VISITACION VALLEY SCHLAGE LOCK
INFRASTRUCTURE PLAN

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Prepared by

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1. INTRODUCTION / PROJECT DESCRIPTION

1.1 Purpose

This Infrastructure Plan is an accompaniment to and is referenced in the Development Agreement (DA) between Visitacion Development LLC or its Assignees (Developer) and City and County of San Francisco (City). The DA outlines the infrastructure responsibilities of the City and the Developer. This Infrastructure Plan defines the site and infrastructure improvements required to construct the Schlage Lock Development Project (Project), including the information contained in Sections of the document covering Environmental Remediation, Demolition, Grading, Street and Transportation Improvements, Open Space and Park Improvements, Potable Water System, Combined Sewer System, Stormwater Management System, and Dry Joint Utility System, as well as associated responsible parties in charge of implementing and operating the improvements. The area encompassing these infrastructure improvements consists of the approximately 20-acre portion of the Visitacion Valley/Schlage Lock Design for Development Area defined as Zone 1 (Schlage Lock Site), which is owned by the Developer and is being redeveloped pursuant to the DA.

The overall project description, location, proposed street and open space designs and the nature of the development within the Schlage Lock Site are described fully in the Visitacion Valley/Schlage Lock Open Space and Streetscape Master Plan (Open Space and Streetscape Master Plan) prepared by AECOM and GLS Landscape/Architecture.

The definitions of development-related terms as defined in the DA shall apply to this Infrastructure Plan.

1.2 Land Use Program for the Infrastructure Plan

Anticipated land uses at the Schlage Lock Site include up to 1,679 residential units, approximately 46,700 square feet of retail space and the rehabilitation of an approximately 18,000-square-foot historic building as a community-serving use. These land use plan numbers have been used to develop utility demands. Although, the land use plan may be adjusted in the future, subsequent to the applicable planning process, in order to implement the project. Refer to Figure 1.1 for proposed site parcelization.

1.3 Infrastructure Plan Overview

This Infrastructure Plan will govern the construction and development of infrastructure in the Schlage Lock Site and off-site work needed to support the proposed development project

(Project). This Infrastructure Plan may be modified to the extent that such additional infrastructure is mutually agreed to by the City and the Developer consistent with the terms of the DA.

This Infrastructure Plan and project DA define infrastructure improvements to be provided by the Developer for the Schlage Lock Site. The Project infrastructure obligations of the City and its agencies and departments are described in the DA. While some infrastructure improvements to be provided by City agencies and other governmental agencies are described, their inclusion herein is not intended to be inclusive of all improvements to be provided by City agencies and other governmental agencies.

1.4 Property Acquisition, Dedication, and Easements

The mapping, street vacations, property acquisition, dedication and acceptance of streets and other infrastructure improvements will occur through the Subdivision Mapping process. Except as otherwise noted, infrastructure described in this Infrastructure Plan shall be constructed within the public right-of-way or dedicated easements to provide for access and maintenance of infrastructure facilities.

Public service easements will be allowed within the Schlage Lock Site as necessary to provide infrastructure and services to the Project. Proposed public water, wastewater, and power easements benefitting the SFPUC on private property will be reviewed on a case-by-case basis. Full access for vehicles and equipment for the maintenance and repair of utility mains is required. Restrictions to surface improvements in access easements will be defined in the review of the improvements for the parks and adjacent rights-of-way, in future easements, or in other interagency agreements. Public utilities within easements will be installed in accordance with the standards in this Infrastructure Plan and applicable City regulations for public acquisition and acceptance within public utility easement areas, including provisions for maintenance access; however, such areas shall not be required to be dedicated as public right-of-ways or improved to public right-of-way standards.

1.5 Project Datum

All elevations referred to herein are based on the City of San Francisco datum.

1.6 Conformance with EIR & Entitlements

This Infrastructure Plan has been developed to be consistent with project mitigation measures required by the Environmental Impact Report (EIR) and other entitlement

documents. Regardless of the status of their inclusion in this Infrastructure Plan, the mitigation measures of the EIR shall apply to the Project. Applicable sound and vibration studies required by the EIR will be completed during the approval process for each individual development parcel.

1.7 Applicability of Uniform Codes and Infrastructure Standards

Future modifications to this Infrastructure Plan and/or existing City Standards, Guidelines, and Codes are subject to the requirements of the DA.

1.8 Project Phasing

It is anticipated that the Schlage Lock Site will be developed in several phases. Each phase will be further divided into development blocks (Blocks). The Developer shall indicate the phase limits upon submittal of each Phase Application, as further defined in the DA. Phase Applications will include a brief description of the infrastructure required to serve the proposed development. The Developer may submit Phase Applications, for one or more Blocks, that would include a description of utilities and transportation improvements planned for each Block and shall correspond to improvements to be provided with the applicable subdivision map. The information provided with each Phase Application will be consistent with the procedures outlined in the project DA. In order to maintain flexibility in determining infrastructure requirements, an infrastructure phase is defined as the access, utility and open space improvements necessary to accommodate development included in a single Phase Application.

1.9 Phases of Infrastructure Construction

The Developer will design and install the new infrastructure in advance or to match the construction buildout phasing of the Project and to serve the Blocks. The extent of the proposed infrastructure installation within each Block will be based on an "adjacency" principle. Adjacency, or adjacent infrastructure, refers to infrastructure which is near to and may share a common border or end point with a Block but is not immediately adjoining or contiguous with a Block, and represents the minimum necessary to serve the Block. The infrastructure required for successive Blocks will connect to the existing infrastructure systems as close to the edge of the proposed Block as possible with permanent and/or temporary systems while maintaining the integrity of the existing system for the remainder of the Schlage Lock Site. The conceptual limits of the existing infrastructure to be demolished as well as conceptual layouts of the permanent and/or

temporary infrastructure systems for each Block will be provided as part of the construction document submittals for that Block or Phase. Repairs and/or replacement of the existing facilities necessary to serve the Block will be designed and constructed by the Developer.

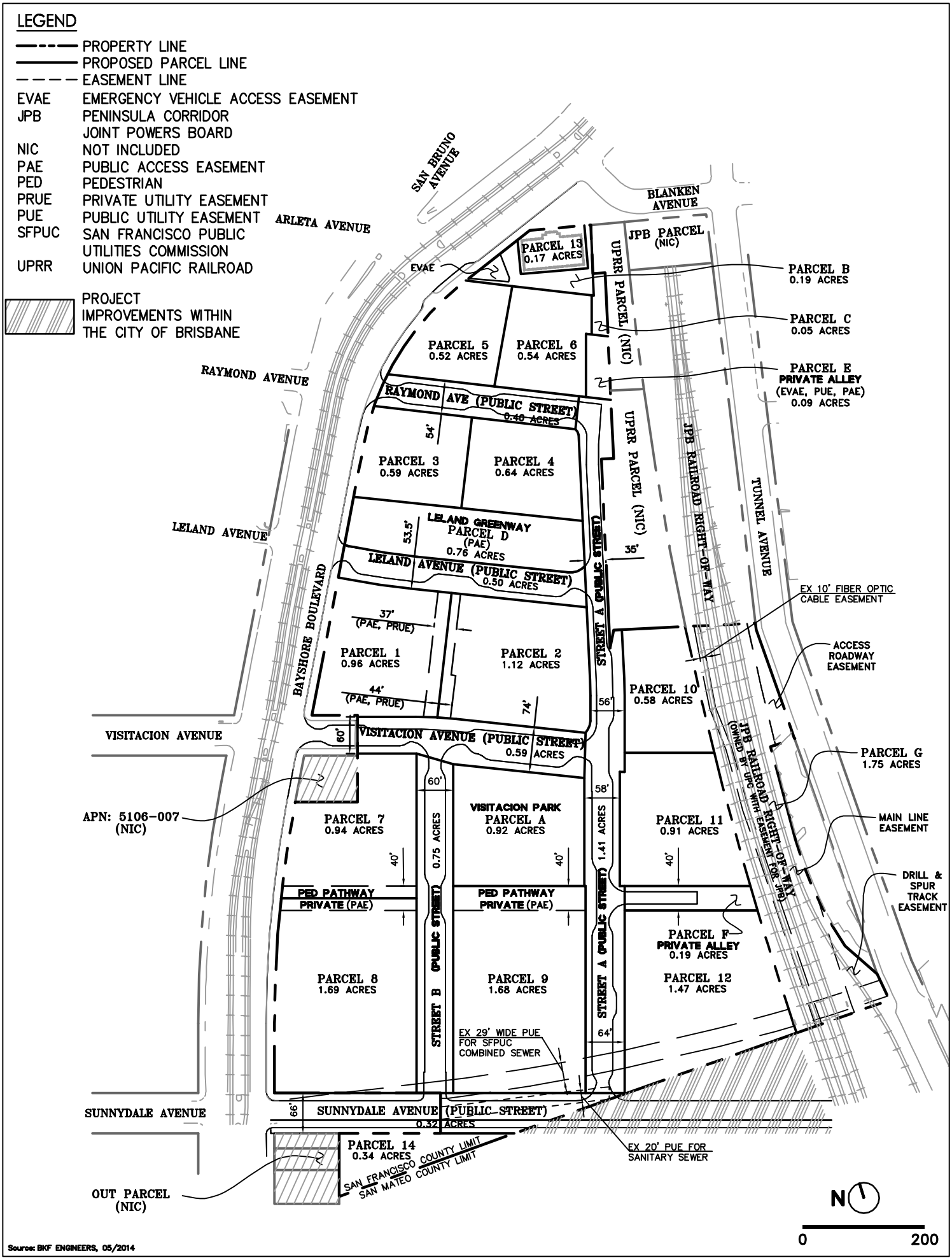
The City will be responsible for maintenance of proposed public infrastructure installed by the Developer once construction of the new infrastructure is complete and accepted by the San Francisco Department of Public Works (SFDPW), the San Francisco Department of Recreation and Parks (SFDRP), the SFMTA, or the SFPUC, except as otherwise specified in the DA. At all phases of development prior to full build out, the Developer shall demonstrate to the SFPUC that a functioning water and wastewater infrastructure system is in place at all times and complies with all City laws, codes and regulations. In addition, the Developer is responsible for maintaining a safe flow path for the 100-year storm at all times during the development. The SFPUC shall review the adequacy of the flow path for the 100-year storm for full build out as well as all phases prior to full build out. A Grading and Overland Release Master Plan and a Combined Sewer Master Plan that outlines the project's wastewater infrastructure system for full build-out of the Project will be submitted to the SFPUC and SFDPW for review and approval in advance of the 60% construction documents for phased buildout of the public rights-of-way and parks. The Developer is responsible for providing any temporary infrastructure that is necessary to provide functional service to any phase of development prior to full build-out. The SFPUC is not obligated to accept or operate temporary infrastructure.

At all phases of the development, the Developer must provide functioning and adequate stormwater management in compliance with the SFPUC's post-construction stormwater management requirements and the City of San Francisco Stormwater Design Guidelines (SDG). A Stormwater Management Master Plan that outlines the project's stormwater management solutions for full build-out of the Project will be prepared and submitted to the SFPUC for review and approval in advance of the 60% construction documents for phased buildout of the public rights-of-way and parks. The Developer must complete the construction of the stormwater management improvements required for each development phase prior to receiving a temporary certification of occupancy for the development phase. If a future park will include stormwater controls necessary for a particular phase of development or future parcel to meet the stormwater management requirements of the SFPUC, that park must be developed in conjunction with that

development phase and be complete prior to issuance of the certificate of occupancy for any Block within that phase. Interim centralized stormwater management facilities necessary to achieve stormwater management compliance within a development phase will be constructed and operational prior to or in conjunction with that phase. Interim stormwater Best Management Practices (BMPs) currently implemented as part of the on-site remediation will be preserved on undeveloped parcels.

1.10 Coordination with Brisbane

Portions of Sunnydale Avenue and Street A are located in the City of Brisbane. In conjunction with the Bi-County Transportation Study and the Bayshore Station Access Study efforts, designs of these streets will be reviewed and coordinated with Brisbane in the future and may require design changes to infrastructure and streetscape designs. The improvements and utilities along the extension of Sunnydale Avenue into Brisbane required to access and service the southwest corner of the Schlage Lock Site, to allow for future extension of the Muni T-Third light rail, and to provide connectivity to the Bayshore Caltrain Station will require a future agreement between the City and County of San Francisco and the City of Brisbane to address the jurisdictional issues, including different design standards and funding mechanisms, across city and county boundaries.



Source: BKF ENGINEERS, 05/2014

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PLOT DATE: 05-28-14
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FIGURE 1.1: CONCEPTUAL PARCELIZATION PLAN

2. SUSTAINABILITY

Infrastructure is designed to facilitate the use of alternative forms of transportation, while reducing the use of resources such as water and energy. Key benefits of sustainable site design and infrastructure elements include improved health and cleaner environment. Sustainable infrastructure includes stormwater management facilities (i.e. landscaped park areas, landscape strips, flow-thru planters, bio-retention areas), transit facilities and traffic calming, and energy-efficient outdoor lighting. Each of these elements is addressed in other chapters of this Infrastructure Plan. Sustainable building designs will be addressed in the individual Phase and building permit application documents. Final designs of sustainable project elements within the public rights-of-way will be reviewed as part of the master plan and construction document approval process.

3. ENVIRONMENTAL REMEDIATION

3.1 Feasibility Study and Remedial Action Plan

On November 16, 2009 the State of California, Department of Toxic Substances Control (DTSC), approved a Feasibility Study/Remedial Action Plan (FS/RAP) (authored by MACTEC [now AMEC], an environmental consultant and contractor) that describes the preferred remedial actions for soil and groundwater at the Schlage Operable Unit (Schlage OU), and for heavy metal soil contamination in the San Francisco County portion of the Universal Paragon Corporation (UPC) Operable Unit (UPC OU), located in San Francisco, California. Furthermore, a Remedial Design Implementation Plan (RDIP) to address Volatile Organic Compounds (VOC) contaminated soil and groundwater was developed to define and facilitate the remedial action objectives in the FS/RAP. The VOC RDIP was approved by the DTSC on January 6, 2010. An additional RDIP (by Jordan & Graf Ground Improvement, Inc.) to address heavy metals remediation on the UPC OU was approved by the DTSC July 18, 2011.

The remedial actions described in the FS/RAP and in the VOC and heavy metals RDIPs were selected to meet the remedial action objectives for contaminated soil and groundwater at the Schlage Lock Site, and to prepare the Schlage Lock Site for redevelopment. The FS/RAP and RDIPs were framed with the intention to redevelop the Schlage Lock Site with a combination of public open space and residential podium housing above commercial/retail uses, parking structures, or other commercial space.

An agreement has been executed between the Developer and BP PLT-I, LLC (BP) that includes site demolition, remediation, and rough grading. BP agreed to assume environmental liability and perform remediation to obtain development clearance from the DTSC. This agreement is insured by Chartis (formerly AIG) to guarantee BP's performance. The former Schlage Lock factory buildings were demolished in 2009. Remedial activities to clean up the soil and groundwater began in 2010. On April 29, 2011, the DTSC issued a Completion Report approval letter of the remediation effort for the area north of Visitacion Avenue to allow for the proposed development; a similar letter for the area south of Visitacion Avenue is expected to be obtained. Land Use Covenants (LUC) and deed restrictions will be recorded by the DTSC to limit human exposures for contaminants left in place.

3.2 On-Going Soil and Groundwater Remediation

The FS/RAP objectives include on-site remediation of VOC- impacted soil through excavation and aeration to the pad elevations and depths of clean utility corridors established in 2007 in the Planned Use and Grading Plan (Exhibit H-1of the UPC-BP agreement), which were prepared by BKF Engineers and consistent with the 2009 Visitacion Valley Design for Development (D4D). Additional fill material will be required during final site development and to provide a clean soil cap to remediate heavy metals contaminated soils. The current grading plan does not contemplate excavation below the 2007 grades except potentially in limited areas. If a future grading revision requires excavation below these 2007 grades additional remediation effort and environmental insurance premiums may be required to provide for cleanup and environmental insurance coverage. A work plan was written by the Developer and reviewed by the City and the DTSC to address any future excavation and backfill associated with geotechnical concerns, general site grading and revisions to pad elevations and utility corridor depths that may require amendments to the FS/RAP and the RDIP.

The FS/RAP includes options for remediation of soils contaminated with heavy metals in the soil of the UPC OU as follows: targeted excavation and relocation with capping, excavation and disposal offsite at an approved landfill, or capping in place and recording a State Land Use Covenant and a deed restriction on the title of the impacted parcel. The UPC OU heavy metals RDIP provides further detail on how the heavy metals will be remediated and is currently being amended with an interim grading plan to accommodate a clean soil cap. The active remediation effort for VOC contamination in the area south of Visitacion Avenue has been completed and is entering an operations and maintenance phase as outlined in the AMEC Operations and Maintenance Plan (O&M Plan) approved by the DTSC on February 20, 2013. Various long-term operations and maintenance plans, site inspections, groundwater monitoring, and reporting will likely be required by the DTSC to assure compliance with the conditions prescribed by FS/RAP. Based on previous comments on the FS/RAP received from the DTSC, infiltration through metals contaminated soils will not be allowed. However, infiltration may be feasible if the heavy metal contamination is found to be not soluble. Additional approvals from DTSC will be required should the Project pursue infiltration measures associated with achieving compliance with the San Francisco Stormwater Design Guidelines. The DTSC will issue an approval letter for construction when it is satisfied that the results of remediation meet the

requirements of the FS/RAP and VOC and heavy metals RDIPs. Land Use Covenants and deed restrictions will be recorded by the DTSC to limit human exposures for contaminants left in place.

3.3 Clean Utility Corridors

Clean Utility Corridors were defined in the FS/RAP and RDIPs to include the space within the roadways up to a minimum of 1 foot below the level of the utilities. Clean Utility Corridors were sampled and tested to meet the Clean-up Levels established in the FS/RAP. This effort was documented in the MACTEC Phase I Soil Remedial Completion Report approved by the DTSC on April 29, 2011. Metals impacted soils are allowed to be placed in the roadways 1 foot below utilities and 2 feet above the groundwater level. The heavy metals RDIP addendum will provide details for a detectable barrier, as requested by the City, to be installed over any metals impacted soils placed below the clean utility corridors. The RDIP addendum will also provide details for a detectable barrier, as requested by the City, to be installed over any metals impacted soils placed under a soil cap with a minimum 3-foot thickness.

A final Conceptual Soil and Groundwater Management Plan will be developed as necessary by the Developer prior to the approval of each Final Map in conjunction with the DTSC's approval of the applicable "Remediation Completion Report" and Operations and Management (O&M) Agreement. This plan will have details on the extent of the groundwater and other remaining contamination throughout the Schlage Lock Site, including the clean utility corridors. The plan will describe Land Use Controls and O&M measures to be recorded on the various parcels throughout the site, including any utilities within the groundwater contaminated area.

3.4 Groundwater Monitoring

The O&M Plan details a schedule for monitoring a network of groundwater monitoring wells established at various locations throughout the site to monitor groundwater quality and ongoing remediation progress. Groundwater monitoring reports are submitted to the DTSC on a quarterly basis. A copy of the monitoring report will be forwarded to the SFPUC. The location of these wells will conflict with the planned location of several buildings and other improvements. Wells that are in conflict with planned improvements will require relocation to a permanent location during the construction of each Phase or Block. The construction

of these relocated wells will be performed by the Developer, reviewed and permitted by the San Francisco County Department of Public Health and coordinated with the DTSC.

In March 2013, the DTSC approved a decommission plan for the former Groundwater Extraction and Treatment (GWET) system, and the system has since been removed.

4. DEMOLITION, DECONSTRUCTION AND HISTORIC STRUCTURE STABILIZATION

4.1 Scope of Demolition

The Developer will be responsible for the demolition and deconstruction of all non-retained existing buildings and infrastructure features that were not removed as part of the previously completed site environmental remediation activities overseen by AMEC and BP. Various walls and retaining walls remain in place around the perimeter of the Schlage Lock Site to maintain structural lateral support of the adjacent roadways and parcels. These walls will be demolished and replaced with similar permanent improvements that will be integrated into the proposed buildings and street network. The design of these permanent retaining walls to be integrated into buildings and streets will be reviewed and approved by the DBI and the SFDPW during the building design and permitting process and/or project construction documents. Remaining utility materials, primarily metals, previously not removed as part of the site environmental remediation will be recycled as feasible. Where transite pipe (asbestos-cement pipe) is encountered, appropriate abatement methods will be used to satisfy applicable regulatory agency requirements.

The Developer will be responsible for the demolition of remaining structures at the southeast corner of the Schlage Lock Site to be removed during the final phase of remedial activities or during final site designs and approvals. The Developer shall also be responsible for providing for the permanent improvements proposed to replace the existing improvements in accordance with the approved building and construction permits issued by the City. The extent of these improvements and associated demolition will be determined during the construction document approval process.

4.2 Stabilization of Historic Office Building, Street A, and Surroundings

Foundation and interior improvements, where required within the Historic Office Building to make the space compliant with current Codes, will be implemented. The portion of Blanken Park on the Schlage Lock site, Street A and the Historic Office Building Plazas will also incorporate structural improvements and retaining walls to provide for the lateral support of the surrounding roadway, railroad corridor, and adjacent parcels. These lateral support improvements and retaining walls will be required prior to, or in conjunction with, construction of the Blanken Park area and Street A. The extent of these improvements will be determined during building permit approval process for the Historic Office Building, while retaining walls within the Street A right-of-way will be reviewed as part of the Grading

and Overland Release Master Plan and construction document approval process. The Developer will be responsible for providing interim and final structural improvements and retaining structures.

5. GEOTECHNICAL CONDITIONS

Site geotechnical investigations have been completed and potential site wide geotechnical improvements have been identified by Treadwell and Rollo, culminating in the development of the "Preliminary Geotechnical Investigation, Visitacion Valley Redevelopment Area, Zone 1" (Geotechnical Report) by Treadwell and Rollo, dated February 24, 2009.

5.1 Existing Site Geotechnical Conditions

5.1.1 Existing Site Soils

As described in the Geotechnical Report, the Schlage Lock Site is essentially divided into two sections with the northern and southern portions of the site each presenting unique geotechnical conditions. The northern and western portions of the site are underlain with 9 to 12 feet of loose to dense Colma sand. The Colma sand is overlain with layers of silty and clayey sand at varying depths. Borings at the westernmost portion of the northern section of the site adjacent to the railroad tracks indicate the presence of Franciscan Complex bedrock between 36 and 45 feet below ground surface. The southern half of the site was filled with loose to medium dense sandy fill. Beneath the sandy fill, the site is underlain with up to eight feet of compressible bay mud fill and a layer of loose to medium-dense marine sand. Bedrock in the southern portion of the Schlage Lock Site is located approximately 61 feet to 126 feet below ground surface.

5.1.2 Site Geotechnical Constraints

From a geotechnical perspective, the following are the primary issues for new development at the Schlage Lock Site:

5.1.2.1 Liquefaction/Settlement of Sand Layers.

In the northeastern portion of the Schlage Lock Site, 1.5-foot to 4-foot thick medium-dense sand layers are present. The southern portion of the site is underlain by loose to medium dense sandy fill, marine sand and Colma sand beneath the groundwater table. These sands are at best medium dense and are thus subject to liquefaction and settlement during earthquakes. Liquefaction is a phenomenon where saturated, cohesionless soil (such as sand) experiences a temporary reduction in strength during the cyclic loading of an earthquake due to an increase in pore water pressure. The result is immediate settlement and possibly lateral movement of the sand material.

5.1.2.2 Settlement of Young Bay Mud.

In the southern portion of the Schlage Lock Site, a layer of compressible bay mud is susceptible to minor consolidation settlement. The anticipated rate of settlement of the bay mud from the load of the existing site fill is on the order of 1 to 4 inches. It is anticipated that fill may be placed on top of the existing bay mud layer to accommodate the proposed site plan and development. Placing the new fill on top of the existing bay mud layer will initiate a new cycle of consolidation settlements of approximately 3 to 5 inches.

5.1.2.3 Existing Retaining Walls.

Existing retaining walls adjacent to the railroad tracks and Bayshore Boulevard typically consist of cast-in-place concrete walls. Most retaining walls appear visibly to be in serviceable condition, although many existing concrete walls will conflict with the proposed development plans. Disposition of existing retaining wall is discussed in Section 5.2.4.

5.2 Site Geotechnical Approaches

Successful site development will require engineering design and project construction methods that account for the existing soil conditions. These improvements will help ensure that site accessibility and building access is maintained both during seismic events and as minor long-term consolidation settlement occurs.

5.2.1 Geotechnical Soil Improvements

To reduce the liquefaction potential and minor consolidation settlement at the site, existing weak and undocumented fill discovered beneath buildings may be over-excavated and replaced with engineered fill or be remediated with soil improvements per the recommendations of the Geotechnical Engineer. Geotechnical remediation will be completed in conjunction with vertical building and infrastructure construction on individual Blocks by the Developer. Based on the results of, and if required by, final site geotechnical investigations, soil improvements required within the public right-of-way will be constructed by the Developer.

5.2.2 Building Foundations

Building foundation designs will be based on final geotechnical reports, site investigations and structural designs developed as part of the permitting process for vertical construction on the development parcels. The Developer or subsequent owner

of a development parcel will be responsible for the design and construction of building foundations.

5.2.3 SFPUC 168-inch Inside Diameter (ID) Combined Sewer Stabilization

The SFPUC has a 168-inch combined sewer tunnel along the southern edge of the site. The SFPUC holds a 29-foot wide subsurface easement per Recorded Document 2010-J052542 for the sewer tunnel. The language of the easement provides for the future construction of improvements over the easement provided that the improvements do not negatively impact the sewer tunnel. The current project proposes new buildings that will span the sewer tunnel. Building foundations spanning the sewer tunnel will be designed and constructed by the Developer. Structural and architectural plans and specifications, foundation plans and details, and a construction/settlement monitoring program, shall be reviewed and approved by the SFPUC prior to permitting vertical construction on each of the Blocks. Prior to vertical construction on each of the Blocks that may negatively impact the tunnel, as well as following completion of construction, the Developer shall also submit a video inspection to the SFPUC of the tunnel, in compliance with SFPUC video inspection guidelines.

5.2.4 SFPUC Existing 78-inch Combined Sewer Easement

An existing 20-foot wide sewer easement was recorded at Book A456 Page 516 in the Official Records of the City and County of San Francisco over the alignment of the existing 78-inch sewer main on the southern edge of the site. Future construction of improvements cannot negatively impact the sewer. Structural and architectural plans and specifications, as well as plans for foundation monitoring will be reviewed and approved by the SFPUC prior to permitting both horizontal and vertical construction in any area on or adjacent to the easement area. The Developer shall provide, at their own cost, for settlement, survey, or various construction monitoring of existing combined sewers if determined necessary by the SFPUC.

5.2.5 Retaining Walls

It is anticipated that several of the existing retaining walls within the proposed development footprint will be modified or rebuilt due to grade changes and road realignment. The condition of retaining walls proposed to remain in place will be evaluated on a case-by-case basis during detailed design process. These walls may be seismically retrofitted or replaced to comply with City codes, the California Building

Code (CBC), and the design-level geotechnical report. Where retaining walls are to be removed, proper shoring techniques, such as soldier pile and lagging systems or underpinning systems will be implemented to ensure the stability of existing site and adjacent facilities. Measures, such as the construction of new code-compliant retaining walls or retaining elements incorporated into the foundations of proposed buildings to address grade conflicts will be coordinated during the review and approval of construction documents and issuance of building permits.

The retaining walls will be designed and constructed by the Developer and reviewed and approved by the DBI, the SFDRP, and the SFDPW. Where walls are located within the public rights-of-way and public parks, maintenance and ownership of the retaining wall will be the responsibility of the SFDPW,SFDRP, or another City of San Francisco agency upon acceptance of the final construction. Maintenance and ownership responsibilities for retaining walls constructed on private development parcels will be assigned to the owners of the individual Blocks in which the retaining walls are located on. Design and Installation of interim retaining walls required to support the development of proposed on-site streets will be the responsibility of the Developer.

5.2.6 Flexible Utility Connections

Portions of the site may experience differential settlement at the interface of pile supported buildings and the utility connections. Differential settlement at these location may cause the utility connections to shear and break along this plane. Where required flexible utility connections, incorporating such solutions flexible pipe materials, ball joints or settlement vaults, will be installed at the face of the building to mitigate the displacement of the utility connections and ensure continuous utility service.

5.2.7 Building Access

Settlement of the ground plane is anticipated in certain areas of the site due to an increase in fill depths and existing compressible clay soils. Where a pile-supported building structure interfaces with the on-grade public streetscape, differential settlement may occur where the compressible material beneath the street begins to settle relative to pile supported buildings. To mitigate areas where differential settlement is anticipated, grading and building designs will incorporate measures to ensure that continuous accessible paths of travel are maintained where building access points and private passageways interface with the public right-of-way.

Measures, such as hinge slabs, gangways and other adjustable surfaces, will be designed to accommodate the maximum anticipated long-term consolidation differential settlement. Alternatively, the project may consider a surcharging program, which induces consolidation settlement prior to the construction of new improvements to reduce, and possible eliminate, the need for project specific differential settlement design mitigations.

5.3 Phase of Geotechnical Stabilization

Geotechnical stabilization will occur in phases to match the development sequence of the Blocks. The amount of stabilization will be the minimum necessary for the Block. The stabilization of smaller areas will allow the existing utility services and vehicular access areas to remain in place as long as possible in order to reduce disruption of access to the adjacent train tracks and Blocks.

5.4 Schedule for Additional Geotechnical Studies

As part of the project Grading and Overland Release Master Plan review and approval process, a final geotechnical investigation will be prepared to cover development of the public street rights-of-ways and parks. This report will support the development of the utility infrastructure master plans, the Stormwater Management Master Plan, and the Grading and Overland Release Master Plan, as well as, final infrastructure designs included in the construction documents. Geotechnical Reports to support the development of private building parcels will be prepared and submitted to the City as part of the building permit process.

6. SITE GRADING

6.1 Existing Site Conditions

The existing grade within the Schlage Lock Site slopes gradually downward from north to south. At the western edge, the site is bounded by and conforms to the existing grades along Bayshore Boulevard. To the east, the northern area is elevated above the existing Caltrain railroad tracks by a 20-foot to 25-foot retaining wall while the southeastern edge is at grade. The ground elevations range from approximately 55 (SF Datum) in the northeastern area of the site adjacent to the Historic Office Building to approximately 8 (SF Datum) near the southern edge. In addition to the existing 20-foot to 25-foot tall retaining wall adjacent to the railroad parcels, other smaller on-site retaining walls were installed to stabilize the site and accommodate existing site uses.

6.2 Project Grading Requirements

6.2.1 Environmental Remediation Requirements

As previously discussed in Section 5, the Schlage Lock Site is currently subject to the FS/RAP being overseen by DTSC and completed by the Developer and the AMEC/BP team. Under the terms of the FS/RAP, soil excavated to address metals-impacted soils may be relocated and placed at a minimum of 2 feet above the groundwater table. In areas slated for public open space on grade, metals-impacted soils would be placed under a clean soil cap with a minimum of a 3-foot thickness consistent with the EIR. The FS/RAP allows for metals-impacted soils to be also placed directly under residential uses if those residential uses are located over commercial podium construction or over podium parking structures. Metals-impacted soils may also be placed under roadways, hardscape, or a minimum of 1 foot beneath clean utility corridors. Final details for impacted soil mitigations will be specified in the UPC OU RDIP. State Land Use Covenants and deed restrictions will be recorded on the title to the property where metals-impacted soils are located.

6.2.2 Consolidation Settlement

As described in Section 5, the southern area of the Schlage Lock Site may experience minor amounts of liquefaction due to soft existing bay mud. Appropriate measures such as soil and foundation improvements will be constructed by the Developer to minimize differential settlement across the building parcels. To mitigate areas where differential settlement is anticipated, grading and building designs will incorporate measures to ensure that continuous accessible paths of travel are maintained where building access points and private passageways interface with the public right-of-way. Measures, such as hinge slabs, gangways and other adjustable surfaces, will be designed to accommodate the maximum anticipated long-term consolidation differential settlement. Other proposals may include soil surcharging where feasible and approved by SFDPW and SFPUC on a case-by-case basis.

A design level Geotechnical Report will be prepared to address mitigations as part of the Grading and Overland Release Master Plan approval process for review and approval by the City in advance of the 60% construction documents for phased buildout of the public rights-of-way and parks.

6.3 Site Grading Designs

The Developer will be responsible for the design and construction of the proposed grading plan for the Schlage Lock Site. Proposed grading designs for the development will match the existing north to south drainage pattern of the existing site. To ensure proper overland release and provide Americans with Disabilities Act (ADA) accessible pathways throughout and adjacent to the site, a new street grid with interconnected open space and pathway areas will be constructed to link Blanken Avenue with Sunnydale Avenue to the south and Bayshore Boulevard with Street A to the east. An accessible path of travel will follow from Bayshore Boulevard through Parcels B, C, and E, and down the on-site street grid to provide a continuous path to Sunnydale Avenue. Throughout the site, grades less than 5 percent are provided as a first priority item, where feasible. As required due to site constraints, public access areas with slopes exceeding 5 percent but less than 8.33 percent will include handrails per Code requirements. The conceptual grading plan for the Schlage Lock Site is included in Figure 6.1.

6.3.1 Proposed Site Grading at Conforms

Conceptual grading designs generally conform to the existing grades along the northern interface with Blanken Avenue and the existing Historic Office Building and the existing grades along Bayshore Boulevard at the western edge of the project. At the southern boundary of the project, a new segment of Sunnydale Avenue will be constructed, requiring the placement of 1 to 5 feet of fill to provide overland release and drainage.

At the eastern edge along the Peninsula Corridor Joint Powers Board (JPB) right-of-way, a large grade differential exists. At the northern edge of the interface, an ADA-accessible path within the Schlage Lock Site is designed to head south along the JPB right-of-way and connect to Street A. Accessible paths of travel and sidewalks within the development area will be provided to join and be coordinated with accessible paths of travel adjacent to and bordering the development area that connect to the adjacent Caltrain/JPB Train Station accessible entrances. To accommodate the 25-foot to 30-foot grade differential between the JPB right-of-way and the accessible path and community gardens, a single or stepped retaining wall will ultimately be installed. Interim grading solutions to accommodate the development of each adjacent Block will be constructed based on recommendations provided by the project Geotechnical and Structural Engineering consultants. Where buildings are directly adjacent to the JPB right-of-way, retaining elements will be incorporated into the private development parcel building foundations.

As more detailed designs are developed during the Grading and Overland Release Master Plan and construction document review processes of the project, the grading at conforms may require adjustment and refinement based on future coordination with the SFDPW.

6.3.2 Proposed Roadway and Building Areas

The proposed on-site street grid will be graded to provide overland release for the Project. As required by the SFPUC, grading and hydrology designs will be developed such that the 100-year HGL is contained within the top of curb elevations on opposite sides of a street throughout each phase of the development.

Site development and grading designs will be developed to comply with the codified requirements for accessible paths of travel. Where feasible, proposed slopes along public street and private alleys will be set at a maximum of 5 percent to provide ADA accessible pathways of travel without requiring handrails. Where accessible pathway slopes range between 5 percent and 8.33 percent, code-compliant ramps will be designed.

At street intersections, grades will be tabled at a maximum slope of 2% to provide an accessible path of travel in crosswalks. In addition, vertical curves within the streets will be designed to both begin and end outside the limits of the crosswalk areas.

A critical low point of 17.1 north of Parcel 7 will be required to ensure access is provided to the existing parcel not included as part of the Schlage Lock Site at the southeast corner of the Visitacion-Bayshore intersection. Inline storage, where feasible, or a pump station will be required to ensure overland release at this location with the final design solution subject to SFPUC approval. Review and approval of the overland release solution will occur during the master plan approval process described in Section 6.5. Construction of the overland release solution at this location will be the Developer's responsibility with ownership and maintenance responsibilities borne by the SFPUC or another City agency, unless negotiated otherwise as part of the master plan approval process.

6.3.3 The project overland flow paths are shown on Figure 6.1.Historic Building Grading

The existing Historic Office Building at the southeast corner of the Bayshore Boulevard and Blanken Avenue intersection may be used as a community-serving facility. The existing access point elevations at the first level, the existing parking level and the second level are approximately 39, 46.5, and 51.5 (SF Datum), respectively. Access to the building on the northern side will be at the second level. Along the southern side of the building, access will be provided at the first level. Due to structural issues with exposing the foundation between the existing parking level and the first level at the southern and western faces of the building, a 1-foot to 8-foot retaining wall will be constructed adjacent to the building to allow for the construction of an ADA-accessible path of travel. As stated in Section 4.2, these lateral support improvements will be

required prior to or in conjunction with construction of the portion of the Blanken Park area on the Schlage Lock Site.

6.4 Proposed Site Earthwork

As part of the site remediation efforts, the northern and western portion of the site was graded to approximately the proposed rough pad grade elevations. Future grading at the site will include importing fill in the southeast corner and fine grading of streets and open space areas. It is anticipated that the site earthwork will result in a net import of soil. Since remediation activities are still on-going, the earthwork quantities will be determined at later stages of the design. To support future grading activities, a Storm Water Pollution Prevention Plan/Erosion and Sediment Control Plan will be submitted in parallel with future grading permits. Grading in conjunction with site remediation efforts will be performed by the Developer.

6.5 Phases of Grading Activities and Approvals

The proposed grading will be completed in phases to match the Blocks of the project. The amount of grading will be the minimum necessary for the Block. The phasing of grading will allow the Project to minimize the disruption to the adjacent and future built uses at the site and the adjacent train tracks, and to limit the amount of export required for any given Block. Impacts to improvements installed with previous phases of development due to the designs of the new Block will be the responsibility of the Developer and addressed prior to approval of the construction drawings for the new Block.

A Grading and Overland Release Master Plan and a Combined Sewer Master Plan will be submitted to the SFPUC and SFDPW for review and approval in advance of the 60% construction document submittal for phased buildout of the public rights-of-way and parks. Comments provided by City and its agencies on the Master Plans will be incorporated into the construction document submittals for review and approval by the City and its agencies.

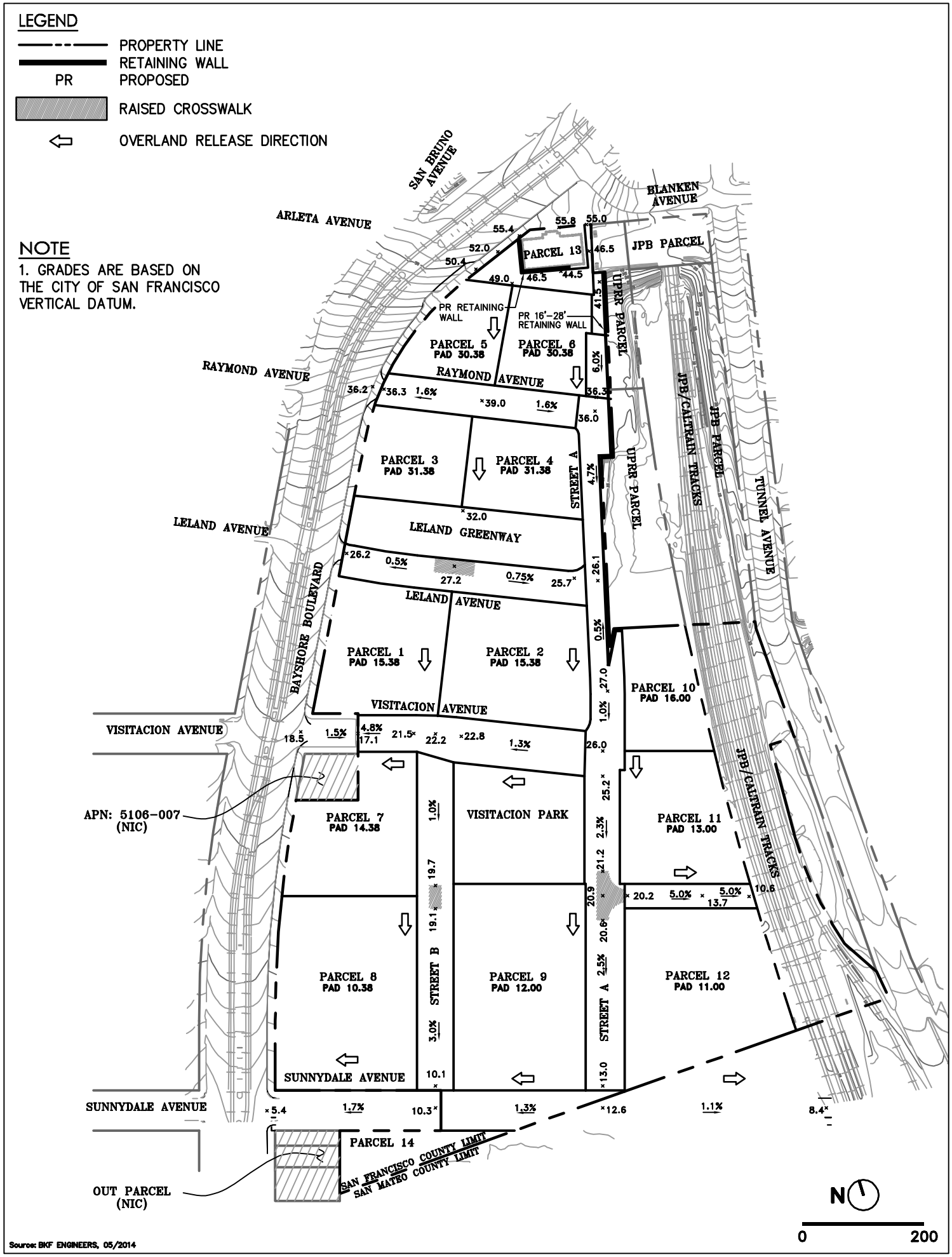

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FIGURE 6.1: CONCEPTUAL GRADING PLAN

7. STREET AND TRANSPORTATION DESIGNS

The development of the Schlage Lock Site is designed to connect and complement adjacent transit services with pedestrian-friendly streets and pathways. The alignments of existing streets will be extended into the site, and on-site streets will be enhanced with pedestrian-focused, traffic calming features. Additional descriptions of the streetscape are in the Open Space and Streetscape Master Plan.

7.1 Public Transportation System

The Schlage Lock Site is adjacent to the Muni T-Third light rail Arleta and Sunnydale stations, the Caltrain Bayshore Station, and stops for several Muni and SamTrans local and express buses. The San Francisco County Transportation Authority (SFCTA), San Francisco Municipal Transportation Agency (SFMTA), City of Brisbane, and other agencies are studying improvements to Muni T-Third light rail and Caltrain commuter rail. SFMTA has a long-term goal of ensuring a direct connection between the T-Third line and the Bayshore Caltrain Station. With the approval of the Candlestick Point/Hunters Point Shipyard Phase II Transportation Plan, creating a Bus Rapid Transit route linking Hunters Point, Candlestick Point, Executive Park, Visitacion Valley, the T Third line, the Bayshore Caltrain Station and Balboa Park BART has become a local/regional transportation priority and facilitates rapid, seamless transit access between existing and new jobs and residents and major transit hubs. Critical to the function of this Bus Rapid Transit line and the connecting T Third/Caltrain hub is safe, convenient pedestrian and bicycle access, particularly to and from the adjacent neighborhoods of Little Hollywood and Visitacion Valley.

Concurrently, the Bayshore Caltrain Station is being studied for improvements and a potential relocation to connect with the planned bus rapid transit and the T Third. The future extension of Geneva Avenue in Brisbane and an improved Bayshore Station are ongoing, long-term projects that will require the cooperation of several different stakeholders to determine the final alignments and locations, establish funding, acquire right-of-way, construct improvements, and operate. As detailed in the project Streetscape and Open Space Master Plan, an interim pedestrian path connecting the project site with the existing Bayshore Caltrain Station will be provided through the project site at Parcel F.

SFCTA is also initiating a study for the proposed Harney-Geneva Bus Rapid Transit (BRT). In the interim, the alignment of the BRT is expected to be primarily on existing streets. Once

the Geneva Avenue extension is completed, the BRT travel route is expected to travel on portions of the new extension.

Efforts to encourage use of public transportation by future residents and workers are described in the Transportation Management Plan attached to the DA.

7.2 Public Street System

The Developer will be responsible for the design and construction of the public streets. Improvements will generally include the following:

- Pavement section
- Concrete curbs and gutters
- Concrete sidewalk and curb ramps
- Traffic control signs and striping
- Traffic signals
- Street lighting
- Street landscaping and trees
- Stormwater management facilities (may include such methods as landscape strips, permeable pavements, and small bio-retention areas)
- Street furnishings (includes, but are not limited to, benches, trash cans, bike support facilities and pedestrian scale lighting)
- Accessible on-street passenger loading zones with adjacent street level passenger loading aisles and curb ramps.
- Accessible on-street parking spaces with adjacent curb ramps.

Streetscape and landscape improvements are further defined in the Open Space and Streetscape Master Plan.

7.2.1 Public Street Layout and Parcelization

A system of street and parcel numbers has been created to facilitate planning and design coordination and is shown on Figure 7.1. Street A and Street B are temporary street names for planning use with final street names to be selected in the future. The proposed public street network for the Schlage Lock Site is shown on Figure 7.2. Interim conditions for Sunnydale Avenue will be determined and coordinated with SFMTA during construction document approvals, with consideration of resource availability for constructing the planned Muni extension of Segment S of the T-Third line. Typical cross sections for these streets are based on those shown in the Open Space and Streetscape Master Plan and included on Figures 7.3 through 7.7.

7.2.2 Roadway Dimensions

The vehicular, curb-to-curb lane widths are dictated by the dimensions provided in the Open Space and Streetscape Master Plan. Typically vehicular travel lanes within streets

handling two-way traffic will vary between 10 and 12 feet in width. The travel lanes are measured from the face of curb or outside edge of a parking stall to the line of lane striping, where parking is provided. Streets accommodating two directions of travel will have a minimum width dimension of 20 feet, excluding parking, to accommodate fire truck access.

Class II bike lanes are provided along Sunnydale Avenue and will be 5 foot-6 inches wide measured from face of curb (or edge of Muni light rail lane) to the center line of lane striping.

Parallel parking stalls within the street right-of-way will be 7 feet wide. Along Leland Avenue, 12-foot wide lane widths are proposed to accommodate the 17-foot deep back-in parking stalls, angled at 45 degrees, on the south side of the street as shown on Figure 7.8. Locations for 8-foot wide accessible parking stalls, which will be provided at a rate of 4% of the total street parking count, and accessible loading zones are shown in the project Open Space and Streetscape Master Plan.

7.2.3 Landscape, Sidewalk and Setback Zone Dimensions

Dimensions of the landscape, sidewalk and building setback zones adjacent to the vehicular travel ways vary throughout the site. Specific dimensions for these components are illustrated in the Open Space and Streetscape Master Plan and selected based on the land use, character and traffic conditions of each street. Where feasible, utility boxes, cleanouts, manholes, vault access hatches other other utility structures will be located within landscape and bulb-outs and outside of pedestrian throughway zone, curb ramps and crosswalks. Improvements in the area between the back of curb and the right-of-way line will be maintained by the Developer or a project Homeowners Association (HOA).

Code-compliant accessible curb ramps, including, a 2-foot wide gutter pan for the full width of a crosswalk, will be provided at street corners to provide for pedestrian access across public streets. Where both a clear sidewalk width is less than 15 feet, measured perpendicularly from face of curb to property line or projected property line, and curb ramps are provided to serve crosswalks, building corners shall be chamfered to provide level landing at least 4 feet in depth by the curb ramp width or 4 feet, whichever is

greater, at the top of each curb ramp. In addition, a continuous accessible path of travel from one sidewalk around the corner to the other provided that it is at least 4 feet in clear width and with a vertical clearance of at least 8 feet above the walking surface. Where chamfering occurs on private parcels to provide the accessible passage area, a public access easement will be reviewed and approved by the SFDWP Bureau of Street Use and Mapping in compliance with the SFDPW easement dedication procedures. In addition, recorded public access easement will remain in place for the life of the building on a development parcel where the access easement is required.

7.2.4 Retaining Walls Supporting the Street A Public Right-of-Way

A portion of the Street A public right-of-way may require retaining walls on adjacent open space parcels to bridge the grade difference between the proposed development and the existing JPB right-of-way. These walls will be either seismically retrofitted or replaced to comply with City and County of San Francisco codes, the CBC, and the design-level geotechnical report. Ownership and maintenance of the wall will be controlled by the City.

7.3 Streetscape Design Considerations and Elements

7.3.1 Traffic Calming

As part of the pedestrian-oriented development plan outlined in the Open Space and Streetscape Master Plan, traffic calming elements are proposed to improve non-vehicular traffic safety and access. Proposed traffic calming elements for the project street rights-of-way are identified in Exhibit 7.9 and include raised intersections, raised crosswalks, bulb-outs with reduced curb radii, back-in parking stalls along Leland Avenue and Visitacion Avenue, and narrowed lane widths.

7.3.1.1 Raised Intersections and Raised Crosswalks

A raised intersection is proposed at the intersection of Street A and Parcel F. If accessibility guidelines and overland release requirements cannot be met at the raised intersection, the project will review options for incorporating an at-grade crossing with accessible curb ramps at this location. Raised crosswalks are proposed on Street B at pedestrian paths and the middle of Leland Avenue. At these locations the street pavement areas will be raised 6 inches to match the curb heights adjacent to the intersection and crosswalks. Overland release flow arrows

are included on Figure 6.1 with the locations of the raised crossings added for reference.

The design for these intersections and crosswalks will be coordinated with and are subject to the approval of the SFPUC, SFDPW, the SFMTA, and the San Francisco Fire Department (SFFD). A Grading and Overland Release Master Plan and a Combined Sewer Master Plan will be submitted to the SFPUC and SFDPW for review and approval in advance of the 60% construction documents for phased buildout of the public rights-of-way and parks. The master plans will confirm that the City overland drainage release requirements are achieved through hydrologic/hydraulic modeling. If site designs cannot meet the SFFD, SFDPW and SFPUC requirements for overland drainage release and fire department access, alternative solutions will be developed during the master plan approval process that may include crossings at the street pavement level. The grading and combined sewer design solutions included in the master plans will be incorporated into the construction documents for review and approval by the City and its agencies.

The project's HOA will be responsible for maintenance and restoration of the street sections, including pavement markings, within the raised intersection and raised crosswalk. Designs will incorporate measures to minimize maintenance and reduce the potential for dirt, silt and other debris to settle within the crosswalks.

7.3.1.2 Intersection Bulb-Outs

Bulb-outs have been strategically added along Bayshore Boulevard at intersections where there are currently parallel parking areas, wider drive lanes, or striped shoulders. Where feasible, curb radii have been generally kept to a minimum of 10-feet, per SFMTA recommendations for low-traffic streets; however, larger radii have been incorporated at many locations to provide the required clearances for SFFD access. The final design for the bulb-outs will be coordinated with the SFMTA, SFDPW, SFMTA, and the SFFD. Bulb-out improvements will be constructed if the designs can meet the SFDPW and SFPUC requirements for overland drainage release and accessibility for persons with disabilities. Overland Release at these locations will be studied in the Grading and Overland Release Master Plan, which will be reviewed and approved by the SFPUC and SFDPW in advance of the 60%

construction documents for phased buildout of the public rights-of-way and parks. A typical bulb-out detail is shown on Figure 7.14.

7.3.1.3 Back-in Parking Stalls

Back-in parking stalls are proposed on both Visitacion and Leland Avenue as shown on Figure 7.8, section A on Figure 7.3, and section L on Figure 7.6. The travel lanes adjacent to the Leland Avenue angled parking are proposed to be 12-feet wide to accommodate the back-in stalls with a 2-foot special paving section adjacent to the parking stalls to visually maintain the 10-foot wide travel lane. Back-in parking stalls are also proposed on a portion of Visitacion Avenue. The travel lanes on this portion of Visitacion Avenue will be 10-feet wide with the parking stalls designed as 21-feet deep to accommodate vehicular back-in turning movements. The final design of the back-in parking stalls will be coordinated with the SFMTA and SFDPW.

7.3.1.4 Narrowed Lane Widths

The traffic lane widths for the new two-way streets will be 10 feet, per SFMTA recommendations for low-traffic streets. The traffic lanes adjacent to the back-in parking stalls on Leland Avenue will be 12 feet.

7.3.2 Fire Department Access

Based on the planning efforts undertaken during the Open Space and Streetscape Master Plan and meetings with the SFFD, intersection radii, street widths from curb to curb on opposite sides of the street, and right-of-way layouts have been designed to accommodate fire truck turning movements as documented on Figures 7.2 through 7.7 and 7.11. Per the SFFD, intersections are designed to accommodate the truck turning movements of the City of San Francisco Articulated Fire Truck (Fire Truck). At intersection approaches and within intersections, the Fire Truck may encroach into the opposing vehicular travel land to complete turning movements. Figure 7.12 identifies a typical detail of turning movements of the San Francisco Articulated Fire Truck at typical site intersections.

7.3.3 Street Pavement Sections

The structural pavement cross section for the vehicular travel lanes on all new public roadways will comply with the requirements of the San Francisco Subdivision Code. Vehicular travel way structural cross sections will typically consist of 9-inches of Portland

Cement Concrete and a 3-inch asphalt concrete wearing surface for proposed on-site streets and shall be designed to the AASHTO rigid pavements design method using a 40-year design life.

As documented in the Streetscape and Open Space Master Plan, parallel parking stalls within the public right-of-way will be constructed with asphalt to ease SFDPW's street maintenance operations. Painted concrete special striping or other special decorative treatment, meeting accessibility requirements as determined by the SFDPW, may be used at raised crosswalk and intersection locations in conformance with the project Open Space and Streetscape Master Plan. Final special pavement designs are subject to the approval of the SFDPW during the construction document phase of the project and shall be designed to the AASHTO rigid pavements design method using a 40-year design life.

The use of alternative pavements in the public right-of-ways described above or other alternative pavement sections, such as asphalt concrete wearing surface over Class 2 aggregate base, porous paving, and decorative pavement (patterned concrete, patterned asphalt, paving stones, etc.) are subject to review and approval by the SFDPW. The project HOA will be responsible for maintenance and restoration of the pavement markings within areas with special striping or decorative treatments.

7.3.4 Proposed Street Lights

The Developer will design, layout and install the proposed project street lights. Street lighting shall comply with City of San Francisco standards for photometrics and acceptable fixtures. The Leland Avenue lighting standard, consistent with the lighting standards used on recent streetscape improvements on Leland Avenue west of Bayshore Boulevard, is proposed along the new portion of Leland Avenue that will be built as part of the development. The Bayshore Boulevard standard will be retained on the west edge of the site. Along the rest of the streets, the City standard street light will be used. A park Pole Light will be used throughout the proposed public parks. Building-mounted lights are recommended where buildings flank the pedestrian alleys or paths. The street and pedestrian light poles and fixtures shall comply with the SFPUC's "Guide to San Francisco, Street Lights," and the final pole and fixture selection shall be approved by the SFPUC. As necessary, temporary park pole light standards will illuminate any sidewalks or temporary pathways that are constructed to provide

pedestrian access to the Bayshore Caltrain Station before the adjacent buildings are complete and building mounted lights are operational. Where permitted and pending final selection of the electrical service provider for the project, the electrical service for the street lights will be located within the joint trench (refer to Section 14).

The 60% and 95% street light construction documents and specifications will be submitted to the SFPUC for review, comment and approval prior to construction. Street lights located on privately-owned (but publicly accessible) pedestrian streets will be maintained by the private property owners.

7.4 Off-site Traffic Signalization

As shown in Figure 7.13 and described below, the Developer will be responsible for design and construction funding, either as partial contribution or in full, of traffic signal modifications or new traffic signals, as well as striping. Where possible, the electrical service for traffic signals will be located within the joint trench (see Section 14). Traffic signals shall be designed by and constructed to the specifications of the SFMTA and SFDPW. Additional intersection improvements required by the EIR include, but may be ruled infeasible and therefore not constructed, by the City include:

7.4.1 Bayshore Boulevard/Leland Avenue

The Developer will be responsible for modifying the signal timing by shifting 6 seconds from the northbound/southbound left-turn movements to the through movements. The final mitigation design will be determined by the SFMTA. The Developer will be responsible for SFMTA costs to review, design, coordinate, and to implement improvements including signal design and signal timing changes.

7.4.2 Bayshore Boulevard/Sunnydale Avenue

In addition, the EIR recommends restriping the westbound approach to create two lanes at the intersection: a shared left-through lane and exclusive right-turn lane. The final mitigation design will be determined by the SFMTA.

7.4.3 Tunnel Avenue/Blanken Avenue

The EIR recommends signalizing the intersection, which may require undergrounding of existing overhead electrical, and communications facilities and improving stormwater collection infrastructure to accommodate the proposed traffic signal infrastructure. However, the SFMTA anticipates that signalizing the intersection will have adverse

impacts to parking and traffic operations on Bayshore Boulevard and may delay implementation of the signal until the Candlestick Point project comes online. The final mitigation design will be determined by the SFMTA. The Developer will be responsible for SFMTA costs to review, design, coordinate, and to implement improvements including signal design and signal timing changes.

If the project is required to signalize the intersection, new curb ramps, in accordance with SFDPW standards, will be installed at the corners. The Developer will be responsible for costs to design, permit, construct and inspect the improvements.

7.4.4 Bayshore Boulevard/Tunnel Avenue

The Developer will be responsible for modifying the signal timing by shifting 1 second from the southbound left-turn movement to the northbound/southbound through movements. Prior to implementation of this mitigation measure, the SFMTA will assess transit and traffic coordination along Bayshore Boulevard to ensure that the changes would not substantially affect SF Muni transit operations, signal progressions, pedestrian minimum green time requirements, and programming limitations of signals. The final mitigation design will be determined by the SFMTA. The Developer will be responsible for SFMTA costs to review, design, coordinate, and to implement improvements including signal design and signal timing changes.

7.4.5 Alana Way/Beatty Avenue

As referenced in the Bi-County Transportation Study, the project will pay its fair share contribution via the Development Agreement towards the construction of improvements, to be completed by others, at the Alana Way/Beatty Avenue intersection.

7.5 On-site Traffic Control and Signalization

Traffic calming and stop-controlled intersections, rather than signalization, are the primary strategy for on-site traffic control. Stop signs will be added at some of the intersections, with final locations to be coordinated with the City and based on a traffic sight distance requirements and project phasing. Additional descriptions of the streetscape traffic control elements are included in the Open Space and Streetscape Master Plan. If implemented, stop signs on city streets will require legislation from SFMTA Board and traffic calming may also require SFMTA Board and/or public hearing.

7.6 Public Bike and Pedestrian Paths on Private Property

Pathways restricted to foot and bicycle traffic will be privately owned, publicly accessible open spaces, built by the Developer on structured podiums within the Blocks. To allow for public access on private property, public access easements will be shown and granted on the project phased final map. As shown on Figure 7.1, the public access pathways are located between Parcels 1 and 2, Parcels 7 and 8, and adjacent to Parcel 9. In addition, a stairway and pathway between Parcels 3 and 4 will be open to the public during day time hours and will be designed to meet code requirements for accessibility. An accessible path of travel linking Bayshore Boulevard with Raymond Avenue will be installed across Parcels B, C and E. In addition, an accessible path of travel will be provided over Parcel F to link Street A with the Bayshore Caltrain Station. These areas will be constructed with decorative elements, such as colored concrete, and associated landscape improvements, as detailed in the project Streetscape and Open Space Master Plan. Based on final building designs and access requirements for the adjacent development parcels, opportunities to reduce landscape planter widths to 10-feet and increase paved access paths to 20-feet in width will be reviewed and incorporated where feasible. Public infrastructure within the bike and pedestrian pathways on private development parcels is not currently anticipated. Any proposed water and wastewater easements on private property will be reviewed by the SFPUC on a case-by-case basis.

Upon approval of the improvements by the City, maintenance and operation of the public bike and pedestrians pathways built on privately owned structures will be the responsibility of the private property owner.

7.7 Acceptance and Maintenance of Street Improvements

Upon acceptance of the new and/or improved public streets by the SFDPW, responsibility for the operation and maintenance of the roadway, streetscape elements, and retaining walls will be designated as defined in the various City of San Francisco Municipal Codes. Acceptance of water and wastewater utility infrastructure within street improvements shall be subject to SFPUC approval. Proposed water and combined sewer infrastructure shall be designed to facilitate future access for maintenance. Conflicts between proposed public water and combined sewer infrastructure and the surface improvements proposed as part of the project, including but not limited to dedicated transportation routes, trees, bulb-outs, traffic circles and medians, shall be minimized in the design of the infrastructure and surface improvements. The SFPUC will review all proposals for surface improvements above

proposed public water and combined sewer infrastructure on a case-by-case basis to ensure that future access for maintenance is preserved. Street improvements installed to meet the SDG will be maintained by the private property owners or their Assignees.

As outlined in the DA, the project HOA will be responsible for maintenance and restoration of the non-standard street pavement materials, including decorative paving, within the raised intersection and raised crosswalk. Restoration will include replacement of the pavement markings within areas with special striping or decorative treatments.

7.8 Phasing of New Roadway Construction

The Developer will construct the new roadway system and traffic control and signalization improvements in phases in advance of or to match development of the Blocks, per the Phasing Plan attached to the DA. The amount of the existing roadway repaired and/or replaced will likely be the minimum necessary to serve the Block. Repairs and/or replacement of the existing facilities necessary to serve the Block will be designed and constructed by the Developer. Fire truck turnaround areas, if any, will be coordinated with the SFFD and constructed by the Developer consistent with the Fire Code. Phasing of traffic signalization improvements will be based on cumulative development thresholds identified by the project traffic consultant and/or the SFMTA coincident with the Phase applications, construction documents or as stated in the DA. Sidewalk and other accessible pedestrian paths of travel, either permanent or temporary, shall be provided to serve the pedestrian entrance and exit requirements of each block prior to being released for occupancy. Such paths of travel will connect to the sidewalks along Bayshore Boulevard and hence to the public transit stations and bus stops thereon.

Impacts to improvements installed with previous phases of development due to the designs of the new phase will be the responsibility of the Developer and addressed prior to approval of the construction drawings for the Block.

7.9 SFMTA Infrastructure

Where required, the following list of infrastructure items includes items to be owned, operated and maintained by the SFMTA within public rights-of-way:

- Security monitors and cameras
- Signals and Signal Interconnects, including Muni Bus Prioritization signals
- TPS signal preempt detectors

- Conduit containing TPS signal cables
- Shelters
- Paint – poles and asphalt delineating coach stops
- Asphalt painting for transit lanes
- Departure prediction ("NextBus") monitors and related communications equipment
- Bicycle racks
- Crosswalk striping, except for areas with a raised intersection/crosswalk or with painted concrete special striping or other special decorative treatment
- Bike lane and facility striping
- APS/Pedestrian crossing signals
- Street Signs

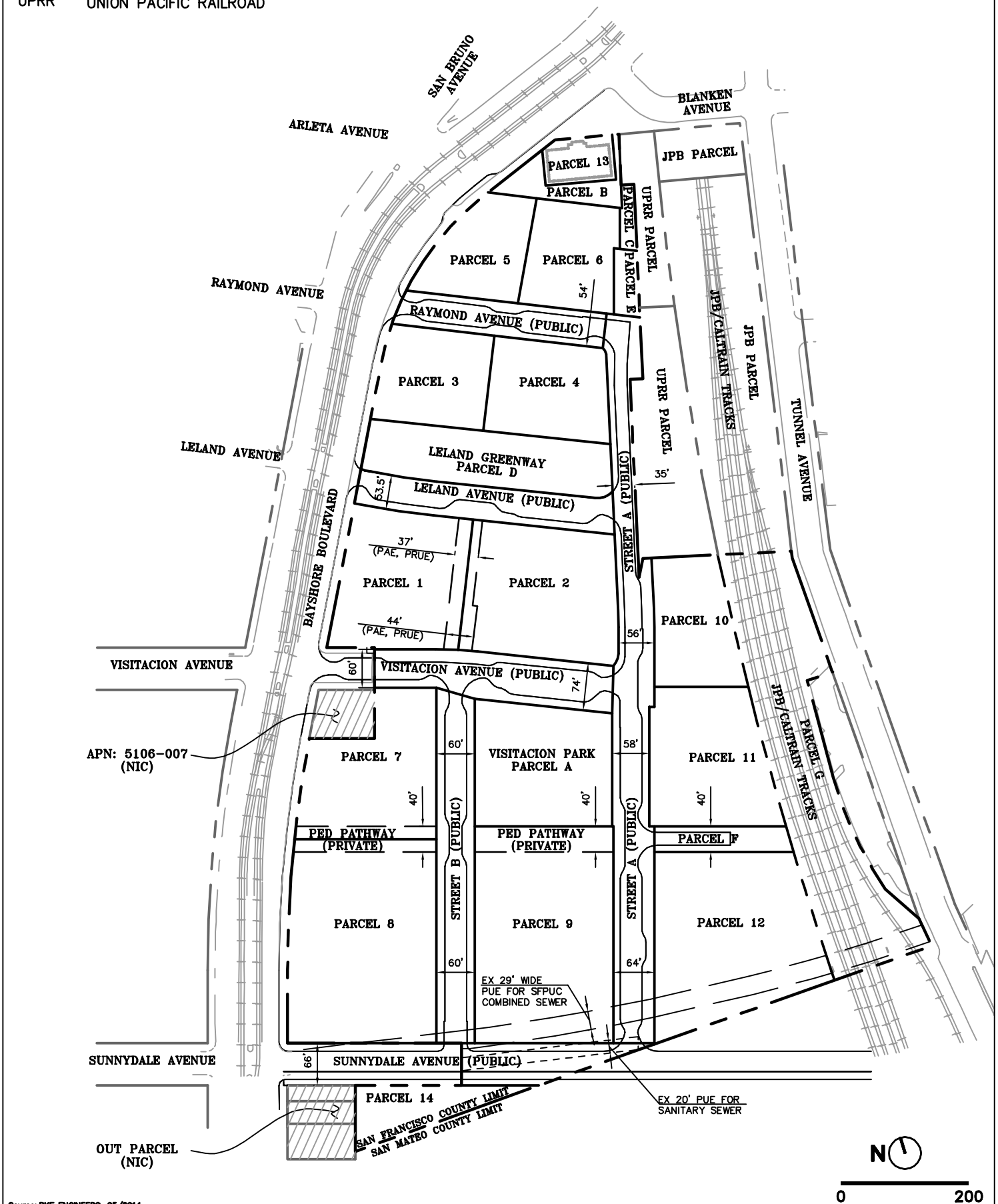

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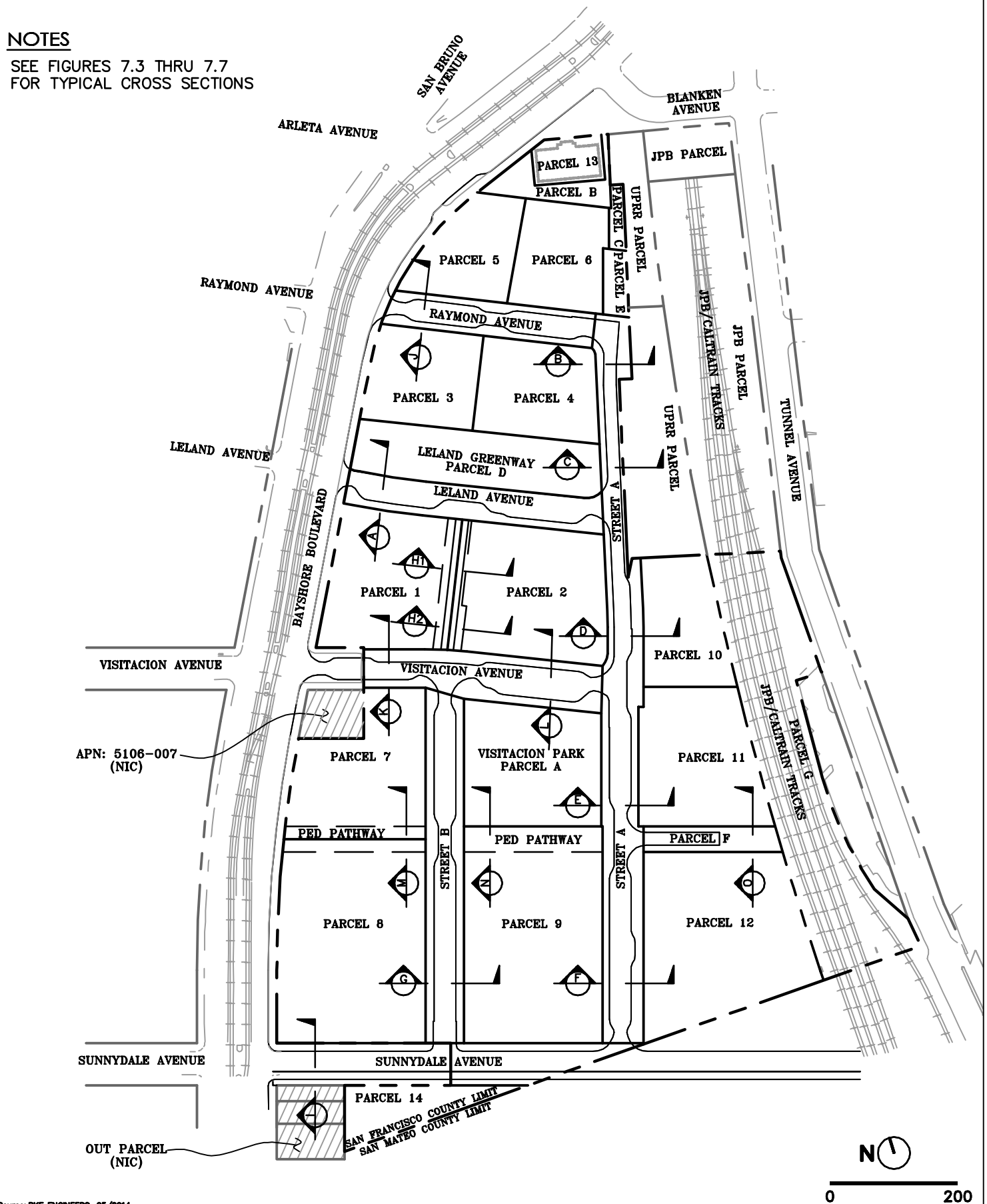
FIGURE 7.1: CONCEPTUAL SITE PLAN AND STREET LAYOUT

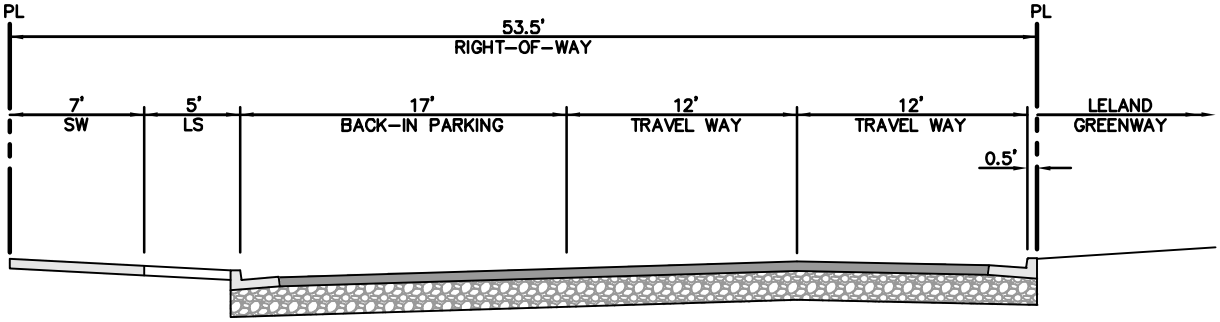


Schlage Lock Infrastructure Plan-DRAFT

FIGURE 7.2: PLAN VIEW & CROSS SECTION LOCATIONS

LEGEND

LS	LANDSCAPING
PAE	PUBLIC ACCESS EASEMENT
PL	PROPERTY LINE
PR	PROPOSED
PRUE	PRIVATE UTILITY EASEMENT
SW	SIDEWALK



A — **LELAND AVENUE**
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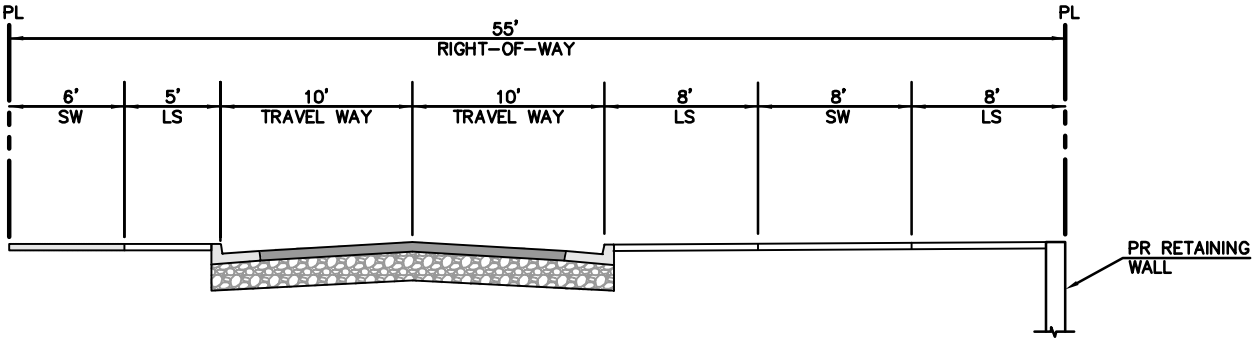

B — **STREET A**
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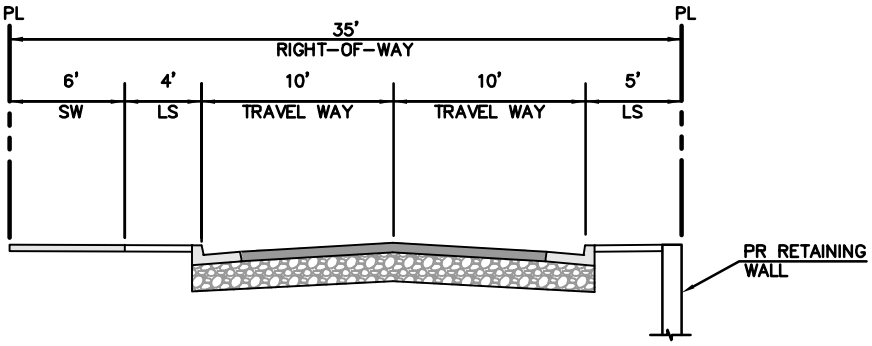

C — **STREET A**
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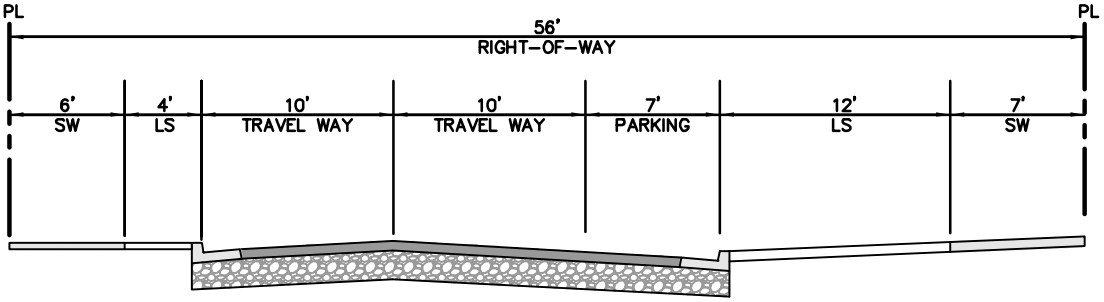
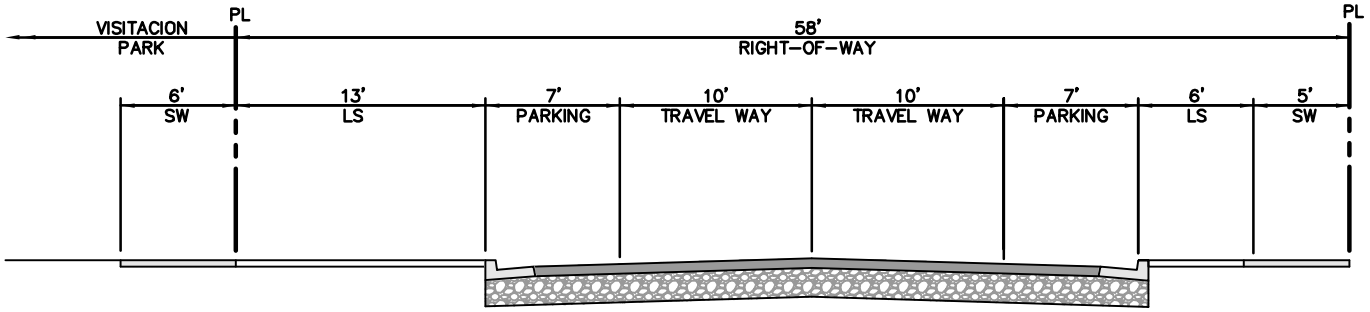
FIGURE 7.3: TYPICAL STREET CROSS SECTIONS

LEGEND

LS	LANDSCAPING
PAE	PUBLIC ACCESS EASEMENT
PL	PROPERTY LINE
PR	PROPOSED
PRUE	PRIVATE UTILITY EASEMENT
SW	SIDEWALK



D – STREET A
NTS



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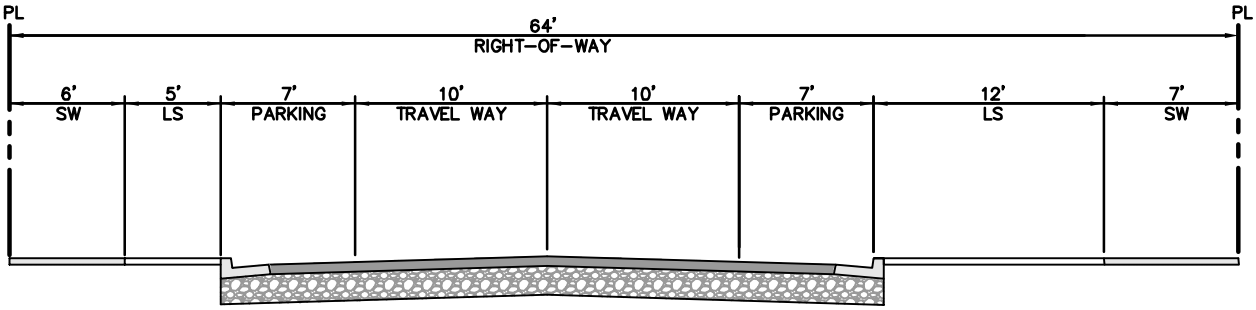
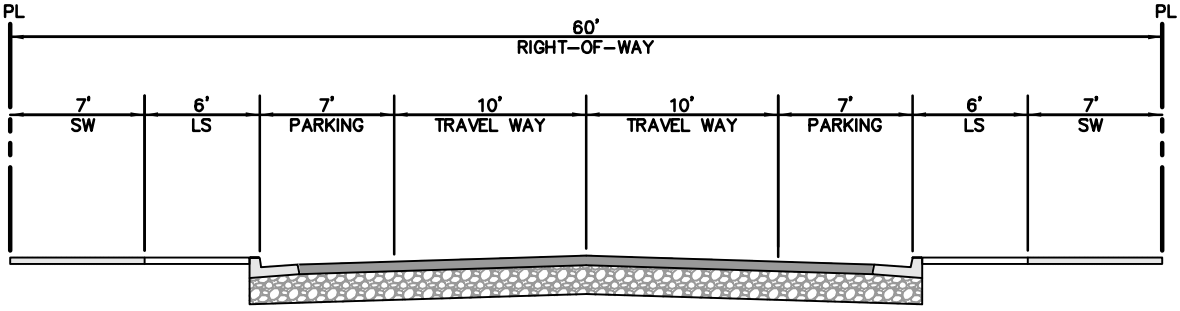


F – STREET A
NTS

Source: BKF ENGINEERS, 05/2014

LEGEND

LS	LANDSCAPING
PAE	PUBLIC ACCESS EASEMENT
PL	PROPERTY LINE
PR	PROPOSED
PRUE	PRIVATE UTILITY EASEMENT
SW	SIDEWALK



G – **STREET B**
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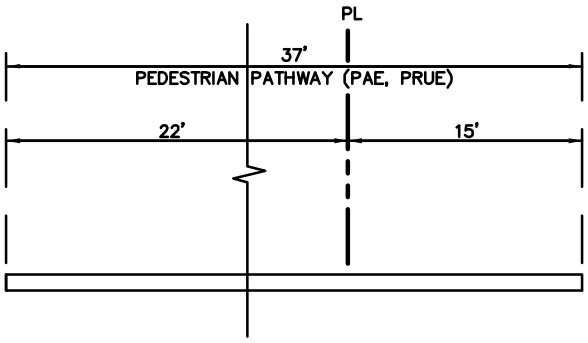

H1 – **PEDESTRIAN ACCESS AREA**
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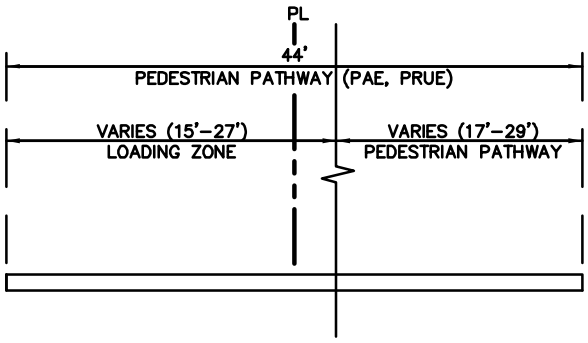

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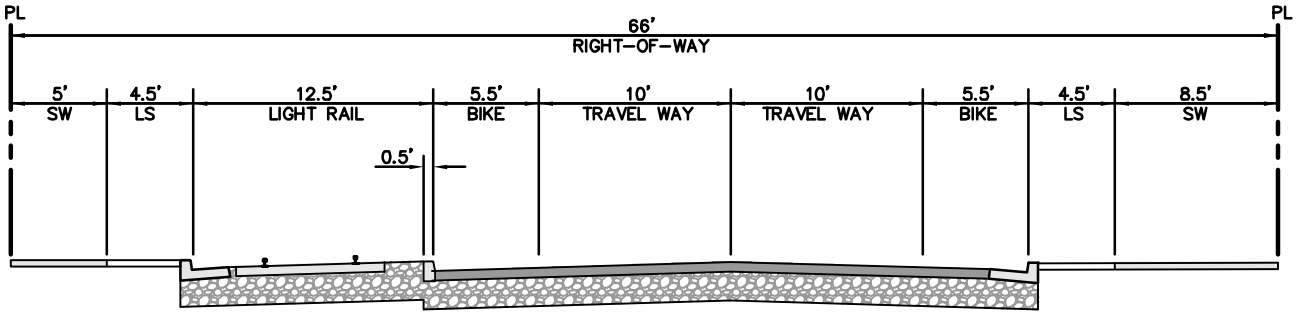

I – **SUNNYDALE AVENUE**
NTS

Source: BKF ENGINEERS, 05/2014

DRAWING NAME: K:\Eng07\070090\DWG\Exhibits\Infrastructure Plan\Plotted Sheets\7.3-7.7_Street Cross Sections.dwg
PLOT DATE: 05-28-14
PLOTTED BY: yee

LEGEND

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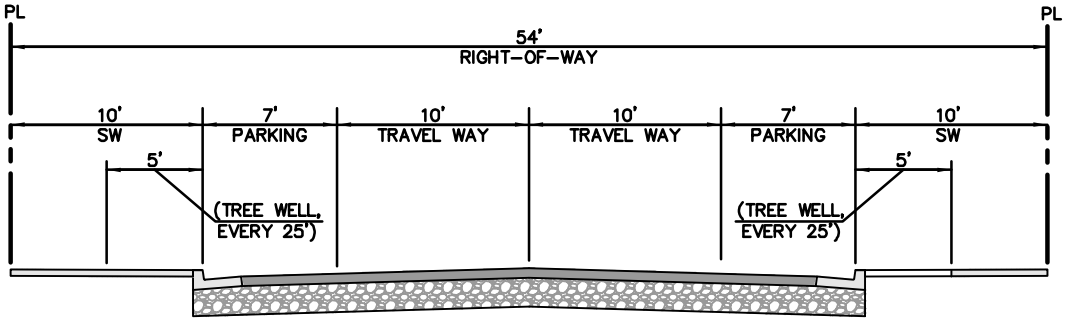
PAE	PUBLIC ACCESS EASEMENT
PL	PROPERTY LINE
PR	PROPOSED
PRUE	PRIVATE UTILITY EASEMENT
SW	SIDEWALK



J
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RAYMOND AVENUE
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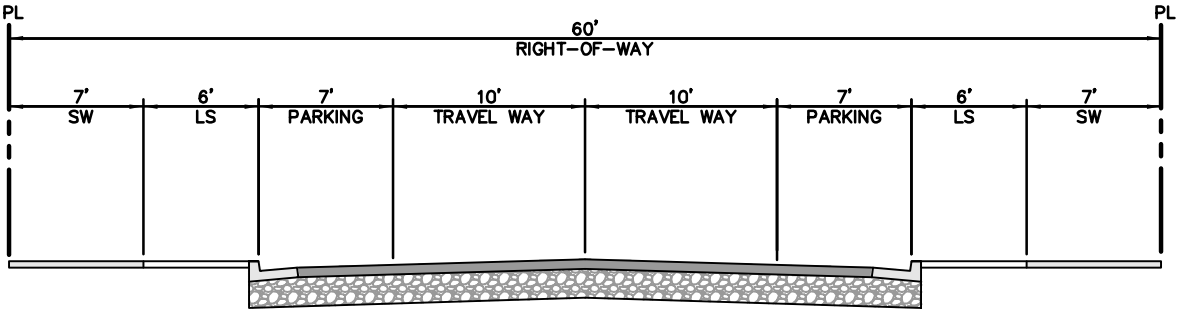

K
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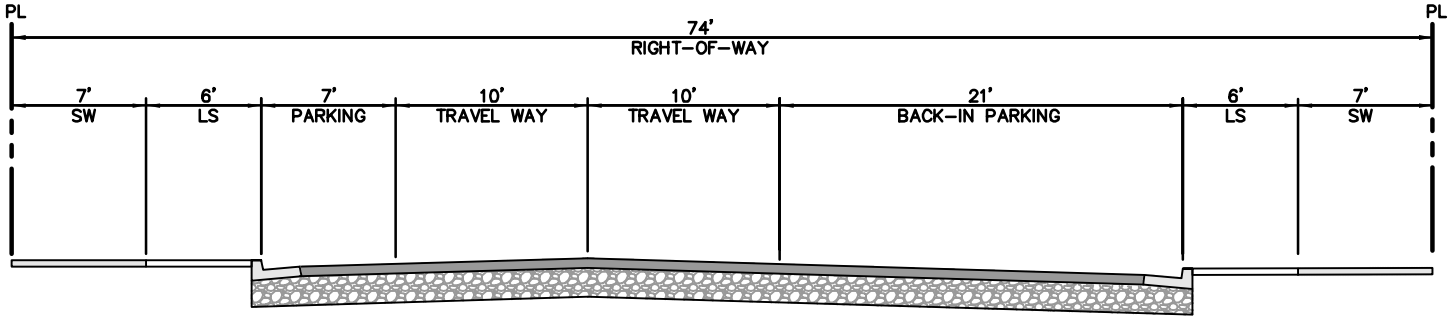
VISITACION AVENUE
NTS



L
–

VISITACION AVENUE
NTS

Source: BKF ENGINEERS, 05/2014

LEGEND

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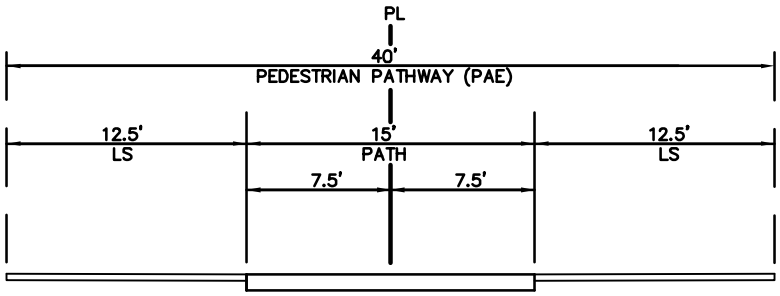
PL	PROPERTY LINE
PR	PROPOSED
PRUE	PRIVATE UTILITY EASEMENT
SW	SIDEWALK



M – PRIVATE PEDESTRIAN ACCESS PATH
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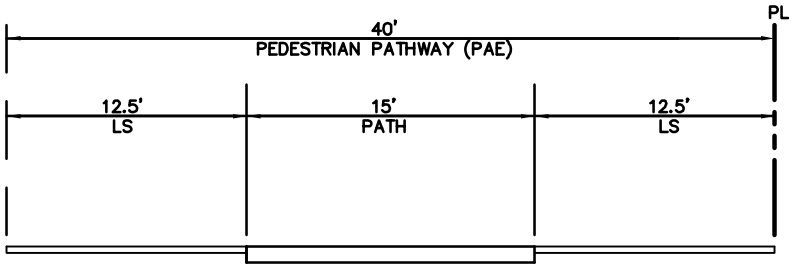
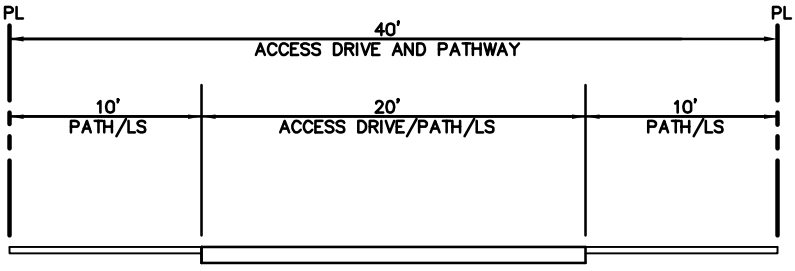
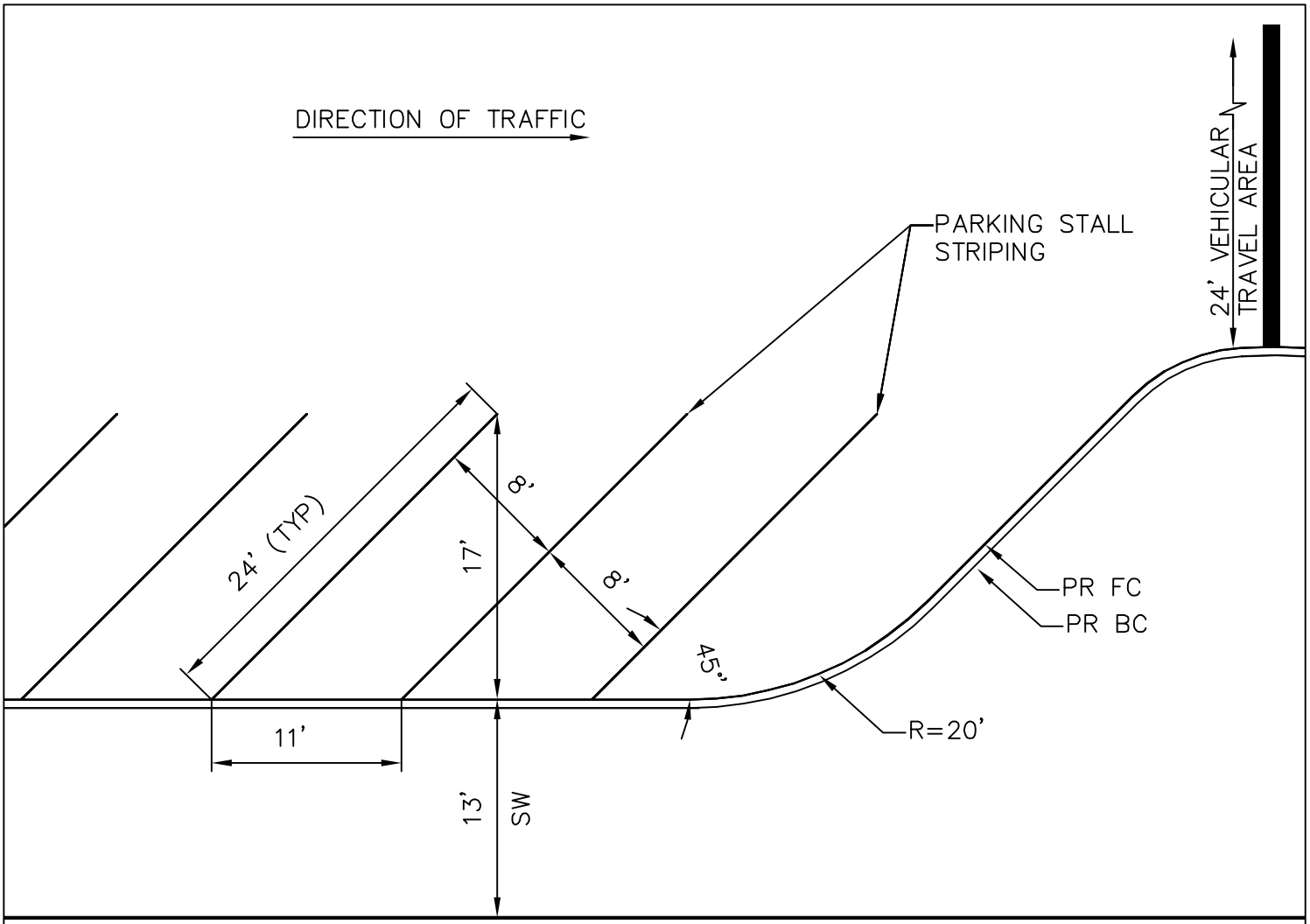


N – PRIVATE PEDESTRIAN ACCESS PATH
NTS



O – PRIVATE ALLEY
NTS

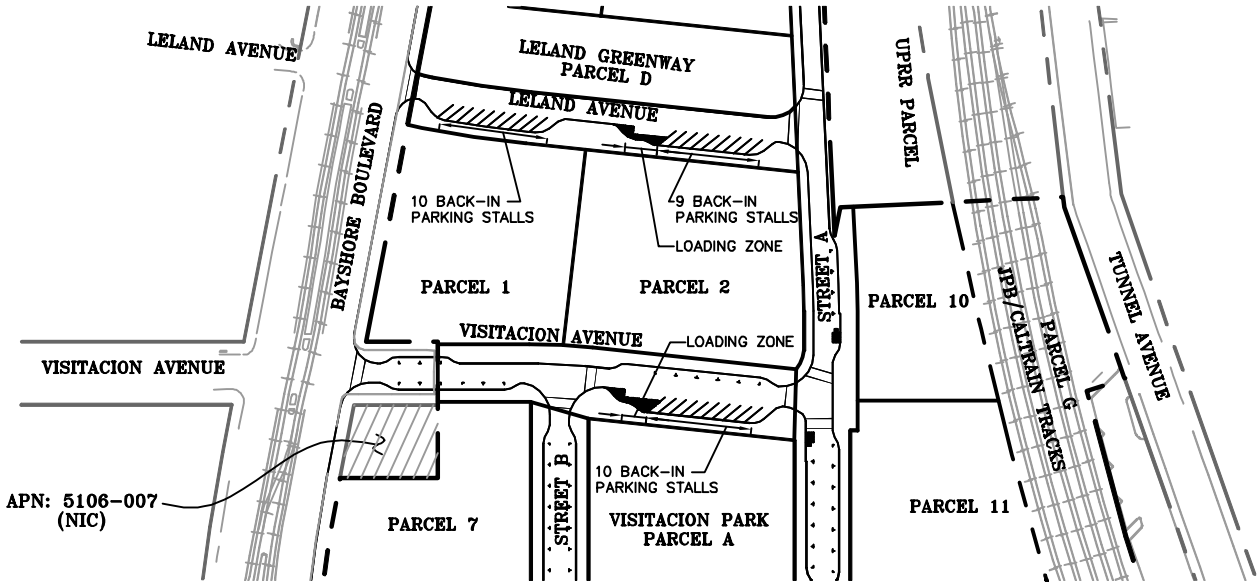
Source: BKF ENGINEERS, 05/2014



BACK-IN PARKING STALL DETAIL

N

0 10



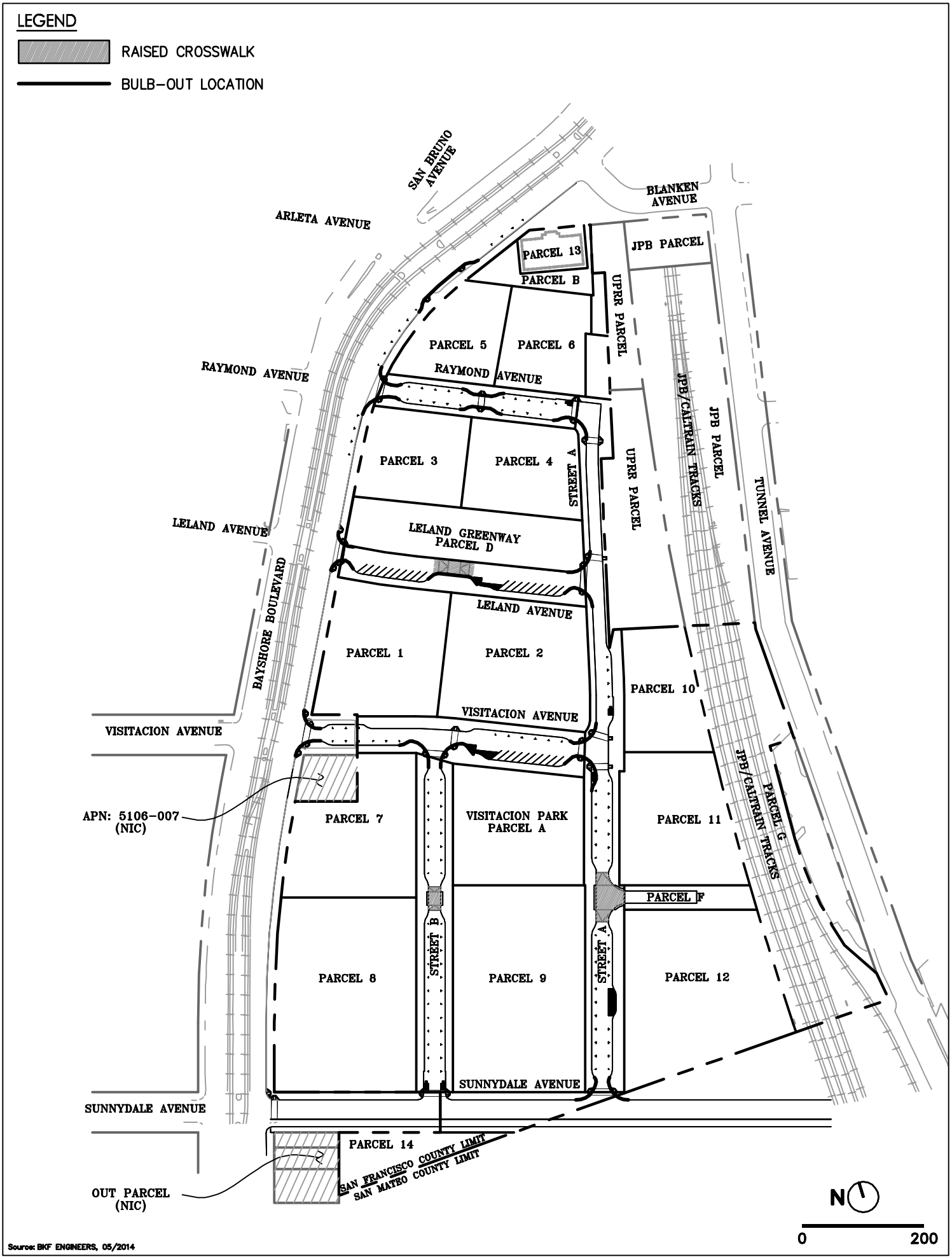
LOCATION OF BACK-IN PARKING STALLS

N

0 200

Source: BKF ENGINEERS, 05/2014

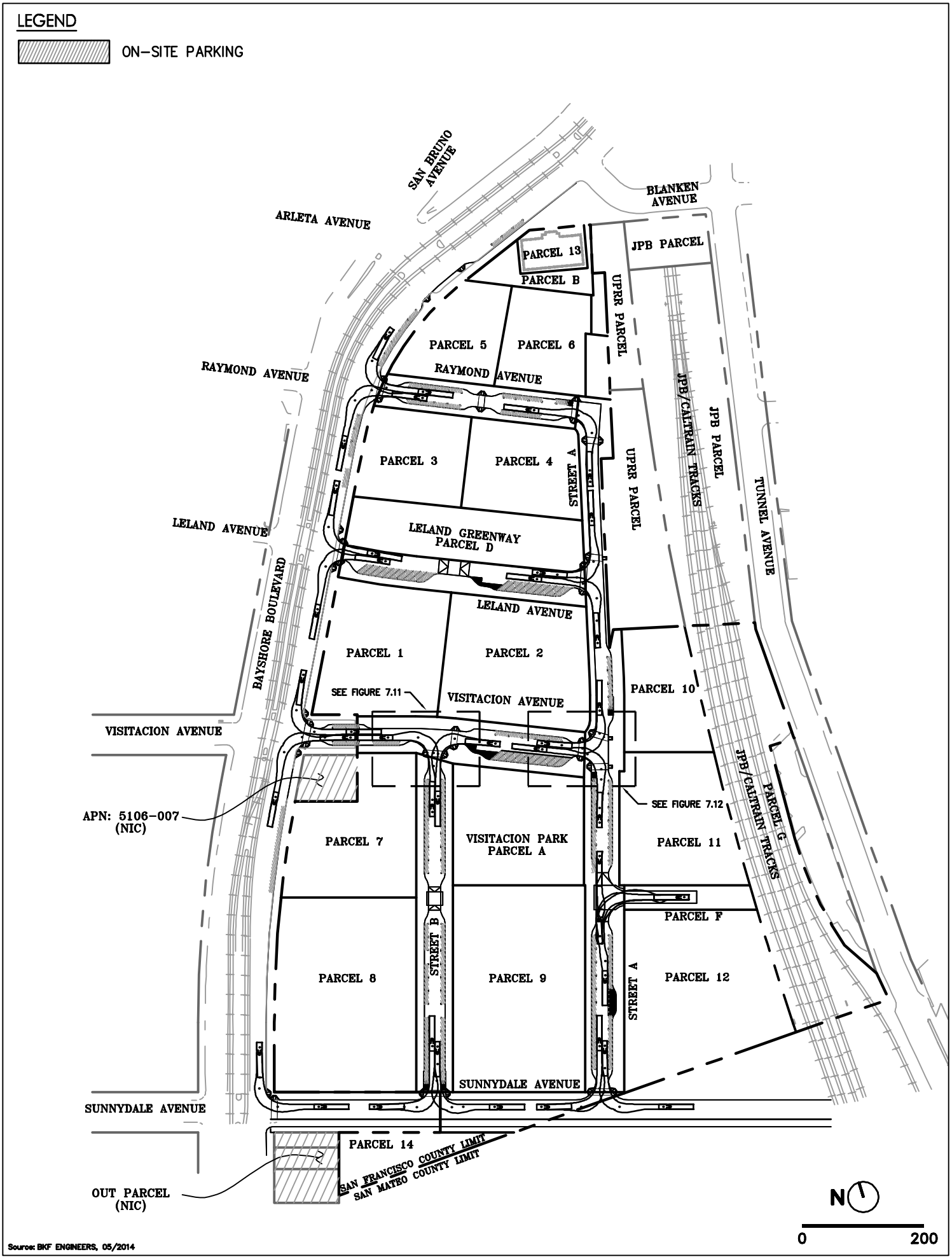
DRAWING NAME: K:\Eng07\070090\DWG\Exhibits\Infrastructure Plan\Plotted Sheets\7.8_Typical Back-in Parking Stall.dwg
PLOT DATE: 05-28-14 PLOTTED BY: yee



Source: BKF ENGINEERS, 05/2014

DRAWING NAME: K:\Eng07\070090\DWG\Exhibits\Infrastructure Plan\Plotted Sheets\7.9_Traffic Calming.dwg
PLOT DATE: 05-28-14
PLOTTED BY: yee

FIGURE 7.9: POTENTIAL TRAFFIC CALMING ELEMENTS



Source: BKF ENGINEERS, 05/2014

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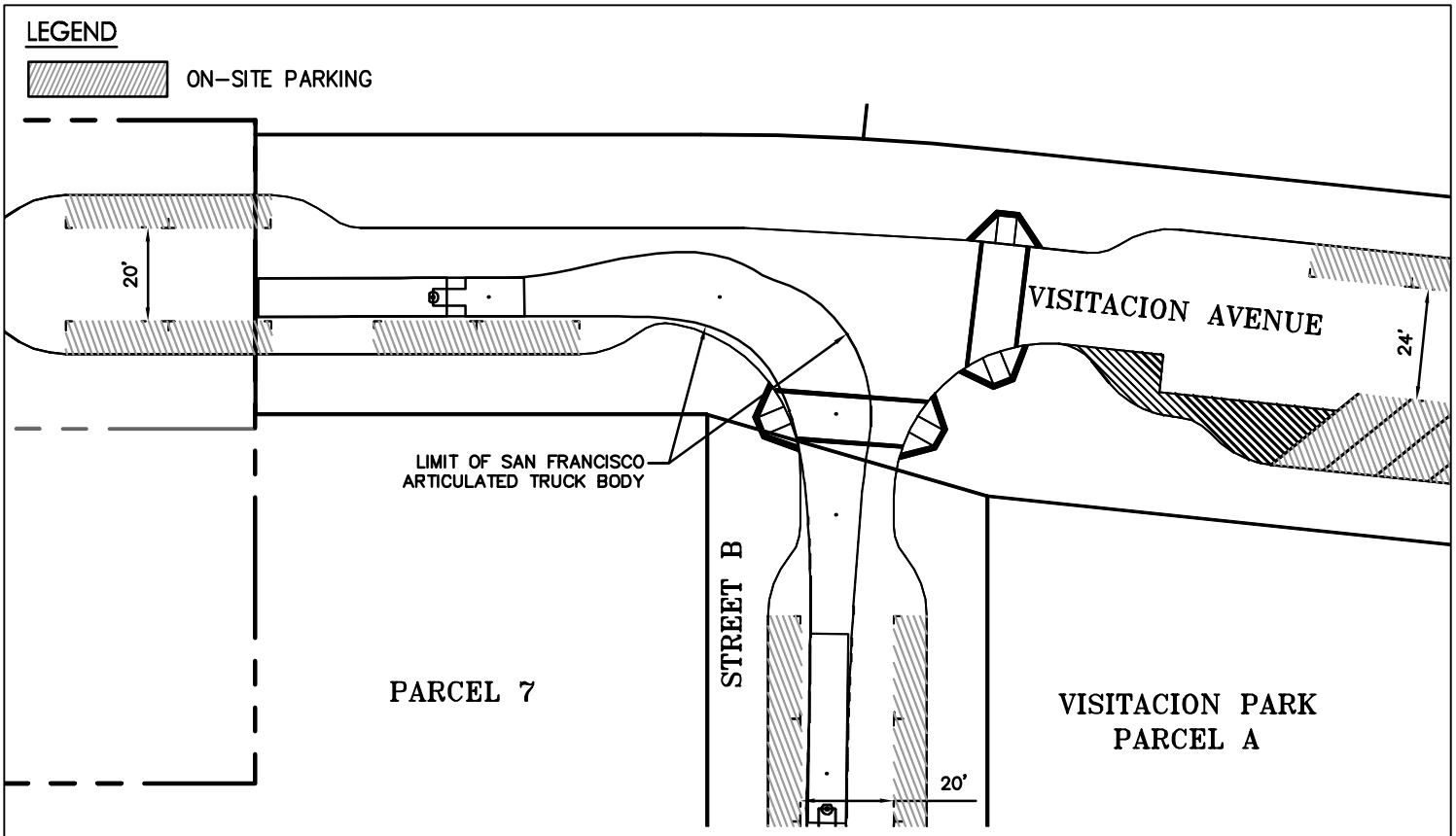
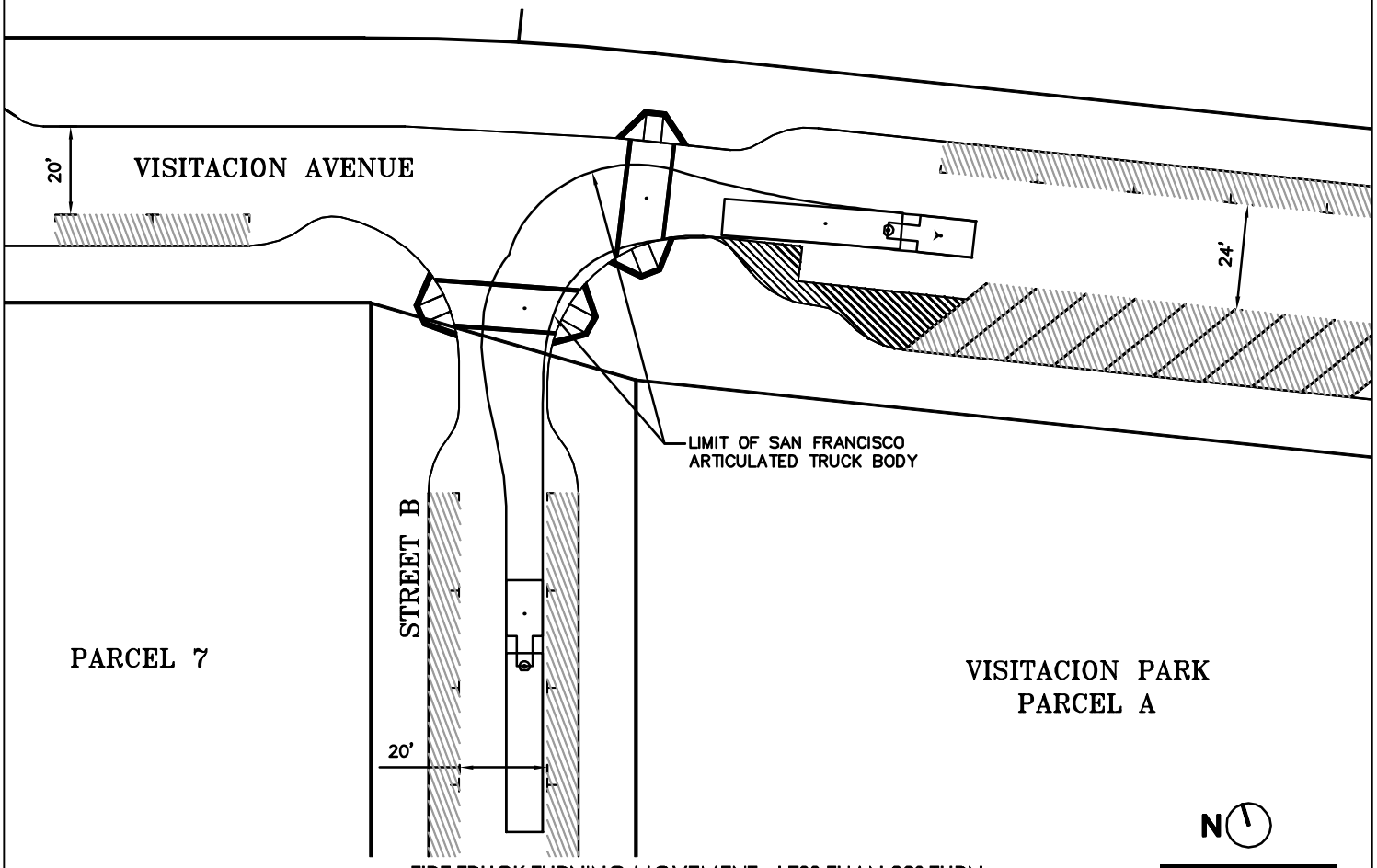
PLOT DATE: 05-28-14
PLOTTED BY: yee

FIGURE 7.10: CONCEPTUAL FIRE TRUCK TURNING ANALYSIS



FIRE TRUCK TURNING MOVEMENT - 90° TURN

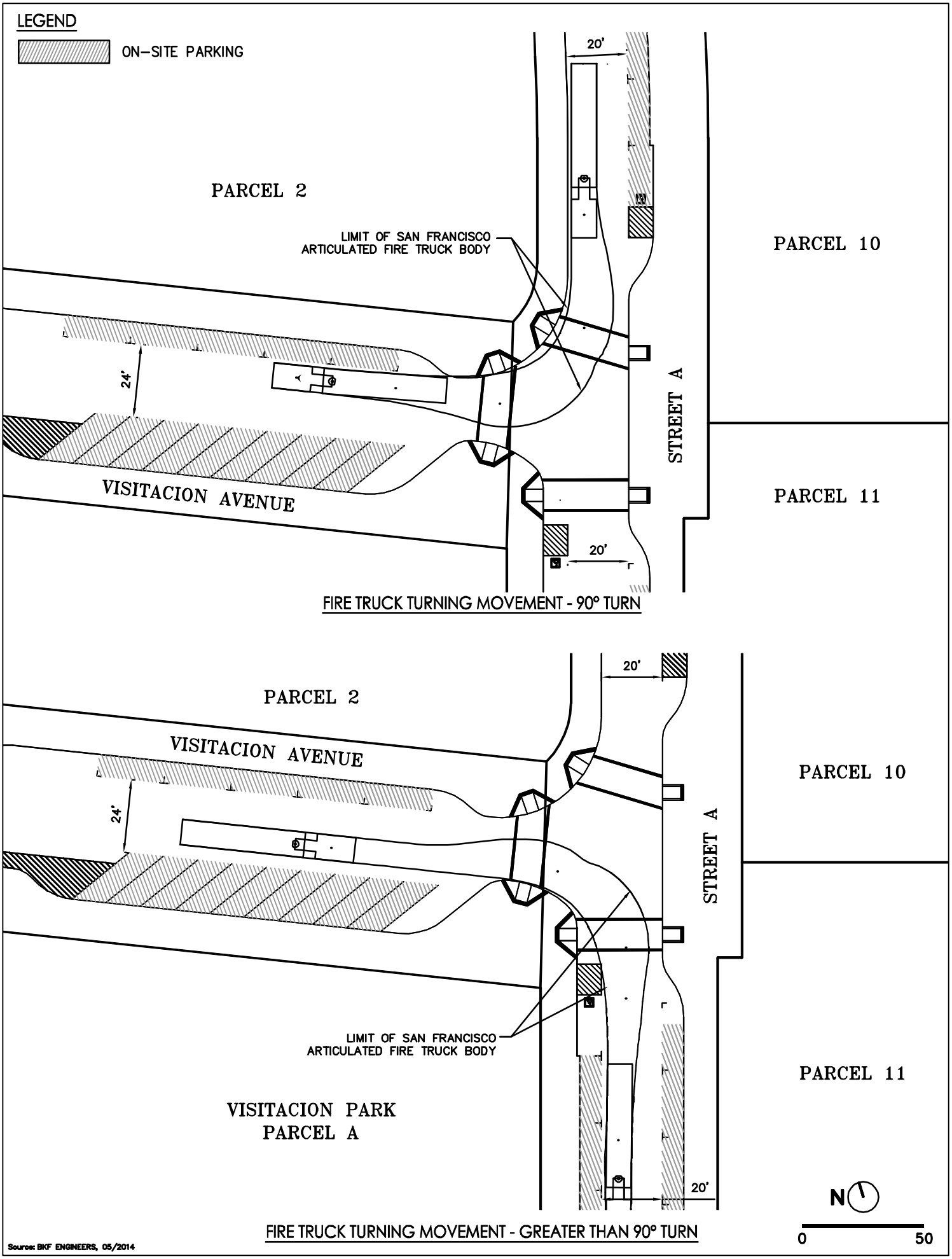


FIRE TRUCK TURNING MOVEMENT - LESS THAN 90° TURN

Source: BKF ENGINEERS, 05/2014

DRAWING NAME: K:\Eng07\070090\DWG\Exhibits\Infrastructure Plan\Plotted Sheets\7.11_Fire Truck Blow up.dwg
PLOT DATE: 05-28-14
PLOTTED BY: yeee

FIGURE 7.11: ENLARGEMENT OF TYPICAL INTERSECTION FIRE TRUCK TURNING



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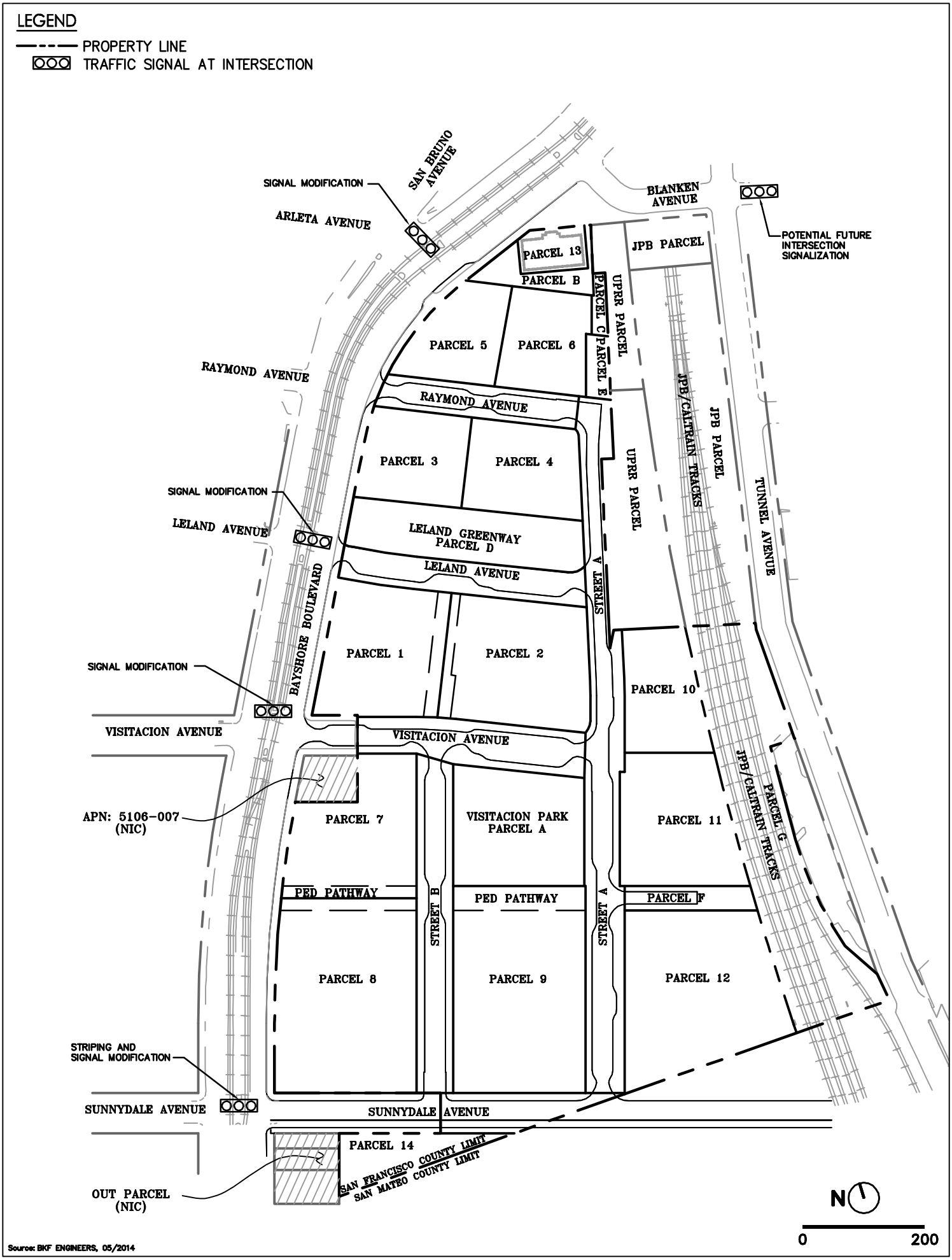
PLOT DATE: 05-28-14
PLOTTED BY: yee

FIGURE 7.12: ENLARGEMENT OF TYPICAL INTERSECTION FIRE TRUCK TURNING



Source: BKF ENGINEERS, 05/2014

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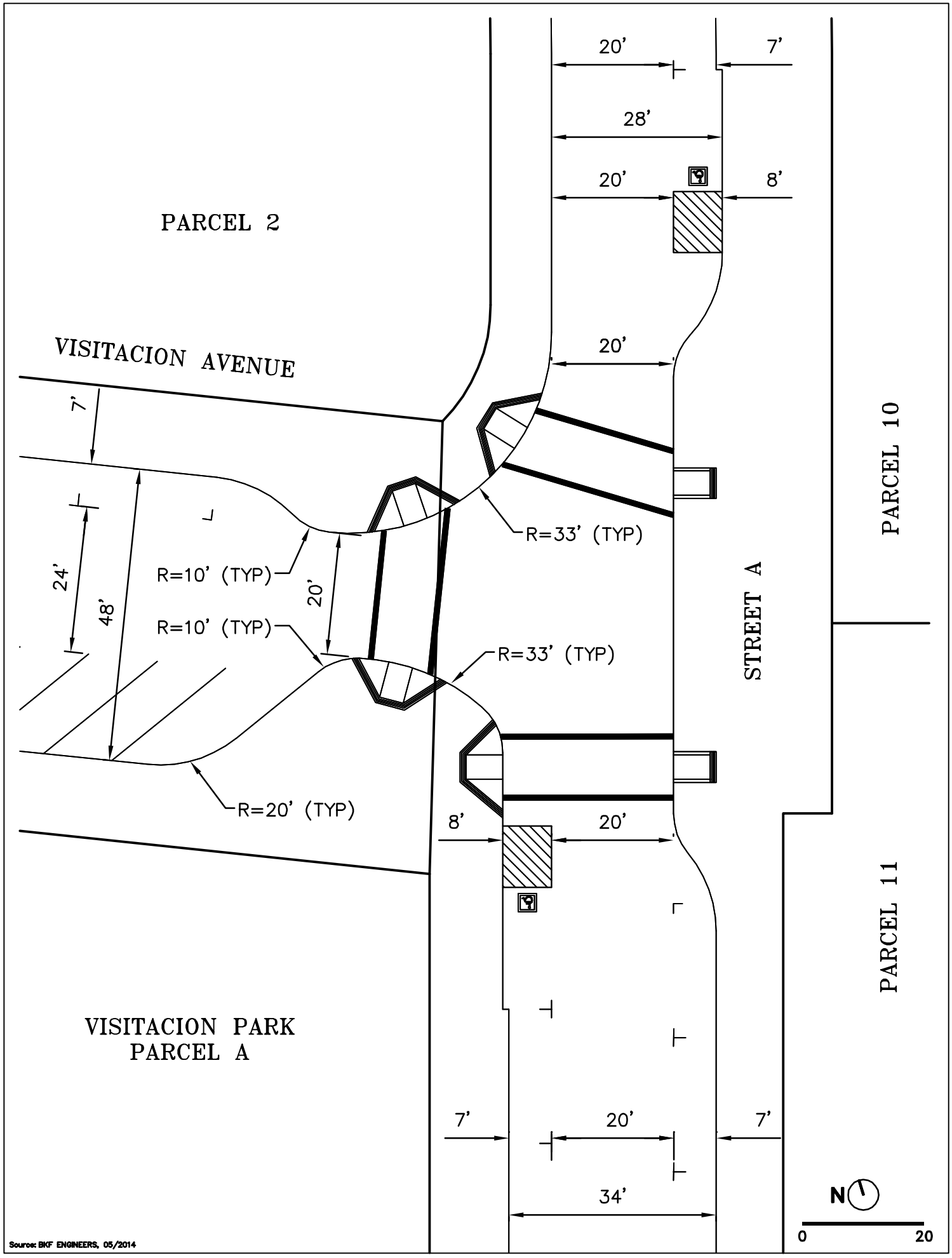
PLOT DATE: 05-28-14
PLOTTED BY: yee

FIGURE 7.13: PROPOSED OFF-SITE TRAFFIC MITIGATIONS



Source: BKF ENGINEERS, 05/2014

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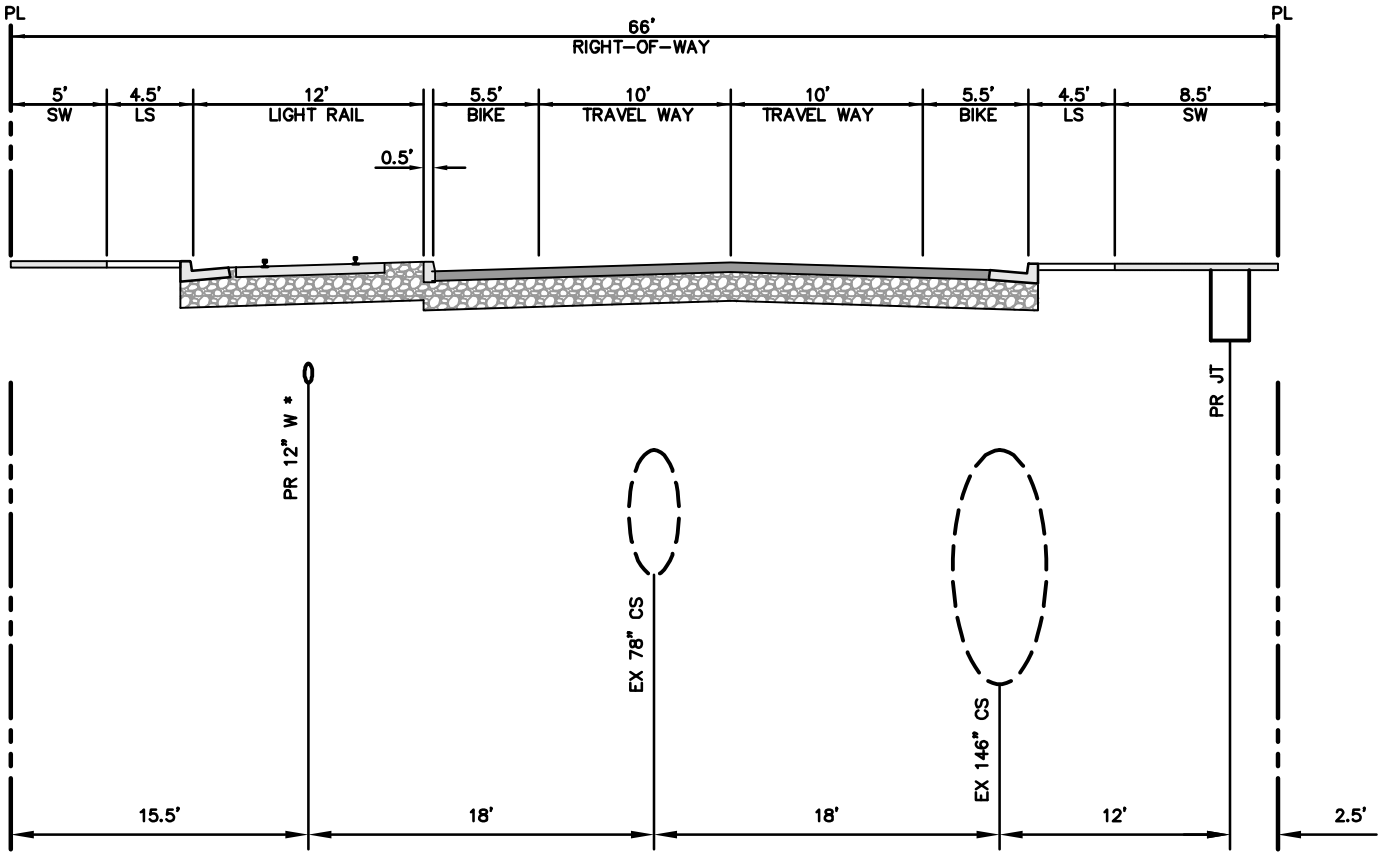
PLOT DATE: 05-28-14 PLOTTED BY: yee

FIGURE 7.14: TYPICAL INTERSECTION BULB-OUT DETAIL

LEGEND

CS	COMBINED SEWER
EX	EXISTING
JT	JOINT TRENCH
LS	LANDSCAPING
PAE	PUBLIC ACCESS EASEMENT
PL	PROPERTY LINE
PR	PROPOSED
PRUE	PRIVATE UTILITY EASEMENT
SW	SIDEWALK
W	WATER



*NOTE: FINAL LOCATION OF PROPOSED 12" WATER TO BE DETERMINED BY THE SFPUC TO AVOID PLACEMENT UNDERNEATH POTENTIAL MUNI T-THIRD LIGHT RAIL LINE.

1 / - **SUNNYDALE AVENUE**
NTS

Source: BKF ENGINEERS, 05/2014

FIGURE 7.15: CONCEPTUAL SUNNYDALE AVENUE UTILITY SECTION

8. OPEN SPACE AND PARKS

8.1 Proposed Public Parks

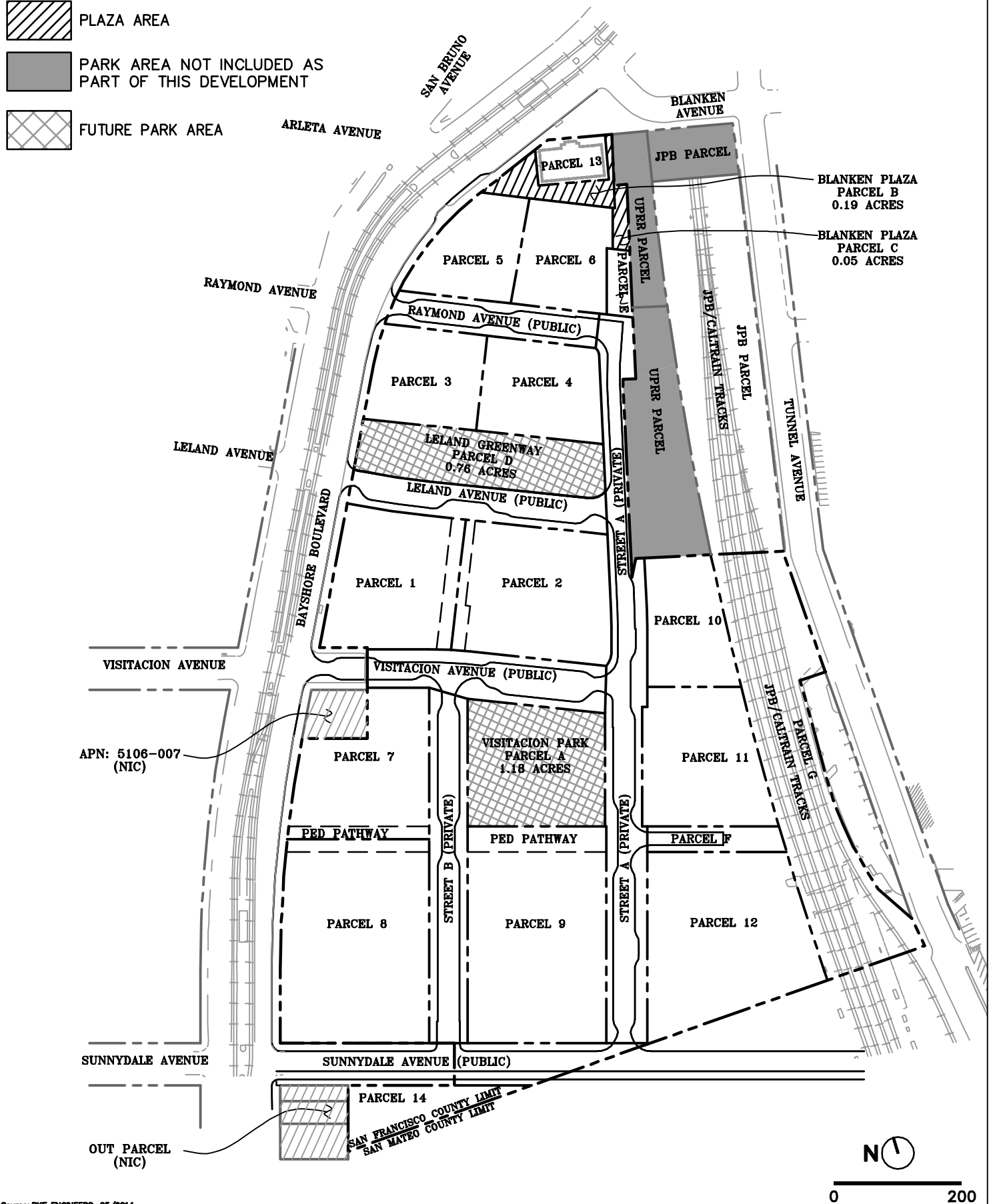
Three major park areas—a portion of the Blanken Park, Leland Greenway, and Visitacion Park—are located on the Project Site and will be constructed as a part of the Project. Land fee title or easement purchase from JPB and UPRR will be required to build the remainder of Blanken Park as proposed in the Open Space and Streetscape Master Plan. Where feasible, stormwater management features may be incorporated into the park areas to promote site sustainability goals and achieve compliance with the SDG. Additional approvals with DTSC will be required should the project pursue infiltration stormwater management elements or stormwater storage and reuse for irrigation, if feasible, associated with achieving compliance with the SDG. Figure 8.1 identifies the locations and areas of the proposed public parks at the Schlage Lock Site. Park improvements, which may include public art and historic commemoration elements, are described in detail in the Open Space and Streetscape Master Plan. These park and infrastructure improvements, including stormwater collection facilities, stormwater management facilities, irrigation systems, and fire hydrants, will be designed and installed per City standards by the Developer. Review, permitting and inspection costs for the park and playground improvements are the responsibility of the Developer. Playground and park designs shall be reviewed and approved by SFDPW prior to permit issuance and shall be inspected for compliance with the approved plans prior to being sanctioned for use.

8.2 Phasing, Operations and Maintenance for Open Space and Parks

The Developer will construct the new parks in phases to match the need for parkland generated by each of the Blocks of the project, as well as the availability of utilities to each park area. The following identifies construction triggers that will dictate the completion of the proposed public park improvements:

- **Leland Greenway:** Construction will be completed when development of two of the adjacent Blocks (Parcels 3 and 4) is finished.
- **Visitacion Park:** Construction will be completed when some of the adjacent Blocks are completed.
- **Blanken Park:** The Historic Office Building Plaza will be completed when Parcels 5 and 6 are constructed.

The maintenance of improvements within the parks, including stormwater management facilities within the park, will be funded through private sources, as described in the DA.



Source: BKF ENGINEERS, 05/2014

DRAWING NAME: K:\Eng07\070090\DWG\Exhibits\Infrastructure Plan\Plotted Sheets\8.1_Proposed Public Park and Plaza Locations.dwg
PLOT DATE: 05-28-14
PLOTTED BY: yee

FIGURE 8.1: PROPOSED PUBLIC PARK & PLAZA LOCATIONS

9. POTABLE WATER SYSTEM

9.1 Existing Low Pressure Water System

Water service will be provided by a water supply, storage, and distribution system operated by the SFPUC. The system will be used for domestic water supply and low pressure fire hydrants. Existing low pressure water system surrounds the site on Bayshore Boulevard (12-inch), Blanken Avenue (8-inch and 12-inch), and on Tunnel Avenue (8-inch and 12-inch) on the east side of the Caltrain/JPB tracks. According to record maps, a 12-inch main crosses under the tracks and connects the Schlage Lock site to the system in Tunnel Avenue.

Service to the former Schlage Lock factory was from the existing main on Bayshore Boulevard at Visitacion Avenue and from the existing main on Tunnel Avenue crossing under the tracks. On-site water facilities were removed as part of the site remediation under the oversight of the DTSC.

9.2 Proposed Low Pressure Water System

9.2.1 Project Water Demands

The project water demands stated as total required flow rate are identified in the Table 9.1 below and in Appendix C. A future project Master Plan that outlines the Project's methods used for calculating the flow demands will be submitted to the SFPUC for review and approval in advance of the 60% construction documents for phased buildout of the public rights-of-way and parks.

	Demand (gpm)
Domestic Average Daily Water Demand	141
Fire Water Demand	4,000
Irrigation Demand	84
Total Required Flow Demand	**4,225**

Table 9.1: Project Water Demands

9.2.2 Project Water Supply

As included in the project EIR and based on written communication from the SFPUC Director of Water Resources, dated October 11, 2007, the 2005 SFPUC Urban Water Management Plan had accounted for water demands associated with the proposed

redevelopment of the Schlage Lock Site and that development would not require major expansions of the existing water system. As both the proposed project and SFPUC water demand projections have been revised since then, the currently proposed project has subsequently been accounted for in SFPUC's latest City-wide demand projections provided in its 2013 Water Availability Study[1]. As concluded previously, the development would not require major expansions of the existing water system.

9.2.3 Project Water Distribution System

The low pressure water system will be designed and constructed by the Developer, then owned and operated by the SFPUC upon construction completion and improvement acceptance by the SFPUC. The proposed low pressure water system is identified schematically on Figure 9.1. Along Bayshore Boulevard, four new water connections will line up with the project's proposed public street connections to provide an on-site looped system. As determined by the SFPUC, an additional connection to the existing 12-inch pipe near the JPB tracks may be added if the existing line is in an adequate working condition and if the existing stub is located at a convenient location west of the JPB property line on the Schlage Lock Site. This domestic water supply and fire protection system consists of ductile iron pipe mains, low pressure fire hydrants, valves and fittings, and appurtenances. Final pipe sizes, locations, connections and interconnections, flows, pressures, and location and number of fire hydrants will be determined with an EPANET hydraulic model analysis using appropriate design criteria reasonably established by the City. The potable water infrastructure will be located within the public street pavement such that the outside wall of a water or combined sewer pipe is a minimum of 1-foot clear from the lip of gutter and a minimum of 5-feet clear from a proposed tree trunk. The project water system will be modeled by the SFPUC during the Potable Water Master Plan review process to determine on-site system infrastructure requirements. After the Potable Water Master Plan approval process is substantially complete, final water system infrastructure designs for improvements within the new project streets will be submitted to the SFPUC for approval as part of the construction document plan set.

Vertical and horizontal separation distances between adjacent combined sewer system, potable water, and dry utilities will conform to the requirements outlined in Title

[1] http://www.sfwater.org/modules/showdocument.aspx?documentid=4168

22 of the California Code of Regulations and the State of California Department of Health Services Guidance Memorandum 2003-02. See Typical Street Utility (Figure 9.2) for depth and relationship to other utilities. Required disinfection and connections to new mains will be performed by the SFPUC

9.2.4 Proposed Fire Hydrant Locations

As shown on Exhibit 9.3, proposed on-site and off-site fire hydrants have been located at a maximum radial separation of 300 feet between hydrants. In addition, building fire department connections will be located within 100-feet of a fire hydrant. To accommodate the proposed frontage improvements and new street cuts along Bayshore Boulevard, existing fire hydrants will be relocated or replaced by the Developer. Final hydrant locations are subject to the approval of the SFFD, SFPUC, and will be located outside of the curb returns per DPW Order 175,387, where feasible. If fire hydrants are required within the curb returns to meet SFFD requirements, the project will work with the SFPUC and SFDPW to request an exception per Sections VI and VII of DPW Oder 175,387. Pending further discussions and approvals with the SFFD and SFPUC during the master planning process, public fire hydrants may be required on Parcels C and F to provide the necessary fire hydrant coverage at the site. Since the fire hydrants would be placed on private property, public utility easements would be required. Exhibit 9.3 shows 2 Fire Hydrants along the extension of Sunnydale Avenue into Brisbane to provide fire protection to the southwest corner of the project. A future agreement will be required between the City of San Francisco and the City of Brisbane to address the jurisdictional issues across City Limit boundaries.

9.3 Off-site Mitigations

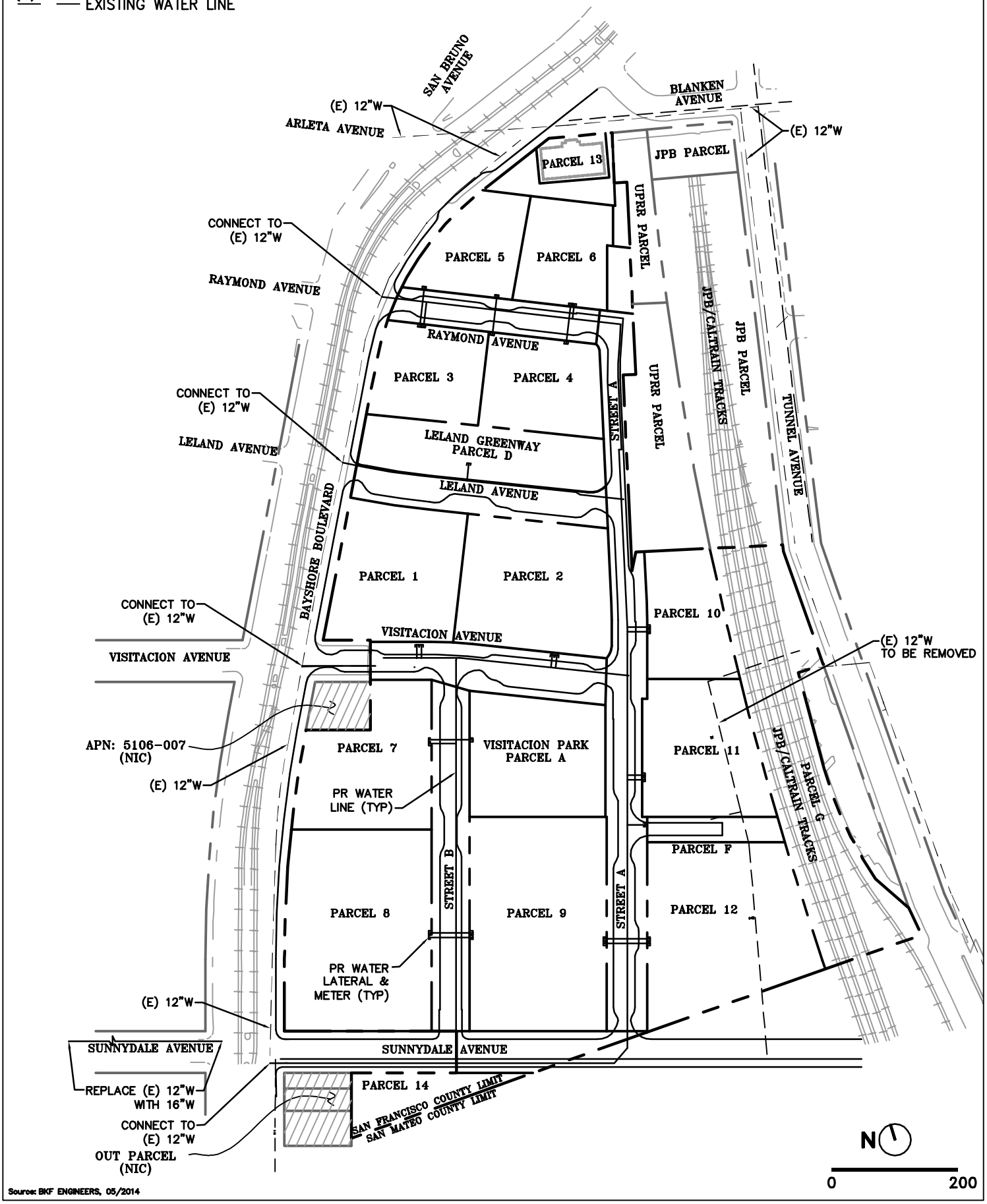
Based on the SFPUC's initial 2008 study and water model using the Project demands, the existing 12-inch main along Sunnydale Avenue between Peabody Street to the west side of Bayshore Boulevard will be replaced by a parallel 16-inch main in order to serve the proposed development. Given the increase in project density, the SFPUC will re-evaluate the project's impacts to its existing system surrounding the site as part of the Potable Water Master Plan approval process and confirm the required off-site mitigations to serve the redevelopment project. It is anticipated that the Developer will either design and construct the off-site improvements or pay a fee to the SFPUC to cover the design and construction costs in the future. The off-site improvements will be owned, operated and maintained by the SFPUC.

9.4 Phases for Potable Water System Construction

The Developer will design and install the new potable water system in advance of or in phases to match the Blocks of the Project, per the Phasing Plan in the DA. The amount of the existing system replaced with each Block may be the minimum necessary to serve the Block. The new Block will connect to the existing systems as close to the edge of the Block area as possible while maintaining the integrity of the existing system for the remainder of the development. Repairs and/or replacement of the existing facilities necessary to serve the Block will be designed and constructed by the Developer.

A Potable Water Master Plan will be submitted to the SFPUC and SFDPW for review and approval in advance of the 60% construction documents for phased buildout of the public rights-of-way and parks. Comments provided by City and its agencies on the Master Plans will be incorporated into the 60%, 95% and 100% construction document submittals for review and approval by the City and its agencies.

The SFPUC will be responsible for maintenance of existing potable water facilities. The SFPUC will be responsible for the new potable water facilities once construction of the Block or new potable water facility is complete and accepted by the SFPUC. Impacts to improvements installed with previous Blocks of development due to the designs of new Blocks will be the responsibility of the Developer and addressed prior to approval of the construction drawings for the new Block.



Source: BKF ENGINEERS, 05/2014

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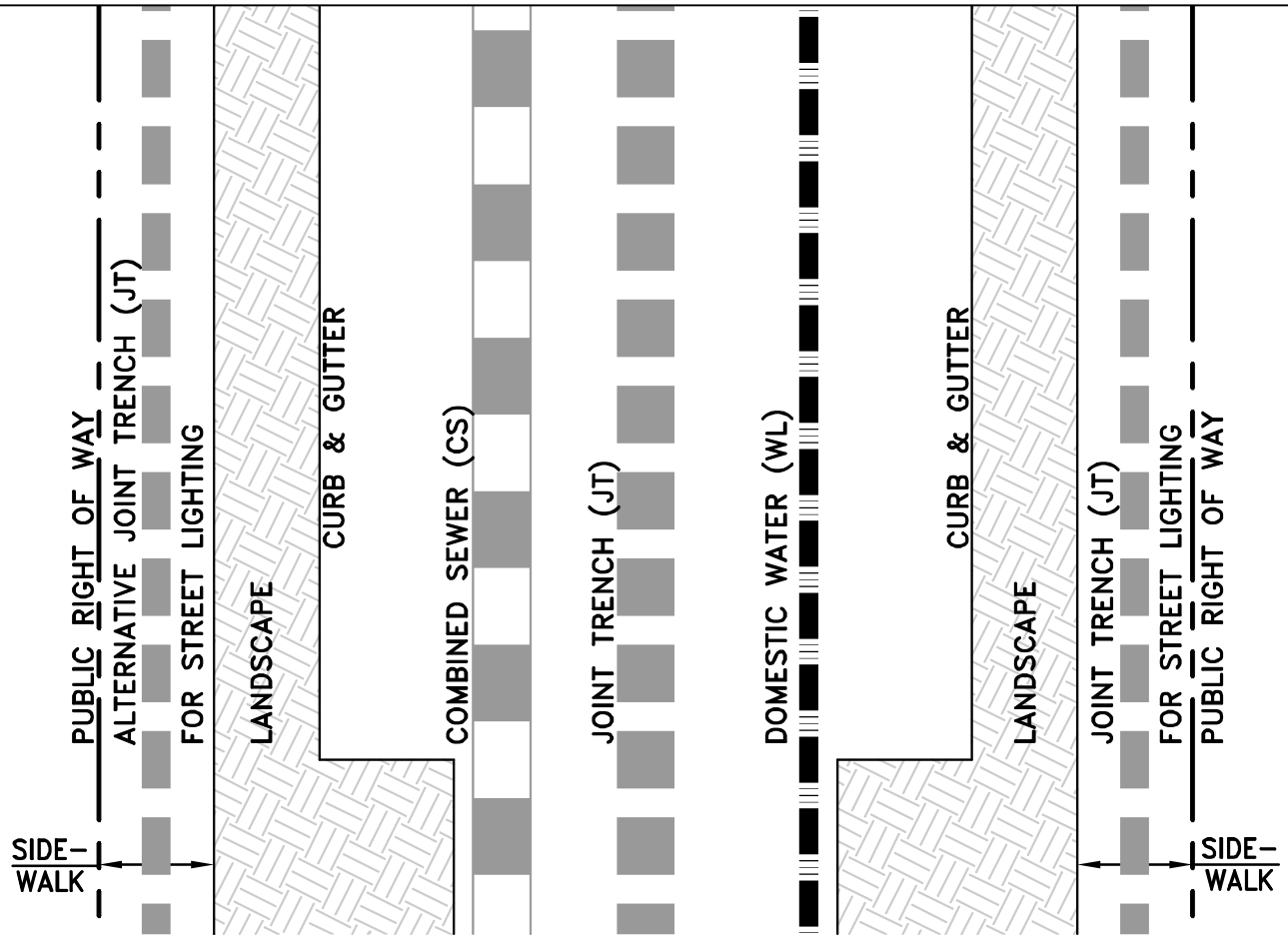
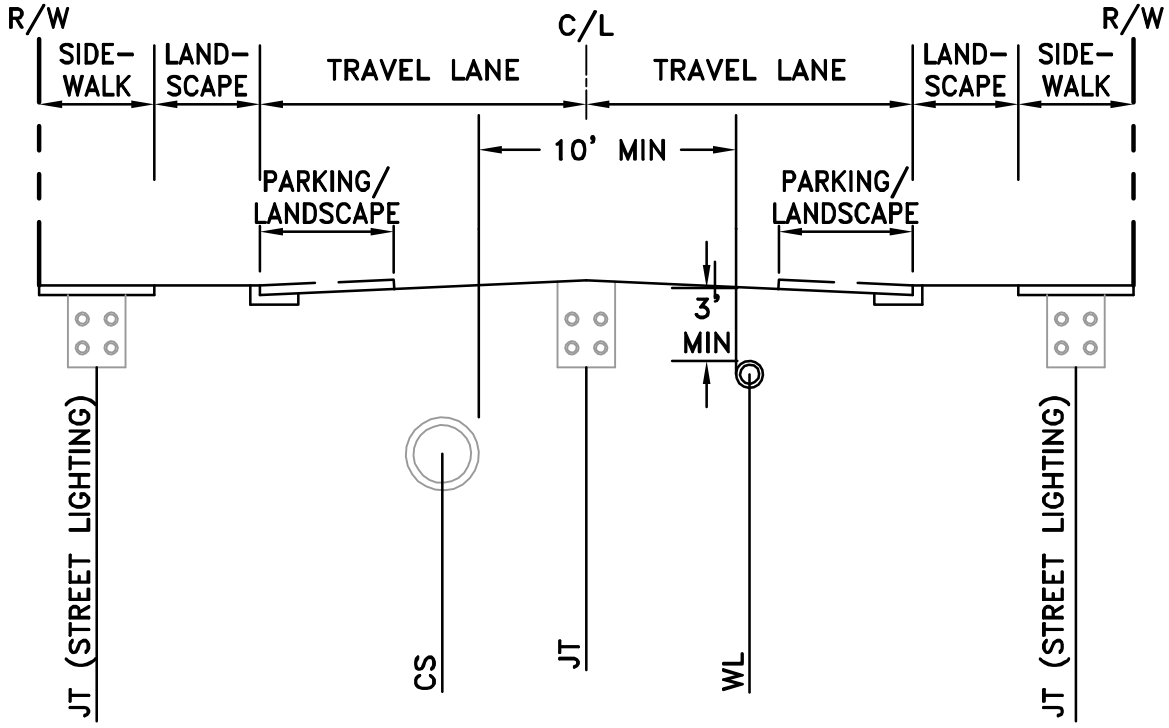
PLOT DATE: 05-28-14
PLOTTED BY: yeee

FIGURE 9.1: CONCEPTUAL POTABLE WATER SYSTEM



TYPICAL STREETS
NTS



TYPICAL UTILITY CROSS SECTION
NTS

Source: BKF ENGINEERS, 05/2015

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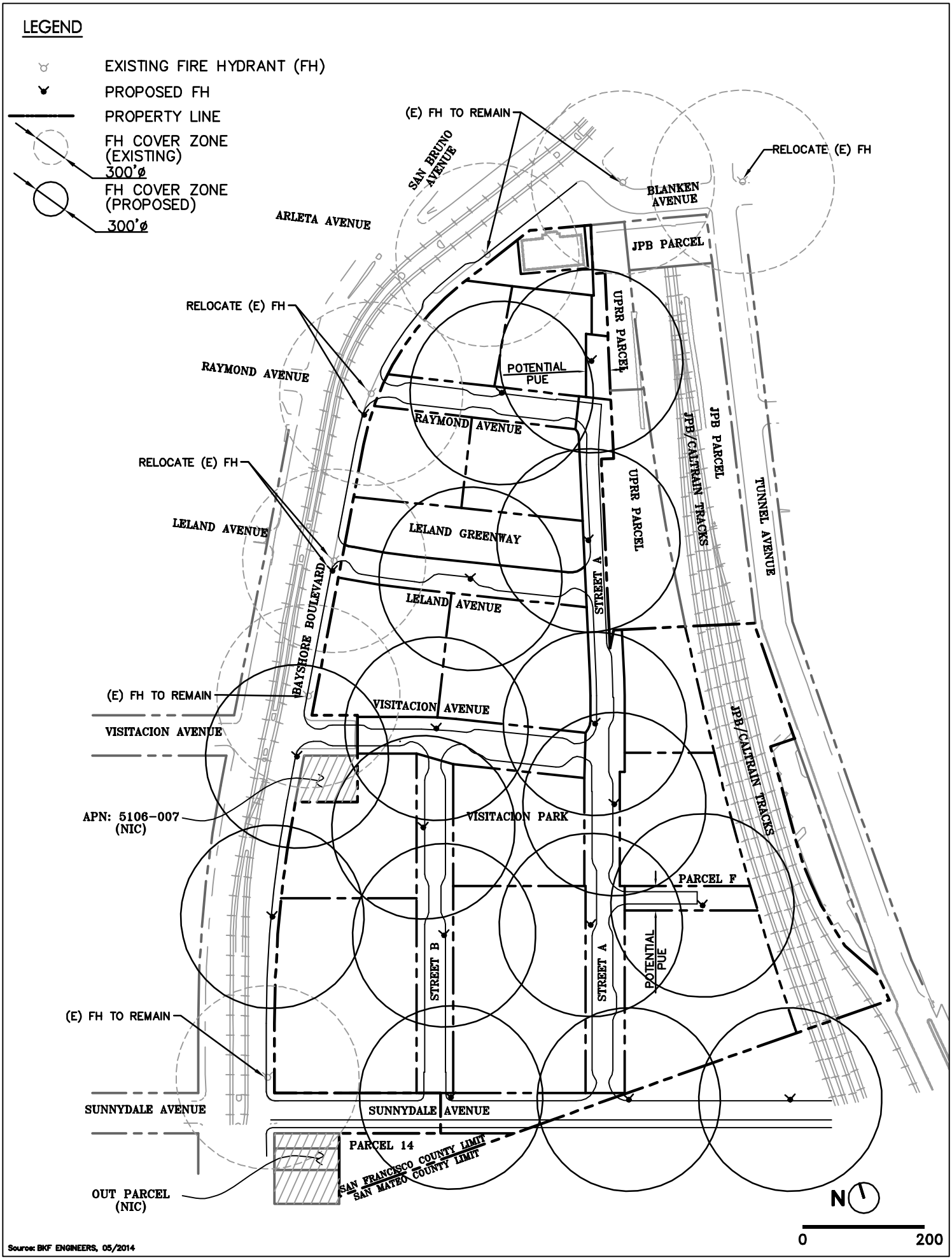
PLOT DATE: 05-28-14
PLOTTED BY: yeee

FIGURE 9.2: TYPICAL UTILITY SECTION WITHIN PUBLIC STREETS



Source: BKF ENGINEERS, 05/2014

DRAWING NAME: K:\Eng07\070090\DWG\Exhibits\Infrastructure Plan\Plotted Sheets\9.3_Conceptual Fire Hydrant Locations.dwg
PLOT DATE: 05-28-14 PLOTTED BY: yee

FIGURE 9.3: CONCEPTUAL FIRE HYDRANT LOCATIONS

10. COMBINED SEWER SYSTEM

10.1 Existing Combined Sewer System

The existing combined sewer main on Bayshore Boulevard connects to the 78-inch combined sewer main in Sunnydale at the Bayshore Boulevard and Sunnydale Avenue intersection. The existing combined sewer main on Tunnel Avenue (east side of the JPB tracks) also connects to the 78-inch combined sewer. At the intersection of Bayshore Boulevard and Blanken Avenue, the Historic Office Building to remain connects to the existing 15-inch combined sewer main in Blanken Avenue.

Also a 12-inch storm drain line from the former parking lot at the southwest corner of the site drains into the 78-inch Sunnydale main. Flow from the 12-inch combined sewer that runs beneath the JPB tracks connects with existing sanitary sewer infrastructure in Tunnel Avenue and is eventually conveyed to the SWPCP for treatment prior to discharge to the Bay.

The 78-inch combined sewer crosses the San Mateo County line travels beneath the Recology facility and discharges to the Harney Way Box Culvert and into the Sunnydale Pump Station, located east of Highway 101 on Harney Way in Brisbane. Flow from Sunnydale Pump Station is then conveyed through a series of conduits, tunnels and lift stations, eventually arriving at San Francisco's Southeast Water Pollution Control Plant (SWPCP) for treatment prior to discharge to the San Francisco Bay. Based on the project EIR, capacity is available at the SWPCP to serve the proposed project.

The City of San Francisco has recently constructed a new 168-inch combined auxiliary sewer main (Sunnydale Auxiliary Sewer) that runs approximately parallel to the existing 78-inch combined sewer main in Sunnydale Avenue. The Sunnydale Auxiliary Sewer has been installed within San Francisco County and runs parallel to the County line within a 29-foot public easement. An access structure with a 48-inch-by-48-inch connection knockout was installed within Sunnydale Avenue on the east side of the Sunnydale Avenue and Bayshore Boulevard intersection. At select locations, the Sunnydale Auxiliary Sewer is hydraulically linked to the 78-inch Sunnydale Combined Sewer with flow diversion structures. Similar to the 78-inch Sunnydale combined sewer, the 168-inch main connects to the Harney Way Box Culvert where flows will then be conveyed to the SWPCP for treatment prior to discharge to the San Francisco Bay.

10.2 Proposed Combined Sewer System

10.2.1 Proposed Sanitary Sewer Demands

Project sanitary sewer demands conservatively assume a 95% return on water demands resulting in an Average Daily Dry Weather Flow (ADWF) of approximately 192,300 gallons per day (gpd) (See Appendix C). A Combined Sewer Master Plan that outlines the Project's methods for calculating the flow demands will be submitted to the SFPUC for review and approval in advance of the 60% construction documents for phased buildout of the public rights-of-way and parks. Applying a peaking factor of 3 to the ADWF, the project is anticipated to generate a Peak Dry Weather Flow (PDWF) of 576,900 gpd. As recommended by the Subdivision Regulations, an Inflow and Infiltration rate (I&I) of 0.003 cubic feet per second (cfs) (~1,925 gpd) per acre is added to the PDWF to calculate the Peak Wet Weather Flow (PWWF). Including the project I&I of 38,507gpd/acre, the anticipated PWWF for the project is approximately 615.410 gpd.

10.2.2 Proposed Combined Sewer Capacity

Preliminary hydrology models for the entire site have been developed and provided to the City as part of the Tentative Map approval process to confirm the combined sewer system designs and capacity. Storm and sewer flow capacity to serve the entire buildout of the project in the existing 78-inch combined sewer main and the adjacent 168-inch parallel combined sewer main has been confirmed by the "Hydraulic Study for Sewer Connection from Visitacion Valley Redevelopment Project" (Hydraulic Study) by Hydraulic Section IDC, SFDPW, and dated August 2013 (See Appendix B). Per the Hydraulic Study, flow diversion connections are adequately sized to support the demands generated by the development. As documented in the Hydraulic Study, capacity exists within the existing 78-inch combined sewer main on the southern edge of the property to serve the proposed project. In addition, a portion of the sewer demands for Parcel 1 or 2 up to 0.35 cfs may be connected to the existing manhole of the 12-inch main on Visitacion Avenue, approximately 65 feet east of Bayshore Boulevard. An analysis of the impacts of the proposed development demands on the existing upstream and downstream manholes will be reviewed as part of the Combined Sewer Master Plan review and approval process in advance of the 60% construction documents for phased buildout of the public rights-of-way and parks.

10.2.3 Proposed Combined Sewer Design Basis

The proposed combined sewer system will be designed in accordance with the City of San Francisco Subdivision Regulations (Subdivision Regulations) or SFPUC Wastewater Utility Standards, as appropriate. Piping systems will be designed to convey the 5-year storm event inside the combined sewer infrastructure with overland release of the 100-year 90-minute storm conveyed between the top of curb elevations of the streets. Where sewer ejector pumps, diversion line, or interceptors are incorporated into the private development parcel utility system designs, the sewer demands shall be included in the hydrology calculations for sizing combined sewer mains. If pumps, interceptors or diversion lines are not included, the sewer demands shall not be included in the sizing calculations for the combined sewer mains per the City Subdivision Regulations. Where sewer ejector pumps, diversion line, or interceptors are incorporated into the private development parcel utility system designs they will be owned and maintained by the private parcel owner.

10.2.4 Proposed Combined Sewer Design Criteria

As documented in the Subdivision Regulations or SFPUC wastewater utility standards, as appropriate, proposed 6-inch to 21-inch pipes will be constructed from ASTM C-700 Extra Strength Vitrified Clay Pipe (VCP) with 24-inch to 36-inch pipe constructed from ASRM C-700 Extra Strength VCP. High density polyethylene (HDPE) pipe SDR-17 or better will be used in place of VCP where approved by the Director of Public Works with the consent of the SFPUC. HDPE larger than 12-inch shall be mandrel tested. Proposed city main sewers within the development will be constructed on approved crush rock bedding. The minimum residential and commercial service lateral size is 6 inches and 8 inches, respectively. Side sewers will have an air vent and trap. Manhole covers will be solid with manhole spacing set at a maximum distance of 300 to 350 feet and at changes in size, grade or alignment. Stormwater inlets will be installed per the Subdivision Regulations or SFPUC wastewater utility standards and outside of the curb returns crosswalks, accessible passenger loading zones and accessible parking spaces, where feasible.

A minimum cover of 6 feet will be provided on top of mains within public streets, unless a reduced cover depth of up to 4-feet is approved by the Director of Public Works with the consent of the SFPUC. Pipe slopes will be designed to minimum and maximum

values of 0.2 percent and 15 percent, respectively. Mains that are 12 inches to 18 inches in diameter shall have sufficient capacity to carry the design flow when running half full based on depth (d/D = 0.50). Mains larger than 18 inches shall have sufficient capacity to carry the design flow when running 0.75 full based on depth (d/D = 0.75). Freeboard Requirements will conform to the City of San Francisco Subdivision Regulations or SFPUC wastewater utility standards. The minimum freeboard requirement should take precedence over the filling ratio (d/D) for design flow conditions. Unless approved otherwise by the SFPUC, the slope of the main sewer will achieve a minimum velocity of 2 ft/sec under average flow conditions.

Vertical and horizontal separation distances between adjacent combined sewer system, potable water, and dry utilities will conform to the requirements outlined in Title 22 of the California Code of Regulations and the State of California Department of Health Services Guidance Memorandum 2003-02. Where feasible, the combined sewer will be located in the center of the proposed public streets per Subdivision Regulations. As shown in Exhibit 10.2 and as required in many locations within the Project, the combined sewer will be offset from the center of the street to ensure that adjacent water lines can be placed outside of the proposed bulbouts while maintaining the required health code separation clearances. The combined sewer will be located within the public street pavement such that the outside wall of a water or combined sewer pipe is a minimum of 1-foot clear from the lip of gutter and a minimum of 5-feet clear from a proposed tree trunk. Final approval of the combined sewer location within the street section and variances is subject to SFPUC approval during the Combined Sewer Master Plan and Project construction document review process.

10.2.5 Proposed Combined Sewer Collection System

The proposed combined sewer system is identified schematically on Figure 10.1. The combined sewer system will be designed and constructed by the Developer. Street sewers including street drainage within the new City street rights-of-way will be reviewed and approved by the SFPUC. The new combined sewer system will be maintained and owned by the SFPUC, upon construction completion and improvement acceptance by the SFPUC. The proposed system will include stormwater collection structures and sanitary sewer laterals connected by a system of 12-inch to 36-inch gravity combined sewer mains.

A portion of the first phase of development may discharge a flow of approximately 0.35 cubic feet per second (cfs) to an existing manhole of the 12-inch main on Visitacion Avenue, approximately 65 feet east of Bayshore Boulevard.

In addition, similar to the existing condition, the Historic Office Building to remain will connect to the existing 15-inch combined sewer main in Blanken Avenue.

The remainder of the combined sewer system will connect to the existing 78-inch combined sewer on Sunnydale Avenue at two locations. At the both the intersection of Street B and Sunnydale Avenue and the intersection of Street A and Sunnydale Avenue, the on-site combined sewer system will connect to existing manhole structures. When connecting proposed combined sewer infrastructure to the existing 78-inch Sunnydale combined sewer main, a manhole will be installed at the point of connection or on the development's on-site combined sewer main at a maximum distance of 10 feet from the exterior wall of the existing 78-inch Sunnydale combined sewer main. Special connection details at the existing 78-inch Sunnydale combined sewer main will require review and approval by the SFPUC.

See Figure 10.2 for the approximate combined sewer system depth and its relationship to other adjacent utilities.

10.2.6 Construction within the 29-foot wide SFPUC easement

The SFPUC has a 168-inch combined sewer tunnel along the southern edge of the site. The SFPUC holds a 29-foot wide subsurface easement per Recorded Document 2010-J052542 for the sewer tunnel. The language of the easement provides for the future construction of improvements over the easement provided that the improvements do not negatively impact the sewer tunnel. The current project proposes new buildings that will span the sewer tunnel. Building foundations spanning the sewer tunnel will be designed and constructed by the Developer. Structural and architectural plans and specifications, foundation plans and details, and a construction/settlement monitoring program, shall be reviewed and approved by the SFPUC prior to permitting vertical construction on each of the Blocks. Prior to vertical construction on each of the Blocks that may negatively impact the tunnel, as well as following completion of construction,

the Developer shall also submit a video inspection to the SFPUC of the tunnel, in compliance with SFPUC video inspection guidelines.

10.2.7 Proposed Combined Sewer Backflow Prevention

Hydrology models will be developed as part of the Combined Sewer Master Plan review and approval process in advance of the 60% construction documents for phased buildout of the public rights-of-way and parks. The evaluation will analyze the 78-inch flow under pressure conditions to determine the necessity for a backflow prevention device to keep wet weather flows from backing up into the Schlage Lock Site combined sewer system. At the SFPUC's discretion, the developer will construct the improvements as determined by the hydraulic analysis.

10.3 Phases for Combined Sewer System Construction

Construction phasing of the project will comply with the state construction General Permit and provide a Storm Water Pollution Prevention Plan/Erosion and Sediment Control Plan. The Developer will design and install the new combined sewer system to match the Blocks of the project. Some on-site infrastructure remains as part of the environmental grading SWPPP and will be removed by the Developer with the phased buildout of the project. The amount of the existing system replaced within each Block will be the minimum necessary to serve the Block. The new Blocks will connect to the systems constructed in previous phases as close to the edge of the new Block as possible while maintaining the integrity of the system for the remainder of the development. Repairs and/or replacement of the existing system or new system constructed for previous phases necessary to serve the new Block will be designed and constructed by the Developer.

A Combined Sewer Master Plan will be submitted to the SFPUC for review and approval in advance of the 60% construction documents for phased buildout of the public rights-of-way and parks. Detailed infrastructure designs for the combined sewer system will be submitted for review and approval at the 60%, 95% and 100% construction document plan stages for each phase of the project.

The SFPUC will be responsible for the new combined sewer system in public streets once construction of the Block or new combined sewer system is complete and accepted by the SFPUC.

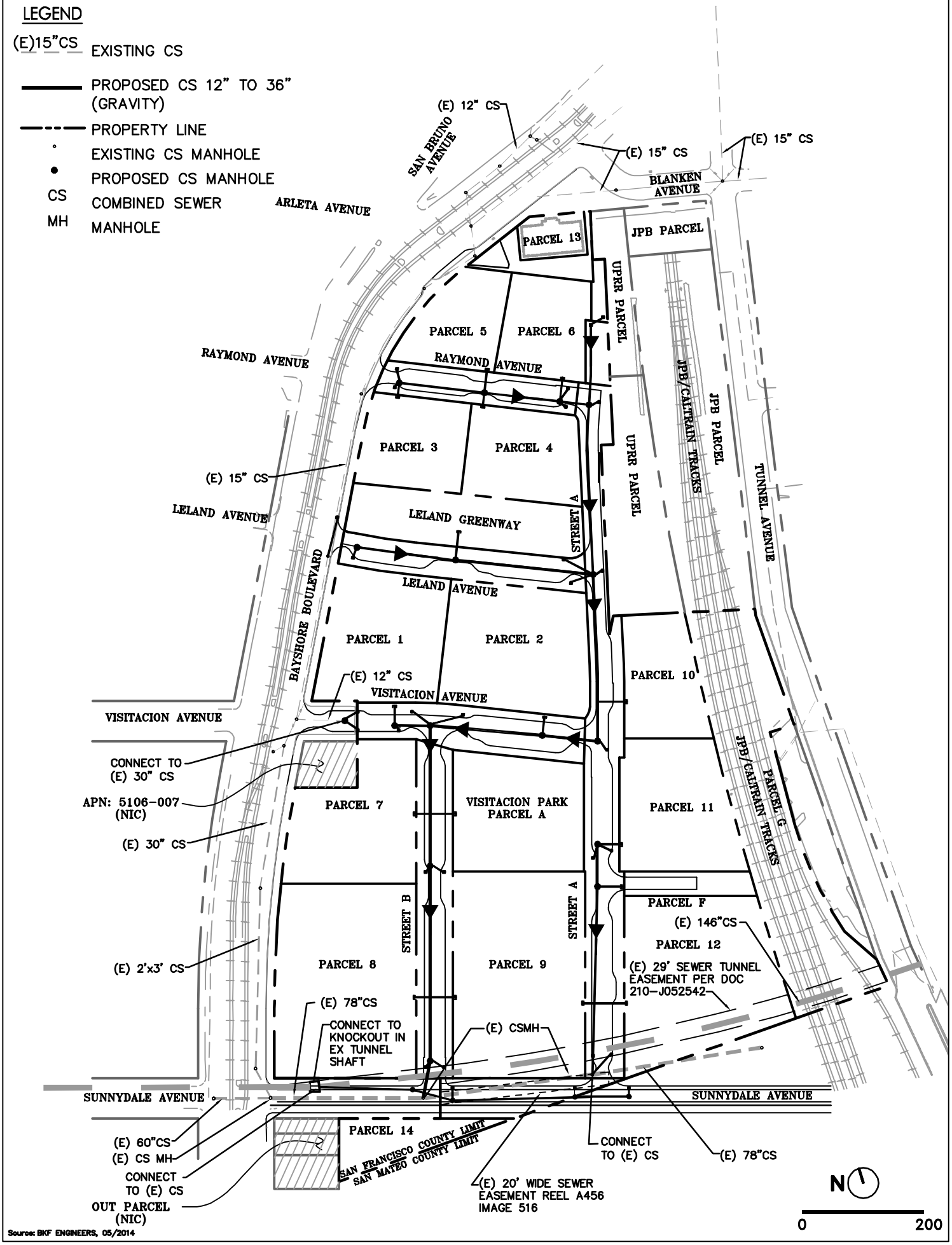


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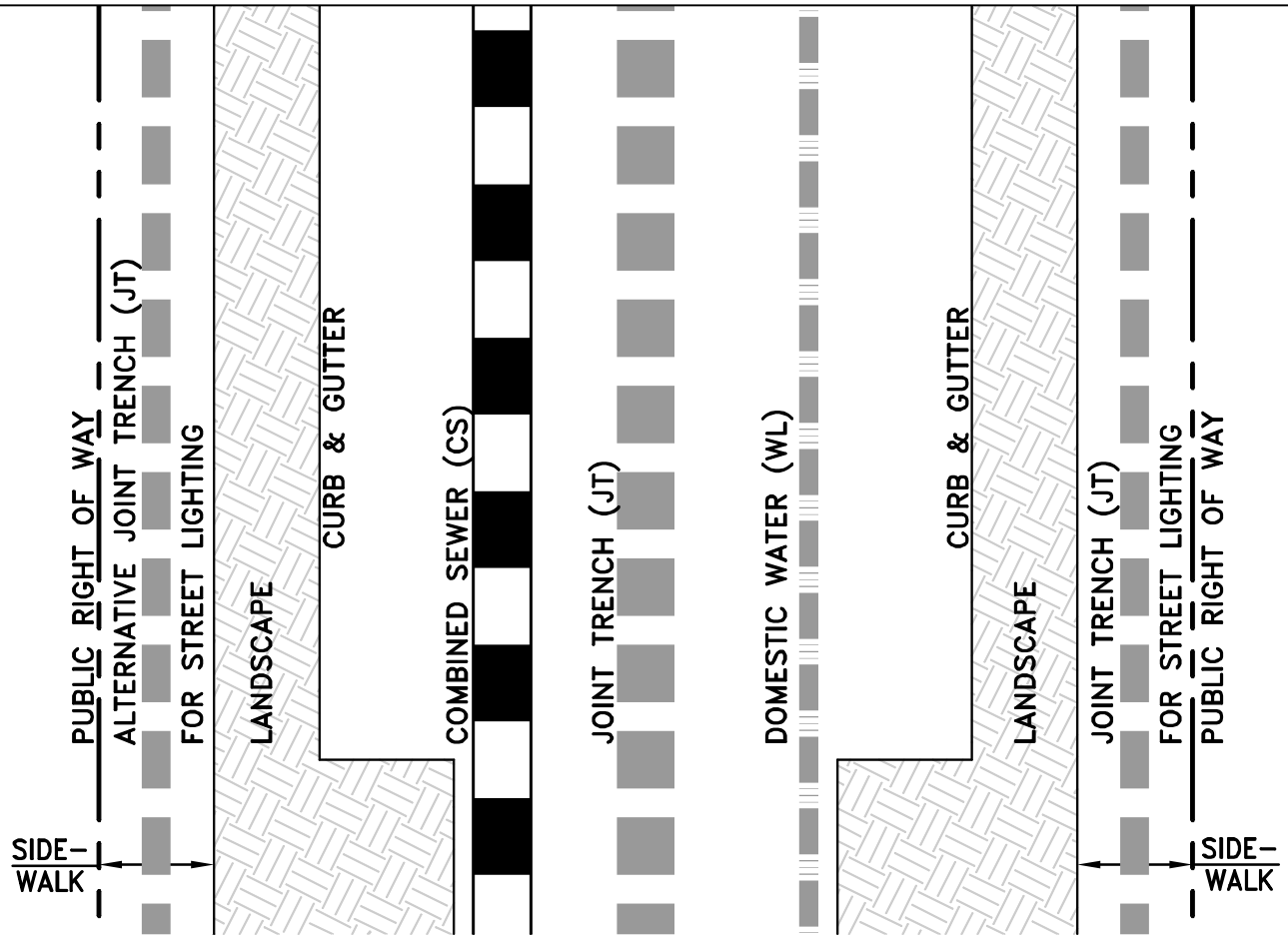
FIGURE 10.1: CONCEPTUAL COMBINED SEWER SYSTEM



TYPICAL STREETS
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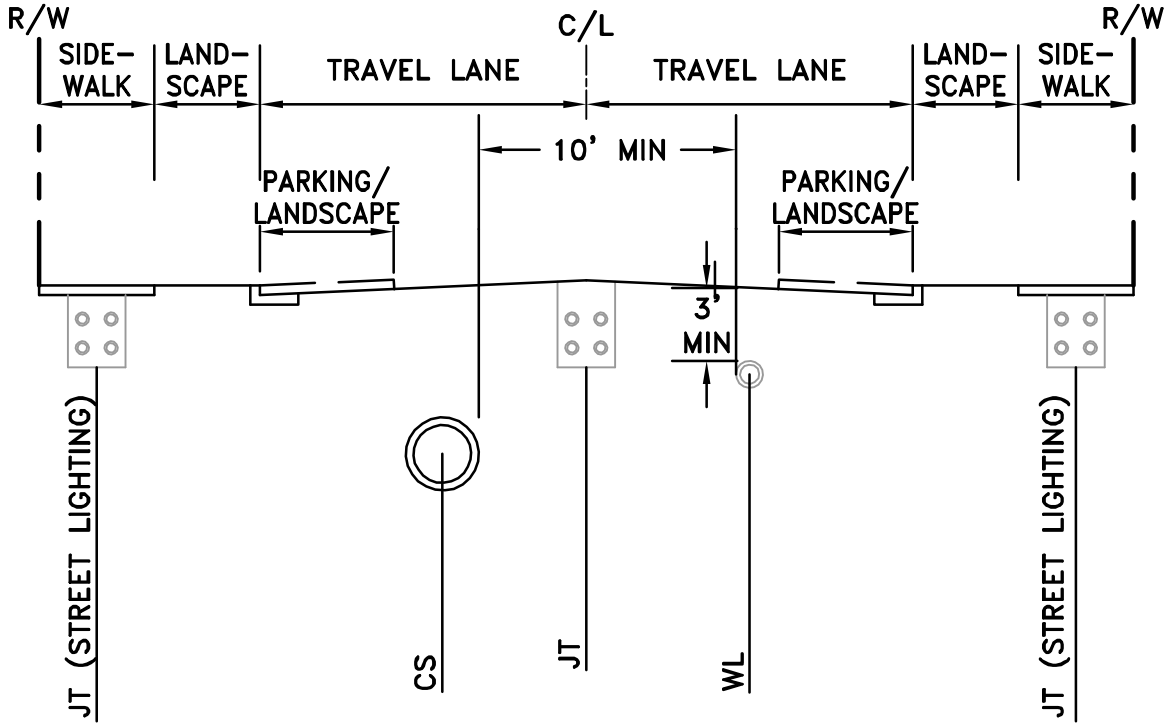

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FIGURE 10.2: TYPICAL UTILITY SECTION WITHIN PUBLIC STREETS

11. AUXILIARY WATER SUPPLY SYSTEM (AWSS)

11.1 Existing AWSS Infrastructure

The San Francisco Public Utilities Commission (SFPUC), in cooperation with the San Francisco Fire Department (SFFD), owns and operates the Auxiliary Water Supply System (AWSS), a high-pressure non-potable water distribution system dedicated to fire suppression that is particularly designed for reliability after a major seismic event. Currently, AWSS infrastructure does not exist within or directly adjacent to the project site. Hardened Pipe and AWSS piped systems are located to the north and west of the project site, approximately a mile away. An existing cistern is located on Blanken Avenue, east of the project site and railroad tracks within the Little Hollywood neighborhood.

11.2 AWSS Regulations and Requirements

New developments within the City and County of San Francisco (CCSF) must meet fire suppression objectives that were developed by the SFPUC and SFFD following a major seismic event. The SFPUC and SFFD work with the Developer to determine post-seismic fire suppression requirements during the planning phases of the project. Requirements will be determined based on increase in building density, fire flow and pressure requirements, City-wide objectives for fire suppression following a seismic event, and proximity of new facilities to existing AWSS facilities. AWSS improvements will be located in public right-of-way, on CCSF property, or on private property within a public easement, as approved by SFPUC on a case by case basis.

11.3 Conceptual AWSS Infrastructure

To meet the SFPUC and SFFD AWSS requirements, the development may be required to incorporate infrastructure and facilities that may include, but are not limited to:

- Multiple underground water storage cisterns, typically 75,000 gallons each;
- Seismically reliable high-pressure water piping and hydrants with connection to existing AWSS distribution system;
- Independent network of seismically reliable low-pressure piping and hydrants with connection to existing potable water distribution system at location that is determined to be seismically upgraded by SFPUC;
- Saltwater pump station that supplies saltwater to AWSS distribution piping following a major seismic event;
- Piping manifolds along waterfront that allow fire trucks to access and pump sea or

bay water for fire suppression; and/or

- Portable water supply system (PWSS), including long reaches of hose and equipment mounted on dedicated trailers or trucks.

For the Schlage Lock development project, it is anticipated that one of the three options or a portable water supply system may meet the requirements; however, the project-specific requirements have not been fully analyzed by the SFPUC and SFFD in time for the publication of the Infrastructure Plan. Final designs of the AWSS solution for the project site and/or selection of a PWSS will be determined by the SFPUC and SFFD in consultation with the Developer.

11.4 Phases for AWSS Construction

The Developer will construct the new AWSS in advance of or in phases to match the Blocks of the Project, per the Phasing Plan in the DA. The SFPUC will be responsible for the new AWSS facilities once construction of the Block is complete and accepted by the SFPUC. Impacts to improvements installed with previous Blocks of development due to the designs of new Blocks will be the responsibility of the Developer and addressed prior to approval of the construction drawings for the new Block.

12. RECYCLED WATER ASSESSMENT

Currently, neither existing nor planned recycled infrastructure exists within the Schlage Lock Site vicinity. The existing site does not contain infrastructure for recycled water, nor did the former site facilities include recycled water infrastructure or similar on-site systems. The nearest exiting source of recycled water is North San Mateo County Sanitation District's water treatment plant in Daly City; however, there is no recycled water conveyance infrastructure serving the Schlage Lock Site.

SFPUC's Recycled Water Master Plan for the City and County of San Francisco (March 2006) calls for the expansion of the auxiliary water supply system, including an upgrade of SWPCP and extension of recycled water pipelines. However, these pipelines are not planned to extend to the Schlage Lock site, with the nearest system termination points located at Salinas Avenue and Third Street in the Bayview Neighborhood and San Bruno Avenue and Mansel Street in the Portola Neighborhood. Correspondingly, the Schlage Lock Site is located outside the Reclaimed Water Use Ordinance Area.

Currently, the SFPUC is conducting a recycled water demand assessment of potential users and uses in the eastern areas of San Francisco. The 2012 Recycled Water Project Needs Assessment Report examined the potential uses of recycled water for irrigation, toilet flushing, and various commercial and industrial applications. The report does not identify the Schlage Lock Site among potential users.

Since a recycled water source and service is not available, the proposed project does not intend to design or construct recycled water infrastructure at the Schlage Lock Site.

13. STORMWATER MANAGEMENT SYSTEM

13.1 Existing Stormwater Management System

Prior to demolition, the Schlage Lock site was approximately 98 percent impervious, mostly covered with pavement and buildings. Stormwater discharged directly to an on-site combined sewer system that conveyed both the stormwater runoff and sanitary sewer flows from the site. The combined system discharged to the City of San Francisco combined sewer system at three locations—a 12-inch connection to the Bayshore Boulevard combined sewer system, an 18-inch lateral to the 78-inch combined sewer main in Sunnydale Avenue, and a 12-inch combined sewer line that runs east beneath the JPB railroad tracks. Also, a 12-inch storm drain line from the former parking lot at the southwest corner of the site drains into the 78-inch Sunnydale main. The existing site did not include any stormwater management systems to reduce runoff volumes.

13.2 Proposed Stormwater Management System

13.2.1 San Francisco Stormwater Design Guidelines

The City of San Francisco Stormwater Design Guidelines (SDG) is the regulatory guidance document describing requirements for post-construction stormwater management. The SDG requires projects in combined sewer areas to implement a stormwater management plan that results in a 25 percent decrease in the total volume and peak flow of stormwater runoff from the 2-year 24-hour design storm.

13.2.2 Proposed Site Conditions and Baseline Assumptions

The development will include the dedication of approximately 4.66-acres of public streets and 2.01-acres of parks and plaza open space areas. Within the public street rights-of-way, landscape strips and permeable pavers over clean aggregate in tree wells may be included to reduce runoff flow rates and volumes supplemented by areas of lined bio-retention cells. The private development areas will be approximately 12.34-acres of the site. The private development sites will be covered entirely with podium structures with landscape planters and pedestrian pathways. The landscape elements will act to slow the rate at which stormwater flows from the parcels to the public combined sewer system and reduce the volume of runoff through evapotranspiration, retention within soil void spaces and absorption by plant materials. These baseline conditions will be designed to integrate with the potential stormwater management

concepts and Low Impact Development (LID) elements to create both a sustainable environment at the site as well as achieve compliance with the SDG.

13.2.3 Stormwater Management Design Concepts and Master Plan

The redevelopment of the Schlage Lock site will include both public areas (public street right-of-way and public parks), and private development areas (private streets and building parcels). A 25% reduction in total volume and peak flow of the runoff generated by the 2 year 24 hour storm event from the development area is required by the SDG since the Project will be installing and connection to an existing combined sewer system. Stormwater management performance quantities and strategies will be developed as part of the Stormwater Management Master Plan, for review and approval by the SFPUC in advance of the 60% construction documents for phased buildout of the public rights-of-way and parks.

13.3 Stormwater Control Plan

Based on the designs reviewed and approved by the SFPUC as part of the Stormwater Management Master Plan, the stormwater management strategies for the Schlage Lock Site will be documented in a Stormwater Control Plan (SCP) in compliance with SFPUC stormwater management regulations and the requirements of the SDG. The selected modeling methodology will be per the SFPUC Accepted Hydrologic calculation methods. The Preliminary Stormwater Control Plan for the public improvements will be submitted for review and approval before the 60% construction document plan for each phase of the project, and the Final SCP will be submitted with the 95% construction document set for that phase or block and prior to construction. For private development parcels, a Preliminary SCP and Final SCP shall be submitted for approval per SFPUC stormwater management requirements.

13.4 Phases for Stormwater System Construction

The Developer will design and install the new stormwater management systems to match the Blocks of the project. Permanent and interim stormwater management requirements as outlined in the SDG will be met at the completion of each Block and/or phase of the Project.

At all phases of the development, the Developer must provide functioning and adequate stormwater management in compliance with the SFPUC's post-construction stormwater

management requirements and the Stormwater Design Guidelines. A Stormwater Management Master Plan that outlines the project's stormwater management solutions for full build-out of the Project will be prepared and submitted to the SFPUC for review and approval in advance of the 60% construction document submittals for phased buildout of the public rights-of-way and parks. The Developer must complete the construction of the stormwater management improvements required for each development phase prior to receiving a temporary certification of occupancy for the development phase. If a future park will include stormwater controls necessary for a particular phase of development or future parcel to meet the stormwater management requirements of the SFPUC, that park must be developed in conjunction with that development phase and be complete prior to issuance of the temporary certificate of occupancy for any parcel within that phase. Permanent or interim centralized stormwater management facilities necessary to achieve stormwater management compliance within a development phase will be constructed and operational prior to or in conjunction with that phase. Interim stormwater Best Management Practices (BMPs) currently implemented as part of the on-site remediation will be preserved on undeveloped parcels. Stormwater management systems, which may include infiltration basins, bio-retention cells, flow-through planters, pump stations and storage areas located on public or private property within the Schlage Lock Site, will be maintained by the property owner(s), Master Development Association, or its Assignees.

14. DRY UTILITY SYSTEMS

14.1 Existing Electrical, Gas, and Communication Systems

On the east side of Bayshore Boulevard adjacent to the Schlage Lock site, there are existing electrical, gas, and communication systems. On Blanken Avenue, there are gas and communication systems.

14.2 Project Power Providers and Requirements

Chapter 99 of the City of San Francisco Administrative Code requires the City to consider the feasibility of supplying electricity to new development projects. The SFPUC shall prepare an assessment of the feasibility of the City providing electric service to the development (the "Feasibility Study"). The Developer will cooperate with SFPUC in SFPUC's preparation of the Feasibility Study. The Feasibility Study shall include, but not be limited to, the following: 1) electric load projection and schedule; 2) evaluation of existing electric infrastructure and new infrastructure that will be needed; 3) analysis of purchase and delivery costs for electric commodity as well as transmission and distribution services that will be needed to deliver power to the development; 4) the potential for load reduction through energy efficiency and demand response; 5) business structure cost analysis; and 6) financial and cost recovery period analysis. Should the City elect to provide electric service to the Project such service shall be provided by the City on terms and conditions generally comparable to, or better than, the electric service otherwise available to the project.

14.3 Proposed Joint Trench

The proposed Joint Trench is identified schematically on Figure 14.1. Work necessary to provide the joint trench for dry utilities, typically installed within in public streets and adjacent sidewalk area, consists of trench excavation and installation of conduit ducts for electrical, gas, and communication lines. Additionally, utility vaults, splice boxes, street lights and bases, wire and transformer allowance, and backfill are included. Electric and power systems will be constructed per the applicable standards of the agency or company with controlling ownership of said facilities with street lighting infrastructure constructed per City standards. The utility owner/franchisee (such as SFPUC, PG&E, AT&T, Comcast and/or other communication companies) will be responsible for installing facilities such as transformers and wire. All necessary and properly authorized public utility improvements for which franchises are authorized by the City shall be designed and

installed in the public right-of way in accordance with permits approved by SFDPW. Joint trenches or utility corridors will be utilized wherever allowed. The location and design of joint trenches or utility corridors in the right-of way must be approved by SFDPW during the subdivision review process. The precise location of the joint trench in the right-of-way will be determined prior to recording the applicable Final Map and identified in the project construction documents. Nothing in this Infrastructure Plan shall be deemed to preclude the Developer from seeking reimbursement for or causing others to obtain consent for the utilization of such joint trench facilities where such reimbursement or consent requirement is otherwise permitted by law.

14.4 Phases for Dry Utility Systems Construction

The Developer will design and install the new joint trench systems in phases to match the Blocks of the project. The amount of the existing system replaced with each Block will be the minimum necessary to serve the Blocks. The Block will connect to the existing systems as close to the edge of the new Block as possible while maintaining the integrity of the existing system. Repairs and/or replacement of the existing facilities necessary to serve the Block will be designed and constructed by the Developer.

The service providers will be responsible for maintenance of existing facilities until replaced by the Developer and will be responsible for the new power facilities once the Block or new power facility is complete and accepted by the utility provider.

Impacts to improvements installed with previous phases of development due to the designs of the new phase will be the responsibility of the Developer and addressed prior to approval of the construction drawings for the new phase.

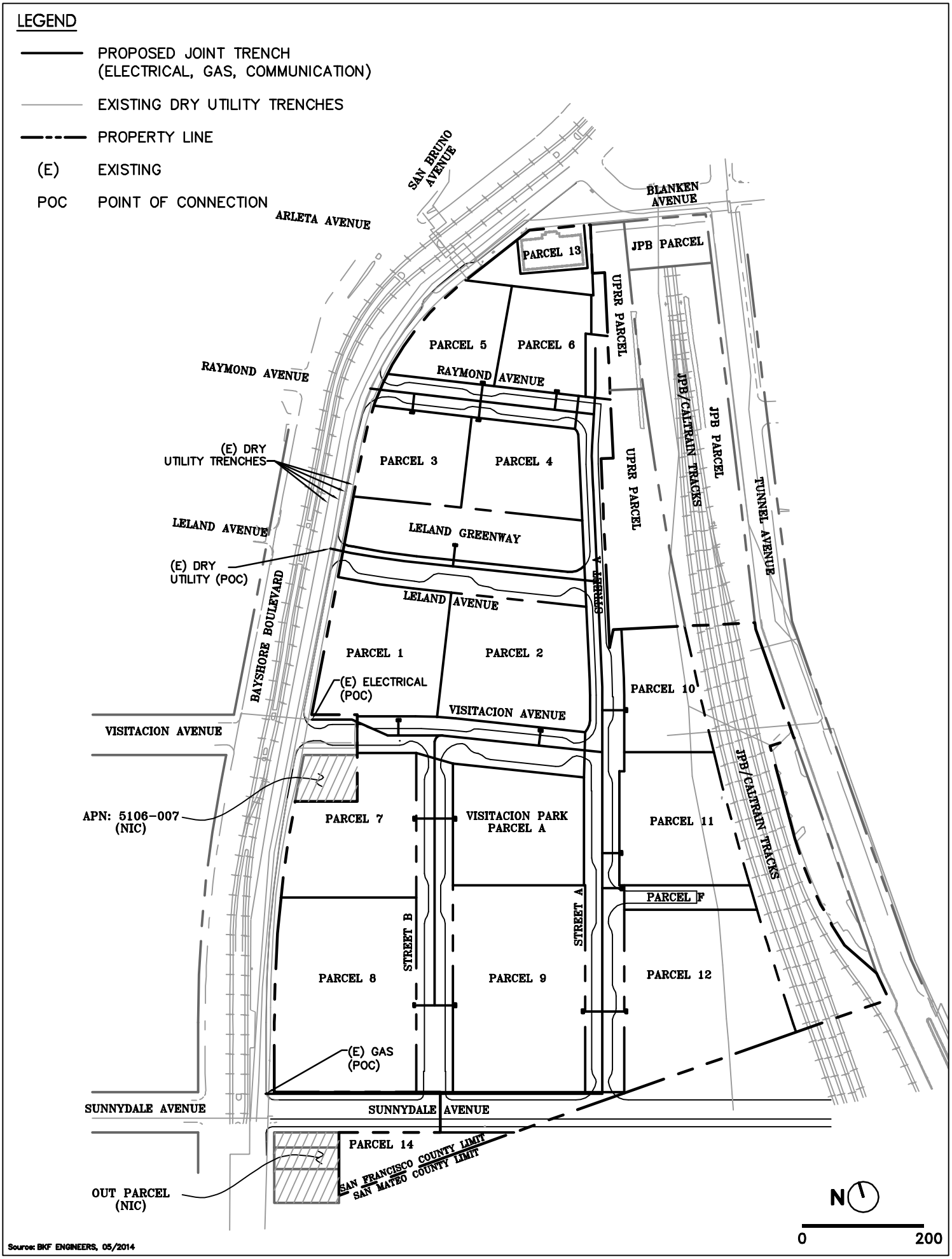

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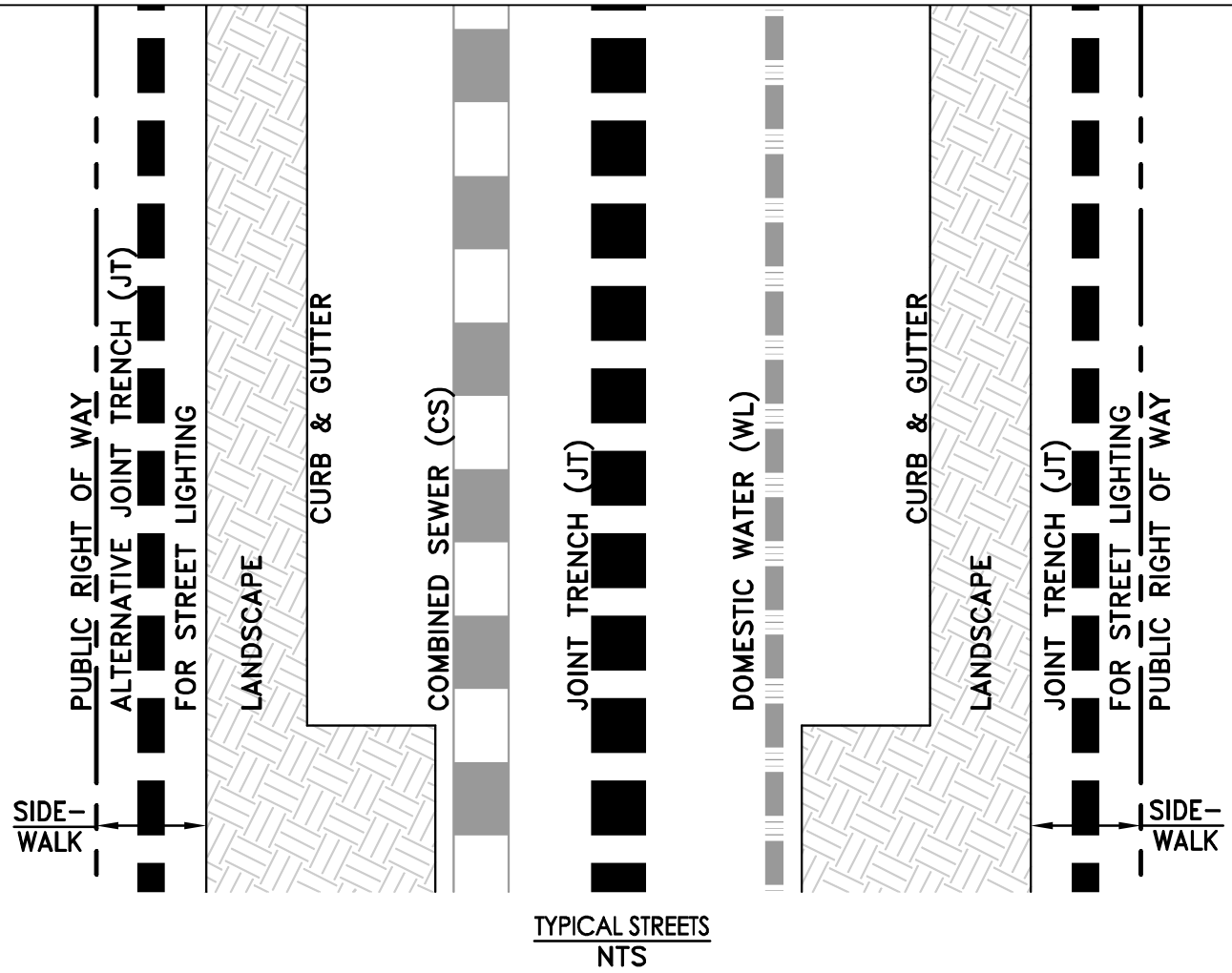
FIGURE 14.1: CONCEPTUAL DRY UTILITY SYSTEM



TYPICAL STREETS
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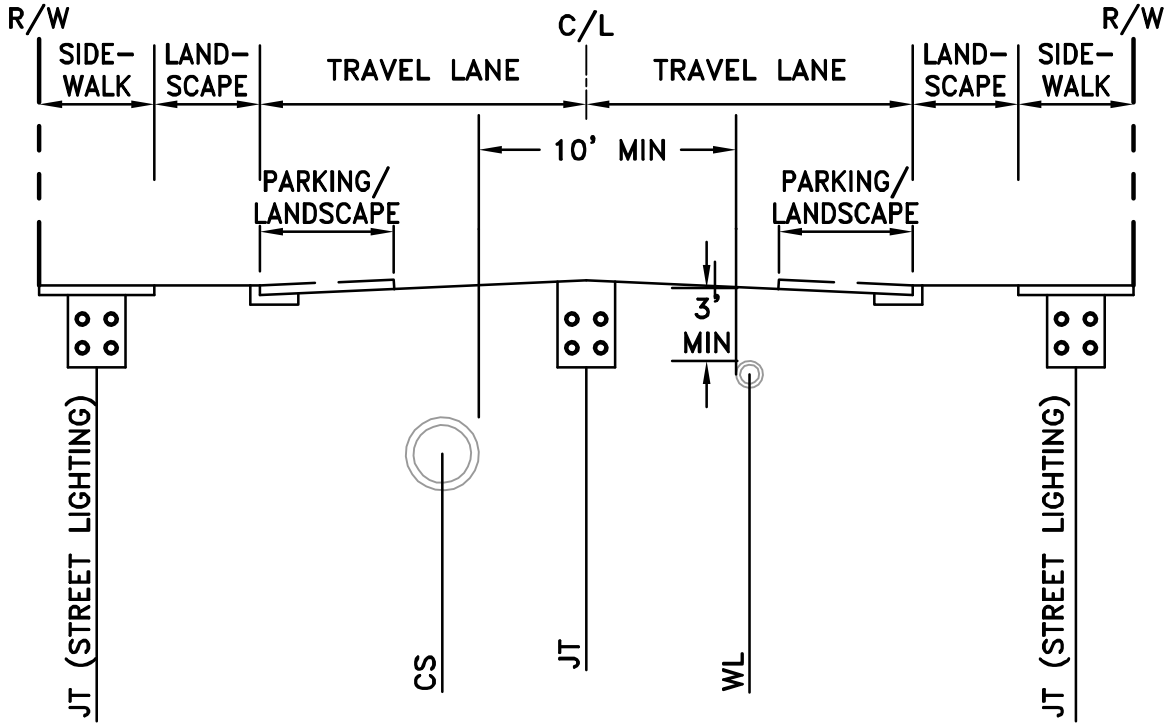

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FIGURE 14.2: TYPICAL UTILITY SECTION WITHIN PUBLIC STREETS

15. FUTURE UTILITY DOCUMENTATION SUBMITTAL REQUIREMENTS

Following City approval of this Infrastructure plan and prior to construction, the Developer shall submit the following subsequent infrastructure related design documents to the City for review and approval to ensure that all proposed public water, wastewater, and power infrastructure meets all requirements and standards of the SFPUC and be reviewed and approved by the SFPUC.

15.1 Utility Master Plans

Following approval of the Infrastructure Plan but prior to the submittal of the 60% construction documents for phased build-out of the public rights-of-way and parks, the Developer shall submit Utility Master Plans to the SFPUC for review and approval, as outlined below, that cover site wide infrastructure issues that were not resolved in the Infrastructure Plan. The Utility Master Plans shall generally include:

15.1.1 Wastewater, Stormwater Management, Water, and Power System Descriptions

The descriptions shall include the following:

- Written description and figures showing the proposed gravity pipe and force main layout, sizes, materials, depths, velocities and slopes that were not covered in the Conceptual Infrastructure Report.
- Written description and figures showing all proposed pump stations or other non-pipe infrastructure assets or facilities proposed as part of the project.
- Conceptual details showing all proposed points of connection with existing infrastructure as appropriate
- Conceptual details showing proposed service connections to parcels
- Written Description and figures showing any proposed underground structures in parcels or in the public ROW that were not covered in the approved Infrastructure plan.
- Updated description and figures showing all proposed easements for future public infrastructure that were not covered in the approved Infrastructure Plan.
- Updated description and figures showing project phasing.

15.1.2 The Combined Sewer Master Plan

The Master Plan shall include the following:

- A written description and figures demonstrating that a functioning wastewater infrastructure system is in place at all times and complies with all City laws, codes and regulations at all phases of development prior to full build out of the Project.
- Capacity Analysis for entire development including modeling (SWMM or equivalent) to demonstrate that the Project will provide adequate collection system capacity. The Analysis shall include detailed sanitary sewer and stormwater flows based on anticipated building usage and development plan, analyzing the impact of the project on downstream infrastructure, localized wet weather flooding; and combined sewer system surcharges into streets at full build out. The analysis shall include a detailed description of all assumptions and calculation methods used, including explanation and reference for selected peaking factors.
- A description of the methods used to estimate sewer flows for the project.
- A written description and figures outlining any proposals for variances to the SFPUC standards for the combined sewer location within the street section for review and approval of the SFPUC on a case-by-case basis.
- A hydraulic modeling analysis of the 78-inch flow under pressure conditions to determine the necessity for a backflow prevention device to keep wet weather flows from backing up into the Project's combined sewer system.

15.1.3 Grading and Overland Release Master Plan

The Master Plan shall include the following:

- Written description and figures generally showing the overland flow path 100-year storm, outlet location and drainage boundaries that were not covered in the Conceptual Infrastructure Report.
- A hydrologic/hydraulic modeling analysis to demonstrate overland flow will be contained at full project build out as required in applicable codes and regulations. The analysis shall include all proposed surface improvements in the development phase that could impede overland flow paths in the ROW such as raised intersections, raised cross walks, curbless street designs, bulb-outs, etc. If site designs cannot meet the SFPUC requirements for overland drainage release,

alternative solutions will be developed during the master plan approval process that may include crossings at the street pavement level.

- A final geotechnical investigation that covers development of the public street rights-of-ways and parks for the entire project and demonstrate to the SFPUC that appropriate mitigations measures such as soil and foundation improvements will be constructed by the Developer to minimize differential settlement across the building parcel.

15.1.4 Stormwater Management Master Plan

The Master Plan shall include the following:

- A modeling analysis (SWMM or equivalent) demonstrating to the SFPUC that the project's stormwater management approach and layout for full build-out as well as all phases prior to full build out of the Project, including stormwater management are adequate to meet the performance quantities and strategies required by the SFPUC stormwater management regulations and the requirements of the Stormwater Design Guidelines.
- Conceptual details showing any proposed stormwater management controls, as appropriate.
- A project wide Maintenance Assessment of the maintenance required for the proposed Stormwater Controls as well as a description of the funding mechanism that will be in place to perform that maintenance.

15.2 Phase Applications

Development Phase Applications shall include a Development Phase Hydraulics and Hydrology Plan including:

- Updated Development Phase Combined Sewer System Capacity Analysis of sanitary sewer and storm drain flows for the development phase based on anticipated building usage and the development plan. This analysis shall also include an assessment of the impact of the development phase on downstream infrastructure, localized wet weather flooding, and combined sewer system surcharges into streets. The analysis shall include a detailed description of all assumptions and calculation methods used, including explanation and reference for selected peaking factors.

- Updated Overland Flow analysis for development phase demonstrating that overland flow will be contained at any and all points in time during construction and following construction of the development phase in question as required in applicable codes and regulations. The analysis shall include all proposed surface improvements in the development phase that could impede overland flow paths in the ROW such as raised intersections, raised cross walks, curbless street designs, bulb-outs, etc. The analysis shall also describe any necessary off-site improvements to be constructed by the Developer deemed reasonably necessary to protect publicly- and privately-owned property downstream. The need, or absence of need, for any such off-site improvements shall be demonstrated by the Developer through modeling the 100 year overland flows at the Project Site for both existing conditions and for the proposed Development Phase in question. The analysis shall include a detailed description of all assumptions and calculation methods used. The developer may be required to fund the City to perform this analysis as appropriate.
- Updated Stormwater Management Plan for development phase, demonstrating how the development phase in question will comply with federal, state and City laws, codes and regulations in effect as of the date any such application is submitted, including but not limited to the Stormwater Management Ordinance.
- Updated Maintenance Assessment: Each development phase must include an assessment of the activities required to appropriately maintain the proposed Stormwater Controls. If SFPUC has identified a failure to maintain the Stormwater Controls of previous phases, the SFPUC shall not be required to approve the any subsequent phase applications until such maintenance failure is resolved.

15.3 Construction Documents

Construction Document Permit Applications shall include then following:

- The first set of improvement plans shall be submitted with Standard specifications for use with all subsequent improvement plan submittals. Subsequent improvement plans will comply with the approved project specifications and submit project specific specifications as needed to supplement the standard specifications.
- Proof of conformance with all infrastructure requirements outlined in the applicable City regulations, the infrastructure plan, or the phase applications.

- Proof of conformance with any mitigations identified in the phase application to alleviate any impact of the development project on downstream infrastructure, minimize localized wet weather flooding, minimize combined sewer system surcharges into streets, and safely contain overland flow.
- Proof of conformance with the stormwater management requirements applicable to the project at the time of submission including:
    - Preliminary Stormwater Control Plan at conceptual design/first construction document (~60% construction document)
    - Final Stormwater Control Plan at detailed design (~95% construction documents)
- Proof of conformance with the City's construction site runoff requirements, including a Storm Water Pollution Prevention Plan/Erosion and Sediment Control Plan
- Details of the connection to existing, off-site infrastructure.

APPENDIX A:
REFERENCES

The following References were used in preparation of this document:

1. San Francisco Planning Department and San Francisco Redevelopment Agency,"Visitacion Valley/Schlage Lock Design For Development," February 2009

2. San Francisco Redevelopment Agency, "Visitacion Valley Redevelopment Program Final Environmental Impact Report," dated December 2, 2008

3. San Francisco Planning Commission and San Francisco Redevelopment Commission, "Visitacion Valley Redevelopment Program California Environmental Quality Act Findings: Findings of Fact, Evaluation of Mitigation Measures and Alternatives, and Statement of Overriding Considerations," dated February 3, 2009

4. AECOM, GLS, BKF, "Visitacion Valley Redevelopment Area zone 1 (schlage lock plan area) open space and streetscape master plan (Final Draft)," Latest Edition

5. E-mail Correspondence ending on April 13, 2009 with Chi Yu at SFPUC regarding the results of the conceptual SFPUC water demand model for the Schlage Lock Site

6. E-mail Correspondence ending on April 17, 2009 with Chi Yu at SFPUC regarding Water System Improvements to support redevelopment of the Schlage Lock Site

7. E-mail Correspondence ending on August 26, 2009 with SFDPW regarding the capacity of the existing 18" combined sewer main in Bayshore Boulevard

8. Memorandum dated April 16, 2010 from Rosey Jencks at the SFPUC Urban Watershed Management Program to Thomas L. Evans of the San Francisco Redevelopment Area regarding "Visitacion Valley Transit Oriented Development Phase 1 Master Plan and Open Space and Streetscape Master Plan – Schlage Lock"

9. Memorandum dated February 9, 2009 from Wallis Lee at the SFDPW Hydraulic Engineering Department to Jason Lin at UPC regarding "Relocation of Sunnydale/Bayshore Control Structure"

10. "Hydraulic Study for Sewer Connection from Visitacion Valley Redevelopment Project" by Hydraulic Section IDC, SFDPW, and dated August 2013

APPENDIX B:
SFDPW HYDRAULIC STUDY, AUGUST 2013

Transmittal Letter

Date 2013-7-30
Updated 2013-8-8

To,

Leslie Webster,

SFPUC

Dear Lesley,

Please find attached hydraulic analysis report for modeling incorporating the Visitacion Valley Redevelopment Project (Schlage Lock site) discussed in the meeting of June 4, 2013. Consultant BKF provided relevant information in CAD to us needed for the analysis.

B. Shrestha

Hydraulic Section

SFDPW

Hydraulic Study

for

Sewer Connection

from

Visitacion Valley Redevelopment Project

Aug 2013

Hydraulic Section

IDC, SFDPW

1680 Mission St 2nd Fl

San Francisco, CA 94103

Abstract

Hydraulic Section has performed a study of the collection system in the Sunnydale sewershed that incorporates the Visitacion Valley Redevelopment Project. The project's consultant BKF has proposed a combined sewer system within the project which will tie into the City's combined sewer system at two locations along the existing 78" diameter sewer main along Sunnydale Avenue. There is also a newly constructed deeper tunnel along Sunnydale Avenue which transitions from 81.5" to 144" diameter at the Bayshore intersection. This hydraulic study was carried out to determine the hydraulic grade in these Sunnydale sewers when the discharge from the project is added.

Further modification to the model can be used to answer other hydraulic design related questions as needed.

Executive Summary

The Sunnydale Avenue sewers will have acceptable hydraulic grade after the proposed connection from the Visitacion Valley Redevelopment Project. It is because the two main sewers along Sunnydale Avenue are inter-connected by an overflow weir at Bayshore Blvd. This weir diverts 90 cfs flow from the 78" diameter pipe to enter into the deeper tunnel during design storm condition.

1. Introduction

Visitacion Valley Redevelopment Project (Schlage Lock site) is planned in the south-east corner of the City. The project consultant, BKF, has proposed a combined sewer system in this site which will be tied into the City's combined sewer system along Sunnydale Avenue. The sewer system of the project site is intended to be handed over to the City in the future. Sewer system along Sunnydale Ave consists of two major pipes: namely an older 78 inch diameter pipe and a deeper tunnel with diameter ranging from 81.5 inch to 144 inch.

The proposed sewer design has two branches – identified as East and West systems by BKF. (see appendix 13) The East system connects to the Sunnydale 78 inch sewer via 15 inch diameter pipe. The West system connects to the same Sunnydale 78 inch sewer via a 36 inch pipe. The East system has approximately 3.9 acre tributary area. The West system has approximately 13.4 acre tributary area. The site grade slopes from 45 feet to 10 feet towards south-east direction.

2. Purpose

The study was conducted to determine the suitability of connection points of the proposed combined sewer system for the project to the sewer system of the City. The modeling work carried on is anticipated to provide further hydraulics related questions as the design progresses.

3. Methodology

Hydraulic modeling of the system was performed using Innovyze ICM software. Hydraulic Section maintains and uses an existing model for various needs. Current model is called EHY13, various versions of which are used for different tasks as needed. This available hydraulic model of the Sunnydale sewershed was modified by adding information of the proposed system for the Visitacion

Valley provided by the consultant. Additional elements of the sewer system which are either planned or in design under Sunnydale Phase II were added to the model.

The primary goal of the study was to determine if there is any significant impact on the hydraulic grade line for the older tunnel to which the connections from the project are to be made. Hence, no significant effort was put to include the detail of the subcatchment hydrology of the project site. The model should not be used to compare directly the hydrologic calculation performed by the consultants. The consultant had appropriately used the Rational Method in Bentley StormCAD software. The runoff computation in EHY13 model is approximately 20% more conservative for the project site. Such difference between the flowrates used by the consultants and the present model is within an acceptable range. The outlet flow rates in our EHY13 model are more conservative for hydraulic grade line computation purpose.

4. Modeling

4.1. Model Network ID 18301

4.2. Model Run ID 22022

4.3. Subcatchment Parameters

4.3.1. NRCS Soil Type D

4.3.2. Slopes = 5%

4.3.3. Impervious = 75%

4.3.3.1. Initial Loss 0.01 inch

4.3.3.2. Runoff routing value 0.05

4.3.4. Pervious = 25%

4.3.4.1. Initial Loss 0.10 inch

4.3.4.2. Horton initial 0.50 inch/hr

4.3.4.3. Horton final 0.15 inch/hr

4.3.4.4. Decay 2/hr

4.3.4.5. Recovery 0.05 / hr

5. Assumptions

5.1. Uses 5-year 3-hour design storm hyetograph with 1.3 inch total depth

5.2. Hydraulic downstream control was assumed to be the weirs at Sunnydale Transport/Storage Box. This overflow weir is at the elevation of (-)2.6 feet with respect to the City Datum.

5.3. All pipes upstream in the entire Sunnydale Sewershed which are smaller than 12 inch are modeled as 12 inch diameters.

5.4. The 78 inch diameter pipe overflow connection along Schwerin from Kelloch Ave to Sunnydale Ave, which is under design, is included in the model.

5.5. Overflow from Talbert system to the new tunnel is included. Weir Elevation is 20 ft

5.6. Weir crest at Bayshore overflow structure is at (-)1 ft

5.7. Modeling output results table (appendix 1, 2) may occasionally show *negative velocities* and *artificially high velocities* for some conduits. These results do not impact the overall hydraulic calculations or conclusion derived from the model. Appendix-14 explains the reason for this.

6. Conclusion

6.1. The HGL at two locations where the discharge from the project will be connected has freeboard of 4 feet for the design storm condition. (see appendix 5)

6.2. The maximum level in West outfall is 1.1 feet. (see appendix 6)

6.3. The maximum level in East outfall is 0.9 feet. (see appendix 6)

6.4. The discharge rate at West outfall is 30 cfs. It is more conservative than consultants' calculation of 23 cfs.

6.5. The discharge rate at the East outfall is 8 cfs.

References

Summary of Schlage Lock Site Preliminary Hydrology Model, BKF

Various CAD drawings of site drainage layout

Drawings from Hydraulics Job Order 0541J

As-built 1832 (1913)

Results Summary Table (Existing)

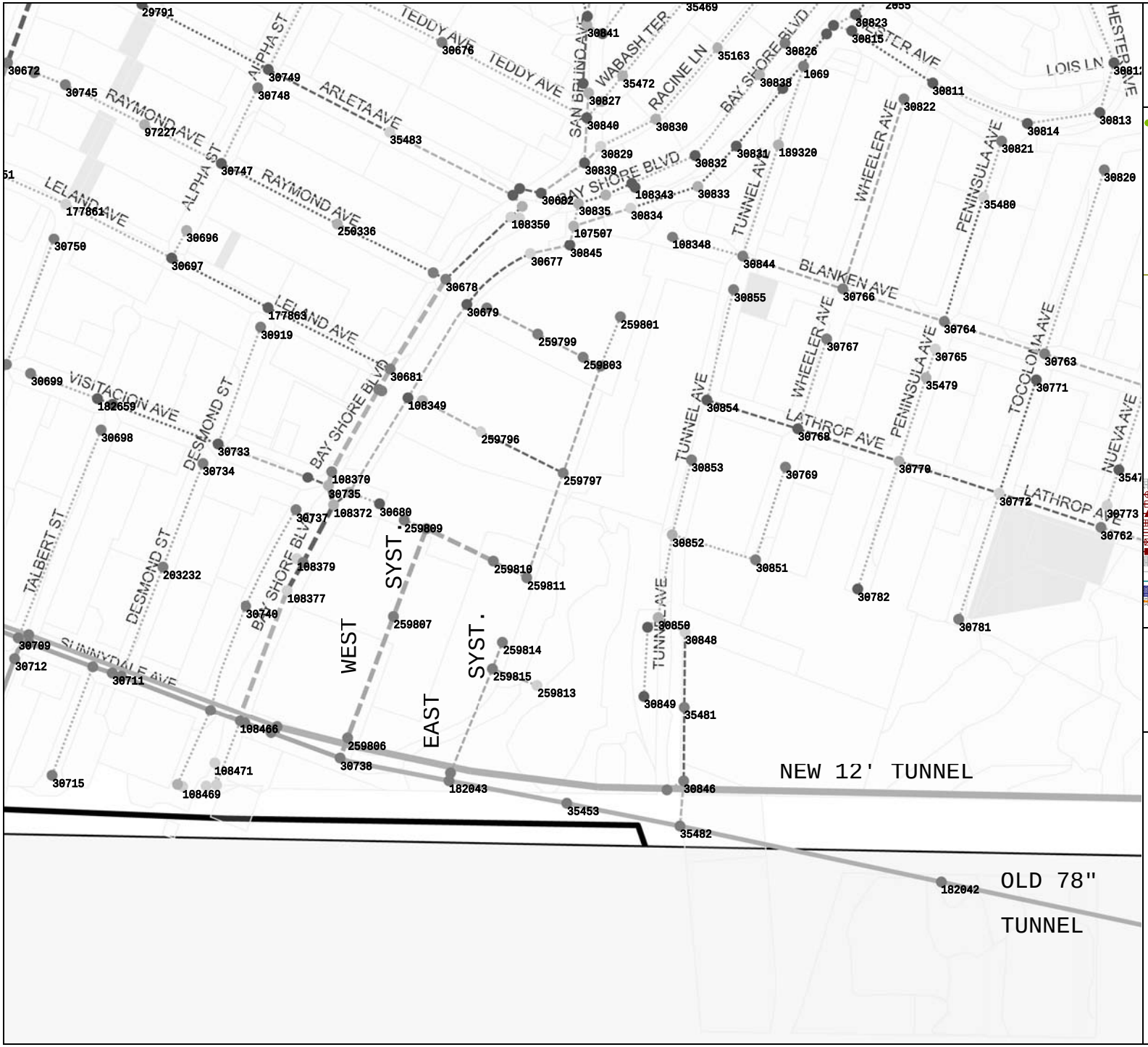
Line No	US Node	DS Node	Existing Size (inches)	Length (ft)	Slope (%)	US Rim (ft)	DS Rim (ft)	US Inv (ft)	DS Inv (ft)	US HGL (ft)	US Freeboard (ft)	DS HGL (ft)	DS Freeboard (ft)	DS V (ft/s)	DS Q (cfs)	Pipe Capacity (cfs)
0	182043	35453	78	295.4	0.349	12	7.943	-5.842	-6.874	-1.395	13.395	-1.545	9.488	4.298	125.1289	268.59
0	252050	A01-1020	144	3099.1	0.194	6.44	7	-19.5	-25.509	-2.328	8.768	-3.055	10.055	0.902	107.8099	1026.32
0	252052	30738	78	180.5	0.349	8.3	10	-4.258	-4.888	-0.753	9.053	-1.082	11.082	6.667	130.4319	300.54
0	252055	252050	82.8	659.7	0.999	11.224	6.44	-12.91	-19.5	-1.993	13.217	-2.328	8.768	2.811	112.7599	532.6
0	259795	259796	15	162.8	0.307	26.2	27	21	20.5	24.091	2.109	24.109	2.891	-0.179	-0.2373	3.58
0	259796	259797	15	226.6	0.441	27	26.2	20.5	19.5	24.109	2.891	20.696	5.504	6.318	7.6634	4.29
0	259797	259811	24	273	1.831	26.2	25.8	19.5	14.5	20.696	5.504	16.181	9.619	6.486	18.3229	30.62
0	259798	259799	15	140.4	0.791	36.5	38.9	30.11	29	30.22	6.28	30.221	8.679	-0.183	-0.2232	5.75
0	259799	259803	18	124.2	0.402	38.9	36.7	29	28.5	30.221	8.679	29.379	7.321	5.377	6.8285	6.66
0	259801	259802	12	130.6	0.383	36	35.9	28.5	28	28.635	7.365	28.633	7.267	-0.197	-0.1031	2.2
0	259802	259797	18	278	3.058	35.9	26.2	28	19.5	28.633	7.267	20.696	5.504	4.224	6.3911	18.37
0	259803	259802	18	48.3	1.035	36.7	35.9	28.5	28	29.379	7.321	28.633	7.267	6.417	6.7787	10.69
0	(WEST) 259806	30738	36	52.8	15.715	12	10	6.8	-1.5	7.407	4.593	-1.082	11.082	22.254	22.2409	264.43
0	259807	259806	36	319.4	1.002	20.5	12	10	6.8	11.294	9.206	7.407	4.593	8.428	22.4747	66.77
0	259808	259807	30	229.6	0.958	22.1	20.5	12.2	10	13.539	8.561	11.294	9.206	8.239	21.1396	40.15
0	259809	259808	15	58.1	1.376	20.2	22.1	13	12.2	13.538	6.662	13.539	8.561	-0.183	-0.2314	7.58
0	259810	259808	30	184.2	0.977	24.6	22.1	14	12.2	15.131	9.469	13.539	8.561	5.915	15.8328	40.55
0	259811	259810	24	91.2	0.548	25.8	24.6	14.5	14	16.181	9.619	15.131	9.469	6.872	17.4442	16.76

APPENDIX 2

Line No	US Node	DS Node	Existing Size (inches)	Length (ft)	Slope (%)	US Rim (ft)	DS Rim (ft)	US Inv (ft)	DS Inv (ft)	US HGL (ft)	US Freeboard (ft)	DS HGL (ft)	DS Freeboard (ft)	DS V (ft/s)	DS Q (cfs)	Pipe Capacity (cfs)
0	259813	259815	15	116.4	0.859	16.8	20.9	13	12	13.798	3.002	12.726	8.174	5.202	4.0411	5.99
0	259814	259815	15	69.2	1.444	22	20.9	13	12	13.555	8.445	12.726	8.174	4.123	3.0514	7.76
0(EAST)	259815	259817	15	277.1	3.428	20.9	12	12	2.5	12.726	8.174	3.096	8.904	9.911	6.5572	11.96
0	259817	182043	15	19.6	5.111	12	12	2.5	1.5	3.096	8.904	-1.395	13.395	11.372	6.523	14.61
0	30738	182043	78	273.4	0.349	10	12	-4.888	-5.842	-1.082	11.082	-1.395	13.395	5.671	137.205	268.41
0	30739	252052	78	68.6	0.35	5.194	8.3	-4.018	-4.258	-0.542	5.736	-0.753	9.053	8.136	143.4091	300.82

Total Length (ft)	7378.2	Minimum DS Freeboard (ft)	2.891	Maximum DS Flow (cfs)	143.4091
Minimum DS Invert	-25.509	Maximum Size (inches)	144	Maximum Pipe Capacity (cfs)	1026.32
Maximum US Invert	30.11	Maximum Slope (%)	15.715	Maximum DS Velocity (ft/s)	22.254

APPENDIX 3


EHY13
Simulation - 2010 5-Year Storm
Map Centre Coords
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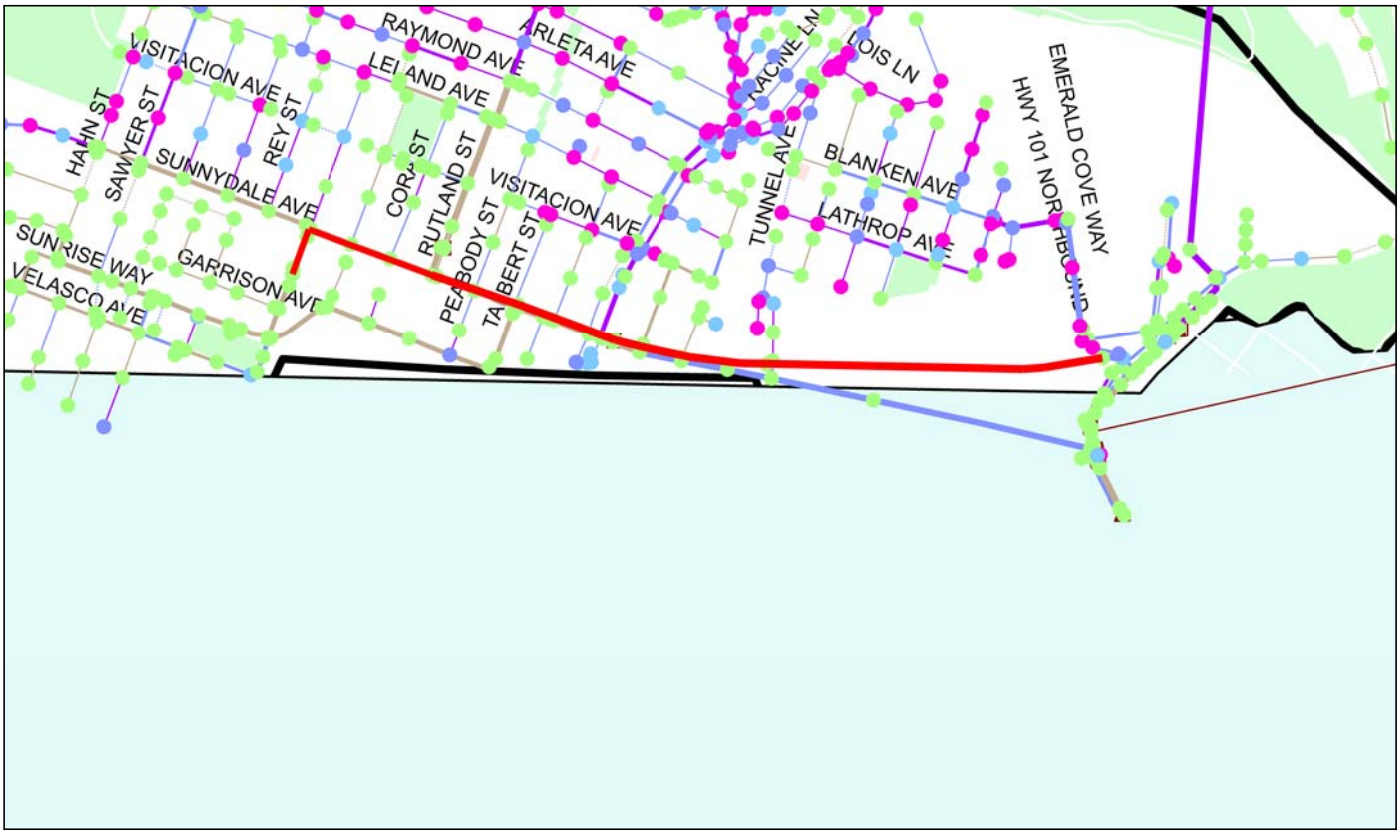
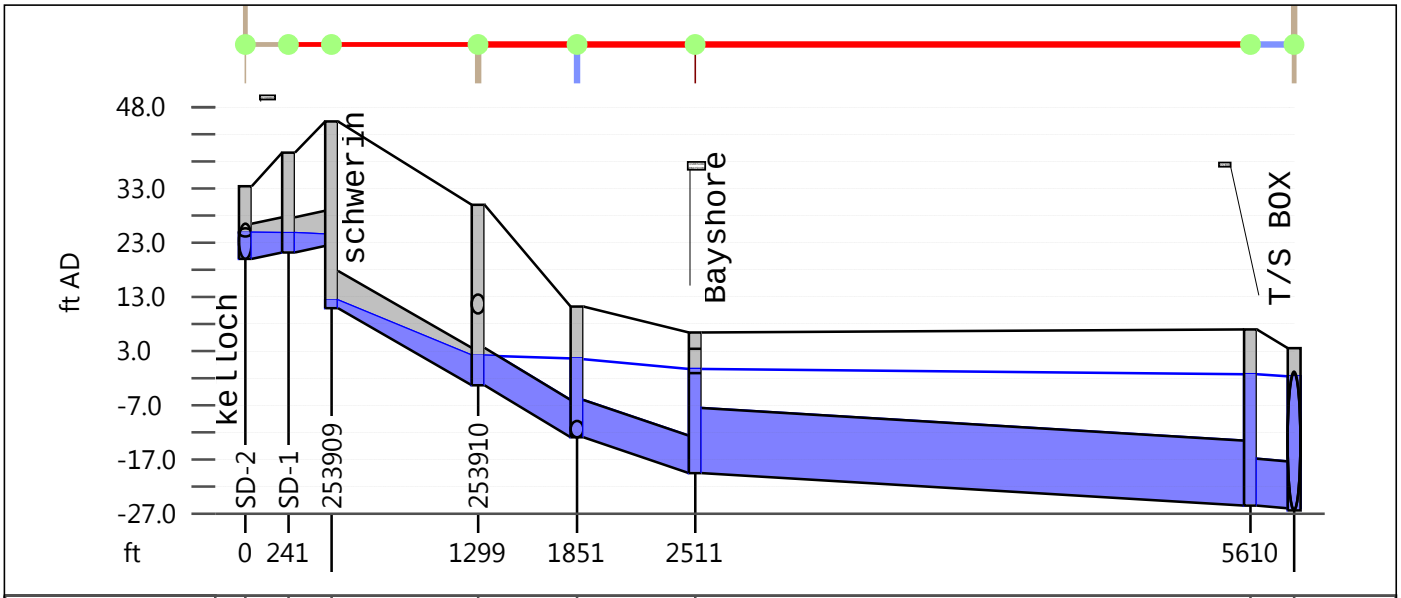
Date Printed: 07/29/2013
Scale 1:4100
0.05 miles
Powered by
InfoWorks™
NEW 12' TUNNEL
OLD 78" TUNNEL
WEST SYST.
EAST SYST.
BAY SHORE BLVD
TUNNEL AVE
WHEELER AVE
PENINSULA AVE
LATHROP AVE
BLANKEN AVE
TOCCOLOMA AVE
NUEVA AVE
LOIS LN
HESTER AVE
TEDDY AVE
RACINE LN
WABASH TER
SAN BRUNO AVE
ARLETA AVE
ALPHA ST
RAYMOND AVE
LELAND AVE
VISITACION AVE
DESMOND ST
TALBERT ST
SUNNYDALE AVE

APPENDIX 4





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width (in)		-	-	82.8	82.8	82.8	144.0	-	
r.pfc (ft3/s)		-	-	702.524	-	532.596	1026.324	-	
US flow (ft3/s)		-	-	64.74162	-	-	377.80707	-	

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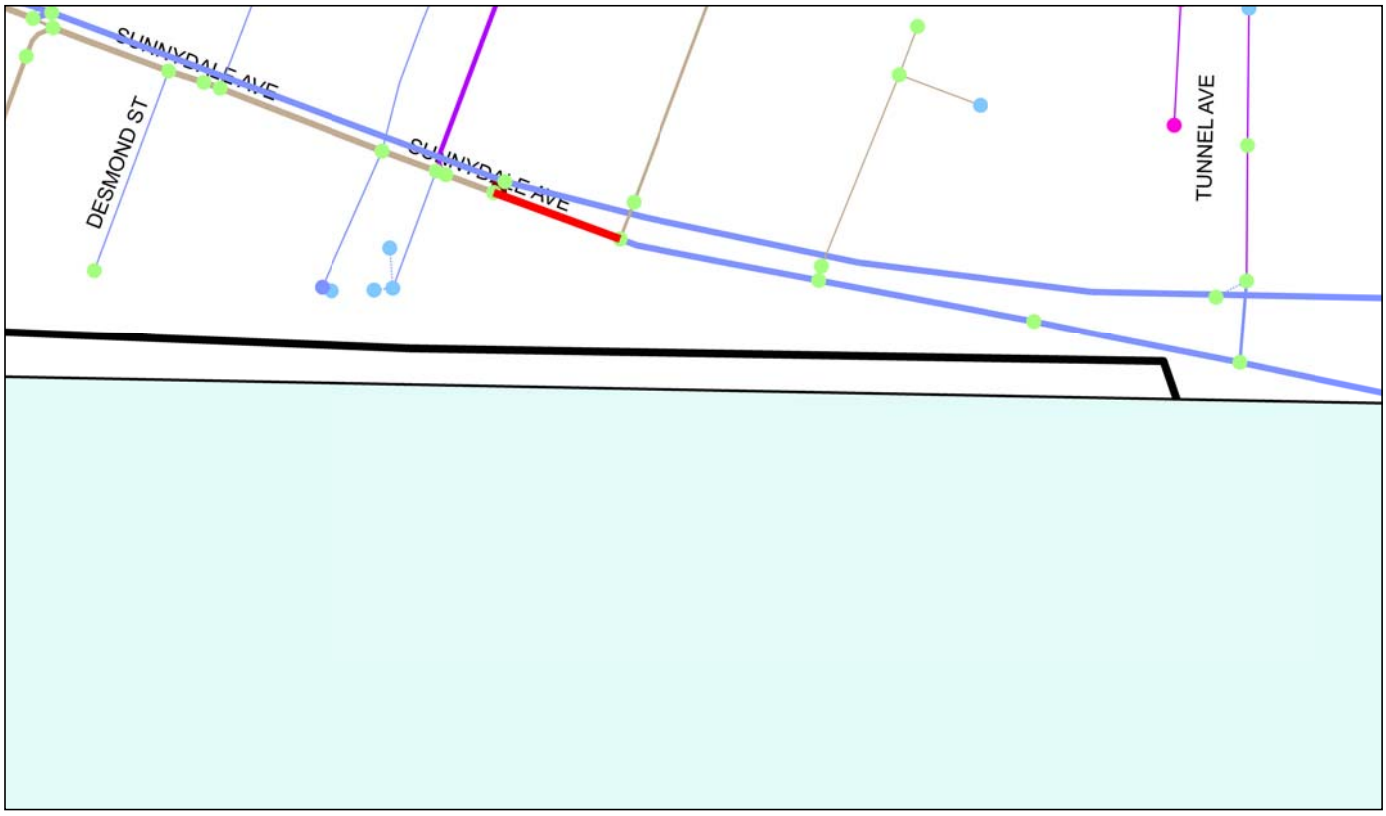
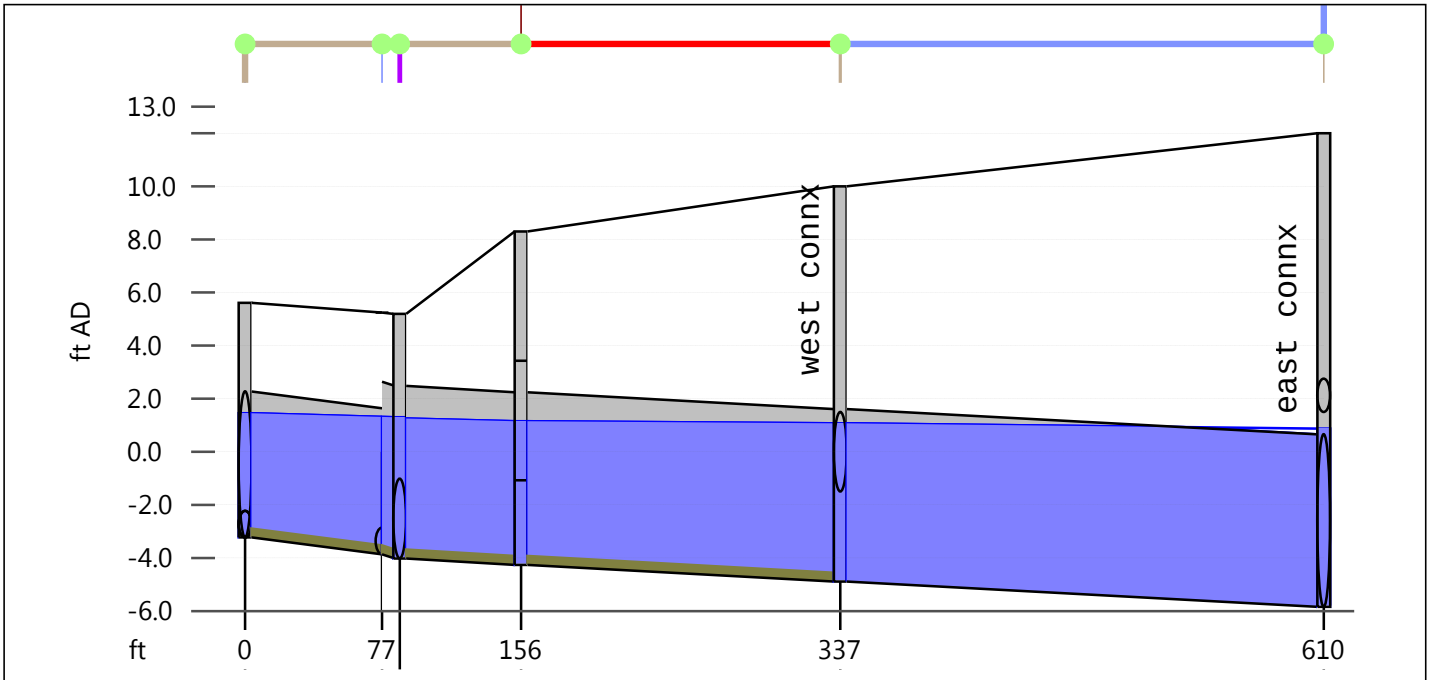
Asset ID								

APPENDIX 5





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Shape ID		CIRC		CIRC	CIRC	CIRC		
width (in)		66.0		78.0	78.0	78.0		
r.pfc (ft3/s)		290.865		300.589	300.313	268.412		
US flow (ft3/s)		132.93405		-	140.24930	157.95442		
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Asset ID								

APPENDIX 6

Location Plot Produced by bshrestha (07/29/2013 11:41:16) Page 1 of 1
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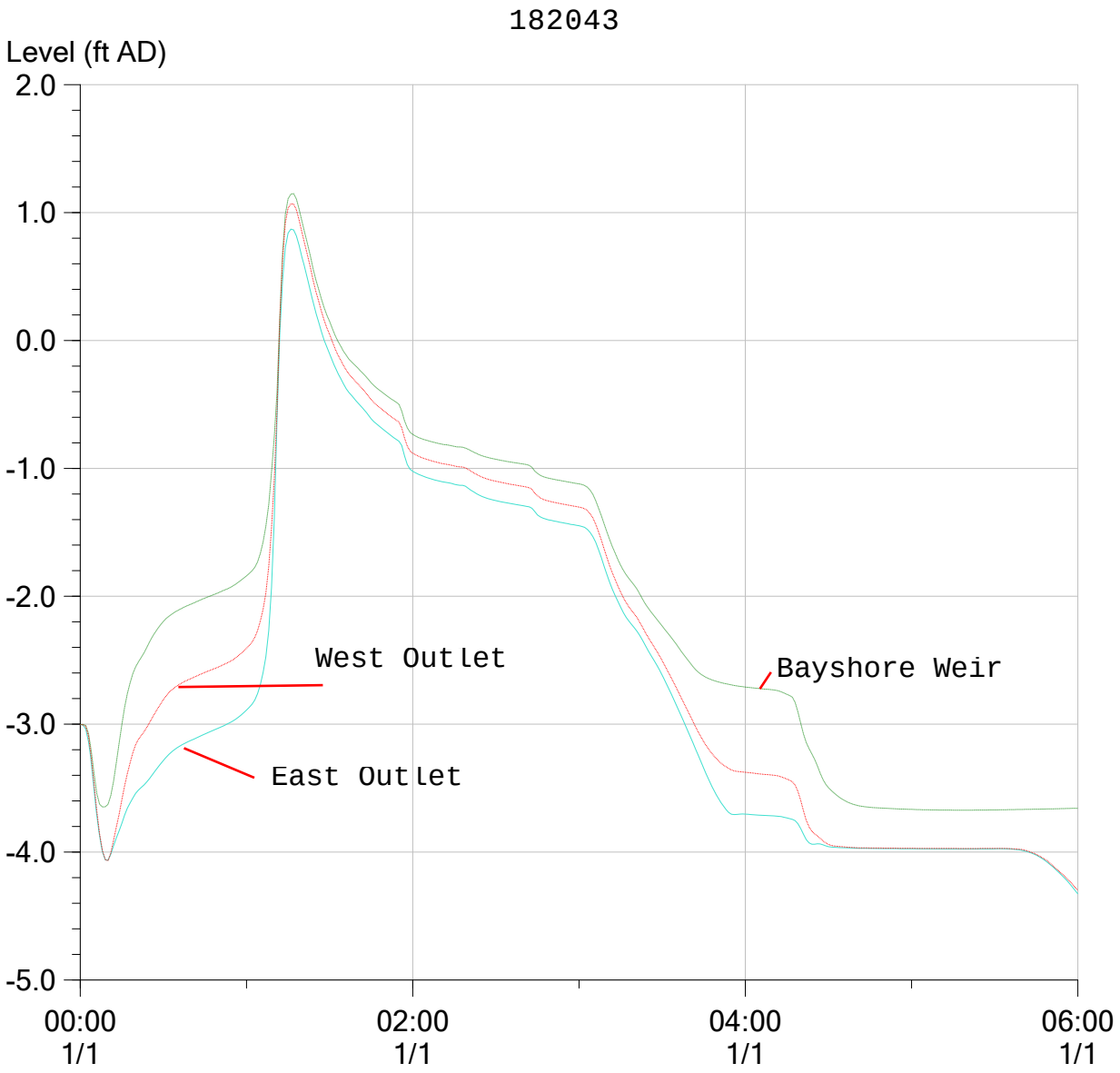

	Level (ft AD)	
	Min	Max
182043	-4.327	0.870
252052	-3.672	1.148
30738	-4.299	1.068

Results Report

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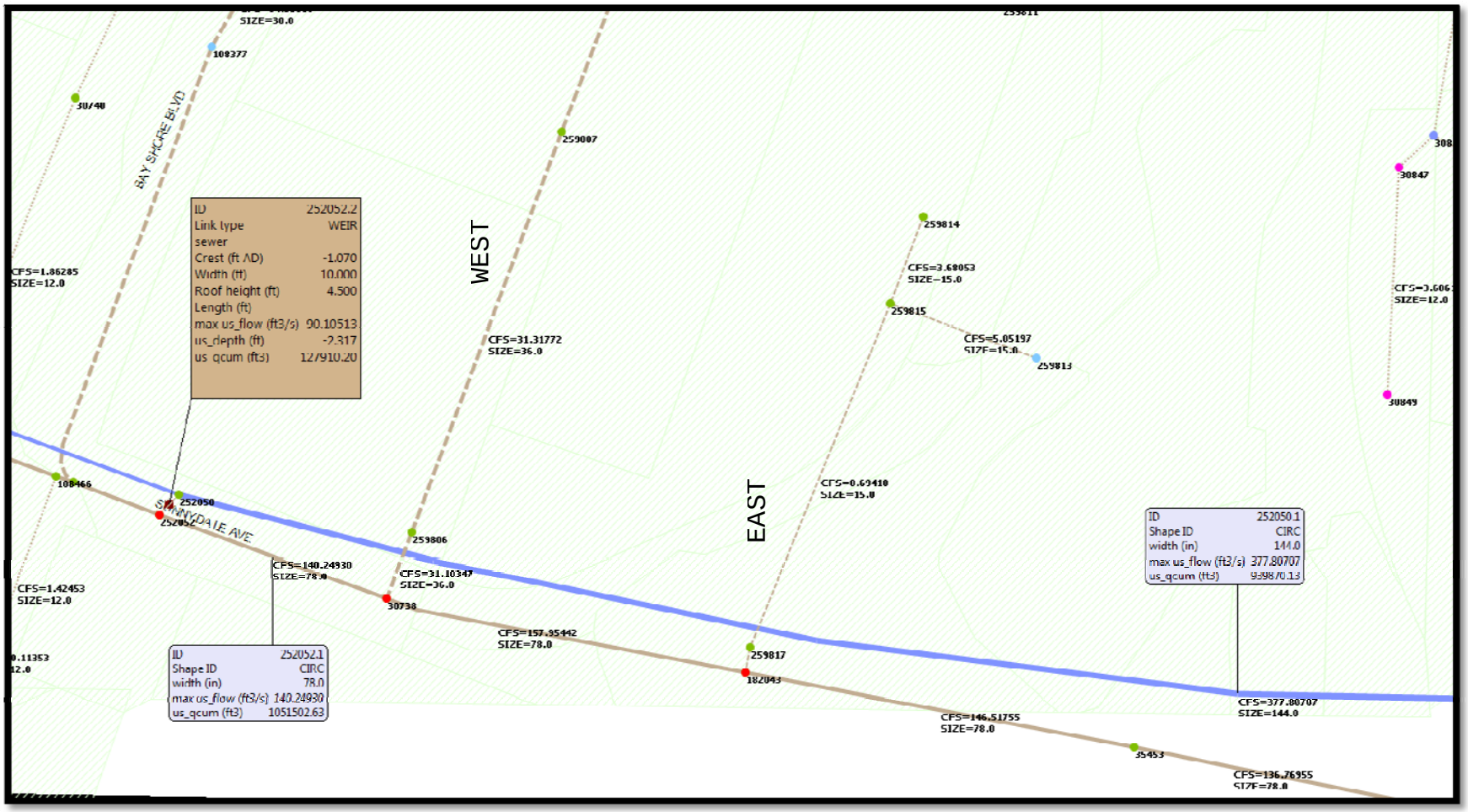
InfoWorks™

APPENDIX 7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Width (ft) 10.000
Roof height (ft) 4.500
Length (ft)
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us_depth (ft) -2.317
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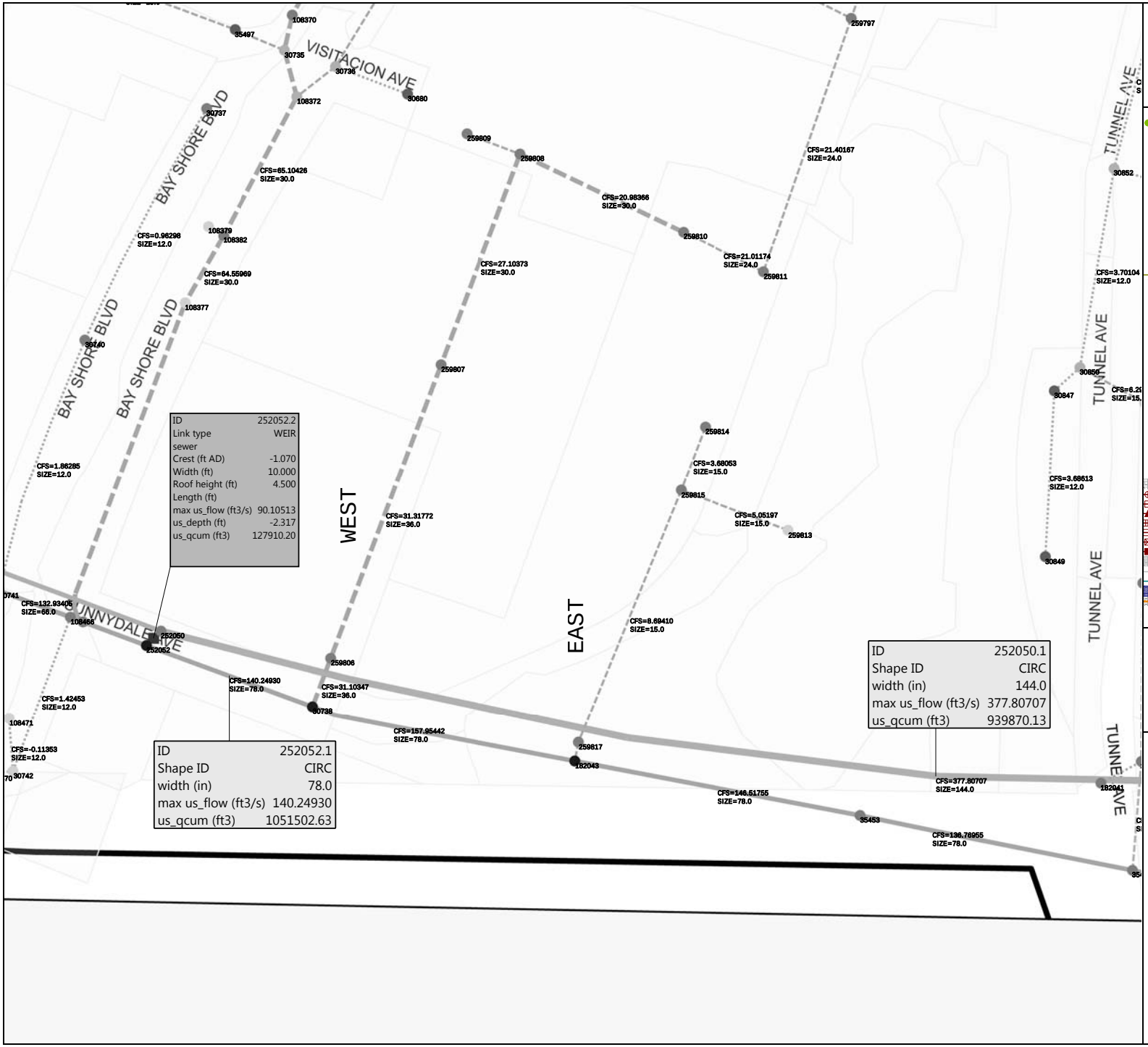
APPENDIX 8



EHY13 Simulation - 2010 5-Year Storm

Node [32232]
Flood Depth : sim.max_flooddepth (ft)
Colour/Symbol
< -4.00000005
>= -4.00000005
>= -2.00000002
>= 0
SYSTEM : system_type
Size
#NOT
combined
foul
other
overland
sanitary
storm
Conduit [31993]
Surcharge State : sim.Surcharge
Line Colour
< 1
>= 1
>= 2
Flow : sim.ds_flow (ft3/s)
Line Width
< 19.99999993
>= 19.99999993
>= 49.99999877
>= 99.99999753
>= 199.99999506
>= 500.00000449
>= 1000.00000898
HEIGHT : conduit_height (in)
Line Style/Line Width
< 13
>= 13
>= 25
>= 61
>= 91
Subcatchment [56659]
Flap valve [72]
Orifice [16]
Pump [82]
Screen [11]
Sluice [88]
User control [4]
Weir [233]
Polygon [6]
General line [5]
Porous wall [4]
Mesh zone [6]
Base linear structure (2D) [1]

Map Centre Coords
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Date Printed: 07/29/2013
Scale 1:1700
0.01 miles

Powered by
InfoWorks™

Location Plot (Upstream Link End) Produced by bshrestha (07/29/2013 11:11:12) Page 1 of 1
Sim: >Studies>Redevelopments>Visitacion>RUNS>Upsized_12inches>VISITACION_12 2010 5-Year Storm (07/25...
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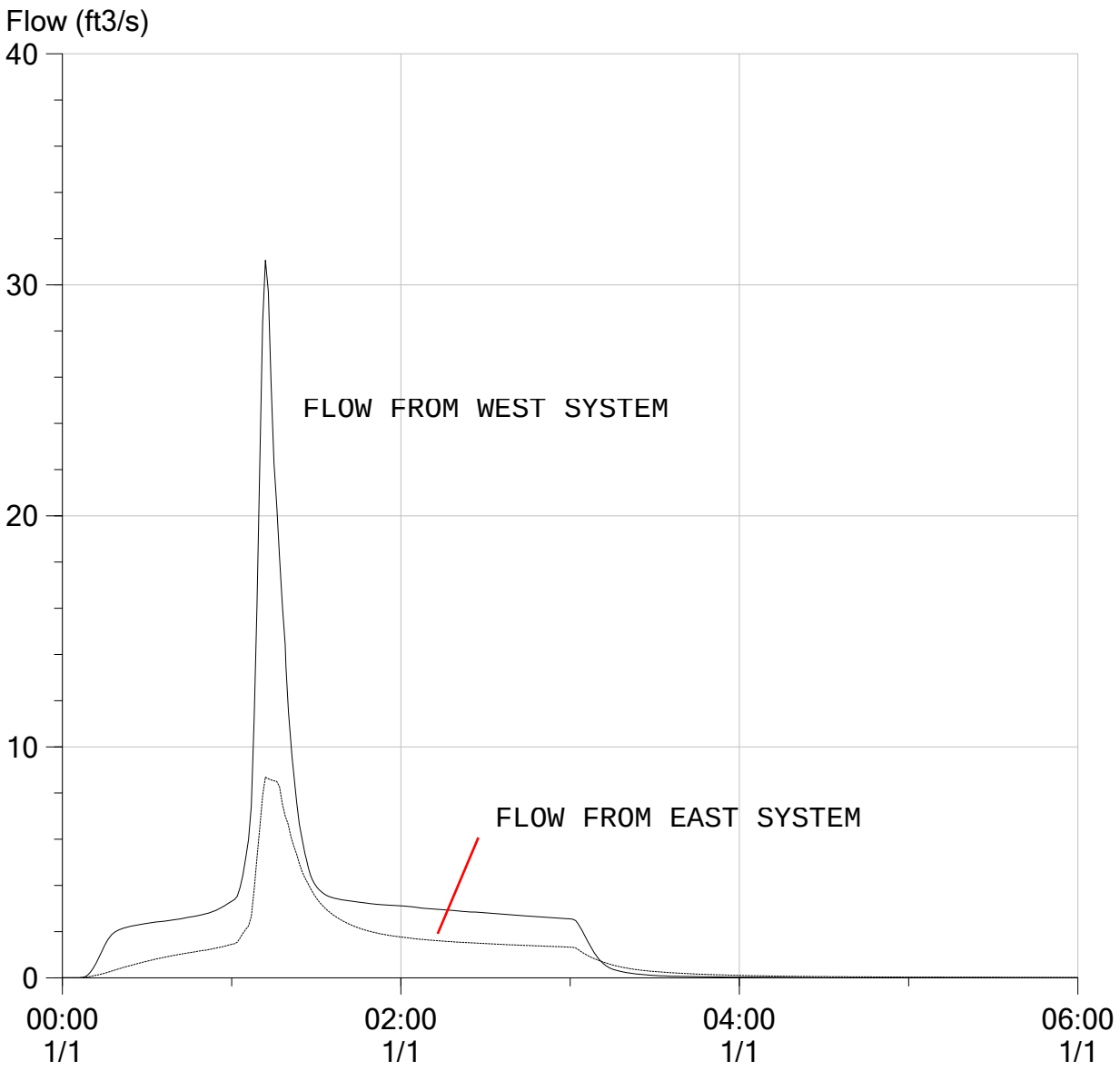

	Flow (ft3/s)		
	Min	Max	Volume (ft3)
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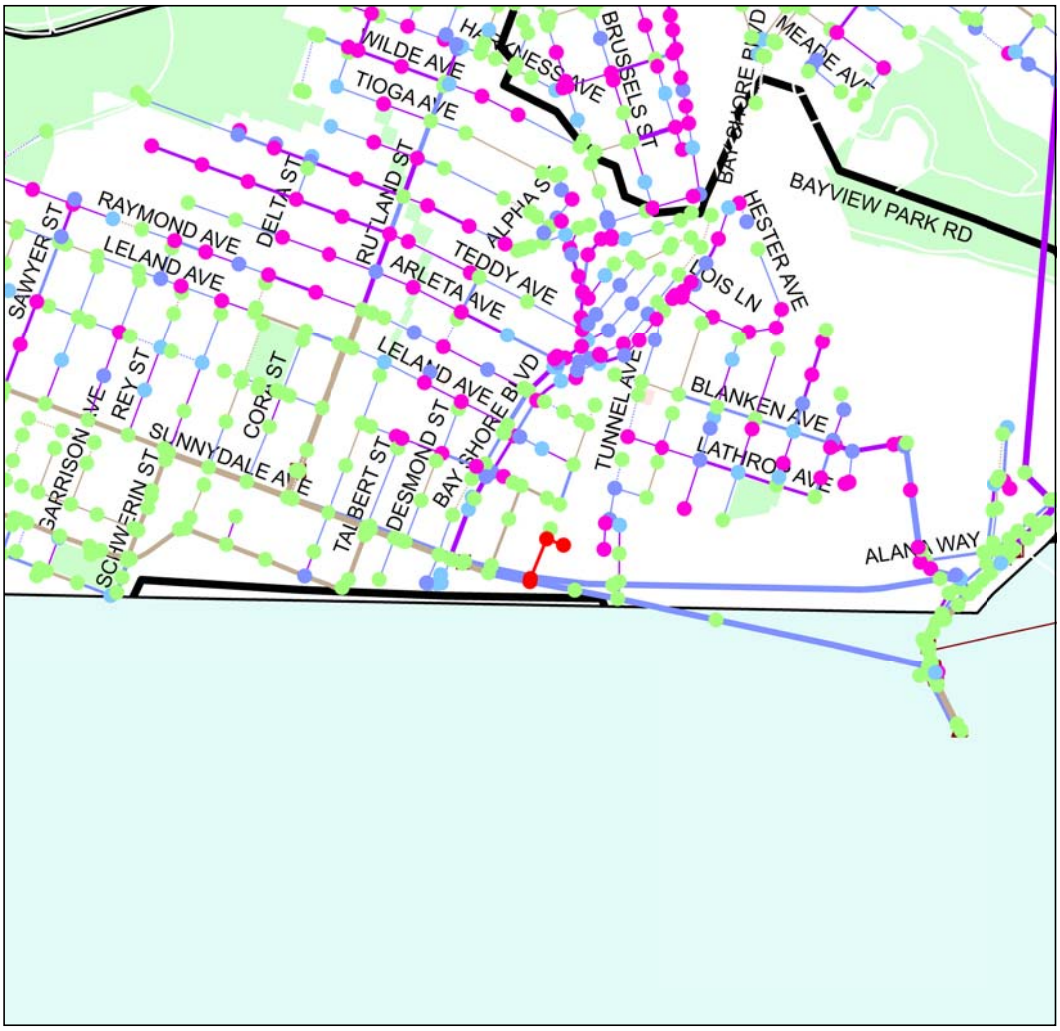
259817.1	0.004	8.688	23051.710

Results Report

Powered by

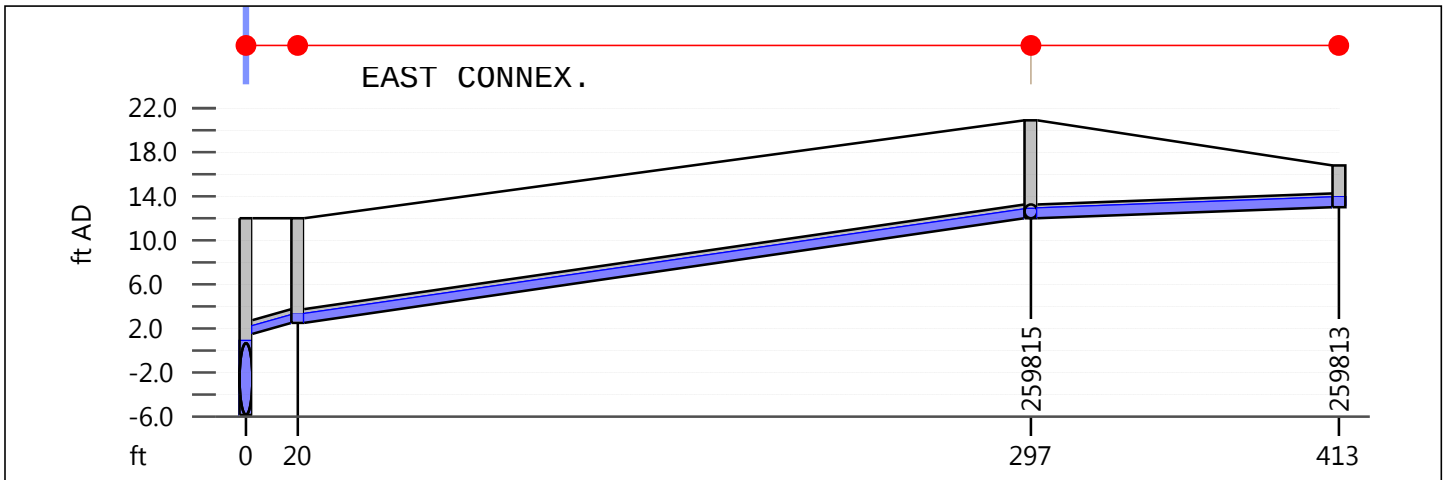
InfoWorks™

APPENDIX 10



N

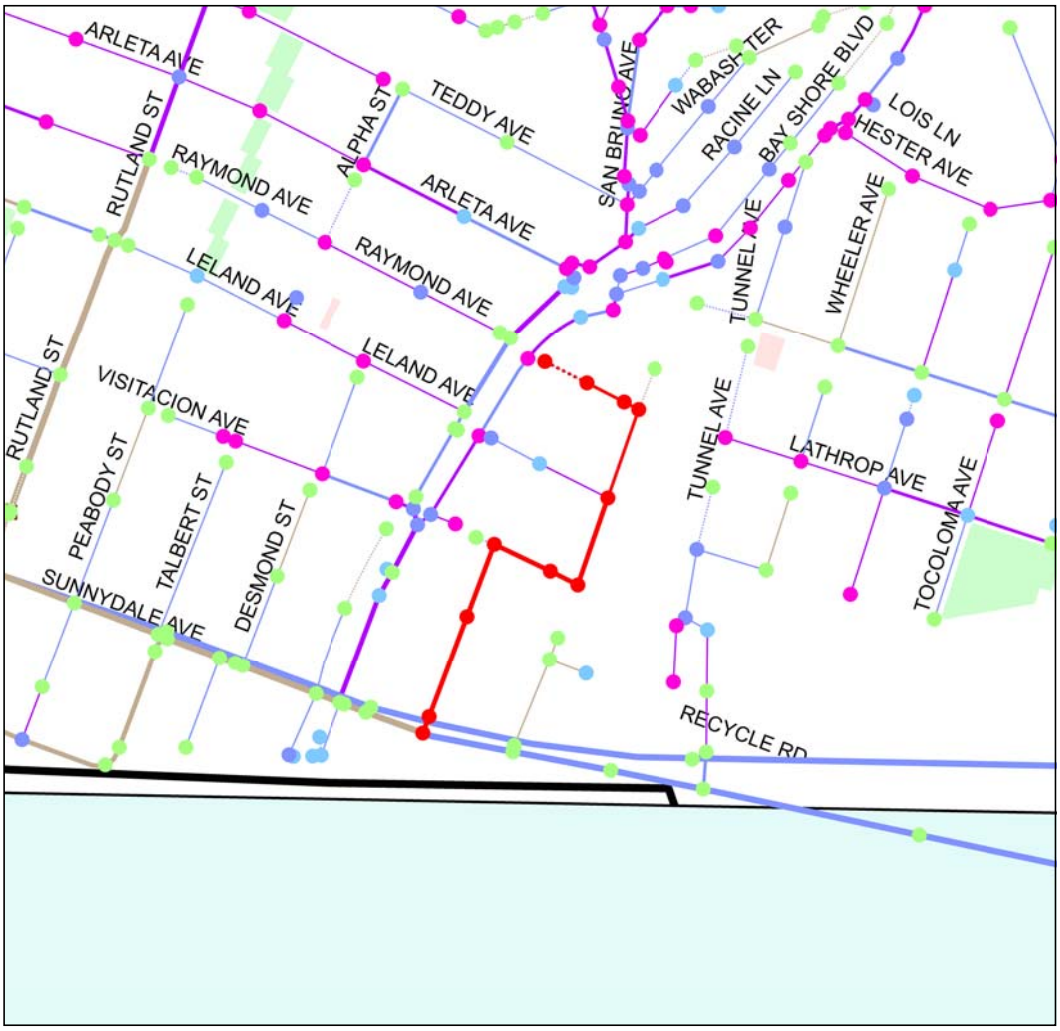
VISITACION VALLEY REDEVELOPMENT CONNECTION TO SUNNYDALE OLDER SEWER HGL PROFILE



Link	-	259815.1	259813.1	
length (ft)	-	277.1	116.4	
Shape ID	-	CIRC	CIRC	
width (in)	-	15.0	15.0	
r.pfc (ft3/s)	-	11.962	5.989	
US flow (ft3/s)	-	8.69410	5.05197	

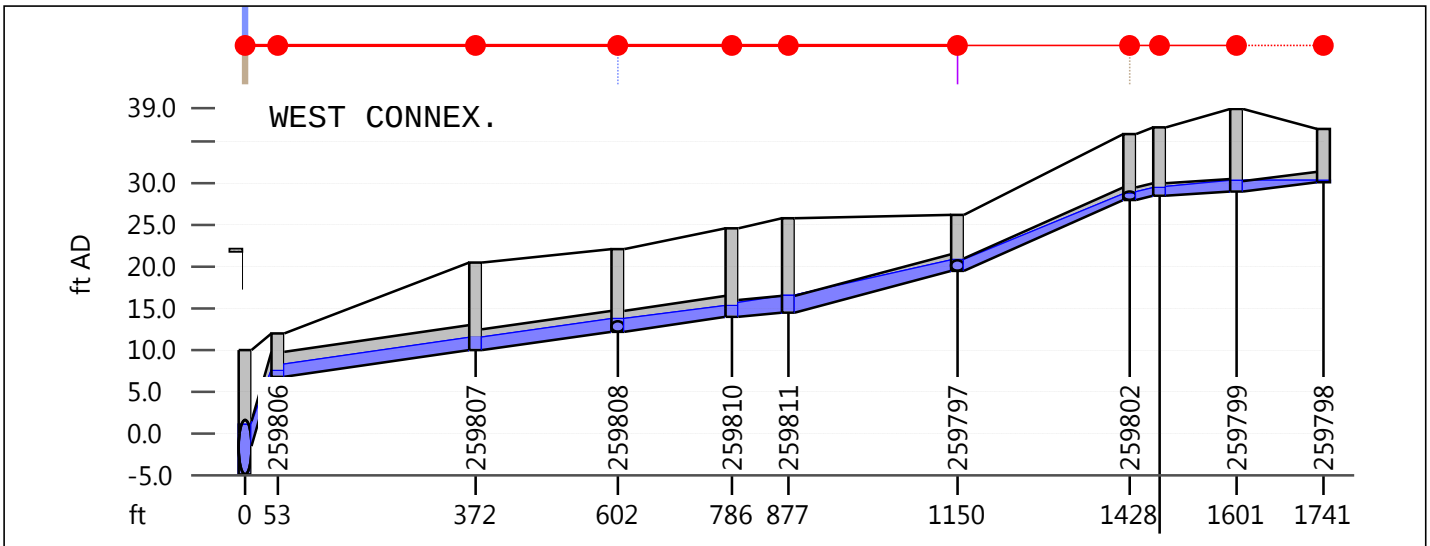
Node		259817	259815	259813
Asset ID				

APPENDIX 11



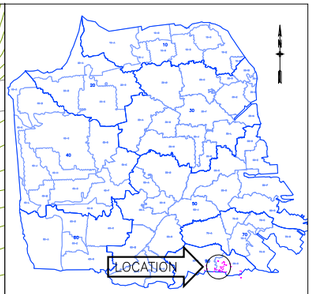
N

VISITACION VALLEY REDEVELOPMENT CONNECTION TO SUNNYDALE OLDER SEWER HGL PROFILE



Link		-	259807.1	259808.1	-	-	259797.1	259802.1	-	-	-	
length (ft)		-	319.4	229.6	184.2	-	273.0	278.0	-	124.2	140.4	
Shape ID		-	CIRC	CIRC	CIRC	-	CIRC	CIRC	-	CIRC	CIRC	
width (in)		-	36.0	30.0	30.0	-	24.0	18.0	-	18.0	15.0	
r.pfc (ft3/s)		-	66.768	40.153	40.552	-	30.619	18.372	-	6.665	5.746	
US flow (ft3/s)		-	31.31772	27.10373	-	-	21.40167	7.24471	-	-	-	
Node		-		259807	259808	-	-	259797	-	-	-	
Asset ID												

APPENDIX 12



50 0 100

NOTE: THESE MAPS OF SEWER FACILITIES SHOULD BE CONSIDERED SCHEMATIC IN NATURE. HORIZONTAL LOCATION AND ELEVATIONS ARE APPROXIMATE, AND MUST BE FIELD VERIFIED FOR ALL DESIGN PURPOSES EHY, BOE, DPW, SAN FRANCISCO 2013

PROPOSED SYSTEM SHOWN FOR VISITACION VALLEY REDEVELOPMENT PROJECT

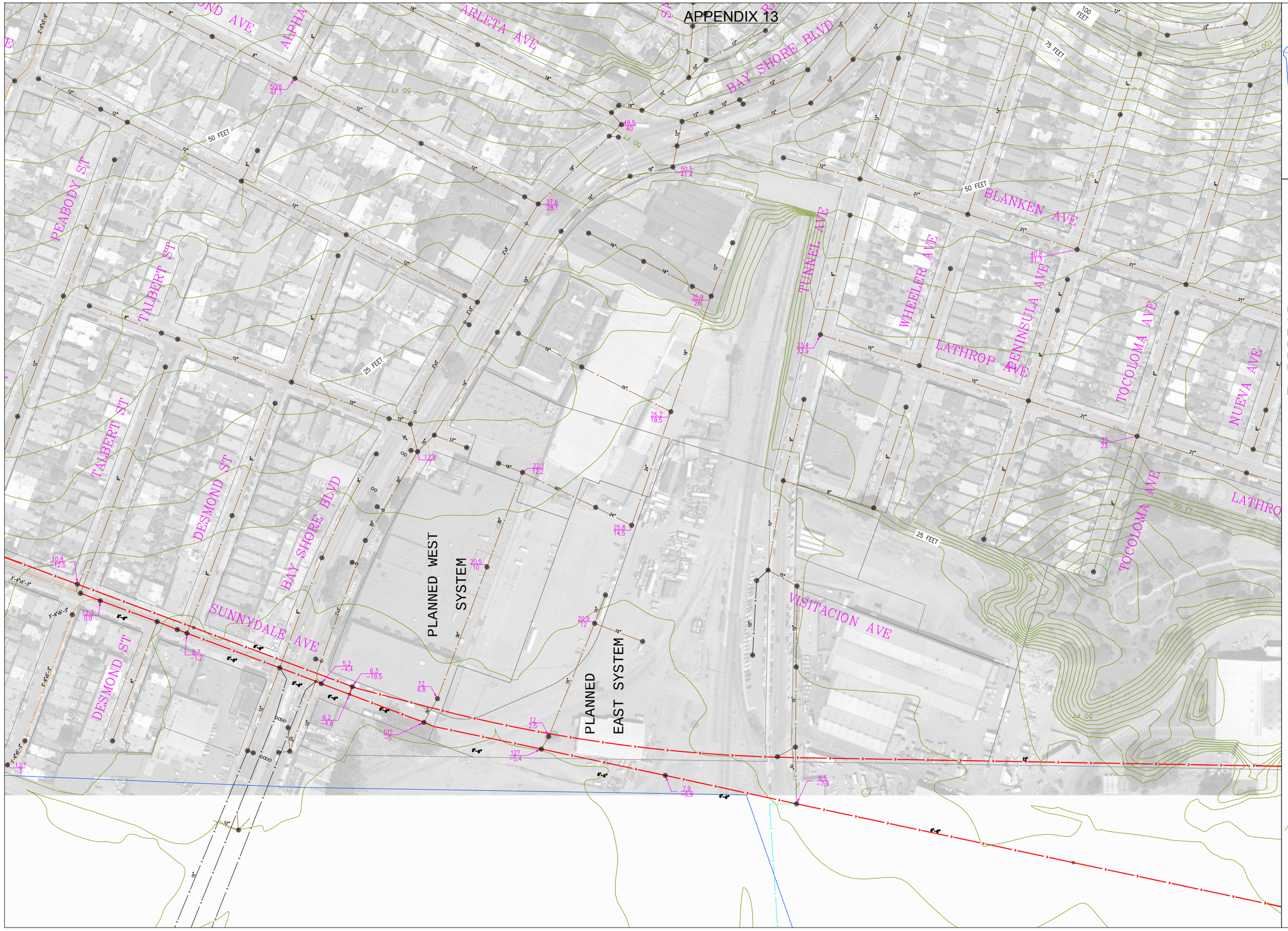
VISITACION VALLEY/SUNNYDALE AND VICINITY
SEWER SYSTEM MAP
SUB BASIN ID 90-D
USE GRAPHICAL SCALE
FOR REFERENCE PURPOSE ONLY

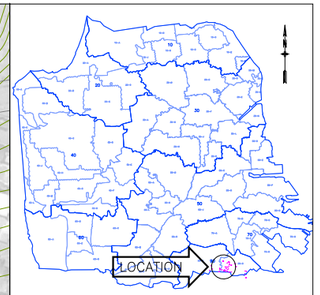
LEGEND

FIG." EXISTING SIZE
EXISTING SEWER
CONTOUR
RIM & INVERT

ATTACHMENT X

APPENDIX 13





50 0 100

NOTE: THESE MAPS OF SEWER FACILITIES SHOULD BE CONSIDERED SCHEMATIC IN NATURE. HORIZONTAL LOCATION AND ELEVATIONS ARE APPROXIMATE, AND MUST BE FIELD VERIFIED FOR ALL DESIGN PURPOSES EHY, BOE, DPW, SAN FRANCISCO 2013

PROPOSED SYSTEM SHOWN FOR VISITACION VALLEY REDEVELOPMENT PROJECT

VISITACION VALLEY/SUNNYDALE AND VICINITY
SEWER SYSTEM MAP
SUB BASIN ID 90-D
USE GRAPHICAL SCALE
FOR REFERENCE PURPOSE ONLY

LEGEND

FIG." EXISTING SIZE
EXISTING SEWER
X FT CONTOUR
RIM & INVERT
RIM
INV

ATTACHMENT X

APPENDIX 14

Explanation of Negative Velocities and high velocities

EHY SFDPW

B Shrestha 2013-8-7

(1) Why some velocities are reported negative in model results?

The negative velocity, and negative flow, is due to flow back filling from the downstream end of the conduit.

The conduit in figure 1 shows and reports flow in the negative (upstream) direction for a duration (figure 4 graph). The flow from the sub-catchment is being loaded at the downstream node. When downstream node of the conduit has the hydraulic head higher than the upstream node, the flow is in upstream direction. It continues to occur until the hydraulic head comes to an equilibrium state.

Although such phenomenon is possible, I am dissuading one from believing that each of the model result has to be correct in reality. I am only explaining the theoretical basis of the calculation.

There are also other possible known reasons for negative velocities: (1) digitization of the pipe from downstream to upstream end; (2) instantaneous numerical instability of the calculation.

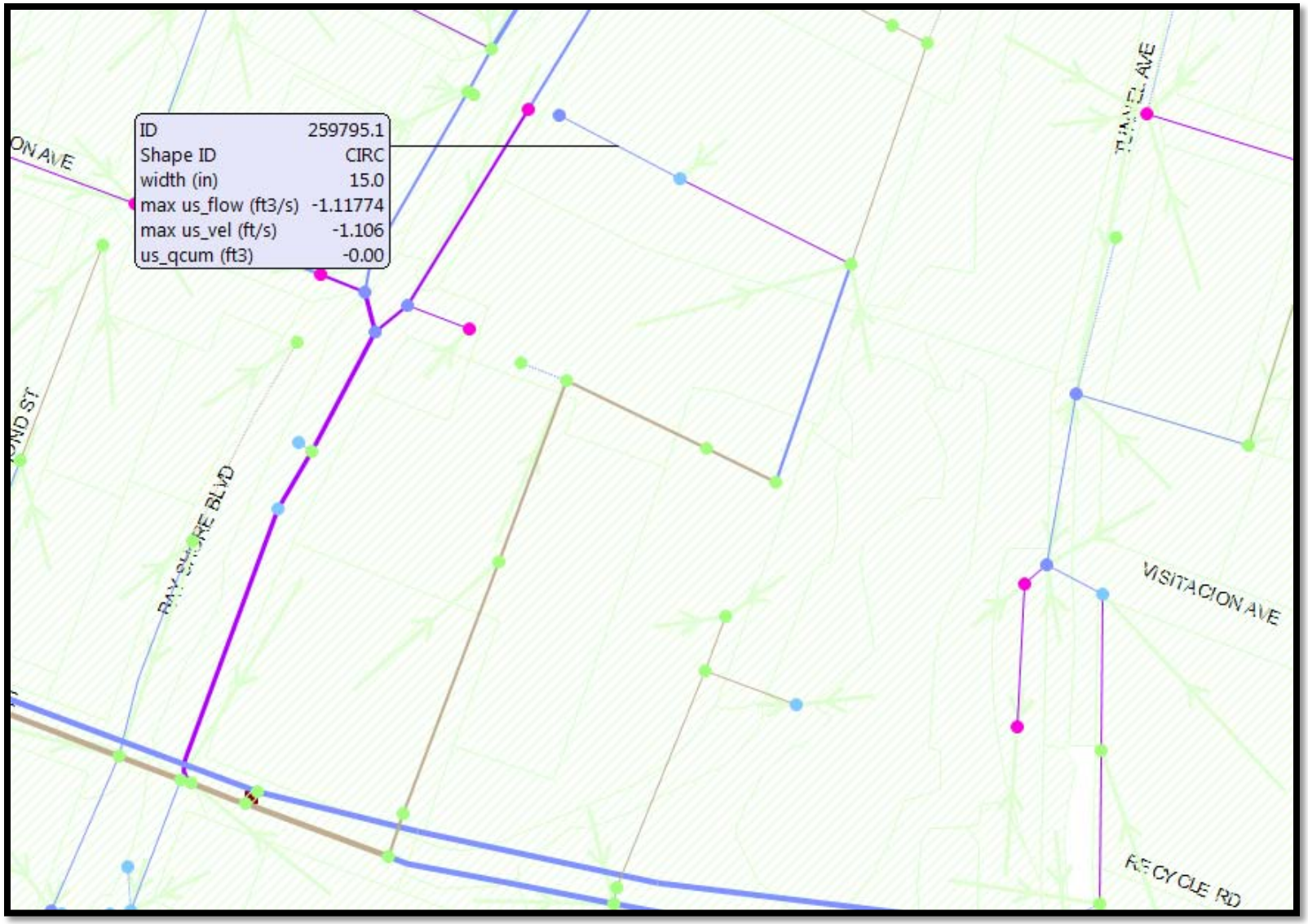
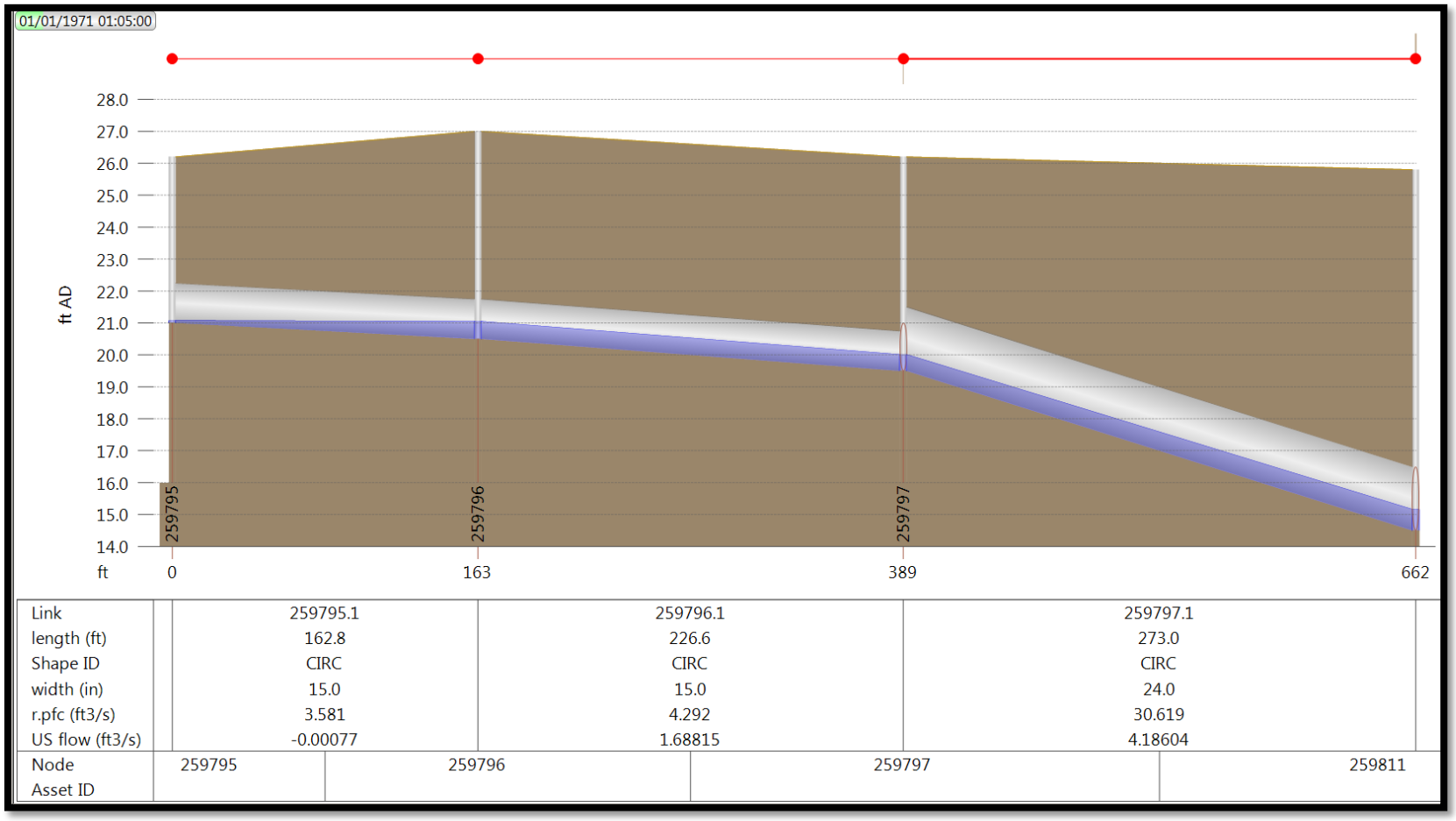
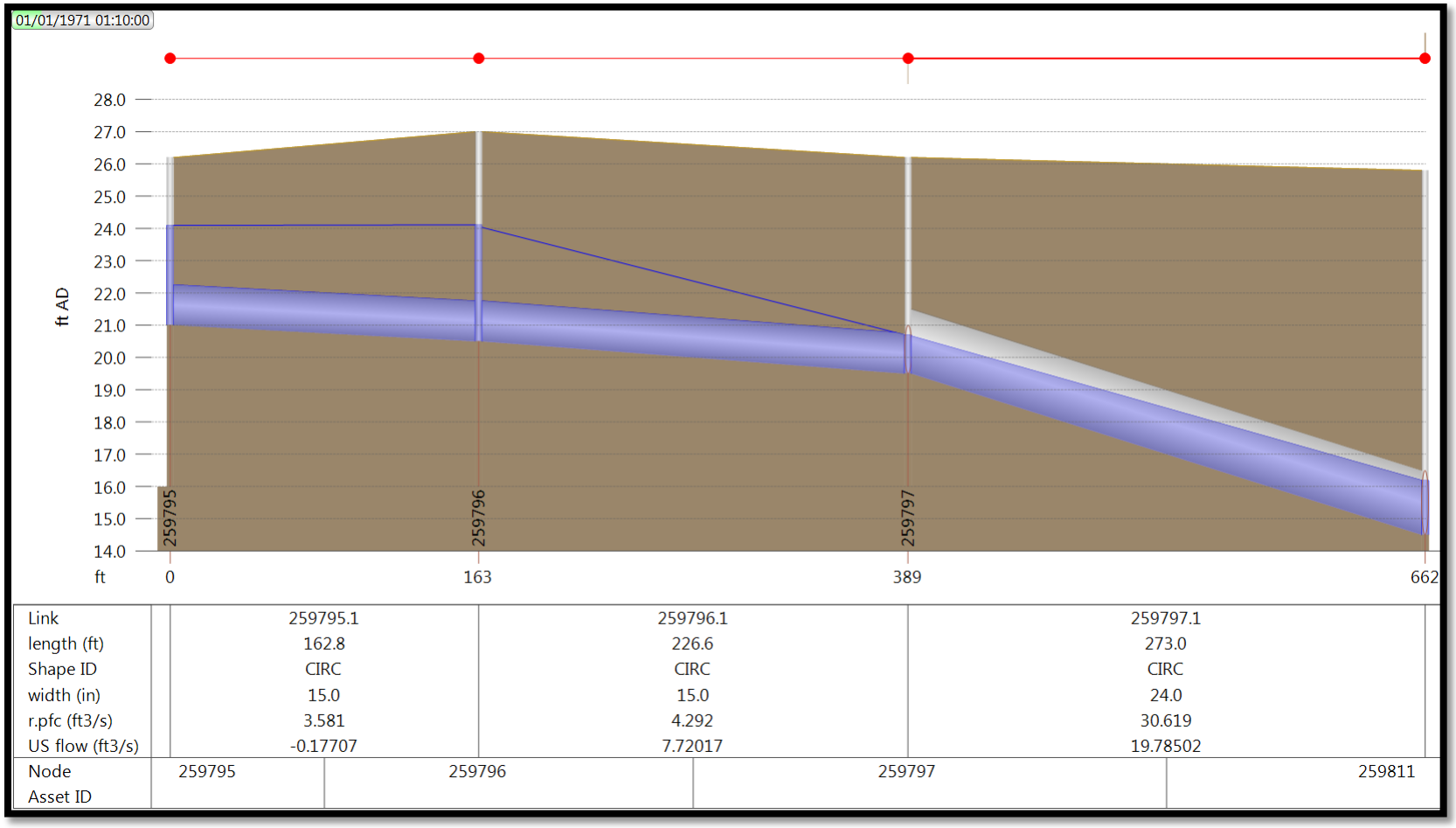

ID 259795.1
Shape ID CIRC
width (in) 15.0
max us_flow (ft3/s) -1.11774
max us_vel (ft/s) -1.106
us_qcum (ft3) -0.00
VISITACION AVE
RECYCLE RD

Figure 1



Link	259795.1	259796.1	259797.1	
length (ft)	162.8	226.6	273.0	
Shape ID	CIRC	CIRC	CIRC	
width (in)	15.0	15.0	24.0	
r.pfc (ft3/s)	3.581	4.292	30.619	
US flow (ft3/s)	-0.00077	1.68815	4.18604	
Node	259795	259796	259797	259811
Asset ID				

Figure 2



Link	259795.1	259796.1	259797.1
length (ft)	162.8	226.6	273.0
Shape ID	CIRC	CIRC	CIRC
width (in)	15.0	15.0	24.0
r.pfc (ft3/s)	3.581	4.292	30.619
US flow (ft3/s)	-0.17707	7.72017	19.78502

Node	259795	259796	259797	259811
Asset ID				

Figure 3

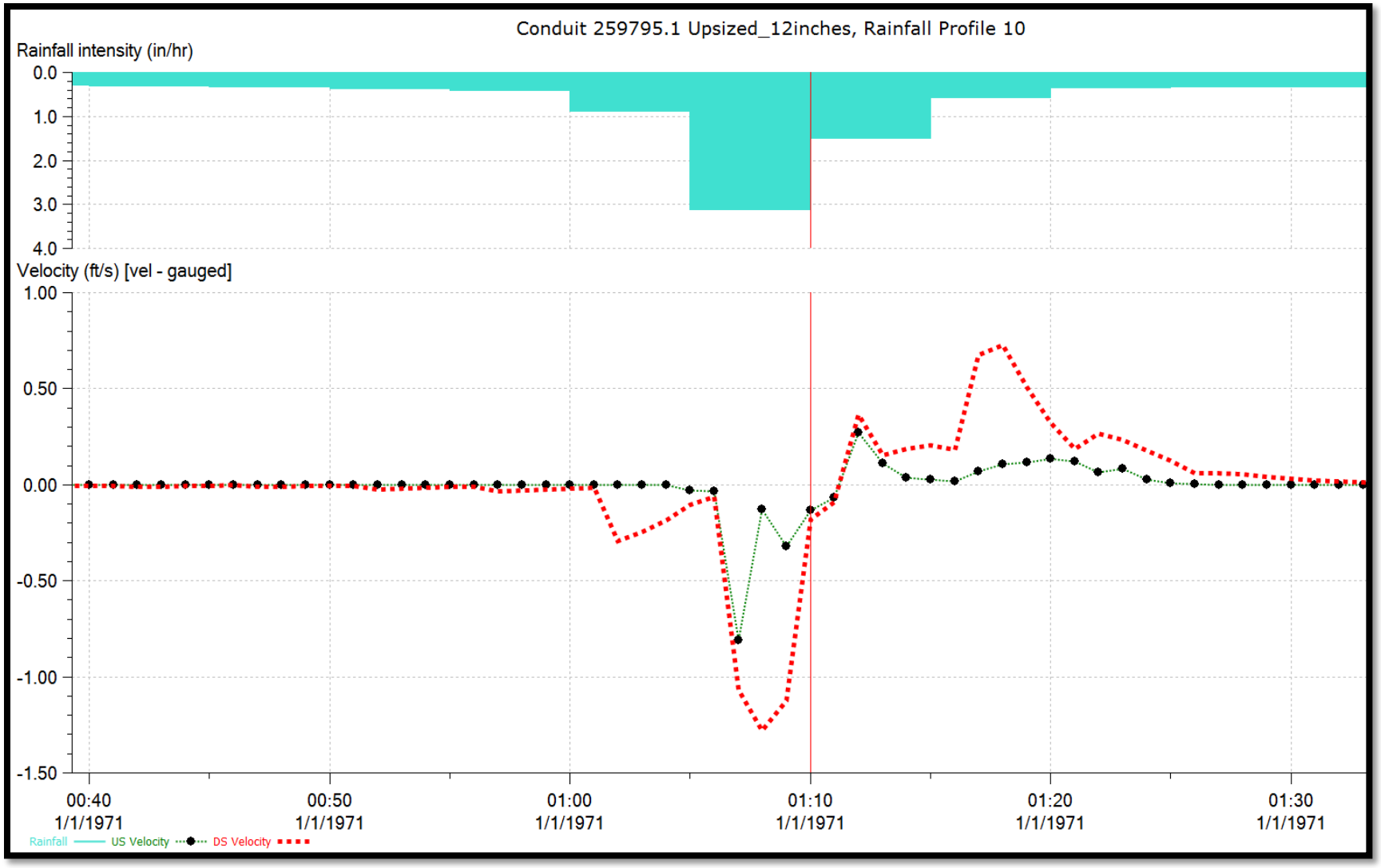

Conduit 259795.1 Upsized_12inches, Rainfall Profile 10
Rainfall intensity (in/hr)
0.0
1.0
2.0
3.0
4.0
Velocity (ft/s) [vel - gauged]
1.00
0.50
0.00
-0.50
-1.00
-1.50
00:40
1/1/1971
00:50
1/1/1971
01:00
1/1/1971
01:10
1/1/1971
01:20
1/1/1971
01:30
1/1/1971
Rainfall
US Velocity
DS Velocity

Figure 4

(2) Why are some velocities very high?

The conduit in figure 5 and figure 7 shows 109 feet per second as maximum velocity.

Using the Mannings' equation, velocities up to 30 feet per second is obtained and is expected in many steep pipes.

However, artificially high instantaneous velocities like 50 feet per second or 100 feet per second are numerical instabilities encountered while solving Saint Venant Equation. For each conduit, a number of calculations need to be performed for many time steps. The highest velocity found in these series of calculations is reported as maximum velocity. These spikes do not usually cascade into causing the overall degradation and reliability of calculation. The software does not suppress these values because it is an important indicator to the hydraulic engineer that occasionally internal calculations have limitations; and that an engineer makes a conscious decision whether such results affect the overall hydraulic result.

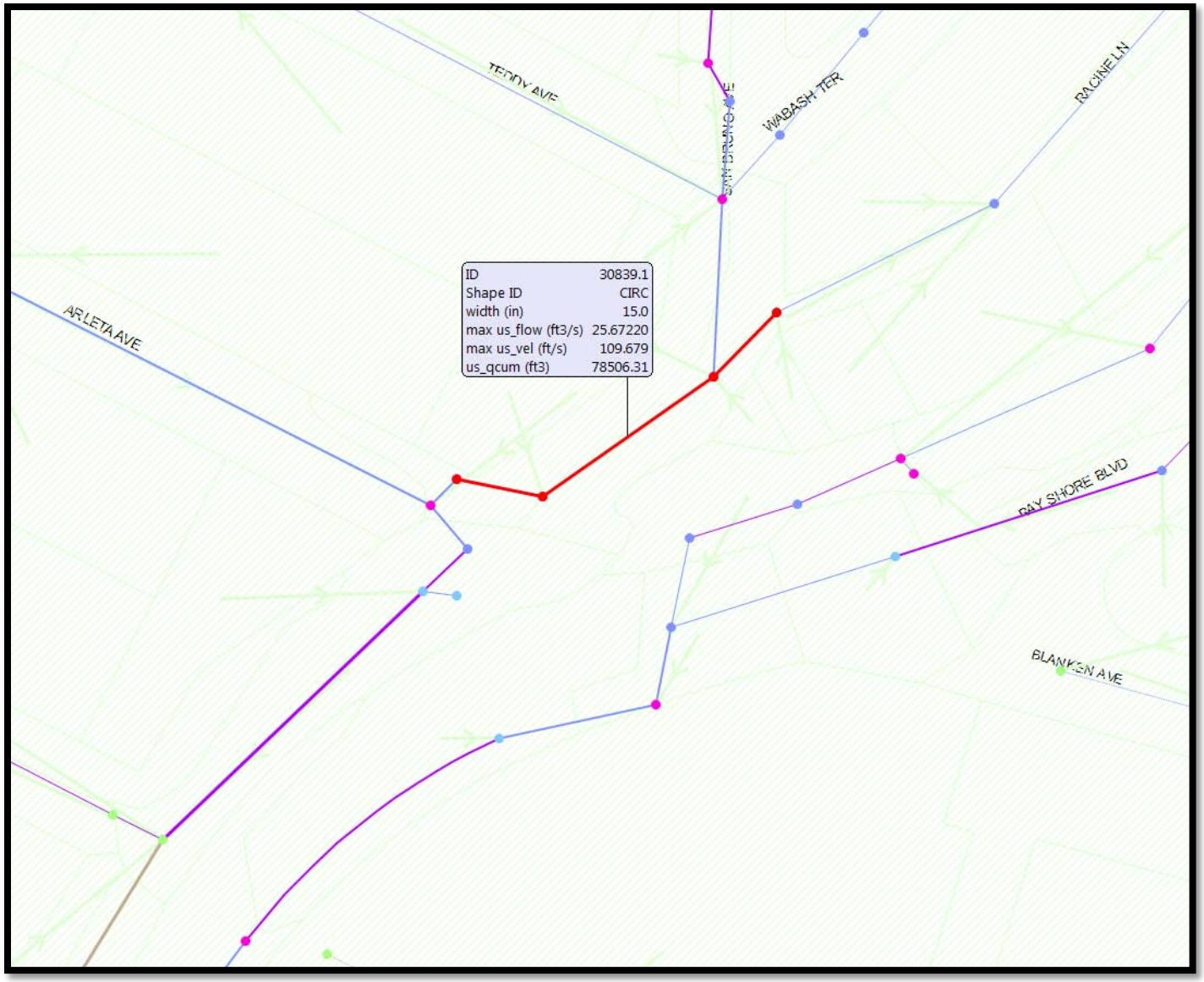

TEDDY AVE
WABASH TER
RACINE LN
ARLETA AVE
BAY SHORE BLVD
BLANKEN AVE
ID 30839.1
Shape ID CIRC
width (in) 15.0
max us_flow (ft3/s) 25.67220
max us_vel (ft/s) 109.679
us_qcum (ft3) 78506.31

Figure 5

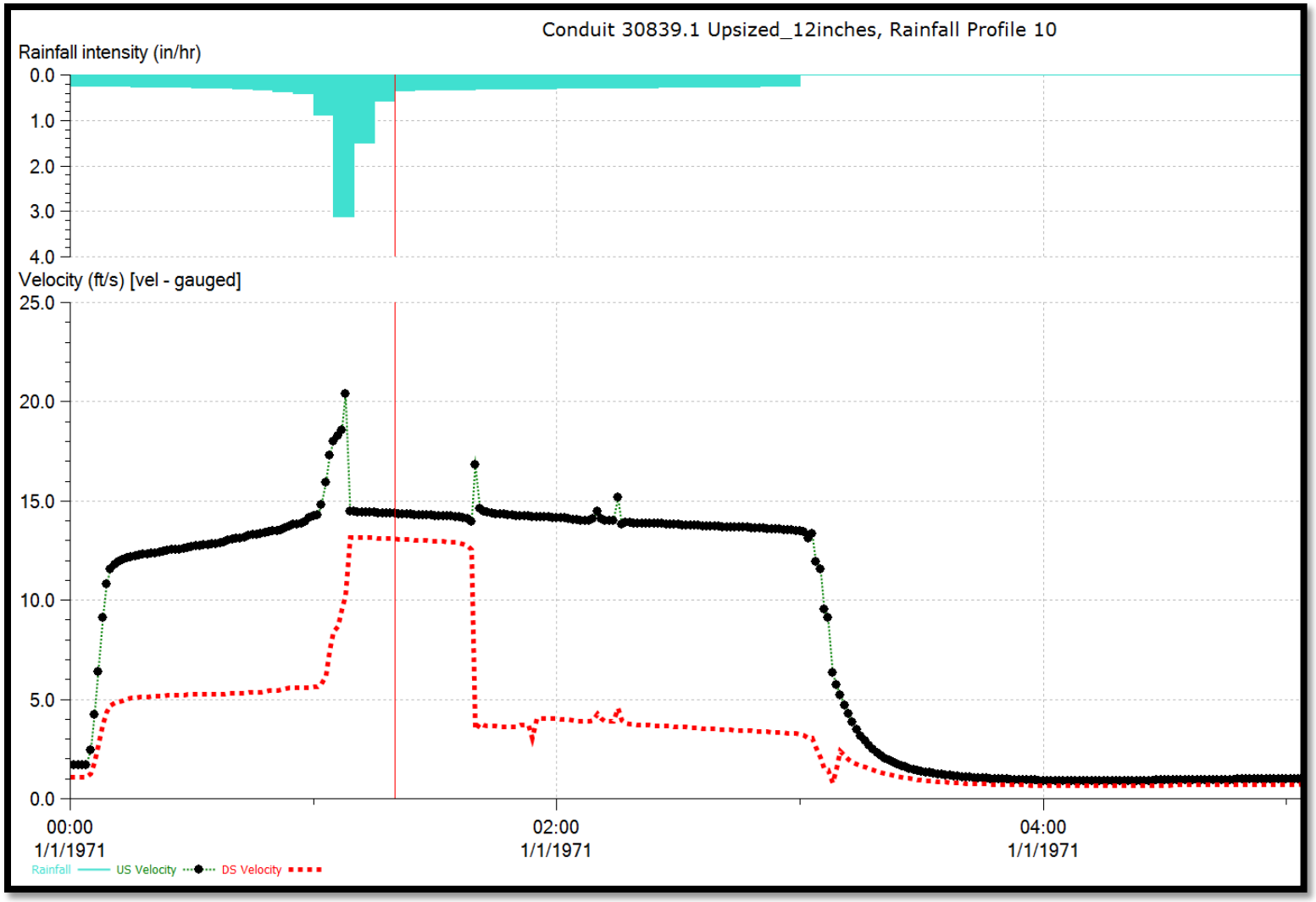
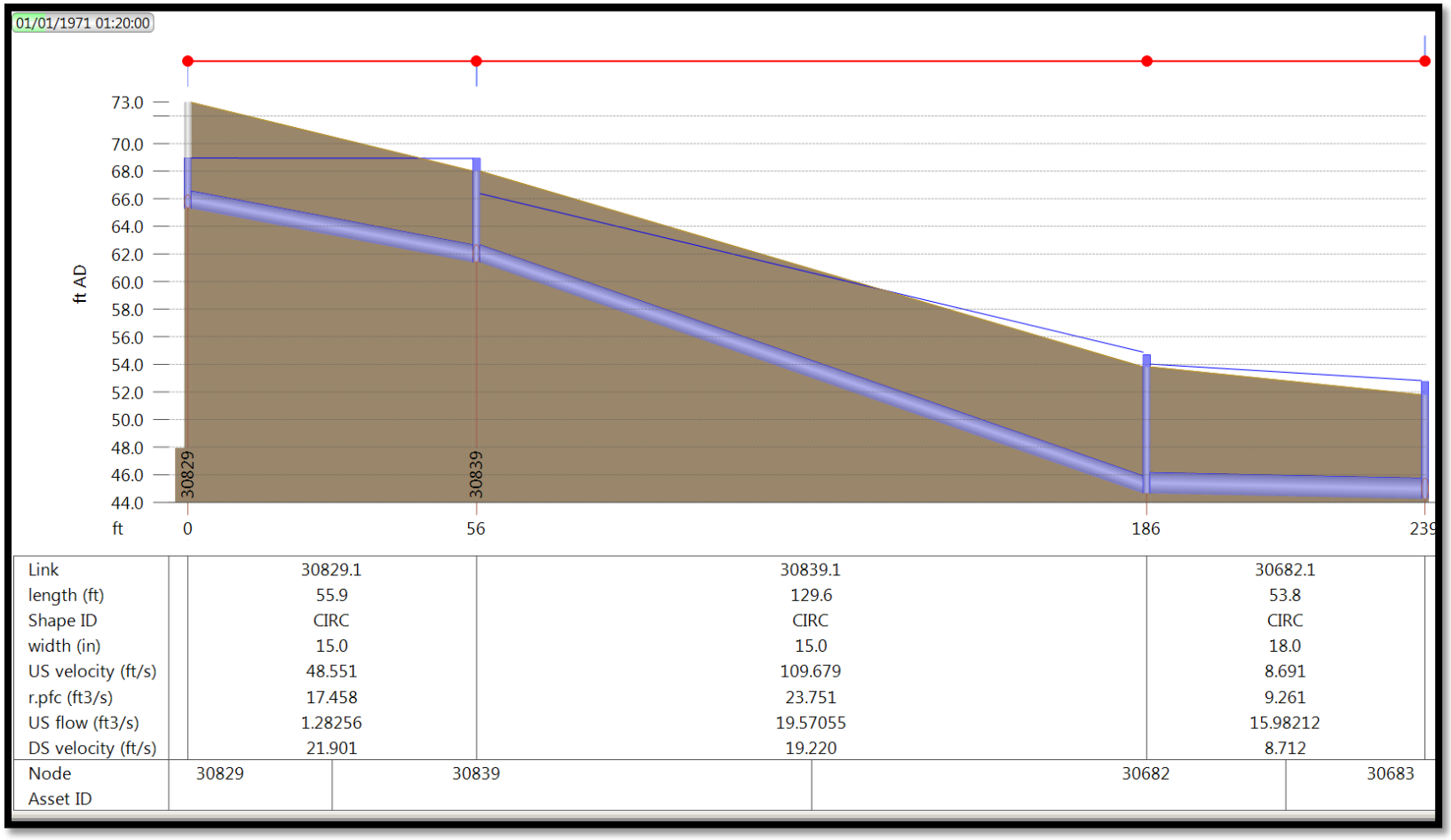

Conduit 30839.1 Upsized_12inches, Rainfall Profile 10
Rainfall intensity (in/hr)
0.0
1.0
2.0
3.0
4.0
Velocity (ft/s) [vel - gauged]
25.0
20.0
15.0
10.0
5.0
0.0
00:00
1/1/1971
02:00
1/1/1971
04:00
1/1/1971
Rainfall
US Velocity
DS Velocity

Figure 6



Link	30829.1	30839.1	30682.1
length (ft)	55.9	129.6	53.8
Shape ID	CIRC	CIRC	CIRC
width (in)	15.0	15.0	18.0
US velocity (ft/s)	48.551	109.679	8.691
r.pfc (ft3/s)	17.458	23.751	9.261
US flow (ft3/s)	1.28256	19.57055	15.98212
DS velocity (ft/s)	21.901	19.220	8.712

Node	30829	30839	30682	30683
Asset ID				

Figure 7

Result Table

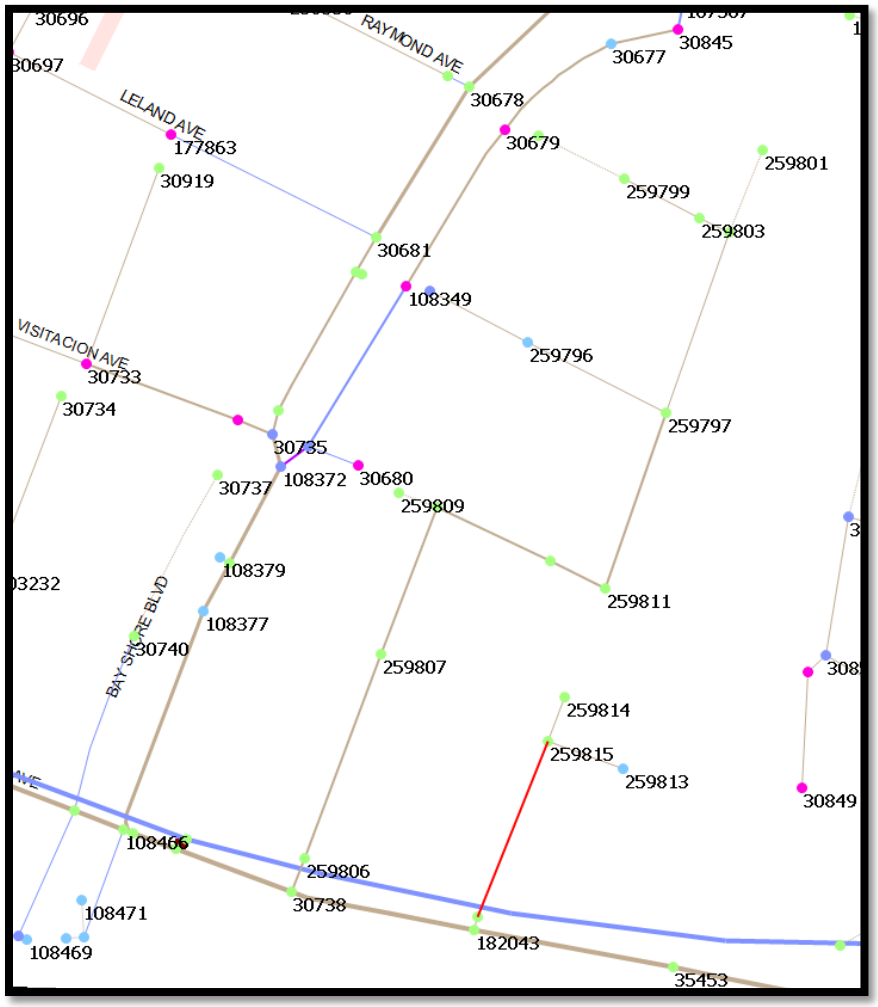


Figure 8

From: Eickman, Kent
Sent: Monday, August 05, 2013 12:29 PM
To: Webster, Leslie; Tran, Michael
Subject: RE: Schlage Locke Sewer Issues

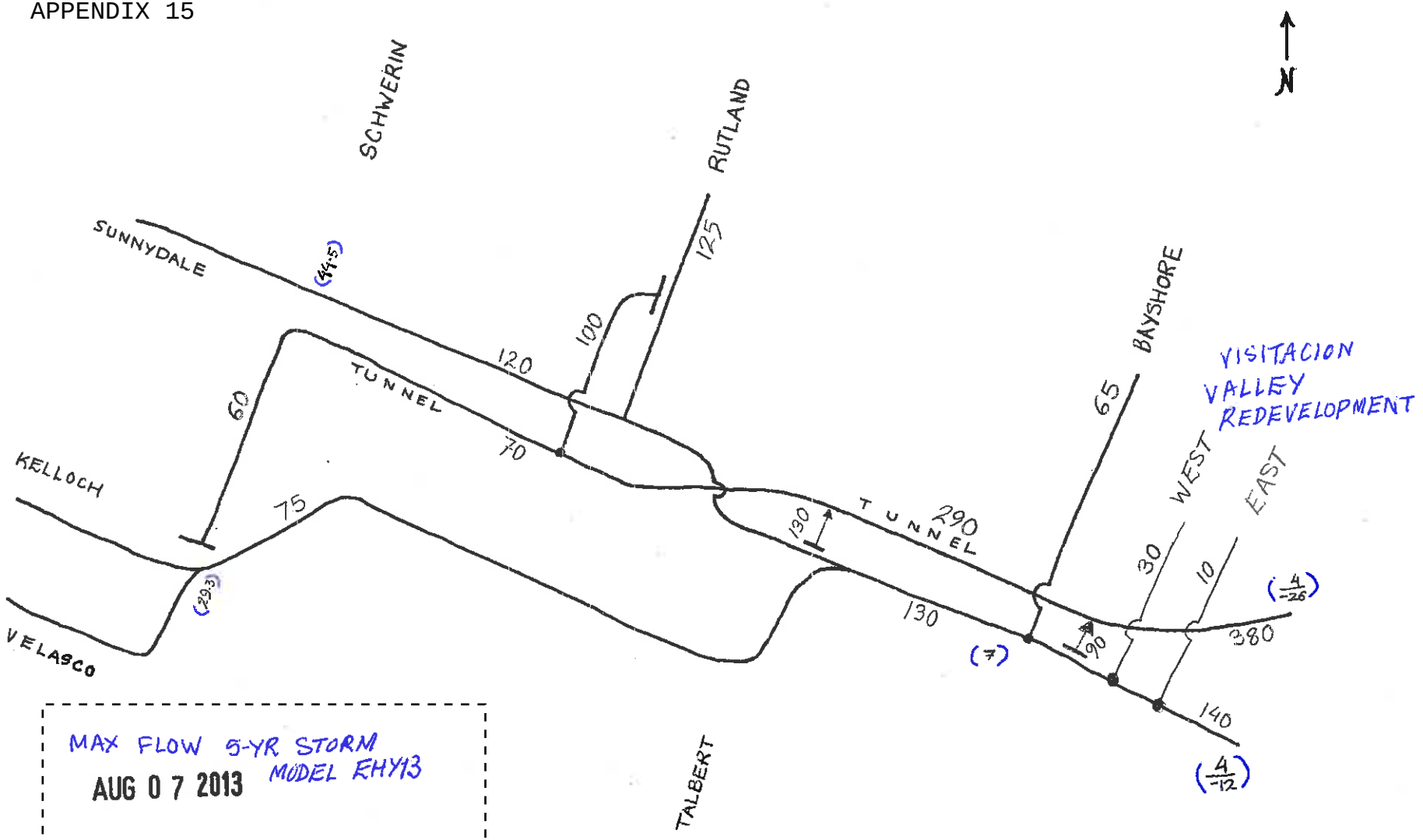
Appendix 1 shows some minus velocities and flows. It also has one pipe with 22.254 fps, is this excessive?

thanks

EXAMPLE ONLY - DO NOT USE FOR RESULTS

ROW	LINE#	U/S NODE	D/S NODE	X-SECT	SHAPE	LENGTH	SLOPE	SITE	CFS	FT/S	MGAL	STATE	U/S RIM	D/S RIM	U/S INV	D/S INV	U/S FB	D/S FB	Q'
1	Old tunnel	182043	35453	78	CIRC	295	0.35		146.5	6.1	8.420	0.61	12.0	7.9	-5.8	**-6.9**	11.1	7.3	268.6
2	Old tunnel	30738	182043	78	CIRC	273	0.35		158.0	7.6	8.220	0.48	10.0	12.0	-4.9	**-5.8**	8.9	11.1	268.4
3	Main Tunnel - con	252050	A01-1020	144	CIRC	**3099**	0.19	onnections	377.8	3.2	7.030	1	6.4	7.0	-19.5	**-25.5**	1000.3	8.3	1026.3
4	Sunnyd.	252052	30738	78	CIRC	180	0.35		140.3	7.9	7.870	0.41	8.3	10.0	-4.3	**-4.9**	7.2	8.9	300.5
5	Leland extend	259796	259797	15	CIRC	227	0.44	West	8.3	6.2	0.090	0.4	27.0	26.2	20.5	19.5	2.3	5.4	4.3
6	Visitacion extend	259809	259808	15	CIRC	58	1.38		-0.1	-1.0	0.000	0.5	20.2	22.1	13.0	12.2	6.5	8.4	7.6
7		259802	259797	18	CIRC	278	3.06		7.2	9.8	0.070	0.3	35.9	26.2	28.0	19.5	7.2	5.4	18.4
8	Headend	259801	259802	12	CIRC	131	0.38	West	0.0	-0.4	0.000	0.3	36.0	35.9	28.5	28.0	7.3	7.2	2.2
9		259803	259802	18	CIRC	48	1.04		7.2	6.5	0.070	0.3	36.7	35.9	28.5	28.0	7.3	7.2	10.7
10	Raymond Extend	259799	259803	18	CIRC	124	0.4	West	7.3	4.6	0.070	0.3	38.9	36.7	29.0	28.5	8.6	7.3	6.7
11	Raymond Extend	259798	259799	15	CIRC	140	0.79	West	0.0	-0.5	0.000	0.4	36.5	38.9	30.1	29.0	6.2	8.6	5.8
12	Outlet	259806	30738	36	CIRC	53	**15.72**	West	**31.1**	25.2	0.350	0.1	12.0	10.0	6.8	**-4.9**	4.5	8.9	264.4
13		259807	259806	36	CIRC	319	1	West	**31.3**	9.3	0.350	0.2	20.5	12.0	10.0	6.8	9.0	4.5	66.8
14		259808	259807	30	CIRC	230	0.96		27.1	8.9	0.300	0.2	22.1	20.5	12.2	10.0	8.4	9.0	40.2
15		259810	259808	30	CIRC	184	0.98		21.0	8.3	0.220	0.2	24.6	22.1	14.0	12.2	9.3	8.4	40.6
16	Visitacion extend	259811	259810	24	CIRC	91	0.55	West	21.0	6.7	0.220	0.3	25.8	24.6	14.5	14.0	9.3	9.3	16.8
17	Visitacion extend	259797	259811	24	CIRC	273	1.83	West	21.4	10.5	0.220	0.3	26.2	25.8	19.5	14.5	5.4	9.3	30.6
18	Leland extend	259795	259796	15	CIRC	163	0.31	West	-1.1	-1.1	0.000	0.4	26.2	27.0	21.0	20.5	**1.4**	2.3	3.6
19	Headend	259813	259815	15	CIRC	116	0.86	East	5.1	5.5	0.100	0.3	16.8	20.9	13.0	12.0	2.9	8.0	6.0
20	Headend	259814	259815	15	CIRC	69	1.44	East	3.7	6.1	0.070	0.3	22.0	20.9	13.0	12.0	8.4	8.0	7.8
21		259815	259817	15	CIRC	277	3.43	East	8.7	10.5	0.170	0.3	20.9	12.0	12.0	2.5	8.0	8.8	12.0
22	Outlet	259817	182043	15	CIRC	20	5.11	East	8.7	12.2	0.170	0.3	12.0	12.0	2.5	**-5.8**	8.8	11.1	14.6

APPENDIX 15



MAX FLOW 5-YR STORM
MODEL EHY13

AUG 0 7 2013

NOTES:
SEWER SCHEMATIC
FOR DISCUSSION PURPOSE ONLY
EHY 1/2013
ELEV. IN (X)
INPUT 485 CFS

OUTPUT 520 CFS

Shrestha, Bimayendra

From: Webster, Leslie [LWebster@sfwater.org]
Sent: Wednesday, June 05, 2013 08:21
To: Petrick, Molly; Jurosek, Marla; Eickman, Kent; Lee, Wallis; Todd Adair; Howard Pearce; Steven Huang; jdallosta@bkf.com; Shrestha, Bimayendra
Cc: Lesk, Emily
Subject: RE: Schlage Locke Sewer Issues

Hello All,

Here is a summary of the next steps from our meeting yesterday (June 4, 2013 at SFPUC):

- The development team will provide DPW Hydraulics with their proposed sewer mains, nodes, and catchment boundaries. DPW Hydraulics will include it in modeling analysis, and share the hydraulic analysis with the development team to help facilitate the selection and design of discharge locations. It is expected that during the analysis, there may be some back-and-forth to come up with the best solution. The modeling analysis and back and forth is expected to take 3 weeks following Hydraulics receipt of the system information. (Please follow up with Wallis and/or Bimu as needed re this analysis)

- The development team will follow up with an infrastructure plan for SFPUC review and comment. This IP will include the discharge location as well as the an overland flow analysis and updated stormwater management proposal.

- The development team will also follow up with more information how the IP will relate to the Development Agreement, which is planned to go before the BoS in July or August.

Best regards,

Leslie

Leslie Webster

(415) 554-3459

lwebster@sfwater.org

-----Original Appointment-----
From: Petrick, Molly
Sent: Thursday, May 30, 2013 3:33 PM
To: Petrick, Molly; Jurosek, Marla; Webster, Leslie; Eickman, Kent; Lee, Wallis; Conf, 525GG, 10th Fl - Spring Valley; Security Desk, 525GG; Todd Adair; 'Howard Pearce'; 'Steven Huang'; Lesk, Emily
Cc: Shrestha, Bimayendra
Subject: Schlage Locke Sewer Issues
When: Tuesday, June 04, 2013 12:30 PM-1:30 PM (GMT-08:00) Pacific Time (US & Canada).
Where: SFPUC - 525 Golden Gate Ave, Spring Valley Conference Rm (10th Floor)

BkF
ENGINEERS / SURVEYORS / PLANNERS

255 Shoreline Drive, Suite 200
Redwood City, California 94065
(650) 482-6300 (Tel)
(650) 482-6399 (Fax)

MEMORANDUM

Date: **06/07/13** BKF No.: 20070090

To: Wallis Lee, SFDPW – Hydraulics
Bimayendra Shrestha, SFDPW - Hydraulics

Copies To: Marla Jurosek, SFPUC
Molly Petrick, SFPUC
Kent Eickman, SFPUC
Steven Huang, UPC
Chun Pong Ng, UPC
Howard Pearce, UPC
James Dallosta, BKF

From: Todd Adair, BKF

Subject: **Schlage Lock Site – Preliminary Hydrology Model**

Wallis / Bimo
Thank you again for meeting with us earlier this week to review the revised Schlage Lock development and discuss the combined sewer system proposed for the project.

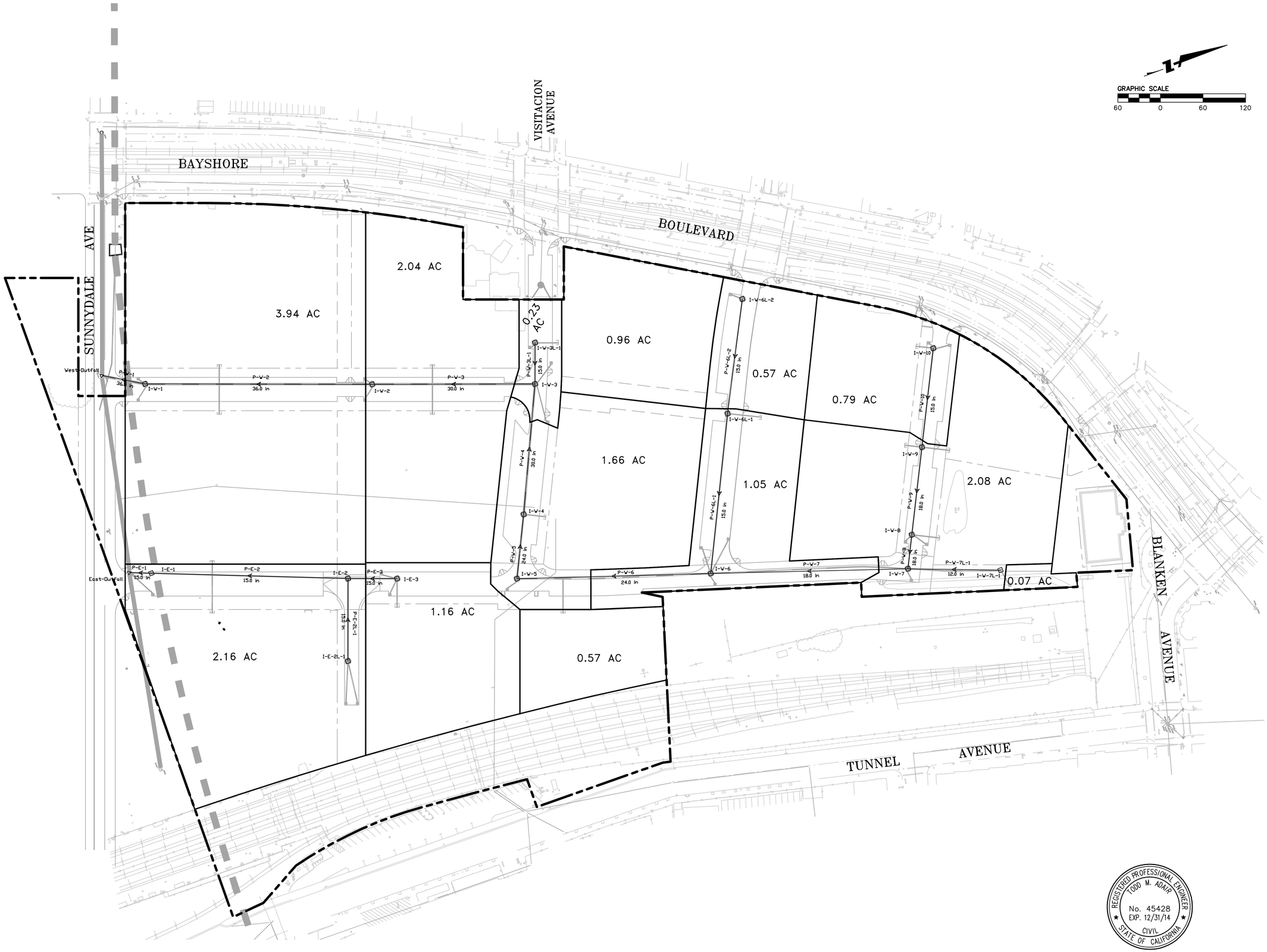
Based on our meeting we have attached our Preliminary Hydrology Model for the stormwater runoff in the proposed combined sewer system. As discussed, our model is based on the Rational Method. This provides a conservative stormwater flow rate leaving the site. We will develop a Dynamic Model for the project once we begin the final designs for the site and anticipate the flow volumes will be reduced using this method.

We anticipate your model will take into account the pre-existing conditions for the site. We have included our preliminary model for the pre-existing condition as well. This is based on the existing site being almost 100% impervious prior to the remediation activities on the site. Although we do not have record drawings for the utility systems that were once serving the site, the existing grades indicate the site drained to the southeast corner and connected to the 78-inch combined sewer main. We have included a conceptual layout for the existing stormwater system. Based on our model results, the existing flow from the site is approximately 41.3 cfs.

Based on our preliminary model results, the proposed project will discharge 23.2 cfs at the main proposed connections point (Outfall West), and 7.5 cfs at the secondary discharge point (Outfall East). Combined this is a decrease of 10.3 cfs from the existing condition.

We have attached our model results as Table 1 – Hydrology and Table 2 – Hydraulics as well as the exhibits for the existing and proposed conditions. It is our understanding you will add this information into your model for the 78-inch combined sewer main and determine if the flow from the site can be accommodated in the combined sewer system.

Please let us know if you have any questions or need any additional information.



BKF ENGINEERS / SURVEYORS / PLANNERS
255 SHORELINE DR. STE. 200
REDWOOD CITY, CA 94065
650/482-6300
650/482-6399 (FAX)

VISITACION VALLEY REDEVELOPMENT, ZONE 1
TENTATIVE MAP
MODEL-PROPOSED UTILITY PLAN

CITY OF SAN FRANCISCO SAN FRANCISCO COUNTY CALIFORNIA

Revisions

No.	

Date 05/09/2012
Scale NOTED
Design JD
Drawn JD
Approved TMA
Job No 20070090-33

Sheet Number:
C5

REGISTERED PROFESSIONAL ENGINEER
TODD M. ADAIR
No. 45428
EXP. 12/31/14
CIVIL
STATE OF CALIFORNIA

DRAWING NAME: J:\Eng07\070090\DWG\STORM CAD\SLPRSDUT.dwg
PLOT DATE: 06-06-13
PLOTTED BY: som

APPENDIX C:
CONCEPTUAL POTABLE WATER AND SANITARY SEWER DEMANDS

BkF
Engineers / Surveyors / Planners

Conceptual Potable Water and Sanitary Sewer Demand Calculations

Schlage Lock Redevelopment - San Francisco, CA

Domestic Water Demand								Sanitary Sewer Demand			
Use	Living Units[1]	Size[1]	Load [2]		Avg. Daily Demand	Avg. Daily Demand	Avg. Daily Demand	Load [13]		ADWF	PDWF [14]
		(SF/Use)			(gpd)	(gpm)	(cfs)			(cfs)	(cfs)
1-bedroom Condo	697		102	gpd/unit	71,094	49	0.110	96.9	gpd/unit	0.104	0.313
2-bedroom Condo	849		125	gpd/unit	106,125	74	0.164	118.75	gpd/unit	0.156	0.468
3-bedroom Condo	133		140	gpd/unit	18,620	13	0.029	133	gpd/unit	0.027	0.082
Retail		43,700	150	gpd/1000 SF	6,555	5	0.010	142.5	gpd/1000 SF	0.010	0.029
Cultural		0	150	gpd/1000 SF	0	0	0.000	142.5	gpd/1000 SF	0.000	0.000
TOTALS	1679				**202,394**	**141**	**0.313**			**0.297**	**0.892**

PWWF (CFS) [15]	0.892

Fire Water Demand[12]

Construction Type	Size[3]	Largest Floor[4]	Fire Flow Square Footage[5]	Demand[6]	Avg Daily Demand[7] w/50% CFC Reduction
	(SF)	(SF/Use)	(SF)	(gpm)	(gpm)
Type I		33,471	100,413	3500	**1,750**
Type III**B** or V-B	181,560	37,064	181,560	8000	**4,000**
TOTAL FIRE DEMAND[9]					**4,000**

192300
576900
615407

Irrigation Demand[8]

Acreage[10]	Unit Demand	Irrigation Period	Irrigation Frequency	Cycle Length	Avg. Daily Demand
	(acre-ft/acre/yr)	(months)	(cycles/day)	(minutes)	(gpm)
2.1	3	5	8	20	**84**
TOTAL IRRIGATION DEMAND					**84**

TOTAL AVERAGE DAILY WATER DEMAND (GPM)	4,226

Notes

1 Living Unit numbers and square footages are based on values provided by UPC.
2 1- bedroom (2005 unit demands) and Retail/Office Loads are based on the values provided in the Visitacion Valley Redevelopment Program Draft EIR, dated 06/03/08. 2-bedroom and 3-bedroom units assume 2.5 persons and 2.8 persons per unit, respectively, at 60 gpd/person, per the August 2006 "Projected Water usage for BAWSCA Agencies" Tech Memo by URS.
3 Building Size for Construction Types are based on values provided by UPC on 03/18/09.
4 Square footage of largest floor is based on values provided by UPC on 03/18/09.
5 Fire flow square footages are based on the 2013 California Fire Code (CFC) Section B104. For Type IA and IB, fire flow areas are based on the area of the three largest consecutive floors (CFC B104.3).
6 Demands are calculated per CFC Table B105.1.
7 Per CFC B105.2, a reduction of up to 75% in the fire flow demand, as approved, is allowed when the building is provided with fire sprinklers. This calculation assumes both that the building will be sprinklered and that a 50% reduction will be approved.
8 Irrigation Demand assumes that the site is watered every day for a 5 month period. In addition, it is assumed that the green areas will be irrigated in 8 cycles for an individual cycle length of 20 minutes during the 5 month irrigation period.
9 Total Fire Demand is the larger of the demands for the two difference construction types. In this case, the 4000 gpm demand for the Type IIIB or V-B construction is the larger and is the assumed fire demand in this document.
10 Acreage is loosely based on the landscaped areas identified in the site plan provided by GLS in April 2014.
11 Domestic Water Demands are average daily demand and are not peaked.
12 Fire Demands provided are based on the California Fire Code requirements. MEP or Fire Sprinkler consultant to confirm if additional fire water demand or pumping systems are required for internal building fire sprinkler systems.
13 Sanitary sewer demand loads are based on a 95% return on water use.
14 Assumed a peaking factor of 3 based on industry standards. Peaking factor is applied to the Average Dry Weather Flow (ADWF) to calculate Peak Dry Weather Flow (PDWF)
15 Peak Wet Weather Flow (PWWF) = PDWF + I&I. I&I is asusmed to be .003 cfs/acre per SF Subdivision Code. Area of this phase is ~3.26 acres.

Date: 5/16/2014