
# Marin County on behalf of Marin Emergency Radio Authority (MERA) Request for Proposals Radio Communications System

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**Prepared by**


**Federal Engineering, Inc.**
**10600 Arrowhead Dr., Suite 160**
**Fairfax, VA 22030**
**703-359-8200**

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# 1. Project Overview

## 1.1 Introduction

The Marin Emergency Radio Authority (MERA) and Marin County, California, request proposals from qualified vendors to provide a 700 MHz Project 25 (P25) Phase 2 compliant trunked radio system to support mission critical communications within Marin County. Responding vendors should have experience in providing P25 Phase 2 systems to public safety and public service users. The proposed communications system shall provide enhanced Public Safety voice wireless communications capabilities for all MERA member agencies with the capability of supporting seamless interoperability with the surrounding counties throughout the Bay Area. The following are the primary goals for this project:

1. Deploy a P25 Phase 2 standards-based system to enhance coverage, capacity, system resiliency and interoperability
2. Deploy new IP-based dispatch consoles and gateways designed to support all of the features of the new P25 radio system while retaining any required legacy operational communication capabilities and interoperability
3. Deploy a new microwave system to support an all-IP backbone and Ethernet traffic in loop configurations to enhance availability and provide the scalability to support P25 voice applications
4. Deploy new P25 subscriber radios with both Phase 1 and Phase 2 capabilities that can operate in the 700/800 MHz bands for the required transition from UHF T-Band operation and maximize the potential for enhancing interoperability with adjacent counties

MERA/Marin County also desires to explore the following initiatives as OPTIONS in the new system procurement and deployment.

1. Deployment of P25 Inter-Subsystem Interface (ISSI) to allow intersystem roaming, further enhancing interoperability
2. Deployment of geo-diverse system control components and optional P25 system features to enhance redundancy, availability, and performance
3. Deploy a radio system providing in-building coverage to support the MERA Agencies Cal-Park Tunnel and SO Jail complexes utilizing a distributed antenna systems (DAS) or bi-directional amplifiers (BDA. The Jail BDA

must be included in the proposal and the Cal-Park Tunnel included as an option.

## 1.2 Background

### 1.2.1 Marin County

Located north of San Francisco, Marin County is home to a population of approximately 260,750 people according to the 2014 estimates. Marin County encompasses a land area of approximately 520 square miles and is located within close proximity to San Francisco, a major metropolitan center of the state of California. The County's topography is very rugged and mountainous. These areas are typically heavily wooded and prone to fire hazard during the fire season.

A. Marin Emergency Radio Authority (MERA)

In February 1998, public safety agencies in Marin County formed MERA using a joint-powers-authority (JPA) to begin developing a countywide regional communications system. After an extensive process, a new computer-controlled digital radio system was constructed. The radio system provides mission critical communication capabilities for member agencies in the law enforcement, fire management, emergency medical, road maintenance, transit, public works, local government, and other county-based entities. The trunked radio system unifies public safety response, making it possible for members to more effectively and efficiently communicate with each other and within individual departments. The existing MERA voice radio communications network consists of the Motorola Digital 7.13 SmartZone technology with Smart-X interfaces and a UHF T-band trunked and simulcast communications network. Its design allows wide area communications between dispatch centers and mobile units operating throughout the county.

The following Marin County agencies use the MERA UHF T-Band radio communications network for their radio communication operations:

1) County of Marin
2) Central Marin Police Authority
3) City of Belvedere
4) Bolinas Fire Protection District
5) Town of Corte Madera
6) Town of Fairfax
7) Inverness Public Utility District
8) Kentfield Fire Protection District

9) City of Larkspur
10) Marin Transit
11) City of Mill Valley
12) City of Novato
13) Novato Fire Protection District
14) Town of Ross
15) Ross Valley Fire Services
16) Town of Tiburon
17) Tiburon Fire Protection District
18) Town of San Anselmo
19) City of San Rafael
20) Marin Community College District
21) City of Sausalito
22) Marin Municipal Water District
23) Marinwood Community Services District
24) Stinson Beach Fire Protection District
25) Southern Marin Fire Protection District

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B. The MERA network design utilizes five distinct “cells” to cover Marin County. These cells include:

1. East Simulcast Cell: 101 Corridor, 11 channels and 7 transmit sites and 2 receive sites
2. West Simulcast Cell: West Marin area, 7 channels and 3 transmit sites
3. Sonoma IR Cell: Northeast Marin County, 6 channels and 1 site
4. Bay Hill IR Cell: Northwest Marin County, 5 channels and 1 site
5. Bolinas IR Cell: West Marin and Bolinas Area, 5 channels and 1 site

C. Microwave Network:

MERA and Marin County microwave networks provide connectivity to 18 microwave sites, which employ a variety of 6, 11 and 18 GHz links. There are 4 paths not owned by MERA which include NVPD, Woodacre and EOF.

### *1.2.2 RFP Purpose*

The goal of this RFP is to solicit proposals from qualified vendors for the development of a state-of-the-art, Project 25 (P25) Phase 2 TDMA compatible, 700 MHz, radio

communications system to support mission critical communications within Marin County. MERA/Marin County must vacate the current radio systems UHF T-Band channels as a consequence of HR 3630 Middle Class Tax Relief and Job Creation Act of 2012, which requires the giveback of the T-band spectrum (470 – 512 MHz). The proposed communications system shall provide enhanced public safety voice wireless communications capabilities for all MERA member agencies and the capability for seamless interoperability with the surrounding counties throughout the Bay Area.

A. This RFP reflects user operational requirements, system requirements, infrastructure requirements and system support requirements for MERA/Marin County; this RFP addresses (but is not limited to):

1. Coverage requirements
2. Daily operational communications requirements of first responders
3. Significant system components and subscriber units
4. Minimum performance specifications for the system and subscriber units based on defined user needs, national standards and industry best practices
5. Hardware specifications
6. Site Development Requirements (surveying, environmental review, permitting)
7. Construction Specifications (including towers, shelters, utility/access infrastructure, fencing, etc.)
8. Connectivity with existing Marin systems and interoperability with surrounding counties.

B. Proposed systems shall leverage existing communications infrastructure to the greatest extent possible, meet the daily coverage and capacity needs, support transparent roaming and interoperability within the region, and provide reserve capacity for use during major manmade or natural catastrophic events.

### 1.2.3 Interoperability with Legacy and Adjacent Systems

A. MERA/Marin County seeks to leverage existing systems to create a multi-tiered communications network for both strategic and tactical communications in support of mutual aid and coordination of incident response. System designs and migration plans should acknowledge and integrate interoperability with existing

legacy systems within the County, which may remain in service; these systems include:

1. VHF Low Band systems (3)
    a. Analog, 4-wire, tone controlled, multi-frequency radio base stations
2. VHF High Band Systems (26)
    a. Analog, 4-wire, tone controlled, multi-frequency radio base stations
3. UHF Conventional systems (19)
    a. Analog, 4-wire, tone controlled, multi-frequency radio base stations
4. 700\800 MHz Digital/Analog Systems (6)
    a. Multi-Channel base/repeaters at multiple sites
5. Other Alerting and Siren Control System and over the air operations
    a. FIRESCAD is a fire station ring-down and alerting system, which is currently, deployed using a Motorola SCADA system (used for fire station alerting and siren control) on an analog talkgroup on the MERA trunked network.
    b. Knox Boxes are remotely controlled key boxes that store keys, access cards and other small items for use by fire personnel during an emergency to unlock gates, common areas, etc. such as in an apartment building. The Knox Boxes currently use an analog talkgroup on the MERA trunked network with DTMF signaling.
    c. Remote gate operation currently controlled on a simplex UHF channel by a timed carrier signal.

B. Methods of interconnection and interoperability with these systems should be described in detail regarding feature and functional aspects of each solution proposed. IP technologies are preferred. These solutions will be considered in the scoring of proposals received.

C. Proposed methods for interoperability with adjacent County, State and Federal public safety radio systems should be described in detail.

## 1.3 Overview of this Document

A. This section provides a high level overview of all sections of this RFP.

1. Section 1, *Project Overview* – Provides MERA/Marin County background information and an overview of RFP sections.
2. Section 2. *Project Summary* – Provides a general overview of requirements contained in this RFP.
3. Section 3, *Instructions to Proposers* – Provides instructions to proposers, including, but not limited to: proposal due date; pre-proposal conference information; and evaluation criteria.
4. Section 4, *Radio Communications System Requirements* – This section provides requirements for the desired communications system and options. This section includes requirements for system configuration, site selection, RF coverage, and site equipment.
5. Section 5, *Backhaul Network* – Provides requirements for backhaul connectivity, digital microwave backhaul equipment, and network management. Existing backhaul connectivity shall be used only if it is current generation equipment and fully supportive of the all IP network proposed.
6. Section 6, *Subscriber Equipment* – Provides requirements for portable radios, mobile radios, and control stations.
7. Section 7, *Facilities and Infrastructure Development* – Existing facilities shall be used to the greatest extent practical. Where not practical, this section provides specifications for tower construction, site preparation, access infrastructure, drainage, fencing, equipment shelters, generators, DC battery plant and UPS equipment for any site upgrades/remodels and new sites proposed by RESPONDENT.
8. Section 8, *Training* – Provides requirements for training programs to be developed by the SELECTED VENDOR.
9. Section 9, *System Implementation, Test, and Acceptance* – Provides requirements for system cutover, staging, installation, fleet mapping, coverage testing, and final acceptance.
10. Section 10, *Warranty, Maintenance, and Support* – Provides requirements for the warranty, extended warranty, maintenance, and hardware/software support of the proposed system and subsystems.

11. Section 11, *MERA/Marin County Terms and Conditions*

B. Appendices to this RFP:

1. Appendix A – *Sample Contract*
2. Appendix B – *Compliance Matrix*
3. Appendix C – *Proposal Pricing Forms*
4. Appendix D – *Master Site List*
5. Appendix E – *700 MHz Frequency Allocations*
6. Appendix F – *Conventional System Site List*
7. Appendix G – *Existing Microwave Backhaul Information*
8. Appendix H – *Specific Coverage Area Requirements*
9. Appendix I – *Site Surveys*

# 2. Project Summary

## 2.1 Project Components

A. The SELECTED VENDOR shall be responsible for providing the following project components:

1. Furnishing and installing all equipment and ancillary facilities provided as part of the project.
2. Preparing FCC Licensing forms, coordination forms, required engineering and supporting maps due to site and antennae changes from initial estimates used for preliminary coordination.
3. Engineering and system design
4. Project management
5. Software installation and programming
6. Training
7. Acceptance testing, including coverage testing
8. Cutover plan and execution
9. Maintenance during implementation
10. Warranty upon acceptance (Years 1 – 3)
11. Extended warranty and technical support (Years 4 – 15)
12. System Software and Hardware Refresh Programs (Years 4 – 15)
13. Decommissioning/removal of legacy communications system and ancillary devices not utilized in the operation of the new communications system, including removal of existing frequency and trunking parameters, including encryption.

B. The SELECTED VENDOR shall be responsible for furnishing a complete and fully functional system:

1. Radio communications system, including the guarantee of radio coverage and Grade of Service (GoS) compliant with coverage and capacity requirements
2. Digital microwave backhaul network

3. Radio dispatch consoles
4. Infrastructure facilities (e.g., towers, shelters, fencing)
5. Network management system
6. User radio equipment (Portable, Mobile, Pagers, Control Station radios, Station Alerting Equipment at all fire stations and siren locations, portable and mobile radio accessories)

C. Work shall be planned, coordinated, and conducted with minimal interruption of service to existing critical systems.

D. The SELECTED VENDOR shall completely describe the equipment and methods that will be used to implement the system. The intent of this document is to allow RESPONDENT to offer the best equipment, technology, and methods available to provide state-of-the-art public safety communications systems of highest quality and performance.

E. Should the system proposed fail to operate as proposed due to the SELECTED VENDOR's or sub-contractor's errors or omission, these issues will be corrected by the SELECTED VENDOR at no additional cost to MERA/Marin County

F. All equipment shall be provided in new condition at the latest available release and covered by a full manufacturer's warranty and support services for not less than 3 years. ***Warranty of all equipment supplied shall not commence until after full system acceptance as defined in this RFP.***

G. Proposals shall not be accepted that include systems, equipment, or components at or near the end of their respective lifecycles. All equipment proposed shall be at the beginning of the products lifecycle and be fully supported and available for a minimum of 10 years after system acceptance.

## 2.2 Authorization and Funding

A. MERA/Marin County has authorized this RFP to meet the requirements of *HR 3630 Middle Class Tax Relief and Job Creation Act of 2012*, and as part of an ongoing effort to enhance mission critical radio communications and interoperability throughout Marin County and the Bay Area.

B. Each RESPONDENT shall provide financing options for the complete system offered over 5-, 10-, and 15-year periods. The financing options offered may be lease or term financing.

C. Upon authorization by MERA/Marin County, the SELECTED VENDOR shall offer other agencies or municipalities in the County user equipment and system components at the same pricing as that offered to MERA/Marin County.

## 2.3 Proposals Desired

A. MERA/Marin County desires a complete turnkey solution (excluding site construction) addressing all project systems, subsystems, and components for the voice communications network. This network shall provide public safety grade communications capabilities throughout the desired coverage areas, allowing agencies within the County to safely, effectively, and efficiently carry out their duties. MERA/Marin County seeks to obtain proposals for a 700/800 MHz, Project 25, Phase 2 simulcast trunked radio system, backhaul network, dispatch console subsystem, and user devices.

B. Proposal Options: Requirements described as an “OPTION” or “OPTIONAL” refer to features, equipment or site development that may or may not be purchased by MERA/Marin County, or items whose quantities are not determined yet. RESPONDENTS are required to respond to all OPTIONAL requirements.

C. Alternative Proposals:

1. In the event a RESPONDENT has a technological solution that does not meet the exact requirements set forth in this RFP, but fully addresses all functional requirements, the RESPONDENT may offer more than one proposal as long as each proposal fully addresses the intent of the requirements set forth in this RFP.
2. Alternate proposals shall be submitted separately under a separate cover from the base proposal and clearly marked “ALTERNATIVE PROPOSAL”.
3. The RESPONDENT shall comply with the same submittal instructions in Section 3.4, *Proposal Format*.

## 2.4 Quality Assurance and Coordination

### 2.4.1 Codes, Standards and Guidelines

A. The equipment and accessories provided as part of RESPONDENT’s proposal shall be designed, manufactured, and tested in accordance with the applicable

standards from the organizations listed below, 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 SELECTED VENDOR's equipment. Other internationally recognized codes and standards will be acceptable provided they meet or exceed the requirements of the listed codes and standards. Some sections of the listed standards are not applicable; RESPONDENT shall take exceptions and note.

C. If the RESPONDENT intends to use codes, standards or guidelines different from the list contained in this RFP, the RESPONDENT shall submit, for MERA/Marin County's approval, details of the codes and standards, which RESPONDENT proposes to use. RESPONDENT shall demonstrate to the satisfaction of MERA/Marin County 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 SELECTED VENDOR shall refer the conflict to MERA/Marin County for written resolution before start of design.

E. The SELECTED VENDOR shall provide a list of codes and standards used for the manufacture of SELECTED VENDOR's product in effect at the time of purchase order.

F. Equipment shall meet all pertinent FCC Rules and Regulations, specifically including Part 1.1310, Part 2 Frequency Allocations and Radio Treaty Matters, Part 15 Radio Frequency Devices, Part 68 Connection of Terminal Equipment to the telephone network, and Part 101 Microwave Services. As required by the FCC Rules and Regulations all radio equipment shall be certified by an approved laboratory. If requested by the Purchaser a copy of the certification shall be provided.

G. Installation shall comply with the Marin County Code and California Code of Regulations (CCR) Title 24. This shall include the seismic design requirements for Essential Facility buildings housing Public Safety Communications Equipment and Systems.

H. All microwave equipment shall comply with Telcordia (formerly Bellcore) GR-63-CORE Network Equipment Building System (NEBS) Level 3. A copy of the NEBS testing shall be available if requested by MERA/Marin County.

I. All materials and equipment supplied under this specification shall comply with all applicable regulations and standards listed below, and all federal, state and local statutes. All electrical material and equipment shall be listed and/or labeled by OSHA through a National Recognized Testing Laboratory (NRTL) and approved by the authority having jurisdiction.

J. Equipment mounting (e.g., racks and cabinets) shall conform to full Zone 4 earthquake compliance in accordance with NEBS requirements. The SELECTED VENDOR shall provide certification that the racks and/or cabinets used meet the NEBS requirements for Zone 4 in their as-built documentation package.

   a. 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.

   b. Bracing must also be applied to equipment during unattended periods of construction.

K. The SELECTED VENDOR shall comply with the following applicable standards, rules, regulations, and industry guidelines, provided here in no particular order with no implication of priority, as they apply to the RESPONDENT's proposed solution:

   1. American National Standards Institute (ANSI)
   2. National Electrical Manufacturer's Association (NEMA)
   3. Electronics Industry Association (EIA)
   4. Telecommunications Industry Association (TIA)
   5. Telecommunications Distribution Methods Manual (TDMM)
   6. NFPA 70:National Electrical Code (NEC)
   7. Institute of Electrical and Electronics Engineers (IEEE)
   8. Federal Communications Commission (FCC)
   9. Underwriters Laboratories, Inc. (UL)
   10. American Society of Testing Materials (ASTM)
   11. National Fire Protection Association (NFPA)

L. RESPONDENT shall comply with industry best practices for system installation, grounding, bonding, and transient voltage surge suppression (TVSS), as outlined

in the following guidelines, provided here in no particular order with no implication of priority:

1. Motorola R56 – Standards and Guidelines for Communication Sites (latest revision)
2. Harris Site Grounding and Lightning Protection Guidelines (AE/LZT – 123 4618/1 – latest revision)
3. Other contractor / industry standards that RESPONDENT shall provide to MERA/Marin County for review and approval prior to contract award.

M. Governing codes and conflicts: If the requirements of this RFP differ from those of the governing codes and regulations, then the more stringent of the two shall become applicable.

N. Governing codes and conflicts: If the requirements of this RFP directly conflict with those of the governing codes and regulations, the RESPONDENT/SELECTED VENDOR shall bring the conflict to the attention to MERA for resolution.

O. If the RESPONDENT cannot meet any of the standards or guidelines listed above, the RESPONDENT shall list all deviations in their proposal.

### 2.4.2 Frequency Coordination and Licensing

A. Land Mobile Radio (LMR) licenses -- The SELECTED VENDOR shall be responsible for all frequency research, prior coordination, preparation and tracking of all associated FCC license applications and submittals on behalf of MERA/Marin County. MERA/Marin County shall be responsible for coordination fees and licensing fees, if any, and signatures, as applicable. MERA/Marin County has completed the Region 6 700 MHz coordination process for the 27 reserved 700 MHz frequencies pairs in accordance with Region 6 allocation. Marin County shall provide all current licensing information to the SELECTED VENDOR following contract award. Following approval of the preliminary design, the SELECTED VENDOR shall provide all license modifications, supporting engineering, coordination maps and applicable forms to MERA/Marin County for review and approval. The SELECTED VENDOR shall also be responsible for any additional frequency research, support, new coordination maps and engineering required to modify the original frequency coordination estimates, preparation and tracking of resubmittals if necessary for any reason. MERA/Marin County shall sign and submit all forms following approval.

B. Antenna Structure Registration (ASR) – The SELECTED VENDOR shall be responsible for preparation and submittal of any ASR forms as required for any new or existing towers.

C. Microwave Licenses – The SELECTED VENDOR shall be responsible for all microwave frequency research, prior coordination preparation, and tracking of all associated FCC license applications and submittals on behalf of MERA/Marin County. MERA/Marin County shall be responsible for coordination fees and licensing fees, if any, and signatures, as applicable.

### 2.4.3 Federal Aviation Administration (if applicable)

A. The SELECTED VENDOR shall complete and submit to the Federal Aviation Administration (FAA) any Aviation forms as necessary.

## 2.5 Project Management Plan

A. The RESPONDENT shall provide a Project Management Plan that includes, the Vendors Project Manager definition of duties, a detailed Work Breakdown Structure (WBS), project scope, deliverables, schedule, QA/QC processes, and risk management sections.

B. The plan shall describe how the RESPONDENT proposes to monitor and control the installation and deployment of the proposed system, and mitigate risks, in order to ensure that the system meets the design specifications and is delivered on time.

C. Regularly scheduled, weekly status meetings (meeting frequency at the discretion of MERA/Marin County) shall be established between the MERA/Marin County Project Team, Consultant Project Manager and the SELECTED VENDOR. The SELECTED VENDOR shall provide a schedule for these meetings subject to the approval of MERA/Marin County and shall be responsible for the agendas for these status meetings.

D. The SELECTED VENDOR shall provide MERA/Marin County a written monthly status report.

### 2.5.1 Scheduling

A. The SELECTED VENDOR shall develop and maintain a project schedule utilizing Microsoft® Project. The schedule shall be provided in Microsoft® Project and

Adobe® PDF formats. That schedule shall include tasks, milestones, start and end dates, task predecessors, and task owners based on an approved WBS.

B. The schedule shall represent tasks associated with completing work on all items identified in the WBS. The project schedule shall be updated throughout the project with anticipated dates based on the best available information, and actual dates as tasks are completed.

C. The updated schedule shall be provided as an agenda item for all weekly or biweekly status meetings (meeting frequency at the discretion of MERA/Marin County).

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

1. Site surveys
2. Detailed design review including engineering analyses and schedules
3. Site preparation
4. Equipment manufacturing
5. Factory acceptance test
6. Equipment delivery
7. System installation
8. System configuration
9. System optimization
10. Field acceptance test
11. Coverage testing
12. Technical training
13. System administration training
14. User training
15. Burn in period
16. System cutover
17. System documentation development and delivery
18. Punch list resolution
19. Final system acceptance

20. System and equipment warranty periods

### 2.5.2 Project Punch List

A. The SELECTED VENDOR shall establish and maintain a punch list, as mutually agreed to with MERA/Marin County, for site facilities, equipment, and for acceptance tests.

B. The punch list shall be maintained in real time and published weekly. The punch list shall 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. The party resolving the issue
8. Details about how each punch list item was resolved and tested
9. Project manager signoff (SELECTED VENDOR and MERA/Marin County)
10. Any notes about the item.

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

D. The SELECTED VENDOR shall be responsible for reviewing each punch list item, and advising MERA/Marin County of any changes. The status of punch list items shall be updated during each biweekly status meeting. All punch list items must be fully resolved before system acceptance will be granted.

### 2.5.3 Project Meetings

A. A project kickoff meeting shall be scheduled prior to the beginning of the project.

B. Weekly or biweekly (meeting frequency at the discretion of MERA/Marin County) onsite project status meetings shall be scheduled following contract award and the initial kickoff meeting.

C. The SELECTED VENDOR shall be responsible for scheduling the meetings as well as preparing meeting agendas and minutes. Meeting agenda items shall include, at a minimum, the following items:

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

### 2.5.4 Project Staffing

A. Project staffing shall be managed by the SELECTED VENDOR based on workload and the level of effort throughout the implementation / installation process; however, the positions identified below shall be staffed throughout the duration of the project and shall not change without prior approval by MERA/Marin County

1. SELECTED VENDOR's Project Manager:
    a. The SELECTED VENDOR's Project Manager shall be the primary point of contact between MERA/Marin County and the SELECTED VENDOR and all sub-contractors.
    b. The SELECTED VENDOR's Project Manager shall 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.
    c. The SELECTED VENDOR's Project Manager shall be responsible for coordination of the status meetings.
2. SELECTED VENDOR's Project Engineer:

a. The SELECTED VENDOR's Project Engineer shall have the primary responsibility for developing and managing the system design and ensuring that the system is installed in accordance with the approved system design.

b. Any deviation from the system design shall be subject to project change control procedures and will not be undertaken until approved by MERA/Marin County.

c. The SELECTED VENDOR's Project Engineer shall develop block diagrams, system block diagrams, and rack diagrams to assist the installation team in completing the system installation.

d. The Project Engineer shall also supervise the development and execution of the Factory Acceptance Test Plan, System Acceptance Test Plan, the Coverage Acceptance Test Plan, Cutover Plan, and guide the project team through the processes and procedures necessary to prove that the system performs as specified in the contract. No test plan will be executed until approved by MERA/Marin County.

### *2.5.5 QA/QC Program*

A. The RESPONDENT shall include a Quality Assurance / Quality Control (QA/QC) plan for the MERA/Marin County radio system project. The plan shall address all stages of the project, including, but not limited to:

1. Procurement
2. System design
3. Installation
4. Implementation
5. Testing
6. Cutover
7. 30 day operational test

B. The QA/QC plan shall specifically describe the plans and procedures that ensure the proposed system is designed, implemented, and tested in accordance with the standards and requirements described in this RFP.

C. The QA/QC plan shall be included as part of the Project Management Plan developed by the Project Manager.

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

E. The proposed QA/QC plan shall 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
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

## 2.6 Project Submittals

Key project deliverables and submittal requirements are outlined below and described in further detail throughout this RFP.

A. All project submittals shall be subject to review and approval by MERA/Marin County and its Engineer / Consultant.

B. All submittals shall be provided in hard copy, properly bound, and in electronic format (USB Flash Drive or CD-ROM). The quantity of hard copies required shall vary for each type of submittal and shall be determined by MERA/Marin County prior to submission.

C. All submittals shall include a cover letter or letter of transmittal, signed, dated, and fully describing the contents of the submittal.

## 2.7 Preliminary Design (included in proposal response)

The SELECTED VENDOR shall submit the Preliminary Design package as part of their proposal, which shall include the following:

A. QA/QC Plan

B. Detailed project schedule

C. System block diagrams

D. Radio and microwave channel plans

E. Microwave path engineering report(s)

F. Proposed sites and site details

G. 30% site development/construction drawings

H. Equipment room overview drawings

I. Equipment rack/cabinet elevation drawings

J. Tower profile drawings indicating antenna mounting locations

K. Detailed lists of materials for each site

L. 30-Day Operational Test Plan

M. Coverage Acceptance Test Plan (CATP)

## 2.8 Detailed Design (90 days after contract award)

The SELECTED VENDOR shall submit the Final Design package 90 days after contract award, which shall include the following:

A. Any updates to previously submitted design information

B. Patching schedules and termination details for all cabling necessary for a complete installation

C. Cutover plan

D. System operation and maintenance manuals for all equipment

E. Factory test data

F. Site installation drawings

G. Structural analyses and results

H. 70% and 95% site development/construction drawings and submittal timelines for both

I. The SELECTED VENDOR shall submit a detailed Factory Acceptance Test Plan (FATP), outlining a comprehensive series of tests that will demonstrate proof of performance and readiness for shipment.

J. The Final FATP shall be submitted and testing shall start after MERA approval.

## 2.9 Detailed Design Review

A. A detailed design review meeting shall be conducted to allow for the SELECTED VENDOR to present the system design for review and approval.

B. The detailed design review will allow the SELECTED VENDOR to present their system design and detail how the design meets all requirements.

C. The detailed design review shall be considered the last step prior to ordering and/or manufacturing of equipment. Upon approval of the detailed design by MERA/Marin County the SELECTED VENDOR should begin the ordering and manufacturing of system equipment. MERA/Marin County shall not be held liable for any equipment ordered, or manufactured prior to approval of the detailed design.

D. MERA/Marin County shall be given 30 days to approve the detailed design documents provided by the SELECTED VENDOR.

## 2.10 System Staging, Delivery, and Installation

A. System staging must be performed in the United States.

B. The SELECTED VENDOR shall ship all equipment and subscriber equipment immediately prior to field installation.

C. The SELECTED VENDOR shall submit a Bill of Materials / packing list with two copies for each shipment of equipment. The packing list shall include the following information at a minimum for each component included in the packaging:

1. Manufacturer
2. Model
3. Serial number
4. Unique identification of the package containing the item

D. All items shipped by the SELECTED VENDOR or their suppliers will include the above information.

E. The SELECTED VENDOR shall provide a complete inventory list of all equipment provided to MERA/Marin County.

F. The SELECTED VENDOR shall be responsible for storage of equipment. At MERA/Marin County's discretion and if available, MERA/Marin County may provide storage space.

G. The SELECTED VENDOR shall retain title and risk of loss for all items until, in the case of mobile equipment, installation in a vehicle, in the case of portable units until delivery and inventory, and in the case of system components, until final system acceptance.

## *2.11 Final System Acceptance*

A. Final system acceptance shall not be granted until the successful completion of all system testing tasks, successful 30-day operational test, the delivery of all system documentation, the resolution of all punch-list items.

B. The SELECTED VENDOR shall submit a detailed System Acceptance Test Plan (SATP), outlining a comprehensive series of tests that will demonstrate proof of performance and readiness for final acceptance by MERA/Marin County.

C. The SATP shall be submitted no later than 15 business days before the testing starts, and shall be reviewed by MERA/Marin County no later than five business days before the testing starts.

D. The SELECTED VENDOR shall submit five final and complete sets of as-built documentation, including the following:

1. Documentation index
2. Field test reports
3. Coverage test reports
4. Warranty documentation
5. Detailed list of materials for each site
6. As-built system block diagrams
7. As-built site drawings, including all cabling and terminations
8. Site layout drawings, as appropriate
9. Tower drawings showing all installations
10. Measurable audio and power levels settings
11. All measurable levels for audio, power output, etc. including test point levels as required in factory service manuals

# 3. Instructions to Proposers

## 3.1 Overview

A. Proposals must be received by close of business on July 22, 2016, Proposals received after this time will not be considered.

B. RESPONDENT shall comply with Senate Bill 854, requiring registration at the State of California Department of Industrial Relations (DIR) prior to submitting a proposal.

C. RESPONDENT shall submit a bound original and three bound copies of the proposal to the County. Each package shall also include a copy of the proposal in electronic format on CD-ROM. The front of the package should be marked “Proposal for MERA/Marin County Radio Communications System”. Proposals shall be addressed to:

Marin County Communications System Proposal
Marin County Department of Public Works
Attn: Communications Division Manager
3501 Civic Center Drive, Room 304
San Rafael, CA 94903

## 3.2 RFP Schedule

Dependent on the volume of proposals received, MERA/Marin County anticipates the following schedule for proposal review:

**Table 1 – RFP Schedule**

| Date | Event |
|---|---|
| May 16, 2016 | Mandatory pre-proposal conference |
| May 17 – May 27, 2016 | Site Surveys |
| July 22, 2016 | Sealed proposals due |
| July 26 – September 19, 2016 | Proposals evaluation |
| September 20 – September 29, 2016 | RESPONDENT interviews |
| October 11 – November 17, 2016 | Negotiations/fee review |
| December 14, 2016 | Contract execution |
| October, 2018 | System acceptance |

## 3.3 Pre-Proposal Conference

A. A mandatory pre-proposal conference will be held on May 16, 2016 at 9:00AM PDT. The conference will be held at the 3501 Civic Center Drive, San Rafael, CA, Room 315. During the pre-proposal conference, Federal Engineering may provide answers to any questions received and hold an open discussion regarding the project. Oral responses during the conference shall not be binding on MERA/Marin County.

B. RESPONDENT may submit questions to the County, in either written or electronic format (email), prior to 4:00PDT on June 3, 2016.

C. County contact for submission of technical questions:

Marin County Communications System Proposal
Marin County Department of Public Works
Attn: Communications Division Manager
3501 Civic Center Drive, Room 304
San Rafael, CA 94903

Pat Echols
pechols@marincounty.org

D. Following the conference, all attendees will be provided with a copy of the sign-in sheet, questions, and responses.

E. RESPONDENT shall survey existing MERA/Marin County sites and dispatch facilities. Limited to three personnel per RESPONDENT. Please provide names of personnel attending the site visits by May 10, 2016. Site visits will be conducted between May 17, 2016 and May 27, 2016.

## 3.4 Proposal Format

A. RESPONDENT shall adhere to the proposal format provided below, organized by section, with each section tabbed and numbered:

1. Section 1: Cover letter
2. Section 2: Table of contents
3. Section 3: Executive summary
4. Section 4: Qualifications

   All RESPONDENTS shall provide information describing experience and qualifications with similar projects in their proposal, or upon request from MERA/Marin County, including, but not limited to the following:

   a. Descriptions of the RESPONDENT's qualifications
   b. Resumes of key personnel
   c. Supplementary information
   d. A list of five systems of similar size and complexity, successfully completed by the RESPONDENT, including:
      1) Name of the system
      2) Location
      3) Contact person
      4) Contact telephone number

5. Section 5: Description of the system, including equipment, software, design, and services to be provided:
   a. Radio communications system
   b. Radio dispatch consoles

c. Voice logging recorder and integration (must be included as option for local agency purchase)

d. Network management subsystem, with ability to monitor many other pieces of equipment.

e. Microwave backhaul connectivity including preliminary path profiles

f. Radio and microwave channel plans

g. Subscriber equipment

h. Site Development/Improvements including utilities, site grading, storm water management, access roads, security provisions, shelters and structures.

i. Tower profile drawings including antenna mounting locations and ancillary equipment

j. Equipment room drawings

k. Equipment rack elevation drawings

l. Additional subsystems (such as Volunteer Fire Paging, Fire Station Alerting and Siren Controls, Knox Box activation)

m. RF coverage capability

n. Scope of Work documentation detailing complete system installation on a site by site basis

o. System design information shall include a complete detailed description, block diagrams, equipment layouts, and equipment lists necessary to provide a complete and comprehensive description.

p. Payment milestone schedule.

6. Section 6: Project Management plan including preliminary project schedule with detailed Gantt chart

7. Section 7: Quality Assurance / Quality Control (QA/QC) plan

8. Section 8: Training programs.

9. Section 9: Point-by-point compliance

RESPONDENT shall provide compliance statements for each outline level or bullet point of this RFP. RESPONDENT shall complete the compliance matrix provided in Appendix B – *Compliance Matrix*. Compliance statements are limited to the following three choices:

a. COMPLY - The proposal meets or exceeds the specified requirement.

b. COMPLY WITH CLARIFICATION – The proposal does not meet the exact stated requirement; however, meets a substantial portion of or meets the intent of the requirement. RESPONDENT must provide a detailed explanation when using this statement.

c. EXCEPTION - The proposal does not meet the specified requirements. RESPONDENT must provide a detailed explanation when using this statement.

10. Section 10: System, subsystem and subscriber warranty information (Years 1-3)

11. Section 11: System testing documentation including staging factory acceptance testing, coverage acceptance testing, 30-day operational test and final acceptance testing

12. Section 12: Post-Warranty Maintenance, Hardware and Software Programs (Years 4-15)

13. Section 13: Detailed equipment specification sheets for all proposed equipment

B. Respondent shall provide total proposal cost, itemized pricing, proposed payment milestones and dates, by using the pricing forms provided in Appendix C – *Proposal Pricing Forms*, to the greatest extent possible. Costs for OPTIONAL items shall also be provided on the forms. RESPONDENT may provide proposed fees for any other services that are not included in this schedule but that can be provided by the RESPONDENT and that are consistent and responsive to the services requested.

**NOTE: THE COST PROPOSAL SHALL BE SUBMITTED IN SEPARATE, SEALED ENVELOPE. THE INCLUSION OF ANY COST INFORMATION IN THE TECHNICAL PROPOSAL MAY RESULT IN SUCH PROPOSAL BEING REJECTED BY MERA/MARIN COUNTY.**

## *3.5 Addenda to the RFP*

During the proposal development period, the County may issue written addenda making changes or corrections to the specifications and/or other portions of this RFP as issued. Any such addenda shall be sent to each person, firm, or corporation who has secured a copy of these specifications. Such changes or corrections shall be included in the work

and/or materials covered by the proposal, and such addenda shall become part of the specifications and contract.

## 3.6 Evaluation

A. MERA/Marin County's selection of a vendor to supply and install a Project 25 Phase 2 radio system shall be based upon the demonstrated competence and qualifications of the RESPONDENT to provide and install a communications system and ancillary equipment that best fits the needs of MERA/Marin County. Each proposal will be evaluated and scored through a process conducted by MERA.

B. Each RESPONDENT's submittal must fully address the requirements listed in this solicitation and the RESPONDENT's degree of experience, knowledge, and ability to provide experienced and qualified support staff. The proposal submitted by the RESPONDENT must not have any exclusions, conditions or provisions applied to the aforementioned request. It is MERA/Marin County's intention to select a vendor that is the most qualified to meet MERA/Marin County's needs. The award shall be based on but not limited to the following factors:

**Table 1 – RFP Evaluation Criteria**

| RFP EVALUATION CRITERIA | Scoring Value Maximum Points |
|---|---|
| **Respondent Qualifications and Experience**<br>a. History of the company including the number of years in business providing P25 Phase 2 based radio systems as specified in this solicitation including descriptions of qualifications.<br>b. Qualifications of organizational personnel and staff responsibilities including resumes of key project staff.<br>c. Supplemental information demonstrating qualifications and experience.<br>d. A minimum of one to a maximum of five references from organizations for which your company is currently providing P25 Phase 2 based radio systems similar to the specifications of this solicitation on the Bidder's Qualifications Sheets. Provided the following information for each reference:<br>i. Name of the system<br>ii. Description of system and services provided<br>iii. Location<br>iv. Contact person<br>v. Contact telephone number | 10 |

| RFP EVALUATION CRITERIA | Scoring Value Maximum Points |
|---|---|
| **Response to Scope of Work**<br><br>a. Adherence to Compliance Matrix<br>b. Radio Communications System Requirements:<br>i. P25 systems compliance (with feature table)<br>ii. Expansion Capabilities (scalability)<br>iii. Site Selections<br>iv. Existing Site Development<br>c. Coverage -<br>d. Site Equipment:<br>i. Core(s)<br>ii. Simulcast Control<br>iii. Remote sites, UPS, DC Battery Plant, Antenna Systems, Interoperability Gateways<br>e. Dispatch Console Systems – features, functions, capabilities<br>f. Voice Logging Recorder and interface<br>g. Network Management Systems features, functions, capabilities<br>h. Smartphone Interface features, functions, capabilities<br>i. ISSI – External P25 system interfaces<br>j. Backhaul systems including digital microwave<br>k. Subscriber equipment features, functions and capabilities<br>i. Mobiles<br>ii. Portables<br>iii. Control Stations<br>l. Fire Station Alerting and Siren Controls<br>m. Volunteer Fire Paging<br>n. Training plans | Separate core required items into one section worth 45 points. Optional items go into a separate section worth 5 points. 50 |
| **Project Plans and Schedules**<br><br>Preliminary project schedule with detailed Gantt chart, Quality Assurance / Quality Control (QA/QC) plan, acceptance test plans (including coverage) | 5 |

| RFP EVALUATION CRITERIA | Scoring Value Maximum Points |
|---|---|
| **Warranty, Support, and Maintenance Plans**<br><br>System, subsystem, software, and subscriber warranty, support, and maintenance plans. | 10 |
| **Pricing**<br><br>Costs provided on the pricing sheets, which is a separate Excel spreadsheet. This form must be submitted in a separate sealed package. | 25 |
| **MAXIMUM SCORING POINTS TOTAL** | 100 |
| | |
| **Oral Presentation** - At its sole discretion, the MERA Evaluation Committee may require an interview/presentation before the final selection and award to a Firm. Submittal of material and information during an interview/presentation could add up to 15 additional points to the total score of the Respondent. | 15<br><br>(possible additional points if an oral presentation is requested) |
| **The following Scoring Formula will determine Scoring Value Maximum Points for the categories above:** | |
| Excellent | .75 - 1.00 |
| Good | .50 - .74 |
| Fair | .25 - .49 |
| Poor | 0 - .24 |
| Multiply scoring formula by possible scoring value maximum point allotment. *Example:* If a firm is scored as .6 (Good) on **Respondent Qualifications and Experience** then this is multiplied by the maximum scoring points, e.g. .6 x 10 (maximum scoring points), which would then equal 6 points. | |
| ***SPECIAL NOTE*** - The Cost Proposal will be evaluated as follows: | |
| Lowest Conforming Proposal<br>Proposals within 5% of Low Proposal<br>Proposals within 7% of Low Proposal<br>All others | 25 points<br>20 points<br>15 points<br>5 points |

C. A Best and Final Offer process represents an optional step in the selection process and may be used when:

1. No single response addresses all the specifications.

2. The cost submitted by all proposers is too high.
3. The scores of two (2) or more proposers are very close after the evaluation process.
4. All proposers submitted responses that are deficient in one or more area.

D. MERA/Marin County reserves the right to negotiate the fee and/or scope of services with the highest ranked RESPONDENT. If negotiations with this RESPONDENT cannot be completed successfully, then MERA/Marin County reserves the right to negotiate with the second highest ranked RESPONDENT.

E. At the sole discretion of MERA/Marin County, RESPONDENTS may also be asked to provide a sample of proposed equipment to demonstrate capabilities and features. This request may include, but not be limited to subscriber units and system components.

## 3.7 Award

MERA/Marin County intends to award a contract(s) for the complete system or portions thereof. However, MERA/Marin County specifically reserves the following rights, consistent with procuring a system that best meets the needs of MERA/Marin County and system users:

A. MERA/Marin County reserves the right to accept or reject any or all proposals or any portion thereof.

B. MERA/Marin County reserves the right to accept all or part of any proposal depending solely upon the requirements and needs of MERA/Marin County.

C. MERA/Marin County reserves the right to seek clarifications of any proposal submitted or specific aspects of any proposal prior to the award of the contract. After seeking such clarification, MERA/Marin County will allow the RESPONDENT an opportunity to provide the requested clarification.

D. MERA/Marin County reserves the right to adjust item quantities and/or reconfigure the communications system in the best interest of MERA/Marin County subsequent to award of the contract.

E. If multiple contracts are awarded, in lieu of a turnkey contract, MERA/Marin County may either:

1. Negotiate additional scope with one or more of the successful RESPONDENT(S) to assume Prime Contractor status, or

2. Provide system integration or prime contractor services provided the SELECTED VENDOR has submitted a proposal for those services.

# 4. Radio Communications System Requirements

## *4.1 Overview*

A. RESPONDENTS shall propose a complete 700 MHz Project 25, Phase 2 Time Division Multiple Access (TDMA) simulcast trunking radio communications system. MERA/Marin County has been allocated 27 700 MHz frequencies as part of the Region 6 NPSPAC Plan.

B. The existing dispatch consoles shall be replaced with new IP-based dispatch consoles and gateways designed to support all of the features of the new P25 radio system while retaining any required legacy capabilities or features and interoperability not supported by the new radio system.

C. The system shall leverage the existing microwave backhaul network to the greatest extent possible without affecting operations of the existing systems. New microwave backhaul links shall provide 150 Mbps throughput and meet 99.999% reliability. Designs employing ring topology are preferred.

D. The RESPONDENT shall propose and fully describe network security features of the proposed systems.

E. New distributed antenna systems (DAS) and/or bi-directional amplifiers (BDA) shall be provided for the Cal-Park Tunnel and SO jail complexes. (Note – Jail is a requirement, all others are local agency options)

F. The radio system shall provide portable and mobile radio coverage as described in Section 4.8, *Coverage*.

G. Subscriber units shall be capable of operating in both 700 and 800 MHz bands. Operational in both P25 Phase 1 and Phase 2 trunking modes as well as conventional operation. Multiple tiers of subscribers shall be proposed to support a diverse group of users.

H. An ISSI connection(s) to allow intersystem roaming with other Project 25 systems shall be provided allowing for a minimum of three connections and a minimum of 12 concurrent talkpaths to other P25 systems.

I. As an OPTION, a Smartphone/broadband device integration allowing for the transmitting and receiving of voice calls via a smartphone or broadband capable device shall be provided.

J. In the event that requirements are stated in more than one section and appear to conflict, the more stringent requirement shall apply.

## 4.2 Project 25

A. The proposed radio system shall comply with all of the latest applicable TIA 102 documents as adopted by TIA at the time of proposal submission, and the SELECTED VENDOR is expected to comply with applicable newly adopted standards throughout the implementation until final acceptance of the system. The RESPONDENT is responsible to ensure that the proposed radio system is compliant with the latest revision.

B. RESPONDENTS shall provide a list of Project 25 TIA-102 standards documents applicable to each P25 feature supplied and confirm compliance with each.

C. If a RESPONDENT is not compliant with a requirement, the RESPONDENT shall identify the requirement by number and name, and provide a detailed explanation of why the proposed system does not meet the requirement.

D. RESPONDENTS shall provide a definitive list of all equipment, features and functions included in their proposal that limit or may limit the use of P25 standard based equipment from alternative vendors.

E. P25 Phase 2 refers to the Project 25 requirements and standards for a digital Common Air Interface (CAI) using 2-slot TDMA on 12.5 kHz radio channels for a 6.25 kHz equivalent bandwidth, including infrastructure and user radio devices.

F. All system equipment shall be configured, licensed, and equipped to provide for concurrent use of both Phase 1 Frequency Division Multiple Access (FDMA) and Phase 2 (TDMA) subscribers on all channels and at all sites, without user or console operator intervention at the repeater, talkgroup and channel level. RESPONDENT shall fully describe the technical and operational aspects of this capability in the proposed system. RESPONDENT shall describe the reduction in GOS should P25 Phase 1 radios use the system.

## 4.3 Redundancy and Survivability

A. The proposed radio communications system shall support mission critical operations; therefore, a high degree of redundancy and survivability is required. A network topology utilizing fault tolerance shall be incorporated to the greatest extent possible through a distributed and/or redundant architecture.

B. All efforts shall be made to design a system that eliminates single points of failure. For those elements that would result in a major system failure, redundancy is required and may include geographically separating primary and secondary components to provide fault tolerance from geographic or site related failures. Such elements include, but are not limited to the following:

1. All core equipment and network elements
2. Backhaul network (loop/ring protected)
3. Power system design including appropriate (best practice) redundant (N+1) power supplies for equipment and network gear to prevent single point failures, e.g., no subsystem shall be degraded due to loss of a single power supply.
4. Simulcast control equipment
5. Voting equipment

C. The proposed radio system(s) shall include fallback modes minimizing degraded operation and preventing system failure. The system(s) shall be capable of automatic activation of fallback modes in the event of a hardware, software or subsystem failure. Additionally, the system(s) shall provide graceful degradation, as these fallback modes of operation are required. The network management system shall detect and report all failures or degraded conditions in real time. At a minimum, the following failures should invoke a system action or recovery to prevent a complete system failure:

1. Loss of single channel (hardware or interfering signal) should NOT cause a fallback mode.
2. Loss of multiple channels (hardware or interfering signals)
3. Loss of all control channel(s). Loss of less than all control channels should not put the system into fallback.
4. Loss of multiple site controller(s). Loss of a single site controller should not put the system into fallback.
5. Loss of multiple site router(s) or switches(s) at any site. Loss of a single router or switch should not put the system into fallback.
6. Loss of a multiple simulcast sub-sites. Loss of a single simulcast sub-site should not put the system into fallback.

7. Loss of multiple system controller(s). Loss of a single system controller should not put the system into fallback.
8. Loss of backhaul or network connectivity at any site in the system. Loss of a single site connection should not put system into fallback.
9. Loss of more than one data storage media at a core site that would impair system performance. Loss of one data storage media should not put the system into fallback.

D. A detailed description shall be supplied describing the system operation and impact to both subscriber and console users when each of the failures described above occurs.

## 4.4 Expansion

A. The systems shall be scalable by adding additional hardware and/or software to increase coverage, capacity, or features. RESPONDENT shall propose equipment such that the system can be easily expanded by a minimum factor of 20%. For example if a transmitter combiner requires five ports for the system design, a six-port combiner should be provided for ready expansion.

B. The RESPONDENT shall list the expansion capabilities of the proposed system, including but not limited to the following:

1. Total discrete channels
2. Channels per site
3. Simulcast cells
4. Sites per simulcast cell
5. Multicast sites
6. Unit IDs
7. Total users
8. Talkgroups
9. Dispatch Positions

C. The RESPONDANT shall guarantee the capability for a minimum of 20% system expansion.

D. The RESPONDANT shall guarantee availability of all equipment required for 20% expansion for a minimum of 15 years.

## 4.5 Grade of Service (GoS) – Trunked System

A. The measure of traffic loading capacity for any trunked system is defined by Grade of Service (GoS). Grade of Service is used to measure the probability that a radio call will not gain immediate access to a radio channel, but rather, be placed in a busy queue for later processing when a voice channel becomes available. For example, a 2% GoS represents that 98% of the radio calls attempted on the system get processed immediately, and 2% get placed into the user queue.

B. The system shall meet a GoS of 1%, with 90% of units placed in queue receiving a channel-grant within one second. RESPONDENT shall use the following information in developing their design:

1. Assume 1.2 calls per unit per hour
2. Assume 12 second transmission duration plus hang time for repeater de-key after ending of talkgroup call
3. RESPONDENT shall use the unit counts provided below:
    a. 3,000 Portable Units
    b. 2,000 Mobile Units
    c. 250 Control Stations
    d. Roaming from other Counties on 12 roaming talkgroups

C. RESPONDENT shall submit traffic-engineering studies in their proposal describing how their proposed system design meets this criterion. The traffic engineering study shall describe the methodology used in developing the study along with any assumptions relating to inter and intra cell usage. Use 250 talkgroups and the numbers above for calculations

## 4.6 Site Selection

A. RESPONDENTS shall use MERA/Marin County's existing communications sites to the greatest extent possible. RESPONDENT shall determine the number and location of sites needed to provide the required coverage. MERA/Marin County has identified a number of preferred sites for use in the proposed system,

provided in Appendix D – *Master Site List*. The preferred order of site selection shall be; current tower sites utilized by MERA/Marin County, additional sites as identified in Appendix D, existing tower sites not currently utilized, then new or "green field" sites.

B. In the event the RESPONDENT feels that the provided site locations are insufficient to deliver the required coverage, alternate sites may be suggested. If alternate sites are required to meet the coverage level required by this RFP, the RESPONDENT shall state both the level of coverage they are willing to guarantee from a design using sites from Appendix D – *Master Site List,* and an alternate design that will provide the required coverage.

C. If additional sites are needed, commercial sites for lease or new greenfield sites may be proposed. Costs and timelines associated with these sites for development and California Environmental Quality Act (CEQA) review and documentation requirements (such as Environmental Impact Report if warranted) must be included in the proposal for consideration by MERA/Marin County.

D. Cost associated with each existing or proposed site shall be detailed separately, on a per site basis.

## 4.7 Existing Site Development

A. RESPONDENTS shall verify that any existing MERA/Marin County sites selected for use have sufficient space available for antenna and ancillary equipment to be installed at the tower/structure/shelter. In the event a RESPONDENT proposes a location where tower/structure/shelter space is not available, the RESPONDENT'S guarantee of coverage shall not change even though an alternative design may be required.

B. Cost associated with development of existing sites shall be detailed separately, on a per site basis as required in Appendix C – *Proposal Pricing Forms*, *Table C.4A*.

C. The SELECTED VENDOR shall perform structural analysis. If no current drawings are available, the SELECTED VENDOR shall also be responsible for any tower mapping services required for the structural analysis.

D. Structural analysis shall be performed on existing towers according to the ANSI/TIA-222 standard, latest version applicable at time of structural analysis.

E. Structural analysis shall include existing and proposed equipment; however, it is MERA/Marin County's intent that the SELECTED VENDOR remove unused system equipment once cutover and acceptance of the new system is completed.

F. Structural analysis reports shall be provided to MERA/Marin County upon completion of study or studies.

G. In the event a tower fails the structural analysis, the SELECTED VENDOR shall be responsible for modifying the tower to correct the deficiencies. A passing structural analysis report shall be provided to MERA/Marin County detailing the tower modifications.

H. In the event that use of an existing commercial tower location is proposed, the RESPONDENT shall provide MERA/Marin County with lease costs for tower space and ground space required to support communications systems. Additionally, the RESPONDENT will exercise due diligence to verify availability of the tower elevations proposed and that the tower and site can support the proposed equipment.

I. RESPONDENT shall identify and include with their proposal any additional work and associated costs necessary to make existing sites and infrastructure usable in the proposed radio system.

J. The SELECTED VENDOR shall be responsible for updating all existing sites that are part of the proposed system to be compliant with their provided grounding standards. SELECTED VENDOR shall be accountable for updating all deficient site conditions.

K. The SELECTED VENDOR shall be responsible for completing any documents required by local, state and federal departments including, but not limited to permitting documents, California Environmental Quality Act (CEQA) review and State Historic Preservation Office (SHPO) forms.

L. The SELECTED VENDOR will be responsible for resolving design issues related to site permitting and zoning.

M. Code Compliance:

1. Installation of all electrical equipment, power distribution, lighting assemblies and associated wiring shall comply with the most recent edition of the National Electric Code (NEC) and Occupational Safety and Health Administration (OSHA) regulations.

2. All electrical equipment shall be listed or approved by Underwriters Laboratories (UL).

N. The SELECTED VENDOR and any subcontractor employed by the SELECTED VENDOR shall comply with all applicable local codes as well as industry best practices and guidelines stipulated in Section 2.4.1, *Codes, Standards and Guidelines*.

O. The SELECTED VENDOR shall assume total responsibility for maintaining liability insurance covering the following items:

1. Project design
2. Implementation
3. Licensing
4. Shipping
5. Receiving
6. All site work required
7. Any items required for the SELECTED VENDOR or any required subcontractors.

P. Prior to any excavations, the SELECTED VENDOR or subcontractor shall obtain all Marin County approvals and follow appropriate procedures outlined at the following website: www.call811.com.

Q. The SELECTED VENDOR will coordinate with utility companies and MERA/Marin County for all utility related items, such as electrical service hookups and disconnects.

R. During detailed design, the SELECTED VENDOR shall provide detailed drawings including all structures and foundations, sealed by a professional engineer registered in the state of California.

1. Detailed dimensioned drawings showing all system components and locations
2. Drawings and/or specifications shall describe any auxiliary equipment
3. Manufacturer specification sheets of all equipment used shall be provided

S. Concrete:

1. For all foundations, pads and concrete work, the SELECTED VENDOR or subcontractor will provide to MERA/Marin County or MERA/Marin County's representative, a test sample of each mix of concrete demonstrating that it has been tested for compliance with the foundation specifications set forth by the requisite site engineer. Written reports certifying the strength of the concrete are to accompany each test cylinder.
2. If any concrete used in the foundation does not meet specifications, the SELECTED VENDOR or subcontractor will be required to remove the foundation and pour a new foundation using compliant materials, at no expense to MERA/Marin County.

T. All control functions and alarms from towers, shelters and backup power shall be interfaced to the Network Management System (NMS) detailed herein, for remote control and monitoring.

## 4.8 Coverage

The County envisions the radio system to provide coverage as described below:

A. The system must meet or exceed existing system portable radio coverage (shown in Appendix H – *Specific Coverage Area Requirements*) throughout the 911-call area using the existing and potential sites listed in Appendix D – *Master Site List*.

B. The radio systems shall be required to serve the Specific Coverage Area Requirements of MERA/Marin County, at 97% reliability at a Delivered Audio Quality (DAQ) of 3.4 or better as measured by TSB-88 testing methods.

C. The system should provide portable in-building coverage to the defined urban areas of operation identified in Appendix H – *Specific Coverage Area Requirements*.

D. Coverage guarantees shall be provided for areas maps defined in Appendix H – *Specific Coverage Area Requirements.*

1. Portable on Street-Countywide
2. Portable in-building-Defined Urban Area (18dB Loss)
3. Portable on-street-Defined trouble Areas
4. Portable on-street-Defined Historic Call Area

E. Any uncovered areas (i.e., the uncovered %) shall not be composed of a large number of contiguous grids or cells, such that large areas of the service territory are not covered. In no case will highly populated areas be included in the uncovered portion.

F. Coverage design, implementation, and testing for the system shall adhere to the latest revision of Telecommunications Industry Association (TIA) Telecommunications Systems Bulletin; *Wireless Communications Systems - Performance in Noise and Interference - Limited Situations - Recommended Methods for Technology - Independent Modeling, Simulation, and Verifications* (TSB-88).

G. RF coverage is defined as the digital Bit Error Rate (BER) that provides a minimum Delivered Audio Quality (DAQ) 3.4 audio signal for both outbound (talk-out) and inbound (talk-in) communications. Coverage will be tested using BER and must test both inbound and outbound per TSB-88 Testing methods.

H. The RESPONDENT shall propose indoor Distributed Antenna System (DAS), or Bi-Directional (BDA) amplifier system to provide extended coverage within the Cal-Park Tunnel and SO Jail complexes. Site walks for each of these facilities will be required for pre-approved prospective RESPONDENT personnel after the pre-bid meeting. Jail is a requirement; all others are a local agency option. At the pre-bid conference, respondents must provide a list of staff that will be attending the required site visits.

### 4.8.1 Coverage Model and Maps

A. The RESPONDENT shall employ a suitable coverage prediction model using appropriate terrain and land cover data for the environment, and shall include a detailed description of the propagation models used and the assumptions made in preparation of the maps. A brief description of the methodology of the software used to calculate coverage shall also be included in the proposal narrative.

B. RESPONDENT shall submit both talk-out and talk-in system composite coverage maps for all proposed design configurations. The maps shall be clearly labeled and shall show system gain calculations for each of the following:

1. Mobile radios – Standard dash or trunk mount with a unity gain antenna mounted in the center of the roof
    a. Talk-out to a mobile radio

b. Talk-in from a mobile radio

2. Portable radios – Standard portable radio outdoors:
   a. Talk-out to a portable radio on hip with swivel belt clip
   b. Talk-in from a portable radio on hip with swivel belt clip
3. Portable radios – Standard portable inside a 18db loss building
   a. Talk-out to a portable radio on hip with swivel belt clip
   b. Talk-in from a portable radio on hip with swivel belt clip

C. Coverage shall be depicted using a light transparent color or cross-hatching for those areas that meet or exceed the minimum coverage threshold. The background map layer shall show the geographic boundary of the Marin County, the 40 dBµ service contour, cities and towns, as well as major roads.

D. All maps must clearly delineate the difference between areas predicted to be equal to or greater than DAQ 3.4 equivalent coverage and areas that do not meet coverage requirements. RESPONDENT shall include the effects of Time Delayed Interference (TDI) in all coverage maps (if applicable) per TSB-88.

E. Coverage maps shall be provided in the proposal in two formats:

1. 11”x17” (minimum) full color hardcopy format
2. In PDF file format on CD-ROM or USB flash drive

F. Thirty meter U.S. Geologic Survey (USGS), NAD-83 terrain elevation data shall be used for coverage simulations. Alternatively, 3 arc-second data may be used where 30-meter data is not available.

### *4.8.2 Link Budgets*

A. RESPONDENT shall provide link budgets, clearly defining the following minimum information, relating to each map and each site:

1. Base station / repeater RF power output
2. Antenna gain (transmit and receive)
3. Antenna down tilt (if applicable)
4. Transmit ERP

5. Receiver sensitivity
6. Total antenna system gains, or losses
7. Antenna height
8. Mobile and portable antenna height for talk-out and talk-in
9. Mobile and portable RF output power
10. The configuration of field units (for example – talk-out to portable inside 18 dB loss buildings)

## 4.9 Site Equipment

A. All site equipment supplied shall be new, of high quality, and designed to provide high reliability to support mission critical communications. RESPONDENTS shall provide specification sheets for all proposed equipment. The radio communications system shall consist of the following components:

1. System control equipment
2. Simulcast control equipment
3. Receiver voting equipment
4. Base Stations
5. Combiners/Multicouplers
6. Antenna Systems
7. Uninterruptable Power Supply (UPS)
8. DC Power Plant
9. Dispatch Console Subsystem
10. Network Management Subsystem

### 4.9.1 System Control Equipment

A. The system and site control equipment shall be capable of controlling all channels in the proposed system. The control equipment may use a distributed or centralized architecture. All primary control equipment, if used will be located at 1600 Las Gamos Drive, San Rafael, CA.

B. Since system and site control equipment is critical to the network, and considering the region's susceptibility to earthquakes and other natural disasters,

placement of the equipment at a secure, highly stable location is of the utmost importance. MERA/Marin County believes that 1600 Las Gamos Rd., San Rafael, CA is suitable for the placement of the equipment.

C. The system and site control equipment shall fully support the P25 and any other functional requirements as referred to in this RFP.

D. The proposed system control equipment shall be configured with a primary and redundant controller. RESPONDENTS shall detail how their system control equipment will provide a high degree of reliability and maintain system availability during failures that effect the site housing the control equipment.

E. The RESPONDENT shall fully describe the manner in which the proposed system and system controllers function and operate.

### 4.9.2 Simulcast Control Equipment

A. The SELECTED VENDOR shall provide all necessary simulcast components and signal processing elements required to optimize voice quality in coverage overlap areas.

B. The simulcast control equipment shall be configured with a primary and redundant controller. RESPONDENTS are expected to propose a system configuration that provides a resilient system able to withstand complete site failures. RESPONDENTS shall detail how a complete failure of the simulcast control site will affect system performance.

C. Simulcast control equipment typically relies on GPS receivers for timing and frequency stability. RESPONDENTS shall detail how the system will continue to operate during a GPS failure.

D. Non-captured overlap areas with delay spreads in excess of those required to meet the Delivered Audio Quality (DAQ) objective shall be minimized inside the service area. Any area predicted to exceed the acceptable maximum delay spread shall not be included in the calculated coverage area percentage.

E. Simulcast systems shall operate without the need for manual optimization and system / subsystem alignment. All alignment and adjustments shall be automated where possible (e.g., signal conditioning adjustments for channel banks, signal launch times at sites, etc.).

F. Simulcast equipment shall be monitored remotely configurable by the Network Management System (NMS).

### 4.9.3 Receiver Voting

A. Receiver voting equipment shall monitor all receivers in the simulcast system and select the best signal for processing and rebroadcast through the network.

B. RESPONDENTS shall explain how the system will continue to operate during the loss of the voting site.

C. Receiver voting equipment shall be monitored by the NMS.

### 4.9.4 Base Station Equipment

A. General:

1. Base station equipment shall be solid state in design and function with standard site conditions for temperature, altitude, and humidity.
2. Base station equipment shall be monitored and remotely configurable by the NMS. Monitoring shall include, but not be limited to interrogating the base station equipment for; power amplifier temperatures, high/low voltage conditions and high Standing Voltage Wave Ration (SVWR). RESPONDENTS shall detail any additional operating conditions capable of being monitored.
3. The units shall be as compact as possible, with mounting configurations for standard 19” relay racks or cabinets.
4. Base station equipment shall be controlled via IP connection and not analog control methods such as 2, or 4 wire E&M signaling.

B. Base station equipment shall comply with applicable portions of Part 90 of the FCC Rules and Regulations, as well as appropriate EIA and similar agency standards and shall be FCC type accepted for the 700 and 800 MHz frequency bands.

C. Prior to implementation, the SELECTED VENDOR shall perform the following studies at each site:

1. Intermodulation analysis – The SELECTED VENDOR shall consider equipment from all tenants located at the proposed site, per FCC licensed information and observation of the equipment located at the site.
2. Maximum Permissible Exposure (MPE) study (per latest revision of Office of Engineering Technology (OET) bulletin 65) – The SELECTED VENDOR shall consider equipment from all tenants located at the proposed site, per FCC licensed information.
3. NTIA Study Regarding Receiver Front End Overload – The SELECTED VENDOR shall provide any additional filters or studies required.

D. The SELECTED VENDOR shall resolve all issues predicted during the intermodulation analysis and MPE studies. If an intermodulation problem is identified following implementation, the SELECTED VENDOR shall resolve the issue without degrading system coverage or performance, for a period of up to 12 months after final acceptance at no cost to MERA/Marin County.

E. RESPONDENT shall include detailed specification sheets for all proposed equipment, including towers.

### 4.9.5 Antenna Systems

A. RESPONDENT shall propose all antenna system equipment necessary for a complete design.

B. Antennas shall be appropriate to provide the required coverage and meet applicable FCC rules and regulations.

C. Transmission line type and length shall be appropriate to provide the required coverage.

D. SELECTED VENDOR shall label each coaxial cable and waveguide with coaxial/waveguide length, height of antenna/microwave dish and azimuth.

E. RESPONDENT shall fully describe expansion capacity for combiner and multicoupler systems.

F. RESPONDENT shall include detailed specification sheets for all proposed equipment, including, but not limited to antennas, receiver multicouplers and transmitter combiners.

### 4.9.6 Interoperability Gateway Devices

A. Gateway devices shall be provided to integrate existing non-trunked RF resources into the new system. Each RF site shall be equipped with a gateway device allowing for an integration of a minimum of eight conventional resources. RESPONDENTS shall detail operation and expansion capabilities of these gateways.

B. The existing sites shall be supplied with sufficient gateway devices to allow for connectivity of all existing conventional stations plus an additional 20% gateway port capacity. The SELECTED VENDOR shall be responsible for connecting the base/repeater stations to the provided gateway devices.

C. Any gateway connected device will have the ability of having its audio recorded on the logging recorder.

D. Gateway stations will be capable of being patched to any talkgroup, or conventional resource by the dispatch console system.

### 4.9.7 DC Power Supply

A. The SELECTED VENDOR shall furnish and install a -48 VDC power plant system at each radio site.

B. Each DC Power system will include all batteries, battery mounting or racking facilities, float-type battery chargers/rectifiers, low voltage disconnects, and DC load centers required for a complete installation.

C. Individual breakers shall be supplied for each piece of equipment.

D. Rectifier modules shall be hot swappable modular type with N+1 redundancy.

E. Rectifier modules shall be capable of on-line expansion.

F. System shall be capable of completely charging all batteries in less than 24 hours while equipment is operating at 100% load.

G. System shall be capable of an eight hour runtime at 100% load.

### 4.9.8 Uninterruptable Power Supply (UPS)

A. The SELECTED VENDOR shall provide a single phase, online, double conversion, static type, uninterruptible power supply (UPS) at RF Sites requiring UPS's with the following features:

1. Surge suppression
2. Input harmonics reduction
3. Rectifier / charger
4. Inverter
5. Static bypass transfer switch
6. Battery and battery disconnect device
7. Internal maintenance bypass / isolation switch
8. Output isolation transformer
9. Remote UPS monitoring provisions
10. Battery monitoring
11. Remote monitoring

B. The SELECTED VENDOR shall perform electrical loading analysis for shelter equipment, excluding HVAC, during preliminary design to verify UPS size required. All electrical loading calculations shall include a 50% expansion factor, and all assumptions regarding power consumption and duty factor shall be thoroughly explained.

C. For the purpose of the proposal, the SELECTED VENDOR shall assume the following:

1. Calculated output with a 50% expansion factor as stated
2. Single phase
3. 60 Hz
4. 0.8 Power Factor
5. Minimum eight hour runtime

D. Quality Assurance:

1. Electrical components, devices, and accessories shall be listed and labeled, as defined in NFPA 70, by a qualified testing agency and marked for intended location and application.
2. UL compliance shall be listed and labeled under UL 1778 by a Nationally Recognized Testing Laboratory (NRTL).
3. UPS components shall be suitable for installation in computer rooms, as defined by NFPA 75.

E. Operational Requirements:

1. Automatic operation includes the following:
    a. Normal Conditions – Load is supplied with power flowing from the normal power input terminals, through the rectifier-charger and inverter, with the battery connected in parallel with the rectifier-charger output.
    b. Abnormal Supply Conditions – If normal supply deviates from specified and adjustable voltage, voltage waveform, or frequency limits, the battery supplies energy to maintain constant, regulated current.
    c. If normal power fails, energy supplied by the battery through the inverter continues supply-regulated power to the load without switching or disturbance.
    d. When power is restored at the normal supply terminals of the system, controls automatically synchronize the inverter with the external source before transferring the load. The rectifier-charger then supplies power to the load through the inverter and simultaneously recharges the battery.
    e. If the battery becomes discharged and normal supply is available, the rectifier-charger charges the battery. On reaching full charge, the rectifier-charger automatically shifts to float-charge mode.
    f. If any element of the UPS system fails and power is available at the normal supply terminals of the system, the static bypass transfer switch switches the load to the normal AC supply circuit without disturbance or interruption.
    g. If a fault occurs in the system supplied by the UPS, and current flows in excess of the overload rating of the UPS system, the static

bypass transfer switch operates to bypass the fault current to the normal AC supply circuit for fault clearing.

h. When the fault has cleared, the static bypass transfer switch returns the load to the UPS system.

i. If the battery is disconnected, the UPS continues to supply power to the load with no degradation of its regulation of voltage and frequency of the output bus.

2. Manual operation includes the following:

   a. Turning the inverter off causes the static bypass transfer switch to transfer the load directly to the normal AC supply circuit without disturbance or interruption

   b. Turning the inverter on causes the static bypass transfer switch to transfer the load to the inverter

3. Controls and indications: Basic system controls shall be accessible on a common control panel on the front of the UPS enclosure.

## *4.10 Dispatch Console System*

A. The dispatch console is a critical link for public safety personnel. It is here that the dispatch operator must relay critical information from the general public to public safety personnel in the field. At times, the dispatcher may be in stressful conditions with lives at risk. It is imperative that the dispatch console be configured such that the operation of such console is second nature to the dispatch personnel. The dispatch console should provide the operator with as much information as necessary without the screen being cluttered and be easily navigated to perform necessary functions.

B. RESPONDENT shall provide pricing for replacement of all existing consoles with state-of-the-art IP controlled consoles.

C. RESPONDENT shall provide interfacing to existing IP based console equipment, when applicable.

D. A list of existing console systems and operator positions is provided below. The SELECTED VENDOR shall perform due diligence to verify the systems and quantities outlined below in Table 2:

**Table 2 – Marin County Dispatch Centers**

| Dispatch Center | Console Manufacturer | Console Model | Number of Positions |
|---|---|---|---|
| **County of Marin Comm. Center** | **Motorola** | **MCC-7500** | 16 |
| **County of Marin Backup Center** | **Motorola** | **Gold Elite** | 2 |
| **Master site** | **Motorola** | **Gold Elite** | 1 |
| **Master site** | **Motorola** | **MCC-7500** | 1 |
| **Jail** | **Motorola** | **Gold Elite** | 1 |
| **Radio Shop** | **Motorola** | **Gold Elite** | 1 |
| **Radio Shop** | **Motorola** | **MCC-7500** | 1 |
| **Novato PD** | **Motorola** | **Gold Elite** | 3 |
| **San Rafael PD** | **Motorola** | **Gold Elite** | 4 |
| **County Fire - Woodacre** | **Motorola** | **Gold Elite** | 3 |
| **Fairfax PD** | **Motorola** | **Gold Elite** | 1 |

E. These IP based console locations are to control the proposed trunked system and all conventional resources.

F. Vendor to provide pricing for potential additional dispatch consoles with a guaranteed pricing period.

G. Radio consoles to use COTS technology including CPU's, monitors, speakers, hard drives, video and sound cards, RAM, etc. where applicable.

### *4.10.1 General Requirements and Features*

A. Dispatch Console Equipment (Operator Positions) shall be designed to be placed on modular workstation furniture and provide operators with an ergonomic design

permitting ease of operation over extended periods, typically 8-12 hours for each operator. The term ergonomic should include the ability to change colors for individual resources for visual ease of use.

B. Console positions shall be able to acoustically cross-mute channels in order to eliminate acoustic feedback between operators.

C. The screen display shall be designed so that all dispatching functions shall be operable from one display.

D. The screen display shall be very flexible, allowing authorized personnel the ability to change colors for individual resources and determine which resources and functions are available at each operator position.

E. New features and screen configurations shall be supported through software programming and not reconfiguration of hardware.

F. Capability to program, store, retrieve, and edit multiple, custom operator screens and configurations for each operator position shall be provided.

G. Operator screen configurations and alias database shall be stored locally or on a centrally located server.

H. The SELECTED VENDOR shall be responsible for loading alias information for all existing and provided subscriber devices into the console's database.

I. RESPONDENT shall describe their alias management system in detail. Each dispatch center shall have access to the database so they can control their own alias management. No other functionality shall be allowed at these terminals.

J. The dispatch console shall display an alias name on screen when a unit with a radio ID stored in the alias database is transmitting.

K. Consoles shall be equipped with AES encryption to provide operator positions the ability to decrypt and encrypt secure voice communications. Channels shall have a distinctive icon that indicates whether encryption is in use for that channel.

L. Upon activation of an emergency alarm by field units, dispatch positions shall provide an audible alert, display alias and ID of calling unit, and provide a visual alert of an emergency activation.

M. Operators shall have the ability to utilize a headset or stationary gooseneck type microphone for transmitting audio.

N. The dispatch console system shall be interfaced to the E911 phone system allowing for complete integration.

O. The capability to converse on the telephone utilizing the same operator headset that is used for radio conversations shall be provided.

P. An instant recall option shall be provided allowing the operator to verify his or her recent traffic. Both telephony and radio traffic shall be available for playback.

Q. The console system shall control the radio system via a networking interface; RF control stations will not be used as primary control of the radio system.

R. As an OPTION, the console system may be integrated with MERA/Marin County's Computer Aided Dispatch (CAD) system which is currently Intergraph® Version 9.3, Rev. MR 2, but which may be replaced in the future. RESPONDENT shall identify all CAD systems that the proposed system currently may be interfaced to, supported features, along with OPTIONAL CAD interface costs.

S. Dispatch consoles shall be able to monitor and transmit on all proposed and existing systems.

T. A transmit/receive audio level (Vu) meter or other indicator shall be provided showing the level of transmitted voice. This meter should also indicate the level of receive audio present on the selected channel.

U. Operator positions shall have the ability to independently set each talkgroup/channel's volume level. Minimum audio levels should be capable of being set to avoid missed calls.

V. A control/indicator shall be provided to allow the operator to mute or unmute audio from unselected channels. Selected audio and unselected audio shall be audible from separate speakers.

### *4.10.2 Trunked Requirements*

A. Dispatch consoles shall be compatible with the proposed radio system. Dispatch consoles shall directly interface with the system core.

B. Dispatch consoles shall be equipped with an instant transmit switch for each talkgroup displayed.

C. The Push-to-Talk (PTT) ID and Alias of the unit calling shall appear in addition to a call indicator. After the call is completed, the unit PTT ID and Alias shall remain displayed until another call is received.

D. To aid dispatchers in a busy system, a list of the last 15 radio IDs and Aliases shall be available in a recent call list.

E. In order to enhance dispatcher effectiveness in a PTT ID system, the various display modes available shall interact in the following manner:

1. An operator shall be capable of setting up (and subsequently knocking down) an emergency call from the dispatch console position.
2. An operator shall be capable of private communication between a dispatch console operator and a radio user.

F. It shall be possible to temporarily mute unselected talkgroups. The unselected audio will unmute automatically after a programmable preset time. Mute shall be 20 dB minimum.

G. Dispatch consoles shall have the capability to patch two or more talkgroups together so users may communicate directly. Patched talkgroups shall require a single talk path resource. (at a minimum, capable of creating 3 patches per position)

H. Operator positions shall have the ability to patch trunked resources and conventional resources.

I. Dispatch consoles shall have the capability to select multiple talkgroups for simultaneous transmit.

J. If the dispatcher attempts to make a call on a trunked radio system connected to the dispatch consoles and all trunked channels are busy, a visual and audible alert will be initiated at the dispatch consoles.

### 4.10.3 Conventional Requirements

A. Dispatch equipment shall include an instant transmit switch for each conventional repeater channel and/or base station.

B. On conventional resources capable of operating on multiple frequencies and/or modes, a control and indicator shall be provided to select the desired transmit frequency and/or mode. The select channel function shall cause the associated channel to switch channels / modes. Once a channel has been selected the operator shall be able to transmit on this channel by pressing the footswitch or transmit button. Operators shall have the ability to enable or disable the repeat function of the selected repeater. MERA/Marin County desires the capability of controlling up to 16 channels per resource. EIA Function/Guard Tone and IP control should be available.

C. A control/indicator shall be provided to allow the operator to mute or unmute audio from unselected channels. Selected audio and unselected audio shall be audible from separate speakers.

D. A control/indicator shall be provided allowing the operator to select multiple channels allowing the dispatcher the ability to broadcast to several channels at once.

E. Operators shall have the ability to patch two or more conventional repeaters and/or base stations together so users may communicate directly. Operator positions shall be equipped such that a minimum of eight simultaneous patches shall be available.

F. Operator positions shall have the ability to patch conventional resources and trunked resources.

### *4.10.4 Paging Requirements*

A. The console shall provide paging tones for Volunteer Fire Paging..

B. The console shall generate the following paging formats:

1. Quick Call I
2. Quick Call II
3. DTMF
4. Selective call
5. Trunking Call Alert

C. Tone and voice pages shall be supported, with the consoles generating two-tone paging.

D. The console shall have the ability to permanently patch the Fire Dispatch voice on paging frequency and trunked system talkgroup simultaneously.

E. Preprogrammed pages and groups shall be created and modified using the console.

F. A manual page feature shall be provided.

G. A visible indication shall be given when each page ends.

H. Standard list pages shall be created allowing the operator to select or stack pages to be sent to multiple recipients.

I. An instant page feature should allow operators to send multiple pages.

J. An interface to station public address systems for selected radio talkgroup.

### 4.10.5 Operator Position Equipment

A. All equipment supplied for use by the dispatch operators will be capable of withstanding the 24 hours a day, 7 days a week environment of a busy dispatch center.

B. Operator position display monitors will be a 21” LCD/LED touchscreen.

C. Keyboards shall be a standard 101- key keyboard. Keyboards and mice at EOF are remoted with PC’s in backroom.

D. Operator functions shall be executed by positioning a screen pointer (cursor) over the appropriate icon and pressing the mouse button or by touching the monitor screen.

E. As an OPTION, a high quality gooseneck microphone shall be provided for each operator position.

F. Two headset jack boxes and headsets are to be provided at each position allowing the operator to hear select audio via a headset and allow the operator to respond via a microphone attached to the headset. The jack boxes are to be equipped with manual volume controls on each side of the box, one for the telephone and one for the radio. The headset plug inserted into the jack shall automatically disconnect the console’s microphone and mute the select speakers. This configuration is to allow a supervisor to plug into an active system to monitor the activity at that console position.

G. A minimum of two speakers, with options to expand to a total of eight speakers, shall be provided for selected and unselected audio per operator position.

H. The existing 911 system shall be integrated into the console system to allow the dispatcher to communicate via a single headset for telephony and radio conversations.

I. Radio traffic shall be muted from telephony sessions when a Push-To-Talk (PTT) is activated.

J. A heavy-duty footswitch shall be provided to allow the operator to key the selected channel hands free.

K. PCs supplied shall be capable of providing a Graphical User Interface (GUI) using a currently supported version of Microsoft Windows®. RESPONDENTS shall detail which Operating System (OS) will be provided. Radio consoles to use COTS technology including CPU's, monitors, speakers, hard drives, video and sound cards, RAM, etc. where applicable.

L. PCs supplied shall be certified to support the version of Microsoft Windows operating system supplied as part of the system.

M. PCs supplied shall be certified to support the most recent version of Microsoft Windows desktop operating system available at the time of implementation.

N. PCs supplied shall be based on present state of the art PC technology and must utilize solid state hard drives. Include spare hard drives with images of all required OS and software.

### *4.10.6 Console Networking Equipment*

A. It is anticipated that the common electronics equipment required of console networks from the past have been replaced with networking equipment including routers, switches and PCs. This equipment ties the console system back to the central control/Project 25 core network. RESPONDENTS shall fully describe the console subsystem's networking environment.

B. The console networking equipment should be designed to avoid any single point of failure.

C. Redundant routers and/or switches shall be utilized for networking of the console system and connectivity to the system's core network.

D. The console networking equipment and console positions shall send alarm information to the NMS. Alarms specific to the dispatch console system shall be displayed at the console operator positions.

### 4.10.7 Console Backup System

A. In the event of console or console interface failure, a control station shall be provided at each console position that allows the dispatcher to access the radio system.

B. Backup control stations shall be connected to individual outside antennas and be remotely located with fully functional remotes.

## 4.11 Voice Logger Recorder

Agencies in Marin County currently utilize a Voice Print International VPI® EMPOWER 5.X logging recorder for recording and playback of radio and telephony audio.

1. VPI® EMPOWER 5.x
2. Runs on two Supermicro® servers (primary/redundant)
3. Each server configured with five, 24 port analog cards, 120 analog channels total

A. As an OPTION, the RESPONDENT shall detail the extent of integration between the proposed radio system and existing VPI® EMPOWER system.

B. The RESPONDENT shall detail the costs associated with the integration of the VPI® EMPOWER system with the proposed radio system.

## 4.12 Network Management System (NMS)

A. The RESPONDENT shall propose a hierarchical NMS capable of incorporating multiple management systems into a high-level management system that provides a single point to manage multiple subsystems.

B. The NMS shall display system status and alarm conditions and must provide the ability to remotely access the system to check the operational status and view alarms through the network. This includes the ability to:

1. Monitor the health of all networked devices

2. Monitor environmental alarms (site temperature, door intrusion, etc.)
3. Remotely interrogate equipment
4. Configure components remotely
5. Routinely backup remote equipment configurations
6. Remotely restore equipment configurations
7. Push updates to remote equipment
8. Generate system statistical reports
9. Provide paging functions based on multiple levels of fault configurations

C. Key elements of the NMS are:

1. Real time airtime usage
2. Real time monitoring of network element status
3. Real time status of network usage
4. Real time alarm management
5. Simple Network Management Protocol (SNMP) support allowing interfaces with higher-level network management systems.

D. The RESPONDENT shall fully explain which Network Management applications require a license and which, if any can be accessed via a browser application

E. All systems and subsystems provided shall be monitored by the NMS.

F. The proposed radio system's NMS shall monitor any equipment monitored by the current NMS.

G. The NMS shall provide email and pager notification of alarms.

H. The NMS shall support a hierarchical user authorization mechanism allowing assignment of various roles to users and those users can act on a specific subset of devices.

### *4.12.1 Network Management Terminals (NMT)*

A. The NMT shall provide primary processing, display, and control of information to and from a variety of locations. System status and alarm conditions shall be displayed. The NMT shall provide the ability to remotely access the system to

check the operational status of the system, configure system parameters, generate usage reports and view alarms.

B. Network Management Terminals shall be provided for the following locations:

1. System Control/Core Site(s) at 1600 Los Gamos Drive, San Rafael, CA
2. Marin County Communications at 4 Peter Behr Drive, San Rafael, CA
3. NMT's with restricted access are to be provided at each dispatch center for independent Alias management

C. NMT shall meet the following general requirements:

1. Expandable software architecture shall be easily updated by adding software applications.
2. Hardware and software platform shall be PC based using a currently version of operating system and comprised of hardware certified for use with the supplied software.
3. Both graphic and tabular displays shall provide instantaneous and comprehensive network status information.
4. The NMT shall provide full archiving and control functions.
5. All NMTs shall be licensed to operate concurrently the entire suite of management applications available to manage the system.
6. The NMT shall be designed to monitor 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 be capable of performing full management functions.
8. The NMT shall provide alarm filtration and consolidation.
9. The NMT shall allow for multiple levels of operator privilege accounts set via a master, or administrative login account.
10. The SELECTED VENDOR shall be responsible for configuring all NMT user accounts according to MERA/Marin County requirements.

## *4.13 ISSI (P25 Inter RF SubSystem Interface)*

A. The RESPONDENT's ISSI shall conform to the latest released revision of the P25 standard. Subsequent standards and upgrades that follow during and after

system installation shall be included by the SELECTED VENDOR and implemented in the Project 25 system, at no additional charge, up to final system acceptance.

B. The RESPONDENT's ISSI shall support all P25 system features that have been adopted including but not limited to:

1. The ISSI shall support a minimum of two other RF subsystems operating in a trunked mode and provide for 12 concurrent talk paths from each RF Subsystem.
2. The ISSI shall consist of a control element and a traffic element. The control element shall:
    a. Convey messages for management and location tracking of subscribers including alias and serving Radio Frequency Simulation System (RFSS) system identification
    b. Authentication of subscribers
    c. Management of the setup, maintenance and tear down of a call
    d. Provision of over-the-air control and over-the-air encryption rekeying of subscriber units.
    e. Emergency indication if activated

C. The traffic element shall convey Project 25 voice and/or data traffic in either encrypted or clear (unencrypted) formats between connected Project 25 RFSSs.

D. The ISSI shall support the management of subscribers who roam onto the ISSI interconnected RFSSs.

E. The ISSI shall support home network authentication of units that roam to a visited RFSS.

F. The ISSI shall allow transfer of P25-defined encryption key management information across the ISSI.

G. RESPONDENT shall list all ISSI supported features including identifying any features that are not supported between disparate manufacturers' RFSS.

H. RESPONDENT shall describe the interfaces required to support ISSI, including those needed for other manufacturer's RFSSs.

## 4.14 Smartphone Integration

A. As an OPTION, RESPONDENT shall propose an interface to the proposed radio system that integrates voice only communications between MERA/Marin County P25 radio system users and MERA/Marin County users with broadband devices and/or smartphone applications. This interface should generally support the services and capabilities described in the National Public Safety Telecommunications Council (NPSTC) *Recommendations for PTT over LTE Requirements* dated July 18, 2013.

B. The system shall support 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 P25 radio network.

D. The system shall include the necessary hardware, software, and licensing to support TIA-102.BACA network-level communications. RESPONDENT shall specify Project 25 services as well as ancillary services and features that the interface supports.

E. The system shall support AES encryption and RESPONDENT shall described the technical and operational capabilities for encryption provided by the interface.

F. The system shall support the following features and functions:

1. Minimum of 25 simultaneous P25 group calls
2. Minimum of 1,000 talkgroups per gateway device
3. 256-bit AES encryption

G. The system shall support call recording and playback (both transmit and receive) on the broadband device and/or smartphone

H. The SELECTED VENDOR shall supply 250 user licenses for both user devices and interface device(s) to support 250 user devices.

I. RESPONDENT shall identify incremental costs for additional users and/or interfaces.

J. The system shall support Android™, Windows®, and iOS™ mobile platforms and support managed group and PTT communications utilizing most consumer smartphones and not be limited to a single 3G/4G carrier network.

# 5. Backhaul Network

A. RESPONDENT shall propose a detailed backhaul plan utilizing existing IP digital microwave links and resources to the highest degree practical. Backhaul equipment, which has reached end of life or is no longer supported by the manufacturer shall be replaced. Basic information about existing microwave links for consideration is provided in Appendix G – *Existing Microwave Backhaul Information*.

B. RESPONDENT shall be responsible to determine if each applicable existing link in the plan will provide required capacity and reliability. Where existing links will require upgrades or where new links will be required, RESPONDENT shall provide a detailed explanation of the proposed upgrade and the applicable costs on a link-by-link basis. If new links are required, MERA/Marin County requires IP-based solutions. Consideration must be given to H.R.3630 - Middle Class Tax Relief and Job Creation Act of 2012 microwave give back requirements.

## *5.1 Digital Microwave Network*

A. The digital microwave backhaul network shall consist of, monitored hot standby (MHSB) or ring protected, point-to-point licensed microwave hops. Unlicensed microwave will not be accepted. The microwave system shall be designed to achieve 99.999% overall availability.

B. The radio shall deliver two-frequency, full duplex operation. Space diversity configurations are acceptable if necessary to meet reliability requirements.

C. The overall microwave backhaul network must support a minimum 150 Mbps bandwidth.

D. RESPONDENTS must indicate packet latency and jitter performance of the microwave backhaul network. In addition, RESPONDENTS must confirm that such performance is sufficient to accommodate all radio and dispatch communications traffic for the proposed radio system as transported by the proposed microwave backhaul network.

E. The network must reroute network traffic in case of a path or device failure in a sufficient amount of time to support the proposed radio system. RESPONDENTS must describe how the proposed system fulfills this requirement.

F. The microwave system must be designed to meet or exceed a two-way annual availability (BER = 10^-3) of 99.999% at the required capacity.

G. Each individual microwave link must be designed to meet or exceed a two-way annual quality performance (availability) of 99.9995% (BER = 10-6) at the required capacity.

H. The SELECTED VENDOR shall be responsible for all microwave frequency research, prior coordination, and preparation of all associated FCC license applications and submittals on behalf of MERA/Marin County.

I. All RF paths shall be tested to demonstrate proper antenna alignment by measuring the net path loss between sites as measured at the equipment rack interface.

## 5.2 Microwave Backhaul Network Engineering

A. The RESPONDENT shall provide preliminary microwave path details including centerline mounting height recommendations, fade margins, antenna sizes, system gains and system losses, and path profiles.

B. The SELECTED VENDOR shall conduct physical path surveys to assure that all proposed paths meet proper clearance criteria.

C. The SELECTED VENDOR shall also conduct site visits at all sites, notify MERA/Marin County and the Owner of any site modifications, and include any upgrade costs in the proposal.

D. The SELECTED VENDOR must provide modified antenna centerline mounting height recommendations, if required, based on the information gathered during the physical path surveys and site visits.

E. The proposed microwave backhaul network equipment must be type accepted for licensing under applicable Part 101 of the FCC Rules and Regulations.

## 5.3 Microwave Antenna System

A. Microwave antennas shall be compatible with the radio frequency bands and conform to applicable FCC requirements. Solid parabolic type, Category A antennas shall be used in accordance with FCC Part 101.115.

B. All mounting brackets, connectors and other hardware shall be supplied as necessary for a complete installation.

C. As an OPTION, RESPONDENT shall identify costs to provide and install ice shields to protect each microwave dish from falling ice.

D. Radomes shall be installed on every microwave dish antenna.

E. An automatic waveguide dehydrator system shall be provided for each communications shelter or location where microwave equipment is provided.

## 5.4 Microwave Backhaul Network Management

A. RESPONDENTS shall fully describe alarm, monitor, and control capabilities of the microwave terminal equipment, including capacity for external alarms (e.g., door alarms, generator, etc.).

B. The SELECTED VENDOR shall provide an Element Management System (EMS) with sufficient alarm, control, and tracking capabilities for the proposed microwave network and to be integrated with the system Network Management System. The system shall be capable of remotely monitoring equipment status and performance from all sites.

C. The NMS shall be fully compatible with the integrated NMS requirements defined in Section 4.12, *Network Management System (NMS),* of this RFP.

D. The overall network shall have a common end-to-end management and configuration tool capable of complete control of all network elements. The tool shall be able to support building an end-to-end path without requiring manual configuration of each intermediate device. Graphical display of resulting configurations is preferred.

1. Automated error checking shall be included to prevent typical configuration problems such as oversubscription of a link. The tool shall alert the user when such errors occur.
2. The management tool shall perform automated backups of all device configurations and include a change log of all changes made to a device over time.
3. The management tool shall support a hierarchical user authorization mechanism allowing assignment of various roles to users and those users can act on a specific subset of devices.

# 6. Subscriber Equipment

## 6.1 Overview

A. Subscriber equipment includes all 700/800 MHz non-fixed user equipment, such as:

1. Portable radios
2. Mobile radios
3. Control station radios

B. RESPONDENT shall provide detailed unit pricing for all user radio equipment and each accessory item, with different levels of user equipment (if applicable) such as Basic Tier (basic features), Mid-Tier (mid-level features), and High Tier (advanced features), as well as multi-band radios capable of operation on the proposed system. Table 3 provides a summary of potential quantities of subscriber equipment that ***may*** be purchased by MERA agencies under this procurement.

**Table 3 – Potential subscriber radio quantities**

| Portable Radios | Qty. | Mobile Radios | Qty. |
|---|---|---|---|
| Basic Tier | 150 | Basic Tier | 100 |
| Mid-Tier (mid-level features) | 1800 | Mid-Tier (mid-level features) | 1200 |
| High Tier (Top tier/advanced features) | 150 | High Tier (Top tier/advanced features) | 100 |
| Multi-band (VHF/UHF/700-800) | 900 | Multi-band (VHF/UHF/700-800) | 600 |
| **Total Portables** | **3000** | **Total Mobiles** | **2000** |
| **Control Stations** | | | **350** |

C. All subscriber equipment shall be provided to accommodate Project 25, Phase 1 and Phase 2, 700/800 MHz operation.

## 6.2 General Requirements

A. All user radio equipment must be FCC type accepted in accordance with applicable FCC Part 90 rules and regulations.

B. All user radio equipment shall meet MIL-STD-810 latest revision.

C. All user radio equipment shall be software configurable.

D. All user radio equipment shall support the following operating modes:

1. Conventional P25 Phase 1
2. Trunked P25 Phase 1 with enhanced vocoder
3. Trunked P25 Phase 2 with enhanced vocoder
4. Radio-to-radio direct communication (talk-around) P25 Phase 1
5. Conventional analog

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

F. All subscriber radios shall be field tune/aligned with automated test equipment approved by MERA/Marin County. A complete list of all radios must be provided to MERA/Marin County.

G. Respondent shall be responsible for all subscriber radio installation and programming. A complete list of all subscriber radios (by serial number) and list of all code plugs will be provided to MERA/Marin County.

H. As an OPTION, each user radio model capable of AES encryption, shall have the feature quoted and costed.

I. As an OPTION, each user radio model capable of AES encryption with Over-the-Air Rekeying (OTAR) shall have the feature quoted and costed.

J. As an OPTION, each user radio model capable of Over-the-Air Programming (OTAP) shall have the feature quoted and costed.

K. User radios shall be capable of subscriber (radio) authentication by the radio system.

L. All user radios proposed shall be compliant with TIA-603-D Land Mobile FM or PM Communications Equipment Measurement and Performance Standards and TIA-102.CAAB-D: Land Mobile Radio Transceiver Performance Recommendations Project 25 - Digital Radio Technology C4FM/CQPSK Modulation Transceiver Performance Recommendations.

M. RESPONDENT shall provide detailed equipment specifications for all proposed user radios and accessories, including the following:

1. General specifications:
    a. Radio dimensions
    b. Weight with battery (portable)
    c. Antenna and antenna connector type
    d. Channel/mode capacity
2. Environmental specifications and applicable standards
3. Performance in strong signal environments including digital adjacent channel rejection, digital offset adjacent channel rejection, spurious response rejection, intermodulation rejection, and blocking rejection.

### 6.2.1 Portable Radios

A. MERA/Marin County has estimated the quantities of portable radios. For the purpose of this RFP, RESPONDENT shall provide pricing with the assumption that the County may purchase the number of portable radios shown in Table 3 and as outlined in the Price Forms.

B. Features:

1. Full compliance with P25 features and operation
2. PTT button
3. Top-mounted on/off volume knob
4. Talkgroup/channel selector
5. Emergency button, physically protected from inadvertent activation, with software defined configurable activation delay

6. Alphanumeric display (on applicable models), 14 character display desired
7. Transmit indicator
8. Over-the-Air Programming (OPTIONAL)
9. Send and receive text messages (OPTIONAL)
10. Accessory connector for remote speaker microphone, or vehicular adapter for operational use in a vehicle
11. Battery life indication or low battery alert, graphical indication on display
12. Minimum 500mW speaker audio output
13. 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. RESPONDENT shall explain operation of this feature in P25 trunked and conventional modes.
14. Submersible.

C. Battery:

1. RESPONDENT shall propose batteries without cadmium. Pricing shall be provided for the following:
    a. Lithium-ion
    b. Lithium Polymer
2. As an OPTION, RESPONDENT shall propose radios certified as intrinsically safe.
3. As an OPTION, RESPONDENT shall propose radios capable of submersion to one meter.
4. Batteries shall provide a minimum operational use of 12 hours based on a 5-5-90 duty cycle in a public safety environment.
5. RESPONDENT shall provide detailed specifications for all batteries proposed, including the following at a minimum:
    a. Battery life
    b. Total battery life-cycle expectancy
    c. Recharge time
    d. Dimensions

e. Weight

f. Warranty

D. Accessories: RESPONDENT shall provide OPTIONAL pricing for all accessories, including the following at a minimum:

1. Data cables
2. Battery chargers – single unit, multiple bay, and vehicular chargers:
    a. RESPONDENT shall provide smart, mixed chemistry battery chargers. The RESPONDENT shall provide complete specifications on all chargers offered.
    b. Battery chargers must have the ability to cycle the battery by application of load to condition it.
    c. 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 a minimum requirement.
3. Alternate antennas
4. GPS (internal to radio)
5. Bluetooth (accessories)
6. Remote speaker microphone without antenna
7. Remote speaker microphone with antenna
8. Remote speaker microphone with GPS capability
9. Remote speaker microphone with keypad
10. Remote speaker microphone with Amplified Speaker (Audio)
11. Bluetooth remote speaker microphone
12. Headset:
    a. Wired
    b. Bluetooth
13. Carrying cases / belt clips
14. OTAP
15. Wireless (e.g. Wi-Fi, Bluetooth, LTE, LMR) connectivity for OTAP

16. AES Encryption
17. AES Encryption with OTAR
18. Vehicular adapter – provides in vehicle portable radio battery charging, mobile microphone, amplified speaker, transmit power amplifier, external antenna connection.

E. Multiband portable radios:

1. RESPONDENT shall propose multiband portable radios capable of operating in the following frequency bands:
    a. VHF: 136 – 174 MHz
    b. UHF: 380 – 520 MHz
    c. 700/800 MHz: 762 – 870 MHz

### 6.2.2 Mobile Radios

A. MERA/Marin County has estimated the quantities of mobile radios. For the purpose of this RFP, RESPONDENT shall provide pricing with the assumption that the County may purchase the number of mobile radios shown in Table 3 and as outlined in the Price Forms.

B. Mobile radios shall be supplied complete with microphone, external speaker, cables, fusing, mounting hardware, low loss coaxial cable, unity gain antennas, alignment and installation services to provide for a complete installation.

C. RESPONDENT shall provide pricing for dash mounted units, dual head units and remote mounted units. Installation and interfacing must be included in cost.

D. Features:

1. Full compliance with P25 Phase 1 and Phase 2 features and operation
2. Mobile 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. Preferred full keypad on control head
7. Programmable side buttons on keypad microphone

8. Emergency button, protected from inadvertent activation, with software defined configurable activation delay
9. OTAP (OPTIONAL)
10. Multi-line alphanumeric display
11. Transmit indicator
12. Programmable buttons on control head
13. Minimum 5 watt speaker audio output

E. Accessories – RESPONDENT shall provide OPTIONAL pricing for all accessories, including the following at a minimum:

1. Cables:
    a. Data cables
    b. Extension cables
    c. Adapters
    d. Power cables
2. Optional user activated external speaker (outside vehicle)
3. Optional call alert/page feature for horn/lights
4. Optional dual control heads
5. Dual control head
6. Microphone full keypad functional for telephone interconnect and other functions such as call alert/page or private call
7. Optional headset interfacing hardware and installation
8. External speakers
9. Public address kits
10. AES encryption
11. AES encryption with OTAR
12. Antennas (different gains and/or mounts)
13. External weatherproof speakers

F. Multiband mobile radios

1. As an OPTION, RESPONDENT shall propose multiband mobile radios capable of operating in the following frequency bands:
    a. VHF: 136 – 174 MHz
    b. UHF: 380 – 520 MHz
    c. 700/800 MHz: 762 – 870 MHz

### 6.2.3 Control Stations

A. MERA/Marin County has estimated the quantities of Control Station radios. For the purpose of this RFP, RESPONDENT shall provide pricing with the assumption that the County may purchase the number of control station radios shown in Table 3 and as outlined in the Price Forms.

B. Control station radios shall be supplied complete with desktop microphone, mounting hardware, coaxial cable and Yagi directional antennas, alignment and installation services to provide for a complete installation.

C. Control station radios and antenna system shall be installed following the vendor's provided site grounding specifications.

D. Control station radios shall be able to be remotely controlled via multiple desk set devices. RESPONDENTS shall detail how many desk set devices can control a single control station and if there is a distance limitation without extra equipment being required.

E. Full function desk sets shall be able to control every feature available on the front panel of the control station.

F. Features:

1. Full compliance with P25 features and operation
2. Desk top microphones
3. Front-mounted on/off volume knob
4. Talkgroup/channel selector
5. Emergency button, protected from inadvertent activation
6. Alphanumeric display
7. Transmit indicator

8. Over the Air Programmable
9. Headset option (6-wire)

G. Accessories – RESPONDENT shall provide OPTIONAL pricing for all accessories, including the following at a minimum:

1. Cables:
    a. Data cables
    b. Extension cables
    c. Adapters
    d. Power cables
2. Antennas
3. External Speakers
4. Public address kits
5. Desktop microphone
6. 6-wire headset jack for control station
7. OTAR
8. Send and receive text messages
9. AES Encryption

H. Multiband mobile radios

1. As an OPTION, RESPONDENT shall propose multiband control stations capable of operating in the following frequency bands:
    a. VHF: 136 – 174 MHz
    b. UHF: 380 – 520 MHz
    c. 700/800 MHz: 762 – 870 MHz

### 6.2.4 Fire Station Alerting and Siren Activation, Knox Boxes and Remote Gate Control

A. MERA/Marin County currently utilize FIRESCAD, a fire station ring-down and alerting system, deployed using an analog talkgroup on the MERA trunked UHF T-Band network.

B. Knox Boxes are remotely controlled using an analog talkgroup on the MERA trunked network with DTMF signaling.

C. A number of gates are remotely controlled using a simplex UHF channel with a timed carrier function.

D. The SELECTED VENDOR shall be responsible for providing and implementing an over-the-air Fire Station and Siren Alerting System that provides, at least the same level of features and functionality utilized today at 35 fire stations.

E. RESPONDENTS may propose, as an OPTION alternative Fire Station Alerting, Remote Gate Control and Knox Box system(s) they feel may provide a better solution than the system(s) in use today.

### 6.2.5 Volunteer Fire Paging

A. Fire Paging is currently supported via VHF Low-band, tone and voice paging base stations.

B. The SELECTED VENDOR shall be responsible for providing and implementing an over-the-air Volunteer Fire Voice Paging System that provides, at least the same level of features and functionality utilized today. Functions shall include but are not limited to:

1. Alert Tone and Voice Paging (Paging utilizing cellular signal is not acceptable)
2. Continuous monitoring of dispatch talk group audio
3. Capable of sending dispatch audio and a paging signal to a belt worn, receive only pager
4. All equipment proposed shall be at the beginning of the products lifecycle and fully supported for a minimum of 7 years after installation.

C. RESPONDENTS may propose, as an OPTION Volunteer Fire Voice Paging system they feel may provide a better solution than the system in use today.

# 7. Facilities and Infrastructure Development

A. The site facilities and infrastructure development section applies to RESPONDENTS proposal for existing sites requiring upgrades as well as additional and alternate sites required to provide the required level of coverage as explained in Section 4.8*, Coverage*.

B. Cost associated with additional and alternate site development shall be listed separately, on a per site basis as detailed in Appendix C – *Proposal Pricing Forms, Table C.4B*.

C. Installations shall comply with the California Code of Regulations (CCR) Title 24. This shall include the seismic design requirements for Essential Facility buildings housing Public Safety Communications Equipment and Systems.

## *7.1 General*

A. The SELECTED VENDOR shall be responsible for completing any documents required by local, state and federal departments including, but not limited to permitting documents, California Environmental Quality Act (CEQA) review, Environmental Impact Statement (EIS) and EIR preparation and State Historic Preservation Office (SHPO) forms.

B. The SELECTED VENDOR shall be responsible for any issues related to site selection and will be responsible for resolving any issues related to site permitting or zoning.

C. RESPONDENTS shall adhere to Industry best practices as defined in Section 2.4.1, *Codes, Standards and Guidelines*. RESPONDENTS shall provide a copy of the grounding standard to be utilized during site development/installation.

D. Code Compliance:

1. Installation of all electrical equipment, power distribution, lighting assemblies and associated wiring shall comply with the most recent edition of the National Electric Code (NEC) and Occupational Safety and Health Administration (OSHA) regulations.
2. All electrical equipment shall be listed or approved by Underwriters Laboratories (UL).

3. The SELECTED VENDOR and any contractor employed by the SELECTED VENDOR shall comply with all local codes and industry best practices and guidelines stipulated in Section 2.4.1, *Codes, Standards and Guidelines*.

E. The SELECTED VENDOR shall assume total responsibility for maintaining liability insurance covering the following items:

1. Project design
2. Implementation
3. Licensing
4. Shipping
5. Receiving
6. Any items required for the SELECTED VENDOR or any required sub-vendors or subcontractors.

F. Prior to any excavations, the SELECTED VENDOR or subcontractor shall follow appropriate procedures outlined at the following website: www.call811.com.

G. The SELECTED VENDOR will coordinate with MERA/Marin County and required utility companies for all utility related items, such as electrical service hookups and disconnects.

H. During preliminary design, the SELECTED VENDOR shall provide detailed drawings including all structures and foundations, sealed by a professional engineer registered in the state of California.

1. Detailed dimensioned drawings showing all system components and locations.
2. Drawings and/or specifications shall describe any auxiliary equipment.
3. Manufacturer specification sheets of all equipment used shall be provided.

I. All control functions and alarms from towers, shelters and backup power shall be interfaced to the NMS detailed herein, for remote control and monitoring.

## 7.2 Towers

A. General (For new towers or modifications to existing towers.):

1. Any new tower(s) proposed shall be self-supporting.

2. Towers proposed shall be TIA-222 Class III towers designed for the appropriate exposure and topographic categories.
3. Any tower manufacturer supplying a tower(s) for this system will guarantee structural integrity of the tower for a period of not less than 20 years from the date of acceptance.
4. The SELECTED VENDOR shall be responsible for all geotechnical analyses (soil testing) and proper foundation design.

B. Tower Loading:

1. The tower and foundation shall be designed for all proposed equipment, legacy equipment, appurtenances, ancillary equipment, initial antenna loading plus 100% future antenna system growth, without addition to or modification of the finished tower or foundation.
2. The proposed tower structure shall be designed and installed in accordance with the latest revision of the ANSI/TIA-222 standard.

C. Proposed towers shall include the following:

1. Ice bridge – A horizontal transmission line ice bridge, extending from the tower cable ladder to the equipment building entry port, shall be provided. The ice bridge will be self-supported and cannot be directly connected to the tower or the shelter.
2. Transmission Line Support – A vertical transmission line support system shall be provided to securely attach the antenna transmission lines. Holes shall be provided in the tower support members, tower hanger adapter plates or separate ladder structures to allow installation of snap-in cable hangers and bolt-in cable hangers at maximum 3-foot intervals. The mounting holes shall be precision punched or drilled and sufficiently separated to accommodate the snap-in or bolt-in hangers.
3. Climbing Access – A ladder, beginning at a point at least 10 feet off the ground, shall be provided as an integral part of the tower to permit access by authorized personnel. The tower shall be equipped with an OSHA approved anti-fall safety device in accordance with ANSI/TIA-222. This device must not interfere with the climber's ease of reach by hand or foot from one rung of the ladder to the next, going up or coming down. Two safety climbing belts shall be supplied with each new tower.
4. Lighting:

a. Tower lighting shall be supplied as required by the applicable determination as issued by the FAA for this project and fully compliant with FAA AC 70/7460-1K or latest revision.

b. The system control circuitry shall provide synchronization and intensity control of the obstruction lighting system and shall monitor the overall integrity of the lighting system for component failures or improper operation.

c. The SELECTED VENDOR or subcontractor shall wire all alarms to a contractor provided Type 66 block located in the communications shelter or equipment room. All alarms shall be clearly labeled.

5. A lightning ground rod shall be installed at the very top of the tower to extend at least 2 feet above the top of the tower or lighting fixture.

6. Labeling shall be clearly provided near the base of all new towers for the following:

   a. Make

   b. Model

   c. Serial number

   d. Tower height

   e. Latitude and longitude

   f. FAA and FCC identification numbers (if applicable)

D. Construction:

1. All welding must be done in the factory prior to the galvanizing process. Field welding is not acceptable.

2. The tower shall be constructed of high-strength steel. All components and hardware being hot dip galvanized with zinc coating per EIA standards after fabrication. A zinc coating shall be permanently fused to the steel, both inside and outside, so all surfaces are protected and no painting is required for rust protection.

3. Prior to galvanizing, each piece of steel and every weld is to be deburred and smooth finished.

4. RESPONDENT shall carefully examine and study existing site conditions. Difficulties in accessing sites for tower delivery and installation will be the responsibility of the SELECTED VENDOR. Later claims for additional

compensation due to additional labor, equipment or materials required due to difficulties encountered during tower delivery or installation will not be considered.

E. Final Testing and Acceptance – Upon completion of the work, documentation detailing final inspection and testing shall be submitted, documenting the following:

1. Steel structure:
    a. Vertical alignment and plumbness
    b. All bolts tight and torqued to specification
    c. No damaged or missing structural members
    d. All surface scratches and damage to the galvanization will be repaired using the hot stick process.
    e. No signs of stress or vibration
    f. All climbing ladders, and other devices installed correctly
    g. Labels and tags
2. Grounding:
    a. Verify lugs and CADWELD®s
    b. Ground resistance test and record
    c. Ground lightning rod installed at top of tower
3. Ice Bridge: Installed per specification
4. Lighting and controls:
    a. Inspect conduit and wiring installation
    b. Verify proper lamp operation
    c. Verify alarm contact operation
    d. Verify labeling
5. Photographs:
    a. Overall structure from N, E, S, W
    b. Footers
    c. Grounding

## 7.3 Shelters

A. General:

1. RESPONDENT shall propose a new equipment shelter for all new RF site locations and existing facility upgrades as required.
2. The shelter shall be a prefabricated, preassembled shelter. The shelter can be constructed from concrete, and/or aggregate materials. Any new shelter, or modification to existing shelters, must incorporate all EIR dictated requirements.

B. Size:

1. Minimum shelter size shall be 12’ x 20’, with a minimum interior height of 9 feet.
2. The PROPOSER shall be responsible for determining if a larger shelter size is required based on proposed equipment to be installed. Legacy and proposed systems may use up to 60% of the floor space, allowing for a minimum of 40% additional space for future expansion.

C. Flooring:

1. RESPONDENTS are to propose a structure with floor and/or solid foundation featuring a minimum uniform load rating of 200 pounds per square foot with no more than 3,000 pounds over any four-square-foot area. This rating shall be increased in sections as necessary to support heavy weight equipment. If delivered assembled with floor, the floor shall exhibit a minimum 90 pounds per square foot uniform live load capacity while the building is being lifted.
2. Floors shall be insulated to a minimum R-11 rating. Insulation shall be secured in place to prevent shifting during construction and transportation.
3. The floor shall be covered by a high quality, industrial / commercial grade asphalt or vinyl tile. All edges shall be covered by wall molding.

D. Walls:

1. Walls shall be constructed to a minimum 120 MPH wind loading, including overturning moments.

2. Bullet Proof: Walls and doors shall withstand the effects of bullets or other projectiles equivalent to a 30.06 high power rifle load fired from a distance of 50 feet with no penetration to the inner cavity of the wall. No interior damage shall be sustained including insulation, interior walls, etc.
3. The outside walls shall be finished concrete or an aggregate composition.
4. The inside walls shall be finished with minimum 5/8-inch plywood (or equivalent) trimmed with coordinated molding to allow mounting of panels, blocks, etc.
5. High performance insulation shall provide a minimum insulation factor of R-11.
6. All ducts and openings shall be protected with a screen barrier to prevent the entry of insects, birds, or small animals

E. Roof:

1. The building roof shall support a minimum 100 pounds per square foot uniform live load.

1. The roof is to be pitched to facilitate runoff of water.
2. The shelter roof shall withstand the impact of ice falling from the adjacent tower without suffering any damage or shall otherwise be protected from such damage. RESPONDENTS are to describe in their proposal how this requirement will be met.
3. High performance insulation shall provide a minimum insulation factor of R-19.

F. Door:

1. Shelters shall have one 42” x 84” insulated door, with three stainless steel tamperproof hinges, passage style lever handle, deadbolt lockset and fiberglass weather hood or awning. The door shall be equipped with a hydraulic door closer.
2. The exterior door shall be of aluminum or steel (stainless or galvanized) construction with a finish to match the building finish.
3. The door shall withstand the effects of bullets or other projectiles equivalent to a 30.06 high power rifle load fired from a distance of 50 feet with no penetration to the inner cavity of the door. No interior damage shall be

sustained from such events, including damage to insulation, interior walls, etc. The door shall comply with ANSI/SDI A250.8 requirements

4. The doorsill shall be of stepped construction to prevent rainwater from entering the shelter at the bottom of the door or from around the doorframe. The doorframe shall have a weather seal around the door to limit air and water intrusion.

G. Finishing:

1. The RESPONDENT shall describe the interior and exterior finishes. Color and finishes shall be selected by MERA/Marin County from samples provided by the SELECTED VENDOR or subcontractor.
2. All joints shall be sealed with a compressible, resilient sealant.

H. AC Power System:

1. The SELECTED VENDOR shall deliver the building complete with a 200 ampere capacity, 240 volts, single phase electrical panel box with a ground bar.
2. This panel shall be equipped with a 200 ampere capacity main circuit breaker used to supply power for all electrical functions related to the site.
3. Overall panel size shall be determined by the need to provide the number of individual breakers required plus excess capacity as required by NEC. (minimum of 10 extra breakers at each location)
4. Receptacles:
    a. Each radio equipment unit (or rack) shall be supplied with two 20 Amp circuits, each terminated at a typical twist-lock NEMA 5-20 receptacle. Receptacles shall be mounted above the overhead cable tray.
    b. Service receptacles shall be mounted on the walls at six-foot intervals or less.
    c. One weatherproof ground fault interrupter (GFI) exterior power receptacle shall be provided with each shelter, to be mounted near air conditioning units.
    d. A power receptacle shall be located near the microwave dehydrator to power the unit.

e. Each receptacle shall be fed from an individual breaker. The feeding breaker shall be identified at the receptacle and the receptacle shall be identified at the breaker. All breakers or circuits shall be 20 Amp, unless otherwise noted.

I. Power Line Surge Suppression:

1. An AC surge protector shall be provided and installed inside the shelter.
2. An acceptable unit shall be an in-line type such as the AC Data Systems “integrated load center”. An alternate unit must meet or exceed all of the capabilities of this model unit.
3. Minimum surge protector requirements:
   a. Built-in redundancy of dual stages per phase with filtering
   b. Surge energy shunted to ground, not to neutral
   c. Front panel indicator lamps
   d. Remote / local status contacts
   e. Fusible link protected so as not to interrupt power
   f. Field replacement protection blocks, fuses, if needed
   g. UL listed components
   h. EMI/RFI filtering per Mil-STD-220
   i. The unit shall be capable of handling the full 240 Volt, 200 Amp capacity of the electrical system

J. Wiring Methods:

1. All wiring noted on the site drawings or otherwise included by the SELECTED VENDOR shall be installed in conduit. Where no protection method is specified, conduit shall be used.
2. All conduit shall be securely surface mounted and supported by approved clamps, brackets, or straps as applicable and held in place with properly selected screws. No wiring shall be imbedded inside any walls, floor or ceiling. Entrance power, outside lighting, air conditioning outlet and Telco are the only wiring that may penetrate shelter walls or floor.
3. All wire raceway, conduit, etc., is to be mechanically joined and secured.

4. Flexible steel conduit or armored cable shall protect wiring connected to motors, fans, etc., and other short runs where rigid conduit is not practical.
5. Unless otherwise specified, all power wiring shall be a minimum 12 AWG size solid copper conductors with insulation rated for 600 Volts alternating current (AC).
6. One 4' x 6' x ¾" Telco board shall be installed.

K. Light Fixtures:

1. Ceiling mounted LED light fixtures shall be supplied for the equipment shelters. A sufficient quantity of light fixtures shall be supplied to provide a uniform light level throughout the building of 150-foot candles at 4 feet above the floor.
2. Light fixtures shall be fed as a gang from a common breaker and controlled by an on/off switch near the door.

L. Outdoor Lighting:

1. An exterior 1,000-lumen LED motion activated light fixture shall be wall mounted by the front entrance of the shelter.
2. The exterior lighting system shall be fed from a separate, appropriately rated breaker and light switch by the door.

M. Heating, Ventilation, and Air Conditioning (HVAC):

1. The SELECTED VENDOR shall provide an HVAC system for each shelter proposed. The RESPONDENT shall propose dual AC units with lead-lag controller. Each AC unit shall be sized for 100 percent of the building's required cooling capacity, as determined by the BTU analysis. Noise abatement requirements shall be followed.
2. The SELECTED VENDOR shall perform BTU analysis (heat load calculations) for all shelter equipment during preliminary design to verify HVAC system size. All calculations shall include a 50% expansion factor, and all assumptions regarding power consumption, duty factor, and heat loading shall be thoroughly explained.
3. Each unit shall be capable of maintaining an inside ambient temperature range between 65 and 85 degrees F. Each unit shall be sized to maintain temperatures inside the shelter at 70 degrees F when exterior temperatures go as high as 100 degrees F.

4. The HVAC system shall be controlled by a wall mounted thermostat. It shall turn on the air conditioner when the interior temperature reaches 78 degrees F and off when the temperature drops below 75 degrees F. Thermostat control shall be adjustable within the range of 45 to 85 degrees F.

5. A properly sized thermostatically-controlled exhaust fan, located as high as possible in the shelter with gravity damper, hood with insect screen, and timer connected to emergency power shall be supplied to vent the building in case of HVAC failure. A corresponding cold air intake vent with motorized louvers shall also be installed low on an opposing wall to allow unobstructed air flow through the site. A room temperature alarm shall be monitored by the NMS.

N. Antenna Cable Entry – A bulkhead panel shall be supplied to accommodate coaxial transmission lines between 1/2-inch and 1 5/8-inch diameter elliptical or coaxial waveguides. A minimum of 12 transmission lines shall be accommodated with 4-inch openings. The building manufacturer shall seal the conduits into the wall to assure that they are watertight.

O. Cable Tray – All new shelters will be equipped with cable trays. The SELECTED VENDOR shall install a minimum 18-inch wide cable tray system above the equipment.

P. Shelters shall be supplied with at least two 10-pound CO2 fire extinguisher, an approved eyewash station and first aid kit.

Q. RESPONDENT shall carefully examine and study existing site conditions. Resolving difficulties in accessing sites for shelter delivery and installation will be the responsibility of the SELECTED VENDOR. Later claims for additional compensation due to additional labor, equipment or materials required due to difficulties encountered during shelter delivery or installation will not be considered.

## 7.4 Generator and Automatic Transfer Switch (ATS)

This section provides specifications and requirements for standby power systems to supply electrical power in the event of failure of normal supply, consisting of a liquid cooled engine, an AC alternator and system controls with all necessary accessories for a complete operating system, including but not limited to the items as specified.

A. The SELECTED VENDOR shall provide an emergency generator system at each new RF site for backup power.

B. SELECTED VENDOR shall perform electrical loading analysis for shelter equipment, including HVAC systems, during preliminary design to verify generator size and fuel tank capacity. All electrical loading calculations shall include a 50% expansion factor, and all assumptions regarding power consumption and duty factor shall be thoroughly explained.

C. In the event loading is less than 50 kW, a 50 kW generator will be proposed.

D. Generators will be powered by liquid propane or diesel.

E. In the event of a commercial power outage, the emergency generator shall provide power to the entire shelter without system outage.

F. Quality Assurance – The system shall be supplied by a manufacturer who has been regularly engaged in the production of engine-alternator sets, automatic transfer switches, and associated controls for a minimum of 10 years, thereby identifying one source of supply and responsibility.

G. The generator system and all accessories and ancillary equipment shall comply with the following standards:

1. NFPA 37 Flammable and Combustible Liquids Code
2. NFPA 55 Standard for the Storage and Handling of Compressed Gases
3. NFPA 70 with particular attention to Article 700, "*Emergency Systems*"
4. NFPA 110 Requirements for Level 1 Emergency Power Supply System
5. NFPA 101 - Code for Safety to Life From Fire in Buildings and Structures
6. ANSI/NEMA MG 1 - Motor and Generators
7. ANSI/NEMA AB 1 - Molded Case Circuit Breakers
8. ANSI/NEMA 250 - Enclosures for Electrical Equipment (1,000 volts maximum)

H. Labeling and Identification – All wiring harnesses and connectors shall be clearly identified by number and function according to the associated schematic diagrams and documentation provided by the vendor.

I. Factory Testing:

1. Before shipment of the equipment, the generator set shall be tested under rated load for performance and proper functioning of control and interfacing circuits. Tests shall include:
    a. Verification that all safety shutdowns are functioning properly
    b. Verification of single step load pickup per NFPA 110-1996, Paragraph 5-13.2.6
    c. Verification of transient and voltage dip responses and steady state voltage and speed (frequency) checks
    d. Full load test for a minimum of one hour
2. Provide complete report(s) of all testing performed

J. Startup and Checkout:

1. The supplier of the electric generating plant and associated items covered herein shall provide factory trained technicians to check out the completed installation and to perform an initial startup inspection to include:
    a. Ensuring the engine starts (both hot and cold) within the specified time
    b. Verifying that engine parameters are within specification
    c. Verifying that no load frequency and voltage adjusting is required
    d. Testing all automatic shutdowns of the generator
    e. Performing a simulation of power failure to test that generator start up and automatic transfer switches (ATS) pick up building load correctly.
    f. Returning to commercial power and test generator and ATS to demonstrate correct cycling to normal commercial power.
    g. Performing a load test of the generator, to ensure full load frequency, liquid propane (LP) pressure and voltage is within specification by using a load bank rated at 80% of the generator's capacity. This test shall be run for a minimum of one hour.
    h. Testing and verifying all remote indicators and controls.

2. The SELECTED VENDOR shall provide complete report(s) of all testing performed.

### 7.4.1 Generator

A. The prime mover shall be a liquid cooled, propane or diesel fueled, naturally aspirated engine of 4-cycle design.

B. The engine shall have sufficient horsepower rating to drive the generator to full output power without a gearbox between the engine and generator.

C. The generator shall meet EPA standards that apply to Marin County.

D. The engine shall have a battery charging DC alternator with a solid-state voltage regulator.

E. The alternator shall be protected by internal thermal overload protection and an automatic reset field circuit breaker.

F. One-step load acceptance shall be 100% of generator set nameplate rating and meet the requirements of NFPA 110 paragraph 5-13.2.6.

G. The electric plant shall be mounted with vibration isolators on a welded steel base that shall permit suitable mounting to any level surface.

H. A main line output circuit breaker carrying the UL mark shall be factory installed.

1. Form C auxiliary contacts rated at 250 VAC/10 amps shall be provided to allow remote sensing of breaker status.

I. Controls:

1. All engine alternator controls and instrumentation shall be designed, built, wired, tested and shock mounted in a NEMA 1 enclosure mounted to the generator set by the manufacturer. It shall contain panel lighting, a fused DC circuit to protect the controls and a +/-5% voltage adjusting control.
2. The generator set shall contain a complete two-wire automatic engine start-stop control, which starts the engine on closing contacts and stop the engine on opening contacts.
3. A programmable cyclic cranking limiter shall be provided to open the starting circuit after four attempts if the engine has not started within that

time. Engine control modules must be solid-state plug-in type for high reliability and easy service.

4. The panel shall include:
    a. Meters to monitor:
        1) AC voltage
        2) AC current
        3) AC frequency
    b. Emergency stop switch
    c. Audible alarm
    d. Programmable engine control
    e. Monitoring module

5. The programmable module shall include:
    a. Manual OFF/AUTO switch
    b. Four LED's to indicate:
        1) Not In Auto
        2) Alarm Active
        3) Generator Running
        4) Generator Ready

6. The module shall display all pertinent unit parameters including:
    a. Generator Status – ON/OFF/AUTO
    b. Instrumentation - Real-time readouts of the following engine and alternator analog values:
        1) Oil pressure
        2) Coolant temperature
        3) Fuel level (where applicable)
        4) DC battery voltage

5) Run time hours

c. Alarm Status - Current alarm(s) condition of:

1) High or low AC voltage

2) High or low battery voltage

3) High or low frequency

4) Low or pre-low oil pressure

5) Low water level

6) Low water temperature

7) High and pre-high engine temperature

8) High, low and critical low fuel levels (where applicable)

9) Over crank

10) Over speed

11) Unit not in "Automatic Mode"

J. Unit Accessories:

1. The exhaust silencer(s) shall be provided, of the size recommended by the manufacturer, and shall provide noise reduction for use in residential areas.
2. The generator set shall include an automatic dual rate battery charger manufactured by the generator set supplier. The battery charger is to be factory installed on the generator set. Due to line voltage drop concerns, a battery charger mounted in the transfer switch will be unacceptable.
3. A heavy duty, lead acid 12 VDC battery shall be provided by the generator set manufacturer. The generator set shall have a frame suitable for mounting the battery and include all connecting battery cables.
4. Corrosion resistant coating for operating in salt air environment.

### 7.4.2 Automatic Transfer Switch (ATS)

A. The automatic transfer switch shall be compatible with the set to maintain system compatibility and local service responsibility for the complete emergency power system.

B. Representative production samples of the transfer switch supplied shall have demonstrated through tests the ability to withstand at least 10,000 mechanical operation cycles. One operation cycle is defined as the electrically operated transfer from normal to emergency and back to normal.

C. Wiring must comply with NEC table 373-6(b). The manufacturer shall furnish schematic and wiring diagrams for the particular automatic transfer switch and a typical wiring diagram for the entire system.

D. Ratings and Performance:

1. The ATS shall be adequately sized to match the generator and shelter electrical systems.
2. The ATS shall be a 2-pole design rated for 600 VAC 200 amps continuous operation in ambient temperatures of -20 degrees Fahrenheit (-30 degrees Celsius) to +140 degrees Fahrenheit (+60 degrees Celsius).
3. The operating mechanism will be a single operating coil design, electrically operated and mechanically held in position.
4. A provision will be supplied to be able to manually operate the switch in the event of logic or electrical coil failure.

E. Controls:

1. Controls shall signal the generator set to start in the event of a power interruption.
    a. A solid-state time delay start, adjustable from 0.1 to 10 seconds, shall delay this signal to avoid nuisance startups on momentary voltage dips or power outages.
2. Controls shall transfer the load to the generator set after it reaches proper voltage.
3. Controls shall retransfer the load to the line after normal power restoration.

a. A return to utility timer, adjustable from 1-30 minutes, shall delay this transfer to avoid short-term normal power restoration.

4. The operating power for transfer and retransfer shall be obtained from the source to which the load is being transferred.
5. Controls shall signal the generator to stop after the load retransfers to normal.
    a. A solid-state engine cool down timer, adjustable from 1-30 minutes, shall permit the engine to run unloaded to cool down before shutdown.
    b. Should the utility power fail during this time, the switch will immediately transfer back to the generator.
6. Front mounted controls shall include a selector switch to provide for a NORMAL TEST mode with full use of time delays, FAST TEST mode that bypasses all time delays to allow for testing the entire system in less than one minute, or AUTOMATIC mode to set the system for normal operation.
    a. The controls shall provide bright lamps to indicate the transfer switch position in either UTILITY (white) or EMERGENCY (red). A third lamp is needed to indicate STANDBY OPERATING (amber). These lights must be energized from utility or the generator set.
    b. The controls shall provide a manually operated handle to allow for manual transfer. This handle must be mounted inside the lockable enclosure and accessible only by authorized personnel.
    c. The controls shall provide a safety disconnect switch to prevent load transfer and automatic engine start while performing maintenance. This switch will also be used for manual transfer switch operation.
    d. The controls shall provide LED status lights to give a visual readout of the operating sequence including:
        1) Utility on
        2) Engine warm-up
        3) Standby ready
        4) Transfer to standby
        5) In-phase monitor

6) Time delay neutral

7) Return to utility

8) Engine cool down

9) Engine minimum run

### 7.4.3 Fuel System

A. The SELECTED VENDOR shall provide a complete fuel system for new sites, including filled tank(s) and all associated piping, valves, controls, etc.

B. Tank and fuel system components shall be sized to provide a minimum of 72 hours of run time at full load. The SELECTED VENDOR shall provide a 500-gallon minimum tank(s).

C. Fuel tank(s) shall be located a minimum of 10 feet from the generator and building.

D. Clear access shall be provided for refueling.

E. Tanks:

1. Steel and polyurethane construction
2. UL labeled in accordance with UL 644 and stamped in accordance with ASME Section VIII Division 1
3. All tanks are to be secured to an adequately sized concrete foundation
4. Tank(s) will be protected from vehicular traffic with steel or concrete bollards approved by MERA/Marin County.

F. Fuel System Construction:

1. No copper pipe will be allowed for any part of the underground fuel line system.
2. No bare black iron pipe will be used for any part of fuel system.
3. Any underground steel pipe will be epoxy coated and all joints wrapped to prevent corrosion.
4. All underground pipes will be at least 18 inches below the surface.

5. Fuel lines crossing a driveway will be protected from damage by being installed in a larger pipe sleeve or covered with a concrete barrier of sufficient strength.
6. All above ground pipe will be supported at least every 36 inches.

G. Controls and Monitoring Equipment:

1. Gas capacity gauge with low fuel level alarm contact closure
2. Low fuel level monitoring device will be installed. Lightning protection will be provided for any wires entering the shelter.
3. Multi-valve for filling, pressure relief and gauging

## 7.5 DC Power

A. The SELECTED VENDOR shall furnish and install a -48 VDC power plant system at each radio site.

B. Each DC power system will include all batteries, battery mounting or racking facilities, float-type battery chargers/rectifiers, low voltage disconnects, and DC load centers required for a complete installation.

C. Individual breakers shall be supplied for each piece of equipment.

D. Rectifier modules shall be hot swappable modular type with N+1 redundancy.

E. Rectifier modules shall be capable of on-line expansion.

F. The DC power system shall be capable of completely charging all batteries in less than 24 hours while equipment is operating at 100% load.

G. The DC power system shall be capable of an eight hour runtime at 100% load.

## 7.6 Uninterruptable Power Supply (UPS)

A. The SELECTED VENDOR shall provide a single phase, online, double conversion, static type, uninterruptible power supply (UPS) at each RF Site, only when required, with the following features:

1. Surge suppression
2. Input harmonics reduction

3. Rectifier / charger
4. Inverter
5. Static bypass transfer switch
6. Battery and battery disconnect device
7. Internal maintenance bypass / isolation switch
8. Output isolation transformer
9. Remote UPS monitoring provisions
10. Battery monitoring
11. Remote monitoring

B. The SELECTED VENDOR shall perform electrical loading analysis for shelter equipment, excluding HVAC, during preliminary design to verify UPS size required. All electrical loading calculations shall include a 50% expansion factor, and all assumptions regarding power consumption and duty factor shall be thoroughly explained.

C. For the purpose of the proposal, the SELECTED VENDOR shall assume the following:

1. Calculated output with a 50% expansion factor as stated
2. Single phase
3. 60 Hz
4. 0.8 Power Factor
5. Minimum 4-hour runtime

D. Quality Assurance:

1. Electrical components, devices, and accessories shall be listed and labeled, as defined in NFPA 70, by a qualified testing agency and marked for intended location and application.
2. UL compliance shall be listed and labeled under UL 1778 by a Nationally Recognized Testing Laboratory (NRTL).
3. UPS components shall be suitable for installation in computer rooms, as defined by NFPA 75.

E. Operational Requirements:

1. Automatic operation includes the following:
    a. Normal Conditions – Load is supplied with power flowing from the normal power input terminals, through the rectifier-charger and inverter, with the battery connected in parallel with the rectifier-charger output.
    b. Abnormal Supply Conditions – If normal supply deviates from specified and adjustable voltage, voltage waveform, or frequency limits, the battery supplies energy to maintain constant, regulated current.
    c. If normal power fails, energy supplied by the battery through the inverter continues supply-regulated power to the load without switching or disturbance.
    d. When power is restored at the normal supply terminals of the system, controls automatically synchronize the inverter with the external source before transferring the load. The rectifier-charger then supplies power to the load through the inverter and simultaneously recharges the battery.
    e. If the battery becomes discharged and normal supply is available, the rectifier-charger charges the battery. On reaching full charge, the rectifier-charger automatically shifts to float-charge mode.
    f. If any element of the UPS system fails and power is available at the normal supply terminals of the system, the static bypass transfer switch switches the load to the normal AC supply circuit without disturbance or interruption.
    g. If a fault occurs in the system supplied by the UPS, and current flows in excess of the overload rating of the UPS system, the static bypass transfer switch operates to bypass the fault current to the normal AC supply circuit for fault clearing.
    h. When the fault has cleared, the static bypass transfer switch returns the load to the UPS system.
    i. If the battery is disconnected, the UPS continues to supply power to the load with no degradation of its regulation of voltage and frequency of the output bus.
2. Manual operation includes the following:

a. Turning the inverter off causes the static bypass transfer switch to transfer the load directly to the normal AC supply circuit without disturbance or interruption

b. Turning the inverter on causes the static bypass transfer switch to transfer the load to the inverter

3. Controls and indications: Basic system controls shall be accessible on a common control panel on the front of the UPS enclosure.

## 7.7 Site Preparation

A. SELECTED VENDOR shall provide complete plans and specifications for all site preparation for site improvements as necessary. Per Public Contract Code (Design – Bid – Build method), MERA/Marin County will bid site construction work separately. Contractor work shall include, but is not limited to the following:

1. Full adherence to all state and local codes
2. Protecting existing plants and grass to remain
3. Removing existing plants and grass as necessary
4. Clearing and grubbing
5. Stripping and stockpiling topsoil
6. Removing above- and below-grade site improvements
7. Disconnecting, capping or sealing, and removing site utilities
8. Temporary and permanent erosion and sedimentation control measures
9. Access road development
10. New utility connections

B. The SELECTED VENDOR or subcontractor shall comply with National Pollutant Discharge Elimination System (NPDES) Phase II requirements.

C. RESPONDENT shall carefully examine and study existing conditions, difficulties and utilities affecting execution of work. Later claims for additional compensation due to additional labor, equipment or materials required due to difficulties encountered or underground water conditions will not be considered.

D. The SELECTED VENDOR shall verify that existing plant life to remain and clearing limits are clearly tagged, identified and marked in such a manner as to insure their safety throughout construction operations.

E. Protection:

1. The SELECTED VENDOR shall protect and maintain bench mark, monument, property corner, and other reference points; reestablishing them by a registered professional surveyor if disturbed or destroyed, at no cost to MERA/Marin County.
2. The SELECTED VENDOR shall locate and identify existing utilities that are to remain and protect them from damage, reestablishing them if disturbed or destroyed, at no cost to MERA/Marin County.
3. The SELECTED VENDOR shall protect trees, plant growth and features to remain as final landscape. Branches or roots of any trees, which are to remain, shall not be disturbed. Adequate guards, fences, lighting, warning signs and similar items, shall be provided and maintained as required.
4. The SELECTED VENDOR shall install protection such as fencing, boxing of tree trunks, or other measures as approved by the Project Engineer.
5. The SELECTED VENDOR shall conduct operations with minimum interference to public or private accesses and facilities; maintain ingress and egress at all times; and clean or sweep any roadways daily or as required by the governing authority. At such times as deemed necessary by MERA/Marin County, dust control shall be provided with water sprinkling systems or equipment provided by the SELECTED VENDOR or subcontractor.

F. Clearing:

1. The SELECTED VENDOR shall clear areas required for access to the site and execution of work.
2. Unless otherwise indicated, the SELECTED VENDOR shall remove trees, shrubs, grass, other vegetation, improvements, or obstructions interfering with the installation of new construction with all permitting and County approvals. Removal includes digging out stumps, roots and root material. Depressions caused by clearing and grubbing operations are to be filled to subgrade elevation to avoid water pooling. Satisfactory fill material shall be placed in horizontal layers not exceeding 8" loose depth, and thoroughly

compacted per fill requirements of this section and CSI Division 2-Site Construction-Section 02200.

3. The SELECTED VENDOR shall remove grass, trees, plant life, stumps and all other construction debris from the site to a location that is suitable for handling such material according to state laws and regulations.

G. Demolition: The SELECTED VENDOR shall remove existing pavement, utilities, curbing and shrubbery as necessary for construction of improvements.

H. Topsoil Excavation:

1. The SELECTED VENDOR shall strip topsoil from areas that are to be filled, excavated, landscaped or re-graded to such a depth that it prevents intermingling with underlying subsoil or questionable material.
2. The SELECTED VENDOR shall stockpile topsoil in storage piles where directed by the Project Engineer, in areas not scheduled for construction, job trailer location, or equipment lay-down areas. Storage piles shall be constructed to freely drain surface water. Storage piles shall be covered as required to prevent windblown dust. Unsuitable soil shall be disposed of as specified for waste material, unless otherwise desired by MERA/Marin County. The SELECTED VENDOR or the SELECTED VENDOR's subcontractor shall remove excess topsoil from the site.
3. Final topsoil coatings shall consist of organic soil found in depth of not less than 6". Satisfactory topsoil is reasonably free of subsoil, clay lumps, stones and other objects over 2" in diameter, weeds, roots, and other objectionable material.

I. Access Roads:

1. A 12-foot wide access road shall be provided to the fence gate at new sites.
2. Roadbeds shall be prepared, rolled and provided with 6 inches of aggregate base course.
3. Roads shall be graded appropriately for proper drainage and control erosion in accordance with NPDES Phase II permit requirements where applicable.

## 7.8 Fencing

A. SELECTED VENDOR shall provide plans and specifications for chain-link fencing around the perimeter of all new proposed sites, according to the specifications in this section including those provided in Table 4.

B. Framework: Type I or Type II Steel Pipe.

1. Type I – Schedule 40 steel pipe with 1.8 ounces of zinc coating per square foot of surface area conforming to Standard Specification ASTM (American Society for Testing and Materials) F-1083; or,
2. Type II – Pipe manufactured from steel conforming to ASTM A569. External surface triple coated per ASTM F-1234. Type II pipe shall demonstrate the ability to resist 1,000 hours of exposure to salt spray with a maximum of 5% red rust in a test conducted in accordance with ASTM B-117.
3. All coatings are to be applied inside and out after welding.
4. Unless otherwise noted, Type II framework shall be provided.
5. Pipe shall be straight, true to section and conform to the following weights:

**Table 4 – Type I and Type II Steel Pipe Specifications**

| Pipe Size Outside Diameter | Type I Weight lb./ft. | Type II Weight lb./ ft. |
|---|---|---|
| 1 5/8” | 2.27 | 1.84 |
| 2” | 2.72 | 2.28 |
| 2 ½” | 3.65 | 3.12 |
| 3” | 5.79 | 4.64 |
| 3 ½” | 7.58 | 5.71 |
| 4” | 9.11 | 6.56 |
| 6.58” | 18.97 | |

C. Fabric:

1. Aluminized fabric shall be manufactured in accordance with ASTM A-491 and coated before weaving, with a minimum of 0.4 ounces of aluminum per square foot of surface area. The steel wire and coating shall conform to

ASTM A-817. Fabric shall be 9-gauge woven in a 2-inch diamond mesh. The top selvage shall be twisted and barbed. The bottom selvage shall be knuckled.

2. Zinc-coated fabric shall be galvanized after weaving with a minimum 1.2 ounces of zinc per square foot of surface area and conform to ASTM A-392, Class I. Fabric shall be 9-gauge wire woven in a 2-inch diamond mesh. The top selvage shall be twisted and barbed. The bottom selvage shall be knuckled.

D. Fence posts specifications include:

**Table 5 – Fence post specifications**

| Fence Posts TYPE I - II Fabric Height | Line Post O.D. | Terminal Post O.D. |
|---|---|---|
| Under 6’ | 2” | 2 ½” |
| 6’-9’ | 2 ½” | 3” |
| 9’-12’ | 3” | 4” |

E. Gate Posts:

**Table 6 – Gate posts specifications**

| Gate Posts Type II | | |
|---|---|---|
| **Single Gate Width** | **Double Gate Width** | **Post O.D. Type II** |
| Up to 6’ | Up to 12’ | 3” |
| 7’to 12’ | 13’ to 25’ | 4” |

F. Rails and Braces: 1 5/8" O.D.

G. Gates: Frame assembly of 2" O.D. pipe Type I or Type II with welded joints. Weld areas shall be repaired with zinc-rich coating applied per manufacturer's directions. The fence fabric shall match the fence posts, gate posts and gates. Gate accessories, hinges, latches, center stops, keepers and necessary hardware shall be of a quality required for industrial and commercial application. Latches shall permit padlocking. The SELECTED VENDOR shall provide one

padlock for each gate with three keys for each padlock. All padlocks shall be keyed alike.

H. Installation:

1. General – Fence installation shall conform to ASTM F-567, Standard Practice for Installation of Chain-Link Fence.
2. Height – Fence height shall be as indicated on contract drawings. If no height is indicated, the fence shall be 7 ft. high, plus 1-ft. for barbed wire.
3. Post Spacing – Line posts shall be uniformly spaced between angle points at intervals not exceeding 10 feet.
4. Bracing – Gate and terminal posts shall be braced back to adjacent line posts with horizontal brace rails and diagonal truss rods
5. Top Rail – The top rail shall be installed through the line post loop caps connecting sections with sleeves to form a continuous rail between terminal posts.
6. Fencing shall have a bottom rail instead of a tension wire.
7. Fabric – The fabric shall be pulled taut with the bottom selvage 2-inches above grade. The fabric shall be fastened to the terminal posts with tension bars threaded through mesh and secured with tension bands at maximum 15-inch intervals. The fabric shall be tied to the line posts and top rails with tie wires spaced at a maximum of 12-inches on posts and 24-inches on rails. The fabric shall be attached to the bottom rail with top rings at maximum 24-inch intervals.
8. Barbed Wire – Barbed wire shall be anchored to the terminal extension arms, pulled taut and firmly installed in the slots of the line post extension arms.
9. Valleys – Should the fence cross a ditch or drainage swell, 3/8” diameter aluminum alloy rods shall be driven vertically 18” into the ground on 4-inch centers, woven through the fence fabric to provide security for these areas.
10. Vegetation-stop and aggregate shall be applied to the entire compound area (the area inside the fencing) and 6” beyond the fencing. Vegetation-stop shall be constructed with weed barrier geotextile and aggregate shall be applied 3” in depth and consist of AASHTO#10 coarse aggregate.

# 8. Training

The SELECTED VENDOR shall develop and conduct training programs to allow MERA/Marin County personnel to become knowledgeable with the system, subsystems, and individual equipment. All training with the exception of technical training shall be "Train-the-Trainer".

## *8.1 General Requirements*

A. RESPONDENT shall fully describe all proposed training programs detailing how the RESPONDENT intends to provide training. All training shall be Train-the-Trainer with the exception of technical training. The training description shall include the following:

1. A list of all subjects with a description of each
2. Class material to be provided by the SELECTED VENDOR
3. Number of classes
4. Class duration
5. Need for recurring training
6. Class size
7. Class cost

B. Training location will be selected by MERA/Marin County. The SELECTED VENDOR shall coordinate with MERA/Marin County regarding the number of attendees and schedule.

C. Classes shall be scheduled as near to system cutover as possible.

D. The SELECTED VENDOR shall train MERA/Marin County employees or designated individuals. All non-technical training will utilize a Train-the-Trainer approach that will be used so that attendees can train other users.

E. The SELECTED VENDOR shall provide draft training materials to MERA/Marin County for approval and customization prior to duplication.

F. The SELECTED VENDOR shall provide all instructional material, including printed manuals, audio, video, interactive self-paced personal computer programs, and complete operating instructions for all technical and operational

training classes. Actual and or exact model and series of equipment being delivered shall be made available for hands-on use and operation during training. Training materials shall be provided in editable electronic formats that can be tailored to operational needs by MERA/Marin County. All instructional material shall be subject to the approval of MERA/Marin County and shall become property of MERA/Marin County.

G. The instructional material, including printed manuals, audio, video, interactive self-paced personal computer programs, and complete operating instructions for all technical and operational training classes provided by SELECTED VENDOR shall become property of MERA/Marin County.

## 8.2 Operator Training

A. All operator training shall be “Train-the-Trainer”. Operator training classes provided by the SELECTED VENDOR shall be tailored to include actual system talkgroups and subscriber/console features that will be used. Standard training that covers general usage not applicable to the provided system shall be removed from the training syllabus.

B. The SELECTED VENDOR shall provide complete and comprehensive operational training covering features, operation, and special care associated with the equipment supplied. Operator training shall include the following categories:

1. Portable Radio Unit Operation (structured as Train-the-Trainer)
2. Mobile Radio Unit Operation (structured as Train-the-Trainer)
3. Dispatch Console Operation (structured as Train-the-Trainer)
4. Dispatch Console Supervisor (structured as Train-the-Trainer)

## 8.3 Technical/System Management Training

A. The SELECTED VENDOR shall provide complete and comprehensive technical training in the theory, maintenance, and repair of each type of equipment and system provided for the project. This training shall include, as a minimum, system theory, troubleshooting, repair, and servicing techniques as applicable to the selected system. Technical training shall include the following categories:

1. Infrastructure maintenance and troubleshooting

2. Subscriber unit maintenance and troubleshooting
3. Microwave network maintenance, and troubleshooting

B. The SELECTED VENDOR shall provide complete and comprehensive technical training for MERA/Marin County technical staff charged with managing the system. This training shall include, but is not limited to:

1. Planning and setting up the system and network
2. Building and implementing system and network profiles and configurations
3. Performing database management functions
4. Monitoring and managing the system's performance
5. Writing and printing system reports.
6. System management training shall include the following categories:
    a. Network Management System (NMS) programming, operation and control
    b. System back-up
    c. Alarm system and alerting
    d. Fleet mapping and radio programming (moves, adds, changes)

# 9. System Implementation, Test, and Acceptance

## 9.1 General

A. The SELECTED VENDOR shall attend project and construction meetings as deemed necessary by MERA/Marin County prior to and during installation. Additional meetings may be scheduled at the discretion of MERA/Marin County.

B. If any changes in the overall timeline occur, the SELECTED VENDOR shall update the project schedule for discussion during these project meetings.

C. The SELECTED VENDOR shall provide written minutes of all meetings no later than five business days after the meeting.

D. The SELECTED VENDOR shall provide monthly project status reports.

## 9.2 Cutover Plan

A. The SELECTED VENDOR shall be responsible for planning and coordinating the implementation of all equipment, subsystems, and the overall system.

B. The cutover plan shall ensure that new systems are brought online with minimum interruption to all existing systems and communications and with minimal impact on current space constraints at the dispatch centers and existing facilities.

C. During detailed design review, the SELECTED VENDOR shall deliver a preliminary cutover plan describing how the radio system will be phased over into a fully operational system.

1. The SELECTED VENDOR shall successfully complete all tests and training prior to the actual cutover of systems.
2. The SELECTED VENDOR shall provide the necessary labor to cutover from existing systems to the proposed system.
3. The plan shall include the schedule and procedures associated with the transition of each operational user group. The plan shall specifically address how the existing users will begin using the new system with minimal operational impact.

4. The plan shall provide detailed component or subsystem cutover plans, and specifically delineate between systems that affect and do not affect ongoing operations.
5. MERA/Marin County reserves the right to approve and change the cutover plan as it relates to any or all system components.

## 9.3 Fleet Mapping

A. The SELECTED VENDOR shall develop the fleet map with input and direction from MERA/Marin County. The fleet map shall contain at a minimum:

1. Talkgroup ID
2. Agency
3. Emergency actions
4. Encryption capability
5. Roaming capability
6. Priority
7. Scan groups
8. Paging
9. Private Call
10. Mutual Aid Operation
11. Hospital Paging

B. In collaboration with MERA/Marin County, the SELECTED VENDOR shall develop subscriber programming templates for all equipment, and program all radio units. These templates shall have features and functions defined for a particular subscriber and user type. Templates shall be developed on a per-agency – per-user type basis.

C. MERA/Marin County will be given the opportunity to test up to 100 subscriber devices prior to cutover to ensure fleet mapping fits the needs of the users. If the fleet mapping requires modifications, the SELECTED VENDOR shall modify the fleet map and allow for retesting by MERA/Marin County at no cost. There shall be no limit on the number of changes required of the fleet mapping to ensure the needs of the users are met.

D. Once the fleet map and templates are completed and approved by MERA/Marin County the SELECTED VENDOR shall use these for installation of subscriber units and for further configuration of the system. The contractor shall submit these fleet maps and templates with the final as-built documentation.

E. Specific programming information utilized to configure individual subscriber units shall be detailed on a spreadsheet which contains, at a minimum, subscriber model number, subscriber serial number, agency, any sub-department names and alias assigned to subscriber unit. The spreadsheet shall be provided in electronic format.

## 9.4 Staging

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

B. Standard factory test documentation, documenting the tests performed and indicating successful completion of testing shall be submitted to MERA/Marin County.

C. System Staging:

1. The complete system shall be staged and tested at the factory or other approved test facility, in the United States, to the greatest extent practical. The intent of the staging tests is to demonstrate to MERA/Marin County that the system is complete, functional, and ready for shipment and installation.
2. The SELECTED VENDOR shall provide all necessary technical personnel, and test equipment to conduct staging tests. All deviations, anomalies, and test failures shall be resolved to the satisfaction of MERA/Marin County at the SELECTED VENDOR's expense.
3. The SELECTED VENDOR shall use the Factory Acceptance Test Plan (FATP) reviewed and accepted by MERA/Marin County. It is expected that a preliminary FATP has been performed and all tests have been successful before MERA/Marin County witnesses the official FATP. The FATP shall be signed and dated by the SELECTED VENDOR and MERA/Marin County's representatives, following completion of all tests. All tests in the FATP shall be marked as either pass, fail, or pass qualify.
4. Failed tests shall be documented, corrected, and retested. All defective components shall be replaced and retested. Defective components that

cannot be corrected shall be replaced at the expense of the SELECTED VENDOR.

5. Retest of individual failed FATP tests or the entire plan shall be at MERA/Marin County's discretion.

6. The fully executed and completed FATP document shall be provided to MERA/Marin County.

## 9.5 System Installation

A. Installation shall include a complete, tested, system to include placement of associated cabling, appropriate system layout and terminal connections. The SELECTED VENDOR shall provide associated power supplies and any other hardware, adapters and/or connections to deliver a complete operable system to MERA/Marin County at the time of acceptance.

B. All installations shall be performed by recently factory trained and authorized personnel. Qualified, personnel with current factory training and familiarity with the type of equipment to be installed. RESPONDENTS shall provide the names of the service shops, a summary of their experience and a list of five references (minimum) for each proposed shop.

C. During detailed design, the SELECTED VENDOR shall participate in a mandatory project site survey with MERA/Marin County or MERA/Marin County's representative to confirm specific equipment location within each space. At that time, the exact equipment locations will be determined and documented by the SELECTED VENDOR.

D. The Facilities and Site Development CONTRACTOR shall coordinate with others, as appropriate, to confirm that any preparation work that affects the installation of the radio equipment, such as tower work, coring, bracing, conduit, and electrical, is complete before base station equipment installation begins.

E. The SELECTED VENDOR shall 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 shall be new and shall meet the requirements of this RFP. All materials furnished and work completed shall be subject to inspection by MERA/Marin County or MERA/Marin County's engineer.

F. Equipment supplied as spare equipment may not be used for installation of the proposed system. All spare equipment must be supplied in an unused condition.

G. All equipment and devices shall be cleaned internally and externally, and all damaged finishes shall be repaired.

H. Worksites shall be left neat and broom swept upon completion of work each day. All shelter floors will be thoroughly cleaned and all scuff marks and abrasions will be removed prior to acceptance. All trash shall be removed weekly.

I. Inspection:

1. MERA/Marin County and/or the County's representative shall conduct an inspection of the installations upon substantial completion. Any deficiencies shall be documented on a single punch list and provided to the Contractor for resolution.
2. Final acceptance testing shall not commence until all punch list items are resolved to the satisfaction of MERA/Marin County.

## 9.6 System Acceptance Testing (SATP)

A. Prior to final acceptance testing, the SELECTED VENDOR shall verify and document that all equipment, hardware, and software are upgraded to the latest factory revision. Multiple revision levels among similar equipment are not acceptable. MERA/Marin County shall be given two weeks written notice that the system is ready for final acceptance testing.

B. System Acceptance Test Plan (SATP):

1. The SELECTED VENDOR shall use the completed and approved System Acceptance Test Plan (SATP). It is expected that the SATP has been performed and all tests have been successful before MERA/Marin County witnesses the official SATP. The SATP shall be signed and dated by the SELECTED VENDOR and MERA/Marin County representatives following completion of all tests. All tests in the SATP shall be marked as either pass, fail, or pass qualify.
2. The SELECTED VENDOR shall provide all necessary technical personnel, and test equipment to conduct SATP tests. All deviations, anomalies, and test failures shall be resolved to the satisfaction of MERA/Marin County at the SELECTED VENDOR's expense.
3. Failed tests shall be documented, corrected, and retested. All defective components shall be replaced and retested. Defective components that

cannot be corrected shall be replaced at the expense of the SELECTED VENDOR.

4. Retest of individual failed SATP tests or the entire plan shall be at MERA/Marin County's discretion.
5. The fully executed and completed SATP document shall be provided to MERA/Marin County.

## 9.7 Coverage Testing

A. RESPONDENT shall submit a preliminary Coverage Acceptance Test Plan (CATP) with the Proposal. The final CATP shall be submitted during the Detailed Design stage of the project. SELECTED VENDOR shall provide test vehicles; MERA/Marin County will provide witnesses for the CATP).

B. CATP:

1. The CATP shall be consistent with the procedures and guidelines outlined in TSB-88 latest revision.
2. Coverage testing shall commence only after the radio system is fully tested and aligned. Significant changes to the system will require retesting of coverage at MERA/Marin County's discretion.
3. The SELECTED VENDOR shall perform three types of coverage testing measurements for each testable grid both inbound and out bound talk paths:
    a. Automated testing for Bit Error Rate (BER) levels
    b. Automated testing for signal strength levels
    c. Manual subjective intelligibility testing (DAQ)
4. Automated and intelligibility testing shall serve to fully verify that coverage requirements are met both technically and operationally. BER, Signal Strength and DAQ shall be used to fully verify that coverage requirements are met, a failure of any test to meet the minimum requirements shall deem coverage inadequate.
5. Test Configurations:
    a. Testing configurations for automated and intelligibility testing shall represent typical operating configurations to the greatest extent

possible, using portable and mobile radio equipment to be used with the system.

b. For testing purposes, the County shall be divided into 1/4-square mile bins (½-mile x ½-mile). The SELECTED VENDOR or Contractor may subdivide grids if necessary.

c. Inaccessible grids shall not count as either a pass or fail in the statistical analysis.

d. Automated Objective Mobile Drive Testing:

1) The SELECTED VENDOR shall test both the signal level and Bit Error Rate (BER), at a statistically significant number of test locations (test grids) representing the entirety of the MERA/Marin County service area.

2) Covered area testing based on predicted coverage maps shall not be acceptable.

3) Automated test equipment, comparable to the Survey Technologies Inc. “Field Test 7” real time coverage mapping software, and associated P25 test equipment or equivalent shall be used.

4) BER testing shall be conducted in P25 Phase 2 (TDMA) modes for both uplink and downlink paths.

e. Non-automated subjective DAQ testing:

1) DAQ coverage testing for talk-in and talk-out performance shall be conducted using typical portable radios in Phase 2 mode to be used on the system.

2) The SELECTED VENDOR shall provide a standardized test form for testing.

C. BER pass/fail criteria shall be based on TSB-88 values for P25 TDMA uplink and downlink paths as specified for an equivalent DAQ of 3.4 or better for Marin County’s service area, at 97% reliability, as specified in Section 4.8, *Coverage*. Coverage testing is required for both the outbound signal and the inbound signal. The BER for the inbound signal may not be calculated; it must be tested. If the BER test fails, the coverage guarantee shall be deemed as invalid as well. The SELECTED VENDOR shall be responsible for making necessary adjustments to

system design, securing any additional equipment needed and installation of equipment and software necessary to satisfy the coverage guarantee at no cost to MERA/Marin County.

## 9.8 Cutover

A. The SELECTED VENDOR shall provide all necessary personnel required to support the Cutover Plan. These personnel will be present prior to, during and immediately following cutover to ensure a smooth transition.

B. Cutover will not occur until all punch list items have been resolved to the satisfaction of MERA/Marin County and all installation and testing procedures have been executed and passed. MERA/Marin County will reserve the right to begin the cutover process in the event of existing open punch list items at their sole discretion.

## 9.9 30-Day Operational Test Period

A. Upon successful completion of system acceptance testing and completion of cutover, the system will be operated in the fully loaded configuration using normal operating parameters for a 30-day Operational Test Period. Should a critical failure occur during this period the system will be repaired by the SELECTED VENDOR and the 30 day test will restarted for an additional 30 days.

B. The 30-Day Operational Test Period, including any restarted test periods, is by definition part of the Final System Acceptance Test Plan, and as such must be successfully completed prior to system acceptance. System use, including use for intended purpose during this period, no matter its length, is specifically defined as other than “Beneficial Use” and may not be used to deem system acceptance in any manner.

C. The system warranty period will start upon successful completion of all system acceptance test activities, including SATP, resolution of all punch-list items, and completion of the 30-Day Operational Test Period including any restarted test periods.

D. The SELECTED VENDOR and MERA/Marin County will define critical failures jointly. In the event of a disagreement, MERA/Marin County reserves the right to make a sole determination.

## 9.10 System Acceptance

A. MERA/Marin County shall deem the system ready for System Acceptance following successful completion and approval of the following:

1. Completion of system and subscriber units installations as described in Detailed Design
2. Completion of all work required by detailed design and contractual obligations
3. System testing
4. RF Coverage testing
5. Cutover
6. Satisfactory resolution of all punch-list items
7. Satisfactory completion of 30-Day Operational Test Period
8. Delivery of all system documentation including as-built documentation capturing any and all changes or modifications from the original design documentation.

## 9.11 As-Built Documentation

A. At the completion of the installation phase, the SELECTED VENDOR shall provide complete as-built documentation, including but not limited to the following:

1. Equipment provided
2. Plan and elevation drawings of all equipment including antennas on towers
3. Cabling and terminations
4. Software and configuration files for all equipment
5. System block diagrams
6. Site layout drawings
7. Tower mapping documentation
8. Tower structural analysis documentation
9. Detailed design documentation
10. Fleet mapping and programming

11. Setup and alignment information
12. Successfully completed, signed, and dated acceptance testing documents including staging, coverage and final acceptance testing.
13. Warranty documentation

## 9.12 Final System Acceptance

MERA/Marin County shall deem the system ready for final system acceptance following successful completion and approval of the following:

A. Final Design submittals

B. Factory Acceptance Test Plan (FATP)

C. System installation

D. Final inspection and punch list resolution

E. As-built documentation

F. System Acceptance Test Plan (SATP), including Coverage Acceptance Test Plan (CATP), and 30-Day Operational Test Period

G. Training

# 10. Warranty, Maintenance, and Support

## *10.1 Warranty*

A. The proposed communications system shall have a warranty and maintenance period of 3 years. The warranty/maintenance period shall commence upon Final System Acceptance.

B. The SELECTED VENDOR shall provide a single toll-free telephone number that answers 24 hours a day, 7 days a week, 365 day a year, for service requests and warranty claims.

C. The RESPONDENT shall state in the Proposal the name, address, and capabilities of the factory authorized service station(s) providing warranty service.

D. The following procedures shall be followed during the warranty period:

1. Warranty Maintenance shall be performed 24 hours a day with no additional charges.
2. The service facility shall provide prompt repair service, with service personnel arriving onsite within two hours after a service request by MERA/Marin County and returning the system to service within 4 hours after a service request by MERA/Marin County.
3. MERA/Marin County shall be provided 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 MERA/Marin County owned spares are used to complete a repair, the model and serial number of both the defective unit and the spare shall be noted in the documentation.
4. For all equipment needing factory or depot repairs, a comprehensive tracking system shall be put in place by the SELECTED VENDOR to track units to and from the factory/depot.

E. The following services will be provided during the warranty period:

1. Network Monitoring: the SELECTED VENDOR shall remotely monitor all components provided as part of this procurement. Monitoring shall be performed 24 hours a day 7 days a week from a remote location specifically staffed with personnel performing monitoring duties for other systems throughout the United States. Any connectivity required for network monitoring shall be provided and paid for by the SELECTED VENDOR. Any

and all network monitored events shall be logged by the SELECTED VENDOR and a report shall be provided to MERA/Marin County on an agreed upon schedule. This is monitor only and no changes shall be made without prior coordination with Marin County Technicians. Marin County Technicians will be afforded the same monitoring capabilities as the Selected Vendor during this warranty period and beyond.

2. Dispatch Services: the SELECTED VENDOR shall notify the appropriate personnel in the event of a system event detected through the network monitoring service. Any events requiring notification of maintenance personnel shall be logged and notification provided to MERA/Marin County technician immediately. Between the Selected Vendor and Marin County technician(s) a plan of action will be executed. The maintenance log will be provided to MERA/Marin County on a weekly basis, or as requested.
3. On-Site Repair: after coordination with Marin County technicians the SELECTED VENDOR shall supply the appropriate personnel to provide on-site repair of any failed system components or ancillary equipment. All components provided through this procurement shall be repaired by the SELECTED VENDOR or their subcontractors. System components shall be returned to a fully functional state via direct on-site repair, replacement of faulty module, or replacement of entire component.
4. Depot Repair: the SELECTED VENDOR shall provide for depot repair of any components found to be defective, or not within factory specifications.
5. Software Services: the SELECTED VENDOR shall provide and install any software patches, anti-virus definitions, or other software as needed to any provided networking and/or system devices.
6. Information Security Services: the SELECTED VENDOR shall monitor the network architecture to detect and respond to security related incidents, manage system firewalls, update anti-virus software, test and update security patches, and proactively manage the security of the radio system network.
7. Software Refresh: the SELECTED VENDOR shall install all software updates that have been released and are applicable to the provided system and its components. The SELECTED VENDOR shall provide all labor and software. Prior to expiration of the warranty period, all system software shall be updated to the latest software revision shipping on the end of warranty date. MERA/Marin County owned spare parts shall be included in software update process. The software refresh will include any new features that

were not previously available. Training shall be included for any changes to operational characteristics brought on by the software refresh.

8. Hardware Refresh: the SELECTED VENDOR shall replace any hardware that is not compatible with the latest revision software at the time of any software refresh or update.

9. Any system component that enters end-of-life support or becomes obsolete shall be replaced with the then current versions shipping on the warranty expiration date. This ensures system components are not at end of life upon expiration of the warranty period. MERA/Marin County-owned spare parts that become obsolete will also be replaced with upgraded model.

10. System Manager: the SELECTED VENDOR shall provide system management functions by an individual that has been factory trained and is competent to monitor and change network settings as required by MERA/Marin County, with prior coordination with Marin County technicians. These services shall be available during the system warranty period on an as needed basis and will not be limited to alias database changes, usage and alarm reports. If any changes to the system cannot be performed by the provided system manager, the SELECTED VENDOR shall provide the appropriate personnel to meet the request of MERA/Marin County.

11. Spare parts: the SELECTED VENDOR shall maintain a sufficient quantity of spare parts to maintain 24/7 operation of the provided system and subsystems. As an OPTION, MERA/Marin County may purchase spare parts. Restoration times shall not be dependent upon MERA/Marin County's decision to purchase spares.

## *10.2 Maintenance*

A. The SELECTED VENDOR shall, with prior coordination with Marin County Technicians, maintain and repair all systems, equipment, hardware and software throughout the implementation, migration and warranty periods. MERA/Marin County reserves the right to have technical staff onsite to witness, and if desired, assist in the maintenance and troubleshooting procedures. This does not relieve the SELECTED VENDOR from warranty and maintenance responsibility as defined in this RFP.

B. MERA/Marin County reserves the right to conduct system maintenance and troubleshooting on an as needed basis to maintain system operation at its sole

discretion. This does not relieve the SELECTED VENDOR from warranty and maintenance responsibility as defined in this RFP.

### 10.2.1 Maintenance Standards

A. Replacement parts used in repairs shall be equal in quality and ratings to the original parts.

B. Equipment shall be maintained in a clean condition. Oil, dust and other foreign substances shall be removed on a routine basis.

C. Equipment and system performance shall be maintained at the level initially described in these equipment and systems specifications. The service organization shall maintain records to confirm this has been done at intervals defined by MERA/Marin County.

D. The SELECTED VENDOR shall provide only factory trained and authorized maintenance personnel.

E. If fixed equipment or a fixed equipment module fails more than twice during the acceptance test or twice during the first year after system acceptance, the SELECTED VENDOR shall meet with MERA/Marin County to discuss and explain such failures. If, in the opinion of MERA/Marin County, these failures indicate that the equipment is potentially prone to continuing failures, the SELECTED VENDOR shall replace the equipment or module at no cost to MERA/Marin County.

## 10.3 Parts Availability

A. From the date of system acceptance to the tenth anniversary of the date of system acceptance, the SELECTED VENDOR shall maintain replacement parts for all delivered equipment.

B. In the event the SELECTED VENDOR plans to discontinue supply of any part required for maintenance after the seventh anniversary of system acceptance, the SELECTED VENDOR shall send written notice to MERA/Marin County 24 months prior to the date of discontinuance to allow for last-time buys and replenishment.

C. All parts, ordered on a priority basis, shall be delivered within 24 hours after placing an order. The SELECTED VENDOR shall provide year around, 24-hour ordering facilities via telephone, internet, e-mail, and fax service.

## 10.4 Spare Equipment

A. RESPONDENT shall propose to MERA/Marin County as an OPTION, recommended spare parts and test equipment including a minimum of five service monitors for the system, subsystems, and individual equipment.

B. The list of spare parts shall include, but is not limited to:

1. Any vendor identified Field Replaceable Units (FRUs)
2. Any infrastructure component, which does not have FRUs that can cause a critical failure if it were to fail. Examples could include Base Station Antennas and other non-modular components.
3. Power supplies
4. Test measurement, calibration and repair kits
5. Diagnostic equipment to support MERA/Marin County maintenance activities
6. Spares for less critical items shall also be listed

C. The list shall 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 the component level when a critical unit has failed.

D. The quantities of spares in the list shall be appropriately sized to accommodate equipment quantities in the system.

E. The list shall define the primary equipment category each spare kit supports, e.g., transceiver board for a repeater, interface board for a console, etc.

F. In the event MERA/Marin County decides not to purchase the recommended spares the SELECTED VENDOR providing warranty services shall be required to provide spare parts required to restore system failures within the required restoration time.

G. The system engineering design documentation shall include a narrative on the RESPONDENT's ability to replace failed units from stock and the process and timing to repair, replace, and return failed units delivered for repair.

H. System engineering design documentation shall also include the Mean Time Between Failure (MTBF) of equipment, parts, and other maintenance support for the system.

## *10.5 Post Warranty Maintenance and Support*

A. As an OPTION, the RESPONDENT shall propose maintenance services and system software/hardware lifecycle management refresh programs for subsequent years, renewable on an annual basis. A minimum of pricing for years 4 through 15 shall be provided.

B. The RESPONDENT shall fully describe the scope and terms and conditions of the maintenance services and system software/hardware lifecycle management refresh programs.

C. The RESPONDENT shall indicate who the local authorized repair facility will be for post warranty repairs upon completion of the Detailed Design Review process.

D. Pricing shall include at a minimum all services provided during the warranty period. Scope of Work (SOW) documents shall be provided for all proposed services. In the event the RESPONDENT wraps several services into a larger offering, those services shall be broken into each service and SOW documents provided.

# 11. County Terms and Conditions

## MARIN COUNTY TERMS AND CONDITIONS

1. SUBCONTRACTORS

   A. Each portion of the work shall be performed by an organization experienced to do work in that particular field and no portion of the work shall be reserved by the Contractor to perform unless the Contractor is equipped and experienced to handle it properly. Contractor shall include a complete list of subcontractors proposed for the work.

   B. No portion of contracts or subcontracts shall be assigned, transferred or sublet without the consent of the County.

   C. If the Contractor fails to specify a subcontractor for any portion of the work, they shall be deemed to have agreed to perform such portion themselves. They shall not be permitted to subcontract that portion of the work except in cases of public emergency or necessity and then only after the finding of the awarding authority has been publicly recorded.

   D. If Contractor hires a subcontractor under this Agreement, Contractor shall require subcontractor to provide and maintain insurance coverage(s) identical to what is required of Contractor under this Agreement and shall require subcontractor to name Contractor as additional insured under this Agreement. It shall be Contractor's responsibility to collect and maintain current evidence of insurance provided by its subcontractors and shall forward to the County evidence of same.

2. ASSIGNMENT AND SUBCONTRACTING

   The Contractor shall have no right, authority or power to sell, mortgage, or assign the resulting purchase order, or any interest herein, nor any right, power of authority to allow, or permit any other person or persons or organizations to have any interest in or use any part of the rights or obligations granted there under for any purpose whatsoever without the prior written consent of the County of Marin. Neither the purchase order, nor any interest created thereby, shall pass by operation of law to any trustee or receiver in bankruptcy or to any other receiver or assignee for the benefit of creditors or any claim there under to any other party or parties, except as expressly authorized by the County of Marin.

3. CONTRACTOR REGISTRATION WITH CALIFORNIA DEPARTMENT OF INDUSTRIAL RELATIONS

A contractor or subcontractor shall not be qualified to bid on, be listed in a bid proposal, subject to the requirements of Section 4104 of the Public Contract Code, or engage in the performance of any contract for public work, as defined in this chapter, unless currently registered and qualified to perform public work pursuant to Section 1725.5 of the Labor Code. It is not a violation of this section for an unregistered contractor to submit a bid that is authorized by Section 7029.1 of the Business and Professions Code or by Section 10164 or 20103.5 of the Public Contract Code, provided the contractor is registered to perform public work pursuant to Section 1725.5 of the Labor Code at the time the contract is awarded.

_____**If initialed by County representative, the above paragraph has been determined by the County to be inapplicable on the basis that the services to be provided under this contract do not require registration with the California Department of Industrial Relations pursuant to Labor Code Section 1771.1(a). It is the Contractor's responsibility to correct this determination if it believes the conclusion to be inaccurate.**

4. INDEMNIFICATION

Contractor agrees to release, indemnify, defend, and hold County, its employees, officers, and agents, harmless from any and all liabilities including, but not limited to, litigation costs and attorney's fees arising from any and all claims and losses to anyone who may be injured or damaged by reason of Contractor's negligence, recklessness or willful misconduct in the performance of this contract.

5. INSURANCE

Contractor shall maintain a commercial general liability insurance policy in the amount of one million dollars ($1,000,000.00). Where the services to be provided under this Contract involve or require the use of any type of vehicle by Contractor in order to perform said services, Contractor shall also provide comprehensive business or commercial automobile liability coverage including non-owned and hired automobile liability in the amount of one million dollars ($1,000,000.00). Said policies shall remain in force through the life of this Contract and shall be payable on a "per occurrence" basis unless County specifically consents to a "claims made" basis. The County of Marin and MERA shall be named as

additionally insured on the commercial general liability policy. The insurer shall supply a certificate of insurance with an additional insured endorsement signed by the insurer evidencing such insurance to County prior to commencement of work, and said certificate with endorsement shall provide for ten (10) day advance notice to County of any termination or reduction in coverage.

____ **By initialing in the space provided, Contractor warrants that the services to be provided under this Contract do not require the use of any type of vehicle by Contractor.**

Nothing herein shall be construed as a limitation of Contractor's liability, and County agrees to give timely notice to Contractor of any negligence claim.

Failure to provide and maintain the insurance required by this contract will constitute a material breach of the agreement. In addition to any other available remedies, County may suspend payment to the Contractor for any services provided during any time that insurance was not in effect and until such time as the Contractor provides adequate evidence that Contractor has obtained the required coverage.

6. WORKERS' COMPENSATION

Contractor acknowledges that it is aware of the provisions of the Labor Code of the State of California which require every employer to be insured against liability for worker's compensation or to undertake self-insurance in accordance with the provisions of that Code, and it certifies that it will comply with such provisions before commencing the performance of the work of this Contract. If Contractor has employees, a copy of the certificates evidencing such insurance shall be provided to county prior to commencement of work.

____ **By initialing in the space provided Contractor warrants that no employees will be used in providing the services under this Contract.**

7. NONDISCRIMINATORY EMPLOYMENT

Contractor shall not unlawfully discriminate against any individual based on race, color, religion, nationality, sex, sexual orientation, age or condition of disability. Contractor and/or any permitted subcontractor understands and agrees that Contractor is bound by and will comply with the nondiscrimination mandates of all federal, state and local statutes, regulations and ordinances.

8. LICENSING AND PERMITS

The Contractor shall maintain the appropriate licenses through the life of this Contract. Contractor shall also obtain any and all permits which might be required by the work to be performed herein.

9. CONFORMITY WITH LAW AND SAFETY

A. Contractor shall observe and comply with all applicable laws, ordinances, codes and regulations of governmental agencies, including federal, state, municipal and local governing bodies having jurisdiction over the scope of services or any part hereof, including all provisions of the Occupation Safety and Health Act of 1979 and all amendments thereto, and applicable federal, state and local government safety regulations. All services performed by Contractor must be in accordance with these laws, ordinances, codes and regulations. Contractor shall indemnify and save County harmless from any and all liabilities, fines, penalties and consequences arising from any non-compliance of violations of such laws, ordinances, codes and regulations.

B. Accidents: If a death, serious personal injury, or substantial property damage occurs in connection with the performance of this agreement, Contractor shall immediately notify the County by telephone. Contractor shall promptly submit to County a written report, in such form as may be required by County, of all accidents which occur in connection with this agreement. This report must include all of the following information:

1) Name and address of the injured or deceased person;

2) Name and address of Contractor’s subcontractor (if any);

3) Name and address of Contractor’s Liability Insurance Carrier; and

4) A detailed description of accident and whether any of County’s equipment, tools, or material were involved.

10. ADMENDMENT

This contract may be amended or modified only by written agreement of all parties.

## 11. JURISDICTION AND VENUE

This contract shall be construed in accordance with the laws of the State of California and the parties hereto agree that venue shall be in Marin County, California.

## 12. ATTORNEY'S FEES

If any action at law or inequity is brought to enforce or interrupt the provisions of this agreement, the prevailing party shall be entitled to reasonable attorney's fees in addition to any other relief to which it may be entitled.

## 13. RIGHT TO AUDIT

County shall have the right of audit and inspection of the Contractor's business records at any time during the term of this agreement. Contractor shall have readily available all records related to the performance of the agreement and shall provide office space as may be required for County to audit these records.

## 14. TERMINATION FOR DEFAULT – TIME EXTENSION FOR DELAY

If the Contractor fails or refuses to prosecute the work, or any separable part therefore, as to insure that the services specified will not be completed and/or delivered within the time specified in the purchase order, the County of Marin, may by written notice to the Contractor, terminate its right to proceed with the work or such part of the work to which there has been a delay. The Contractor and its sureties shall be liable to the County of Marin for liquidated damages, or if no liquidated damages are so provided, then for any damages to the County of Marin resulting from the Contractor's failure or refusal to complete/deliver the items within the specified time.

Time extension for delay may be allowed the Contractor by the County of Marin for any delay in the completion/delivery of specified services which arises from enforceable causes beyond the control of the Contractor and without fault or negligence of the Contractor, including but not restricted to such causes as the act or negligence of the County of Marin, stormy or inclement weather in which specified work cannot be done, strikes, boycotts, acts of God, acts of the public enemy, acts of government, fire, flood, epidemics, freight embargo, or delays of suppliers which arise from unforeseeable causes beyond the control and without the fault or negligence of the Contractor.

## 15. CANCELLATION OF THE CONTRACT

Without cause, the County of Marin may cancel this contract at any time with thirty-(30) days' written notice to any supplier/contractor. With cause, the County of Marin may cancel this contract at any time with ten-(10) days' written notice to the Contractor. Cancellation for cause shall be at the discretion of the County of Marin and shall be, but is not limited to, failure to supply the materials, equipment or service specified within the time allowed or within the terms, conditions or provisions of this contract. The Contractor may not cancel this contract without prior written consent of the Purchasing Agent.

## 16. INDEPENDENT CONTRACTOR

The Contractor agrees and certifies that they or any of their agents, servants, or employees is not an agent or employee of the County of Marin. The Contractor is an independent solely responsible for Contractor's acts. The resulting purchase order shall not be construed as an agreement for employment with the County.

## 17. NON-APPROPRIATION OF FUNDS

The County of Marin warrants that it has funds available to remit payments on the resulting County purchase order at the time the purchase order is executed. Should appropriated funds during the term of the purchase order become unavailable for the purpose of the purchase order, the County may cancel the purchase order by providing the Contractor with written notice. Such notice shall release both the County and Contractor from all obligations under the purchase order, and Proposer shall refund the County the balance of any advance payment made for orders of goods and/or services which are outstanding or which have not been received by the County.

## 18. LIQUIDATED DAMAGES

An authorized management representative of the County shall insure that all services are provided in a timely professional manner as required by the scope of work. Such authorized management representative shall notify the Vendor of all discrepancies and request Vendor to respond in a specified time to correct discrepancies. Failure by the Vendor to respond to correct a discrepancy shall be cause for a pro-rate deduction from the invoice.

When the Vendor fails to respond to either a verbal or written request to correct discrepancies to be corrected within a specific time limit established, an "outside"

Vendor or County employee(s) may be requested and dispatched to the site to provide the required services or corrective work in accordance with instructions furnished by the authorized management representative. The Vendor who failed to respond shall incur the total cost per the “outside” Vendor’s invoice or the total hourly cost, including benefits, of the County employee(s).

Alternately, liquidated damages in the amount of one hundred dollars ($100.00) for each and every day that the Vendor fails to perform may be assessed to cover damages sustained by the County by reason of such failure. Such amount(s) shall be deducted from the Vendor’s invoice. Additionally, the County reserves the right to withhold from any payment due there under, sufficient funds to discharge any delinquent accounts of the Vendor resulting from work under this contract.

19. NUCLEAR FREE ZONE

The County of Marin is a Nuclear Free Zone in which work on nuclear weapons and/or the storage or transportation of weapons, related components, and nuclear material is prohibited or restricted. Further, the County of Marin is prohibited or restricted from contracting for services or products with, or investing County funds in, any Nuclear Weapons Contractor.

20. GOVERNING LAWS

This Request for Proposal and the resulting purchase order shall be governed by all applicable federal, state, and local laws, codes, ordinances, and regulations including, but not limited to, those promulgated by CAL-OSHA, FED-OSHA, EPA, EEOC, DFEH, the California State Department of Health Services. This contract shall be in accordance with the substantive and procedural laws of the State of California.

21. INDEPENDENT CONTRACTOR

The vendor agrees and certifies that they or any of their agents, servants, or employees is not an agent or employee of the County. The Vendor is an independent solely responsible for Vendor’s acts. The resulting Purchase Order shall not be construed as an agreement for employment with the County.

## 22. NON-APPROPRIATION OF FUNDS

The County warrants that it has funds available to remit payments on the resulting County Purchase Order at the time the purchase order is executed. Should appropriated funds during the term of the Purchase order become unavailable for the purpose of the Purchase Order, the County may cancel the Purchase Order by providing the Vendor with written notice. Such notice shall release both the County and Vendor from all obligations under the Purchase Order, and Vendor shall refund the County the balance of any advance payment made for orders of goods and/or services which are outstanding or which have not been received by the County.

## 23. COOPERATIVE AGREEMENT

School Districts, special Districts or other governmental units in the County of Marin shall be capable of purchasing the items specified on this Request for Proposal. The Vendor shall provide firm fixed pricing for all items or services, as specified herein, and allow the agencies described herein to purchase said goods or services at any time during the effective period of the resulting County of Marin purchase order.

## 24. LIVING WAGE

This contract is subject to the County of Marin Living Wage Ordinance. The Ordinance requires the payment of a living wage to all covered employees engaged in providing services pursuant to a service contract as defined in Section 2.50.030(F). Vendor specifically agrees that should the County investigate allegations of non-compliance with the Living Wage Ordinance, Vendor shall make available for audit, its books and records relating to the service contract, as well as the books and records of its Subcontractors, and Vendor will make available employees so that the County can interview such employees in furtherance of its investigation. Misrepresentation during the procurement or contracting process in order to secure the contract will disqualify a Vendor or contractor from further consideration in the procurement or contracting process. Failure to comply once a contract has been awarded will constitute a material breach of the contract and may result, among other things, in the suspension or termination of the affected contract and debarment from future County contracting opportunities for a period not to exceed three years.

## 25. CHANGE ORDERS

The County may at any time, without notice to any sureties, by written change order, make any change in the work specified in the resulting Contract, including but not limited to changes:

A. In the general/special provisions and terms and conditions of the Contract.

B. In the written scope of work

**No Order, Statement or Conduct, Written or Oral, Shall Be Treated as a Change Order Unless in Writing and Signed by Both the County and Vendor.**

## 26. PAYING OF PREVAILING WAGES

The Board of Supervisors has been provided with a determination of the prevailing rates of wages applicable to this project, which is on file in the Office of the County Clerk, copies of which may be obtained from the Department of Public Works. Said rates are based on an eight (8) hour day, forty (40) hour week, except as otherwise noted and currently in effect. Existing agreements between the Building Trades and Construction Industry groups relate to wages, overtime, holidays and other special provisions shall be strictly observed. In compliance with the provisions of Section 1776 of the Labor Code of the State of California, as amended, the Contractor and each of his Subcontractors shall keep an accurate payroll record, showing the name, address, social security number, work classification, straight time and overtime hours worked each day and week, and the actual per diem wages paid to each journeyman, apprentice or worker employed by them in connection with the project. Said records shall be available for inspection at all reasonable hours, and copies shall be made available to the employee or his authorized representative, the State Division of Labor Standards Enforcement, the State Division of Apprenticeship Standards, and the County.

## 27. LOCAL BUSINESS PREFERENCE

In accordance with County of Marin Ordinance #89-2993, whenever the County acquires services or supplies by purchase or contract, the Purchasing Agent, in evaluating the price or bid, shall award a five percent (5%) preference on the price submitted by a local County business.

## 28. WITHDRAWAL OF PROPOSAL

No proposals submitted may be withdrawn within sixty - (60) calendar days after the submittal deadline. Proposals submitted prior to the submittal deadline may be withdrawn only by written request of the vendor.

## 29. ADDENDUM

Any changes, additions, deletions or clarifications to this proposal package, including the general/special provisions and specifications, shall be made by written addendum to the Request for Proposal. Such addendum shall be issued by the Purchasing Department and will be made to all prospective vendors in possession of the proposal package. Addendum issued within five (5) calendar days of the proposal opening date/time may be cause for extension of the proposal in order to allow prospective vendor's sufficient time to prepare their proposals.

## 30. FORCE MAJEURE

Time extension for delay may be allowed the Vendor by the County of Marin for any delay in the completion/delivery of specified items which arises from unforeseeable causes beyond the control of the vendor and without fault or negligence of the vendor, including but not restricted to such causes as the act or negligence of the County of Marin, stormy or inclement weather in which specified work cannot be done, strikes, boycotts, acts of God, acts of the public enemy, acts of government, fire, flood, epidemics, freight embargo, delays of suppliers which arise from unforeseeable causes beyond the control and without the fault or negligence of both the vendor and supplier.

## 31. TERMINATION FOR CONVENIENCE

The County reserves the right to terminate the contract at any time, for the convenience of the County of Marin, without penalty or recourse, by giving written notice to the Contractor at least thirty (30) calendar days prior to the effective date of such termination. The Contractor shall be entitled to receive just and equitable compensation for services and/or supplies delivered to and accepted by the County pursuant to the contract prior to the effective date of termination. Termination compensation cannot exceed the monthly service fee, and the termination nullifies the remaining months of the contract.

A. Termination for lack of funding: The County reserves the right to terminate any contract in any user agency if said agency loses funding during the term of the contract.

B. Termination for non-performance: The County may terminate the contract in whole or in part if delivery or performance is repeatedly unsatisfactory. Unsatisfactory performance includes but is not limited to:

1) Repeated failure to respond within requested time-frame

2) Failure to perform services when promised or expected

3) Inability to reach Contractor contact; lack of customer service

## 32. CANCELLATION OF CONTRACT

The County may cancel this contract WITHOUT CAUSE at any time by giving thirty- (30) days' written notice to the supplier/contractor. The County may cancel this contract WITH CAUSE at any time by giving ten- (10) days' written notice to the supplier/contractor. Cancellation for cause shall be at the discretion of the County and shall be, but is not limited to, failure to supply the materials, equipment or service specified within the time allowed or within the terms, conditions or provisions of this contract. Upon termination, the County shall pay the Vendor the allowable costs incurred to date of termination. The successful Proposer may not cancel this contract without prior written consent of the Purchasing Agent.

## 33. GENUINE PROPOSAL

The Undersigned hereby certifies that this cost proposal is genuine and not sham or collusive, or made in the interest or on behalf of any person or business not herein named, and that he has not directly or indirectly induced or solicited any other proposer to furnish a sham proposal, or any other person or business to refrain from providing a cost proposal, and that he has not in any manner sought by collusion to secure himself an advantage over any other proposer.

Contractor has read and understands the foregoing and agrees to be bound by all of the foregoing terms and conditions.

_____

**Contractor (Firm Name)**

_____ _____

**Signature** **Date**

# Appendix A - Sample Contract

Sample of the County of Marin Professional Services Contract is provided in file PSC Template 1-15.doc

# Appendix B - Compliance Matrix

| RFP Section | Description | RESPONDENTS Statement of Compliance | RESPONDENTS Clarifications and Comments |
|---|---|---|---|
| 1 | PROJECT OVERVIEW | | |
| 1.1 | Introduction | | |
| 1.2 | Background | | |
| 1.2.1 | Marin County | | |
| 1.2.3 | RFP Purpose | | |
| 1.3 | Overview of this Document | | |
| 2 | PROJECT SUMMARY | | |
| 2.1 | Project Components | | |
| 2.2 | Authorization and Funding | | |
| 2.3 | Proposals Desired | | |
| 2.4 | Quality Assurance and Coordination | | |

| RFP Section | Description | RESPONDENTS Statement of Compliance | RESPONDENTS Clarifications and Comments |
|---|---|---|---|
| 2.4.1 | Codes, Standards and Guidelines | | |
| 2.4.2 | Frequency Coordination and Licensing | | |
| 2.4.3 | Federal Aviation Administration (if applicable) | | |
| 2.5 | Project Management Plan | | |
| 2.5.1 | Scheduling | | |
| 2.5.2 | Project Punch List | | |
| 2.5.3 | Project Meetings | | |
| 2.5.4 | Project Staffing | | |
| 2.5.5 | QA/QC Program | | |
| 2.6 | Project Submittals | | |
| 2.7 | Preliminary Design (included in proposal response) | | |
| 2.8 | Detailed Design (90 days after contract award) | | |
| 2.9 | Detailed Design Review | | |

| RFP Section | Description | RESPONDENTS Statement of Compliance | RESPONDENTS Clarifications and Comments |
|---|---|---|---|
| 2.10 | System Staging, Delivery and Installation | | |
| 2.11 | Final System Acceptance | | |
| 3 | INSTRUCTIONS TO PROPOSERS | | |
| 3.1 | Overview | | |
| 3.2 | RFP Schedule | | |
| 3.3 | Pre-Proposal Conference | | |
| 3.4 | Proposal Format | | |
| 3.5 | Addenda to the RFP | | |
| 3.6 | Evaluation | | |
| 3.7 | Award | | |
| 4 | RADIO COMMUNICATIONS SYSTEM REQUIREMENTS | | |
| 4.1 | Overview | | |
| 4.2 | Project 25 | | |

| RFP Section | Description | RESPONDENTS Statement of Compliance | RESPONDENTS Clarifications and Comments |
|---|---|---|---|
| 4.3 | Redundancy and Survivability | | |
| 4.4 | Expansion | | |
| 4.5 | Grade of Service (GoS) – Trunked System | | |
| 4.6 | Site Selection | | |
| 4.7 | Existing Site Development | | |
| 4.8 | Coverage | | |
| 4.8.1 | Coverage Model and Maps | | |
| 4.8.2 | Link Budgets | | |
| 4.9 | Site Equipment | | |
| 4.9.1 | System Control Equipment | | |
| 4.9.2 | Simulcast Control Equipment | | |
| 4.9.3 | Receiver Voting | | |
| 4.9.4 | Base Station Equipment | | |

| RFP Section | Description | RESPONDENTS Statement of Compliance | RESPONDENTS Clarifications and Comments |
|---|---|---|---|
| 4.9.5 | Antenna Systems | | |
| 4.9.6 | Interoperability Gateway Devices | | |
| 4.9.7 | DC Power Supply | | |
| 4.9.8 | Uninterruptable Power Supply (UPS) | | |
| 4.10 | Dispatch Console System | | |
| 4.10.1 | General Requirements and Features | | |
| 4.10.2 | Trunked Requirements | | |
| 4.10.3 | Conventional Requirements | | |
| 4.10.4 | Paging Requirements | | |
| 4.10.5 | Operator Position Equipment | | |
| 4.10.6 | Console Networking Equipment | | |
| 4.10.7 | Console Backup System | | |
| 4.11 | Voice Logger Recorder | | |

| RFP Section | Description | RESPONDENTS Statement of Compliance | RESPONDENTS Clarifications and Comments |
|---|---|---|---|
| 4.12 | Network Management System (NMS) | | |
| 4.12.1 | Network Management Terminals (NMT) | | |
| 4.13 | ISSI (P25 Inter RF SubSystem Interface) | | |
| 4.14 | Smartphone Integration | | |
| 5 | BACKHAUL NETWORK | | |
| 5.1 | Digital Microwave Network | | |
| 5.2 | Microwave Backhaul Network Engineering | | |
| 5.3 | Microwave Antenna System | | |
| 5.4 | Microwave Backhaul Network Management | | |
| 6 | SUBSCRIBER EQUIPMENT | | |
| 6.1 | Overview | | |
| 6.2 | General Requirements | | |
| 6.2.1 | Portable Radios | | |

| RFP Section | Description | RESPONDENTS Statement of Compliance | RESPONDENTS Clarifications and Comments |
|---|---|---|---|
| 6.2.2 | Mobile Radios | | |
| 6.2.3 | Mobile Radios | | |
| 6.2.3 | Control Stations | | |
| 6.2.4 | Fire Station and Siren Alerting, Knox Boxes and Remote Gate Control | | |
| 6.2.5 | Volunteer Fire Paging | | |
| 7 | FACILITIES AND INFRASTRUCTURE DEVELOPMENT | | |
| 7.1 | General | | |
| 7.2 | Towers | | |
| 7.3 | Shelters | | |
| 7.4 | Generator and Automatic Transfer Switch (ATS) | | |
| 7.4.1 | Generator | | |
| 7.4.2 | Automatic Transfer Switch (ATS) | | |
| 7.4.3 | Fuel System | | |

| RFP Section | Description | RESPONDENTS Statement of Compliance | RESPONDENTS Clarifications and Comments |
|---|---|---|---|
| 7.5 | DC Power | | |
| 7.6 | Uninterruptable Power Supply (UPS) | | |
| 7.7 | Site Preparation | | |
| 7.8 | Fencing | | |
| 8 | TRAINING | | |
| 8.1 | General Requirements | | |
| 8.2 | Operator Training | | |
| 8.3 | Technical/System Management Training | | |
| 9 | SYSTEM IMPLEMENTATION, TEST AND ACCEPTANCE | | |
| 9.1 | General | | |
| 9.2 | Cutover Plan | | |
| 9.3 | Fleet Mapping | | |
| 9.4 | Staging | | |

| RFP Section | Description | RESPONDENTS Statement of Compliance | RESPONDENTS Clarifications and Comments |
|---|---|---|---|
| 9.5 | System Installation | | |
| 9.6 | System Acceptance Testing (SATP) | | |
| 9.7 | Coverage Testing | | |
| 9.8 | Cutover | | |
| 9.9 | 30-Day Operation Test Period | | |
| 9.10 | System Acceptance | | |
| 9.11 | As-Built Documentation | | |
| 9.12 | Final System Acceptance | | |
| 10 | WARRANTY, MAINTENANCE AND SUPPORT | | |
| 10.1 | Warranty | | |
| 10.2 | Maintenance | | |
| 10.2.1 | Maintenance Standards | | |
| 10.3 | Parts Availability | | |

| RFP Section | Description | RESPONDENTS Statement of Compliance | RESPONDENTS Clarifications and Comments |
|---|---|---|---|
| 10.4 | Spare Equipment | | |
| 10.5 | Post Warranty Maintenance and Support | | |
| 11 | COUNTY TERMS AND CONDITIONS | | |
| Appendix A | Sample Contract | | |
| Appendix B | Compliance Matrix | | |
| Appendix C | Proposal Pricing Forms | | |
| Appendix D | Master Site List | | |
| Appendix E | Conventional System | | |
| Appendix F | 700 MHz Allocations | | |
| Appendix G | Existing Microwave Backhaul Information | | |
| Appendix H | Specific Coverage Area Requirements | | |
| Appendix I | Site Surveys | | |

# Appendix C - Proposal Pricing Forms

## Table C.1 – Proposal Pricing Form (Total Base System Costs)

| Description | Total |
|---|---|
| **System Components (Subtotals from Table C.2)** | |
| System Control Equipment | |
| Simulcast Control Equipment | |
| Remote Site Equipment | |
| Microwave Network Equipment | |
| Network Management System | |
| Dispatch Console Equipment | |
| Spare Equipment | |
| Other | |
| ***Total System Components Cost*** | |
| **System Services (Subtotals from Table C.3)** | |
| Installation | |
| Project Management | |
| System Engineering | |
| System Staging | |
| Coverage & Acceptance Testing | |
| Documentation | |
| Training | |
| Warranty & Maintenance | |
| Other | |
| ***Total Services Cost*** | |

| Description | Total |
|---|---|
| **Infrastructure Development - Existing Sites (Subtotals from Table C.4A)** | |
| Towers | |
| Shelters | |
| Generator, Propane/Diesel Tanks, and ATS | |
| PM, Engineering, and Installation | |
| Other | |
| ***Total Infrastructure Development Cost - Existing Sites*** | |
| **Infrastructure Development - (Subtotals from Alternate Sites Table C.4B)** | |
| Towers | |
| Shelters | |
| Generator, Propane/Diesel Tanks, and ATS | |
| Remote Site Equipment | |
| Microwave Network Equipment | |
| PM, Engineering, and Installation | |
| Other | |
| ***Total Infrastructure Development Cost - Alternate Sites*** | |

| Description | Total |
|---|---|
| **User Radio Cost (Subtotals from Table C.6)** | |
| Portable Radios | |
| Mobile Radios | |
| Control Stations | |
| Warranty & Maintenance | |
| Other | |
| ***Total User Radio Cost*** | |
| **Total Proposal Cost** | |

## Table C.2 – Proposal Pricing Form (System Components Cost)

***NOTE: Show unit cost per site where applicable***

| Item | Description | Site Name/Location | Qty. | Unit Cost | Extended Cost |
|---|---|---|---|---|---|
| **System Control Equipment** | | | | | |
| | System Core Equipment with redundancy to support system services proposed | | | | |
| | System Core Equipment software and licensing to support system services proposed | | | | |
| | ISSI (connection to up to two other RFSS's) | | | | |
| | Interoperability Gateway Devices | | | | |
| | Ancillary Support Equipment (e.g., UPS and similar) | | | | |
| | Smartphone interface equipment to P25 system | | | | |
| | Smartphone interface equipment software and licensing | | | | |
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| Item | Description | Site Name/Location | Qty. | Unit Cost | Extended Cost |
|---|---|---|---|---|---|
| | ***System Control Equipment Subtotal*** | | | | |
| | **Simulcast Control Equipment** | | | | |
| | Simulcast Control Equipment with redundancy to support required system services | | | | |
| | Simulcast Control Equipment software and licensing to support required system services | | | | |
| | Voting Control Equipment with redundancy | | | | |
| | Voting Control Equipment software and licensing | | | | |
| | Ancillary Support Equipment (e.g., UPS and similar) | | | | |
| | **Simulcast Control Equipment Subtotal** | | | | |
| | **Remote Site Equipment** | | | | |
| | Remote site control and RF equipment | | | | |
| | Remote site control and RF equipment licensing and software | | | | |
| | Antenna systems (Radio) | | | | |
| | Ancillary Support Equipment (e.g., UPS, dehydrators, etc.) | | | | |
| | Interoperability Gateway Devices | | | | |
| | | | | | |

| Item | Description | Site Name/Location | Qty. | Unit Cost | Extended Cost |
|---|---|---|---|---|---|
| | ***Remote Site Equipment Subtotal*** | | | | |
| | | **Microwave Network Equipment** | | | |
| | Microwave control and RF equipment | | | | |
| | Microwave control and RF equipment software and licensing | | | | |
| | Antenna systems (Microwave) | | | | |
| | Ancillary Support Equipment (e.g., UPS, dehydrators, etc.) | | | | |
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RESPONDENT: _____

| Item | Description | Site Name/Location | Qty. | Unit Cost | Extended Cost |
|---|---|---|---|---|---|
| | ***Microwave Network Equipment Subtotal*** | | | | |
| | **Network Management System** | | | | |
| | Network Management Control Equipment | | | | |
| | Network Management Remote Site Equipment | | | | |
| | Network Management Terminals | | | | |
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| | ***Subtotal Network Management System*** | | | | |
| | **Dispatch Console System** | | | | |
| | Common or Core equipment | | | | |
| | Common/Core software and licensing | | | | |
| | Operator position equipment | | | | |
| | Operator position software and licensing | | | | |
| | Voice logging recorder interface | | | | |
| | CAD system interface | | | | |
| | Console back up control stations | | | | |
| | Interoperability Gateway Devices | | | | |
| | | | | | |

| Item | Description | Site Name/Location | Qty. | Unit Cost | Extended Cost |
|---|---|---|---|---|---|
| | ***Dispatch Console System Subtotal*** | | | | |
| | **Recommended Spare Equipment (list)** | | | | |
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| | ***Recommended Spare Equipment Subtotal*** | | | | |
| | **Other** | | | | |
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| | **Other Subtotal** | | | | |
| | **Total System Components Cost** | | | | |

RESPONDENT: _____

## Table C.3 – Proposal Pricing Form (System Services Cost)

***NOTE: Show unit cost per site where applicable***

| Item | Description | Site Name/Location | Qty. | Unit Cost | Extended Cost |
|---|---|---|---|---|---|
| **Installation** | | | | | |
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| | | | | **Installation Subtotal** | |
| **Project Management** | | | | | |
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| | | | | **Project Management Subtotal** | |

| Item | Description | Site Name/Location | Qty. | Unit Cost | Extended Cost |
|---|---|---|---|---|---|
| | **System Engineering** | | | | |
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| | **System Engineering Subtotal** | | | | |
| | **System Staging** | | | | |
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| | **System Staging Subtotal** | | | | |
| | **Coverage & Acceptance Testing** | | | | |
| | Coverage Testing | | | | |
| | Factory Acceptance Testing | | | | |
| | System Acceptance Testing | | | | |
| | | | | | |
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| | | | | | |
| **Coverage and Acceptance Testing Subtotal** | | | | | |

| Item | Description | Site Name/Location | Qty. | Unit Cost | Extended Cost |
|---|---|---|---|---|---|
| **Documentation** | | | | | |
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| **Documentation Subtotal** | | | | | |
| | **Training** | | | | |
| | User Radio Operator Training | | | | |
| | Dispatch Console Operator Training | | | | |
| | Dispatch Supervisor Training | | | | |
| | System Manager Training | | | | |
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| | | | | | |
| **Training Subtotal** | | | | | |

| Item | Description | Site Name/Location | Qty. | Unit Cost | Extended Cost |
|---|---|---|---|---|---|
| **Warranty & Maintenance (Radio System, Microwave, and Dispatch Consoles)** | | | | | |
| | | | | | |
| | Remote System Monitoring (24/7) | | | | |
| | Onsite Response and Repair (24/7) | | | | |
| | FRU Exchange and Repair | | | | |
| | Annual Preventive Maintenance and Optimization | | | | |
| | On Call Technical Support Services (24/7) | | | | |
| | Information Security Monitoring and Protection Services | | | | |
| | System software maintenance (updates) | | | | |
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| | | | | **Warranty and Maintenance Subtotal** | |

| Item | Description | Site Name/Location | Qty. | Unit Cost | Extended Cost |
|---|---|---|---|---|---|
| **Other** | | | | | |
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| **Other Subtotal** | | | | | |
| | **Total System Services Cost** | | | | |

## Table C.4A – Proposal Pricing Form (Existing Site Development Cost)

***NOTE: Show unit cost per site where applicable***

| Item | Description | Site Name/Location | Qty. | Unit Cost | Extended Cost |
|---|---|---|---|---|---|
| **Towers (OPTIONAL)** | | | | | |
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| **Towers Subtotal** | | | | | |
| **Shelters (OPTIONAL)** | | | | | |
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| Item | Description | Site Name/Location | Qty. | Unit Cost | Extended Cost |
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| | | | | **Shelters Subtotal** | |
| **Generator, Propane/Diesel Tanks, and ATS (OPTIONAL)** | | | | | |
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| | | | | **Generator, Propane/Diesel Tanks, and ATS Subtotal** | |
| **Project Management (OPTIONAL)** | | | | | |
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| Item | Description | Site Name/Location | Qty. | Unit Cost | Extended Cost |
|---|---|---|---|---|---|
| | | | | **Project Management Subtotal** | |
| | | | | **Engineering (OPTIONAL)** | |
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| | | | | **Engineering Subtotal** | |
| | | | | **Installation (OPTIONAL)** | |
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| Item | Description | Site Name/Location | Qty. | Unit Cost | Extended Cost |
|---|---|---|---|---|---|
| | | | | Installation Subtotal | |
| Construction Work (OPTIONAL) | | | | | |
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| | | | | Construction Work Subtotal | |
| | | | | Total Infrastructure Development Cost | |

## Table C.4B – Proposal Pricing Form (Alternate Site Development Cost)

***NOTE: Show unit cost per site where applicable***

| Item | Description | Site Name/Location | Qty. | Unit Cost | Extended Cost |
|---|---|---|---|---|---|
| **Towers (OPTIONAL)** | | | | | |
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| | | | | **Towers Subtotal** | |
| **Shelters (OPTIONAL)** | | | | | |
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| | | | | **Shelters Subtotal** | |

| Item | Description | Site Name/Location | Qty. | Unit Cost | Extended Cost |
|---|---|---|---|---|---|
| **Generator, Propane/Diesel Tanks, and ATS (OPTIONAL)** | | | | | |
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| **Generator, Propane/Diesel Tanks, and ATS Subtotal** | | | | | |
| **Remote Site Equipment** | | | | | |
| | Remote site control and RF equipment | | | | |
| | Remote site control and RF equipment licensing and software | | | | |
| | Antenna systems (Radio) | | | | |
| | Ancillary Support Equipment (e.g. UPS, dehydrators, etc.) | | | | |
| | Interoperability Gateway Devices | | | | |
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| **Remote Site Equipment Subtotal** | | | | | |

| Item | Description | Site Name/Location | Qty. | Unit Cost | Extended Cost |
|---|---|---|---|---|---|
| **Microwave Network Equipment** | | | | | |
| | Microwave control and RF equipment | | | | |
| | Microwave control and RF equipment software and licensing | | | | |
| | Antenna systems (Microwave) | | | | |
| | Ancillary Support Equipment (e.g. UPS, dehydrators, etc.) | | | | |
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| **Microwave Network Equipment Subtotal** | | | | | |
| **Project Management** | | | | | |
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| **Project Management Subtotal** | | | | | |

| Item | Description | Site Name/Location | Qty. | Unit Cost | Extended Cost |
|---|---|---|---|---|---|
| **Engineering** | | | | | |
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| | | | | **Engineering Subtotal** | |

| Item | Description | Site Name/Location | Qty. | Unit Cost | Extended Cost |
|---|---|---|---|---|---|
| **Installation** | | | | | |
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| | | | | **Installation Subtotal** | |
| **Other** | | | | | |
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| | | | | **Other Subtotal** | |
| | | | | **Total Infrastructure Development Cost** | |

RESPONDENT: _____

## Table C.5 – Proposal Pricing Form (Optional System Components Cost)

***NOTE: Show unit cost per site where applicable***

| Item | Description | Site Name/Location | Qty. | Unit Cost | Extended Cost |
|---|---|---|---|---|---|
| **System Control Equipment** | | | | | |
| | Geo Diverse Core Equipment to support system services proposed | | | | |
| | Geo Diverse Core Equipment software and licensing to support system services proposed | | | | |
| | ISSI (connection for additional RFSS) | | | | |
| | Interoperability Gateway Device (per device) | | | | |
| | Ancillary Support Equipment (e.g., UPS and similar) | | | | |
| | Smartphone interface equipment to P25 system to support additional users (show in increments with price breaks to expand base system) | | | | |
| | Smartphone interface equipment software and licensing additional users (show in increments with price breaks to expand user base) | | | | |
| **System Control Equipment Subtotal** | | | | | |
| **Simulcast Control Equipment** | | | | | |

| Item | Description | Site Name/Location | Qty. | Unit Cost | Extended Cost |
|---|---|---|---|---|---|
| | Geo-diverse Simulcast Control Equipment to support required system services | | | | |
| | Geo-diverse Simulcast Control Equipment software and licensing to support required system services | | | | |
| | Geo-diverse Voting Control Equipment | | | | |
| | Geo-diverse Voting Control Equipment software and licensing | | | | |
| | Ancillary Support Equipment (e.g., UPS and similar) | | | | |
| | | | | **Simulcast Control Equipment Subtotal** | |
| | | | | Network Management System | |
| | Network Management Control Equipment (expansion) | | | | |
| | Network Management Remote Site Equipment (expansion) | | | | |
| | Network Management Terminals (expansion) | | | | |
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| | | | | **Network Management System Subtotal** | |
| | | | | Recommended Spare Equipment (list) | |

| Item | Description | Site Name/Location | Qty. | Unit Cost | Extended Cost |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | **Recommended Spare Equipment Subtotal** | |
| | | | Other | | |
| | Microwave dish ice shields | | | | |
| | BDA/DAS for Cal-Park Tunnel | | | | |
| | BDA/DAS for SO Jail Complex | | | | |
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| | | | | **Other Subtotal** | |

## Table C.6 – Proposal Pricing Form (User Radio Cost)

| Item | Description | Qty. | Model/Item/Option/ Part # | Unit Cost | Extended Cost |
|---|---|---|---|---|---|
| | **Portable Radios** | | | | |
| | **Basic Tier Portable:** 700/800 MHz, Project 25 - Phase 2, w/battery, belt clip, standard antenna, IP54 rated (minimum), display with limited keypad (3-6 keys), 512 modes/channels | | | | |
| | **Basic Tier Radio Options:** | | | | |
| | Ruggedized Housing | | | | |
| | OTAP Software | | | | |
| | Spare Batteries | | | | |
| | Desk Chargers | | | | |
| | Multi-Unit Chargers (minimum of 6 slots) | | | | |
| | Swivel Carry Case | | | | |
| | Speaker Mic with Antenna | | | | |
| | Programming | | | | |
| | **Basic Tier Portable w/accy. Totals** | | | | |
| | **Mid-Tier Portable**: 700/800 MHz, Project 25 - Phase 2,w/battery, belt clip, standard antenna, IP67 rated (minimum), display with limited keypad, 512 - 1000 modes/channels | | | | |
| | **Mid-Tier Radio Options:** | | | | |
| | Ruggedized Housing | | | | |
| | High Visibility Housing | | | | |

| Item | Description | Qty. | Model/Item/Option/ Part # | Unit Cost | Extended Cost |
|---|---|---|---|---|---|
| | OTAP Software | | | | |
| | Encryption | | | | |
| | OTAR Software | | | | |
| | Multikey Software | | | | |
| | Hi-Capacity Battery upgrade (3000 mAh rating or better) | | | | |
| | Hi-Capacity Spare Battery | | | | |
| | Standard Capacity Spare Battery | | | | |
| | Desk Chargers | | | | |
| | Multi-Unit Chargers (minimum of 6 slots) | | | | |
| | Swivel Carry Case | | | | |
| | Speaker Mic with Antenna | | | | |
| | Programming | | | | |
| | **Mid-Tier Portable w/accy. Totals** | | | | |
| | **High Tier Portable**: 700/800 MHz, Project 25 - Phase 2, w/battery, belt clip, standard antenna, IP67 rated (minimum), display with full keypad, 1000+ modes/channels | | | | |
| | **High Tier Radio Options:** | | | | |
| | Ruggedized Housing | | | | |
| | OTAP Software | | | | |
| | Encryption | | | | |
| | OTAR Software | | | | |
| | Multikey Software | | | | |
| | Hi-Capacity Battery upgrade (3000 mAh rating or better) | | | | |

RESPONDENT: _____

| Item | Description | Qty. | Model/Item/Option/ Part # | Unit Cost | Extended Cost |
|---|---|---|---|---|---|
| | Hi-Capacity Spare Battery | | | | |
| | Standard Capacity Spare Battery | | | | |
| | Desk Chargers | | | | |
| | Multi-Unit Chargers (minimum of 6 slots) | | | | |
| | Swivel Carry Case | | | | |
| | Speaker Mic with Antenna | | | | |
| | Vehicular Charger | | | | |
| | Bluetooth Remote Speaker Mic | | | | |
| | Programming | | | | |
| | **High Tier Portable w/accy. Totals** | | | | |
| | **Multi-Band High Tier Portable:** 700/800 MHz, Project 25 - Phase 2, w/battery, belt clip, standard antenna, IP67 rated (minimum), display with full keypad, 1000+ modes/channels | | | | |
| | **Multi-Band High Tier Radio Options:** | | | | |
| | Ruggedized Housing | | | | |
| | OTAP Software | | | | |
| | Encryption | | | | |
| | OTAR Software | | | | |
| | Multikey Software | | | | |
| | GPS capable | | | | |
| | Hi-Capacity Battery upgrade (3000 mAh rating or better) | | | | |
| | Hi-Capacity Spare Battery | | | | |
| | Standard Capacity Spare Battery | | | | |
| | Desk Chargers | | | | |

RESPONDENT: _____

| Item | Description | Qty. | Model/Item/Option/ Part # | Unit Cost | Extended Cost |
|---|---|---|---|---|---|
| | Multi-Unit Chargers (minimum of 6 slots) | | | | |
| | Swivel Carry Case | | | | |
| | Speaker Mic with Antenna | | | | |
| | Portable Wireless Headset | | | | |
| | Programming | | | | |
| | **Multi-Band High Tier Portable w/accy. Totals** | | | | |
| | **Mobile Radios** | | | | |
| | **Basic Tier Mobile:** 35W Dash Mount, 700/800 MHz, Project 25 - Phase 2 with OTAP software, microphone, external speaker, cables, fusing, mounting hardware, coaxial cable, unity gain antenna, IP54 rated (minimum), display with limited keypad, 512 modes/channels | | | | |
| | Programming and installation | | | | |
| | Removal of Legacy equipment | | | | |
| | **Basic Tier Mobile w/accy. Totals** | | | | |
| | **Mid-Tier Mobile**: 35W Dash Mount, 700/800 MHz, Project 25 - Phase 2 with microphone, external speaker, cables, fusing, mounting hardware, coaxial cable, unity gain antenna, IP54 rated (minimum), display with limited keypad, 513 -1000 modes/channels | | | | |
| | **Mid-Tier Radio Options:** | | | | |
| | OTAP Software | | | | |
| | Encryption | | | | |

| Item | Description | Qty. | Model/Item/Option/ Part # | Unit Cost | Extended Cost |
|---|---|---|---|---|---|
| | OTAR Software | | | | |
| | Multikey Software | | | | |
| | Remote Mount | | | | |
| | Dual Control Head | | | | |
| | Hand Held Control Head | | | | |
| | Headset Interface System | | | | |
| | Control Station Option (power supply,/deskmic, base tray) | | | | |
| | Programming and installation of Remote Mount | | | | |
| | Programming and installation of Dual Control Head | | | | |
| | Programming and installation of Hand Held Control Head | | | | |
| | Installation of Headset Interface System | | | | |
| | Programming and installation of Dash Mount | | | | |
| | Removal of Legacy equipment | | | | |
| | **Mid-Tier Mobile w/accy. Totals** | | | | |
| | **High Tier Mobile:** 35W Dash Mount 700/800 MHz, Project 25 - Phase 2 with OTAP software, microphone, external speaker, cables, fusing, mounting hardware, coaxial cable, unity gain antenna, IP54 rated (minimum), display with full keypad, 1000 plus modes/channels | | | | |
| | **High Tier Radio Options:** | | | | |

| Item | Description | Qty. | Model/Item/Option/ Part # | Unit Cost | Extended Cost |
|---|---|---|---|---|---|
| | Control Station Option (power supply,/deskmic, base tray) | | | | |
| | Programming and installation | | | | |
| | Removal of legacy equipment | | | | |
| | **High Tier Mobile w/accy. Totals** | | | | |
| | **Multi-Band High Tier Mobile:** 35W Dash Mount 700/800 MHz, Project 25 - Phase 2 with microphone, external speaker, cables, fusing, mounting hardware, coaxial cable, unity gain antenna, IP54 rated (minimum), display with full keypad, 1000 plus modes/channels | | | | |
| | **Multi-Band High Tier Radio Options:** | | | | |
| | OTAP Software | | | | |
| | Encryption | | | | |
| | OTAR Software | | | | |
| | Multikey Software | | | | |
| | GPS capable | | | | |
| | Remote Mount | | | | |
| | Dual Control Head | | | | |
| | Hand Held Control Head | | | | |
| | Headset Interface System | | | | |
| | Control Station Option (power supply,/deskmic, base tray) | | | | |
| | Motorcycle Mount | | | | |
| | Outside (external to vehicle) speaker | | | | |
| | Programming and installation of Remote | | | | |

| Item | Description | Qty. | Model/Item/Option/ Part # | Unit Cost | Extended Cost |
|---|---|---|---|---|---|
| | Mount | | | | |
| | Programming and installation of Dual Control Head | | | | |
| | Programming and installation of Hand Held Control Head | | | | |
| | Installation of Headset Interface System | | | | |
| | Programming and installation of Control Station | | | | |
| | Programming and installation of Motorcycle Mount | | | | |
| | Programming and installation of Dash Mount | | | | |
| | Removal of legacy equipment | | | | |
| | **Multi-Band High Tier Mobile w/accy. Totals** | | | | |
| | **Warranty & Maintenance** | | | | |
| | ***3 year extended warranty per unit cost*** | | | | |
| | Basic portable | | | | |
| | Mid-tier portable | | | | |
| | High tier portable | | | | |
| | Multi-band portable | | | | |
| | Basic mobile | | | | |
| | Mid-tier mobile | | | | |
| | High tier mobile | | | | |
| | Multi-band mobile | | | | |
| | ***Annual per unit maintenance cost (year 4)*** | | | | |
| | Basic portable | | | | |

| Item | Description | Qty. | Model/Item/Option/ Part # | Unit Cost | Extended Cost |
|---|---|---|---|---|---|
| | Mid-tier portable | | | | |
| | High tier portable | | | | |
| | Multi-band portable | | | | |
| | Basic mobile | | | | |
| | Mid-tier mobile | | | | |
| | High tier portable | | | | |
| | Multi-band mobile | | | | |
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| Item | Description | Qty. | Model/Item/Option/ Part # | Unit Cost | Extended Cost |
|---|---|---|---|---|---|
| | **Other** | | | | |
| | Encryption Key loader | | | | |
| | List associated key loader cables separately for each type required. i.e., mobile, portable, system interface, etc. | | | | |
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| | Fire Station Alerting Interface for Control Stations | | | | |
| **Total User Radio Costs** | | | | | |

## Table C.7 – Proposal Pricing Form (User Radio Options Cost)

| Item | Description | Model/Item/Option/Part # | Qty. | Unit Cost | Extended Cost |
|---|---|---|---|---|---|
| | **Portables** | | | | |
| | ***Optional Portable Radio Models*** | | | | |
| | Basic Radio - Intrinsically safe | | 1 | | |
| | Mid-Tier Radio - Intrinsically safe | | 1 | | |
| | High Tier - Radio Intrinsically safe | | 1 | | |
| | Multi-band High Tier Radio - Intrinsically safe | | 1 | | |
| | | | | | |
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| | | | | | |
| | ***Battery Options*** | | | | |
| | Standard Li-ion | | 1 | | |
| | Standard NiMh | | 1 | | |
| | Standard Li-Polymer | | 1 | | |
| | High Capacity (3000 mAh or better) Li-ion | | 1 | | |
| | High Capacity (3000 mAh or better) NiMh | | 1 | | |
| | High Capacity ( 3000 mAh or better) Li-Polymer | | 1 | | |
| | Ruggedized Li-ion | | 1 | | |
| | Ruggedized NiMh | | 1 | | |

| Item | Description | Model/Item/Option/Part # | Qty. | Unit Cost | Extended Cost |
|---|---|---|---|---|---|
| | Ruggedized Li-Polymer | | 1 | | |
| | | | | | |
| | | | | | |
| | ***Additional Features and Accessories*** | | | | |
| | Integrated GPS | | 1 | | |
| | External GPS (e.g., With speaker mic ) | | 1 | | |
| | Vehicular Charger | | 1 | | |
| | Remote speaker microphone without antenna | | 1 | | |
| | Remote speaker microphone with antenna | | 1 | | |
| | Remote speaker microphone with keypad | | 1 | | |
| | Remote speaker microphone with Amplified Speaker (Audio) | | 1 | | |
| | Bluetooth remote speaker microphone | | 1 | | |
| | Headset: Wired | | 1 | | |
| | Headset: Bluetooth | | 1 | | |
| | Wireless (e.g. Wi-Fi, Bluetooth, LTE, LMR) connectivity for OTAP | | 1 | | |

| Item | Description | Model/Item/Option/Part # | Qty. | Unit Cost | Extended Cost |
|---|---|---|---|---|---|
| | Vehicular adapter – provides in vehicle portable radio battery charging, mobile microphone, amplified speaker, transmit power amplifier, external antenna connection. | | 1 | | |
| | OTAR | | 1 | | |
| | OTAP | | 1 | | |
| | AES encryption | | 1 | | |
| | Multi-key | | 1 | | |
| | | | | | |
| | **Mobiles** | | | | |
| | ***Optional Mobile Radio Models*** | | | | |
| | Basic Radio: Remote (split) mount | | | | |
| | Mid-Tier Radio: Remote Split Mount | | | | |
| | High Tier Radio: Remote Split Mount | | | | |
| | | | | | |
| | | | | | |
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| | ***Optional Control Station Models*** | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

| Item | Description | Model/Item/Option/Part # | Qty. | Unit Cost | Extended Cost |
|---|---|---|---|---|---|
| | | | | | |
| | ***Additional Features and Accessories*** | | | | |
| | Data interface cables | | | | |
| | Extended length control cables | | | | |
| | Extended length power cables | | | | |
| | User activated external weatherproof speaker (outside vehicle) | | | | |
| | Call alert/page feature for horn/lights | | | | |
| | Siren speaker interface | | | | |
| | Public address kits | | | | |
| | OTAR | | | | |
| | AES encryption | | | | |
| | Multi-key | | | | |
| | High Gain Antenna | | | | |
| | Low Profile Antenna | | | | |
| | Undercover/stealth antenna | | | | |
| | Fire Station Alerting interface | | | | |
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| Item | Description | Model/Item/Option/Part # | Qty. | Unit Cost | Extended Cost |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |

## Table C.8 – Proposal Pricing Form (Post-Warranty Options Cost)

| Item | Description | Qty. | Unit Cost | Extended Cost |
|---|---|---|---|---|
| | **Infrastructure Equipment** | | | |
| | (Post-warranty Support, Hardware/Software , Years 4-15) | | | |
| | ***Radio System*** | | | |
| | Remote System Monitoring (24/7) | | | |
| | Onsite Response and Repair (24/7) | | | |
| | FRU Exchange and Repair | | | |
| | Annual Preventive Maintenance and Optimization | | | |
| | On Call Technical Support Services (24/7) | | | |
| | Information Security Monitoring and Protection Services | | | |
| | System software maintenance (updates) | | | |
| | System software platform refresh (bi-annual) | | | |
| | System hardware refresh (bi-annual) | | | |
| | | | | |
| | | | | |
| | ***Microwave System*** | | | |
| | Remote System Monitoring (24/7) | | | |
| | Onsite Response and Repair (24/7) | | | |
| | FRU Exchange and Repair | | | |
| | Annual Preventive Maintenance and Optimization | | | |
| | On Call Technical Support Services (24/7) | | | |
| | System software maintenance (updates) | | | |
| | System software platform refresh (bi-annual) | | | |

| Item | Description | Qty. | Unit Cost | Extended Cost |
|---|---|---|---|---|
| | System hardware refresh (bi-annual) | | | |
| | | | | |
| | ***Dispatch Console System*** | | | |
| | Remote Monitoring (24/7) | | | |
| | Onsite Response and Repair (24/7) | | | |
| | FRU Exchange and Repair | | | |
| | On Call Technical Support Services (24/7) | | | |
| | Information Security Monitoring and Protection Services | | | |
| | System software platform refresh (bi-annual) | | | |
| | System hardware refresh (bi-annual) | | | |
| | | | | |
| | ***Other Recommended Services*** | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | **User Radio Equipment** | | | |
| | ***Annual per unit maintenance cost (years 4)*** | | | |
| | Basic portable | | | |
| | Mid-tier portable | | | |
| | High tier portable | | | |
| | Multi-band portable | | | |
| | Basic mobile | | | |
| | Mid-tier mobile | | | |

| Item | Description | Qty. | Unit Cost | Extended Cost |
|---|---|---|---|---|
| | High tier portable | | | |
| | Multi-band mobile | | | |
| | | | | |
| | | | | |

## Table C.9 – User Radio Discount Schedule

| Item | Description | Qty. Break Point | Discount (%) | Discount Application Notes |
|---|---|---|---|---|
| | **Discount Schedule** | | | |
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## Table C.10 – Proposed Payment Milestones

| Item | Description | % of Total Cost | Estimated due date (days after contract execution) |
|---|---|---|---|
| | **Payment Milestone** | | |
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# Appendix D - Master Site List

| Site Name | Latitude | Longitude | Site Status | Priority (for new sites) | Address | Site Owner | TX Antenna Height (centerline - feet) | RX Antenna Height (centerline - feet) |
|---|---|---|---|---|---|---|---|---|
| Mt. Barnabe | 38.02713889 | -122.7163889 | Current West TX/RX | | 1 Barnabe Peak Ave. Lagunitas, CA. 94938 | County of Marin | 30 | 70 |
| Bay Hill Road | 38.34158333 | -123.0216667 | Current IR | | 2855 Bayhill Rd. #1. Bodega, CA. 94923 | Incline Partners | 40 | 60 |
| Big Rock | 38.05908333 | -122.6038611 | Current East TX/RX | | 325 H Ranch Rd. San Rafael, CA. 94947 | C&C | 55 | 100 |
| Burdell | 38.14490556 | -122.5940972 | Current East TX/RX | | End of Burdell Mt. fire road | American Tower | 40 | 60 |
| Dollar Hill | 37.98032222 | -122.5293278 | Current East TX/RX | | End of Robert Dollar Drive | San Rafael / MERA | 25 | 60 |
| Forbes | 37.979081 | -122.546881 | Current East TX/RX | | 195 Tamal Vista dr. San Rafael, CA. 94901 | MMWD | 45 | 60 |
| Mill Valley City Hall | 37.90795278 | -122.5474444 | Current East TX/RX | | 26 Corte Madera Dr. Mill Valley, CA. 94941 | City of Mill Valley | 40 | 60 |
| Mt. Tamaplais | 37.92888889 | -122.5875 | Current West TX/RX; East RX | | 2001 Ridgecrest BLVD. Mill Valley, CA. 94941 | American Tower | 20 | 40 |
| Mt. Tiburon | 37.89047222 | -122.4646944 | Current East TX/RX | | 991/2 Mt. Tiburon Rd. | MERA | 35 | 60 |
| Pt. Reyes | 38.08002778 | -122.8672222 | Current West TX/RX | | FAA Vortac Site Mt Vision Rd. Inverness, CA. 94937 | FAA | 13 | 8 |
| San Pedro | 37.99019444 | -122.5005278 | Current East TX/RX | | 2099 Bayhills Dr. San Rafael, CA. 94903 | C&C | 65 | 100 |

RESPONDENT: _____

| Site Name | Latitude | Longitude | Site Status | Priority (for new sites) | Address | Site Owner | TX Antenna Height (centerline - feet) | RX Antenna Height (centerline - feet) |
|---|---|---|---|---|---|---|---|---|
| Sonoma Mt. | 38.34833333 | -122.5769444 | Current IR | | 2482 Sonoma Mt. Rd. Petaluma, CA 94903 | Sonoma County | 100 | 120 |
| Stewart Point (Bolinas) | 37.930365 | -122.720172 | Current IR | | 615 Horseshoe Hill Rd. | Martinelli Ranch | 30 | 45 |
| Corda | 38.182906 | -122.596407 | New Candidate Site | None Given | Unknown | Unknown | 40 | 60 |
| Tomales | 38.260861 | -122.903667 | New Candidate Site | 1 | 28775 Shoreline Highway, Tomales, CA 94971 | Private Owner, Cell site managed by American Tower | 60 | 80 |
| Martha | 37.885056 | -122.449833 | New Candidate Site | 2 | 140 Lyford Drive, Tiburon, CA 94920 | Martha Property | 35 | 60 |
| Wolfback Ridge | 37.85103333 | -122.4984167 | New Candidate Site | 3 | 200 Sundial Road, Sausalito, CA 94965 | FM Broadcast | 40 | 60 |
| Muir Beach WT | 37.86335 | -122.5854 | New Candidate Site | 4 | Muir Beach Overlook, Muir Beach, CA 94965 | Muir Beach Community Services District | 40 | 60 |
| Redwood Landfill | 38.163778 | -122.575222 | New Candidate Site | 5 | Redwood Highway and San Antonio Road | Verizon Wireless | 40 | 60 |
| East Marshall | 38.1844 | -122.85285 | New Candidate Site | 6 | Unknown | Unknown | 40 | 60 |

| Site Name | Latitude | Longitude | Site Status | Priority (for new sites) | Address | Site Owner | TX Antenna Height (centerline - feet) | RX Antenna Height (centerline - feet) |
|---|---|---|---|---|---|---|---|---|
| Golden Gate Toll Plaza | 37.806833 | -122.475722 | New Candidate Site | 7 | Golden Gate Bridge Toll Plaza, San Francisco, CA 94129-0601 | Golden Gate Bridge Highway and Transportation District | 40 | 60 |
| Sutro Tower | 37.755278 | -122.45277 | New Candidate Site | 8 | 1 La Avanzada Street, San Francisco, California 94131-1124 | Sutro Tower Inc (ASR # 1001289) | - | - |

# Appendix E - Conventional Systems

## Table E.1 – Conventional Channels

| CHANNEL | 2nd Deck | Mt. Barnabe | Bay Hill | Big Rock | Mt. Burdell | Crest Tank | Dollar Hill | Forbes Hill | Jail | Mt. Barnabe | Mt. Tam | Prime Site | Pt. Reyes | San Pedro | Shop | Sonoma Mt. | Stewart Pt. | Sugarloaf | Tomales |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AIRCRAFT/SAR EMERGENCY | X | | | | | | | | | | | | | | | | | | |
| CDF INTERCOM | X | | | | | | | | | | | | | | | | | | |
| CESRS CONTROL | X | | | | | | | | | | | | | | | | | | |
| CHP BLUE/VIO | X | | | | | | | | | | | | | | | | | | |
| COMM/OES CONTROL | X | | | | | | | | | | | | | | | | | | |
| *CWMA | X | | | | | | | | | | | | | | | | | | |
| F-12 ALERTING | X | | | | | | | | | | | | | | | | | | |
| *FSA CONTROL STATION | X | | | | | | | | | | | | | | | | | | |
| *KNOX CONTROL | X | | | | | | | | | | | | | | | | | | |
| MARIN LOCAL CONTROL | X | | | | | | | | | | | | | | | | | | |
| MED M/A | X | | | | | | | | | | | | | | | | | | |
| OES FIRE | X | | | | | | | | | | | | | | | | | | |
| UHF CLERS | X | | | | | | | | | | | | | | | | | | |
| VHF CLERS | X | | | | | | | | | | | | | | | | | | |

| CHANNEL | 2nd Deck | Mt. Barnabe | Bay Hill | Big Rock | Mt. Burdell | Crest Tank | Dollar Hill | Forbes Hill | Jail | Mt. Barnabe | Mt. Tam | Prime Site | Pt. Reyes | San Pedro | Shop | Sonoma Mt. | Stewart Pt. | Sugarloaf | Tomales |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8CALL90 | | X | | | | | | | | | | | | | | | | | |
| MED M/A | | X | | | | | | | | | | | | | | | | | |
| U CALL | | X | | | | | | | | | | | | | | | | | |
| 700 CALLING SIMUL | | | X | | | | | | | | | | | | | | | | |
| 700 TAC | | | X | | | | | | | | | | | | | | | | |
| 700 CALLING SIMUL | | | | X | | | | | | | | | | | | | | | |
| 700 TAC | | | | X | | | | | | | | | | | | | | | |
| CALAW1 | | | | X | | | | | | | | | | | | | | | |
| COMM/OES | | | | X | | | | | | | | | | | | | | | |
| *CWMA | | | | X | | | | | | | | | | | | | | | |
| MARIN LOCAL RPTR | | | | X | | | | | | | | | | | | | | | |
| MCOE | | | | X | | | | | | | | | | | | | | | |
| MMWD | | | | X | | | | | | | | | | | | | | | |
| *MRN CMD | | | | X | | | | | | | | | | | | | | | |
| UHF MED | | | | X | | | | | | | | | | | | | | | |
| VCALL | | | | X | | | | | | | | | | | | | | | |
| *MRN CMD | | | | | X | | | | | | | | | | | | | | |

| CHANNEL | 2nd Deck | Mt. Barnabe | Bay Hill | Big Rock | Mt. Burdell | Crest Tank | Dollar Hill | Forbes Hill | Jail | Mt. Barnabe | Mt. Tam | Prime Site | Pt. Reyes | San Pedro | Shop | Sonoma Mt. | Stewart Pt. | Sugarloaf | Tomales |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NOV SAN DIST. YARD | | | | | | X | | | | | | | | | | | | | |
| 8CALL90 | | | | | | | X | | | | | | | | | | | | |
| 700 CALLING SIMUL | | | | | | | X | | | | | | | | | | | | |
| 700 TAC | | | | | | | X | | | | | | | | | | | | |
| CALAW4 | | | | | | | X | | | | | | | | | | | | |
| *MRN CMD | | | | | | | X | | | | | | | | | | | | |
| SNR UHF | | | | | | | X | | | | | | | | | | | | |
| SNR VHF | | | | | | | X | | | | | | | | | | | | |
| CALAW1 | | | | | | | | X | | | | | | | | | | | |
| CDF #1 | | | | | | | | X | | | | | | | | | | | |
| CDF #2 | | | | | | | | X | | | | | | | | | | | |
| *JAIL BACKUP RADIO | | | | | | | | | X | | | | | | | | | | |
| 700 CALLING SIMUL | | | | | | | | | | X | | | | | | | | | |
| 700 TAC | | | | | | | | | | X | | | | | | | | | |
| COMM/OES | | | | | | | | | | X | | | | | | | | | |
| *CWMA | | | | | | | | | | X | | | | | | | | | |
| MARIN LOCAL RPTR | | | | | | | | | | X | | | | | | | | | |

| CHANNEL | 2nd Deck | Mt. Barnabe | Bay Hill | Big Rock | Mt. Burdell | Crest Tank | Dollar Hill | Forbes Hill | Jail | Mt. Barnabe | Mt. Tam | Prime Site | Pt. Reyes | San Pedro | Shop | Sonoma Mt. | Stewart Pt. | Sugarloaf | Tomales |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MCOE | | | | | | | | | | X | | | | | | | | | |
| MMWD | | | | | | | | | | X | | | | | | | | | |
| PRNSS | | | | | | | | | | X | | | | | | | | | |
| SHERIFF PRIMARY | | | | | | | | | | X | | | | | | | | | |
| VFD PAGING | | | | | | | | | | X | | | | | | | | | |
| 700 CALLING SIMUL | | | | | | | | | | | X | | | | | | | | |
| 700 TAC | | | | | | | | | | | X | | | | | | | | |
| COMM/OES | | | | | | | | | | | X | | | | | | | | |
| *CWMA | | | | | | | | | | | X | | | | | | | | |
| MARIN LOCAL RPTR | | | | | | | | | | | X | | | | | | | | |
| MCOE | | | | | | | | | | | X | | | | | | | | |
| MED M/A | | | | | | | | | | | X | | | | | | | | |
| MMWD | | | | | | | | | | | X | | | | | | | | |
| SHERIFF PRIMARY | | | | | | | | | | | X | | | | | | | | |
| TAM TEST | | | | | | | | | | | X | | | | | | | | |
| UHF MED | | | | | | | | | | | X | | | | | | | | |
| USCG CALLING CH 16 Mon | | | | | | | | | | | X | | | | | | | | |

| CHANNEL | 2nd Deck | Mt. Barnabe | Bay Hill | Big Rock | Mt. Burdell | Crest Tank | Dollar Hill | Forbes Hill | Jail | Mt. Barnabe | Mt. Tam | Prime Site | Pt. Reyes | San Pedro | Shop | Sonoma Mt. | Stewart Pt. | Sugarloaf | Tomales |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| USCG WORKING CH 16/22A | | | | | | | | | | | X | | | | | | | | |
| VFD PAGING | | | | | | | | | | | X | | | | | | | | |
| ACU 1 | | | | | | | | | | | | X | | | | | | | |
| ACU 2 | | | | | | | | | | | | X | | | | | | | |
| 700 CALLING SIMUL | | | | | | | | | | | | | X | | | | | | |
| 700 TAC | | | | | | | | | | | | | X | | | | | | |
| 700 CALLING SIMUL | | | | | | | | | | | | | | X | | | | | |
| 700 TAC | | | | | | | | | | | | | | X | | | | | |
| *MRN CMD | | | | | | | | | | | | | | X | | | | | |
| U CALL | | | | | | | | | | | | | | X | | | | | |
| VFIRE21 | | | | | | | | | | | | | | X | | | | | |
| CA PARKS & REC | | | | | | | | | | | | | | | X | | | | |
| CALAW4 | | | | | | | | | | | | | | | | X | | | |
| 700 CALLING SIMUL | | | | | | | | | | | | | | | | X | | | |
| 700 TAC | | | | | | | | | | | | | | | | X | | | |
| COMM/OES | | | | | | | | | | | | | | | | X | | | |
| *CWMA | | | | | | | | | | | | | | | | X | | | |

| CHANNEL | 2nd Deck | Mt. Barnabe | Bay Hill | Big Rock | Mt. Burdell | Crest Tank | Dollar Hill | Forbes Hill | Jail | Mt. Barnabe | Mt. Tam | Prime Site | Pt. Reyes | San Pedro | Shop | Sonoma Mt. | Stewart Pt. | Sugarloaf | Tomales |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MARIN LOCAL RPTR | | | | | | | | | | | | | | | | X | | | |
| MED M/A | | | | | | | | | | | | | | | | X | | | |
| SHERIFF PRIMARY | | | | | | | | | | | | | | | | X | | | |
| VFIRE21 | | | | | | | | | | | | | | | | X | | | |
| 700 CALLING SIMUL | | | | | | | | | | | | | | | | | X | | |
| 700 TAC | | | | | | | | | | | | | | | | | X | | |
| *FSA REPEATER | | | | | | | | | | | | | | | | | X | | |
| MED M/A | | | | | | | | | | | | | | | | | X | | |
| VCALL | | | | | | | | | | | | | | | | | X | | |
| VFD PAGING | | | | | | | | | | | | | | | | | X | | |
| MMWD | | | | | | | | | | | | | | | | | | X | |
| VFD PAGING | | | | | | | | | | | | | | | | | | | X |

## Table E.2 – Channels Sorted by Location

| ITEM | USE | SITE | RADIO | FUNCTION |
|---|---|---|---|---|
| 23 | AIRCRAFT/SAR EMERGENCY | 2nd Deck | AIR | AIR AM RADIO |
| 31 | CDF INTERCOM | 2nd Deck | Intercom | CDF Intercom |
| 32 | CESRS CONTROL | 2nd Deck | MTR-2000 | CESRS Control Station |
| 33 | CHP BLUE/VIO | 2nd Deck | Mitrek | CHP Control Station |
| 38 | COMM/OES CONTROL | 2nd Deck | MTR-2000 | Shop/OES Radio |
| 39 | *CWMA | 2nd Deck | TKR-850 | CWMA CS |
| 44 | F-12 ALERTING | 2nd Deck | MTR-2000 | Civic Center Alerting |
| 45 | *FSA CONTROL STATION | 2nd Deck | APX Consolette | FSA Interface to Microwave for Repeater |
| 48 | *KNOX CONTROL | 2nd Deck | Consolette | KNOX Control Station |
| 49 | MARIN LOCAL CONTROL | 2nd Deck | MTR-2000 | Control Station |
| 57 | MED M/A | 2nd Deck | MTR-2000 | Control Station |
| 71 | OES FIRE | 2nd Deck | Daniels | OES FIRE - State Maintained |
| 81 | UHF CLERS | 2nd Deck | Quantar | UHF CLERS |
| 94 | VHF CLERS | 2nd Deck | MTR-2000 | VHF CLERS - Make into a BIM for Access |
| 19 | 8CALL90 | Barnabe | Quantar | 800 Calling Channel |
| 58 | MED M/A | Barnabe | MTR-2000 | Med Mutual Aid Repeater |
| 79 | U CALL | Barnabe | TKR-850 | UHF Calling Channel |
| 1 | 700 CALLING SIMUL | Bay Hill | GTR-8000 | Bay Hill Calling Rx Only |
| 10 | 700 TAC | Bay Hill | GTR-8000 | Bay Hill TAC - Multi-Frequency |

| ITEM | USE | SITE | RADIO | FUNCTION |
|---|---|---|---|---|
| 2 | 700 CALLING SIMUL | Big Rock | GTR-8000 | Big Rock Calling |
| 11 | 700 TAC | Big Rock | GTR-8000 | Big Rock TAC - Multi-Frequency |
| 25 | CALAW1 | Big Rock | MTR-2000 | VHF Clemars |
| 34 | COMM/OES | Big Rock | MTR-2000 | Shop/OES Radio |
| 40 | *CWMA | Big Rock | TKR-850 | CWMA 4004*2 |
| 50 | MARIN LOCAL RPTR | Big Rock | MASTR III | Marin Local Repeater |
| 54 | MCOE | Big Rock | Quantar | Schools Repeater |
| 62 | MMWD | Big Rock | Kenwood | MMWD Analog UHF |
| 66 | *MRN CMD | Big Rock | Quantar | Marin Command Simulcast |
| 82 | UHF MED | Big Rock | MTR-2000 | Multi-frequency leave on MED 9 |
| 86 | VCALL | Big Rock | MTR-2000 | VHF CALLING |
| 67 | *MRN CMD | Burdell | Quantar | Marin Command Simulcast |
| 70 | NOV SAN DIST. YARD | Crest Tank | MTR-3000 | County Maintained |
| 20 | 8CALL90 | Dollar | Quantar | 800 Calling Channel |
| 3 | 700 CALLING SIMUL | Dollar Hill | GTR-8000 | Dollar Hill Calling |
| 12 | 700 TAC | Dollar Hill | GTR-8000 | Dollar Hill - Multi-Frequency |
| 27 | CALAW4 | Dollar Hill | MTR-2000 | UHF Clemars |
| 68 | *MRN CMD | Dollar Hill | Quantar | Marin Command Simulcast |
| 76 | SNR UHF | Dollar Hill | MTR-2000 | San Rafael Fire UHF |
| 77 | SNR VHF | Dollar Hill | MTR-2000 | Fire VHF Overlay San Rafael |

| ITEM | USE | SITE | RADIO | FUNCTION |
|---|---|---|---|---|
| 26 | CALAW1 | Forbes | MTR-2000 | VHF Clemars |
| 29 | CDF #1 | Forbes Hill | MTR-2000 | CDF Radio 1 Multi-Channel |
| 30 | CDF #2 | Forbes Hill | TKR-750 | CDF Radio 2 Multi-Channel |
| 47 | *JAIL BACKUP RADIO | Jail | Quantar | Jail Conventional Backup |
| 4 | 700 CALLING SIMUL | Mt. Barnabe | GTR-8000 | Mt. Barnabe Calling |
| 13 | 700 TAC | Mt. Barnabe | GTR-8000 | Mt. Barnabe TAC - Multi-Frequency |
| 35 | COMM/OES | Mt. Barnabe | MTR-2000 | Shop/OES Radio |
| 41 | *CWMA | Mt. Barnabe | TKR-850 | CWMA 4004*3 |
| 51 | MARIN LOCAL RPTR | Mt. Barnabe | MASTR III | Marin Local Repeater |
| 55 | MCOE | Mt. Barnabe | MICOR | Schools Repeater |
| 63 | MMWD | Mt. Barnabe | Kenwood | MMWD Analog UHF |
| 72 | PRNSS | Mt. Barnabe | Consolette | PRNSS - Sea Shore Maintained |
| 73 | SHERIFF PRIMARY | Mt. Barnabe | MICOR | Sheriff F1 Low Band |
| 88 | VFD PAGING | Mt. Barnabe | RELM | Fire Paging |
| 5 | 700 CALLING SIMUL | Mt. Tam | GTR-8000 | Mt. Tam Calling |
| 14 | 700 TAC | Mt. Tam | GTR-8000 | Mt. Tam TAC - Multi-Frequency |
| 36 | COMM/OES | Mt. Tam | MTR-2000 | Shop/OES Radio |
| 42 | *CWMA | Mt. Tam | TKR-850 | CWMA 4004*4 |
| 52 | MARIN LOCAL RPTR | Mt. Tam | MASTR III | Marin Local Repeater |
| 56 | MCOE | Mt. Tam | MICOR | Schools Repeater |

| ITEM | USE | SITE | RADIO | FUNCTION |
|---|---|---|---|---|
| 59 | MED M/A | Mt. Tam | MTR-2000 | Med Mutual Aid Repeater |
| 64 | MMWD | Mt. Tam | Kenwood | MMWD Analog UHF |
| 74 | SHERIFF PRIMARY | Mt. Tam | MICOR | Sheriff F1 Low Band |
| 78 | TAM TEST | Mt. Tam | Quantar | Test Radio |
| 83 | UHF MED | Mt. Tam | MTR-2000 | Multi-frequency leave on MED 3 |
| 84 | USCG CALLING CH 16 Mon | Mt. Tam | TKR-750 | Channel 16 Monitor |
| 85 | USCG WORKING CH 16/22A | Mt. Tam | TKR-750 | Channel 16 & 22A T/R |
| 89 | VFD PAGING | Mt. Tam | RELM | Fire Paging |
| 21 | ACU 1 | Prime Site | ACU | ACU 1 Console Interface |
| 22 | ACU 2 | Prime Site | ACU | ACU 2 Console Interface |
| 6 | 700 CALLING SIMUL | Pt. Reyes | GTR-8000 | Mt. Vision Calling |
| 15 | 700 TAC | Pt. Reyes | GTR-8000 | Mt. Vision TAC - Multi-Frequency |
| 7 | 700 CALLING SIMUL | San Pedro | GTR-8000 | San Pedro Calling |
| 16 | 700 TAC | San Pedro | GTR-8000 | San Pedro TAC - Multi-Frequency |
| 69 | *MRN CMD | San Pedro | Quantar | Marin Command Simulcast |
| 80 | U CALL | San Pedro | TKR-850 | UHF Calling Channel |
| 92 | VFIRE21 | San Pedro | MTR-2000 | Old Fire White |
| 24 | CA PARKS & REC | Shop | Consolette | CA Park & Rec - State Maintained |
| 28 | CALAW4 | Sonoma | MTR-2000 | UHF Clemars, Sonoma no antenna, spare |
| 8 | 700 CALLING SIMUL | Sonoma Mt. | GTR-8000 | Sonoma Mt. Calling Rx Only |

| ITEM | USE | SITE | RADIO | FUNCTION |
|---|---|---|---|---|
| 17 | 700 TAC | Sonoma Mt. | GTR-8000 | Sonoma Mt. TAC - Multi-Frequency |
| 37 | COMM/OES | Sonoma Mt. | MTR-2000 | Shop/OES Radio |
| 43 | *CWMA | Sonoma Mt. | GR-400 | CWMA 4004*1 - No Antenna, Spare |
| 53 | MARIN LOCAL RPTR | Sonoma Mt. | MASTR III | Marin Local Repeater |
| 60 | MED M/A | Sonoma Mt. | MASTR III | Med Mutual Aid Repeater - Sonoma Maintained |
| 75 | SHERIFF PRIMARY | Sonoma Mt. | MICOR | Sheriff F1 Low Band |
| 93 | VFIRE21 | Sonoma Mt. | MTR-2000 | Sonoma has Access |
| 9 | 700 CALLING SIMUL | Stewart Pt. | GTR-8000 | Stewart Pt. Calling |
| 18 | 700 TAC | Stewart Pt. | GTR-8000 | Stewart Pt. TAC - Multi-Frequency |
| 46 | *FSA REPEATER | Stewart Pt. | MTR-3000 | FSA for Stinson Beach |
| 61 | MED M/A | Stewart Pt. | MTR-2000 | Med Mutual Aid Repeater |
| 87 | VCALL | Stewart Pt. | MTR-2000 | VHF CALLING |
| 90 | VFD PAGING | Stewart Pt. | RELM | Fire Paging |
| 65 | MMWD | Sugarloaf | Kenwood | MMWD Analog UHF |
| 91 | VFD PAGING | Tomales | RELM | Fire Paging |

## Table E.3 – Conventional Equipment

Existing Conventional Equipment Information provided in a separate document due to its size.

# Appendix F - 700 MHz Allocations

| Region 6 - Northern California - Marin County<br>700 MHz Channel Allotments | | | | | |
|---|---|---|---|---|---|
| **Class** | **Band Width** | **Channel** | **Base Frequency** | **Mobile Frequency** | **Notation** |
| General Use | Voice 12.5KHz | 127-128 | 769.79375 | 799.79375 | |
| General Use | Voice 12.5KHz | 137-138 | 769.85625 | 799.85625 | |
| General Use | Voice 12.5KHz | 167-168 | 770.04375 | 800.04375 | |
| General Use | Voice 12.5KHz | 243-244 | 770.51875 | 800.51875 | |
| General Use | Voice 12.5KHz | 255-256 | 770.59375 | 800.59375 | |
| General Use | Voice 12.5KHz | 287-288 | 770.79375 | 800.79375 | |
| General Use | Voice 12.5KHz | 331-332 | 771.06875 | 801.06875 | |
| General Use | Voice 12.5KHz | 355-356 | 771.21875 | 801.21875 | |
| General Use | Voice 12.5KHz | 367-368 | 771.29375 | 801.29375 | |
| General Use | Voice 12.5KHz | 391-392 | 771.44375 | 801.44375 | |
| General Use | Voice 12.5KHz | 415-416 | 771.59375 | 801.59375 | |
| General Use | Voice 12.5KHz | 439-440 | 771.74375 | 801.74375 | |

| Region 6 - Northern California - Marin County<br>700 MHz Channel Allotments | | | | | |
|---|---|---|---|---|---|
| **Class** | **Band Width** | **Channel** | **Base Frequency** | **Mobile Frequency** | **Notation** |
| General Use | Voice 12.5KHz | 463-464 | 771.89375 | 801.89375 | |
| General Use | Voice 12.5KHz | 487-488 | 772.04375 | 802.04375 | |
| General Use | Voice 12.5KHz | 511-512 | 772.19375 | 802.19375 | |
| General Use | Voice 12.5KHz | 535-536 | 772.34375 | 802.34375 | |
| General Use | Voice 12.5KHz | 559-560 | 772.49375 | 802.49375 | |
| General Use | Voice 12.5KHz | 583-584 | 772.64375 | 802.64375 | |
| General Use | Voice 12.5KHz | 607-608 | 772.79375 | 802.79375 | |
| General Use | Voice 12.5KHz | 631-632 | 772.94375 | 802.94375 | |
| General Use | Voice 12.5KHz | 675-676 | 773.21875 | 803.21875 | |
| General Use | Voice 12.5KHz | 719-720 | 773.49375 | 803.49375 | |
| General Use | Voice 12.5KHz | 783-784 | 773.89375 | 803.89375 | |
| General Use | Voice 12.5KHz | 827-828 | 774.16875 | 804.16875 | |
| General Use | Voice 12.5KHz | 871-872 | 774.44375 | 804.44375 | |

| Region 6 - Northern California - Marin County<br>700 MHz Channel Allotments | | | | | |
|---|---|---|---|---|---|
| **Class** | **Band Width** | **Channel** | **Base Frequency** | **Mobile Frequency** | **Notation** |
| General Use | Voice 12.5KHz | 915-916 | 774.71875 | 804.71875 | |
| General Use | Voice 12.5KHz | 947-948 | 774.91875 | 804.91875 | |

# Appendix G - Existing Microwave Backhaul Information

Existing Microwave Backhaul Information provided in a separate document due to its size.

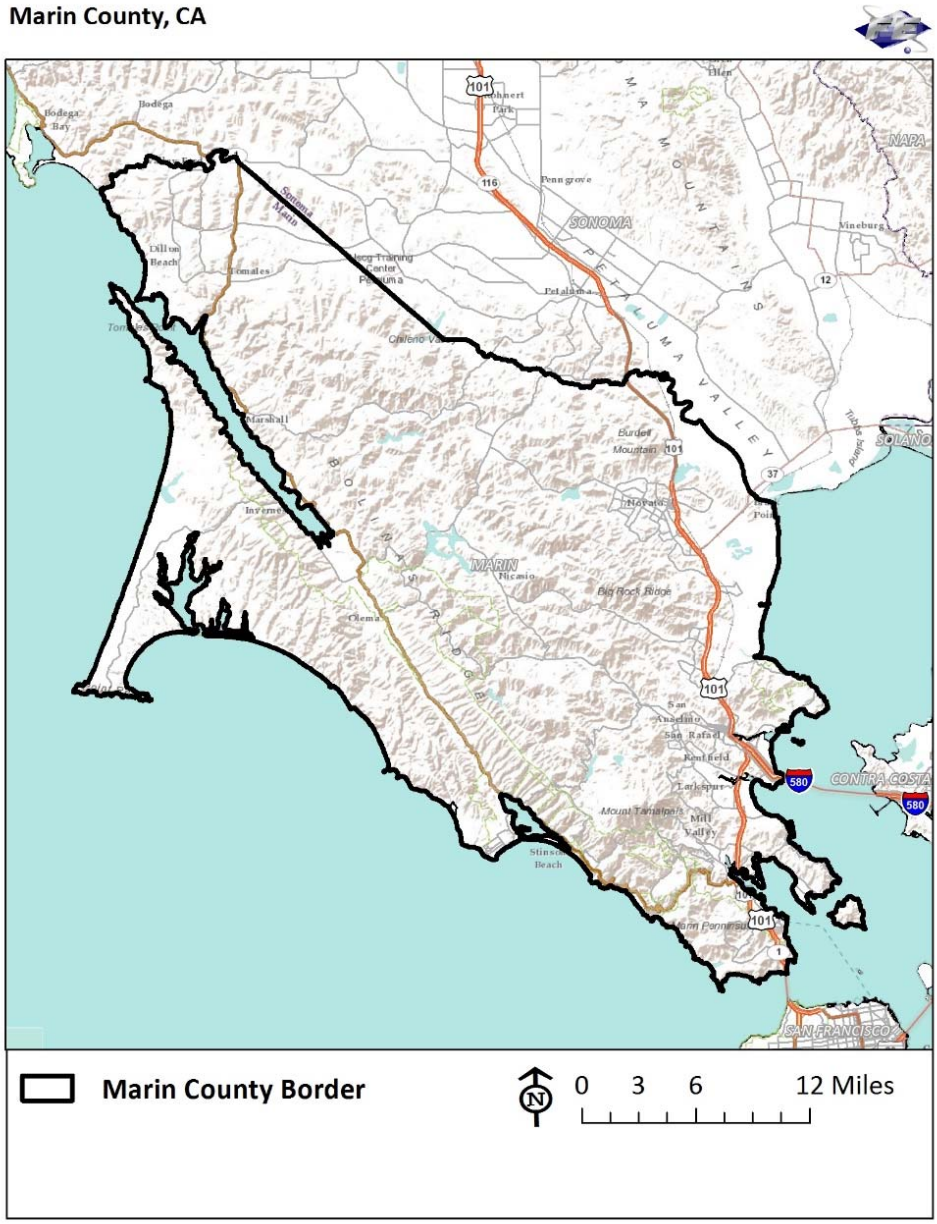
# Appendix H - Specific Coverage Area Requirements

## Figure H.1 – Existing System Coverage Map

Figure H.2 is a visualization of the desired coverage throughout the Marin County. The brown shaded areas represent of where enhanced urban coverage is desired. The green shaded area represents federal property that is served by Marin County EMS and Fire and requires rural coverage along with the tan shaded areas.

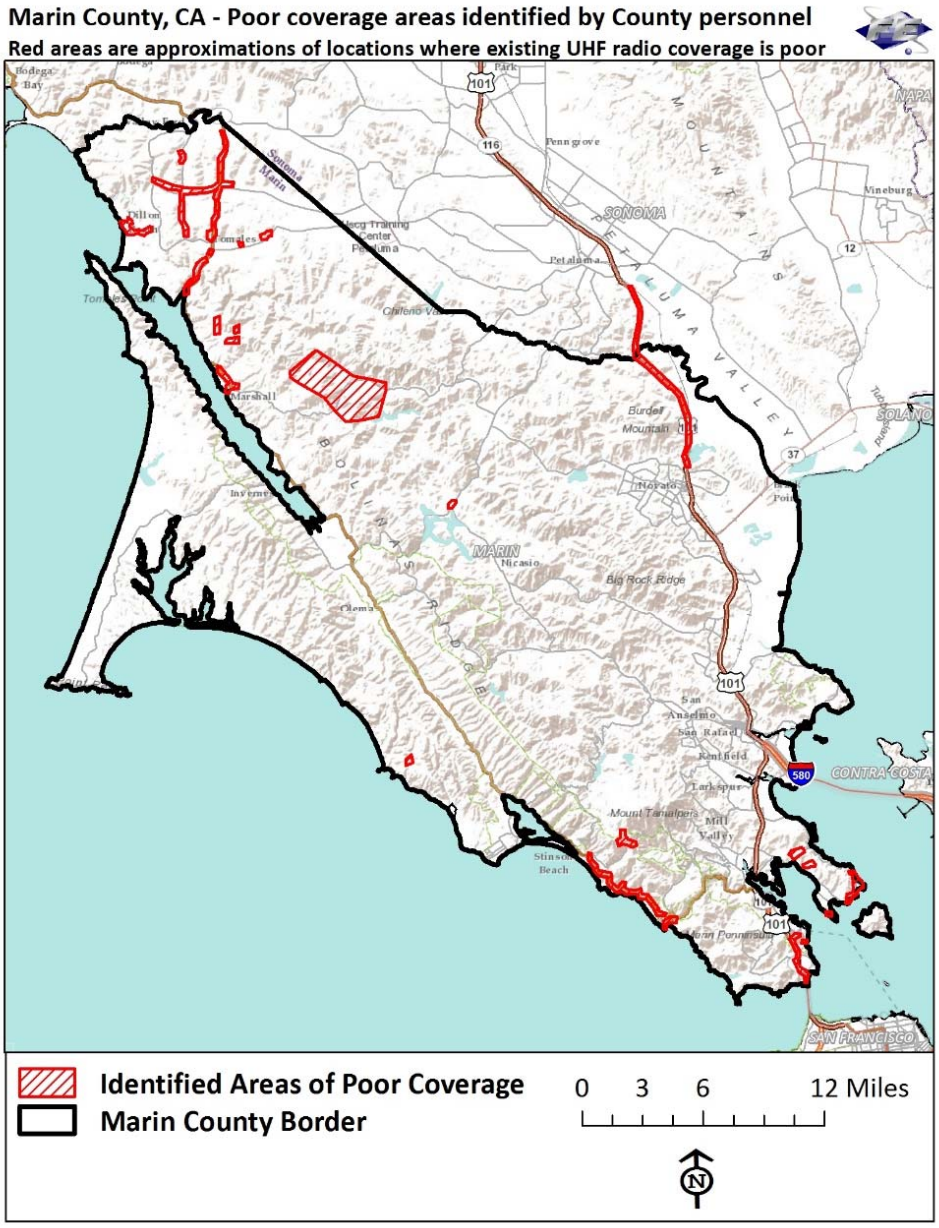
## Figure H.2 – Coverage Enhancement Requirements

## Figure H.3 – Bounded Area of Marin County

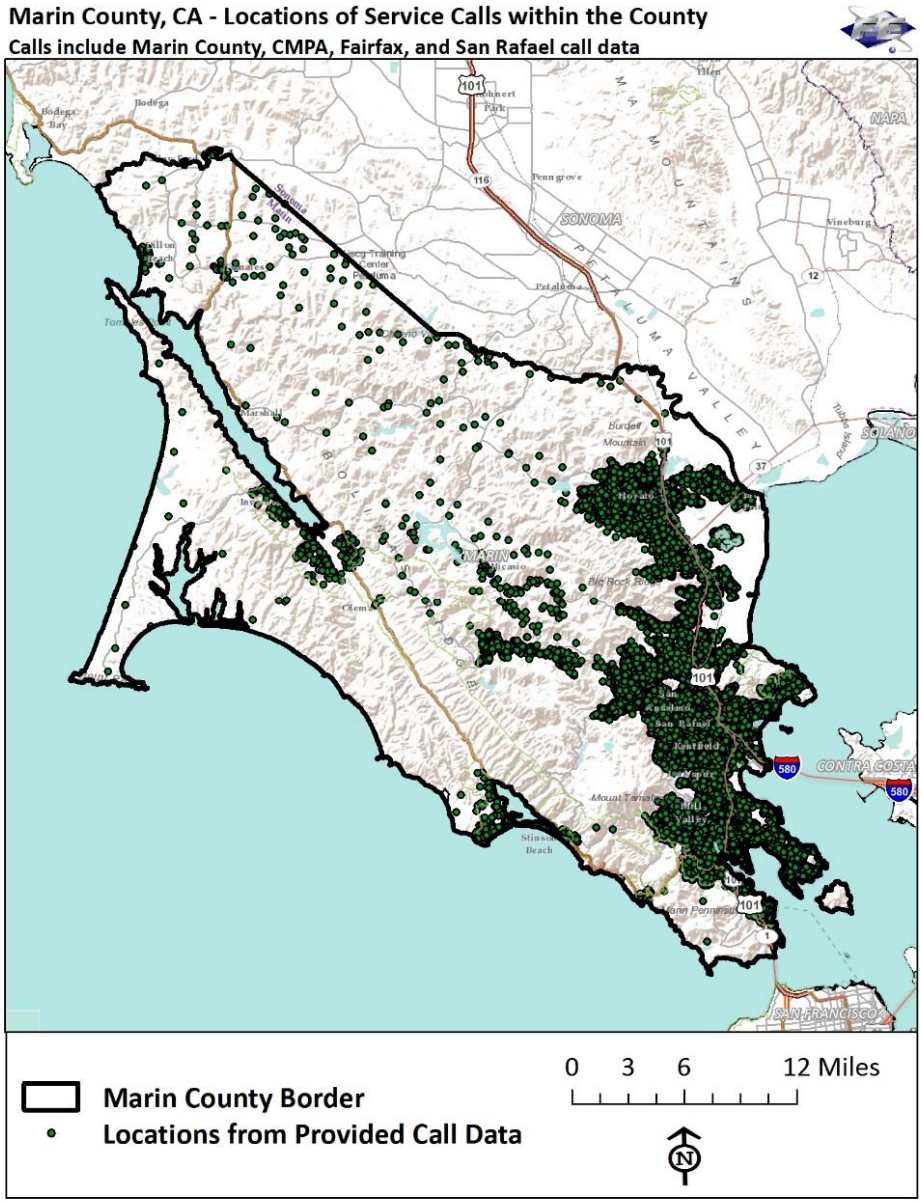


## Figure H.4 – Marin County Current Radio Sites and Candidate Sites

## Figure H.5 – User Identified Poor Coverage Areas



## Figure H.6. – Local Service Calls



# Appendix I - Site Surveys

The site surveys are provided at
http://www.meraonline.org/mera_docs/Marin%20County%20Combined%20Site%20Survey%20Reports%2020151229a.pdf