COUNTY OF MARIN

# DEPARTMENT OF PUBLIC WORKS

Quality, Excellence, Innovation

Raul M. Rojas
DIRECTOR

Administration
PO Box 4186
San Rafael, CA 94913-4186
415 473 6528 T
415 473 3799 F
415 473 3232 TTY
CRS Dial 711
www.marincounty.org/pw



**DATE:** December 10, 2014

**TO:** MERA Governing Board

**FROM:** Craig Tackabery, Operations Officer

**SUBJECT:** AGENDA ITEM **E-2a**: FISCAL YEAR 2014/15 NEXT GENERATION SYSTEM CASH FLOW NEEDS

Recommended Action: Adopt the Proposed Revised Budget for FY 2014/15 Next Generation System Cash Flow Needs in the Amount of $207,000.

Background: On May 14, 2004 your Board approved System Analysis Fiscal Year 2014/15 Capital Projects, and adopted a Resolution regarding the Operating, New Project Financing, Revenue Bonds and Reserves Budgets. Since that time, Measure A, the parcel tax to fund the Next Generation System, was approved by the voters. This report updates the System Analysis Capital Projects recommendation for Fiscal Year 2014/15.

On December 11, 2013, your Board reviewed the Marin Emergency Radio Authority Next Generation Radio System Implementation Feasibility Study, accepted the report, and determined that a 700 MHz P25 Phase 2 system per the estimated budget be the basis for the Next Generation system proposed in the ballot measure.

We recommend that the project be implemented with two major procurements, a Consulting Services contract and a System Vendor contract.

**Consulting Services contract:** obtain consulting services from a qualified firm to provide project management, procurement management, implementation oversight, quality assurance, coordination, performance testing oversight, system cutover and acceptance oversight, and to provide regular status reports to the MERA Next Generation System Project Oversight Committee.

**System Vendor contract:** vendor shall be responsible for providing the following project components: engineering and system design; furnishing and installing system equipment and ancillary facilities; project management; software installation and programming; mobile, portable and base station programming and installation; training; acceptance testing,

including coverage testing; cutover plan and execution; warranty and maintenance.

We recommend that MERA contract with the County of Marin to serve as lead agency through all phases of the project, including consulting services procurement, design, environmental compliance, system vendor procurement, and system vendor contract administration phases of the project. The County has considerable experience in implementing large public works projects, and has technical, engineering, legal, accounting, and administrative support available to support the project. A contract between the County and the contractor gives the County direct control over the contractor, and is consistent with other MERA-County service contracts.

For the balance of this fiscal year, we expect to complete the Consulting Services contractor selection, and to begin the System Vendor procurement process. We do not expect to award a System Vendor contract this fiscal year. To move forward, we recommend the following:

Consulting Services Contract

- The Executive Board is authorized to approve the Consulting Services Request for Proposal. Prior to Executive Board approval, route the draft Consulting Services Request for Proposal to each member agency and MERA staff for review.
- The Next Generation System Project Oversight Committee designate Committee and staff members who will serve on the Consulting Services contractor selection committee.
- The County of Marin award the Consulting Services contract for a first phase of work, through the System Vendor procurement, based on a contractor recommendation from the Next Generation System Project Oversight Committee and the Executive Board.

System Vendor Contract

- The Next Generation System Project Oversight Committee reviews the Consulting Services contractor's performance and makes a recommendation whether to continue with the same firm during project implementation. The County of Marin award the Consulting Services contract for the second phase of work, based on a contractor recommendation from the Executive Board.

- The Executive Board is authorized to approve the System Vendor Request for Proposal, based on a recommendation from the Next Generation System Project Oversight Committee. Prior to Executive Board approval, route the draft System Vendor Request for Proposal to each member agency and MERA staff for review.
- The Next Generation System Project Oversight Committee designate Committee and staff members who will serve on the System Vendor contractor selection committee.
- The County of Marin awards the System Vendor contract, to the contractor recommended by the Next Generation System Project Oversight Committee, Executive Board, and Governing Board.

The Feasibility Study contained a Request for Proposals for a Radio Communication System from June, 2010. This is a comprehensive document that includes an overview of the existing MERA system and the specifications for a new 700 MHz P25 Phase 2. Utilizing UASI 2008 funding, the Bay Area UASI Interoperability Communications Group received funding of $1,126,396, to be facilitated by the City and County of San Francisco, to develop Requests for Proposals for six Bay Area counties, of which Marin County was one. Through a competitive proposal process the firm of Federal Engineering was selected. Starting in November 2009 Federal Engineering worked with Marin County to develop the Request for Proposal.

We recommend that the Consulting Services contractor be tasked with refreshing the existing Requests for Proposal, rather than starting from scratch with a new Request for Proposal. This will leverage the considerable investment in time and funds already expended in the existing Request for Proposal. We recommend that the existing Request for Proposal refresh include, but not limited to the following:

- Updating to reflect technology changes in the last four years
- Revising to reflect items identified in the Feasibility Study, such as volunteer fire department paging; a system upgrade agreement option; and additional coverage sites
- Reviewing Request for Proposals and Contracts from County Public Works and other agencies who have recently implemented 700 MHz emergency radio systems. Items to evaluate include: security to insure contractor performance; contract time and liquidated damages; warranty or guarantee; and retention of a portion of each invoice
- Review of lessons learned from Generation 1 implementation

- Update project schedule. The Feasibility Study included Appendix D, a System Design Report, dated April 29, 2010. The Report contained a section on Implementation Plans, including a 700 MHZ P25 Implementation Schedule (attached). The schedule dates need to be updated. In addition, the schedule tasks need to be updated to reflect more detail in the System Design section. It is expected that the design will be an iterative process between the vendor and MERA that includes improved coverage and new MERA sites. After the design phase, additional tasks need to be included in the schedule regarding environmental compliance, real estate acquisition, and evaluation of options to move the project forward in a phased manner with the backbone first and new sites as they become available.

As described in the Feasibility Study, in August 2011 Marin County Department of Public Works staff received approval from the California Region 6 700MHz Committee for allocation of the Marin County allotted 700MHz frequencies. With the proposed funding for frequency coordination, DPW will proceed with Federal Communications Commission filing and coordination process.

We recommend that for the balance of the 2014/15 Fiscal Year, a budget of $207,000 be established for soft costs. Attached is a revised Proposed Capital Projects budget table. The budget is based on the following task estimates:

| | |
|---|---|
| $117,000 | DPW Staff – see attached Next Gen budget spreadsheet |
| 90,000 | System Consulting Services – Refresh vendor RFP, manage vendor procurement |

DPW staff costs will be invoiced in accordance with the hourly rates established in the System Analysis Agreement dated June 12, 2012 between MERA and the County of Marin. Not included in these costs is time for Communication Engineering Services. MERA and the County of Marin have an annual agreement dated June 10, 2014 for Communication Engineering Services. It is estimated that the Communications Engineer will spend 10 to 20% of his time supporting the Next Generation System project.

Attachments: Proposed Capital Projects Table
Cost Breakdown Summary
Excerpt from the Feasibility Study, Appendix D, a System Design Report, dated April 29, 2010, regarding Implementation Plans, including a 700 MHZ P25 Implementation Schedule

| **Proposed Capital Project** | **Approved Budget 2014/2015** | **Revised Budget 2014/2015** |
|---|---|---|
| Tomales Emergency Radio Project | $8,000 | $8,000 |
| Martha Company Development Proposal in Tiburon | 10,000 | 10,000 |
| Next Generation System Feasibility Study Revisions and Outreach Support | 10,000 | 10,000 |
| Next Generation System Grants | 0 | 0 |
| Next Generation System Project | 0 | 207,000 |
| **Total** | $28,000 | $235,000 |

## Cost Breakdown Summary

**MERA Next Generation Project**
**Date Updated- 12/01/2014**

| Role | Operations Officer | Communications Maintenance 1 | Communications Maintenance 2 | Senior Accounting Assistant | Comm. Serv. Manager | | Total Hours | Task Labor Cost at Billing Terms |
|---|---|---|---|---|---|---|---|---|
| Team Member | | | | | | | | |
| Labor Rate: Systems Analysis Agreement | $210.63 | $160.12 | $160.12 | $95.44 | $160.12 | | | |
| **1.0 Consulting Services Procurement** | | | | | | | | |
| 1a. Prepare RFP | 20 | | | 4 | 16 | | 40 | $7,156 |
| 1.b. Analyze responses, participate in ranking | 8 | | | 4 | 8 | | 20 | $3,348 |
| 1.c. Negotiate contract | 20 | | | | 8 | | 28 | $5,494 |
| | | | | | | | 0 | $0 |
| | | | | | | | 0 | $0 |
| | | | | | | | 0 | $0 |
| Task 1.0 Subtotal | 48 | 0 | 0 | 8 | 32 | 0 | 88 | $15,998 |
| **2.0 Technical Support to Consultant for System Vendor Procurement** | | | | | | | | |
| 2a. Review RFP prepared by Consulting Services contractor | 32 | | | 8 | 60 | | 100 | $17,111 |
| 2.b. Release RFP, review addendums and requests for information prepared by Consulting Services contractor | 16 | | | 4 | 40 | | 60 | $10,157 |
| 2.c. Pre-bid conference, site tours | 16 | 128 | 128 | 4 | 40 | | 316 | $51,147 |
| 2.d. Proposal review, selection panel support, system vendor interviews | 32 | | | 4 | 32 | | 68 | $12,246 |
| Task 2.0: Subtotal | 96 | 128 | 128 | 20 | 172 | 0 | 544 | $ 90,661 |
| **3.0 FCC Licensing** | | | | | | | | |
| 3a. Preliminary investigation | | | | | 62 | | 62 | $9,999 |
| | | | | | | | 0 | $0 |
| | | | | | | | 0 | $0 |
| | | | | | | | 0 | $0 |
| | | | | | | | 0 | $0 |
| Task 3.0 Subtotal | 0 | 0 | 0 | 0 | 62 | 0 | 0 | $9,999 |
| Total Labor Hours | 144 | 128 | 128 | 28 | 266 | 0 | 632 | |
| Project Costs | $30,331 | $20,495 | $20,495 | $2,672 | $42,592 | $0 | | $116,658 |

# 6.0 Implementation Plans

This section provides detailed migration plans for each of the two viable selected system designs. The migration plan includes the procurement method and an implementation schedule. We clearly outline a migration path for MERA agencies and the system upgrades that must be included. The implementation plan takes into consideration operational concerns and the need to ensure that uninterrupted voice radio service is provided during the transition.

AECOM has overseen the procurement and implementation of numerous communications projects. Some clients desire a hands-off approach where the project is under control of the Land Mobile Radio (LMR) vendor to deliver a turnkey radio system. Other clients prefer to expend the effort to manage the process, perhaps manage several vendors, and in the process, receive the radio system they wanted at significantly reduced cost. We believe that Marin County fits in the latter category, and with AECOM's help, can construct the recommended radio system in an affordable manner. The experience and expertise of a qualified communication consultant, like AECOM, can lead to significant cost savings and can dramatically improve the functionality and effectiveness of the system installed by the vendor.

Either of the two system designs presented here will meet the long term needs of the County. Ultimately, the choice will be determined based on operational feasibility, practical implementation limitations and cost. Our intent is that the implementation plans discussed here will assist the County in making this important decision. In Section 7, we provide an opinion of probable costs for each system design.

## 6.1 Critical Implementation Aspects

We have provided a summary of several important "critical implementation" aspects that should be considered during the implementation and procurement process. A majority of the recommendations in this section are "best practices" that we have developed as part of our process. Each of the following points applied to either of the system designs should be considered as the County implements either solution. Throughout this section, you will see our recommendations and we will highlight some of the value added by having an experienced consultant involved in the implementation process.

**Preliminary System Design**

The 700 MHz P25 Phase 2 system or the UHF T-Band P25 Phase 2 system described in Section 5 of this report are both viable preliminary system designs. AECOM has developed each of these system designs to validate the feasibility of a countywide simulcast and to provide site selection, connectivity and capacity recommendations based on our LMR radio system development experience. During the RFP process, the County should expect each vendor to provide their own solution and each vendor may make recommendations that differ from the System Design presented in this report. We encourage the County to use our system design as a baseline and any changes recommended by the vendor should be validated using the Marin County Project Team.

**RFP Specification Writing**

AECOM has developed dozens of RFP specifications and we can, upon request, assist the County with this process. AECOM can develop the technical specifications portion of the procurement documentation for either radio system design. State-of-the-art integrated wide-area radio systems are complex, and by necessity unique to each situation. Our functional/operational approach to specifications allow system proposers the latitude to design around their own proprietary configurations, while retaining the essential attributes and operational characteristics developed specifically for Marin County consistent with the County's overall telecommunications plan. Our process includes physical facilities requirements, evaluation criteria, draft specifications, vendor review process and the final specifications. We would encourage the County to ensure that these critical components are part of the specification process, regardless of who the County uses to develop the RFP Specification.

**Radio Site EIS / EIR, Access and Development**

Appendix C contains a summary of the EIS / EIR considerations for Marin County. We understand the unique circumstances and history of the existing MERA system implementation / approval process and we have provided sufficient detail to help the County account for the EIS / EIR considerations of either radio system design.

**Dispatch Center Development**

None of the existing consoles and dispatch center equipment is compatible with a P25 Phase 2radio system. We have included the cost and timeline to upgrade these facilities. A detailed dispatch center assessment was not part of the scope of work for this project; however AECOM is able to assist the County in planning for this type of upgrade. We have decades of experience in helping agencies upgrade their dispatch centers.

**Procurement and Negotiations**

The Procurement Phase entails the period beginning with the issuance of the system specifications, and concludes with the signing of the contract between Marin County / MERA and the system supplier. The procurement process will have been defined prior to issuing the procurement documentation, and should be carefully and strictly followed in order to mitigate the risk of vendor protest. AECOM's process includes responding to vendor questions, an evaluation process that mitigates the risk of protest by unsuccessful vendor(s), a detailed technical evaluation of proposals received, a price evaluation of each proposal received, and an evaluation report. Finally, we will work with Marin County in the negotiation process for the selected vendor. Each of these components is critical in order for the contract to meets the needs of the County.

**System Acceptance Testing**

We recommend that actual test procedures be developed mutually between the selected vendor and Marin County. AECOM's process includes a thorough review and approval process for the test procedures that are aligned with the test plan requirements established in the Final Specifications. System testing procedures should be included in the Detailed Design Review and formal testing should be part of Staging and will continue in the field with complementary site and system tests that exercise and demonstrate all critical functions and properties of the Implemented System. We recommend that the County (or their representative) monitor and provide general oversight for acceptance testing, which will address four systems test areas: Coverage, Fixed Infrastructure, Interference, and Telecommunications Subsystem. It is essential that the infrastructure system tests be critically observed and that the County requires that the selected vendor to spot check specific equipment tests to establish consistency with tests done previously in the factory or the shop.

**System Acceptance**

The Acceptance Phase entails the period beginning with the system staging tests, including inspection of the installation at each site, and concludes with the acceptance of the project after cutover. The goal is that System Acceptance Tests demonstrate the initial Systems Attributes developed at the beginning of the project. System Acceptance will include staging tests, facility and infrastructure inspections, acceptance tests, thirty-day operational tests, a review of training plan, review of as-built drawings, and the reporting process.

**Training**

Training should include at least three distinct areas: Field user Training, Dispatcher / Operator Training, Administration Training, and Maintenance Training. The Field User Training should focus on making sure every radio user is trained on the proper use of the radio. Although digital P25 trunked radios are not overly complex, they may be slightly "different" from the existing MERA system, and offer many new features to the users. Training for field radio users should utilize a train-the-trainer approach. Trainers from each agency would attend this training and then the agency trainers will train all their personnel on all shifts. These trainers will then train new personnel as they are added, as well as provide refresher training.

Dispatcher Training: It is also important that dispatchers receive training on the new radio system. Formal user training for dispatchers will make the users knowledgeable and comfortable with their communications tools. Since new consoles will be utilized on the new radio system, dispatchers will need to be trained on the new features and

functionality, as well as on the new radio system itself. Also, if the dispatch centers are connected to the microwave system, they will need to learn the operation of a backup radio.

Vendor-provided training allows questions to be fully answered and explained, and can provide for a more thorough initial training. When every dispatcher receives training from the vendor, a thorough foundation is established for the dispatch operations. Subsequent dispatcher training for new personnel or for refresher training is then accomplished through agency-provided train-the-trainer. It is recommended that every dispatcher receive operator training. Operator training is conducted on-site on the agency's consoles. There should be two to three people per available console used for training. At a minimum, there should be three to four training sessions to accommodate all shifts and people's work schedules.

Administration Training: Administration and management of a P25 radio system is complex. A successful implementation of the radio system will require careful planning of operations at all levels. Radio System Administration Training is very important for the successful implementation of the system. It provides the administrators with the knowledge necessary for planning the operations of the system, as well as the knowledge of how to use the tools required for implementation, such as the database computers and radio programming. Since system-wide planning is important, Administration Training should be early in the implementation schedule. This allows the administrators to appropriately plan for the system as it is being built. It is recommended that this course be held at the factory where all the features and functionality can be demonstrated on a fully-functional system, since their own system may not be implemented. While travel expenses will be incurred, this expense is offset by having a satisfactory training experience. Furthermore, we recommend that robust System Administrator software be included in the RFP Specification.

Maintenance Training: Since the components of the P25 system will be very similar to the existing MERA trunked radio system, the maintenance training should focus on filling in the gaps and differences with the new system. Clearly, the benefits of a preventative maintenance program will be essential to keep the new system running dependably. Radio system maintenance courses can be two weeks in length for overall systems maintenance, with base station and mobile / portable maintenance course being typically one week.

**System Migration**

During the Implementation process, it is important to understand that the existing MERA system must remain active and fully functional through the process. In an earlier report, we highlighted the challenge this would present on the existing facilities. Since the existing MERA system will have to remain in place and operational during the build-out of the 700 MHz system, all sites must be capable, and have the physical space, to support UHF T-Band equipment for the existing system **and** for 700 MHz equipment for the new system. In addition, the microwave backbone and dispatch centers must support both systems simultaneously, as well. It will be important that the RFP Specification address this need.

In addition, the upgrade to UHF T-Band P25 Simulcast will also require additional equipment and antennas be installed in some shelters and on some of the existing towers. It will be important that the physical constraints at each site are considered. If it is determined that the sites and / or towers do not have the physical space for equipment to support both systems during the cutover, then the County will have to work with the selected vendor in developing a solution that will address this critical need. In addition, some of the dispatch centers may not have the physical space to accommodate both systems during the cutover. Detailed site surveys and dispatch surveys were beyond the scope of this project, but should be conducted if the County decides to move forward with either radio system design discussed in this report.

## 6.2 700 MHz P25 Phase 2 Option

This section provides a comprehensive migration plan for a countywide 700 MHz P25 Phase 2 standard-based digital trunking system. The 700 MHz P25 Phase 2 system option is described in detail in Section 5.1 of this report. As we begin to discuss the implementation process, it is important to understand some of the procurement implementations offered by P25. The P25 standard is a long awaited breakthrough because it introduces competition in the radio

marketplace. With P25 it is possible to use one vendor for your infrastructure and another vendor for your user radios. Multiple vendors introduce competition into the procurement process and can ultimately drive your cost down, even if you ultimately decide to purchase from a single vendor. The industry is in its infancy regarding feature-rich trunked radios capable of working on other-brand infrastructure. We recommend carefully crafted procurement specifications to maximize the benefits and minimize surprises or disappointments.

### 6.2.1 700 MHz Implementation Process

Prior to the start of the implementation process, several pre-planning steps must be completed. This radio project was one of those critical steps and identified two viable options that will meet the long term needs of the County. However, the County and MERA must now choose which option will be implemented. Following this choice, other important steps must be taken.

First, the County must validate the radio inventory and verify the number of radios in the existing system. Some agencies may have a desire to add more radios to the system, but have not made this need known. The number of radios on the system will directly impact the channel allocations of the radio system. Next, the County should assess each site and each dispatch center and determine if they are able to support the existing MERA system and also able to provide the physical space needed to implement the 700 MHz radio system. If physical space is not available, a determination should be made if the lack of space can be overcome by a cost effective solution. Finally, the Preliminary EIR and EIS considerations should be factored into the timeline and any concerns should be addressed immediately. We have not included these pre-planning steps in our schedule so that the schedule could be focused on the critical radio system implementation steps.

From a high level, we suggest thinking of the project in terms of four elements that must come together: 1) the LMR infrastructure, 2) facilities work for tower sites and dispatch locations, 3) the microwave backbone, and 4) subscriber equipment. The P25 standard allows us to break out the radio equipment/portion separately. The County could issue contracts for each of these elements independently using negotiated or competitive procurements for each. In practice, the procurement process would result in two RFP cycles. In the first cycle two RFP's are issued, one for the LMR infrastructure and the other for subscriber gear. The infrastructure RFP contains potential sites and coverage goals and yields proposals for coverage based upon an actual design. During the Detailed Design Review (DDR) with the contracted LMR infrastructure vendor, tower sites become finalized.

At this point, procurement of the microwave backbone and facilities/tower work can proceed. Of course the Environmental Impact considerations must be considered at this point, which is summarized in Appendix C. With the coverage design (and sites) now settled, AECOM's specifications for microwave and facilities may be finalized and issued. The microwave vendor is selected and final site feasibility is determined with completed path surveys. Once the microwave design review is complete, the microwave vendor may begin building equipment. With all site details confirmed, the selected facilities contractor(s) may start on the site, shelter and tower work. In this timeframe, the LMR vendor can be approved to begin building the infrastructure. While the facilities work is in progress, LMR infrastructure staging tests may be executed.

LMR staging is also the best time to finalize subscriber gear selection. We recommend a carefully written and executed test plan under which P25 equipment samples from all potential vendors are subjected to side-by-side comparisons for functionality and performance.

Once the shelters are ready, the microwave equipment has been staged, and LMR equipment has been built, the County can receive these shipments directly at the sites and authorize installation.

After the microwave system has been installed, optimized, and demonstrated, LMR testing can proceed. All functional testing which could not be completed at staging is finished at this time. Finally, the finished system is subjected to a carefully planned and executed coverage test (preferably done with foliage on the trees in

the summer) and the system is ready for a 30 day burn-in cycle. During this time, cutover plans can be finalized, the radio programming fleetmap finalized, and training/documentation, and vendor punchlists can be completed. The system is then ready for cutover and final acceptance.

### 6.2.2 700 MHz Implementation Schedule

AECOM has developed this implementation schedule based on several key factors:

1. The schedule assists in that there is not a disruption of radio service for existing MERA radio users.
2. The schedule points out important considerations that must be addressed if the schedule is to stay on track.
3. We have assumed that for the purpose of scheduling that funding is available.
4. We have assumed a start date of January 3, 2011. This start date allows time for MERA and the County Board to select a desired alternative and to identify a funding source. This start date can be adjusted and we have included an estimate of the months to complete each task / milestone.
5. Any schedule is subject to review and will ultimately be determined by the County working with the selected vendor. The schedule provided here is intended to assist the County in the planning process.

Figure 6-1 illustrates the project schedule for implementing a 700 MHz P25 Phase 2 system. The schedule is based on our experience with similar projects of this scope. Again, the implementation schedule is based upon a "notice to proceed" date of January 3, 2011 for the development of the specifications which can be adjusted based on the specific procurement process of the County. The schedule generally applies to the entire system, and should be tailored for any specific additions or reductions in requirements. The radio contractor will develop as part of his proposal a detailed construction and implementation schedule. The entire project will take approximately 45 months, from the start of Functional Specification development until Final System Acceptance. A start date of January 2011 would lead to an estimated completion date of September 2014.

We would expect the 700 MHz Licensing Process to take up to 11 months. The specification and proposal evaluation for the Radio System, Microwave System and Physical Facilities would overlap, but each would be a separate Request for Proposal (RFP) process. We recommend that the procurement process be carefully planned and follow the schedule shown in Figure 6-1. Keep in mind that there are several pre-planning steps that must be taken prior to beginning the implementation process. We have outlined these in Section 6.2.1.

## 6.3 UHF T-Band P25 Phase 2 Option

The second viable option for Marin County is to upgrade the existing MERA UHF T-Band system to a P25 Phase 2 simulcast system. This section provides a comprehensive migration plan for a countywide UHF T-Band P25 Phase 2 standard-based digital trunking system. The UHF T-Band P25 Phase 2 system option is described in detail in Section 5.2 of this report. As we begin to discuss the implementation process, it is important to understand that there are some unique distinctions between upgrading to a UHF P25 system and implementing the 700 MHz Option discussed in Section 6.2.

First, this option is an upgrade to the existing UHF T-Band MERA SmartZone 3.0 system. Any radios purchased must be backward compatible with the MERA system, and will by necessity mean that the County will continue to purchase Motorola subscriber units. Although the P25 standard does introduce competition in the radio marketplace, the backward compatibility with the existing MERA system limits the Counties user radio choices. It will be important to negotiate with the vendor so that competitive pricing is put in place for all purchases.

The infrastructure upgrades will also follow a similar pattern. Since the existing system will remain active as each site is upgraded, the County will have to ensure that system infrastructure (the fixed equipment at each radio site) is

combiners, antenna systems, and other components, but we have not factored these into our costing our into our implementation plan since we did not conduct site surveys.

### 6.3.1 UHF Implementation Process

The migration from a SmartZone 3.0 system to a P25 Phase 2 system can be accomplished in phases. Below, each major phase is described along with some of the key considerations for each step. Many of the phases listed below are similar to those discussed with the 700 MHz Implementation discussed in Section 6.2. Keep in mind that the time allocated for each phase is an estimate for planning purposes and that they may need to be adjusted based on the RFP Specification process. We also have included an implementation schedule, shown in Figure 6.2 that corresponds to the descriptions outlined below.

Prior to the start of the implementation process, several pre-planning steps must be completed. Each of these preplanning steps is described below.

Preplanning Step 1: Choosing an Option

This radio project focused on developing viable options two viable options that will meet the long term needs of the County. The County and MERA must now choose which option will be implemented.

Preplanning Step 2: UHF T-Band Licensing

Starting with the County's current channels, AECOM searched for the "best" channels that could be used in a single simulcast configuration. By "best" channel, we mean the channels with the least number of potential co-channel and adjacent channel interference. Our analysis found 18 channels that can be licensed in a countywide UHF T-Band simulcast, which will support the MERA system users for the next 15 years, plus a 20% increase for additional emergency responders. While we completed the initial engineering effort to license these channels in a simulcast configuration, the licensing process must be completed. We recommend that the County begin the licensing process of the channels allocated in Table 3-2 soon so that the frequency licenses can be secured for a UHF simulcast design. Keep in mind that we list 18 channels that may be licensed as a simulcast, but only 11 of these are needed for a P25 Phase 2 solution. The remaining 7 channels can be used to support interoperability, future growth and fire station alerting needs.

Preplanning Step 3: Validate Radio Inventory (count and model)

Next, the County must validate the radio inventory and verify the number of radios in the existing system. Some agencies may have a desire to add more radios to the system, but have not made this need known. The number of radios on the system will directly impact the channel allocations of the radio system. Every subscriber unit must be replaced with subscriber units that are P25 Phase 2 compliant (ready for P25 Phase 2 use when purchased, avoiding a software upgrade fee). Any units replaced in the current MERA system, should be replaced with P25 Phase 2 subscriber units. AECOM contacted Motorola and they are scheduled to begin delivering UHF T-Band P25 Phase 2 compliant subscriber units in the late summer of 2010.

Preplanning Step 4: Conduct Site / Dispatch Surveys

Next, the County should assess each site and each dispatch center and determine if they are able to support the existing MERA system and also able to provide the physical space needed to implement the upgrade to a UHF P25 Phase 2 Simulcast radio system. If physical space is not available, a determination should be made if the lack of space can be overcome by a cost effective solution.

Preplanning Step 5: Preliminary EIR / EIS considerations

The Preliminary EIR and EIS considerations should be factored into the timeline and any concerns should be addressed immediately. Appendix C of this report includes some of the important EIR / EIS considerations.

After the preplanning steps are completed, the County can move forward with the radio system implementation. We have broken the implementation project into four phases that must come together: 1) the Radio infrastructure, 2) the microwave backbone, 3) facilities work for tower sites and dispatch locations, and

4) system implementation and acceptance. Each of these phases is described below and the timeline for each is shown in Figure 6-2.

Phase 1: Radio System

Each of the first three phases has 2 essential components, the RFP / Specification Process and the System procurement process. The tendency might be to avoid a formal RFP Specification, since this is simply an upgrade to an existing system; however, we recommend that the technical specifications portion of the procurement documentation be developed for the UHF T-Band radio system design. The specification process should include a detailed specification for the Radio System, the Microwave and the Physical Facilities and will be used in each of these phases. The process should include site facilities requirements, evaluation criteria, draft specifications, vendor review process and the final specifications. We would encourage the County to make sure that these critical components are part of the specification process, regardless of who the County uses to develop the RFP Specification.

The Radio system phase will end with the Procurement Process and entails the period beginning with the issuance of the system specifications, and concludes with the signing of the contract between Marin County / MERA and the system supplier. The procurement process will have been defined prior to issuing the procurement documentation, and should be carefully and strictly followed in order to mitigate the risk of vendor protest.

Phase 2: Microwave

This phase will also have 2 essential components, the RFP / Specification Process and the System procurement process. The Specification, site selection and other details should be updated based on the system design of the selected vendor. The phase will conclude with the Microwave Procurement process.

Phase 3: Physical Facilities RFP / Specification

Our UHF P25 Phase 2 design uses the same sites as the existing MERA system. Significant upgrades may not be needed; however, the Physical Facilities RFP / Specification should be updated to reflect any changes introduced by the Final Radio System Design, and the Final Microwave System Design. The phase will conclude with the Physical Facilities Procurement process.

Phase 4: System Implementation and Acceptance

The System Implementation will include actual test procedures that validate the system design and that are developed mutually between the selected vendor and Marin County. System testing procedures should be included in the Detailed Design Review and formal testing should be part of Staging and will continue in the field with complementary site and system tests that exercise and demonstrate all critical functions and properties of the Implemented System. We recommend that the County (or their representative) monitor and provide general oversight for acceptance testing, which will address four systems test areas: Coverage, Fixed Infrastructure, Interference, and Telecommunications Subsystem. Each of these test areas are used to validate the System Implementation.

This phase will end with the final system tests, including inspection of the installation at each site, and the acceptance of the project after cutover. The goal is for System Acceptance Tests to demonstrate the initial Systems Attributes developed at the beginning of the project. System Acceptance will include staging tests, facility and infrastructure inspections, acceptance tests, thirty-day operational tests, a review of training plan, review as-built drawings, and the reporting process.

Marin County, CA
Revision: 0

**Figure 6-1**
**700MHz P 25 Implementation Schedule**

AECOM

| ID | Task Name | Resource Names | Duration | Start | Finish |
|---|---|---|---|---|---|
| 0 | **AECOM Project Work Plan** | | **971.01 days** | **Mon 1/3/11** | **Tue 9/23/14** |
| 1 | Notice to Proceed | Marin | 1 day | Mon 1/3/11 | Mon 1/3/11 |
| 2 | Specification Initialization Letter | AECOM | 1 day | Tue 1/4/11 | Tue 1/4/11 |
| 3 | **Licensing** | | **270 days** | **Wed 1/5/11** | **Tue 1/17/12** |
| 4 | License Application Preparation | AECOM | 30 days | Wed 1/5/11 | Tue 2/15/11 |
| 5 | License Approval | FCC | 240 days | Wed 2/16/11 | Tue 1/17/12 |
| 6 | **Radio** | | **286 days** | **Wed 1/5/11** | **Wed 2/8/12** |
| 7 | **Phase 2 Specifications** | | **109 days** | **Wed 1/5/11** | **Mon 6/6/11** |
| 8 | **Draft Radio Specification** | | **103 days** | **Wed 1/5/11** | **Fri 5/27/11** |
| 9 | Rough-Out Meeting | Meeting | 1 day | Wed 1/5/11 | Wed 1/5/11 |
| 10 | Equipment Specifications | AECOM,Marin | 29 days | Wed 1/5/11 | Mon 2/14/11 |
| 11 | Propagation Finalization | AECOM | 10 days | Thu 1/6/11 | Wed 1/19/11 |
| 12 | Sample Terms & Conditions | AECOM | 3 days | Thu 1/13/11 | Mon 1/17/11 |
| 13 | Terms & Conditions | Marin | 46 days | Tue 1/18/11 | Tue 3/22/11 |
| 14 | Final System Design | AECOM | 10 days | Thu 1/20/11 | Wed 2/2/11 |
| 15 | Evaluation Criteria | AECOM | 5 days | Wed 3/23/11 | Tue 3/29/11 |
| 16 | Non-Fixed Equipment Finalization | Marin | 20 days | Wed 2/2/11 | Tue 3/1/11 |
| 17 | Vendor Pre-Qualifications | AECOM | 8 days | Thu 2/24/11 | Mon 3/7/11 |
| 18 | System Service Specifications | AECOM | 39 days | Wed 2/2/11 | Mon 3/28/11 |
| 19 | Cost Sheet Preparation | AECOM | 20 days | Tue 3/1/11 | Mon 3/28/11 |
| 20 | Radio Draft Assembly | AECOM | 2 days | Wed 3/30/11 | Thu 3/31/11 |
| 21 | Vendor Invitation Letter | Marin | 11 days | Tue 3/8/11 | Tue 3/22/11 |
| 22 | Radio PM Review | AECOM | 3 days | Fri 4/1/11 | Tue 4/5/11 |
| 23 | Radio Technical Edit | AECOM | 5 days | Wed 4/6/11 | Tue 4/12/11 |
| 24 | Radio - Finalize Draft Specifications | AECOM | 20 days | Wed 4/13/11 | Tue 5/10/11 |
| 25 | Radio - Publish Draft Specifications | AECOM | 3 days | Wed 5/11/11 | Fri 5/13/11 |
| 26 | Radio - Proposer Review | Proposer | 10 days | Mon 5/16/11 | Fri 5/27/11 |
| 27 | Radio - Client Review / Approval | Marin | 10 days | Mon 5/16/11 | Fri 5/27/11 |
| 28 | **Final Specifications** | | **6 days** | **Mon 5/30/11** | **Mon 6/6/11** |
| 29 | Radio - Finalize Document | AECOM | 3 days | Mon 5/30/11 | Wed 6/1/11 |
| 30 | Radio - Publish Final Specifications | AECOM | 2 days | Thu 6/2/11 | Fri 6/3/11 |
| 31 | Release Radio RFP | Marin | 1 day | Mon 6/6/11 | Mon 6/6/11 |
| 32 | End Phase 2A Radio | | 0 days | Mon 6/6/11 | Mon 6/6/11 |
| 33 | **Phase 3 Procurement** | | **177 days** | **Tue 6/7/11** | **Wed 2/8/12** |
| 34 | Radio - Procurement Initialization Letter | AECOM | 2 days | Tue 6/7/11 | Wed 6/8/11 |

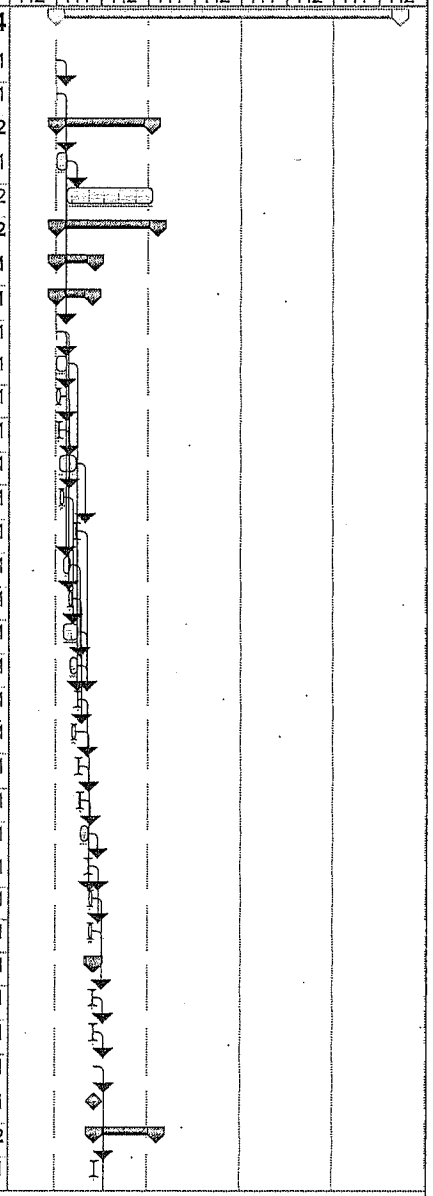

Figure 6-1
700MHz P 25 Implementation Schedule



| ID | Task Name | Resource Names | Duration | Start | Finish |
|---|---|---|---|---|---|
| 35 | Proposal Preparation | Proposer | 34 days | Tue 6/7/11 | Fri 7/22/11 |
| 36 | Pre-Proposal Conference | AECOM | 4 days | Tue 6/21/11 | Fri 6/24/11 |
| 37 | Addenda | AECOM | 9 days | Mon 6/27/11 | Thu 7/7/11 |
| 38 | **Technical Evaluation** | | **36 days** | **Mon 7/25/11** | **Mon 9/12/11** |
| 39 | Technical Proposal Opening | Marin | 1 day | Mon 7/25/11 | Mon 7/25/11 |
| 40 | First Pass Evaluation | AECOM/Marin | 15 days | Tue 7/26/11 | Mon 8/15/11 |
| 41 | Request Clarifications | AECOM | 5 days | Tue 8/16/11 | Mon 8/22/11 |
| 42 | Clarification Response | Proposer | 5 days | Tue 8/23/11 | Mon 8/29/11 |
| 43 | Final Technical Evaluation | AECOM/Marin | 5 days | Tue 8/30/11 | Mon 9/5/11 |
| 44 | Evaluation Team Meeting | Meeting | 5 days | Tue 9/6/11 | Mon 9/12/11 |
| 45 | Proposer Presentation | Proposer | 5 days | Tue 9/6/11 | Mon 9/12/11 |
| 46 | **Cost Evaluation** | | **6 days** | **Tue 9/13/11** | **Tue 9/20/11** |
| 47 | Cost Proposal Opening | Marin | 1 day | Tue 9/13/11 | Tue 9/13/11 |
| 48 | Cost Evaluation | AECOM/Marin | 5 days | Wed 9/14/11 | Tue 9/20/11 |
| 49 | Recommendations | AECOM | 10 days | Wed 9/21/11 | Tue 10/4/11 |
| 50 | Executive Presentation | Meeting | 1 day | Wed 10/5/11 | Wed 10/5/11 |
| 51 | Negotiations | Marin | 45 days | Thu 10/6/11 | Wed 12/7/11 |
| 52 | Approve Contract | Marin | 6 days | Thu 12/8/11 | Wed 2/8/12 |
| 53 | Contract Sign | Marin | 6 days | Thu 12/8/11 | Tue 2/7/12 |
| 54 | End Phase 3A Radio | | 1 day | Wed 2/8/12 | Wed 2/8/12 |
| 55 | **Microwave** | | **327.01 days** | **Tue 6/7/11** | **Thu 9/6/12** |
| 56 | **Phase 2 - Specifications** | | **250.01 days** | **Tue 6/7/11** | **Tue 5/22/12** |
| 57 | **Draft Specifications** | | **81 days** | **Tue 6/7/11** | **Tue 9/27/11** |
| 58 | Microwave Specification | AECOM | 53 days | Tue 6/7/11 | Thu 8/18/11 |
| 59 | MW Draft Assembly | AECOM | 2 days | Fri 8/19/11 | Mon 8/22/11 |
| 60 | MW - PM Review | AECOM | 3 days | Tue 8/23/11 | Thu 8/25/11 |
| 61 | MW Technical Edit | AECOM | 5 days | Fri 8/26/11 | Thu 9/1/11 |
| 62 | MW Finalize Draft Specifications | AECOM | 5 days | Fri 9/2/11 | Thu 9/8/11 |
| 63 | MW Publish Draft Specs | AECOM | 3 days | Fri 9/9/11 | Tue 9/13/11 |
| 64 | MW - Client Review/Approval | Marin | 10 days | Wed 9/14/11 | Tue 9/27/11 |
| 65 | **Final Specifications** | | **164.01 days** | **Wed 10/5/11** | **Tue 5/22/12** |
| 66 | Finalize Microwave RFP | AECOM | 55 days | Wed 10/5/11 | Tue 12/20/11 |
| 67 | Publish Final MW RFP | AECOM | 9 days | Wed 12/21/11 | Mon 3/5/12 |
| 68 | Release RFP Microwave | Marin | 4 days | Tue 3/6/12 | Thu 5/17/12 |
| 69 | End Phase 2 B MW | | 3 days | Thu 5/17/12 | Tue 5/22/12 |

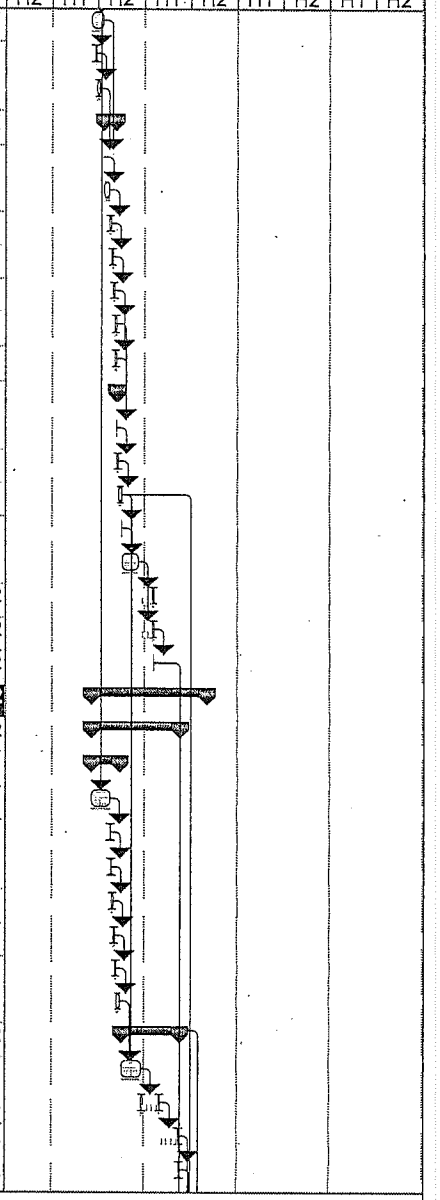

Figure 6-1
700MHz P 25 Implementation Schedule



| ID | Task Name | Resource Names | Duration | Start | Finish |
|---|---|---|---|---|---|
| 70 | **Phase 3 - Procurement** | | **80 days** | **Thu 5/17/12** | **Thu 9/6/12** |
| 71 | MW Procurement Initial Letter | AECOM | 11 days | Thu 5/17/12 | Fri 6/1/12 |
| 72 | Proposal Prep | Microwave Vendor | 29 days | Thu 5/17/12 | Wed 6/27/12 |
| 73 | MW Pre-Proposal Conference | AECOM/Marin | 1 day | Fri 6/1/12 | Mon 6/4/12 |
| 74 | MW Addenda | AECOM | 7 days | Mon 6/4/12 | Wed 6/13/12 |
| 75 | **Technical Evaluation** | | **21 days** | **Wed 6/27/12** | **Thu 7/26/12** |
| 76 | MW Proposal Opening | Marin | 1 day | Wed 6/27/12 | Thu 6/28/12 |
| 77 | Technical Evaluation | AECOM/Marin | 15 days | Thu 6/28/12 | Thu 7/19/12 |
| 78 | Evaluation Team Meeting | Meeting | 5 days | Thu 7/19/12 | Thu 7/26/12 |
| 79 | **Cost Evaluation** | | **5 days** | **Thu 7/26/12** | **Thu 8/2/12** |
| 80 | Cost and Proposal Opening | Marin | 1 day | Thu 7/26/12 | Fri 7/27/12 |
| 81 | Cost Evaluation | AECOM/Marin | 5 days | Thu 7/26/12 | Thu 8/2/12 |
| 82 | Recommendations | AECOM | 13 days | Thu 8/2/12 | Tue 8/21/12 |
| 83 | Negotiations | AECOM/Marin | 10 days | Tue 8/21/12 | Tue 9/4/12 |
| 84 | Microwave Contract Sign | Marin | 2 days | Tue 9/4/12 | Thu 9/6/12 |
| 85 | End Phase 3B MW | | 0 days | Thu 9/6/12 | Thu 9/6/12 |
| 86 | **Physical Facilities** | | **117 days** | **Tue 5/22/12** | **Thu 11/1/12** |
| 87 | **Phase 2 - Specifications** | | **117 days** | **Tue 5/22/12** | **Thu 11/1/12** |
| 88 | **Phy Fac Draft Specification** | | **30 days** | **Tue 5/22/12** | **Tue 7/3/12** |
| 89 | Physical Facilities Specifications | AECOM | 7 days | Tue 5/22/12 | Thu 5/31/12 |
| 90 | Phy Fac Draft Assembly | AECOM | 2 days | Thu 5/31/12 | Mon 6/4/12 |
| 91 | Phy Fac PM Review | AECOM | 2 days | Mon 6/4/12 | Wed 6/6/12 |
| 92 | Phy Fac Technical Edit | AECOM | 3 days | Wed 6/6/12 | Mon 6/11/12 |
| 93 | Phy Fac Finalize Draft Specifications | AECOM | 3 days | Mon 6/11/12 | Thu 6/14/12 |
| 94 | Phy Fac Publish Draft Specs | AECOM | 3 days | Thu 6/14/12 | Tue 6/19/12 |
| 95 | Phy Fac - Client Review/Approval | Marin | 10 days | Tue 6/19/12 | Tue 7/3/12 |
| 96 | **Phy Fac Final Specification** | | **12 days** | **Tue 7/3/12** | **Thu 7/19/12** |
| 97 | Finalize Facility RFP | AECOM | 10 days | Tue 7/3/12 | Tue 7/17/12 |
| 98 | Publish Final Facility Specs | AECOM | 1 day | Tue 7/17/12 | Wed 7/18/12 |
| 99 | Release Facility RFP | Marin | 1 day | Wed 7/18/12 | Thu 7/19/12 |
| 100 | End Phase 2D Phy Fac | | 0 days | Wed 7/18/12 | Wed 7/18/12 |
| 101 | **Phase 3 - Procurement** | | **36 days** | **Thu 7/19/12** | **Fri 9/7/12** |
| 102 | Procurement Initial Letter | AECOM | 5 days | Thu 7/19/12 | Thu 7/26/12 |
| 103 | Proposal Prep | Facility Vendor | 30 days | Thu 7/26/12 | Thu 9/6/12 |
| 104 | Pre-Proposal Conference | Meeting | 10 days | Thu 7/19/12 | Thu 8/2/12 |

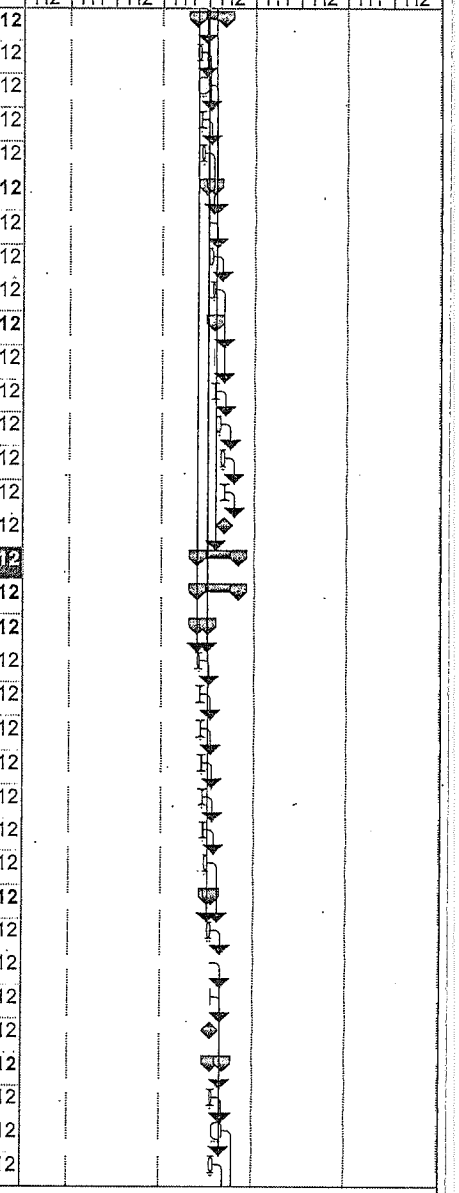

**Figure 6-1**
**700MHz P 25 Implementation Schedule**



| ID | Task Name | Resource Names | Duration | Start | Finish |
|---|---|---|---|---|---|
| 105 | Addenda | AECOM | 10 days | Thu 8/2/12 | Thu 8/16/12 |
| 106 | Proposed Opening | Marin | 1 day | Thu 9/6/12 | Fri 9/7/12 |
| 107 | **Technical Evaluation** | | **20 days** | **Fri 9/7/12** | **Fri 10/5/12** |
| 108 | Tech Evaluation | AECOM/Marin | 15 days | Fri 9/7/12 | Fri 9/28/12 |
| 109 | Evaluation Team Meeting | Meeting | 5 days | Fri 9/28/12 | Fri 10/5/12 |
| 110 | Cost Evaluation | AECOM/Marin | 1 day | Fri 10/5/12 | Mon 10/8/12 |
| 111 | Cost Proposal Opening & Evaluation | AECOM/Marin | 1 day | Mon 10/8/12 | Tue 10/9/12 |
| 112 | Recommendations | AECOM | 5 days | Tue 10/9/12 | Tue 10/16/12 |
| 113 | Negotiations | AECOM/Marin | 10 days | Tue 10/16/12 | Tue 10/30/12 |
| 114 | Physical Facilities Contract Sign | Marin | 2 days | Tue 10/30/12 | Thu 11/1/12 |
| 115 | End Phase 3D Phy Fac | | 0 days | Thu 11/1/12 | Thu 11/1/12 |
| 116 | **Phase 4 - Implementation & Acceptance** | | **493 days** | **Thu 11/1/12** | **Tue 9/23/14** |
| 117 | **DESIGN REVIEW** | | **61 days** | **Thu 11/1/12** | **Fri 1/25/13** |
| 118 | Design Materials | Contractors | 60 days | Thu 11/1/12 | Thu 1/24/13 |
| 119 | Implementation Plan | Contractors | 10 days | Thu 11/1/12 | Thu 11/15/12 |
| 120 | Finalize Detailed Design | rin/AECOM/Contractors | 40 days | Thu 11/15/12 | Thu 1/10/13 |
| 121 | DDR Meeting | rin/AECOM/Contractors | 1 day | Thu 1/10/13 | Fri 1/11/13 |
| 122 | DDR Approval | AECOM/Marin | 10 days | Fri 1/11/13 | Fri 1/25/13 |
| 123 | **TEST PLAN** | | **230 days** | **Fri 1/25/13** | **Fri 12/13/13** |
| 124 | Staging Test Plan Submittal | Contractors | 40 days | Fri 1/25/13 | Fri 3/22/13 |
| 125 | Staging Test Plans Approval | AECOM/Marin | 20 days | Fri 3/22/13 | Fri 4/19/13 |
| 126 | Acceptance Test Plan Submittal | Contractors | 40 days | Fri 8/23/13 | Fri 10/18/13 |
| 127 | Acceptance Test Plan Approval | AECOM/Marin | 40 days | Fri 10/18/13 | Fri 12/13/13 |
| 128 | **RADIO** | | **295 days** | **Fri 1/25/13** | **Fri 3/14/14** |
| 129 | Manufacture Radio System | Contractors | 60 days | Fri 1/25/13 | Fri 4/19/13 |
| 130 | Stage Radio System | rin/AECOM/Contractors | 20 days | Fri 7/26/13 | Fri 8/23/13 |
| 131 | Ship Non-Fixed Equipment | Contractors | 65 days | Fri 8/23/13 | Fri 11/22/13 |
| 132 | Ship Infrastructure | Contractors | 10 days | Fri 11/22/13 | Fri 12/6/13 |
| 133 | Non-Fixed Equipment Installation | Contractors | 75 days | Fri 11/22/13 | Fri 3/7/14 |
| 134 | Infrastructure Installation | Contractors | 30 days | Fri 12/6/13 | Fri 1/17/14 |
| 135 | Final Inspection | AECOM | 20 days | Fri 1/17/14 | Fri 2/14/14 |
| 136 | Optimization | Contractors | 30 days | Fri 1/17/14 | Fri 2/28/14 |
| 137 | Telecom Test | Contractors | 5 days | Fri 2/28/14 | Fri 3/7/14 |
| 138 | Punch List Update | AECOM | 5 days | Fri 2/14/14 | Fri 2/21/14 |
| 139 | Pre-Test Punch List Resolution | Contractors | 15 days | Fri 2/21/14 | Fri 3/14/14 |

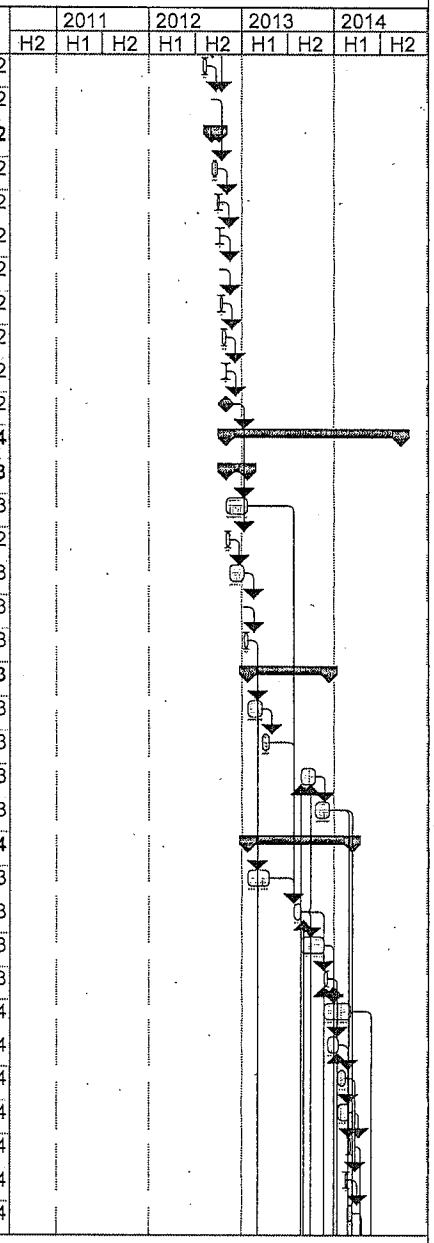

Figure 6-1
700MHz P 25 Implementation Schedule



| ID | Task Name | Resource Names | Duration | Start | Finish |
|---|---|---|---|---|---|
| 140 | **MICROWAVE** | | **120 days** | **Fri 1/25/13** | **Fri 7/12/13** |
| 141 | Microwave Path Survey | Contractors | 40 days | Fri 1/25/13 | Fri 3/22/13 |
| 142 | Manufacture Microwave | Contractors | 60 days | Fri 3/22/13 | Fri 6/14/13 |
| 143 | Microwave Staging Test Plan Submittal | Contractors | 20 days | Fri 3/22/13 | Fri 4/19/13 |
| 144 | Microwave Staging Test Plan Approval | AECOM/Marin | 10 days | Fri 4/19/13 | Fri 5/3/13 |
| 145 | Microwave Staging | rin/AECOM/Contractors | 20 days | Fri 6/14/13 | Fri 7/12/13 |
| 146 | **PHYSICAL FACILITIES** | | **225 days** | **Fri 1/25/13** | **Fri 12/6/13** |
| 147 | Site Acquisition | Marin | 130 days | Fri 1/25/13 | Fri 7/26/13 |
| 148 | Site Development | Contractors | 40 days | Fri 7/26/13 | Fri 9/20/13 |
| 149 | Tower Procurement | Contractors | 28 days | Fri 7/26/13 | Wed 9/4/13 |
| 150 | Building Implementation | Contractors | 45 days | Fri 9/20/13 | Fri 11/22/13 |
| 151 | Tower Implementation | Contractors | 45 days | Fri 9/20/13 | Fri 11/22/13 |
| 152 | Facility Inspection | AECOM | 10 days | Fri 11/22/13 | Fri 12/6/13 |
| 153 | **TRAINING** | | **150 days** | **Fri 8/23/13** | **Fri 3/21/14** |
| 154 | System Administrative Support Training | Contractors | 10 days | Fri 8/23/13 | Fri 9/6/13 |
| 155 | Maintenance Training | Contractors | 45 days | Fri 1/17/14 | Fri 3/21/14 |
| 156 | **FINAL TEST** | | **70 days** | **Fri 3/14/14** | **Fri 6/20/14** |
| 157 | Interference Test | Contractors | 5 days | Fri 3/14/14 | Fri 3/21/14 |
| 158 | Infrastructure Test | Contractors/AECOM | 10 days | Fri 3/21/14 | Fri 4/4/14 |
| 159 | Operations Training | Contractors | 10 days | Fri 4/4/14 | Fri 4/18/14 |
| 160 | Punch List Resolution | Contractors | 40 days | Fri 4/4/14 | Fri 5/30/14 |
| 161 | Coverage Test | Contractors/AECOM | 15 days | Fri 4/4/14 | Fri 4/25/14 |
| 162 | User Training | Contractors | 15 days | Fri 4/4/14 | Fri 4/25/14 |
| 163 | Test Report Submittal | Contractors | 20 days | Fri 4/25/14 | Fri 5/23/14 |
| 164 | Test Report Approval | AECOM | 10 days | Fri 5/23/14 | Fri 6/6/14 |
| 165 | System Maintenance Manual Submittal | Contractors | 10 days | Fri 4/25/14 | Fri 5/9/14 |
| 166 | System Maintenance Manual Review | AECOM | 10 days | Fri 5/9/14 | Fri 5/23/14 |
| 167 | As Built Document Submittal | Contractors | 30 days | Fri 4/25/14 | Fri 6/6/14 |
| 168 | As Built Document Review | AECOM | 10 days | Fri 6/6/14 | Fri 6/20/14 |
| 169 | Burn In Test | Contractors | 20 days | Fri 4/25/14 | Fri 5/23/14 |
| 170 | **CUTOVER** | | **87 days** | **Fri 5/23/14** | **Tue 9/23/14** |
| 171 | Cutover Recommendation | AECOM | 3 days | Fri 5/23/14 | Wed 5/28/14 |
| 172 | Cutover | Contractors | 10 days | Wed 5/28/14 | Wed 6/11/14 |
| 173 | Final System Acceptance | AECOM | 2 days | Fri 6/20/14 | Tue 6/24/14 |
| 174 | System Commissioning | Marin | 65 days | Tue 6/24/14 | Tue 9/23/14 |