephone: (415) 558-6378

Project Title: 86.683E: San Francisco International Airport Master Plan

Project Sponsor: San Francisco International Airport Project Contact Person: John Costas

Project Address: San Francisco International Airport

City and County: San Francisco

Project Description: The project would be the San Francisco International Airport (SFIA) Master Plan. The proposed SFIA Master Plan would be a physical/management design plan focusing on the accommodation of facilities through the development of improved land use and circulation patterns for all airport-owned lands excluding the undeveloped West of Bayshore site. Principal projects considered in the SFIA Master Plan include: 1) new International Terminal, 2) transportation/transit center, 3) consolidation of cargo facilities, 4) consolidation of administrative facilities, 5) overall circulation system, 6) hotel/commercial/airport support development on airport lands, 7) consolidation of airline maintenance and administrative facilities.

THIS PROJECT MAY HAVE A SIGNIFICANT EFFECT ON THE ENVIRONMENT AND AN ENVIRONMENTAL IMPACT REPORT IS REQUIRED. This determination is based upon the criteria of the Guidelines of the State Secretary for Resources, Section 15063 (Initial Study), 15064 (Determining Significant Effect), and 15065 (Mandatory Findings of Significance), and the following reasons, as documented in the Environmental Evaluation (Initial Study) for the project, which is attached.

Deadline for Filing of an Appeal of this Determination to the City Planning Commission: August 21, 1989. An appeal requires: 1) a letter specifying the grounds for the appeal, and; 2) a $75.00 filing fee.

Barbara W. Sahm

~~Barbara W. Sahm,~~
Environmental Review Officer

SEM174

Proposed San Francisco International Airport Master Plan
Initial Study
Case # 86.683E

I. PROJECT DESCRIPTION

Project Location

The 2,400-acre San Francisco International Airport (SFIA) is the principal commercial air passenger and cargo facility in the Bay Area, handling approximately 30 million annual passengers. Although located on unincorporated land within San Mateo County, the airport is owned by the City and County of San Francisco.

SFIA is surrounded by the City of South San Francisco to the north; the Cities of San Bruno and Millbrae to the west; the City of Millbrae to the south; and San Francisco Bay to the east. (See Figure 1.)

The airport land is traversed near the Western perimeter by U.S. Highway 101 (Bayshore Freeway). Most of the land west of the freeway remains undeveloped. In addition, approximately 80 acres east of the freeway are undeveloped. The airport complex, including runways, passenger facilities, and airline maintenance facilities, occupies the larger area east of the Bayshore Freeway. Approximately 260 acres of airport land remain undeveloped. The majority of this acreage, approximately 180 acres lies in the area west of the Bayshore Freeway.

Project Description

The forecast of aviation activity at SFIA estimates that by 1991 the volume of passengers using SFIA will be 36 million annually, and by the year 2006 it will increase to 51.3 million passengers annually.[1] In order to accommodate the expected growth in aviation activity at SFIA, the Airports Commission has proposed preparation of a SFIA Master Plan. The Plan will be a blueprint for the use of airport lands in the short-term (5 years) and long-term (20 years). The proposed SFIA Master Plan will involve land use reconfiguration and consolidation of facilities at SFIA. The proposed SFIA Master Plan will be a physical/management design plan focusing on the accommodation of facilities through the development of improved land use and circulation patterns for all airport-owned lands excluding the undeveloped West of Bayshore site.

The Five-Year Capital Projects Plan will provide funding for the improvement of the infrastructure at the airport and construction of new facilities to accommodate expected growth in aviation activity at SFIA. The Five-Year

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1 Forecast of Aviation Activity at SFIA was prepared by Thompson Consultants International for the San Francisco Airports Commission and is found in the SFIA Master Plan Working Paper "A" (1987).

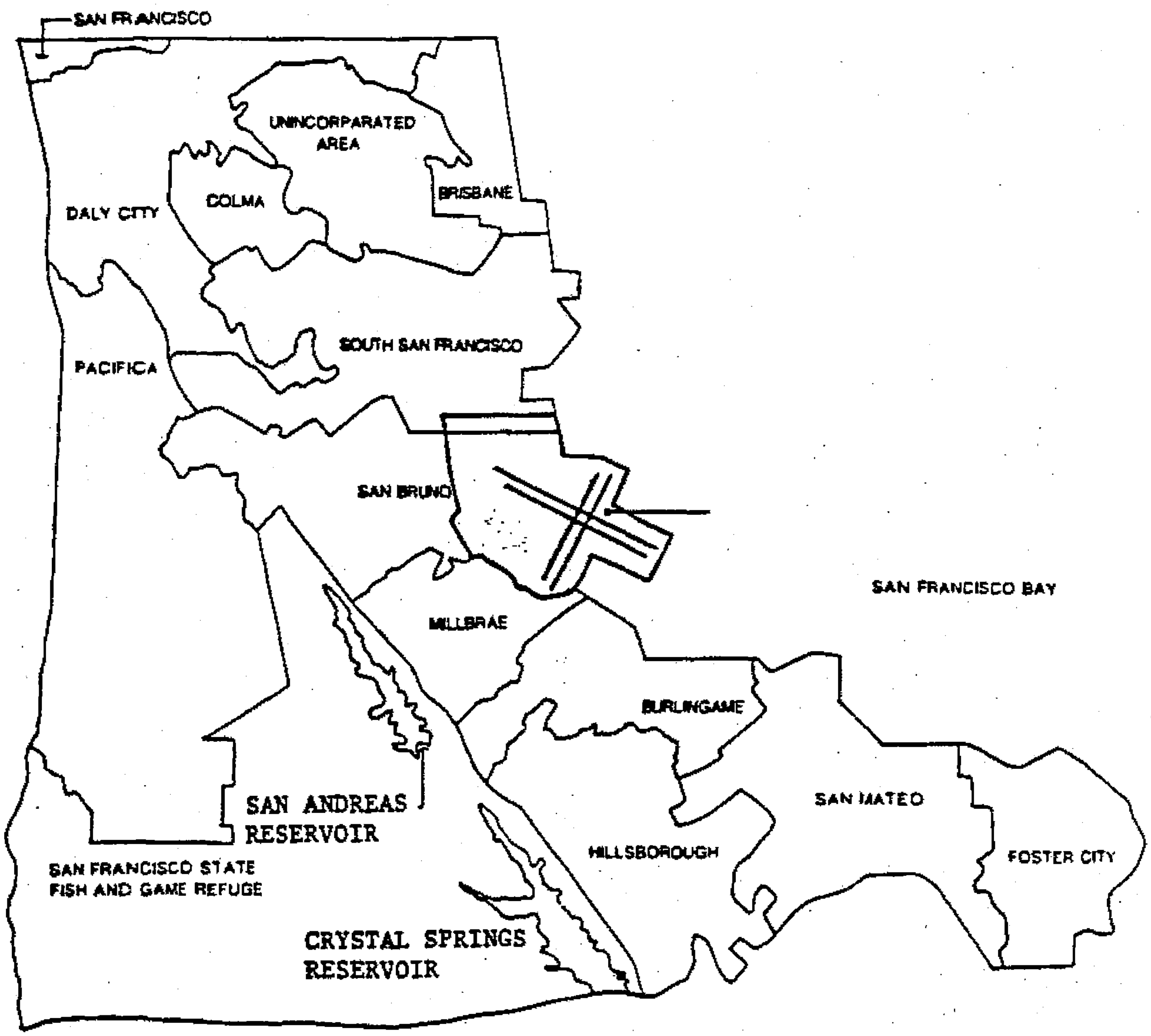

FIGURE 1
SAN FRANCISCO INTERNATIONAL AIRPORT AND ENVIRONS

NO SCALE

Capital Plan which is updated and approved by the Airport Commission annually, will reflect additional capital improvements necessary to implement the SFIA Master Plan if the SFIA Master Plan is approved.

The size and specific locations of the developments that would occur as a result of the SFIA Master Plan have been identified as near term (to 1996) and long term (to 2006) projects and are described in SFIA Master Plan Working Paper B, Daniel, Mann, Johnson, and Mendenhall (DMJM), June 1988. The principal projects considered in the SFIA Master Plan include:

1. New International Terminal.
2. Transportation/transit center at SFIA.
3. Consolidation of cargo facilities.
4. Consolidation of airport administrative facilities.
5. Overall circulation system.
6. Hotel/commercial/airport support development on airport lands.
7. Consolidation of airline maintenance and administrative facilities.

II. SUMMARY OF POTENTIAL ENVIRONMENTAL EFFECTS

A. EFFECTS FOUND TO BE POTENTIALLY SIGNIFICANT

The proposed SFIA Master Plan is examined in this Initial Study to identify potential effects on the environment. Effects that have been determined to be potentially significant and will be analyzed in an environmental impact report include: transportation, noise, relationship of the proposed SFIA Master Plan to and its effects on adjacent land uses, population and housing, air quality, public services and utilities, hazardous materials, cultural resources and energy.

B. EFFECTS FOUND TO BE INSIGNIFICANT

The following potential impacts were determined either to be insignificant or mitigated through measures included as part of the project. These items require no further analysis in the EIR:

Visual: All projects identified in the SFIA Master Plan would be located east of the Bayshore Freeway. The project area is separated from neighboring population centers by the Freeway, the West of Bayshore open space, and the Peninsula Commute Service tracks. The new facilities would be constructed among existing Airport structures and be subject to FAA height restrictions. No public open space exists on Airport Commission land east of the Bayshore Freeway.

Biology: The West of Bayshore open space area owned by the Airport Commission is the habitat of the San Francisco garter snake, an endangered species. This open space area has been excluded from SFIA Master Plan development. Additionally, the Bay shoreline would not be affected by SFIA development since the current runway configuration will be retained in the SFIA Master Plan. Because open spaces and Bay shoreline would not be affected by SFIA Master Plan development, biological effects require no further analysis.

III. ENVIRONMENTAL EVALUATION CHECKLIST

A. COMPATIBILITY WITH EXISTING ZONING AND PLANS	Not Applicable	Discussed
1) Discuss any variances, special authorizations, or changes proposed to the City Planning Code or Zoning Map.	X	
2) Discuss any conflicts with any other adoptted environmental plans and goals of the City or Region.		X

Surrounding Jurisdictions

The airport is surrounded by the City of South San Francisco to the north; the Cities of San Bruno and Millbrae to the West; the City of Millbrae to the south; and the San Francisco Bay to the east. (See Figure 1.) The area north of the airport is within the City of South San Francisco and it is zoned as industrial. Lands adjacent to the airport and within San Bruno and Millbrae are zoned low to medium residential.

Airport Land Use Commission (ALUC)

The ALUC, established by State mandate, has authority to specify how land near SFIA is to be used based on safety and noise considerations. Cities affected by SFIA noise and safety considerations, and thus guided by the ALUC Airport Land Use Plan (ALUP), are: Brisbane, South San Francisco, Daly City, Colma, San Bruno, Millbrae, Burlingame, San Mateo, Foster City, Hillsborough, and Pacifica. The ALUP sets height restrictions for new constructions, and standards for buildings near the airport, including soundproofing requirements. Although ALUC has no authority over SFIA operations, it reviews any substantive change in development plans made by the San Francisco Airports Commission.[2] Specifically, in addition to preparation, adoption and implementation of the airport land use plan for airport environs, the San Mateo County ALUC has a role in monitoring progress on implementation of recommendations of the Airport Land Use Plan. ALUC's community perspective and intergovernmental organization place the Committee in an excellent position to monitor communities to ensure the ALUP is implemented and to work cooperatively with the SFIA to reduce adverse effects of the Airport on its neighbors.

Residential land uses are considered more noise-sensitive than commercial or industrial uses. Around the airport, ALUC policy allows residential development without noise insulation in areas up to 65 CNEL. In areas 65 to 70 CNEL, noise insulation is required.

Compatibility of the proposed project with surrounding land uses, zoning, and public policies of the surrounding jurisdiction will be discussed in the EIR.

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2 "Airport Land Use Plan," Regional Planning Committee, San Mateo County, page II B-15, 1981.

Federal Aviation Administration (FAA)

The FAA regulates aviation noise and flight operational procedures (including aviation safety). Increase in projected aviation activity at SFIA could generate noise levels that exceed FAA standards. FAA policy on noise exposure and aviation safety will be discussed in the EIR.

Regional and Local Plans

<u>Metropolitan Transportation Commission (MTC) and Association of Bay Area Governments (ABAG)</u>: Developed a Regional Airport Plan which allocates future volumes of air passengers to the three regional airports (San Francisco, Oakland and San Jose).[3] SFIA is expected to exceed its allocated volume of passengers.

<u>Bay Conservation Development Commission (BCDC)</u>: The project is also subject to BCDC permits because it is located on the waterfront. It is therefore required to respond to BCDC policies.

<u>San Mateo County</u>: Although located on unincorporated land in San Mateo County, the airport is owned by the City and County of San Francisco and it therefore is not directly subject to land use regulations of San Mateo County. SFIA is classified as a special urban area in the San Mateo County General Plan.

The EIR will provide a discussion of the proposed SFIA Master Plan as it relates to these regional plans and their policies.

B. ENVIRONMENTAL EFFECTS - Could the project:

	YES	NO	DISCUSSED
1) Land Use			
a) Disrupt or divide the physical arrangement of an established community?		X	X
Have any substantial impact upon the existing character of the vicinity?	X		X

The proposed SFIA Master Plan is a physical/management design plan that focuses on the accommodation of facilities through the development of land use and circulation patterns for all airport-owned lands. Land use recommendations emanating from the proposed SFIA Master Plan would be limited to airport lands, and as such, there would be no disruption or division of any established community. The project's relationship to surrounding land uses will be discussed in the EIR.

3 "Regional Airport Plan," ABAG/MTC, 1980.

2) Visual Quality

	YES	NO	DISCUSSED
a) Have a substantial, demonstrable negative aesthetic effect?	___	X	X
b) Substantially degrade or obstruct any scenic view or vista now observed from public areas?	___	X	X
c) Generate obtrusive light or glare substantially impacting other properties?	___	X	X

The residential subdivisions of Belle-Air (in San Bruno), Marino Vista Park and Bayside Manor (in Millbrae) are adjacent to the currently vacant West of Bayshore site. Since the proposed Master Plan does not include the West of Bayshore area, the SFIA Master Plan would not generate visual impacts that would affect the aforementioned residential areas. The project area is separated from neighboring population centers by the Freeway, the West of Bayshore open space, and the Peninsula Commute Service tracks. The new facilities would be constructed among existing Airport structures and be subject to FAA height restrictions. No public open space exists on Airport Commission land east of the Bayshore Freeway. As a result, the EIR will not discuss potential visual effects and mitigation measures.

3) Population

	YES	NO	DISCUSSED
a) Induce substantial growth or concentration of population?	X	X	X
b) Displace a large number of people (involving either housing or employment)?	___	X	___
c) Create a substantial demand for additional housing in San Francisco, or substantially reduce the housing supply?	___	X	___

The 350 firms and organizations operating at the airport employ about 31,000 persons, making SFIA the largest employer in the county. Employee residences are distributed throughout the Bay Area with 38% residing in San Mateo County, 23% residing in San Francisco, 13% residing in Alameda County, and 10% residing in Santa Clara County. The other 16% live in other counties in the Bay Area.[4]

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4 Airports Commission, SFIA, Economic Impact of San Francisco International Airport, 1987.

As indicated above, SFIA employees reside throughout the nine counties in the Bay Area. The project would not be expected to create a demand for housing in excess of market supply capacity. However, because of the expected increase in employment at SFIA and because job/housing balance is a regional concern, population and housing impacts will be discussed in the EIR. Additionally, the EIR will discuss employment as it relates to employee commute patterns and potential impacts on traffic.

4) Transportation/Circulation	YES	NO	DISCUSSED
a) Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system?	X		X
b) Interfere with existing transportation systems, causing substantial alterations to circulation patterns or major traffic hazards?	X		
c) Cause a substantial increase in transit demand which cannot be accommodated by existing or proposed transit capacity?		X	X
d) Cause a substantial increase in parking demand which cannot be accommodated by existing parking facilities?	X		

Increase in employment and airport operations could potentially increase demand on existing transportation systems. In particular, the construction of a new International Terminal and Transportation Center, including related access ramps, could change the existing circulation system.

Airport traffic contributes to congestion on the Bayshore Freeway and local arterial roads near the airport. Airport-related traffic accounts for 25% of the traffic on Bayshore Freeway, and 20 to 40% of traffic on Old Bayshore Highway, Millbrae Avenue, and San Bruno Avenue in the vicinity of the airport.[5] In addition, the growth in air freight operations has resulted in more truck traffic to and from the airport.[5] Truck traffic from San Francisco International Airport comprises about 15% of the truck traffic on the Bayshore Freeway in the vicinity of the airport. Traffic-related effects of the proposed SFIA Master Plan will be analyzed in the EIR. Mitigation measures will also be discussed.

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5 San Mateo County General Plan 1986.

5) Noise	YES	NO	DISCUSSED
a) Increase the ambient noise levels for adjoining areas?	X		X
b) Violate Title 24 Noise Insulation Standards, if applicable?		X	
c) Be substantially impacted by existing noise levels?		X	

The predominant noise source at SFIA is from aircraft operations. The Airports Commission collects aviation noise data which are regularly submitted to the State for review. Noise monitoring requirements for airports in California are contained in Title 21, Subchapter 6, of the California Administrative Code. Airports that have areas impacted by noise levels greater than 65 dB Community Noise Equivalent Level (CNEL) are required to operate a noise monitoring system that collects noise level data for at least 48 weeks per year.

The Airport Noise Mitigation Action Plan (ANMAP) is a program at SFIA designed to reduce noise at SFIA and its environs. The ANMAP consists of a package of noise-reducing actions including aircraft noise monitoring, flight procedure changes, aircraft noise limits and restrictions, and economic incentives. These actions combined with a new generation of aircraft with quieter engines have reduced aviation noise at SFIA. While the noise level has been reduced, the number of flight operations has increased.

The proposed Master Plan, if approved and implemented, would permit further increase in number of flights and possible noise increases. The EIR will analyze aviation and traffic-related noise impacts of the proposed SFIA Master Plan on land uses within SFIA and in surrounding areas. Mitigation measures will be discussed.

6) Air Quality/Climate	YES	NO	DISCUSSED
a) Violate any ambient air quality standard or contribute substantially to an existing or projected air quality violation?			X
b) Expose sensitive receptors to substantial pollutant concentrations?	X		
c) Permeate its vicinity with objectionable odors?		X	
d) Alter wind, moisture or temperature (including sun shading effects) so as to substantially affect public areas or change the climate either in the community or region?		X	

The major sources of air pollutants from San Francisco International Airport are motor vehicle and aircraft emissions. Other sources of emissions include ground support equipment such as service vehicles, heat generation plants, and fueling operations. The major air pollutants associated with airport operations are carbon monoxide, hydrocarbons, and nitrogen oxides. No public open spaces that exist on Airport Commission land would be shaded by proposed development. Aircraft and traffic-induced air quality impacts related to the SFIA Master Plan will be analyzed and mitigation measures discussed in the EIR.

7) Utilities/Public Services	YES	NO	DISCUSSED
a) Breach published national, state or local standards relating to solid waste or litter control?		X	
b) Extend a sewer trunk line with capacity to serve new development?		X	
c) Substantially increase demand for schools, recreation or other public facilities?		X	
d) Require major expansion of power, water or communications facilities?	X		X

The proposed project could potentially increase demand for public services and utilities on the site and increase water and energy consumption. For example, increases in the number of passengers, increase in airport operations and concomitant increases in employment would generate increased solid waste, wastewater, and the demand for public services. The effect of the increased demand for public services and utilities will be analyzed in the EIR and mitigations will be discussed.

8) Biology	YES	NO	DISCUSSED
a) Substantially affect a rare or endangered species of animal or plant or habitat of the species?		X	X
b) Substantially diminish habitat for fish, wildlife or plants, or interfere substantially with the movement of any resident or migratory fish or wildlife species?		X	X
c) Require removal of substantial numbers of mature, scenic trees?		X	X

The West of Bayshore Airport Commission land has been identified as the habitat of the San Francisco garter snake, which is on the list of endangered species. Pursuant to Section 7 of the Endangered Species Act of 1973, CALTRANS and the Federal Highway Administration requested interagency consultation with the U.S. Fish and Wildlife Service (USFWS).
The USFWS, under the Endangered Species Act of 1973, is required to ensure that the continued existence of any endangered or threatened species is not jeopardized as a result of a Federally-funded or authorized action. This Act applies to projects which adversely modify or destroy habitat critical to these species.

The area west of the Bayshore Freeway between Millbrae Avenue and San Bruno Avenue has been identified as habitat of the San Francisco Garter Snake (Thamnophis sirtalis tetrataenia), a federally and state listed endangered species. The San Francisco Garter Snake occurs from the San Francisco/San Mateo County line south to Ano Nuevo Point on the coast in fresh water creeks and marshes with adjoining upland areas. The Millbrae population is the only known population of this species on the eastern side of San Francisco Peninsula; it is also thought to be the largest and most vigorous population[6]. This site, therefore, represents critical habitat for this species. The Millbrae population was subject of a two year study from 1983-85, which identified ecological and life history aspects of this population[7]. Management of this species is the responsibility of the USFWS and the California Department of Fish and Game.

Impacts to the West of Bayshore will not be evaluated in the EIR since this area is excluded from SFIA Master Plan development.

9) Geology/Topography	YES	NO	DISCUSSED
a) Expose people or structures to major geologic hazards (slides, subsidence, erosion and liquefaction)?		X	X
b) Change substantially the topography or any unique geologic or physical features of the site?		X	

Geology

SFIA is about 8.6 feet above mean sea level (San Francisco City Datum). Soils at the site are composed of sedimentary layers of three types of soil material over bedrock. The uppermost layer is the younger bay mud, which is a soft to slightly preconsolidated grey, silty clay containing shells and organic

6 U.S. Fish and Wildlife Service, Recovery Plan for the San Francisco Garter Snake, 1985.

7 Wharton, Brode and Knudsen, Ecological and Life History Aspects of the San Francisco Garter Snake at the San Francisco International Airport Study Site, 1988.

materials. The lowest layer or older bay mud is firm clay consisting of silt. Sandwiched between the uppermost layer or younger bay mud and the lowest layer or older bay mud is a layer of fine-grained sand.

The engineering properties of the younger bay mud make it most troublesome of the sediments in the Bay. Foundation problems arise from the nature of the younger bay mud, which is generally a soft, silty clay that has a high water content and is weak and highly compressible. Additionally, landfill has been added to the project site through 1969. The most recent landfills have been utilized to prepare the sites for two construction projects in 1969, the Pan Am Food Service Center and Flying Tigers Cargo Center, neither of which were built[8]. The nature of the landfill as it relates to soil stability and to the possible presence of methane gas pockets will be examined in the EIR.

Seismology

The major geologic effect of concern at San Francisco International Airport is earthquake damage. To appreciate the potential effect, an understanding of the behavior of Bay area soil and fill materials is required. Given this understanding, the potential effects can be estimated.

Moderate to strong earthquakes may produce a variety of effects, including surface faulting, vertical displacement, ground shaking, lurch cracking of alluvial or fill materials, compaction or liquefaction of soils and landslides, as well as tsunamis or seiches. The specific local effects from an earthquake depend as much, if not more, on the condition of the soil than on distance from the epicenter or magnitude of the quake. In general, earthquake waves in passing from more dense solid rock to less dense alluvial and water saturated material tend to increase in amplitude and acceleration.

Ground shaking, due to earthquakes, produces different effects on different soil types. Generally, in cohesionless soils, compaction of soils with low clay content result in ground settlement; in saturated soils, high water pressures reduced by ground vibration cause an upward flow of water which liquefies these soils; this liquefaction phenomenon is rather common in earthquakes of moderate to large magnitude.

In the area of the SFIA, the fill materials would act somewhat differently than underlying bay mud and sand deposits to earthquake induced ground motions. In the event of an earthquake, the sand seams in the bay mud may liquefy. The magnitude of the effect would depend on the density of the deposit and the intensity and duration of the earthquake. Fill materials are likely to settle substantially in the event of an earthquake. This would lead to differential settlements of buildings that they support. Fill materials can also liquefy, undergoing lateral movements, or develop slides.

The closest active faults to the SFIA area are the San Andreas Fault, about three miles southwest of SFIA, and the Hayward and Calaveras Faults, about 15

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8 Leong, Mel; Assistant Deputy Director - Environmental Control, San Francisco International Airport; telephone communication, February 27, 1989.

and 30 miles east of SFIA respectively. In the event of an earthquake on the San Andreas Fault, a magnitude of 8.3 on the Richter Scale shock would close SFIA for a period of weeks. A magnitude of 7.0 on the Richter Scale would close SFIA for several days. An earthquake on the Hayward Fault with a magnitude of 8.3 would close down SFIA for less than one week. A magnitude of 7.0 on the Hayward Fault would delay operations for only a few hours. In the event of a seiche or tsunami, the part of Runway 28R that extends into the Bay could be flooded.

During the implementation phase of the Master Plan, the project sponsor would follow the recommendations of structural and foundation reports to be prepared for any construction on the site. While the airport will review the plans for specific construction projects, its building code, San Francisco International Airport Tenant Improvement Guide, 1988, uses the same seismic engineering standards as those within the 1985 Uniform Building Code. These standards include earthquake-resistant design and material specifications that are designed to allow for some structural damage to buildings but not for collapse during a major earthquake. This topic requires no further discussion in the EIR.

10) Water	YES	NO	DISCUSSED
a) Substantially degrade water quality, or contaminate a public water supply?		X	X
b) Substantially degrade or deplete ground water resources, or interfere substantially with ground water recharge?		X	
c) Cause substantial flooding, erosion or siltation?		X	

Hydrology

The water table in the airport area is approximately five feet above sea level in winter months and drops several feet during the drier summer months. The water table has posed a problem for previous construction activities at SFIA. However, proper construction methods and dewatering of the construction site have permitted previous construction activities to proceed without affecting surrounding structures. Therefore, issues related to SFIA Master Plan Facility Construction will not be addressed in the EIR. Potential contamination and its effect on water quality will be analyzed in the EIR[8].

There exists the possibility of groundwater contamination from use of hazardous materials at SFIA.

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8 Leong, Mel, Assistant Deputy Director - Environmental Control, San Francisco International Airport; telephone communication, February 27, 1989.

11) Energy/Resources

	YES	NO	DISCUSSED
a) Encourage activities which result in the use of large amounts of fuel, water, or use these in a wasteful manner?	X		
b) Have a substantial effect on the potential extraction or depletion of a natural resource?		X	X

Construction and operation of the proposed facilities would result in increased energy consumption, especially the "people-mover" system. Pacific Gas and Electric Company (PG&E) supplies all of SFIA's electricity and natural gas used for space conditioning, lighting, information processing, and various operations machinery. Potential impacts of the project on energy resources will be discussed in the EIR.

12) Hazards

	YES	NO	DISCUSSED
a) Create a potential public health hazard or involve the use, production or disposal of materials which pose a hazard to people, animal or plant populations in the area affected?	X		
b) Interfere with emergency response plans or emergency evacuation plans?		X	
c) Create a potentially substantial fire hazard?		X	

Aviation fuel storage and a network of pipelines are located at the airport. SFIA has contingency plans in case of fire or plane crash. The proposed SFIA Master Plan by itself would not create a public health hazard, would not interfere with existing emergency response plans, nor overburden emergency service capacity. However, fuel spills have occurred on Airport Commission lands in the past and an analysis of these hazardous materials, including potential effect on groundwater, will be studied in the EIR. Additionally, the effect of new pipelines and fuel storage locations will be examined.

13) Cultural

	YES	NO	DISCUSSED
a) Disrupt or adversely affect a prehistoric or historic archaeological site or a property of historic or cultural significance to a community or ethnic or social group; or a paleontological site except as a part of a scientific study?		X	

		YES	NO	DISCUSSED
b)	Conflict with established recreational, educational, religious or scientific uses of the area?	___	X	___
c)	Conflict with the preservation of buildings subject to the provisions of Article 10 or Article 11 of the City Planning Code?	___	X	___

A cultural resource search of SFIA was conducted by the California Archaeological Inventory. Archival and field study was recommended to identify and evaluate possible cultural resources that may be of historic or architectural value. These will be evaluated in the EIR.

C. OTHER	YES	NO	DISCUSSED
Require approval of permits from City Departments other than Department of City Planning or Bureau of Building Inspection, or from Regional, State or Federal Agencies?	X	___	X

New maintenance, cargo, airline support, ground transportation, and International Terminal would be constructed on Airport Commission lands east of the Bayshore Freeway as part of the Master Plan. Permits for construction activities at SFIA must be obtained from the Bay Conservation Development Commission for any facility that is within 100 feet of the Bay shoreline[9].

D. MITIGATION MEASURES		YES	NO	DISCUSSED
1)	If any significant effects have been identified, are there ways to mitigate them?	X	___	X
2)	Are all mitigation measures identified above included in the project?	X	___	___

Environmental issues determined to have no significant impact or to have been mitigated are: visual and biological.

E. ALTERNATIVES TO THE PROPOSED PROJECT.

In accordance with the State CEQA guidelines Section 15126, an EIR must consider and analyze alternatives to the proposed project. A "No Project" alternative, which describes the impacts related to retaining existing conditions and facilities at SFIA without modifying or constructing new facilities, and a Reduced Scale alternative, a lesser degree of buildout in terms of the number of facilities and/or total square footage to be constructed, would be incorporated into the EIR analysis. Additionally, a

9 Leong, Mel: Assistant Deputy Director - Environmental Control, San Francisco International Airport; telephone communication, February 27, 1989.

third alternative, a maximum buildout or greater total square footage than the proposed project, would also be included.

F. MANDATORY FINDINGS OF SIGNIFICANCE	YES	NO	DISCUSSED
1) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or pre-history?	X		
2) Does the project have the potential to achieve short-term, to the disadvantage of long-term, environmental goals?		X	
3) Does the project have possible environmental effects which are individually limited, but cumulatively considerable? (Analyze in the light of past projects, other current projects, and probable future projects.)	X		
4) Would the project cause substantial adverse effects on human beings, either directly or indirectly?	X		

Potential impacts of the proposed project on traffic, ambient noise, land use, population and housing, air quality, utilities/public services, energy, hazardous materials, cultural resource and measures to mitigate these impacts will be discussed in the EIR.

The project would contribute to cumulative effects in the areas of transportation, air quality and noise. The project could potentially degrade ambient air quality and could increase the level of ambient noise; both impacts could cause adverse effects on human beings either directly or indirectly. These potential impacts and mitigation measures will be discussed in the EIR.

G. ON THE BASIS OF THIS INITIAL STUDY

____ I find the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared by the Department of City Planning.

____ I find that although the proposed project could have significant effect on the environment, there WILL NOT be a significant effect in this case because the mitigation measures, numbers __________, in the discussion have been included as part of the proposed project. A NEGATIVE DECLARATION will be prepared.

✓ I find that the proposed project MAY have significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

Barbara W. Sahm

BARBARA W. SAHM
Environmental Review Officer

for

DEAN L. MACRIS
Director of Planning

DATE: July 20, 1989

APPENDIX B. PROJECT DESCRIPTION

TABLE B.1: NEAR-TERM SFIA MASTER PLAN PROJECTS (1990-1996) - TERMINAL

Project/Facility Number	Facility Name	Existing 1990	Demolish	Construct	Net New Construction/a/	Remodel	No Change/b/	1996 Total/c/
1.0 TERMINAL								
	North Terminal /d/	1,161,000					1,161,000	1,161,000
	Int'l. Terminal /e/	120,000					120,000	120,000
	South Terminal /f/	571,900					571,900	571,900
1.1.1	International Terminal (New) /g/			250,000	250,000			250,000
1.1.3	Boarding Area G (New)			500,000	500,000			500,000
1.1.2	Boarding Area A	185,600	(185,600)	500,000	314,400			500,000
1.2.2	Boarding Area B	92,000	(60,000)	400,000	340,000		32,000	432,000
1.2.1	Boarding Area D	490,000				490,000		490,000
SUBTOTAL TERMINAL (NEAR-TERM PLAN)		2,620,500	(245,600)	1,650,000	1,404,400	490,000	1,884,900	4,024,900

/a/ Net New Construction = Construct square feet minus Demolish square feet.
/b/ No Change = Existing 1990 square feet minus (Demolish square feet + Remodel square feet).
/c/ Total 1996 = Construct square feet + Remodel square feet + No Change square feet OR Existing 1990 square feet + Net New Construction square feet.
/d/ New International Terminal Levels 4 - 8 to include an additional 100,000 square feet of hotel and concession space and an additional 160,000 square feet of administration/office space. These are listed under functional areas 8.0 and 7.0, respectively.
/e/ Includes Boarding Area E and Boarding Area F square feet.
/f/ Does not include Boarding Area D square feet (together, the International Terminal/Boarding Area D = 610,000 square feet).
/g/ Includes Boarding Area C square feet, but does not include Boarding Area A and Boarding Area B square feet (together, the South Terminal/Boarding Areas A, B and C = 849,500 square feet).

SOURCES: Table 6.3 and Appendix 12.5, *SFIA Final Draft Master Plan*, 1989; SF Airports Commission, 1990; Environmental Science Associates, Inc., 1990.

TABLE B.1: LONG-TERM SFIA MASTER PLAN PROJECTS (1997-2006) - TERMINAL

Project/Facility Number	Facility Name	1996 Total	Demolish	Construct	Net New Construction/a/	Remodel	No Change/b/	2006 Total/c/
1.0 TERMINAL								
	North Terminal /d/	1,161,000					1,161,000	1,161,000
	Int'l. Terminal /e/	120,000					120,000	120,000
	South Terminal /f/	571,900					571,900	571,900
	International Terminal	250,000					250,000	250,000
	Boarding Area G	500,000					500,000	500,000
	Boarding Area A	500,000					500,000	500,000
1.2.1	Boarding Area B	432,000	(32,000)	104,000	72,000		400,000	504,000
	Boarding Area D	490,000					490,000	490,000
SUBTOTAL TERMINAL (LONG-TERM PLAN)		4,024,900	(32,000)	104,000	72,000		3,992,900	4,096,900
NEAR-TERM Demolish, Construct, Net New Construction, Remodel			(245,600)	1,650,000	1,404,400	490,000		
TOTAL MASTER PLAN Demolish, Construct, Net New Construction, Remodel			(277,600)	1,754,000	1,476,400	490,000		

/a/ Net New Construction = Construct square feet minus Demolish square feet.
/b/ No Change = 1996 Total square feet minus (Demolish square feet + Remodel square feet).
/c/ Total 2006 = Construct square feet + Remodel square feet + No Change square feet OR 1996 Total square feet + Net New Construction square feet.
/d/ Includes Boarding Area E and Boarding Area F square feet.
/e/ Does not include Boarding Area D square feet.
/f/ Includes Boarding Area C square feet, but does not include Boarding Area A and Boarding Area B square feet.

SOURCES: Table 6.3 and Appendix 12.5, *SFIA Final Draft Master Plan*, 1989; SFIA Airports Commission, 1990; Environmental Science Associates, Inc., 1990.

TABLE B.1: NEAR-TERM AND LONG-TERM SFIA MASTER PLAN PROJECTS (1990-1996 and 1997-2006) - AIRLINE SUPPORT

Project/Facility Number		Facility Name	Existing 1990	Demolish	Construct	Net New Construction/a/	Remodel	No Change/b/	1996 Total/c/
2.0 AIRLINE SUPPORT (NONTERMINAL)									
		Catering:							
	52	Host International	31,690					31,690	31,690
2.1	62	United Airlines Catering	13,800	(13,800)	60,000	46,200			60,000
		Supporting Facilities:							
	31	United Warehouse	12,544					12,544	12,544
2.2.1-.2	38	American GSE	2,500	(2,500)	10,000	7,500			10,000
	45	Delta Warehouse	7,200					7,200	7,200
	90	ASII/Evergreen	12,544	(12,544) /d/		(12,544)			
	93	Pan Am Crew Baggage Holding	1,500	(1,500) /e/		(1,500)			
SUBTOTAL NONTERMINAL AIRLINE SUPPORT (NEAR-TERM PLAN)			81,800	(30,300)	70,000	39,700		51,500	121,500
TOTAL MASTER PLAN Demolish, Construct, Net New Construction, Remodel				(30,300)	70,000	39,700			

/a/ Net New Construction = Construct square feet minus Demolish square feet.
/b/ No Change = Existing 1990 square feet minus (Demolish square feet + Remodel square feet).
/c/ Total 1996 = Construct square feet + Remodel square feet + No Change square feet OR Existing 1990 square feet + Net New Construction square feet.
/d/ Replacement area in proposed North Field Cargo/Maintenance Facility, under Functional Area 5.0
/e/ Replacement area in proposed Pan Am Maintenance/Administration/Cargo Facility, under Functional Area 3.0.

SOURCES: Table 6.3 and Appendix 12.5, *SFIA Final Draft Master Plan*, 1989; SFIA Airports Commission, 1990; Environmental Science Associates, Inc., 1990.

TABLE B.1: NEAR-TERM SFIA MASTER PLAN PROJECTS (1990-1996) - AIRLINE MAINTENANCE

Project/Facility Number		Facility Name	Existing 1990	Demolish	Construct	Net New Construction/a/	Remodel	No Change/b/	1996 Total/c/
3.0 AIRLINE MAINTENANCE									
		Major:							
	1-12	United Maint. Ctr.	2,870,950					2,870,950	2,870,950
	Line:								
3.1/3.1.4		East Field Maint. Hangar (New)			495,000	495,000			495,000
	32	Hangar (Vacant)	16,000	(16,000)		(16,000)			
	33	American Maintenance	392,240					392,240	392,240
3.1.2	39	Qantas Maint. Hangar	168,761	(168,761)	/d/	(168,761)			
	42	Continental Maint. Hangar	26,825					26,825	26,825
	45,47	Delta Maintenance	136,875					136,875	136,875
3.1.1	60	United Service Center	90,000	(90,000)	/d/	(90,000)			
3.2	65	Pan Am Maintenance	161,825	(161,825)	262,500 /e/	100,675			262,500
3.1.3	67	TWA Service	9,800	(9,800)	/d/	(9,800)			
	84	JAL Maint. Building	9,000	(9,000)	/f/	(9,000)			
	51	Northwest Maint. Hangar	36,000					36,000	36,000
SUBTOTAL AIRLINE MAINTENANCE (NEAR-TERM PLAN)			3,918,300	(455,400)	757,500	302,100		3,462,900	4,220,400

/a/ Net New Construction = Construct square feet minus Demolish square feet.

/b/ No Change = Existing 1990 square feet minus (Demolish square feet + Remodel square feet).

/c/ Total 1996 = Construct square feet + Remodel square feet + No Change square feet OR Existing 1990 square feet + Net New Construction square feet.

/d/ Function to be accommodated in new East Field Maintenance Hangar.

/e/ Facility to include replacement area for Building 93 (Pan Am Crew Baggage Holding) and Building 64 (Pan Am Administration), in Functional Areas 2.0 and 8.0, respectively.

/f/ Replacement area in new North Field Cargo/Maintenance facility (Functional Area 5.0).

SOURCES: Table 6.3 and Appendix 12.5, *SFIA Final Draft Master Plan*, 1989; SFIA Airports Commission, 1990; Environmental Science Associates, Inc., 1990.

TABLE B.1: LONG-TERM SFIA MASTER PLAN PROJECTS (1997-2006) - AIRLINE MAINTENANCE

Project/Facility Number	Facility Name	1996 Total	Demolish	Construct	Net New Construction/a/	Remodel	No Change/b/	2006 Total/c/
3.0 AIRLINE MAINTENANCE								
	Major:							
1-12	United Maint. Ctr.	2,870,950					2,870,950	2,870,950
	Line:							
	East Field Maint. Hangar	495,000					495,000	495,000
33	American Maintenance	392,240					392,240	392,240
42	Continental Maint. Hangar	26,825	(26,825) /d/		(26,825)			
45,47	Delta Maintenance	136,875					136,875	136,875
65	Pan Am Maintenance/ Administration/Cargo	262,500					262,500	262,500
51	Northwest Maint. Hangar	36,000					36,000	36,000
SUBTOTAL AIRLINE MAINTENANCE (LONG-TERM PLAN)		4,220,400	(26,800)		(26,800)		4,193,600	4,193,600
NEAR-TERM Demolish, Construct, Net New Construction, Remodel			(455,400)	757,500	302,100			
TOTAL MASTER PLAN Demolish, Construct, Net New Construction, Remodel			(482,200)	757,500	275,300			

/a/ Net New Construction = Construct square feet minus Demolish square feet.

/b/ No Change = 1996 Total square feet minus (Demolish square feet + Remodel square feet).

/c/ Total 2006 = Construct square feet + Remodel square feet + No Change square feet OR 1996 Total square feet + Net New Construction square feet.

/d/ Replacement area in West Field Cargo Maintenance Center (Functional Area 5.0).

SOURCES: Table 6.3 and Appendix 12.5, *SFIA Final Draft Master Plan*, 1989; SFIA Airports Commission, 1990; Environmental Science Associates, Inc., 1990.

TABLE B.1: NEAR-TERM AND LONG-TERM SFIA MASTER PLAN PROJECTS (1990-1996 and 1997-2006) - GENERAL AVIATION

Project/Facility Number		Facility Name	Existing 1990	Demolish	Construct	Net New Construction/a/	Remodel	No Change/b/	1996 Total/c/
4.0 GENERAL AVIATION									
4.1/4.1.3		Fixed Base Operator (FBO) Facility (New)			90,000	90,000			90,000
4.1.1	40	FBO: Butler	48,112	(48,112) /d/		(48,112)			
4.1.2	54	Chevron, USA Hangar	40,000	(40,000)		(40,000)			
SUBTOTAL GENERAL AVIATION (NEAR-TERM PLAN)			88,100	(88,100)	90,000	1,900			90,000
TOTAL MASTER PLAN Demolish, Construct, Net New Construction, Remodel				(88,100)	90,000	1,900			

/a/ Net New Construction = Construct square feet minus Demolish square feet.
/b/ No Change = Existing 1990 square feet minus (Demolish square feet + Remodel square feet).
/c/ Total 1996 = Construct square feet + Remodel square feet + No Change square feet OR Existing 1990 square feet + Net New Construction square feet.
/d/ Function to be accommodated in new FBO Facility.

SOURCES: Table 6.3 and Appendix 12.5, *SFIA Final Draft Master Plan*, 1989; SFIA Airports Commission, 1990; Environmental Science Associates, Inc., 1990.

TABLE B.1: NEAR-TERM SFIA MASTER PLAN PROJECTS (1990-1996) - AIR FREIGHT

Project/Facility Number		Facility Name	Existing 1990	Demolish	Construct	Net New Construction/a/	Remodel	No Change/b/	1996 Total/c/
5.0 AIR FREIGHT									
5.1		West Field Cargo/ Maintenance (New) /d/							324,000
5.1.1		Building 1			108,000	108,000			
5.1.2		Building 2			108,000	108,000			
5.1.3		Building 3			54,000	54,000			
5.1.4		Building 4			54,000	54,000			
5.3/5.3.3		North Field Cargo/ Maintenance (New)			432,000	432,000			432,000
5.3.1	16	Flying Tigers Hangar	108,036	(108,036) /e/		(108,036)			
	43	U.S. Air Mail Facility	168,000					168,000	168,000
5.3.2	83	JAL Cargo Building	78,000	(78,000) /f/		(78,000)			
	41	Airborne Cargo Bldg.	60,000					60,000	60,000
	46	Delta	21,000					21,000	21,000
	53	Cargo Building No. 7	55,296	(55,296) /g/		(55,296)			
	55	Northwest Orient Cargo	114,550					114,550	114,550
	56	American Airlines Cargo	71,400					71,400	71,400
	57	U.S. Air Cargo	6,356					6,356	6,356
5.2	58	United Cargo	113,720		36,280 /h/	36,280		113,720	150,000
5.4	68	TWA Cargo	71,387				71,387		71,387
SUBTOTAL AIR FREIGHT (NEAR-TERM PLAN)			867,700	(241,300)	792,300	551,000	71,400	555,000	1,418,700

/a/ Net New Construction = Construct square feet minus Demolish square feet.

/b/ No Change = Existing 1990 square feet minus (Demolish square feet + Remodel square feet).

/c/ Total 1996 = Construct square feet + Remodel square feet + No Change square feet OR Existing 1990 square feet + Net New Construction square feet.

/d/ Facility to include replacement area for Building 42 (Continental Maintenance Hangar), in Functional Area 3.0.

/e/ Demolition of the Flying Tigers Hangar is in the approved SFIA Five-Year Capital Projects Plan. Function to be accommodated in new North Field Cargo Maintenance facility.

/f/ Function to be accommodated in new North Field Cargo Maintenance facility.

/g/ Function to be accommodated in new West Field Cargo Maintenance facility.

/h/ Addition to existing facility.

SOURCES: Table 6.3 and Appendix 12.5, *SFIA Final Draft Master Plan*, 1989; SFIA Airports Commission, 1990; Environmental Science Associates, Inc., 1990.

TABLE B.1: LONG-TERM SFIA MASTER PLAN PROJECTS (1997-2006) - AIR FREIGHT

Project/Facility Number		Facility Name	1996 Total	Demolish	Construct	Net New Construction/a/	Remodel	No Change/b/	2006 Total/c/
5.0 AIR FREIGHT									
5.4		West Field Cargo/ Maintenance	324,000					324,000	486,000
5.4.1		Building 7 (New)			54,000	54,000			
5.4.2		Building 8 (New)			54,000	54,000			
5.4.3		Building 9 (New)			54,000	54,000			
		North Field Cargo/ Maintenance	432,000					432,000	432,000
5.5	43	U.S. Air Mail Facility	168,000		132,000 /d/	132,000		168,000	300,000
	41	Airborne Cargo Bldg.	60,000	(60,000)		(60,000)			
	46	Delta	21,000					21,000	21,000
	55	Northwest Orient Cargo	114,550					114,550	114,550
	56	American Airlines Cargo	71,400					71,400	71,400
	57	U.S. Air Cargo	6,356					6,356	6,356
	58	United Cargo	150,000					150,000	150,000
	68	TWA Cargo	71,387					71,387	71,387
SUBTOTAL AIR FREIGHT (LONG-TERM PLAN)			1,418,700	(60,000)	294,000	234,000		1,358,700	1,652,700
NEAR-TERM Demolish, Construct, Net New Construction, Remodel				(241,300)	792,300	551,000	71,400		
TOTAL MASTER PLAN Demolish, Construct, Net New Construction, Remodel				(301,300)	1,086,300	785,000	71,400		

/a/ Net New Construction = Construct square feet minus Demolish square feet.
/b/ No Change = 1996 Total square feet minus (Demolish square feet + Remodel square feet).
/c/ Total 2006 = Construct square feet + Remodel square feet + No Change square feet OR 1996 Total square feet + Net New Construction square feet.
/d/ Addition to existing facility.

SOURCES: Table 6.3 and Appendix 12.5, *SFIA Final Draft Master Plan*, 1989; SFIA Airports Commission, 1990; Environmental Science Associates, Inc., 1990.

TABLE B.1: NEAR-TERM AND LONG-TERM SFIA MASTER PLAN PROJECTS (1990-1996 and 1997-2006) - AIRPORT SUPPORT

Project/Facility Number		Facility Name	Existing 1990	Demolish	Construct	Net New Construction/a/	Remodel	No Change/b/	1996 Total/c/
6.0 AIRPORT SUPPORT									
	49	Engineering Building	30,800					30,800	30,800
		Maintenance:							
	50	Shops/Office	56,000					56,000	56,000
	48	Equipment Garage	20,000					20,000	20,000
	88	Bus Maintenance	5,000					5,000	5,000
		Crash, Fire and Rescue:							
6.2	17	Contingency Bldg. 1000	10,800	(10,800)	15,000 /d/	4,200			15,000
6.3	35	Fire Station No. 1	12,000	(12,000)	12,000				12,000
6.1	34	Fire Station No. 2	12,000	(12,000)	12,000 /e/				12,000
	28	Community College Flight School	26,200					26,200	26,200
SUBTOTAL AIRPORT SUPPORT (NEAR-TERM PLAN)			172,800	(34,800)	39,000	4,200		138,000	177,000
TOTAL MASTER PLAN Demolish, Construct, Net New Construction, Remodel				(34,800)	39,000	4,200			

/a/ Net New Construction = Construct square feet minus Demolish square feet.
/b/ No Change = Existing 1990 square feet minus (Demolish square feet + Remodel square feet).
/c/ Total 1996 = Construct square feet + Remodel square feet + No Change square feet OR Existing 1990 square feet + Net New Construction square feet.
/d/ Replacement building to be known as "Multi-Purpose Facility."
/e/ Replacement of CFR Station #2, included in the approved SFIA Five-Year Capital Projects Plan, is ongoing.

SOURCES: Table 6.3 and Appendix 12.5, *SFIA Final Draft Master Plan*, 1989; SFIA Airports Commission, 1990; Environmental Science Associates, Inc., 1990.

TABLE B.1: NEAR-TERM SFIA MASTER PLAN PROJECTS (1990-1996) - COMMERCIAL

Project/Facility Number	Facility Name	Existing 1990	Demolish	Construct	Net New Construction/a/	Remodel	No Change/b/	1996 Total/c/
7.0 COMMERCIAL								
44	Bank of America	13,062					13,062	13,062
63	Hilton Inn	220,000					220,000	220,000
7.1	Chevron Gas Station	900	(900)	1,000	100			1,000
8.1	Hotel Space, Int'l. Terminal			100,000	100,000			100,000
SUBTOTAL COMMERCIAL (NEAR-TERM PLAN)		234,000	(900)	101,000	100,100		233,100	334,100

/a/ Net New Construction = Construct square feet minus Demolish square feet.
/b/ No Change = Existing 1990 square feet minus (Demolish square feet + Remodel square feet).
/c/ Total 1996 = Construct square feet + Remodel square feet + No Change square feet OR Existing 1990 square feet + Net New Construction square feet.

SOURCES: Table 6.3 and Appendix 12.5, *SFIA Final Draft Master Plan*, 1989; SFIA Airports Commission, 1990; Environmental Science Associates, Inc., 1990.

TABLE B.1: LONG-TERM SFIA MASTER PLAN PROJECTS (1997-2006) - COMMERCIAL

Project/Facility Number	Facility Name	1996 Total	Demolish	Net New Construct	Construction/a/	Remodel	No Change/b/	2006 Total/c/
7.0 COMMERCIAL								
44	Bank of America	13,062	(13,062) /d/		(13,062)			
63	Hilton Inn	220,000				220,000		220,000
	Chevron Gas Station	1,000					1,000	1,000
	Hotel Space, Int'l. Terminal	100,000					100,000	100,000
SUBTOTAL COMMERCIAL (LONG-TERM PLAN)		334,100	(13,100)		(13,100)	220,000	101,000	321,000
NEAR-TERM Demolish, Construct, Net New Construction, Remodel			(900)	101,000	100,100			
TOTAL MASTER PLAN Demolish, Construct, Net New Construction, Remodel			(14,000)	101,000	87,000	220,000		

/a/ Net New Construction = Construct square feet minus Demolish square feet.
/b/ No Change = 1996 Total square feet minus (Demolish square feet + Remodel square feet).
/c/ Total 2006 = Construct square feet + Remodel square feet + No Change square feet OR 1996 Total square feet + Net New Construction square feet.
/d/ Replacement area under Project 8.2, New Office Building.

SOURCES: Table 6.3 and Appendix 12.5, *SFIA Final Draft Master Plan*, 1989; SFIA Airports Commission, 1990; Environmental Science Associates, Inc., 1990.

TABLE B.1: NEAR-TERM SFIA MASTER PLAN PROJECTS (1990-1996) - ADMINISTRATION/OFFICE

Project/Facility Number		Facility Name	Existing 1990	Demolish	Construct	Net New Construction/a/	Remodel	No Change/b/	1996 Total/c/
8.0 ADMINISTRATION/OFFICE									
8.1/8.1.2		International Terminal Levels 4,5,6,7 (New) /d/			160,000	160,000			160,000
	59	United Administration	92,216					92,216	92,216
8.1.1	64	Pan Am Administration	33,852	(33,852) /e/		(33,852)			
SUBTOTAL ADMINISTRATION/ OFFICE (NEAR-TERM PLAN)			126,100	(33,900)	160,000	126,100		92,200	252,200

/a/ Net New Construction = Construct square feet minus Demolish square feet.
/b/ No Change = Existing 1990 square feet minus (Demolish square feet + Remodel square feet).
/c/ Total 1996 = Construct square feet + Remodel square feet + No Change square feet OR Existing 1990 square feet + Net New Construction square feet.
/d/ Airport offices located in existing international terminal would be relocated to the new international terminal.
/e/ Function to be accommodated under Project 3.2, Pan Am Maintenance/Administration/Cargo facility.

SOURCES: "Table 6.3 and Appendix 12.5, *SFIA Final Draft Master Plan*, 1989; SFIA Airports Commission, 1990; Environmental Science Associates, Inc., 1990.

TABLE B.1: LONG-TERM SFIA MASTER PLAN PROJECTS (1997-2006) - ADMINISTRATION/OFFICE

Project/Facility Number	Facility Name	1996 Total	Demolish	Construct	Net New Construction/a/	Remodel	No Change/b/	2006 Total/c/
8.0 ADMINISTRATION/OFFICE								
8.2	Office Building (New)			100,000	100,000			100,000
	International Terminal Levels 4,5,6,7	160,000					160,000	160,000
59	United Administration	92,216					92,216	92,216
SUBTOTAL ADMINISTRATION/ OFFICE (LONG-TERM PLAN)		252,200		100,000	100,000		252,200	352,200
NEAR-TERM Demolish, Construct, Net New Construction, Remodel			(33,900)	160,000	126,100			
TOTAL MASTER PLAN Demolish, Construct, Net New Construction, Remodel			(33,900)	260,000	226,100			

/a/ Net New Construction = Construct square feet minus Demolish square feet.
/b/ No Change = 1996 Total square feet minus (Demolish square feet + Remodel square feet).
/c/ Total 2006 = Construct square feet + Remodel square feet + No Change square feet OR 1996 Total square feet + Net New Construction square feet.

SOURCES: Table 6.3 and Appendix 12.5, *SFIA Final Draft Master Plan*, 1989; SFIA Airports Commission, 1990; Environmental Science Associates, Inc., 1990.

TABLE B.1: NEAR-TERM AND LONG-TERM SFIA MASTER PLAN PROJECTS (1990-1996 and 1997-2006) - MISCELLANEOUS

Project/Facility Number	Facility Name	Existing 1990	Demolish	Construct	Net New Construction/a/	Remodel	No Change/b/	1996 Total/c/
10.0 MISCELLANEOUS								
10.1	U.S. Coast Guard Facilities							
	"A" Hangar	29,700	(29,700)	29,700				29,700
	"B" Admin. Building	12,021	(12,021)	12,021				12,021
	"C" Barracks	25,000	(25,000)		(25,000)			
	"D" Building	1,721	(1,721)	1,721				1,721
	"F" Building	14,000	(14,000)	14,000				14,000
	"H" Building	6,000	(6,000)	6,000				6,000
SUBTOTAL MISCELLANEOUS (NEAR-TERM PLAN)		88,400	(88,400)	63,400	(25,000)			63,400
TOTAL MASTER PLAN Demolish, Construct, Net New Construction, Remodel			(88,400)	63,400	(25,000)			

/a/ Net New Construction = Construct square feet minus Demolish square feet.

/b/ No Change = Existing 1990 square feet minus (Demolish square feet + Remodel square feet).

/c/ Total 1996 = Construct square feet + Remodel square feet + No Change square feet OR Existing 1990 square feet + Net New Construction square feet.

SOURCES: Table 6.3 and Appendix 12.5, *SFIA Final Draft Master Plan*, 1989; SFIA Airports Commission, 1990; U.S. Coast Guard, 1990; Environmental Science Associates, Inc., 1990.

TABLE B.2: NEAR-TERM MASTER PLAN (1990-1996) PROJECT SUMMARY/a/

FUNCTIONAL AREA		TOTAL NEW CONSTRUCTION	DEMOLISH EXISTING AREA	NET NEW CONSTRUCTION	REMODEL EXISTING BLDG.	COMMENTS
TERMINAL:						
1.1.1	International Terminal	250,000		250,000		Existing International Terminal converted to Domestic
1.1.2	Boarding Area A	500,000	185,600 (Demo 1a)	314,400		Replaces existing Boarding Area "A"
1.1.3	Boarding Area G	500,000		500,000		
1.2.1	Boarding Area D				490,000	
1.2.2	Boarding Area B - Phase I	400,000	60,000 (Demo 1b)	340,000		Replaces existing Boarding Area "B"
	Subtotal	1,650,000	245,600	1,404,400	490,000	
AIRLINE SUPPORT:						
2.1	United Airlines Catering	60,000	13,800 (Demo 2a, 2b)	46,200		Replaces existing catering
2.2	American GSE	10,000	2,500 (Demo 2c)	7,500		Replaces existing American GSE
	Subtotal	70,000	16,300	53,700		
AIRLINE MAINTENANCE:						
3.1	East Field Maintenance Hangar	495,000	90,000 (Demo 3a)			Replaces existing U.A. Service Ctr.
			16,000 (Demo 3c)			Replaces existing hangar
			168,761 (Demo 3d)	210,439		Replaces existing hangar
			9,800 (Demo 3f)			Replaces existing hangar
3.2	Pan Am Maint/Admin/Cargo Hangar	262,500	1,500 (Demo 2c)			Replaces existing Pan Am baggage
			161,825 (Demo 3b)			Replaces existing Pan Am Maint.
			33,852 (Demo 8a)	65,323		Replaces existing Pan Am Admin.
	Subtotal	757,500	481,700	275,800		

(Continued)

TABLE B.2: NEAR-TERM MASTER PLAN (1990-1996) PROJECT SUMMARY/a/ (Continued)

FUNCTIONAL AREA		TOTAL NEW CONSTRUCTION	DEMOLISH EXISTING AREA	NET NEW CONSTRUCTION	REMODEL EXISTING BLDG.	COMMENTS
GENERAL AVIATION:						
4.1	FBO	90,000	48,112 (Demo 4a)			Replaces existing G.A. Facilities
			40,000 (Demo 4b)	1,888		
	Subtotal	90,000	88,100	1,900		
AIRFREIGHT:						
5.1	West Field Cargo/Maint.	324,000	55,296 (Demo 5a)	268,704		Replaces existing Cargo Bldg. 7
5.2	U.A.L. Cargo Expansion	36,280		36,280		
5.3	North Field Cargo/Maint.	432,000	108,036 (Demo 5b)			Replaces existing Federal Express (Flying Tigers). Demo Project included in approved SFIA Five-Year Capital Projects Plan.
			9,000 (Demo 3e)			Replaces existing JAL Maintenance
			78,000 (Demo 5c)			Replaces JAL Cargo
			12,544 (Demo 2d)	224,420		Replaces existing cargo (Evergreen)
5.4	TWA Cargo & Maint.				71,387	Reconfigures/remodels existing facility. Includes demo projects 3f & 5d.
	Subtotal	792,300	262,900	529,400	71,400	
AIRPORT SUPPORT:						
6.1	Crash/Fire/Rescue No. 2	12,000	12,000 (Demo 6c)			Replaces existing CFR #2. Replacement included in approved SFIA Five-Year Capital Projects Plan.
6.2	Multipurpose Ops. Facility	15,000	10,800 (Demo 6b)	4,200		Replaces existing Ops. Bldg.
6.3	Crash/Fire/Rescue Support Bldg.	12,000	12,000 (Demo 6d)			Replaces existing CFR Support
	Subtotal	39,000	34,800	4,200		

(Continued)

TABLE B.2: NEAR-TERM MASTER PLAN (1990-1996) PROJECT SUMMARY/a/ (Continued)

FUNCTIONAL AREA	TOTAL NEW CONSTRUCTION	DEMOLISH EXISTING AREA	NET NEW CONSTRUCTION	REMODEL EXISTING BLDG.	COMMENTS
COMMERCIAL:					
7.1 Service Station	1,000	900 (Demo 7a)	100		
7.2 Hotel Space	100,000		100,000		New hotel space in levels 4-8 of new International terminal.
Subtotal	101,000	900	100,100		
ADMINISTRATION/OFFICE: (Airport, Airline, Tenant)					
8.1 International Terminal (Levels 4-8)	160,000		160,000		
Subtotal	160,000		160,000		
MISCELLANEOUS:					
10.1 U.S. Coast Guard Facilities	63,400	88,400	(25,000)		
Subtotal	63,400	88,400	(25,000)		
TOTAL NEAR TERM PLAN	3,723,200	1,218,700	2,504,500	561,400	

SOURCES: SFIA Airports Commission, May 1990; U.S. Coast Guard, June 1990; Environmental Science Associates, Inc.

TABLE B.2: LONG-TERM MASTER PLAN (1997-2006) PROJECT SUMMARY/a/

FUNCTIONAL AREA		TOTAL NEW CONSTRUCTION	DEMOLISH EXISTING AREA	NET NEW CONSTRUCTION	REMODEL EXISTING BLDG.	COMMENTS
TERMINAL:						
1.2	Boarding Area B - Phase II	104,000	32,000 (Demo lc)	72,000		Replaces existing Boarding Area "A"
	Subtotal	104,000	32,000	72,000		
AIRFREIGHT:						
5.5	West Field Cargo/Maint.	162,000	26,825 (Demo 3g) 60,000 (Demo 5e)	75,175		Replaces Bldg. 82 Maint. Hangar Replaces Existing Airborne Cargo
5.6	Mail Facility Expansion	132,000		132,000		
	Subtotal	294,000	86,800	207,200		
COMMERCIAL:						
7.2	Hilton Hotel				220,000	
	Subtotal				220,000	
ADMINISTRATIVE/OFFICE:						
8.2	Office Building	100,000	13,062 (Demo 7b)	86,938		
	Subtotal	100,000	13,100	86,900		
TOTAL LONG TERM PLAN		498,000	131,900	366,100	220,000	
TOTAL MASTER PLAN		4,221,200	1,350,600	2,870,600	781,400	

/a/ All figures are in gross building square feet. Subtotals and totals are rounded to the nearest 100. Note: This summary table was provided by SFIA Airports Commission in May 1990; facility categorization does not correspond precisely to Draft Master Plan. Project Description Tables 3 - 6 and Appendix Table B.1 are based on Master Plan facility categorization; subtotals may therefore differ from this table. All totals correspond, however (new construction, demolish, net change, remodel).

SOURCES: SFIA Airports Commission, May 1990; U.S. Coast Guard, June 1990; Environmental Science Associates, Inc.

TABLE B-3: HISTORICAL ANNUAL PASSENGER TOTALS, BAY AREA AIR CARRIER AIRPORTS, 1960-1990

Year	San Francisco Int'l	Metro Oakland	San Jose Int'l	Buchanan Field	Sonoma County	Total
1960	4,637,035	334,440	80,731			5,052,206
1961	4,754,327	274,530	76,437			5,105,294
1962	5,036,092	312,884	109,261			5,458,237
1963	6,414,620	425,650	119,260			6,959,530
1964	7,459,461	491,730	124,360			8,075,551
1965	8,706,984	966,636	109,483			9,783,103
1966	10,145,309	1,209,729	416,850			11,771,888
1967	12,248,051	1,461,543	714,257			14,423,851
1968	13,544,414	1,818,220	1,071,434			16,434,068
1969	13,968,980	2,146,800	1,572,320			17,688,100
1970	13,867,941	2,055,180	1,595,154			17,518,275
1971	13,451,716	2,053,769	1,704,748			17,210,233
1972	14,676,025	2,080,793	1,886,401			18,643,219
1973	15,567,030	2,226,494	2,037,787			19,831,311
1974	16,201,138	2,295,871	2,146,157			20,643,166
1975	16,362,160	2,214,811	2,311,238			20,888,209
1976	17,564,033	2,164,243	2,662,140			22,390,416
1977	18,912,622	2,499,855	3,052,167			24,464,644
1978	21,519,923	2,788,176	3,398,579			27,706,678
1979	22,865,369	2,771,815	3,617,412			29,254,596
1980	21,338,383 /a/	2,417,100	2,876,920			26,632,403
1981	19,848,490	2,546,760	2,824,120			25,219,370
1982	21,028,790	2,852,110	3,051,180			26,932,080
1983	23,166,500	2,914,670	3,550,370			29,645,540
1984	24,192,900	3,618,760	3,900,200			31,711,860
1985	25,018,400 /a/	4,138,990	4,708,800		3,460 /e/	33,866,190
1986	28,874,068 /a/	3,800,770	5,659,140	86,874 /d/	30,751 /e/	38,451,603
1987	29,812,440	4,010,000	5,693,944	125,004 /d/	52,618 /e/	39,694,006
1988	30,506,790 /b/	3,832,241	5,744,223	120,245 /d/	44,739 /e/	40,248,238
1989	29,939,835	4,228,986	6,726,558	114,852 /d/	113,431 /e/	41,123,662
1990 /c/	30,387,922 /b/	5,261,164	7,090,268	101,476 /d/	130,336 /e/	42,971,166

NOTES:

/a/ *San Francisco International Airport Final Draft Master Plan*, Table 7.2.
/b/ *San Francisco International Airport Comparative Traffic Report*, respective years.
/c/ 1990 figures for Metropolitan Oakland and San Jose International Airports are for the 12 month period ending on the last day of the third quarter (all other figures are end of fourth quarter of indicated year).
/d/ Hal White, Buchanan Field Airport, April 1991.
/e/ Manager's Office, Sonoma County Airport, April 1991.

SOURCES: 1960-1979: Metropolitan Transportation Commission (MTC), from respective airport records; 1980-1990: MTC, from respective airport records, unless otherwise noted.

APPENDIX E

TABLE B-4

SAN FRANCISCO INTERNATIONAL AIRPORT
FIVE YEAR CAPITAL PROJECT PLAN
SEPTEMBER 18, 1989
ESTIMATED CONSTRUCTION COST

CONTRACT EXT	NEW/REV	DESCRIPTION	1989 PRIOR	1989/90	1990/91	1991/92	1992/93	1993/94	FUND	NOTE
908	R	Remodel Engineering Building	450,000						C	3
1011 B		Reconstruct T/W "C" to Plot 50 - Phase II	4,000,000						D	3
1017		Expand Electrical Distribution System, Phase II	4,300,000						C	3
1106	R	McDonnell Road Widening				1,000,000			A	
1289	R	Reconstruct Storm Drain Near East Underpass				500,000			D	
1527		Microwave Landing System				1,000,000			E	7
1553		Extend Taxiway L to Runway 19L		4,000,000					C	4,5
1556		Extend Taxiway V to Taxiway L			1,500,000				D	5
1558		Replace Elec Equip & Change Field Light Voltage	2,900,000						700	2,5
1559 C	R	Taxiway Repair & Reconstruction		1,300,000					D	3,5
1559 D		Taxiway Repair & Reconstruction				2,300,000			D	5
1559 E		Taxiway Repair & Reconstruction			1,900,000				E	5
1559 F	N	Taxiway Repair & Reconstruction					2,000,000		E	
1562		Reconstruct Serv Rd, North Access Road to T/W "C"		255,000					A	1,6
1563		Reconstruct CG Road at North Detention Pond			130,000				A	1,6
1602		Airport Land Use Master Plan	550,000						C	4
1643		Construct H/S Exit T/W "Z" at R/W 19L & T/W "F"			6,500,000				E	5
1644	R	Construct Fillets at R/W 10L & Taxiway L,T,N					2,000,000		E	5
1680 A		Parking Garage Restriping	500,000						B	1

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TABLE B-4

SAN FRANCISCO INTERNATIONAL AIRPORT
FIVE YEAR CAPITAL PROJECT PLAN
SEPTEMBER 10, 1989
ESTIMATED CONSTRUCTION COST

CONTRACT EXT	NEW/REV	DESCRIPTION	1989 PRIOR	1989/90	1990/91	1991/92	1992/93	1993/94	FUND	NOTE
1696	R	Drainage Improvements Lot B-1				800,000			E	
1697	R	Drainage Improvement Canal to DPS #2		1,480,000					E	1
1698		Drainage Improvement Tank Farm		250,000					E	
1721		Dike Reconstruction, Phase V		1,300,000					E	5
1723		New Firehouse No.2		2,500,000					E	5
1729		Cargo Building, Plot 42	200,000						E	
1730	R	North Access Road Realignment		300,000					A	5
1731	R	Demolition of Existing Structure, Plot 17		170,000					E	
1732		Utility Installation- 4th Fl., IT	150,000						E	
1739	R	Electronic Security Door System	2,150,000						C	1,5
1846 I	R	IT Conveyor Belt Improvements		270,000					D	1
1872		Equalization Tank at Sewage Treatment Plant		600,000					E	5
1876		Boarding Area E & F Roof Rehabilitation		600,000					C	1
1889		North Terminal & B/A E & F Carpet Replacement	850,000						D	2
1895	R	Taxiway A Centerline Lights & Upgrade of T/W Light			2,000,000				E	1,5
1896		Field Lighting Raceway System Improvement			22,600,000				E	1,5
1898	R	Repair of Sewage Treatment Plant			400,000				E	1,5
1907		North Terminal Water Proofing - NT Roof	4,000,000						A	3
1946		International Terminal Carpet Replacement	600,000						D	3

TABLE B-4

SAN FRANCISCO INTERNATIONAL AIRPORT
FIVE YEAR CAPITAL PROJECT PLAN
SEPTEMBER 18, 1989
ESTIMATED CONSTRUCTION COST

CONTRACT	EXT	NEW/REV	DESCRIPTION	1989 PRIOR	1989/90	1990/91	1991/92	1992/93	1993/94	FUND	NOTE
1947			Replace 20" Water Main at North Oxidation Pond	200,000						C	3,5
1950			Lighting on N. Access Rd., McDonnell Rd., and R-2				600,000			E	5
1952		R	Overlay & Reconstruct Runway 28L		13,600,000					D	3,5
1953			Lower Level Roadway Improvements		1,000,000					E	1,5
1954		R	Security Film Installation on Glass - IT		200,000					A	1
1955			Digester for Sewage Treatment Plant		400,000					E	5
1956			Reloc. of 24" Effluent Line & Weir Struct. Plot 17		500,000					E	5
1957			Replace 20" & 12" Water Drains Looping at Garage		300,000					E	5
1958		R	Overlay & Reconstruct R/W 28R T/W P to West End			6,000,000				E	1,5
1959			Airport to United Cogeneration Plant Connection			2,500,000				E	
1960			Expand Electrical Distribution System, Phase III			3,000,000				E	
1961			Expansion of Central Plant		3,500,000					C	1,5
1962			Sedimentation Tanks at Sewage Treatment Plants				1,200,000			E	5
1963			Replac. Drain Lines to Drainage Pump Station #2	800,000						E	5
1977			Replacement of Cable 12 BANA-1	317,000						FAA	1
1982		R	Consolidated Airport Administrative Offices		900,000					A	1
1985			Replacement of Catwalks, Ducts, and Equipment, IT	3,000,000						C	1
1998		R	Elevator 210 Replacement - IT		500,000					E	1
2023	B		Traffic Barriers & Guard Shelter - Taxiway B	350,000						A	1

TABLE B-4

SAN FRANCISCO INTERNATIONAL AIRPORT
FIVE YEAR CAPITAL PROJECT PLAN
SEPTEMBER 18, 1989
ESTIMATED CONSTRUCTION COST

CONTRACT	EXT	NEW/REV	DESCRIPTION	1989 PRIOR	1989/90	1990/91	1991/92	1992/93	1993/94	FUND	NOTE
2023	C		Traffic Barriers & Guard Shelter - Post Office	276,000						A	1
2023	D		Traffic Barriers & Guard Shelter-Coast Guard Sta.	276,000						A	1
2024			Carpet Replacement - Engr. Bldg. & Airborne Conn.	222,000						FAA	3
2033			Emergency Lighting Units & Medical Equipment	234,000						A	3
2036			Security/Emergency Communications Equipment	264,000						D	4
2041		R	Crash/Fire/Rescue Engine Pumpers	285,000						C	
2044			Underground Tank Replacement - IT	435,000						C	4
2072			Mobile Baggage Scanner	350,000						B	
2084		N	Water Main Improvement			750,000				E	
2085		N	Rehabilitate Drainage Pump Station #2			500,000				E	
2092			Public Safety Communications Equipment	166,000						A	4
2101			Computer Generated Diagram & Fault Analysis	250,000						FAA	3
2102		R	Development of Parking Lot DD			7,500,000				D	1
2103		R	Vehicular Bridge From Lot D to Lot DD			3,170,000				D	1
2105			Purchase of Airline Improvements, B/A B	1,100,000						E	3
2106			Addition to B/A B		6,200,000					D	1
2128			Pavement Management System	125,000						C	3
2131			Police/Airfield Radio System	324,000						B	4
2132			Telephone System Conversion		180,000					E	4

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TABLE B-4

SAN FRANCISCO INTERNATIONAL AIRPORT
FIVE YEAR CAPITAL PROJECT PLAN
SEPTEMBER 18, 1989
ESTIMATED CONSTRUCTION COST

CONTRACT	EXT	NEW/REV	DESCRIPTION	1989 PRIOR	1989/90	1990/91	1991/92	1992/93	1993/94	FUND	NOTE
2133		R	Contingency Facility			1,500,000				E	
2137		R	International Terminal Flooring at Customs		300,000					C	2
2147		N	Police Locker Rooms - Boarding Area C		280,000					D	1
2154			Ground Transportation Information System		410,000					E	
2156			4TH Floor IT Press Room & Training Room	125,000						E	
2159			Police Tactical Radio System	302,000						B	4
2160			In-Transit Lounge		130,000					C	1
2163			Airport Fuel System		320,000					B	
2164			Extension of Elevator in the Center of the IT		400,000					E	1
2174		N	Changeable Message Sign		180,000					A	1
2195		N	North Field Public Access Road Paving		320,000					C	3
2196		N	Airport Perimeter Security Fence		330,000					C	3
2197		N	Electrical Improvements, North Field Road		330,000					D	3
2198		N	Accounting Office Work Station		175,000					C	1
2199		N	Taxiway C, Automated Security Gates		330,000					C	3
2234		N	Dual Agent Crash/Fire/Rescue Vehicle		350,000					A	2
2241		N	Dike Reconstruction, Phase 6				1,700,000			E	
2242		N	N. & S. Oxidation Ponds & Drainage Canals Waterprf			500,000				E	
2243		N	Drainage Pump Sta. 1A, 1B & 1C Piling Replacement			300,000				E	

TABLE B-4

SAN FRANCISCO INTERNATIONAL AIRPORT
FIVE YEAR CAPITAL PROJECT PLAN
SEPTEMBER 18, 1989
ESTIMATED CONSTRUCTION COST

CONTRACT	EXT	NEW/REV	DESCRIPTION	1989 PRIOR	1989/90	1990/91	1991/92	1992/93	1993/94	FUND	NOTE
2247		N	Modernization of Fire Alarm System			600,000				E	
2248		N	International Terminal Doors		160,000					E	
2249		N	North Terminal Doors				430,000			E	
2254		N	Relocation of Budget Rental Car		1,200,000					E	I
2255		N	Relocation of Dollar Rental Car		300,000					E	I
9996			CONSTRUCTION TOTAL	30,051,000	45,820,000	61,350,000	9,530,000	4,000,000			
9997			AE&I	4,507,650	6,873,000	9,202,500	1,429,500	600,000			
9998			CONTINGENCY	2,253,825	3,436,500	4,601,250	714,750	300,000			
9999			TOTAL	36,812,475	56,129,500	75,153,750	11,674,250	4,900,000			

TABLE B-4

Notes to project schedule:

(1) Projects which are in design phase.
(2) Projects for which construction contracts have been awarded.
(3) Projects which are in construction.
(4) Projects which are 90% complete.
(5) Projects which are eligible for ADAP or AIP reimbursement.
(6) Projects which will receive ADAP or AIP reimbursement.
(7) Projects will not be funded without first returning to the Airline Affairs Committee and the Airports Commission for approval.
(8) Project will be funded from other projects appearing on the Plan relating to South Terminal Modernization & Renovation.

(A) Projects financed by the proceeds, and/or the interest earned on the proceeds, of the Series A Revenue Bonds.
(B) Projects financed by the proceeds, and/or the interest earned on the proceeds, of the Series B Revenue Bonds.
(C) Projects financed by the proceeds, and/or the interest earned on the proceeds, of the Series C Revenue Bonds.
(D) Projects financed by the proceeds, and/or the interest earned on the proceeds, of the Series D Revenue Bonds.
(E) Projects to be financed with the new Series E issue.
(G.O) Projects financed by the interest earned on the proceeds, of the 1967 General Obligation Bonds.
(700) Projects financed by the Fund 700 Capital Projects Fund.

R - Revised
N - New

APPENDIX C: NOISE

TABLE C-1: AVERAGE DAILY AIR CARRIER AIRCRAFT DEPARTURES, TRIP LENGTH AND AIRCRAFT TYPE, 1990/a/

Type of Aircraft	Departure Trip Length (Nautical Miles)/b/ 500 - 1,000	1,000 - 1,500	1,500 - 2,000	2,000 - 2,500	2,500 - 3,000	3,000 - 3,500	3,500+	Total
Stage 2/c/								
B-727 (all)	28.0	34.5	2.2	17.8	0.0	0.0	0.0	82.5
B-737 (-100,-200)/d/	35.4	21.2	0.0	0.0	0.0	0.0	0.0	56.6
B-747/e/	0.5	0.8	0.0	2.5	1.6	4.0	0.0	9.4
Stage 3/c/								
B-737-300	39.5	14.2	0.8	15.7	0.0	0.0	0.0	70.2
B-747	1.0	1.5	0.0	4.6	2.9	0.0	7.5	17.5
B-757 (all)	0.8	2.5	2.1	6.9	0.8	0.0	0.0	13.1
B-767 (all)	0.4	2.2	4.7	9.1	8.4	0.0	0.0	24.8
DC-8-71	0.7	0.8	0.0	2.7	3.4	0.0	0.0	7.6
DC-10,L-1011(all)	1.3	3.7	4.0	30.2	3.6	0.0	0.0	42.8
MD-80 series	20.5	9.0	1.0	11.3	0.0	0.0	0.0	41.8
Airbus (all types)	2.5	0.0	0.6	2.1	0.0	0.0	0.0	5.2
BAe-146	39.3	3.5	0.0	0.0	0.0	0.0	0.0	42.8
Total	169.9	93.9	15.4	102.9	20.7	4.0	7.5	414.3

NOTES:

/a/ Average daily aircraft departures are equal to annual departures divided by 365. Annual data for 1989 were used to represent 1990 conditions.

/b/ One nautical mile is equal to 6,076 feet.

/c/ Classification of aircraft as "Stage 2" or "Stage 3" refers to noise standards established by Federal Aviation Regulations Part 36.

/d/ Includes departures by DC-9 aircraft.

/e/ Earlier models of the B-747 are classified as Stage 2 aircraft.

SOURCES: Ken Eldred Engineering, from information provided by SFIA landing fee reports and the Metropolitan Transportation Commission; Environmental Science Associates, Inc.

TABLE C-1A: 1990 AND ASSUMED FUTURE RUNWAY USE BY AIRCRAFT CATEGORY AND TIME OF DAY

Type	Time/a/	1R	1L	10L	10R	19L	19R	28L	28R	Total
		Percent Departures by Runway End								
B-747 Short Range/b/	Day	25%	24%	1%	0%	1%	0%	0%	49%	100%
	Evening	25%	24%	1%	0%	1%	0%	0%	49%	100%
	Night	25%	25%	10%	0%	0%	0%	0%	40%	100%
B-747 Long Range/c/	Day	0%	0%	0%	0%	0%	0%	0%	100%	100%
	Evening	0%	0%	0%	0%	0%	0%	0%	100%	100%
	Night	0%	0%	20%	0%	0%	0%	0%	80%	100%
All Others/d/	Day	46%	46%	2%	2%	0%	0%	2%	2%	100%
	Evening	46%	46%	2%	2%	0%	0%	2%	2%	100%
	Night	41%	41%	8%	8%	0%	0%	1%	1%	100%

/a/ Day= 7:00 a.m. to 7:00 p.m.; Eve.= 7:00 p.m. to 10:00 p.m.; Night= 10:00 p.m. to 7:00 a.m.
/b/ With destinations of 1,500 miles or fewer from SFIA.
/c/ With destinations greater than 1,500 miles from SFIA.
/d/ All other airline aircraft.

SOURCE: Ken Eldred Engineering and Environmental Science Associates, Inc., based on SFIA runway use data for 1989.

TABLE C-2: AIRCRAFT DEPARTURES AT SFIA BY PAIR OF RUNWAY ENDS, NIGHTTIME NOISE ABATEMENT RUNWAY USE, 1989

	Percent Aircraft Departures by Pair of Runway Ends/a,b/				
Type of Aircraft	1	10	19	28	Total
B-747	11%	68%	0%	21%	100%
All Others	34%	52%	2%	12%	100%
All Aircraft	41%	48%	2%	9%	100%

/a/ Occurring between 1:00 a.m. and 6:00 a.m. Based on sampling for five consecutive days each month.

/b/ Each of the four pairs of runway ends listed refers to the ends of the parallel runways 1-19 and 10-28 (e.g., "1" refers to Runways 1L and 1R).

SOURCE: Ken Eldred Engineering

TABLE C-3: COMPARISON OF CALCULATED AND MEASURED ANNUAL CNEL VALUES IN DECIBELS AT REMOTE MONITORING STATIONS, 1990 /a/

		CNEL Values (dBA)		
Station	City Location	Calculated/b/	Measured/c/	Difference/d/
1	San Bruno	71.7	72.4	(0.7)
2	San Bruno	55.5	53.4	2.1
3	South San Francisco	56.2	58.2	(2.0)
4	South San Francisco	68.8	70.7	(1.9)
5	San Bruno	63.7	64.6	(0.9)
6	South San Francisco	65.8	66.0	(0.2)
7	Brisbane	55.3	57.3	(2.0)
8	Millbrae	71.2	68.7	2.5
9	Millbrae	63.6	62.2	1.4
10	Burlingame	59.8	61.0	(1.2)
11	Burlingame	63.9	63.0	0.9
12	Foster City	62.5	61.7	0.8
13	Hillsborough	50.3	57.2	(6.9)
14	South San Francisco	54.2	54.2	0.0
15	South San Francisco	62.2	63.5	(1.3)
16	South San Francisco	57.4	58.4	(1.0)
17	South San Francisco	60.3	59.6	0.7
18	Daly City	63.1	63.8	(0.7)
19	Pacifica	58.7	59.2	(0.5)
20	Daly City	55.7	59.2	(3.5)
21	San Francisco	53.7	54.2	(0.5)
22	San Bruno	63.9	60.3	3.6
23	San Francisco	60.9	62.0	(1.1)
24	San Francisco	59.5	60.0	(0.5)
25	San Francisco	54.9	54.8	0.1
26	San Francisco	52.9	58.0	(5.1)
27	San Francisco	40.5	53.6	(13.1)

/a/ Remote monitoring stations are shown in Figure 21, Section III.C. Noise Setting, p. 162.
/b/ CNEL values calculated using the Integrated Noise Model. Values reflect aircraft operations at SFIA only.
/c/ Measured values reflect all aircraft operations recorded at remote monitoring stations.
/d/ Calculated values minus measured values.

SOURCE: Ken Eldred Engineering.

SINGLE-EVENT NOISE

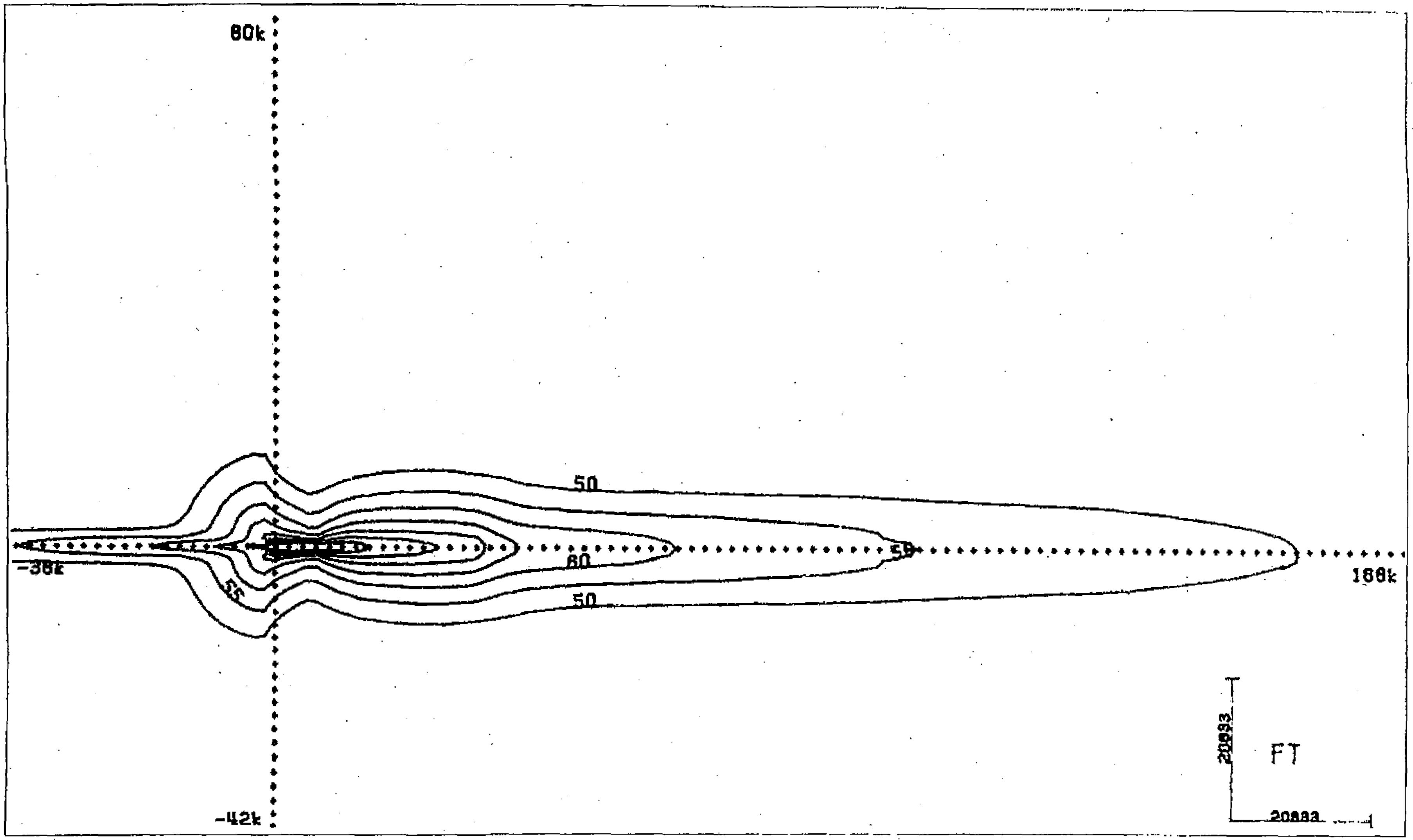
In order to analyze the single-event noise produced by the aircraft using SFIA, sound exposure level (SEL) contours were developed for four representative aircraft: the B-727-200; B-737-300; B-747-200; and B-767. Figures C-1 through C-4 show single-event SEL contours for these four aircraft. The contours are similar to the CNEL contours shown in Sections III.C. and IV.C. Noise, pp. 153-170 and 331-352, except that they represent single-event rather than cumulative noise levels. Each SEL contour represents the noise produced by one aircraft landing on and taking off from one runway. The long, narrow end of the contour represents the noise produced during landing; the rounder end of the contour represents the noise produced during takeoff.

The sound exposure level contours developed are generic (not site-specific), in that the areas that are shown as exposed to certain noise levels are calculated 1) based on distance from whatever runway an aircraft uses for takeoff or landing, and 2) given a set of assumptions about aircraft performance (for example, assuming that the aircraft continues straight out after takeoff). The actual single-event noise levels experienced in a particular area near SFIA would depend on the runway used, the weight of the aircraft, wind and weather conditions, the flight route and other operational procedures used by the aircraft pilot, and other factors.

Table C-4 shows the number of square miles within the contours of 80, 95, and 110 dB, SEL, for each of the four aircraft studied. As shown in Table C-4, the B-727-200, a Stage 2 aircraft, produces the largest single-event noise contours of the four aircraft. The B-737-300, a Stage 3 aircraft, produces the smallest single-event noise contours.

Table C-5 shows the sound exposure levels each of the aircraft produces at various distances from the beginning of takeoff. The noise levels shown would be experienced if the aircraft were flying directly overhead. Table C-6 shows the corresponding sound exposure levels for arriving aircraft, at various distances from the runway threshold. Table C-7 shows a comparison of the maximum takeoff and landing noise levels at a point 30,000 feet (about 5.7 statute miles) from the landing end of the runway (and 40,000 feet from the takeoff end, assuming a 10,000-foot runway). As shown in Table C-7, the takeoff and landing noise levels for the B-727-200 are different by over 10 dB, SEL, whereas the takeoff and landing noise levels for the B-767 are almost the same.

Using the data in Tables C-4 through C-7, the maximum sound exposure levels occurring at the remote monitoring stations and selected study sites were estimated. Table C-8 shows the results for the remote monitoring stations. As shown in Table C-8, the highest sound exposure levels are created by the B-727-200, at sites in San Bruno, Millbrae, and Burlingame. Table C-9 shows estimated sound exposure levels at the selected study sites. As shown in Table C-9, the sound exposure levels are generally lower at the selected study sites than at the remote monitoring stations, because the selected study sites are relatively far from SFIA.

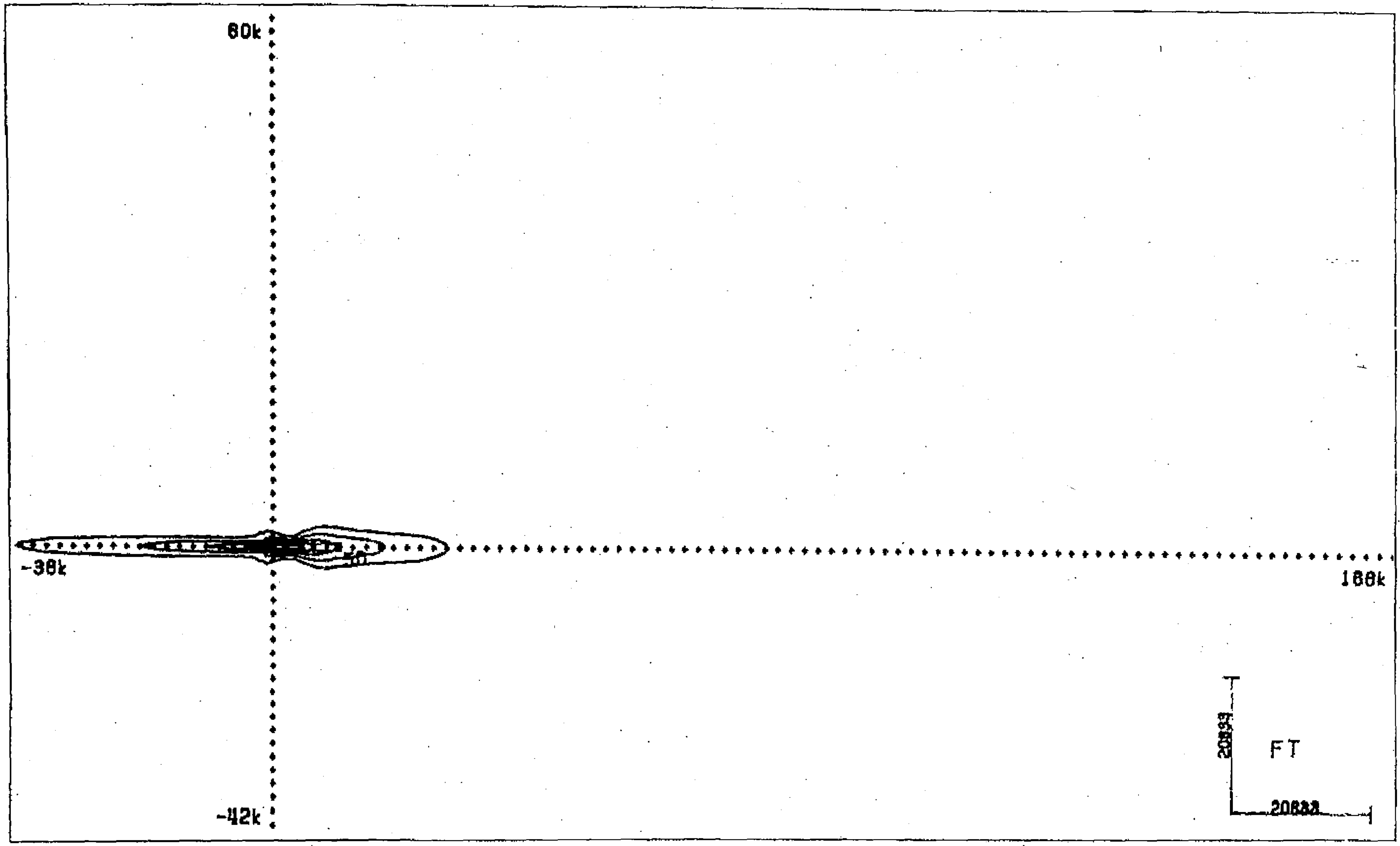


NOTE: Contour reflects typical aircraft performance characteristics and the trip length most frequently used by this aircraft at SFIA.

SOURCE: FAA Integrated Noise Model Version 3.9, Ken Eldred Engineering

Figure C-1
Single Event Sound Exposure Contour, 727 (Q15)

16230

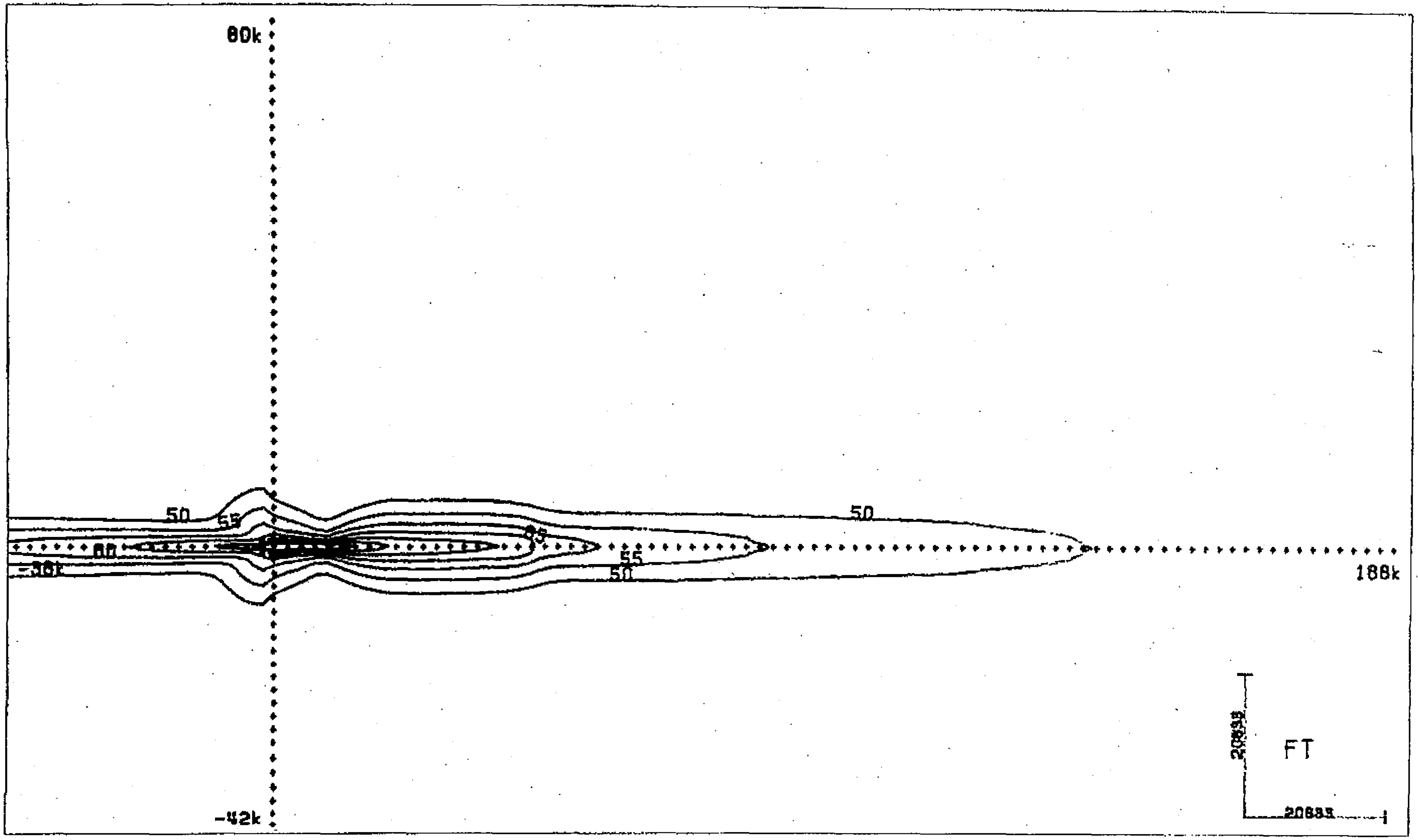


NOTE: Contour reflects typical aircraft performance characteristics and the trip length most frequently used by this aircraft at SFIA.

SOURCE: FAA Integrated Noise Model Version 3.9, Ken Eldred Engineering

Figure C-2

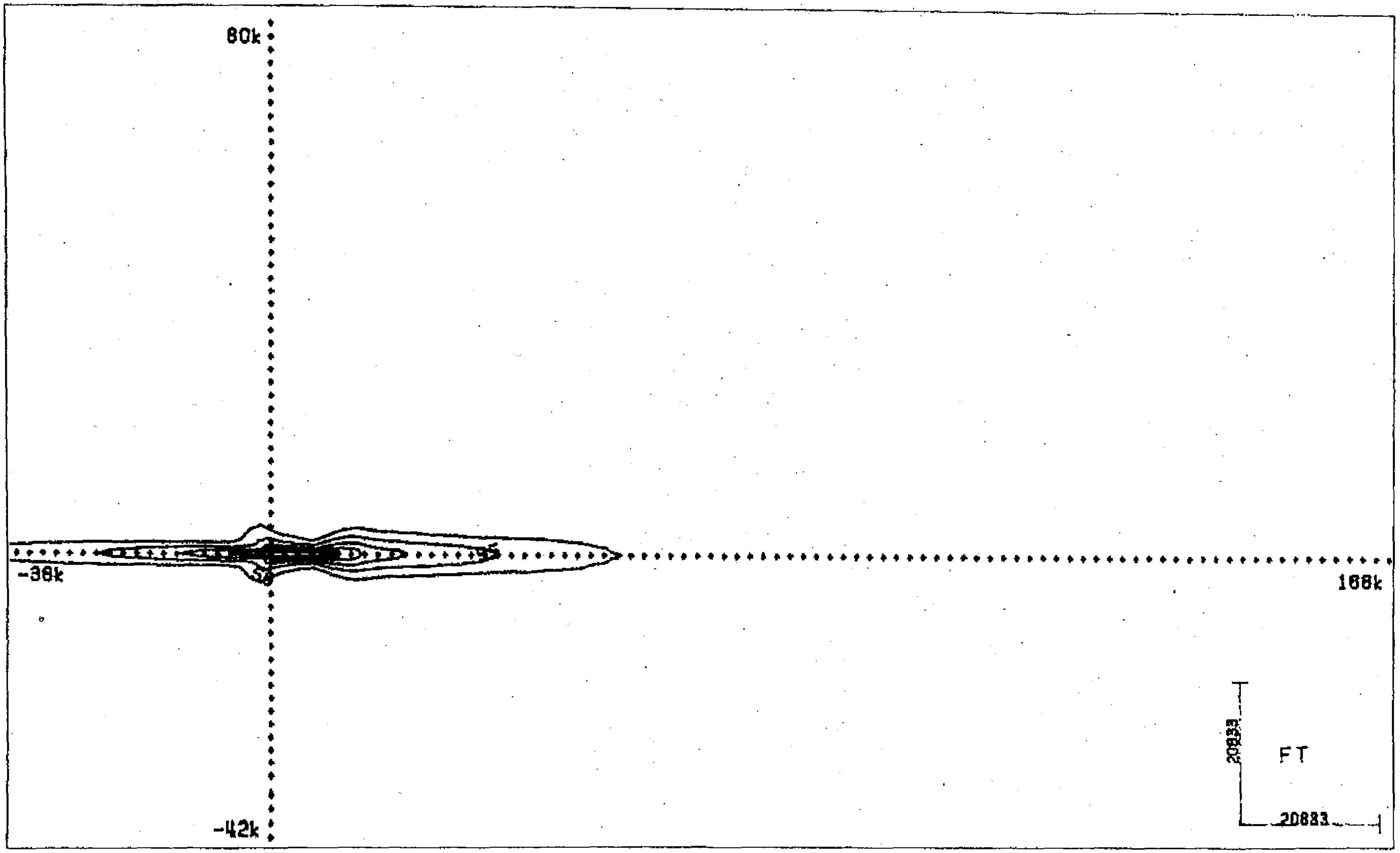
Single Event Sound Exposure Contour, 737 (300)



NOTE: Contour reflects typical aircraft performance characteristics and the trip length most frequently used by this aircraft at SFIA.

SOURCE: FAA Integrated Noise Model Version 3.9, Ken Eldred Engineering

Figure C-3
Single Event Sound Exposure Contour, 747 (20B)



NOTE: Contour reflects typical aircraft performance characteristics and the trip length most frequently used by this aircraft at SFIA.

SOURCE: FAA Integrated Noise Model Version 3.9, Ken Eldred Engineering

Figure C-4
Single Event Sound Exposure Contour, 767 (CF6)

TABLE C-4: AREA WITHIN SOUND EXPOSURE LEVEL CONTOURS FOR REPRESENTATIVE AIRCRAFT USING SFIA

Sound Exposure Level (dB)	Area (in Square Miles) by Representative Aircraft Type/a/ B-727-200	B-747-200	B-767	B-737-300
80	105.7	59.8	15.4	7.8
95	9.6	6.2	0.9	0.3
110	0.7	0.4	0.2	0.1

/a/ Assuming a straight-out departure and typical aircraft performance characteristics. Trip lengths (related to aircraft weight) are those most frequently used by these aircraft at SFIA.

SOURCE: Ken Eldred Engineering.

TABLE C-5: SOUND EXPOSURE LEVELS AT VARIOUS TAKEOFF DISTANCES FOR REPRESENTATIVE AIRCRAFT USING SFIA

Distance From Start of Takeoff Roll (feet)	Sound Exposure Level (in dB) by Representative Aircraft Type/a/ B-727-200	B-747-200	B-767	B-737-300
15,000	109.4	106.4	92.6	86.2
21,000	106.0	103.3	89.6	82.2
25,000	104.6	102.2	88.1	80.5
30,000	101.9	100.8	86.3	78.7
40,000	94.0	92.8	83.1	75.3
50,000	92.0	89.5	80.5	72.7
70,000	88.4	85.6	76.9	68.5
100,000	84.5	82.1	73.2	65.3

/a/ Assuming a straight-out departure and typical aircraft performance characteristics. Trip lengths (related to aircraft weight) are those most frequently used by these aircraft at SFIA. Sound levels are those that would be heard on the ground directly under the aircraft.

SOURCE: Ken Eldred Engineering.

TABLE C-6: SOUND EXPOSURE LEVELS AT VARIOUS LANDING DISTANCES FOR REPRESENTATIVE AIRCRAFT USING SFIA

Distance From Runway Threshold (feet)	Sound Exposure Level (in dB) by Representative Aircraft Type/a/			
	B-727-200	B-747-200	B-767	B-737-300
5,000	97.4	102.7	95.9	94.0
15,000	91.2	97.1	89.2	87.1
30,000	86.6	92.7	83.7	82.0
50,000	82.4	88.4	79.2	77.5

/a/ Assuming arrival along a 3-degree glide slope and typical aircraft performance characteristics. Sound levels are those that would be heard on the ground directly under the aircraft.

SOURCE: Ken Eldred Engineering.

TABLE C-7: COMPARISON OF TAKEOFF AND LANDING SOUND EXPOSURE LEVELS FOR REPRESENTATIVE AIRCRAFT USING SFIA

Type of Operation and Distance (feet)	Sound Exposure Level (in dB) by Representative Aircraft Type/a/			
	B-727-200	B-747-200	B-767	B-737-300
Takeoff (40,000)/b/	96.9	92.8	83.1	78.7
Landing (30,000)/c,d/	86.6	92.7	83.7	82.0

/a/ Assuming straight-out departure or arrival along a 3-degree glide slope, and typical aircraft performance characteristics. For takeoffs, trip lengths (related to aircraft weight) are those most frequently used by aircraft at SFIA. Sound levels are those that would be heard on the ground directly under the aircraft.

/b/ From beginning of takeoff roll, assuming a 10,000-foot runway.

/c/ Values are higher than those in Table C-5 because aircraft flight destinations are assumed to be further away (making aircraft height higher and altitudes at distances shown lower).

/d/ From runway threshold.

SOURCE: Ken Eldred Engineering.

TABLE C-8: CALCULATED MAXIMUM SOUND EXPOSURE LEVELS AT REMOTE MONITORING STATIONS FOR REPRESENTATIVE AIRCRAFT USING SFIA

No. /b/	City Location	Sound Exposure Level (in dB) by Representative Aircraft Type/a/ B-727-200	B-747-200	B-767	B-737-300
1	San Bruno	112	106	92	88
2	San Bruno	107	102	88	84
3	South San Francisco	108	102	88	85
4	South San Francisco	108	103	89	85
5	San Bruno	110	105	91	87
6	South San Francisco	108	102	88	85
7	Brisbane	103	99	85	82
8	Millbrae	120	114	100	94
9	Millbrae	113	107	93	90
10	Burlingame	111	105	92	88
11	Burlingame	113	106	93	89
12	Foster City	95	90	82	77
13	Hillsborough	107	102	87	83
14	South San Francisco	106	101	86	83
15	South San Francisco	108	103	89	85
16	South San Francisco	103	98	85	81
17	South San Francisco	103	98	85	81
18	Daly City	100	96	84	80
19	Pacifica	98	94	83	79
20	Daly City	95	90	81	76
21	San Francisco	94	89	80	76
22	San Bruno	N/A	N/A	N/A	N/A
23	San Francisco	97	92	82	78
24	San Francisco	95	90	81	76
25	San Francisco	93	87	79	74
26	San Francisco	93	87	79	74
27	San Francisco	91	86	76	71

/a/ Assuming a straight-out departure and typical aircraft performance characteristics. Trip lengths (related to aircraft weight) are those most frequently used by these aircraft at SFIA.
/b/ Remote monitoring stations are shown in Figure 21, Section III.C. Noise Setting, p. 162.

SOURCE: Ken Eldred Engineering.

● TABLE C-9: CALCULATED MAXIMUM SOUND EXPOSURE LEVELS AT SELECTED STUDY LOCATIONS FOR REPRESENTATIVE AIRCRAFT USING SFIA

No. /b/	City Location	Sound Exposure Level (in dB) by Representative Aircraft Type/a/ B-727-200	B-747-200	B-767	B-737-300
A	SF-Visitacion Valley	96	91	82	77
B	SF-Mt. Davidson	94	90	81	76
C	SF-Ingleside	95	90	81	76
D	Albany	90	84	75	70
E	Kensington	89	84	75	70
F	Berkeley	90	85	77	71
G	Berkeley	90	84	75	70
H	Oakland	91	86	77	73
I	Berkeley	90	85	76	71
J	Orinda Village	90	84	75	70
K	Berkeley/Oakland	90	85	76	71
L	Oakland	90	85	76	71
M	Orinda	89	84	75	70
N	Walnut Creek	87	82	73	67
O	Richmond	88	83	74	68
P	Moraga	89	84	75	70
Q	Danville	88	82	73	68
R	Pacifica	92	87	78	74
S	Pacifica	91	85	77	72
T	Pacifica	93	88	79	74

/a/ Assuming a straight-out departure and typical aircraft performance characteristics. Trip lengths (related to aircraft weight) are those most frequently used by these aircraft at SFIA.

/b/ Study locations are shown in Figure 21, Section III.C. Noise Setting, p. 162.

SOURCE: Ken Eldred Engineering.

● TABLE C-10: SENSITIVE RECEPTORS WITHIN 65 to 70 and 70 to 75 dBA, CNEL NOISE CONTOURS/a/

1990 Existing Base

70-75 dBA Contour

Millbrae Nursery School
Millbrae Serra Convalescent Hospital
Sheltering Pines Convalescent Hospital

65-70 dBA Contour

Chadbourne School
Fire Station
Belle Air School
Avalon School
Taylor School*
Green Hills School*
South San Francisco High School*
Los Cerritos School*
El Rancho School*
Alta Loma School*
Lincoln School*
Millbrae City Hall
Millbrae City Library

1996 Project and No-Project Alternative

65-70 dBA Contour

Chadbourne School
Mills High School*
Peninsula Hospital*
Fire Station*
Belle Air School*
Avalon School*
South San Francisco High School*
Los Cerritos School*
Millbrae Nursery School
Millbrae Serra Convalescent Hospital
Sheltering Pines Convalescent Hospital
Millbrae City Hall
Millbrae City Library

● TABLE C-10: SENSITIVE RECEPTORS WITHIN 65 to 70 and 70 to 75 dBA, CNEL NOISE CONTOURS/a/ (CONTINUED)

2006 No Project Alternative

65-70 dBA Contour

Avalon School*
South San Francisco High School*
Los Cerritos School*
Sheltering Pines Convalescent Hospital*

2006 Project

65-70 dBA Contour

South San Francisco High School
Los Cerritos School
Southwood School
Avalon School*
Sheltering Pines Convalescent Hosptial*
Millbrae Serra Convalescent Hospital*

NOTES:

/a/ Other than residences.

*On border of contour.

SOURCE: Environmental Science Associates, Inc.

NOISE APPENDIX

DESCRIPTION OF NOISE AND ITS EFFECTS ON PEOPLE

Kenneth McK. Eldred

Index Page

1. INTRODUCTION

This appendix summarizes information on ways to describe environmental sound exposure with respect to people and on its effects in terms of interference with human activity and annoyance.

This information is primarily based on the U.S. Environmental Protection Agency "Levels Document"[1*] and on subsequent research and findings. The set of six descriptors provides for quantifying the instantaneous magnitude of sound and the total magnitude of sound exposure to a single event or to a collection of events.

The cumulative noise metric in this appendix is the Day-Night Sound Level (Ldn). This quantity very similar to the California Community Noise Equivalent Level (CNEL), except that CNEL contains a 5 dB penalty for the evening hours of 7:00-10:00pm, whereas Ldn does not. The result is that CNEL is usually slightly larger numerically than Ldn, usually by 0.1 to 1 dB. Except for this negligible difference, the human effects for a value of CNEL should be the same as those given here for Ldn.

The appendix contains information of the effects of noise on speech communication, sleep and annoyance, addressing the effect of background noise and single event noise as well as the cumulative value of intruding noise. Finally, it contains current land use recommendations with respect to noise.

* The numbers in superscript refer to references at the end of the appendix text.

2. DESCRIPTION OF ENVIRONMENTALSOUND EXPOSURE

This section presents the set of descriptors that are most useful in quantifying sounds heard in residential neighborhoods and relating them to the various health effects. It then develops the simple relationships between sound exposures associated with various events heard during a defined time period and the resulting total cumulative sound exposure. Finally, it discusses longer term temporal factors which must be considered in defining the appropriate activity level and the typical expected difference between outdoor and indoor noise.

2.1 Descriptors[5]

There are a great many descriptors that have been advocated for the purpose of characterizing one or more attributes of environmental sound. Here we present a set of quantities that were developed originally by the United States Environmental Protection Agency, standardized by the national and international technical community and generally used today by the U.S. Government agencies, states and local authorities. These quantities allow for description of the:

- instantaneous magnitude of sound and the character of its frequency spectrum .
- magnitude of the total sound exposure associated with a single event such as an aircraft fly-by.
- magnitude of the average sound exposure in an hourly period which may be related to interface with human activity or health.
- magnitude of the 24-hour sound exposure with a night-time penalty weighting which may be related to noise impact.

Table 1 lists the principal descriptors and gives a short definition and principal use for each of the quantities that provide the basis for discussion of sound in this document. The following paragraphs provide further information on each of these quantities.

TABLE 1

Principal Descriptors of Environmental Sound

Quantity	Symbol Abbreviation	Short Definition	Principal Uses
Sound Level	L	Mean square value of A-weighted sound pressure level at any time re. a reference pressure.	Describes magnitude of a sound at a specific position and time.
Sound Exposure	SE	Time integral of the mean square A-weighted sound pressure re. a mean square reference pressure and 1-second duration (pasques).	Describes magnitude of all of the sounds at a specific position accumulated during a specific event, or for a stated time interval.
Sound Exposure Level	SEL	10 x logarithm of sound exposure.	Decibel form of sound exposure.
Equivalent Sound Level	L_{eq}	Level of a steady sound which has the same sound exposure level as does a time-varying sound over a stated time interval.	Describes average (energy) state of environment. Usually employed for durations of: 1 hr {$L_{eq}(1)$}, 8 hr {$L_{eq}(8)$}, or 24 hr {$L_{eq}(24)$}.
Day/night Sound Level	Ldn	Equivalent sound level for a 24-hour period with a +10 dB weighting applied to all sounds occurring between 10 pm and 7 am.	Describes average environment in residential situations; accounting for effect of nighttime noises, and often is averaged over a 365-day year.
Day/night Sound Exposure	DNSE	Linear Day/night sound exposure for a 24-hour period with a 10 times weighting applied to all sounds occurring between 10 pm and 7 am.	Linear analogue to Day/night Sound Level is very useful for adding up or comparing constituent parts of the total sound environment.

Sound Level (L_A)

The instantaneous magnitude of a sound may be described by its sound level which accounts both for the magnitude of its pressure fluctuations and their distribution in the frequency spectrum.

The distribution of sound energy as a function of frequency is termed the "frequency spectrum." See Figure 1 for an example. The frequency spectrum is important to the measurement of the magnitude of sounds because the human ear is more sensitive to sounds at some frequencies than at others. For example, the human ear hears best in the frequency range of 1000 to 5000 cycles per second (or Hertz) than at very much lower or higher frequencies. Therefore, in order to determine the magnitude of a sound on a scale that is proportional to its magnitude as perceived by a human, it is necessary to weight that part of the sound energy spectrum humans hear most easily more heavily when adding up the total sound magnitude as perceived. Figure 2 illustrates this concept of weighting the physical sound spectrum to account for the frequency response of the ear.

The most popular form of frequency weighting, called A-weighting, is incorporated in the definition of sound level. A-weighting, which was developed in the 1930's for use in a sound level meter, accomplishes the weighting by an electrical network which works in a manner similar to the bass and treble controls on a hi-fi set. Its major effect is to deemphasize low frequency sounds, e.g. to roll off the bass response. A-weighting has been used extensively throughout the world to measure the magnitudes of sounds of all types. Because of its universality, it was adopted by EPA and other government agencies for the description of sounds in the environment.

The unit used to measure the magnitude of sound level is the decibel. In the phrase, "The sound level is so many decibels," its use is analogous to the use of "inch" in the phrase, "The length is so many inches" or to "degree" in the phrase, "The temperature on the celsius scale is so many degrees." However, unlike the scales of length and temperature, which are linear scales, the sound level scale is logarithmic. By definition, therefore, the level of a sound which has 10 times the mean square sound pressure of the reference sound is 10 decibels (or dB) greater than the reference sound, and one which has 100 times (or 10 x 10) the mean square sound pressure of the reference sound is 20 dB greater (10 + 10) dB.

This use of a logarithmic scale for sound is convenient because sound pressures of normal interest extend over a range of 10 million to 1. Since the mean square sound pressure is proportional to the square of sound pressure, it extends over a typical range of 100 million million (a 100 trillion) to 1. This huge number, 100 trillion (or 100,000,000,000,000, with 14 zeros after the 1) is much more conveniently represented on the logarithmic scale as 140 dB (14 x 10).

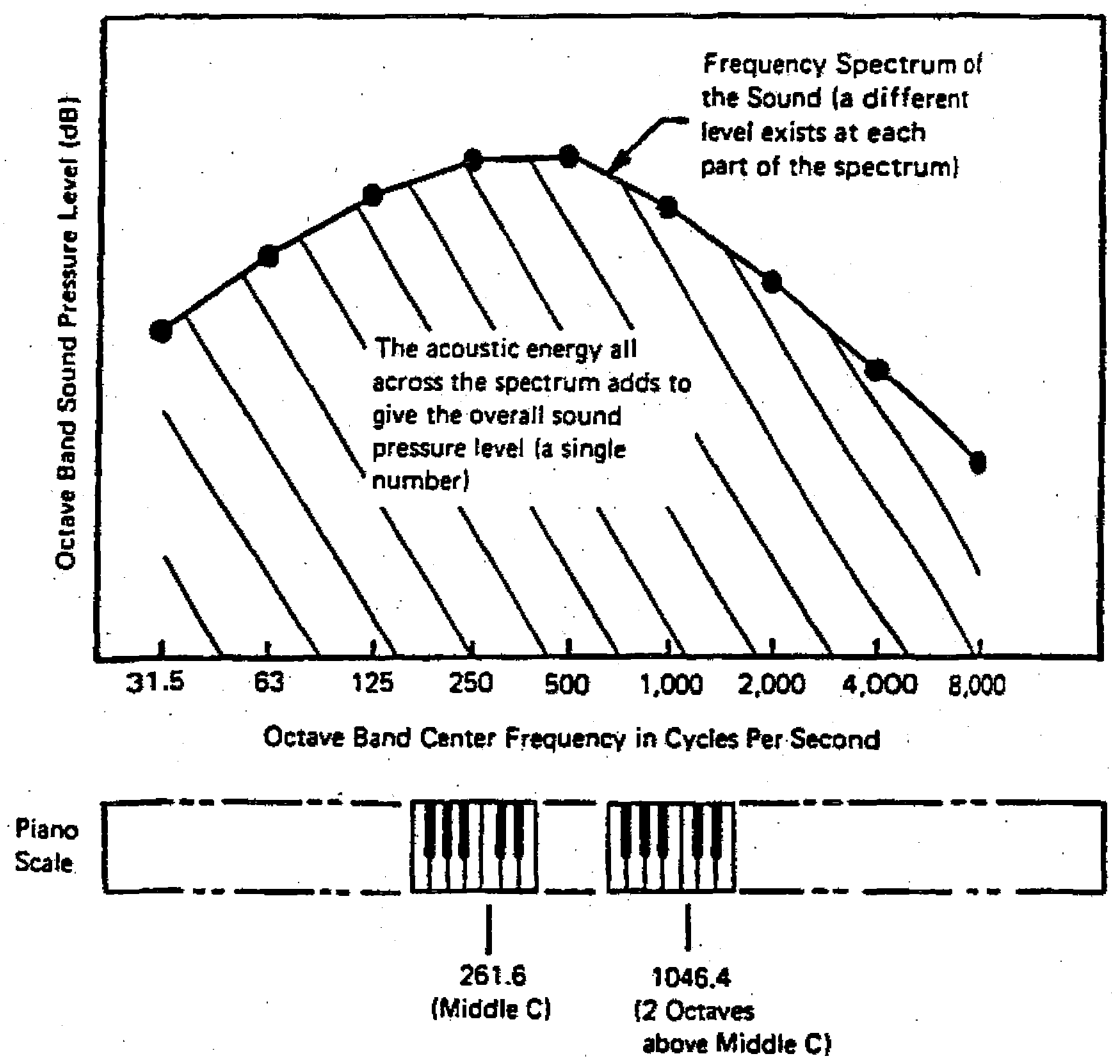


Figure 1: **Example of a Frequency Spectrum of a Sound**

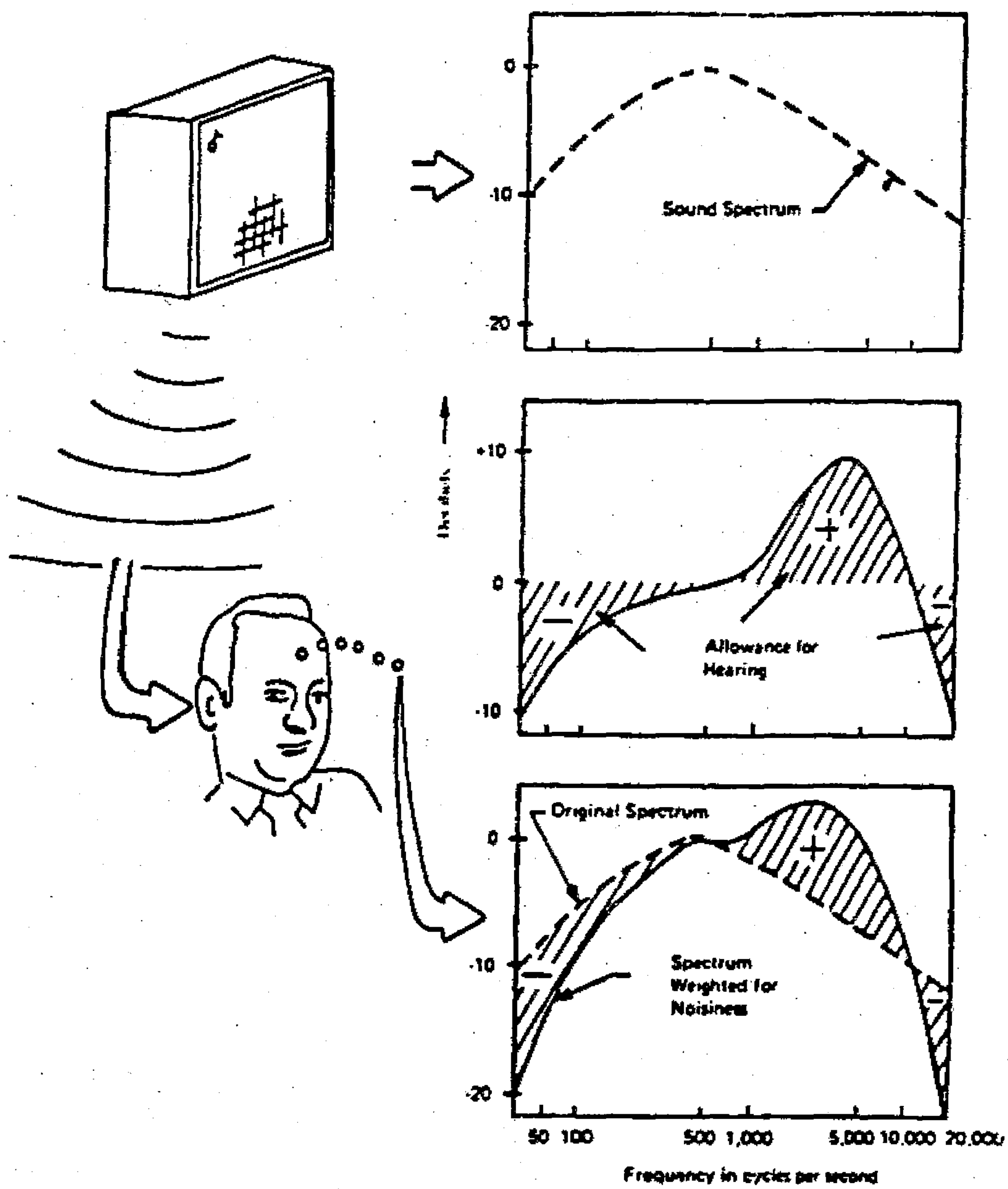


Figure 2: Weighting the Measured Sound Spectrum to Account for the Frequency Response of the Ear

The use of the logarithmic decibel scale requires somewhat different arithmetic than we are accustomed to using with linear scales. For example, if two similar but independent noise sources operate simultaneously, the measured mean square sound pressure from the two sources will add together to give a value twice that which would result from either source operating alone. The resulting sound pressure level in decibels from the combined sources will be only 3 dB higher than the level produced by either source alone, since the logarithm of 2 is 0.3 and 10 times 0.3 is 3. In other words, if we have two sounds of different magnitude from independent sources, then the level of the sum will never be more than 3 dB above the level produced by the greater source alone. If the two sound sources produce individual levels that are different by 10 dB or more, than adding the two together produces a level that is not significantly different from that produced by the greater source operating alone.

The zero value on the A-weighted sound level scale (sound level, for short) is the reference pressure of 20 micro-newtons per square meter. This value was selected because it approximated the smallest sound pressure that can be detected by a human. The average sound level of a whisper at a 1-meter distance from the person who is whispering is 40 dB; the sound level of a normal voice speaking 1 meter away is 57 dB; a shout, 1 meter away, is 85 dB. Other examples of sound levels are illustrated in Figure 3.

Sound Exposure (SE)[6,7]

Sound exposure is the analogous non-logarithmic arithmetic quantity to sound exposure level. It provides the basis for describing the total sound exposure during a stated period of time. This includes a wide variety of environmental noise situations in which the magnitude of the sound is constantly changing with time. Sound exposure is the linear time integral of the mean square sound pressure, having the dimension of pressure squared x time. Its units are pascal squared seconds (pasques for short).

Sound Exposure Level (SEL)

The sound exposure level characterizes the total sound associated with a single event during a stated time period. The sound level during a discrete event varies with time, rising from a residual level to a maximum value and then falling back to the residual level, as illustrated in Figure 4. The total sound exposure associated with such an event is a function of the duration of the event and its maximum sound level. Since both of these factors are relevant to the effect of the sound on people, the sound exposure level has been found to be the most appropriate and useful descriptor for most types of single event sounds including aircraft fly-bys.

Figure 5 shows an example of the time history of the ambient noise in a suburban neighborhood. The large changes in sound level, which occur as the result of diverse discrete events, demonstrate the difficulty of selecting a single value of the sound level time history to characterize the total sample. To account for all of these sounds, the cumulative sound exposure, or sound exposure level, allows the summation of all of these individual sounds into a single total value for each sample in a manner that can be correlated with the probable effect of these sounds on people.

Equivalent Sound Level (Leq)

The equivalent sound level during a stated time period is the level of a steady sound which has the same sound exposure as does the actual sound. The major virtue of the equivalent sound level is that its magnitude correlates well with the effects on humans that result from a wide variation in types of environmental sound levels and time patterns. It has been proven to provide good correlation between noise and speech interference and the risk of noise-induced hearing loss. It also is the basis for the principal quantity used to describe the total outdoor noise environment, the Day-night Sound Level.

The equivalent sound level for the hour which contained most of the ten-minute sample in Figure 5 was 57 dB and the corresponding sound exposure level was 92.6 dB (a sound exposure of 0.72 pasques).

Day-night Sound Level (Ldn)

The Day-night Sound Level is defined as the A-weighted equivalent sound level for a 24-hour period with a +10 dB weighting applied to the equivalent sound levels measured during the nighttime hours of 10:00 pm to 7:00 am. The nighttime weighting acts to increase the levels measured in nighttime by 10 dB. Hence, an environment that has a measured daytime equivalent sound level of 60 dB and a measured nighttime equivalent sound level of 50 dB has weighted nighttime sound level of 60 dB (50 + 10) and a Day-night Sound Level of 60 dB.

The Day-night Sound Level is the primary descriptor of cumulative noise in the outdoor environment, correlating well with overall community reaction to noise and to the results of social surveys of annoyance to aircraft noise. It has been adopted throughout the federal government and is now embodied in numerous federal regulations and guidelines. Its magnitude has been related to most of the effects of noise on people to an extent unmatched by any other descriptor. Therefore, it has the highest utility in evaluating environmental noise with respect to people.

For some applications and noise abatement measures, it can be useful to separate the daily exposure into more time periods, e.g. daytime, evening and nighttime, depending on the noise activities and lifestyle of the population. Some countries and the state of California have adopted such variations from Ldn. However, the standardized Ldn used here results in the best overall comparability of various residential noise environments.

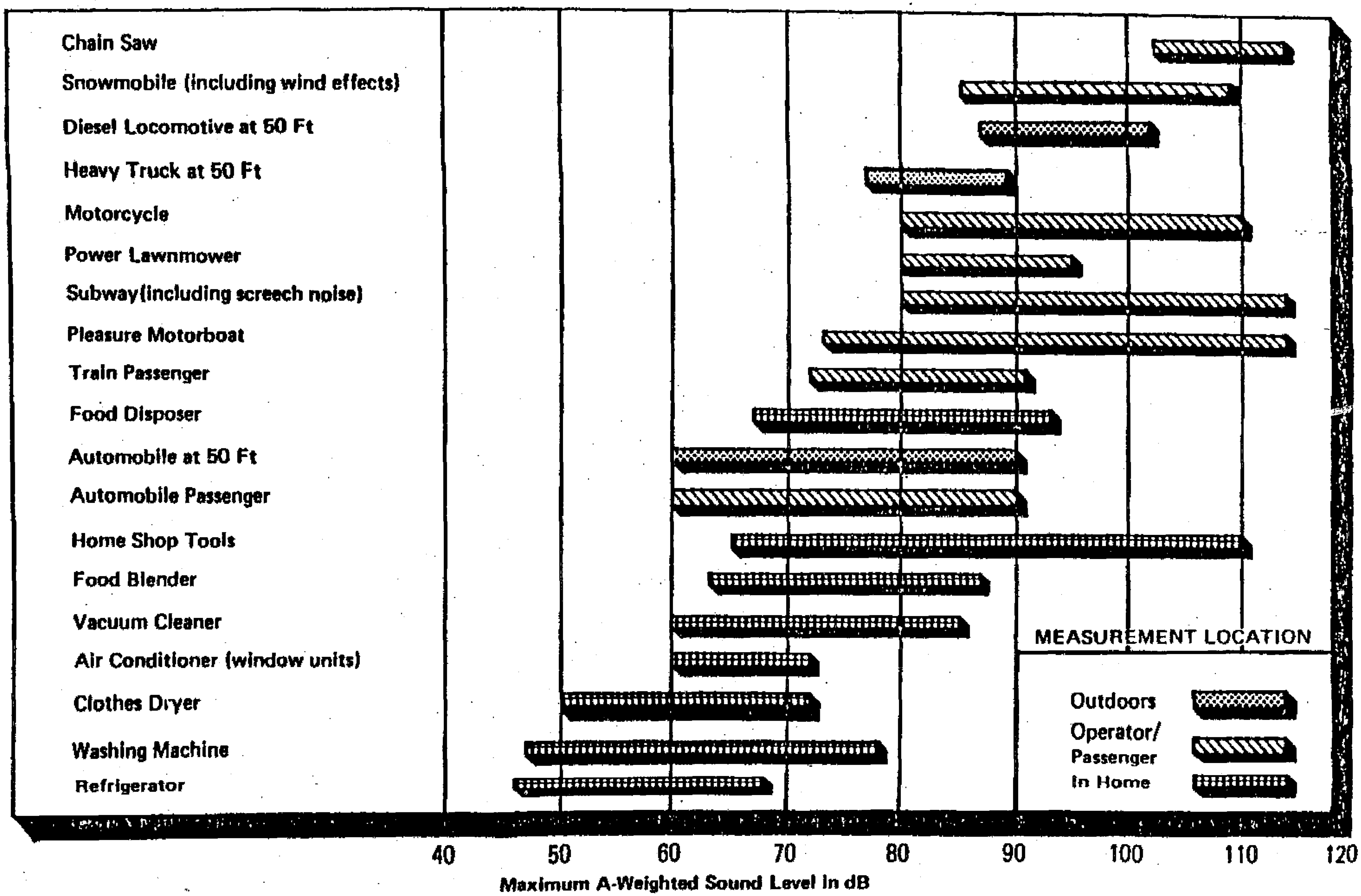


Figure 3: **Typical Range of Common Sounds**

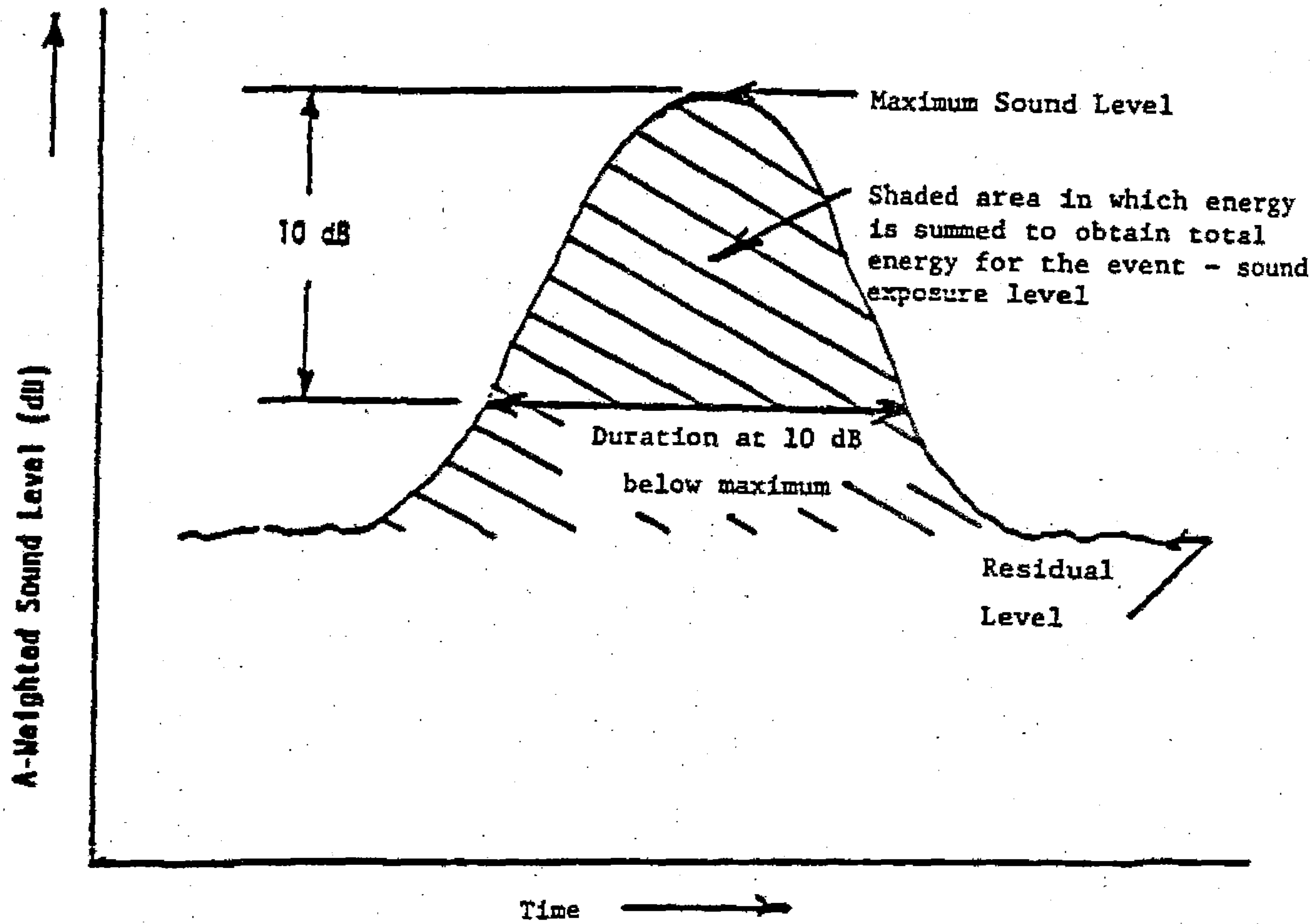


Figure 4: **Time History of Sound Level of a Single Event Sound**

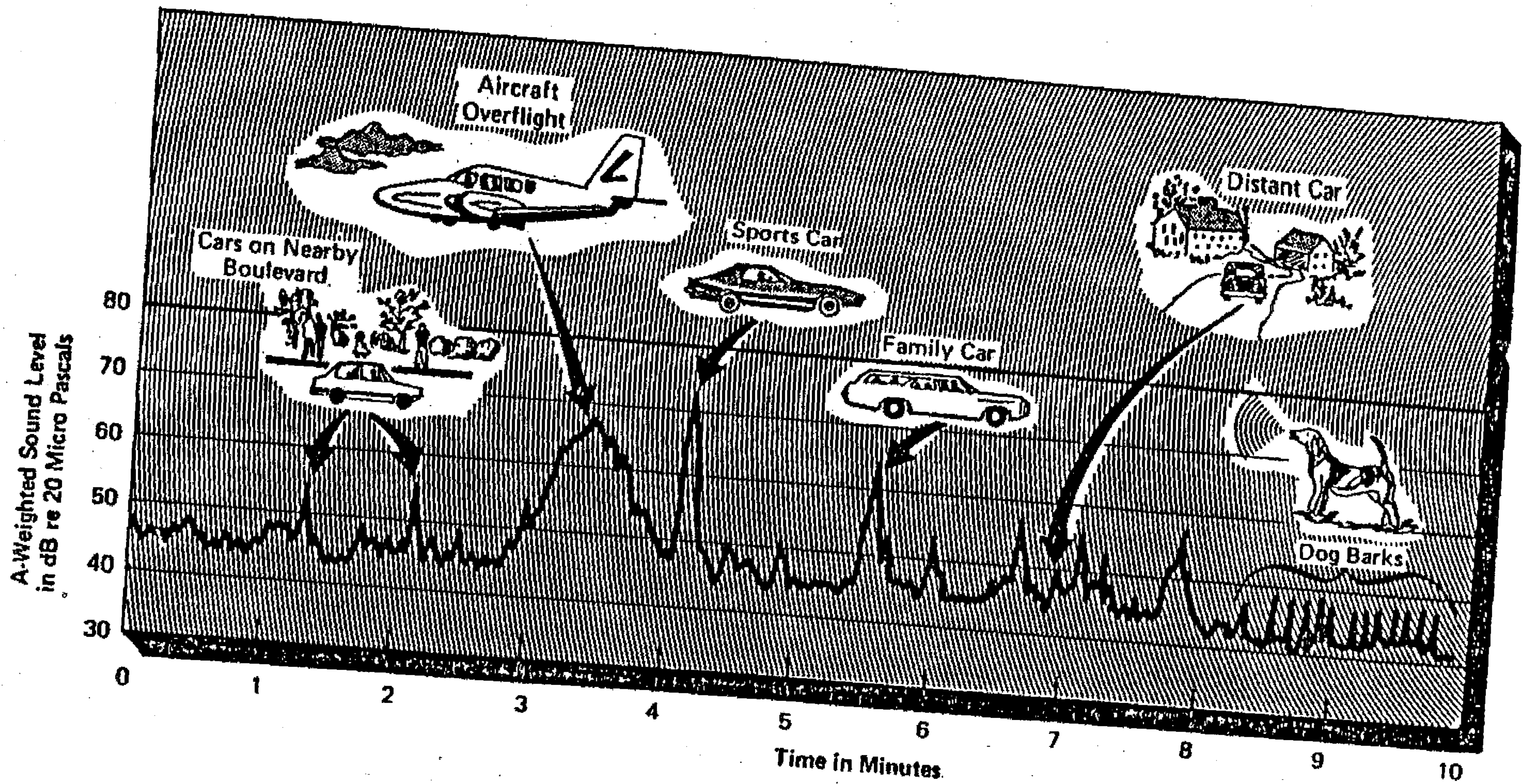


Figure 5: Typical Outdoor Sound Measured on a Quiet Suburban Street

Day-Night Weighted Sound Exposure (DNSE)

An alternative cumulative noise descriptor that corresponds with the Day-night Sound Level is the Day-night Weighted Sound Exposure. Its units are pascal-squared seconds, pasques for short. The range of primary interest for DNSE is 1 to 1,000 pasques, equivalent to Ldn values of 45 to 75 dB.

Figure 6 illustrates the direct relationship between the logarithmetic Day-night Sound Level scale and the Day-night Sound Exposure scale. A value of 1 pasque is equivalent to an Ldn of 45 dB which is a very quiet environment such as found on a farm in California. The value of 10 pasques is equivalent to an Ldn of 55 dB which is the level proposed by the US Environmental Protection Agency (EPA) as protective of the "public health and welfare with an adequate margin of safety" (see Section 4.1). Such a level is often found in suburban neighborhoods. The value of 100 pasques is equivalent to an Ldn of 65 dB, a level considered by the FAA and various other agencies to be the threshold of possibly significant noise problems, and is the minimum value of Ldn required for eligibility for sound proofing under FAA grant programs. Finally, a value of 1,000 pasques is equivalent to an Ldn of 75 dB, the level which it is generally recognized as the maximum cumulative level fit for residential living, even with sound proofing applied to the residential units.

2.2 The Cumulative Sound Exposure from Single Events

The cumulative sound exposure resulting from a series of sound events is calculated by adding up the sound exposures of the individual events. For example, if there were three events with sound exposures of 4, 9 and 23 pasques, then the cumulative sound exposure is calculated by adding 4 + 9 + 23 to obtain 36 pasques.

This simple arithmetic property of sound exposure is very useful when examining the possible effects of alternative noise mitigating measures. For example, a 30 percent reduction in the operations on a ~~specific reduction in the operations on a~~ specific runway leads to a 30 percent reduction in the cumulative sound exposure from those operations. The ability of this technique can be easily seen in the examples in Table 2.

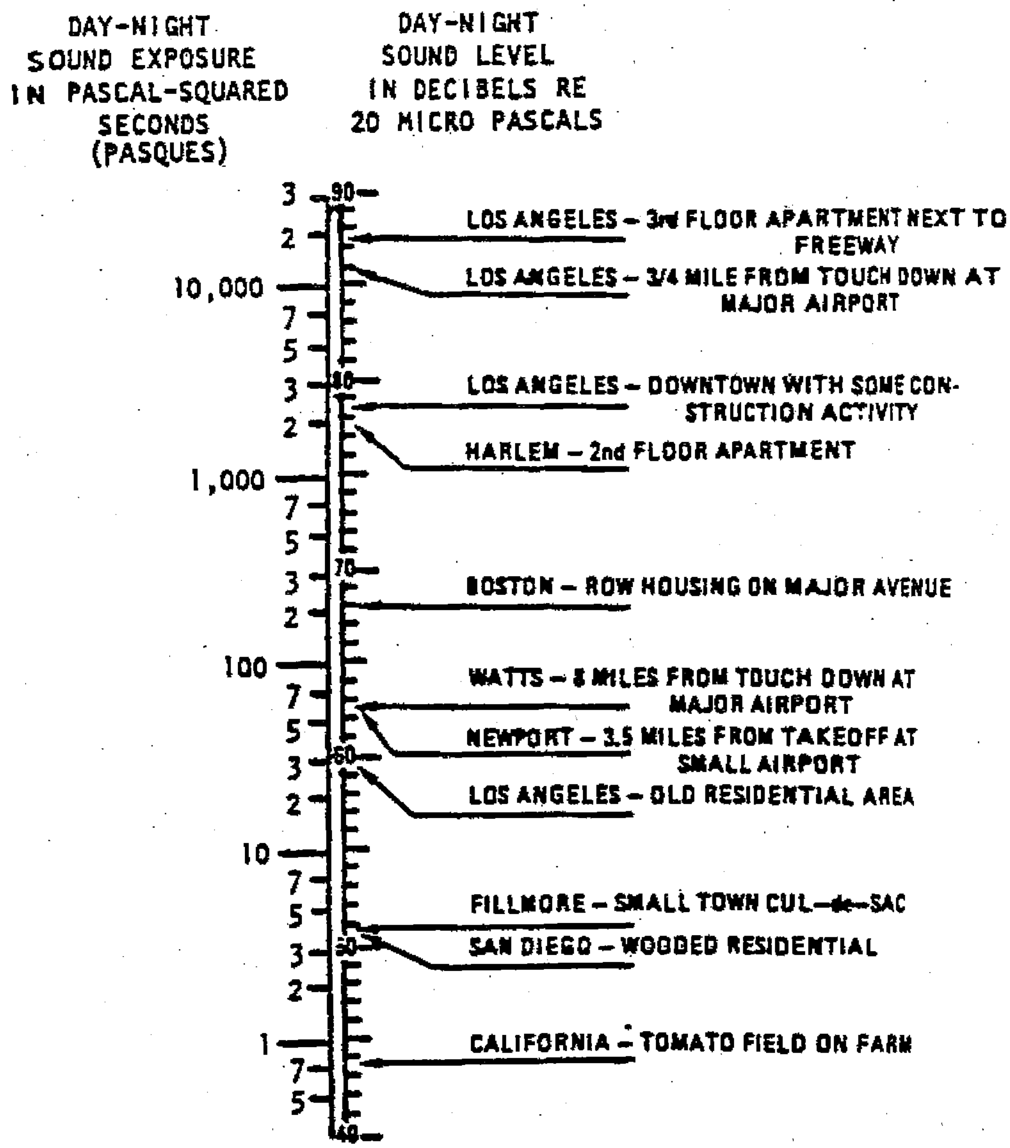


Figure 6: **Examples of 24-hour Day-night Weighted Cumulative Noise Measurements with Both Day-night Weighted Sound Exposure and Day-Night Sound Level Scales**

TABLE 2

Examples of the Use of Day/night Weighted Sound Exposure (DNSE)

Example 1: Contributions of departures on five runways to sound exposure at a specific location (at a typical large commercial airport)

Departure Runway	Ldnp* (decibels)	DNSE (pasques)	% Total Exposure	No. Ops.	DNSE per Operation (pasques)
08	64.4	95	20	45	2.11
14	62.5	61	13	75	.81
23	66.9	169	37	100	1.69
26	64.2	91	20	78	1.17
32	61.1	45	10	60	.75
TOTAL:	71.3	461	100	358	1.29

TABLE 2 (continued)

Example 2: Contribution of departures from various aircraft on all runways to sound exposure at a specific location (at a typical large commercial airport)

Aircraft Type	Ldnp* (decibels)	DNSE (pasques)	% Total Exposure	No. Ops.	DNSE per Operation (pasques)
727	69.9	338	72	152	2.22
DC9	64.2	89	19	113	0.79
747	60.5	38	8	23	1.67
DC10	51.6	5	1	41	0.12
767	47.6	2	Neg.	29	0.07
TOTAL:	71.3	472	100	358	1.32

* Ldnp is the partial value of Ldn associated with the indicated operation

The day-night weighted sound exposure may also be used to include the effect of the population impacted by alternative proposals in attempting to decide which proposal should be selected. For example, assume that the noise from airfield operations impacted two apartment properties; Apartment A with a population of 500 people, and Apartment B with a population of 100 people, and that the current DNSE values are 10 pasques and 40 pasques, respectively. Thus at Apartment A there are 500 people living in an area which has a DNSE of 10 pasques, and at Apartment B there are 100 people with a DNSE of 40 pasques. One can calculate in each area the total population weighted DNSE by multiplying the number of people exposed by their DNSE. Thus, at Apartment A, population-weighted DNSE is 5,000 people pasques and at Apartment B it is 4,000 people pasques. Then the total current impact in terms of cumulative sound exposure is simply the sum of the population-weighted DNSE's or 9,000 people pasques in this example. Alternatives with proposed noise mitigations could be similarly evaluated and their totals compared with that of the current operation, to give one type of single number comparative measure.

This technique can be applied to the estimated national population affected by noise from aircraft operations at civilian airports. The results are shown in Table 3.

TABLE 3

Estimated Population Impact of Aircraft Noise Based on Population Weighted by Day-Night Sound Exposure

DNL Interval (dB)	Population (millions)	Average DNSE (pasques)	Population Weighted DNSE (people pasques)	% of Total Above Ldn = 55 dB
			615	
80-85	.1	6150.0	388	20.9
75-80	.2	1940.0	615	13.2
70-75	1.0	615.0	660	20.9
65-70	3.4	194.0	418	22.4
60-65	6.8	61.5	248	14.2
55-60	12.8	19.4	2944	8.4
				100.0

The results indicate that about 21 percent of the population-weighted DNSE occurs at very high values of DNSE (DNSE greater than 3,000 pasques and the corresponding Ldn greater than 80 dB). Further, 78 percent of the national impact as measured by this metric occurs at values of DNSE greater than 100 (Ldn greater than 65 dB).

2.3 Locational and Temporal Modifying Factors

The usual definition of the noise environment is given in terms of the outdoor noise level and for cumulative noise, a "typical" 24-hour day. Often, the evaluation of noise effects on people involve the noise indoors, rather than outdoors, which may require a transition from outdoors to indoors. Also, the determination of a "typical" day may involve evaluating many temporal operational aspects of the sources of noise, including daily, weekly, and seasonal patterns. These aspects are discussed in the following paragraphs.

2.3.1 Outdoor to Indoor Noise Reduction

The majority of the existing data regarding levels of environmental noise in residential areas has been obtained outdoors. Such data are useful in characterizing the neighborhood noise environment, evaluating the noise of identifiable sources and relating the measured values with those calculated for planning purposes. For these purposes, the outdoor noise levels have proved more useful than indoor noise levels because the indoor noise levels contain the additional variability of individual building sound level reduction. This variability among dwelling units results from type of construction, interior furnishings, orientation of rooms relative to the noise, and the manner in which the dwelling unit is ventilated.

Data on the reduction of aircraft noise afforded by a range of residential structures indicate that houses can be approximately categorized into "warm climate" and "cold climate" types. Additionally, data are available for typical open-window and closed-window conditions. These data indicate that the sound level reduction provided by buildings within a given community has a wide range due to differences in the use of materials, building techniques, and individual building plans. Nevertheless, for planning purposes, the typical reduction in sound level from outside to inside a house can be summarized as follows in Table 4.

TABLE 4

Sound Level Reduction due to Houses* in Warm and Cold Climates, with Windows Open and Closed

	Windows Open	Windows Closed
Warm Climate	12 dB	24 dB
Cold Climate	17 dB	27 dB
Approximate National Average	15 dB	25 dB

* (Attenuation of outdoor noise by exterior shell of the house)

The approximate national average "window open" condition corresponds to an opening of 2 square feet and a room absorption of 300 sabins (typical average of bedrooms and living rooms). This window open condition has been assumed throughout this report in estimating conservative values of the sound levels inside dwelling units which result from outdoor noise. The results indicate that a reduction of 15 dB is appropriate for the "window open" conditions and a reduction of 25 dB for the "window closed" condition. Higher values could be appropriate for houses with well-fitted storm windows or sound proofing treatment. These values are appropriate for estimating the indoor noise from outdoor noise measurements or for translating indoor noise criteria to the outdoors.

2.3.2 Temporal Factors

The work of the US Environmental Protection Agency in correlating the Ldn with the effects of cumulative noise in community neighborhoods, used the concept of "annual average day" as the "typical" day. This definition is unambiguous and it is usually simple to calculate the desired quantity since annual statistics are readily available for most sources of interest.

In some cases where the operation of the noise source is invariant, such as an electrical power transformer, selection of definition for typical day requires little effort. However, where there are major temporal changes in operations serious consideration of the scheme for defining a typical day is required. Some examples might include:

- Operation of snow making and grooming machines at a ski resort which occurs only in the winter.
- Operation of sports car racing that occurs only on Friday and Saturday evenings for four months of the year.
- Operation of Commercial airplanes at a civilian airport which has significantly fewer flights from midnight Friday through Saturday at noon.
- Highway traffic in a summer resort area where the population in the high season is ten times that in the off season.
- Operation of aircraft over a community which only occurs when the weather conditions dictate use of a specific runway configuration.
- Operation at military air bases or training areas, where activity is dictated by various operational requirements.

For some of these examples, such as the regular daily variation of commercial airplane schedules, the typical day is defined as an "average busy day." It may be calculated by selecting one of the days during the week (Thursday has been used in several civilian airport studies); or by a more complex calculation procedure. For example, U.S. DOD procedures use as a busy day, a day when the number of operations is greater than one-half the average annual day (the annual number of operations divided by 365). From those busy days the "average busy day" is calculated.

For some of the other examples it is more appropriate to estimate the noise for two definitions of a typical day, the annual average day and an average day during the period when the noise occurs. Thus, for a source that operates only in one season, a typical day would be selected to represent average day operations in that season. Similarly, for a flight track that is only used under certain weather conditions, a day may be selected in which it is assumed that the flight track is used for the entire 24 hours. Alternatively, a typical day could be defined to have the average usage on the days when the flight track is used. These additional analyses are often helpful in understanding the impacts as perceived by the residents.

3. INTERFERENCE WITH HUMAN ACTIVITIES AND ANNOYANCE[1,3,8,9,10,11]

3.1 Activity Interference

This section discusses the two forms of activity that are frequently cited as susceptible to interference by noise. These are speech communications and sleep.

3.1.1 Interference with Speech Communication[1,2,3,12,13]

Speech communication has long been recognized as an important requirement of any human society. Interference with speech communication disturbs normal domestic or educational activities, creates an undesirable living environment, and can sometimes, for these reasons, be a source of significant annoyance. The principal concerns in residential neighborhoods are the effects of noise on face-to-face conversation outdoors and indoors, telephone use, and radio or television enjoyment.

The chief effect of intruding noise on speech is to mask the speech sounds and thus reduce intelligibility. The important contributions to intelligibility in speech sounds cover a range in frequency from about 200 to 6,000 Hz, with a dynamic level range of about 30 dB, throughout the frequency band. The intelligibility of speech will be nearly perfect if all these contributions are available to a listener for his understanding. Much of the acoustic energy in speech is contained in the lower part of this frequency range. However, important information required to differentiate between speech sounds is contained in the higher frequency range. To the extent that intruding noise masks out or covers some of these contributions, the intelligibility deteriorates more readily the higher the noise level, particularly if the noise frequencies coincide with the important speech frequencies.

Results of speech research define the levels of noise that will produce varying degrees of masking as a function of average noise level and the distance between talkers and listeners. Other factors such as the talker's enunciation, the familiarity of the listener with the talker's language, the room acoustics, the listener's motivation and, of course, the normality of the listener's hearing also influence intelligibility.

For outdoor speech communication, Table 5 shows distances between speaker and listener for satisfactory outdoor speech at two levels of vocal effort in steady background noise levels. In other words, if the noise levels in the table are exceeded, the speaker and listener must either move closer together or expect reduced intelligibility. The loss of intelligibility as a function of noise level for normal voice level with a 2-meter communication distance is given in Figure 7.

TABLE 5

Steady A-weighted Sound Levels that Allow Communication with 95 Percent Sentence Intelligibility Over Various Distances Outdoors for Different Voice Levels

VOICE LEVEL	COMMUNICATION DISTANCE (Meters)					
	0.5	1	2	3	4	5
Normal Voice	72	66	60	56	54	52
Raised Voice	78	72	66	62	60	58

For indoors, the effects of masking normally-voiced speech are summarized in Figure 8, which assumes the existence of a reverberant field in the room. This reverberant field is the result of reflections from the walls and other boundaries of the room. These reflections enhance speech sounds so that the decrease of speech level with distance found outdoors occurs only for spaces close to the talker indoors. For typical living rooms, the level of the speech is more or less constant throughout the room at distances greater than 1.1 meters from the talker. The distance from the talker at which the level of speech decreases to a constant level in the reverberant part of the room is a function of the acoustic absorption in the room. The greater the absorption, the greater the distance over which the speech will decrease and the lower the level in the reverberant field for a given vocal effort. The absorption in a home will vary with the type and amount of furnishings, carpets, drapes and other absorbent materials, being generally least in bathrooms and kitchens and greatest in living rooms and bedrooms.

As shown in Figure 8, the maximum sound level that will permit relaxed conversation with 100 percent sentence intelligibility throughout the room is 45 dB. People have a considerable capability to vary their voice levels to overcome noise and achieve desired communication. This ability works well over a range of levels of steady noises, but is less useful if the interfering noises are intermittent. Figure 9 shows necessary voice levels limited by noise conditions. The communication distance is given on the ordinate, the sound level and the parameters are voice level. At levels above 50 dB, people raise their voice level as shown by the "expected" line if communications are not vital or by the "communicating" line if communications are vital. Below and to the left of the"normal voice line, communications are at an Articulation Index of 0.5, 98 percent sentence intelligibility. At a shout, communications are possible except above and to the right of the "impossible" area line.

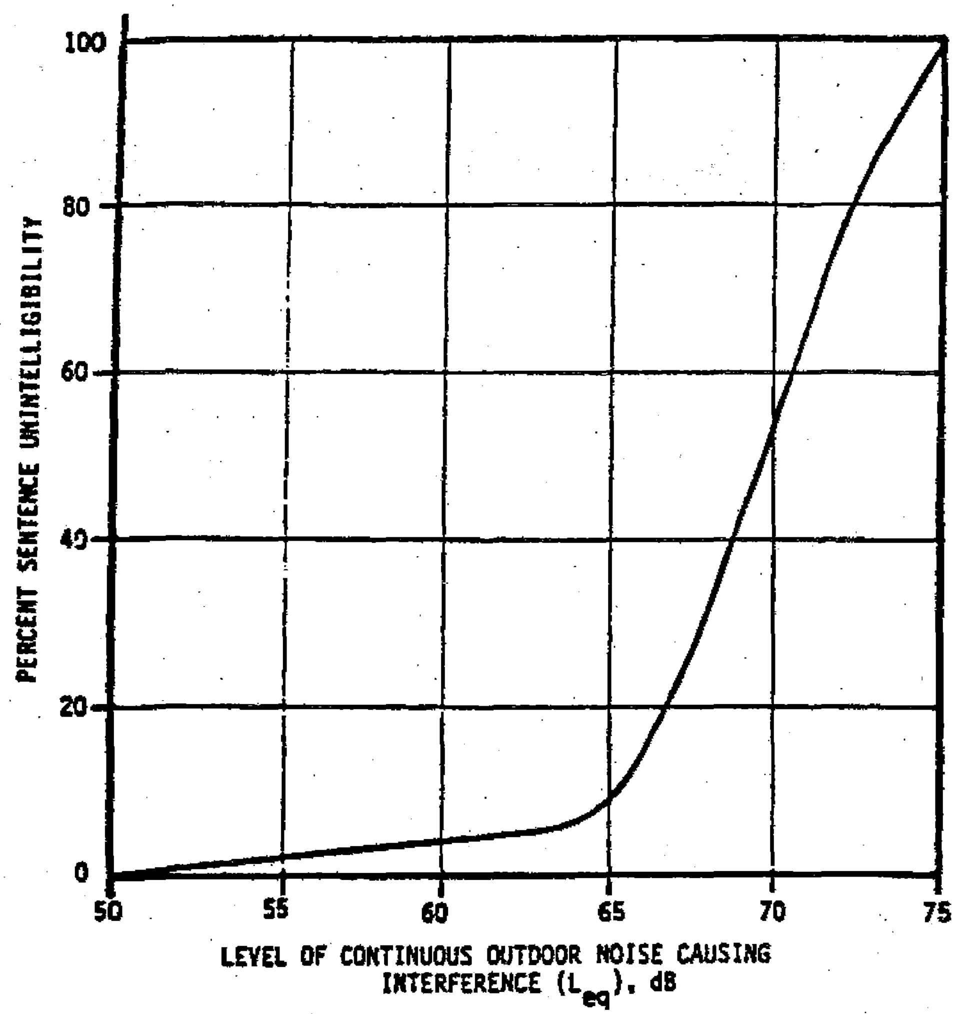


Figure 7: **Criteria for Outdoor Speech Interference for Normal Voice Level at a 2-meter Communication Distance**

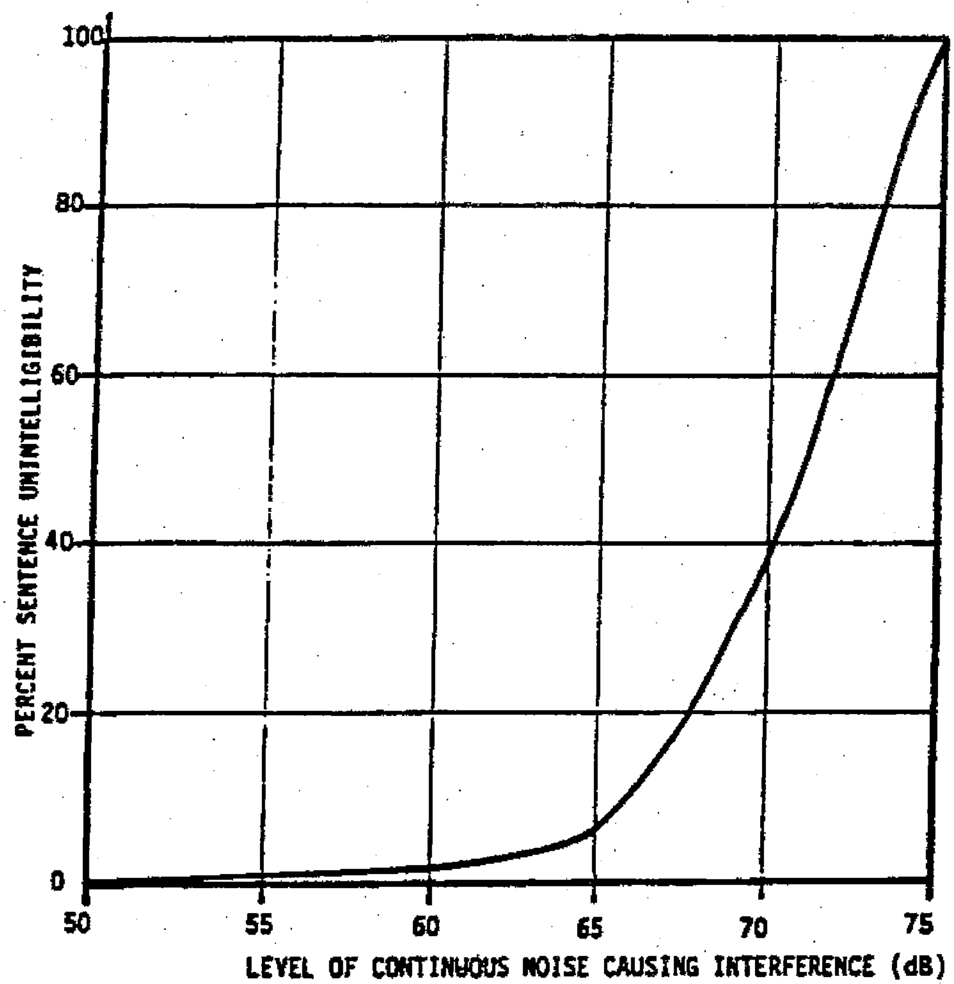


Figure 8: **Criteria for Indoor Speech Interference for Relaxed Conversation Distance in a Typical Living Room.**

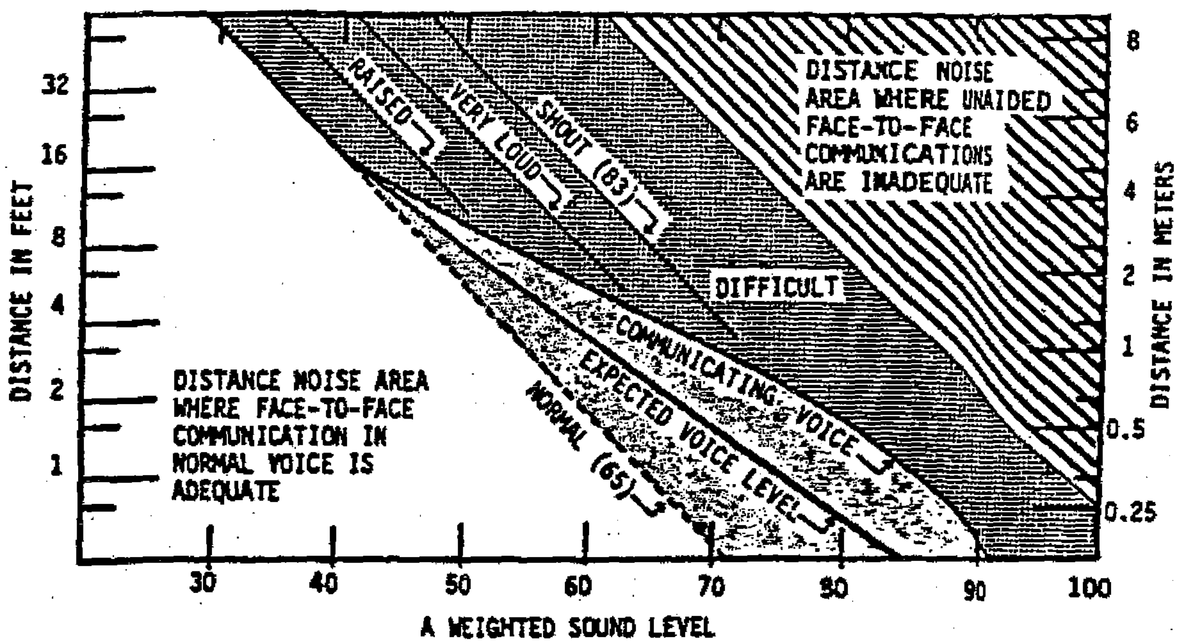


Figure 9: Necessary Voice Levels as Limited by Ambient Noise for Selected Communication Distances for Satisfactory Face-to-face Conversation

3.1.2 Rest and Sleep Interference[17,18,19,20]

Noise interference with rest, relaxation and sleep is a major cause of annoyance. Interferences result primarily from intermittent rather than steady noise, and are often associated with single event sounds such as the passing by of transportation vehicles.

Noise can make it difficult to fall asleep. Noise levels associated with single events can create momentary disturbances of natural sleep patterns by causing shifts from deep to lighter stages. Such noises may even cause awakening which the person may or may not be able to recall. However, regardless of recall, a person whose sleep has been disturbed severely may feel lethargic and nervous during his waking hours.

Generally, the higher the noise level, the greater the probability of a response. In one series of experiments, it was found that there was a 5 percent probability of subjects being awakened by maximum sound levels of 40 dB at the ear and a 30 percent probability at 70 dB. If EEG changes are also considered, these probabilities increase to 10 percent at 40 dB and 60 percent at 70 dB. arousal from sleep depends on the sleep stage, the time of the night and the age of the individual, among other factors.

Examples of criteria pertaining to sleep disturbance are displayed in Figures 10 and 11. These figures, which were adapted from a summary and analysis of recent experimental sleep data as related to noise exposure, show a relationship between frequency of response (disruption or awakening) and the sound level of an intrusive noise. In Figure 10, the frequency of sleep disruption (as measured by changes in sleep stage, including behavioral awakening) is plotted as a function of the Sound Exposure Level. Similarly, the frequency of awakening is shown in Figure 11. These data show that the probability of two types of sleep disturbance, within certain statistical limits, may be predicted by physical indices of noise exposure.

These sound exposure levels are measured in the vicinity of the sleeping person. Fifteen dB should be added to translate them to outdoor levels for the case of open windows and 25 dB should be added to obtain the corresponding outdoor SEL's for typical closed windows. Thus, Figure 10 indicates a 50 percent probability of disturbance with an outdoor sound exposure level of 89 dB with windows open and 99 dB with windows closed. The corresponding numbers for a 50 percent probability of awakening from Figure 11 are 107 dB with windows open and 117 dB with windows closed. These and other examples are summarized below in Table 9.

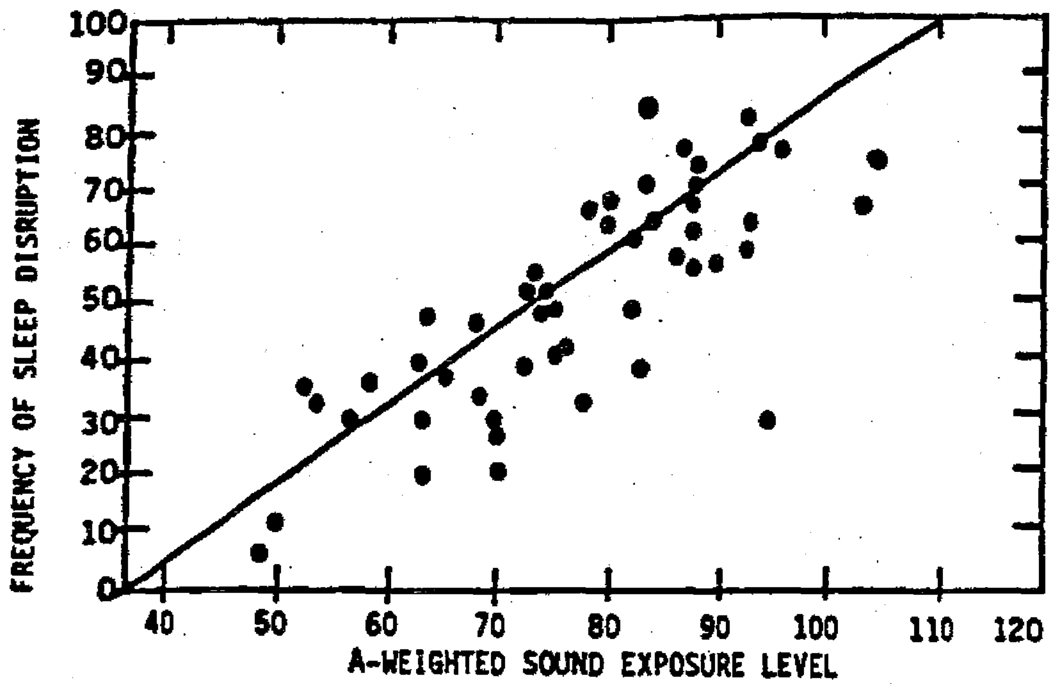


Figure 10: **Probability of a Noise Induced Sleep Change as a Function of Sound Exposure Levels Measured Near the Sleeping Person**

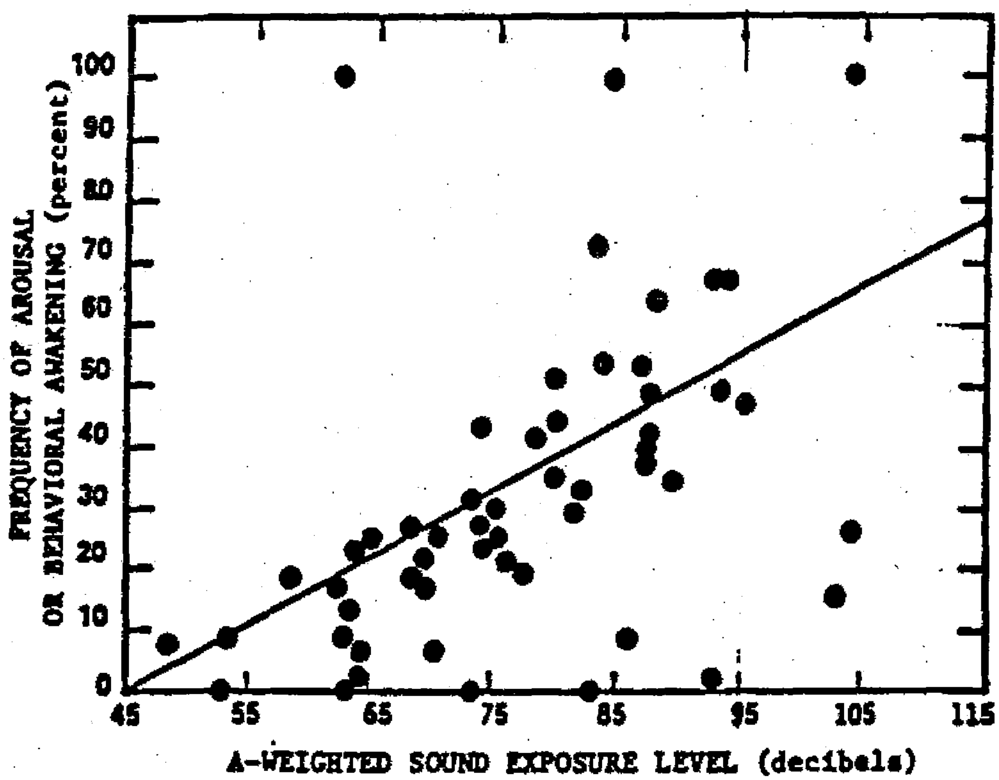


Figure 11: **Probability of a Noise Induced Awakening as a Function of Sound Exposure Levels Measured Near the Sleeping Person**

3.2 Annoyance[1,2,4,11,14,15,16]

Noise is defined as "unwanted sound." Its most common effect on people is the stimulation of an annoyance reaction. Such a reaction implies a judgement as to the desirability of the sound to the listener within the existing contextual frame of reference. This judgement includes both acoustic and non-acoustic factors.

A recent proposed model for annoyance to noise identifies two principal acoustic factors as:

- the magnitude of an intrusive sound considering its frequency and temporal characteristics, and

- the characteristics of the reference noise distribution that exists without the presence of the intrusive noise.

These two factors determine the potential detectability of the intruding sound.

The model also contains several non-acoustic factors, including the listener's:

- degree of concentration, and

- affective state which describes the mood and attitude of the listener toward the noise/sound when the intrusion occurs.

Clearly, if the listener is engaged in a task requiring high concentration, it is less likely that a sound with low potential detectability is heard. However, if a sound is heard which interrupts the concentration required to accomplish the task, annoyance is a likely result. Further, if the listener's attitude toward the source of the sound is negative, the annoyance reaction is likely to be stronger.

When interviewed on their annoyance to noises of different types, people are likely to remember specific instances when they were most strongly annoyed by noise intrusion. Similarly, for individuals who complain about noise, an actual complaint action is often triggered by a noisy event which caused a strong annoyance reaction.

There is a great variation among individuals in their annoyance reaction to a specific sound, and in their annoyance to entire classes of sounds. However, the average values of long term integrated adverse responses to noise have considerably greater uniformity. Studies of annoyance in this context are largely based on the results of sociological surveys. Such surveys have been conducted among residents of a number of countries including the United States. Although it is known that the long-term annoyance reaction to a certain environment can be influenced to some extent by the experience of recent individual annoying events, the sociological surveys are designed to reflect, as much as possible, the integrated response to living in a certain environment and not the response to isolated events.

The results of sociological surveys are generally stated in terms of the percentage of respondents expressing differing degrees of disturbance or dissatisfaction due to the noisiness of their environments. Some of the surveys go into a complex procedure to construct a scale of annoyance. Others report responses to the direct question of "how annoying is the noise?" Each social survey is related to some kind of measurement of the noise levels to which the survey respondents are exposed, enabling correlation between annoyance and outdoor noise levels in residential areas. Figure 12 compares the results of 12 major sociological surveys, seven concerning aircraft, four from street traffic, and one from a railroad. The lines for each survey represent the mean responses across all survey cells. The actual average responses of individuals within each cell have a $\pm$ 6 dB data spread around their grand mean values. It is clear from this synthesis of the results from both traffic and aircraft noise situations that the responses to both appear to be similar for the same values of Ldn.

Very low and fast flying military aircraft in military training areas or on military training routes can pose a special problem due to the high onset rate of the fly-over (see Section 3.2.2). Due to the startle or surprise, they can contribute directly to the perceived annoyance. As a result, the U.S. Air Force procedures add for onset rates faster than 15 db per second a penalty to the measured or estimated sound exposure level (SEL). The penalty increases for onset rate from 15 to 30 dB per second to a maximum value of 5 dB for onset rates beyond 30 dB per second. This value has been confirmed by preliminary laboratory annoyance studies with such fly-over noise. It is recommended for incorporation into the SELs and Ldns used for predicting annoyance responses according to Figure 12.[44]

A second method of assessing the annoyance resulting from noise is to study cases of community reactions. These reactions can be measured by a scale which extends from "no observed reaction," through varying degrees of complaint activity to actual legal or political action. Objections have been made to the use of this type of data as a surrogate for annoyance. These objections are based on two principal issues. First, there may be considerable distortion of the number of complaints caused by a few energetic complainants. Second, a variety of socio-economic factors may intervene between the reaction of annoyance to noise and the action of filing a complaint.

The first of these factors can be overcome by careful review of cases to assume that the degree of complaint actually is determined by the number of complainants responding soon after the onset of the noise situation. The second biasing factor probably exists to some unknown degree. However, there is no reason to believe that this factor is not uniform across all degrees of reaction. Further, although the magnitude of this bias cannot be assessed with existing data, the cases examined in the following paragraphs involve people with diverse economic characteristics.

A series of fifty-five case histories of community noise problems were analyzed. Approximately one-half of the cases involved steady state industrial and residential noises, and the other one-half consisted of multiple single event transportation and industrial noises. The basic Ldn Data are summarized in Figure 13 as a function of the magnitude of

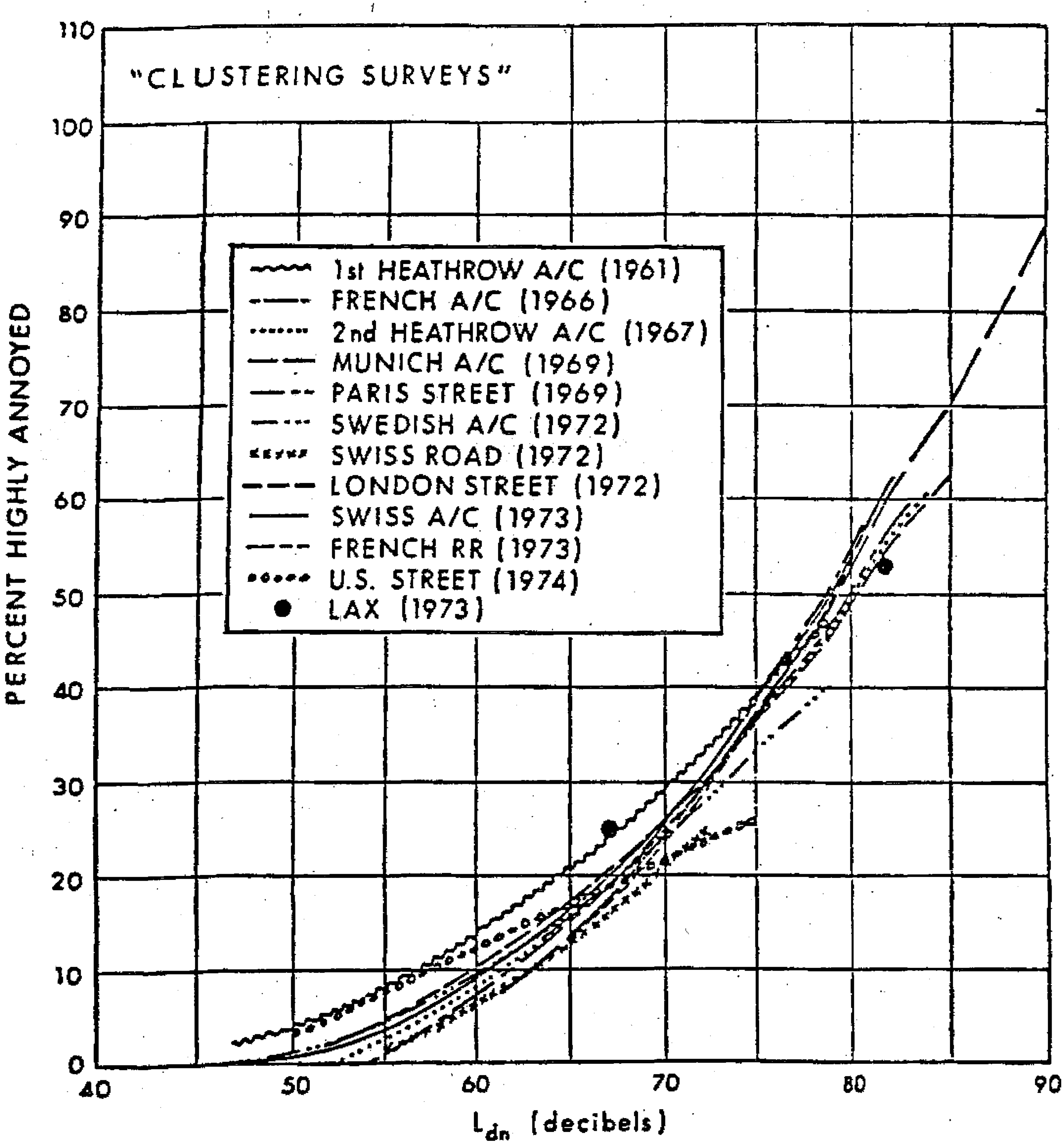


Figure 12: **Summary of Annoyance Data from 12 Surveys**

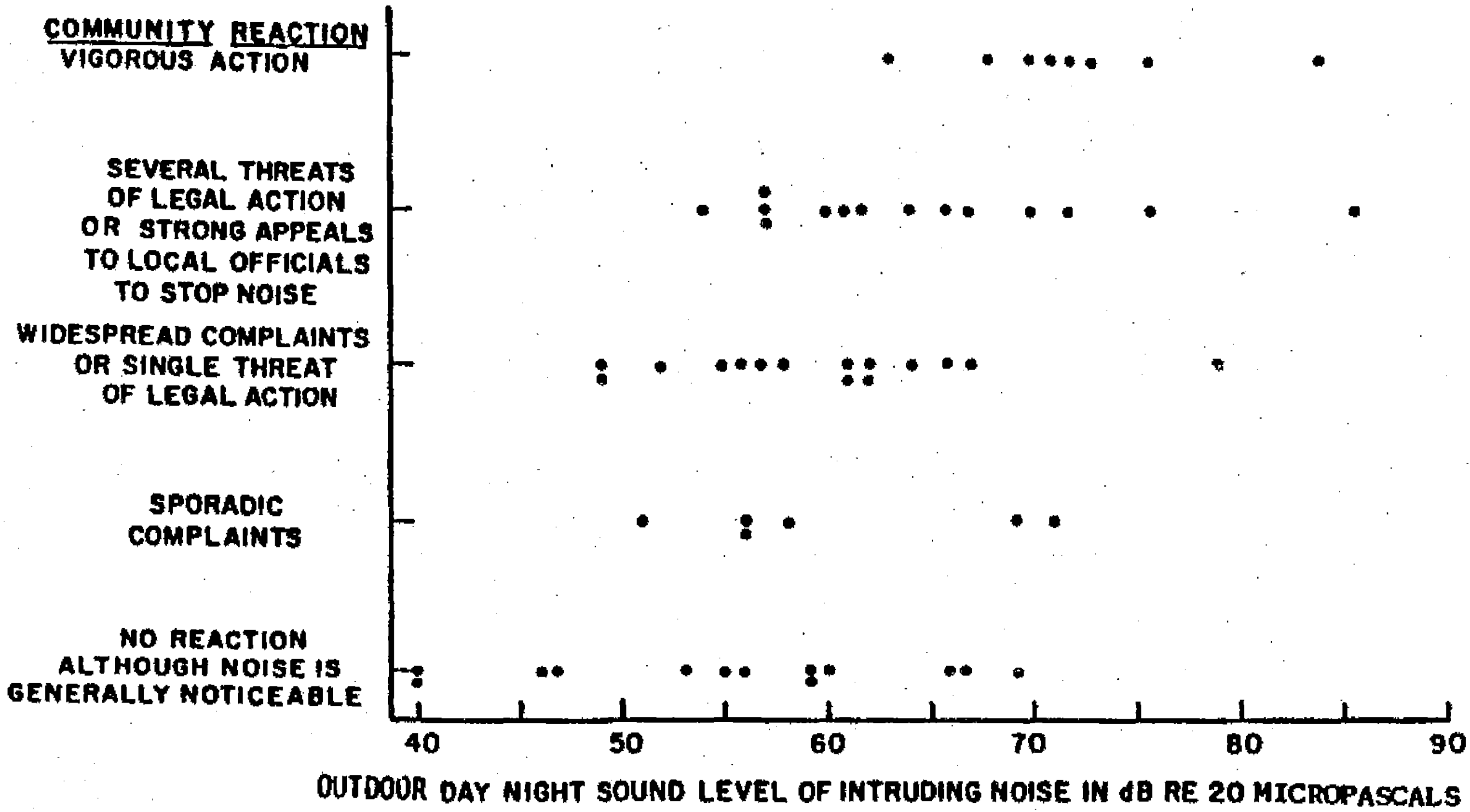


Figure 13: **Community Reaction to Noises of Many Types as a Function of Outdoor Day-night Sound Level of the Intruding Noise**

community reaction. The scatter of data points is as much as 32 dB, showing little correlation between Ldn and reaction. The data were reanalyzed to relate the normalized measured Ldn with the observed community reaction. The normalization procedure summarized in Table 6 follows the Stevens, Rosenblith and Bolt method with a few minor modifications. The results are summarized in Figure 14. Approximately 90 percent of the cases are enveloped by ±5 dB, and the standard deviation of these data is 3.3 dB about their means. This value of 3.3 dB compares with the standard deviation of 7.9 dB for the basic data in Figure 13.

The no-reaction response in Figure 14 corresponds to a normalized outdoor Ldn ranging between 50 and 61 dB, with a mean of 55 dB. This mean value is 5 dB below the value that characterizes a residential urban community which is the baseline category for the data in the figure. From these results, it appears that no community reaction to an intruding noise is expected on the average, when the normalized Ldn of an identifiable intruding noise is approximately 5 dB less than the Ldn in the absence of the identifiable intruding noise. This conclusion is not surprising; it simply suggests that people tend to judge the magnitude of an intrusion with reference to the noise environment in the absence of the intruding noise source.

The data in Figure 14 indicate that widespread complaints may be expected when the normalized value of the outdoor Ldn of the intruding noise exceeds that existing without the intruding noise by approximately 5 dB, and vigorous community reaction may be expected when the excess approaches 20 dB.

Clearly, the community reaction is better correlated with the normalized value of the Ldn produced by the intruding noise than with its absolute value. The most significant corrections involved in the normalization is the background noise (the Ldn that exists without the intruding noise). When the background noise is not included in the normalization of the data, the standard deviation increases from 3.3 to 6.4 dB, clearly accounting for a large fraction of the standard deviation (7.9 dB) of the basic data.

In order to evaluate noise in areas where the background noise is different from the urban Ldn of 60 dB used for the normalization of the data in Table 6 and Figure 14, it may be useful to re-normalize these data relative to the background level of principal interest. This may be accomplished by changing the position of the zero in Table 6 and rescaling Figure 14 as appropriate. Alternatively, the same analysis result can be accomplished by using background Ldn values given in Table 7 together with the relative Ldn values given in Table 8. As shown in the example for a quiet residential neighborhood in Table 8, sporadic complaints might be expected where the Ldn of the intruding noise is 50 dB and widespread complaints at an Ldn of 55 dB.

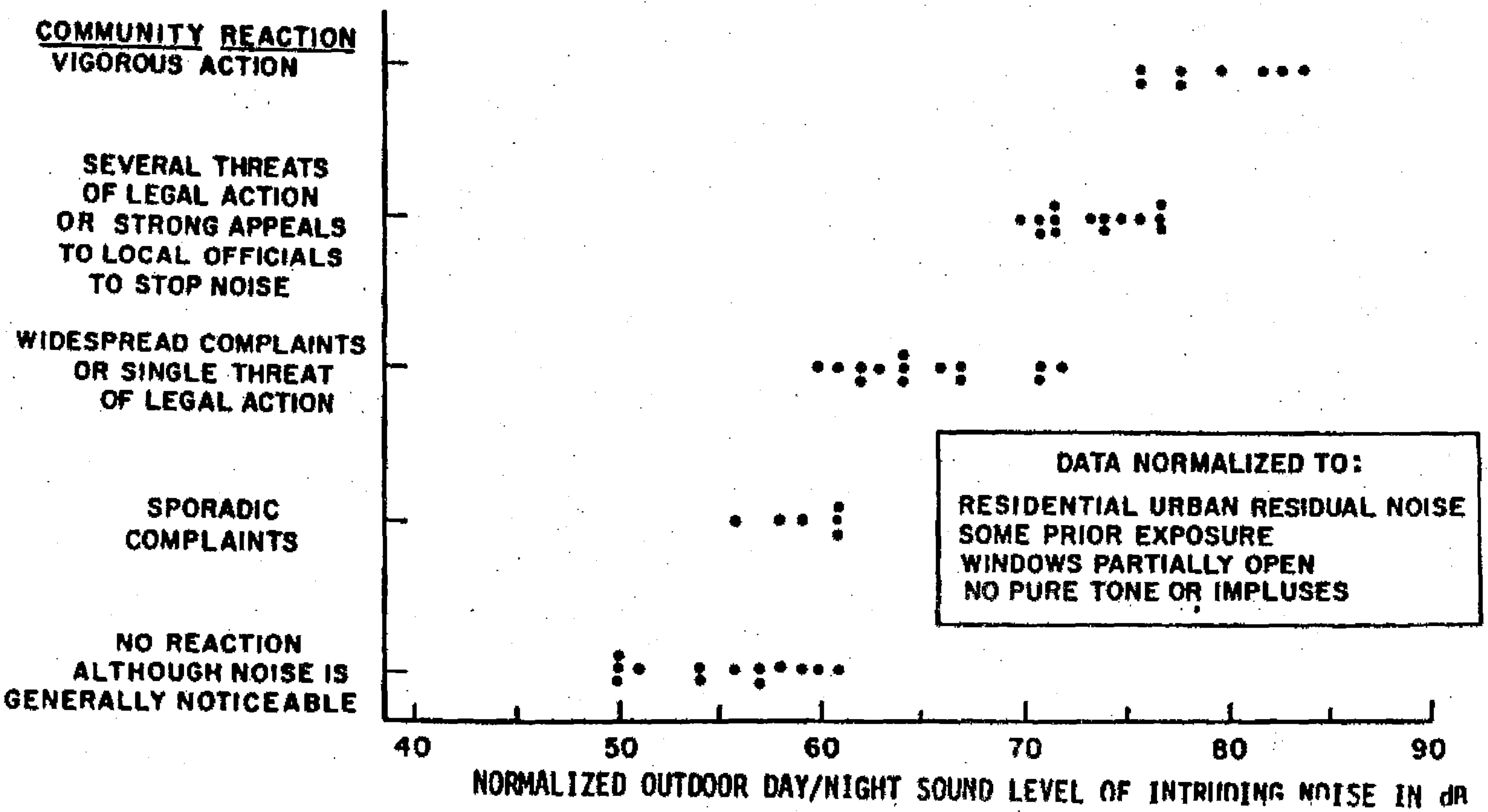


Figure 14: Community Reaction to Noises of Many Types as a Function of the *Normalized* Outdoor Day-night Sound Level of the Intruding Noise

TABLE 6

Corrections to be Added to the
Day-Night Sound Level (Ldn) to Obtain Normalized Ldn

Type of Correction	Description	Correction Added to Measured Ldn in dB
Seasonal Correction	Summer (or year-round operation)	0
	Winter only (or windows always closed)	- 5
Correction for Outdoor Residual Noise Level	Quiet suburban or rural community (away from large cities, industrial activity and trucking	+10
	Normal suburban community (away from industrial activity)	+ 5
	Urban residential community (not near heavily traveled roads or industrial areas)	0
	Noisy urban residential community (near relatively busy roads or industrial areas)	- 5
	Very noisy urban residential community	-10
Correction for Previous Exposure and Community Attitudes	No prior experience with intruding noise	+ 5
	Community has had some exposure to intruding noise; little effort is being made to control noise. This correction may also be applied to a community which has not been exposed previously to noise, but the people are aware that bona fide efforts are being made to control it.	0
	Community has had considerable exposure to intruding noise; noise maker's relations with community are good.	- 5
	Community aware that operation causing noise is necessary but will not continue indefinitely. This correction may be applied on a limited basis and under emergency conditions.	-10
Pure Tone or Impulse	No pure tone or impulsive character.	0
	Pure tone or impulsive character present.	+ 5

TABLE 7

Areas with Various Day-Night Noise Levels Together with Customary Qualitative Description of the Area

Qualitative Description*	Typical Range Ldn in dB	Average Ldn in dB	Average Census Tract Populations Density, Number of People per Square Mile
Quiet Suburban Residential	48-52	50	630
Normal Suburban Residential	53-57	55	2,000
Urban Residential	58-62	60	6,300
Noisy Urban Residential	63-67	65	20,000
Very Noisy Urban Residential	68-72	70	63,000

* Rural and undeveloped areas typically have Ldn levels in the range of 33-47 dB.

TABLE 8

Community Reaction in Residential Areas as a Function of Estimated Relative Normalized Outdoor Day-Night Sound Levels of Intruding and Background Noise Without the Presence of Intruding Noise

Community Average Reaction	Relative Ldn in dB (intruding minus background)	Example of Quiet Suburban Residential Area Intruding Noise Ldn in dB
None	- 5	45
Sporadic Complaints	0	50
Widespread Complaints	5	55
Threats of Legal Action	14	64
Vigorous Action (includes litigation and concerted efforts to obtain government regulation)	21	71

* Example is quiet suburban residential area with a background = 50 dB

TABLE 9

Examples of the Outdoor Sound Exposure Level for Typical Windows Open and Closed for Selected Probabilities of Sleep Disturbance and Awakening from Noise

Probability of Sleep		Outside Sound Exposure Level (dB)	
Awakening	Disturbance	Windows Open	Windows Closed
10 %	25 %	70	80
30 %	50 %	89	99
50 %	75 %	107	117

The partial day-night sound levels resulting from a single nighttime occurrence of one of the events in Table 9 is approximately 39 dB less than the SEL. Thus, for windows closed, the partial Ldnp resulting from a single nighttime occurrence of 117 dB is 78 dB and for an occurrence of 99 dB is 60 dB. Consequently, for most actual situations, annoyance criteria stated in terms of cumulative sound exposure give adequate protection for sleep disturbance.

Since a sound level of 40 dB is considered a conservative estimate of the level disturbing the sleep of patients in hospitals, a level of 34 to 47 dB is recommended for interior hospital noise levels. For other sleeping environments maximum acceptable levels of 55 dB are frequently assumed.

3.0 Summary

3.1 Background Guidance[1,2,3,21,22,23,24]

The levels of environmental noise which are expected to interfere with human activity depend upon the activity and the person's contextual frame of reference. The cumulative effect of activity interference by noise has been found to be the best measure in terms of annoyance. Although other factors, such as attitude towards the noise source, may influence an individual's reaction to activity interferences, the percentage of people annoyed, or highly annoyed, in a given environmental situation provides a useful index of the severity of the situation. Additionally, annoyance may be a useful indicator of potential *noise induced stresses*, which are thought by some to contribute to stress-related diseases.

There have been two basic approaches to developing criteria, or regulatory limits, for environmental noise. One approach is to determine the maximum levels which are compatible with various human activities (such as speech communication, sleep, mental activity, listening to music, etc.), or considered to be the maximum levels consistent with protection of hearing. The second approach is to assess the relative intrusive quality of noise and the reaction it causes, accounting for attitudinal and other factors.

In its Levels Document, the Environmental Protection Agency (EPA) utilized the first approach. To describe environmental noise, EPA defined the day-night average sound level (Ldn) which represents the average noise level in a 24-hour day, with a penalty of 10 dB for noise which occurs during the nighttime hours of 10 pm to 7 am. For residential areas it identified a Ldn of 55 dB as the "level...requisite to protect the public health and welfare with adequate margin of safety," the words in quotations representing its congressional mandate. This level was derived by selecting 45 dB within a home as compatible with 100 percent speech intelligibility, adding 15 dB to account for the average noise reduction of an exterior wall with a partially open window, and subtracting 5 dB as a margin of safety to account for other effects. It should be noted that this identified day-night sound level of 55 dB is not a regulation, but rather the long-term ideal goal. In 1974, over 50 percent of the U.S. population was living in outside noise environments exceeding this level.

Later, in its strategy document, EPA first recommended immediate efforts to reduce noise exposure to a Ldn value of no more than 75 dB. This value is essentially consistent with the level previously identified as maximum with respect to *protection of hearing*. Second, EPA recommended reduction of environmental noise levels to an Ldn of 65 dB or lower through vigorous regulatory and planning actions. Third, EPA recommended adoption of an Ldn of 55 dB as a goal to be considered "to the extent possible" in the planning of future programs.

In 1980, five Federal cabinet departments, agencies and administrations developed a set of guidelines for considering noise in land use planning and control.[22] These guidelines were intended to be used in coordinating policies and regulations of various organizations within the Federal government. Prediction programs and abatement efforts follow the same guidance. Further, they were to be advisory to state and local governments which have authority for most land use regulations. Similar recommendations are contained in the ANSI Standard, "Compatible Land Use with Respect to Noise"[23] and in the Federal Aviation Administration Airport Noise Campatibility Planning Part 150 Regulation.

3.2 Evaluation of Existing and Future Environments

To evaluate the severity of noise environments with respect to their effect on public health, the main factors to be considered are:

- Annoyance {required metric: Ldn}
- Sleep interference {required metric: SEL and Lmax}
- Noise-induced hearing loss {required metric: Leq(8hr)}
- Speech communication {required metric: Leq}

The combination of these four evaluations is sufficient for most situations. These same factors can provide guidance and relative assessment procedures to minimize direct and indirect stress effects responsible for most claims pertaining to health. There is no evidence that these stresses either cause or aggravate clinical diseases, as long as noise exposure levels are below those causing permanent hearing impairment.

The overall community response including and integrating all potential activity interference and health effects discussed, is best evaluated and forecasted based on the land-use guidelines summarized in 4.1 and condensed in Table 10.

The table gives the approximate percentage of residents who would be expected to be highly annoyed based on this synthesis of sociological surveys, see Figure 10. Also shown in the table are approximate community reactions for the Ldn normalized to urban residential background noise, year round, some prior exposure and without impulses or pure-tone characters.

The detailed criteria reviewed in Section 3 are to be used for evaluating specific health effects (e.g. noise-induced hearing loss or sleep interference) or specific activity interferences (e.g. school activity or leisure activity) at specific locations, for which the statistical response, on which Table 10 is based is not applicable.

TABLE 10

Summary Table Relating Residential Land Use Criteria to Effects[22]

Ldn in dB	Federal Interagency Guideline (Note 1)	Approximate % Highly Annoyed (Note 2)	Approximate Community Reaction for Urban Residential Area, Year round, Some Prior Exposure and Without Impulse and Pure-tone Characteristics (Note 3)
Not exceeding 55 (Note 4)	Compatible	Less than 4 %	No reaction
55-65	Generally compatible (Note 5)	4 - 15 %	Sporadic complaints (no reaction to widespread complaint)
65-75	Marginally compatible with 25-30 dB NLR (Note 6)	15 - 37 %	Widespread complaints to strong appeals and threats of legal action
above 75	Incompatible	Greater than 37 %	Vigorous Action

TABLE 10 FOOTNOTES:

1) The levels can be used by individual communities to incorporate public health and welfare goals into the planning process. These levels do not in themselves, however, form the sole basis for appropriate land use action because they do not consider cost, feasibility, the noise levels from any particular source, or the development needs of the community and do include an adequate margin of safety. They should be considered by all communities in their planning, including those who now enjoy quiet and wish to preserve it, as well as those which are relatively noisy and wish to mitigate the problem.

2) From Figure 10.

3) From Figure 12.

4) Environmental Protection Agency has identified Ldn of 55 dB as protective of public health and welfare with an adequate margin of safety.

5) The designation of these uses as "compatible" in this zone reflects individual Federal agencies' consideration of general cost and feasibility factors as well as past community experiences and program objectives. Localities, when evaluating the application of these guidelines to specific situations, may have different concerns or goals to consider.

6 a) Although local conditions may require residential use, it is discouraged in Ldn 65-70 dB and strongly discouraged in Ldn 70-75 dB. The absence of viable alternative development options should be determined and an evaluation indicating that a demonstrated community need for residential use would not be met if development were prohibited in these zones should be conducted prior to approvals.

b) Where the community determines that residential uses must be allowed, measures to achieve outdoor to indoor Noise Level Reduction (NLR) of at least 25 dB in Ldn 65-70 dB and 30 dB in Ldn 70-75 dB should be incorporated into building codes and be considered in individual approvals. Normal construction can be expected to provide a NLR of 20 dB, thus the reduction requirements are often stated as 5, 10 or 15 dB over standard construction and normally assume mechanical ventilation and closed windows year round. Additional consideration should be given to modifying NLR levels based on peak noise levels.

c) NLR criteria will not eliminate outdoor noise problems. However, building location and site planning, design and use of berms and barriers can help mitigate outdoor noise exposure particularly from ground level sources. Measures that reduce noise at a site should be used wherever practical in preference to measures which only protect interior spaces.

REFERENCES

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STANDARD INSTRUMENT DEPARTURES

This appendix contains copies of eight pages containing the Federal Aviation Administration's Standard Instrument Departures (civil) for San Francisco International Airport as of January 1990. The departures are named as follows:

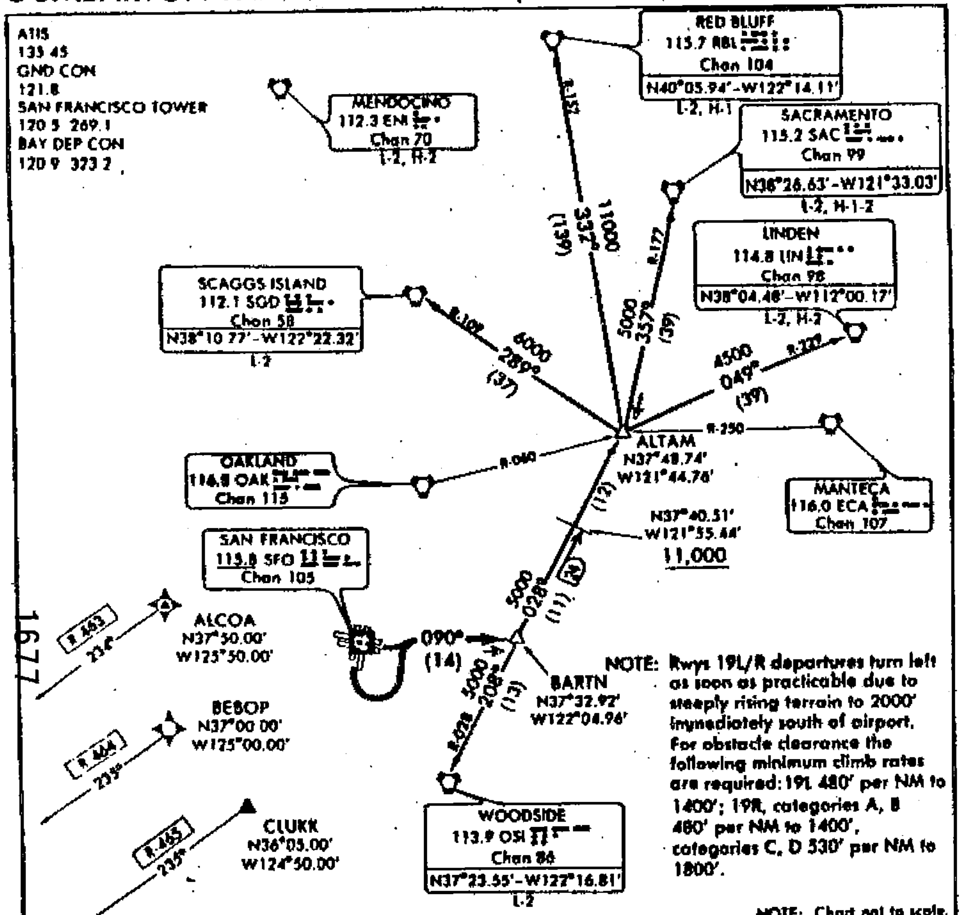
- DUMBARTON THREE
- EUGEN FOUR
- GAP NINE
- OFFSHORE ONE
- PORTE SEVEN
- QUIET ONE
- REBAS ONE
- SAN FRANCISCO THREE
- SHORELINE EIGHT
- STINS FOUR

SOURCE: U.S. Government Flight Information Publication "Standard Instrument Departures (civil) Western United States, Effective 11 January 1990 to 8 March 1990," NOAA.

(DUMB3.BARTN) 89152

DUMBARTON THREE DEPARTURE (PILOT NAV)

SAN FRANCISCO INTL
SAN FRANCISCO, CALIFORNIA



DEPARTURE ROUTE DESCRIPTION

ELEV 11

TAKE-OFF RUNWAYS 10L/R and 19L/R: Turn left and climb via SFO R-090 to BARTN INT, thence via (transition) or (assigned route/fix).

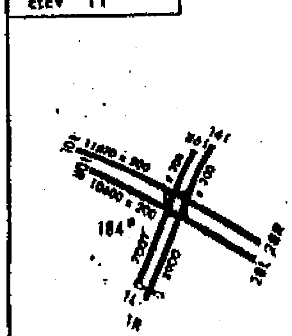
LINDEN TRANSITION (DUMB3.LIN): From over BARTN INT via OSI R-028 and LIN R-229 to LIN VORTAC.

RED BLUFF TRANSITION (DUMB3.RBL): From over BARTN INT via OSI R-028 and RBL R-152 to RBL VORTAC.

SACRAMENTO TRANSITION (DUMB3.SAC): From over BARTN INT via OSI R-028 and SAC R-177 to SAC VORTAC.

SCAGGS ISLAND TRANSITION (DUMB3.SGD): From over BARTN INT via OSI R-028 and SGD R-109 to SGD VORTAC.

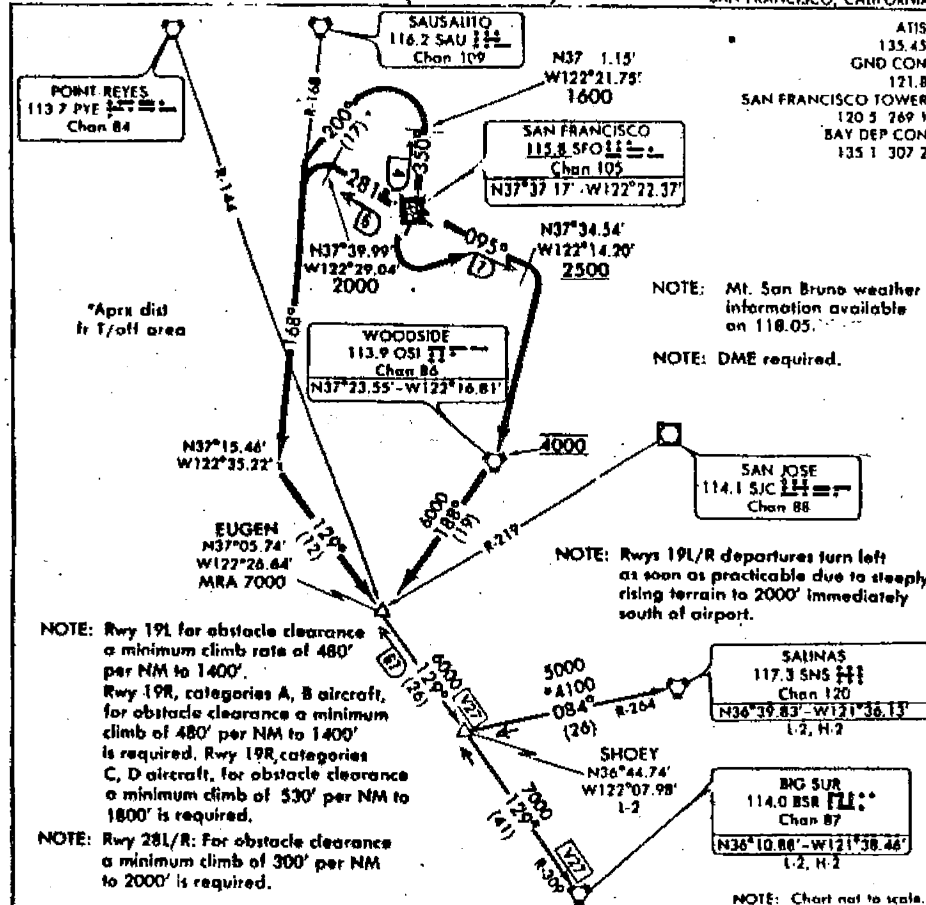
WOODSIDE TRANSITION (DUMB3.OSI): From over BARTN INT via OSI R-028 to OSI VORTAC.



(EUGEN4.EUGEN) 89208

EUGEN FOUR DEPARTURE (PILOT NAV)

SAN FRANCISCO INTL
SAN FRANCISCO, CALIFORNIA



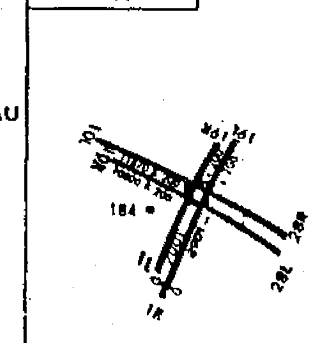
DEPARTURE ROUTE DESCRIPTION

ELEV 11

TAKE-OFF RUNWAYS 1L/R: Climb via SFO R-350 until passing the 4 DME fix and after reaching 1600', then turn left heading 200° to intercept and proceed via SAU R-168 and BSR R-309 to EUGEN INT. Thence via (transition) or (assigned route).

TAKE-OFF RUNWAYS 10L/R: Climb via SFO R-095 to cross the 7 DME fix at or above 2500', then turn right and proceed direct OSI VORTAC. Cross OSI VORTAC at 4000, then via OSI R-188 to EUGEN INT. Thence via (transition) or (assigned route).

(Continued on next page)



EUGEN FOUR DEPARTURE (PILOT NAV)

DEPARTURE ROUTE DESCRIPTION
(Continued)

TAKE-OFF RUNWAYS 19L/R: Turn left to intercept and proceed via SFO R-095 to cross the 7 DME fix at or above 2500′, then turn right and proceed direct OSI VORTAC. Cross OSI VORTAC at 4000, then via OSI R-188 to EUGEN INT. Thence via (transition) or (assigned route).

TAKE-OFF RUNWAYS 28L/R: Climb via SFO R-281 after passing 6 DME fix and reaching 2000′, turn left to intercept and proceed via SAU R-168 and BSR R-309 to EUGEN INT. Thence via (transition) or (assigned route).

BIG SUR TRANSITION (EUGEN4.BSR)

SALINAS TRANSITION (EUGEN4.SNS)

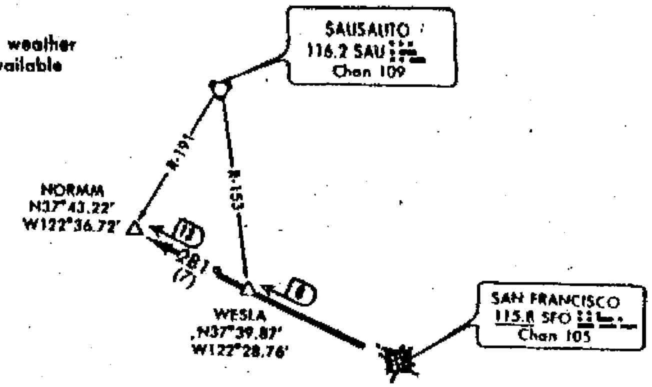
SHOEY TRANSITION (EUGEN4.SHOEY)

1678

GAP NINE DEPARTURE (PILOT NAV)

ATIS
135.45
GND CON
121.8
SAN FRANCISCO TOWER
120.5 269.1
BAY DEP CON
135.1 307.2

NOTE: Mt. San Bruno weather information available on 118.05.



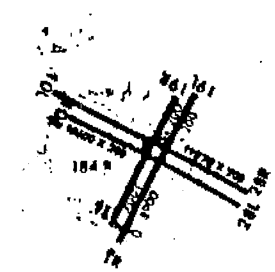
NOTE: Rwys 28L/R;
For obstacle clearance a minimum climb of 300′ per NM to 2000′ is required.

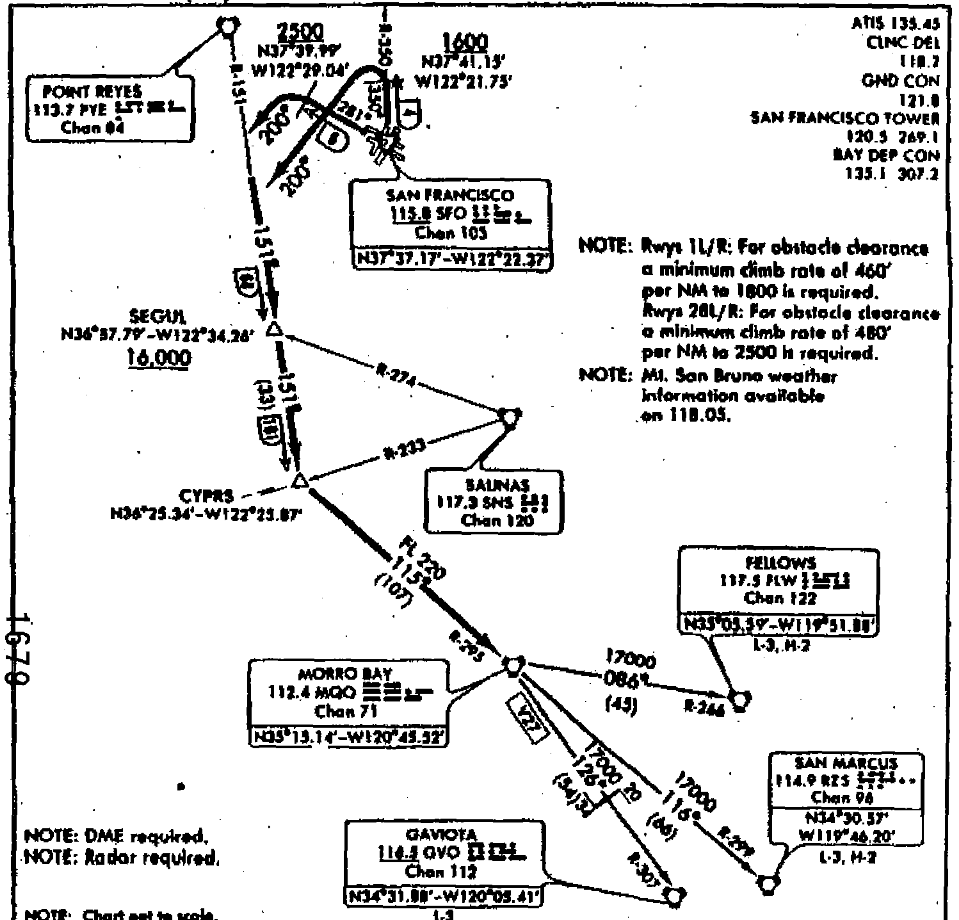
NOTE: Chart not to scale

DEPARTURE ROUTE DESCRIPTION

TAKE-OFF RUNWAYS 28L/R: Via SFO VOR/DME R-281 to NORMM INT; Thence via (assigned route).

ELEV 11





DEPARTURE ROUTE DESCRIPTION

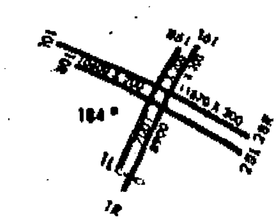
TAKE-OFF RUNWAYS 1L/R: Intercept and proceed via SFO R-350. Cross SFO R-350 4 DME at or above 1600'. Thence . . . .

TAKE-OFF RUNWAY 28L/R: Intercept and proceed via SFO R-281. Cross SFO R-281 6 DME at or above 2500'. Thence . . . .

. . . . Turn left heading 200° to intercept and proceed via PYE R-151 to SEGUL INT. Cross SEGUL INT at or above 16,000', then proceed via PYE R-151 to CYPRS INT. Then via MQO R-295 to MQO VORTAC. Thence via (transition) or (assigned route).

(Continued on next page)

ELEV 11



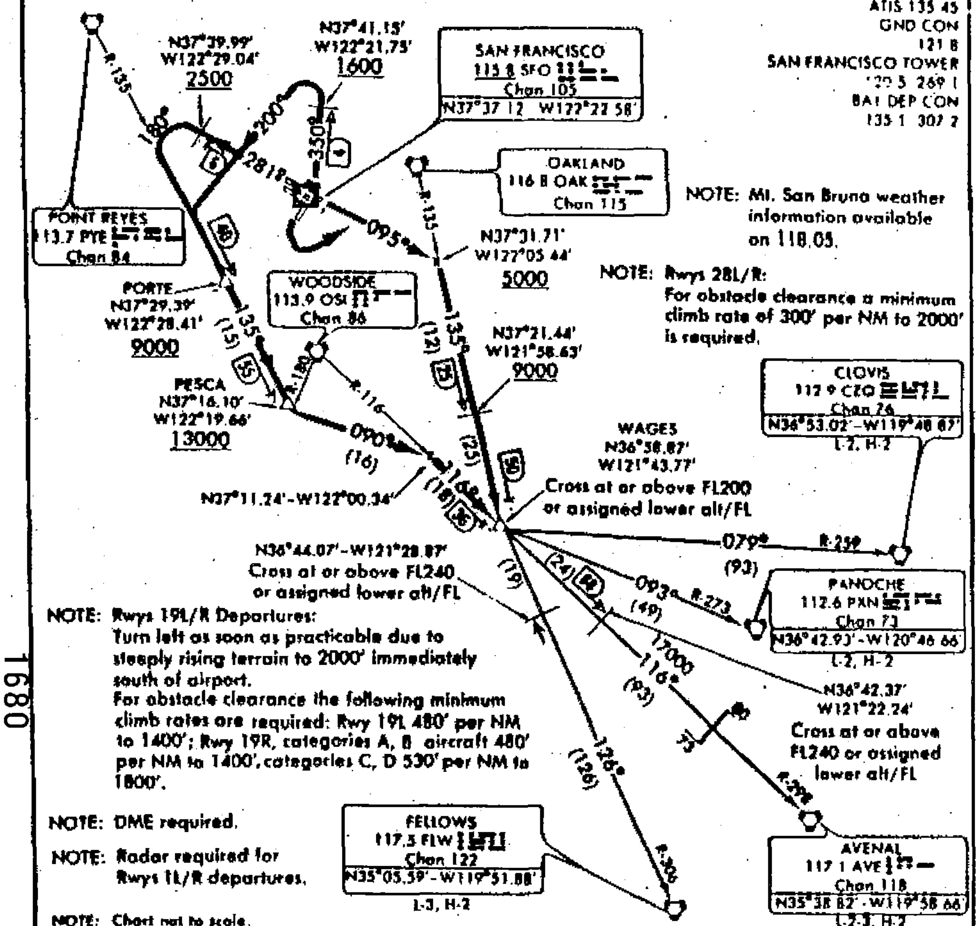
DEPARTURE ROUTE DESCRIPTION
(Continued)

When SFO VOR/DME is inoperative, Runway 28 departures expect radar vector to the PYE R-151 then resume SID.

FELLOWS TRANSITION (OFFSH1.FLW)
GAVIOTA TRANSITION (OFFSH1.GVO)
SAN MARCUS TRANSITION (OFFSH1.RZS)

1680

ATIS 135.45
GND CON 121.8
SAN FRANCISCO TOWER 120.5 269.1
BAY DEP CON 135.1 307.2



NOTE: Mt. San Bruno weather information available on 118.05.

NOTE: Rwys 28L/R: For obstacle clearance a minimum climb rate of 300' per NM to 2000' is required.

NOTE: Rwys 19L/R Departures: Turn left as soon as practicable due to steeply rising terrain to 2000' immediately south of airport. For obstacle clearance the following minimum climb rates are required: Rwy 19L 480' per NM to 1400'; Rwy 19R, categories A, B aircraft 480' per NM to 1400', categories C, D 530' per NM to 1800'.

NOTE: DME required.

NOTE: Radar required for Rwys 1L/R departures.

NOTE: Chart not to scale.

DEPARTURE ROUTE DESCRIPTION

TAKE-OFF RUNWAYS 1L/R: Intercept and proceed via SFO R-350. Cross SFO R-350 4 DME fix at or above 1600'. Turn left heading 200° to intercept and proceed via the PYE R-135. Cross PORTE DME fix at or above 9000' and PESCA DME fix at or above 13,000'. Then turn left heading 090° to intercept and proceed via the OSI R-116 to cross WAGES INT at or above FL200 or at assigned lower altitude/flight level. Thence via (transition) or (assigned route).

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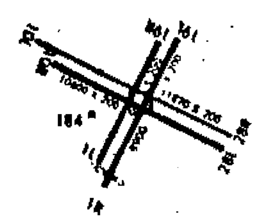
ELEV 11



DEPARTURE ROUTE DESCRIPTION
(Continued)

TAKE-OFF RUNWAYS 10L/R AND 19L/R: Intercept and proceed via SFO R-095 to intercept the OAK R-135 at or above 5000'. Proceed via OAK R-135 to cross the OAK R-135 25 DME fix at or above 9000'. Cross WAGES INT at or above FL200 or at assigned lower altitude/flight level. Thence via (transition) or (assigned route).

TAKE-OFF RUNWAYS 28L/R: Intercept and proceed via SFO R-281, cross SFO R-281 6 DME fix at or above 2500', then turn left heading 180° to intercept and proceed via the PYE R-135 to cross PORTE DME fix at or above 9000' and PESCA DME fix at or above 13,000'. Then turn left heading 090° to intercept and proceed via the OSI R-116 to cross WAGES INT at or above FL200 or at assigned lower altitude/flight level. Thence via (transition) or (assigned route). When SFO VOR/DME is inoperative, Rwy 28 departures expect radar vector to PYE R-135 then resume SID.

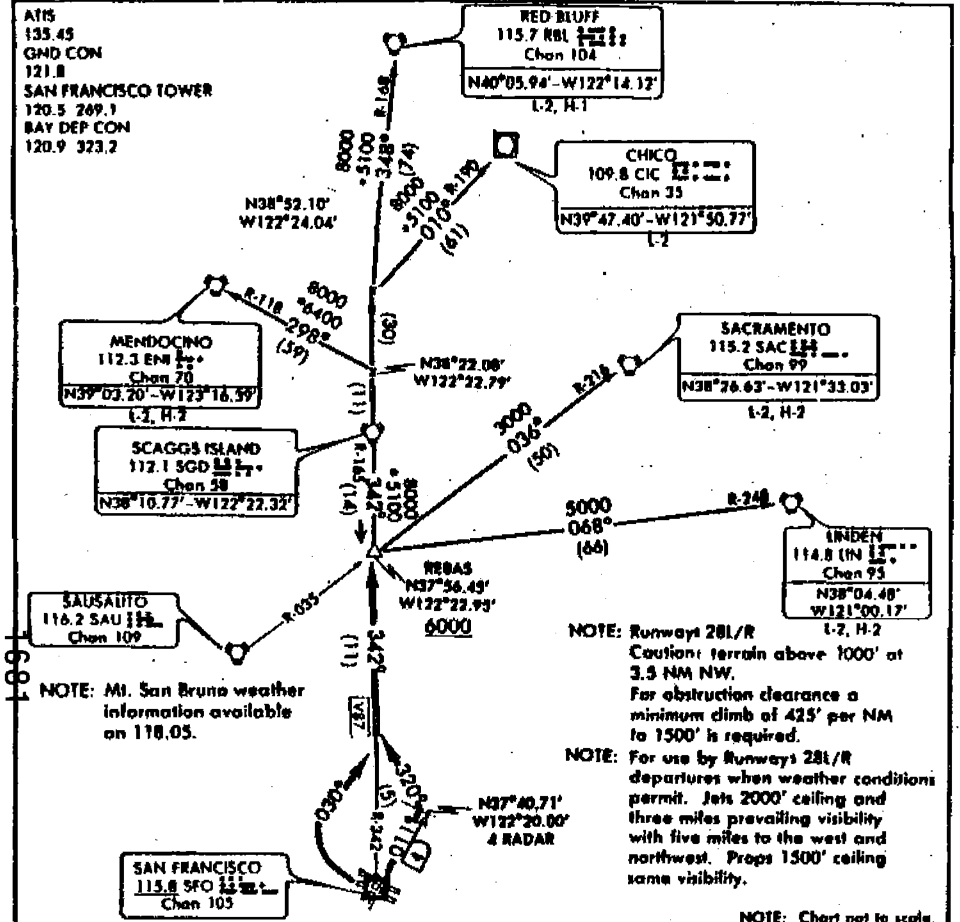
AVENAL TRANSITION (PORTE7.AVE): From over WAGES INT via OSI R-116 and AVE R-298 to AVE VORTAC. Cross the OSI R-116 60 DME fix at or above FL 240 or at assigned lower altitude/flight level.

CLOVIS TRANSITION (PORTE7.CZQ): From over WAGES INT via CZQ R-259 to CZQ VORTAC.

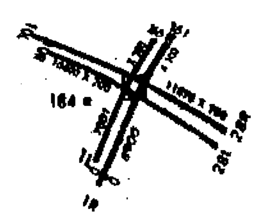
FELLOWS TRANSITION (PORTE7.FLW): From over WAGES INT via FLW R-306 to FLW VORTAC. Cross the FLW R-306 126 DME fix at or above FL240 or at assigned lower altitude/flight level.

PANOCHE TRANSITION (PORTE7.PXN): From over WAGES INT via PXN R-273 to PXN VORTAC.

QUIET ONE DEPARTURE (PILOT NAV)



ELEV 11



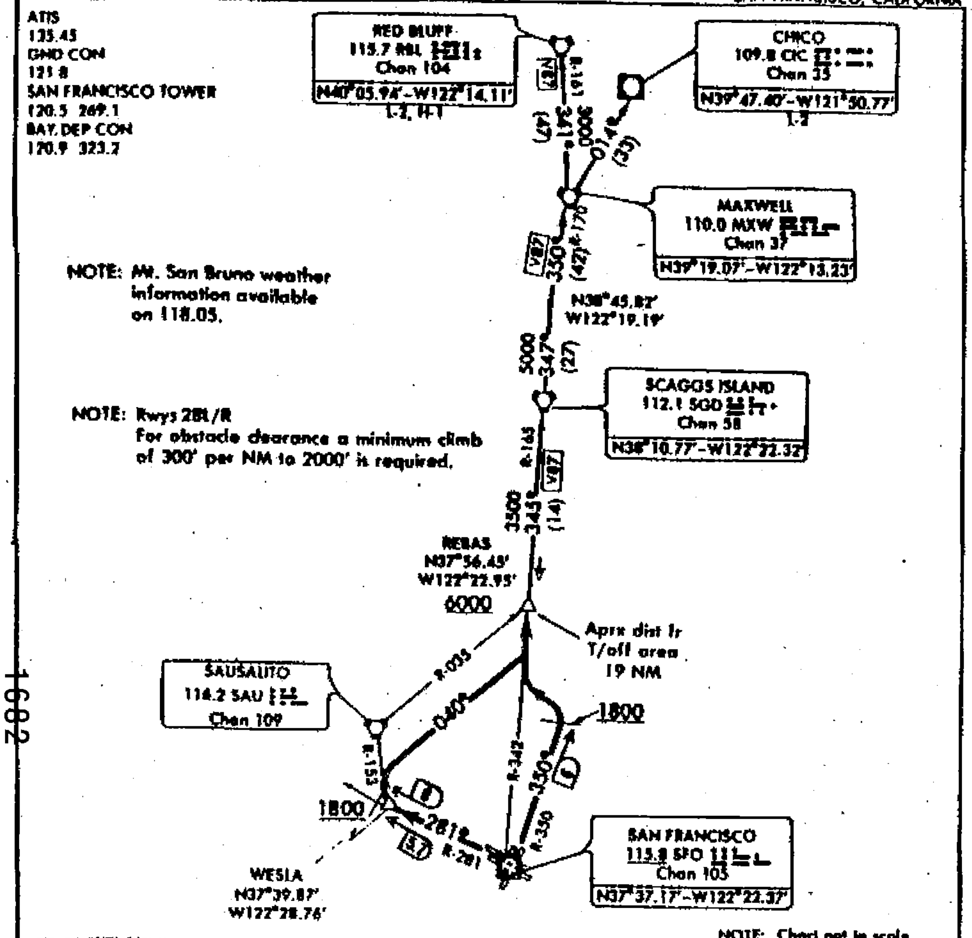
DEPARTURE ROUTE DESCRIPTION

TAKE-OFF RUNWAYS 1L/R: Climb via SFO R-011 to the 4 DME/Radar, then turn left heading 320° to intercept and proceed via SFO R-342 to cross REBAS INT at or above 6000'. Thence via (transition) or (assigned route).
TAKE-OFF RUNWAYS 28L/R: Turn right as soon as feasible heading 030° to intercept and proceed via the SFO R-342 to REBAS INT. Cross REBAS INT at or above 6000'. Then via (transition) or (assigned route). Maintain VFR conditions until intercepting SFO R-342.

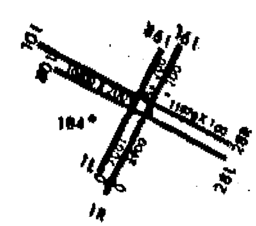
(Continued on next page)

DEPARTURE ROUTE DESCRIPTION
(Continued)

CHICO TRANSITION (CUIT1.CIC): From over REBAS INT via SFO R-342 and CIC R-190 to CIC VOR/DME.
LINDEN TRANSITION (CUIT1.LIN): From over REBAS INT via LIN R-248 to LIN VORTAC.
MENDOCINO TRANSITION (CUIT1.ENI): From over REBAS INT via SFO R-342 and ENI R-118 to ENI VORTAC.
RED BLUFF TRANSITION (CUIT1.RBL): From over REBAS INT via SFO R-342 and RBL R-168 to RBL VORTAC.
SACRAMENTO TRANSITION (CUIT1.SAC): From over REBAS INT via SAC R-216 to SAC VORTAC.



ELEV 11



DEPARTURE ROUTE DESCRIPTION

TAKE-OFF RUNWAYS 1L/R: Climb via the SFO R-350 to cross the 6 DME fix at or above 1800', then turn left to intercept and proceed via the SFO R-342, to cross REBAS INT at or above 6000'. Then via (transition) or (assigned route).

TAKE-OFF RUNWAYS 28L/R: Climb via the SFO R-281 to cross the 6 DME fix or WESLA INT at or above 1800', then turn right heading 040° to intercept and proceed via SGD R-165 to cross REBAS INT at or above 6000'. Then via (transition) or (assigned route).

(Continued on next page)

DEPARTURE ROUTE DESCRIPTION
(Continued)

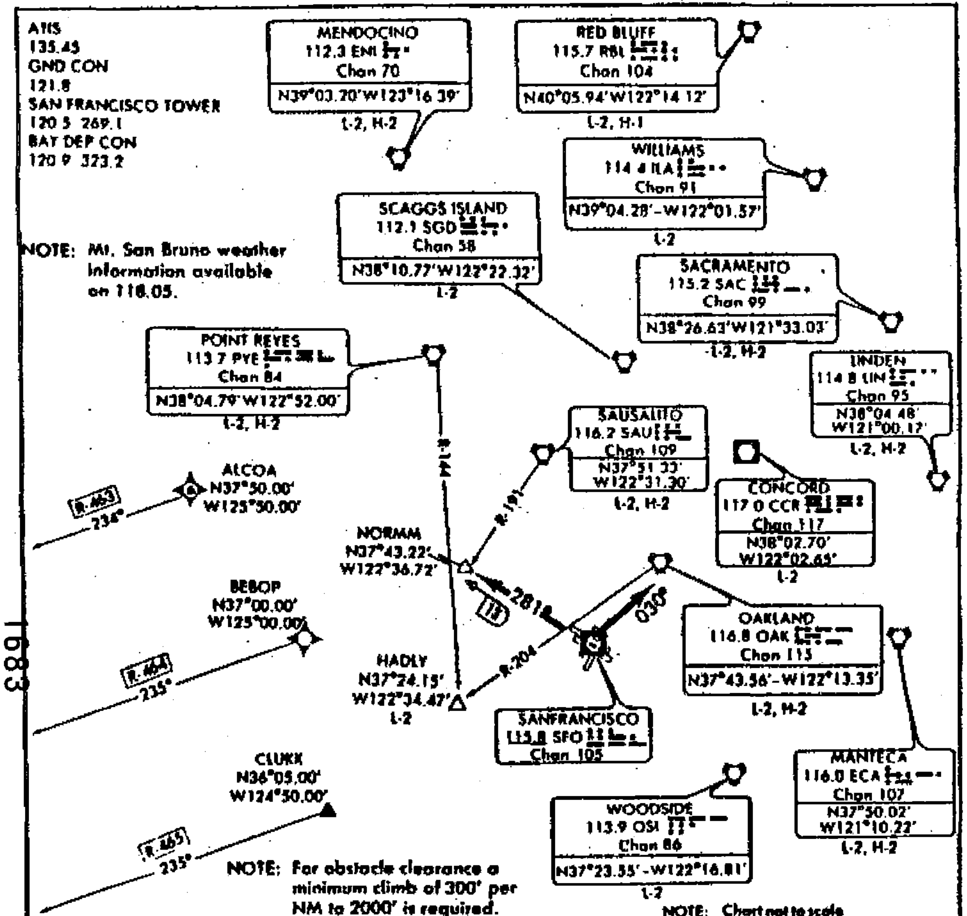
CHICO TRANSITION (REBAS1.CIC): From over REBAS INT via SGD R-165 to SGD VORTAC then SGD R-347 and MXW R-170 to MXW VORTAC. Thence via MXW R-014 to CIC VOR/DME.

RED BLUFF TRANSITION (REBAS1.RBL): From over REBAS INT via SGD R-165 to SGD VORTAC thence via SGD R-347, MXW R-170 to MXW VORTAC. Thence via MXW R-341 and RBL R-161 to RBL VORTAC.

(SFO3.SFO) 89152

SAN FRANCISCO THREE DEPARTURE (VECTOR)

SAN FRANCISCO INTL
SAN FRANCISCO, CALIFORNIA



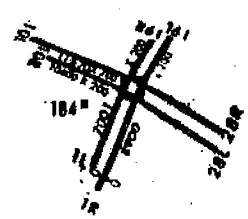
ELEV 11

DEPARTURE ROUTE DESCRIPTION

TAKE-OFF RUNWAYS 1L/R: Climb via heading 030° or as assigned for vector to assigned route/fix.
TAKE-OFF RUNWAYS 28L/R: Climb via SFO R-281 to NORMM INT; expect vector to assigned route/fix after NORMM INT.

LOST COMMUNICATIONS:

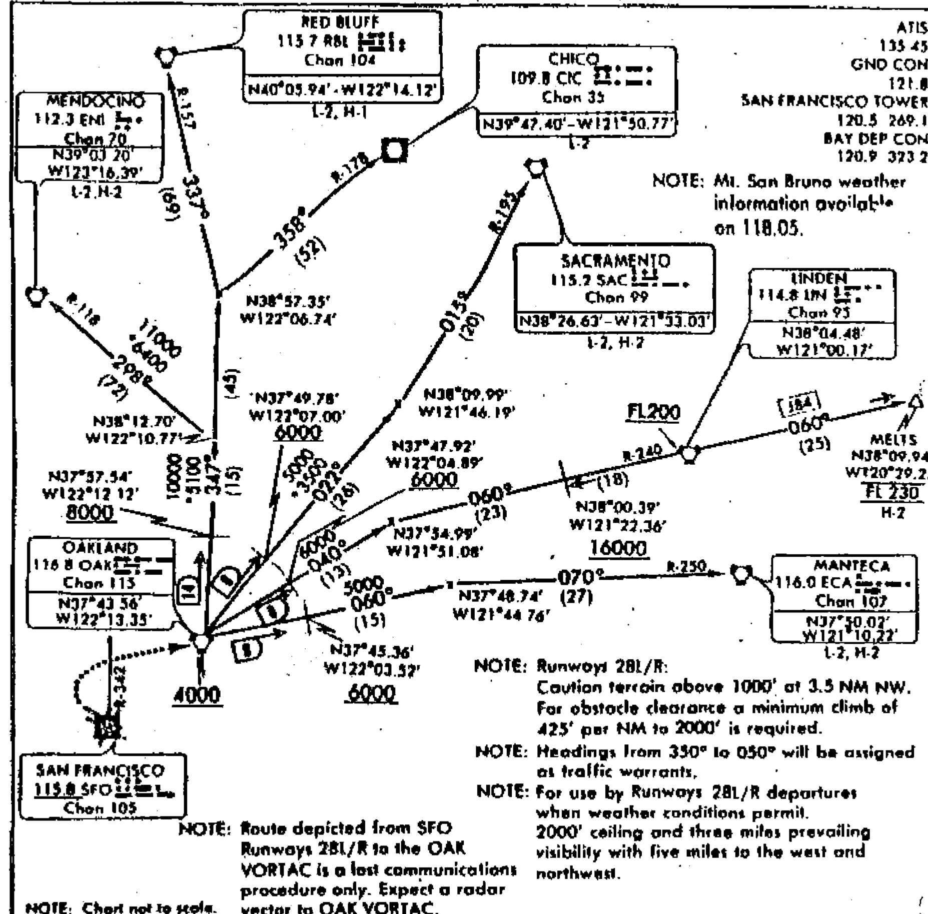
Take-off runways 1L/R, 28L/R: If not in contact with departure control after reaching 3000', continue to climb to assigned altitude and proceed direct to assigned route/fix.



(SHOR8. OAK) 89152

SHORELINE EIGHT DEPARTURE (PILOT NAV)

SAN FRANCISCO INTL
SAN FRANCISCO, CALIFORNIA

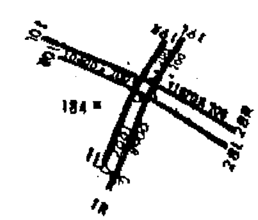


ELEV 11

DEPARTURE ROUTE DESCRIPTION

TAKE-OFF RUNWAYS 28L/R: Turn right as soon as feasible heading as assigned, for vector to OAK VORTAC. Then via (transition) or (assigned route). Maintain VFR conditions until crossing SFO R-342.

(Continued on next page)



SHORELINE EIGHT DEPARTURE (PILOT NAV)

DEPARTURE ROUTE DESCRIPTION (Continued)

CHICO TRANSITION (SHOR8.CIC): Climb via OAK R-347 and CIC R-178 to CIC VOR/DME. Cross OAK R-347 14 DME fix at or above 8000'. Maintain (assigned altitude) or (flight level). Thence via (assigned route).

MANTECA TRANSITION (SHOR8.ECA): Climb via OAK R-060 and ECA R-250 to ECA VORTAC. Cross OAK R-060 8 DME fix at or above 6000'. Maintain (assigned altitude) or (flight level). Thence via (assigned route).

MELTS TRANSITION (SHOR8.MELTS): Climb via OAK R-040 and LIN R-240 and LIN R-060 to MELTS DME fix. Cross the OAK R-040 8 DME fix at or above 6000'. Cross the LIN R-240 18 DME fix at or above 16,000'. Cross LIN VORTAC at or above FL 200. Cross MELTS DME fix at FL 230. Thence via (assigned route).

MENDOCINO TRANSITION (SHOR8.ENI): Climb via OAK R-347 and ENI R-118 to ENI VORTAC. Cross the OAK R-347 14 DME fix at or above 8000'. Maintain (assigned altitude) or (flight level). Thence via (assigned route).

RED BLUFF TRANSITION (SHOR8.RBL): Climb via OAK R-347 and RBL R-157 to RBL VORTAC. Cross the OAK R-347 14 DME fix at or above 8000'. Maintain (assigned altitude) or (flight level). Thence via (assigned route).

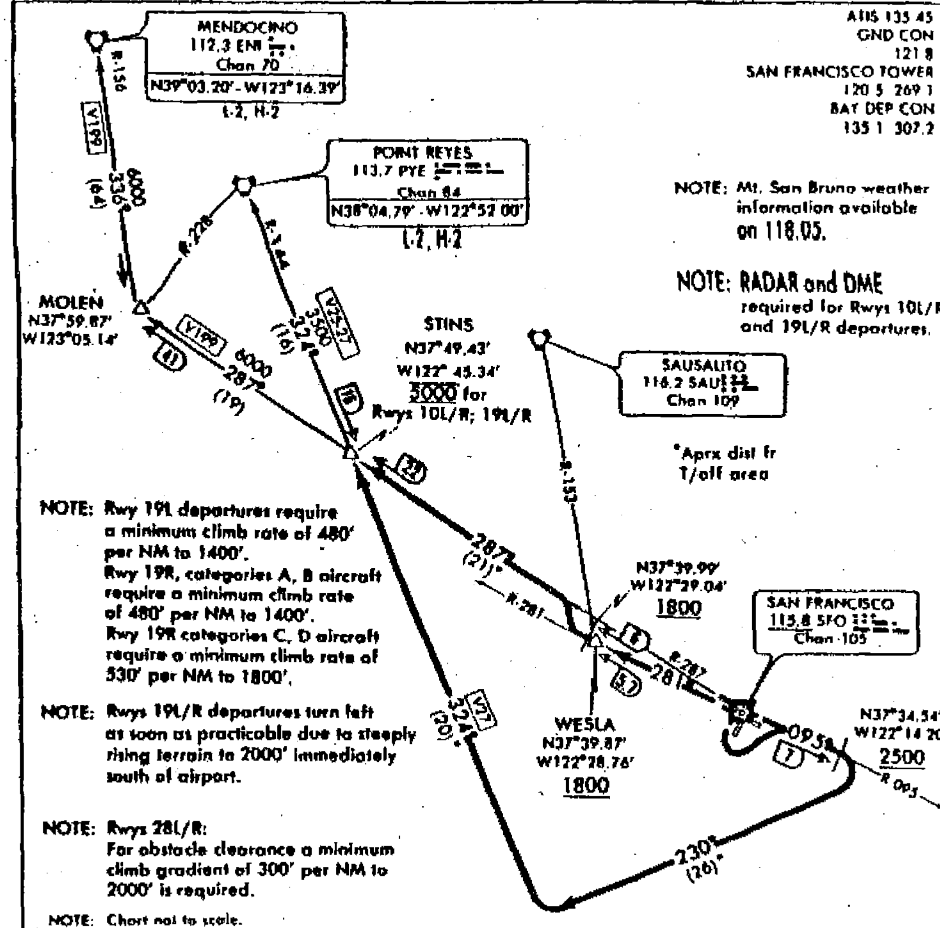
SACRAMENTO TRANSITION (SHOR8.SAC): Climb via OAK R-022 and SAC R-195 to SAC VORTAC. Cross the OAK R-022 8 DME fix at or above 6000'. Maintain (assigned altitude) or (FL). Thence via (assigned route).

LOST COMMUNICATIONS:

Take-off runways 28L/R: If not in contact with departure control one minute after crossing the SFO R-342, proceed direct to OAK VORTAC. Cross OAK VORTAC at or above 4000'.

1684

STINS FOUR DEPARTURE (PILOT NAV)



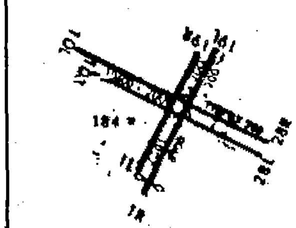
DEPARTURE ROUTE DESCRIPTION

TAKE-OFF RUNWAYS 10L/R AND 19L/R: Intercept and proceed via SFO R-095. Cross the SFO R-095 7 DME fix at or above 2500', then turn right heading 230° to intercept and proceed via PYE R-144 to STINS INT. Cross STINS INT at 5000'. Thence via (transition) or (assigned route).

TAKE-OFF RUNWAYS 28L/R: Intercept and proceed via SFO R-281. Cross the SFO R-281 6 DME fix (or WESLA INT) at or above 1800', then turn right to intercept and proceed via SFO R-287 to STINS INT. Thence via (transition) or (assigned route).

(Continued on next page)

ELEV 11



Report 64-91

Addendum to Noise Analysis for San Francisco International Airport Master Plan Environmental Impact Report

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February 1991

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1. INTRODUCTION

This addendum contains an analysis of the sensitivity of the noise impacts to the differences amongst alternative fleet forecasts. The initial analysis of noise impacts were made for the future years of 1996 and 2006, based on forecasts from the Draft Master Plan (MP), Ref. 1. It also noted that the number of operations estimated in the FAA Terminal Area Forecast (TAF), Ref. 2, were intermediate between the constrained and unconstrained Master Plan estimates.

In this analysis we add three additional forecasts that were contained in the California Aviation Systems Plan (CASP). These forecasts consist of an unconstrained "likely result" for the two study years, Ref. 3, and a recommended scenario for 2005, Ref. 4, extrapolated to 2006.

This report develops detailed fleet mixes from the CASP forecasts and then compares these fleets and their estimated noise to those obtained from the other forecasts.

2. AIRPLANE FLEET MIX DEVELOPED FOR CASP FORECASTS

The CASP Forecast, Ref. 3, was published in July of 1989. Its basic assumptions for San Francisco International Airport are contained in its summary statement, as follows:

"San Francisco

The opening of new terminal facilities and use of larger capacity airplanes will allow air service at San Francisco International Airport to grow normally during the first half or so of the forecast period. As traffic and service reach design capacity limits, air service growth for the Bay Area will increasingly be re-directed, principally to Oakland. San Francisco's share of the Bay Area market should drop from the high 70 percent to the low 60 percent (or lower) during the forecast period. While some international services will be operated at Oakland and San Jose, San Francisco will continue as the dominant international gateway airport for the Bay Area."

The CASP fleet operations forecasts for air carrier operations (excluding commuters) were based on forecasts of the enplaned passengers at the Airport. In turn, these forecasts were based on population forecasts for the counties served by the Airport and the historic per capita use of air transportation in this service area. The forecast passenger enplanements were then allocated to three size categories of turbojet airplanes, based on historical load factors and usage by equipment type and the evolving equipment mix based on "recent scheduling practices and fleet modernization programs".

Table 1A presents the CASP forecasts of air carrier operations in turbojet powered airplanes at San Francisco International Airport. It divides the operations by passenger and cargo uses and into three size categories:

Large Jet - 300 seat average
Medium Jet - 165 seat average
Small Jet - 100 seat average

Table 1B combines the annual passenger and cargo departure estimates, multiplies the result by two to obtain total operations (arrivals plus departures) and divides by 365 to obtain the annual average daily operations in each size category. It also contains the estimates for the study year of 1996 obtained by linear interpolation and for 2006 obtained by extrapolation of the 2000-2005 forecast periods.

Table 1B contains the 2005 recommended scenario, Ref. 4. It was based on the following stated assumptions:

"San Francisco Bay Metropolitan Area

The preliminary CASP update recommendations for the San Francisco Bay Metropolitan Area are described below:

1990 Scenario Conditions

- o No air carrier operations are redistributed to other airports.
- o No new air carrier airports or runways are proposed.
- o No general aviation operations are relocated from air carrier to general aviation airports in the Region.

1995 Scenario Conditions

- o Some air carrier operations are redistributed from San Francisco International to Metropolitan Oakland and San Jose International Airports.
- o No new air carrier airports or runways are proposed.
- o Runway extension at San Jose International Airport to provide parallel air carrier runways.
- o No general aviation operations are relocated from air carrier to general aviation airports in the Region.

2000 Scenario Conditions

- o Some air carrier operations are redistributed from San Francisco International to Metropolitan Oakland, San Jose International and a new air carrier airport.
- o Air carrier service is added at Travis Air Force Base. Several studies have been conducted to identify potential new air carrier airport locations in the San Francisco Bay Area at both existing airports and new sites. There is already an existing joint-use agreement with the military that would permit air carrier operations at Travis Air Force Base. It was therefore assumed for this study that this would be the first new air carrier airport that could be added to the system in the San Francisco Bay Area.

- General aviation operations are relocated from air carrier to general aviation airports. The relocation involves only some of the single-engine airplanes local operations.

<u>2005 Scenario Conditions</u>

- Air carrier operations are redistributed from San Francisco International to San Jose International, an expanded Metropolitan Oakland and a new air carrier airport.
- A second air carrier runway is added at Metropolitan Oakland International Airport. The Port of Oakland is currently evaluating the feasibility of adding a new air carrier runway at Metropolitan Oakland International Airport. At this time the preferred location for a new runway has not been determined and the necessary environmental and other processing that would be required has not been initiated.
- General aviation operations are relocated from air carrier to general aviation airports. The relocation involves relocation of 90 percent of the local general aviation operations and 50 percent of the single-engine propeller airplane itinerant operations.
- The redistribution of air carrier operations results in a requirement for increased passenger terminal capacity over that currently estimated at airports in the San Francisco Bay Area by 2005.

  The latest information indicates MAP capacities of 12.0 MAP at Metropolitan Oakland international, 51.3 MAP at San Francisco International, 18.0 MAP at San Jose International and 5.0 MAP for joint use of Travis Air Force Base.

  To the extent it is not possible to provide these levels of passenger terminal capacity, then additional air carrier airports will need to be developed or expanded. Alternatively, the redistribution of more smaller and fewer large capacity air carrier airplanes and/or the relocation of additional high-performance general aviation turbojet operations need to be relocated from San Francisco International in order to permit additional air carrier operations and utilize the estimated excess passenger terminal capacity by 2005.

- At the Buchanan Field Airport in Concord, air carrier operations are assumed to continue to be limited to small jets and medium and small propeller airplanes. The Airport is expected to remain primarily a general aviation airport.
- Because of its remote location from most of the Bay Area, the Sonoma County Airport in Santa Rosa is expected to attract a relatively small amount of any air carrier operations that might be redistributed from the three major Bay Area air carrier airports.
- The general aviation activity associated with the preliminary recommended Scenario requires the relocation of a forecast total of 270,000 general aviation airplane operations and about 600 based airplanes from the three air carrier airports to other airports in the San Francisco Bay Area by 2005."

These three forecasts were distributed amongst the detailed equipment types using a methodology similar to that previously applied to the Master Plan (MP) estimates. To obtain this distribution, the airplanes contained in the FAA 1989 Report to Congress, Ref. 5, were subdivided into large, medium and small. The category assignments were similar to those used in the CASP, except that the DC870 series was retained as a large airplane as in the MP, and all B727 airplanes were considered to be medium size, as in the MP.

The FAA national fleet forecast, Ref. 5, contains the B7J7 airplane and does not contain the newly announced B777 airplane. The B7J7 airplane was a study airplane in the 150 seat category which was cancelled. For noise analysis it is assumed to be replaced by an MD80 series airplane which is of similar size. The new B777 airplane is not included in this study since its launch announcement came long after all of the MP analysis was completed. Additionally, there are no reliable national forecasts of its probable numbers in the future fleet.

The percentages of FAR Part 36 Stage 2 airplanes in the year 2006 are 5.1 and 4.2 for the CASP unconstrained and recommended scenarios, respectively. These numbers are consistent with the existing San Francisco Noise Abatement Regulation. However, it is currently proposed to be amended to require only Stage 3 airplane operations beginning in

2000. Further, the new law passed by Congress on a National Noise Policy, Ref. 6, would require phaseout of all Stage 2 airplanes by the beginning of 2004 and at least 85 percent of each air carrier fleet by the beginning of 2000. The effect of this new legislation would be to reduce all of the 2006 cumulative noise estimates (CNEL) by about one decibel.

The methodology to obtain the forecast fleet distributions was to:

a) Determine the proportionate change in the number of airplanes in the national fleet in each equipment type from the 1989 base year to the forecast year based on the FAA forecast.

b) Determine the proportionate reduction in future daily operations of airplanes operating at SFIA in 1989 because of forecast retirement.

c) For each forecast year and each size category determine the proportionate number of operations required of new airplanes (new airplane operations required equals forecast operations less 1989 operations plus retirements).

d) Allocate new airplane operations by equipment type in each size category in proportion to their existence in the forecast national fleet.

The resulting fleet mixes were then allocated to departure stage lengths (route distances) and time of operation as in the MP analysis, based on the 1989 operations for long, medium and short range. The detailed results for the three study periods are contained in Tables 2, 3 and 4. It is noted that these forecasts have a small number of "nighttime" Stage 2 airplanes which represent those estimated to operate between 10:00 and 11:00 P.M. when the Noise Abatement Regulation nighttime rule begins.

The corresponding CNEL contours calculated by the FAA Integrated Noise Model (INM)* are presented in Figures 1, 2 and 3. Comparison

*Note the INM algorithm for noise at the beginning of takeoff roll for locations behind the runway has been revised for these analyses to better represent the noise (back blast) actually experienced in this area.

of these three figures indicates both 2006 contours are substantially smaller than the 1996 contours in the region over the bay (Runway 01 L and R departures) but have only small changes over San Bruno and South San Francisco (Runway 28 L and R departures). The major decrease over the bay results from the change from Stage 2 to Stage 3 for the majority of airplanes. However, the Runway 28 departures are mostly long range B747 type airplanes whose average noise is almost at the Stage 3 levels for both study years.

3. COMPARISON OF THE VARIOUS FORECASTS

The various forecasts of average daily operations for air carriers (excluding commuter) at San Francisco International Airport are summarized in Table 5. All show an increase from actual 1989 operations. The increase for 1996 ranges between 12 and 48 percent and that for 2006 between 6 and 78 percent. In both years the MP constrained has the smallest forecast number of operations and the CASP unconstrained the largest number. Also, in both cases the FAA TAF forecast is bounded by the MP constrained and unconstrained forecast. The Recommended Scenario for 2006 is slightly greater than the MP constrained forecast but less than the FAA TAF forecast.

Table 6 compares the 1996 MP constrained and unconstrained daily operations forecasts with the CASP unconstrained forecasts. The CASP forecast is only 4 percent larger than the MP unconstrained forecast for the large airplanes including the 747. However, it is 29 and 21 percent greater for the medium and small size categories, respectively.

Table 7 compares the 2006 forecasts for the MP constrained and unconstrained and the CASP unconstrained and recommended scenario. The CASP recommended scenario is about the same as the MP constrained forecast in all size categories. However, the CASP unconstrained forecast is larger than the MP unconstrained forecast by 17, 12 and 73 percent for large, medium and small size categories, respectively. The significant difference in the forecasts with respect to the small airplanes does not have a major effect on noise impact because these airplanes are among the quietest airplanes. The magnitude of the difference is partly due to the base periods selected; for example, much of American's operations in small and medium airplanes had moved to San Jose in 1989. Also, the FAA national fleet forecast contained few airplanes of the 100 seat category, so that the forecast new airplanes were drawn from airplanes at the high seat capacity end of the small size range. Consequently, the number of airplanes assigned to the small size category contain more seats than the CASP forecast assumed.

Table 8 gives the INM calculated CNEL values at the remote monitoring stations (RMS), see Figure 4, for all of these forecasts. Table 9 gives similar data for the selected locations in other areas. Note that the levels actually experienced in the more remote areas are highly dependent upon their locations with respect to the model's flight tracks. These flight tracks were chosen to be representative within the 65 dB CNEL contours; many more tracks would be required to attempt to accurately model the cumulative noise at remote locations. For this purpose the maximum expected single event sound exposure levels at each of these locations is far more meaningful.

Tables 10 and 11 summarize the differences between the forecast cases and the 1989 Base Case. Note that the track density requirements for remote selected sites discussed above with respect to absolute values of cumulative noise do not apply to these differences. In 1996 the average difference at these sites from 1989 was -2.8 dB for the MP constrained, -2.6 dB for the MP unconstrained, and -2.0 dB for the CASP unconstrained. The FAA forecast results would be expected to be between -2.8 and -2.6 dB.

In 2006 there was greater variability amongst the forecasts. The resulting differences at the RMS in Table 10 range from -5.2 dB and -5.0 dB for the MP constrained and CASP recommended scenarios to -4.4 and -3.7 dB for the MP and the CASP unconstrained cases. Similar results are found for the selected remote locations in Table 11. The FAA TAF differences would be intermediate between these higher and lower pairs of results, with decreases on the order of -4.7 dB.

It should be noted that these average decreases in 2006 did not occur at all the measurement microphones. In fact, for the two unconstrained forecasts in 2006, small increases ranging from 0 to 0.9 dB were calculated at RMS 1, 4 and 12 which are located in San Bruno, South San Francisco and Foster City, respectively. These increases result primarily from the assumed increase in B747 traffic. Future projections of this traffic based on a better understanding of the 2006 heavy long-range airplane fleet including the B777 and other still to be announced airplanes should result in a decrease of noise from that estimated here.

References

1. "San Francisco International Airport, Final Draft Master Plan", November 1989.
2. FAA Terminal Area Forecasts, April 1987.
3. "California Aviation Systems Plan", Element II, Forecasts Volume 1 and 2, California Department of Transportation, Division of Aeronautics, July 1969.
4. "California Aviation Systems Plan", Element IV, Systems Requirements, California Department of Transportation, Division of Aeronautics, July 1989.
5. Federal Aviation Administration, "Report to Congress, Status of the U.S. Stage 2 Commercial Aircraft Fleet", August 1989.
6. Public Law..., 1990.

TABLE 1. SAN FRANCISCO INTERNATIONAL AIRPORT

A) CALIFORNIA AVIATION SYSTEM PLAN FORECAST PASSENGER AND CARGO JET POWERED AIR CARRIER AIRPLANE ANNUAL DEPARTURES

	LARGE JET 300 SEATS		MED JET 165 SEATS		SMALL JET 100 SEATS	
YEAR	PASS	CARGO	PASS	CARGO	PASS	CARGO
1980	21682	1378	54716	2762	42194	0
1985	25828	1838	61688	627	45228	846
1990	36204	1850	67605	701	58709	935
1995	44291	1903	78409	722	69933	962
2000	53386	1968	87110	746	86239	995
2005	62963	2046	97307	776	99167	1034

B) CALIFORNIA AVIATION SYSTEM PLAN FORECAST PASSENGER AND CARGO JET POWERED AIR CARRIER AIRPLANE AVERAGE DAILY OPERATIONS *

	AVERAGE AIRPLANE SIZE				AVERAGE
YEAR	LARGE	MEDIUM	SMALL	TOTAL	NO. SEATS
UNCONSTRINED FORECAST					
1980	126.36	314.95	231.20	672.50	167
1985	151.59	341.45	252.46	745.51	169
1990	208.52	374.28	326.82	909.61	172
1995	253.12	433.59	388.47	1075.18	172
** 1996	293.27	471.84	460.09	1225.20	172
2000	303.31	481.40	477.99	1262.71	172
2005	356.21	537.44	549.05	1442.70	173
** 2006	366.79	548.65	563.26	1478.70	173
RECOMMENDED SCENARIO					
2005	240.82	338.47	320.37	899.66	178
** 2006	247.97	345.53	328.66	922.16	178

* Average daily operations equals annual departures times two divided by 365 days.

** Obtained by linear interpolation

ABLE 2

N FRANCISCO INTERNATIONAL AIRPORT 2006 CASP UNCONSTRAINED FORCAST DAILY OPERATIONS

	ARRIVALS				DEPARTURES		TOTALS			STAGE 1			STAGE 2			STAGE 3			STAGE 4			STAGE 5			STAGE 6			STAGE 7	
irplane Type	TOTAL	D	E	N	TOTAL	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N
IRBUS A330/340	10.19	5.44	3.26	1.49	10.19	7.64	0.83	1.72	0.21	0.00	0.19	0.65	0.00	0.23	0.83	0.00	0.04	3.39	0.79	0.72	1.56	0.04	0.39	1.01	0.00	0.15	0.00	0.00	0.00
EING 747 -100, SP, 200	18.19	9.72	5.81	2.66	18.19	13.63	1.48	3.08	0.37	0.00	0.34	1.15	0.00	0.41	1.48	0.00	0.08	6.04	1.41	1.29	2.78	0.08	0.70	1.80	0.00	0.26	0.00	0.00	0.00
EING 747 -200, 300, 400	22.27	11.89	7.12	3.26	22.27	16.69	1.82	3.77	0.45	0.00	0.41	1.41	0.00	0.50	1.81	0.00	0.09	7.40	1.72	1.58	3.40	0.09	0.86	0.00	0.00	0.00	2.21	0.00	0.32
EING 767 (JT9)	25.07	13.39	8.01	3.67	25.07	18.79	2.04	4.24	0.51	0.00	0.46	1.59	0.00	0.57	2.04	0.00	0.11	8.33	1.94	1.78	3.83	0.11	0.96	0.00	0.00	0.00	2.49	0.00	0.36
EING 767 (CF6)	50.14	26.78	16.02	7.34	50.14	37.57	4.09	8.48	1.02	0.00	0.93	3.18	0.00	1.13	4.08	0.00	0.21	16.66	3.88	3.57	7.66	0.21	1.93	0.00	0.00	0.00	4.97	0.00	0.72
D DOUGLAS MD-11	12.35	6.60	3.95	1.81	12.35	9.25	1.01	2.09	0.25	0.00	0.23	0.78	0.00	0.28	1.01	0.00	0.05	4.10	0.96	0.88	1.89	0.05	0.47	0.00	0.00	0.00	1.22	0.00	0.18
D DOUGLAS DC-10+L1011	35.67	19.05	11.40	5.22	35.67	26.73	2.91	6.03	0.72	0.00	0.66	2.26	0.00	0.81	2.91	0.00	0.15	11.85	2.76	2.54	5.45	0.15	1.37	3.54	0.00	0.51	0.00	0.00	0.00
D DOUGLAS DC-8-71	1.90	1.01	0.61	0.28	1.90	1.42	0.15	0.32	0.04	0.00	0.04	0.12	0.00	0.04	0.15	0.00	0.01	0.63	0.15	0.14	0.29	0.01	0.07	0.00	0.00	0.00	0.19	0.00	0.03
IRBUS A300/310	7.63	5.22	1.74	0.67	7.63	5.31	1.35	0.97	2.40	0.74	0.46	1.73	0.54	0.03	0.15	0.00	0.04	1.03	0.07	0.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IRBUS A320	34.58	23.66	7.89	3.03	34.58	24.08	6.11	4.40	10.86	3.33	2.08	7.85	2.47	0.12	0.67	0.00	0.18	4.69	0.31	2.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OEING 727	12.52	8.74	2.86	0.93	12.52	10.00	2.21	0.31	4.37	1.21	0.31	2.89	0.89	0.00	0.31	0.00	0.00	2.43	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OEING 737 (DC9+BAC111) (OM)	3.53	2.55	0.81	0.17	3.53	2.65	0.62	0.25	1.07	0.34	0.25	0.81	0.25	0.00	0.09	0.00	0.00	0.68	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OEING 737 (DC9+BAC111) (D17)	3.52	2.55	0.80	0.17	3.52	2.64	0.62	0.25	1.06	0.34	0.25	0.81	0.25	0.00	0.09	0.00	0.00	0.68	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OEING 737-300	221.13	151.00	50.49	19.64	221.13	153.57	39.06	28.50	69.54	21.30	13.24	50.18	15.79	0.82	4.25	0.00	1.20	29.21	1.96	13.64	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OEING 757	47.97	32.65	10.95	4.37	47.97	32.12	8.47	7.38	14.63	4.62	3.33	10.85	3.43	0.22	0.90	0.00	0.28	6.14	0.43	3.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OEING 7J7	53.00	36.26	12.10	4.64	53.00	36.90	9.36	6.74	16.65	5.11	3.19	12.03	3.79	0.19	1.05	0.00	0.27	7.19	0.47	3.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
D DOUGLAS MD-80/90	126.52	86.56	28.89	11.08	126.52	88.09	22.35	16.09	39.74	12.19	7.62	28.72	9.04	0.45	2.47	0.00	0.65	17.15	1.12	7.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RITISH AEROSPACE 146	44.18	34.75	6.63	2.81	44.18	35.92	5.99	2.27	32.33	5.99	2.27	3.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	[illegible]
OKKER F100	9.27	7.29	1.39	0.59	9.27	7.54	1.26	0.48	6.78	1.26	0.48	0.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	[illegible]
OTALS	739.63	485.11	180.71	73.81	739.63	530.54	111.73	97.36	203.01	56.42	36.75	131.37	36.46	5.80	24.28	0.00	3.35	127.61	18.12	42.18	26.85	0.74	6.76	6.35	0.00	0.91	11.08	0.00	1.60

BLE 3

N FRANCISCO INTERNATIONAL AIRPORT 1996 CASP UNCONSTRAINED FORECAST DAILY OPERATIONS

	ARRIVALS				DEPARTURES		TOTALS		STAGE 1			STAGE 2			STAGE 3			STAGE 4			STAGE 5			STAGE 6			STAGE 7		
rplane Type	TOTAL	D	E	N	TOTAL	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N
BUS A330/340	3.13	1.67	1.00	0.46	3.13	2.35	0.26	0.53	0.06	0.00	0.06	0.20	0.00	0.07	0.25	0.00	0.01	1.04	0.24	0.22	0.48	0.01	0.12	0.31	0.00	0.04	0.00	0.00	0.00
ING 747 -100, SP, 200	18.19	9.72	5.81	2.66	18.19	13.63	1.48	3.08	0.37	0.00	0.34	1.15	0.00	0.41	1.48	0.00	0.08	6.04	1.41	1.29	2.78	0.08	0.70	1.80	0.00	0.26	0.00	0.00	0.00
ING 747 -200, 300, 400	17.13	9.15	5.47	2.51	17.13	12.84	1.40	2.90	0.35	0.00	0.32	1.09	0.00	0.39	1.40	0.00	0.07	5.69	1.32	1.22	2.62	0.07	0.66	0.00	0.00	0.00	1.70	0.00	0.24
ING 767 (JT9)	15.04	8.03	4.81	2.20	15.04	11.27	1.23	2.54	0.31	0.00	0.28	0.95	0.00	0.34	1.22	0.00	0.06	5.00	1.16	1.07	2.30	0.06	0.58	0.00	0.00	0.00	1.49	0.00	0.21
ING 767 (CF6)	30.07	16.06	9.61	4.40	30.07	22.53	2.45	5.08	0.61	0.00	0.56	1.91	0.00	0.68	2.45	0.00	0.13	9.99	2.33	2.14	4.59	0.13	1.16	0.00	0.00	0.00	2.98	0.00	0.43
) DOUGLAS MD-11	5.54	2.96	1.77	0.81	5.54	4.15	0.45	0.96	0.11	0.00	0.10	0.35	0.00	0.13	0.45	0.00	0.02	1.84	0.43	0.39	0.85	0.02	0.21	0.00	0.00	0.00	0.55	0.00	0.08
) DOUGLAS DC-10+L1011	42.23	22.56	13.49	6.18	42.23	31.65	3.44	7.14	0.86	0.00	0.78	2.68	0.00	0.95	3.44	0.00	0.18	14.03	3.27	3.00	6.45	0.18	1.62	4.19	0.00	0.60	0.00	0.00	0.00
) DOUGLAS DC-8-71	6.81	3.64	2.18	1.00	6.81	5.10	0.56	1.15	0.14	0.00	0.13	0.43	0.00	0.15	0.55	0.00	0.03	2.26	0.33	0.48	1.04	0.03	0.26	0.00	0.00	0.00	0.69	0.00	0.10
BUS A300/310	8.53	5.84	1.95	0.75	8.53	5.94	1.51	1.08	2.68	0.82	0.51	1.94	0.61	0.03	0.17	0.00	0.04	1.16	0.08	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BUS A320	28.97	19.82	6.61	2.54	28.97	20.17	5.12	3.68	9.10	2.79	1.75	6.58	2.07	0.10	0.57	0.00	0.15	3.93	0.26	1.68	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ING 727	57.84	40.35	13.21	4.28	57.84	46.18	10.22	1.45	20.21	5.57	1.45	13.34	4.13	0.00	1.43	0.00	0.00	11.21	0.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ING 737 (DC9+BAC111) (ON)	17.96	13.00	4.10	0.86	17.96	13.49	3.17	1.29	5.43	1.73	1.29	4.14	1.28	0.00	0.44	0.00	0.00	3.48	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ING 737 (DC9+BAC111) (D17)	17.96	13.00	4.10	0.86	17.96	13.49	3.17	1.29	5.43	1.73	1.29	4.14	1.28	0.00	0.44	0.00	0.00	3.48	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ING 737-300	144.19	97.22	32.92	14.05	144.19	98.41	25.47	20.31	45.71	13.89	8.27	32.60	10.30	0.65	2.48	0.00	1.07	15.78	1.28	12.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ING 757	61.21	41.09	13.97	6.14	61.21	36.71	10.81	13.69	17.19	5.90	5.73	13.69	4.37	0.43	1.05	0.00	0.46	6.62	0.54	5.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ING 7J7	3.46	2.37	0.79	0.30	3.46	2.41	0.61	0.44	1.09	0.33	0.21	0.79	0.25	0.01	0.07	0.00	0.02	0.47	0.03	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	[illegible]
) DOUGLAS MD-80/90	84.44	57.77	19.28	7.39	84.44	58.79	14.92	10.74	26.52	8.14	5.09	19.17	6.03	0.30	1.65	0.00	0.43	11.45	0.75	4.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
ITISH AEROSPACE 146	43.94	34.56	6.59	2.79	43.94	35.73	5.95	2.26	32.16	5.95	2.26	3.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
KER F100	6.00	4.72	0.90	0.38	6.00	4.88	0.81	0.31	4.39	0.81	0.31	0.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TALS	612.64	403.51	148.56	60.57	612.64	439.72	93.02	79.90	172.71	47.67	30.70	109.21	30.33	4.65	19.54	0.00	2.76	103.46	14.45	34.51	21.10	0.58	5.31	6.30	0.00	0.91	7.40	0.00	1.07

TABLE 4

SAN FRANCISCO INTERNATIONAL AIRPORT 2006 CASP RECOMMENDED SCENARIO FORECAST DAILY OPERATIONS

	ARRIVALS				DEPARTURES		TOTALS		STAGE 1			STAGE 2			STAGE 3			STAGE 4			STAGE 5			STAGE 6			STAGE 7		
Airplane Type	TOTAL	D	E	N	TOTAL	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N
AIRBUS A330/340	3.38	1.81	1.08	0.49	3.38	2.53	0.28	0.57	0.07	0.00	0.06	0.21	0.00	0.08	0.28	0.00	0.01	1.12	0.26	0.24	0.52	0.01	0.13	0.34	0.00	0.05	0.00	0.00	0.00
BOEING 747 -100, SP, 200	18.19	9.72	5.81	2.66	18.19	13.63	1.48	3.08	0.37	0.00	0.34	1.15	0.00	0.41	1.48	0.00	0.08	6.04	1.41	1.29	2.78	0.08	0.70	1.80	0.00	0.26	0.00	0.00	0.00
BOEING 747 -200, 300, 400	13.21	7.06	4.22	1.93	13.21	9.90	1.08	2.23	0.27	0.00	0.26	0.84	0.00	0.30	1.08	0.00	0.06	4.39	1.02	0.94	2.02	0.06	0.51	0.00	0.00	0.00	1.31	0.00	0.19
BOEING 767 (JT9)	13.82	7.38	4.42	2.02	13.82	10.36	1.13	2.34	0.28	0.00	0.26	0.88	0.00	0.31	1.13	0.00	0.06	4.59	1.07	0.98	2.11	0.06	0.53	0.00	0.00	0.00	1.37	0.00	0.20
BOEING 767 (CF6)	27.65	14.77	8.83	4.05	27.65	20.72	2.25	4.68	0.56	0.00	0.51	1.75	0.00	0.62	2.25	0.00	0.12	9.19	2.14	1.97	4.22	0.12	1.06	0.00	0.00	0.00	2.74	0.00	0.39
McD DOUGLAS MD-11	4.10	2.19	1.31	0.60	4.10	3.07	0.33	0.69	0.08	0.00	0.08	0.26	0.00	0.09	0.33	0.00	0.02	1.36	0.32	0.29	0.63	0.02	0.16	0.00	0.00	0.00	0.41	0.00	0.06
McD DOUGLAS DC-10+L1011	35.67	19.05	11.40	5.22	35.67	26.73	2.91	6.03	0.72	0.00	0.66	2.26	0.00	0.81	2.91	0.00	0.15	11.85	2.76	2.54	5.45	0.15	1.37	3.54	0.00	0.51	0.00	0.00	0.00
McD DOUGLAS DC-8-71	1.90	1.01	0.61	0.28	1.90	1.42	0.15	0.32	0.04	0.00	0.04	0.12	0.00	0.04	0.15	0.00	0.01	0.63	0.15	0.14	0.29	0.01	0.07	0.00	0.00	0.00	0.19	0.00	0.03
AIRBUS A300/310	6.08	4.16	1.39	0.53	6.08	4.23	1.07	0.77	1.91	0.59	0.37	1.38	0.43	0.02	0.12	0.00	0.03	0.82	0.05	0.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AIRBUS A320	17.63	12.06	4.03	1.54	17.63	12.27	3.11	2.24	5.54	1.70	1.06	4.00	1.26	0.06	0.34	0.00	0.09	2.39	0.16	1.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BOEING 727	12.26	8.55	2.80	0.91	12.26	9.79	2.17	0.31	4.28	1.18	0.31	2.83	0.88	0.00	0.30	0.00	0.00	2.38	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BOEING 737 (DC9+BAC111) (HH)	3.53	2.55	0.81	0.17	3.53	2.65	0.62	0.25	1.07	0.34	0.25	0.81	0.25	0.00	0.09	0.00	0.00	0.68	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BOEING 737 (DC9+BAC111) (D17)	3.53	2.55	0.81	0.17	3.53	2.65	0.62	0.25	1.07	0.34	0.25	0.81	0.25	0.00	0.09	0.00	0.00	0.68	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BOEING 737-300	111.50	76.00	25.46	10.04	111.50	77.24	19.69	14.56	35.11	10.74	6.64	25.29	7.96	0.43	2.11	0.00	0.64	14.35	0.99	7.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BOEING 757	30.88	20.96	7.05	2.87	30.88	20.25	5.45	5.18	9.27	2.98	2.29	6.97	2.21	0.16	0.57	0.00	0.19	3.83	0.27	2.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BOEING 7J7	27.02	18.49	6.17	2.37	27.02	18.81	4.77	3.44	8.49	2.60	1.63	6.13	1.93	0.10	0.53	0.00	0.14	3.66	0.24	1.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
McD DOUGLAS MD-80/90	84.99	58.14	19.40	7.44	84.99	59.17	15.01	10.81	26.70	8.19	5.12	19.29	6.07	0.31	1.66	0.00	0.44	11.52	0.75	4.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BRITISH AEROSPACE 146	43.25	34.02	6.49	2.75	43.25	35.17	5.86	2.22	31.65	5.86	2.22	3.52	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FOKKER F100	2.53	1.99	0.38	0.16	2.53	2.06	0.34	0.13	1.85	0.34	0.13	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTALS	461.12	302.46	112.45	46.21	461.12	332.66	68.35	60.10	129.32	34.86	22.45	78.73	21.24	3.73	15.61	0.00	2.02	79.51	11.76	25.68	18.01	0.50	4.53	5.68	0.00	0.82	4.02	0.C	87

TABLE 5

SUMMARY OF TOTAL DAILY AIR CARRIER OPERATIONS FORECASTS FOR SAN FRANCISCO INTERNATIONAL AIRPORT

SOURCE	1989	1996	2006
1989 ACTUAL	829		
MASTER PLAN CONSTRAINED		927	881
CASP RECOMMENDED SCENARIO			922
FAA TERMINAL AREA FORECAST		945	1041
MASTER PLAN UNCONSTRAINED		1028	1128
CASP UNCONSTRAINED		1225	1479

TABLE 6

1996 FORECASTS FOR AVERAGE DAILY OPERATIONS IN COMPARISON WITH 1989 ACTUAL OPERATIONS

AIRPLANE TYPE	NUMBER SEATS	ACTUAL 1989 OPS	MASTER PLAN CONST	FORECAST UNCONST	CASP FORECAST
Large airplanes (300 seats)					
B747	450	53.80	61.73	68.13	70.63
MD11	360	0.00	5.22	9.42	11.07
A330/340	330	0.00	2.93	5.30	6.23
DC10/L1011	320	85.60	84.46	84.46	84.46
A300/310	250	10.60	14.60	16.44	17.06
B767	230	49.40	68.64	84.14	90.21
DC870	200	15.00	13.62	13.62	13.62
Sub total		214.40	251.20	281.51	293.27
Medium airplanes (165 seats)					
B757	200	26.20	63.89	81.24	122.41
A320	180	0.00	22.70	33.15	57.95
B7J7	150	0.00	2.71	3.96	6.92
MD80/90	150	83.60	117.01	132.39	168.88
B727	140	165.00	115.68	115.68	115.68
Sub total		274.80	321.99	366.42	471.84
Small airplanes (100 seats)					
B737300	140	140.60	191.57	215.03	288.38
B737/DC9/BA111	120	113.20	71.83	71.83	71.83
BAE146	100	85.80	86.51	86.84	87.87
F100	100	0.00	4.14	6.05	12.00
Sub total		339.60	354.05	379.75	460.09
TOTAL		828.80	927.24	1027.68	1225.20
Stage 2 operations		314.78	224.094	229.4864	224.10
Stage 2 percent		38.0%	24.2%	22.3%	18.3%

TABLE 7

2006 FORECASTS FOR AVERAGE DAILY OPERATIONS IN COMPARISON WITH 1989 ACTUAL OPERATIONS

AIRPLANE TYPE	NUMBER SEATS	ACTUAL 1989 OPS	M. PLAN CONST	CASP REC. SCENARIO	M. PLAN UNCONST	CASP FORECAST
Large airplanes (200 seats)						
B747	450	53.80	61.72	62.80	72.73	80.91
MD11	360	0.00	7.21	8.20	17.24	24.69
A330/340	330	0.00	5.95	6.76	14.23	20.38
DC10/L1011	320	85.60	71.33	71.33	71.33	71.33
A300/310	250	10.60	13.33	12.15	15.14	15.26
B767	230	49.40	78.91	82.94	119.94	150.42
DC870	200	15.00	3.79	3.79	3.79	3.79
Sub total		214.40	242.24	247.97	314.40	366.79
Medium airplanes (165 seats)						
B757	200	26.20	62.06	61.75	85.70	95.94
A320	180	0.00	35.55	35.25	58.99	69.15
B7J7	150	0.00	54.50	54.03	90.42	106.00
MD80/90	150	83.60	170.71	169.97	228.14	253.03
B727	140	165.00	24.52	24.52	24.52	24.52
Sub total		274.80	347.34	345.53	487.77	548.65
Small airplanes (100 seats)						
B737300	140	140.60	188.41	223.00	219.93	442.26
B737/DC9/BA111	120	113.20	14.11	14.11	14.11	14.11
BAE146	100	85.80	86.21	86.50	86.47	88.36
F100	100	0.00	2.94	5.06	4.87	18.53
Sub total		339.60	291.67	328.66	325.38	563.26
TOTAL		828.80	881.25	922.16	1127.55	1478.70
Stage 2 operations		314.78	38.63	38.63	38.63	38.63
Stage 2 percent		38.0%	4.4%	4.2%	3.4%	2.6%

TABLE 8

SAN FRANCISCO INTERNATIONAL AIRPORT CNEL VALUES CALCULATED AT REMOTE MONITOR STATIONS

RMS	CITY LOCATION	1989 BASE	1996 MP(C)	1996 MP(U)	1996 CP(U)	2006 MP(C)	2006 CP(R)	2006 MP(U)	2006 CP(U)
1	San Bruno	71.7	71.1	71.5	70.7	70.9	70.7	71.7	72.0
2	San Bruno	55.5	53.4	53.7	53.8	52.1	52.1	52.9	53.4
3	South San Francisco	56.2	53.6	53.8	54.1	51.3	51.5	52.1	52.7
4	South San Francisco	68.8	68.0	68.5	67.8	68.1	68.0	68.9	69.2
5	San Bruno	63.7	62.2	62.6	62.2	61.5	61.4	62.3	62.7
6	South San Francisco	65.8	63.5	64.0	63.6	63.4	63.2	64.3	64.4
7	Brisbane	55.3	51.9	52.0	52.9	48.5	48.9	49.4	50.3
8	Millbrae	71.2	67.8	67.9	68.8	64.2	64.7	65.1	66.0
9	Millbrae	63.6	60.1	60.3	61.1	56.2	56.8	57.1	58.0
10	Burlingame	59.8	56.2	56.3	57.2	52.3	52.8	53.0	54.0
11	Burlingame	63.9	60.4	60.5	61.4	56.5	57.1	57.3	58.3
12	Foster City	62.5	62.7	63.1	62.6	62.5	61.5	63.4	63.2
13	Hillsborough	50.3	46.7	46.8	47.7	42.8	43.4	43.6	44.5
14	South San Fancisco	54.2	52.0	52.3	52.5	50.8	50.8	51.6	52.1
15	South San Fancisco	62.2	59.0	59.1	59.7	54.8	55.2	55.4	56.1
16	South San Fancisco	57.4	55.3	55.6	55.6	54.4	54.2	55.3	55.5
17	South San Fancisco	60.3	58.4	58.8	58.6	58.1	57.5	58.9	58.9
18	Daly City	63.1	60.7	61.6	60.9	60.5	59.6	61.3	61.0
19	Pacifica	58.7	56.8	57.1	57.2	55.9	55.7	56.8	57.0
20	Daly City	55.7	52.6	52.8	53.6	50.1	50.5	51.0	51.9
21	San Francisco	53.7	50.7	50.9	51.7	48.3	48.7	49.3	50.2
22	San Francisco	63.9	60.4	60.6	61.4	57.7	58.1	58.5	59.4
23	San Francisco	60.9	57.7	57.8	58.6	54.9	55.3	55.8	56.7
24	San Francisco	59.5	56.2	56.3	57.0	53.4	53.8	54.2	55.1
25	San Francisco	54.9	51.7	51.9	52.6	49.1	49.5	50.0	50.9
26	San Francisco	52.9	49.7	49.9	50.6	47.1	47.4	48.0	48.8
27	San Francisco	40.5	37.7	37.9	38.8	35.4	35.8	36.4	37.4

TABLE 9

SAN FRANCISCO INTERNATIONAL AIRPORT CNEL VALUES CALCULATED AT SELECTED LOCATIONS

		1989	1996			2006			
I.D.	CITY LOCATION	BASE	MP(C)	MP(U)	CP(U)	MP(C)	CP(R)	MP(U)	CP(U)
A	SF-Visitacion Valley	59.1	56.0	56.2	57.0	53.4	53.8	54.3	55.3
B	SF-San Miguel Hills	52.8	49.8	50.0	50.7	47.3	47.7	48.3	49.1
C	SF-Ingleside	53.7	50.7	50.9	51.6	48.2	48.6	49.1	50.0
D	Albany	49.6	46.1	46.2	47.0	43.0	43.4	43.8	44.7
E	Kensington	46.9	43.6	43.8	44.6	40.7	41.1	41.5	42.5
F	Berkeley	48.7	45.4	45.5	46.3	42.4	42.9	43.3	44.2
G	Berkeley	41.7	38.9	39.1	39.9	36.4	36.8	37.4	38.3
H	Berkeley	46.0	43.0	43.2	44.0	40.5	40.9	41.5	42.4
I	Berkeley	42.4	39.7	39.9	40.6	37.3	37.6	38.3	39.2
J	Orinda Village	40.2	39.5	39.8	39.7	38.8	38.3	34.8	39.9
K	Claremont ?	41.5	40.5	40.8	40.9	39.6	39.2	40.6	40.8
L	Piedmont ?	40.5	38.7	39.0	39.4	37.3	37.2	38.3	38.8
M	Orinda	39.4	36.7	37.0	37.7	34.4	34.8	35.5	36.3
N	Walnut Creek	47.2	43.9	44.0	44.8	49.8	41.3	41.6	42.6
O	Richmond	40.5	37.4	37.6	38.4	34.6	35.1	35.5	36.5
P	Moraga	52.8	49.3	49.4	50.2	46.1	46.6	46.9	47.8
Q	Danville	41.1	38.2	38.3	39.1	35.4	35.8	36.3	37.3
R	Pacifica	49.8	46.6	46.8	47.6	43.8	44.2	44.7	45.6
S	Pacifica	49.4	46.2	46.3	47.1	43.3	43.7	44.2	45.1
T	Pacifica	49.8	46.5	46.7	47.5	43.7	44.1	44.6	45.5

TABLE 10

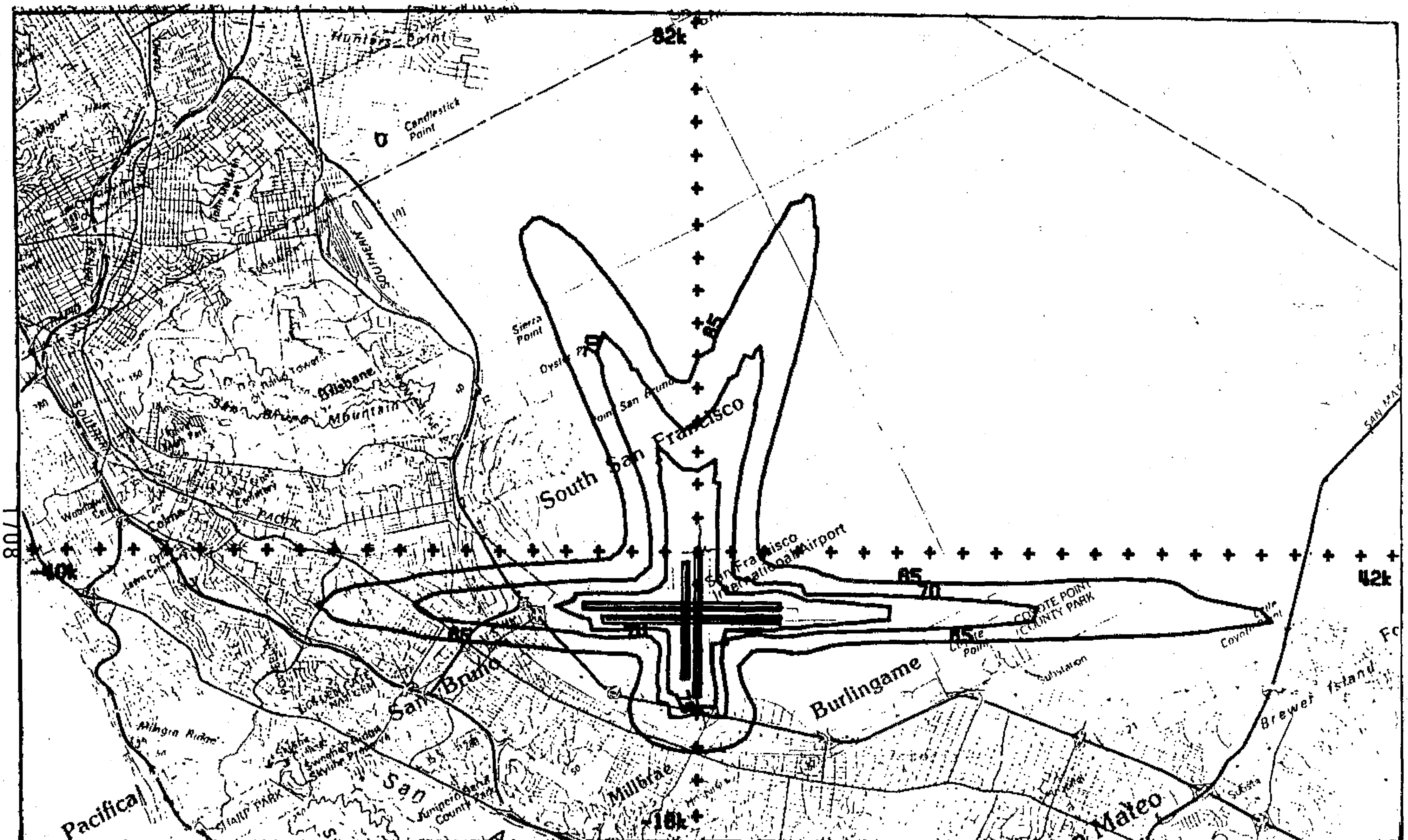
SAN FRANCISCO INTERNATIONAL AIRPORT CHANGES IN CNEL VALUES CALCULATED AT REMOTE MONITOR STATIONS

RMS	CITY LOCATION	1989 BASE	1996 MP(C)	1996 MP(U)	1996 CP(U)	2006 MP(C)	2006 CP(R)	2006 MP(U)	2006 CP(U)
1	San Bruno	71.7	-0.6	-0.2	-1.0	-0.8	-1.0	0.0	0.3
2	San Bruno	55.5	-2.1	-1.8	-1.7	-3.4	-3.4	-2.6	-2.1
3	South San Francisco	56.2	-2.6	-2.4	-2.1	-4.9	-4.7	-4.1	-3.5
4	South San Francisco	68.8	-0.8	-0.3	-1.0	-0.7	-0.8	0.1	0.4
5	San Bruno	63.7	-1.5	-1.1	-1.5	-2.2	-2.3	-1.4	-1.0
6	South San Francisco	65.8	-2.3	-1.8	-2.2	-2.4	-2.6	-1.5	-1.4
7	Brisbane	55.3	-3.4	-3.3	-2.4	-6.8	-6.4	-5.9	-5.0
8	Millbrae	71.2	-3.4	-3.3	-2.4	-7.0	-6.5	-6.1	-5.2
9	Millbrae	63.6	-3.5	-3.3	-2.5	-7.4	-6.8	-6.5	-5.6
10	Burlingame	59.8	-3.6	-3.5	-2.6	-7.5	-7.0	-6.8	-5.8
11	Burlingame	63.9	-3.5	-3.4	-2.5	-7.4	-6.8	-6.6	-5.6
12	Foster City	62.5	0.2	0.6	0.1	0.0	-1.0	0.9	0.7
13	Hillsborough	50.3	-3.6	-3.5	-2.6	-7.5	-6.9	-6.7	-5.8
14	South San Fancisco	54.2	-2.2	-1.9	-1.7	-3.4	-3.4	-2.6	-2.1
15	South San Fancisco	62.2	-3.2	-3.1	-2.5	-7.4	-7.0	-6.8	-6.1
16	South San Fancisco	57.4	-2.1	-1.8	-1.8	-3.0	-3.2	-2.1	-1.9
17	South San Fancisco	60.3	-1.9	-1.5	-1.7	-2.2	-2.8	-1.4	-1.4
18	Daly City	63.1	-2.4	-1.5	-2.2	-2.6	-3.5	-1.8	-2.1
19	Pacifica	58.7	-1.9	-1.6	-1.5	-2.8	-3.0	-1.9	-1.7
20	Daly City	55.7	-3.1	-2.9	-2.1	-5.6	-5.2	-4.7	-3.8
21	San Francisco	53.7	-3.0	-2.8	-2.0	-5.4	-5.0	-4.4	-3.5
22	San Francisco	63.9	-3.5	-3.3	-2.5	-6.2	-5.8	-5.4	-4.5
23	San Francisco	60.9	-3.2	-3.1	-2.3	-6.0	-5.6	-5.1	-4.2
24	San Francisco	59.5	-3.3	-3.2	-2.5	-6.1	-5.7	-5.3	-4.4
25	San Francisco	54.9	-3.2	-3.0	-2.3	-5.8	-5.4	-4.9	-4.0
26	San Francisco	52.9	-3.2	-3.0	-2.3	-5.8	-5.5	-4.9	-4.1
27	San Francisco	40.5	-2.8	-2.6	-1.7	-5.1	-4.7	-4.1	-3.1
	Average		-2.8	-2.6	-2.1	-5.2	-5.0	-4.4	-3.7
	Standard Deviation		0.9	1.0	0.6	2.1	1.7	2.1	1.8

TABLE 11

SAN FRANCISCO INTERNATIONAL AIRPORT CHANGES IN CNEL VALUES CALCULATED AT SELECTED LOCATIONS

I.D.	CITY LOCATION	1989 BASE	1996 MP(C)	1996 MP(U)	1996 CP(U)	2006 MP(C)	2006 CP(R)	2006 MP(U)	2006 CP(U)
A	SF-Visitacion Valley	59.1	-3.1	-2.9	-2.1	-5.7	-5.3	-4.8	-3.8
B	SF-San Miguel Hills	52.8	-3.0	-2.8	-2.1	-5.5	-5.1	-4.5	-3.7
C	SF-Ingleside	53.7	-3.0	-2.8	-2.1	-5.5	-5.1	-4.6	-3.7
D	Albany	49.6	-3.5	-3.4	-2.6	-6.6	-6.2	-5.8	-4.9
E	Kensington	46.9	-3.3	-3.1	-2.3	-6.2	-5.8	-5.4	-4.4
F	Berkeley	48.7	-3.3	-3.2	-2.4	-6.3	-5.8	-5.4	-4.5
G	Berkeley	41.7	-2.8	-2.6	-1.8	-5.3	-4.9	-4.3	-3.4
H	Berkeley	46.0	-3.0	-2.8	-2.0	-5.5	-5.1	-4.5	-3.6
I	Berkeley	42.4	-2.7	-2.5	-1.8	-5.1	-4.8	-4.1	-3.2
J	Orinda Village	40.2	-0.7	-0.4	-0.5	-1.4	-1.9	-3.4	-0.3
K	Claremont	41.5	-1.0	-0.7	-0.6	-1.9	-2.3	-0.9	-0.7
L	Piedmont	40.5	-1.8	-1.5	-1.1	-3.2	-3.3	-2.2	-1.7
M	Orinda	39.4	-2.7	-2.4	-1.7	-5.0	-4.6	-3.9	-3.1
N	Walnut Creek	47.2	-3.3	-3.2	-2.4	2.6	-5.9	-5.6	-4.6
O	Richmond	40.5	-3.1	-2.9	-2.1	-5.9	-5.4	-5.0	-4.0
P	Moraga	52.8	-3.5	-3.4	-2.6	-6.7	-6.2	-5.9	-5.0
Q	Danville	41.1	-2.9	-2.8	-2.0	-5.7	-5.3	-4.8	-3.8
R	Pacifica	49.8	-3.2	-3.0	-2.2	-6.0	-5.6	-5.1	-4.2
S	Pacifica	49.4	-3.2	-3.1	-2.3	-6.1	-5.7	-5.2	-4.3
T	Pacifica	49.8	-3.3	-3.1	-2.3	-6.1	-5.7	-5.2	-4.3
	Average		-2.8	-2.6	-2.0	-4.9	-5.0	-4.5	-3.6
	Standard Deviation		0.8	0.8	0.6	2.2	1.2	1.2	1.2



FAA INTEGRATED NOISE MODEL VERSION 3

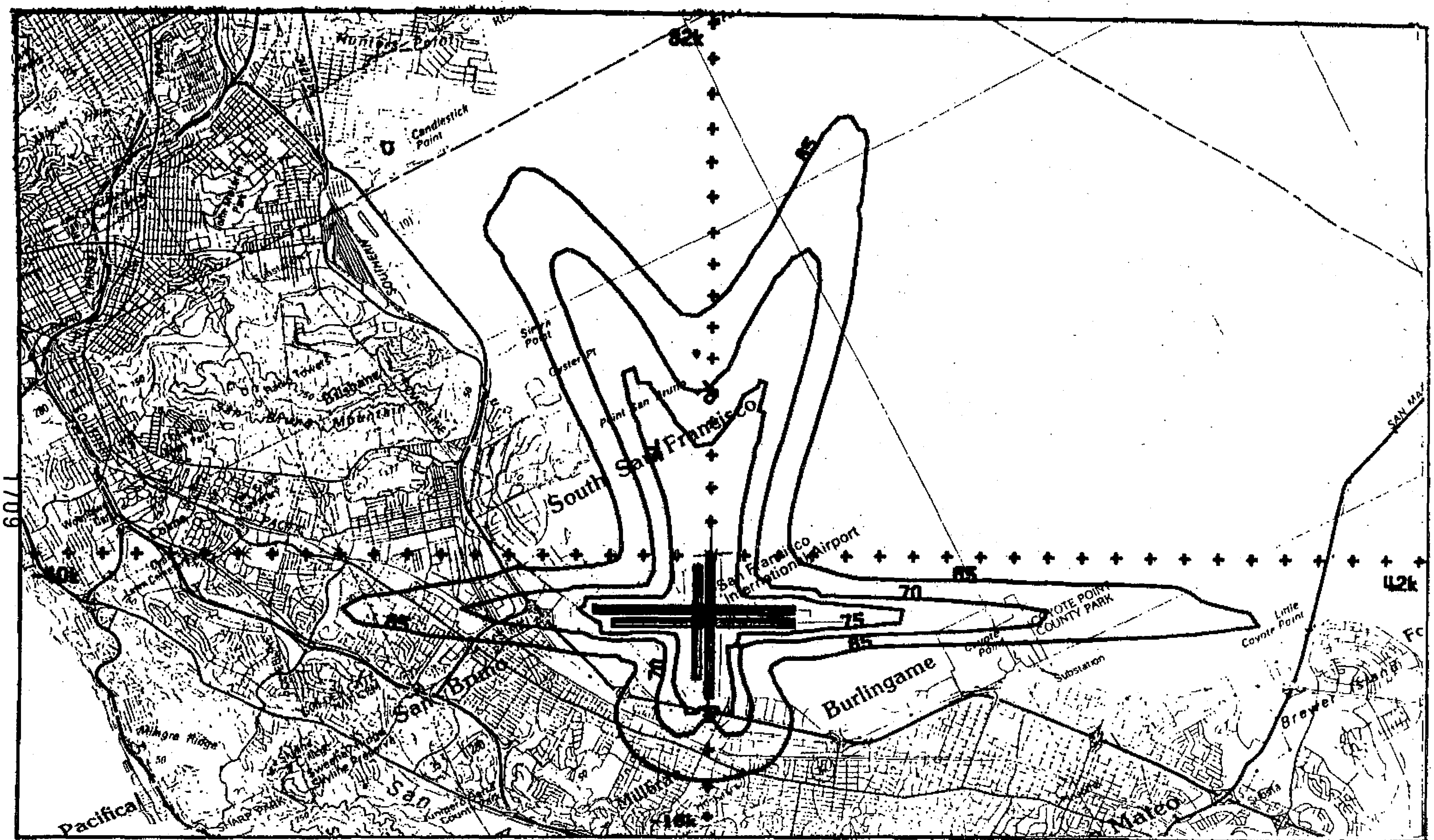
YEAR 2006 WITH CASP UNCONSTRAINED FORECAST

SAN FRANCISCO INTERNATIONAL AIRPORT

METRIC=CNEL

FT

FIGURE 1. 2006 UNCONSTRAINED



FAA INTEGRATED NOISE MODEL VERSION 3

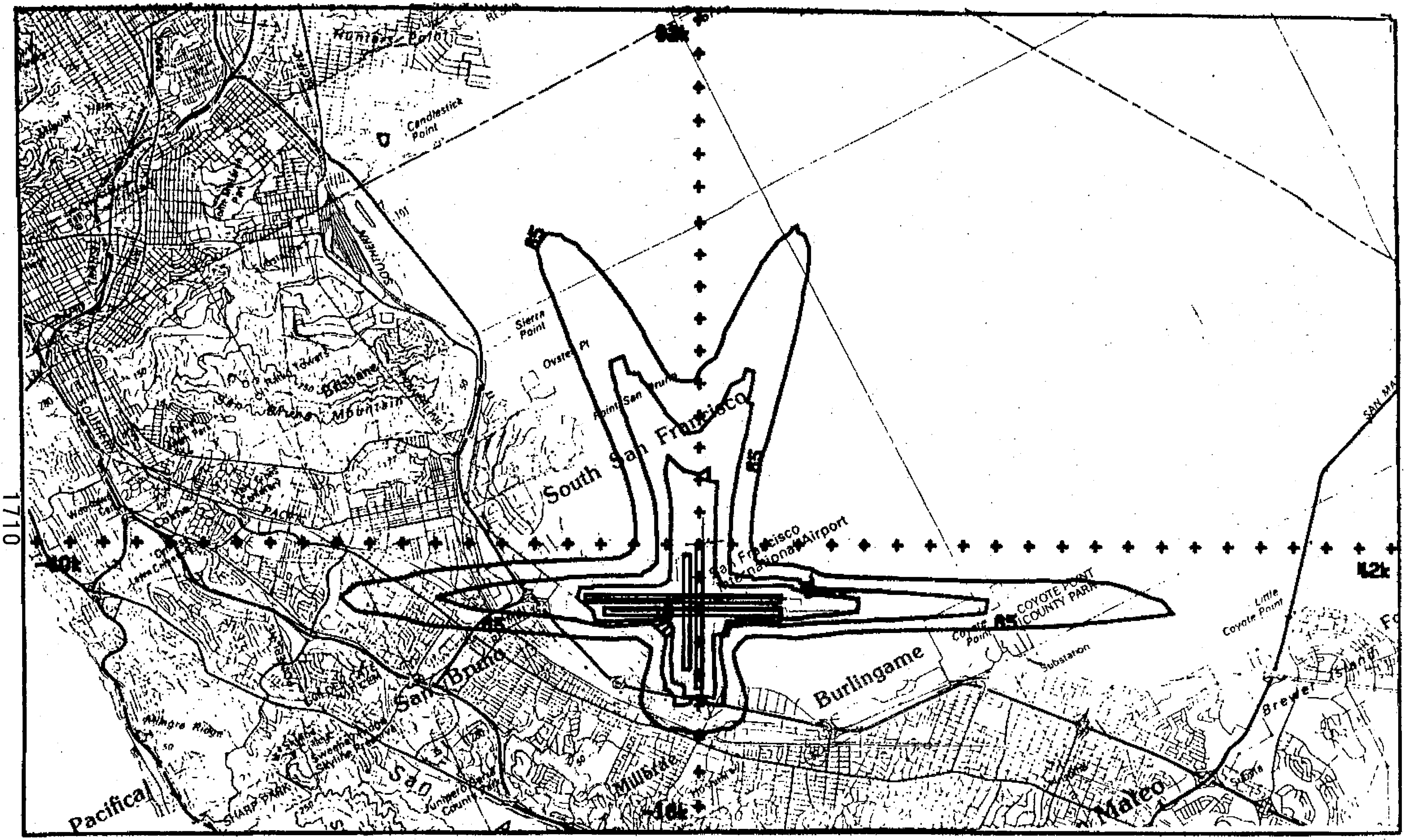
YEAR 1996 WITH CASP UNCONSTRAINED FORECAST

SAN FRANCISCO INTERNATIONAL AIRPORT

METRIC=CNEL

FT

FIGURE 2. 1996 UNCONSTRAINED



FAA INTEGRATED NOISE MODEL VERSION 3

YEAR 2006 WITH CASP RECOMMENDED SCENARIO

SAN FRANCISCO INTERNATIONAL AIRPORT

METRIC=CNEL

FIGURE 3. 2006 RECOMMENDED SCENARIO

APPENDIX D: AIR QUALITY

TABLE D-1: SAN FRANCISCO AIR POLLUTANT SUMMARY, 1987-1989

Pollutant	Standard	Monitoring Data by Year /a/ 1987	1988	1989
Ozone (O_3)				
Highest 1-hr average, ppm/b/	0.09/c/	0.09	0.09	0.08
Number of standard excesses		0	0	0
Carbon Monoxide (CO)				
Highest 1-hr average, ppm	20.0/c/	17.0	15.0	14.0
Number of standard excesses		0	0	0
Highest 8-hr average, ppm	9.0/c/	10.0	12.8	9.0
Number of standard excesses		1	1	0
Nitrogen Dioxide (NO_2)				
Highest 1-hr average, ppm	0.25/c/	0.15	0.12	0.14/e/
Number of standard excesses		0	0	0
Sulfur Dioxide (SO_2)				
Highest 24-hr average, ppm	0.05/d,f/	0.01	0.01	0.02
Number of standard excesses		0	0	0
Particulate Matter-10 Micron (PM_{10})				
Highest 24-hr average, ug/m^3 /b/	50/c/	65	117	101
Number of standard excesses /g/		4	5	13
Annual Geometric Mean, ug/m^3	30/c/	21.7	23.1	31.6
Lead				
Highest 30-day average, ug/m^3	1.5/d/	0.10	0.11	0.09
Number of standard excesses		0	0	0

NOTES: NR = Not Recorded; NA = Not Applicable
Underlined values indicate violations of standards.

/a/ CO data were collected at the BAAQMD monitoring station at 939 Ellis Street; all other data were collected at the Arkansas Street station.
/b/ ppm - parts per million; ug/m^3 - micrograms per cubic meter.
/c/ State standard, not to be exceeded.
/d/ State standard, not to be equaled or exceeded.
/e/ Data presented are valid, but incomplete in that an insufficient number of valid data points were collected to meet EPA and/or ARB criteria for representativeness.
/f/ State standard applies at locations where state 1-hour ozone or particulate standards are violated. Federal standard of 365 ug/m^3 applies elsewhere.
/g/ Measured every six days.

SOURCE: California Air Resources Board, *Air Quality Data Summaries*, 1987-1989.

●TABLE D-2: AIR QUALITY SENSITIVE RECEPTORS

Within 1/4 mile of Airport Property Line

Sheltering Pines Convalescent Hospital
Millbrae Serra Convalescent Hospital
Millbrae Nursery School
Residential areas (West of US 101)
Belle Air School (San Bruno)
Lomita Park School (Millbrae)

Within 1/2 mile of Airport Property Line

Residential areas (West of US 101)
Churches
Capuchino High School (San Bruno)
Happy Hall School (Childcare Center - San Bruno)
Saint Dunstan School (Millbrae)

Within 1 mile of Airport Property Line

Churches
Decima M. Allen School (San Bruno)
Edgemont School (San Bruno)
El Crystal School (San Bruno)
City Park (San Bruno)
Glen Oaks School (Millbrae)
Green Hills Country Club
Green Hills School (Millbrae)
Highlands School (Millbrae)
Taylor Jr. High School (Millbrae)
Former Chadbourne School (now vacant, will become senior citizens center/home) (Millbrae)
Mills High School (Millbrae)
Spring Valley School (Millbrae)
Peninsula Hospital
Lincoln School (Burlingame)
Parkside Jr. High School (San Bruno)
City of San Bruno Public Library
Ray Park (Burlingame)
Residential Areas (W. of El Camino Real)

SOURCE: Environmental Science Associates, Inc.

AIRPORTS COMMISSION
SAN FRANCISCO INTERNATIONAL AIRPORT

THE EARTHQUAKE OF 1989

A REPORT ON
SAN FRANCISCO INTERNATIONAL AIRPORT

BY: R.V. WILSON
DIRECTOR
COMMUNITY AFFAIRS

THE EARTHQUAKE OF 1989
A REPORT ON
SAN FRANCISCO INTERNATIONAL AIRPORT

At 5:04 p.m. on Tuesday, October 17, 1989, just about the time the third game of the World Series was scheduled to begin at Candlestick Park, a 7.1 earthquake struck the San Francisco Bay Area. It was a 15 second nightmare everyone knew was inevitable, a monster we would one day have to confront. Even though the quake's epicenter was centered south of San Francisco by some 70 miles, it had devastating effects on our City and our Airport. We had a lucky break, however, as it was still daylight.

The personal experiences of Airport employees during the earthquake are as numerous as the number of employees who experienced the trembler. The terminal buildings twisted and swayed, concrete walls bent and offices and terminal concessions were upset with desk drawers flying open, items on shelves tossed to the ground, bookshelves turned over, pictures hanging askew on the walls and pieces of plaster and ceiling tile and rubble covered the floors. Overhead water lines burst from the stress flooding terminal waiting areas and public lobbies. Amazingly there was little or no panic among the more than 15,000 passengers and employees that were immediately evacuated from the three terminal buildings. Aftershocks were on everyone's mind. Electrical power went off immediately in the terminals and except for emergency lighting everything inside was dark. A quiet sort of eerie sensation came over many of us as Airport police and employees orderly and quietly escorted passengers through a debris strewn terminal to outside center traffic islands, many of them not uttering a sound.

Damage to the South Terminal was minimal with some elongated metal ceiling panels falling. The International Terminal suffered more damage, particularly in the main lobby and the Air Traffic Control Tower. The ticket counter area lost approximately 15% of the ceiling tile and several broken sprinkler lines spewed water onto the marble and terrazzo floor. The water soaked composition ceiling tile and smooth surface of the floor was cause for several people slipping; however, no injuries were reported.

The Air Traffic Control Tower was a different story, however. Being 9 stories up, the highest point on the Airport, the tower suffered severe damage. Almost the entire ceiling including lighting fixtures, insulation and ceiling supports came crashing down onto the controllers and their consoles. A large 1/2" tempered plate glass tower window broke out of its frame and portions of the glass came hurtling inside the tower cab injuring three controllers with cuts severe enough to need medical attention. Some of the control tower's electrical gear fell out of the gaping hole where the window glass once was breaking into pieces on the catwalks below the exterior of the tower cab. Emergency generator power for the tower took over within 10 seconds of the main power failure again restoring power to the tower. The Airport was ordered closed and controllers immediately began diverting inbound aircraft on approach to SFO as well as holding all outbound aircraft from departing. Aircraft were held at their point of origin in various cities throughout the United States or if in route were diverted to other West Coast airports. Even though the tower was electronically functional, it lacked enough controllers to safely operate.

Approximately 500 to 1,000 passengers remained at the Airport overnight awaiting flights with no place to go. When safe to do so, passengers were allowed back into the South Terminal. Many of them slept on the floor in the South Terminal lobby along ticket counters and in the baggage claim areas on cots that were provided by the local American Red Cross. Hotels in the area immediately filled with other passengers. Hotel courtesy vans transported people from the Airport to various hotels. The Amfac and Hyatt Hotels in Burlingame were damaged by the earthquake and guests from those hotels quickly filled the remaining rooms of competitive hotels leaving little room for our remaining passengers. The Airport Hilton opened their vacant rooms as well as the Villa Hotel in San Mateo and the LaQuinta provided accommodations in their ballroom.

While many passengers remained at the Airport overnight, they were given blankets and pillows supplied by some of the airlines and food from the Airport's food concessionaire Marriott Host.

Airport Director Lou Turpen maintained periodic meetings with airline managers and Airport staff throughout the evening and early morning to map strategies and assess damage of various airline, Airport and tenant areas.

The Airport terminals were determined to be structurally sound by Airport engineers and there was no obvious damage to any of the runways. Additional inspection during daylight the next day confirmed there was no runway damage. Damage to the runways was expected because of the liquefaction effects that resulted in structural failure to so many other areas including the Marina District and Oakland Airport runways. It did not occur at SFO.. Underground fuel hydrant systems were reported okay and there were no fuel leaks or spills.

Initially no landings or takeoffs were permitted and the Airport roadways were secured by Airport Police who were only allowing emergency vehicles, necessary Airport employees for cleanup, and the media through. Other terminal traffic was turned away so as not to interject additional problems to an already emergency situation.

The North Terminal took the brunt of damage which was mainly focused in the United Airlines area. Boarding Area "F" suffered major damage with loss of approximately 80% of the ceiling tile, broken fire sprinkler lines spewing thousands of gallons of water onto the furniture and carpets as well as TV flight monitors in several locations toppled from their mountings above public seating areas miraculously hitting no one. Fifteen of United's twenty-two gates were out of service for three and one half days. Four to six inches of water covered most of Boarding Area "F" from gates 76 to 90 making it difficult to traverse and search the area. Carpets became soggy mixed with saturated ceiling tile and moving walkways were flooded. One serious injury occurred at Gate 78 when an airline employee was found under a check-in counter and could not move. The original diagnosis was a broken back or neck and the Airport's Fire Department, Police Department and medical clinic doctor were summoned to her aid. She was transported by Medivac ambulance to Peninsula Hospital.

The evacuation of all three terminals went very smoothly with many passengers and employees directed to the outside center islands and courtyards to await further notice concerning their flights, Airport closure, overnight status and food. Portable emergency lighting was set up by the Fire Department in the courtyards for passenger safety. Medical personnel made frequent trips to the courtyard areas to ascertain if anyone required medical attention.

The Airport's Fire Department responded to many reports of fires, medical requests, natural gas leaks and chemical spills at United Airlines' Maintenance Base. Several firefighters responded off duty to assist Marina District residents, many who were trapped in homes and apartments that had collapsed.

The Airport's sewage treatment facility was surveyed with no apparent damage and the water supply was investigated for contamination.

The Airport's rescue boat was readied for launching in order to provide bay water for firefighting if the domestic water supply should be cut off.

Electrical power was restored by the Airport electricians within 3 hours after the initial shock of the earthquake which definitely aided in the Airport's attempts to begin a major cleanup effort.

Even though the Airport was officially closed, United Airlines received permission and decided to transport 500 of their passengers to Seattle, Washington on two wide body aircraft. Passengers were bused from a remote location and ground loaded onto the aircraft. These passengers were awaiting departure to various parts of the country and would be disbursed through United's Seattle station. United Express had dispatched 40 employees from their Fresno terminal to SFO to aid in the cleanup. British Airways departed their flight to London since most of the passengers were in the process of boarding when the earthquake struck. There was very little air traffic activity in the Bay Area because of damage to SFO, San Jose and Oakland Airports and their respective towers and damage to smaller general aviation airports, such as San Carlos.

Many employees on their way home hearing of the problems at the Airport returned back to help. In fact, some retired employees called in and offered to return to help in any way they could at no cost. Now that's dedication.

The Airport did not receive a lot of media attention as you might expect. The media was focused on the Marina District, the Bay Bridge collapse and Interstate 880's devastation and only a smattering of radio, TV and print media paid any attention to the Airport.

Cleanup activities began as soon as power was restored. Airline and Airport people alike had no lines of demarcation and literally thousands of employees pitched in to help each other restore SFO to operational status in only 13 hours after the initial shock of the earthquake. In fact, the San Mateo Times said it precisely in an article the day following the earthquake in which the reporter wrote "SFO operated magnificently throughout the crisis, and how the building maintenance people got all that ceiling tile swept and hauled away in such short order remains a mystery." Well, it was no mystery but just hard work by a large group of tireless and dedicated employees. The Airport even received letters from passengers who couldn't believe the Airport was restored to operation so quickly.

Exactly 13 hours later at 6:00 a.m. on October 18, 1989, flights officially began again. Initially flights operated at about 50% of schedule since the tower was operating without a window and the noise was extreme. Tower controllers wanted to make sure they could convey and understand all radio transmissions between pilots and controllers. Activity improved the following day when a temporary plexiglass panel was put in to replace the window glass and by Thursday, October 19, 1989, the tower was fully operational. In fact, within 10 days after the earthquake the Airport had a record day with 1,443 operations. Logistically it was a nightmare for the airlines. It took several days to properly schedule flights since aircraft and flight crews had been diverted all over the country and were not where they were supposed to be, in San Francisco.

The terminal areas underwent extensive structural checks by Airport and independent engineers. Emergency contracts were put into force almost immediately to remove remaining ceiling, carpet and begin the task of replacement. The terminals will have the visible cosmetic scars of the quake for months to come but restoration of the damaged areas will have little effect on passengers and airline operations.

Aside from the terminal complex, major damage took place at Cargo Building No. 8 which housed Continental and Mexicana air cargo as well as other smaller offices. Because of the time of the quake, 5:04 p.m., very few people were in the building. Concrete columns supporting the three story structure broke away exposing reinforcing steel allowing the steel to "balloon" from the weight of the upper story. This building was constructed 'prior to' the stringent earthquake standards incorporated today and had limited seismic resistance. This particular building was constructed with techniques very similar to the Cypress Viaduct in the East Bay which so dramatically collapsed. Cargo Building No. 8 has been torn down and will be replaced with a modern structure.

A random survey was taken from the various airlines concerning the passenger loads immediately after the earthquake. Various airlines reported between normal passenger loads and a drop off of 40%. Cargo loads were down between 12 to 14%.

The rapid response to the disaster was not accidental. It pays to be prepared and the Airport was. The Airport's Disaster Preparedness Program worked.

Airports Commission President Morris Bernstein and Airport Director Lou Turpen had high praise for those people involved in the earthquake cleanup as well as safety response and will honor all those employees who so unselfishly gave of their time and energy to restore operations at SFO so quickly. At a gathering on Tuesday, December 12, 1989, a small token of appreciation will be presented to the employees, Airport, airline and tenant alike, who participated in the cleanup effort.

APPENDIX F: HAZARDOUS MATERIALS REGULATORY SETTING

Table F-1: Underground Tanks Airport Owned

Table F-2: Airport Owned Above Ground Storage Tanks

Table F-3: Underground Tanks Tenant Owned

HAZARDOUS MATERIALS REGULATORY SETTING

Laws and regulations govern the management of hazardous materials and wastes at the federal, state and local levels. The Environmental Protection Agency (EPA) is responsible for enforcing laws pertaining to hazardous materials and wastes at the federal level. The primary federal hazardous material and waste laws are contained in the Resource Conservation and Recovery Act of 1976 (RCRA), and the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA and Amendments 1986). These laws require that responsible parties report any known hazardous waste contamination of soil or groundwater to the EPA. (In the San Mateo area, reporting must be to either the California Department of Health Services, the San Francisco Bay Area Regional Water Quality Control Board (RWQCB) or the San Mateo County Department of Health Services, depending on the specific circumstance. Even though the Airport is owned and operated by the City of San Francisco, it is within San Mateo County borders and, therefore, reports to San Mateo Department of Health Services.)

Public Disclosure of Hazardous Materials

CERCLA was amended in 1986 by the Superfund Amendments and Reauthorization Act (SARA), which includes a section requiring public disclosure of information relating to the types and quantities of hazardous materials used at various types of facilities. The section, also called SARA Title III, or the Emergency Planning and Community Right-to-Know Act of 1986 ("right-to-know" law), addresses toxic air contaminant emissions inventories, community emergency planning, emergency release notification and hazardous chemical inventory reporting. SARA Title III includes requirements for making hazardous material safety data sheets (MSDSs) readily available in the workplace; it also mandates community information programs for industries with substantial hazardous material use.

The *Hazardous Materials Release Response Plans and Inventory Law of 1985* (Business Plan Act) requires that any business that handles hazardous materials prepare a business plan, which must include the following:

- details, including floor plans, of the facility and business conducted at the site;
- an inventory of hazardous materials that are handled or stored on the site;
- an emergency response plan; and
- a training program in safety procedures and emergency response for new employees, and an annual refresher course for all employees.

The Business Plan Act also allows an administering agency to require designated businesses to submit a risk management and prevention program (RMPP). An RMPP must include the following:

- a description of each accident involving acutely hazardous material that had occurred on the premises within the previous three years;
- a report detailing the condition of equipment used to handle acutely hazardous elements;
- maintenance and monitoring procedures and controls to minimize the risk of accident;
- a schedule for implementing future response procedures;
- audits, inspections, and record keeping procedures for the RMPP; and
- an identification of personnel at the business who are responsible for carrying out specified RMPP tasks.

The San Mateo County Department of Environmental Health and the Airports Commission at SFIA share responsibilities as the designated local administering agencies for the Business Plan Act. Any business or facility which handles a hazardous material or mixture containing hazardous material which has a quantity equal to or greater than 500 pounds, or total volume of 55 gallons or 200 cubic feet at standard temperature and pressure for a compressed gas, and is not contained solely in a consumer product and pre-packaged for direct distribution to, and used by the general public, is required to complete a Business Plan. Separate from the submission of the Business Plans, the County requires certain businesses handling certain quantities of extremely hazardous materials to prepare a risk management prevention program. The County is responsible for reviewing and approving all Business Plans. In addition, formal inspections are conducted of all facilities storing hazardous materials.

The California Office of Emergency Services assists the county with implementation of the Business Plan Act.

Hazardous Waste Handling Requirements

The federal *Resource Conservation and Recovery Act of 1976* (RCRA) created a federal hazardous waste "cradle to grave" regulatory program that is administered by the U.S. Environmental Protection Agency (EPA). RCRA gives EPA the authority to regulate the generation, transportation, treatment, storage, and disposal of hazardous waste.

RCRA was amended in 1984 by the *Hazardous and Solid Waste Act* (HSWA), which affirmed and extended the "cradle-to-grave" system of regulating hazardous substances. HSWA specifically prohibits the use of certain techniques for the disposal of some hazardous wastes.

RCRA also provides for individual states to implement a RCRA program directly as long as the state program is at least as stringent as federal RCRA requirements. EPA must approve state programs intended to implement federal regulations. In California, EPA has retained RCRA responsibility, but approval of the state program is pending.

The EPA has delegated much of its regulatory authority to the individual states whenever adequate state regulatory programs exist. The Toxic Substance Control Division, California Department of Health Services (DHS) is the agency empowered to enforce federal hazardous materials and waste regulations in California, in conjunction with the EPA.

The California hazardous materials and waste laws incorporate federal standards, but in many respects are stricter. For example, the California *Hazardous Waste Control Law* (HWCL), the state equivalent of RCRA, contains a much broader definition of hazardous materials and wastes. Some substances that are not considered hazardous under federal waste law are under state law. The HWCL allows DHS to adopt regulations governing the generation, transportation, and disposal of hazardous wastes. While the HWCL differs somewhat from RCRA, both laws impose "cradle to grave" regulatory systems for handling hazardous materials in a manner that protects human health and the environment. Regulations implementing the HWCL are generally more stringent than regulations implementing RCRA.

State hazardous materials and waste laws are contained in the California Code of Regulations (CCR), Title 26. Regulations implementing the HWCL list 791 hazardous chemicals and 20 to 30 more common materials that may be hazardous; establish criteria for identifying, packaging and labeling hazardous wastes; prescribe management of hazardous wastes; establish permits for hazardous waste storage, disposal and transportation; and identify hazardous wastes that cannot be disposed of in landfills.

Under both RCRA and the HWCL, hazardous waste manifests must be retained by the generator for a minimum of three years. Hazardous waste manifests list a description of the waste, its intended destination and regulatory information about the waste. A copy of each manifest must be filed with DHS. The generator must match copies of hazardous waste manifests with receipts from the treatment / disposal / recycling facility.

The County of San Mateo Department of Health Services, Office of Environmental Health, is directly involved in the management of hazardous materials and wastes within San Mateo county. Any business in the state that generates hazardous waste needs to be permitted. The County handles the permitting of all hazardous waste generators in the San Mateo County, including the Airport. Hazardous waste generators within the Airport also are required to obtain permits from the Airports Commission. In addition, the San Mateo County Fire Department issues permits for the storage of flammable liquids. The County is also responsible for issuing permits to businesses that store hazardous materials. To ensure compliance with regulatory requirements, the County conducts regular inspections.

Hazardous Material Emergency Response

The state *Hazardous Substance Account Act of 1984* (the state "superfund") was enacted to establish a response authority for releases of hazardous substances, to compensate persons injured by the release of hazardous substances, and to establish funding mechanisms to pay for the cleanup of hazardous waste releases.

The California Office of Emergency Services assists state and local agencies in emergency planning. In emergency situations, the Office of Emergency Services coordinates emergency response.

In the workplace, emergency equipment and supplies, such as fire extinguishers and eye washes, must be kept in accessible places and be checked periodically, according to State Fire Marshal's Office and Occupational Safety and Health Administration (OSHA) requirements. Spill centers must be inventoried and resupplied monthly (as required by OSHA). Fire extinguishers must be inspected and replenished, as necessary, on an annual basis. On a monthly basis, eye washes and safety showers must be checked.

Hazardous Material Worker Safety Requirements

The California Occupational Safety and Health Administration (Cal/OSHA) and the Federal Occupational Safety and Health Administration (OSHA) are the agencies responsible to assure worker safety in the handling and use of chemicals. In California, Cal/OSHA assumes primary responsibility for the enforcement of regulations governing the handling and use of chemicals in the workplace. Cal/OSHA standards are generally more stringent than the Federal "General Duty Codes."

The Federal OSHA has adopted numerous regulations pertaining to labor and worker safety (contained in the *Code of Federal Regulations Title 29 - Labor* [CFR 29]). These regulations specify, under the authority of the Occupational Safety and Health Act of 1970, inspections, citations, penalties, occupational injury reports, and labor agreements and agency standards. The OSHA regulations contain standards relating to hazardous materials handling, including workplace conditions, employee protection requirements, first aid, fire protection, and material handling and storage. Because California has a federally approved OSHA program it must have adopted regulations that are at least as stringent as those found in CFR 29.

Cal/OSHA regulations concerning the use of hazardous materials in the workplace (which are detailed in Title 8 of the California Code of Regulations [CCR]) include requirements for employee safety training, availability of safety equipment, accident and illness prevention programs, hazardous substance exposure warnings, and emergency action and fire prevention plan preparation. Cal/OSHA enforces the hazard communication program regulations, which contain training and information requirements including procedures for labeling, identifying, and communicating hazard information relating to hazardous substances and their handling as well as mandatory availability of Material Safety Data Sheets (MSDSs), and communication plan preparation requirements. These regulations also require preparation of emergency action plans (escape and evacuation procedures, rescue and medical duties, alarm systems, and training in emergency evacuation).

Both federal and state laws require businesses using hazardous materials to provide training to employees working with hazardous materials in chemical work practices and hazardous materials safety. The training must include methods of safe handling of hazardous materials, an explanation of Material Safety Data Sheets (MSDSs), use of emergency response equipment and supplies, and an explanation of the building emergency response plan and procedures.

Chemical safety information must be available. Specific, more detailed training and monitoring is required for the use of carcinogens, lead, asbestos, and other chemicals listed in CFR 29. Conformance with these regulations reduces the risk of accidents, worker health effects, and emissions.

State Fire Code regulations require emergency pre-fire plans to include training programs in the use of first aid fire equipment and methods of evacuation.

The federal *Toxic Substances Control Act* (TSCA) authorized EPA to regulate the production, use, distribution and disposal of chemicals that may present unreasonable risks to public health or the environment. TSCA provides EPA with the authority to ban (or phase out) the use of chemicals, to require record-keeping and reporting of certain information and to conduct premanufacture reviews of potential risks associated with the production of certain chemicals. Two hazardous materials that EPA must regulate under TSCA are a class of chemical substances known as polychlorinated biphenyls (PCBs) and asbestos.

The *Safe Drinking Water and Toxics Enforcement Act (Proposition 65)* requires that a business with 10 or more employees warn its employees and other individuals of any exposures to "significant levels" of state-listed substances that cause cancer, birth defects, and other reproductive harm. In addition, businesses are prohibited from knowingly discharging "significant amounts" of listed substances into water or land where the substance could get into any sources of drinking water.

Water Quality Protection

SFIA lies within the jurisdiction of the San Francisco Bay Regional Water Quality Control Board (RWQCB). The RWQCB is authorized by the State Water Resources Control Board (SWRCB) to enforce the provisions of the state Porter-Cologne Water Quality Control Act of 1969, which incorporates the federal Clean Water Act (1977) and the Federal Water Pollution Control Act (1972). The RWQCB has the authority to require groundwater investigations when the quality of the groundwaters or surface waters of the state have been or could be threatened, and to remediate the site if necessary.

Industrial wastewaters are regulated under many the provisions of the Clean Water Act to ensure that the state water quality standards are achieved. Regulations that affect airports are the National Pollutant Discharge Elimination System (NPDES) program (Section 402), Effluent Limitations (Section 301), National Standards of Performance (Section 306), and Toxic and Pretreatment Effluent Standards (Section 307).

Site Remediation

Remediation of a contaminated site is subject to many of the regulations described above, including CERCLA, RCRA, HWCL, and the state superfund act. These regulations are enforced by the California Department of Health Services and the SWRCB. Site remediation may be subject to regulation by other state or local agencies including the San Mateo County Department of Health Services. For example, if soils containing hazardous materials are excavated, the Bay Area Air Quality Management District may impose specific requirements on such activities to protect ambient air quality from dust or airborne contaminants. If extraction of contaminated groundwater or construction dewatering of a hazardous waste site is required, subsequent discharge of such waters to the storm / sewer collection system or to the publicly owned treatment works is regulated by the RWQCB and the Airports Commission.

Land Disposal Restrictions

The HSWA increased environmental requirements for hazardous waste facilities and restricted the disposal of RCRA-regulated hazardous waste in or on land, including landfills, land treatment areas, waste piles and surface impoundments. Hazardous wastes must meet certain treatment standards that are promulgated by the EPA. Treated or exempted wastes may be land disposed in facilities that meet the design requirements of Subtitle C of RCRA.

California land disposal restrictions are found in Title 22, Section 66900 of the California Code of Regulations. State land disposal treatment standards originate from the Hazardous Waste Management Act (1986) which parallels RCRA in that it also set a May 8, 1990 date for which all land disposal of untreated hazardous waste is banned. In addition, the act addresses the need for criteria for the disposal of solid hazardous waste and prohibits land disposal of liquid hazardous waste and hazardous wastes containing free liquids.

The state Toxic Pits Cleanup Act (1984) banned the discharge of liquid hazardous wastes containing cyanide or PCB's on January 1, 1985. Restricted wastes (wastes containing certain metals, halogenated organics, and especially toxic materials), or liquid hazardous wastes with a pH greater than twelve or less than two were prohibited from land disposal on January 1, 1986. The Act also affected land disposal of liquid hazardous wastes. All surface impoundments were required to be fitted with double linings, leachate collection and groundwater monitoring consistent with the State Water Resources Control Board regulations (Title 23 of the California Code of Regulations) by June 30, 1988 or stop accepting waste by that time. This law has resulted in closure of old ponds and alternative treatment and disposal of liquid hazardous wastes.

Underground Storage Tanks

Federal law and regulations relating to underground storage tanks (USTs) used to store hazardous materials (including petroleum products) require that UST owners and operators register USTs. New federal regulations also require extensive remodeling and upgrading of USTs, including installation of leak detection systems. Tank removal and testing procedures are also specified.

State laws relating to USTs include permit, monitoring, closure, and cleanup requirements. Regulations set forth UST construction and monitoring standards, existing UST monitoring standards, release reporting requirements, and closure requirements.

San Mateo County is designated by the SWRCB to enforce the state Underground Storage Tank (UST) Program. Permitting of underground storage tanks installation and removal is overseen by the San Mateo County Office of Environmental Health and the Airports Commission.

Above-Ground Storage Tanks

Currently, above-ground storage tanks are regulated by local agencies, most commonly the fire department. SFIA operates its own Fire Department that is responsible for the regulation of above-ground storage tanks containing flammable substances at the Airport. The SFIA Fire Department enforces National Fire Protection Association (NFPA) standards and San Francisco Fire Code regulations regarding the storage of flammables in above-ground storage tanks, and includes above-ground storage tanks in its hazardous material storage inspection program.

The Above-ground Petroleum Storage Act (SB 1050) was passed in 1989. This bill requires owners of above-ground petroleum storage tanks to prepare spill prevention control and countermeasure plans, prepare monitoring programs and pay storage fees. The fees will be deposited into the Environmental Protection Trust Fund to be used for specified purposes relating to spills. While the Act focuses on the storage of petroleum, it also requires the State Water Resources Control Board to conduct a study concerning improving the oversight of above-ground storage facilities. This study, due by January 1, 1992, will determine the extent to which above-ground tanks will be subject to a state inspection program.

OSHA also addresses the above-ground storage of hazardous materials. These regulations, found in Title 8, Section 5595 of the California Code of Regulations, establish requirements for drainage, dikes and walls to prevent accidental discharge from endangering employees or facilities.

Polychlorinated Biphenyls (PCBs)

PCBs are organic oils that were formerly used in many pieces of electrical equipment, including transformers and capacitors, primarily as electrical insulators. Years after their widespread and commonplace installation, it was discovered that PCBs cause various human health effects including cancer. PCBs are highly persistent in the environment.

In the early 1980s, EPA banned the use of PCBs in future electrical equipment and began a program to phase out PCB-containing portions of existing equipment. As part of the phase-out program, Pacific Gas & Electric Company (PG&E) has an active program to remove all PCB-containing transformers and replace them with equipment containing nonhazardous materials. Where PCB-containing transformers remain, they must be labeled.

The TSCA, which authorized EPA to regulate the production, use, distribution and disposal of certain chemicals, specifically mandated EPA to regulate PCBs. Title 40, Section 761.00 of the Code of Federal Regulations contains these regulations. The TSCA set dates for the removal of PCB-containing articles. As of October 1, 1985, the use and storage for reuse of PCB transformers (defined as containing 500 ppm PCB or more) that pose an exposure risk to food or feed is prohibited. In addition, the installation of PCB transformers in or near commercial buildings was prohibited. The EPA also required that all PCB transformers must be registered with fire personnel as of December 1, 1985 whether in use or in storage, and be inspected every three months. If a leak is found, the area must be contained to prevent exposure, and the leak must be eliminated.

As of October 1, 1990, the use of network PCB transformers is prohibited and all existing network PCB transformers must be removed. All PCB radical transformers must be equipped with electrical protection to avoid transformer failure due to high or low currents.

Asbestos

Asbestos, a naturally occurring fibrous material, was used as a fireproofing and insulating agent in building construction before such uses were banned by EPA in the 1970s. Asbestos use was eliminated because it was discovered to cause lung diseases in persons exposed to its airborne fibers. It was widely used prior to the discovery of its health effects; therefore, asbestos may be found in walls, ceiling, floors (tile), and building coating materials. The legal definition of asbestos-containing materials includes all construction materials that contain more than 0.1% asbestos by weight.

Inhalation of airborne particulates is the primary mode of asbestos entry into the body, making friable (easily crumbled) materials the greatest health threat. For this reason, it is regulated both as a hazardous air pollutant under the Clean Air Act and as a potential worker safety hazard, under the authority of OSHA. These regulations prohibit emissions of asbestos-related manufacturing, prohibit demolition or construction activities that could disturb asbestos, specify precautions and safe work practices that must be followed to minimize the potential for release of asbestos fibers, and require notice to federal and local governmental agencies prior to beginning renovation or demolition that could disturb asbestos. In the San Francisco Bay Area the agencies with primary responsibility for asbestos safety are the Bay Area Air Quality Management District, Cal/OSHA, Fed/OSHA and the EPA.

- Because the EPA has delegated the enforcement responsibility of all National Environmental Standard Hazardous Air Pollutants (NESHAP) requirements, including asbestos, to the BAAQMD, the BAAQMD is responsible for regulating the removal of friable asbestos of one percent or more. Although it was necessary at one time to notify the EPA of any intentions to demolish buildings, this is no longer required. Instead, BAAQMD must be notified ten days prior to a demolition, regardless of whether or not the buildings are known to contain asbestos. This requirement also applies to the removal of asbestos from areas of at least 100 square or linear feet./1/

- The Asbestos Hazards Emergency Response Act (AHERA) has also given EPA the authority to regulate abatement methods and establish standards for exposure levels during and following abatement activities, but AHERA only applies to public and non-profit private schools (K-12). AHERA spells out accreditation standards for the training of personnel involved in asbestos abatement at these schools, and in November 1992, the EPA is expected to implement regulations recently mandated by Congress that extend the training provisions of AHERA to those working on other public and commercial projects./2/

Some state regulations on asbestos are more stringent than federal regulations. For example, California requires licensing of contractors who conduct abatement activities.

In conformance with the Federal Clean Air Act, the Bay Area Air Quality Management District may require permits for monitoring and containment of asbestos during construction and demolition activities.

Air Toxics

The *Air Toxics "Hot Spots" Information and Assessment Act of 1987* (AB 2588) requires specified facilities to submit to the local air quality control agency a plan to inventory air toxics emissions for a specified list of substances. After the inventory plan is approved, the facility must implement the plan and submit the resulting facility air toxics emission inventory to the agency. In the San Francisco Bay Area, the Bay Area Air Quality Management District (BAAQMD) implements AB 2588. After BAAQMD receives completed emission inventories, it will be required to identify priority facilities for which health risk assessments must be performed.

● NOTES - Hazardous Materials Regulatory Setting

● /1/ Bernardo, Naomi, Air Quality Technician, Bay Area Air Quality Management District, telephone conversation, February 10, 1992.

● /2/ Lanier, Don, Compliance Monitor, Environmental Protection Agency, telephone conversation, February 10, 1992.

TABLE F-1

SAN FRANCISCO INTERNATIONAL AIRPORT

UNDERGROUND TANKS
AIRPORT-OWNED (20) AS OF JANUARY 10, 1991

LOCATION	CAPACITY GALLONS	S.F.I.A. I.D.#	CONTENTS	R.W.Q.C.B. I.D.#	Material	Year Installed
1. Central Pump Station	4,000	1UD	Diesel	38000024230000004	Steel	1969
2. Lomita/Millbrae Pump Station	4,000	2UD	Diesel	38000024230000005	Steel	1969
3. Shuttle Bus Maintenance Base	10,000	3UD	Diesel	38000024230000026	DWFG	1985
4. Shuttle Bus Maintenance Base	550	4UW	Waste Oil	38000024230000027	DWFG	1985
5. Maintenance Base	850	6UW	Waste Oil	38000024230000012	SWFG	1974
6. Maintenance Base	4,000	9UG	Diesel	38000024230000015	SWFG	1974
7. Maintenance Base	10,000	7UG	Unleaded	38000024230000013	SWFG	1974
8. Maintenance Base	6,000	8UG	Leaded	38000024230000014	SWFG	1974
9. Central Plant Fuel Storage Area	40,000	10UF	Diesel	38000024230000016	Steel	1978
10. Central Plant Fuel Storage Area	40,000	11UF	Diesel	38000024230000017	Steel	1978
1. Central Plant Fuel Storage Area	20,000	12UF	Diesel	38000024230000018	SWFG	1976
12. Central Plant Fuel Storage Area	20,000	13UF	Diesel	38000024230000019	SWFG	1976
13. Central Plant Fuel Storage Area	20,000	14UF	Diesel	38000024230000020	SWFG	1976
14. Central Plant Fuel Storage Area	20,000	15UF	Diesel	38000024230000021	SWFG	1976
15. North Terminal	1,000	18UF	Diesel	38000024230000009	*Steel	1990
16. Field Lighting Bldg. Firehouse #2	6,000	20UF	Diesel	38000024230000011	Steel	1954
17. H & I Connector	1,000	19UF	Diesel	38000024230000010	*SFDW	1990
18 Parking Garage	1,000	17UD	Diesel	38000024230000008	*DWFG	1986
19. International Terminal	4,000	16UP	Diesel	38000024230000023	*Steel	1990
20. South Terminal E/End	2,000	21UD	Diesel	—	Steel	1988

Note: SWFG – Single Wall Fiberglass
DWFG – Double Wall Fiberglass
* – Vaulted
SFDW – Steel Fiberglass Double Wall

TABLE F-2

San Francisco International Airport

Airport-owned
Above Ground Storage Tanks

	Location	Capacity (gallons)	Contents	Age
1.	Treatment Plant	1,200	Diesel	1989 - 1 year
2.	Int'l Terminal	1,000	Diesel	1987 - 3 years
3.	Feild Lighting Building No. 2	4,000	Diesel	1984 - 6 years
4.	Central Plant Garage	1,000	Diesel	1976 - 14 years
5.	Plot 50 B-1 JAL Cargo Facilities	260	Diesel	1980 - 10 years

SAN FRANCISCO INTERNATIONAL AIRPORT
UNDERGROUND TANKS
TENANT OWNED (36)
Revised (12/12/90)

TABLE F-3

TENANT		CAPACITY GALLON	USE	I.D.	MATERIAL	YEAR INSTALLED
1. AMERICAN	1 Superbay Hangar	8,600	Unleaded	AAL-ULG-2	Steel	Unknown
2. AVIS	2 Rent-A-Car Facility	10,000	Unleaded	AVS-4 UG	DWFG	1986
	Rent-A-Car Facility	10,000	Unleaded	AVS-5 UG	DWFG	1986
3. BUDGET	4 Rent-A-Car Facility	12,000	Unleaded	BUD-1 UG	DWFG	1990
	Rent-A-Car Facility	12,000	Unleaded	BUD-2 UG	DWFG	1990
	Rent-A-Car Facility	1,000	Oil Product	BUD-3 UO	DWFG	1990
	Rent-A-Car Facility	6,000	Diesel	BUD-4 UD	DWFG	1990
4. CHEVRON (Gas Station)	4 Gas Station	1,000	Oil Waste	CHV-ULG 4	DWFG	1986
	Gas Station	10,000	Unleaded	UL #6670	DWFG	1986
	Gas Station	10,000	Unleaded	UL #6668	DWFG	1986
	Gas Station	10,000	Leaded	UL #6667	DWFG	1986
5. DOLLAR	1 Rent-A-Car Facility	10,000	Unleaded	DOL-1-UG	DWFG	1990
6. FAA	5 ALS Runway 28R	2,000	Diesel	FAA-1 UD	Steel	Unknown
	Air Traffic Control Tower	2,000	Diesel	FAA-2 UD	Steel	1990
	Glide Slope Runway 28	550	Unleaded	FAA-3 UD	Steel	Unknown
	GWQ Localizer	1,000	Diesel	FAA-4 UD	Steel	Unknown
	Remote Transmitter Receiver	550	Unleaded	FAA-5 UD	Steel	Unknown
7. HERTZ	4 Rental Car Facility	12,000	Unleaded	HRT-ULG 1	DWFG	1986
	Rental Car Facility	12,000	Unleaded	HRT-ULG 2	DWFG	1986
	Rental Car Facility	10,000	Unleaded	HRT-ULG 3	DWFG	1985
	Rental Car Facility	10,000	Diesel	HRT-UD 4	DWFG	1985
8. NATIONAL	5 Rental Car Facility	10,000	Unleaded	NAT-ULG-1	SWFG	1976
	Rental Car Facility	10,000	Unleaded	NAT-ULG-2	SWFG	1976
	Rental Car Facility	10,000	Unleaded	NAT-ULG-3	SWFG	1976
	Rental Car Facility	10,000	Unleaded	NAT-ULG-4	SWFG	1975
	Rental Car Facility	350	Oil Product	NAT-UO-5	Unknown	1976
9. SHELL OIL CO.	1 Shell Satellite II	6,000	Oil Waste	SHL-5 UW	DWFG	1986
10. TWA	1 TWA Maintenance Facility	10,000	Unleaded	TWA-1-UG	DWFG	1984
11. UNITED	6 Bldg. 15 West (Aux. Fuel Tank for Generators)	8,000	Jet Fuel	UAL-MOC-1W	VCS	1982
	Bldg. 51	4,000	Fuel Oil	UAL-MOC-5US	VCS	1969
	Bldg. 56	1,500	Solvent	UAL-MOC-6US	VCS	1971
	Bldg. 84 (Dirty Solvent Tank)	1,000	Solvent	UAL-MOC-7US	VCS	1968
	UAL-MOC (Calibration Fluid Tank-West)	1,200	Calibration Fluid	UAL-MOC-12UO	Carbon Steel	1971
	UAL-MOC (Calibration Fluid Tank-East)	1,200	Calibration Fluid	UAL-MOC-13UO	Carbon Steel	1971
12. PAN AM	2 Pan Am Maintenance Facility	6,800	Waste Oil	PAA-1-UW	Carbon Steel	1963
	Pan Am Maintenance Facility	10,000	Diesel	PAA-2-UF	Unknown	1963

NOTES: DWFG - Double Wall Fiberglas
SWFG - Single Wall Fiberglas
VCS - Vaulted Carbon Steel

APPENDIX G: <u>TRANSPORTATION</u>

TABLE G-1: VEHICULAR LEVELS OF SERVICE AT SIGNALIZED INTERSECTIONS

Level of Service	Description	Volume/Capacity (v/c) Ratio/a/
A	Level of Service A describes a condition where the approach to an intersection appears quite open and turning movements are made easily. Little or no delay is experienced. No vehicles wait longer than one red traffic signal indication. The traffic operation can generally be described as excellent.	less than 0.60
B	Level of Service B describes a condition where the approach to an intersection is occasionally fully utilized and some delays may be encountered. Many drivers begin to feel somewhat restricted within groups of vehicles. The traffic operation can generally be described as very good.	0.61-0.70
C	Level of Service C describes a condition where the approach to an intersection is often fully utilized and back-ups may occur behind turning vehicles. Most drivers feel somewhat restricted, but not objectionably so. The driver occasionally may have to wait more than one red traffic signal indication. The traffic operation can generally be described as good.	0.71-0.80
D	Level of Service D describes a condition of increasing restriction causing substantial delays and queues of vehicles on approaches to the intersection during short times within the peak period. However, there are enough signal cycles with lower demand such that queues are periodically cleared, thus preventing excessive back-ups. The traffic operation can generally be described as fair.	0.81-0.90
E	Capacity occurs at Level of Service E. It represents the most vehicles that any particular intersection can accommodate. At capacity there may be long queues of vehicles waiting upstream of the intersection and vehicles may be delayed up to several signal cycles. The traffic operation can generally be described as poor.	0.91-1.00
F	Level of Service F represents a jammed condition. Back-ups from locations downstream or on the cross street may restrict or prevent movement of vehicles out of the approach under consideration. Hence, volumes of vehicles passing through the intersection vary from signal cycle to signal cycle. Because of the jammed condition, this volume would be less than capacity.	1.01+

/a/ Capacity is defined as Level of Service E.

SOURCE: Environmental Science Associates, Inc. from *Transportation Research Circular No. 212*, Transportation Research Board, 1980.

TABLE G-2: TRAFFIC LEVELS OF SERVICE FOR FREEWAYS

Level of Service	Description	Volume/Capacity (v/c) Ratio/a/
A	Level of Service A describes a condition of free flow, with low volumes and high speeds. Traffic density is low, with speeds controlled by driver desires, speed limits, and physical roadway conditions. There is little or no restriction in maneuverability due to the presence of other vehicles, and drivers can maintain their desired speeds with little or no delay.	0.00-0.60
B	Level of Service B is in the higher speed range of stable flow, with operating speeds beginning to be restricted somewhat by traffic conditions. Drivers still have reasonable freedom to select their speed and lane of operation. Reductions in speed are not unreasonable, with a low probability of traffic flow being restricted.	0.61-0.70
C	Level of Service C is still in the zone of stable flow, but speeds and maneuverability are more closely controlled by the higher volumes. Most of the drivers are restricted in their freedom to select their own speed, change lanes, or pass. A relatively satisfactory operating speed is still obtained.	0.71-0.80
D	Level of Service D approaches unstable flow, with tolerable operating speeds being maintained though considerably affected by changes in operating conditions. Fluctuations in volume and temporary restrictions to flow may cause substantial drops in operating speeds. Drivers have little freedom to maneuver, and comfort and convenience are low, but conditions can be tolerated for short periods of time.	0.81-0.90
E	Level of Service E cannot be described by speed alone, but represents operations at even lower operating speeds (typically about 30 to 35 mph) than in Level D, with volumes at or near the capacity of the highway. Flow is unstable, and there may be stoppages of momentary duration.	0.91-1.00
F	Level of Service F describes forced flow operation at low speeds (less than 30 mph), in which the freeway acts as storage for queues of vehicles backing up from a restriction downstream. Speeds are reduced substantially and stoppages may occur for short or long periods of time because of downstream congestion. In the extreme, both speed and volume can drop to zero.	1.01+

/a/ Capacity is defined as Level of Service E.

SOURCE: Environmental Science Associates, Inc. from information in the *Highway Capacity Manual*, Special Report 87, Highway Research Board, 1965.

TABLE G-3: VEHICULAR LEVELS OF SERVICE AT UNSIGNALIZED INTERSECTIONS

Level of Service	Description
A	Level of Service A describes a condition where the approach to an intersection appears quite open and turning movements are made easily. Little or no delay is experienced. The traffic operation can generally be described as excellent.
B	Level of Service B describes a condition where the approach to an intersection is occasionally fully used and some delays may be encountered. Many drivers begin to feel somewhat restricted within groups of vehicles. The traffic operation can generally be described as very good.
C	Level of Service C describes a condition where the approach to an intersection is often fully used and back-ups may occur behind turning vehicles. Most drivers feel somewhat restricted, but not objectionably so. The traffic operation can generally be described as good.
D	Level of Service D describes a condition of increasing restriction causing substantial delays and queues of vehicles on approaches to the intersection during short times within the peak period. The traffic operation can generally be described as fair.
E	Capacity occurs at Level of Service E. It represents the most vehicles that any particular intersection can accommodate. At capacity there may be long queues of vehicles waiting up-stream of the intersection and vehicles may experience very long delays. The traffic operation can generally be described as poor.
F	Level of Service F represents a jammed condition. Insufficient gaps of suitable size exist to permit movement of vehicles out of the approach under consideration. Extremely long delays occur, and drivers may select smaller than usual gaps. In such cases, safety may be a problem. This condition usually warrants improvement to the intersection.

SOURCE: Environmental Science Associates, Inc. from *Highway Capacity Manual*, Special Report 209, Transportation Research Board, 1985.

TABLE G-4: CUMULATIVE DEVELOPMENT VEHICLE TRIP GENERATION, A.M. and P.M. PEAK HOURS

Cumulative Development*		Units	A.M. Peak Hour Rate In	A.M. Peak Hour Rate Out	A.M. Peak Hour Trips In	A.M. Peak Hour Trips Out	A.M. Peak Hour Total Trips	P.M. Peak Hour Rate In	P.M. Peak Hour Rate Out	P.M. Peak Hour Trips In	P.M. Peak Hour Trips Out	P.M. Peak Hour Total Trips
Burlingame:/a/												
Hotel Rooms	1,325.00	Room	0.35	0.18	464	238	702	0.27	0.22	358	291	649
Restaurants	535.00	KSF	10.70	8.41	5,725	4,499	10,224	10.57	9.37	5,655	5,013	10,668
Office Space	714.00	KSF	1.32	0.20	942	143	1,085	0.23	1.18	164	843	1,007
Hyatt Regency Hotel	791.00	Room	0.35	0.18	277	142	419	0.27	0.22	214	174	388
Millbrae:/b/												
Millbrae Waterfront Park	2.80	Acre	0.30	0.16	1	0	1	0.19	0.36	1	1	2
San Bruno:/c,d,e,f/												
Bayhill 8 Office Space	250.00	KSF	1.55	0.23	387	57	444	0.27	1.43	67	357	424
Bayhill 8 Senior Housing	150.00	DU	0.20	0.55	30	82	112	0.63	0.37	94	55	149
Bayhill 8 Hotel Suites	300.00	Suite	0.28	0.23	84	69	153	0.27	0.31	81	93	174
Tanforan Park	128.30	KSF	0.81	0.81	104	104	208	2.87	2.87	368	368	736
Town Center	109.00	KSF	0.86	0.86	94	94	188	2.21	2.21	241	241	482
94-Unit Motel Suites	94.00	Suite	0.21	0.17	20	16	36	0.14	0.19	13	18	31
US Navy Office Space	107.20	KSF	1.72	0.26	184	28	212	0.31	1.64	33	176	209
US Navy Housing Units	110.00	DU	0.20	0.55	22	60	82	0.63	0.37	69	41	110
South San Francisco:/g,h/												
Marriott Courtyard	152.00	room	0.35	0.18	53	27	80	0.27	0.22	41	33	74
Hampton Inn/i/	140.00	room	0.35	0.18	49	25	74	0.27	0.22	38	31	69

/a/ Monroe, Margaret, City Planner, City of Burlingame, telephone conversation April 27, 1990 and letter to DKS Associates, May 2, 1990. Included in letter: Burlingame Hotel Development as of 10/86 and updated to 7/89; Burlingame Bayfront Specific Area Plan Exhibit M; Northern Bayfront Area Development list of completed projects revised 12/1/89.

/b/ Department of Community Development, City of Millbrae, telephone conversation, April 27, 1990.

/c/ Foscardo, George, Director of Planning and Building, City of San Bruno, telephone conversation, April 27, 1990.

/d/ City of San Bruno, North San Bruno Areawide Traffic Study Final Report, prepared by DKS Associates, December 1986.

/e/ City of San Bruno, Tanforan Park - Proposed Median Break on El Camino Real, prepared by DKS Associates, August 30, 1988.

/f/ City of San Bruno, Bayhill VIII Traffic Study, prepared by DKS Associates, May 17, 1989.

/g/ Cordes, Ken, City of South San Francisco Planning Department, telephone conversation, April 27, 1990.

/h/ City of South San Francisco, "Major Projects in South San Francisco," May 1990.

/i/ The analysis would remain essentially the same with deletion of one project and the addition of another. Carlson, Steve, Senior Planner, City of South San Francisco Planning Department, telephone conversation, March 27 and June 17, 1991. The "Precise Plan" approved for Hampton Inn expired in 1990. A new Genentech project, a 225,000-sq.-ft. research and development building, has subsequently been approved.

* Cumulative development was assumed to be built out by 1996 in Millbrae, San Bruno, and South San Francisco. In Burlingame the Hyatt Regency Hotel and 38 percent of other development was assumed to be built out in 1996.

Note: DU = dwelling units; KSF = thousands of gross square feet of floor area.

SOURCES: ITE and DKS Associates

TABLE G-5: PROJECT TRIP GENERATION 1996 A.M. AND P.M. PEAK HOURS

Name		Units	A.M. Peak Hour Rate In	A.M. Peak Hour Rate Out	A.M. Peak Hour Trips In	A.M. Peak Hour Trips Out	A.M. Peak Hour Total Trips	P.M. Peak Hour Rate In	P.M. Peak Hour Rate Out	P.M. Peak Hour Trips In	P.M. Peak Hour Trips Out	P.M. Peak Hour Total Trips
APM Interim Maint. Facility	60.00	KSF	0.85	0.12	51	7	58	0.13	0.91	8	55	63
Pan Am Maintenance Hangar	100.67	KSF	0.85	0.12	86	12	98	0.13	0.91	13	92	105
Service Station Relocate	0.10	KSF	0.85	0.12	0	0	0	0.13	0.91	0	0	0
New Bldg/Const/Engine Office	5.80	KSF	0.46	0.07	3	0	3	0.08	0.42	0	2	3
Unconstrained Growth A.M.	824.00	Enp	1.10	0.88	904	728	1,632					
Unconstrained Growth P.M.	895.00	Enp						0.950	1.030	856	922	1,772
UAL Catering Facility	46.20	KSF	0.85	0.12	39	6	45	0.13	0.91	6	42	48
UAL Cargo Facility Expand	36.28	KSF	0.85	0.12	31	4	35	0.13	0.91	5	33	38
W. Field Cargo/Maint.	268.70	KSF	0.85	0.12	228	32	260	0.13	0.91	35	245	280
American GSE	7.50	KSF	0.85	0.12	6	1	7	0.13	0.91	1	7	8
E. Field Cargo/Maint.	226.44	KSF	0.85	0.12	192	27	219	0.13	0.91	29	206	235
FBO Facility	1.89	KSF	0.85	0.12	2	0	2	0.13	0.91	0	2	2
N. Field Cargo/Maint.	237.00	KSF	0.85	0.12	201	28	229	0.13	0.91	31	216	247
Multipurpose Facility	5.00	KSF	0.85	0.12	4	1	5	0.13	0.91	1	5	6

SOURCES: ITE, DKS Associates

TABLE G-6: PROJECT TRIP GENERATION 2006 A.M. AND P.M. PEAK HOURS

Name		Units	A.M. Peak Hour Rate In	A.M. Peak Hour Rate Out	A.M. Peak Hour Trips In	A.M. Peak Hour Trips Out	A.M. Peak Hour Total Trips	P.M. Peak Hour Rate In	P.M. Peak Hour Rate Out	P.M. Peak Hour Trips In	P.M. Peak Hour Trips Out	P.M. Peak Hour Total Trips
Pan Am Maintenance Hangar	100.67	KSF	0.85	0.12	86	12	98	0.13	0.91	13	92	105
Service Station Relocate	0.10	KSF	0.85	0.12	0	0	0	0.13	0.91	0	0	0
100K Office Building	86.94	KSF	0.46	0.07	40	6	46	0.08	0.42	7	37	43
New Bldg/Const/Engine Office	5.80	KSF	0.46	0.07	3	0	3	0.08	0.42	0	2	3
Unconstrained Growth A.M.	1,428.00	Enp	1.10	0.88	1,567	1,261	2,827					
Unconstrained Growth P.M.Enp	1,552.00	Enp						0.950	1.030	1,474	1,599	3,073
UAL Catering Facility	46.20	KSF	0.85	0.12	39	6	45	0.13	0.91	6	42	48
UAL Cargo Facility Expand	36.28	KSF	0.85	0.12	31	4	35	0.13	0.91	5	33	38
W. Field Cargo/Maint.	268.70	KSF	0.85	0.12	228	32	260	0.13	0.91	35	245	280
American GSE	7.50	KSF	0.85	0.12	6	1	7	0.13	0.91	1	7	8
W. Field Cargo/Maint.	102.00	KSF	0.85	0.12	87	12	99	0.13	0.91	13	93	106
US Post Office	132.00	KSF	0.85	0.12	112	16	128	0.13	0.91	17	120	137
APM Maintenance Facility	60.00	KSF	0.84	0.12	50	7	58	0.12	0.91	7	55	62
E. Field Cargo/Maint.	226.44	KSF	0.85	0.12	192	27	219	0.13	0.91	29	206	235
FBO Facility	1.89	KSF	0.85	0.12	2	0	2	0.13	0.91	0	2	2
N. Field Cargo/Maint.	237.00	KSF	0.85	0.12	201	28	229	0.13	0.91	31	216	247
Multipurpose Facility	5.00	KSF	0.85	0.12	4	1	5	0.13	0.91	1	5	6

SOURCES: ITE, and DKS Associates

OFF-SITE AIR TERMINALS

Technical Aspects

The term "off-airport terminal" encompasses a variety of possible arrangements to get air passengers to (and from) an airport from remote locations. Depending upon the layout of the airport, characteristics of travellers, origins and destinations of travellers, and space available at remote locations, some or all of the following services could be provided:

- Scheduled coach or van express service from a remote location;
- Competitively priced (or free) parking;
- Comfortable waiting area;
- Ticket sales;
- Seat selection; and
- Baggage check-in.

The first three of these are the minimum characteristics of an "off-airport terminal". There is really little difference between this level of service and typical airport express transit service. On the basis of this definition, SFIA already has some level of off-airport terminal capability. The Marin Airporter has the most extensive service. It runs coaches from several locations. The Larkspur Landing location had, until 1991, provided space for airline ticket agents from United and American Airlines to sell tickets, check in bags, and have customers select seats. The basic coach service and one airline ticket agent still remain. Other airporter services to SFIA are described in Section III (Environmental Setting) of the EIR, on pp. 130 - 134.

Issues Affecting Feasibility

The potential effectiveness of diverting auto traffic to the off-Airport operation would depend on a number of factors, including:

- Frequency and reliability of bus or limo service;
- Accessibility of the remote location;
- Adequacy and price of parking, versus Airport parking characteristics;
- Efficiency of check-in services (if any) versus that of the airline terminal service; and
- Density of the market near the off-Airport terminal.

The recent experience of the Marin Airporter at the Larkspur Landing terminal, where ticketing and baggage check services were added to an established airport express transit service, highlights several issues relating to off-airport terminal operation. When ticketing and baggage check-in services were added, the following difficulties arose:

- Since coaches left every half-hour, passengers tended to arrive with about ten minutes to spare. This put a severe burden on the check-in agents who were not adequately equipped to handle such peaking of traffic.

- The ticket service was used mostly as a local ticket office rather than a convenience for same-day airline passengers. There was also a conflict between handling of ticket purchasers who were not flying that day and baggage check-in operations.

- The service did not really attract additional patronage to the Marin Airporter.

Eventually, baggage check-in operations were curtailed, and one of the airlines closed its ticket office.

In the Los Angeles area, the Van Nuys FlyAway Service is operated by the Los Angeles Department of Airports. This is an express bus service from the San Fernando Valley to Los Angeles International Airport which has seven air carriers providing ticketing at the terminal; baggage cannot be checked. This service recently reduced fares from nine dollars to four dollars. Apparently, this reduction did not have an immediate effect on the number of airline passengers using the service; however, airport employees found it to be a convenient service. Recent reports indicate that air passenger service is up.

Potential Effectiveness in Mitigating Airport Traffic Congestion

Additional off-Airport terminal capacity for SFIA would need to accomplish some, or all, of the following:

- Provide additional frequency at existing off-Airport locations;

- Seek out current gaps in off-Airport terminal operation, and encourage new service in this market. This would include opening new terminals and starting new coach services.

- Determine the level of bonus services such as baggage check-in and ticketing that could reasonably be provided, and the potential to attract new riders as a result of this additional service; and

- Identify the level to which users of additional off-Airport terminal services would be diverted from private automobiles, or other transit services.

Caltrans is currently funding a research project at the Institute for Transportation Studies at the University of California at Berkeley, titled: Feasibility Study for a California Off-Airport Terminal Demonstration Program. In part of this research project, air passenger survey data taken by the Metropolitan Transportation Commission (MTC) will be evaluated to determine current gaps in express transportation services to Bay Area airports. Should the results of this research indicate that a potential market for additional off-Airport terminals exists, SFIA would then be in a position to participate in efforts to increase the level of off-Airport terminal activity.

If off-Airport terminal services were initiated successfully, it would have the potential to reduce vehicle congestion at Airport approaches and regional routes to and from the airport. It is impossible to quantify the effects of such actions without a specific service under consideration.

Institutional Feasibility

The San Francisco Airports Commission charter (Section 3.691) prohibits the Airport from offering a transit service to an off-Airport terminal. SFIA cannot operate a transit system in competition with existing ground transportation services. As a result of this prohibition, SFIA has not been able to take advantage of a Caltrans demonstration project relating to off-Airport terminals. Therefore, for SFIA to engage directly in any activity related to implementing an off-Airport terminal would involve an amendment to the Airport's charter.

Alternatively, it might be possible for Caltrans to work with a private operator or an existing transit agency (e.g., SamTrans, AC Transit) to improve transit/off-Airport terminal services to SFIA.

On the basis of available information, it appears that adding off-Airport terminal capacity could reduce automobile travel to the Airport. As noted above, however, the Airport is prohibited by charter from offering, or being involved in such services. If additional services are to be offered, it would have to be the work of private- or public-transit operators. These operators would make decisions on whether to provide additional service, based on the potential profitability of the service.

Off-Airport terminals are part of the transit system to the Airport. Several mitigation measures related to increasing transit mode share are already suggested in the EIR. Any efforts to increase transit mode share would increase the attractiveness to private businesses to expand on or implement new off-Airport terminal services.

APPENDIX H: UTILITIES AND SERVICES

TABLE H-1: PROPOSED SFIA MASTER PLAN IMPROVEMENTS TO EXISTING UTILITIES

Proposed Improvements	Which Utility Affected	What Will Happen
North Access Road Improvements	• Water • Sanitary Sewer	Relocation of existing water and sewer mains from adjoining future development parcels.
New Building Construction	• Water	Relocation of existing water mains.
General Aviation Facilities Relocation	• Sanitary Sewer	Additional Sewer Main to Access proposed site Addition of a new lift.
Construction of Boarding Area G	• Sanitary Sewer	Relocation of 18-inch force main to the perimeter of the apron
Construction of Ground Transportation Center	• Sanitary Sewer System	Rerouting of sewer lines to exterior.
	• Industrial Waste Sewer	Rerouting of IWSS lines.
1. Building construction increases runoff	• Drainage	Resizing and relocation of the existing drainage facilities serving the present car rental parking lots.
Construction of East Field Maintenance Hangar	• Industrial Waste • Sewer System	Local system for this area requires the replacement of the current 4-inch diameter main to an 8-inch diameter main and that the local lift station capacity be increased.

(Continued)

TABLE H-1: PROPOSED SFIA MASTER PLAN IMPROVEMENTS TO EXISTING UTILITIES (Continued)

Proposed Improvements	Which Utility Affected	What Will Happen
1. Building construction increases runoff	• Drainage	Resizing of current 42-inch storm drain to 48-inch and relocation into new roadway.
Expansion of Parking Lots D and DD (area currently underserved; expansion will increase drainage)	• Drainage	Addition of 48-inch drain to current 48-inch to increase capacity for current flooding and increased runoff
North and West Field Cargo/Maintenance Facilities	• Drainage	Drainage lines in each of these areas will be relocated to new roadway system

SOURCE: *SFIA Final Draft Master Plan*, 1989

TABLE H-2: EXISTING SFIA UTILITIES AND MISCELLANEOUS STRUCTURES, 1989

61 United Boilerhouse
89 United Water Storage Tank
91 Cold Storage

Utilities:
14 Electrical Substation
22 Electrical Substation
29 Electrical Substation
37 Electrical Substation
75 Electrical Substation
77 Electrical Substation
78 Main Substation
27 Water Quality Control Plant
87 Water Quality Control Plant
30 Wastewater Pumping Plant
36 Wastewater Pumping Plant
Industrial Waste Treatment
66 Pump House
85 Pump Station
92 Pump Station
73 Drainage Pumping Plant
74 Drainage Pumping Plant
76 Drainage Pumping Plant
79 Drainage Pumping Plant

Fueling Bulk Storage:
24 Standard Oil Fuel Farm
25 Pacific SW Trading Fuel Farm
26 Pacific SW Trading Fuel Farm

Day Storage:
69 Shell Storage Tanks
86 Shell Garage/Warehouse
70 Union Storage Tanks
71 PST Tanks
72 PST Tanks

Miscellaneous
Multi-Purpose Harbor Dock
U.S. Coast Guard
Ramps
Pumps
Fuel Hydrants
Tank Farm

SOURCES: Table 6.3, *SFIA Final Draft Master Plan*, 1989; Airports Commission, 1990; Environmental Science Associates, 1990.

TABLE H-3

SAN FRANCISCO INTERNATIONAL AIRPORT FIRE DEPARTMENT

- A P P A R A T U S   I N V E N T O R Y -

	MOBILE #	MANUFACTURER YEAR	WATER GALLONS	FOAM GALLONS	CHEMICAL POUNDS	PUMP GPM	TURRET GPM	HOSE REELS	HOSE	MANNING	COMPANY	STATION
OPERATIONAL EQUIPMENT	#31	Ford '87	EMT vehicle with all standard first-aid equipment, rescue equipment & tools							0-2	3	1
	#36	Ford '73	Tractor towing boat trailer (M54) and 34' Rescue/Fire Boat (M55).									
	#37	Oshkosh '80	4000	515	—	1900	1800/900	2-150' 1½"	—	0-2	1	1
	#38	Oshkosh '81	4000	515	—	1900	1800/900	2-150' 1½"	—	0-2	2	2
	#40	Oshkosh '85	3000	410	500 Halon	1800	1500/750	1-150' 1"	—	0-2	1	1
	#41A	Oshkosh '88	3000	410	500 Halon	1800	1500/750	1-150' 1"	—	1-2	2	2
	#42A	Ford '85	Fire Commanders Vehicle							1-0		
	#43	GMC '77	Vehicle towing 21' 6" Boston Whaler Rescue Boat									
	#45	Grumman '81	5000	50	—	1500	—	1-200' 1"	600' 3" 500' 5"	0-1	3	1
	#47A	LTI '88 (Quint)	400	30	—	1500	—	1-250' 1"		1-2	3	1
	#54	Boat Trailer	Fifth wheel trailer to tow 34' Rescue/Fire Boat.									
	#55	Fire Boat '88	34' Rescue/Fire Boat equipped with two (2) full sets of scuba gear, miscellaneous rescue equipment and twenty 20-person rescue platforms.							0-1	1	1
AUXILIARY EQUIPMENT	#32	LaFrance '65	500	50	—	1000	—	2-200' 1"	600' 3" 500' 5"	—	-	-
	#39	Oshkosh '81	1500	205	500	1000	750 foam	1-150' 1"	—	—	-	-
	#44	Mack '71	75' elevating platform (Aerialscope) with standard ladder complement & special entry/overhaul tools.							—	-	-
	#41	Yankee '60	1400	300	—	750	500	1-200' 1"	—	—	-	-
RESCUE EQUIPMENT	Light Units (2)		Each has five (5) fixtures (90,000 lumens each fixture), auxiliary generator, diesel power. Elevates to 10'. Also, two (2) single fixtures on 12' stands.									
	Foam Trailer		Presently being outfitted - 4000-gallon AFFF.									
	Hose Trailer		Carries 2500' of 5" hose - portable hydrants & fittings.									

DIVISION VEHICLES

# 6	Chevrolet	Operations Officer's vehicle	#33	Ford	Scuba Van
# 7	Plymouth	Fire Chief's vehicle	#46	Pick-up	Safety Officer's vehicle
#30A	Plymouth	Fire Marshal's vehicle			

CONSANT STAFFING LEVEL - 3-Officers / 14-Firefighters

APPENDIX I: FAA AND *CASP* ALTERNATIVES

SFBAA TASK FORCE RECOMMENDATIONS

Recommendations and assumptions for San Francisco Bay Area air carrier airports from *San Francisco Bay Area Airports Task Force Capacity Study of SFO, SJC and OAK International Airports* (prepared jointly by FAA, Bay Area International Airports Staffs, Air Transport Association, and the Airlines serving the San Francisco Bay Area), 1987:

"The San Francisco Bay Area Airports Capacity Task Force evaluated the operation of each airport and the potential benefits of the proposed improvements in terms of airfield capacity, demand, and delays. When appropriate, it used the airfield simulation model to determine peak period aircraft delays for current and future operations.

The task force annualized the peak period delays to determine the potential economic benefits of the proposed improvements, including different runway use strategies. The annualized delays indicate the efficiency of the existing system and provide a method for comparing the benefits of the proposed changes.

A dollar value was attached to each minute of average annual aircraft delay for both present and proposed operations. This made it possible to make several comparisons to establish the relative benefits, costs, and priorities of each item. These include: annual delay cost associated with each current operation (baseline case); reduction in delay costs from proposed improvements; cost benefit of the delay reduction versus the annualized implementation cost; and a method of prioritizing the proposed improvements based on a ranking of the resultant delay reductions.

The delay reduction proposals for San Francisco, Oakland and San Jose international airports are classified by category: airfield improvements; facilities and equipment (navigational aids); air traffic control procedures; and user improvements. The delay reduction recommendation for each airport listed by category, are shown in Tables I-1, I-2 and I-3. (SFBAA Task Force Study, p. 6)

TABLE I-1: RECOMMENDED ACTION PLAN FOR SAN FRANCISCO INTERNATIONAL AIRPORT

IMPROVEMENTS	Annual Savings/a/ ($ Millions/ Hours, Ths.)	Type of Action/b/	Time Frame/c/	Responsible Group
• Airfield				
1. Create holding areas near R/W 10 L/R, 1R and 28R	---/---/d/	Achievable	Near Term	Airport
2. Improve noise barrier for R/W 1R	$2.6/1.4	Achievable	Near Term	Airport
3. Extend R/W 19L/R	$57.1/31.5	Master Plan	Far Term	Airport
4. Extend R/W 28L/R	$151.7/83.7	Master Plan	Far Term	Airport
5. Construct independent, parallel R/W 28	$67.0/36.9	Master Plan	Far Term	Airport
6. Extend taxiway C to threshold R/W 10L	---/---/d/	Achievable	Near Term	Airport
7. Create high speed exit from R/W 10L between taxiway L and P	---/---/d/	Achievable	Near Term	Airport
8. Extend taxiway T to taxiway B or A	---/---/d/	Achievable	Near Term	Airport
• Air Traffic Control Improvements				
9. Expand visual approach procedure	$7.6/4.2	Achievable	Near Term	FAA
10. Offset instrument approach to R/W 28R	$17.1/9.2	Achievable	Near Term	FAA
11. Use staggered, 1-mile divergent IFR departures on R/W 10L/R	$12.5/6.8	Achievable	Near Term	FAA
• Facilities and Equipment				
12. Install Microwave Landing System (MLS) on R/W 28 and 19	$12.5/6.8	Achievable	Near Term	FAA
• User Improvements				
13. Taxi aircraft across active runways instead of towing	---/---/d/	Achievable	Near Term	Carriers
14. Distribute airline traffic more evenly among three airports	$93.0/53.0	Major Policy	Near Term	Carriers
15. Distribute traffic uniformly within the hour	$11.5/6.2	Major Policy	Near Term	Carriers
16. Divert 50% general aviation aircraft to reliever airports	$17.6/9.5	Major Policy	Near Term	Airport

• Improvements Considered But Not Recommended

1. Construct angled high speed exit for R/W 1: Cost couldn't be justified.
2. Convert taxiways to STOL runways: Not operationally advantageous.
3. Reduce IFR spacing: Not operationally feasible.

TABLE I-2: RECOMMENDED ACTION PLAN FOR SAN JOSE INTERNATIONAL AIRPORT

IMPROVEMENTS	Annual Savings/a/ ($ Millions/ Hours, Ths.)	Type of Action/b/	Time Frame/c/	Responsible Group
• Airfield				
1. Create staging area at R/W 30L/R	---/---/d/	Achievable	Near Term	Airport
2. Extend and upgrade R/W 30R/29	$1.0/1.5	Achievable	Near Term	Airport
3. Create angled exits for R/W 12R	---/---/d/	Achievable	Near Term	Airport
• Facilities and Equipment				
4. Promote use of reliever ILS training facilities	---/---/d/	Achievable	Far Term	FAA
5. Install MLS on R/W 30L	---/---/d/	Achievable		FAA
• Air Traffic Control Improvements				
6. Implement simultaneous departures with Moffett	---/---/d/	Achievable	Near Term	FAA USN

TABLE I-3: RECOMMENDED ACTION PLAN FOR METROPOLITAN OAKLAND INTERNATIONAL AIRPORT

IMPROVEMENTS	Annual Savings/a/ ($ Millions/ Hours, Ths.)	Type of Action/b/	Time Frame/c/	Responsible Group
• Airfield				
1. Construct taxiway from S.E. corner of terminal to R/W 29 approach threshold	---/---/d/	Achievable	Intermediate	Airport
2. Build taxiway parallel to R/W 27L	---/---/d/	Achievable	Intermediate	Airport
3. Add taxiway between north and south complexes	---/---/d/	Achievable	Intermediate	Airport
4. Convert taxiway 1 to air carrier R/W 29 and add parallel taxiway	---/---/d/	Achievable	Intermediate	Airport
5. Enlarge staging pads at entrances to R/W 11/29	---/---/d/	Achievable	Intermediate	Airport
6. Construct additional angled exit off R/W 11	---/---/d/	Achievable	Intermediate	Airport
7. Build penalty box on south side of approach end of R/W 29	---/---/d/	Achievable	Intermediate	Airport
• Facilities and Equipment				
8. Install MLS on R/W 29 and 27	---/---/d/	Achievable	Intermediate	FAA
9. Install a non-directional beacon approach to R/W 29	---/---/d/	Achievable	Intermediate	FAA

NOTE: The task force considers Oakland capacity adequate for forecast levels through 1995. However, it believes the improvements listed above would increase efficiency of aircraft movements on the ground.

NOTES - SFBAA Task Force Capacity Study Tables I-1, I-2 and I-3

/a/ Fiscal year implemented (in 1986 dollars).

/b/ Types of action: Achievable - changes or improvements for which benefits have been clearly identified; on which action may already be underway; and which do not require a major policy change by any of the participating Task Force organizations. Major Policy Change - a change in procedure or operational regulation which requires a major policy revision by one of the Task Force

NOTES - (continued)

organizations. Master Plan Study - a physical change for which the benefits in delay reduction must be evaluated in terms of its environmental and economic consequences by groups outside the task force.
/c/ Time Frame: Near Term - 1991; Intermediate Term - 1996; Far Term - Beyond 1996.
/d/ Savings: Figures not available because improvements were not simulated.

SOURCE (for Tables 1-1, 1-2 & 1-3): San Francisco Area Airports Task Force Capacity Study.

CASP RECOMMENDATIONS

Recommendations and assumptions for San Francisco Bay Area air carrier airports from the *California Aviation System Plan, Draft Report on Action Plan* (July 1989), California Department of Transportation, Division of Aeronautics:

"1990 Conditions

- No air carrier or general aviation operations are redistributed to other airports.

1995 Conditions

- Some air carrier operations are redistributed from San Francisco International to Metropolitan Oakland International and San Jose International Airports.
- Runway extension at San Jose International Airport to provide parallel air carrier runways.

2000 Conditions

- Air carrier operations are redistributed from San Francisco International to Metropolitan Oakland International, San Jose International and a new air carrier airport.
- Air carrier service is added at Travis Air Force Base. There is already an existing joint-use agreement with the military that would permit air carrier operations at Travis Air Force Base.
- Some general aviation operations are relocated from air carrier to general aviation airports.

2005 Conditions

- Air carrier operations are redistributed from San Francisco International to San Jose International, an expanded Metropolitan Oakland International and a new air carrier airport.
- A second air carrier runway is added at Metropolitan Oakland International Airport.

- General aviation operations are relocated from air carrier to general aviation airports. The general aviation activity associated with the recommended plan requires the relocation of a forecast total of 270,000 general aviation aircraft operations and about 600 based aircraft from the three air carrier airports to other airports in the San Francisco Bay Area by 2005.

- The redistribution of air carrier operations results in a requirement for increased passenger terminal capacity over that currently estimated at some airports in the San Francisco Bay Area by 2005.

  The latest information indicates MAP capacities of 12.0 MAP at Metropolitan Oakland International, 51.3 MAP at San Francisco International, 18.0 MAP at San Jose International and 5.0 MAP for joint use of Travis Air Force Base.

  To the extent it is not possible to provide these levels of passenger terminal capacity, then additional air carrier airports will need to be developed or expanded. Alternatively, the redistribution of more smaller and fewer large capacity air carrier aircraft and / or...additional high-performance general aviation turbojet operations need to be relocated from San Francisco International in order to permit additional air carrier operations and utilize the additional passenger terminal capacity by 2005.

- At the Buchanan Field Airport in Concord, air carrier operations are assumed to continue to be limited to small jets and medium and small propeller aircraft. The airport is expected to remain primarily a general aviation airport.

- Because of its remote location from most of the Bay Area, the Sonoma County Airport in Santa Rosa is expected to attract only a relatively small amount of air carrier operations that might be redistributed from the three major Bay Area air carrier airports."

APPENDIX J: SFIA CAPACITY

TABLE J-1: SFIA AVERAGE DAY PEAK MONTH FLIGHTS FORECAST FOR THE PROJECT SHOWING BOTH PROPORTIONAL INCREASES AND CAPACITY CONSTRAINTS (61 PERCENT OF THE TIME)/a/

		1996		2006	
Hour	1990	Proportional Increase/b/	Capacity Constraints/c/	Proportional Increase/b/	Capacity Constraints/c/
0000	19	22	22	24	24
0100	12	14	14	15	15
0200	6	7	7	8	8
0300	3	4	4	4	4
0400	2	2	2	3	3
0500	4	5	5	5	5
0600	28	33	33	36	36
0700	59	69	69	75	75
0800	75	88	88	96	96
0900	80	94	94	102	102
1000	74	87	87	95	95
1100	90	106	103	115	103
1200	94	110	103	120	103
1300	86	101	103	110	103
1400	77	91	99	98	103
1500	77	91	91	98	103
1600	81	95	95	104	103
1700	73	86	86	93	103
1800	69	81	81	88	103
1900	77	91	91	98	100
2000	69	81	81	88	88
2100	71	83	83	91	91
2200	53	60	60	65	65
2300	30	35	35	38	38
TOTAL	1,309	1,536	1,536	1,669	1,669

NOTES

/a/ Under visual flight rules, the airfield capacity at SFIA is 103 total flights (landings plus takeoffs) per hour (61 percent of the time) for a total daily (24-hour period) capacity of 2,472 flights.

/b/ Proportional increase assumes that all flights could take off and land per hour in the same proportions that occured in 1990.

/c/ Capacity constraints assumes that flights would first be scheduled to take off and land in the same proportions per hour as occurred in 1990. This would necessitate delays in some flights to the next hour. In 1996 these delays would be accommodated within the daytime hours. In 2006, these delays would result in an increase of two flights in the evening period and no increase in the nighttime period. Future flights could be spread in such a way as to have the maximum number of flights possible both scheduled to, and in actuality to take off and land during the daytime (7:00 a.m. to 7:00 p.m.) resulting in no increase during the evening hours.

SOURCES: 1990 SFO Tower Daily Traffic Counts; Environmental Science Associates, Inc.

TABLE J-2: SFIA AVERAGE DAY PEAK MONTH FLIGHTS FORECAST FOR THE PROJECT SHOWING BOTH PROPORTIONAL INCREASES AND CAPACITY CONSTRAINTS (25 PERCENT OF THE TIME)/a/

		1996		2006	
Hour	1990	Proportional Increase/b/	Capacity Constraints/c/	Proportional Increase/b/	Capacity Constraints/c/
0000	19	22	22	24	24
0100	12	14	14	15	15
0200	6	7	7	8	8
0300	3	4	4	4	4
0400	2	2	2	3	3
0500	4	5	5	5	5
0600	28	33	33	36	36
0700	59	69	69	75	75
0800	75	88	88	96	96
0900	80	94	94	102	102
1000	74	87	87	95	95
1100	90	106	103	115	103
1200	94	110	90	120	90
1300	86	101	90	110	90
1400	77	91	90	98	90
1500	77	91	90	98	90
1600	81	95	90	104	90
1700	73	86	90	93	90
1800	69	81	90	88	90
1900	77	91	103	98	103
2000	69	81	94	88	103
2100	71	83	83	91	103
2200	53	60	60	65	103
2300	30	35	35	38	61
TOTAL	1,309	1,536	1,536	1,669	1,669

NOTES:

/a/ Under visual flight rules there are occasions (about 25 percent of the time) when the most optimum weather conditions do not occur requiring that alternate runways (28L, 28R instead of 1L, 1R) are used for departures. The airfield capacity at SFIA drops from 103 to 90 total flights (landings plus takeoffs) per hour. During the peak month the times when such weather conditions generally occur are during the peak flight hours (noon to 7:00 p.m.). The table above generally reflects flight delays that would occur assuming these constraints.

/b/ Proportional increase assumes that all flights could take off and land per hour in the same proportions that occurred in 1990.

/c/ Capacity constraints assumes that flights would first be scheduled to take off and land in the same proportion per hour as occurred in 1990. This would necessitate delays in some flights to the next hour. In 1996 these delays would result in an increase of about ten percent more flights in the evening period and no increase in the nighttime period. In 2006, these delays would result in an increase of about 12 percent more flights in the evening period and about 31 percent more flights in the nighttime period.

SOURCES: 1990 SFO Tower Daily Traffic Counts; Environmental Science Associates, Inc.

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