City and County of San Francisco

Request for Proposals for

Public Safety Radio Replacement Project

Date issued:	June 8, 2015
Pre-proposal conference:	June 23, 2015, 1:00 PM
Site visits:	July 8-17, 2015
Proposal due:	August 24, 2015, 5:00 PM

Request for Proposals for Public Safety Radio Replacement Project

TABLE OF CONTENTS

Page

Appendices:

A. CMD Attachment 2: Requirements for Architecture, Engineering and Professional Services Contracts, for contacts $50,000 and over document (separate document). Proposers must submit the following forms:

Form 2A	CMD Contract Participation form
Form 2B	CMD "Good Faith" Outreach Requirements form
Form 3	CMD Non-discrimination Affidavit
Form 5	CMD Employment form

The following form may be required, depending on the circumstances:

Form 4	Joint Venture Participation Schedule

B. Standard Forms: Listing and Internet addresses of Forms related to Taxpayer Identification Number and Certification, to Business Tax Declaration, and to Chapters 12B and 12C, and 14B of the S.F. Administrative Code. B-1

C. Agreement for Professional Services (form P-500) separate document

D. Software License Agreement separate document

E. Maintenance Agreement separate document

F. Non-Disclosure Agreement separate document

Attachments:

Attachment A – Existing Sites Information

Attachment B – Coverage Boundaries and Loss Zones

Attachment C – In-Building Coverage Areas

Attachment D – Typical Busy Hour Traffic Report

Attachment E – FCC License Information

Attachment F – Dispatch Center Information

Attachment G – Fixed Radio Information

Attachment H – Backhaul Network Information

Attachment I – BayRICS Regional ID Plan

Attachment J – Price Sheet Template

Attachment K – Subscriber Radio Packages

Attachment L – Compliance Matrix

Request for Proposals for

Public Safety Radio Replacement Project

1.0 INTRODUCTION AND SCHEDULE

1.1 GENERAL

The City and County of San Francisco (CCSF or the City) is soliciting proposals from firms to build, deploy, and maintain a new radio communications system that replaces the current Citywide Emergency Radio System (CERS). It is required that the new system will provide the resilience and redundancy for trunked voice and data services as expected in day-to-day and emergency public safety operations.

The City intends to enter into a professional services contract with the winning infrastructure replacement proposer to design, deploy and commission a Project 25 voice radio system. In addition the City intends to procure subscriber radios to operate on the new system, and may elect to enter into multiple agreements (from various manufacturers) for the purchase of this equipment. Lastly, the City is also interested in a maintenance contract to manage and maintain the system for up to 18 years after final system acceptance.

The CERS system is approaching end of life, and will be out of manufacturer support in 2018. Because of this, the City has developed an anticipated high-level timeline for the CERS replacement project. Proposers are responsible to developing a detailed schedule as part of the RFP response considering this anticipated timeline.

Vendor Selection, Contract Negotiations Complete	March 2016
Detailed Design Complete	September 2016
System Installation and Testing Complete	March 2018
Cutover Complete	April 2019
Final System Acceptance	October 2019

1.2 RFP SCHEDULE

The anticipated schedule for selecting a vendor is:

Proposal Phase	Date
RFP is issued by the City	June 8, 2015
Mandatory Pre-proposal conference	June 23, 2015, 1:00 PM
Site walks	July 8-17, 2015
Deadline for submission of written questions or requests for clarification	July 27, 2015, 5:00 PM
Proposals due	August 24, 2015, 5:00 PM
Oral interview with firms selected for further consideration	TBD

2.0 PROJECT REQUIREMENTS

2.1 OVERVIEW

The City and County of San Francisco (CCSF or the City) is soliciting proposals from firms to design and deploy a new radio communications system that replaces the current Citywide Emergency Radio System (CERS).

The new infrastructure system will need to have sufficient capacity to support CERS users and the potential to support Public-service Emergency Radio System (PERS) users. The new infrastructure system must provide the resilience and redundancy for trunked voice and data services as expected in day-to-day and emergency public safety operations.

For infrastructure proposals, the services must include planning, design, engineering, installation and technical support to maintain the new radio system.

The City seeks to procure a radio communications infrastructure system that will comprise an interoperable, secure, reliable and cost effective Project 25 based platform for CERS users. The combined system configuration will provide 1) added channel capacity to handle CERS and PERS traffic loading, 2) increased coverage for CERS users within the CCSF service area, and 3) enhanced interoperability for CERS users.

Infrastructure proposals are required to include a complete replacement of the existing CERS system and equipment to achieve the desired new system configuration. The remaining systems (PERS, SFMTA, EWDN, and 700 MHz I/O systems) are intended to remain operational in their current configuration. Unless specifically noted in this Request for Proposals (RFP), the use or inclusion of, or reliance on existing equipment and systems must **NOT** be included in the proposer's proposal.

Proposers are responsible for designing and proposing a system that meets the requirements set forth by the City.

The successful proposer(s) will be singularly responsible for the radio system resulting from the subsequent contract. This installation is to include, but not be limited to, all system design(s), site preparation on existing and/or proposed sites, base radios, hardware, antenna support structures, software, engineering, installation of materials, all labor for design, engineering, program management, configuration, optimization, testing, and warranty maintenance. The proposal must also include all network connectivity to all existing sites and any proposed new microwave site(s) that may be required. Proposals for new and proposed sites must include any additional costs that may be required for buildings, power, emergency back-up power, roads, antenna support structures, FCC licensing and assurance the site will be available to achieve the coverage delineated in this RFP. In the event that the proposer's radio system hardware or software version or revision changes before the beginning of final acceptance testing, the proposer will be responsible for conversion or addition of the needed changes or upgrades to the most current version.

The new infrastructure system must be in conformance with applicable standards, which have been approved at the time of the first equipment order. The proposer is responsible for providing a system with identical hardware throughout the system, wherever possible, in terms of hardware model and revision level, software versions and firmware versions.

The selected infrastructure proposer will be responsible for licensing and permitting, including any FAA, zoning and FCC requirements. Where due to legalities, permitting, zoning and/or

licensing may be undertaken only by the City or other site/system owner, the selected proposer must complete all tasks required for permitting, zoning and/or licensing without additional cost to the City, including tracking progress to completion and any resubmittals if required.

The selected infrastructure proposer will be responsible for the backhaul system which includes all necessary hardware/software to provide interconnection to the existing network as well as the newly proposed radio communications system.

The new infrastructure system must be developed, installed and tested in a manner that provides continued, uninterrupted communications. The proposer must provide a detailed plan with their proposal as to how they will accomplish their implementation and what, if any problems or issues, they anticipate as the system is implemented, particularly with regard to uninterrupted communications.

The subscriber equipment proposed must meet the needs of the CERS users and the PERS users as defined in these specifications. The subscriber equipment must provide trunked voice and data services as expected in day-to-day and emergency public safety operations.

For subscriber equipment proposals, the services must include planning, installation and technical support to deliver and deploy the new radio equipment.

The City seeks to procure radio communications subscriber equipment that will deliver interoperable, secure, reliable and cost effective Project 25 communications for City radio users.

The successful subscriber equipment proposer(s) will be singularly responsible for the subscriber equipment delivered through their subsequent contract. This installation is to include, but not be limited to, all subscriber equipment, antennas, software, installation labor, program management, configuration, programming, testing, and warranty maintenance.

The new subscriber equipment must be in conformance with applicable standards, which have been approved at the time of the first equipment order. The proposer is responsible for providing equipment with as similar as possible, in terms of hardware model and revision level, software versions and firmware versions.

The new subscriber equipment must be installed, deployed and tested in a manner that provides continued, uninterrupted communications. The proposer must provide a detailed plan with their proposal as to how they will coordinate with the infrastructure implementation and what, if any problems or issues, they anticipate as the system is implemented, particularly with regard to uninterrupted communications.

The requirements utilized in this RFP are not intended to be proprietary or restrictive to any single manufacturer. The intent of these requirements is to establish a benchmark of the equipment quality desired as an outcome to this RFP. It is the responsibility of each proposer to identify in writing, not more than ten calendar days after the RFP is issued, any requirements they believe are restrictive and to offer alternative requirements for consideration by the City. Failure to do so will nullify any post-conference concerns in this regard.

Proposals must be fully responsive to the documentation, descriptions, and specifications contained in this RFP, and its attachments. The City reserves the right to reject any or all proposals or portions of any proposals, waive any informality or irregularity in any proposal received, and to award the contract for reasons other than the lowest price. The City also reserves the right to alter this RFP or the terms and conditions and attachments at any time prior to the execution of a contract by the City and the selected proposer.

2.1.1 BACKGROUND

The City maintains radio systems for Public Safety, Public Service, Municipal Transportation, Mobile Data, San Francisco International Airport, and Regional Interoperability. Each of these systems was designed to support the specific needs of the agencies that use them and each is in various stages of its lifecycle.

The City, through a competitive RFP process, deployed CERS in 2000. The trunked system employs 23 channels to meet anticipated user capacity needs. As this original system was based on a Motorola SmartZone 3.0 platform, it utilized a Master Site Zone Controller to monitor and control system resources, assign channels for voice traffic, and route audio. The Master Site was upgraded to a Motorola 7.7 Master Site and later expanded to include other Motorola subsystems such as the Public-service Emergency Radio System (PERS), San Francisco International Airport (SFIA), Enhanced Wireless Data Network (EWDN), and the 700 MHz P25 Interoperability System.

Citywide Emergency Radio System (CERS)

The CERS is a subsystem of the Motorola 7.7 Master Site. The system configuration is a simulcast system deployed across eight sites in the City. The system operates in a trunked **mixed-mode** (either analog or digital) using Motorola's proprietary SMARTNET/SmartZone trunking protocol. The system has 23 trunked 800 MHz channels with one of the channels operating as a control channel and the remaining 22 channels operating as voice traffic channels. The control channel can rotate among four control channel capable repeaters for redundancy. There are approximately 6,700 radios operating on the subsystem, including portable handheld radios, mobile (in-vehicle) radios and fixed station (consolette) radios.

The CERS subsystem currently consists of two microwave loops; the north loop and the south loop. The north loop consists of six sites utilizing 18GHz Harris Constellation microwave radios with a capacity of 28 T1s. The south loop consists of three sites utilizing 18GHz Harris Constellation microwave radios with a capacity of 28 T1s. All eight backhaul locations are equipped with an Alcatel-Lucent 7705 Services Access Router (SAR-8) that provides interface and MPLS capabilities.

- CERS North microwave loop links:
  - Fort Miley/VA Medical Center to Clay/Jones
  - Clay/Jones to One Market Plaza
  - One Market Plaza to Central Radio Station
  - Central Radio Station to Forest Hills
  - Forest Hills to San Francisco State University
  - San Francisco State University to Fort Miley
- CERS South microwave loop links:
  - Central Radio Station to Bernal Heights
  - Bernal Heights to South Hill
  - South Hill to Central Radio Station

Public Service Emergency Radio System (PERS)

The PERS is a subsystem of the Motorola 7.7 Master Site. The system configuration is a simulcast system deployed across four sites in the City. The system operates in a trunked analog mode using Motorola's proprietary SMARTNET/SmartZone trunking protocol. The system has

12 trunked channels with one of the channels operating as a control channel and the remaining 11 channels operating as voice traffic channels. The system shares 4 channels with the CERS subsystem and normally operates with these 4 channels disabled to limit potential interference. Because of this, the system operates with 8 channels day-to-day with the ability to expand to 12 channels in the event of an issue with the CERS system. There are approximately 1,800 radios operating on the subsystem, including portable handheld radios, mobile (in-vehicle) radios and fixed station (consolette) radios.

The PERS subsystem backhaul consists of a four-site microwave loop utilizing Alcatel-Lucent 9500MPT-HC with the Alcatel-Lucent 7705 Service Access Router (SAR) access card in the 11GHz frequency range. This network provides the users of the PERS network with 150Mbps of capacity. Each backhaul location is equipped with an Alcatel-Lucent 7705 Services Access Router (SAR-8) that provides interface and MPLS capabilities.

- PERS microwave loops links:
    - Fort Miley/VA Medical Center to Clay/Jones
    - Clay/Jones to One Market Plaza
    - One Market Plaza to Central Radio Station
    - Central Radio Station to Fort Miley

San Francisco International Airport (SFIA) Radio System

The SFIA System is a subsystem of the Motorola 7.7 Master Site. The system configuration is a simulcast system deployed across two sites at the San Francisco International Airport (SFIA). The system operates in a trunked digital mode using P25 Phase 1 trunking protocol. The system has 7 trunked channels with one of the channels operating as a control channel and the remaining 6 channels operating as voice traffic channels. There are approximately 1,000 radios operating on the subsystem, including portable handheld radios, mobile (in-vehicle) radios and fixed station (consolette) radios.

Enhanced Wireless Data System (EWDN)

The San Francisco EWDN is a subsystem of the Motorola 7.7 Master Site. The system is used to provide mobile data service to San Francisco Fire Department (SFFD) and San Francisco Police Department (SFPD) units. The system configuration is a multicast system deployed across 5 sites in the City plus two additional sites at the SFIA Airport for a total of 7 sites. The system operates in data mode only using the TIA-902 high-speed data protocol, branded as High Performance Data (HPD) by Motorola. HPD offers variable bit rate service at raw data rates of 32, 64, and 96 kbps. The system has 8 channels with one channel per site with the exception of CRS, which has two channels.

700 MHz Interoperability (I/O) System

The San Francisco 700 MHz I/O system is a subsystem of the Motorola 7.7 Master Site. The system configuration is a simulcast system deployed across 4 sites in the City. The system operates in a trunked digital mode using P25 Phase 1 trunking protocol. The system has 6 trunked channels with one of the channels operating as a control channel and the remaining 5 channels operating as voice traffic channels. The 700 MHz I/O system is primarily used for interoperability purposes in accordance with the BayRICS regional fleet map plan and as such does not support typical dispatch operations for City agencies.

San Francisco Municipal Transportation Authority (SFMTA) System

The SFMTA system is a subsystem of the Harris P25 Network Switching Center (NSC). The radio network being installed is part of a larger integrated transit management system, and is used for communications throughout the fleet. The system has not been fully deployed at the

time of this writing, so the discussed system and configuration is subject to change. The system is scheduled to be deployed and operational by the end of 2015. The NSC will be housed at 1455 Market Street with a geographically redundant switch located at CRS. Configuration of the P25 portion of the system will be a simulcast system deployed across 4 sites in the City. The system will operate in a trunked digital mode using P25 Phase 2 trunking protocol. The system has 9 trunked channels with one of the channels operating as a control channel and the remaining 8 channels operating as voice traffic channels.

The system will also include a second subsystem using Harris' proprietary OpenSky digital communications technology. While the P25 system will be used by non-revenue radios (radios not installed on revenue-generating transit vehicles: buses, light rail, etc.); the Open Sky system will be used exclusively for revenue vehicles for voice and data communications. Configuration of the OpenSky portion of the system will be a multicast system deployed across 4 sites in the City. The system will operate in a trunked digital mode using Harris proprietary OpenSky trunking protocol. The system has 15 trunked channels dispersed among the 4 sites.

2.1.2 INFRASTRUCTURE PROJECT SCOPE

The City is soliciting proposals to enter into a contract with a qualified proposer to design, deploy, and provide technical support for a new radio communications infrastructure system. This RFP is intended to result in a system configuration that will establish a replacement of the current CERS system with the new system supporting all CERS and potentially PERS users. This single system configuration will provide 1) sufficient channel capacity to handle all CERS users, 2) increased coverage from the current CERS system, and 3) enhanced interoperability between CERS users.

This section defines the specific services to be performed by the successful infrastructure system proposer in the management of the project, the interfaces between the successful proposers (if more than one) and the City. The successful infrastructure system proposer will ensure that the personnel, material, equipment, services and facilities required to satisfy the requirements of this project are made available in a timely manner. In addition, the successful infrastructure system proposer will have a project evaluation and control system that provides all information needed to manage the project satisfactorily, including as a minimum the milestone status, schedule, planning, and technical data.

As part of the new system implementation services, the City plans to install a standards-based Project 25 Phase 2 Time Division Multiple Access (TDMA) digital trunked radio system. The system will use nine transmitter sites in a simulcast configuration with each site equipped for 16 radio channels operating in a 2-slot TDMA mode providing for 30 available "talk-channels". Two additional channels must be installed as standby spares to allow City maintenance personnel the ability to selectively disable up to 2 channels in the event of interference or other maintenance needs. These two channels bring the total installed channel count to 18 channels with the minimum capability that any 16 can be active at any time. The services must include turnkey planning, design, engineering, FCC licensing, labor, materials procurement, delivery, installation, and commissioning of the new radio communications system to provide trunked voice and data services.

The scope of the infrastructure system portion of this RFP is to design and implement the appropriate radio communications system that meets the following City specified functional requirements:

- Open standards-based solution
- Trunked and simulcast technologies
- Coverage guarantee within the City and County of San Francisco

- Fault tolerant architecture (no single point of failure)
- P25 Phase 2 operation to accommodate system loading
- Common IP-based network to interconnect system elements

2.1.3 SUBSCRIBER EQUIPMENT PROJECT SCOPE

The City is also soliciting proposals to enter into a contract with a qualified proposer to supply, configure, install and provide technical support for new subscriber radio communications equipment. The subscriber equipment portion of this RFP is intended to result in the procurement of new subscriber equipment to replace the current CERS (and potentially PERS) subscriber equipment.

This section defines the specific services to be performed by the successful subscriber equipment proposer in the management of the project, the interfaces between the successful proposer(s) and the City. The successful proposer will ensure that the personnel, material, equipment, services and facilities required to satisfy the requirements of this project are made available in a timely manner. In addition, the successful proposer will have a project evaluation and control system that provides all information needed to manage the project satisfactorily, including as a minimum the milestone status, schedule, planning, and technical data.

The scope of the subscriber equipment portion of this RFP is to deliver and install the appropriate subscriber radio communications equipment to function on the proposed infrastructure system; meeting the following City specified functional requirements:

- Open standards-based solution
- Trunked and simulcast technologies
- P25 Phase 2 operation to accommodate system loading

2.1.4 OPTIONAL PROJECT SCOPE

2.1.4.1 PERS REPLACEMENT SYSTEM

In addition to the CERS replacement scope cited in Section 2.1.2 above, the City also requests an additional **OPTIONAL** system configuration that will establish a replacement of the current PERS system. This system will be configured as a simulcast subsystem of the main CERS system cited in Section 2.1.2 above.

As part of the optional system implementation services, the City plans to install a standards-based Project 25 Phase 2 Time Division Multiple Access (TDMA) digital trunked radio system for use by the City's public services departments. The system will use five transmitter sites in a simulcast configuration with each site equipped for 9 radio channels operating in a 2-slot TDMA mode providing for 16 available "talk-channels". The 5 sites for this system must include:

1. South Hill
2. One Market Plaza
3. Bayview
4. Twin Peaks (CRS)
5. Ft. Miley (VA Hospital)

These optional services must include turnkey planning, design, engineering, FCC licensing, labor, materials procurement, delivery, installation, and commissioning of the new radio communications system to provide trunked voice and data services.

The City envisions that proposers can provide this subsystem through one of three scenarios:

1. Providing a new 5-site, 9-channel, P25 Phase 2 subsystem.
2. Expansion of the existing SFMTA P25 Phase 2 system to 5 sites.
3. Expansion of the existing 700 MHz Interoperability System to 5 sites and 9 channels and upgrade it to P25 Phase 2 operation.

Proposers may choose to propose more than one optional method to meet the requirements of this section. Proposers may propose additional methods to meet these requirements that they believe are in the best interest of the City to consider.

All RFP requirements for this subsystem, with the exception of Sections 2.3.4.1, 2.3.4.2, 2.12.7, and 2.12.8 apply to this optional project scope.

Proposers should note that this scope and associated pricing will **NOT** be scored as part of the overall RFP process.

2.1.4.2 VOICE LOGGING RECORDER

In addition to the CERS replacement scope cited in Section 2.1.2 above, the City also requests an additional **OPTIONAL** system configuration that will provide a voice logging recorder for the new P25 radio system.

These optional services must include turnkey planning, design, engineering, labor, materials procurement, delivery, installation, and commissioning and training of the new Voice Logging Recorder system to record and log audio for the new radio system and dispatch consoles.

The Voice Logging Recorder must:

A. The voice logging recorder must record all radio traffic passing through the system. Dispatch centers participating in the new system must have remote access to the logging recorder. Dispatch centers may choose to have their own logging capabilities in addition to this centralized recorder.

B. The digital logging recorder must be IP-based, networked P25 compatible and must provide the ability to log / record the following systems:

   1. Conventional (including encrypted) radio traffic identified to be recorded
   2. Analog conventional audio from 48 sources not carried on the IP network
   3. Trunked (including encrypted) radio traffic identified to be recorded

C. The logging recorder must be equipped to archive radio audio to various storage media including, CD-R/W, DVD-R/W devices, and/or network attached storage devices.

D. The logging recorder must store audio in variable bit rate, industry standard, digital formats such as WAV, WMP, MP3, etc.

E. The logging recorder must store 30,000 channel-hours before requiring archiving. The logging recorder must be upgradable and expandable to allow for greater capacity before archiving is necessary.

F. The logging recorder must record a minimum of 384 simultaneous sources of audio.

G. The logging recorder must have client/server architecture, partitioning, hardware, and software to allow for the access, playback, and transfer of digital audio files across a Transmission Control Protocol (TCP)/IP over Ethernet network. This will allow multiple jurisdictions/entities to access the files. The logging recorder must allow individual user logon and various levels of access to channels and authorized permissions. The playback device will be equipped to decrypt encrypted audio recordings.

H. The logging recorder and playback station must be AES encryption equipped.

I. The logging recorder must have the capability of encryption rekeying via local and remote commands.

J. The logging recorder must be highly reliable with component redundancy to support the requirements of 24 hours a day, 7 days a week, 365 days a year operation.

K. The logging recorder must meet all applicable FCC, IEEE, EIA/TIA, and APCO standards.

L. The ability of multiple search and playback techniques must include, but not be limited to:

1. Console position
2. P25 emergency call activation
3. User unit ID
4. Talkgroup
5. Individual Call
6. RF channel (for conventional repeaters/base stations only)
7. Date
8. Time

M. The logging recorder, console system, and radio system must share a common time reference.

N. The logging recorder must be suitable for mounting in an EIA/TIA standard 19” wide rack.

O. The logging recorder must interface directly with the system for audio and P25 data. Recorders that interface through the dispatch consoles are not acceptable.

P. The logging recorder system must include redundant components to ensure no single point of failure, for example dual power supplies.

1. The logging recorder must record in a fault tolerant manner such that the failure of a component shall not result in a loss or corruption of recorded information.

Q. The logging recorder must interface directly with 911 telephone system located at 1011 Turk St.

All RFP requirements for this subsystem, if applicable, apply to this optional project scope.

Proposers should note that this scope and associated pricing will **NOT** be scored as part of the overall RFP process.

2.1.5 CONTACT INFORMATION

All technical questions relating to this RFP must be presented by 5 p.m., July 6, 2015, by email (NOTE: electronic communications are legally binding documents) to:

Attention: Public Safety Radio Replacement Project

Email: 800RadioReplacement@sfgov.org

Please note, that questions and correspondence by any means (i.e., telephone, mail, email, fax or in person) with City staff regarding this RFP, may be grounds for disqualification from this RFP process.

2.2 PROPOSER MINIMUM REQUIREMENTS

Proposers qualified under this RFP will be eligible to submit a proposal for:

A. P25 Radio Infrastructure Replacement Services.
B. P25 Radio Subscriber Products and Services.

Proposers must clearly indicate in their proposal whether they are submitting a proposal for Infrastructure Replacement Services or a proposal for Radio Subscriber Products and Services or both. Each proposal is to be independent. The City may choose to award to an Infrastructure Replacement Services proposer independent of the selected Radio Subscriber Products and Services.

2.2.1 P25 RADIO INFRASTRUCTURE REPLACEMENT SERVICES PROPOSER MINIMUM REQUIREMENTS

To be qualified to perform the system replacement portion of the project, proposers must meet the following minimum qualifications:

Proposer must be experienced in managed consulting and professional services portfolio to build (plan, design, engineering, installation, integration, optimization, test and network turn-up) public safety radio communication systems. Proposer must be in possession of all applicable and current licenses, certifications, etc.

Proposers must complete all of the questions in this section. All questions in this section are pass/fail with criteria for passing listed for each question. Proposers must pass all questions in this section in order to be qualified to submit a proposal for P25 Radio Infrastructure Replacement Services.

Question 1:

Has at least one of the companies within your proposed team successfully completed three (3) radio communications system construction projects with a minimum of five (5) sites and a minimum contract value of $ 20 million within the past ten (10) years?

*Note: Qualifying radio communications system projects are defined as the installation of Project 25 radio equipment, configuration of trunking and simulcast technologies, communication tower preparation/installing antenna mounting structures, transmission cabling, site power connectivity, and other supporting equipment.

☐Yes ☐No

If "no", your firm is not qualified to submit a proposal for Infrastructure Replacement portion of the project.

Question 2:

Has at least one of the companies within your proposed team successfully completed two (2) successful migrations of a legacy land mobile radio (LMR) public safety system with more than 3,000 user radios to a Project 25 system?

*Note: Qualifying Project 25 system projects are defined as P25 Phase 1 or P25 Phase 2 systems in a trunking and simulcast configuration.

☐Yes ☐No

If "no", your firm is not qualified to submit a proposal for Infrastructure Replacement portion of the project.

Question 3:

Does your proposed Project Manager for this Project have at least eight (8) years of experience on radio communications system projects of similar size and complexity as the P25 Communications System Design-Build Services as described in this RFP?

☐Yes ☐No

If "no", your firm is not qualified to submit a proposal for the Infrastructure Replacement portion of the project.

All requirements within the RFP will apply to Proposers submitting a proposal for Infrastructure Replacement Services.

List the qualifying projects in your proposal by submitting Project Data Sheets which include at a minimum:

- Brief description of the project
- Number of sites
- Contract value
- Number of subscribers
- Contact Name
- Contact Email Address
- Contact Telephone Number

2.2.2 P25 RADIO SUBSCRIBER PRODUCTS AND SERVICES PROPOSER MINIMUM REQUIREMENTS

To be qualified to perform the subscriber products and services portion of the project, proposers must meet the following minimum qualifications:

Proposer must be experienced in managed consulting and professional services portfolio to build (plan, design, engineering, installation, integration, optimization, test and network turn-up) public safety radio communication systems. Proposer must be in possession of all applicable and current licenses, certifications, etc.

Proposers must complete all of the questions in this section. All questions in this section are pass/fail with criteria for passing listed for each question. Proposers must pass all questions in this section in order to be qualified to submit a proposal for P25 Radio Infrastructure Replacement Services.

Question 1:

Has at least one of the companies within your proposed team successfully supplied and had accepted at least 500 P25 subscriber units for three (3) separate radio communications systems.

☐Yes ☐No

If "no", your firm is not qualified to submit a proposal for the Subscriber Products and Services portion of this project.

Question 2:

Does your proposed Project Manager for this Project have at least five (5) years of experience on radio communications system projects of similar size and complexity as the P25 Communications System Design-Build Services as described in this RFP?

☐Yes ☐No

If "no", your firm is not qualified to submit a proposal for the Subscriber Products and Services portion of this project.

The Sections enumerated below apply to all Proposers submitting a proposal for Subscriber Products and Services as applicable:

A. Section 2.3.1 and all subsections
B. Section 2.3.11 and all subsections
C. Section 2.12.3 and all subsections
D. Section 2.12.4 and all subsections
E. Section 2.12.5 and all subsections
F. Section 2.13.3
G. Section 2.14 and all subsections except Section 2.14.4

Subscribers supplied must support and be compliant to the system requirements specified throughout Section 2.0 of the RFP. All other sections (i.e. Sections 1.0 and, 3.0 – 8.0) will apply to Proposers submitting a proposal for Subscriber Replacement Services

List the qualifying projects in your proposal by submitting Project Data Sheets which include at a minimum:

- Brief description of the project
- Number of sites
- Contract value
- Number of subscribers
- Contact Name
- Contact Email Address
- Contact Telephone Number

2.2.3 SENSITIVE INFORMATION AND SECURITY

Proposer personnel participating in sitewalks must complete and sign the Non-Disclosure Agreement attached to the RFP and submit to the City at the mandatory pre-bidders conference.

1. Proposers must limit the number of people participating in sitewalks to a maximum of 10 people.
2. Proposer personnel participating in sitewalks must submit to, and pass a background check prior to beginning sitewalks. Names and pertinent information must be submitted at the mandatory pre-bidders conference.
3. All Contractor personnel (including subcontractors) working on the project must submit to, and pass a background check prior to beginning work on the project.

2.3 NEW SYSTEM REQUIREMENTS

Functional Specifications describe the general, functional, and operational requirements of the desired system. While not a design, this specification provides minimum requirements for system architecture, performance requirements including coverage, capacity, reliability, availability and redundancy. It also describes the key components of the system including the RF trunked network, control equipment, dispatch consoles, and backhaul network.

A. The new system must meet the following minimum requirements:
   1. Open standards-based solution
   2. Trunked technology
   3. Simulcast technology
   4. Coverage guarantee
   5. Fault tolerant core network and simulcast control, without any identifiable single point of potential failure, designed to five 9s system availability
   6. P25 Phase 2 operation to accommodate system loading
   7. Common IP-based network to interconnect system elements

B. The system approach must use existing sites to the greatest extent possible, using only those sites necessary, and may propose to add other developed or greenfield sites as necessary. The City prefers the following priority for site selection for new sites:
   1. City owned sites
   2. Public safety sites owned by other government agencies
   3. Commercial sites

4. Greenfield sites

C. All system infrastructure components must be designed to support public safety critical infrastructure or other mission critical use.

D. Manufacturers that supply components for the system must have a proven and known supply chain to serve the City for the lifecycle of the system.

1. The lifecycle for this system is defined as eighteen (18) years beginning upon System Acceptance.

E. Software and firmware updates must be thoroughly regression tested prior to release and implementation. Software updates must include release information identifying the changes made, either to repair a problem or enhancements made.

2.3.1 CODES AND STANDARDS

A. The equipment and accessories must be designed, manufactured, and tested in accordance with the applicable standards from the following organizations listed in Section 2.3.1.1, including all amendments in effect at the time of purchase order placement.

B. These codes and standards set forth minimum requirements necessary to assure satisfactory performance of the Contractor's equipment. Other internationally recognized codes and standards will be acceptable provided they meet or exceed the requirements of the listed codes and standards.

C. If different from the project list, the Contractor must submit for the City's approval, details of the codes and standards, which Contractor proposes to use. Contractor must demonstrate to the satisfaction of the City that these codes and standards meet or exceed the requirements of the codes and standards listed.

D. In the event of any conflict between codes, standards, and this specification; the Contractor must refer the conflict to the City for written resolution before start of design.

E. Contractor must provide a list of codes and standards used for the manufacture of Contractor's product in effect at the time of purchase order.

F. All materials and equipment supplied under this specification must comply with all applicable regulations and standards listed below in Section 2.3.1.1, and all Federal, State and Local Statutes. All electrical material and equipment must be listed and/or labeled by OSHA through a Nationally Recognized Testing Laboratory (NRTL) and approved by the authority having jurisdiction.

2.3.1.1 IMPLEMENTATION GUIDELINES

A. The Contractor must comply with applicable standards, rules, regulations, and industry guidelines from the following organizations, presented here alphabetically with no priority implied:

1. American National Standards Institute (ANSI)
2. American Society of Testing Materials (ASTM)
3. Electronics Industry Association (EIA)
4. Federal Aviation Administration (FAA)
5. Federal Communications Commission (FCC)
6. 800 MHz Regional Planning Committee (RPC) 6 Regional Plan
7. 700 MHz Regional Planning Committee (RPC) 6 Regional Plan

8. Institute of Electrical and Electronics Engineers (IEEE)
9. National Electrical Code (NEC)
10. National Electrical Manufacturer's Association (NEMA)
11. National Fire Protection Association (NFPA)
12. Telecommunications Distribution Methods Manual (TDMM)
13. Telecommunications Industry Association (TIA)
14. Underwriters Laboratories, Inc. (UL)

2.3.1.2 GROUNDING STANDARDS

A. The Contractor must comply with industry best practices for system installation, grounding, bonding, and transient voltage surge suppression (TVSS). Grounding standard AE/LZT 123 4618/1 published by Harris and R56 Standards and Guidelines for Communications Sites published by Motorola are referenced to provide guidance as to the level of practice acceptable. Other similar published practices for grounding, bonding, and TVSS may be followed in lieu of these documents.

B. The Contractor must provide an electronic copy of the selected grounding standard with their Preliminary Design to the City for review and approval.

2.3.1.3 SECURITY STANDARDS

A. The Contractor must comply with industry best practices for cybersecurity. The Contractor must deploy hardware, software, and protocols that protect against cyber-attacks, minimize network vulnerabilities, and mitigate security breaches. The Contractor must provide security management tools that allow system managers to manage access to resources, maintain confidentiality, and ensure data integrity.

B. The Contractor must comply with the following security standards and industry guidelines, provided here in no particular order with no implication of priority:

1. FIPS PUB 140-2; "Security Requirements for Cryptographic Modules"
2. ISO/IEC 27000:2009; "Information Technology – Security Techniques – Information Security Management Systems – Overview and Vocabulary"
3. ISO/IEC 27001:2005; "Information Security Management Systems – Requirements"
4. ISO/IEC 27002:2005; "Code of Practice for Information Security Management"
5. ISO/IEC 27005:2008; "Information Security Risk Management"
6. ISO/IEC 27010:2012; "Information Technology – Security Techniques – Information Security Management for Inter-Sector and Inter-Organizational Communications"
7. ISO/IEC 27031:2011; "Guidelines for ICT Readiness for Business Continuity"
8. ISO/IEC 27032:2012; "Information Technology – Security Techniques – Guidelines for Cybersecurity"
9. ISO/IEC 27033; "Information Technology – Security Techniques - Network Security"
10. ISO/IEC 27035:2011; "Information Security Incident Management"
11. ISO/IEC 18043; "Selection, Deployment, and Operations of Intrusion Detection Systems"

12. ISO FCAPS; “Fault management, Configuration management, Accounting management, Performance management, Security management”
13. ITIL Version 3; “Service Design, Section 4.6 Information Security Management”

C. Routing and switching equipment must employ Open Systems Interconnection (OSI) model Layer 2 and Layer 3 security best practices to minimize different types of attacks on the data link layer and to filter network traffic on the network layer.

D. The system must utilize secure protocols (SNMPv3, SSHv2 and HTTPS) for network management, configuration, alarms and events.

E. The Contractor must supply, install, and configure virtual private network (VPN) hardware and software to allow multiple levels of remote secure access of system RF and control infrastructure equipment.

F. To provide early warnings of intrusions and to protect against external attacks, the Contractor must supply, install, and configure firewall protection system(s) and intrusion detection system(s).

G. The Contractor must supply, install, and configure anti-virus and anti-malware software on all supplied servers and workstations, along with definitions updates during the warranty period.

H. To ensure protection against the latest security risks, the Contractor must provide operating system patches for all supplied commercial off the shelf products during the warranty period.

I. To secure over the air communications, the system must be capable of providing talkgroups with end-to-end AES encryption (including consoles and logging recorders) compliant with current P25 requirements, other jurisdictions, and the Federal Government.

J. New backhaul links must support payload encryption and must be licensed in frequency bands regulated by 47 CFR, Part 101.103. At a minimum, payload encryption must be fully compatible with AES and comply with FIPS-197. The AES algorithm must support 128- or 256-bit symmetric keys, via a randomly generated encryption combination.

2.3.2 PROJECT 25 REQUIREMENTS

A. All P25 system equipment must be equipped, configured, and licensed to provide concurrent use of both Phase 1 and Phase 2 subscribers without user or dispatcher intervention at both the talkgroup and channel level. Proposer must fully describe the technical and operational aspects of this capability in the proposed system as well as any associated cost effects.

B. The system must be P25 system compliant with all applicable TIA-102 Standards; latest published revision as of the date of the proposal response and brought up to the latest revision as of the date of start of Final System Acceptance testing.

C. The system core and all subsystems, as well as subscriber radios must be capable of being programmed with any ID within the P25 range.

D. The system must provide, at a minimum, the following features:

1. Push-To-Talk Identification (PTT-ID)
2. Group Call
3. Private Call
4. Emergency Alert

5. Emergency Call
6. Selective Call
7. Selective Alert
8. Radio Inhibit
9. Dynamic Regrouping
10. Busy Queue
11. Status / Message
12. Talkgroup Patch
13. Multi-group or Announcement Group Call

E. The system must support the assignment of 9 levels of priority for each talkgroup. When calls are placed into system busy queue, talkgroups with higher priority levels shall be processed and granted system access before those of lower priority levels.

F. The system must employ the Advanced Encryption Standard (AES) encryption algorithm, capable of providing talkgroups with end-to-end encryption (including consoles and logging recorders) compliant with current P25 requirements, other jurisdictions, and the Federal Government. The AES encryption algorithm is defined by the Federal Information Processing Standards document FIPS-197.

G. The dispatch consoles require Over the Network Programming (i.e. configurable over the LAN).

H. The system hardware and software must include the Inter-RF Sub-system Interface (ISSI) compliant with the P25 standards.

1. ISSI must be equipped (and licensed) to interface to 3 external systems listed below:
    i. SFMTA P25 System
    ii. Current San Francisco P25 Master Site (connecting PERS, CERS, 700 I/O subsystems)
    iii. BART P25 Underground System
2. Optional pricing to be provided for 2, 4, and 6 additional external system links
3. ISSI must include automatic roaming feature set to allow subscribers from different Wide-area Control Networks (WACNs) to roam onto and register onto the City system, if properly provisioned.
4. ISSI must support a minimum of 20 simultaneous talkgroup/conversations per link

I. The system hardware and software must include the Console Sub-system Interface (CSSI) compliant with the P25 standards.

2.3.3 FUNCTIONAL REQUIREMENTS

The system must include the following functional components:

A. P25 700/800 MHz Trunked Radio Infrastructure:

1. System control equipment:
    i. Fault tolerant network system controller (core)

a. Fault tolerant is defined as no single point of failure within the equipment set comprising the core (e.g. servers, routers, etc.)

ii. The loss of any single site must not reduce system functionality other than the loss of radio base station access and associated coverage from that site.

iii. The loss of any single link must not reduce system functionality

2. Simulcast control equipment:

i. Fault tolerant simulcast controllers using distributed redundancy

a. Fault tolerant is defined as no single point of failure within the equipment set comprising the simulcast controllers (e.g. servers, routers, etc.)

ii. The loss of any single site must not reduce system functionality other than the loss of radio base station access at that site.

iii. The loss of any single link must not reduce system functionality

iv. Distributed simulcast control equipment will be at geographically separate physical locations.

v. Simulcast control and voting operations may be integrated into base radios.

3. Critical System Interface Equipment:

i. This includes all interfaces between the Trunked radio system and systems external to the Trunked Radio system, such as, ISSI, CSSI, PTT Application Integration Gateway, Firewalls, etc.

ii. All interfaces must be fault tolerant and/or redundant as to not be susceptible to any single point failures.

iii. All interfaces must be designed such that any hardware or software failure will not interfere with trunked system operation.

iv. Equipment interfaces must be IP-based

B. IP-based P25-compliant dispatch consoles:

1. Console system connections must be IP-based and compliant with relevant P25 specifications.

C. All site equipment must be new, of high quality, and designed to provide high reliability to support emergency public safety operations.

D. All site equipment must operate in the temperature range of 20°F - 110°F without degradation.

E. Site improvements, including equipment racks, cable trays, battery plants, and grounding systems, must meet the specifications itemized in Section 2.10.

F. Simulcast equipment:

1. The system must use simulcast signal processing as required to optimize voice quality in coverage overlap areas.

2. Non-captured overlap areas with delay spreads in excess of those required to meet the required Delivered Audio Quality (DAQ) objective must be minimized inside the service area. (Any areas outside the acceptable delay spread must be indicated on coverage maps.)

3. Simulcast systems must operate without the need for manual optimization and system/subsystem alignment. All alignment and adjustments must be automated where possible.
4. Simulcast cells must be capable of operating independently in trunked mode in the event of failure of, or lost connectivity to, the network core.

G. Receiver voting:

1. Receiver voting equipment must monitor all receivers in the simulcast cell and select the best signal for processing and rebroadcast through the network.
2. Receiver voting equipment must continue to operate in the event of failure of, or lost connectivity to, the network core.
3. Receiver voting, if not a geographically distributed architecture, must be equipped with a hot standby comparator, geographically separated from the primary comparator to provide redundancy.

H. Antenna systems:

1. The system must include new, low Passive Intermodulation (PIM), top tier, antenna system equipment, including antenna, transmission line and connectors, antenna combiners, receiver multicouplers, and all other components between the antenna and radio, for a complete design.
2. Antennas must provide the required guaranteed coverage, match the antenna design used for all coverage modeling, and meet applicable FCC rules and regulations.
3. Antennas must be designed to perform in and endure the environmental conditions typically experienced in coastal areas, which are subject to the corrosive effects of salt air. Structural survivability of antennas must be a minimum wind rating of 125 mph and comply with MIL-STD-810E, Method 509.3, Procedure I environmental specifications for salt fog.
4. Transmission line type and length must be appropriate to provide the required coverage.

2.3.4 PERFORMANCE REQUIREMENTS

2.3.4.1 COVERAGE

A. Attachment A – Existing Sites Information, provides general information on the existing radio sites, including structure height and coordinates. The City desires the use of existing radio sites to the greatest extent possible.

B. The Contractor may consider existing sites owned by other government entities, commercial sites, and new sites developed at greenfield locations as required to meet the following coverage specifications.

C. The system must provide guaranteed radio coverage meeting the following criteria:

1. The service area to be covered is the geographical boundaries of the City and County of San Francisco. Attachment B – Coverage Boundaries and Loss Zones, has “shape” (.SHP) files for importing into a modeling program.
2. The following standard radio configurations must govern talk-in and talk-out coverage:
    i. Mobile radios – a trunk or dash mounted mobile radio with a unity gain mobile antenna mounted in the center of the vehicle roof at a height of five feet.

ii. Portable radios – A three-watt portable radio with a flexible half wavelength dipole antenna on the radio:

a. Talk-out to a portable radio on hip (3 foot elevation) with belt clip

b. Talk-in from a portable radio on hip with a remote speaker/microphone (without antenna on the remote mic)

iii. Base stations – Output and Effective Radiated Power (ERP) levels and antenna height and gain must be the maximum as permitted by the Regional Planning Committee and FCC rules and regulations, unless system engineering determines that a lower height or ERP is sufficient (such as for tower top amplifiers or to minimize simulcast interference).

3. Coverage design, implementation, and testing for the system must adhere to the Telecommunications Industry Association (TIA), Telecommunications System Bulletin (TSB) TSB-88D, or the latest revision.

i. The City interprets TSB-88.2D that a Lognormal Fading Standard Deviation of 5.6 dB is applicable to this system design for coverage reliability predictions. Coverage designs must be based upon this value.

4. All coverage maps must be accompanied with documentation showing all technical parameters used to produce the predicted radio coverage results, including but not limited to propagation model used, lognormal fading standard deviation factor, reserve gain on the tower top amplifier, antenna system loss/gain (infrastructure and subscriber), transmitter ERP, and inbound & outbound received signal levels (in dBm).

5. Maps predicting Time Delay Interference (TDI) must be prepared for each simulcast cell.

6. Talk-in and talk-out coverage must meet or exceed the performance as specified herein for the service area with 95% reliability and a DAQ of 3.4 or better.

7. DAQ of 3.4 is defined as speech understandable with repetition only rarely required; some noise/distortion. DAQ as defined in this document applies to both inbound and outbound communications.

8. Tower Top Amplifiers (TTA) may be permissible in some areas. The primary factors that may restrict the use of a TTA are high noise floors and instances where tower operators and/or owners do not permit their use. Several of the current sites have extremely high noise floors and the City strongly recommends that the Contractor investigate site noise floors on any site where they intend to use a TTA. Should the Proposer use a TTA in their proposal and later find that interference prevents the use of that TTA, the Contractor must be responsible for the redesign of the receiver system to rectify the deficiency and provide the required coverage to the City at no additional cost to the City, including the cost of additional equipment and all site development and site lease costs for the duration of the contract.

9. Proposer shall provide composite talk-in and composite talk-out coverage prediction maps showing “Covered Area Reliability” as defined by TSB-88.1D (i.e., all colored areas of the maps must exhibit an individual tile reliability of 95% or greater) for the following scenarios:

i. Portable on-street.

ii. Portable in-building (using loss values defined in Attachment B – Coverage Boundaries and Loss Zones)

D. The system coverage design must include enough sites to meet the 95% reliability requirement and be configured in such a way that the loss or failure of any single site must not result in a loss of coverage greater than 5% of the service area.

E. The guaranteed coverage of the system must be tested and prove that the portable on-street and in-building, talk-in coverage and talk-out coverage meet the specified coverage requirements. Coverage testing methods and procedures must adhere to TSB-88.3C, and address the requirements of NFPA 1221, NFPA 72, and NFPA 5000, Annex F latest revision where applicable.

F. Because the system will use P25 Phase 1 and 2 modes, coverage guarantees must include both Phase 1 and Phase 2 modes.

G. Attachment C – In-Building Coverage Areas, identifies specific locations where portable in-building coverage is required. The system must provide coverage in these critical buildings.

H. Proposers may use native over-the-air coverage from system radio sites or BDA/DAS solutions to rebroadcast radio signals within these buildings to meet this coverage requirement.

I. The Contractor must complete coverage testing of the system with witnesses from the City, utilizing Bit Error Rate (BER) testing. The Contractor must submit appropriate documentation confirming lab testing of the Bit Error level for the portable radio, which will yield the equivalent of a DAQ 3.4 audio quality. Likewise, the Contractor must test the system to that level.

J. Test receivers used must match the typical specifications of the subscriber equipment proposed.

K. The City will observe and monitor the entire coverage testing process. For test purposes, the Contractor must divide the City into grids and test the system according to Section 2.12.6.

L. The Contractor must provide a radio coverage verification and testing package, to include all hardware and software necessary, to complete an independent coverage test for maintenance purposes by City personnel after system acceptance.

2.3.4.2 CAPACITY

A. The system must be designed, equipped and licensed for 18 RF channels, with a minimum of 16 active at any time, providing one control channel and a minimum of 30 Phase 2 talkpaths at each of the nine sites.

B. The system capacity must assume all user radios using the P25 Phase 2 mode only.

C. The capacity of the system, including the individual capacity of each simulcast cell and multicast site (if applicable), must be less than or equal to 1% Grade of Service.

D. The following attachment provides system traffic reports for typical busy hour to be used by the Contractor for the Grade of Service analysis.

1. Attachment D – Typical Busy Hour Traffic Report

E. The Contractor must disclose all assumptions and calculations to the City for validation.

2.3.5 RELIABILITY, AVAILABILITY, AND REDUNDANCY

A. The system must support mission critical operations, therefore requiring a high degree of redundancy and survivability. The system design must utilize a fault tolerant network topology to the greatest extent possible through a distributed and/or redundant architecture. The system must be designed to five 9's availability.

B. There must be no single point of failure on any system/subsystem that may interrupt end-to-end functionality. The system design requires redundancy for those elements that would result in a major system failure. Such elements include, but are not limited to the following:

1. All core network elements
2. Simulcast elements
3. Voting elements
4. Power systems
5. Network switches and routers
6. Gateways
7. Microwave Backhaul
8. Console subsystem control elements, including CSSI elements
9. ISSI elements

C. The system must include several modes of degraded operation (graceful degradation) or failure modes. The system must be capable of automatic activation of failure modes in the event of a failure. The Network Management System (NMS) must detect and report all failures or degraded conditions in real time. At a minimum, the following events must activate a failure mode without bringing the system down completely:

1. Loss of single channel
2. Loss of multiple channels
3. Loss of control channel(s)
4. Loss of site controller(s)
5. Loss of simulcast controller(s)
6. Loss of single site
7. Loss of multiple sites
8. Loss of system Core
9. Loss of any core, site, or ancillary router
10. Loss of any network switch
11. Loss of any firewall

D. The Proposer must describe the specific failure modes, including which mode is entered into and under which set of conditions. None of the above conditions alone can cause the reversion to neither a non-trunked nor a non-simulcast failure mode.

1. Should multiple concurrent failures require the reversion to a non-trunked failure mode (Failsoft), all such sets of conditions must be clearly identified.

2. Should multiple concurrent failures require the reversion to a non-simulcast failure mode, all such sets of conditions must be clearly identified.

E. The system must include a method of forcing individual site repeaters into local conventional repeat mode (Failsoft) controlled by a contact closure or other signal from the existing Supervisory Control and Data Acquisition (SCADA) Remote Terminal Unit (RTU), which is independent from the current and future NMS.

2.3.6 SPECTRUM AND LICENSING

A. The system must use the existing 800 MHz frequencies in accordance with FCC Part 90 Rules and Regulations. Attachment E – FCC License Information, provides license data for the current systems.

B. The Contractor must be responsible for all frequency research, frequency coordination, and the preparation of all Regional Planning Committee (RPC) application packages and associated FCC license applications and submittals on behalf of the City. The Contractor must be knowledgeable of the 700 MHz and 800 MHz processes in RPC Region 6.

C. Following City approval of the Detailed Design, the Contractor must provide all licensing modifications and applicable forms to the City for review and approval. The Contractor will be responsible for any additional frequency research, support, and preparation if necessary. The Contractor must submit all forms following City approval.

D. The Contractor will be responsible for coordination and licensing fees, as applicable. The Contractor must complete and submit, after City approval, all Federal Aviation Administration (FAA) forms for antenna structures as necessary.

E. The Contractor will be responsible for tracking the progress of all FCC license filings and FAA tower applications and must make any modifications and resubmissions as required without additional cost to the City.

F. The Contractor must not present a design in their proposal that is not licensable due to regulations that would limit the tower height, ERP selected or results in unacceptable co-channel or adjacent-channel interference.

1. Proposers should note that several channels used in the current CERS system design are co-channel with the Sacramento Regional Radio Communications System (SRRCS).

2.3.7 SYSTEM RF AND CONTROL INFRASTRUCTURE EQUIPMENT

2.3.7.1 SYSTEM AND SITE CONTROL EQUIPMENT

A. The system and site control equipment must be fault tolerant. The control equipment must use redundant architecture.

1. Should the system control equipment be of centralized design, the City desires it to be located at the Twin Peaks location.

2. If located elsewhere, the Proposer must explain the advantage of the chosen locations.

B. The control equipment must fully support P25 functionality including Phase 1 and Phase 2 dynamic operation.

C. Routers, switches, and servers must consist of “Commercial off the Shelf” (COTS) products to the greatest extent possible. The Contractor must certify all COTS products to be used on the system.

D. The redundant system core must update in real time and must provide catastrophic backup capabilities should the main core become inoperable. The redundant system core will be able to handle the same full system load as the primary core. The redundant cores must be able to switch over without negatively affecting the system operation.

2.3.8 DISPATCH CONSOLES SYSTEM EQUIPMENT

A. The system must support and include a minimum of 60 hardware-based dispatch operator consoles distributed among 7 public safety dispatch locations, as well as software application-based (only) radio control consoles at one location. For a list of current dispatch centers, see Attachment F – Dispatch Center Information.

B. The console system must be a mission critical, IP-based platform that supports all current Project 25 mandatory features as well as additional features the Contractor's system infrastructure may provide.

C. The console system must meet all P25 standards including Console Sub-System Interfaces (CSSI). Any CSSI-compatible console product must be able to interface with the provided system.

D. The console system must encrypt and decrypt secure voice communications using AES encryption with the capability to handle multiple encryption keys. Channels must display a distinctive icon indicating whether a particular channel is using encryption.

E. The console system, inclusive of its supporting LAN/networking system, must provide appropriate management and priority of operations.

1. Voice and console operations traffic must have priority over background data traffic (i.e. System and software patches, security updates)
2. Console operator user interface operations must have priority over background task processing (i.e. system updates must be able to be delayed at the operators' discretion)
3. The Proposer must describe how network and computer operation priority is enabled and managed.
4. Console LAN must be designed such that minimal network retries occur while supporting both the mission critical audio traffic as well as network data traffic, including software, virus updates patches etc..

F. The console system alias database and the radio system alias database shall be of a unified design. Systems requiring multiple entries of alias information are not acceptable.

G. Each console must be stand-alone and not dependent on other consoles to maintain operations.

H. The console system must employ redundant hot standby cards, power supplies, controllers, routers, and switches to prevent a single point of failure.

I. The system must support and include a minimum of 3 dispatch system management terminals located at Twin Peaks, 1011 Turk St, and 1800 Jerrold (Radio Shop).

1. Management terminals must be capable of all administrative functions, including the creation and deletion of user profiles.
2. Management functionally must be able to be provisioned with limitations by management system users profile.

3. Console position management must be accessible from the console position with properly authorized access by user profile.
4. System must support Management, Supervisory, and User profiles.
5. Log-in profile/ID capabilities must be able to be segregated by discipline and location.

J. Console System Trunked Requirements:

1. The console system must allow patching among any combination of: telephone line, trunked talkgroup, and non-trunked channel resources in the system.
2. The console system must allow the selection of multiple talkgroups and/or multiple conventional channels or any combination of these resources.
3. The console system must allow for the console operator to hear field units while dispatch operators transmit on all trunked talkgroups and any conventional repeater channels equipped to do so.

K. Conventional Requirements:

1. The console system must allow for the console operator to enable or disable the repeat function of any conventional repeaters equipped to do so.
2. The console system must allow the selection of the desired transmit frequency or mode on each conventional base station or repeater capable of operating on multiple frequencies or modes.

L. Operator Position Requirements:

1. All dispatch console equipment supplied must operate 24 hours a day, 7 days a week, 365 days a year.
2. The Contractor must provide a touchscreen display monitor with minimum of 20” LCD/LED with resolution of 1900 x 1080 or better.
3. Each dispatch console must be equipped with a keyboard. Keyboards must be a standard 101-key keyboard, and must be compatible with industry standard USB interfaced keyboards.
4. Each dispatch console must be equipped with a mouse or other pointer control device. Computer mice or other pointer control device (e.g., touchpad or trackball) must be compatible with industry standard USB interfaced pointer control equipment.
5. Each dispatch console must be equipped with a microphone.
6. Each dispatch console must be equipped with a Personal Utility Controller (PUC).
    i. The PUC is a button-based, remote user input device that features 10 programmable keys, each with 2 associated status LED’s.
    ii. The PUC shall be sized so that it may be positioned next to a PC-style keyboard.
    iii. The PUC’s connection to the console shall be connectorized.
        a. The connector must allow easy disconnect and removal of the PUC without the need for tools.
        b. The location of the connector shall be non-obtrusive.

c. The PUC must feature a single flexible cord allowing easy placement of the PUC on either side of the console user's keyboard.

d. The PUC must be able to be connected and disconnected from the console without affecting other console operations or requiring the restart of console applications.

iv. The PUC and associated cabling must be designed to withstand 24-hour dispatch operations.

v. Each individual button on the PUC must be programmable to perform at a minimum, but not limited to, any of the following functions:

a. Any Instant Transmit button

b. Any Multi-select activation button

c. Any Alert button

d. Common Push-to-talk (PTT)

e. Selected Channel's PTT Button

vi. In no case shall the programming of any function on the PUC prevent the function from being activated from any other device. For instance, programming Common PTT on a PUC button must not prevent the foot switch, touch screen, the headset or the console keyboard from performing a common PTT action.

7. Each dispatch console must have the ability to connect to a shared pool of local control stations, housed at 1011 Turk St, to provide communications in the event of a loss of connectivity to the system core. See Attachment G – Fixed Radio Information for details on local control stations.

8. Each dispatch console must support a variety of headset options including telephone style handsets and wireless headsets. Each position must have dual headset jacks, each with two volume controls (one for radio and one for telephone), allowing the operator to hear select audio via a headset or handset and allow the operator to respond via a microphone, headset, or handset. The headset must interface to both the telephone instrument and the backup control station at the dispatch position. Headset jacks must be compatible with the following headset equipment:

i. Plantronics (P10) (E1) Adapter/Amplifier

ii. Plantronics Headset (H81)

iii. Plantronics Headset (H141)

iv. Plantronics Headset (HW261)

v. Plantronics Headset (H41)

9. A heavy-duty footswitch must be provided to allow the operator to transmit hands-free on the selected channel/talkgroup.

10. Computers supplied must have current production processors. The City reserves the right to specify or supply the computer platform(s) in accordance with the City standards. All computers must be certified for the latest version of Windows operating system available prior to the start of acceptance testing.

11. Each dispatch console must be equipped with instant recall recorders (IRR) allowing the operator to play back their recent radio or telephone traffic. This feature will be independent of the external voice logging recorder. The recorder must record at least 20 minutes of the current radio and telephone communications, and it must "loop" with first-in, first-out overwriting. Controls must appear as soft-buttons selectable on the console display screen.
    i. For console configurations that have an integrated IRR using the console hardware (i.e. not standalone), the console IRR audio must go to a separate dedicated speaker with a manual volume control.
12. Console positions must include the feature set commonly implemented in public safety dispatch environment.
    i. Replication, to the greatest extent possible, of existing functionally as implemented at the DEM Dispatch Center is desired.
    ii. A site visit of the dispatch center will be provided to allow Proposers to observe the operation of the existing console system located at the DEM Dispatch Center, 1011 Turk St.
13. Console user interface must provide sufficient system status information to allow operators to adjust for system events and errors, including but not limited to:
    i. Loss of direct system connection
    ii. Site Trunking
    iii. Other failure conditions (i.e. Failsoft)
14. Each dispatch console must have the following features:
    i. Selected audio with volume control
    ii. Unselected audio with volume control
    iii. Selected channel/talkgroup push to talk
    iv. Console operator sidetone in headset for telephone or radio operation
    v. Instant push to talk for each channel/talkgroup
    vi. Priority channel marker
    vii. Channel/talkgroup receive activity indicator
    viii. Mute for each channel/talkgroup
    ix. Unselected channels/talkgroups mute with time out timer
    x. Channel/talkgroup multi-select
    xi. Channel-to-channel, channel-to-talkgroup, and talkgroup-to-talkgroup patch
    xii. Unit identification with alias display
    xiii. Paging and Call-Alert functions from aliased Unit ID
    xiv. Two headset jacks each with two volume controls (radio and phone)
    xv. Instant recall recorder
    xvi. Receive "Call" indicator
    xvii. Channel/Talkgroup Busy

xviii. Cross-Busy indication among consoles

xix. Cross-Mute among consoles on channels/talkgroups as may be needed

15. Console user interface must provide a context sensitive on-line function.

i. Help elements must be customizable, such as providing specific procedures for channel resources.

M. Software application-based (only) radio control consoles

1. Soft console application must be compatible with standard Microsoft Windows based PC hardware and software platforms

i. Proposer shall list any requirements and limitations of the acceptable hardware platform.

ii. Soft console shall be compatible with all currently supported versions of Microsoft Windows

iii. Proposer shall list any requirements and limitations of the acceptable operating system version and/or configuration

2. Soft console application must be compatible with standard size PC display configurations

3. Soft console application must operate in a Windowed environment as a Window or Toolbar, and must not require full screen presentation

4. Soft console application must operate with standard keyboard and mouse accessories, and not require specific user interface hardware

5. Soft console application must include the feature set commonly implemented in public safety dispatch environment, to the greatest extent possible within the limitations of the hardware platform

i. Proposer must describe the operation and limitations of the soft console system.

ii. Soft console access must require system login beyond Windows User profile login.

iii. Soft console login must be able to be configured to occur automatically with Windows profile login

iv. User permissions and authorization levels must be linked to specific login profiles

v. Soft console must be able to operate both within the City's enterprise network and across the Internet providing appropriate bandwidth and QoS services are provided.

vi. Proposer must describe the minimum required and optimum desired IP connectivity parameters for soft console operation.

vii. Proposer shall describe any soft console limitations associated with connectivity parameters

N. Individual dispatch center requirements will vary based on unique operational characteristics of each dispatch center. The Contractor must provide a list of all features, options, and accessories available for use with their console system, dispatch positions and soft console solution.

2.3.9 GENERAL FIXED TRANSMITTER / RECEIVER EQUIPMENT

A. Fixed Transmitter / Receiver equipment must:

1. Be solid-state in design and function within normal conditions for temperature, elevation, and humidity expected at a remote radio site.
2. Have monitor/alarm interfaces to provide status to a Network Management System.
3. Be as compact as possible, with mounting configurations for standard Electronics Industry Alliance (EIA) relay racks.
4. Consist of modular components or field replaceable units allowing for in the field repairs whenever possible.

B. Fixed Transmitter / Receiver equipment must comply with applicable requirements of Part 90 and Part 15 of the FCC Rules and Regulations, as well as appropriate TIA/EIA and similar standards and be FCC type accepted for the appropriate frequency bands and the specific application.

C. The Contractor must analyze all transmitters at each site for intermodulation interference, considering transmitting equipment from all tenants located at the sites as identified in FCC license information. If the Contractor identifies a potential or actual intermodulation problem prior to, during, or following implementation, the Contractor must resolve the issue without degrading system coverage or performance for a period of up to 12 months after System Acceptance and at no cost to the City.

D. Transmitters at each site must meet FCC Maximum Permissible Exposure (MPE) standards (per latest revision of FCC Office of Engineering and Technology (OET) Bulletin 65) which must consider all transmit signals from all tenants located at the site, per FCC licensed information. The Contractor must mitigate casual and occupational exposure at locations that exceed MPE standards using fencing, signage, and/or other techniques approved in advance by the City.

E. One Base Station/Repeater must be supplied for each item identified as a Base Station/Repeater listed in Attachment G – Fixed Radio Information.

F. One Control Station must be supplied for each item identified as a Control Station listed in Attachment G – Fixed Radio Information.

2.3.9.1 LOW-BAND VHF CONVENTIONAL FIXED TRANSMITTER / RECEIVER EQUIPMENT

A. Low-band VHF Conventional fixed transmitter / receiver equipment must meet the requirements of Section 2.3.9

B. Low-band VHF fixed transmitter / receiver equipment must be able to be programmed and operate within the frequency range of 42-50 MHz for transmit and receive.

C. Where applicable, low-band VHF conventional fixed transmitter / receiver equipment should be of similar model and technology to the proposed trunking equipment.

D. All low-band VHF conventional Fixed Transmitter / Receiver equipment antenna connections must connect to an antenna port on a City supplied lightning arrestor using low-loss RF cable appropriate for the installation. The City supplied lightning arrestors connect to existing tower mounted low-band VHF antennas.

E. All Low-band VHF Conventional Fixed Transmitter / Receiver equipment must be accessible for transmit and receive operations from the dispatch console.

2.3.9.2 HIGH-BAND VHF CONVENTIONAL FIXED TRANSMITTER / RECEIVER EQUIPMENT

A. High-band VHF Conventional fixed transmitter / receiver equipment must meet the requirements of Section 2.3.9

B. High-band VHF fixed transmitter / receiver equipment must be able to be programmed and operate within the frequency range of 150-174 MHz for transmit and receive.

C. Where applicable, High-band VHF conventional fixed transmitter / receiver equipment should be of similar model and technology to the proposed trunking equipment.

D. All High-band VHF conventional Fixed Transmitter / Receiver equipment antenna connections must connect to an antenna port on a City supplied lightning arrestor using low-loss RF cable appropriate for the installation. The City supplied lightning arrestors connect to existing tower mounted VHF antennas.

E. All High-band VHF Conventional Fixed Transmitter / Receiver equipment must be accessible for transmit and receive operations from the dispatch console.

F. High-band VHF Conventional Fixed Transmitter / Receiver equipment that is designated as multi-frequency per Attachment G – Fixed Radio Information, must have the ability to change channels/modes via dispatch console commands.

2.3.9.3 UHF CONVENTIONAL FIXED TRANSMITTER / RECEIVER EQUIPMENT

A. UHF Conventional Fixed Transmitter / Receiver equipment must meet the requirements of Section 2.3.9

B. UHF Fixed Transmitter / Receiver equipment designated as Range I must be able to be programmed and operate within the frequency range of 380-470 MHz for transmit and receive.

C. UHF Fixed Transmitter / Receiver equipment designated as Range II must be able to be programmed and operate within the frequency range of 450-512 MHz for transmit and receive.

D. UHF Conventional Fixed Transmitter / Receiver equipment must be of similar model and technology to the proposed trunking equipment.

E. All UHF conventional Fixed Transmitter / Receiver equipment and control station antenna connections must connect to an antenna port on a City supplied lightning arrestor using low-loss RF cable appropriate for the installation. The City supplied lightning arrestors connect to existing tower mounted UHF antennas.

F. All UHF conventional Fixed Transmitter / Receiver equipment must be accessible for transmit and receive operations from the dispatch console.

G. All UHF conventional Fixed Transmitter / Receiver equipment must be able to be enabled or disabled from the dispatch console.

H. UHF Conventional Fixed Transmitter / Receiver equipment that is designated as multi-frequency per Attachment G – Fixed Radio Information, must have the ability to change channels/modes via dispatch console commands.

2.3.9.4 800 MHZ CONVENTIONAL FIXED TRANSMITTER / RECEIVER EQUIPMENT

A. Conventional Fixed Transmitter / Receiver equipment must meet the requirements of Section 2.3.9

B. 800 MHz Fixed Transmitter / Receiver equipment must be able to be programmed and operate within the frequency range of 806-824 MHz for receive and 851-870 MHz for transmit.

C. 800 MHz Conventional Fixed Transmitter / Receiver equipment must be of similar model and technology to the proposed trunking equipment.

D. All 800 MHz conventional Fixed Transmitter / Receiver equipment must be installed on a transmitter combiner/receiver multicoupler antenna system separate from the trunked system antenna system as detailed in Attachment G – Fixed Radio Information

E. All 800 MHz trunked control station equipment located at the Twin Peaks site must connect to an antenna port on a City supplied control station combiner using low-loss RF cable appropriate for the installation. The City supplied control station combiner connects to an existing tower mounted 800 MHz antenna.

F. All 800 MHz conventional Fixed Transmitter / Receiver equipment must be accessible for transmit and receive operations from the dispatch console.

G. All 800 MHz conventional Fixed Transmitter / Receiver equipment must be able to be enabled or disabled from the dispatch console.

2.3.9.5 CONTROL STATION ANTENNA SYSTEMS

A. Rack mount control stations installed at the Bayview site must have a directional antenna mounted on the tower oriented toward the San Francisco International Airport.

B. Rack mount control stations installed at the 1011 Turk St. site must use control station combiners to minimize the number antennas installed on the rooftop and lessen potential interference by increasing transmitter-to-transmitter isolation.

1. Control station combiners must be twelve ports or less and exhibit less than 15 dB of loss per port.

2. Each control station combiner must have a separate transmit and receive antenna.

2.3.10 BACKHAUL NETWORK INTERFACE

A. The Contractor must leverage the City's existing backhaul network to the greatest extent possible. The City's existing digital microwave and optical fiber backhaul network employs Alcatel MPLS (multi-protocol label switching) technology using Alcatel-Lucent 7705 SAR-8 routers at each microwave location. The City also has an existing Alcatel-Lucent 5620 Service Aware Manager (SAM) located at Twin Peaks and Turk Street for backhaul network and IP device management

1. The existing City MPLS network must be expanded as required to interface all new microwave sites and links.

2. The existing CERS microwave TDM loop system is to be decommissioned and replaced with equipment consistent with the City's existing PERS microwave equipment.

3. To the greatest extent possible, 11GHz frequencies must be used for the new microwave paths providing 150 Mbps capacity.

4. The new microwave paths must be configured using 2+0 configuration on all links if the appropriate number of frequencies are available. If frequencies are not available, all paths must be configured for 1+1 configuration.
5. The Contractor must guarantee each microwave link is designed to meet or exceed end-to-end annual availability Bit Error Rate (BER) of 99.9995% (BER $=10^{-3}$).
6. The Contractor must guarantee each microwave link be designed to meet or exceed end-to-end annual reliability of 99.999% (BER $=10^{-6}$).

A. The Contractor must integrate all P25 sites into the City's existing backhaul network infrastructure and Service Aware Manager (SAM).

B. Microwave equipment for all sites must be compatible with the City's existing MPLS network.

C. The City's existing backhaul devices have available Ethernet ports for integration to the P25 system. The Contractor will be required to reconfigure the existing equipment and provide any additional equipment required to integrate the proposed system with the backhaul infrastructure.

D. The Contractor will be responsible for turning up and configuring all MPLS devices for all MPLS sites.

E. The Contractor must configure all tunneling services and testing all P25 Voice Packets (VPs) traffic across the MPLS cloud.

F. The Contractor must ensure all core protocols are working correctly throughout the MPLS cloud and all required MPLS features and services are consistent throughout the MPLS infrastructure.

G. The City has multiple networks that interface to the IP-MPLS network infrastructure. The Contractor must work with a City representative to develop and configure a Quality of Service (QoS) plan that will be capable of honoring or handling radio service VPs in an efficient manner.

H. The Contractor must provide the price of a single hop of microwave equipment including installation and optimization that is the exact configuration of the proposed microwave loops as an option.

I. Attachment H – Backhaul Network Information, provides site information for the existing backhaul network and a diagram of the City's suggested microwave network layout. If the Contractor cannot complete the network as shown, the Contractor must provide a detailed reason why the City's suggested layout is not feasible and must provide a fully feasible microwave network design.

2.3.11 SUBSCRIBER RADIO EQUIPMENT

The following sections describe the functional and technical specifications for any subscriber (user and/or field) radio equipment offered.

2.3.11.1 OVERVIEW

A. User radio equipment must be capable of accessing and operating on the proposed trunked radio system and interoperable with P25 systems throughout the Bay Area.

B. Subscriber radio equipment includes the following devices:

1. Portable radios
2. Mobile radios

3. Control Stations – Local controlled
4. Control Stations – Remote Controlled
    i. Desksets must have full digital remote control over the control station for which they are connected. Multiple desksets must be capable of sharing the control station.
5. Rack mounted Control stations – Console controlled
6. Vehicular Extenders

C. Approximate quantities of each type of subscriber equipment are provided in the Cost Forms attached to this RFP. The quantities listed are believed to be accurate and should be used for all subscriber equipment proposals. However, the City does not commit that any contract resulting from this RFP will procure those specific quantities. The City reserves the right to adjust any, and all, subscriber equipment quantities up or down, as required. Approximate quantities of radio packages per department are included in Attachment K – Subscriber Radio Packages.

D. Proposer must provide detailed unit pricing for all user radio equipment and each accessory item.

2.3.11.2 GENERAL REQUIREMENTS

A. All user radio equipment must comply with applicable requirements of Part 90 and Part 15 of the FCC Rules and Regulations, as well as appropriate TIA/EIA and similar standards and must be FCC type accepted in accordance with FCC Part 90 rules and regulations for the specific application.

B. All mobile and portable user radio equipment must meet MIL-STD-810 C, D, E, and F.

C. All user radio equipment must be software configurable.

D. All user radio equipment must have the following operating modes:

1. Conventional FM analog
2. Conventional P25 Phase 1
3. Trunked P25 Phase 1 on-network
4. Trunked P25 Phase 2 on-network
5. Radio to radio direct communication (talk-around) Analog FM and P25 Phase 1

E. All user equipment supplied must be configured for use on the proposed radio system.

F. User radios must support AES encryption as required by the City. Proposer must state whether a specific hardware board/card must be ordered with the radio to support the AES encryption standard. If software only is required, Proposer must state whether this feature can be added at any time after initial purchase and field deployment.

2.3.11.3 PORTABLE RADIOS

A. All user radio equipment must comply with applicable requirements of Part 90 and Part 15 of the FCC Rules and Regulations, as well as appropriate TIA/EIA and similar standards and must be FCC type accepted in accordance with FCC Part 90 rules and regulations for the specific application.

B. Standard model portable radio: Proposer must offer user radio units that are highly reliable and are intended for public safety mission critical operations. Pricing must be

provided for a standard model portable radio including software, licenses, antenna, belt clip and battery as well as the following features:

1. Full compliance with P25 Phase 1 and Phase 2 features and operation
2. PTT button
3. Top-mounted on/off volume knob
4. Top mounted talkgroup/channel/zone selector up to at least 16 positions
    i. Proposer must disclose any limitations in the grouping of talkgroups and conventional channels in the same group or "zone" including any issues with grouping trunked and conventional channels in scan lists.
5. Talkgroup/channel bank or zone selection via alternate means such as keypad/display operation, or simple "ABC" switch.
6. Emergency button, physically protected from inadvertent activation, with software defined configurable activation delay
7. Transmit indicator
8. Software definable top mounted switch that can be programmed for defined functions such as, but not limited to, channel scan on/off, transmit enable/disable, encryption on/off, channel banks, etc.
9. Programmable side buttons
10. Accessory connector for remote speaker microphone, or adapter for operational use in a vehicle
11. Battery life indication or low battery alert, graphical indication on display
12. Selectable numeric radio signal strength indication (RSSI) and BER level
13. Minimum 500mW speaker audio output
14. Dual microphone background noise abatement or cancellation system optimized to reject audio signals identified by the Audio Performance Working Group (APWG) such as, but not limited to, Personal Alert Safety System (PASS) alarms, chain saws, etc. Proposer must explain operation of this feature in P25 trunked and conventional modes.

C. Optional portable radio models: Proposer may provide OPTIONAL pricing for other portable radio models in addition to the required standard model offering. These radios may include additional features or alternate configurations to the standard model radio.

D. Battery:

1. Proposer must provide batteries without cadmium. Pricing must be provided for Lithium-ion only.
2. As an OPTION, Proposer must propose batteries certified as intrinsically safe.
3. As an OPTION, Proposer must propose a "AA" battery clamshell for use in operations where standard AC powered chargers are unavailable.
4. Standard Capacity Batteries must provide a minimum operational use of 8 hours based on a 10-10-80 duty cycle (10% transmit, 10% receive, 80% standby).
5. High Capacity Batteries must provide a minimum operational use of 10 hours based on a 10-10-80 duty cycle (10% transmit, 10% receive, 80% standby).

6. Proposer must provide detailed specifications for all batteries proposed, including the following at a minimum:
    i. Battery life
    ii. Total battery life-cycle expectancy
    iii. Recharge time
    iv. Dimensions
    v. Weight
    vi. Warranty

E. Battery Chargers
1. Proposer must provide information on the intelligence of the battery charger, whether single unit, or multi-unit to extend the life of the batteries.
2. Battery Chargers must have the ability to cycle the battery by application of load to condition it.
3. Battery Chargers must have the ability to gauge the capacity of the battery after recharge, and indicate whether the battery failed the test. Indicator lights or display is minimum requirement.

F. Additional features and accessories: Proposer must provide pricing for optional features and accessories, including the following at a minimum:
1. Encryption
    i. AES with multiple encryption key capability
2. Programming cables with USB interface to the programming computer
3. Radio programming software
4. Battery chargers:
    i. Single-unit battery charger
    ii. Multiple-unit battery charger
    iii. Vehicular charger
5. Flexible ½ wave antennas
6. GPS
7. Bluetooth
8. Remote speaker microphone without antenna
9. Remote speaker microphone with GPS, if portable device does not have built in GPS
10. Remote speaker microphone with keypad
11. Remote speaker microphone with Amplified Speaker (Audio)
12. Wireless remote speaker microphone
13. Headset
    i. Wired
    ii. Wireless / Bluetooth

14. Carrying cases / belt clips
15. Clamshell AA Battery

G. Proposer must provide detailed equipment specifications for all proposed portables and accessories, including the following information:
   1. Radio dimensions
   2. Radio weight with battery
   3. Antenna type with connector type
   4. Channel/mode capacity
   5. General features, transmit / receive parameters, and mechanical specs per EIA/TIA
   6. Proposer must provide detailed specifications and pricing for these radios and all accessories.

2.3.11.4 PORTABLE RADIO PACKAGES

A. The Proposer must provide pricing of the following portable radio packages to be inclusive of hardware, firmware, software, and accessories.

B. Each portable radio package is to be considered an independent proposed item. The City may at its choosing purchase the desired quantity of any package. The City may choose to award each portable radio package to a proposer independent of the selected system contractor and/or independent of the selected contractor for other portable, mobile or control station packages.

C. The City is interested in purchasing portable radios and accessories that meet the intent of the upcoming NFPA 1802 requirements. The Proposer must provide details on how this can be accomplished by the City, including the features that will be available, and the timelines for availability.

D. Portable Radio Package 1 – Law Enforcement - Encrypted
   1. Full-feature portable radio unit with top display and no key pad
      i. Top-mounted graphic/alphanumeric multi-line display with a minimum of eight characters
   2. 700 MHz and 800 MHz
   3. Two Batteries – High capacity
   4. One Hard Leather Swivel Carry Case
   5. One half-wave flexible antenna
   6. One speaker-microphone
      i. include earpiece audio connector on radio mating plug, not on cord or on microphone body
      ii. include Emergency Button on speaker microphone housing
      iii. include volume control on speaker microphone housing
   7. Encryption enabled – AES with multiple encryption key capability
   8. GPS enabled
   9. Automatic Roaming Capability between ISSI connected systems without user intervention

E. Portable Radio Package 2 – Law Enforcement – Non Encrypted
   1. Full-feature portable radio unit with top display and no keypad
      i. Top-mounted graphic/alphanumeric multi-line display with a minimum of eight characters
   2. 700 MHz and 800 MHz
   3. Two Batteries – High capacity
   4. One Hard Leather Swivel Carry Case
   5. One half-wave flexible antenna
   6. One speaker-microphone
      i. include earpiece audio connector on radio mating plug, not on cord or on microphone body
      ii. include Emergency Button on speaker microphone housing
      iii. include volume control on speaker microphone housing
   7. GPS enabled
   8. Automatic Roaming Capability between ISSI connected systems without user intervention

F. Portable Radio Package 3 – Fire Command
   1. Ruggedized Full-feature portable radio unit with top & front display and limited keypad
      i. High-visibility Housing
      ii. Suitable for use in high temperature and fireground environments
      iii. Controls, i.e. knobs and buttons, must be operable with gloved hands
   2. Multi-band VHF, 700 MHz, 800 MHz
   3. Two Batteries – High capacity
      i. FM rated/ Intrinsically Safe
   4. One removable belt clip
   5. One half-wave flexible antenna
   6. One ruggedized speaker-microphone – Remote speaker microphone (RSM) with Amplified Speaker (Audio)
      i. Suitable for use in high temperature and fireground environments
      ii. include Emergency Button on speaker microphone housing
      iii. RSM cord must be able to sustain temperatures of 500°F for 5 minutes without damaging the wiring inside.
      iv. The radio must have a feature that detects RSM cable failure by sounding an alarm to the user.
   7. Encryption enabled – AES with multiple encryption key capability
   8. GPS enabled
   9. Automatic Roaming Capability between ISSI connected systems without user intervention

G. Portable Radio Package 4 – Fire Suppression
   1. Ruggedized Full-feature portable radio unit with top display and no keypad
      i. High-visibility Housing – Color must be different from Fire Command radio
      ii. Suitable for use in high temperature and fireground environments
      iii. Controls, i.e. knobs and buttons, must be operable with gloved hands
   2. 700 MHz and 800 MHz
   3. Two Batteries – High capacity
      i. FM rated/ Intrinsically Safe
   4. One removable belt clip
   5. One half-wave flexible antenna
   6. One ruggedized speaker-microphone – Remote speaker microphone with Amplified Speaker (Audio)
      i. Suitable for use in high temperature and fireground environments
      ii. include Emergency Button on speaker microphone housing
      iii. RSM cord must be able to sustain 500°F for 5 minutes without damaging the wiring inside.
      iv. The radio shall have a feature that detects RSM cable failure by sounding an alarm to the user.
   7. Encryption enabled – AES with multiple encryption key capability
   8. GPS enabled
   9. Automatic Roaming Capability between ISSI connected systems without user intervention

H. Portable Radio Package 5 – Fire Medic
   1. Full-feature portable radio unit with full keypad and top display
      i. Top-mounted graphic/alphanumeric multi-line display with a minimum of eight characters
   2. 700 MHz and 800 MHz
   3. Two Batteries – High capacity
   4. One removable belt clip
   5. One half-wave flexible antenna
   6. One speaker-microphone
      i. include earpiece audio connector on radio mating plug, not on cord or on microphone body
      ii. include Emergency Button on speaker microphone housing
      iii. include volume control on speaker microphone housing
   7. Encryption enabled – AES with multiple encryption key capability
   8. GPS enabled

9. Automatic Roaming Capability between ISSI connected systems without user intervention

I. Portable Radio Package 6 – Public Service (Mid-tier)

1. Limited-feature portable radio unit with limited keypad and display
2. 700 MHz and 800 MHz
3. Two Batteries – Standard capacity
4. One removable belt clip
5. One antenna
6. One speaker-microphone

J. Portable Radio Package 7 – Public Service (Low-tier)

1. Limited-feature portable radio unit with display no keypad (Limited keypad and display acceptable)
2. 700 MHz and 800 MHz
3. Two Batteries – Standard capacity
4. One removable belt clip
5. One antenna

K. Portable Radio Package 8 – System Administrative and Maintenance

1. Full-feature portable radio unit with full keypad and display
2. 700 MHz and 800 MHz
3. Two Batteries – Standard capacity
4. One removable belt clip
5. One antenna
6. Encryption enabled – AES with multiple encryption key capability
7. GPS enabled
8. Automatic Roaming Capability between ISSI connected systems without user intervention

2.3.11.5 MOBILE RADIOS/CONTROL STATIONS

A. All user radio equipment must be of high quality and provides high reliability under heavy use in severe environments. Equipment must comply with applicable requirements of Part 90 and Part 15 of the FCC Rules and Regulations, as well as appropriate TIA/EIA and similar standards and must be FCC type accepted in accordance with FCC Part 90 rules and regulations for the specific application.

B. Standard public-safety mobile radio: Proposer must provide pricing for a P25 Phase 1 and Phase 2 remote mount mobile radio packages supplied complete with microphone, external speaker, cables, fusing, mounting hardware, software and licenses.

C. Standard public service mobile radio: Proposer must provide pricing for a P25 Phase 1 and Phase 2 dash mount mobile radio packages supplied complete with microphone, external speaker, cables, fusing, mounting hardware, software and licenses.

D. Control station radios: Proposer must provide pricing for a control station radio packages complete with desk microphone, speaker, and power supply with battery backup option, cables, coaxial cable and antennas to provide for a complete working package.

1. Local control station radios may be quoted in the form of a mobile radio unit with desktop microphone and external power supply.
2. Remote control station radios must be quoted as desktop package with a desktop microphone, internal power supply, and full feature digital remote deskset.
3. Rack mount control station radios must be quoted as a rack-mountable desktop package with internal power supply, no microphone, and must interface to the dispatch console system via EIA tone remote control or digital remote control.

E. Standard Public-safety mobile and local control stations must include the following features:

1. Full compliance with P25 Phase 1 and Phase 2 features and operation
2. For Mobile Radios, remote mount, with control head
3. Front-mounted on/off volume knob
4. Talkgroup / channel/ mode selector
5. Talkgroup / channel bank/ zone or deck selection
6. Automatic Roaming Capability between ISSI connected systems without user intervention
7. Microphone
8. Emergency button, protected from inadvertent activation, with software defined configurable activation delay
9. Graphic/alphanumeric multi-line display with a minimum of fourteen characters
10. Transmit indicator
11. Programmable buttons on control head
12. Selectable numeric radio signal strength indication (RSSI) and BER level
13. Minimum 5 watt speaker audio output
14. Optional full keypad on control head
15. Optional user activated external speaker (outside vehicle)
16. Optional call alert/page feature for horn/lights
17. Optional dual control heads
18. Optional Noise Cancelling Microphone with dual port technology

F. Standard Public-service mobile radios must include the following features:

1. Full compliance with P25 Phase 1 and Phase 2 features and operation
2. For Mobile Radios, dash mount, with control head
3. Front-mounted on/off volume knob
4. Talkgroup / channel/ mode selector
5. Talkgroup / channel bank/ zone or deck selection

6. Microphone
7. Emergency button, protected from inadvertent activation, with software defined configurable activation delay
8. Graphic/alphanumeric multi-line display with a minimum of fourteen characters
9. Transmit indicator
10. Programmable buttons on control head
11. Selectable numeric radio signal strength indication (RSSI) and BER level
12. Minimum 5 watt speaker audio output
13. Optional user activated external speaker (outside vehicle)
14. Optional call alert/page feature for horn/lights
15. Optional Noise Cancelling Microphone with dual port technology

G. Optional mobile and control station radio models: Proposer may provide OPTIONAL pricing for other mobile and control station radio models in addition to the required standard model offerings. These radios may include additional features or alternate configurations to the standard model radios.

H. Additional features and accessories: Proposer must provide pricing for optional features and accessories, including the following at a minimum:

1. Adapters
2. Power cables
3. External weatherproof speakers
4. Desktop microphone (control stations only)
5. Radio programming software
6. Extension cables

I. Proposer must provide detailed equipment specifications for all proposed mobiles and accessories, including the following information:

1. Radio dimensions
2. Channel/mode/zone capacity
3. General features, transmit/receive parameters, and mechanical specifications per EIA/TIA standards

2.3.11.6 VEHICULAR EXTENDER

A. Vehicular Extender must be of high quality and provides high reliability in severe environments. Equipment must comply with applicable requirements of Part 90 and Part 15 of the FCC Rules and Regulations, as well as appropriate TIA/EIA and similar standards and must be FCC type accepted in accordance with FCC Part 90 rules and regulations for the specific application.

B. The Vehicular Extender must interface to a P25 Phase 2 Trunked mobile unit, providing connection to a radio frequency (or pair) separate from the network, allowing voice traffic to be exchanged between the P25 Phase 2 Trunked network and subscriber radio units operating in a simplex conventional mode in the vicinity of the Vehicular Extender.

C. The Vehicular Extender must operate on the 700 MHz and/or 800 MHz public safety radio bands

D. The Vehicular Extender must operate on simplex channels in conventional mode

   1. The Vehicular Extender may operate on duplex channels in conventional mode as an option

E. The Vehicular Extender must operate in analog conventional mode

   1. The Vehicular Extender may operate in P25 conventional mode as an option

F. The Vehicular Extender must provide a minimum of 2 Watts RF output

G. The Vehicular Extender must have receive sensitivity appropriate for balanced operation with a portable radio of similar power

H. The Vehicular Extender must be provided as a fully functional package with antenna, mounting, all interface cables and ancillary equipment required

I. The Vehicular Extender must be provided with all programming software and cables equipment required to program from a standard PC or laptop.

2.3.11.7 MOBILE RADIO PACKAGES

A. The Proposer must provide pricing of the following mobile radio packages to be inclusive of hardware, firmware, software, and accessories.

B. Each mobile radio package is to be considered and independent proposed item. The City may at its choosing purchase the desired quantity of any package. The City may choose to award each mobile radio package to a proposer independent of the selected system contractor and/or independent of the selected contractor for other portable, mobile or control station packages.

C. Mobile Radio Package 1 – Law Enforcement

   1. Full-feature mobile radio unit with limited keypad and display
   2. 700 MHz and 800 MHz
   3. Remote mount control head
   4. Microphone
   5. External speaker
   6. One vehicle antenna
   7. Encryption enabled – AES with multiple encryption key capability
   8. GPS enabled
   9. Optional Noise Cancelling Microphone with dual port technology

D. Mobile Radio Package 2 – Fire Command

   1. Full-feature mobile radio unit with full keypad and display
   2. Multi-band VHF, 700 MHz, 800 MHz
   3. Remote mount control head
   4. Microphone
   5. External speaker
   6. One vehicle antenna

7. Encryption enabled – AES with multiple encryption key capability
8. GPS enabled
9. Optional Noise Cancelling Microphone with dual port technology

E. Mobile Radio Package 3 – Fire Command w/Vehicle Extender
1. Full-feature mobile radio unit with full keypad and display
2. Multi-band VHF, 700 MHz, 800 MHz
3. Remote mount control head
4. External speaker
5. One vehicle antenna
6. Encryption enabled – AES with multiple encryption key capability
7. GPS enabled
8. Optional Noise Cancelling Microphone with dual port technology
9. Vehicular Extender Interface Software and Cabling
10. Vehicular Extender Package with power cable and antenna

F. Mobile Radio Package 4 – Fire apparatus
1. Full-feature mobile radio unit with limited keypad and display
2. 700 MHz and 800 MHz
3. Remote mount control head
4. Water resistant external speakers
5. One vehicle antenna
6. Encryption enabled – AES with multiple encryption key capability
7. GPS enabled
8. Dual control heads (Water resistant and Extended cabling)
9. Noise Cancelling Microphones with dual port technology
10. Adapter Kit to interface with existing Fire Headsets

G. Mobile Radio Package 5 – Ambulance
1. Full-feature mobile radio unit with limited keypad and display
2. 700 MHz and 800 MHz
3. Remote mount control head
4. External speaker
5. One vehicle antenna
6. Encryption enabled – AES with multiple encryption key capability
7. GPS enabled
8. Optional Noise Cancelling Microphones with dual port technology

H. Mobile Radio Package 6 – Public Service (Mid-Tier)
1. Limited-feature mobile radio unit with limited keypad and display

2. 700 MHz and 800 MHz
3. Remote mount control head
4. External speaker
5. One vehicle antenna
6. Optional User activated external speaker (outside vehicle)
7. Optional Call alert/page feature for horn/lights w/relay kit

I. Mobile Radio Package 7 – Public Service (Low Tier)

1. Limited-feature mobile radio unit with limited keypad and display
2. 700 MHz and 800 MHz
3. Dash mount control head
4. Internal speaker
5. One vehicle antenna
6. Optional User activated external speaker (outside vehicle)
7. Optional Call alert/page feature for horn/lights w/relay kit

J. Mobile Radio Package 8 – System Administrative and Maintenance

1. Full-feature mobile radio unit with limited keypad and display
2. 700 MHz and 800 MHz
3. Dash mount control head
4. Microphone
5. Internal Speaker
6. One vehicle antenna
7. Encryption enabled – AES with multiple encryption key capability
8. GPS enabled

2.3.11.8 CONTROL STATION RADIO PACKAGES

A. The Proposer must provide pricing of the following control station radio packages to be inclusive of hardware, firmware, software, and accessories.

B. Each control station radio package is to be considered and independent proposed item. The City may at its choosing purchase the desired quantity of any package. The City may choose to award each control station radio package to a proposer independent of the selected system contractor and/or independent of the selected contractor for other portable, mobile or control station packages.

C. Control Station Package 1 – Local Control Station - Full Feature

1. Full-feature control station radio unit with full keypad and display
2. 700 MHz and 800 MHz
3. Encryption enabled – AES with multiple encryption key capability
4. Desktop Microphone
5. Control station antenna
6. Antenna cabling - up to 100 feet

D. Control Station Package 2 – Local Control Station - Limited Feature
   1. Limited-feature control station radio unit with limited keypad and display
   2. 700 MHz and 800 MHz
   3. Desktop Microphone
   4. Antenna cabling - up to 100 feet

E. Control Station Package 3 – 7/800 MHz Rackmount Control Station - Full Feature
   1. Full-feature control station radio unit
   2. 700 MHz and 800 MHz
   3. Encryption enabled – AES with multiple encryption key capability
   4. Remote control interface as required for connection to the Dispatch console system for fallback operation, to include at a minimum transmit and receive audio and mode selection
   5. Integrated Power Supply and Audio Electronics
   6. Rackmounting Hardware included
   7. Antenna cabling - up to 100 feet

F. Control Station Package 4 – UHF Rackmount Control Station - Full Feature
   1. Full-feature control station radio unit
   2. UHF 406 – 450 MHz
   3. Encryption enabled – AES with multiple encryption key capability
   4. Remote control interface as required for connection to the Dispatch console system for fallback operation, to include at a minimum transmit and receive audio and mode selection
   5. Integrated Power Supply and Audio Electronics
   6. Rackmounting Hardware included
   7. Antenna cabling - up to 100 feet

G. Control Radio Package 5 – Remote Control Station - Full Feature
   1. Full-feature control station radio unit
   2. 700 MHz and 800 MHz
   3. Encryption enabled – AES with multiple encryption key capability
   4. Integrated Power Supply and Audio Electronics
   5. Control station antenna
   6. Antenna cabling - up to 100 feet
   7. One full-feature desktop remote control unit

2.3.12 PTT APPLICATION INTEGRATION

A. The system must integrate voice and data communications between City P25 radio system users and City users with broadband devices and/or smartphone applications.

B. The system must provide Push-to-Talk (PTT) communications operating over private or public Wi-Fi networks, 3G/4G carrier networks, and Public Safety 4G LTE (Band 14) networks.

C. The system must employ Open Systems Interconnection (OSI) model Layer 2 and Layer 3 security best practices for connection to the City P25 radio network.

D. The system must include the necessary hardware, software, and licensing to provide TIA-102.BACA network-level communications and the following P25 supplemental services:

1. Group calls
2. Individual calls
3. Emergency calls
4. Call alert
5. Radio check
6. Radio detach
7. Radio inhibit/uninhibit
8. Radio unit monitor
9. Short message
10. Status query

E. The system must provide system-level encryption coming from G.711/G.729 audio streams and end-to-end encryption from radios to the dispatchers without transcoding.

F. The system must have the following features and functions:

1. Minimum of 50 simultaneous P25 group calls
2. Minimum of 50 concurrent end-to-end P25 talkgroups
3. Minimum of 1,000 talkgroups per gateway device
4. 256-bit AES encryption

G. The system must support Android™, Windows®, and iOS™ mobile platforms and support managed group and PTT communications utilizing most consumer smartphones.

H. Provide licenses for the following:

1. 150 licenses for a Windows PC version of the PTT application
2. 350 licenses for Mobile and/or Smartphone Applications

2.4 ASSET MANAGEMENT SYSTEM

A. Proposers must provide a consolidated asset management system that employs asset tracking, billing, and report generation. The inventory management system must provide the ability to be hosted on the City's network and have sufficient flexibility to be modified by the City to meet its' specific needs. Key asset management system attributes must include:

1. Inventory management of infrastructure and user equipment:
    i. Site Equipment inventories to include:
        a. Equipment Type

b. Model Number
c. Serial Number
d. Location

ii. Subscriber Unit inventories to include:
a. Equipment Type
b. Model Number
c. Serial Number
d. Department
e. Location

iii. Site maintenance entries (generator refueling, facility checks, etc.)

2. Expandable fields to track all aspects of user equipment:
i. Configuration (active features and functions)
ii. Programming (specific User radio template)
iii. Radio history (keep log of all actions performed on radio)
iv. Reports (standard reports and the ability for the City to create custom reports)
v. Trouble Ticket Fields:
a. Initiation
b. Tracking
c. Resolution Log

3. Fleet mapping Information Fields
i. Radio IDs
ii. Talkgroup IDs
iii. Priorities

4. Billable and Non-billable Users
5. Create Monthly Billing Reports
6. Support Multiple Departments
7. OPTIONAL – Integration with the radio system database to push/pull individual radio data between the Asset Management System and the core radio network.

2.5 NETWORK MANAGEMENT SYSTEM (NMS)

This section provides specifications and requirements for an integrated NMS to monitor and control the conventional and trunked systems and local and remote site facilities and equipment. The NMS must monitor and control all functions of the system. Remote Terminal Units (RTUs) will be located and connected to equipment other than the P25 system to allow control and monitoring of their functions.

Network Management Terminals (NMTs) allow managers and technicians to monitor the functions, modify parameters, reprogram, test, and otherwise remotely control the system and any equipment connected to RTUs. During detailed design, the Contractor must recommend methods to coordinate/consolidate features of the NMS and other SCADA-like (Supervisory

Control and Data Acquisition) alarm, control, and monitoring systems and recommend potential duplication of features to provide redundancy.

2.6 NMS REQUIREMENTS

A. The system must be equipped with a hierarchical NMS capable of incorporating multiple management systems into a high-level management system that provides a single-point to manage multiple systems.

B. The NMS must allow the City to monitor and ensure proper equipment configuration, operation, and integration of existing systems. Systems that the NMS must support include, but are not limited to:

1. The P25 radio system
2. Conventional radio systems
3. City backhaul network (integrate or incorporate existing microwave NMS)

C. The NMS management software configuration must be able to send all traps, alarms, and notifications to the integrated NMS.

D. The NMS must display system status and alarm conditions and must provide remote access to the system to check the operational status and view alarms throughout the network. If the monitored device supports it, this includes the ability to:

1. Monitor the health of all networked devices
2. Remotely interrogate equipment and troubleshoot to Field Replaceable Units (FRU) status
3. Configure components remotely
4. Routinely backup remote equipment configuration
5. Remotely restore equipment configuration
6. Push updates to remote equipment
7. Generate system statistical reports
    i. The proposed NMS must replicate the functions provided by the current Genesis GenWatch system.
8. Provide paging notification based on multiple levels of fault configurations
9. Maintain network components
10. Upgrade network components if necessary
11. Manage encryption capabilities
12. Manage and operate over-the-air features
13. Optimize performance
14. Manage intersystem interoperability

E. The NMS must provide seamless multi-agency network sharing with independent management of user equipment, thereby enabling seamless operation and local autonomy for local user management. Areas of management include talkgroup population, user access privileges, security assignments, failure reports, usage reports, performance reports, etc.

F. Key elements of the NMS are:

1. Local administration database

2. Real-time airtime usage
3. Real-time monitoring of network element status
4. Hierarchical updates on error conditions
5. Real-time status of network usage
6. Real-time alarm management (provides easy and intuitive maintenance)
7. Simple Network Management Protocol (SNMP) support allowing interfaces with higher-level network management systems

G. The NMS must provide subscriber inventory management and control features
   1. The NMS subscriber inventory management feature must provide tracking software configuration and provisioning data in addition to hardware inventory tracking
   2. The NMS subscriber inventory management feature must provide independent management of user equipment by agency
   3. Should subscriber inventory management and control not be available with the provided NMS system, the Proposer must provide a separate subscriber unit inventory management system
   4. The Proposer must describe the operation and features of the proposed subscriber unit inventory management and control system

H. The Contractor must supply a Manager of Managers (MOM); the MOM must manage all alarm, monitoring, control, SCADA, and other functions of the NMS and of the microwave network manager.

I. The proposed NMS must replicate the functions provided by the current MOSCAD system's Graphical User Interface.

2.6.1 NMT REQUIREMENTS

A. The network management terminal (NMT) must provide primary processing, display, and control of information to and from a variety of remote terminal unit (RTU) locations. The NMT must display system status and alarm conditions. The NMT must provide remote access to the NMS to check its operational status and to view alarms.

B. The NMT must meet the following general requirements:
   1. The NMT must have an expandable software and hardware architecture that is easily updatable by adding software modules and hardware boards.
   2. The NMT hardware and software platform must be PC-based using current versions of hardware and software.
   3. The NMT must have graphic and tabular displays and provide instantaneous and comprehensive network status information.
   4. The NMT must provide full archiving and control functions.
   5. The NMT must provide multiple alarm protocols for higher-level NMS mediated by the NMT.
   6. The NMT design must include monitoring a large cross-section of equipment so that it can consolidate multiple alarm systems, rather than just poll alarms from RTU locations.
   7. The NMT must perform full management functions with a local terminal.

8. The NMT must provide e-mail notification of alarms.
9. The NMT must provide alarm filtration and consolidation.
10. The NMT must include web browser interface for common management functions.
11. The NMT must include secure web browser interface to monitor alarms and perform control and management functions via Intranet or Internet.

C. NMT standard features:

1. The NMT must provide programmable display screens including the following:
    i. System summary – high-level screen summary window with links to other screens
    ii. Change of state – summary of points with a change of state from alarm to normal or normal to alarm
    iii. Standing alarms – summary of all points in alarm condition
    iv. Programmable alarm windows – allowing logical grouping of alarms such as by type or site

D. The NMT must provide for the graphic depiction of the network allowing annunciation and point selection via icons, including nested tree depiction of the network with drill down capability and the capability to drive external display devices.

1. Programmable console environment including:
    i. Database definition
    ii. Screen colors
    iii. Alarm summary formats
    iv. Blink attributes
    v. Pager alarm formats
    vi. Audible alert formats
2. Timestamp indicating date and time of message within 0.5 seconds
3. Conditional assignable text messages (minimum 256 characters)
4. Alarm history:
    i. Logging of all alarms to disk and printer (selectable)
    ii. Minimum history log of 500,000 entries
    iii. E-mail support – text message of alarm sent to e-mail lists
    iv. Ping interrogator – to confirm that servers, routers, and IP-based equipment are physically present on the network
    v. Editor – providing point configuration utilities to create and edit point databases
    vi. Security – multiple levels of username and password protection to all for flexible system management

E. The Contractor must provide and install 3 new NMTs to be located at the Twin Peaks facility, the Turk St location, and the 1800 Jerrold St location (Radio Shop via existing MPLS network).

2.6.2 RTU REQUIREMENTS

A. Remote Terminal Units (RTUs) must allow the NMS to monitor the status of equipment not monitored via P25 internal protocols, SNMP traps, nor the backhaul alarm system.

B. There must be at least one RTU located at each radio site used for the system. There must also be at least one RTU located at each site that serves either as a relay site for the microwave backhaul or as a non-trunked conventional radio site.

C. Equipment to be monitored or controlled by RTUs may include the following radio network components:

1. Site facilities, including equipment shelters, towers, antennas and antenna systems, lighting, power, generators
2. Microwave radios
3. Conventional radios
4. Data network equipment including routers, switches
5. Antenna System forward and reflected power as well as VSWR
6. Other equipment, including items monitored by the current MOSCAD equipment

D. RTUs must be fully compatible with the NMS and NMTs supplied and provide complementary functionality wherever necessary to provide complete control of the entire working system.

E. RTUs must support timestamp and system time synchronization.

F. Provision for terminations for all monitored points must be on suitable terminal blocks providing ease of installation, testing, and maintenance.

G. The RTU must be capable of monitoring, controlling, and tracking different alarm types (e.g., dry contact, sensor, environmental).

H. RTUs must support the following points:

1. Status/alarms – 48 minimum expandable to 256 points
2. Control outputs – 8 minimum expandable to 32
3. Analog inputs – 8 minimum expandable to 16

2.7 COMPUTER AIDED DISPATCH (CAD) INTERFACE SYSTEM

The provided trunked radio system must interface with the existing Tiburon Command CAD v2.9 system with the Maverick mapping module, providing the suite of features and services typical for public safety.

2.7.1 CAD INTERFACE SYSTEM REQUIREMENTS

It is the intent of this section to provide the specifications and requirements for an interface to the existing Tiburon, Inc. CAD system. The Proposer shall define the full feature set provided by the proposed/provided interface.

A. This interface must allow the CAD system to monitor and control portions of the trunked system.

B. The CAD Interface must allow the exchange of the following information:
   1. Channel activity
   2. Talkgroup ID
   3. Talkgroup status
   4. Radio ID
   5. Radio ID-Alias information
   6. Radio status
   7. Radio call-alert
   8. Emergency activation
   9. Emergency clear
   10. Receive GPS unit location and unit location polling information and requests

C. The interface must allow the CAD system to execute commands upon the trunking system:
   1. Initiate a group call
   2. Initiate a unit call
   3. Initiate a call-alert to a unit

2.8 UNIT LOCATION (GPS) INTERFACE SYSTEM

The system must include any gateway and server equipment required to enable unit locations services based upon GPS location transferred over the trunked system using the P25 Tier 2 GPS standard.

A. The system must support 1000 active units reporting location once every 5 minutes.

2.8.1 UNIT LOCATION (GPS) INTERFACE SYSTEM REQUIREMENTS

It is the intent of this section to provide specifications and requirements for an interface from the proposed trunked system to one or more third party application and/or data servers for the purpose of implementing location aware applications such as dispatch mapping, closest unit dispatch, etc.

The Proposer must define the full feature set provided by the proposed/provided interface.

A. The system must be fully compatible with the P25 Tier 2 GPS standard.

B. This interface must provide access to all location data generated by the user units equipped and activated with GPS receivers.

C. This interface must allow the execution of commands related to the collection of location information:
   1. Requesting a location update
   2. Establishing location poll rates
   3. Adjusting location poll rates
   4. Selecting units for “fast-polling”
   5. Disabling location poling and updates

2.9 INTEROPERABILITY

2.9.1 INTER-SUB-SYSTEM INTERFACE

The system must be equipped and enabled with the Inter-Sub-System Interface (ISSI) as specified in the P25 TIA specifications.

2.9.2 CONSOLE SUB-SYSTEM INTERFACE

A. The system must be equipped and enabled with the Console Sub-System Interface (CSSI) as specified in the P25 TIA specifications.

B. The CSSI must be equipped and licensed for 60 console positions.

C. The Contractor must disclose the equipment and licensing required to add a compatible console, from any manufacturers, to the system.

2.9.3 CONVENTIONAL STATIONS INTERFACE

A. The Contractor must incorporate all conventional fixed transmitter/receiver equipment, as described in Attachment G – Fixed Radio Information, supporting mutual aid and interoperability channels into the P25 system and include them in the system design, making these an integral part of the system.

B. All console operator positions must have access to all fixed stations, whether 700/800 MHz, VHF, or UHF as described in Attachment G – Fixed Radio Information.

2.10 SITE IMPROVEMENTS

This section includes minimum requirements for site improvements, including re-use of existing sites, mounting and wiring, grounding systems, and environment and building codes.

2.10.1 GENERAL REQUIREMENTS

A. The Proposer shall use existing City infrastructure to the greatest extent possible. Site infrastructure includes:

1. Shelter (or equipment room)
2. Heating, Ventilation, and Air Conditioning (HVAC)
3. Tower structure
4. Physical security
5. Backup generator
6. Uninterruptible Power Supply (UPS)
7. Utility connection to a commercial power source

B. The Proposer shall perform due diligence in verifying all proposed site data for inclusion in the proposed radio system.

C. The Proposer will conduct site surveys to identify the suitability of existing facilities and locations including towers, equipment rooms, power systems and HVAC for the installation of system equipment and components.

D. The tower structures, shelters (or equipment rooms), power sources, and HVAC systems at the existing facilities are in place, and for proposal purposes, are to be presumed to be in good order and in compliance with industry standards.

E. The Proposer must include a -48 VDC power system and battery plant at each proposed radio site to support **ALL** new system equipment. The Proposer shall calculate the DC power system load for new radio system equipment required at each site to determine appropriate size of the battery power plant. The City requires a run

time of at least 2 hours under the assumption that all transmitters are keyed at 100% duty cycle. Additionally, DC power systems placed at the following sites must also support the identified secondary systems:

1. Twin Peaks (CRS) - 700 MHz Interoperability System, PERS, EWDN
2. One Market Plaza – 700 MHz Interoperability System, PERS, EWDN
3. Clay-Jones - EWDN
4. Forest Hill - 700 MHz Interoperability System, EWDN
5. Ft. Miley (VA) - PERS
6. South Hill – 700 MHz Interoperability System, PERS, EWDN

F. The Proposer must identify and propose any additional equipment or modifications to City facilities necessary to support their proposed system.

G. The Contractor shall be responsible for the preparation of all environmental and building plans for the City to review and submit to the appropriate county, state, or federal agency.

H. Code Compliance:

1. Installation of all electrical equipment, power distribution, lighting assemblies, and associated wiring shall comply with all applicable city, county, state, federal, and military codes, the National Electric Code (NEC), and Occupational Safety and Health Administration (OSHA) regulations. Code compliance shall include applicable National Fire Protection Association (NFPA) codes such as the following:
    i. NFPA 1221 for system design
    ii. NFPA 75 and 76 for information technology and telecommunications facilities
    iii. NFPA 110 and 111 for emergency generators and battery plants
    iv. NFPA 70, The National Electrical Code
2. All electrical equipment shall be Underwriters Laboratories (UL) listed or approved.
3. The Contractor and any subcontractor employed by the Contractor shall comply with all applicable local codes and industry best practices including workers' safety measures.

I. The Contractor shall assume total responsibility for maintaining liability insurance covering the following items:

1. Project design
2. Implementation
3. Licenses
4. Shipping
5. Receiving
6. All site work required
7. Any other items required for the Contractor or subcontractors

J. The Contractor will coordinate with utility companies for all utility related items, such as electrical service hookups and disconnects.

2.10.2 MOUNTING AND WIRING:

A. Equipment mounting (e.g., racks, cabinets, and mounting methods) shall conform to full Zone 4 earthquake compliance in accordance with Telcordia (formerly Bellcore) GR-63-CORE Network Equipment Building System (NEBS) requirements. The Contractor must provide certification that the racks and/or cabinets used meet the Telcordia GR-63-CORE NEBS requirements for Zone 4 in their as-built documentation package.

1. Equipment placement in racks or cabinets shall be such that heavier items are placed lower in the racks while lighter items are placed higher in the racks to minimize the effect of centrifugal forces and swaying during an earthquake.
2. Bracing must also be applied to equipment during unattended periods of construction.
3. Contractor must provide certification that the anchors used to secure the racks and cabinets to shelter flooring conform to Zone 4 earthquake compliance standards, to include torque specifications for anchor nuts.
4. Certification for infrastructure installations must include a master set of drawings that have original signatures and stamps from a registered professional engineer.

B. All wiring must be installed in conduit or ductwork. Where no protection method is specified, conduit must be used.

C. All conduits and ducts must be securely surface mounted and supported by approved clamps, brackets, or straps as applicable and held in place with properly selected screws. No wiring must be imbedded inside any walls, floor or ceiling. Entrance power, outside lighting, air conditioning outlets, and telephone/radio connections are the only wiring that may penetrate shelter walls or floor.

D. All wire raceway, conduit, etc., must be mechanically joined and secured to withstand earthquakes.

E. Cable trays must be 12 inches wide, at the top of the radio equipment racks, approximately 7'8" above finished floor. Cable trays must be secured to the ceiling, anchored to at least two walls, and in compliance with the California Building Standards Code. The cable trays must be centered above the racks and parallel to the row of racks.

F. Flexible steel conduit or armored cable must protect wiring connected to motors, fans, etc., and other short runs where rigid conduit is not practical.

G. Unless otherwise specified, all power wiring shall be a minimum 12 AWG (American Wire Gauge) size solid copper conductors with insulation rated for 600 VAC.

2.10.3 GROUNDING SYSTEMS

A. The City follows the Motorola's R56 practices for the grounding of the building, electrical service, tower, cable trays, transmission line entrance portal, and all equipment and other structures. The Contractor must follow industry standard grounding practices that the City must pre-approve. If the Contractor uses grounding practices other than Motorola's R56 or Harris' AE/LZT 123 4618/1, the Contractor must provide the standards documents to the City staff and include these documents in all site documentation.

B. Grounding cables, especially those underground, shall be exothermically welded connections.

C. The shelter and tower grounding systems shall be bonded together.

D. The desired impedance of the ground system is 5 Ohms or less.

2.10.4 CALIFORNIA ENVIRONMENTAL AND BUILDING CODES

A. The Contractor must comply with all applicable city, county, state, and federal environmental regulations, local agency permit conditions of approval, and building codes for any new site(s) and existing sites that are to be modified.

B. The Contractor must comply with and satisfy all environmental, historical, and archeological regulations affecting the System and the sites. CEQA / NEPA (California Environmental Quality Act / National Environmental Policy Act) requirements must be met or shall be waived for every site affected by the rules.

C. If a new site is proposed, the Contractor must develop and submit, with no additional cost to the City, all required Environmental Impact Statements or Reports, if needed. Additionally, the Contractor must apply for and represent the City at zoning and building permit meetings and hearings.

2.11 PROJECT MANAGEMENT REQUIREMENTS

This section includes minimum requirements for the Contractor's Quality Assurance Plan; government and industry standards with which the Contractor must comply; frequency coordination and application requirements; and day-to-day operational management and change management requirements.

2.11.1 PROJECT MANAGEMENT

A. The Contractor must provide a Project Management Plan, which includes, a detailed Work Breakdown Structure (WBS), project scope, deliverables, itemized list of City responsibilities and Contractor responsibilities, project schedule, QA/QC processes, and risk management sections.

B. The Plan must describe how the Contractor intends to monitor and control the installation and deployment of the selected system and mitigate risks in order to ensure that the system meets the design specifications and is delivered on time.

C. Regularly scheduled status meetings must be established between the City Project Team and the Contractor. The Contractor must provide a schedule for these meetings subject to the approval of the City.

D. The Contractor must have a senior executive at the corporate level in attendance at every semi-annual project review with the City.

2.11.1.1 SCHEDULING

A. The Contractor must develop and maintain a project schedule including tasks, milestones, start and end dates, task prerequisites, and task owners based on an approved WBS.

B. The schedule must represent tasks associated with completing work on all items identified in the WBS. The Contractor must update the project schedule with actual dates as tasks are completed.

C. The Contractor must provide the updated schedule as an agenda item for all status meetings between the City and the Contractor.

D. The schedule must address the following at a minimum:

1. The detailed site surveys
2. Preliminary design review
3. Detailed design review
4. Site preparation
5. Equipment manufacturing
6. Factory acceptance test
7. Equipment delivery
8. System installation
9. System configuration
10. System optimization
11. Acceptance testing
12. Coverage testing
13. User training
14. Fleet map development
15. Construction completion
16. User migration and Cutover
17. System documentation development and delivery
18. System and equipment warranty

2.11.1.2 PROJECT MEETINGS

A. A project kickoff meeting must take place prior to the beginning of the project.

B. Weekly scheduled project status meetings must be scheduled following contract award and the initial kickoff meeting.

C. The Contractor will be responsible for scheduling the meetings as well as preparing meeting agendas and minutes. In addition to those identified in Section 2.11.1.1 meeting agenda items must include, as a minimum, the following items:

1. Schedule review
2. Status of deliverables
3. Risk items
4. Changes
5. Plans for the next period
6. Action item assignments
7. Punch list review

2.11.1.3 PROJECT PUNCH LIST

A. The Contractor must establish and maintain a punch list, as mutually agreed to with the City, for site facilities, equipment, and for acceptance tests.

B. The punch list must be maintained in real time and include the following at a minimum:

1. Sequential punch list item number

2. Date identified
3. Item description
4. The party responsible for resolution
5. Expected resolution date
6. Resolution date
7. Full details about how each punch list item was resolved and tested
8. Notes about the item.

C. If responsibility for resolving an item transfers to another person or group, a new entry must be added to the punch list and the original entry must be appropriately noted.

D. The Contractor will be responsible for reviewing each punch list item, and advising the City of any changes. The status of punch list items must be updated during each weekly status meeting.

2.11.1.4 PROJECT STAFFING

A. The Contractor must manage project staffing based on workload and the level of effort throughout the implementation process; however, the Contractor must staff a Project Manager and Project Engineer throughout the duration of the project. The personnel assigned to these positions must not change without prior approval by the City.

B. The City reserves the right to accept or reject any proposed staffing changes throughout the duration of the project. The City reserves the right to have the Contractor replace project staff during the project.

C. Contractor Project Manager:

1. The Contractor Project Manager (PM) must be the primary point of contact between the City and the Contractor.
2. The Contractor PM must have the following minimum experience:
    i. Have managed and successfully completed (system was accepted) at least one public safety radio project of at least $20 million.
    ii. Experience in new site development and construction
    iii. Minimum of eight years' experience as a project manager implementing technology projects
    iv. Must be an employee of the Proposer for a minimum of three years as lead project manager.
3. The Contractor PM must remain assigned as PM for the duration of this project, notwithstanding Paragraph 2.11.1.4 B.
4. The Contractor PM must be on site in San Francisco for a minimum of 75% of the time from the start of implementation until System Acceptance.
5. The Contractor PM must maintain a project office within the limits of the City and County of San Francisco or San Mateo County.
    i. Project office must have space to accommodate activities typical for a project of this size

ii. Project office must come equipped with typical office equipment such as a copier, laser printer, and conference call telephone

iii. Project office must come equipped with broadband internet connectivity (minimum 10 Mb) and Wi-Fi.

iv. Project office must accommodate up to 5 City personnel working in the office day-to-day in addition to working space for contractor employees.

6. The Contractor PM must have the authority to make business decisions that are binding for the Contractor.

7. The Contractor's Project Manager must bear full responsibility for supervising and coordinating the installation and deployment of the communications system; be responsible for development and acceptance of the Project Management Plan; managing the execution of the project against that plan; and overseeing the day-to-day project activities, deliverables, and milestone completion.

8. The Contractor's Project Manager will be responsible for coordination of the weekly status meetings.

D. Contractor Project Engineer:

1. The Project Engineer must have the primary responsibility for managing the system design and ensuring installation of the system in accordance with the approved system design.

2. Any deviation from the system design must be subject to project change control procedures and will not be undertaken until approved by the City.

3. The Project Engineer must supervise the development of block diagrams, system level diagrams, and rack diagrams to assist the installation team in completing the system installation.

4. The Project Engineer must supervise the development and execution of the Staging Acceptance Test Plan (SATP), the Coverage Acceptance Test Plan (CATP), the Final Acceptance Test Plan (FATP), and guide the project team through the processes and procedures necessary to prove that the system performs as specified in the contract. The City must approve all test plans prior to execution.

5. The Project Engineer must have the following minimum qualifications:

i. Three years' experience in configuring trunked P25 Phase 1 and Phase 2 simulcast systems

ii. Five years' experience in LMR systems for public safety customers

iii. Has been employed by the Contractor as a Lead Engineer for at least 3 years

6. The Project Engineer must be on site in San Francisco for a minimum of 50% of the time from the start of implementation until System Acceptance.

2.11.2 QUALITY ASSURANCE AND COORDINATION

A. The Contractor must include a Quality Assurance / Quality Control (QA/QC) plan for the radio system project. The Contractor must submit the QA/QC plan for review during preliminary design as described in this section. The plan must address all stages of the project, including, but not limited to:

1. System design

2. Vendor Equipment Procurement
3. Installation
4. Testing
5. Implementation
6. Cutover

B. The QA/QC plan must specifically describe the plans and procedures that ensure the proposed System design complies with the standards and requirements described in this RFP.

C. The QA/QC plan must become part of the Project Management Plan developed by the Project Manager.

D. The QA/QC plan must be an integral part of the project and include City personnel as part of the review and approval process for all deliverables and submittals.

E. The proposed QA/QC plan must address the following project tasks at a minimum:

1. Design analysis and verification
2. RF coverage analysis and verification
3. Design changes and document control
4. Material shipping, receiving, and storage
5. Site preparation (if required)
6. Field installation and inspection
7. Equipment inventory and tracking
8. System testing and validation
9. Software regression testing
10. Deficiency reporting and correction
11. Implementation and cutover
12. Training and certification

2.11.3 CHANGE MANAGEMENT

A. The change and change order management process will conform to the process and order of priority specified in the contract.

B. Either party may at any time, by written request, propose changes within the general scope of this Agreement, in the scope of work described in the Specifications, in the following:

1. Definition of services to be performed
2. The time (e.g., hours of the day, days of the week) and place of performance of the work
3. In any other aspect of Contractor's work

C. Any such requested change order ("Change Order") must be subject to the Change Order Process more particularly described in the contract.

D. The parties acknowledge that the intent of the Change Order Process is to document and formally approve all changes to the scope of work, provide an equitable adjustment in the Contract Price in the Implementation Plan, including schedule, or

both, and upon acceptance according to the Change Order Process, the Agreement will be modified accordingly.

E. If the City requests a Change Order that requires additional scope, equipment, etc. and modifies the Contract Price, the Contractor must provide a quote for the change within 14 business days of the requested Change Order.

2.12 SYSTEM IMPLEMENTATION, TEST, AND ACCEPTANCE

This section describes the implementation actions and tests needed for system staging, installation, coverage testing, acceptance testing, cutover, and system acceptance.

2.12.1 IMPLEMENTATION PLAN

A system of this scope requires a detailed Implementation Plan ("Plan") to meet City requirements to minimize disruption to operations during the migration and cutover, while minimizing the cost to the City in terms of labor and equipment installation. Users on the existing system or the new system must not be off the air at any time during the migration. The Plan must minimize operational impact to the users during migration. The Contractor must follow a thoroughly thought out Plan that is logical and considers every facet of the new system and the existing system(s).

To maintain the balance between adhering to the implementation schedule and successfully migrating users to the new system with minimal disruption to operations, the Contractor's final Plan must adhere to parameters that address and mitigate issues identified in this RFP while preserving enough flexibility to allow for creative solutions to issues that arise during transition. Significant transition issues identified here aim to provide the framework for the Plan.

The tasks of proposed system design evaluation, procurement, installation, long-term support, and sustained participation across the public safety community are all critical in the new system implementation. Because the migration of each agency or department is one of the critical components of the overall project, the following requirements must be met:

A. Proposals must include a preliminary Plan describing the phasing in of the radio users over a defined period onto the new system.

B. The objectives of the Plan are:

1. Maintaining reliable and stable mission critical communications
2. Timely deployment of a complete, functional network
3. Successful integration with existing systems, including a smooth transition from existing operations
4. Minimize operational impact for users or agencies during migration of sites, microwave interconnection, dispatch operations, and user radio equipment
5. Clear roles and responsibilities between the Contractor and the City
6. Training for all users, administrators and service personnel

C. Prior to detailed design review, the Contractor must deliver a detailed Plan describing the phasing in of the radio users over a defined period onto the new system.

D. Based on discussions from the detailed design review, the Contractor must deliver a final Plan for City review and approval.

Each agency participating in the City system will encounter a number of issues related to migration. Some migration issues will be unique to a particular agency. However, the majority of issues will be common for all agencies, such as scheduling, coordination, space limitations, changes in operations, training, and defining roles and responsibilities.

2.12.1.1 USER MIGRATION

A. CERS users migrate to the new 800 MHz P25 Phase 2 system. With regard to implementation of the P25 Phase 2 system and the migration of user radios to the new system, the Contractor must be aware of the following:

1. Project 25 – The system must operate dynamically on either P25 Phase 1 or P25 Phase 2 modulation, which allows users with either Phase 1 or Phase 2 (now or in the future) to operate seamlessly on the system. The dynamic feature also allows a Phase 2 user to communicate with a Phase 1 user with no operator intervention. A portion of the user radio equipment operating on the existing system has no P25 capability and requires replacement, while another portion may be upgraded to P25 Phase 1 and others may be capable of Phase 1 and Phase 2.

2. The migration must allow for continued PERS, EWDN, SFO, and 700 MHz I/O systems operation. While the CERS system will be decommissioned with the transition to the new system, it is the intention of this procurement to only replace the CERS system.

3. Backhaul – The City's backhaul network uses a two-tier approach with microwave and the City's fiber network to satisfy redundancy requirements. These networks are tied together through the City's MPLS architecture to ensure seamless fallback in the event of a loss of either backhaul path. The migration must allow for use of the City's fiber assets to cutover to the new CERS system, while microwave modifications, interfacing, and commissioning are completed.

B. The Contractor must also consider the following key components in their Plan:

1. Standard Operating Procedures (SOPs)

2. Training

3. Risk Mitigation

C. The Contractor must provide specific statements as to how their Plan addresses these components, keeping in mind the following parameters:

1. There may be additional frequencies available for use during implementation and migration.

2. The Plan must include a provision for the maintenance or replacement of current gateways or other interfaces to analog or non-P25 systems to prevent loss or degradation of connectivity during migration.

3. The Contractor must carefully orchestrate user radio equipment reprogramming to minimize operational disruption and unnecessary expense of overtime due to the difficulty of scheduling the availability of users for reprogramming. Eventually all user radios must be reprogrammed to operate on P25 Phase 1 and/or Phase 2. However, the reprogramming must retain existing system programming.

D. The Contractor must understand that the Plan is one of the most important parts of this project and must correctly conduct the migration. The Contractor must include backup plans and fallback procedures to mitigate risk.

2.12.1.2 STANDARD OPERATING PROCEDURES (SOPS) AND TRAINING

A. As agencies migrate from the existing system to the new system, the City understands that changes in operational procedures will be necessary to accommodate the change in technology. The Plan must address the development of these new SOPs for the new

system, defining proper operation for each participating agency, including, but not limited to the following:

1. Administrative use
2. Day-to-day operations
3. Emergency response
4. Catastrophic incidents
5. Changes to the operation of existing system features
6. Implementation and use of new system features

B. The City expects the Contractor to work with the City to adapt current SOPs to the new system in all areas of the implementation including training, to address those operational changes.

2.12.1.3 DISPATCH CONSOLE MIGRATION

A. With the number of independent dispatch centers in the system, the timing of the cutover of each console may not be determined until well into the system's implementation. Proposals must account for various timing scenarios, such as but not limited to the following:

1. Consoles installed before the system implementation (requiring new consoles to control old system components)
2. Consoles installed after the system implementation (requiring old consoles to control the new system)
3. Use of control stations to operate either on the old system or new system, preferably providing a patch through the old or new consoles
4. Both old and new consoles in place

B. It may be necessary during implementation to patch old and new talkgroups, for example, a unit in the field communicating on Talkgroup 1 on the existing system able to communicate with a user on Talkgroup 1 on the new system.

2.12.1.4 SYSTEM CUTOVER

A. The Plan must use a phased approach to bring portions of the system on as it becomes completed. Completed portions may be cutover for use by agencies. The Contractor will be responsible for planning and coordinating the implementation of all phases for the overall system.

B. Execution of the cutover must ensure the migration of the new system with minimum interruption to all existing systems and communications.

C. The Contractor must successfully complete all tests and training prior to the actual cutover of systems.

D. The Contractor must provide the necessary labor to cutover from existing systems to the new system.

1. If the plan requires reprogramming of radios, this work must be the responsibility of the Contractor

E. The Plan must include the schedule and procedures associated with the transition of each operational user group. The Plan must specifically address how the existing users will begin using the new system with minimal operational impact.

F. The Plan must provide detailed cutover activities, and specifically delineate between systems that affect and do not affect ongoing operations.

G. The Plan must delineate specific fallback procedures should any critical reduction in operability occur during cutover,

H. The City reserves the right to approve and change the Plan as it relates to cutover of any or all system components.

2.12.2 SYSTEMS STAGING

A. Each individual assembly or equipment unit must undergo factory testing prior to shipment.

B. The Contractor must submit the standard factory test documentation, documenting the tests performed and indicating successful completion of tests to the City for review and approval.

C. System Staging:

1. Staging of the complete system must take place in the United States. The intent of the staging tests is to demonstrate to the City that the system is ready for shipment and installation. The system equipment must be racked, wired, and labeled, as it will be configured in the field.

2. Prior to system staging, the City must approve the Contractor's Staging Acceptance Test Plan (SATP), documenting all tests slated for performance during staging.

3. The Contractor must provide all necessary technical personnel and test equipment to conduct staging tests. The Contractor must resolve all deviations, anomalies, and test failures at the Contractor's own expense.

4. The Contractor must use the City approved SATP. The City expects that the Contractor performed the SATP and all tests were successful before the City witnesses the official SATP. Both the Contractor and the City representatives must sign the SATP following successful completion of all tests. All tests in the SATP must be marked as either pass or fail.

5. Documentation must include any equipment or component that failed the SATP. The Contractor must repair or replace and retest any such failed equipment or component.

6. The City reserves the right to require repetition of all or any portion of the SATP after repair or replacement of any failed equipment or component.

7. The Contractor must provide the fully completed and signed SATP document to the City.

2.12.3 SYSTEM INSTALLATION

A. The Contractor will be responsible for preparing and submitting the necessary applications for site permissions/access to install system equipment at non-City owned sites.

B. The Contractor will be responsible for storage and security of all equipment until such time that the items are delivered to their final installation location.

C. The Contractor will be responsible for any leases at non-City owned sites for temporary space needed during installation and migration to the new system.

D. Installation must consist of a complete tested system to include complete alignment or adjustment of all system components, placement of associated cabling, appropriate

system layout, and terminal connections. The Contractor must provide associated power supplies and any other hardware, adapters and or connections to deliver a complete operable system to the City at the time of final acceptance.

E. Final measurements of alignment and test procedures must be recorded for inclusion in final system documentation.

F. All test equipment used for the installation of the system shall be properly calibrated with evidence of calibration provided to the City prior to work commencing.

G. Qualified, adequately trained personnel familiar with this type of work must perform all installations. All subcontractors must be preapproved by the City. Any change in subcontractor or its staff must be preapproved by the City.

H. Prior to the start of the system installation, the Contractor must participate in a mandatory project site survey with the City's representative to confirm actual equipment location within each space. At that time, the Contractor will determine and document the exact equipment locations that differ from the detailed design installation drawings by revising the drawings.

I. The Contractor must provide and pay for all materials necessary for the execution and completion of all work. Unless otherwise specified, all materials incorporated into the permanent work must be new and must meet the requirements of this specification. All materials furnished and work completed must be subject to inspection by a City authorized representative.

J. Equipment supplied as spare equipment is not acceptable if used for installation of the new system. All spare equipment supplied must be in an unused condition. Any spare parts or equipment used during installation must be replaced with new.

K. All equipment and devices must be clean internally and externally, and all damaged finishes repaired.

L. Workers must leave worksites neat and broom swept upon completion of work each day. Prior to final field acceptance, all shelter floors will be thoroughly cleaned and all scuff marks and abrasions will be removed. All trash must be removed daily.

M. Inspection:

1. The City and the Contractor's Project Manager must conduct an inspection of each installation upon substantial completion, and must document any deficiencies on a single punch list provided to the Contractor for resolution.

2. Unless otherwise approved by the City, final field acceptance testing at any site must not commence until all punch list items are resolved for that site and for any site that the testing involves.

N. All decommissioned equipment must be removed once Final Acceptance testing has been completed and passed.

1. Decommissioned equipment must be delivered to City designated collection point or disposed of in accordance with City procedures.

2.12.4 FLEET MAPPING

A. The Contractor must develop the actual fleet map with input and direction from the City. The fleet map must contain at a minimum:

1. Talkgroup ID

2. Work Unit or Division

3. Emergency actions

4. Encryption capability
5. Roaming capability
6. Priority

B. The Contractor must also work with City staff to develop templates for user radio programming. These templates must have the basic features and functions defined for a particular user radio and user type. Templates must be developed on a per work unit or division basis.

C. Fleet maps and templates must include other agencies' systems to allow interoperability without ID and code conflicts per Attachment I –BayRICS Regional ID Plan.

D. Prior to programming user radio units, the Contractor must program a set of radios with each template. The City will test these radios and approve or recommend changes to the templates.

E. Once the Contractor completes the fleet map and the City approves the templates, the Contractor must use the templates for programming, alignment, and installation of user radios and for further configuration of the system. The Contractor must submit these templates with the final as-built documentation.

F. The Contractor must create all required provisioning datasets to be entered into the radios and the system from tabular information.

1. The datasets must be created from tabular data provided by the City and the contractor developed fleet map.
2. Carryover or direct importation of provisioning, fleet map and other configuration data from existing systems is not acceptable.

G. Once the Contractor completes the fleet map and the City approves the templates, the Contractor must supply one laminated radio guide for each radio supplied by the contractor plus an additional 10% for spare replacements.

1. Radio guides must include channel and/or talkgroup assignments within each zone or bank. Where abbreviations are used in a displayed mode name, the full name and description of use should be included next to the mode name.
2. Channels and talkgroups must be color-coded or use similar symbology to easily distinguish between trunked or conventional modes, direct versus repeated modes, main versus interoperability modes, and encrypted versus unencrypted modes.
3. The size of the radio guide will be dictated by the type of radio:
    i. Mobile Radio guides must be formatted as a foldable tri-fold pamphlet such that the guide can easily be placed in a vehicle glove compartment or sun visor or other convenient location.
    ii. Portable Radio guides must be formatted as a 3" x 5" booklet such that the guide can easily be carried in a clothing pocket.
4. Radio guides must include a pictorial representation of the radio and show the function of the various knobs, display icons, buttons, and switches on the radio as programmed.
5. Contractor must provide the editable source file (e.g. Microsoft Word, Publisher, PowerPoint, etc.) used for developing radio guides as part of the as-built documentation suite.

2.12.5 SUBSCRIBER INSTALLATION

A. Contractors must complete the following for all subscriber radios:

1. Perform initial alignment and adjustment of the subscriber radios according to a City approved procedure
2. Program subscriber radios based upon the approved programming templates and fleet map
3. Provision subscriber radios in the system core using authorized Unit ID per the fleet map and serial number
4. Inventory upon receipt capturing, at a minimum, serial number, model number, programming template, and department.
5. Deliver the unit to authorized personnel.

B. Contractors must install mobile radios using the following criteria:

1. Contractor must install mobile radios at facilities specified by each department.
2. Install the mobile in a standard police vehicle, fire vehicle, or public service vehicle, according to a City approved installation procedure
3. Installations utilizing mobile mounting hardware appropriate for the type of vehicle
4. Obtain main power from the leads from a voltage source identified by the City
5. Permanently mount the antennas on each vehicle according to the approved installation procedure, appropriate for the vehicle type.
6. Install new antennas close to the same location as any existing antennas, where practical, in vehicles that already have antennas installed. Install the antennas on the roof, where practical, on any new antenna installations.
7. Properly seal any unused antenna holes with an appropriate rubber plug, if the antenna requires a new location on the vehicle.
8. Remove the existing mobiles from the vehicles at the time of installation of new radios.
9. Perform a radio check according to a City approved procedure
10. Inventory all removed equipment and deliver to authorized City personnel for disposition.

C. Contractors must install control stations at the department specified location using the following criteria:

1. Obtain main power from a voltage source identified by the City
2. Permanently mount the antennas as required according to the approved installation procedure for each control station location.
3. Install new antennas close to the same location as any existing antennas, where practical. Remove and dispose of decommissioned antennas as per other equipment requirements.
4. Properly seal any unused wall penetrations with appropriate material.
5. Remove the existing control station at the time of installation of new equipment providing it is not required for continued operation or a transition period.
6. Perform a radio check according to a City approved procedure

7. Inventory all removed equipment and deliver to authorized City personnel for disposition.

2.12.6 COVERAGE TESTING

A. During the Detailed Design Stage of the project, the Contractor must revise and finalize the preliminary Coverage Acceptance Test Plan (CATP) provided in the proposal. The Contractor must then submit the final CATP to the City for approval.

B. The Contractor must complete coverage testing of this system with witnesses from the City, utilizing automated Bit Error Rate Testing (BER). The Contractor must submit appropriate documentation indicating that the portable radio used for the testing has been lab tested confirming the Bit Error level, which will yield the equivalent of a DAQ 3.4 audio quality. Subsequent system testing must be to that level.

C. The City will witness the entire coverage testing process. For test purposes, the Contractor must divide the City into square grids and test each grid section.

D. CATP:

1. The CATP must be consistent with the procedures and guidelines outlined in TSB-88.3C or latest revision.
2. Coverage testing must commence only after the entire system is fully tested and aligned. Significant changes to the system (i.e., optimization or adjustments) will require retesting of coverage at the discretion of the City.
3. The Contractor must perform automated objective mobile drive testing based on normal driving speeds.
4. Automated testing must serve to fully verify that system coverage meets coverage requirements, both technically and operationally.
5. Subjective (voice quality) coverage testing must be performed for a random sample of the grid tiles for 10% of total tiles. If the subjective testing does not agree with objective measurement of the tile, the worse of the two will be used as the measurement of that tile.
6. The Contractor must provide all necessary technical personnel, vehicles, and test equipment to conduct CATP tests. All deviations, anomalies, and test failures must be resolved at the Contractor's expense.
7. In the event of a coverage test failure and the remedy is the addition of a site, the contractor shall provide all equipment necessary to deploy the additional site. Additionally, the contractor shall also be liable for site operational costs such as facility lease costs and utility costs for a period of 15 years.
8. Automated Objective Mobile Drive Testing:
    i. The Contractor must test both inbound and outbound BER at a statistically significant number of test locations throughout the service area utilizing mobile and/or portable radios equivalent to those that will be used in the field.
    ii. Inaccessible grids must not count as a pass or a fail in the statistical analysis.
9. Test Configurations:
    i. Testing configurations for automated and intelligibility testing must represent typical operating configurations to the greatest extent

possible, using the actual portable and mobile radio equipment intended for use with the system.

ii. All base station and repeater stations must be operational and activated for the duration of the tests.

iii. All tests at all test locations must include actual talk-out and talk-in measurements.

iv. Radio equipment used for coverage testing must operate within nominal tolerance of published specifications.

v. All equipment must be laboratory certified in the parameters used for measurements. All test equipment must be calibrated to test both inbound and outbound BER. The Contractor must supply documentation that verifies a specific BER will yield an audio DAQ 3.4 equivalent operating on a P25 Phase 2 system.

vi. The Contractor must divide the City into test grids. Grid sizes must be based on dB loss values included in Attachment B – Coverage Boundaries and Loss Zones:

a. On-street and 12 dB area grid sizes must be ¼ mile x ¼ mile in size.

b. 23 dB area grid sizes must be 1/8 mile x 1/8 mile in size.

c. 30 dB area grid sizes must be 1/16 mile x 1/16 mile in size.

10. Contractor shall deliver to the City a complete report detailing the results of coverage testing. Report shall include an Executive Summary, Grid Map depicting Pass/Fail Results, Grid BER readings, and Grid signal strength readings.

2.12.7 IN-BUILDING COVERAGE TESTING

A. During the Detailed Design Stage of the project, the Contractor must revise and finalize the preliminary In-building Coverage Acceptance Test Plan (CATP) provided in the proposal. The Contractor must then submit the final in-building CATP to the City for approval.

B. The Contractor must complete coverage testing of this system with witnesses from the City, utilizing automated Bit Error Rate Testing (BER).

C. The Contractor must submit appropriate documentation indicating that the portable radio used for the testing has been lab tested confirming the Bit Error level, which will yield the equivalent of a DAQ 3.4 audio quality. Subsequent system testing must be to that level.

D. The City will witness the entire coverage testing process. For test purposes, the Contractor must divide each Critical Building into uniform square grids and test each grid.

E. Critical In-building CATP:

1. The CATP must be consistent with the procedures and guidelines outlined in NFPA 1221, NFPA 72, and TSB-88.3C latest revision. Coverage testing must commence only after the entire system is fully tested and aligned. Significant changes to the system (i.e., optimization or adjustments) will require retesting of coverage at the discretion of the City.

2. Automated testing must serve to fully verify that system coverage meets coverage requirements, both technically and operationally.

3. Subjective (voice quality) coverage testing must be performed for a random sample of the grid tiles for 10% of total tiles. If the subjective testing does not agree with objective measurement of the tile, the worse of the two will be used as the measurement of that tile.
4. The Contractor must provide all necessary technical personnel, and test equipment to conduct in-building CATP tests. All deviations, anomalies, and test failures must be resolved at the Contractor's expense.
5. Test Configurations:
    i. Testing configurations for automated and intelligibility testing must represent typical operating configurations to the greatest extent possible, using the actual portable radio equipment intended for use with the system.
    ii. All base station and repeater stations must be operational and activated for the duration of the tests.
    iii. All tests at all test locations must include actual talk-out and talk-in measurements.
    iv. The Contractor must divide each Critical Building into test grids using building floor plans. Grid sizes must be comparable in size to other test grids in that building.
    v. Radio equipment used for coverage testing must operate within nominal tolerance of published specifications.
    vi. All equipment must be laboratory certified in the parameters used for measurements. All test equipment must be calibrated to test both inbound and outbound BER. The Contractor must supply documentation that verifies a specific BER will yield an audio DAQ 3.4 equivalent operating on a P25 Phase 2 system.
    vii. Automated Objective Building Testing:
        a. The Contractor must test both inbound and outbound BER at a statistically significant number of test locations throughout the service area utilizing portable radios equivalent to those that will be used in the field.
        b. Inaccessible grids must not count as a pass or a fail in the statistical analysis.

2.12.8 INFORMATION-ONLY IN-BUILDING COVERAGE TESTING

A. Located with the City limits are several buildings that are exempt from the City’s in-building coverage ordinance, yet are critical due to their size, number of potential occupants, or function. These buildings are generally not owned by the City and subject to differing rules depending on ownership, time of construction, etc.

B. To ensure that the City understands the level of coverage the new system will provide in these buildings, the Contractor must perform an information-only coverage test for these buildings. The results from these tests are to be treated as information-only and NOT as a requirement for acceptance

C. The Contractor must complete coverage testing of this system with witnesses from the City, utilizing automated Bit Error Rate Testing (BER).

D. The Contractor must submit appropriate documentation indicating that the portable radio used for the testing has been lab tested confirming the Bit Error level, which

will yield the equivalent of a DAQ 3.4 audio quality. Subsequent system testing must be to that level.

E. The City will witness the entire coverage testing process. For test purposes, the Contractor must divide each Building into uniform square grids and test each grid.

F. Information-only In-building Coverage Testing:

1. The coverage test must be consistent with the procedures and guidelines outlined in NFPA 1221, NFPA 72, and TSB-88.3C latest revision. Coverage testing must commence only after the entire system is fully tested and aligned. Significant changes to the system (i.e., optimization or adjustments) will require retesting of coverage at the discretion of the City.
2. Automated testing must serve to fully verify that system coverage meets coverage requirements, both technically and operationally.
3. The Contractor must provide all necessary technical personnel, and test equipment to conduct the informational in-building coverage tests.
4. Test Configurations:
    i. Testing configurations for automated testing must represent typical operating configurations to the greatest extent possible, using the actual portable radio equipment intended for use with the system.
    ii. All base station and repeater stations must be operational and activated for the duration of the tests.
    iii. All tests at all test locations must include actual talk-out and talk-in measurements.
5. The Contractor must divide each Building into test grids using building floor plans. Grid sizes must be comparable in size to other test grids in that building.
6. Radio equipment used for coverage testing must operate within nominal tolerance of published specifications.
7. All equipment must be laboratory certified in the parameters used for measurements. All test equipment must be calibrated to test both inbound and outbound BER. The Contractor must supply documentation that verifies a specific BER will yield an audio DAQ 3.4 equivalent operating on a P25 Phase 2 system.
8. Automated Objective Building Testing:
    i. The Contractor must test both inbound and outbound BER at a statistically significant number of test locations throughout the service area utilizing portable radios equivalent to those that will be used in the field.
    ii. Inaccessible grids must not count as a pass or a fail in the statistical analysis.
9. The Contractor must develop a Test Report for submittal to the City within 1 month after the conclusion of testing all buildings. The Test Report will detail the level of coverage within each building as a percentage; provide a floorplan map showing which grids passed or failed along with a tabular reference depicting BER and Signal Strength for each grid; and provide a cost estimate and method (BDA, DAS, etc.) necessary to bring the building into coverage compliance.

2.12.9 FINAL ACCEPTANCE TESTING

A. Prior to Final Acceptance Testing, the Contractor must verify and document that all equipment (including user radios purchased during and added on the system after implementation), hardware, and software are upgraded to the then latest factory revision. Multiple revision levels among same equipment types are not acceptable.

B. The Contractor must provide two weeks written notice to the City that the system is ready for final acceptance testing.

C. The Final Acceptance Test Plan (FATP) must test all items described in the detailed design documents.

D. The City will witness the entire final acceptance testing process.

E. Final Acceptance Test Plan:

1. The Contractor must use the completed and City-approved FATP. The City expects that the FATP has been performed and all tests have been successful before the City witnesses the official FATP. Both the City representatives and the Contractor must sign the FATP following completion of all tests. All tests in the FATP must be marked as either pass or fail.
2. The Contractor must provide all necessary technical personnel and test equipment to conduct FATP tests. All deviations, anomalies, and test failures must be resolved at the Contractor's expense.
3. The Contractor must document, repair, replace and retest any equipment that fails any test. The Contractor must replace and retest all defective components.
4. The City reserves the right to require retesting of any equipment that fails any test, after repair or replacement. This includes repetition of any portion or all of the FATP tests.
5. The Contractor must deliver the fully executed and completed FATP document to the City.

2.12.10 AS-BUILT DOCUMENTATION

A. The Contractor must provide final “As-built” documentation on DVD in electronic form, all drawings provided in AutoCAD®, and all others in native format or Adobe Portable Document Format (PDF), as well as five bound, hard copy sets. Hand modified drawings are not acceptable. Hard copies of all drawings must be 11” x 17”.

B. At the completion of the installation phase, the Contractor must provide complete as-built documentation as outlined below:

1. Equipment provided
2. Plan and elevation drawings of all equipment including antennas on towers
3. Cabling and terminations
4. Block and level diagrams
5. Fleet mapping and programming
6. Setup, configuration, and alignment information including final settings for each piece of system equipment
7. Successfully completed, signed, and dated Coverage and Final Acceptance Test Plans

2.12.11 180-DAY OPERATIONAL BURN-IN

A. The Contractor must plan a 180 calendar-day operational burn-in period of the entire system to ensure that all hardware and software defects have been corrected following the final proof of performance testing for components.

B. The conditions of the test must be determined during Detailed Design with plans including loading the system as fully as approved by the City. City staff must monitor the burn-in period. The integrated operation of the system must be demonstrated during this period.

C. The test design must demonstrate the reliability, long-term stability, and maintainability of the systems including all components implemented at that point.

D. A Critical failure of the system during this test will cause the 180-day burn-in period and warranty to reset and restart from the beginning after completion of the repair. A Critical Failure is defined as follows:

1. Any failure which causes a loss of 15% or more in capacity or coverage (Any failure resulting in the loss of one entire trunked site or 2 or more simulcast channels at all sites.)
2. Any failure which causes a loss of simulcast capability
3. Any failure which causes a loss of the primary Core
4. Any system failure that causes the loss of two or more consoles
5. Any failure that renders the logging recorder inoperable
6. The failure of two or more repeaters
7. Concurrent failure of three or more switches and/or routers
8. Failure of the receiver voting system
9. Corruption of any system database

E. System must be fully loaded (all users must be fully migrated).

2.12.12 SYSTEM ACCEPTANCE

A. The system will be ready for System Acceptance after successful completion and approval of the following:

1. Final Detailed Design
2. Staging Acceptance Test
3. All contracted installations completed
4. Final installation inspection and installation punch list resolution
5. As-built documentation
6. Coverage Acceptance Test
7. Final Acceptance Test
8. Punch list resolution
9. 180-Day Operational Burn-in

B. System Acceptance must not occur based on any other factor, including the assertion of beneficial use.

2.13 TRAINING

2.13.1 GENERAL

A. The Contractor must have representation at all training classes to answer questions.

B. The Contractor must develop and conduct training programs to allow the City personnel to become knowledgeable with the system, subsystems, and individual equipment.

C. The City must approve the training syllabus prior to the Contractor starting the training.

D. All training should be tailored to the City's individual implementation of the radio system and various subsystems and components that are installed.

2.13.2 TECHNICAL AND SYSTEM MANAGEMENT TRAINING

A. Technical and System Management training is of the highest priority for the City. City personnel will manage, configure, and maintain the system.

B. The Contractor must train the City employees or designated individuals. The quantity of trainees expected for technical training includes 30 technicians total and 2 engineers over 3 separate sessions.

C. **Technical Training:** The Contractor must provide comprehensive technical training for the City technical staff charged with managing the system. This training must include, but will not be limited to:

1. Planning and configuring the new system
2. Developing and implementing system and network profiles and configurations
3. Performing database management functions
4. Monitoring and managing the system's performance
5. System maintenance, repair, and troubleshooting
6. Writing and printing system reports
7. Using the Contractor provided coverage modeling tool

D. The Contractor must train the City employees or designated individuals. The quantity of trainees expected for system management training includes 30 technicians total and 2 engineers over 3 separate sessions.

E. **System Management Training:** The Contractor must provide system management training including the following:

1. Network Management System (NMS) operation and control
2. Fleet mapping and radio programming
3. Dispatch console system administrator

2.13.3 OPERATOR TRAINING REQUIREMENTS

A. The Contractor must provide comprehensive operational training covering features, operation, and special care associated with the equipment supplied.

B. Contractor must produce customized, department specific, online interactive training materials and videos.

C. The Contractor must train the City employees or designated individuals. The quantity of train-the-trainer trainees expected for operator training includes 15 participants total over 25 separate sessions at locations identified by each department.

D. Operator training must include the following categories:

1. Portable Unit Operation (structured as on-site at City specified location, Train-the-Trainer)
2. Mobile Unit Operation (structured as on-site at City specified location, Train-the-Trainer)
3. Dispatch Console Operation (on-site at City specified location, Train-the-Trainer)

E. The Contractor must provide computer-based customizable training materials for use by City trainers in subsequent training to train City user personnel.

2.13.4 OTHER TRAINING REQUIREMENTS

A. The Contractor must conduct all training at a location selected by the City. The Contractor must coordinate with the City regarding number of attendees and schedule.

B. The Contractor must schedule classes for technical support and operators/users as near to system cutover as possible. The Contractor must schedule classes beneficial for engineering support by the City engineering personnel as early as possible after contract award so that the City engineering personnel have full understanding of the system architecture as implementation progresses.

C. The Contractor must provide all instructional material, including printed manuals, audio, video, interactive self-paced personal computer programs, and complete equipment-operating instructions for all technical and operational training classes.

D. The Contractor must provide exact model and series of equipment being delivered for hands-on use and operation during training.

E. All instructional material provided must be subject to the approval of the City and must become property of the City.

2.14 WARRANTY, MAINTENANCE, AND SUPPORT

The Contractor support includes the initial 1-year warranty, 24x7 on-site support, software and firmware upgrade support, and spare parts and equipment.

2.14.1 WARRANTY

A. The system and subscribers must include a warranty period of 1 year. The warranty period must commence upon System Acceptance defined in Section 2.12.12.

B. System performance, installation, and all hardware, parts, software, and materials (including third-party equipment) must be warranted for a period of 1 year, including all related return and delivery fees.

C. The Contractor must provide their top tier of 24x7 on-site support for the first 12 months following System Acceptance.

D. The Contractor must provide a single toll-free telephone number that is staffed and available 24 hours a day, 7 days a week, 365 days a year, for service requests and warranty claims.

E. Beginning 12 months after System Acceptance, the City technical staff must be the first line of maintenance with the Contractor providing support as required. City

personnel will escort the Contractor to all sites requiring Contractor level on-site support.

F. Service and repair must be performed 24 hours a day, 7 days a week, 365 days a year. There must be no additional charges for work outside of normal Contractor business hours.

G. The City must have the right to perform any maintenance and/or repairs required during the warranty period without voiding or affecting the Contractor's warranty.

H. In the event that Contractor level support is required, the following repair response time and repair-completed time criteria must be in effect:

1. The Contractor must contact the City within 30 minutes of telephone notification by the City of a Critical Service issue. The City defines Critical Service issue as an event that results in a loss of voice traffic on the system as follows:

   i. Any failure which causes a loss of 15% or more in capacity or coverage. (Any failure resulting in the loss of one entire trunked site or 2 or more simulcast channels at all sites.)

   ii. Any failure which causes a loss of simulcast capability

   iii. Any failure which causes a loss of the primary core

   iv. Any system failure that causes the loss of two or more consoles

   v. Any failure that renders the logging recorder inoperable

   vi. The failure of two or more repeaters

   vii. Concurrent failure of three or more switches and/or routers

   viii. Failure of the receiver voting system

   ix. Corruption of any system database

2. The Contractor's qualified service representative and the City representative must attempt to resolve the Critical Service issue over the phone or via remote network management.

3. If the Contractor's qualified service representative and the City representative cannot resolve the issue remotely or over the phone, then the City must make the determination regarding the criticality of the service issue and whether the Contractor must dispatch qualified service representative to the site experiencing the service issue. The Contractor's qualified service representative must be physically present at the site that requires service within 4 hours of City's decision to escalate the call to on-site service. On-site Contractor's service representative must make every effort to resolve the Critical Service issue within 12 hours from the time the critical service issue was reported.

4. For all other (non-critical service) issues, the Contractor must categorize the priority of the issue (at a minimum, levels 2-5) and have a tiered repair response time and repair-completed time criteria to cure the system issue.

I. The Contractor must repair all equipment, hardware, and software throughout the implementation, migration, and warranty periods.

J. The following procedures must be followed during the warranty period:

1. The Contractor must provide the City with written documentation indicating the cause of the service outage, the resolution, and all post-repair testing procedures

to ensure proper operation. In the event the Contractor uses City-owned spares to complete a repair, the documentation must include the model and serial number of both the defective unit and the spare.

2. Hardware:
    i. For all equipment needing factory or depot repairs, the Contractor must maintain a comprehensive tracking system to track units to and from the factory/depot.
    ii. Replacement parts must be new or original repaired parts only.
    iii. Fixed equipment mail-in board repair must be completed within seven calendar days of receipt. Equipment must be returned to the City via second-day shipping, with tracking number provided to the City.
    iv. Serialized units sent in for depot repair must not be exchanged unless specifically authorized by the City. The original unit must be repaired and returned.
3. Software and Firmware:
    i. The Contractor must warrant all software and firmware.
    ii. During the installation and warranty periods, the Contractor must provide, at no additional cost, commercially available upgrades of all software and firmware originally sold to the City. The frequency and timing of installation of upgrades during this period must be at the sole discretion of the City based on availability by the Contractor.
    iii. The Contractor must make every effort to separate corrective revisions from enhancements. If the Contractor is unable to do so, and new releases are necessary to correct problem(s), then the Contractor must provide the entire release (including hardware and firmware enhancements as required) to the City at no additional expense.
    iv. The Contractor must provide all back-up media and revised software manuals to the City at the time of any software revisions at no cost.
    v. The Contractor must update all devices to the same and latest release level prior to the conclusion of the warranty period at no additional cost to the City.

K. Recurring Failures and Manufacturer Defects:

1. Any fixed equipment or fixed equipment module that fails twice during the acceptance test or twice during the first twelve months after System Acceptance must be indicative of a recurring or systemic failure or defect that warrants further investigation by the Contractor and City. If the defect is deemed by the City to be systemic after the investigation is completed, the Contractor must then be responsible for replacing at no additional cost to the City all fixed equipment and/or fixed equipment modules related to the recurring or systemic failure, not only the specific equipment affected.
2. The Contractor, at no additional cost to the City, must correct latent design defects or recurring problems relating to software, firmware, hardware, or overall system design, during the warranty period.
3. During the warranty period, the Contractor must correct all system malfunctions due to software at no additional cost to the City.

4. If, during the first 5 years after System Acceptance, 25% of any type of Contractor supplied equipment or material fails, Contractor must replace this equipment or material at no additional cost to the City.

2.14.2 SOFTWARE AND FIRMWARE UPGRADE SUPPORT

The Contractor must provide software and firmware upgrades during the warranty period at no additional cost to the City.

2.14.3 PARTS AVAILABILITY

A. The Contractor must certify that replacement parts for all delivered equipment must be available for a period of at least 10 years after the equipment is no longer in production.

B. In the event the Contractor plans to discontinue manufacture of any product-line or stocking any part required for maintenance in the City system, the Contractor must send written notice to the City 24 months prior to the date of discontinuance to allow for last-time buys and spares replenishment.

2.14.4 SYSTEM SPARE EQUIPMENT

A. The Contractor must include recommended initial spare parts and equipment to be procured as part of the initial contract for the system, subsystems, and individual equipment.

B. The initial spare parts and equipment must include, but is not limited to, the following:

1. All Contractor identified Field Replaceable Units (FRUs)
2. All infrastructure components having no FRUs, but that can cause a critical failure (e.g., antenna systems, other non-modular components), including all third party equipment items
3. Power supplies
4. Required and/or recommended test, measurement, calibration, and repair kits
5. Recommended diagnostic equipment to support City maintenance activities
6. Initial spares for less critical items must also be enumerated

C. The spare parts and equipment must include items that will rapidly and completely restore all critical system functionality with the least amount of effort (e.g., board replacement instead of troubleshooting to component level when a critical unit fails).

D. The Contractor must determine the types and quantities of spares based on their proposed system size and design.

E. The Contractor must define the primary equipment category each spare kit supports (e.g., transceiver board for a base radio or interface board for a router).

2.14.5 LIFECYCLE SUPPORT

A. The Contractor must provide spare parts and equipment at a discounted rate for the life of the contract.

B. The Contractor must provide technical support at a discounted rate for the life of the contract.

C. The Contractor must provide engineering services at a discounted rate for the life of the contract.

2.14.6 OPTIONAL SYSTEM POST-WARRANTY SUPPORT

A. The City must have the option to purchase post-warranty service for the system. The Contractor must offer OPTIONAL service tier(s) for the system for years 2 through 18, in 1-year increments.

B. Software Support and Upgrades: The Contractor must provide discounted software support and upgrades for the system.

   1. The City requires a firm fixed price for system hardware and software refresh (Parts, software and services) to bring the system up to the then current revision level at 6 years and 12 years post Final System Acceptance.

C. Extended Warranty: The Contractor must offer extended warranty for all supplied equipment for up to an additional 2 (total of 3) years in 1-year increments.

3.0 SUBMISSION REQUIREMENTS

3.1 TIME AND PLACE FOR SUBMISSION OF PROPOSALS

Proposals must be received by 5:00 p.m., on August 24, 2015, 5:00 PM. Postmarks will not be considered in judging the timeliness of submissions. Proposals may be delivered in person and left at the Sheriff Front desk at 1011 Turk St. San Francisco, CA 94102 or mailed to:

Department of Emergency Management
1011 Turk St.
San Francisco, CA 94102

Attn: 800 MHz Radio Replacement Project RFP

Proposers shall submit 10 hard copies of the proposal and two copies, separately bound, of required CMD Forms in a sealed envelope clearly marked "**800MHz Radio Replacement Project – CMD forms**" to the above location. In addition, please submit 2 USB drives with a soft copy of the proposal and CMD forms included on the drive. Proposals that are submitted by fax will not be accepted. Late submissions will not be considered.

3.2 FORMAT

Please use three-hole recycled paper, print double-sided to the maximum extent practical, and submit it in a three-ring binder. Please do not bind your proposal with a spiral binding, glued binding, or anything similar. You may use tabs or other separators within the document.

For word processing documents, the department prefers that text be unjustified (i.e., with a ragged-right margin) and that pages have margins of at least 1" on all sides (excluding headers and footers).

3.3 CONTENT

Firms interested in responding to this RFP must submit the following information, in the order specified below:

Technical Proposal Contents

1. Cover Letter
Section 1 shall be a Cover Letter and introduction, and shall include the name and address of the organization submitting the proposal, together with the name, address and telephone number of the contact person who will be authorized to make representations for the organization, the firm's federal tax ID number and a list of subcontractors, if any. The cover letter shall include a statement that the proposal is valid for 180 days after receipt.

2. Table of Contents
Section 2 shall be a detailed Table of Contents and shall include an outline of the submittal, identified by sequential page number and by section reference number and section title as described herein.

3. Executive Summary
Section 3 shall be an Executive Summary containing a brief overview of the proposed system and offered services.

4. Proposer Capabilities

Section 4 shall include a description of the proposing firm's resources, experience, and capabilities as listed below for successfully developing and completing this project as well as resumes of the staff to be assigned to the project. Submit in the order identified below:

- Background and Experience. In this section, describe your firm's background, its organizational structure, identify decision-making roles, and why this is advantageous to the project. Describe the roles and background of the design team leader and key team members. Describe the firm's demonstrated experience in developing 800 MHz P25 Phase 2 Trunked Radio Systems.
- Key Personnel. Provide resumes describing the background and qualifications of key personnel your firm would use on this project, including any subcontractors that are considered as key personnel on this project. At a minimum, key personnel shall include:
    - Account Manager
    - Project Manager
    - Project Engineer
    - Project Technician
    - Subcontractor(s), if proposed
- Scheduling. Delineate the project scheduling process your firm uses. Use some or all of the projects in the Firm's Experience Summary section (Section 5. below), as well as other projects (if necessary), as specific examples, which demonstrate your ability to deliver your work on time.

5. Firm's Experience Summary

Section 5 shall briefly describe three (3) similar projects completed along with a discussion comparing similarities with this proposed project. Include project reference contact information, including names, titles, email addresses, and telephone numbers for each sample project.

6. Solution Architecture

Section 6 shall be a detailed description of their approach and methodology to develop a design to meet the City's needs. The description should include details on the following items:

- Radio communications system
- Microwave backhaul connectivity
- Radio dispatch console equipment
- Subscriber equipment
- Site infrastructure
- Additional subsystems
- RF coverage predictions
- System design information shall include a complete detailed description, block diagrams, equipment layouts, and equipment lists necessary to provide a complete and comprehensive description.

7. Project Management Plan

This section shall outline how the contractor's team intends to prepare and complete all tasks identified in their proposal including a preliminary schedule with a detailed Gantt

chart with durations for each task in this project. Proposers shall include in this section proposal level versions of the following:

- Statement of Work and Work Breakdown Structure, with deliverables, detailing Contractor Responsibilities and City Responsibilities
- Staging Acceptance Test Plan
- Coverage Acceptance Test Plan
- Migration Plan
- Final Acceptance Test Plan

This section shall also describe the Proposer's Training, Warranty, System Support, Maintenance, and Product Availability plans along with any other items not specifically covered in other sections.

8. Point-by-Point Compliance

Section 8 shall be a Point-by-Point compliance matrix. The Point-by-Point compliance matrix shall be completed in its entirety. Any submitted proposal with a partially completed Point-by-Point compliance matrix shall be deemed non-responsive.

9. Marketing Collateral

Section 9 shall include specification sheets of all proposed equipment. Additional marketing collateral deemed relevant to the project by the proposer shall be included in this section.

Cost Proposal Contents

Please provide the fee proposal in a separate sealed envelope, clearly marked "**800MHz Radio Replacement Project – Fee Proposal**" to the above location.

The fee proposal must include the following:

1. Fee Proposal

Total fee for each of the disciplines identified in the Scope of Work with a not-to- exceed figure; and

Hourly rates for all team members. Hourly rates and itemized costs may be used to negotiate changes in the Scope of Work if necessary.

Detailed equipment, hardware, software, and services pricing as defined by Attachment J – Price Sheet Template.

Completion of the Cost Summary worksheet in Attachment J – Price Sheet Template to the greatest extent possible and in alignment with the proposed system. Proposers must submit an electronic Excel version (i.e. not PDF) in addition to a hardcopy paper version. The City intends to use the costs presented on this sheet for the purpose of evaluating the proposals.
However, the City retains the right to adjust the costs as shown on this sheet with other costs from the proposal to aid in a fair comparison between vendors proposals

2. Financing Proposal

The City desires to understand the range of financing options available. All Proposers are encouraged to present a range of financing and financial options for the City to consider. Financial and financing proposals may be developed for the system infrastructure, subscriber products, or both. The City is assuming an 18 year useful life of the radio system infrastructure. The City does not believe that the portable radios have an 18 year useful life, and is interested in leasing models that will allow for portable radio refreshes during the 18 year lifespan of the system.

Potential financial/financing options include but are not limited to:

A. Conventional financing at market or below market rates
B. Conventional leasing with ownership transferring at the end of the lease term
C. Conventional leasing with purchase option at the end of the lease term
D. Leasing with the option to convert to conventional financing at the end of the term
E. Leasing with the option to renew lease for an additional term
F. Leasing with option for system refresh/renew and lease renew for an additional term
G. Service lease with no ownership.

Please provide within the same sealed envelope of the fee proposal a full explanation of each financial option presented, to include:

A. Concise statement of the terms of the financial proposal including which financing option (a-g above) is being proposed.
B. Monthly or annual cost for each financial option presented.
C. Effective interest rates and other factors to aid in evaluation of each financial option, as applicable.
D. Detailed description of any technical clarifications and/or exceptions to the RFP and/or provided technical proposal required by the selection of the financial option.
E. Breakdown of Useful Life for items that are included in the financial option.
F. Explanation of anything that is considered proprietary or value-added of the financial option.
G. Provide customer references for other municipalities who have entered into similar arrangements.

4.0 EVALUATION AND SELECTION CRITERIA

4.1 SELECTION CRITERIA

The proposals will be evaluated by a selection committee comprised of stakeholder departments that use the radio system on a regular basis. The City intends to evaluate the proposals in accordance with the criteria itemized below.

The City intends to select a competitive set of highest scoring infrastructure proposals to be interviewed by an oral interview committee to make a final selection.

4.1.1 PROJECT APPROACH (60 POINTS)

A. Understanding of the project and the tasks to be performed, etc.

B. Compliance to specifications

C. Project Management Plan and Reasonableness of work schedule.

4.1.2 ASSIGNED PROJECT STAFF (10 POINTS)

A. Recent experience of staff assigned to the project and a description of the tasks to be performed by each staff person; and

B. Professional qualifications and education; and

C. Workload, staff availability and accessibility.

4.1.3 EXPERIENCE OF FIRM AND SUBCONSULTANTS (15POINTS)

A. Expertise of the firm and subconsultants in the fields necessary to complete the tasks; and

B. Quality of recently completed projects, including adherence to schedules, deadlines and budgets; and

C. Experience with similar projects; and

D. References

4.1.4 PROJECT COST (15 POINTS)

A. Proposals will be scored based on the ratio of the proposer's cost relative to the lowest cost proposal. For example, if the most favorable fee proposal to the City is the lowest fee proposed, the lowest fee could receive the total number of points assigned to the fee evaluation criterion. The other fee proposals could then be scored by dividing the amount of the lowest fee by the fee proposal being scored and multiplying the result by the total number of points assigned to the fee evaluation criterion. Under that formula, if a total of 15 points are assigned to rate financial proposals responding to an RFP, the proposer who offers the lowest fee proposal of $10,000 receives all 15 points. The next lowest proposal that offers $20,000 receives a score of 7.5points ($10,000 divided by $20,000, multiplied by 15 points).

4.1.5 ORAL PRESENTATION AND INTERVIEW (100 POINTS)

Following the evaluation of the written proposals, a competitive set of **infrastructure** proposers receiving the highest scores will be invited to an oral presentation and interview. Each session will be scheduled separately with each invited proposer. The presentation portion will consist of the proposer presenting the highlights of their proposal including: Coverage Design, Migration Plan, System Design, and System Features. It is anticipated that there will also be a hands-on demonstration of the Network Management System, as well as well as console dispatch screens

and equipment. The interview portion will consist of standard set of questions asked of each of the proposers. Scoring for the Infrastructure Oral Presentation and Interview will be based on the following criteria:

1. System Design, Performance and Reliability – 25%
2. Coverage Design – 25%
3. Migration Plan – 15%
4. Maintenance Plan – 10%
5. System Features, NMS and Console Hands-on Demonstration – 25%

A competitive set of **radio subscriber** proposers receiving the highest scores will also be invited to an oral interview. As with the infrastructure proposers, each session will be scheduled separately with each invited proposer. The presentation portion will consist of the proposer presenting the highlights of their proposal including: Portable and Mobile Features, Programming Software, and Accessories. It is anticipated that there will also be a hands-on demonstration of the proposed Portable and Mobile Radios and their associated accessories. The interview portion will consist of standard set of questions asked of each of the proposers. Scoring for the Radio Subscriber Oral Presentation and Interview will be on a per package basis based on the following criteria:

1. Subscriber Package Features – 40%
2. Programming Software – 10%
3. Accessories – 20%
4. Subscriber Package Hands-on Demonstration – 30%

Scores from the Proposal review will be added to the scores from the Oral Interview portion to develop the final score.

5.0 PRE-PROPOSAL CONFERENCE AND CONTRACT AWARD

5.1 MANDATORY PRE-PROPOSAL CONFERENCE

Proposers must attend the mandatory pre-proposal conference on June 23, 2015, 1:00 PM to be held at 1011 Turk St, San Francisco, CA 94102. All questions will be addressed at this conference and any available new information will be provided at that time. If you have further questions regarding the RFP, please email your questions to 800radioreplacement@sfgov.org.

5.2 CONTRACT AWARD

The Department of Emergency Management, on behalf of the City, will select a proposer with whom City staff shall commence contract negotiations. The selection of any proposal shall not imply acceptance by the City of all terms of the proposal, which may be subject to further negotiations and approvals before the City may be legally bound thereby. If a satisfactory contract cannot be negotiated in a reasonable time the City, in its sole discretion, may terminate negotiations with the highest ranked proposer and begin contract negotiations with the next highest ranked proposer.

6.0 TERMS AND CONDITIONS FOR RECEIPT OF PROPOSALS

6.1 ERRORS AND OMISSIONS IN RFP

Proposers are responsible for reviewing all portions of this RFP. Proposers are to promptly notify the Department, in writing, if the proposer discovers any ambiguity, discrepancy, omission, or other error in the RFP. Any such notification should be directed to the Department promptly after discovery, but in no event later than July 27, 2015, 5:00 PM. Modifications and clarifications will be made by addenda as provided below.

6.2 INQUIRIES REGARDING RFP

Inquiries regarding the RFP and all oral notifications of intent to request written modification or clarification of the RFP must be directed to:

800radioreplacement@sfgov.org

6.3 OBJECTIONS TO RFP TERMS

Should a proposer object on any ground to any provision or legal requirement set forth in this RFP, the proposer must, not more than ten calendar days after the RFP is issued, provide written notice to the Department setting forth with specificity the grounds for the objection. The failure of a proposer to object in the manner set forth in this paragraph shall constitute a complete and irrevocable waiver of any such objection.

6.4 CHANGE NOTICES

The City may modify the RFP, prior to the proposal due date, by issuing Bid Addendum(s), which will be posted on the website. The proposer shall be responsible for ensuring that its proposal reflects any and all Bid Addendum(s) issued by the Department prior to the proposal due date regardless of when the proposal is submitted. Therefore, the City recommends that the proposer consult the website frequently, including shortly before the proposal due date, to determine if the proposer has downloaded all Bid Addendum(s).

6.5 TERM OF PROPOSAL

Submission of a proposal signifies that the proposed services and prices are valid for 120 calendar days from the proposal due date and that the quoted prices are genuine and not the result of collusion or any other anti-competitive activity.

6.6 REVISION OF PROPOSAL

A proposer may revise a proposal on the proposer's own initiative at any time before the deadline for submission of proposals. The proposer must submit the revised proposal in the same manner as the original. A revised proposal must be received on or before the proposal due date.

In no case will a statement of intent to submit a revised proposal, or commencement of a revision process, extend the proposal due date for any proposer.

At any time during the proposal evaluation process, the Department may require a proposer to provide oral or written clarification of its proposal. The Department reserves the right to make an award without further clarifications of proposals received.

6.7 ERRORS AND OMISSIONS IN PROPOSAL

Failure by the Department to object to an error, omission, or deviation in the proposal will in no way modify the RFP or excuse the vendor from full compliance with the specifications of the RFP or any contract awarded pursuant to the RFP.

6.8 FINANCIAL RESPONSIBILITY

The City accepts no financial responsibility for any costs incurred by a firm in responding to this RFP. Submissions of the RFP will become the property of the City and may be used by the City in any way deemed appropriate.

6.9 PROPOSER'S OBLIGATIONS UNDER THE CAMPAIGN REFORM ORDINANCE

Proposers must comply with Section 1.126 of the S.F. Campaign and Governmental Conduct Code, which states:

No person who contracts with the City and County of San Francisco for the rendition of personal services, for the furnishing of any material, supplies or equipment to the City, or for selling any land or building to the City, whenever such transaction would require approval by a City elective officer, or the board on which that City elective officer serves, shall make any contribution to such an officer, or candidates for such an office, or committee controlled by such officer or candidate at any time between commencement of negotiations and the later of either (1) the termination of negotiations for such contract, or (2) three months have elapsed from the date the contract is approved by the City elective officer or the board on which that City elective officer serves.

If a proposer is negotiating for a contract that must be approved by an elected local officer or the board on which that officer serves, during the negotiation period the proposer is prohibited from making contributions to:

A. the officer's re-election campaign

B. a candidate for that officer's office

C. a committee controlled by the officer or candidate.

The negotiation period begins with the first point of contact, either by telephone, in person, or in writing, when a contractor approaches any city officer or employee about a particular contract, or a city officer or employee initiates communication with a potential contractor about a contract. The negotiation period ends when a contract is awarded or not awarded to the contractor. Examples of initial contacts include: (1) a vendor contacts a city officer or employee to promote himself or herself as a candidate for a contract; and (2) a city officer or employee contacts a contractor to propose that the contractor apply for a contract. Inquiries for information about a particular contract, requests for documents relating to a Request for Proposal, and requests to be placed on a mailing list do not constitute negotiations.

Violation of Section 1.126 may result in the following criminal, civil, or administrative penalties:

A. Criminal. Any person who knowingly or willfully violates section 1.126 is subject to a fine of up to $5,000 and a jail term of not more than six months, or both.

B. Civil. Any person who intentionally or negligently violates section 1.126 may be held liable in a civil action brought by the civil prosecutor for an amount up to $5,000.

C. Administrative. Any person who intentionally or negligently violates section 1.126 may be held liable in an administrative proceeding before the Ethics Commission held pursuant to the Charter for an amount up to $5,000 for each violation.

For further information, proposers should contact the San Francisco Ethics Commission at (415) 581-2300.

6.10 SUNSHINE ORDINANCE

In accordance with S.F. Administrative Code Section 67.24(e), contractors' bids, responses to RFPs and all other records of communications between the City and persons or firms seeking

contracts shall be open to inspection immediately after a contract has been awarded. Nothing in this provision requires the disclosure of a private person's or organization's net worth or other proprietary financial data submitted for qualification for a contract or other benefits until and unless that person or organization is awarded the contract or benefit. Information provided which is covered by this paragraph will be made available to the public upon request.

6.11PUBLIC ACCESS TO MEETINGS AND RECORDS

If a proposer is a non-profit entity that receives a cumulative total per year of at least $250,000 in City funds or City-administered funds and is a non-profit organization as defined in Chapter 12L of the S.F. Administrative Code, the proposer must comply with Chapter 12L. The proposer must include in its proposal (1) a statement describing its efforts to comply with the Chapter 12L provisions regarding public access to proposer's meetings and records, and (2) a summary of all complaints concerning the proposer's compliance with Chapter 12L that were filed with the City in the last two years and deemed by the City to be substantiated. The summary shall also describe the disposition of each complaint. If no such complaints were filed, the proposer shall include a statement to that effect. Failure to comply with the reporting requirements of Chapter 12L or material misrepresentation in proposer's Chapter 12L submissions shall be grounds for rejection of the proposal and/or termination of any subsequent Agreement reached on the basis of the proposal.

6.12RESERVATIONS OF RIGHTS BY THE CITY

The issuance of this RFP does not constitute an agreement by the City that any contract will actually be entered into by the City. The City expressly reserves the right at any time to:

A. Waive or correct any defect or informality in any response, proposal, or proposal procedure;

B. Reject any or all proposals;

C. Reissue a Request for Proposals;

D. Prior to submission deadline for proposals, modify all or any portion of the selection procedures, including deadlines for accepting responses, the specifications or requirements for any materials, equipment or services to be provided under this RFP, or the requirements for contents or format of the proposals;

E. Procure any materials, equipment or services specified in this RFP by any other means; or

F. Determine that no project will be pursued.

6.13NO WAIVER

No waiver by the City of any provision of this RFP shall be implied from any failure by the City to recognize or take action on account of any failure by a proposer to observe any provision of this RFP.

6.14LOCAL BUSINESS ENTERPRISE GOALS AND OUTREACH

The requirements of the Local Business Enterprise and Non-Discrimination in Contracting Ordinance set forth in Chapter 14B of the San Francisco Administrative Code as it now exists or as it may be amended in the future (collectively the "LBE Ordinance") shall apply to this RFP.

6.15LBE SUBCONSULTANT PARTICIPATION GOALS

The LBE subconsulting goal for this project is 5 % of the total value of the goods and/or services to be procured.

Each firm responding to this solicitation shall demonstrate in its response that it has used good-faith outreach to select LBE subcontractors as set forth in S.F. Administrative Code §§14B.8 and

14B.9, and shall identify the particular LBE subcontractors solicited and selected to be used in performing the contract. For each LBE identified as a subcontractor, the response must specify the value of the participation as a percentage of the total value of the goods and/or services to be procured, the type of work to be performed, and such information as may reasonably be required to determine the responsiveness of the proposal. LBEs identified as subcontractors must be certified with the San Francisco Contract Monitoring Division at the time the proposal is submitted, and must be contacted by the proposer (prime contractor) prior to listing them as subcontractors in the proposal. Any proposal that does not meet the requirements of this paragraph will be non-responsive. Note: If a bidder obtains materials, supplies, articles or equipment from an LBE supplier certified by CMD to supply such items, 60% of the cost of the items will count toward the LBE subcontracting goal if the LBE supplier performs a Commercially Useful Function by taking possession of the items and assuming the risk of their delivery.

In addition to demonstrating that it will achieve the level of subconsulting participation required by the contract, a proposer shall also undertake and document in its submittal the good faith efforts required by Chapter 14B.8(C)&(D) and CMD Attachment 2, Requirements for Architecture, Engineering and Professional Services Contracts.

Proposals which fail to comply with the material requirements of S.F. Administrative Code §§14B.8 and 14B.9, CMD Attachment 2 and this RFP will be deemed non-responsive and will be rejected. During the term of the contract, any failure to comply with the level of LBE subcontractor participation specified in the contract shall be deemed a material breach of contract. Subconsulting goals can only be met with CMD-certified LBEs located in San Francisco.

6.16 LBE PARTICIPATION

The LBE Rating Bonus/Bid Discount does not apply to this project since the estimated contract is in excess of $10 million.

6.17 CMD FORMS TO BE SUBMITTED WITH PROPOSAL

All proposals submitted must include the following Contract Monitoring Division (CMD) Forms contained in the CMD Attachment 2:1) CMD Contract Participation Form, 2) CMD "Good Faith Outreach" Requirements Form, 3) CMD Non-Discrimination Affidavit, 4) CMD Joint Venture Form (if applicable), and 5) CMD Employment Form. If these forms are not returned with the proposal, the proposal may be determined to be non-responsive and may be rejected.

Please submit two USB drives with the above CMD forms and your proposal in softcopy format. Hardcopy forms should be placed in a separate, sealed envelope labeled "**800MHz Radio Replacement Project – CMD forms**".

If you have any questions concerning the CMD Forms, you may email Romulus Asenloo, the Contract Monitoring Division Contract Compliance Officer at Romulus.asenloo@sfgov.org.

7.0 CONTRACT REQUIREMENTS

7.1 STANDARD CONTRACT PROVISIONS

The successful proposer will be required to enter into a contract substantially in the form of the Agreement for Professional Services, attached hereto as Appendix C. Failure to timely execute the contract, or to furnish any and all insurance certificates and policy endorsement, surety bonds or other materials required in the contract, shall be deemed an abandonment of a contract offer. The City, in its sole discretion, may select another firm and may proceed against the original selectee for damages. The City reserves the right to require and/or modify insurance limits in accordance with the scope of work negotiated.

Proposers are urged to pay special attention to the requirements of Administrative Code Chapters 12B and 12C, Nondiscrimination in Contracts and Benefits, (§33 in the Agreement); the Minimum Compensation Ordinance (§42in the Agreement); the Health Care Accountability Ordinance (§43 in the Agreement); the First Source Hiring Program (§44 in the Agreement); and applicable conflict of interest laws (§ 22 in the Agreement), as set forth in sections 7.2, 7.3, 7.4, 7.5, and 7.6 below.

7.2 NONDISCRIMINATION IN CONTRACTS AND BENEFITS

The successful proposer will be required to agree to comply fully with and be bound by the provisions of Chapters 12B and 12C of the San Francisco Administrative Code. Generally, Chapter 12B prohibits the City and County of San Francisco from entering into contracts or leases with any entity that discriminates in the provision of benefits between employees with domestic partners and employees with spouses, and/or between the domestic partners and spouses of employees. The Chapter 12C requires nondiscrimination in contracts in public accommodation. Additional information on Chapters 12B and 12C is available on the CMD's website at www.sfCMD.org.

7.3 MINIMUM COMPENSATION ORDINANCE (MCO)

The successful proposer will be required to agree to comply fully with and be bound by the provisions of the Minimum Compensation Ordinance (MCO), as set forth in S.F. Administrative Code Chapter 12P. Generally, this Ordinance requires contractors to provide employees covered by the Ordinance who do work funded under the contract with hourly gross compensation and paid and unpaid time off that meet certain minimum requirements. For the contractual requirements of the MCO, see §42.

For the amount of hourly gross compensation currently required under the MCO, see www.sfgov.org/olse/mco. Note that this hourly rate may increase on January 1 of each year and that contractors will be required to pay any such increases to covered employees during the term of the contract.

Additional information regarding the MCO is available on the web at www.sfgov.org/olse/mco.

7.4 HEALTH CARE ACCOUNTABILITY ORDINANCE (HCAO)

The successful proposer will be required to agree to comply fully with and be bound by the provisions of the Health Care Accountability Ordinance (HCAO), as set forth in S.F. Administrative Code Chapter 12Q. Contractors should consult the San Francisco Administrative Code to determine their compliance obligations under this chapter. Additional information regarding the HCAO is available on the web at www.sfgov.org/olse/hcao.

7.5 FIRST SOURCE HIRING PROGRAM (FSHP)

If the contract is for more than $50,000, then the First Source Hiring Program (Admin. Code Chapter 83) may apply. Generally, this ordinance requires contractors to notify the First Source

Hiring Program of available entry-level jobs and provide the Workforce Development System with the first opportunity to refer qualified individuals for employment.

Contractors should consult the San Francisco Administrative Code to determine their compliance obligations under this chapter. Additional information regarding the FSHP is available on the web at http://www.workforcedevelopmentsf.org/ and from the First Source Hiring Administrator, (415) 401-4960.

7.6 CONFLICTS OF INTEREST

The successful proposer will be required to agree to comply fully with and be bound by the applicable provisions of state and local laws related to conflicts of interest, including Section 15.103 of the City's Charter, Article III, Chapter 2 of City's Campaign and Governmental Conduct Code, and Section 87100 et seq. and Section 1090 et seq. of the Government Code of the State of California. The successful proposer will be required to acknowledge that it is familiar with these laws; certify that it does not know of any facts that constitute a violation of said provisions; and agree to immediately notify the City if it becomes aware of any such fact during the term of the Agreement.

Individuals who will perform work for the City on behalf of the successful proposer might be deemed consultants under state and local conflict of interest laws. If so, such individuals will be required to submit a Statement of Economic Interests, California Fair Political Practices Commission Form 700, to the City within ten calendar days of the City notifying the successful proposer that the City has selected the proposer.

8.0 PROTEST PROCEDURES

8.1 PROTEST OF NON-RESPONSIVENESS DETERMINATION

Within five working days of the City's issuance of a notice of non-responsiveness, any firm that has submitted a proposal and believes that the City has incorrectly determined that its proposal is non-responsive may submit a written notice of protest. Such notice of protest must be received by the City on or before the fifth working day following the City's issuance of the notice of non-responsiveness. The notice of protest must include a written statement specifying in detail each and every one of the grounds asserted for the protest. The protest must be signed by an individual authorized to represent the proposer, and must cite the law, rule, local ordinance, procedure or RFP provision on which the protest is based. In addition, the protestor must specify facts and evidence sufficient for the City to determine the validity of the protest.

8.2 PROTEST OF CONTRACT AWARD

Within five working days of the City's issuance of a notice of intent to award the contract, any firm that has submitted a responsive proposal and believes that the City has incorrectly selected another proposer for award may submit a written notice of protest. Such notice of protest must be received by the City on or before the fifth working day after the City's issuance of the notice of intent to award.

The notice of protest must include a written statement specifying in detail each and every one of the grounds asserted for the protest. The protest must be signed by an individual authorized to represent the proposer, and must cite the law, rule, local ordinance, procedure or RFP provision on which the protest is based. In addition, the protestor must specify facts and evidence sufficient for the City to determine the validity of the protest.

8.3 DELIVERY OF PROTESTS

All protests must be received by the due date. If a protest is mailed, the protestor bears the risk of non-delivery within the deadlines specified herein. Protests should be transmitted by a means that will objectively establish the date the City received the protest. Protests or notice of protests made orally (e.g., by telephone) will not be considered. Protests must be delivered to:

Department of Emergency Management
Attn: 800MHz Radio Replacement Project Team
1011 Turk Street
San Francisco, CA 94102

Appendix B

Standard Forms

The requirements described in this Appendix are separate from those described in Appendix A.

Before the City can award any contract to a contractor, that contractor must file three standard City forms (items 1-3 on the chart). Because many contractors have already completed these forms, and because some informational forms are rarely revised, the City has not included them in the RFP package. Instead, this Appendix describes the forms, where to find them on the Internet (see bottom of page 2), and where to file them. If a contractor cannot get the documents off the Internet, the contractor should call (415) 554-6248 or e-mail Purchasing (purchasing@sfgov.org) and Purchasing will fax, mail or e-mail them to the contractor.

If a contractor has already filled out items 1-3 (see note under item 3) on the chart, **the contractor should not do so again unless the contractor's answers have changed.** To find out whether these forms have been submitted, the contractor should call Vendor File Support in the Controller's Office at (415) 554-6702.

If a contractor would like to apply to be certified as a local business enterprise, it must submit item 4. To find out about item 4 and certification, the contractor should call Contract Monitoring Division at (415) 252-2500.

Item	Form name and Internet location	Form	Description	Return the form to; For more info
1.	Request for Taxpayer Identification Number and Certification http://sfgsa.org/index.aspx?page=4762 www.irs.gov/pub/irs-fill/fw9.pdf	W-9	The City needs the contractor's taxpayer ID number on this form. If a contractor has already done business with the City, this form is not necessary because the City already has the number.	Controller's Office Vendor File Support City Hall, Room 484 San Francisco, CA 94102 (415) 554-6702
2.	Business Tax Declaration http://sfgsa.org/index.aspx?page=4762	P-25	All contractors must sign this form to determine if they must register with the Tax Collector, even if not located in San Francisco. All businesses that qualify as "conducting business in San Francisco" must register with the Tax Collector	Controller's Office Vendor File Support City Hall, Room 484 San Francisco, CA 94102 (415) 554-6702
3.	S.F. Administrative Code Chapters 12B & 12C Declaration: Nondiscrimination in Contracts and Benefits	CMD-12B-101	Contractors tell the City if their personnel policies meet the City's requirements for nondiscrimination against protected classes of people, and	Human Rights Comm. 25 Van Ness, #800 San Francisco, CA 94102-6059

Item	Form name and Internet location	Form	Description	Return the form to; For more info
	http://sfgsa.org/index.aspx?page=4762 In Vendor Profile Application		in the provision of benefits between employees with spouses and employees with domestic partners. Form submission is not complete if it does not include the additional documentation asked for on the form. Other forms may be required, depending on the answers on this form. Contract-by-Contract Compliance status vendors must fill out an additional form for each contract.	(415) 252-2500
4.	CMD LBE Certification Application http://sfgsa.org/index.aspx?page=4762 In Vendor Profile Application		Local businesses complete this form to be certified by CMD as LBEs. Certified LBEs receive a rating bonus pursuant to Chapter 14B when bidding on City contracts. To receive the bid discount, you must be certified by CMD by the proposal due date.	Contract Monitoring Unit 25 Van Ness, #800 San Francisco, CA 94102-6059 (415) 252-2500

Where the forms are on the Internet

Office of Contract Administration

Homepage:	www.sfgov.org/oca/
Purchasing forms:	Click on "Required Vendor Forms" under the "Information for Vendors and Contractors" banner.

Contract Monitoring Division

CMD's homepage:	http://sfgsa.org/index.aspx?page=5365
Equal Benefits forms:	http://sfgsa.org/index.aspx?page=5359
LBE certification form:	http://sfgsa.org/index.aspx?page=5364