

800MHZ P25 TRUNKED RADIO AND MCC 7500 DISPATCH SYSTEM STANDALONE CORE SOLUTION

Exhibit C



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SYSTEM DESCRIPTION

Motorola is proposing to Lake Havasu Police Department a L2 Core trunked system with five (5) MCC7500 dispatch consoles, Nice voice recording, and Moscad fault management. Included will be two (2) trunked repeater sites, each containing five (5) RF channels, capable of handling eight (8) talkpaths by using TDMA modulation. These two RF sites will be tied to the Master Site by PTP810 microwave links, also included in this proposal. Because the existing subscriber units in use today are not capable of using TDMA modulation, we are also including APX7500, APX7000, APX6000, and APX4500 subscriber radios. A description of the infrastructure items is shown below.

1.1 OVERVIEW

ASTRO[®] 25 is the most widely used Project 25, Mission-Critical, Integrated Voice and Data (IV&D) communication network for public safety agencies. Installed worldwide, ASTRO 25 solutions meet and exceed IV&D requirements for day-to-day operations, as well as emergency response in the most demanding situations. ASTRO 25 is a wireless platform that combines uncompromising, real-world performance and the legendary reliability of Motorola Solutions, Inc. (Motorola).

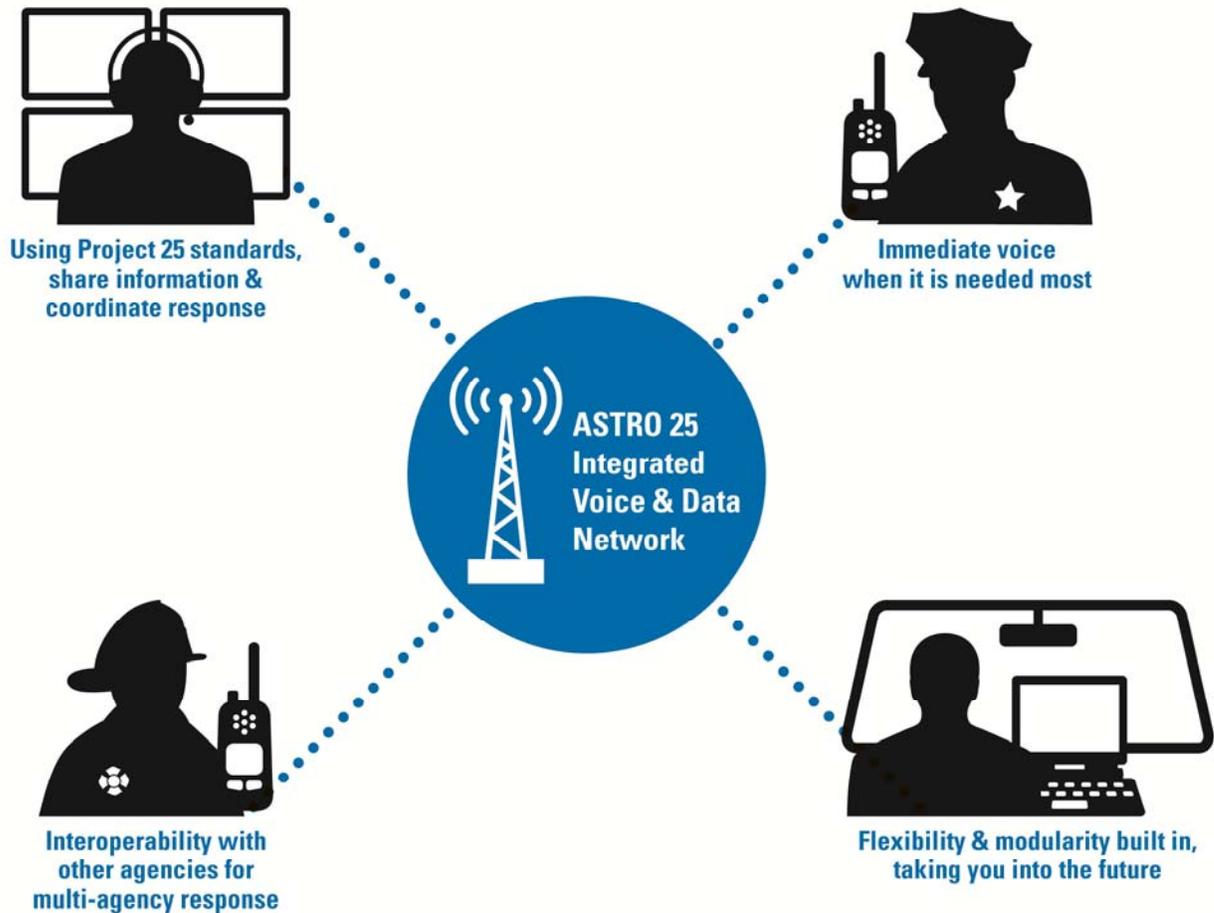
**A PLATFORM WITH
UNPARALLELED
FLEXIBILITY**

From single-site to nationwide deployments, ASTRO 25 is a flexible, modular network with advanced call processing capabilities designed to meet the needs of public safety. ASTRO 25 can adapt to accommodate additional users, increased geographic coverage, enhanced data applications, and connectivity to other networks—all to ensure an efficient and cost-effective solution for decades to come.

ASTRO 25 is optimized for the rigorous demands of public safety, providing reliable communications. When an emergency involves multiple agencies, first responders can share voice and data communication among their teams. In addition, centralized command and control can deploy resources efficiently, maintain communication security, and track personnel effectively.

**RELIABLE
VOICE & DATA
INTEGRATED
AS ONE**





1.2 THE BENEFITS OF ASTRO 25 IP TECHNOLOGY

Motorola’s proposed solution for Lake Havasu PD is our ASTRO 25 platform with IV&D, the foundation of the Mission-Critical portfolio. ASTRO offers a Project 25, standards-based Internet Protocol (IP) modular solution, providing your first responders with:

Cost savings – ASTRO 25 reduces costs by integrating your voice and data needs into a single solution.

Interoperability – ASTRO 25 is compliant with APCO Project 25 standards, offering seamless interoperability with other compliant systems and radios, putting the highest level of interoperability in the end-users’ hands, without the need of gateways or console patches.

Reliability – Pre-release software and upgrade testing, third-party hardware and software certification process, fault-tolerant architecture with multiple fallback modes, multiple levels of redundancy, and real-time network and security monitoring provide Mission-Critical reliability.

**ASTRO 25
WHEN MISSION
CRITICAL
COMMUNICATIONS
DEMAND PROJECT 25
INTEROPERABILITY
& IP FLEXIBILITY**

Increased security – Information Assurance (IA) enhances the confidentiality, integrity, and availability of the Radio Network Infrastructure (RNI). Multiple encryption algorithms keep end-to-end voice and data transmissions confidential.

Enhanced productivity – Easy and intuitive interfaces to critical, real-time information is delivered to users when and where they need it.

Flexibility – Scalable, flexible design allows ASTRO 25 to dynamically adapt to the operational demands of any size organization. The IP-based design supports a unique mix of voice, data, and geographical requirements, permitting easy system enhancements as the users' needs evolve.

A description of the features, benefits, system architecture, and hardware components are provided in this document.

1.3 ASTRO 25 IP SYSTEM FEATURES

An ASTRO 25 system is a feature-rich, modular platform that consists of a Core site, which may include ASTRO 25 RF sites and simulcast cells. This section discusses the various key features and equipment components that comprise the proposed system.

1.3.1 Master Site

The master site is the central point for all system traffic in each ASTRO 25 zone. Call processing and system management occur at the master site. The Voice and Data call processing for each zone is performed by the Zone Controller. The Zone Controller(s) maintain constant communication between the RF Sites, Simulcast Sites and Network Management (NM) sub-systems via the Network Transport Subsystem.

1.3.2 Network Management System

The Network Management (NM) system can be viewed as a set of software applications or tools used to manage the ASTRO 25 wide-area trunked radio system and its constituent components.

The NMS supports the following services:

Network Monitoring – Applications are included for monitoring the status of the transport network and the individual infrastructure components; displaying status information; forwarding alert information; and performing diagnostic procedures.

Configuration Management – Facilities are provided for entering and maintaining the operational parameters of the infrastructure components and user devices (i.e., the mobile and portable radios).

Accounting Management – NMS supports the tracking of radio usage of the system by providing an optional interface to third-party accounting and/or billing applications.

Performance Management – Standard and optional applications are available for monitoring, reporting, controlling, and optimizing the use of system resources.

Security Management – NMS includes features for setting user privileges and controlling their access to view and/or modify information contained in the configuration databases.

The Network Management subsystem will include the following servers at the zone and system levels of the ASTRO 25 system.

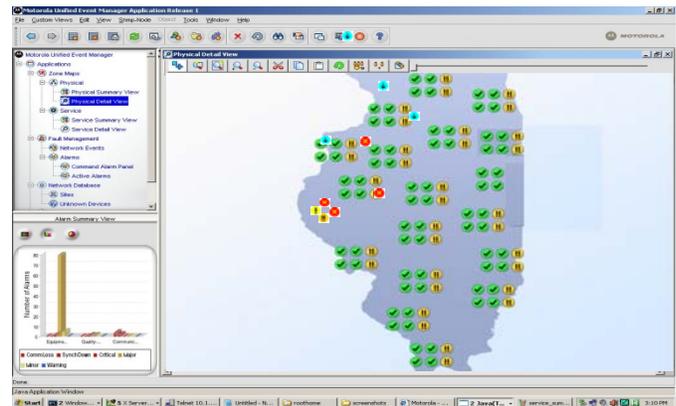
NMS Zone-level Servers (one each per zone) – Air Traffic Router, Zone Database Server, Unified Event Manager (UEM), and Zone Statistics Server

NMS System-level Servers – User Configuration Server (UCS) and System Statistics Server

1.3.2.1 Unified Event Manager

The Unified Event Manager (UEM) application allows system management personnel to manage LMR system devices from a single screen. Historical and real-time traffic screens give users access to radio events, radio status, and any device alarms. Other features include:

1. Graphical views/maps
2. Active alarms and summary views
3. External notification flexibility
4. Remote site control
5. Fault reporting capabilities
6. Device inventory
7. External notification
8. Customized views
9. Role-based access



Sample UEM Screen

The UEM provides a customized discovery process for optimization and deep discovery of subcomponents reported on by a device. The application also allows for automatic registration of the devices without pre-configuration. Interpreting and displaying events in an easy-to-understand and meaningful format—along with a topology of the network and devices tailored for the ASTRO 25 network—will ease navigation and present the network in a manner that is intuitive to a system operator.

Health of services is provided in addition to device-based alarms, including rules for determining the overall status of services in a separate service view (e.g., redundant controller is down – service is still up; we represent both views). Rules have been developed for calculating alarms based on interpreting incoming events. Security procedures are in place to roll SNMPv3 keys and maintain the ability to receive SNMP inform requests through the key role of an entire network. Device commands are presented in a manner specific to each device type. During discovery, a complete device inventory with specific rules to identify service and proxied components is accomplished for all individual devices. Table 1-1 outlines features and benefits of the UEM.

Table 1-1: Unified Event Manager (UEM) Features and Benefits

Feature	Benefit
Optimized Discovery Based on System Design	UEM supports subnet discovery of the IP addresses which are designated for radio system devices. This translates to an efficient device discovery process.
Discovery of Fault Managed Devices	Based on the device type the UEM has pre-determined rules for discovery of the custom entities supported on the device. Additional rules are used for event translation and alarm generation.
Fault Manager Registration	Procedures in place to register the manager's IP address as a trap/inform destination.

Feature	Benefit
Centralized View of the Communications Network	System Managers can view the ASTRO 25 system status and quickly isolate problems to the board level.
Intuitive Graphical User Interface (GUI)	System Managers are quickly notified of failures on the system and can diagnose device problems. Summary and Detail maps provide a graphical display of site status in their geographical location within the system.
Active Alarms View and Alarm Summary	Persistent single view of all failure conditions (“What’s Inoperable”) in the network and a quick reference summary of alarms by severity, allowing users to quickly pinpoint the highest priority failures.
Secure Device Access	SNMPv3 protocol with SHA and AES 128-bit encryption to prevent security breach attempts.
Role-Based Access Control	Assignment of user privileges for access to views and operational capabilities.
Email Notifications	User-specified event notifications are sent via secure email or forwarded to a portable mobile device, which allows System Managers to work away from the System Management Terminal but remain aware of system events.
Fault Reporting Capabilities	Event history data is auto-archived and exported for further analysis and reporting.
Remote Command Operation	Remote state change capability helps to service remote devices and avoid unnecessary trips to the sites for troubleshooting.
Network Inventory	Tabular view of the devices and their associated status.
Audit Trail and Job Status	Traceability and status for commands and actions executed.

The UEM is optimized to quickly discover the devices in our network—making installation and setup quick and error-free. The UEM has a built-in capability to identify the type of device it is discovering; it will activate the pre-determined rules for discovery of the devices, which results in faster event translation and alarm generation in the manager. Each device, via its various entities (i.e., fan, power supply, etc.), will quickly inform the manager what it needs to monitor. Procedures built into the UEM will configure the IP address in the device to give the correct path for sending its information during operation.

Quick and accurate interpretation of the system activity is crucial in effective management of the devices. The UEM translates the events into intuitive information, which will inform the user of either the severity of the failure or implication of the event.

UEM translates the events into active alarms, which make the user aware which events require immediate attention versus more minor events/alarms. The alarm view dynamically updates based on the condition of the reported device (i.e., the alarm will be cleared from the alarm view when a device sends a clear event to the UEM).

The Reliable Communication design in the UEM provides Supervision and Synchronization services:

Supervision – Provides periodic SNMP Polling to ensure communication is established with each device on the network. The UEM generates communication failure alarms/events when communication between the agent and the manager fails.

Synchronization – Used to ensure the accuracy of the state that the device is reporting. If the connection between the UEM and the device is lost, the device will queue up the missed fault events and re-send when the connection is re-established. These Motorola-defined procedures were put in place to enhance the reliability of basic SNMPv3 trap messaging. These procedures manage the re-synchronization of missed failures. The UEM utilizes SNMPv3 informs to enable the device to detect whether the connection has been interrupted.

1.3.2.2 MOSCAD NFM System

The MOSCAD Network Fault Management (NFM) system is an end-to-end solution which collects alarms from devices and equipment at Motorola communication sites; then it sends the information to the Graphic Master Computer (GMC) server and UEM, where the information is stored so that it can be displayed and analyzed by system technologists and managers. Features and benefits of the MOSCAD NFM system are outlined in Table 1-2.

Table 1-2: MOSCAD NFM System Features and Benefits

Feature	Benefit
Collection of Environmental Alarms	A single SDM3000 supports data interfaces and digital alarm inputs to site equipment such as doors, tower lights, UPS, security, and third-party devices.
Data Interfaces to Site Equipment	The SDM3000 collects alarms and values from a wide range of Motorola stations, Microwave Radios, Channel Banks, Frequency Standards, and more via RS232, SNMP V1 & V3, and IP.
Collection of Analog Information	The SDM3000 interfaces to site equipment with analog outputs such as temperature sensors, fuel sensors, RF Power sensors, etc.
Initiation of Site Controls	The SDM3000 interfaces to site equipment which can be controlled, such as doors, generators, security, equipment switching, etc.
Local Web Server	The SDM3000 incorporates a built-in Web Server so that Service Technologists can view alarms of equipment and devices while on site or over the ASTRO network infrastructure.
Reliable Communications	The SDM3000 provides reliable communications to the GMC and UEM via encrypted SNMP V3.
Intuitive Drill Down Display of Alarms	The GMC incorporates an intuitive “Drill Down” display of alarms: Multi-Zone level, Zone level Map Screen, Site level, Device level, and Alarm level.
Intuitive Representation of Equipment	Chassis view graphics of the equipment are displayed on the GMC and GWS GUI, giving System Technologists an immediate understanding of the equipment and subcomponent which is in alarm.
Analog Display Screen	Graphical meters display the analog information of the site (i.e., Generator Fuel Level).
Equipment Control Screen	Equipment and devices can be controlled (turned On/Off, Open/Closed) from the control screen.
Immediate Update of Alarm Status	A combination of polling from the GMC and event reporting from the SDM3000 ensure alarm information is displayed on the GMC/GWS as quickly as possible.
Auto Archive of Alarms	Alarm information is automatically archived on the GMC server for future access by the Historical Alarm Report tool.
User-Defined Historical Alarm Reports	Historical Alarm data in the SQL database on the GMC can be easily accessed to produce reports with the Report Generator function.

Feature	Benefit
Multiple User Levels	Up to 8 user levels, ranging from Administrator to Guest, allow definition of operational capabilities from system configuration through system control to viewing and acknowledgment of alarms.
Alarm Summary Window	The Alarm Summary Window lists all time stamped alarms and can be sorted by Zone, Site, and Equipment, and by acknowledged/un-acknowledged alarms. This allows users to quickly identify any issues with their system.
Station Values Displayed	Station and Microwave values such as RSSI, BER, RF Power, and VSWR are displayed on the GMC/GWS, providing System Technologists with analytical information on the site they are troubleshooting.
Remote Configuration	A terminal window on the GMC/GWS allows remote configuration of analog QUANTARs and TeNSr Channel Banks.
Alphanumeric Paging of Alarms	The GMC/GWS can send specified descriptive alarm messages to alphanumeric-capable pagers over paging networks such as SkyPager or Skytel.
Client View of Multi-Zone System	Each GWS client can view alarms from each zone level GMC server, which minimizes the total number of clients needed in the system.

GMC Server and GWS Client

The MOSCAD NFM GMC server and GWS client is an NFM solution specific to Motorola communications systems. The NFM application graphic screens depict current system status; the user can easily navigate from a macroscopic system view down to the individual site details. RF site alarms are time stamped, stored in the alarm history database, and accessed by the Report Generator utility, which helps the user to filter alarms and events, then displaying, printing, and exporting them.

One GMC is required per Zone, and all the GWS clients (up to 16) view the real-time system alarms, status, and controls from all GMC servers.

GMC Server and GWS Client Graphics

The GMC/GWS NFM application has been developed to provide several layers of screens. The first layer is the System Overview Screen: a map showing the site locations with each site location icon selectable. The second screen layer is the individual site screen (Figure 1-1), graphically showing the exact equipment at each site with selectable equipment graphic icons. A third layer of screens is the individual site component hardware, such as GTR, Microwave, Rubidium standard, and other site support equipment, including environmental alarms. Alarm icons on the site equipment graphic show which module (i.e., Power Supply) is in alarm; selecting that icon provides a list of the alarms for that module. All alarms are also shown on the alarm summary screen.

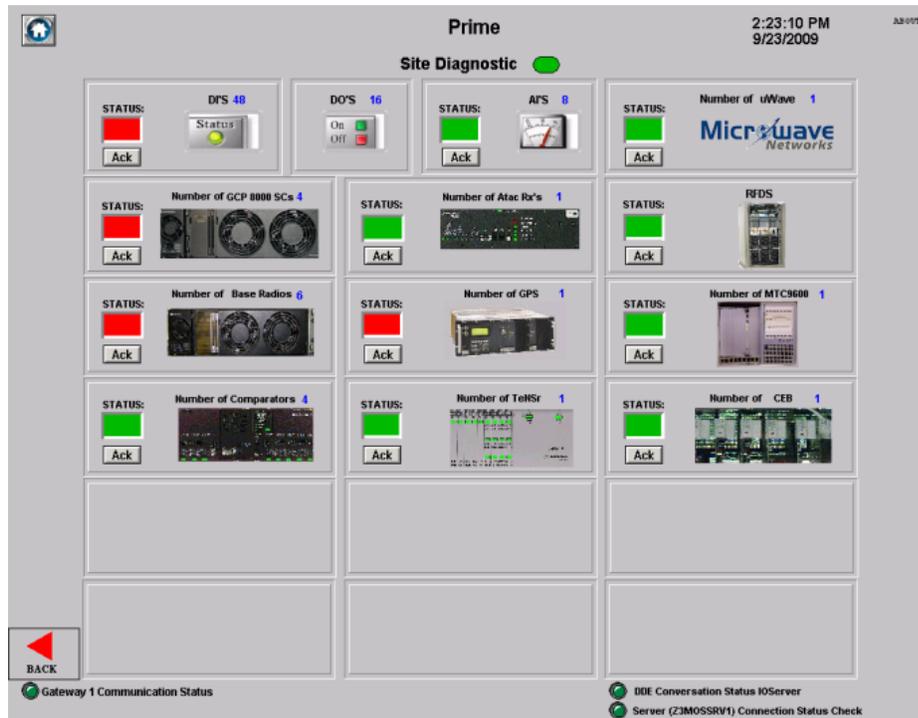


Figure 1-1: Sample Individual Site Screen

SDM3000 Site RTU

The heart of the MOSCAD NFM solution is the SDM3000 site Remote Terminal Unit (RTU), where RF components and environmental equipment are alarmed and controlled. The SDM3000 interfaces to IP devices via SNMP and FSP, to monitor alarms and capture values such as RSSI, RF Power, and BER. The SDM3000 serially interfaces (RS232) to remote site devices by emulating the specific device protocol, allowing the SDM unit to control, collect alarms, configure, and change parameters of the device (Figure 1-2). The SDM3000 collects alarms and initiates controls through the various inputs, outputs, and analog signals via the onboard Input and Output (I/O).



Figure 1-2: Sample SDM3000 Screen

The SDM3000 units take advantage of inherent communications capabilities to securely communicate via encrypted SNMP v3 from the remote sites to the UEM and GMC.

A built-in Web Server on the SDM3000 allows Service Technologists to use a browser to view alarms from all equipment and devices, while they are on site or remote over the ASTRO network infrastructure.

1.3.3 Configuration Management Applications

This section provides information about the applications that provide configuration management capability in ASTRO 25 systems. These devices are the Unified Network Configurator (UNC) and the Provisioning Manager (PM).

1.3.3.1 Unified Network Configurator

The Unified Network Configurator (UNC) is a network change and configuration management tool that enables users to efficiently manage the configurations of networks and devices in an ASTRO 25 system. The UNC is built on VoyenceControl, which is an automated compliance, change, and configuration management system. The UNC provides a single application for the configuration of all radio system and transport devices. Some of the key features that the UNC provides include:

Efficient, role-based user setup

Auto discovery of devices/configurations, reducing configuration errors and initial configuration time by providing minimal data entry

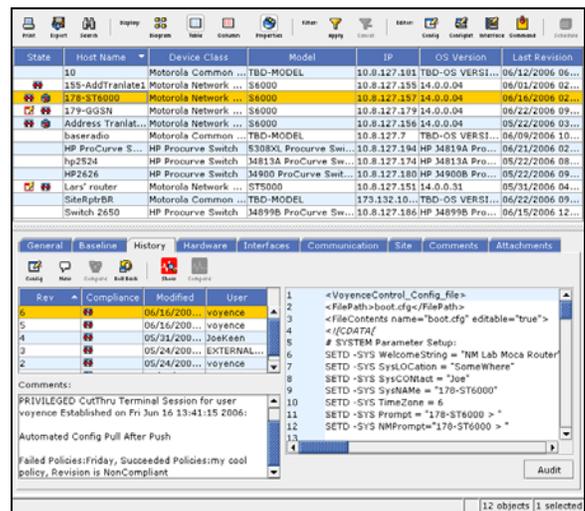
Historical configuration information is easily accessible, along with forensic information and the ability to roll back to previous versions. A valuable tool that the application provides is the ability to create a configuration and not implement it immediately. The UNC allows another user to approve and implement changes, which can help distribute those changes during off hours when system loading is minimal.

The UNC application allows system management personnel to see planned and current configurations simultaneously for quick comparison. This application offers easy editing screens and configuration “wizards” to reduce data entry.

Benefits of the UNC are outlined in Table 1-3.

Table 1-3: UNC Benefits

Feature	Benefit
Built-in Network Tool kit to enable features	Tools provide a methodical process to enable features in the system with minimal labor and chance of error. Examples of these are: turning on authentication on a set of protocols within the Gateways; locking Ethernet switch ports; setting delay; and jitter alarm thresholds.



Sample UNC Screen

Feature	Benefit
Auto Discovery of Devices	Components are automatically discovered, and their configurations are added to the database without the need for any manual entry of data.
Scheduled Distribution	Users can determine the time of day when they would like configurations to be sent to the devices, or delay the distribution of a configuration change until approved.
Distribution Monitoring	Allows users to view the status of configuration changes, such as whether the change is in progress, has successfully completed, or has failed.
Change Logging/Audit Trail	Maintains a log of various user interactions with the configuration system that can be used to help diagnose issues.
Configuration Versioning	Constantly tracks and logs versions that have changed and provides the ability to view or compare versions.
Management of Credentials	SSH and SNMP passwords can be managed. Automated mechanism allows seamless password and passphrase rolling, which can be performed automatically if desired.
Wizards for Common Operations	Radio system administrators can perform common operations using a simple web-based interface specifically developed for ASTRO 25 users. Provides an intuitive guide to assist in easy-to-follow setup procedures.
Rollback to Previous Version	Immediately reverts the device configuration to a previously created version.

1.3.3.2 Provisioning Manager

The Provisioning Manager (PM) is a centralized interface for all user and system configuration.

The PM provides the following:

- Configure system-level parameters for call capability.
- Configure system-level parameters for the master site, such as the parameters for home zone mapping and sub-band restricted ID mapping.
- Configure Console Users, Radios, Talkgroups, Multi-Groups, Agency Groups, and Broadcast Data Agencies.
- Configure access control for users in the PM.
- Configure ZoneWatch windows.
- Configure and manage the attributes relating to a zone such as MGEG Application Platform, Aux I/O Configuration, and Consoles.
- Ability to export some configuration data from the PM.
- Ability to import some configuration data to the PM.
- Optional API available to interface to the PM.

Features and benefits for the PM are outlined in Table 1-4.

Table 1-4: Provisioning Manager Features and Benefits

Feature	Benefit
Central Point for All User Configuration Information	Minimizes configuration conflicts created by multiple entry points. Enables simplified control and consistency for subscriber provisioning.
Radio User Capabilities	Efficient configuration capabilities across multiple agencies and system.
Reuse Configuration information Using Profiles	Minimize configuration data re-entry through the creation of profiles that are shared across several radio users and talkgroups.
Intuitive Navigation	Provides a tree-based navigation with objects arranged logically, allowing users to navigate to their required tasks.
Fleet Management	Allows the user to easily create talkgroup and agency group mapping.
Agency Partitioning	Offers the ability to create security groups to partition system management resources among various agencies and users.
Concurrent User Access	Enables distributed configuration management from multiple users.
MCC7500 Console Information Synchronization	MCC 7500 consoles are automatically synchronized with radio user configuration information from the system, minimizing data entry and allowing for a cohesive view of configuration information.
Manage Configuration Data Distribution	Provides users with control over the distribution of configuration information to the various network devices in the system.

1.3.4 Performance Management Applications

The Motorola performance suite enables a customer to monitor, manage, and report on system performance in near real-time. The applications empower system managers to proactively plan for expansion. The performance suite is composed of both Motorola and third-party solutions that are all certified, sold, and supported by Motorola. Each application has a unique set of features and benefits to facilitate efficient and effective system management. Together, these applications complete the big picture: how the system is performing, operating, and being used, by providing insight into the activity of each zone, site, subscriber, or talkgroup.

Motorola offers performance management as a standard feature of ASTRO 25 systems. Other standard features include ZoneWatch, Historical Reports, and Dynamic Reports. These features enable customers to manage their communications system business more efficiently. ZoneWatch displays real-time communications activity, while Dynamic and Historical reports collect traffic statistics over predetermined intervals for report generation. These applications are used to monitor, collect, log, and evaluate network performance and resource utilization; they collect statistics about radio resource usage for radio units, talkgroups, channels, sites, zones, and system-wide activity report generation. Dynamic and Historical Reports have archival and export features for saving reports for offline data analysis. Statistics are aggregated into detailed and summarized reports on both an individual zone and system-wide basis.

Additionally, Motorola offers enhanced Performance Management features for ASTRO 25 systems, which are described below. Enhanced Performance Management features are available to provide further insight into system performance. Applications perform a variety of tasks, such as polling system resources, detailed reporting, long-term archiving and logging, and data stream collection.

Historical Reports

Historical Reports generate reports on system-wide activity as well as individual zone activity (Figure 1-3). The reports contain statistical data gathered at specific, predefined time intervals. They monitor and analyze information about zones, sites, channels, talkgroups, and users to assist a system manager in understanding how the system is performing; and they are utilized to more efficiently manage resources. Individual reports cannot exceed 16,000 objects (radio users, talkgroups, etc.). Reports can be exported to CSV, HTML, PDF, and XML formats. Table 1-5 outlines the features and benefits of Historical Reports.

Time	Total Active Calls	Total Busy Duration	Total Parked Calls	Average Value Call Duration	Data Cleared Duration	Resource Req. Released Dur.	Percent Usage	Percent Complete	
7:00:00 3:15:00PM	0	0:00:00	0	0:00:10	€	0:00:00	0:00:00	33	100
7:00:00 3:30:00PM	0	0:00:00	0	0:00:10	€	0:00:00	0:00:00	33	100
7:00:00 3:45:00PM	0	0:00:00	0	0:00:10	€	0:00:00	0:00:00	33	100
7:00:00 4:00:00PM	2	0:00:13	0	0:00:10	€	0:00:07	0:00:00	28	100
7:00:00 4:15:00PM	0	0:00:00	0	0:00:10	€	0:00:00	0:00:00	33	100
7:00:00 4:30:00PM	0	0:00:00	0	0:00:10	€	0:00:00	0:00:00	33	100
7:00:00 4:45:00PM	0	0:00:00	0	0:00:10	€	0:00:00	0:00:00	33	100
7:00:00 5:00:00PM	0	0:00:00	0	0:00:10	€	0:00:00	0:00:00	33	100
7:00:00 5:15:00PM	0	0:00:00	0	0:00:10	€	0:00:00	0:00:00	33	100
7:00:00 5:30:00PM	0	0:00:00	0	0:00:10	€	0:00:00	0:00:00	33	100
7:00:00 5:45:00PM	0	0:00:00	0	0:00:10	€	0:00:00	0:00:00	33	100
7:00:00 6:00:00PM	0	0:00:00	0	0:00:10	€	0:00:00	0:00:00	33	100
7:00:00 6:15:00PM	0	0:00:00	0	0:00:10	€	0:00:00	0:00:00	33	100

Figure 1-3: Sample Historical Reports Screen

Table 1-5: Historical Reports Features and Benefits

Feature	Benefit
Real-Time Display	Monitor and analyze information about zones, sites, channels, talkgroups, and users to understand how the system is performing and utilized to more efficiently manage resources.
Reports	Create various types of reports at the zone or system level, organized by system resources to analyze activity and performance.
Data Intervals	Historical data is stored in time-based intervals. For each interval type, the oldest interval in storage is removed as a new interval is added to storage. The timed intervals are defined as follows: Every 15 minutes for 100 intervals (approximately one day; zone level only) Hourly for 241 intervals (approximately 10 days; system and zone level) Daily for 62 intervals (approximately 2 months; system and zone level) Monthly for 36 months (3 years; system and zone level)

Feature	Benefit
Accessing Data/Data Exporting	Users can utilize the Report Scheduler window to schedule zone-wide and system-wide reports to occur at specified times, with an output to a printer or data file. Reports can be exported to one of the following formats: Comma Separated Values (CSV) HTML Adobe Portable Document Format (PDF) Extensible Markup Language (XML)
Data Storage	Statistics are aggregated into detailed and summarized reports on both an individual zone and system-wide basis; they are available on an hourly basis for 10 days, daily for 62 days, and monthly for 1 year.

Radio Control Manager

The Radio Control Manager (RCM) is used primarily by dispatchers to monitor and manage radio events, issue and monitor commands, and make informational queries of the system database. The RCM runs on a local PC client and, depending upon the configuration in the User Configuration Manager (UCM), can access multiple zones.

Table 1-6: Radio Control Manager Features and Benefits

Feature	Benefit
Radio Commands	Regroup Cancel Regroup Selector Lock Cancel Lock Regroup and Lock Cancel Regroup and Lock Selective Inhibit Cancel Inhibit Storm Plan
Status Commands	Radio check Snapshot Zone Status
Events	Emergency Alarms ChangeMe Requests Status Events
Reports	The RCM Reports tool is used to create, view, print, schedule, and export standard reports from RCM. These reports use a common format so the data can be used in spreadsheets. The report information reflects the actual RCM server database information, except the Emergency Alarms. RCM Reports enables you to present and analyze data showing RCM activity on the system.

ZoneWatch

ZoneWatch is a performance management tool that has customizable displays and grids to monitor real-time communications activity in a single zone (Figure 1-4). The information displayed can help system managers become proactive in making better resource planning decisions, such as when additional channels need to be added.

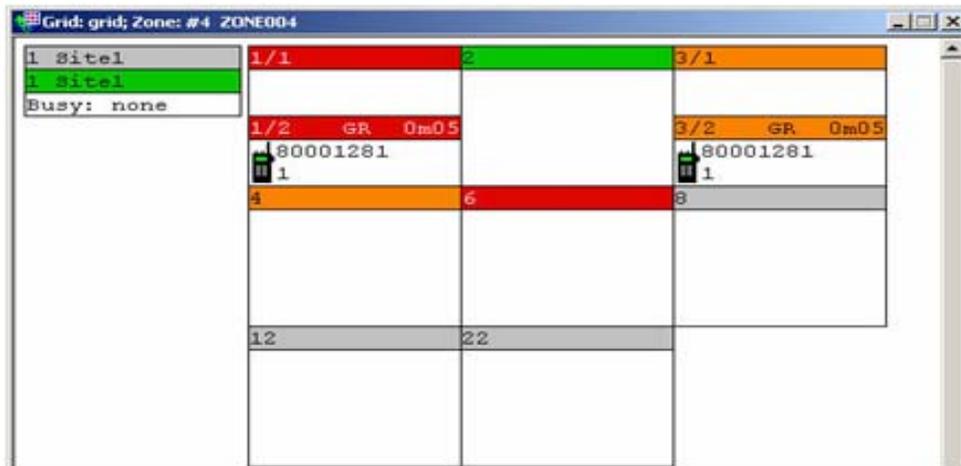


Figure 1-4: Sample ZoneWatch Screen

ZoneWatch also receives fault information relating to repeater sites, console sites, and the zone controller from the UEM. ZoneWatch is used to monitor call traffic and allows the system manager to organize displayed information using various criteria. Benefits of the ZoneWatch real-time display are provided in Table 1-7.

Table 1-7: ZoneWatch Features and Benefits

Feature	Benefit
Real-Time Display	Single Site View, Channel View, and Multisite view display all important radio call information. This provides the manager with insight about radio call activity, channel usage activity, and busy activity, to more efficiently manage the radio system.

1.3.5 Terminal Server

The terminal server allows the System Support Center Service to connect to Lake Havasu PD's configuration and performance applications. System Support will provide a Data Collection Device (DCD) with a connection to each core Ethernet LAN switch. A firewall will allow System Support to connect into the system and retrieve data traffic from the DCD and connect to serial devices (e.g. routers, Ethernet switches) through the terminal server.

1.3.6 TDMA Capability

Motorola is committed to user-driven standards to support interoperability, and is providing Lake Havasu PD an ASTRO 25 system with Project 25 TDMA (P25 TDMA). The proposed ASTRO 25 system infrastructure and APX subscriber radios are capable of P25 TDMA operation.

The proposed solution is built upon the proven ASTRO 25 platform. With the addition of P25 TDMA operation, the ASTRO 25 system leverages 2:1 TDMA channel efficiency to double voice path capacity (Figure 1-5), as compared to a P25 FDMA channel (Figure 1-6). This enhanced capacity improves the Grade of Service (GoS), leading to fewer busied calls and faster callbacks during busy situations, relative to a standard P25 FDMA system.

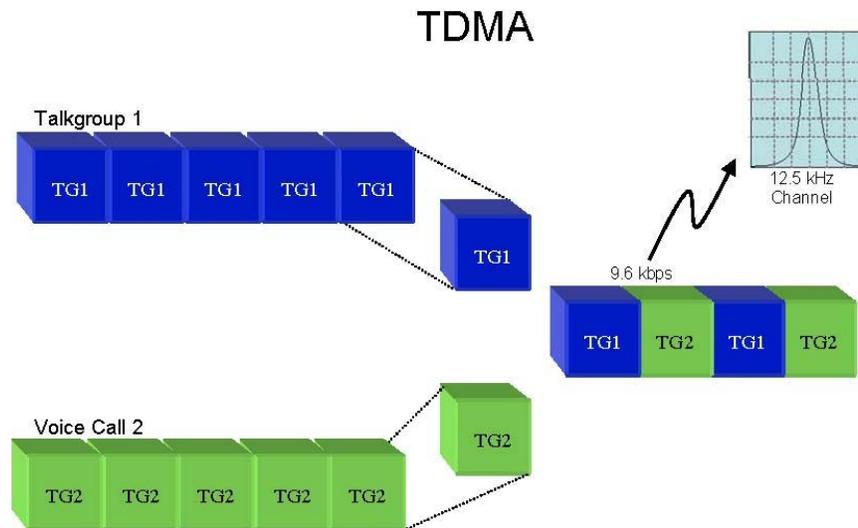


Figure 1-5: TDMA Operation divides a radio frequency into time slots and then allocates slots to calls.

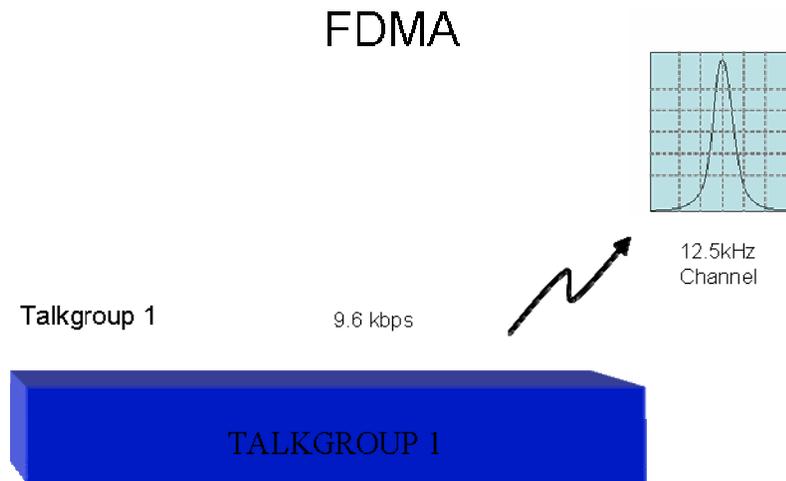


Figure 1-6: FDMA Operation divides spectrum into frequencies, which are then assigned to calls.

This improvement is due to the fact that TDMA provides double the talk path capacity in the same RF bandwidth allocation. Having this additional capacity improves GoS by reducing channel busies. Furthermore, callbacks are faster due to the greater availability of talk paths in the TDMA solution. If more voice path capacity is not required, the RF spectrum can be redeployed for packet data services at the same site, or be redeployed at another site that needs more voice path capacity. P25 TDMA also provides 6.25e (6.25 “equivalent”) operation for satisfying certain future FCC spectral efficiency requirements.

P25 TDMA provides the further advantage of increasing the potential voice path capacity of your system. An ASTRO 25 system utilizing P25 TDMA and implicitly defined channels (channels in 700 or 800 MHz bands) can provide up to 30 voice paths at a site. This is an increase above the 27 voice path capacity of a P25 FDMA ASTRO 25 repeater site (non-simulcast) and the 29 voice path capacity of a P25 FDMA IP simulcast subsystem. With P25 TDMA, the ASTRO 25 system meets your needs for maximum system availability.

1.3.7 Network Transport Subsystem

The ASTRO 25 transport core is engineered to meet the performance requirements of a real-time system transporting voice, call control, network management, and ancillary network services. The Transport Network is a closed network. Only Motorola-supplied equipment, applications, and services can be used on the core and site networks.

IP encapsulation across the customer-provided backhaul network is used to transport Radio Network Interface (RNI) traffic. The Wide Area Network (WAN) Transport can optionally provide encryption, as well as redundant links. In addition, Quality of Service (QoS) can be used to distribute voice packets to provide a constant and steady delivery of packets from the source to the destination.

Ethernet Switch

The Enterprise Ethernet Switch (LAN Switch) is used to aggregate all the Ethernet interfaces for all servers, clients, and gateways.

Core Gateway

The core gateway interfaces to the core LAN, providing layer three routing and protocol conversion between the core IP devices and the remote site IP devices.

Site Gateway

The site gateway interfaces to the remote site LAN via one Ethernet connection, and provides layer three routing and protocol conversion between the remote site IP devices and the core site IP devices.

Redundancy

To ensure system availability, the Transport Network provides:

- Redundant Ethernet switches
- Redundant routers

1.3.8 Information Assurance Elements

The integration of Information Assurance (IA) is another step towards continuing enhancement, ensuring these mission-critical networks remain operational so users can do their jobs better and more efficiently.

The next several paragraphs explain some of the processes, hardware, and software that can be implemented with an ASTRO 25 system. We will work closely with your security team to ensure this system experiences minimal disruption due to outside sources. The following sections list several of the key services that are provided in our IA package.

AntiVirus Supplemental Hardening

The Antivirus (AV) service detects, quarantines, and repairs viruses before they can infect a network. AV definitions require regular updates to ensure the network is continuously protected. All AV programs are tested on a similar system prior to implementation to verify they will not interfere with the network's functionality. Anti-Virus licenses are provided for the Domain Controllers and included NM client. For each additional Windows application (such as Radio Authentication), Windows client, server, or console that has been added to the core, a single copy of Symantec Endpoint Protection has been ordered. This provides the Anti-virus software and license.

Antivirus Service

The Antivirus (AV) service detects, quarantines, and repairs viruses before they can infect a network. AV definitions require regular updates to ensure the network is continuously protected. All AV programs are tested on a similar system prior to implementation to verify they will not interfere with the network's functionality.

1.3.9 Encryption Capabilities

When it is absolutely critical that communications not be monitored by unauthorized parties, radio systems can be configured with encryption. Encryption ensures only authorized units in the system can listen to transmissions being made. Encrypted calls are protected end-to-end throughout the network.

Project 25 Encryption Algorithms

ASTRO systems can be equipped with current Project 25 algorithms and are fully compliant with all Federal Information Processing Standards (FIPS). The following encryption is available: DES-OFB, DVI-XL, DVP-XL, DES-XL, AES, and ADP. The proposed system includes only AES encryption.

Software-Based Encryption Algorithms

Advanced Digital Privacy (ADP) is an entry-level encryption algorithm, offered exclusively by Motorola. ADP allows users to protect any and all communications from eavesdroppers and scanners for less cost than the hardware-based encryption algorithms. With Health Insurance Portability and Accountability Act (HIPAA) compliance being more closely scrutinized, many users are implementing this cost-effective security option for all of their users.

KVL 4000 Key Variable Loader

The KVL 4000 is Motorola's encryption Key Variable Loader for secure enabled Motorola products. Equipped with the Motorola MC55 handheld, the key loader is outfitted with state-of-the-art features and user interface for increased efficiency and programming flexibility. A large LCD color display, paired with an easy-to-use alphanumeric keypad, enables simple viewing and data entry. Built with legendary Motorola quality and security, the KVL 4000 is built to withstand everyday use in federal and public safety environments.

KVL4000 Features and Benefits

The KVL4000 utilizes the Motorola MC55 handheld computer with large 3.5 inch color display, touch screen interface, and QWERTY keyboard. The device is built to withstand everyday use in federal and public safety environments.

Features of the KVL 4000 are outlined in Table 1-8



KVL 4000

Table 1-8: KVL 4000 Features

Feature	Description
Automatic key generation	Automatically generates random keys for any algorithm Can auto-generate a single key or a bulk set of keys
Enhanced security	FIPS 140-2 Level 3 provides the highest level of security for your data User timeout automatically logs out the user after a specified period of inactivity User and administrator authentication allows users and administrators to perform and restrict firmware upgrades, changes, and key management
Dead battery operation	Ability to operate the KVL, including key management and key downloading while charging.
Key Management Facility support	With store and forward capability, the encryption keys are downloaded from the KMF, stored in the KVL, and delivered to the end units.

1.3.10 Individual Call Features

To further enhance user functionality, the ASTRO 25 platform has individual call features in addition to user talkgroup features, as described below. These features are configurable by the system administrator.

Call Alert

Call Alert allows a dispatcher or radio user to selectively page an individual's radio. Call Alert signaling is conducted over the control channel and does not affect voice channel capacity. The Call Alert produces an audible and visual alert on the receiving radio. Indicators on the initiating radio acknowledge delivery of the Call Alert. If the receiving unit has a display, it will show and store the sending unit's ID.

In-Call User Alert

In-Call User Alert is a feature that builds upon Call Alert. When In-Call User Alert is enabled on the system, radios will be able to receive Call Alerts even when involved in voice and data services.

Radio Talkgroup Muting

Radio Talkgroup Muting is a feature that utilizes the Call Alert feature. Radio Talkgroup Muting allows the radio user to mute all voice traffic for the currently selected talkgroup.

The radio can be automatically un-muted by the console dispatcher or another radio user by sending the muted radio a Call Alert. With In-Call User Alert enabled, the Call Alert will reach the muted radio when it is on the voice channel or a data channel, as well as if it is idle on the control channel.

Private Call

Private Call allows a radio user or console dispatcher to selectively call and carry on a private conversation with another individual radio, as long as that unit is not already engaged in another Private Call. The calling unit will receive an acknowledgment of a successful Private Call. If the receiving radio has a display, it will show the calling party's unit ID.

1.3.11 User Accessibility Features

Affiliation Display

The Affiliation Display provides a dynamic view of the sites to which all operating units are currently affiliated, making it easy to track and troubleshoot radios in the system. Specifically, it provides a dynamic view of:

- Sites
- Talkgroups
- Individual radios

This allows a manager to understand the loading characteristics of their system in real-time. Graphing capabilities are also included. Figure 1-7 provides a selected site graph example.

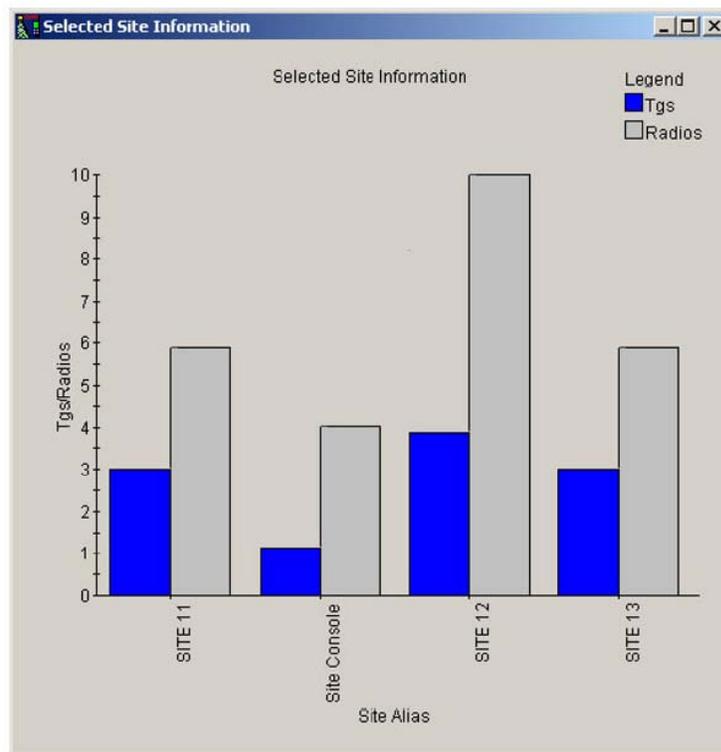


Figure 1-7: Selected Site Graph Example

SNMP Trap Forwarding

SNMP trap forwarding allows for the forwarding of alarms from the UEM application to an external third party application utilizing an industry standard protocol (SNMP v3 management system). This feature permits your existing network to actively monitor alarm conditions within the radio network; a developer's guide is provided.

Email Alerting

Email alerting sends notifications for system alarms in the UEM to a specified email address. Alarms can also be forwarded to a mobile device such as a cell phone or PDA.

1.4 ASTRO 25 SYSTEM FAILURE MODE ANALYSIS

Motorola's ASTRO 25 trunking networks have three modes of operation for increased reliability. The normal mode of operation is wide-area trunking. In the event of multiple component failures that lead to system disruption, the system is equipped to continue operation in two reduced feature operational modes: site trunking and failsoft.

The following pages include a detailed description of each of these operational modes, as well as a comprehensive analysis of the possible infrastructure failure scenarios and the system redundancy for mitigating each scenario.

Wide-Area Trunking

Wide-area trunking is the ASTRO 25 system's normal mode of operation. Wide-area trunking implies that the Fixed Network Equipment is operating properly. All simulcast cells and ASTRO 25 repeater sites are communicating with the Master Site. Subscriber units automatically roam between the various network RF cells. Talkgroup calls occur in the appropriate RF cells if users are distributed throughout multiple cells. Data applications are properly assigned channels for communication between the subscriber units and the host application.

Site Trunking

Site trunking is the first failover mode of operation. Site trunking impacts individual RF cells within a network. In multiple RF cell systems, one RF cell can be in site trunking, while the rest of the system remains in wide-area trunking. Site trunking implies that the simulcast prime site controller or the ASTRO 25 repeater site has lost connectivity with the Master Site. Talkgroup calls initiated in the RF cell that is in site trunking will only be broadcast in that RF Cell. Dispatch consoles use control stations, or the operators use portable radios to communicate on a site trunking RF cell. Console priority is not available in site trunking. Data applications are not available on a site in site trunking and will have to be reinitiated once the system reverts to wide-area trunking.

Radios detect if a site is in wide-area trunking or site trunking. Radio models with a display will indicate to the user when the site is operating in site trunking. The radio alternately displays the selected talkgroup and "Site Trunking." Depending on how the system and user equipment are programmed, subscriber units will try to roam to an RF cell that is in wide-area trunking.

Failsoft by Talkgroup

Subsystem/site failsoft is the final fallback means of communication if a site no longer maintains wide-area or site trunking operation. Multiple failures have to occur for the system to enter failsoft. Failsoft impacts individual RF cells within a network. In multiple RF cell systems, one RF cell can be in failsoft, while the rest of the system remains in wide-area trunking. The subsystem goes into failsoft mode in any of these scenarios:

- The site controllers are not functioning properly
- When all control channels are disabled or malfunctioned
- When only one channel is enabled

Failsoft operation provides communications in conventional mode via repeaters/base radios in order to maintain vital communications. In an IP multi-site simulcast subsystem, in subsystem-wide failsoft, received audio is routed to the comparator for voting and redistributed to all of the sites for simulcast transmission.

The subscriber's operation in failsoft mode is determined by the subscriber's programming. A subscriber can be programmed to behave in the following manner:

Failsoft by control channel operation – The subscriber first scans for alternate control channels outside the multi-site subsystem, then scans the control channel frequencies for failsoft data.

Failsoft by working group – The subscriber looks for Failsoft data on a pre-programmed frequency after a scan for alternate control channels outside the multi-site subsystem is unsuccessful. If the subscriber cannot decode failsoft data on the pre-programmed frequency, the subscriber then scans the control channels in the simulcast subsystem for failsoft data.

Subscriber units in an RF cell that is in failsoft will try to roam to an RF cell that is in either wide-area trunking or site trunking. Dispatch consoles use control stations or the operators use portable radios to communicate on a site trunking RF cell. Console priority is not available in site trunking. Data applications are not available on a site in failsoft and will have to be reinitiated once the system reverts back to wide-area trunking.

1.5 ASTRO 25 INFRASTRUCTURE

1.5.1 Master Site Components

A zone has a master site that contains the computing backbone for that zone. The master site contains all the components necessary for controlling calls within a zone and for communicating with other zones to manage InterZone calls in a multi-zone system. In addition, the master sites provide the hardware and software components that are used for Network Management and system configuration.

All the components that communicate over Ethernet are connected through a central switch called the master site Ethernet LAN switch. This switch provides two separate internal LANs which are integrated to provide redundant links for critical network traffic.

The zone controller is used to process system-wide commands and handle call processing and mobility management functions for the system. In systems with two zone controllers, there is a connection from each zone controller to the LAN switch and a direct connection between the two zone controllers. The LAN switch connection allows each zone controller to communicate with the gateway routers/Core Gateways.

1.5.1.1 Zone Controller

The Zone Controller provides trunking call processing for ASTRO 25 system operation. The Zone Controller forms the heart of a wide-area radio system by providing the central processor for the zone, with the necessary hardware and software capabilities to provide call processing and mobility management.

The Zone Controller builds upon the strength and experience of Motorola wide-area trunking systems to deliver multiple layers of reliability for business-critical, Mission-Critical and life-critical applications.

RELIABILITY THROUGH REDUNDANCY

The Zone Controller is supplied in a redundant controller configuration, and provides the following:

System Availability – The Zone Controller allows software upgrades once loaded, providing enhanced system availability.

Intelligent Switchover – The Redundant Configuration provides automatic switchover to the standby controller if a loss of wide-area communications is detected. Notification can be sent to the user if other components fail, allowing the user to manually switch to the standby controller if desired.

Cross Controller Compatibility – Capable of running two different versions of software simultaneously, ensuring upgrades are fully functional with one controller before upgrading the second controller.

Redundant Configuration – The Redundant Zone Controller is a computer platform with redundant processors that provide trunking call processing for ASTRO 25 wide-area radio communication systems. It is designed to detect failures by automatically switching operation to the standby controller, minimizing the interruption of call processing functionality.

1.5.2 ASTRO 25 RF Sites

ASTRO 25 RF sites provide communications for radio users both inside and outside the ASTRO 25 network. RF Sites may include ASTRO 25 repeater sites, simulcast cells, High Performance Data (HPD) RF sites, and ASTRO 25 conventional channel sites.

The RF Site types applicable to this system design are described briefly in this section.

1.5.2.1 Repeater Sites

An ASTRO 25 Repeater Site consists of a single site with up to 28 channels and two site controllers (in a redundant configuration), which can be standalone or housed in a GTR 8000 Expandable Site Subsystem (ESS).

The GTR 8000 Expandable Site Subsystem in a repeater site is set up in a single trunked site, with one active control channel and a number of voice channels at the site. If packet data services are supported at the site, a number of voice channels can be configured with packet data channel capability. Voice traffic is routed from each of the base radios to the system for distribution to other sites and is repeated by the base radios to support other local subscribers. However, data traffic is routed to the GCP 8000 Site Controller. The site controller routes these packets upstream to the zone controller for further processing and routing.

The ASTRO 25 Repeater Site consists of the following components, described in the Component Descriptions section of this System Description.

- GTR 8000 Expandable Site Subsystem (ESS)
- GTR 8000 Repeater/Base Radio
- GCP 8000 Site Controller
- Radio Frequency Distribution System (RFDS)
- Sub-Site Ethernet Switch
- GGM 8000 Site Gateway

1.5.3 ASTRO 25 Component Descriptions

Each site type in an ASTRO 25 system contains various components. Components included in this system design are described in this section.

GTR 8000 Expandable Site Subsystem

The GTR 8000 Expandable Site Subsystem (ESS) enclosure can contain reconfigured GTR 8000 base stations, site LAN switches, and GCP 8000 controllers, along with an optional Radio Frequency Distribution System (RFDS), depending on your configuration needs.

Voice traffic is routed from each of the site base stations to the system for distribution all sites associated with the call. Benefits of the ESS include:

- Integrated design provides a smaller footprint at the site.
- Front/top access design and minimized cabling reduces install and service labor.
- Increased power supply redundancy through common power bus.

GCP 8000 Site Controller

The GCP 8000 Site Controller (GCP 8000) is the control interface between the transmitter/receiver subsystem and the Zone Controller. The GCP 8000 Site Controller comprises redundant site controller modules; one site controller module acts as the active module, and the second module acts as a standby. The redundancy minimizes the possibility of a single point of failure at the site.

The GCP 8000 provides the following functions:

Manages the channels to maximize throughput and channel availability

Administers registration and context activation requests

Monitors base stations and RF distribution equipment and interacts with the MOSCAD site device manager to facilitate centralized alarm and control monitoring

Provides redundant site control

Enables redundant site link routing for patch redundancy

Additionally, the GCP 8000 provides the following functions at the simulcast site:

Provides a time and frequency reference signal to the base stations, maximizing frequency stability and allowing for further site separation in a simulcast configuration

Provides IP simulcast capability, enabling true end-to-end IP connectivity in a simulcast configuration.

GTR 8000 Site Repeater/Base Radio

The GTR 8000 Base Radio consists of a transceiver module, power amplifier module, fan module, and power supply. The transceiver module includes the functionality for the exciter, receiver, and

station control. The base radio software, configuration, and network management, as well as inbound/outbound traffic handling, are performed through this transceiver module. On-board serial and Ethernet ports are located on this module for local servicing via CSS. The power amplifier module amplifies the low-level modulated RF signal from the transceiver module and delivers the amplified signal on the path to the transmit antenna. The power supply module supports the transceiver and power amplifier modules, and can also provide auxiliary power to a connected site controller or Receive Multicoupler/Low Noise Amplifier (RMC/LNA).

Radio Frequency Distribution System

The Radio Frequency Distribution System (RFDS) provides interconnect between the base radios and antennas, allowing for a completely contained and more compact installation footprint. For the transmitters, this can include isolators, combiners, TX filters, diplexers, and power monitors.

For the receivers, this can include diplexers, site preselectors, and multicouplers. Various RFDS options exist for each of the GTR 8000 Base Radio, GTR 8000 Site Subsystem, and GTR 8000 Expandable Site Subsystem.

RF Site Gateway

The Site Gateway provides an interface that handles all of the IP Network Management traffic between the Core Site and the RF Site. The Site Gateway provides the following:

Media conversion – the gateway converts Ethernet to the selected transport medium.

Traffic prioritization – the gateway applies a prioritization marking to the packets leaving the site.

Fragmentation – the gateway fragments large IP packets per industry standards.

There are two Gateways at each of the two RF sites in the proposed system, to accommodate redundant site links.

Site LAN Switch

The site LAN Switch provides a LAN interface for site equipment and a LAN port for the site gateway. Through the switch, the service technicians gain access to service the site, and also access the system's Graphical User Interface (GUI).

1.6 MCC 7500 SOLUTION OVERVIEW

Motorola's proposed dispatch solution for Lake Havasu PD is our MCC 7500 Dispatch Console, offering IP-based seamless connectivity between Lake Havasu PD's dispatch operators and field personnel.

The MCC 7500 Dispatch Console will provide the Lake Havasu PD with a scalable, flexible system architecture, sophisticated network management and security, and an easy migration to future capabilities.

Cost Savings and Ease of Use

The MCC 7000 series consoles are designed to help reduce the total cost of owning an IP-based, feature-rich dispatch system without compromising quality and reliability. Specific benefits of the MCC 7000 series consoles include the following:

- The intuitive, easy to use Graphical User Interface (GUI) *enhances dispatchers' efficiency and accuracy.*

- Robust API *allows CAD systems to have complete access to console status and features* for further improvements in efficiency and accuracy.
- *Software-based upgrades* facilitate system and feature expansion.
- Installation is simplified and site costs are reduced because *console positions function without backroom electronics*.
- Console *configuration is performed at centralized Network Management clients*, and *changes are automatically distributed*, which saves valuable technician and administrator time.
- Offers *robust service logs that contain real-time information* to facilitate maintenance activities.
- Consoles within the ASTRO 25 dispatch site are *integrated into the ASTRO 25 fault management system*, which uses industry-standard event monitoring protocols, resulting in fewer dispatch site visits.
- *Flexible bandwidth requirements* minimize operating costs for remote console sites.
- *Conventional audio can be transported over the IP network*, which eliminates the need for channel banks or a separate circuit-switched network.

MCC 7500 Console Configuration for the Lake Havasu PD

The proposed solution offers Lake Havasu PD five MCC 7500 Dispatch Consoles to interface with Lake Havasu PD's ASTRO 25 system.

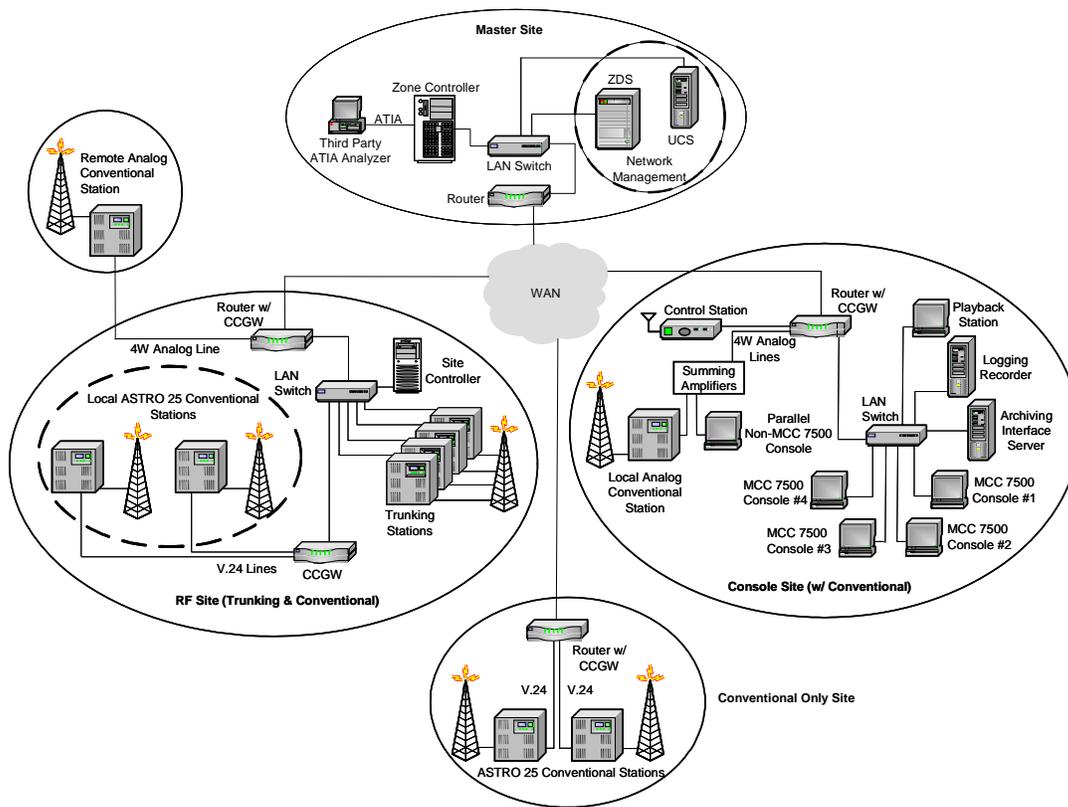


Figure 1-1: Radio System Infrastructure with Motorola MCC 7500 Consoles Sample Block Diagram

1.7 THE MCC 7000 SERIES DISPATCH EXPERIENCE

The MCC 7000 series standard features offer Lake Havasu PD state-of-the-art communications, console management and configuration functionality, dispatch operation, and communications security.

The proposed system also offers Lake Havasu PD the capability to maintain audio recording of the calls made on the communications system.

1.7.1 Interoperability Features

ASTRO 25 is specifically designed around APCO P25 standards. All voice messages are digitized, all Land Mobile Radio (LMR) system features are compliant with P25 standards, and the system uses the P25-defined, 9600-bps control channel format for all control channel commands. As part of ongoing enhancements to this solution, Motorola has joined and actively participated in the P25 interoperability committee to ensure continuously improving interoperability with the radios of other P25 vendors. ASTRO 25 is also fully Common Air Interface (CAI) compliant.

**MUTUAL AID
INTEROPERABILITY
OFFERS FLEXIBILITY
AND FUTURE
EXPANSION.**

Motorola can use multiple customer-furnished interoperability radios to install, configure, and make operational the necessary hardware and software to provide two-way communications between the MCC 7000 series consoles and Mutual Aid channels.

As shown in Figure 1-9, interoperable communications can be provided through a dispatcher-initiated interface (patch) to the Mutual Aid radios. The Motorola Conventional

Channel Gateway (CCGW) forms the bridge between the MCC 7000 series dispatch console on the ASTRO 25 radio network and the Mutual Aid radios. This allows the dispatcher to patch together Mutual Aid radios and required subscribers on the ASTRO 25 system as situations dictate. Each GGM 8000-based CCGW can connect with up to four analog or V.24 ports, and 10 IP-based Mutual Aid channels. The high density GGM8000-based CCGW can connect with up to eight analog and eight V.24 ports, plus 10 IP-based Mutual Aid channels. Multiple CCGWs can be installed per site to support Mutual Aid radios for seamless communications with various agencies. CCGWs can be placed at any RF or console site allowing flexibility of connecting to the MCC 7000 series consoles. CCGW interfaces can be installed at any location as long as there is network connectivity back to the Zone Core. Additional CCGWs can easily be added anywhere on the LMR IP network as Mutual Aid requirements change.

As an incident occurs, local Mutual Aid agencies can initiate a radio conversation to an MCC 7000 series dispatch location via a programmed channel. By selecting an icon on the console monitor, the dispatcher can initiate a patch to an RF channel for first responders as necessary. Incident conversations will be seamless from the moment of the patch initiation, and can be recorded like any talk group conversation within the LMR network. The dispatcher will also be able to take part in and monitor conversations for the duration of the incident, as necessary.

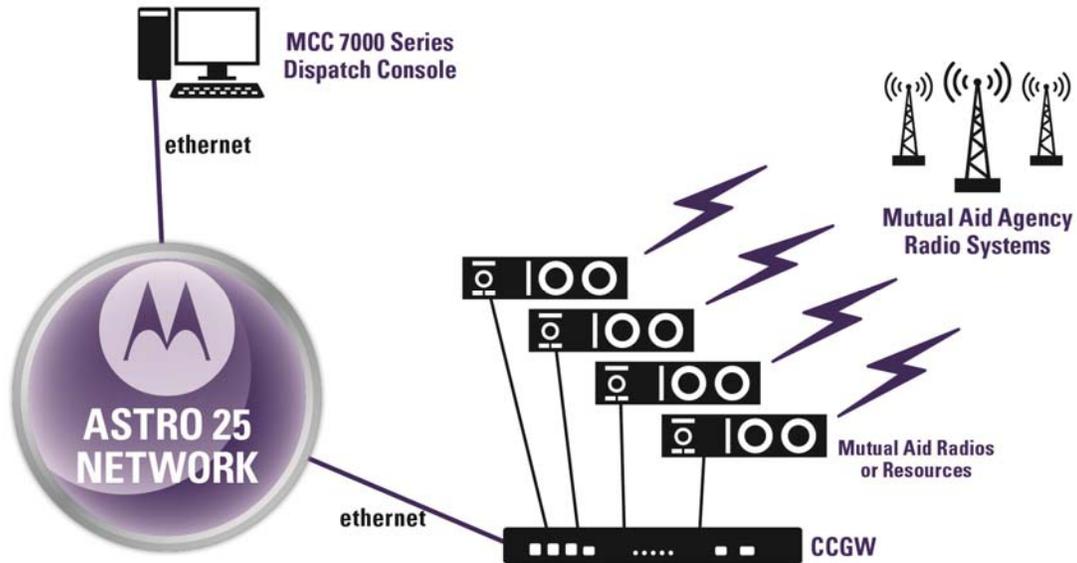


Figure 1-9: Mutual Aid Components

1.7.1.1 Integration with the ASTRO 25 Network

The MCC 7500 IP Dispatch Console will be seamlessly integrated into Lake Havasu PD's ASTRO 25 system, without interface boxes, digital voice gateways or backroom electronics for an integrated mission critical network. This tight union between radio infrastructure and dispatch console equipment has several operational benefits to Lake Havasu PD.

This modular IP approach substantially reduces the amount of space needed for backroom electronics. All dispatch activity is performed over IP. The physical space needed to accommodate the MCC 7500 console position is comparable to that required for a personal computer.

Both trunked talkgroups and conventional radio channels can be accessed and controlled from one MCC 7500 IP Dispatch Console over the same network. This reduces overall transport costs and the need for duplicate fixed network equipment. Table 1-9 outlines the benefits of the MCC 7500's seamless integration to the ASTRO 25 network.

THE MCC 7000 SERIES CONSOLES' IMPROVED USE OF BANDWIDTH ENSURES THAT EMERGENCY CALLS WILL MAKE IT THROUGH TO THE DISPATCH OPERATOR, REGARDLESS OF SYSTEM TRAFFIC.

Table 1-9: Benefits of Seamless Integration of the MCC 7500 IP Console with Lake Havasu PD's ASTRO 25 Network

Feature	Benefit to Lake Havasu PD
Tight coordination between the IP network and IP console eliminates the potential for audio degradation.	Subscribers and console operators will be able to communicate without loss of information.
Emergency calls are prioritized for successful delivery regardless of network traffic.	Console operators will always be able to hear emergency calls from users in the field.
Inherent access to all system resources within the network provides dispatch priority to reach any user when needed.	Console operators will always be able to reach out to users in the field.
Rapid call set up times and quality of service, regardless of the size of the system.	The ability to scale the system to handle future capacity, while maintaining efficient dispatch operations.
True end-to-end encryption capable from the subscriber to the console operator position, enhancing operational security	Assurance that sensitive, private communications will remain secure, from the user in the field to the console dispatch operator.
Improved bandwidth efficiencies reduce transport costs.	Ongoing cost savings for Lake Havasu PD.

1.7.1.2 Connection to ASTRO 25 System

Details on the connectivity between the MCC 7000 series dispatch console and the ASTRO 25 system are described below.

Co-Located Dispatch Console

Lake Havasu PD MCC 7000 series console site is co-located with the core site and interfaces to the network through a subnet interface into a subnet associated with the core site gateway routers. Redundant connections to the core are provided from the console site LAN switches and the core LAN switches.

LAN Switch

The site LAN switch provides LAN interfaces for dispatch site equipment and a LAN port for the link to the core site. Through the switch, service technicians can access the system's configuration manager and service the equipment.

1.7.1.3 Agency Partitioning

With Agency Partitioning, Lake Havasu PD's agencies will gain the interoperability benefits of being on the same system, be able to leverage cost savings in the maintenance of a shared system, and still maintain control of their own console configurations, channels, and encryption keys when applicable.

AGENCY PARTITIONING ALLOWS MULTIPLE AGENCIES TO OPERATE DISPATCH CONSOLES ON THE SAME SYSTEM.

The Agency Partitioning feature enables Lake Havasu PD's system administrators to control who has access to functionality for the console network as a whole. It controls access for conventional RF channels, trunking talkgroups, auxiliary I/Os, pre-programmed pages, encryption keys, and configuration data. Agency Partitioning helps keep an agency's resources available for its users, while preventing unauthorized people from accessing or modifying the network configuration.

1.7.1.4 Voice Encryption

The MCC7500 provides true end-to-end encryption from the subscriber to the console operator position, enhancing operational security. This assures that sensitive, private communications will remain secure, from the user in the field to the console dispatch operator. The following encryption is available: DES-OFB, DVI-XL, DVP-XL, DES-XL, AES, ADP. Only AES was selected for the proposed system.

1.7.1.5 Conventional Base Station Interfaces

The MCC 7000 series consoles are capable of accessing and controlling Lake Havasu PD's analog and digital conventional base stations through the use of conventional channel gateways (CCGW). This capability lowers Lake Havasu PD's cost of ownership in two ways:

- It uses the same transport network, reducing the requirements for dedicated backhaul.
- It reduces the hardware requirements for interoperability, lowering fixed network equipment costs.

The dispatch console processes audio received from the station, and controls various features on the stations, such as frequency selection, private line selection, and repeater on/off.

The low density and the high density versions of the Enhanced GGM 8000-based router can support up to 16 IP interfaced base stations.

Using the high density version of the Enhanced GGM 8000-based CCGW, up to 16 additional conventional channels can be connected to the analog and V.24ports. These 16 channels can be a mixture of analog, MDC 1200, ACIM link, digital, or mixed mode operation.

Additionally, the Enhanced GGM 8000-based CCGWs allow for recovery of MDC1200 and digital signaling, such as unit ID, and emergency alarm, which is passed to the MCC 7500 dispatch operator position(s).

1.7.2 Console Operations



The MCC 7000 series dispatch console is designed to provide mission-critical audio between the dispatch console and users in the field. It is optimized for real-time audio, prioritizing emergency calls over other traffic, minimizing voice queuing, and transmitting calls in 450 milliseconds or less.

Using robust error mitigation to maintain call quality even when the system is heavily loaded, the MCC 7000 series console reduces communication errors that may force dispatch console operators to repeat their transmissions.

1.7.2.1 Dispatch Interface

The MCC 7000 series console's graphical user interface (GUI) optimizes user efficiency. It is designed to display the maximum number of resources a dispatch operator is able to easily view and control. The Lake Havasu PD can customize the MCC 7000 series GUI by agency or by individual user to meet their dynamic needs and requirements.

Elite Dispatch Graphical User Interface

The MCC 7000 series Elite Dispatch GUI is an enhanced version of Motorola's Gold Elite Dispatch GUI. For existing Gold Elite users, the GUI allows a smooth transition and minimal training for radio dispatch operators. For new users, the graphical icons and customization options make the MCC 7000 series console GUI easy to learn and operate.



An example of the MCC 7000 series GUI is shown in Figure 1-10.

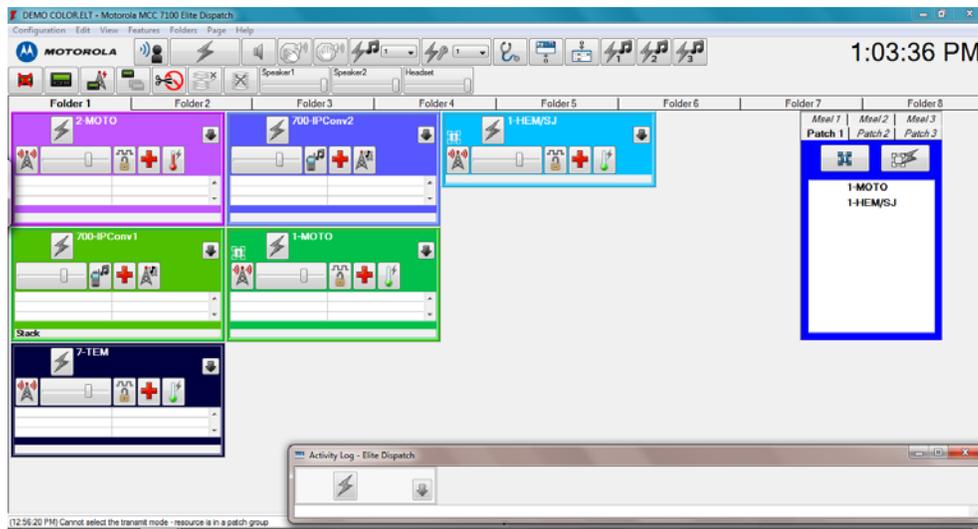


Figure 1-10: The MCC 7000 series GUI delivers critical real-time information is delivered to the console operator when and where they need it

Based on operator preference, the MCC 7000 series GUI can be customized to show details of trunked and conventional RF channels on a per-channel basis. Various controls can be highlighted, such as patch status, frequency select, coded/clear select, and individual volume control. Per-channel controls can be fully or partially shown, or hidden to save space on the screen. Busy dispatch operators can respond to a missed call by simply clicking on an entry in the Activity Log. The number of calls and call information displayed in the Activity Log is customizable to suit the needs of the user. The status of auxiliary inputs and outputs can be conveniently interpreted from the GUI with the use of familiar graphical icons, such as a door shown open or closed.

Inbound Event Display

For those users who prefer a call-based GUI over a resource-based GUI, the MCC 7000 series dispatch console supports the Inbound Event Display (IED) GUI. The IED GUI displays incoming radio events in a queue format. The dispatch console user can manage and respond to these events directly from the queue. Filtering and sorting features are available to allow the information in the queue to be tailored to the needs of the dispatch console user.

The console can be configured to operate in “quiet mode” when using the IED GUI. This is well suited to customers who operate in a Request-To-Talk (RTT) environment.

The types of events that can be displayed in the IED window include:

- Emergency Alarm events.
- Radio Status events.
- Radio Message events.

These events can occur on trunked radio resources, ASTRO 25 conventional radio resources and MDC 1200 radio resources.

An example of an IED window is shown in Figure 1-11.

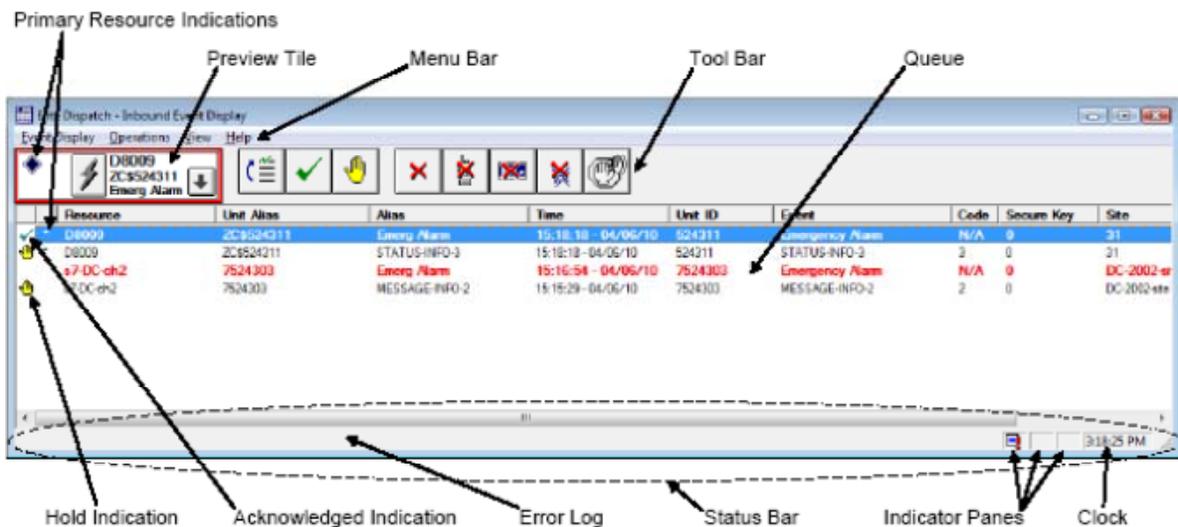


Figure 1-11: Example of an IED Window

Auxiliary Inputs/Outputs

Dispatch Consoles support Global Auxiliary Inputs/Outputs (Aux I/Os) for remote status indications or remote control through dispatch consoles. Global Aux I/Os are typically implemented by hardware that is independent of the dispatch console positions in a system and may be accessible to multiple dispatch consoles.

For dispatch consoles, Aux I/O functionality and support is provided by:

- Configuration of dispatch console Aux I/O parameters through network managers.
- Dispatch console display of status inputs/control outputs.

The Aux I/O Servers are used to provide the Aux I/O feature for the dispatch consoles. The consoles communicate to the Servers to perform the Aux I/O function.

1.7.2.2 Standard Radio Transmission and Reception

A typical MCC 7000 series console has two speakers, one for selected audio and the second for all remaining unselected audio. Additional speakers can be added to the console, allowing dispatch operators to configure a specific speaker for a set of designated audio sources. This simplifies multitasking between multiple audio sources, allowing flexibility in the way the audio is presented to the dispatch operator.

Receiving Calls from the Field and Other Dispatch Operators

Dispatch operators have great flexibility as to how to hear calls from field radio users and other dispatch operators. Each console dispatch operator can define his or her own audio reception profile. They can select a single audio source, whether conventional or talkgroup, to be heard on a selected speaker (“Single Select”). The dispatcher can also define groups of radio resources that can all be heard on a selected speaker (“Multi-Select”).

Initiating Calls to the Field and Other Dispatch Operators

The dispatch operator has several different ways of initiating a call. In most circumstances, a “General Transmit” is appropriate. With the general transmit, the dispatch operator selects a resource on the console and activates the transmission through a footswitch, headset transmit button, or a microphone transmit button.

If the dispatch operator needs to quickly transmit on a resource, they use the “Instant Transmit” function, which activates the resource regardless of whether it is selected. To prevent accidental activation of “Instant Transmit,” it can be limited through an “Instant Transmit Safety Switch,” which must be pressed prior to activation of “Instant Transmit.”

Making Calls to the Field and Other Dispatch Operators

The dispatch operator can transmit audio in different ways, depending on who they need to speak with and how important that communication is. Most basically, they can make calls to all users listening to a specific conventional radio resource or a specific trunking talkgroup. When multiple resources are required, the operator can select additional talkgroups and/or conventional channels as needed for the call using the multi-select feature.

The MCC 7500 console enables dispatch operators to make private calls to individual field radio users or dispatch operators. Once this private call is established, it can be patched in with another resource at the dispatch operator’s discretion.

Controlling Console Audio

The MCC 7000 series consoles offer the operator several different ways of controlling or muting the audio on their console. The operator can change the audio volume of any specific resource routed to a selected speaker and, if they desire, can mute and un-mute all non-selected resources on the console (“All Mute”) for 30 seconds.

The console enables the dispatcher to transmit on a resource while receiving audio from other resources. It also can prevent acoustic feedback when a co-located operator position transmits by muting the transmitting operator position’s audio on a shared resource.

Controlling Network Audio

Dispatch operators can control the audio on the ASTRO 25 network. Using the console, the operator can enable or disable radio users in order to compartmentalize traffic, reduce interruptions, and maintain communications between dispatch and the field. When this function is enabled or disabled, all dispatch consoles with this resource assigned are updated with the current status of the feature. This feature can be controlled from any dispatch console.

Based on operator preference, the MCC 7000 series GUI can be customized to show details of RF resources on a per-channel basis. Various controls can be highlighted, such as patch status, frequency select, coded/clear select, and individual volume control. Per-channel controls can be fully or partially shown, or hidden to save space on the screen. Busy dispatch operators can respond to a missed call by simply clicking on an entry in the Activity Log. The number of calls and call information displayed in the Activity Log is customizable to suit the needs of the user. The status of auxiliary inputs and outputs can be conveniently interpreted from the GUI with the use of familiar graphical icons, such as a door shown open or closed.

1.7.2.3 Dispatch Audio Experience

Emergency Alarms

The MCC 7000 series dispatch console is capable of monitoring radio subscribers for user initiated emergency activations. On subscriber radios that are equipped and programmed to transmit an emergency alarm, the MCC 7000 series console detects that this emergency has occurred and displays the emergency on operator positions that are preprogrammed to receive the emergency notification.

Operator positions can be programmed to either receive the emergency or to completely ignore it. In the event of an emergency condition from a radio user, all programmed consoles will give both an

audible and visual indication of the event. The dispatch operator can then silence the emergency leaving the visual indication on the screen indicating information on the initiating radio allowing the call to be handled and dispatched appropriately.

Once an emergency is received all programmed operator positions will give the audible and visual indication of the event. Any one of these operator positions has the ability to silence the emergency at only their position or for all operator positions on the system.

In the event of a system that all channels are busy at the RF site that receives the emergency, that event is automatically given a Priority Level 1. This is the highest priority possible, putting the emergency call at the top of any busy queue. The emergency call will be given the next available voice channel at that site bumping all non-emergency calls in the queue.

Desktop Speakers

Each dispatch console is capable of supporting up to eight audio speakers. In this design, two speakers are included per position. These speakers supply audio for select/unselect, as well as pre-determined audio sources to specific monitor speakers, each of which transmits unique audio—that is, an audio source cannot appear in multiple speakers at a single dispatch console. Monitor speakers – can tie specific talkgroups to a certain speaker, such as all fire resources to speaker 3.

Each speaker has individual volume controls, and contains an amplifier that provides a maximum of 2 Watts of power output. Speakers are self-contained units, and can be placed on a desktop, mounted in a rack/furniture, mounted on a wall, or mounted on a computer monitor.

Headset Jack

Each dispatch console is capable of supporting up to two headset jacks. A headset jack allows a dispatch console user to use a headset while operating the dispatch console. Each headset can either be connected to the console for supervisory applications, or to a desk telephone. The equipment design proposed includes two headset jack(s) per operator.

The headset jack contains two volume controls: one for adjusting the level of received radio audio and one for adjusting the level of received telephone audio.

The headset jack supports headsets which use either PJ7 (6-wire) or PJ327 (4-wire) longframe connectors (6-wire headsets have a PTT button while 4-wire headsets do not have a PTT button).

Headset Base

The Headset Base consists of an audio amplifier, a push-to-talk switch and a long cord with a PJ7 long frame connector at the end.

Headset Top

The Headset top consists of the earpiece(s), microphone and a short cable that connects to the Headset Base.



Gooseneck Microphone

The VPM is capable of supporting a desktop microphone. The desktop microphone contains a microphone cartridge on a flexible shaft and two buttons in its base. One button controls the General Transmit feature. The other button controls the Monitor feature. Figure below shows Microphone.



**Gooseneck
Microphone**

The desk microphone is permanently fastened down, or it is left loose so the dispatch console user can pick it up while using it. The 18-inch long, flexible shaft allows the base to be placed behind a keyboard or writing area and still be able to position the microphone head within a few inches of the speaker's mouth.

If a desk microphone is connected to a dispatch console while no headsets are connected, the desk microphone is active whenever any transmit function is active. If a desk microphone is connected to a dispatch console while one or two headsets are connected, the desk microphone is only active during a transmit function if its transmit button is pressed. This prevents the desk microphone from picking up unwanted background sound while the dispatch console user is using a headset to transmit.

The microphone head is compatible for use with CRT monitors.

Footswitch

Each dispatch console is capable of a dual pedal footswitch. The footswitch can be configured to control general transmit and monitor functions.

Instant Recall Recorder Port (for Radio)

Short-term, console-specific audio recording is a mechanism used to record a portion of the inbound audio present on a specific dispatch console and make it readily available to the dispatch console user. This recorded audio is retained by the recording system for a short period (typically about 60 minutes) and is easily played back by the dispatch console user. This allows the dispatch console user to replay received audio that the user may have missed.

The instant recall recorder port (for radio) allows an instant recall recorder to be connected to a dispatch console. The port provides an output containing the receive radio audio on the selected channels. Transmit audio of any type (from either this dispatch console or a parallel dispatch console) as well as tones generated by the dispatch console (emergency tones, callback tones, busy tones) are not included in the audio output.

Dispatch console generated tones (e.g., emergency alarm tones, trunking busy tones, error tones, etc.) are not included in the audio appearing at the analog audio output. This is done so that they do not interfere with the dispatch console user's ability to understand the voice audio that was recorded.

Telephone/Headset Port

The telephone/headset port allows an external telephone set to be connected to the dispatch console. The dispatch console's headset can then be used to communicate on both the radio system and a telephone system (i.e. a 911 system).

When a telephone call occurs at a dispatch position, radio audio is directed from the headset to the appropriate console speaker. The headset microphone audio is routed to the telephone, allowing the dispatch console user to communicate hands-free on the telephone set. When the dispatch operator ends their call, the headset reverts back to full radio operation.

When the dispatch operator transmits on a radio resource during a telephone call, the headset microphone is re-routed to the radio system for the duration of the transmission. Once the transmission is completed, the headset microphone is routed back to the telephone. During the transmission, the dispatch operator continues to hear the telephone audio through the headset.

1.7.2.4 Console Telephony

Advanced Conventional

This option will provide the dispatch operator the ability to control ASTRO 25 conventional channels and/or MDC 1200 channels.

1.7.2.5 Emergency Radio Transmission and Reception

As part of a mission-critical communications network, the MCC 7000 series console facilitates immediate prioritization and resolution of emergency communications between Lake Havasu PD's dispatch and first responders in the field. This enables dispatch operators and first responders to focus on their mission, not their equipment—especially during critical situations.

When a field user or another dispatch operator initiates an emergency call, the console emits both visual and audible indications (“Emergency Alarm”). The operator can then “recognize” the emergency call, which ends the audible emergency indication and notifies all console operators that the emergency is being addressed (“Emergency Recognize”). The audible emergency indication may also be muted by a console operator without recognizing the emergency alarm (“Mute Tones at a Single Op”). When an emergency is over, the dispatch console user can end the Emergency Alarm. The emergency mode remains active on the initiating radio unit until it is ended (reset) by the radio user.

Receiving an Emergency Call

When a field user or another dispatch operator initiates an emergency call, the console emits both visual and audible indications (“Emergency Alarm”). The audible indication works to alert the dispatch operator that an emergency is underway; the visual indication directs the dispatch operator's attention to the specific resource on which the emergency call is being made. The dispatch operator can immediately reserve a voice channel for the duration of the emergency.

The audible indication for an emergency is generated at the maximum level of the received audio, regardless of what volume the console has set that resource to. This is to ensure that the console operator does not miss the call. When the emergency call has been acknowledged, the volume for that resource is returned to its previous level.

Responding to an Emergency Call

When a console operator wishes to respond to an emergency call, they can bypass the standard console interface to auto-open a quick list, which contains specific controls for recognizing an emergency call, initiating an emergency call, and ending an emergency call (“Auto-Open of Quick List”). The operator can then “recognize” the emergency call, which ends the audible emergency indication and notifies all console operators that the emergency is being addressed (“Emergency Recognize”).

The audible emergency indication may also be muted by a console operator without recognizing the emergency alarm (“Mute Tones at a Single Op”). This would be used in a situation where one agency is monitoring a channel that belongs to another agency. If an emergency alarm comes in on the second agency's channel, the first agency could mute the tones at their dispatch consoles without having to wait for the second agency to recognize it.

Ending an Emergency Call

When an emergency is over, the dispatch console user can end the Emergency Alarm. The visual indication on the console GUI is removed, and the console informs the other operator positions that the emergency is over (“Emergency End/Knockdown”).

The emergency mode remains active on the initiating radio unit until it is ended (reset) by the radio user.

1.7.2.6 Radio Patch Control

MCC 7500 console users can patch communication between trunked and/or conventional radios that are normally unable to communicate with each other due to different features, programming, or even different frequency bands. A patch group is a group of linked resources that can both receive messages from a console and transmit to all other members of the patch group. The MCC 7500 supports a maximum of 16 active patch groups.

Setting up a Standard Patch

A dispatch operator can set up a standard patch between trunked resources and/or conventional resources. After the patch is created, the dispatch console transmits all audio on one resource to all other resources in the patch group.

Patched radio users see the ID or alias of the other patched radio(s), as opposed to that of the console, provided that the radio subscriber is capable of displaying IDs. This minimizes confusion and the need for the dispatch operator to intervene in the call. Patches are automatically re-established if interrupted so the MCC 7500 user can concentrate on continuing operations.

Pre-Defined Patches

Patches can also be pre-defined, and be automatically re-initiated each time a dispatch console computer is restarted (“Patch Auto-Start”).

Using Multi-Select

The Multi-Select feature allows a dispatch console to define groups of selected radio resources. When a Multi-Select group is opened, all of the resources in the group are simultaneously selected. Resources can be added or removed from a Multi-Select group while it is open or while it is closed.

The Multi-Select feature:

- Selects multiple resources simultaneously.
- Defines and stores groups of resources so that multiple resources can be conveniently selected and deselected.

1.7.2.7 Call Management and Control

Automatic Prioritization of Calls

Calls on the MCC 7000 series console are prioritized through a transmission hierarchy. Calls from primary supervisors take priority over those from secondary supervisors, which in turn take priority over non-supervisors. Instant Transmit or All-Points Bulletin (APB) transmissions, regardless of whether they are from a supervisor, will take priority over general or patch transmissions.

Multiple dispatch console operators can be designated as primary supervisors on the same system, which is useful when multiple agencies share one system, each with their own primary supervisor.

Console supervisors have the capability to disable and enable operator console functionality as necessary.

Manual Prioritization of Calls

“System Access Priority Select” allows a dispatch operator to prioritize trunked resources on the system as either “normal” or “tactical.” A dispatch operator can change the priority of a trunked resource to tactical in order to give the resource a better chance of gaining communication access on a busy system. Only emergency calls have a higher priority than tactical. When the System Access Priority status of a resource is changed, it is updated at all dispatch consoles in the systems that are monitoring that trunked resource.

Standard Call Indications

The MCC 7000 series console indicates the availability of any given resource, whether or not it is being transmitted on at the moment. It will also give an inbound call indication that provides the console operator with a visual cue of audio activity on a radio resource. This functionality makes it easy for an operator to see at a glance what the status of a resource is at any moment.

Resource Identification

To identify a resource, the console reads its unit ID, a string of digits that uniquely represent that resource. The console makes it easy for operators to read unit IDs by replacing them with user-friendly 16-character aliases. These aliases, which are defined during the configuration of the console system, can replace the unit IDs of the following resources:

- Trunking Talkgroup Resource.
- Trunking Announcement Group Resource.
- Trunking Individual Call Resource.
- Conventional Channel Resource.
- Conventional Channel Frequency Selection Control.
- Conventional Channel PL Selection Control.
- Unit ID.
- Aux I/O Resource.

On large systems, unit IDs can be conserved by grouping all individual call resources on a specific trunking talkgroup together under a certain ID. This flexibility simplifies the daily work of Lake Havasu PD’s dispatch operators.

Call Alerting

When an operator needs to reach a radio user or dispatch operator and they are not near their radio or console, the dispatch operator can “page” the unattended radio or console through a series of beeps and an indication of the sender’s ID. When the radio user or dispatch operator becomes available, they will see the unit ID of the calling dispatch operator’s console or radio ID, and be able to return the call. Additionally, a Call Alert can be used to trigger an activity. For instance, a Call Alert may cause a vehicle’s horn to sound and its lights to flash.

The console operator can even send a call alert to a user who is involved in voice and data communications over the network.

1.7.3 Console Logging

The MCC 7000 series dispatch console system proposed to Lake Havasu PD includes a redundant logging recorder subsystem that enables the recording and replay of audio and other information associated with real-time conversations over the network. These capabilities will provide Lake

Havasu PD's personnel with clear audio and enough information to easily understand the context and content of any recorded transmission. This proposal includes logging recorders capable of recording 50 simultaneous conversations coming through the AIS.

In addition to recording audio, the logging recorder has the ability to capture the following information if supported:

- Talkgroup and channel information.
- User identification such as unit ID and alias.
- Call type such as Talkgroup Call, Telephone Patch Call, Emergency Call, etc.
- Non-voice events such as Call Alerts, Radio Status Check, Radio Message, etc.

This information is available for display to the user upon playback, and can be searched by the user in order to retrieve the desired call.

The logging recorder's capacity is based on the number of radio transmissions it needs to record simultaneously, not on the number of channels that it will record.

A call can be saved either as a complete call (audio and any information associated with the call) or as a simple .wav file. Files saved as complete calls must be played using the Scenario Replay application included with the logging recorder. Files saved as .wav files can be played on any application that supports them.

Record and Replay of Archived Calls

The logging recorder provided to the Lake Havasu PD is an IP-based recorder that will record all IP traffic sent to it. It will provide Lake Havasu PD with the capability to record audio at the same level of quality as that heard at the console position. In addition, it will record information associated with the call beyond just the audio.

A replay station can access recordings on multiple recorders, even ones that are not being used with AISs. This provides the user with a complete view of everything being recorded from a single point.

Management of the Logging Recorder Subsystem

Security and fault management for the logging recorder subsystem are configured and managed by a common administration application, residing on either a playback station or a dedicated PC. Administrative personnel can use the management controls of the logging recorder subsystem to configure how calls are recorded.

On a global level, administrators can define which calls are recorded by which agency or department; on a more granular level, administrators can define the following recording behavior:

- Which talkgroups and conventional resources are to be recorded.
- Whether or not secure calls are recorded.
- Which talkgroups and conventional resources are critical and which are not.
- Access rights for replay station user accounts.
- Configures various operational characteristics of the recorders (watermark limits for the recording media, what to do when the recording media fills up, etc.).

Long Term Logging Port

Long term audio recording is used to record a portion of the inbound and outbound audio present on a specific dispatch console. These recordings are typically archived for long-term storage, and provide a historical record of the radio communications made at a given dispatch console.

The long term logging port allows an external logging recorder to be connected to a dispatch console. The audio that appears on this output is configurable, but is typically the audio that was transmitted and/or received at that dispatch console.

The configuration of audio to be presented at this port is tied to the physical dispatch console, so that no matter what user is logged into the console, the same type of audio is logged. The long term logging port can be configured to log any combination of the audio sources listed below:

- Audio received from the currently selected radio resources (note that the level of this audio is not affected by either the individual volume setting of the radio resource or the master volume control on the speaker or headset jack).
- Microphone audio being transmitted to the currently selected radio resources by this dispatch console user.
- Microphone audio being transmitted to unselected radio resources by this dispatch console user.
- Any tones generated by the dispatch console that appear in its speakers (trunking tones, emergency tones, etc.).
- Tones generated by an external paging encoder.

Note that this output may be used with an instant recall recorder as well as a long term logging recorder.

1.7.4 Console System Security

The MCC 7000 series dispatch console enables end-to-end encryption from the operator position to the ASTRO 25 network, so that at no point will Lake Havasu PD's communications be undermined by unencrypted transmissions. Each dispatch operator will be able to fully participate in secure communications while being confident that sensitive, vital information will not be heard by unauthorized individuals.

Secure Access to the Console

To use the dispatch console, an operator must enter a valid radio system user account name and password. The dispatch console validates that information with the radio system's network manager and allows the user to access only the resources for which the user has access rights. This also applies to third-party applications that use the dispatch console's API.

Secure Communications at the Console

The console itself encrypts and decrypts radio voice messages. Thus, radio voice messages are encrypted end-to-end, from the field radio user to the dispatch console. The console operator can choose whether or not to encrypt their transmissions on a particular trunked resource. Console operators can interface with agencies that have different encryption configurations without any manual intervention or delay. The MCC 7500 Console can support up to 60 calls simultaneously, using up to four different algorithms and multiple encryption keys.

To help reduce potential errors when managing encrypted communications, the MCC 7500 interface provides alerts when the console mode does not match that of a received call, and when a patch or multi-select group is being set up between a mix of clear and secure channels. The set of alerts available on the console are in Table 1-10, below.



Table 1-10: Security Indications

Indication/Alert	Indication/Alert Description
Receive Cross-Mode Indication	Indicates when an inbound call's secure mode does not match the console's outbound mode, so that the console operator can respond in the correct mode.
Clear Audio Alert	Provides visual and audible indication that a trunked radio transmission or reception is unencrypted.
Multi-Select Cross-Mode Alert	Indicates that different trunked resources in a multi-select group have different secure modes, preventing console operators from transmitting audio in both secure and non-secure modes.
Patch Cross-Mode Alert	Indicates that different trunked resources in a patch group have different secure modes, preventing console operators from transmitting audio that is intended to be secure in an unencrypted state.
Key Fail Indication	Indicates that a console cannot decrypt or encrypt a call due to a problem with an encryption key.
Panic Key Zeroizing	Erases all encryption keys at a specific console or AIS at the push of a button. The button is recessed in a panel to reduce the chance of accidentally pressing it.
Keypad/Indexset Selection via GUI	Enables the dispatch operator to manually select the keypad/indexset the dispatch console uses.
Key Management via KVL	Enables the operator to use the KVL to manage all keys for a dispatch console or archiving interface server.
Key Management via Store and Forward	Enables the operator to use a KVL and KMF to manage all keys for a console or archiving interface server.

Securing Communications at the Logging Recorder

Not only are real-time communications encrypted, MCC 7500 encryption extends to call logging—ensuring that even recorded communications are not vulnerable to retrieval by unauthorized people.

Like the console itself, the Archiving Interface Server also requires a valid radio system user account name and password be entered and validated by the radio system's network manager before it allows access to recorded information. After gaining access, a user can view and listen to only the recordings for which the user has access rights. This enables agencies to keep their logs private from other agencies on the same system.

The AIS is capable of supporting up to four different encryption algorithms simultaneously.

1.7.5 Console Configuration and Management

The MCC 7000 series console system is configured and managed by the same configuration manager, fault manager, and performance reporting applications as the radio system. The user can define exactly which resources are available and how they are presented to the dispatch console user. This provides Lake Havasu PD with a single point for configuring and managing the entire ASTRO 25 system. Changes are automatically distributed throughout the system. This centralized approach saves valuable time and effort for system administrators and technicians, and reduces the errors that can occur when radio IDs and other data are entered at multiple locations.

In addition, call traffic and performance reports for each console can be generated from the system's network manager. This enables administrators to quickly and easily ensure optimal effectiveness and efficiency.

1.8 MCC 7500 DISPATCH CONSOLE COMPONENT DESCRIPTION

An MCC 7500 Dispatch IP Console consists of the following elements:

- Operator position computer
- Voice Processing Module (VPM)
- Auxiliary Input/Outputs
- Logging equipment
- Network equipment
- Conventional Channel Interface equipment

This section discusses the various components that make up the proposed MCC 7500 Dispatch Console system, Figure 1-12. These components are connected together and to the rest of the ASTRO 25 system on an IP network via console site routers and switches. The MCC 7500 Dispatch Console functions as an integrated component of the total radio system, fully participating in system level features such as end-to-end encryption and agency partitioning.

Since the network is IP-based, the system's interfaces and components can be distributed physically throughout the network. Logging components can be centrally located at the zone core or distributed at console sites. CCGWs can be located at conventional-only RF sites, at trunking RF sites, the master site, or at console sites with conventional stations. Aux I/O Servers can be placed anywhere in the zone, closest to where they are needed.

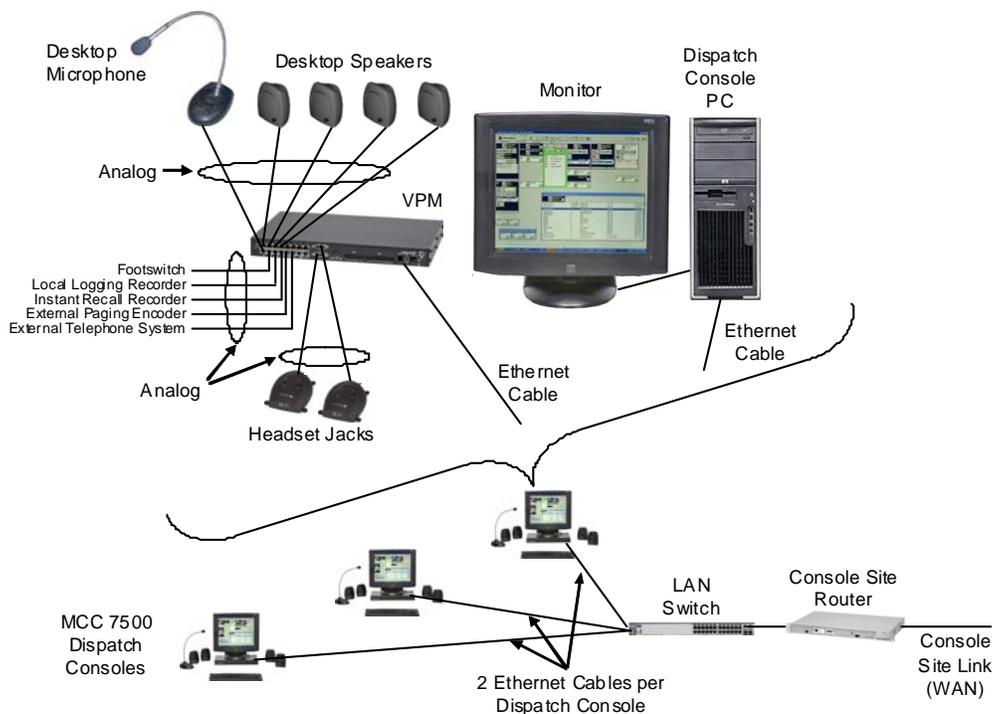


Figure 1-12: Motorola MCC 7500 Dispatch Console Hardware Architecture

1.8.1 Operator Position Components

MCC 7500 operator positions connect directly to the radio system's IP transport network without gateways or interface boxes. Audio processing, encryption, and switching intelligence for dispatch are performed within each software-based operator position, without additional centralized electronics.

An MCC 7500 operator position consists of a computer, a Voice Processing Module (VPM), one select speaker, up to three unselect speakers, a desktop gooseneck microphone and/or headset jack box with in-line PTT amplifier and headset, and optional footswitch.



MCC 7500 Operator Position Components

Voice Processing Module (VPM)

The VPM provides vocoding and audio processing services for the dispatch console. It connects to the console site LAN switch and communicates with the dispatch console PC via Ethernet. Each operator position includes a PC and a dedicated VPM. The VPM also provides connections for analog devices to be connected to the digital console.

The VPM has connectors for the following devices:

- One desktop microphone
- Two headset jacks
- Eight desktop speakers (four speakers max supported in the initial releases)
- Logging recorder
- Radio instant recall recorder
- Telephone instant recall recorder (not supported in initial releases)
- External telephone set
- External paging encoder
- Footswitch
- Generic transmit audio input

Some of the connectors listed above can be used to provide audio inputs and outputs for connecting other types of dispatch consoles to the Motorola radio system in conjunction with the Motorola MCC 7500 Dispatch APIs.

An optional secure card provides encryption and decryption services for the dispatch console. It is capable of supporting multiple, simultaneous encryption/decryption sessions using multiple algorithms and multiple secure keys.

Personal Computer (PC)

The dispatch console uses a customized Motorola-certified PC running the Microsoft Windows operating system, containing a Motorola-designed voice card and a Motorola-designed secure card. The PCs used in ASTRO 25 systems have a mini-tower form factor.

The PCs are processed through Motorola factories in Schaumburg so that the application software, voice cards, and secure cards can be installed and tested to ensure they are operating properly.

1.8.2 Archiving Interface Server (AIS)

The Archiving Interface Server (AIS) provides an interface between the radio system and the logging recorder. This allows calls on the radio system to be recorded together with information associated with the calls.

An AIS is comprised of a personal computer with Voice Card(s) or Secure Card(s). Each Voice Card or Secure Card has a network connection to the ASTRO 25 radio system transport network. Multiple AIS/recorder pairs may be deployed in a radio system (refer to Figure 1-13).

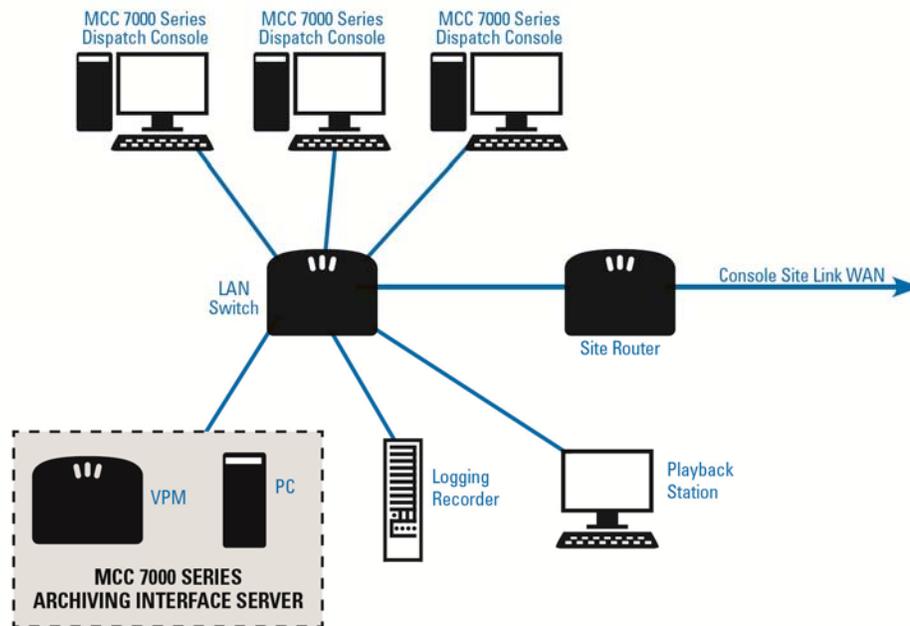


Figure 1-13: Motorola MCC 7500 VPM-Based AIS Hardware Architecture with Logging Recorder

The logging subsystem provides a user interface capable of allowing a user to identify actions/calls that occurred on the radio system, choose the desired call they wish to review, and play back the audio for that call through a logging playback station. The logging subsystem reconstructs the playback audio from the vocoded samples that had been sent to the logging subsystem when the call occurred.

Additionally, a telephony 16-track logging recorder has been included to record non-IP interfaces such as analog lines. Audio from these recorders can be retrieved from a common playback station.

1.8.3 Auxiliary Inputs and Outputs

An Auxiliary Input/Output server enables console operators to control and monitor external devices, such as doors and lights, from the console user interface. Multiple dispatch consoles anywhere in the network may monitor and control the same relay output and/or external inputs. Changes are indicated across all dispatch consoles simultaneously. Customizable graphic icons are also used to provide a visual indication of both the function and state of external inputs.

The contact closures and input buffers required to interface to these devices are housed in Remote Terminal Units (RTUs). These RTUs can be physically located close to where they are needed, at any console site or RF site. The dispatch consoles and RTUs communicate with each other across the

radio system's IP transport network. Individual relay outputs can be configured so that they require a safety switch to be pressed before they respond to any commands from the dispatch console user.

Supported Aux I/O Configurations

The following Aux I/O configurations are supported.

Aux I/O Configuration	Description
Momentary Input	This is an input where the user interface always shows the true state of the input.
Latched Input	This is an input where the user interface does not necessarily show the true state of the input. When the input goes active, the user interface shows the state as active. The display will continue to show the state as active even if the input changes to the inactive state. A dispatch console user must manually reset the display to return it to the inactive state.
Momentary Output	This output relay is activated when the dispatch console user presses the button on the user interface and deactivated when the dispatch console user releases the button.
Latched Output	This output relay changes state only when the dispatch console user presses the button.
Interlocked Latched Output	This latched output relay is part of a group of latched output relays. Only one of the relays in the group may be active at a time. Interlocked relays work in a "break before make" fashion; that is, the previously active relay is deactivated before the new relay is activated.

1.8.4 Conventional Channel Gateway Equipment

Conventional Channel Gateways (CCGWs) are used to interface analog and ASTRO 25 conventional channels to the ASTRO 25 radio system infrastructure. CCGWs provide 4-wire analog interfaces for analog channels and V.24 and IP digital interfaces for ASTRO 25 conventional channels. The platform that is hosting a CCGW may be solely dedicated to that task or it may also be used as a console site router or an RF site router, provided the WAN link is not redundant.

The enhanced GGM 8000-based CCGW is available for interfacing to conventional channels. The enhanced CCGW can support combinations of analog, MDC 1200, ACIM Link, digital and mixed mode channels simultaneously. Low density and high density versions of the enhanced CCGW are available.

- The low density version contains four analog ports and four V.24 ports plus an Ethernet port. Up to eight conventional channels can be connected to the analog and V.24 ports. The eight channels can be mixtures of analog, MDC 1200, ACIM Link, digital or mixed mode. In addition to the eight channels connected to ports, up to 16 IP based channels can be supported. This brings the total number of channels supported on the low density version to 24.
- The high density version contains eight analog ports and eight V.24 ports plus an Ethernet port. Up to 16 conventional channels can be connected to the analog and V.24 ports. The 16 channels can be mixtures of analog, MDC 1200, ACIM Link, digital or mixed mode. In addition to the 16 channels connected to ports, up to 16 IP based channels can be supported. This brings the total number of channels supported on the high density version to 32.

Analog Configuration

The enhanced GGM 8000-based CCGW provides two sets of ports that are used with analog channels. One set (called the Analog Ports) contains the analog inputs and outputs for the channels

along with a COR/Coded/Clear input and a PTT Relay output. The other set (called the Supplemental I/O Ports) contain analog logging recorder outputs and various inputs that can be used with the analog channel.

Each analog port contains the following inputs and outputs:

- **2-Wire Input/Output** – When the channel is configured for 2-wire operation, this input/output is used to send console transmit audio to the channel and to accept radio audio from the channel
- **4-Wire Input** – When the channel is configured for 4-wire operation, this input is used to accept radio audio from the channel.
- **COR or CIU Coded/Clear Input** – If the channel is configured for clear (non-secure) operation with COR (Carrier Operated Relay), then this input is used to accept the COR output from the channel. When used as a COR input, the input uses contact closure detection.
- **PTT Relay Output** – The PTT relay output provides a relay contact closure capable of supporting up to 1 Amp at 24 volts DC.
- **VOX and COR Operation** – A clear (non-secure) analog port must be configured to support either VOX or COR operation. The CCGW will not pass audio to the dispatch consoles or logging recorders unless there is an active VOX or COR condition.
- **LOBL (Line Operated Busy Light) Detectors** – The LOBL detector on the 2 or 4 wire inputs can be used to detect when a parallel non-MCC 7000 series dispatch console is transmitting on the channel via tone remote control.
- **AGC, DLM and Fixed Gain Operation** – When configured for AGC operation, the gain of the audio input is constantly adjusted to provide a constant output level to the dispatch consoles and logging recorders. When configured for DLM operation, the gain of the audio input is constantly adjusted to provide a constant output level to the dispatch consoles and logging recorders. When configured for fixed gain operation, the gain of the audio input is fixed and does not change.

The enhanced GGM 8000-based CCGW provides four (low density version CCGW) or eight (high density version CCGW) ports containing supplemental I/Os which can be used to provide additional functionality on analog channels:

- **LOBL (Line Operated Busy Light) Input** – The LOBL input provides an alternative method to the software LOBL detector for detecting when a parallel non-MCC 7000 series dispatch console is transmitting on an analog channel. This input can be configured for either voltage operation or contact closure operation.
- **High Speed Mute Input** – When the mute input is active, all audio at the configured audio input(s) will be muted.
- **Analog Logging Output** – The analog logging output provides 600 Ohm balanced analog audio consisting of the summed transmit and received audio from the channel connected to the paired analog port.
- **Coded/Clear Call Input** – The coded/clear call input provides certain legacy analog secure conventional channels a means of informing the MCC 7000 series dispatch consoles about the mode (coded or clear) of a call.

V.24 Configuration

The enhanced GGM 8000-based CCGW provides four (low density version) or eight (high density version) V.24 ports to which ASTRO 25 conventional channels may be connected. The V.24 ports on the CCGW are connected to the V.24 ports on the base station or comparator. The V.24 ports are also used for the ACIM link connections to consolettes.

Mixed Mode Configuration

Both the low density and high density versions of the enhanced GGM 8000-based CCGW support mixed mode channels. These channels are shared between digital radio users and analog radio users. When a digital call is generated either by the MCC 7000 series console or a radio user, the V.24 port provides the digital voice path to and from the radio system. Mixed mode operation does not use an IP link for digital audio routing. For analog radio calls, the 2 or 4 wire ports provide the analog voice path, while the V.24 ports will provide control and signaling information for the channel.

IP Conventional Gateway

Both the low density and high density enhanced GGM 8000-based CCGWs can support up to 16 G-Series-based ASTRO 25 conventional channels via the radio system's IP network. The IP interface uses the same Ethernet cable that the enhanced CCGW uses for everything else. The 16 IP-connected channels are in addition to any analog or V.24 channels that may also be connected to the enhanced CCGW.

Conventional Site Controllers

The conventional site controller allows dispatch console users to continue to access and control local conventional channels if connectivity to the radio system's controller is lost. This mode of operation is often called "fallback operation" or "site conventional operation". The conventional site controller is comprised of the GCP 8000 site controller hardware with different software to provide the conventional capabilities. When used as a conventional site controller, the GCP 8000 site controller is outfitted with a single site controller module rather than two site controller modules.

Only one conventional site controller is required per console site or conventional subsystem. This single conventional site controller is capable of supporting the full set of dispatch consoles, archiving interface servers and CCGWs that can be placed in a console site or conventional subsystem.

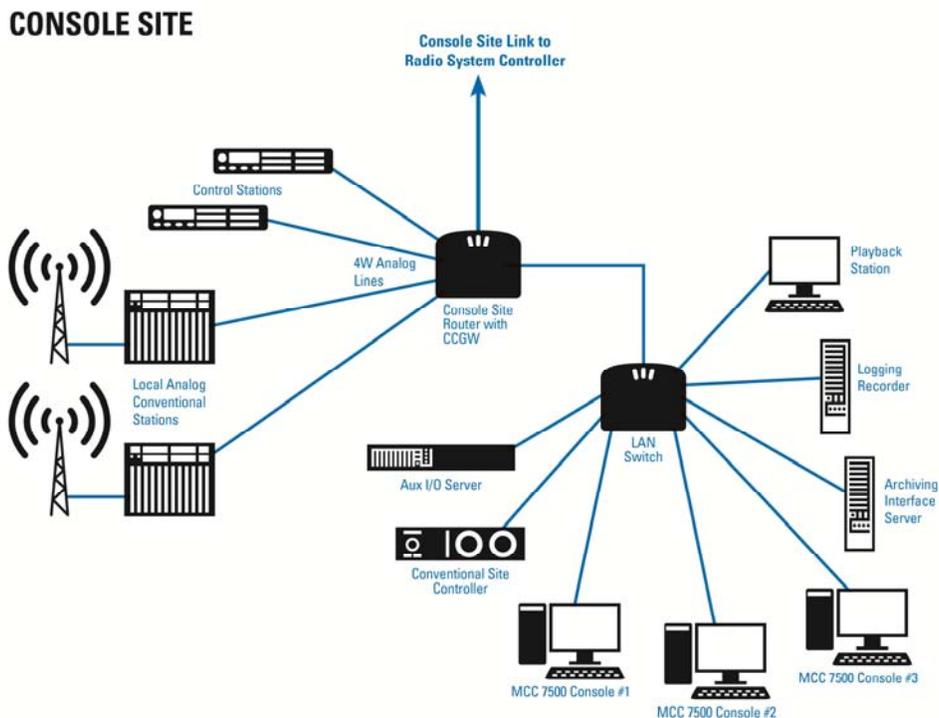


Figure 1-14: Example of a console site with a conventional site controller.

Features Supported in Fallback Operation

While in fallback operation, the dispatch consoles continue to support the vast majority of their capabilities and features. The following general feature groups are supported:

- Station Control Features on Conventional Channels
- Main/Alternate Conventional Channel Interfaces
- Integrated Paging Encoder (analog channels only)
- Channel Marker
- Alert Tones
- RF Cross Mute
- RF Cross Busy
- Acoustic Cross Mute
- Patch
- Select and Multi-Select
- Aux I/Os (that are located at the console site)
- Call Alert (ASTRO 25 Conventional channels only)
- Emergency Call (ASTRO 25 Conventional channels only)

1.9 LOGGING RECORDER DESCRIPTION

This proposal offers the Lake Havasu PD the Nice IP and NRX Logging Recorders, NICE Inform, and NICE Storage Center solution. This is being proposed as a redundant system.

Motorola has taken great care to propose an offering that will provide Lake Havasu PD with a solution that meets their interoperability needs

1.10 NRX LOGGING RECORDER PRODUCT OVERVIEW

NRX is a full-featured, compact recording solution designed to meet the needs of first responders, Integrated Command and Control Centers, law-enforcement agencies, and small contact centers. With its state-of-the-art architecture, NRX provides an affordable, easy-to-use and easily maintained solution. It comes with a wide range of features and benefits, and is designed to meet the needs of organizations seeking a powerful and cost-effective recording system.

NRX bundles utilize standard HP Server hardware with options available for server upgrades.

The standard server included in the NRX bundles has the following features:

- Windows 2008 64 bit OS
- SQL 2008 CAL licenses
- 48,000 hours of on-line storage
- RAID 1 for the hard drives (disk mirroring)
- Dual / redundant power supplies
- HP Rail kit for 4-post cabinet

NRX can record a variety of audio inputs. These include analog inputs (phone and radio), traditional digital telephones (TDM), and VoIP telephones - all within a single recording chassis. NRX also supports CTI integrations for digital and VoIP systems to capture more call data with each recording. The proposed system is analog only recording.



The NRX comes in two configurations 8 channel and 32 channel base systems. Each size comes with a specific server model. The purpose is to deliver a server that suits customer capacity and reduce cost for smaller recording requirements.

The small NRX bundle starts at 8 recording licenses and can be increased in increments of 8 licenses up to 32. The larger NRX bundle starts at 32 recording licenses and can be increased in increments of 8 licenses up to 192 recording licenses in a single server. The proposed system is designed for 16 channels.

Aside from recording licenses, analog and digital (TDM) recording requires audio input boards for the server. VoIP recording does not require audio input boards. Each audio input board provides 24 ports for 2-wire audio feeds. Only analog input was included in the proposed design.

Because an NRX server can support multiple interfaces in a single box, it is important to include the "channel flags" in quotes and orders. These \$0.00 cost items tell NICE Systems how the recorder interface software should be configured.

Some additional features of the solution include:

- G.729A compression (8Kb/s)
- Support for archiving audio to an external USB drive
- Support for archiving audio to a network storage device (i.e. external archiving is native to the product and does not require a separate Storage Center application).

Please note that the NRX does not come with a removable archive media such as DVD or DAT.

NRX can be part of an integrated solution with a Motorola MCC 7500 IP Logging Recorder. NRX can be integrated into any Inform Lite or full Inform system. The network storage capability that is native to NRX can also be incorporated into any Storage Center archiving strategy that is set up for the MCC 7500 IP logging recorder.

Please note that the NRX bundle does not include a user software package. NRX can use the Inform Lite package sold with the MCC 7500 IP logging recorder (a second database license must be ordered). Inform Lite or full Inform can also be ordered separately.

Also note that in small user systems, Inform Lite and Inform can be loaded on the NRX server. This can eliminate the need for a separate hardware for the Inform user applications (a separate PC in the case of Inform Lite or server in the case of full Inform). Please consult with NICE Systems on the limitations of deploying Inform and Inform Lite on the NRX recorder.

Lastly, NRX does not support the Scenario Replay software. It cannot be integrated with any existing recording system that is using Scenario Replay. To integrate NRX into this system would require the customer to upgrade from Scenario Replay to Inform Lite or full Inform.

1.11 NICE INFORM PRODUCT OVERVIEW

NICE Inform is a full-spectrum incident information management solution that captures, consolidates, manages, and analyzes incident information from multimedia sources for faster incident reconstruction, greater insight and improved response. NICE Inform is a browser-based application suite for Public Safety organizations that pieces together incidents in a highly visual and intuitive way; all laid out in a time sequence on a graphical display. NICE Inform is a modular suite of applications comprised of: Reconstruction module - for quick multimedia and multi-source search and incident recreation for investigation purposes; Organizer module - for further incident information management in automated and secure manner; Monitor module - for Supervisor



visibility to real-time communications in the call center; and administrator applications which include system administrator, user administration, and audit applications.

NICE Inform provides for:

- Streamlining of investigations
- Improving interoperability within and between agencies by facilitating secure on-line information sharing
- Automation and simplicity of incident management process
- Secure and tamper-proof infrastructure for sensitive evidence
- Improved services to the public

1.11.1 Reconstruction Application

NICE Inform Reconstruction application is the main search and playback tool in NICE Inform. The Reconstruction application enables searches for recordings stored on various NICE logging recorders, then plays them back as a complete scenario or as a single recording channel. When a search is completed, the results are presented in both a table format and a graphical timeline format. NICE Inform is 'layered on top' of the NICE recording capture devices and views them as one logical system.

1.11.2 Organizer Application

Organizer is an incident management application that provides the ability to manage incident information. It works independently from the recording platform, providing the ability to collect and organize materials related to an incident. Distribution can be done in a variety of ways, such as by saving the calls into one or more ".wav" files, to an audio cassette recorder, DVD, email, etc. as well as by sharing specific incident folder on-line with users that have access to the NICE Inform server. All actions in the incident preparation, modification, or distribution are tagged with unique file numbers, incident numbers, and other reference information for historical tracking and quick lookup.

1.11.3 Monitor Application

A multi-channel audio live monitor application used by Supervisors allowing visibility in real-time of the communications managed by the call takers, dispatchers, or both. The Monitor application also allows for recent call replay so supervisors can verify the details of specific interaction.

1.11.4 System Administration

The Inform system administration application enables administrators to install and set up the physical NICE Inform servers and to add labels to the various system entities. The principal activities involved with system administration include:

- Privileges
 - Creation, editing, and deletion of recording systems
 - Importing and exporting resources from or to a file
 - Importing and exporting resources from or to a system
- User Administration
 - Set up system-wide and user-by-user security for Inform
 - Creation, editing, and deletion of user and group accounts

1.11.5 Audit Application

Enables the user to view and manage the Audit events raised within the Inform system. These are events related to any kind of user interaction with the system including login/logout, tasks, etc.

1.11.6 Client Applications

The client application runs on a PC and provides the interface to the user. The applications communicate with the Inform server, providing a single communication link between the user application and the system.

1.11.7 NICE Inform Server

As a .NET application, Inform delivers applications to users via a server. Users log into a server via Internet Explorer at the desktop. The Inform server requires appropriate MMS SQL licensing.

1.12 NICE STORAGE CENTER

NICE Storage Center is a cost-effective archival management system that enables users to define which of the captured interactions to archive, along with their target location and storage period. A single NICE Storage Center can support multiple capturing units of different types. Its redundancy capabilities together with the ability to leverage existing storage resources offer a robust solution for organizations that need high availability and disaster recovery solution.

1.12.1 Benefits

Whether Lake Havasu PD is searching for a turnkey solution, or prefers to use the storage devices they already have in place, NICE Storage Center offers something that is right for their organization.

- Efficient – Efficient allocation of storage space across multiple sites and platforms
- Centralization – Centrally manages interactions across multiple capturing units and locations for multi-site deployments without the need to manage each site separately
- Open – Leverages enterprise storage resources in any architecture such as Network Attached Storage (NAS), Storage Area Networks (SAN), Content Addressed Storage (CAS)
- Robust – Leverages NICE Storage Center's redundancy capabilities for high availability and disaster recovery
- Automated archiving – Eliminates manual and time-consuming tape management by automating archiving and retention of interactions, based on business needs
- Improves reliability – Avoids issues related to faulty archiving media by fully benefitting from the use of a dedicated disk-based storage solution
- Fast retrieval – Automatically retrieves archived interactions upon request without the need for human intervention and with full user transparency
- Compliance – Meets regulatory requirements for disaster recovery, business continuity planning (BCP) and data retention
- Safeguards investment – Easy to move to newer, more advanced storage devices as they appear in the market without the need for costly upgrades

1.12.2 Features

NICE Storage Center provides comprehensive sets of capabilities to meet specific archiving needs:

- Business driven archiving – User-defined business-driven rules for archiving what, when, where and how to archive using extensive sets of criteria
- Selective retention – Automatic rules-based deletion of interactions based on any CTI criteria and age of recording
- Multi-site and multi-system support – Supports multiple capturing systems and multiple sites for centralized data and archiving management
- Scheduled data transfer – Scheduling engine for off-hours processing minimizes impact on the network during peak hours
- Full redundancy – Multiple MICE Storage Centers can be used in primary/secondary mode to maximize system reliability for both archiving and retrieval operation

1.13 MCC 7500 LOGGER FOR 50 CHANNELS

Our logging recorder solution consists of the redundant MCC 7500 IP Logging Recorder – providing a mission critical IP-based digital logging solution. Motorola has teamed with NICE® Systems, Inc. to provide the MCC 7500 IP Logging Recorder, which is the only fully integrated and certified IP radio recording and replay solution for Motorola’s ASTRO 25 network.

The MCC 7500 offers a range of advantages, including a recording system that can be easily operated by non-technical users functioning in a mission-critical environment. It also enables advanced scenario reconstruction with the synchronized playback of multiple channels, providing new possibilities for fully understanding the chain of events and rapidly creating evidence recordings.

The logging subsystem provides a user interface capable of allowing a user to identify actions/calls that occurred on the radio system, choose the desired call they wish to review, and play back the audio for that call through a logging playback station. The logging subsystem reconstructs the playback audio from the vocoded samples that had been sent to the logging subsystem when the call occurred.

Our solution consists of two IP logging recorders with dual power supplies. The recorders are capable of recording audio from 50 simultaneous calls.

Archiving Interface Server

The two Archiving Interface Servers (AIS) in the proposed design provide an interface between the radio system and the logging recorders. This allows calls on the radio system to be recorded together with information associated with the calls.

The AIS passes the call control information to the logging subsystem including talkgroup or channel identification, user identification (unit ID, unit alias), and call type (talkgroup call, emergency call, etc.). This information is available for display to the user upon playback, and can be used as search criteria allowing the user to search the recorded information for the desired calls.

1.14 PTP810 SITE LINK EQUIPMENT DESCRIPTION

Motorola is proposing a solution for the Lake Havasu PD (“Lake Havasu PD”) that consists of a PTP 810 Licensed Ethernet Microwave system. A description of the features, benefits, system architecture, and hardware components are provided in this system description.



1.15 PTP 810 PROJECT OVERVIEW

This proposal offers the Lake Havasu PD with a Motorola PTP 810 system. The proposed system is a Point to Point Licensed Ethernet solution operating in the 11 and 18 GHz licensed band. These links will tie in the two repeater sites back to the main site at the dispatch center.

Motorola has taken great care to propose an offering that will provide the Lake Havasu PD with a radio solution that meets their needs.

1.16 PTP 810 PRODUCT OVERVIEW

Cambium Networks carrier-grade PTP 810 licensed microwave solutions provide reliable, high-capacity connectivity and backhaul for both your Ethernet and TDM applications. The systems operate in radio frequencies between 6 and 38 GHz at scalable Ethernet data rates up to 700 Mbps full duplex. The modular design offers pluggable modem units that support T1/E1, STM-1, and Ethernet on a single platform, giving you great flexibility to configure the best system for your needs at the optimal cost. The systems are available in both Split Mount and All-Indoor (PTP 810i) architectures. PTP 810i All-Indoor solutions provide an optimal solution when tower access is difficult whether due to weather or other inaccessibility. Available in FCC and ICC 6 and 11 GHz authorized bands, these licensed solutions can obtain up to 477 Mbps with XPIC enabled.

The demand to support more multimedia communications and mobility and deliver higher throughputs for bandwidth intensive applications is growing exponentially. Now operators can leverage their legacy investment while taking advantage of the cost efficiencies and performance benefits of packet-based Ethernet technology. Service providers, public safety and government agencies, heavy industry such as utilities and transportation, and other enterprises will find PTP 810 an optimal solution for making this migration. Capital expenditures and operating expenses can be reduced to support a number of applications including:

- Leased Line Replacement
- Building to Building and Campus Connectivity
- Network Redundancy
- Wireless Network Extensions
- Video Surveillance

PTP 810 features:

Modular Modem Unit Design – Supports T1/E1, STM-1, and Ethernet on a single platform offering flexibility for your unique configuration requirements

- **XPIC** – This functionality allows you to double throughput capacity without increasing channel bandwidth by transmitting different data on both the horizontal and vertical polarizations in the same channel
- **Link Aggregation** — Supports true link aggregation over a single link while most comparative systems require two ports to get similar throughput
- **Robust Capacity** – Highly scalable throughput up to 700 Mbps full duplex with XPIC
- **Configurable Channel Widths** – 7 to 80 MHz
- **Built In Cross Point Switch** – Enables channel mapping without the addition of more equipment



- **Multiple System Configurations** – Supports 1+0 Non-Protected, 1+1 Protected, 1+1 Protected w/Spatial Diversity, 1+1 w/Frequency Diversity, 2+0 for Link Aggregation, 2+0 Ring, Protected PDH Ring, SNCP-Like Protected T1/E1, Protected Ethernet Ring
- **Enhanced QoS** – Protects your voice and high priority traffic

1.17 PTP 810 LINK PLANNER

Included in Motorola's One Point Wireless Suite or available as a standalone tool, PTP LINKPlanner is a free link planning tool for designing and optimizing PTP 810 solutions operating in any RF band between 6 and 38 GHz. PTP LINKPlanner's advanced features intuitively guide you through the link planning and optimization process. With LINKPlanner, Lake Havasu PD will find it easy to:

- Automatically load path profiles and environmental factors such as rain fade
- Configure a reliable, high-performance link over a line-of-sight path
- Design one link or multiple links simultaneously – a feature that is not available in many comparable link-planning tools
- Conduct “what if” scenarios and immediately see the effects of the changes
- Obtain details that accurately predict link performance
- Receive information that helps to complete Lake Havasu PD's licensing application
- View Lake Havasu PD's wireless network via Google™ Earth
- Obtain a complete licensed microwave Bill-of-Materials (BOM) – a real time saver during the purchasing process



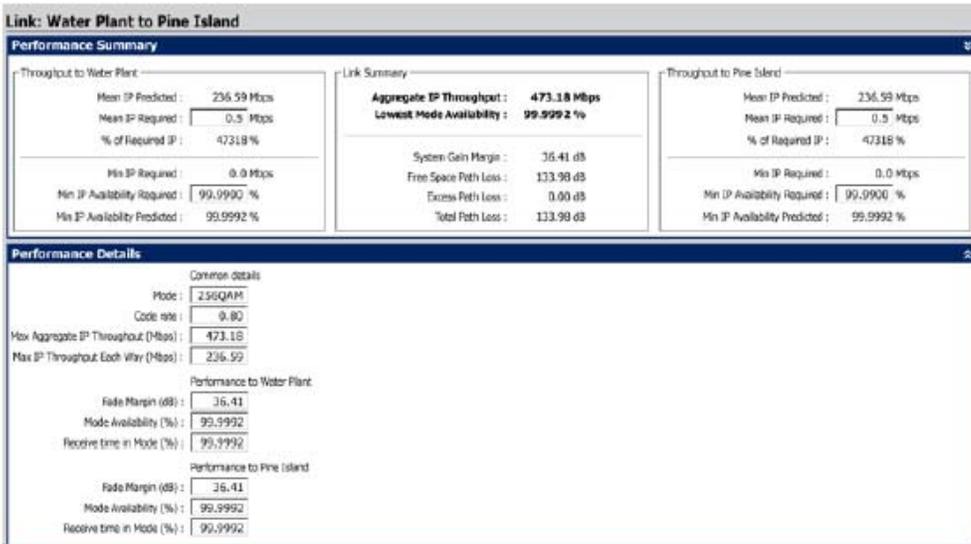
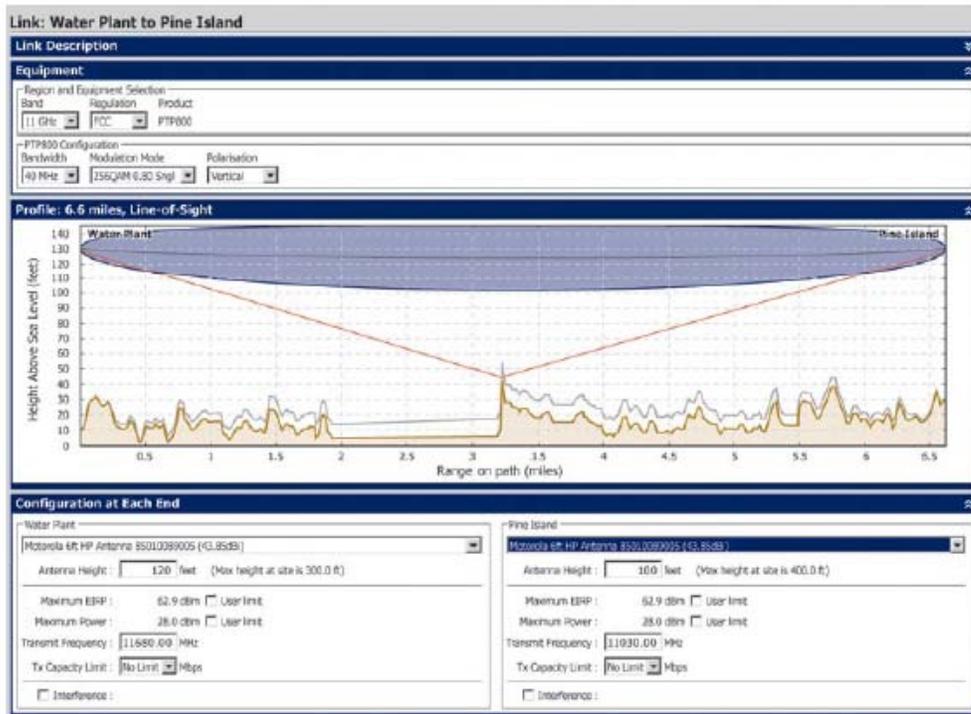


Figure 1-17: Sample PTP 810 Path Profile

PN	Description	Qty
01010208005	ODU-A 11GHz, TR 490 & 500, Lo, B7 (11010.0 - 112000.0 MHz), Rectangular WG, Neg Pol	1
01010208006	ODU-A 11GHz, TR 490 & 500, Hi, B7 (11510.0 - 117000.0 MHz), Rectangular WG, Neg Pol	1
85010089005	6' HP Antenna, 10.70 ~ 11.70 GHz, Single Pol, Mot Interface	2
WB3480	PTP800 Modem 1000/100BaseT with Capacity CAP 10 Mbps	2
WB3546	PTP800 Modem Capacity CAP - Full Capacity (per Unit)	2
WB3616	Coaxial Cable Installation Assembly Kits (w/o Surge Arrestor)	2
WB3657	LPU END KIT PTP800 (1 kits required per Coaxial cable)	2

Figure 1-18: Sample PTP 810 Bill-of-Materials (BOM)

1.18 BAND PLAN

For licensed bands from 6 ~ 38 GHz, the frequency channel spacing plans are defined by ITU-R and CEPT in a series of recommendations.

PTP 800 Band Plan (ETSI)

Admin	Band	Frequency (GHz)	ERC (CEPT)	ITU-R	T/R (MHz)	Channel Spacing (MHz)
ETSI	18	17.7-19.7	Rec12.03E	F595-6	1010	55, 27.5, 13.75
				F595-9 An 3	1008	7
	23	21.2-23.6	T/R 13.02E An A	F637.3 An 3	1008	56, 28, 14, 7
				F637.3 An 3	1232	56, 28, 14, 7
	26	24.5-26.5	13.02 An B	F748-4 An 1	1008	56, 28, 14, 7
	11	10.7-11.7	Rec12.06 Fig1	F387 fig 1	530	40
				Rec12.06 Fig2	F387 fig 2	490
	L6	5.925-6.425		F383-8 Fig 1	252.04	29.65
				F383-8 An 1	240	40, 20, 10
	13	12.75-13.3	12.02E	F497.7	266	56, 28, 14, 7
				F636.3	420	56, 28, 14, 7
	15	14.4-15.35	12.07E	F636.3	490	28, 14, 7
					728	28, 14, 7
	U6	6.425-7.125	14.02E An I	F384.10	340	40
	7	7.125-7.9	None	F385 & An 5	161	28, 14, 7
				F385 An I	154	28, 14, 7
				F385 An II	160	20, 10
				F385 An III	196	28
				F385 An IV	245	28, 14, 7
8	8.275- 8.500	None	F386 An 2	119	14, 7	
			F386 An 3	266	28	
			F386 An 5	208	28, 14, 7	
			F386 An 6	311.32	29.65	
			F386 An 7	151.614	11.662	
28	27.5-29.5	13.02 An C	F748-4 An 2	1008	56, 28, 14, 7	
32	31.8-33.4	Rec 01.02	F1520-2 An 1	812	56, 28, 14, 7	
38	37.0-39.5	T/R 12.01	F749-2 An 1	1260	56, 28, 14, 7	

Figure 1-19: PTP 810 Band Plan (ETSI)

PTP 800 Band Plan (FCC)

Admin	Band	Frequency (GHz)	ERC (CEPT)	ITU-R	T/R (MHz)	Channel spacing (MHz)
FCC	11	10.7-11.7			490 (500)	40, 30, 10
	18	17.7-19.7		F595-9 An 2	1560	50, 40, 30, 20, 10
	23	21.2-23.6		F637.3 An 4	1200	50, 40, 30, 20, 10
	L6	5.925-6.425			252.04	30, 10
	26	24.25-26.25		F748-4 An 3	800	50, 40, 30, 20, 10
	38	38.6-40		F749-2 An 3	700	50

Figure 1-20: PTP Band Plan (FCC)

1.19 PTP 810 SUMMARY

The Motorola Wireless Broadband portfolio offers Lake Havasu PD high-speed, Point-to-Point, Point-to-Multipoint, Mesh, WiFi and WiMAX networks that support data, voice and video communications, enabling a broad range of fixed and mobile applications for public and private systems. With Motorola’s innovative software solutions, Lake Havasu PD can design, deploy and manage broadband networks, maximizing up-time and reliability, while lowering installation costs.

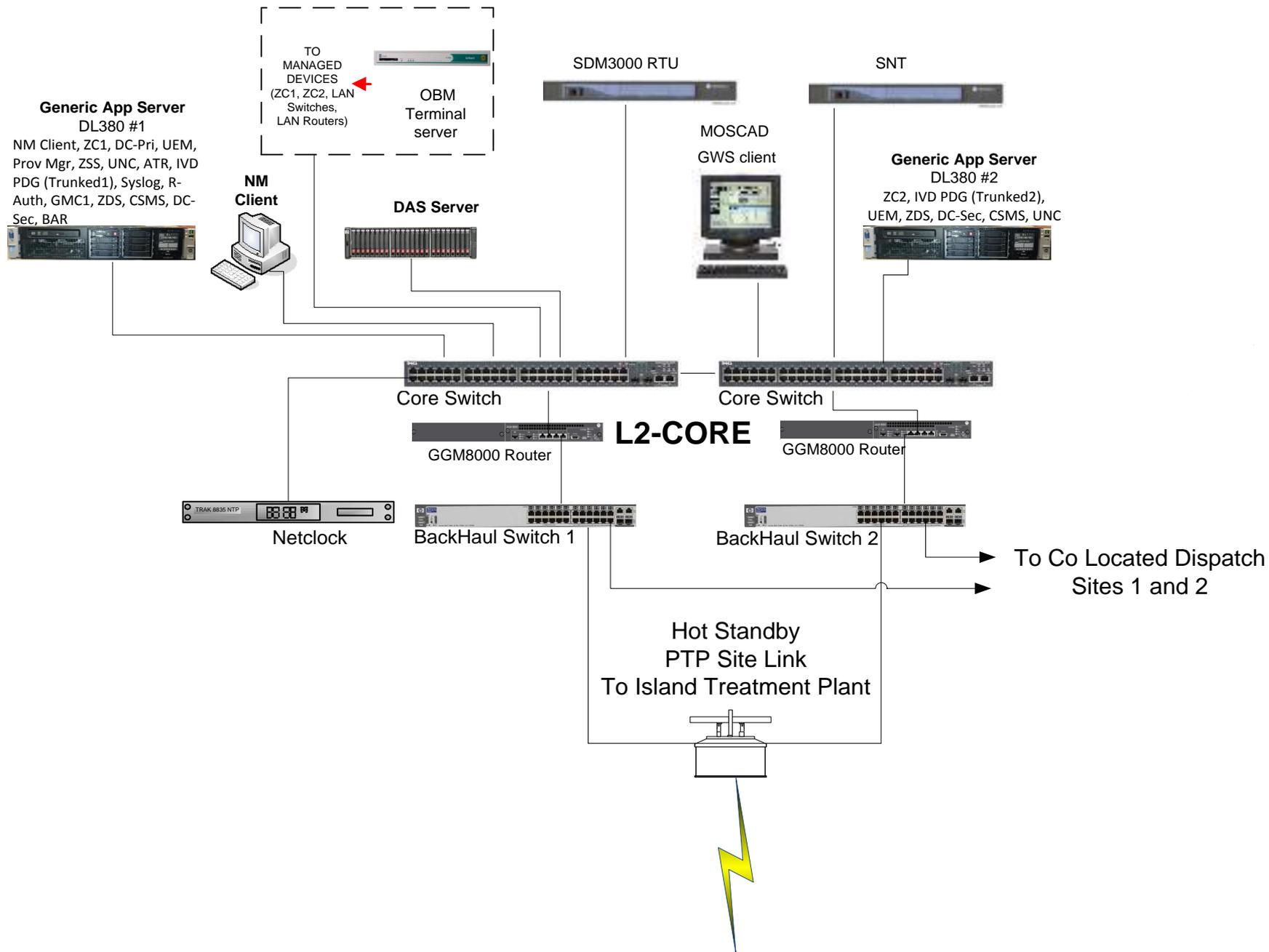
SYSTEM DIAGRAMS

System Diagrams are included on the pages that follow.



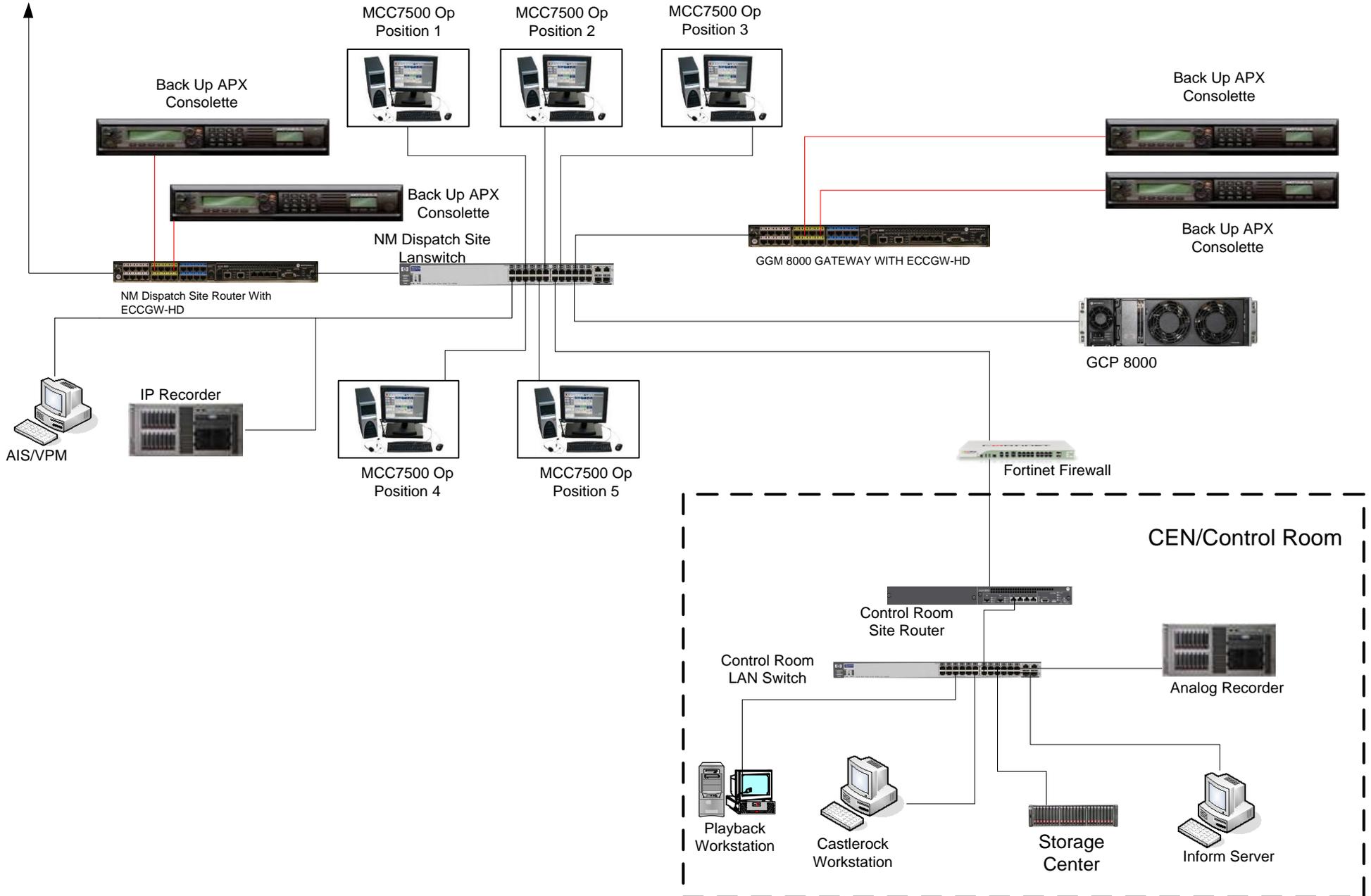
800 MHz ASTRO 25 L2 Core Trunked System

Master Site



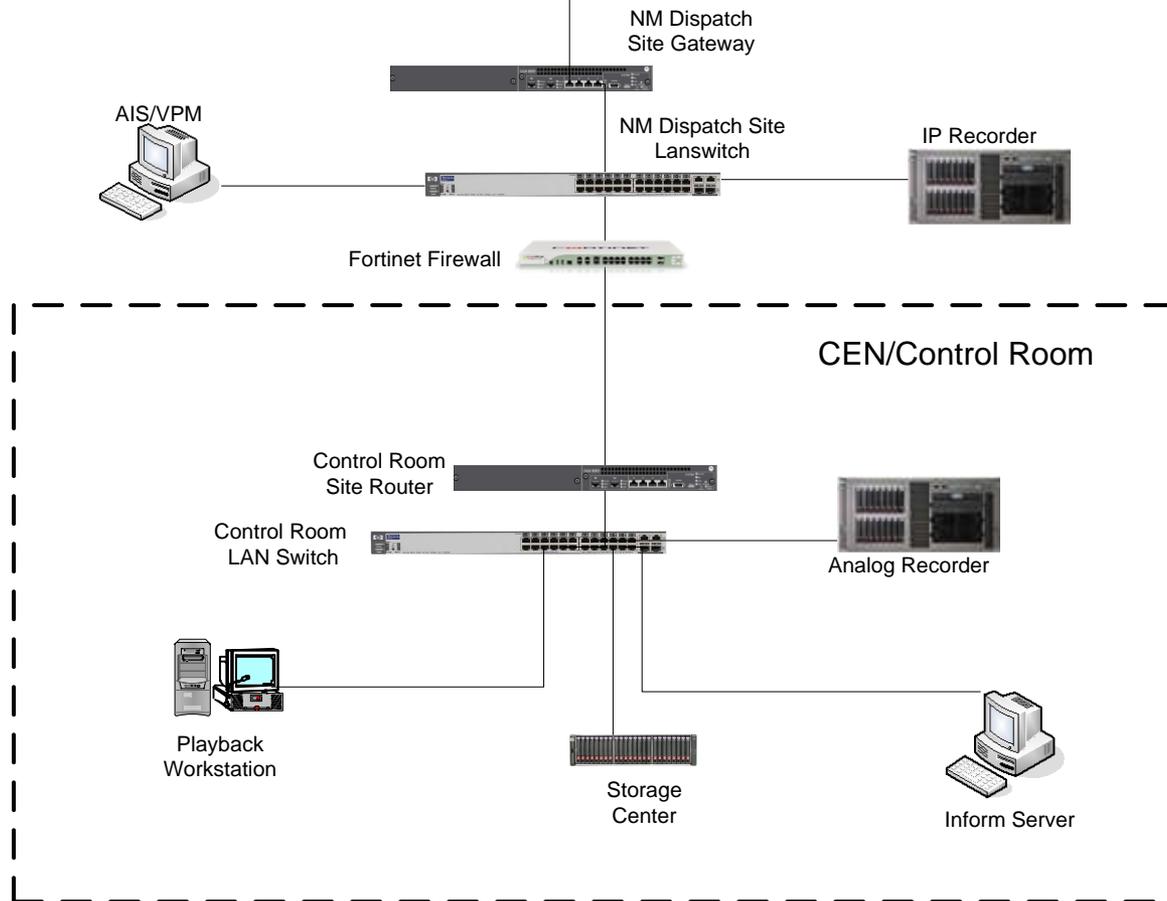
Co Located Dispatch Site 1

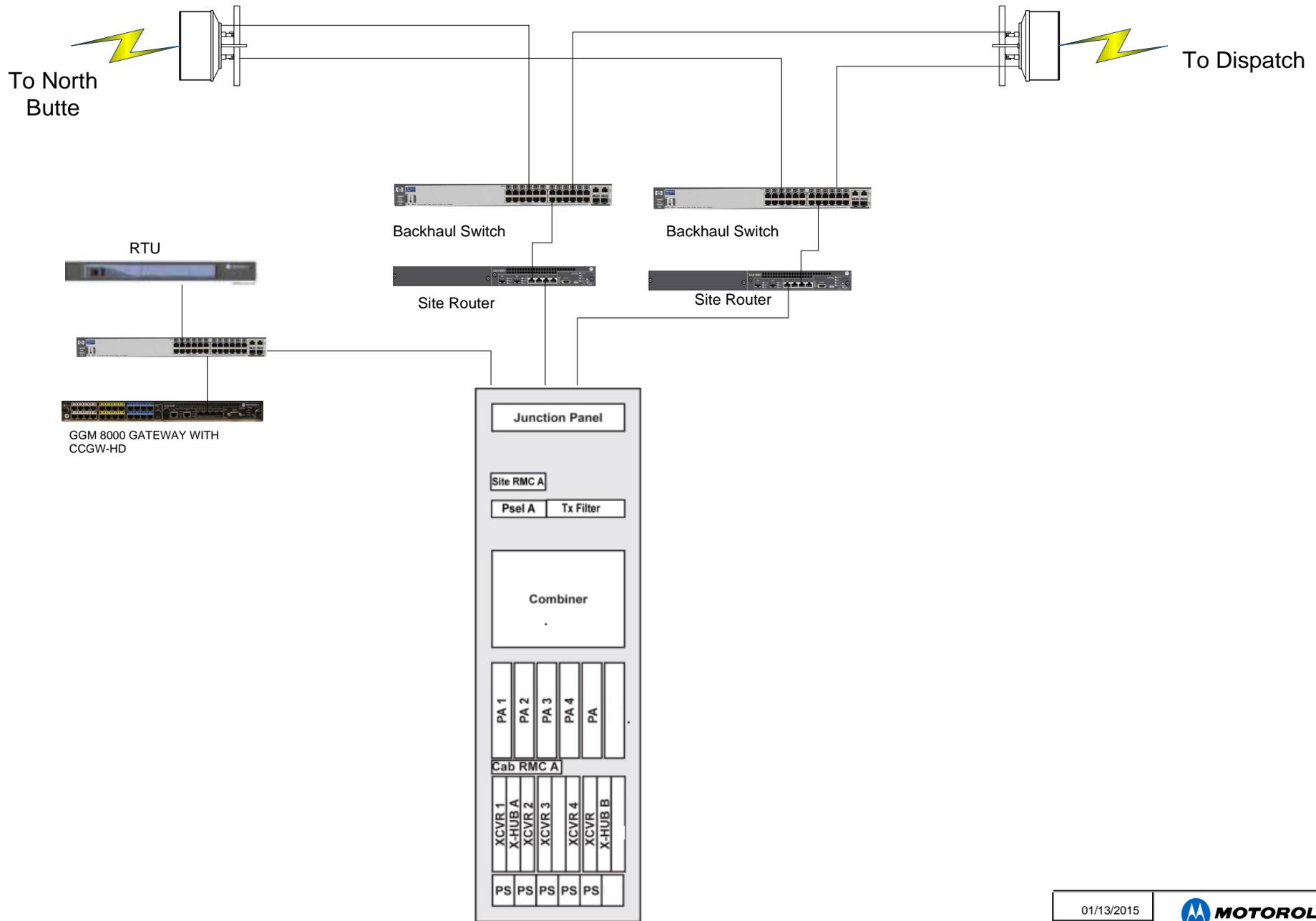
To Master Site Backhaul
Switch 1



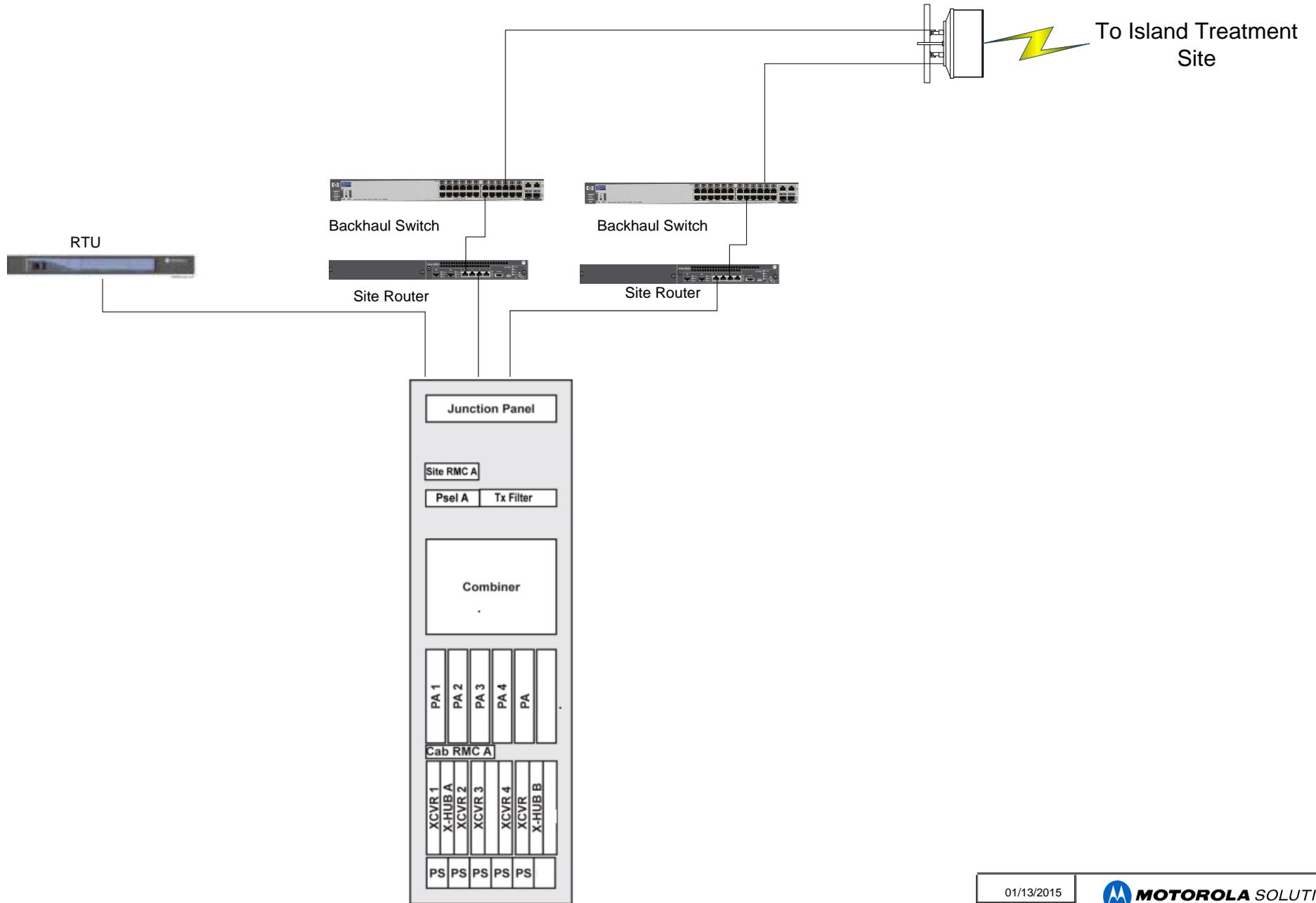
Co Located Dispatch Site 2

To Master Site Backhaul
Switch 2



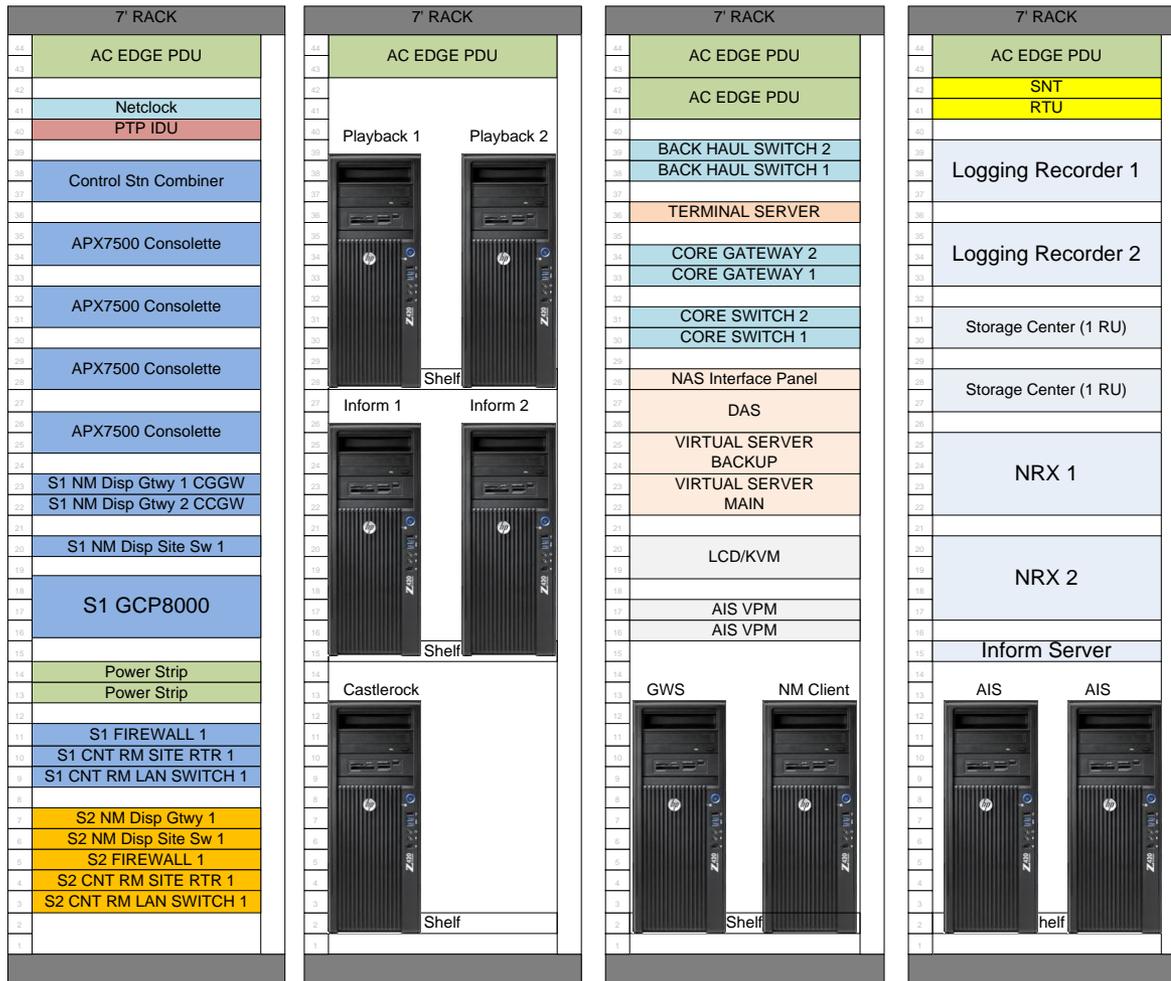


01/13/2015	 MOTOROLA SOLUTIONS			
ENGINEERS Randy Beauchamp	Island Treatment Site			
SOURCE				
DRAWN BY Randy Beauchamp	CUSTOMER APPROVAL	MOTOROLA AUTH.	SCALE Not to scale	DRAWING NUMBER
				REV 1



01/13/2015	 MOTOROLA SOLUTIONS			
ENGINEERS Randy Beauchamp	<h2 style="text-align: center;">North Butte Site</h2>			
SOURCE				
DRAWN BY Randy Beauchamp	CUSTOMER APPROVAL	MOTOROLA AUTH.	SCALE Not to scale	DRAWING NUMBER
				REV 1

Master Site

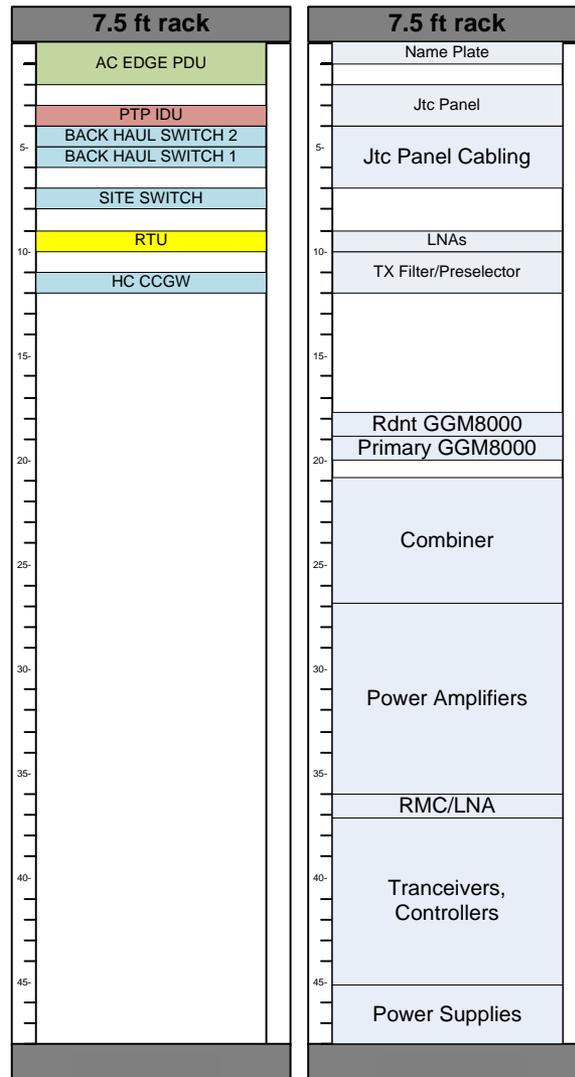


Punchblocks
(Wall Mounted)

 MOTOROLA	
Project:	Lake Havasu
Title:	Rack Diagram
Designed by:	Randy Beauchamp
Date:	January 2015

Island Treatment Plant Remote Site

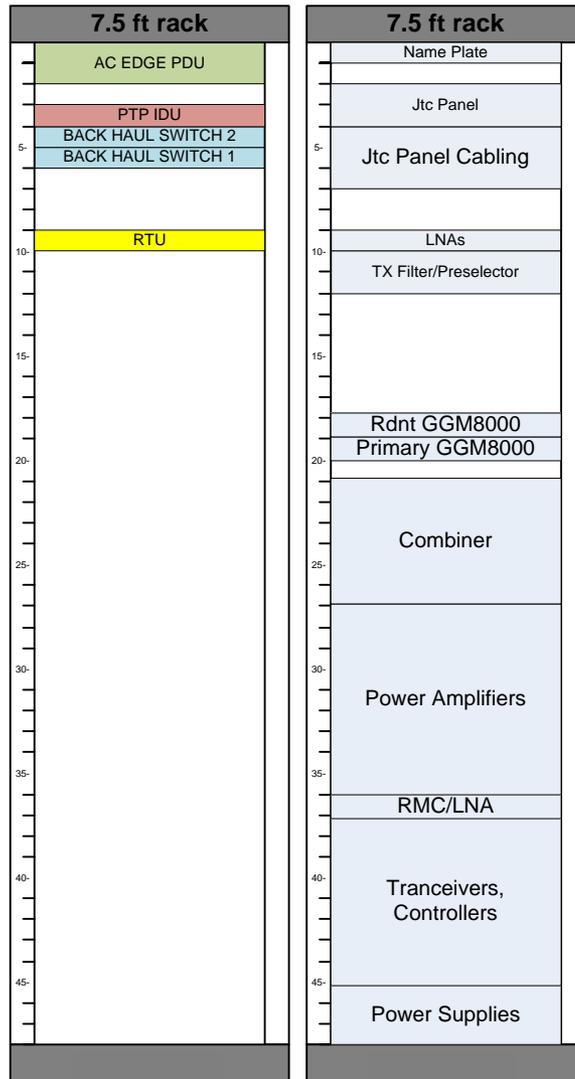
Punchblocks
(Wall Mounted)



	
Project:	Lake Havasu
Title:	Rack Diagram
Designed by:	Randy Beauchamp
Date:	January 2015

North Butte Remote Site

Punchblocks
(Wall Mounted)

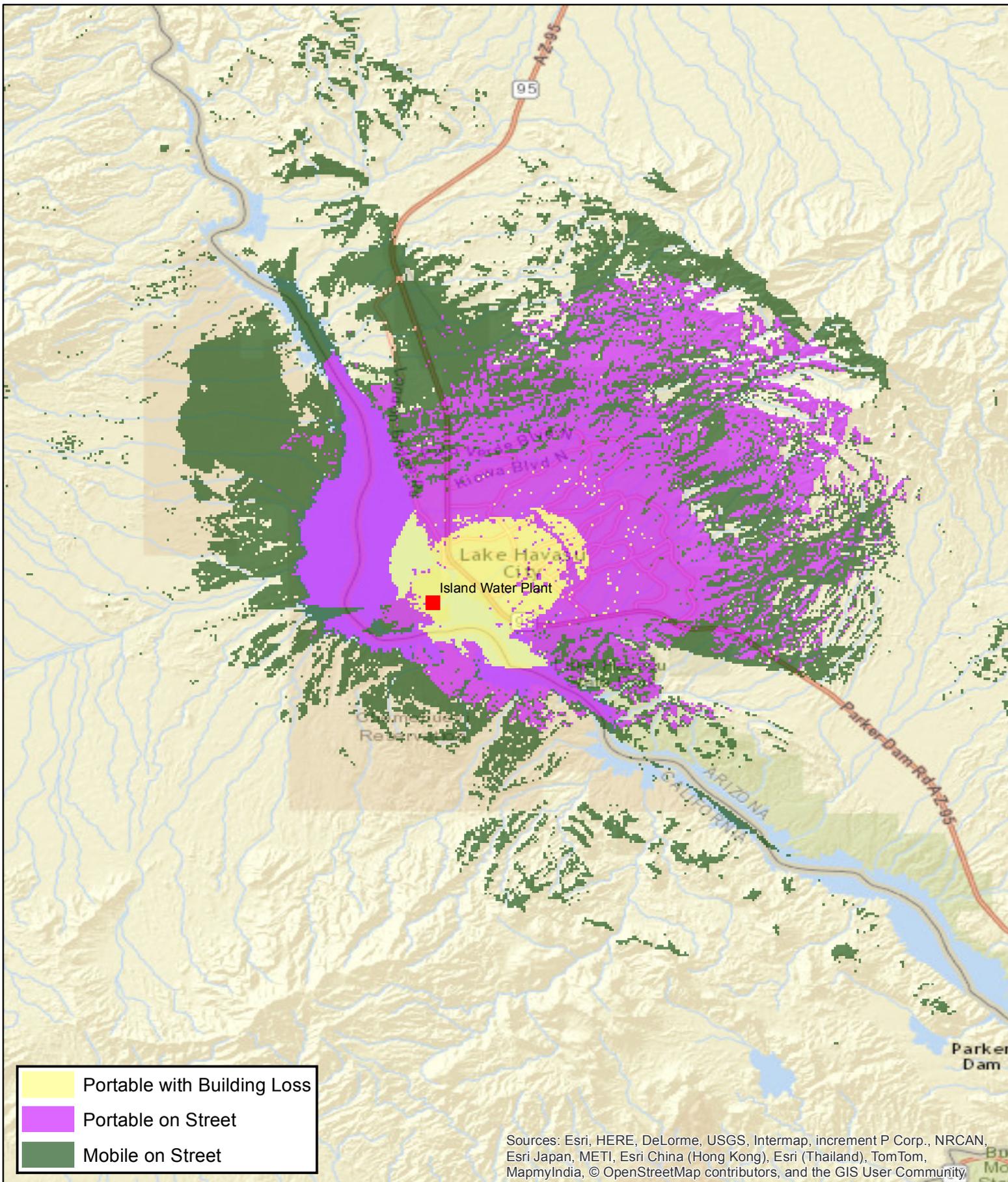


	
Project:	Lake Havasu
Title:	Rack Diagram
Designed by:	Randy Beauchamp
Date:	January 2015

COVERAGE MAPS

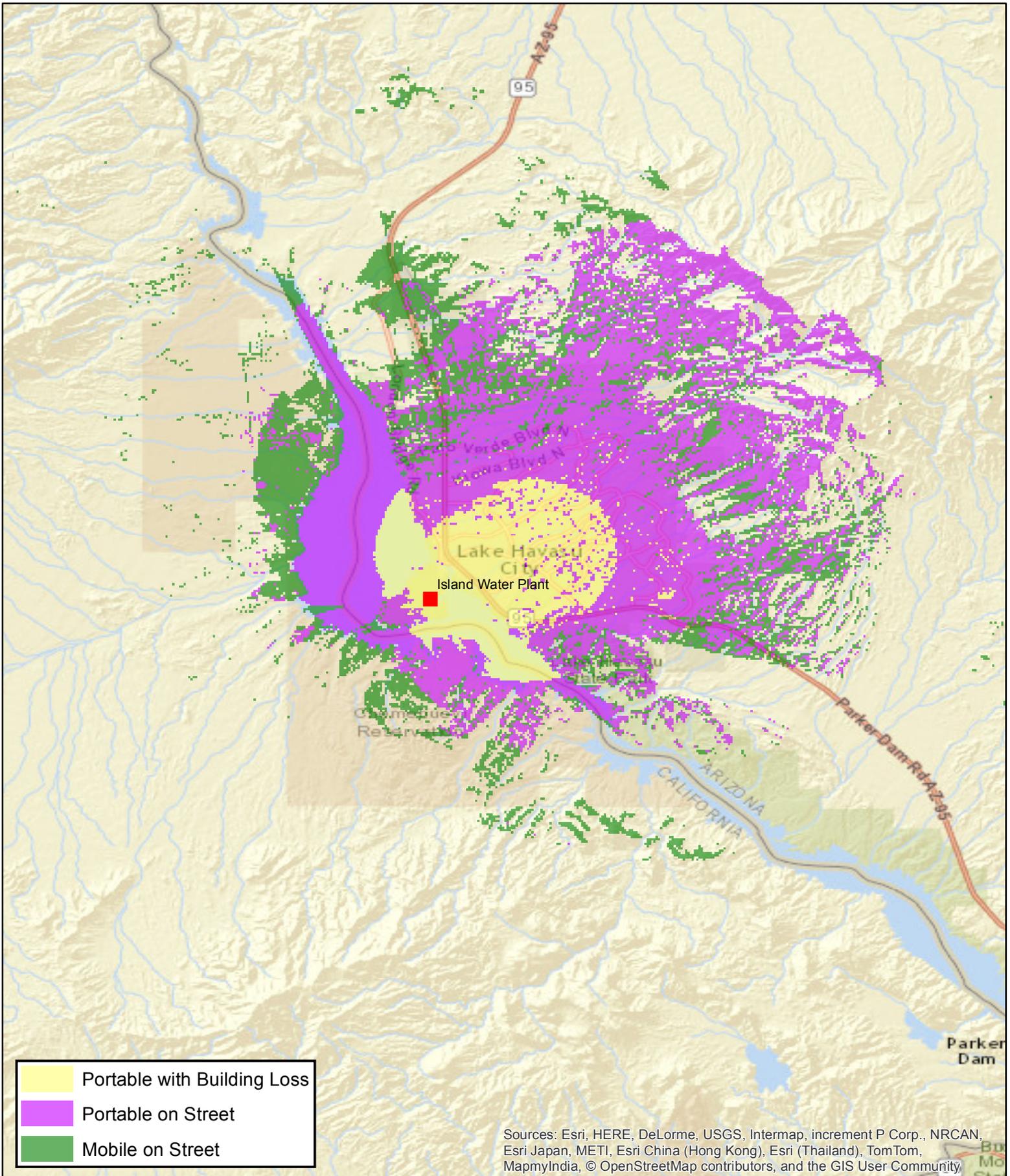
Coverage maps are included on the pages that follow.





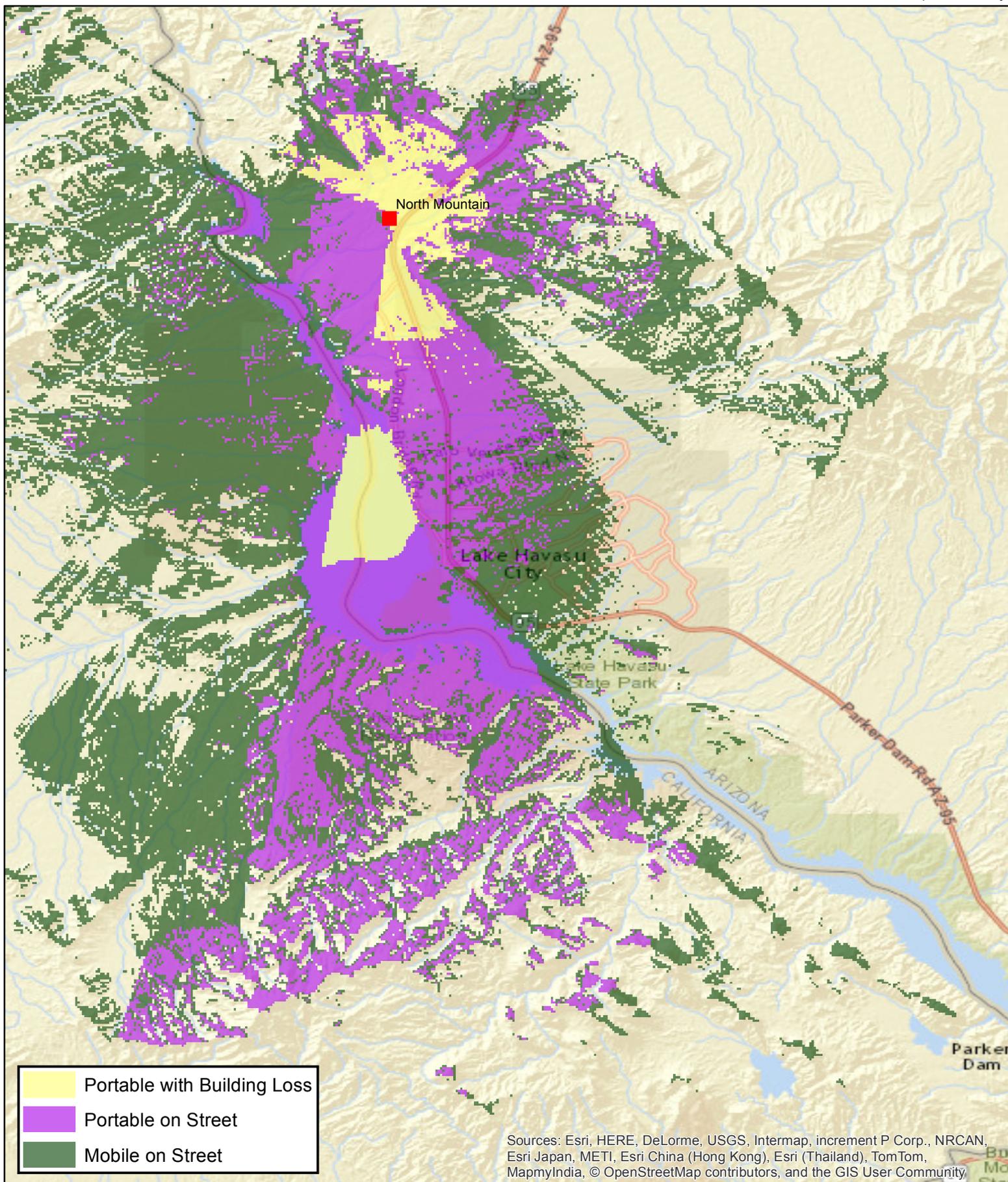
0 0.751.5 3 Miles

Inbound Island Water Plant Overlay



0 0.75 1.5 3 Miles

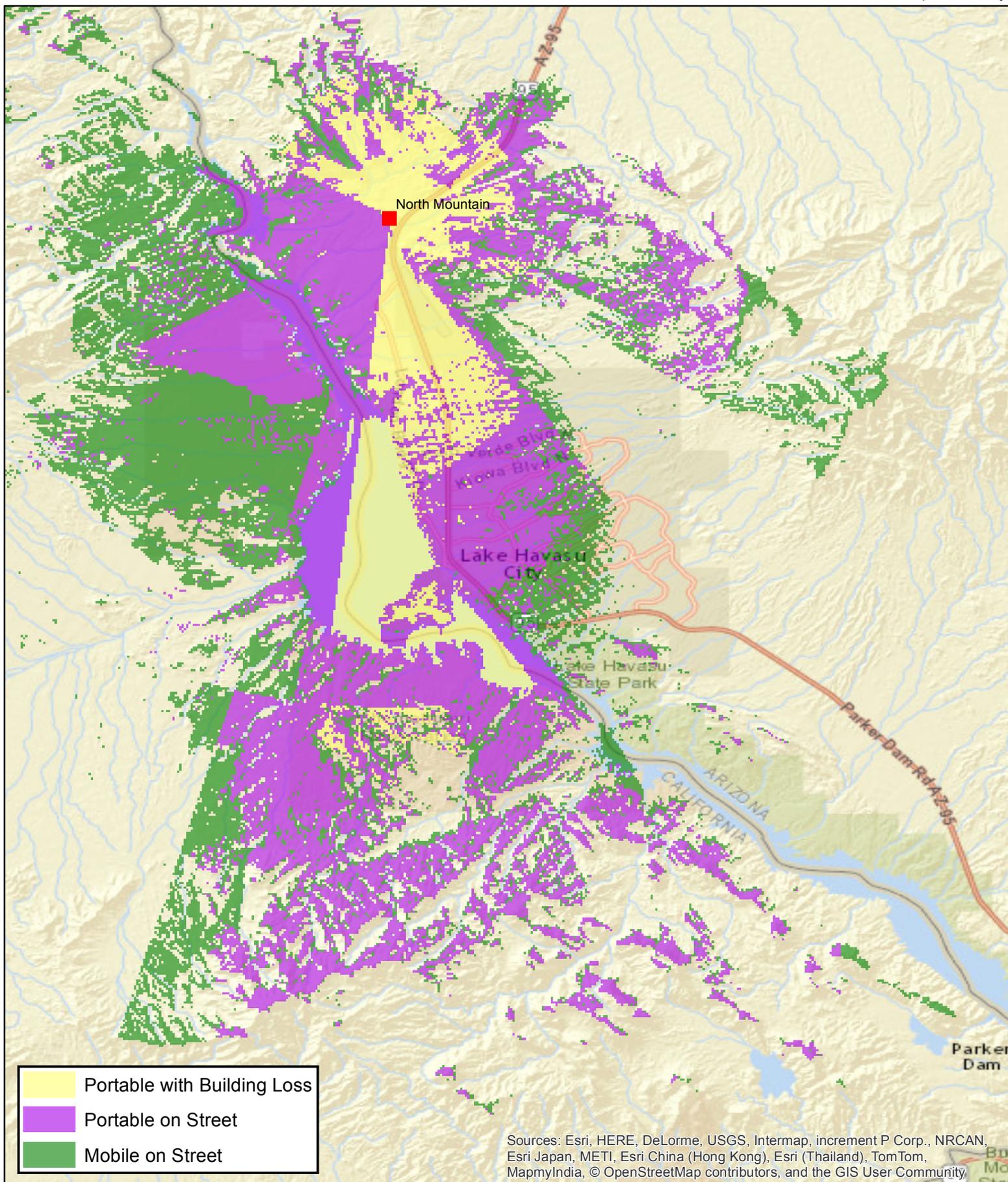
Outbound Island Water Plant Overlay



0 0.75 1.5 3 Miles

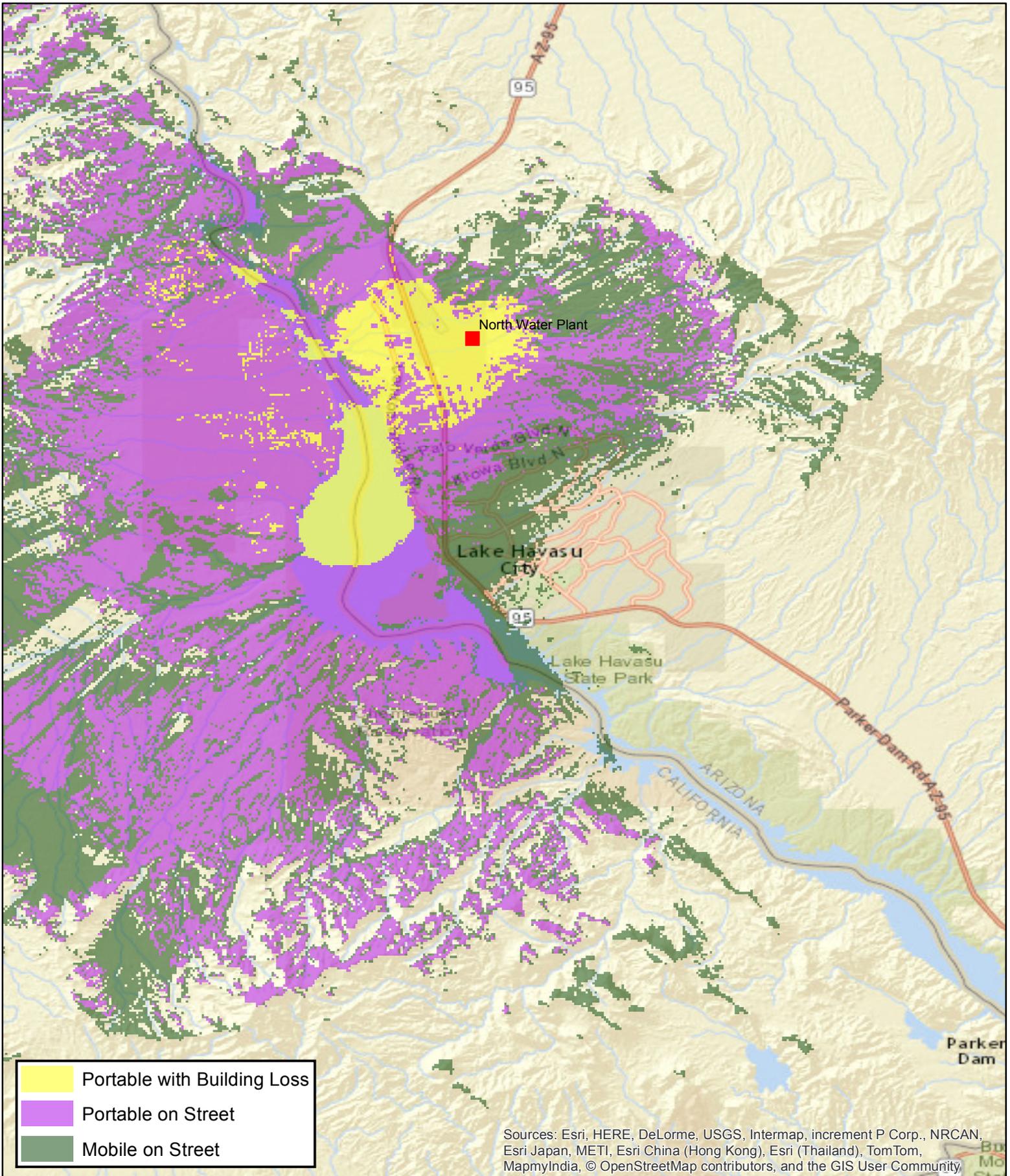
Inbound North Mountain Overlay

CCDTLAB-356
BKG783
R_4



0 0.75 1.5 3 Miles

Outbound North Mountain Overlay

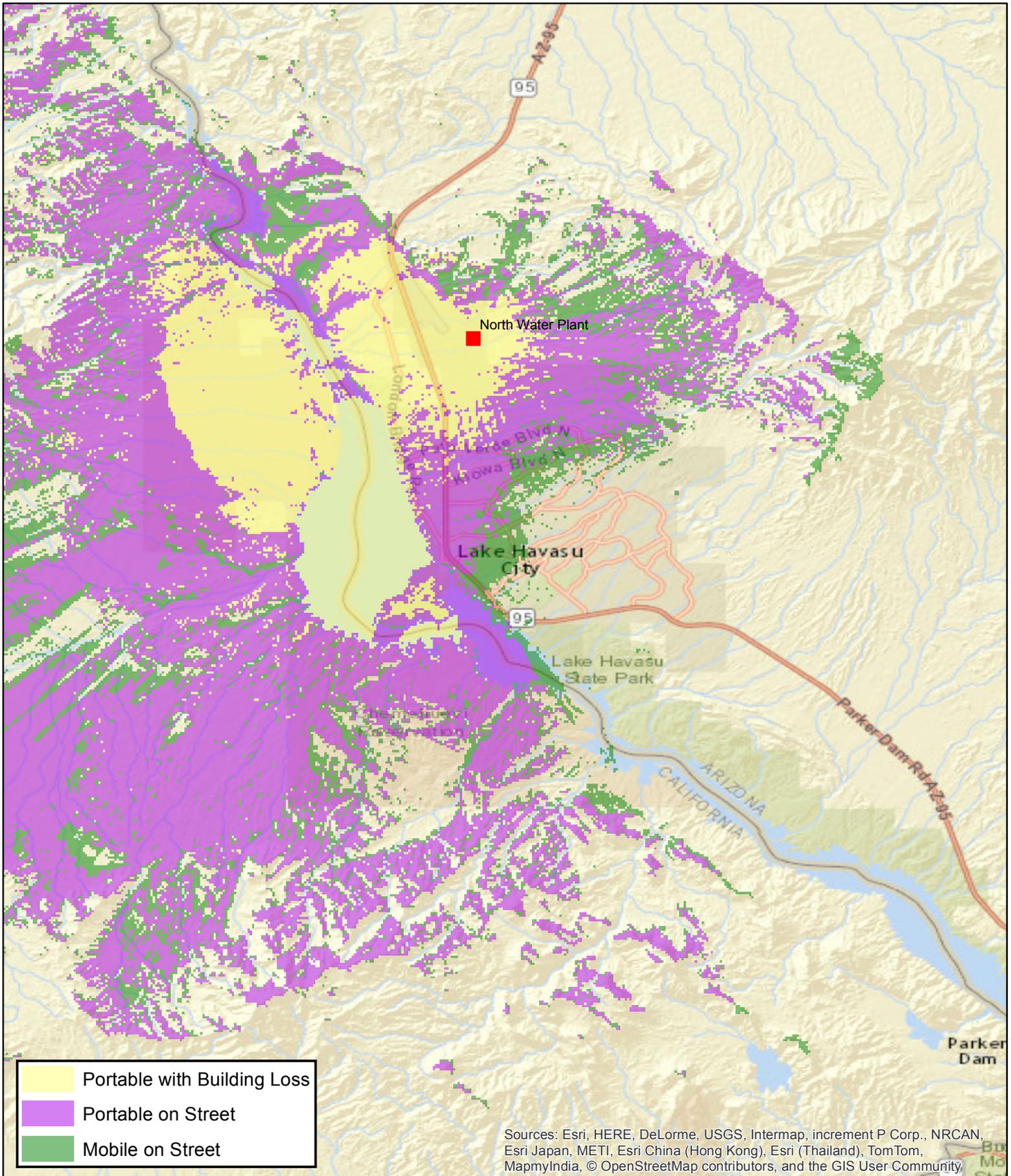


0 0.75 1.5 3 Miles



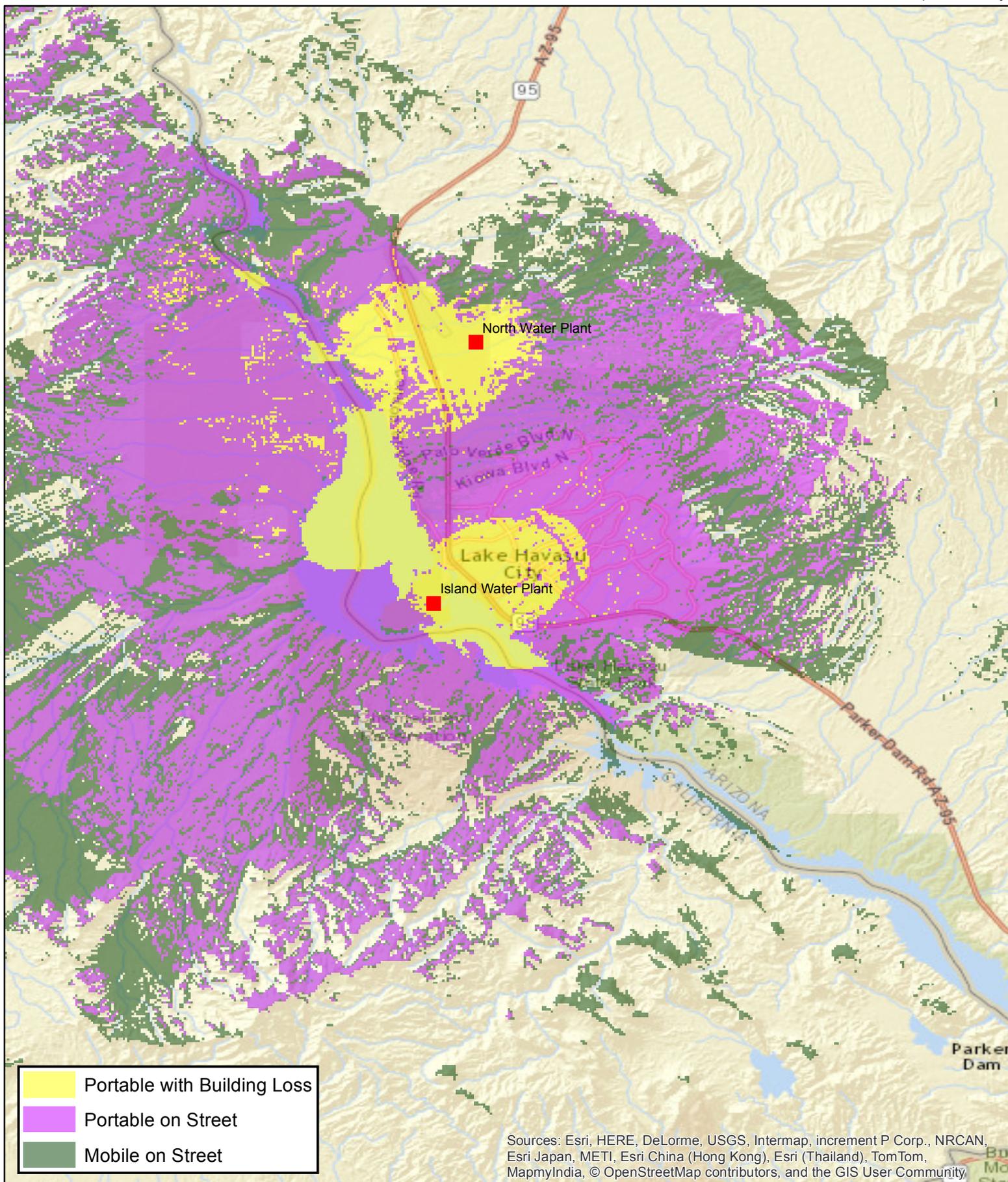
Inbound North Water Plant Overlay

CCDTLAB-356
BKG783
R_4



0 0.75 1.5 3 Miles

Outbound North Water Plant Overlay

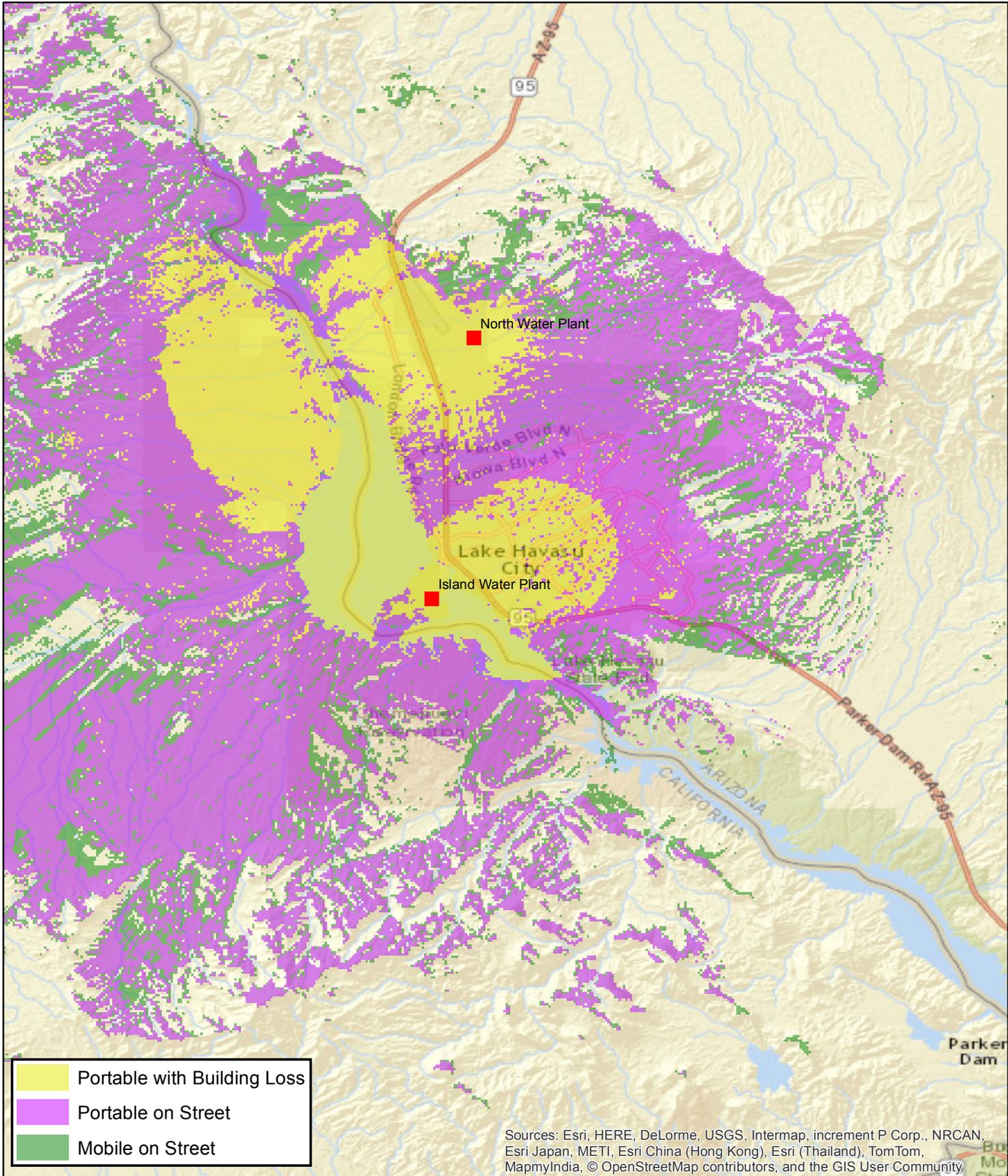


	Portable with Building Loss
	Portable on Street
	Mobile on Street

Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

0 0.75 1.5 3 Miles

Inbound North Water Plant and Island Water Plant Overlay



-  Portable with Building Loss
-  Portable on Street
-  Mobile on Street

Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

0 0.75 1.5 3 Miles


Outbound North Water Plant and Island Water Plant Overlay

CCDTLAB-356
BKG783
R_4

EQUIPMENT LIST

QTY	NOMENCLATURE	DESCRIPTION
		Core (7.15), at Dispatch Location
3	THN1012	RACK 7' OPEN
5	DS110110711	PDU, AC EDGE RACK MOUNT DISTRIBUTION PANEL, 120VAC 60A, 12-15A CIRCUIT
60	DS37502851	BREAKER KIT AIRPAX 15AMP SNAPAC, FOR AC EDGE OR DC EDGE III QTY 1
2	DSRMP615A	SPD, TYPE 3, 120V RACK MOUNT, 15A PLUG-IN W/ (6) 15A NEMA 5-15 OUTLETS
2	DSTSJ100BT	SPD, RJ-48 8 PIN, 10/100 BASE T TSJ PROTECTS/PASSES ON ALL 8 PIN
1	DSTSJADP	RACK MOUNT GROUND BAR, 19 IN FOR TSJ AND WPH SERIES DATA SPDS
		L2 Core
1	SQM01SUM0274	SINGLE ZONE TRUNKED L CORE
1	CA02647AA	ADD: REDUNDANT CORE
1	CA01663AB	ADD: RACK
1	UA00137AA	ADD: EMAIL ALARM NOTIFICATIONS
1	CA02634AA	ADD: MOSCAD NFM VIRTUAL APP A7.15_A3.1
1	CA01750AA	ADD: TERMINAL SERVER
1	UA00158AA	ADD: PHASE 2 TDMA TRKG OP ZONE LIC
1	UA00159AA	ADD: P25 PHASE 2 TDMA TRKNG OP SITE LIC
8	UA00161AA	ADD: P25 PHASE 2 TDMA SW BASE RADIO LIC
		SNT
1	F4544	SITE MANAGER ADVANCED
1	V266	ADD: 90VAC TO 260VAC PS TO SM
1	VA00873	ADD: SDM SNT FW CURR ASTRO REL
		Moscad GWS
1	TT2539	Z420 HIGH TIER WORKSTATION WINDOWS
1	TT2177	INTOUCH RUNTIME 60K TAG W/O-I/O, V10.1, LIC ONLY
1	TT2296	HYPERACCESS VERSION 9.0
1	DDN9048	SERIAL/IP 1 PORT SEAT LICENSE
1	T7449	WINDOWS SUPPLEMENTAL TRANS CONFIG
1	T7885	MCAFFEE WINDOWS AV CLIENT
1	TT1964	SCADALARM PAGING WITH MODEM V6.0
1	DSRM114R2	HEAVY DUTY EQUIPMENT SHELF (GWS / NM Client)
1	DSCL5808N	ATEN : 8 PORT LCD KVM
		RTU
1	F4544	SITE MANAGER ADVANCED
1	V266	ADD: 90VAC TO 260VAC PS TO SM
1	VA00872	ADD: SDM ASTRO RTU FW CURR ASTRO REL
3	V592	AAD TERM BLCK & CONN WI
1	F4528	GMC_PER_DEVICE_SW_LICENSES
1	V809	GMC_SW_LIC_PER_NFM-RTU_I-O
1	F2463	RTU_PER_DEVICE_SW_LICENSES



QTY	NOMENCLATURE	DESCRIPTION
1	V839	RTU_SW_LIC_PER_NFM-RTU_I-O
		NM Client
1	TT2539	Z420 HIGH TIER WORKSTATION WINDOWS
1	T7885	MCAFFEE WINDOWS AV CLIENT
1	T7449	WINDOWS SUPPLEMENTAL TRANS CONFIG
1	T7537	KVL 4000 KEYLOADER
1	U239AD	ADD: ASTRO 25 MODE
1	X795AJ	ADD: ASN MODE
1	CA01598AA	ADD: AC LINE CORD US
1	CA00182AP	ADD: AES ENCRYPTION SOFTWARE
1	C543	ADD: CABLE FOR RNC, DIU, MGE
1	C724	CABLE, KEYLOAD
1	CA01603AA	ADD: USB COMM/CHARGE CABLE W/ CUP
1	C725AA	ADD: KEYLOAD CABLE FOR APX PORTABLE
1	HKN6182	KEYLOADING CABLE ADAPTER (GCAI)
1	TDN9390	KVL CABLE FOR XTS3000 AND MTS2000
1	TKN8209	CABLE KEYLOAD MX
1	DSGP933MMOT94	GPS COMMAND CENTER PACKAGE WITH OCXO OSCILLATOR - UP TO 4 NETWORKS
1	DVN4046B	MASTER SYSTEM KEY STARTER KIT
		Core Spares
1	DLN6822	FRE: DL380p G8 HC 300GB DISK
1	DLN6864	FRU: DL380 G8p POWER SUPPLY
1	DLN6844	CPH 300 GB HARD DRIVE
1	DLN6866	DVD DRIVE
1	DLN6880	DAS - CHASSIS ONLY
1	DLN6879	DAS - PROCESSOR MODULE
1	DLN6867	DAS POWER SUPPLY
1	CKN6952	SAS CABLE 1M
2	DLN6881	1 TB SAS HARD DRIVE
1	SQM01SUM0205	GGM 8000 GATEWAY
1	CA01616AA	ADD: AC POWER
1	TYN4011	FRU: GGM 8000 HD ENH CONV GATEWAY MODULE
1	CLN1856	2620-24 ETHERNET SWITCH
1	CLN1858	3800-48 ETHERNET SWITCH
		Co Located Dispatch Site #1
1	CLN1856	2620-24 ETHERNET SWITCH
1	T7038	GCP 8000 SITE CONTROLLER
1	CA00303AA	ADD: QTY (1) SITE CONTROLLER
1	CA01136AA	ADD: MCC 7500 CONVEN SITE OPER
1	X153AW	ADD: RACK MOUNT HARDWARE
		CCGWs
1	SQM01SUM0205	GGM 8000 GATEWAY
1	CA01616AA	ADD: AC POWER
1	CA02086AA	ADD: HIGH DENSITY ENH CONV GATEWAY

QTY	NOMENCLATURE	DESCRIPTION
1	SQM01SUM0205	GGM 8000 GATEWAY
1	CA01616AA	ADD: AC POWER
1	CA02086AA	ADD: HIGH DENSITY ENH CONV GATEWAY
		Consoles, at Dispatch Location
1	B1905	MCC 7500 ASTRO 25 SOFTWARE
5	B1933	MOTOROLA VOICE PROCESSOR MODULE
5	CA01642AA	ADD: MCC 7500 BASIC CONSOLE FUNCTIONALITY SOFTWARE LICENSE
5	CA01644AA	ADD: MCC 7500 /MCC 7100 ADV CONVL OPERATION
5	CA00147AF	ADD: MCC 7500 SECURE OPERATION
5	CA00182AB	ADD: AES ALGORITHM
5	CA00140AA	ADD: AC LINE CORD, NORTH AMERICAN
5	DS22WBLK	22 INCH WIDE NON-TOUCH MONITOR, BLACK
5	TT2538	Z420 LOW TIER WORKSTATION WINDOWS 7
5	T7449	WINDOWS SUPPLEMENTAL TRANS CONFIG
5	DSRMP615A	SPD, TYPE 3, 120V RACK MOUNT, 15A PLUG-IN W/ (6) 15A NEMA 5-15 OUTLETS
10	B1912	MCC SERIES DESKTOP SPEAKER
5	B1914	MCC SERIES DESKTOP GOOSENECK MICROPHONE
10	B1913	MCC SERIES HEADSET JACK
5	DSTWIN6328A	PROVIDES ONE DUAL PEDAL FOOTSWITCH FOR USE WITH MOTOROLA MCC 7500 DISP
5	T7885	MCAFEE WINDOWS AV CLIENT
5	DDN1612	DUAL IRR SW USB HASP W LICENSE, SOUND CARD, & SPKRS (V46)
		Console Spares
1	B1912	MCC SERIES DESKTOP SPEAKER
1	B1914	MCC SERIES DESKTOP GOOSENECK MICROPHONE
1	B1913	MCC SERIES HEADSET JACK
1	TT2538	Z420 LOW TIER WORKSTATION WINDOWS 7
1	B1934	MCC 7500 VOICE PROCESSOR MODULE FRU
1	CA00147AF	ADD: MCC 7500 SECURE OPERATION
1	CA00182AB	ADD: AES ALGORITHM
1	01009513002	PWR SPLY 108W AC INP 12VDC OUT W18
1	30009351001	DC CABLE ASSY
1	3082933N08	GR500 AC POWER CORD
1	DLN6569	FRU: GCP 8000/GCM 8000
1	DLN6898	FRU: FAN MODULE
1	DLN6781	FRU POWER SUPPLY
1	DLN6455	CONFIGURATION/SERVICE SOFTWARE
		Backup Consolettes
4	L30URS9PW1 N	APX7500 SINGLE BAND 7/800
4	G806	ADD: ASTRO DIGITAL CAI OPERATION
4	L998	ADD: LIMITED FRONT PANEL W/CLOCK/VU
4	GA00232	ENH: 3 YR SFS LITE
4	G843	ADD: AES ENCRYPTION APX
4	G51	ENH: SMARTZONE OPERATION APX
4	G361	ADD: P25 TRUNKING SOFTWARE



QTY	NOMENCLATURE	DESCRIPTION
4	GA00580	ADD: TDMA OPERATION
4	CA01598	ADD: AC LINE CORD US
1	DS4383G01A04	CONTROL STATION COMBINER, STANDARD, 746-869 MHZ, 4 CHANNEL
1	DSSC488SF1SNF	COLLINEAR OMNI 10 DBD 806-869 MHZ
70	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT
1	DDN1088	L4TNM-PSA TYPE N MALE PS FOR 1/2 IN CABLE
1	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
1	TDN9289	221213 CABLE WRAP WEATHERPROOFING
1	DSTSXDfMBF	RF SPD, 698-2700MHZ DC BLOCK HIGH POWER, DIN FEMALE/MALE BIDIRECTIONAL
1	DSGSAKITD	GROUND STRAP KIT - DIN
25	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT
1	DDN1088	L4TNM-PSA TYPE N MALE PS FOR 1/2 IN CABLE
1	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
		AIS
1	B1905	MCC 7500 ASTRO 25 SOFTWARE
1	B1933	MOTOROLA VOICE PROCESSOR MODULE
1	CA00288AB	ADD: MCC 7500 ARCHIVING INTERFACE SERVER SOFTWARE LICENSE
1	CA00147AF	ADD: MCC 7500 SECURE OPERATION
1	CA00182AB	ADD: AES ALGORITHM
1	CA00140AA	ADD: AC LINE CORD, NORTH AMERICAN
1	BLN1297	VPM POWER SUPPLY MOUNTING KIT
1	T7885	MCAFEЕ WINDOWS AV CLIENT
1	T7449	WINDOWS SUPPLEMENTAL TRANS CONFIG
1	TT2538	Z420 LOW TIER WORKSTATION WINDOWS 7
1	DSRM114R2	HEAVY DUTY EQUIPMENT SHELF (CAM / AIS)
		CEN 1 Equipment
1	CLN1856	2620-24 ETHERNET SWITCH
1	SQM01SUM0205	GGM 8000 GATEWAY
1	CA01616AA	ADD: AC POWER
		Firewall
1	T8126	FORTINET FIREWALL APPLIANCE
1	T8128	FORTINET FIREWALL RECOVERY MEDIA
		Playback and Castlerock Workstation (Rack Mount)
1	TT2538	Z420 LOW TIER WORKSTATION WINDOWS 7
1	T7885	MCAFEЕ WINDOWS AV CLIENT
1	T7449	WINDOWS SUPPLEMENTAL TRANS CONFIG
1	DSRM114R2	HEAVY DUTY EQUIPMENT SHELF
		Co Located Dispatch Site #2
1	CLN1856	2620-24 ETHERNET SWITCH
1	SQM01SUM0205	GGM 8000 GATEWAY
1	CA01616AA	ADD: AC POWER
		AIS
1	B1905	MCC 7500 ASTRO 25 SOFTWARE

QTY	NOMENCLATURE	DESCRIPTION
1	B1933	MOTOROLA VOICE PROCESSOR MODULE
1	CA00288AB	ADD: MCC 7500 ARCHIVING INTERFACE SERVER SOFTWARE LICENSE
1	CA00147AF	ADD: MCC 7500 SECURE OPERATION
1	CA00182AB	ADD: AES ALGORITHM
1	CA00140AA	ADD: AC LINE CORD, NORTH AMERICAN
1	BLN1297	VPM POWER SUPPLY MOUNTING KIT
1	T7885	MCAFFEE WINDOWS AV CLIENT
1	T7449	WINDOWS SUPPLEMENTAL TRANS CONFIG
1	TT2538	Z420 LOW TIER WORKSTATION WINDOWS 7
1	DSRM114R2	HEAVY DUTY EQUIPMENT SHELF (CAM / AIS)
		CEN 2 Equipment
1	CLN1856	2620-24 ETHERNET SWITCH
1	SQM01SUM0205	GGM 8000 GATEWAY
1	CA01616AA	ADD: AC POWER
		Firewall
1	T8126	FORTINET FIREWALL APPLIANCE
1	T8128	FORTINET FIREWALL RECOVERY MEDIA
		Playback and Castlerock Workstation (Rack Mount)
1	TT2538	Z420 LOW TIER WORKSTATION WINDOWS 7
1	T7885	MCAFFEE WINDOWS AV CLIENT
1	T7449	WINDOWS SUPPLEMENTAL TRANS CONFIG
1	DSRM114R2	HEAVY DUTY EQUIPMENT SHELF
		Nice Recording Equipment for Both Co Located Sites
1	TT2668	10 SIMUL CALL MCC 7500 IP RECORDER
1	TT05782AA	ADD: 10 SIMULTANEOUS CALL REDUNDANT MCC 7500 IP LOGGING RECORDER
4	TT05784AA	ADD: 10 SIMULTANEOUS CALL CAPACITY
4	TT05785AA	ADD: 10 SIMULTANEOUS CALL CAPACITY FOR REDUNDANT RECORDER
1	TT05718AA	ADD: IP LOGGING RECORDER FOR USE ON 7.15 SYSTEMS
1	DDN1688	MCC 7500 IP LOGGING RECORDER DL360 G8 SPARES
1	TT2670	8 CHANNEL NRX BASE BUNDLE
1	TT05763AA	ADD: ADDITIONAL 8 RECORDING LICENSES - MAX OF 2
32	TT05771AA	ADD: ANALOG CHANNEL FLAG
1	TT05765AA	ADD: 8 CHANNEL NRX PARALLEL RECORDING BUNDLE - BASE SYSTEM
1	TT05766AA	ADD: ADDITIONAL 8 PARALLEL RECORDING LICENSES - MAX OF 2
1	DDN1693	ANALOG AUDIO BOARD - 24 PORTS
1	DDN1690	ANI-ALI DRIVER
1	DDN1693	ANALOG AUDIO BOARD - 24 PORTS
1	DDN1690	ANI-ALI DRIVER
1	DDN7532	SNMP MANAGEMENT APPLICATION
1	TT2672	INFORM R6.1 TURNKEY BUNDLE SERVER, 10 CHANNEL LIC, 1 RECON, 1 MONITOR
13	TT05786AB	ADD: ADDITIONAL 10 INFORM CHANNEL LICENSES
1	DDN1698	ADDITIONAL NICE INFORM RECONSTRUCTION CONCURRENT USER LICENSE
1	DDN1701	NICE INFORM ORGANIZER CONCURRENT USER LICENSES, PRICE PER LICENSE

QTY	NOMENCLATURE	DESCRIPTION
1	DDN1702	NICE INFORM MEDIA PLAYER LICENSE - PRICE PER INFORM SERVER
1	DDN1870	INFORM REPORTER MODULE LICENSE
1	DQSQL200864BITCAL	SQL 2008 64 BIT CLIENT ACCESS LICENSE
1	DQHDUPGRADE	ADD ADDITIONAL STORAGE: 2 X 900GB 10K 2.5IN HDD
1	TT2691	NICE TURNKEY INFORM RESILIENCY BUNDLE - SERVER, SW
2	TT2693	NICE STORAGE CENTER SW AND SERVER - RAID 1 , 1.8 TB OF STORAGE
2	DQHDUPGRADE	ADD ADDITIONAL STORAGE: 2 X 900GB 10K 2.5IN HDD
1	DQNRXSPARESSMALL	SPARES FOR DL 310E G8 SERVER - FOR NRX
1	DQNRXANALOGBOARD	NRX ANALOG SPARE - 24 PORTS
		Remote Site 1 (Island)
1	TRN7343	SEVEN AND A HALF FOOT RACK
1	DS110110711	PDU, AC EDGE RACK MOUNT DISTRIBUTION PANEL, 120VAC 60A, 12-15A CIRCUIT
12	DS37502851	BREAKER KIT AIRPAX 15AMP SNAPAC, FOR AC EDGE OR DC EDGE III QTY 1
2	DSTSJ100BT	SPD, RJ-48 8 PIN, 10/100 BASE T TSJ PROTECTS/PASSES ON ALL 8 PIN
1	DSTSJADP	RACK MOUNT GROUND BAR, 19 IN FOR TSJ AND WPH SERIES DATA SPDS
1	SQM01SUM0205	GGM 8000 GATEWAY
1	CA01616AA	ADD: AC POWER
1	CA02086AA	ADD: HIGH DENSITY ENH CONV GATEWAY
3	CLN1856	2620-24 ETHERNET SWITCH
1	SQM01SUM7054	GTR 8000 EXPANDABLE SITE SUBSYSTEM
1	CA00855AA	ADD: 700/800 MHZ
4	CA01842AA	ADD: P25 TDMA SOFTWARE
1	X305AC	ADD: QTY (5) GTR 8000 BASE RADIOS
5	X591AE	ENH: ASTRO 25 SITE REPEATER SW
1	CA00861AA	ADD: CABINET RMC W/ CAPABILITY OF 6 BRS
1	CA00879AA	ADD: PRIMARY 6 PORT CAVITY COMBINER
1	CA00883AA	ADD: 800 MHZ TX FILTER W/PMU
2	CA00303AA	ADD: QTY (1) SITE CONTROLLER
2	CA02212AA	ADD: ASTRO 25 SITE REPEATER SITE CONTROLLER SOFTWARE VOICE ONLY
1	X882AH	ADD: 7.5 FT OPEN RACK, 48RU
2	CA01706AA	ADD: ADD: GGM 8000 GATEWAY
1	DS428E83I01C110	CONTROL MONITORING UNIT, NON-DIVERSITY, 796-824 MHZ, SNMP,110 VAC
1	DS428E83I01T	TTA, NON-DIVERSITY, 796-824 MHZ, REDUNDANT LNA, TEST PORT, BYPASS
1	DLN6455	CONFIGURATION/SERVICE SOFTWARE
1	CA02686AA	ADD: AC DC POWER DISTRIBUTION
		RTU
1	F4544	SITE MANAGER ADVANCED
1	V266	ADD: 90VAC TO 260VAC PS TO SM
1	VA00872	ADD: SDM ASTRO RTU FW CURR ASTRO REL
3	V592	AAD TERM BLCK & CONN WI
1	F4528	GMC_PER_DEVICE_SW_LICENSES
1	V809	GMC_SW_LIC_PER_NFM-RTU_I-O
5	V843	GMC_SW_LIC_PER_GTR8000_MS_BR
1	F2463	RTU_PER_DEVICE_SW_LICENSES

QTY	NOMENCLATURE	DESCRIPTION
1	V839	RTU_SW_LIC_PER_NFM-RTU_I-O
5	VA00312	RTU_SW_LIC_PER_GTR8000_MS_BR
		TX Antenna/Line
1		Panel Antenna (On IA)
15	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT
2	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
2	TDN9289	221213 CABLE WRAP WEATHERPROOFING
120	L3617	7/8IN HELIAX VIRTUAL AIR FOAM FILLED CORREGATED CABLE (AVA5-50FX)/FOOT
2	DDN1077	7-16IN DIN FEMALE CONNECTOR EZ-FIT FOR 7/8IN CABLE (MOTOROLA SPECIFIC)
4	DSSG7806B2A	SG78-06B2A GROUNDING KIT FOR 7/8 IN COAXIAL CABLE
1	DSL5SGRIP	L5SGRIP 7/8" SUPPORT HOIST GRIP
4	DSSSH78	SSH-78 7/8" SNAPSTAK HANGER 10PK
4	DSUA3	UA-3 UNIVERSAL ANGLE ADAPTOR KIT, KIT OF TEN
1	DSTSXFMBF	RF SPD, 698-2700MHZ DC BLOCK HIGH POWER, DIN FEMALE/MALE BIDIRECTIONAL
25	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT
2	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
		RX Antenna/Line
1		Panel Antenna (On IA)
15	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT
1	DDN1088	L4TNM-PSA TYPE N MALE PS FOR 1/2 IN CABLE
1	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
4	TDN9289	221213 CABLE WRAP WEATHERPROOFING
5	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT
2	DDN1088	L4TNM-PSA TYPE N MALE PS FOR 1/2 IN CABLE
140	L3617	7/8IN HELIAX VIRTUAL AIR FOAM FILLED CORREGATED CABLE (AVA5-50FX)/FOOT
2	DDN1079	78EZN-M N FEMALE MOT CONNECTOR (MOTOROLA SPECIFIC)
4	DSSG7806B2A	SG78-06B2A GROUNDING KIT FOR 7/8 IN COAXIAL CABLE
1	DSL5SGRIP	L5SGRIP 7/8" SUPPORT HOIST GRIP
140	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT
1	DDN1088	L4TNM-PSA TYPE N MALE PS FOR 1/2 IN CABLE
1	DDN1089	L4TNF-PSA TYPE N FEMALE PS FOR 1/2 IN CABLE
4	DSSG1206B2A	SG12-06B2A 1/2IN SURE GROUND GROUNDING KIT
1	DSL4SGRIP	L4SGRIP SUPPORT HOIST GRIP 1/2" LDF
5	DSSSH12	SSH-12 1/2" SNAPSTAK HANGER 10PK
5	DSSSH78	SSH-78 7/8" SNAPSTAK HANGER 10PK
10	DSUA3	UA-3 UNIVERSAL ANGLE ADAPTOR KIT, KIT OF TEN
1	DS1090501WA	RF SPD, 700-1000MHZ BROADBAND 12 VDC PASS NM ANTENNA, NF EQUIPMENT
1	DS1090501WA	RF SPD, 700-1000MHZ BROADBAND 12 VDC PASS NM ANTENNA, NF EQUIPMENT
25	L1700	FSJ1-50A CABLE: 1/4" SUPERFLEX POLY JKT PER FOOT
2	DDN9769	TRANSMISSION LINE,F1TNM-HC 1/4IN TY
25	L1702	FSJ4-50B CABLE: 1/2" SUPERFLEX POLY JKT PER FOOT
2	DDN9682	F4PNMV2-HC 1/2" TYPE N MALE PLATED CONNECTOR
		Remote Site 2 (TBD, North?)
1	TRN7343	SEVEN AND A HALF FOOT RACK

QTY	NOMENCLATURE	DESCRIPTION
1	DS110110711	PDU, AC EDGE RACK MOUNT DISTRIBUTION PANEL, 120VAC 60A, 12-15A CIRCUIT
12	DS37502851	BREAKER KIT AIRPAX 15AMP SNAPAC, FOR AC EDGE OR DC EDGE III QTY 1
2	DSTSJ100BT	SPD, RJ-48 8 PIN, 10/100 BASE T TSJ PROTECTS/PASSES ON ALL 8 PIN
1	DSTSJADP	RACK MOUNT GROUND BAR, 19 IN FOR TSJ AND WPH SERIES DATA SPDS
2	CLN1856	2620-24 ETHERNET SWITCH
1	SQM01SUM7054	GTR 8000 EXPANDABLE SITE SUBSYSTEM
1	CA00855AA	ADD: 700/800 MHZ
4	CA01842AA	ADD: P25 TDMA SOFTWARE
5	CA01902AA	ADD: P25 DYNAMIC CHANNEL SOFTWARE
1	X305AC	ADD: QTY (5) GTR 8000 BASE RADIOS
5	X591AE	ENH: ASTRO 25 SITE REPEATER SW
1	CA00861AA	ADD: CABINET RMC W/ CAPABILITY OF 6 BRS
1	CA00879AA	ADD: PRIMARY 6 PORT CAVITY COMBINER
1	CA00883AA	ADD: 800 MHZ TX FILTER W/PMU
2	CA00303AA	ADD: QTY (1) SITE CONTROLLER
2	CA02212AA	ADD: ASTRO 25 SITE REPEATER SITE CONTROLLER SOFTWARE VOICE ONLY
1	X882AH	ADD: 7.5 FT OPEN RACK, 48RU
2	CA01706AA	ADD: ADD: GGM 8000 GATEWAY
1	DS428E83I01C110	CONTROL MONITORING UNIT, NON-DIVERSITY, 796-824 MHZ, SNMP,110 VAC
1	DS428E83I01T	TTA, NON-DIVERSITY, 796-824 MHZ, REDUNDANT LNA, TEST PORT, BYPASS
		RTU
1	F4544	SITE MANAGER ADVANCED
1	V266	ADD: 90VAC TO 260VAC PS TO SM
1	VA00872	ADD: SDM ASTRO RTU FW CURR ASTRO REL
3	V592	AAD TERM BLCK & CONN WI
1	F4528	GMC_PER_DEVICE_SW_LICENSES
1	V809	GMC_SW_LIC_PER_NFM-RTU_I-O
5	V843	GMC_SW_LIC_PER_GTR8000_MS_BR
1	F2463	RTU_PER_DEVICE_SW_LICENSES
1	V839	RTU_SW_LIC_PER_NFM-RTU_I-O
5	VA00312	RTU_SW_LIC_PER_GTR8000_MS_BR
		TX Antenna/Line
1	DSCOL811870	OMNI, MEANDER COLLINEAR, 9 DBD, 806-870 MHZ PIM RATED
15	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT
2	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
2	TDN9289	221213 CABLE WRAP WEATHERPROOFING
80	L3617	7/8IN HELIAX VIRTUAL AIR FOAM FILLED CORRUGATED CABLE (AVA5-50FX)/FOOT
2	DDN1077	7-16IN DIN FEMALE CONNECTOR EZ-FIT FOR 7/8IN CABLE (MOTOROLA SPECIFIC)
4	DSSG7806B2A	SG78-06B2A GROUNDING KIT FOR 7/8 IN COAXIAL CABLE
1	DSL5SGRIP	L5SGRIP 7/8" SUPPORT HOIST GRIP
7	DSSSH78	SSH-78 7/8" SNAPSTAK HANGER 10PK
7	DSUA3	UA-3 UNIVERSAL ANGLE ADAPTOR KIT, KIT OF TEN
1	DSTSXFMBF	RF SPD, 698-2700MHZ DC BLOCK HIGH POWER, DIN FEMALE/MALE BIDIRECTIONAL
25	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT

QTY	NOMENCLATURE	DESCRIPTION
2	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
		RX Antenna/Line
1	DSCOL811870	OMNI, MEANDER COLLINEAR, 9 DBD, 806-870 MHZ PIM RATED
15	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT
1	DDN1088	L4TNM-PSA TYPE N MALE PS FOR 1/2 IN CABLE
1	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
3	TDN9289	221213 CABLE WRAP WEATHERPROOFING
5	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT
2	DDN1088	L4TNM-PSA TYPE N MALE PS FOR 1/2 IN CABLE
100	L3617	7/8IN HELIAX VIRTUAL AIR FOAM FILLED CORRUGATED CABLE (AVA5-50FX)/FOOT
2	DDN1079	78EZNFM N FEMALE MOT CONNECTOR (MOTOROLA SPECIFIC)
4	DSSG7806B2A	SG78-06B2A GROUNDING KIT FOR 7/8 IN COAXIAL CABLE
1	DSL5SGRIP	L5SGRIP 7/8" SUPPORT HOIST GRIP
100	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT
1	DDN1088	L4TNM-PSA TYPE N MALE PS FOR 1/2 IN CABLE
1	DDN1089	L4TNF-PSA TYPE N FEMALE PS FOR 1/2 IN CABLE
4	DSSG1206B2A	SG12-06B2A 1/2IN SURE GROUND GROUNDING KIT
1	DSL4SGRIP	L4SGRIP SUPPORT HOIST GRIP 1/2" LDF
5	DSSSH12	SSH-12 1/2" SNAPSTAK HANGER 10PK
5	DSSSH78	SSH-78 7/8" SNAPSTAK HANGER 10PK
10	DSUA3	UA-3 UNIVERSAL ANGLE ADAPTOR KIT, KIT OF TEN
1	DS1090501WA	RF SPD, 700-1000MHZ BROADBAND 12 VDC PASS NM ANTENNA, NF EQUIPMENT
1	DS1090501WA	RF SPD, 700-1000MHZ BROADBAND 12 VDC PASS NM ANTENNA, NF EQUIPMENT
25	L1700	FSJ1-50A CABLE: 1/4" SUPERFLEX POLY JKT PER FOOT
2	DDN9769	TRANSMISSION LINE,F1TNM-HC 1/4IN TY
25	L1702	FSJ4-50B CABLE: 1/2" SUPERFLEX POLY JKT PER FOOT
2	DDN9682	F4PNMV2-HC 1/2" TYPE N MALE PLATED CONNECTOR
		PTP (2 Links, 1+1)
2	85009318001	ODU-B 18GHZ,TR1560,LO,B3(17700.0-18140.0 MHZ),RECT WG,NEG POL
2	85009318002	ODU-B 18GHZ,TR1560,HI,B3(19260.0-19700.0 MHZ),RECT WG,NEG POL
2	85009317001	ODU-B 11GHZ,TR 490&500,LO,B5(10700.0-10890.0 MHZ),RECT WG,NEG POL
2	85009317002	ODU-B 11GHZ,TR 490&500,HI,B5(11200.0-11390.0 MHZ),RECT WG,NEG POL
2	DS01010419001	COAXIAL CABLE GROUNDING KITS FOR 1/4" AND 3/8" CABLE
1	DS07009304001	HOISTING GRIP FOR CNT-400 CABLE
2	DS07010110005	ODU COUPLER MOUNTING KIT 11 GHZ - 3DB
2	DS07010110011	ODU COUPLER MOUNTING KIT 18 GHZ - 3DB
4	30010194001	50 OHM BRAIDED COAXIAL CABLE - 75 METER, 246 FEET
2	DS85010089052	4 FT HP ANTENNA, 10.125 - 11.70 GHZ, SINGLE POL, MOT INTERFACE
2	85010089042	2' HP ANTENNA, 17.70 - 19.70 GHZ, SINGLE POL, MOT INTERFACE
4	DSWB3541	PTP800 MODEM CAPACITY CAP - 50 MBPS (PER UNIT)
8	DSWB3616A	COAXIAL CABLE INSTALLATION ASSEMBLY KITS (W/O SURGE ARRESTOR)
8	DSWB3657A	LPU END KIT PTP800 (1 KIT REQUIRED PER COAXIAL CABLE)
1	DSWB3659	FCC M/W FREQ COORDINATION SERVICE
4	DSC000081M003A	PTP810 MMU STANDARD DUAL MODEM, 2XFE + 16XE1/T1
8	DSN000081L006	TNC MALE RIGHT ANGLE FOR CNT-400 BR

4.1 SUBSCRIBER EQUIPMENT LIST-

(Revised June 12, 2015)

QTY	NOMENCLATURE	DESCRIPTION
		Police Subscribers
20	M30TSS9PW1 N	APX7500 DUAL BAND MID POWER
20	GA00589	ADD: GCAI EXTENSION CABLE 2 FT
20	W22	ADD: MOTORCYCLE PALM MIC
20	G322	ADD:REMOTE MOUNT VIP CBL APX
20	GA00259	ADD: UNIVERSAL RELAY CONTROLLER
20	GA00260	ADD: CABLE URC TO TRANSCEIVER
20	G806	ADD: ASTRO? DIGITAL CAI OPERATION
20	GA00244	ADD: 7/800MHZ PRIMARY BAND
20	GA00255AB	ENH: SFS COMPREHENSIVE
20	GA00308	ADD: VHF MP SECONDARY BAND
20	GA00579	ADD: ENABLE DUAL BAND OPERATION
20	G843	ADD: AES ENCRYPTION APX
20	W969	ADD: MULTIPLE KEY ENCRYPTION OPERATION
20	G51	ENH: SMARTZONE OPERATION APX
20	B18	ADD: AUXILARY SPKR 7.5 WATT
20	G174	ADD: ANT 3DB LOW-PROFILE 762-870
20	G792	ADD:VHF ANT WIDEBAND 136-174 MHZ
20	G361	ADD: P25 TRUNKING SOFTWARE
20	GA00580	ADD: TDMA OPERATION
20	G67	ADD: REMOTE MOUNT MID POWER
20	GA00245	ADD: APX 7500 O9 CONTROL HEAD
20	G444	ADD: APX CONTROL HEAD SOFTWARE
20	TT2592	WHELEN/MOTOROLA SIREN
20	TT05707AA	SIREN HARDWARE INSTALL KIT
20	TT05900AA	ADD: SIREN TO RADIO CABLE (21-PIN D
2	M30TSS9PW1 N	APX7500 DUAL BAND MID POWER
2	GA00589	ADD: GCAI EXTENSION CABLE 2 FT
2	W22	ADD: MOTORCYCLE PALM MIC
2	G322	ADD:REMOTE MOUNT VIP CBL APX
2	GA00259	ADD: UNIVERSAL RELAY CONTROLLER
2	GA00260	ADD: CABLE URC TO TRANSCEIVER
2	G806	ADD: ASTRO? DIGITAL CAI OPERATION
2	GA00244	ADD: 7/800MHZ PRIMARY BAND
2	GA00255AB	ENH: SFS COMPREHENSIVE
2	GA00308	ADD: VHF MP SECONDARY BAND
2	GA00579	ADD: ENABLE DUAL BAND OPERATION
2	G843	ADD: AES ENCRYPTION APX
2	W969	ADD: MULTIPLE KEY ENCRYPTION OPERATION
2	G51	ENH: SMARTZONE OPERATION APX
2	B18	ADD: AUXILARY SPKR 7.5 WATT



QTY	NOMENCLATURE	DESCRIPTION
2	G174	ADD: ANT 3DB LOW-PROFILE 762-870
2	G792	ADD:VHF ANT WIDEBAND 136-174 MHZ
2	G361	ADD: P25 TRUNKING SOFTWARE
2	GA00580	ADD: TDMA OPERATION
2	G67	ADD: REMOTE MOUNT MID POWER
2	GA00245	ADD: APX 7500 O9 CONTROL HEAD
2	G444	ADD: APX CONTROL HEAD SOFTWARE
2	TT2592	WHELEN/MOTOROLA SIREN
2	TT05707AA	SIREN HARDWARE INSTALL KIT
2	TT05900AA	ADD: SIREN TO RADIO CABLE (21-PIN D
4	H97TGD9PW1 N	APX7000 DIGITAL PORTABLE RADIO
4	QA00569	ADD: 7/800MHZ PRIMARY BAND
4	HA00025AB	ADD: 3 YR ENCRYPT RSA COMPREHENSIVE
4	QA00574	ADD: VHF SECONDARY BAND
4	QA00579	ADD: ENABLE DUAL BAND OPERATION
4	Q806	ADD: ASTRO? DIGITAL CAI OPERATION
4	H869	ENH: MULTIKEY
4	Q629	ENH: AES ENCRYPTION
4	H38	ADD: SMARTZONE OPERATION
4	Q361	ADD: P25 9600 BAUD TRUNKING
4	QA00580	ADD: TDMA OPERATION
8	H51UCF9PW6 N	APX 4000 7/800 MHZ MODEL 2 PORTABLE
8	H869	ENH: MULTIKEY
8	Q629	ENH: AES ENCRYPTION
8	QA02756	ENH: 3600 OR 9600 TRUNKING BAUD SIN
8	HA00022AB	ENH: Sfs COMPREHENSIVE
8	QA04865	ADD: TWO KNOB CONFIGURATION
8	QA00580	ADD: TDMA OPERATION
8	WPLN4232A	110 VAC 50/60 HZ US IMPRES SUC
50	H98UCF9PW6 N	APX6000 700/800 MODEL 2.5 PORTABLE
50	Q629	ENH: AES ENCRYPTION
50	Q806	ADD: ASTRO? DIGITAL CAI OPERATION
50	H869	ENH: MULTIKEY
50	HA00022AB	ENH: Sfs COMPREHENSIVE
50	H38	ADD: SMARTZONE OPERATION
50	Q361	ADD: P25 9600 BAUD TRUNKING
50	QA00580	ADD: TDMA OPERATION
50	WPLN7080	APX 7000 IMPRES CG SU APX7000 US/NA/CA/LA
40	H98UCF9PW6 N	APX6000 700/800 MODEL 2.5 PORTABLE
40	Q629	ENH: AES ENCRYPTION
40	Q806	ADD: ASTRO? DIGITAL CAI OPERATION
40	H869	ENH: MULTIKEY
40	HA00022AB	ENH: Sfs COMPREHENSIVE
40	H38	ADD: SMARTZONE OPERATION
40	Q361	ADD: P25 9600 BAUD TRUNKING



QTY	NOMENCLATURE	DESCRIPTION
40	QA00580AB	ADD: TDMA OPERATION
44	WPLN7080	APX 7000 IMPRES CG SU APX7000 US/NA/CA/LA
		APX7000
1	T7552	DIGITAL SMARTNET
13	H869BX	ENH: MULTIKEY
13	Q327BJ	ENH: UPGRADE SMARTNET TO SMARTZONE
13	Q361AP	ADD: P25 9600 BAUD TRUNKING
13	QA00580AB	ENH: TDMA OPERATION
1	T7936	APX UCM UPGRADE CD
13	CA00182AR	ADD: AES ENCRYPTION SOFTWARE
		APX7500
1	T7561	DIGITAL SMARTNET
14	W969BJ	ADD: MULTIPLE KEY ENCRYPTION OPERATION
14	G347AR	ENH: UPGRADE SMARTNET TO SMARTZONE
14	G361AJ	ADD: P25 TRUNKING SOFTWARE
14	GA00580AB	ENH: UPGRADE TO TDMA
1	T7936	APX UCM UPGRADE CD
14	CA00182AR	ADD: AES ENCRYPTION SOFTWARE
4	M30TSS9PW1 N	APX7500 DUAL BAND MID POWER
4	W22	ADD: PALM MIC
4	G806	ADD: ASTRO? DIGITAL CAI OPERATION
4	G66	ADD: DASH MOUNT
4	GA00244	ADD: 7/800MHZ PRIMARY BAND
4	GA00232	ENH: 3 YR SFS LITE
4	GA00308	ADD: VHF MP SECONDARY BAND
4	GA00579	ADD: ENABLE DUAL BAND OPERATION
4	G843	ADD: AES ENCRYPTION APX
4	W969	ADD: MULTIPLE KEY ENCRYPTION OPERATION
4	G51	ENH: SMARTZONE OPERATION APX
4	G174	ADD: ANT 3DB LOW-PROFILE 762-870
4	G792	ADD:VHF ANT WIDEBAND 136-174 MHZ
4	B18	ADD: AUXILARY SPKR 7.5 WATT
4	G361	ADD: P25 TRUNKING SOFTWARE
4	GA00580	ADD: TDMA OPERATION
4	G444	ADD: APX CONTROL HEAD SOFTWARE
4	G442	ADD: O5 CONTROL HEAD
3	M30TSS9PW1 N	APX7500 DUAL BAND MID POWER
3	G806	ADD: ASTRO? DIGITAL CAI OPERATION
3	GA00589	ADD: GCAI EXTENSION CABLE 2 FT
3	G607	ADD:CBL REMOTE MOUNT 75 FEET
3	GA00244	ADD: 7/800MHZ PRIMARY BAND
3	GA00232	ENH: 3 YR SFS LITE
3	G843	ADD: AES ENCRYPTION APX
3	W969	ADD: MULTIPLE KEY ENCRYPTION OPERATION
3	G175	ADD: ANT 3DB ELEVATED FEED 762-870

QTY	NOMENCLATURE	DESCRIPTION
3	GA00804	ADD: APX O2 CONTROL HEAD (Green)
3	GA00308	ADD: VHF MP SECONDARY BAND
3	GA00579	ADD: ENABLE DUAL BAND OPERATION
3	G51	ENH: SMARTZONE OPERATION APX
3	G792	ADD:VHF ANT WIDEBAND 136-174 MHZ
3	G361	ADD: P25 TRUNKING SOFTWARE
3	GA00580	ADD: TDMA OPERATION
3	G67	ADD: REMOTE MOUNT MID POWER
3	G444	ADD: APX CONTROL HEAD SOFTWARE
3	G831	ADD: SPKR 15W WATER RESISTANT
3	G892	ENH: HAND MIC,GCAI WATER RESISTANT
2	M25URS9PW1 N	APX6500 7/800 MHZ MID POWER MOBILE
2	G806	ADD: ASTRO? DIGITAL CAI OPERATION
2	W22	ADD: PALM MICROPHONE
2	G442	ADD: O5 CONTROL HEAD
2	G67	ADD: REMOTE MOUNT MID POWER
2	G398AU	ENH: 3 YEAR REPAIR SERVICE ADVANTAGE
2	G843	ADD: AES ENCRYPTION APX
2	W969	ADD: MULTIPLE KEY ENCRYPTION OPERATION
2	G444	ADD: APX CONTROL HEAD SOFTWARE
2	G174	ADD: ANT 3DB LOW-PROFILE 762-870
2	B18	ADD: AUXILARY SPKR 7.5 WATT
2	G51	ENH: SMARTZONE OPERATION APX6500
2	GA00580	ADD: TDMA OPERATION
2	G361	ADD: P25 TRUNKING SOFTWARE
2	M22URS9PW1 N	APX4500 7/800
2	G398AU	ENH: 3 YEAR REPAIR SERVICE ADVANTAGE
2	QA02756	ADD: 3600 OR 9600 TRUNKING BAUD SINGLE SYSTEM
2	G66	ADD: DASH MOUNT O2 WWM
2	G175	ADD: ANT 3DB ELEVATED FEED 762-870
2	G843	ADD: AES ENCRYPTION APX
2	W969	ADD: MULTIKEY
2	W22	ADD: PALM MICROPHONE
2	GA00804	ADD: APX O2 CONTROL HEAD (Green)
2	G444	ADD: APX CONTROL HEAD SOFTWARE
2	B18	ADD: AUXILARY SPKR 7.5 WATT
9	NNTN7624B	IMPRES VEHICULAR CHARGER (FULL KIT)
		Fire Subscribers
		APX7500
1	T7560	ANALOG SMARTNET
17	G808AD	ADD: ASTRO? DIGITAL CAI OPERATION
17	G347AR	ENH: UPGRADE SMARTNET TO SMARTZONE
17	G361AJ	ENH: ASTRO P25 TRUNK SOFTWARE
17	GA00580AB	ENH: UPGRADE TO TDMA
		APX7000

QTY	NOMENCLATURE	DESCRIPTION
1	T7551	ANALOG SMARTNET
56	Q808AK	ADD: ASTRO? DIGITAL CAI OPERATION
56	Q327BJ	ENH: UPGRADE SMARTNET TO SMARTZONE
56	Q361AP	ENH: P25 9600 BAUD TRUNKING
56	QA00580AB	ENH: TDMA OPERATION
6	M22URS9PW1 N	APX4500 7/800
6	G398AU	ENH: 3 YEAR REPAIR SERVICE ADVANTAGE
6	QA02756	ADD: 3600 OR 9600 TRUNKING BAUD SINGLE SYSTEM
6	G66	ADD: DASH MOUNT O2 WWM
6	W22	ADD: PALM MICROPHONE
6	GA00804	ADD: APX O2 CONTROL HEAD (Green)
6	G444	ADD: APX CONTROL HEAD SOFTWARE
6	B18	ADD: AUXILARY SPKR 7.5 WATT
6	GA00580	ADD: TDMA OPERATION
2	G89	ADD: NO RF ANTENNA NEEDED
6	H84KDD9PW5 N	APX 1000 VHF MODEL 1.5 PORTABLE
6	H301	DEL: DELETE STANDARD BELT CLIP
6	QA04097	ENH: P25 CONVENTIONAL
6	H886AQ	ENH: 3 YR SFS LITE
6	PMMN4069A	IMPRES RSM, 3.5MM AUDIO JACK
1	M36KSS9PW1 N	APX1500 VHF
1	G398AU	ENH: 3 YEAR REPAIR SERVICE ADVANTAGE
1	G90	ADD: NO MICROPHONE NEEDED
1	GA01339	ENH: SW P25 TRUNKING
1	G66	ADD: DASH MOUNT O2 WWM
1	G444	ADD: APX CONTROL HEAD SOFTWARE
1	GA00804	ADD: APX O2 CONTROL HEAD (Grey)
1	G89	ADD: NO RF ANTENNA NEEDED
1	B18	ADD: AUXILARY SPKR 7.5 WATT

STATEMENT OF WORK

5.1 CONTRACT

5.1.1 Contract Award (Milestone)

The Customer and Motorola execute the contract and both parties receive all the necessary documentation.

5.1.2 Contract Administration

Motorola Responsibilities:

- Assign a Project Manager, as the single point of contact with authority to make project decisions.
- Assign resources necessary for project implementation.
- Set up the project in the Motorola information system.
- Schedule the project kickoff meeting with the Customer.

Customer Responsibilities:

Assign a Project Manager, as the single point of contact responsible for Customer-signed approvals. Assign other resources necessary to ensure completion of project tasks for which the Customer is responsible.

Completion Criteria:

- Motorola internal processes are set up for project management.
- Both Motorola and the Customer assign all required resources.
- Project kickoff meeting is scheduled.

5.1.3 Project Kickoff

Motorola Responsibilities:

- Conduct a project kickoff meeting during the Contract Design Review (CDR) phase of the project. This will be performed pre-sale before contract is executed.
- Ensure key project team participants attend the meeting.
- Introduce all project participants attending the meeting.
- Review the roles of the project participants to identify communication flows and decision-making authority between project participants.
- Review the overall project scope and objectives with the Customer.
- Review the resource and scheduling requirements with the Customer.
- Review the Project Schedule with the Customer to address upcoming milestones and/or events.
- Review the teams' interactions (Motorola and the Customer), meetings, reports, milestone acceptance, and the Customer's participation in particular phases.

Customer Responsibilities:

- The Customer's key project team participants attend the meeting.
- Review Motorola and Customer responsibilities.



Completion Criteria:

- Project kickoff meeting completed.
- Meeting notes identify the next action items.

5.2 CONTRACT DESIGN REVIEW

5.2.1 Review Contract Design

Motorola Responsibilities:

- Meet with the Customer project team.
- Review the operational requirements and the impact of those requirements on various equipment configurations.
- Establish a defined baseline for the system design and identify any special product requirements and their impact on system implementation.
- Review the System Design, Statement of Work, Project Schedule, and Acceptance Test Plans, and update the contract documents accordingly.
- Discuss the proposed Cutover Plan and methods to document a detailed procedure.
- Submit design documents to the Customer for approval. These documents form the basis of the system, which Motorola will manufacture, assemble, stage, and install.
- Prepare equipment layout plans for staging.
- Prepare Site Evaluation Report that summarizes findings of above-described site evaluations.
- Assist the Customer with frequency planning services, frequency search services, interference analysis, public notifications, coordination, and frequency recommendations for the radio system.
NOTE: If the necessary number of channels for the RF or traffic plan cannot be licensed by the Customer, Motorola will work with the Customer to redesign the system. Should system redesign be required, the contract documents will be updated accordingly.

Restrictions:

- Motorola assumes no liability or responsibility for inadequate frequency availability or frequency licensing issues.
- Motorola is not responsible for issues outside of its immediate control. Such issues include, but are not restricted to, improper frequency coordination by others and non-compliant operation of other radios.
- Motorola is not responsible for co-channel interference due to errors in frequency coordination by APCO or any other unlisted frequencies, or the improper design, installation, or operation of systems installed or operated by others.
- If, for any reason, any of the proposed sites cannot be utilized due to reasons beyond Motorola's control, the costs associated with site changes or delays including, but not limited to, re-engineering, frequency re-licensing, site zoning, site permitting, schedule delays, site abnormalities, re-mobilization, etc., will be paid for by the Customer and documented through the change order process.

Customer Responsibilities:

- The Customer's key project team participants attend the meeting.
- Make timely decisions, according to the Project Schedule.
- Frequency Licensing and Interference:
 - As mandated by FCC, the Customer, as the licensee, has the ultimate responsibility for providing all required radio licensing or licensing modifications for the system prior to



system staging. This responsibility includes paying for FCC licensing and frequency coordination fees.

- Provide the FCC "call sign" station identifier for each site prior to system staging.

Completion Criteria:

- Incorporate any deviations from the proposed system into the contract documents accordingly.
- The system design is "frozen" in preparation for subsequent project phases such as Order Processing and Manufacturing.
- A Change Order is executed in accordance with all material changes resulting from the Design Review to the contract.

5.2.2 Design Approval (Milestone) (Asking for clarification)

The Customer executes a Design Approval milestone document.

5.3 ORDER PROCESSING

5.3.1 Process Equipment List

Motorola Responsibilities:

- Validate Equipment List by checking for valid model numbers, versions, compatible options to main equipment, and delivery data.
- Enter order into Motorola's Customer Order Fulfillment (COF) system.
- Reconcile the equipment list(s) to the Contract.

Customer Responsibilities:

- Provide shipping location(s).
- Complete and provide Tax Certificate information verifying tax status of shipping location.

Completion Criteria:

- Verify that the Equipment List contains the correct model numbers, version, options, and delivery data.
- Trial validation completed.
- Bridge the equipment order to the manufacturing facility.

5.4 MANUFACTURING AND STAGING

5.4.1 Manufacture Motorola Equipment

Motorola Responsibilities:

Manufacture the Motorola fixed, subscribers and non-Motorola equipment necessary for the system based on equipment order.

Customer Responsibilities:

None.

Completion Criteria:

FNE shipped to either the field or the staging facility.

5.4.2 Develop Fleetmap/Templates

Motorola Responsibilities:

- Work with the customer to develop fleetmap plan based on customer needs and requirements.
- Templates completed and approved by the Customer.
- Program subscribers based on the agreed fleetmap design.

Customer Responsibilities:

- Provide fleetmap requirements prior to staging of the system.
- Approve fleetmap templates.

Completion Criteria:

Fleetmap requirements completed and approved by the Customer.

5.4.3 Ship to Staging (Milestone)

Ship all equipment needed for staging to Motorola's Customer Center for Solutions Integration (CCSi) factory staging facility in Schaumburg, Illinois.

5.4.4 Stage System

Motorola Responsibilities:

- Set up and rack the system equipment on a site-by-site basis, as it will be configured in the field at each of the transmitter/receiver sites.
- Provide internal cables.
- Assemble required subsystems to assure system functionality.
- Power up, program, and test all staged equipment.
- Confirm system configuration and software compatibility to the existing system.
- Programming of equipment being staged with information provided at the time of staging.
- Inventory the equipment with serial numbers and installation references.
- Complete system documentation.
- Third party subsystems may be staged at the manufacturer's facilities and integrated in the field.
- Provide a Factory Acceptance Test Plan.

Customer Responsibilities:

- Provide information on existing system interfaces as may be required.
- Provide information on room layouts or other information necessary for the assembly to meet field conditions.
- Review and approve proposed Factory Acceptance Test Plan.

Completion Criteria:

System staging completed and ready for testing.



5.4.5 Perform Staging Acceptance Test Procedures

Motorola Responsibilities:

- Test and validate system software and features.
- Functional testing of standard system features.
- Conduct site and system level testing.
- Power-up site equipment and perform standardized functionality tests.
- Perform system burn-in 24 hours a day during staging to isolate and capture any defects.
- Perform Lake Havasu City Police Department-witnessed tests based upon Factory Acceptance Test Plan.

Customer Responsibilities (If customer chooses to attend):

- Attend Factory Acceptance Testing.
- Pay for travel, lodging, meals, and all incidental expenses for Customer personnel and representatives to witness the Factory Acceptance Testing.

Completion Criteria:

Approve Factory Acceptance Testing.

5.4.6 Ship Equipment to Field

Motorola Responsibilities:

- Pack system for shipment to final destination.
- Arrange for shipment to the field.

Customer Responsibilities:

Customer to provide shipment location.

Completion Criteria:

Equipment ready for shipment to the field.

5.4.7 CCSi Ship Acceptance (Milestone)

All equipment shipped to the field.

5.5 CIVIL WORK FOR THE CUSTOMER-PROVIDED FACILITIES

Motorola Responsibilities:

No civil work has been included in this proposal.

Customer Responsibilities:

- Secure site lease/ownership, zoning, permits, regulatory approvals, easements, power, and Telco connections. Specifically, Lake Havasu City is responsible for securing all approvals to use the North Butte site as an RF site for the proposed system, as well as any site upgrades which may be necessary.
- Provide clear and stable access to the sites for transporting electronics and other materials. Sufficient site access must be available for trucks to deliver materials under their own power and for personnel to move materials to the facility without assistance from special equipment.



- Design and construct facilities for housing communications equipment such as shelters, towers, generators, fuel tanks, fenced compounds, etc.
- Supply adequately sized electrical service, backup power (UPS, generator, batteries, etc.) including the installation of conduit, circuit breakers, outlets, etc., at each equipment location. Provide AC power (dedicated 20A, AC outlets - simplex with ground) for each major piece of equipment within 6 feet of the location of the Motorola-supplied equipment, including the associated electrical service and wiring (conduit, circuit breakers, etc.).
- Provide adequate HVAC, grounding, lighting, cable routing, and surge protection (also, among existing and Motorola-provided equipment) based upon Motorola's Standards and Guidelines for Communication Sites (R56). Ceiling (minimum 9 feet) and cable tray heights (minimum 8 feet) in the equipment rooms in order to accommodate 7-foot, 6-inch equipment racks.
- Provide floor space and desk space for the System equipment at the Customer-provided facilities. Each rack shall be provided a minimum of 24-inch x 24-inch footprint with 36-inch clearance in the front and back.
- Relocate existing equipment, if needed, to provide required space for the installation of Motorola-supplied equipment.
- Bring grounding system up to Motorola's R56 standards and supply a single point system ground, of 5 ohms or less, to be used on all FNE supplied under the Contract. Supply grounding tie point within 10 feet from the Motorola-supplied equipment.
- Provide all necessary wall or roof penetrations on existing buildings for antenna coax and microwave waveguide (if applicable) for main transmitter antennas, microwave radios, and control station Yagi antennas.
- Provide obstruction-free area for the cable run between the demarcation point and the communications equipment.
- Resolve any environmental issues including, but not limited to, asbestos, structural integrity (rooftop, water tank, tower, etc.) of the site, and any other building risks. (Resolve environmental or hazardous material issues).
- Arrange for space on the tower for installation of new antennas at the proposed heights.
- Perform structural analysis of existing tower and rooftops as required to confirm that the structure is capable of supporting proposed and future antenna loads.
- Supply all permits as contractually required.
- Supply interior building cable trays, raceways, conduits, and wire supports.
- Supply engineering and drafting as required for modifications to existing building drawings for site construction.
- Pay for usage costs of power and generator fueling, both during the construction and installation effort, and on an ongoing basis.
- Complete all customer deliverables in accordance within the approved project schedule.

Completion Criteria:

All sites are ready for equipment installations in compliance with Motorola's R56 standards.

5.6 SYSTEM INSTALLATION

5.6.1 Install Fixed Network Equipment (Milestone)

Motorola Responsibilities:

- Will provide storage location for the Motorola-provided equipment.
- Receive and inventory all equipment.



- Install system equipment as specified by the Equipment List, System Description, and system drawings.

Interference:

- Motorola is not responsible for interference caused or received by the Motorola provided equipment except for interference that is directly caused by the Motorola-provided transmitter(s) to the Motorola-provided receiver(s). Should the Lake Havasu City Police Department system experience interference, Motorola can be contracted to investigate the source and recommend solutions to mitigate the issue.

Bond the supplied equipment to the site ground system in accordance with Motorola's R56 standards.

- Will interface with the following network connections:
 - Microwave Ethernet Ports
 - Telco Supplied Wireline Interfaces
 - Customer Aux I/O Points that Terminate at L2 Core Site
- Will remove existing equipment.
- Will relocate existing equipment to a location designated by the Customer.
- Will dispose of existing equipment.

Customer Responsibilities:

- Provide access to the sites, as necessary.

Completion Criteria:

Fixed Network Equipment installation completed and ready for optimization.

5.6.2 Fixed Network Equipment Installation Complete

All fixed network equipment installed and accepted by the Customer.

5.6.3 Console Installation

Motorola Responsibilities:

- Install the console in the space provided by the Customer.
- Connect the Customer-supplied, previously-identified circuits into the console, to a demarcation point located within 25 feet of the console interface.
- Terminate the audio outputs for the logged talkgroups onto a punchblock, and then terminate these outputs into the logging recorder.
- Install a dedicated Local Area Network (LAN) at each dispatch center to connect the proposed console positions.
- Connect the appropriate equipment to the Lake Havasu City Police Department-supplied ground system in accordance with Motorola's R56 Site Installation standards.
- Perform the console programming, based on the console templates designed during the fleetmapping process.

Customer Responsibilities:

- Provide demarcation point located within 25 feet of the console interface.

Completion Criteria:

Console installation is complete.

Design Assumptions:

Motorola has made several system design assumptions in preparing this proposal, which are noted below. Should any of these assumptions be incorrect, Motorola reserves the right to amend the proposal which could result in a change in project scope, schedule, and/or cost. Motorola will need to verify all assumptions or seek alternate solutions in the case of invalid assumptions.

- This quote does not include considerations for any site specific installation requirements, including but not limited to:
 - HVAC
 - Floor Loading
 - Power sourcing/loading
 - Breaker panel availability
 - Surge suppression, beyond that provided by Motorola for new equipment
- All power/HVAC will be provided by the customer:
 - Equipment power is to be 120V AC
 - The demarcation point will be the circuit distribution devices in the equipment racks.
 - The customer will provide NEC and R56 compliant TVSS power panel protection and grounding connection points for all rack-mounted equipment
 - The customer will provide a connection to the building grounding system at each operator position.
- All existing sites or equipment locations will have sufficient space available for the system described. The customer will be responsible to secure the use of existing equipment racks and power/grounding systems for the proposed hardware from existing site owners
- Motorola is not providing any console workspace furniture or enclosures. The customer will be responsible for providing furniture and any custom equipment to accommodate the console operator terminal(s) and to suit individual dispatcher preferences.
- Any site/location or facility upgrades or modifications are the responsibility of the customer.
- Approved local, State, or Federal permits as may be required for the installation and operation of the proposed equipment are the responsibility of the customer.
- No provisions have been made to provide relay closure/detection for shared AUX I/O resources between the MCC 7500 and the existing consoles as none were identified during the design.
- This proposal/design does not make any claims with regards to equivalent functionality between the existing console dispatch equipment/design and the MCC 7500 dispatch equipment.
- The provided CCGWs support conventional stations that utilize four-wire analog E&M (Type II), Tone-Remote Controlled (TRC), or v.24 interfaces.
 - Motorola assumes that all existing conventional resources utilize keying methods that are compatible with the provided CCGWs
 - The CCGW does not support DC-controlled connections.
- AUX I/O functionality has been provided for the dispatch center via a MCC 7500 AUX I/O server depending on the requirement. This server is capable of supporting 16 output relays and 48 input buffers.
 - Relay outputs are single pole form A that are capable of switching 1A @ 24V (AC or DC)
 - Input buffers are active high and are configurable to work with wet (5 or 12V) or dry closures
- Motorola has not made any provisions in its design for connection of third-party systems to its dispatch hardware, this includes but is not limited to:
 - Computer Aided Dispatch (CAD)
 - Telephone Interconnect
- The MCC7500 supports Private AUX I/O connections. The Private AUX I/O functions are limited to:
 - Call on Selected Channel



- Op PTT
- Emergency Beacon
- Activate Private Relay when Public AUXI/O is active
- Any required system interconnections not specifically outlined here will be provided by the Customer. These may include dedicated phone circuits, microwave links or other types of connectivity.
- No coverage guarantee is included in this proposal.
- No box level or performance spec testing will be conducted.

5.6.4 Console Installation Complete

Console installation completed and accepted by the Customer.

5.6.5 Control Station Installation

Motorola Responsibilities:

- Properly connectorize and ground the cabling, which will be run to the outdoor antenna location using the least obtrusive method.
- Protect the cabling by providing and installing a bulkhead lightning surge protector.
- Survey the exact mounting locations and develop control station installation plan.
- Perform the following tasks for the local control stations installations:
 - Install Equipment identified on equipment list.
 - Assist the Customer to determine the locations of control stations and desk sets at each site.
 - Install RF local control stations identified in the equipment list.
 - Install line (not greater than 100 feet in length) and antenna system (connectors, coax grounding kit, antenna, and surge protection). Confirm line length is appropriate.
 - Connect to the Customer-supplied ground point.
- Program all control stations once, from the template (approved by Lake Havasu City Police Department) prior to delivery.

Customer Responsibilities:

- Provide cable entry into the building through wall feed-through and seal with silicone, or provide an entry plate and boot.
- Provide ground point within 6 cable feet of the control station.
- Provide necessary space for installation of the local control station. (This also requires a flat surface for placement.)
- Supply, exterior or internal, vertical spaces for installation of the control station antenna.
- Supply a dedicated 115 VAC grounded electrical outlet rated at 15 A to power the control station and remote control device. Provide an outlet within 6 feet of the unit.
- Supply a ground point of 5 ohms or less located in the immediate vicinity (within 6 feet) of the finalized location of the antenna and control station.
- Provide antenna-mounting facilities at each of the RF control station points specified, while providing an adequate means of feed-line routing and support.

Completion Criteria:

Completion of all the control station installations, and approval by the Customer.



5.6.6 Control Station Complete

Control Station installation completed and accepted by the Customer.

5.6.7 System Installation Acceptance (Milestone)

All equipment installations are completed and accepted by the Customer.

5.7 SYSTEM OPTIMIZATION

5.7.1 Optimize System FNE

Motorola Responsibilities:

- Verify that all equipment is operating properly and that all electrical and signal levels are set accurately.
- Check forward and reflected power for all radio equipment, after connection to the antenna systems, to verify that power is within tolerances.
- Motorola and its subcontractors optimize each subsystem.
- Check audio and data levels to verify factory settings.
- Test features and functionality are in accordance with manufacturers' specifications and that they comply with the final configuration established during the CDR/system staging.
- Install and integrate the RF sites with the system, then optimize and activate the core controller.
- Integrate the consoles and RF sites into the system to ensure proper operation.
- Set up the consoles on the new radio system to perform the dispatching operation.

Customer Responsibilities:

- Provide access/escort to the sites.
- Provide required radio ID and alias information to enable alias database setup for interface to console.
- Define the logging recorder tracks by talkgroup.
- Dispatchers to use the existing conventional system icons for dispatching until cutover.

Completion Criteria:

System FNE optimization is complete.

5.7.2 Link Verification

Motorola Responsibilities:

Perform test to verify site link performance, prior to the interconnection of the Motorola-supplied equipment to the link equipment.

Customer Responsibilities:

None

Completion Criteria:

Link verification successfully completed.



5.7.3 Optimization Complete

System optimization is completed. Motorola and the Customer agree that the equipment is ready for acceptance testing.

5.8 TRAINING

5.8.1 Perform Training

Motorola Responsibilities:

- Develop training plan in conjunction with Lake Havasu City officials.
- Conduct the training classes outlined in the Training Plan.

Customer Responsibilities:

- Attend training classes.
- Comply with the prerequisites in the Training Plan.

Completion Criteria:

All training classes completed.

5.8.2 Training Complete

All training classes completed.

5.9 AUDIT AND ACCEPTANCE TESTING

5.9.1 Perform R56 Installation Audit

Motorola Responsibilities:

- Perform R56 site-installation quality audits, verifying proper physical installation and operational configurations.
- Create site evaluation report to verify site meets or exceeds requirements, as defined in Motorola's Standards and Guidelines for Communication Sites (R56).

Customer Responsibilities:

- Provide access/escort to the sites.
- Witness tests. (optional)

Completion Criteria:

All R56 audits completed successfully.

5.10 CONDUCT FIELD ATP

Motorola Responsibilities:

- Conduct the Field ATP upon functional testing documents approved during the Design Review phase.

- If any major task as contractually described fails, repeat that particular task after Motorola determines that corrective action has been taken.
- Document all issues that arise during the acceptance tests.
- Document the results of the acceptance tests and present to the Customer for review.
- Resolve any minor task failures before Final System Acceptance.

Customer Responsibilities:

Witness the Field ATP.

Completion Criteria:

- Successful completion of the Field ATP.
- Customer approval of the Field ATP.

5.10.1 System Acceptance Test Procedures (Milestone)

Customer approves the completion of all the required tests.

5.11 SUBSCRIBER INSTALLATION

5.11.1 Program and Install Mobiles

Motorola Responsibilities:

- Program test mobiles with each template version and activate them on the system.
- Program all the mobiles, as identified in the equipment list, in accordance with the Customer-approved programming templates, client software, and fleetmap.
- Install all mobiles in the vehicle as discussed in the CDR.
- The following guidelines are followed during installation:
 - A "one-time only" programming charge is included in the project price.
 - Installations utilize the standard mobile mounting hardware provided with the type of unit.
 - Remove the existing mobiles from the vehicles at the time of installation of new radios

Customer Responsibilities:

- Verify and approve successful testing of features selected during the CDR process.
- Provide adequate number of vehicles for installations, according to the project/installation schedule.
- If any installations require variations from the approved plan, the Customer must approve, before proceeding with the variance.
- Prior to subscriber flash upgrade ("Customer") will perform all appropriate preventative maintenance on the subscriber radios within 24 months prior to cutover and ensure the radios are in good working order. Preventative Maintenance would include calibration and tuning to ensure the radios are operating within manufacturer's specifications.

Completion Criteria:

All mobiles are programmed and installed successfully and approved by the Customer.



5.11.2 Program and Distribute Portables

Motorola Responsibilities:

- Program test portables with each template version and activate them on the system.
- Once all templates and client software is tested and approved by the Customer, Motorola requests written approval of template acceptance.
- Program all the portables, as identified in the equipment list, based upon the Customer approved programming templates, client software, and fleetmap. A “one-time only” programming is included in the project pricing.
- Deliver units to authorized Customer personnel and inventory upon receipt.

Customer Responsibilities:

- Approve final template(s) for portable programming.
- Upon receipt of portables, a Customer-authorized signatory acknowledges receipt of all portables, accessories and proper operation of a sampling of portables.
- Distribute the portables to end users.

Completion Criteria:

All portables are successfully programmed and approved by the Customer.

5.11.3 Subscribers Complete

All Subscribers are programmed and/or distributed/installed successfully, and approved by the Customer.

5.12 FINALIZE

5.12.1 Cutover

Motorola Responsibilities:

- Motorola and the Customer develop a mutually agreed upon cutover plan based upon discussions held during the CDR.
- During cutover, follow the written plan and implement the defined contingencies, as required.
- Conduct cutover meeting(s) to address both how to mitigate technical and communication problem impact to the users during cutover and during the general operation of the system.

Customer Responsibilities:

- Attend cutover meetings and approve the cutover plan.
- Notify the user group(s) affected by the cutover (date and time).
- Conduct a roll call of all users working during the cutover, in an organized and methodical manner.
- Ensure that all subscriber users are trained and the subscribers have been activated on the system.
- Provide Motorola with the subscriber information for input into the system database, for activation.

Completion Criteria:

Successful migration from the old system to the new system.



5.12.2 Resolve Punchlist

Motorola Responsibilities:

Work with the Customer to resolve punchlist items, documented during the Acceptance Testing phase, in order to meet all the criteria for final system acceptance.

Customer Responsibilities:

Assist Motorola with resolution of identified punchlist items by providing support, such as access to the sites, equipment and system, and approval of the resolved punchlist item(s).

Completion Criteria:

All punchlist items resolved and approved by the Customer.

5.12.3 Transition to Service/Project Transition Certificate

Motorola Responsibilities:

- Review the items necessary for transitioning the project to warranty support and service.
- Provide a Customer Support Plan detailing the warranty and post-warranty support, if applicable, associated with the Contract equipment.
- Provide additional information regarding post-warranty support, included in the Warranty/Post-Warranty section of this document.

Customer Responsibilities:

Participate in the Transition Service/Project Transition Certificate (PTC) process.

Completion Criteria:

All service information has been delivered and approved by the Customer.

5.12.4 Finalize Documentation

Motorola Responsibilities:

Provide the following documents:

- System-Level Diagram as shown on the system diagram section of this proposal.
- Rack Diagrams
- ATP Test Checklists
- Field Acceptance Test Plan Test Sheets and Results

Customer Responsibilities:

Receive and approve all documentation provided by Motorola.

Completion Criteria:

All required documentation is provided and approved by the Customer.

5.12.5 Final Acceptance (Milestone)

All deliverables completed, as contractually required.

Final System Acceptance received from the Customer.

5.13 PROJECT ADMINISTRATION

5.13.1 Project Status Meetings

Motorola Responsibilities:

- Motorola Project Manager, or designee, will attend all project status meetings with the Customer, as determined during the CDR.
- Record the meeting minutes and supply the report.
- The agenda will include the following:
 - Overall project status compared to the Project Schedule.
 - Product or service related issues that may affect the Project Schedule.
 - Status of the action items and the responsibilities associated with them, in accordance with the Project Schedule.
 - Any miscellaneous concerns of either the Customer or Motorola.

Customer Responsibilities:

- Attend meetings.
- Respond to issues in a timely manner.

Completion Criteria:

Completion of the meetings and submission of meeting minutes.

5.13.2 Progress Milestone Submittal

Motorola Responsibilities:

Submit progress (non-payment) milestone completion certificate/documentation.

Customer Responsibilities:

Approve milestone, which will signify confirmation of completion of the work associated with the scheduled task.

Completion Criteria:

The Customer approval of the Milestone Completion document(s).

5.13.3 Change Order Process

Either Party may request changes within the general scope of this Agreement. If a requested change causes an increase or decrease in the cost or time required to perform this Agreement, the Parties will agree to an equitable adjustment of the Contract Price, Performance Schedule, or both, and will reflect the adjustment in a change order. Neither Party is obligated to perform requested changes unless both Parties execute a written change order.



ACCEPTANCE TEST PLAN

A detailed Acceptance Test Plan will be developed upon purchase and will be reviewed during the Project Kickoff/Design Review meeting.



TRAINING PLAN

Motorola Solutions, Inc, shall develop a training plan for end users. This training plan shall be developed in conjunction with Lake Havasu City officials and will be provided by Motorola Solutions (through Creative Communications) to all dispatches/Supervisors. Any associated costs are included as part of this proposal.



SERVICE/WARRANTY

Motorola has the most comprehensive service organization in the Land Mobile Industry. Since 1947, we have been building a unique service team, national in scope, but local in its ability to respond to our Customer's diverse needs. As product and system complexity has evolved over the years, the Motorola Global Solutions and Service Division has responded by developing new service products and programs to match the evolution. This ensures that we have the ability to provide service products to effectively maintain your system.

8.1 WARRANTY AND ABOVE-WARRANTY SERVICES

Motorola will provide warranty services per our standard warranty terms and conditions as outlined within the enclosed Communication Systems Agreement. In addition, Motorola will provide above-warranty services during the Warranty Period at no additional cost. These above-warranty services are listed below with a brief description of each service. After the Warranty Period, these services may be purchased under a separate maintenance agreement.

8.1.1 On-Site Infrastructure Response/ Dispatch Service

Motorola's On-Site Response service gives you that advantage by making available our network of expert support resources located all across North America to *provide on-site support when you need it*. These Motorola certified field technicians arrive at your door equipped and ready to do what it takes to get your system running at optimum capacity.

Using Motorola-approved test equipment, service procedures and backed by Motorola's centralized technical resources, technicians from your local authorized service center are dispatched to your site to perform diagnostics, remove components for repair, and reinstall new or reconditioned components. When it is a response to a call for help, Motorola On-Site Response service *guarantees technician dispatch, site arrival, and problem resolution—all within your contracted response times*.

Motorola field technicians average 35-60 hours of technical training per year and 15-25 years of solution experience that aid in the quick and timely resolution of your service issues. Motorola on-site technicians are also backed up by technical consultants and field engineering support across the county when the situation calls for a more specialized expertise. We recognize that your communication system is critical to your operation and our support strategy of local and centralized support is our promise to you that we will do whatever it takes to keep it working at peak efficiency.

Motorola's On-Site Response service is a vital component of an intelligent communication support plan that keeps your business running, your costs down, and helps you stay focused on your goals.

Our **Dispatch Service** is 24 hours a day, 7 days a week. Dispatch service provides robust escalation process whereby predefined response times are monitored and escalated throughout Motorola Management to prevent delayed or dropped response times. Dispatch service combined with MOL allows the customer to be actively involved with the service process.



8.1.2 Technical Support Service

Motorola Technical Support Service assures you maximum preparedness with on-demand technical support, commitment to restoration, and whatever it takes to enable immediate communication via your wireless network! The skilled professionals and advanced systems at the Motorola System Support Center are there to keep your network running at peak performance 24 hours a day, 7 days a week.

Technical Support provides:

- Expert technologists trained in troubleshooting to analyze, isolate and correct problems to get your system issue(s) resolved quickly.
- Best-in-class Remote Diagnosis capabilities: advanced diagnostics and fully equipped test labs, if applicable, based on system type
- Automated test systems to quickly diagnose boards
- Shared knowledge database constantly updated for technologists to utilize to reduce cycle time
- Immediate access to Network Designers and Engineers
- Rigorous and defined case and escalation management process and procedures
- Motorola technologists participate in ongoing training programs
- Customer case performance reports available upon request

8.1.3 Infrastructure Repair and/or Infrastructure Repair with Advanced Replacement

Motorola Infrastructure Repair and/or Infrastructure Repair with Advanced Replacement Service assures you maximum preparedness through the most effective repair processes so that potential service disruptions are minimized or alleviated. The skilled professionals and advanced systems at the Motorola Infrastructure Depot are here to keep your network running at peak performance 24 hours a day, 7 days a week. Infrastructure may be repaired down to the Component level at the Motorola Infrastructure Depot Operations (IDO). At Motorola's discretion, select third party Infrastructure may be sent to the original equipment manufacturer or third party vendor for repair. If Infrastructure is no longer supported by the original equipment manufacturer or third party vendor, Motorola may replace the equipment with similar Infrastructure.

Infrastructure Repair provides:

- Expert technicians utilizing state-of-the-art automated test equipment trained in troubleshooting to analyze, isolate and correct problems to get your equipment repaired quickly.
- Rigorous and defined case and escalation management process and procedure

Infrastructure Repair with Advanced Replacement Service adds:

- 24 hour advanced replacement exchange for the malfunctioning equipment
- Rental/Loaner equipment in cases where the customer requires the exact serialized repaired equipment returned.

8.1.4 Network Monitoring Service

Network Monitoring Service can help keep your network at optimum availability so it is ready to serve mission critical communications needs. By watching over the network continuously, Network Monitoring Service takes action whenever needed, and resolves network problems. *We often intervene and correct the problem before you even know a problem exists.* Network Monitoring



Service provides improved productivity and enhanced network performance, which in turn helps to increase your technology Return On Investment.

Using a combination of network monitoring software, automated alerts, and remote diagnostics inquiries, our System Support technologists actively monitor your network to maximize network uptime and overall preparedness...for the expected *and* unexpected. Upon receiving an alert, our team immediately performs a series of diagnostics to assess the problem. Often the situation can be resolved remotely, but when additional attention is required, local field technicians are dispatched immediately to your site to achieve restoration. Network Monitoring Service works in conjunction with Dispatch Services, Onsite Infrastructure Response and Technical Support Services.

8.1.5 Network Preventative Maintenance

Motorola's Network Preventative Maintenance is a program of regularly scheduled check-ups designed to assure network readiness and overall reliability. This service will be performed annually in conjunction with a prearranged schedule. This service will be performed during normal working hours with the intent to minimize any disruption of service to users. If the service must be performed after hours, a quote will be provided. System documentation will be updated based on this information. The list of documented parameters will be determined by agreement with the customer. All equipment provided as a part of the system will be included.

As wireless networks become increasingly complex, and are enabled to perform more sophisticated tasks, the scope of possible issues grows exponentially. With Network Preventative Maintenance, Motorola offers a proactive, anticipatory service that ensures all network components are operating consistent to manufacturers' specifications – *the first step in minimizing premature repairs*.

Certified field technicians, located throughout North America, are prepared to inspect networks on a routine and prescribed basis. This service is likely the most cost-effective form of network maintenance – the technological equivalent of routine physical examinations.

Using Motorola's best-in-class test equipment, technicians examine hands-on and, if operational testing dictates, align infrastructure to manufacturer's specifications. Equally important, on-site field technicians are supported by Motorola's centralized technical resources and engineering expertise.

8.1.6 Security Monitoring Service

Security elements such as anti-virus, firewalls, and Intrusion Detection Systems (IDS) are a good first step, but they are not enough to secure your network. Radio network operators must take additional steps to reduce vulnerabilities to potential attack and protect critical radio network infrastructure. Motorola's ASTRO 25 Security Monitoring is a complete solution that reduces the risk of network availability being impacted by a security threat. Specialized security analysts provide uninterrupted monitoring of the radio network security elements utilizing advanced correlation and visualization tools to detect, characterize, and respond to events that are specifically applicable to government and public safety radio networks. Our security analysts have direct and immediate access to Motorola engineers for rapid resolution. This level of service ensures the operational impact that security events may cause to your network are minimized or eliminated.

8.1.7 Security Update Service (SUS)

Commercial security software updates are often designed without RF systems in mind and could cause inadvertent harm to your radio network, disrupting mission-critical communications and putting your first responders and citizens at risk. Motorola's Security Update Service (SUS) assures that commercial anti-virus definitions, operating system software patches, and Intrusion Detection Sensor

signature files are compatible with your ASTRO 25 network and do not interfere with network functionality. Our expert network security technologists analyze, perform testing, and validate the latest security software updates in a dedicated test lab. We also provide continuous monitoring of updates to provide you regular electronic updates upon completion of successful testing.

8.1.8 Motorola-NICE

Motorola-NICE Technical Support service provides an additional layer of support through centralized, telephone consultation for issues that require a high level of communications network expertise and troubleshooting capabilities. Technical Support is delivered by the system Support Center (SSC). The SSC is staffed with trained, skilled technologists specializing in the diagnosis and swift resolution of performance issues.

Motorola-NICE Infrastructure Repair service provides for the repair of all Motorola-manufactured equipment, as well as equipment from third-party infrastructure vendors. All repair management is handled through a central location eliminating your need to send equipment to multiple locations.

Motorola-NICE Dispatch Service and OnSite Infrastructure Response ensure that local, trained, and qualified technicians are dispatched to diagnose and restore your Motorola provided NICE equipment. Following proven response and restoration processes, the local authorized service center in your area is contacted and a qualified technician is sent to your site. An automated escalation and case management process is followed to ensure that technician site arrival and restoration comply with contracted response and restore times.

Once the issue has been resolved, the System Support Center verifies resolution and with your approval, closes the case. Activity records are also available to provide a comprehensive history of site performance, issues, and resolution.

8.1.9 Service From the Start (SFS) Comprehensive

Service From The Start (SFS) Comprehensive provides all-component level service for the Equipment that is specifically named in the applicable agreement or any of the agreement's subsequent revisions. Services are performed at the Radio Support Center (RSC), or Federal Technical Support Center. SFS Comprehensive is only applicable on XTS®, XTL™, APX™, and some MOTOTRBO™ model radios. A radio model may be added to an SFS Comprehensive service agreement while it is currently being manufactured by Motorola, or for up to one (1) year after manufacturer cancellation date of said model. SFS Comprehensive includes:

- Repair and or replacement of cracked housings, frames, covers, crushed components, shields, missing components, circuit boards, warped circuit boards.
- Damage to LCD screens (cracks to screen, or any damage that does not pass Motorola test parameters) .
- Damaged foils/traces/lands.
- Electrical damage.
- Water/chemical corrosion.
- Contaminants visible which cannot be cleaned up reliably.

8.2 POST WARRANTY SERVICES (OPTIONAL)

As Motorola's continuing commitment to supporting your system, the above-warranty services can be extended after the Warranty Period to provide maintenance and service support in future years. Any of the services described above can be customized in future years, and are available for purchase



either in “System Support Services” packages or as individual service offerings. Included in the proposal is pricing that is based upon the City purchasing a 9 year package of the services described above, which would commence at the end of the Warranty Period. In addition, Motorola has provided in the proposal pricing for a 10 year Astro System Upgrade Agreement as fully described below that would also commence at the end of the Warranty Period.

8.2.1 ASTRO 25 SYSTEM UPGRADE AGREEMENT II (SUA II)

1.0 DESCRIPTION OF SERVICE AND OBLIGATIONS

- 1.1 As system releases become available, Motorola agrees to provide the Customer with the software, hardware and implementation services required to execute up to one system infrastructure upgrade in a two-year period for their ASTRO 25 system. At the time of the system release upgrade, Motorola will provide applicable patches and service pack updates when and if available. Currently, Motorola’s service includes 3rd party SW such as Microsoft Windows and Server OS, Red Hat Linux, Sun Solaris and any Motorola software service packs that may be available. Motorola will only provide patch releases that have been analyzed, pre-tested, and certified in a dedicated ASTRO 25 test lab to ensure that they are compatible and do not interfere with the ASTRO 25 network functionality. Additionally, if purchased, the Security Update Service (SUS) coverage is defined in Appendix C.
- 1.2 The Customer will have, at its option, the choice of upgrading in either Year 1 or Year 2 of the coverage period. To be eligible for the ASTRO 25 SUA II, the ASTRO 25 system must be at system release 7.7 or later.
- 1.3 ASTRO 25 system releases are intended to improve the system functionality and operation from previous releases and may include some minor feature enhancements. At Motorola’s option, system releases may also include significant new feature enhancements that Motorola may offer for purchase. System release software and hardware shall be pre-tested and certified in Motorola’s Systems Integration Test lab.
- 1.4 The price quoted for the SUAII requires the Customer to chose a system upgrade from the list of System Release Upgrade Paths available to the Customer as per the system release upgrade chart referenced and incorporated in Appendix A. Should the Customer elect an upgrade path other than one listed in Appendix A, the Customer agrees that additional costs may be incurred to complete the implementation of the system upgrade. In this case, Motorola agrees to provide a price quotation for any additional materials and services necessary.
- 1.5 ASTRO 25 SUA II entitles a Customer to past software versions for the purpose of downgrading product software to a compatible release version.
- 1.6 The following ASTRO 25 certified system release software for the following products are covered under this ASTRO 25 SUA II: base stations, site controllers, comparators, routers, LAN switches, servers, dispatch consoles, logging equipment, network management terminals, Network Fault Management (“NFM”) products, network security devices such as firewalls and intrusion detection sensors, and associated peripheral infrastructure software.

- 1.7 Product programming software such as Radio Service Software (“RSS”), Configuration Service Software (“CSS”), and Customer Programming Software (“CPS”) are also covered under this SUA II.
- 1.8 ASTRO 25 SUA II makes available the subscriber radio software releases that are shipping from the factory during the SUA II coverage period. New subscriber radio options and features not previously purchased by the Customer are excluded from ASTRO 25 SUA II coverage. Additionally, subscriber software installation and reprogramming are excluded from the ASTRO 25 SUA II coverage.
- 1.9 Motorola will provide certified hardware version updates and/or replacements necessary to upgrade the system with an equivalent level of functionality up to once in a two-year period. Hardware will be upgraded and/or replaced if required to maintain the existing feature and functionality. Any updates to hardware versions and/or replacement hardware required to support new features or those not specifically required to maintain existing functionality are not included. Unless otherwise stated, platform migrations such as, but not limited to, stations, consoles, backhaul, civil, network changes and additions, and managed services are not included.
- 1.10 The following hardware components, if originally provided by Motorola, are eligible for full product replacement when necessary per the system release upgrade :
 - 1.10.1 Servers
 - 1.10.2 PC Workstations
 - 1.10.3 Routers
 - 1.10.4 LAN Switches
- 1.11 The following hardware components, if originally provided by Motorola, are eligible for board-level replacement when necessary per the system release upgrade. A “board-level replacement” is defined as any Field Replaceable Unit (“FRU”) for the products listed below:
 - 1.11.1 GTR 8000 Base Stations
 - 1.11.2 GCP 8000 Site Controllers
 - 1.11.3 GCM 8000 Comparators
 - 1.11.4 MCC 7500 Console Operator Positions
 - 1.11.5 STR 3000 Base Stations
 - 1.11.6 Quantar Base Stations
 - 1.11.7 Centracom Gold Elite Console Operator Interface Electronics
 - 1.11.8 Centracom Gold Elite Central Electronics Banks
 - 1.11.9 Ambassador Electronics Banks
 - 1.11.10 Motorola Gold Elite Gateways
 - 1.11.11 ASTROTAC Comparators
 - 1.11.12 PSC 9600 Site Controllers
 - 1.11.13 PBX Switches for Telephone Interconnect
 - 1.11.14 NFM/NFM XC/MOSCAD RTU
- 1.12 The ASTRO 25 SUA II does not cover all products. Refer to section 2.0 for exclusions and limitations.
- 1.13 Motorola will provide implementation services necessary to upgrade the system to a future system release with an equivalent level of functionality up to once in a two-year period. Any implementation services that are not directly required to support the system upgrade are not included. Unless otherwise stated, implementation services necessary for system expansions,



platform migrations, and/or new features or functionality that are implemented concurrent with the system upgrade are not included.

- 1.14 As system releases become available, Motorola will provide up to once in a two-year period the following software design and technical resources necessary to complete system release upgrades:
 - 1.14.1 Review infrastructure system audit data as needed.
 - 1.14.2 Identify additional system equipment needed to implement a system release, if applicable.
 - 1.14.3 Complete a proposal defining the system release, equipment requirements, installation plan, and impact to system users.
 - 1.14.4 Advise Customer of probable impact to system users during the actual field upgrade implementation.
 - 1.14.5 Program management support required to perform the system upgrade.
 - 1.14.6 Field installation labor required to perform the system upgrade.
 - 1.14.7 Upgrade operations engineering labor required to perform the system upgrade.
- 1.15 ASTRO 25 SUA II pricing is based on the system configuration outlined in Appendix B. This configuration is to be reviewed annually from the contract effective date. Any change in system configuration may require an ASTRO 25 SUA II price adjustment.
- 1.16 The ASTRO 25 SUA II applies only to system release upgrades within the ASTRO 25 7.x platform.
- 1.17 Motorola will issue Software Maintenance Agreement (“SMA”) bulletins on an annual basis and post them in soft copy on a designated extranet site for Customer access. Standard and optional features for a given ASTRO 25 system release are listed in the SMA bulletin.

2.0 UPGRADE ELEMENTS AND CORRESPONDING PARTY RESPONSIBILITIES

- 2.1 Upgrade Planning and Preparation: All items listed in this section are to be completed at least 6 months prior to a scheduled upgrade.
 - 2.1.1 Motorola responsibilities
 - 2.1.1.1 Obtain and review infrastructure system audit data as needed.
 - 2.1.1.2 Identify additional system equipment needed to implement a system release, if applicable.
 - 2.1.1.3 Complete a proposal defining the system release, equipment requirements, installation plan, and impact to system users.
 - 2.1.1.4 Advise Customer of probable impact to system users during the actual field upgrade implementation.
 - 2.1.1.5 Inform Customer of high speed internet connection requirements.
 - 2.1.1.6 Assign program management support required to perform the system upgrade.
 - 2.1.1.7 Assign field installation labor required to perform the system upgrade.
 - 2.1.1.8 Assign upgrade operations engineering labor required to perform the system upgrade.
 - 2.1.1.9 Deliver release impact and change management training to the primary zone core owners, outlining the changes to their system as a result of the upgrade path elected. This training needs to be completed at least 12 weeks prior to the scheduled upgrade. This training will not be provided separately for user agencies who reside on a zone core owned by another entity. Unless specifically stated in this document, Motorola will provide this training only once per system.



- 2.1.2 Customer responsibilities
 - 2.1.2.1 Contact Motorola to schedule and engage the appropriate Motorola resources for a system release upgrade.
 - 2.1.2.2 Provide high-speed internet connectivity at the zone core site(s) for use by Motorola to perform remote upgrades and diagnostics. Specifications for the high-speed connection are provided in Appendix D. High-speed internet connectivity must be provided at least 12 weeks prior to the scheduled upgrade. In the event access to a high-speed connection is unavailable, Customer may be billed additional costs to execute the system release upgrade.
 - 2.1.2.3 Assist in site walks of the system during the system audit when necessary.
 - 2.1.2.4 Provide a list of any FRUs and/or spare hardware to be included in the system release upgrade when applicable.
 - 2.1.2.5 Purchase any additional software and hardware necessary to implement optional system release features or system expansions.
 - 2.1.2.6 Provide or purchase labor to implement optional system release features or system expansions.
 - 2.1.2.7 Participate in release impact training at least 12 weeks prior to the scheduled upgrade. This applies only to primary zone core owners. It is the zone core owner's responsibility to contact and include any user agencies that need to be trained or to act as a training agency for those users not included.

2.2 System Readiness Checkpoint: All items listed in this section must be completed at least 30 days prior to a scheduled upgrade.

2.2.1 Motorola responsibilities

- 2.2.1.1 Perform appropriate system backups.
- 2.2.1.2 Work with the Customer to validate that all system maintenance is current.
- 2.2.1.3 Work with the Customer to validate that all available patches and antivirus updates have been updated on the customer's system.

2.2.2 Customer responsibilities

- 2.2.2.1 Validate system maintenance is current.
- 2.2.2.2 Validate that all available patches and antivirus updates to their system have been completed.

2.3 System Upgrade

2.3.1 Motorola responsibilities

- 2.3.1.1 Perform system infrastructure upgrade in accordance with the system elements outlined in this SOW.

2.3.2 Customer responsibilities

- 2.3.2.1 Inform system users of software upgrade plans and scheduled system downtime.
- 2.3.2.2 Cooperate with Motorola and perform all acts that are reasonable or necessary to enable Motorola to provide software upgrade services.

2.4 Upgrade Completion



- 2.4.1 Motorola responsibilities
 - 2.4.1.1 Validate all system upgrade deliverables are complete as contractually required.
 - 2.4.1.2 Deliver post upgrade implementation training to the customer as needed, up to once per system.
 - 2.4.1.3 Obtain upgrade completion sign off from the customer.
- 2.4.2 Customer Responsibilities
 - 2.4.2.1 Cooperate with Motorola in efforts to complete any post upgrade punch list items as needed.
 - 2.4.2.2 Cooperate with Motorola to provide relevant post upgrade implementation training as needed. This applies only to primary zone core owners. It is the zone core owner's responsibility to contact and include any user agencies that need to be trained or to act as a training agency for those users not included.
 - 2.4.2.3 Provide Motorola with upgrade completion sign off.

3.0 EXCLUSIONS AND LIMITATIONS

- 3.1 The parties agree that Systems that have non-standard configurations that have not been certified by Motorola Systems Integration Testing are specifically excluded from the ASTRO 25 SUA II unless otherwise agreed in writing by Motorola and included in this SOW.
- 3.2 The parties acknowledge and agree that the ASTRO 25 SUA II does not cover the following products:
 - MCC5500 Dispatch Consoles
 - MIP5000 Dispatch Consoles
 - Plant/E911 Systems
 - MOTOBRIDGE Solutions
 - ARC 4000 Systems
 - Motorola Public Sector Applications Software ("PSA")
 - Custom SW, CAD, Records Management Software
 - Data Radio Devices
 - Mobile computing devices such as Laptops
 - Non-Motorola two-way radio subscriber products
 - Genesis Products
 - Point-to-point products such as microwave terminals and association multiplex equipment
- 3.3 ASTRO 25 SUA II does not cover any hardware or software supplied to the Customer when purchased directly from a third party, unless specifically included in this SOW.
- 3.4 ASTRO 25 SUA II does not cover software support for virus attacks or other applications that are not part of the ASTRO 25 system, or unauthorized modifications or other misuse of the covered software. Motorola is not responsible for management of anti-virus or other security applications (such as Norton).
- 3.5 Upgrades for equipment add-ons or expansions during the term of this ASTRO 25 SUA II are not included in the coverage of this SOW unless otherwise agreed to in writing by Motorola.

4.0 SPECIAL PROVISIONS



- 4.1 Customer acknowledges that if its System has a Special Product Feature, additional engineering may be required to prevent an installed system release from overwriting the Special Product Feature. Upon request, Motorola will determine whether a Special Product Feature can be incorporated into a system release and whether additional engineering effort is required. If additional engineering is required Motorola will issue a change order for the change in scope and associated increase in the price for the ASTRO 25 SUA II.
- 4.2 Customer will only use the software (including any System Releases) in accordance with the applicable Software License Agreement.
- 4.3 ASTRO 25 SUA II services do not include repair or replacement of hardware or software that is necessary due to defects that are not corrected by the system release, nor does it include repair or replacement of defects resulting from any nonstandard, improper use or conditions; or from unauthorized installation of software.
- 4.4 ASTRO 25 SUA II coverage and the parties' responsibilities described in this Statement of Work will automatically terminate if Motorola no longer supports the ASTRO 25 7.x software version in the Customer's system or discontinues the ASTRO 25 SUA II program; in either case, Motorola will refund to Customer any prepaid fees for ASTRO 25 SUA II services applicable to the terminated period.
- 4.5 If Customer cancels a scheduled upgrade within less than 12 weeks of the scheduled on site date, Motorola reserves the right to charge the Customer a cancellation fee equivalent to the cost of the pre-planning efforts completed by the Motorola Solutions Upgrade Operations Team.
- 4.6 The SUA II annualized price is based on the fulfillment of the two year term. If Customer terminates, except if Motorola is the defaulting party, Customer will be required to pay for the balance of payments owed if a system release upgrade has been taken prior to the point of termination.



APPENDIX A – ASTRO 25 SYSTEM RELEASE UPGRADE PATHS

Release Date	Platform Release	Available Upgrade Paths	
Oct-05	R7.0	N/A	
Jun-06	R7.1	N/A	
Dec-06	R7.2	7.7	
Mar-07	R7.1.1	N/A	
Dec-07	R7.4	7.7	
Jun-08	R7.5	7.7	
Dec-08	R7.6	7.7	
Jun-09	R7.7	7.9	7.11
Jan-10	R7.8	7.9	
Dec-10	R7.9	7.11	7.13
Aug-11	R7.11	7.13	7.14
Mar-12	R7.12	N/A	
Nov-12	R7.13	7.14	7.15 (planned)
Nov-13	R7.14	7.15 (planned)	7.16 (planned)
Nov-14	R7.15 (planned)	7.16 (planned)	7.17 (planned)

- The information contained herein is provided for information purposes only and is intended only to outline Motorola’s presently anticipated general technology direction. The information in the roadmap is not a commitment or an obligation to deliver any product, product feature or software functionality and Motorola reserves the right to make changes to the content and timing of any product, product feature or software release.
- The most current system release upgrade paths can be found in the most recent SMA bulletin.

APPENDIX B - SYSTEM PRICING CONFIGURATION

This configuration is to be reviewed annually from the contract effective date.. Any change in system configuration may require an ASTRO 25 SUA II price adjustment.

Core	
Master Site Configuration	0
Zones in Operation (Including DSR and Dark Master Sites)	0
Zone Features: IV&D, TDMA, Telephone Interconnect, CNI, HPD, CSMS, IA, POP25, Text Messaging, Outdoor Location, ISSI 8000, InfoVista, KMF/OTAR	0
RF System	
Voice RF Sites & RF Simulcast Sites (including Prime Sites)	0
Repeaters/Stations (FDMA)	0
Repeaters/Stations (TDMA)	0
HPD RF Sites	0
HPD Stations	0
Dispatch Console System	
Dispatch Sites	0
Gold Elite Operator Positions	0
MCC 7500 Operator Positions (GPIOM)	0
MCC 7500 Operator Positions (VPM)	0
Conventional Channel Gateways (CCGW)	0
Conventional Site Controllers (GCP 8000 Controller)	0
Logging System	
Number of AIS Servers	0
Number of Voice Logging Recorder	0
Number of Logging Replay Clients	0
Network Management and MOSCAD NFM	
Network Management Clients	0
MOSCAD NFM Systems	0
MOSCAD NFM RTUs	0
MOSCAD NFM Clients	0
Fire Station Alerting (FSA)	
FSA Systems	0
FSA RTUs	0
FSA Clients	0
Fire Station Alerting (FSA)	
Voice Subscribers non-APX	0
Voice Subscribers APX	0
HPD Subscribers	0
Computing and Networking Hardware (for SUA / SUA II, actual replacement qty may be less than shown)	
Workstations - High Performance	0
Workstations - Mid Performance	0
Servers - High Performance	0
Servers - Mid Performance	0
LAN Switch - High Performance	0
LAN Switch - Mid Performance	0
Routers	0

SECURITY UPDATE SERVICE (SUS)

Approved by Motorola Contracts & Compliance: 8/1/2012

Statement of Work

Security Update Service (SUS)

1.0 Definitions

Terms that are capitalized but not defined in this Statement of Work shall have the definition given to such terms in the Service Terms and Conditions, the Communications System Agreement or other applicable agreement. The following terms have the following meanings:

1.1 Non-Motorola Software: Software whose copyright is owned by a party other than Motorola or its affiliated company, including but not limited to the anti-virus definitions, operating system software patches and signature files that will be pre-tested pursuant to this Statement of Work.

1.2 System: The currently shipping Motorola ASTRO® 25 System Release and up to 5 releases prior.

1.3 Supported Release: Security Update Service is available on the currently shipping Motorola ASTRO® 25 System Release and up to 5 releases prior. If a customer is on a System Release outside of the N-5 release schedule, then they cannot purchase this service.

2.0 Description of Services

With Security Update Service (“Service”), Motorola pretests the updated commercial anti-virus definitions for the Microsoft Windows based boxes on a System. This Service includes Motorola obtaining Microsoft Security Updates for Windows operating system, Solaris recommended patch bundles, Red Hat Linux security patches, anti-virus definitions* and intrusion detection sensor updates for Motorola supplied equipment from applicable original equipment manufacturer (OEM). Motorola will evaluate and pre-test each update on Motorola’s ASTRO 25 test System components for operational impact. Motorola’s verification and evaluation process for anti-virus definitions will consist of applying each update to an appropriate ASTRO 25 system release that corresponds and is consistent with supported** and fielded systems. Each assessment will consist of no less than 36 hours of examination time to evaluate the impact each anti-virus update has to the system. Upon satisfactory completion of the assessment pertaining to anti-virus signatures, these updates will be provided on a weekly basis either automatically or through connecting to Motorola’s secured extranet connection. When anti-virus definitions classified as Category 4 (Severe, difficult to contain) and Category 5 (Very Severe, very difficult to contain) by the commercial Approved by Motorola Contracts & Compliance: 8/1/2012 supplier are released, Motorola will determine if a high-priority release is necessary. Operating system updates/patches will be made available to our customers electronically upon successful testing in our lab environments on a monthly basis for Microsoft patches and on a quarterly basis for all others. NOTICE: If a customer wants antivirus and IDS updates automatically deployed onto



their network, then they must purchase the Security Monitoring service. Otherwise, customers may download the updates from the secure extranet site and manually deploy them onto their network. Motorola will perform testing only on standard configurations certified by Motorola System Integration Testing (SIT) and Motorola supplied equipment/software prior to making an update available to Customers.

* - Not all systems are provided antivirus for Microsoft and UNIX platforms. To receive full antivirus support under this service offering, the customer must have a standard ASTRO 25 system that is supported and also has implemented antivirus for UNIX.

** - Supported is defined as the current system release and the last five prior. Support beyond this model requires approval from the Customer Service Manager and the Security Services Product Manager. For extended coverage, please communicate a formal request to your account manager.

The customer will be responsible for deploying Microsoft, Oracle, Sun Microsystems, UNIX, and Linux security updates from a Motorola provided secured extranet Web site. Antivirus and IDS updates will be capable of being pushed automatically to the customer ASTRO25 network only if the Security Monitoring service is purchased by the customer. If there is a recommended configuration change that is successfully tested on the ASTRO 25 test System, Motorola will provide detailed instructions for performing the configuration change.

Inclusions: Security Update Service is available on the currently shipping Motorola ASTRO 25 System Release and up to 5 releases prior. If a customer is on a System Release outside of the N-5 release schedule, then they cannot purchase this service.

Exclusions: Systems that have non-standard configurations that have not been certified by Motorola SIT are specifically excluded from this Service unless otherwise agreed in writing by Motorola. Service does not include pre-tested intrusion detection system (IDS) updates for IDS solutions not purchased through Motorola. NICE Recorder, certain consoles, MARVLIS, Symbol Equipment, AirDefense Equipment, AVL, and Radio Site Security products are also excluded. The scope of service coverage is defined by Motorola Services and is subject to change based on OEM support lifecycles. The terms and conditions of this Statement of Work are an integral part of Motorola's Service Terms and Conditions or other applicable Agreement to which it is attached and made a part thereof by this reference.

3.0 Motorola has the following responsibilities:

3.1 Obtain anti-virus definitions for the Microsoft Windows platform, intrusion detection sensor signatures for Motorola supplied IDS, Microsoft Security Updates for Windows Operating system, Solaris operating system recommended patch bundles, and Red Hat Linux security patches from Motorola selected commercial suppliers.

3.2 Evaluate anti-virus definitions classified as Category 4 and 5 by Motorola selected commercial supplier to determine if a high-priority release is required. Motorola in its discretion will determine the urgency of the update based on the impact to the System.



3.3 Identify and document latest System vulnerabilities and compliance issues discovered during quarterly vulnerability scan performed in Section 3.4.

3.4 Investigate new vulnerabilities and compliance issues that are identified. Recommended response may include, but is not limited to, ASTRO 25 Systems, deploy security software updates; deploy operating system security updates or patches; implement configuration changes; upgrade to current ASTRO 25 System Release (actual upgrade expense not included in this service offering); or recommending a compensating control.

3.5 Pre-test recommended remediation when applicable and make documentation and/or software updates available to Customer electronically.

3.6 Provide documented response with recommended remediation when applicable for all new vulnerabilities quarterly or at Motorola's discretion to Customer electronically.

3.7 Test anti-virus definitions, intrusion detection sensor signatures, and operating system security updates/patches by deploying them on a dedicated ASTRO 25 test System with the standard supported configurations, which include Motorola's then current approved cohabitated applications.

3.8 Confirm that tested anti-virus definitions, intrusion detection sensor signatures, and operating system security updates/patches do not degrade or compromise System functionality on dedicated test System within the standard supported configurations.

3.9 Address issues identified during testing to support functionality under the procedures specified in 3.8 above by working with Motorola selected commercial supplier or Motorola product development engineering team.

3.10 Release pre-tested anti-virus definitions and intrusion detection sensor signatures for Motorola supplied IDS electronically on a weekly basis upon successful completion of the weekly test cycle to be completed one week after release by commercial supplier unless an issue is detected or within 36 hours from Motorola selected commercial supplier's Category 4 & 5 certified virus definitions being available or at Motorola's discretion if determined by Motorola to be a high-priority release. Release may include Approved by Motorola Contracts & Compliance: 8/1/2012 the anti-virus definition file, intrusion detection sensor signatures, updated configuration files, instructions and other information deemed pertinent by Motorola.

3.11 Release Microsoft, Solaris and Red Hat Linux operating system security patches/updates when they are certified and available with instructions for obtaining patch/update for Customer deployment on the Customer system. Microsoft operating system security updates will be released monthly as available from Motorola selected commercial supplier upon successful completion of monthly test cycle. Solaris and Red Hat Linux operating system security patches will be released quarterly upon successful completion of quarterly test cycle or at Motorola's discretion.

3.12 Notify Customer when the latest release is available with instructions on where to obtain latest release.



3.13 Provide technical assistance if there is an issue with the installation of an update.

3.14 Maintain annual Customer subscriptions for anti-virus definitions and intrusion detection sensor signatures, with Motorola selected commercial supplier.

4.0 Customer has the following responsibilities:

4.1 Provide means for accessing pre-tested files electronically.

4.2 Deploy pre-tested files on Customer System as instructed in the "Read Me" text provided.

4.3 Implement recommended remediation(s) on Customer System as determined necessary by Customer.

4.4 Upgrade System to a Supported System Release as necessary to continue Service.

4.5 Identify one point of contact for issues specific to Security Update Service.

4.6 Cooperate with Motorola and perform all acts that are reasonable and/or necessary to enable Motorola to electronically provide Security Update Service – Platinum to Customer.

4.7 Comply with the terms of the applicable license agreement between Customer and the Non-Motorola Software copyright owner.

4.8 Adhere closely to the System Support Center (SSC) troubleshooting guidelines provided upon system acquisition. A failure to follow SSC guidelines may cause Customer and Motorola unnecessary or overly burdensome remediation efforts that may result in a service fee to Customer.

5.0 WARRANTIES AND DISCLAIMER:

Motorola warrants that its services will be free of defects in materials and workmanship for a period of ninety (90) days following completion of the service. Your sole remedies are to require Motorola to re-perform the affected service or at Motorola's option to refund, on a pro-rata basis, the service fees paid for the affected service. During the applicable Warranty Period, Motorola warrants that the tested anti-virus definitions, intrusion detection sensor signatures, and operating system security updates/patches do not degrade or compromise System functionality, and that after incorporation of the recommended remediation action the System Software, when used properly and in accordance with the Documentation, will be free from a reproducible defect that eliminates the functionality or successful operation of a feature critical to the primary functionality or successful operation of the Software. Product and Software documentation that specifies technical and performance features and capabilities, and the user, operation and training manuals for the Software (including all physical or electronic media upon which this information is provided) are collectively referred to as "Documentation." Whether a defect occurs will be determined solely with reference to the Documentation. Motorola does not warrant that Customer's use of the Software or Products will be uninterrupted or error-free or that the Software or the Products will meet Customer's particular requirements.



MOTOROLA DISCLAIMS ALL OTHER WARRANTIES WITH RESPECT TO PRE-TESTED ANTI-VIRUS DEFINITIONS, DATABASE SECURITY UPDATES, OPERATING SYSTEM SOFTWARE PATCHES, AND INTRUSION DETECTION SENSOR SIGNATURE FILES, EXPRESS OR IMPLIED, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, AND NON-INFRINGEMENT. FURTHER, MOTOROLA DISCLAIMS ANY WARRANTY CONCERNING THE NON-MOTOROLA SOFTWARE AND DOES NOT GUARANTEE THAT CUSTOMER'S SYSTEM WILL BE ERROR-FREE OR IMMUNE TO VIRUSES OR WORMS AS A RESULT OF THESE SERVICES.



APPENDIX D – HIGH-SPEED CONNECTIVITY SPECIFICATIONS

Connectivity Requirements

- The minimum supported link between the core and the zone is a full T1
- Any link must realize or a sustained transfer rate of 175 kBps / 1.4 Mbps or better, bidirectional
- Interzone links must be fully operational when present
- Link reliability must satisfy these minimum QoS levels:
 - Port availability must meet or exceed 99.9% (three nines)
 - Round trip network delay must be 100 ms or less between the core and satellite (North America) and 400 ms or less for international links
 - Packet loss shall be no greater than 0.3%
 - Network jitter shall be no greater than 2 ms
- The network requirements above are based on the SLA provided for Sprint Dedicated IP Services as of April, 2012. It is possible other vendors may not be able to meet this exact SLA, so these cases must be examined on a case-by-case basis.



PRICING SUMMARY

(Revised June 12, 2015)

Motorola is pleased to provide the following equipment and services to Lake Havasu City Police Department for the stand alone system offer:

Description	Price
System hardware	\$1,539,093.00
System Integration Services	\$667,376.00
Infrastructure Total	\$2,206,469.00
Subscribers	\$893,427.00
System Total	\$3,099,896.00
Order by 9/25/2015 Ship by 11/15/2015 5% off of Infrastructure	<\$110,323.00>
Buy full system & Subs-Order by 9/25/2015 Ship by 11/15/2015 5% off of Infrastructure	<\$110,323.00>
Buy full system & Subs-Order by 9/25/2015 Ship by 11/15/2015 10% off of subscribers	<\$89,345.00>
Total system cost	\$2,789,905.00
Applicable Tax	\$169,343.00
Final System Cost	\$2,959,248.00



EXTENDED SERVICES OPTIONAL-(Not Part of This Contract.)

Description		Price
SUA II years 1-10	see matrix	\$1,745,905.00
Extended Service Years 1-10	see matrix	\$2,080,437.00
Total system investment as proposed		\$7,084,899.00

Lake Havasu PD, AZ - Standalone System SUA II										
Discount Pricing Based On Ten Year Agreement (SUA II begins when warranty expires)										
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
System Upgrade Agreement II (SUA II) (NSBD)	182,583	184,928	187,255	189,805	192,450	195,000	197,644	200,511	203,377	206,339
System Upgrade Agreement II (SUA II) With multi-year incentive discount	164,325	166,435	168,530	170,825	173,205	175,500	177,880	180,460	183,040	185,705

Lake Havasu PD, AZ - Standalone System Extended Service/Maintenance										
Discount Pricing Based On Ten Year Agreement (Year 1 is the Warranty Year)										
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Extended Service/Maintenance (NSBD)	included	213,754	220,168	235,721	242,525	249,799	257,292	265,011	272,963	279,796
Extended Service/Maintenance With Multi-year incentive discount	included	198,791	204,756	219,221	225,548	232,313	239,282	246,460	253,856	260,210

Pricing is based on State of Arizona QPA (Quantity Purchase Agreement) Contract # ADSP013-036680

Payment Terms for SUA-II and Extended Services: (Not Part of This Contract)

Customer will make payments to Motorola annually at the beginning of each maintenance year in accordance to the Pricing Summary table and Exhibit D - Service Terms and Conditions.

Proposal Validity

Pricing is valid through September 25, 2015.

TERMS AND CONDITIONS

Terms and Conditions are included on the pages that follow.



Communications System Agreement

Motorola Solutions, Inc. ("Motorola") and Lake Havasu City ("Customer") enter into this "Agreement," pursuant to which Customer will purchase and Motorola will sell the System, as described below. Motorola and Customer may be referred to individually as a "Party" and collectively as the "Parties." For good and valuable consideration, the Parties agree as follows:

Section 1 EXHIBITS

The exhibits listed below are incorporated into and made a part of this Agreement. In interpreting this Agreement and resolving any ambiguities, the main body of this Agreement takes precedence over the exhibits and any inconsistency between Exhibits A through E will be resolved in their listed order.

Exhibit A	Motorola "Software License Agreement"
Exhibit B	"Payment Schedule"
Exhibit C	"Technical and Implementation Documents"
C-1	"System Description" dated 2-23-2015
C-2	"Equipment List" dated 2-23-2015 with subscribers updated 6-12-2015
C-3	"Statement of Work" dated 2-23-2015
C-4	"Acceptance Test Plan" or "ATP" dated 2-23-2015
C-5	"Performance Schedule" dated 2-23-2015
Exhibit D	Service Statement(s) of Work and "Service Terms and Conditions" (if applicable)
Exhibit E	"System Acceptance Certificate"

Section 2 DEFINITIONS

Capitalized terms used in this Agreement have the following meanings:

- 2.1. "Acceptance Tests" means those tests described in the Acceptance Test Plan.
- 2.2. "Administrative User Credentials" means an account that has total access over the operating system, files, end user accounts and passwords at either the System level or box level. Customer's personnel with access to the Administrative User Credentials may be referred to as the Administrative User.
- 2.3. "Beneficial Use" means when Customer first uses the System or a Subsystem for operational purposes (excluding training or testing).
- 2.4. "Confidential Information" means all information consistent with the fulfillment of this Agreement that is (i) disclosed under this Agreement in oral, written, graphic, machine recognizable, and/or sample form, being clearly designated, labeled or marked as confidential or its equivalent or (ii) obtained by examination, testing or analysis of any hardware, software or any component part thereof provided by discloser to recipient.
- 2.5. "Contract Price" means the price for the System, excluding applicable sales or similar taxes and freight charges.
- 2.6. "Effective Date" means that date upon which the last Party executes this Agreement.
- 2.7. "Equipment" means the equipment that Customer purchases from Motorola under this Agreement. Equipment that is part of the System is described in the Equipment List.
- 2.8. "Force Majeure" means an event, circumstance, or act of a third party that is beyond a Party's reasonable control (e.g., an act of God, an act of the public enemy, an act of a government entity, strikes or other labor disturbances, hurricanes, earthquakes, fires, floods, epidemics, embargoes, war, and riots).

- 2.9. "Infringement Claim" means a third party claim alleging that the Equipment manufactured by Motorola or the Motorola Software directly infringes a United States patent or copyright.
- 2.10. "Motorola Software" means Software that Motorola or its affiliated company owns.
- 2.11. "Non-Motorola Software" means Software that another party owns.
- 2.12. "Open Source Software" (also called "freeware" or "shareware") means software with either freely obtainable source code, license for modification, or permission for free distribution.
- 2.13. "Proprietary Rights" means the patents, patent applications, inventions, copyrights, trade secrets, trademarks, trade names, mask works, know-how, and other intellectual property rights in and to the Equipment and Software, including those created or produced by Motorola under this Agreement and any corrections, bug fixes, enhancements, updates or modifications to or derivative works from the Software whether made by Motorola or another party.
- 2.14. "Software" means the Motorola Software and Non-Motorola Software, in object code format that is furnished with the System or Equipment.
- 2.15. "Specifications" means the functionality and performance requirements that are described in the Technical and Implementation Documents.
- 2.16. "Subsystem" means a major part of the System that performs specific functions or operations. Subsystems are described in the Technical and Implementation Documents.
- 2.17. "System" means the Equipment, Software, and incidental hardware and materials that are combined together into an integrated system; the System is described in the Technical and Implementation Documents.
- 2.18. "System Acceptance" means the Acceptance Tests have been successfully completed.
- 2.19. "Warranty Period" means one (1) year from the date of System Acceptance or Beneficial Use, whichever occurs first.

Section 3 SCOPE OF AGREEMENT AND TERM

- 3.1. **SCOPE OF WORK.** Motorola will provide, install and test the System, and perform its other contractual responsibilities, all in accordance with this Agreement. Customer will perform its contractual responsibilities in accordance with this Agreement.
- 3.2. **CHANGE ORDERS.** Either Party may request changes within the general scope of this Agreement. If a requested change causes an increase or decrease in the cost or time required to perform this Agreement, the Parties will agree to an equitable adjustment of the Contract Price, Performance Schedule, or both, and will reflect the adjustment in a change order. Neither Party is obligated to perform requested changes unless both Parties execute a written change order.
- 3.3. **TERM.** Unless terminated in accordance with other provisions of this Agreement or extended by mutual agreement of the Parties, the term of this Agreement begins on the Effective Date and continues until the date of Final Project Acceptance or expiration of the Warranty Period, whichever occurs last.
- 3.4. **ADDITIONAL EQUIPMENT OR SOFTWARE.** For three (3) years after the Effective Date, Customer may order additional Equipment or Software if it is then available. Each order must refer to this Agreement and must specify the pricing and delivery terms. Notwithstanding any additional or contrary terms in the order, the applicable provisions of this Agreement (except for pricing, delivery, passage of title and risk of loss to Equipment, warranty commencement, and payment terms) will govern the purchase and sale of the additional Equipment or Software. Title and risk of loss to additional Equipment will pass at shipment, warranty will commence upon delivery, and payment is due within twenty (20) days

after the invoice date. Motorola will send Customer an invoice as the additional Equipment is shipped or Software is licensed. Alternatively, Customer may register with and place orders through Motorola Online ("MOL"), and this Agreement will be the "Underlying Agreement" for those MOL transactions rather than the MOL On-Line Terms and Conditions of Sale. MOL registration and other information may be found at <https://businessonline.motorola.com> and the MOL telephone number is (800) 814-0601.

3.5. **MAINTENANCE SERVICE.** During the Warranty Period, in addition to warranty services, Motorola will provide maintenance services for the Equipment and support for the Motorola Software pursuant to the Statement of Work set forth in Exhibit D. Those services and support are included in the Contract Price. If Customer wishes to purchase additional maintenance and support services for the Equipment during the Warranty Period, or any maintenance and support services for the Equipment either during the Warranty Period or after the Warranty Period, the description of and pricing for the services will be set forth in a separate document. If Customer wishes to purchase extended support for the Motorola Software after the Warranty Period, it may do so by ordering software subscription services. Unless otherwise agreed by the parties in writing, the terms and conditions applicable to those maintenance, support or software subscription services will be Motorola's standard Service Terms and Conditions, together with the appropriate statements of work.

3.6. **MOTOROLA SOFTWARE.** Any Motorola Software, including subsequent releases, is licensed to Customer solely in accordance with the Software License Agreement. Customer hereby accepts and agrees to abide by all of the terms and restrictions of the Software License Agreement.

3.7. **NON-MOTOROLA SOFTWARE.** Any Non-Motorola Software is licensed to Customer in accordance with the standard license, terms, and restrictions of the copyright owner on the Effective Date unless the copyright owner has granted to Motorola the right to sublicense the Non-Motorola Software pursuant to the Software License Agreement, in which case it applies and the copyright owner will have all of Licensor's rights and protections under the Software License Agreement. Motorola makes no representations or warranties of any kind regarding Non-Motorola Software. Non-Motorola Software may include Open Source Software. All Open Source Software is licensed to Customer in accordance with, and Customer agrees to abide by, the provisions of the standard license of the copyright owner and not the Software License Agreement. Upon request by Customer, Motorola will use commercially reasonable efforts to determine whether any Open Source Software will be provided under this Agreement; and if so, identify the Open Source Software and provide to Customer a copy of the applicable standard license (or specify where that license may be found); and provide to Customer a copy of the Open Source Software source code if it is publicly available without charge (although a distribution fee or a charge for related services may be applicable).

3.8. **SUBSTITUTIONS.** At no additional cost to Customer, Motorola may substitute any Equipment, Software, or services to be provided by Motorola, if the substitute meets or exceeds the Specifications and is of equivalent or better quality to the Customer. Any substitution will be reflected in a change order.

3.9. **OPTIONAL EQUIPMENT OR SOFTWARE.** This paragraph applies only if a "Priced Options" exhibit is shown in Section 1, or if the parties amend this Agreement to add a Priced Options exhibit. During the term of the option as stated in the Priced Options exhibit (or if no term is stated, then for one (1) year after the Effective Date), Customer has the right and option to purchase the equipment, software, and related services that are described in the Priced Options exhibit. Customer may exercise this option by giving written notice to Seller which must designate what equipment, software, and related services Customer is selecting (including quantities, if applicable). To the extent they apply, the terms and conditions of this Agreement will govern the transaction; however, the parties acknowledge that certain provisions must be agreed upon, and they agree to negotiate those in good faith promptly after Customer delivers the option exercise notice. Examples of provisions that may need to be negotiated are: specific lists of deliverables, statements of work, acceptance test plans, delivery and implementation schedules, payment terms, maintenance and support provisions, additions to or modifications of the Software License Agreement, hosting terms, and modifications to the acceptance and warranty provisions.

Section 4 PERFORMANCE SCHEDULE

The Parties will perform their respective responsibilities in accordance with the Performance Schedule. By executing this Agreement, Customer authorizes Motorola to proceed with contract performance.

Section 5 CONTRACT PRICE, PAYMENT AND INVOICING

5.1. **CONTRACT PRICE.** The Contract Price in U.S. dollars is **\$2,789,905.00**. If applicable, a pricing summary is included with the Payment Schedule. Motorola has priced the services, Software, and Equipment as an integrated system. A reduction in Software or Equipment quantities, or services, may affect the overall Contract Price, including discounts if applicable.

5.2. **INVOICING AND PAYMENT.** Motorola will submit invoices to Customer according to the Payment Schedule. Except for a payment that is due on the Effective Date, Customer will make payments to Motorola within twenty (20) days after the date of each invoice. Customer will make payments when due in the form of a wire transfer, check, or cashier's check from a U.S. financial institution. Overdue invoices will bear simple interest at the maximum allowable rate. For reference, the Federal Tax Identification Number for Motorola Solutions, Inc. is 36-1115800.

5.3. **FREIGHT, TITLE, AND RISK OF LOSS.** Motorola will pre-pay and add all freight charges to the invoices. Title to the Equipment will pass to Customer upon shipment. Title to Software will not pass to Customer at any time. Risk of loss will pass to Customer upon delivery of the Equipment to the Customer. Motorola will pack and ship all Equipment in accordance with good commercial practices.

5.4. **INVOICING AND SHIPPING ADDRESSES.** Invoices will be sent to the Customer at the following address:

Lake Havasu City
2330 McCulloch Blvd N.
Lake Havasu City, AZ 86403

The address which is the ultimate destination where the Equipment will be delivered to Customer is:

Lake Havasu Police Dept
2360 McCulloch Blvd N.
Lake Havasu City, AZ 86403

The Equipment will be shipped to the Customer at the following address (insert if this information is known):

Creative Communications
2100 College Dr. Unit 118
Lake Havasu City, AZ 86403
928-680-4333

Customer may change this information by giving written notice to Motorola.

Section 6 SITES AND SITE CONDITIONS

6.1. **ACCESS TO SITES.** In addition to its responsibilities described elsewhere in this Agreement, Customer will provide a designated project manager; all necessary construction and building permits, zoning variances, licenses, and any other approvals that are necessary to develop or use the sites and mounting locations; and access to the work sites or vehicles identified in the Technical and Implementation Documents as reasonably requested by Motorola so that it may perform its duties in accordance with the Performance Schedule and Statement of Work. If the Statement of Work so indicates, Motorola may assist Customer in the local building permit process.

6.2. **SITE CONDITIONS.** Customer will ensure that all work sites it provides will be safe, secure, and in compliance with all applicable industry and OSHA standards. To the extent applicable and unless the Statement of Work states to the contrary, Customer will ensure that these work sites have adequate:

physical space; air conditioning and other environmental conditions; adequate and appropriate electrical power outlets, distribution, equipment and connections; and adequate telephone or other communication lines (including modem access and adequate interfacing networking capabilities), all for the installation, use and maintenance of the System. Before installing the Equipment or Software at a work site, Motorola may inspect the work site and advise Customer of any apparent deficiencies or non-conformities with the requirements of this Section. This Agreement is predicated upon normal soil conditions as defined by the version of E.I.A. standard RS-222 in effect on the Effective Date.

6.3. **SITE ISSUES.** If a Party determines that the sites identified in the Technical and Implementation Documents are no longer available or desired, or if subsurface, structural, adverse environmental or latent conditions at any site differ from those indicated in the Technical and Implementation Documents, the Parties will promptly investigate the conditions and will select replacement sites or adjust the installation plans and specifications as necessary. If change in sites or adjustment to the installation plans and specifications causes a change in the cost or time to perform, the Parties will equitably amend the Contract Price, Performance Schedule, or both, by a change order.

Section 7 TRAINING

Any training to be provided by Motorola to Customer will be described in the Statement of Work. Customer will notify Motorola immediately if a date change for a scheduled training program is required. If Motorola incurs additional costs because Customer reschedules a training program less than thirty (30) days before its scheduled start date, Motorola may recover these additional costs.

Section 8 SYSTEM ACCEPTANCE

8.1. **COMMENCEMENT OF ACCEPTANCE TESTING.** Motorola will provide to Customer at least ten (10) days notice before the Acceptance Tests commence. System testing will occur only in accordance with the Acceptance Test Plan.

8.2. **SYSTEM ACCEPTANCE.** System Acceptance will occur upon successful completion of the Acceptance Tests. Upon System Acceptance, the Parties will memorialize this event by promptly executing a System Acceptance Certificate. If the Acceptance Test Plan includes separate tests for individual Subsystems or phases of the System, acceptance of the individual Subsystem or phase will occur upon the successful completion of the Acceptance Tests for the Subsystem or phase, and the Parties will promptly execute an acceptance certificate for the Subsystem or phase. If Customer believes the System has failed the completed Acceptance Tests, Customer will provide to Motorola a written notice that includes the specific details of the failure. If Customer does not provide to Motorola a failure notice within thirty (30) days after completion of the Acceptance Tests, System Acceptance will be deemed to have occurred as of the completion of the Acceptance Tests. Minor omissions or variances in the System that do not materially impair the operation of the System as a whole will not postpone System Acceptance or Subsystem acceptance, but will be corrected according to a mutually agreed schedule.

8.3. **BENEFICIAL USE.** Customer acknowledges that Motorola's ability to perform its implementation and testing responsibilities may be impeded if Customer begins using the System before System Acceptance. Therefore, Customer will not commence Beneficial Use before System Acceptance without Motorola's prior written authorization, which will not be unreasonably withheld. Motorola is not responsible for System performance deficiencies that occur during unauthorized Beneficial Use. Upon commencement of Beneficial Use, Customer assumes responsibility for the use and operation of the System.

8.4 **FINAL PROJECT ACCEPTANCE.** Final Project Acceptance will occur after System Acceptance when all deliverables and other work have been completed. When Final Project Acceptance occurs, the parties will promptly memorialize this final event by so indicating on the System Acceptance Certificate.

Section 9 REPRESENTATIONS AND WARRANTIES

9.1. **SYSTEM FUNCTIONALITY.** Motorola represents that the System will perform in accordance with the Specifications in all material respects. Upon System Acceptance or Beneficial Use, whichever occurs first, this System functionality representation is fulfilled. Motorola is not responsible for System performance deficiencies that are caused by ancillary equipment not furnished by Motorola which is attached to or used in connection with the System or for reasons or parties beyond Motorola's control, such as natural causes; the construction of a building that adversely affects the microwave path reliability or radio frequency (RF) coverage; the addition of frequencies at System sites that cause RF interference or intermodulation; or Customer changes to load usage or configuration outside the Specifications.

9.2. **EQUIPMENT WARRANTY.** During the Warranty Period, Motorola warrants that the Equipment under normal use and service will be free from material defects in materials and workmanship. If System Acceptance is delayed beyond six (6) months after shipment of the Equipment by events or causes within Customer's control, this warranty expires eighteen (18) months after the shipment of the Equipment.

9.3. **MOTOROLA SOFTWARE WARRANTY.** Unless otherwise stated in the Software License Agreement, during the Warranty Period, Motorola warrants the Motorola Software in accordance with the terms of the Software License Agreement and the provisions of this Section 9 that are applicable to the Motorola Software. If System Acceptance is delayed beyond six (6) months after shipment of the Motorola Software by events or causes within Customer's control, this warranty expires eighteen (18) months after the shipment of the Motorola Software. TO THE EXTENT, IF ANY, THAT THERE IS A SEPARATE LICENSE AGREEMENT PACKAGED WITH, OR PROVIDED ELECTRONICALLY WITH, A PARTICULAR PRODUCT THAT BECOMES EFFECTIVE ON AN ACT OF ACCEPTANCE BY THE END USER, THEN THAT AGREEMENT SUPERCEDES THIS SOFTWARE LICENSE AGREEMENT AS TO THE END USER OF EACH SUCH PRODUCT.

9.4. **EXCLUSIONS TO EQUIPMENT AND MOTOROLA SOFTWARE WARRANTIES.** These warranties do not apply to: (i) defects or damage resulting from: use of the Equipment or Motorola Software in other than its normal, customary, and authorized manner; accident, liquids, neglect, or acts of God; testing, maintenance, disassembly, repair, installation, alteration, modification, or adjustment not provided or authorized in writing by Motorola; Customer's failure to comply with all applicable industry and OSHA standards; (ii) breakage of or damage to antennas unless caused directly by defects in material or workmanship; (iii) Equipment that has had the serial number removed or made illegible; (iv) batteries (because they carry their own separate limited warranty) or consumables; (v) freight costs to ship Equipment to the repair depot; (vi) scratches or other cosmetic damage to Equipment surfaces that does not affect the operation of the Equipment; and (vii) normal or customary wear and tear.

9.5. **WARRANTY CLAIMS.** To assert a warranty claim, Customer must notify Motorola in writing of the claim before the expiration of the Warranty Period. Upon receipt of this notice, Motorola will investigate the warranty claim. If this investigation confirms a valid warranty claim, Motorola will (at its option and at no additional charge to Customer) repair the defective Equipment or Motorola Software, replace it with the same or equivalent product, or refund the price of the defective Equipment or Motorola Software. That action will be the full extent of Motorola's liability for the warranty claim. If this investigation indicates the warranty claim is not valid, then Motorola may invoice Customer for responding to the claim on a time and materials basis using Motorola's then current labor rates. Repaired or replaced product is warranted for the balance of the original applicable warranty period. All replaced products or parts will become the property of Motorola.

9.6. **ORIGINAL END USER IS COVERED.** These express limited warranties are extended by Motorola to the original user purchasing the System for commercial, industrial, or governmental use only, and are not assignable or transferable.

9.7. **DISCLAIMER OF OTHER WARRANTIES.** THESE WARRANTIES ARE THE COMPLETE WARRANTIES FOR THE EQUIPMENT AND MOTOROLA SOFTWARE PROVIDED UNDER THIS AGREEMENT AND ARE GIVEN IN LIEU OF ALL OTHER WARRANTIES. MOTOROLA DISCLAIMS

ALL OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

Section 10 DELAYS

10.1. **FORCE MAJEURE.** Neither Party will be liable for its non-performance or delayed performance if caused by a Force Majeure. A Party that becomes aware of a Force Majeure that will significantly delay performance will notify the other Party promptly (but in no event later than fifteen days) after it discovers the Force Majeure. If a Force Majeure occurs, the Parties will execute a change order to extend the Performance Schedule for a time period that is reasonable under the circumstances.

10.2. **PERFORMANCE SCHEDULE DELAYS CAUSED BY CUSTOMER.** If Customer (including its other contractors) delays the Performance Schedule, it will make the promised payments according to the Payment Schedule as if no delay occurred; and the Parties will execute a change order to extend the Performance Schedule and, if requested, compensate Motorola for all reasonable charges incurred because of the delay. Delay charges may include costs incurred by Motorola or its subcontractors for additional freight, warehousing and handling of Equipment; extension of the warranties; travel; suspending and re-mobilizing the work; additional engineering, project management, and standby time calculated at then current rates; and preparing and implementing an alternative implementation plan.

Section 11 DISPUTES

The Parties will use the following procedure to address any dispute arising under this Agreement (a "Dispute").

11.1. **GOVERNING LAW.** This Agreement will be governed by and construed in accordance with the laws of the State in which the System is installed.

11.2. **NEGOTIATION.** Either Party may initiate the Dispute resolution procedures by sending a notice of Dispute ("Notice of Dispute"). The Parties will attempt to resolve the Dispute promptly through good faith negotiations including 1) timely escalation of the Dispute to executives who have authority to settle the Dispute and who are at a higher level of management than the persons with direct responsibility for the matter and 2) direct communication between the executives. If the Dispute has not been resolved within ten (10) days from the Notice of Dispute, the Parties will proceed to mediation.

11.3. **MEDIATION.** The Parties will choose an independent mediator within thirty (30) days of a notice to mediate from either Party ("Notice of Mediation"). Neither Party may unreasonably withhold consent to the selection of a mediator. If the Parties are unable to agree upon a mediator, either Party may request that American Arbitration Association nominate a mediator. Each Party will bear its own costs of mediation, but the Parties will share the cost of the mediator equally. Each Party will participate in the mediation in good faith and will be represented at the mediation by a business executive with authority to settle the Dispute.

11.4. **LITIGATION, VENUE and JURISDICTION.** If a Dispute remains unresolved for sixty (60) days after receipt of the Notice of Mediation, either Party may then submit the Dispute to a court of competent jurisdiction in the state in which the System is installed. Each Party irrevocably agrees to submit to the exclusive jurisdiction of the courts in such state over any claim or matter arising under or in connection with this Agreement.

11.5. **CONFIDENTIALITY.** All communications pursuant to subsections 11.2 and 11.3 will be treated as compromise and settlement negotiations for purposes of applicable rules of evidence and any additional confidentiality protections provided by applicable law. The use of these Dispute resolution procedures will not be construed under the doctrines of laches, waiver or estoppel to affect adversely the rights of either Party.

Section 12 DEFAULT AND TERMINATION

12.1 **DEFAULT BY A PARTY.** If either Party fails to perform a material obligation under this Agreement, the other Party may consider the non-performing Party to be in default (unless a Force Majeure causes the failure) and may assert a default claim by giving the non-performing Party a written and detailed notice of default. Except for a default by Customer for failing to pay any amount when due under this Agreement which must be cured immediately, the defaulting Party will have thirty (30) days after receipt of the notice of default to either cure the default or, if the default is not curable within thirty (30) days, provide a written cure plan. The defaulting Party will begin implementing the cure plan immediately after receipt of notice by the other Party that it approves the plan. If Customer is the defaulting Party, Motorola may stop work on the project until it approves the Customer's cure plan.

12.2 **FAILURE TO CURE.** If a defaulting Party fails to cure the default as provided above in Section 12.1, unless otherwise agreed in writing, the non-defaulting Party may terminate any unfulfilled portion of this Agreement. In the event of termination for default, the defaulting Party will promptly return to the non-defaulting Party any of its Confidential Information. If Customer is the non-defaulting Party, terminates this Agreement as permitted by this Section, and completes the System through a third Party, Customer may as its exclusive remedy recover from Motorola reasonable costs incurred to complete the System to a capability not exceeding that specified in this Agreement less the unpaid portion of the Contract Price. Customer will mitigate damages and provide Motorola with detailed invoices substantiating the charges.

Section 13 INDEMNIFICATION

13.1. **GENERAL INDEMNITY BY MOTOROLA.** Motorola will indemnify and hold Customer harmless from any and all liability, expense, judgment, suit, cause of action, or demand for personal injury, death, or direct damage to tangible property which may accrue against Customer to the extent it is caused by the negligence of Motorola, its subcontractors, or their employees or agents, while performing their duties under this Agreement, if Customer gives Motorola prompt, written notice of any claim or suit. Customer will cooperate with Motorola in its defense or settlement of the claim or suit. This section sets forth the full extent of Motorola's general indemnification of Customer from liabilities that are in any way related to Motorola's performance under this Agreement.

13.2. **GENERAL INDEMNITY BY CUSTOMER.** Customer will indemnify and hold Motorola harmless from any and all liability, expense, judgment, suit, cause of action, or demand for personal injury, death, or direct damage to tangible property which may accrue against Motorola to the extent it is caused by the negligence of Customer, its other contractors, or their employees or agents, while performing their duties under this Agreement, if Motorola gives Customer prompt, written notice of any the claim or suit. Motorola will cooperate with Customer in its defense or settlement of the claim or suit. This section sets forth the full extent of Customer's general indemnification of Motorola from liabilities that are in any way related to Customer's performance under this Agreement.

13.3. PATENT AND COPYRIGHT INFRINGEMENT.

13.3.1. Motorola will defend at its expense any suit brought against Customer to the extent it is based on a third-party claim alleging that the Equipment manufactured by Motorola or the Motorola Software ("Motorola Product") directly infringes a United States patent or copyright ("Infringement Claim"). Motorola's duties to defend and indemnify are conditioned upon: Customer promptly notifying Motorola in writing of the Infringement Claim; Motorola having sole control of the defense of the suit and all negotiations for its settlement or compromise; and Customer providing to Motorola cooperation and, if requested by Motorola, reasonable assistance in the defense of the Infringement Claim. In addition to Motorola's obligation to defend, and subject to the same conditions, Motorola will pay all damages finally awarded against Customer by a court of competent jurisdiction for an Infringement Claim or agreed to, in writing, by Motorola in settlement of an Infringement Claim.

13.3.2. If an Infringement Claim occurs, or in Motorola's opinion is likely to occur, Motorola may at its option and expense: (a) procure for Customer the right to continue using the Motorola Product; (b) replace or modify the Motorola Product so that it becomes non-infringing while providing functionally

equivalent performance; or (c) accept the return of the Motorola Product and grant Customer a credit for the Motorola Product, less a reasonable charge for depreciation. The depreciation amount will be calculated based upon generally accepted accounting standards.

13.3.3. Motorola will have no duty to defend or indemnify for any Infringement Claim that is based upon: (a) the combination of the Motorola Product with any software, apparatus or device not furnished by Motorola; (b) the use of ancillary equipment or software not furnished by Motorola and that is attached to or used in connection with the Motorola Product; (c) Motorola Product designed or manufactured in accordance with Customer's designs, specifications, guidelines or instructions, if the alleged infringement would not have occurred without such designs, specifications, guidelines or instructions; (d) a modification of the Motorola Product by a party other than Motorola; (e) use of the Motorola Product in a manner for which the Motorola Product was not designed or that is inconsistent with the terms of this Agreement; or (f) the failure by Customer to install an enhancement release to the Motorola Software that is intended to correct the claimed infringement. In no event will Motorola's liability resulting from its indemnity obligation to Customer extend in any way to royalties payable on a per use basis or the Customer's revenues, or any royalty basis other than a reasonable royalty based upon revenue derived by Motorola from Customer from sales or license of the infringing Motorola Product.

13.3.4. This Section 13 provides Customer's sole and exclusive remedies and Motorola's entire liability in the event of an Infringement Claim. Customer has no right to recover and Motorola has no obligation to provide any other or further remedies, whether under another provision of this Agreement or any other legal theory or principle, in connection with an Infringement Claim. In addition, the rights and remedies provided in this Section 13 are subject to and limited by the restrictions set forth in Section 14.

Section 14 LIMITATION OF LIABILITY

Except for personal injury or death, Motorola's total liability, whether for breach of contract, warranty, negligence, strict liability in tort, indemnification, or otherwise, will be limited to the direct damages recoverable under law, but not to exceed the price of the Equipment, Software, or services with respect to which losses or damages are claimed. **ALTHOUGH THE PARTIES ACKNOWLEDGE THE POSSIBILITY OF SUCH LOSSES OR DAMAGES, THEY AGREE THAT MOTOROLA WILL NOT BE LIABLE FOR ANY COMMERCIAL LOSS; INCONVENIENCE; LOSS OF USE, TIME, DATA, GOOD WILL, REVENUES, PROFITS OR SAVINGS; OR OTHER SPECIAL, INCIDENTAL, INDIRECT, OR CONSEQUENTIAL DAMAGES IN ANY WAY RELATED TO OR ARISING FROM THIS AGREEMENT, THE SALE OR USE OF THE EQUIPMENT OR SOFTWARE, OR THE PERFORMANCE OF SERVICES BY MOTOROLA PURSUANT TO THIS AGREEMENT.** This limitation of liability provision survives the expiration or termination of the Agreement and applies notwithstanding any contrary provision. No action for contract breach or otherwise relating to the transactions contemplated by this Agreement may be brought more than one (1) year after the accrual of the cause of action, except for money due upon an open account.

Section 15 CONFIDENTIALITY AND PROPRIETARY RIGHTS

15.1. CONFIDENTIAL INFORMATION.

15.1.1. Each party is a disclosing party ("Discloser") and a receiving party ("Recipient") under this Agreement. During the term of this Agreement and for a period of three (3) years from the expiration or termination of this Agreement, Recipient will (i) not disclose Confidential Information to any third party; (ii) restrict disclosure of Confidential Information to only those employees (including, but not limited to, employees of any wholly owned subsidiary, a parent company, any other wholly owned subsidiaries of the same parent company), agents or consultants who must be directly involved with the Confidential Information for the purpose and who are bound by confidentiality terms substantially similar to those in this Agreement; (iii) not copy, reproduce, reverse engineer, de-compile or disassemble any Confidential Information; (iv) use the same degree of care as for its own information of like importance, but at least use reasonable care, in safeguarding against disclosure of Confidential Information; (v) promptly notify Discloser upon discovery of any unauthorized use or disclosure of the Confidential Information and take reasonable steps to regain possession of the Confidential Information and prevent further unauthorized

actions or other breach of this Agreement; and (vi) only use the Confidential Information as needed to fulfill this Agreement.

15.1.2. Recipient is not obligated to maintain as confidential, Confidential Information that Recipient can demonstrate by documentation (i) is now available or becomes available to the public without breach of this Agreement; (ii) is explicitly approved for release by written authorization of Discloser; (iii) is lawfully obtained from a third party or parties without a duty of confidentiality; (iv) is known to the Recipient prior to such disclosure; or (v) is independently developed by Recipient without the use of any of Discloser's Confidential Information or any breach of this Agreement.

15.1.3. All Confidential Information remains the property of the discloser and will not be copied or reproduced without the express written permission of the Discloser, except for copies that are absolutely necessary in order to fulfill this Agreement. Within ten (10) days of receipt of Discloser's written request, Recipient will return all Confidential Information to Discloser along with all copies and portions thereof, or certify in writing that all such Confidential Information has been destroyed. However, Recipient may retain one (1) archival copy of the Confidential Information that it may use only in case of a dispute concerning this Agreement. No license, express or implied, in the Confidential Information is granted other than to use the Confidential Information in the manner and to the extent authorized by this Agreement. The Discloser warrants that it is authorized to disclose any Confidential Information it discloses pursuant to this Agreement.

15.2. **PRESERVATION OF MOTOROLA'S PROPRIETARY RIGHTS.** Motorola, the third party manufacturer of any Equipment, and the copyright owner of any Non-Motorola Software own and retain all of their respective Proprietary Rights in the Equipment and Software, and nothing in this Agreement is intended to restrict their Proprietary Rights. All intellectual property developed, originated, or prepared by Motorola in connection with providing to Customer the Equipment, Software, or related services remain vested exclusively in Motorola, and this Agreement does not grant to Customer any shared development rights of intellectual property. Except as explicitly provided in the Software License Agreement, Motorola does not grant to Customer, either directly or by implication, estoppel, or otherwise, any right, title or interest in Motorola's Proprietary Rights. Customer will not modify, disassemble, peel components, decompile, otherwise reverse engineer or attempt to reverse engineer, derive source code or create derivative works from, adapt, translate, merge with other software, reproduce, distribute, sublicense, sell or export the Software, or permit or encourage any third party to do so. The preceding sentence does not apply to Open Source Software which is governed by the standard license of the copyright owner.

Section 16 GENERAL

16.1. **TAXES.** The Contract Price does not include any excise, sales, lease, use, property, or other taxes, assessments or duties, all of which will be paid by Customer except as exempt by law. If Motorola is required to pay any of these taxes, Motorola will send an invoice to Customer and Customer will pay to Motorola the amount of the taxes (including any interest and penalties) within twenty (20) days after the date of the invoice. Customer will be solely responsible for reporting the Equipment for personal property tax purposes, and Motorola will be solely responsible for reporting taxes on its income or net worth.

16.2. **ASSIGNABILITY AND SUBCONTRACTING.** Except as provided herein, neither Party may assign this Agreement or any of its rights or obligations hereunder without the prior written consent of the other Party, which consent will not be unreasonably withheld. Any attempted assignment, delegation, or transfer without the necessary consent will be void. Notwithstanding the foregoing, Motorola may assign this Agreement to any of its affiliates or its right to receive payment without the prior consent of Customer. In addition, in the event Motorola separates one or more of its businesses (each a "Separated Business"), whether by way of a sale, establishment of a joint venture, spin-off or otherwise (each a "Separation Event"), Motorola may, without the prior written consent of the other Party and at no additional cost to Motorola, assign this Agreement such that it will continue to benefit the Separated Business and its affiliates (and Motorola and its affiliates, to the extent applicable) following the Separation Event. Motorola may subcontract any of the work, but subcontracting will not relieve Motorola of its duties under this Agreement.

16.3 **WAIVER.** Failure or delay by either Party to exercise a right or power under this Agreement will not be a waiver of the right or power. For a waiver of a right or power to be effective, it must be in a writing signed by the waiving Party. An effective waiver of a right or power will not be construed as either a future or continuing waiver of that same right or power, or the waiver of any other right or power.

16.4 **SEVERABILITY.** If a court of competent jurisdiction renders any part of this Agreement invalid or unenforceable, that part will be severed and the remainder of this Agreement will continue in full force and effect.

16.5 **INDEPENDENT CONTRACTORS.** Each Party will perform its duties under this Agreement as an independent contractor. The Parties and their personnel will not be considered to be employees or agents of the other Party. Nothing in this Agreement will be interpreted as granting either Party the right or authority to make commitments of any kind for the other. This Agreement will not constitute, create, or be interpreted as a joint venture, partnership or formal business organization of any kind.

16.6 **HEADINGS AND SECTION REFERENCES.** The section headings in this Agreement are inserted only for convenience and are not to be construed as part of this Agreement or as a limitation of the scope of the particular section to which the heading refers. This Agreement will be fairly interpreted in accordance with its terms and conditions and not for or against either Party.

16.7 **ENTIRE AGREEMENT.** This Agreement, including all Exhibits, constitutes the entire agreement of the Parties regarding the subject matter of the Agreement and supersedes all previous agreements, proposals, and understandings, whether written or oral, relating to this subject matter. This Agreement may be executed in multiple counterparts, and shall have the same legal force and effect as if the Parties had executed it as a single document. The Parties may sign in writing, or by electronic signature, including by email. An electronic signature, or a facsimile copy or computer image, such as a PDF or tiff image, of a signature, shall be treated as and shall have the same effect as an original signature. In addition, an electronic signature, a true and correct facsimile copy or computer image of this Agreement shall be treated as and shall have the same effect as an original signed copy of this document. This Agreement may be amended or modified only by a written instrument signed by authorized representatives of both Parties. The preprinted terms and conditions found on any Customer purchase order, acknowledgment or other form will not be considered an amendment or modification of this Agreement, even if a representative of each Party signs that document.

16.8 **NOTICES.** Notices required under this Agreement to be given by one Party to the other must be in writing and either personally delivered or sent to the address shown below by certified mail, return receipt requested and postage prepaid (or by a recognized courier service, such as Federal Express, UPS, or DHL), or by facsimile with correct answerback received, and will be effective upon receipt:

Motorola Solutions, Inc.
Attn: Deb Robinson or Henry Johnson
7237 Church Ranch Blvd., Suite 406
Westminster, CO 80021
fax: 858-368-3350

Customer
Attn: Chief Dan Doyle
2360 McCulloch Blvd
Lake Havasu City, AZ 86403 5947
doyled@lhcaz.gov
fax: 928-680-5430

16.9 **COMPLIANCE WITH APPLICABLE LAWS.** Each Party will comply with all applicable federal, state, and local laws, regulations and rules concerning the performance of this Agreement or use of the System. Customer will obtain and comply with all Federal Communications Commission ("FCC") licenses and authorizations required for the installation, operation and use of the System before the scheduled installation of the Equipment. Although Motorola might assist Customer in the preparation of its FCC license applications, neither Motorola nor any of its employees is an agent or representative of Customer in FCC or other matters.

16.10 **AUTHORITY TO EXECUTE AGREEMENT.** Each Party represents that it has obtained all necessary approvals, consents and authorizations to enter into this Agreement and to perform its duties under this Agreement; the person executing this Agreement on its behalf has the authority to do so; upon

execution and delivery of this Agreement by the Parties, it is a valid and binding contract, enforceable in accordance with its terms; and the execution, delivery, and performance of this Agreement does not violate any bylaw, charter, regulation, law or any other governing authority of the Party.

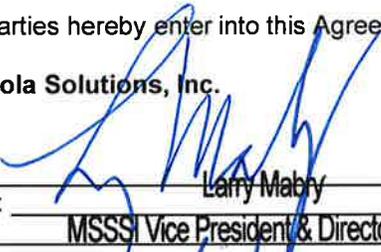
16.11. ADMINISTRATOR LEVEL ACCOUNT ACCESS. Motorola will provide Customer with Administrative User Credentials. Customer agrees to only grant Administrative User Credentials to those personnel with the training or experience to correctly use the access. Customer is responsible for protecting Administrative User Credentials from disclosure and maintaining Credential validity by, among other things, updating passwords when required. Customer may be asked to provide valid Administrative User Credentials when in contact with Motorola System support. Customer understands that changes made as the Administrative User can significantly impact the performance of the System. Customer agrees that it will be solely responsible for any negative impact on the System or its users by any such changes. System issues occurring as a result of changes made by an Administrative User may impact Motorola's ability to perform its obligations under the Agreement or its Maintenance and Support Agreement. In such cases, a revision to the appropriate provisions of the Agreement, including the Statement of Work, may be necessary. To the extent Motorola provides assistance to correct any issues caused by or arising out of the use of or failure to maintain Administrative User Credentials, Motorola will be entitled to bill Customer and Customer will pay Motorola on a time and materials basis for resolving the issue.

16.12. SURVIVAL OF TERMS. The following provisions will survive the expiration or termination of this Agreement for any reason: Section 3.6 (Motorola Software); Section 3.7 (Non-Motorola Software); if any payment obligations exist, Sections 5.1 and 5.2 (Contract Price and Invoicing and Payment); Subsection 9.7 (Disclaimer of Implied Warranties); Section 11 (Disputes); Section 14 (Limitation of Liability); and Section 15 (Confidentiality and Proprietary Rights); and all of the General provisions in Section 16.

The Parties hereby enter into this Agreement as of the Effective Date.

Motorola Solutions, Inc.

Lake Havasu City (Customer)

By: 
Name: Larry Mabry
Title: MSSSI Vice President & Director Sales
Date: 9/11/2015

By: _____
Name: _____
Title: _____
Date: _____

Exhibit A

SOFTWARE LICENSE AGREEMENT

This Exhibit A Software License Agreement ("Agreement") is between Motorola Solutions, Inc., ("Motorola"), and Lake Havasu City ("Licensee").

For good and valuable consideration, the parties agree as follows:

Section 1 DEFINITIONS

1.1 "Designated Products" means products provided by Motorola to Licensee with which or for which the Software and Documentation is licensed for use.

1.2 "Documentation" means product and software documentation that specifies technical and performance features and capabilities, and the user, operation and training manuals for the Software (including all physical or electronic media upon which such information is provided).

1.3 "Open Source Software" means software with either freely obtainable source code, license for modification, or permission for free distribution.

1.4 "Open Source Software License" means the terms or conditions under which the Open Source Software is licensed.

1.5 "Primary Agreement" means the agreement to which this exhibit is attached.

1.6 "Security Vulnerability" means a flaw or weakness in system security procedures, design, implementation, or internal controls that could be exercised (accidentally triggered or intentionally exploited) and result in a security breach such that data is compromised, manipulated or stolen or the system damaged.

1.7 "Software" (i) means proprietary software in object code format, and adaptations, translations, de-compilations, disassemblies, emulations, or derivative works of such software; (ii) means any modifications, enhancements, new versions and new releases of the software provided by Motorola; and (iii) may contain one or more items of software owned by a third party supplier. The term "Software" does not include any third party software provided under separate license or third party software not licensable under the terms of this Agreement.

Section 2 SCOPE

Motorola and Licensee enter into this Agreement in connection with Motorola's delivery of certain proprietary Software or products containing embedded or pre-loaded proprietary Software, or both. This Agreement contains the terms and conditions of the license Motorola is providing to Licensee, and Licensee's use of the Software and Documentation.

Section 3 GRANT OF LICENSE

3.1. Subject to the provisions of this Agreement and the payment of applicable license fees, Motorola grants to Licensee a personal, limited, non-transferable (except as permitted in Section 7) and non-exclusive license under Motorola's copyrights and Confidential Information (as defined in the Primary Agreement) embodied in the Software to use the Software, in object code form, and the Documentation solely in connection with Licensee's use of the Designated Products. This Agreement does not grant any rights to source code.

3.2. If the Software licensed under this Agreement contains or is derived from Open Source Software, the terms and conditions governing the use of such Open Source Software are in the Open Source

Software Licenses of the copyright owner and not this Agreement. If there is a conflict between the terms and conditions of this Agreement and the terms and conditions of the Open Source Software Licenses governing Licensee's use of the Open Source Software, the terms and conditions of the license grant of the applicable Open Source Software Licenses will take precedence over the license grants in this Agreement. If requested by Licensee, Motorola will use commercially reasonable efforts to: (i) determine whether any Open Source Software is provided under this Agreement; (ii) identify the Open Source Software and provide Licensee a copy of the applicable Open Source Software License (or specify where that license may be found); and, (iii) provide Licensee a copy of the Open Source Software source code, without charge, if it is publicly available (although distribution fees may be applicable).

Section 4 LIMITATIONS ON USE

4.1. Licensee may use the Software only for Licensee's internal business purposes and only in accordance with the Documentation. Any other use of the Software is strictly prohibited. Without limiting the general nature of these restrictions, Licensee will not make the Software available for use by third parties on a "time sharing," "application service provider," or "service bureau" basis or for any other similar commercial rental or sharing arrangement.

4.2. Licensee will not, and will not allow or enable any third party to: (i) reverse engineer, disassemble, peel components, decompile, reprogram or otherwise reduce the Software or any portion to a human perceptible form or otherwise attempt to recreate the source code; (ii) modify, adapt, create derivative works of, or merge the Software; (iii) copy, reproduce, distribute, lend, or lease the Software or Documentation to any third party, grant any sublicense or other rights in the Software or Documentation to any third party, or take any action that would cause the Software or Documentation to be placed in the public domain; (iv) remove, or in any way alter or obscure, any copyright notice or other notice of Motorola's proprietary rights; (v) provide, copy, transmit, disclose, divulge or make the Software or Documentation available to, or permit the use of the Software by any third party or on any machine except as expressly authorized by this Agreement; or (vi) use, or permit the use of, the Software in a manner that would result in the production of a copy of the Software solely by activating a machine containing the Software. Licensee may make one copy of Software to be used solely for archival, backup, or disaster recovery purposes; *provided* that Licensee may not operate that copy of the Software at the same time as the original Software is being operated. Licensee may make as many copies of the Documentation as it may reasonably require for the internal use of the Software.

4.3. Unless otherwise authorized by Motorola in writing, Licensee will not, and will not enable or allow any third party to: (i) install a licensed copy of the Software on more than one unit of a Designated Product; or (ii) copy onto or transfer Software installed in one unit of a Designated Product onto one other device. Licensee may temporarily transfer Software installed on a Designated Product to another device if the Designated Product is inoperable or malfunctioning, if Licensee provides written notice to Motorola of the temporary transfer and identifies the device on which the Software is transferred. Temporary transfer of the Software to another device must be discontinued when the original Designated Product is returned to operation and the Software must be removed from the other device. Licensee must provide prompt written notice to Motorola at the time temporary transfer is discontinued.

4.4. When using Motorola's Radio Service Software ("RSS"), Licensee must purchase a separate license for each location at which Licensee uses RSS. Licensee's use of RSS at a licensed location does not entitle Licensee to use or access RSS remotely. Licensee may make one copy of RSS for each licensed location. Licensee shall provide Motorola with a list of all locations at which Licensee uses or intends to use RSS upon Motorola's request.

4.5. Licensee will maintain, during the term of this Agreement and for a period of two years thereafter, accurate records relating to this license grant to verify compliance with this Agreement. Motorola or an independent third party ("Auditor") may inspect Licensee's premises, books and records, upon reasonable prior notice to Licensee, during Licensee's normal business hours and subject to Licensee's facility and security regulations. Motorola is responsible for the payment of all expenses and costs of the Auditor. Any information obtained by Motorola and the Auditor will be kept in strict confidence by Motorola and the

Auditor and used solely for the purpose of verifying Licensee's compliance with the terms of this Agreement.

Section 5 OWNERSHIP AND TITLE

Motorola, its licensors, and its suppliers retain all of their proprietary rights in any form in and to the Software and Documentation, including, but not limited to, all rights in patents, patent applications, inventions, copyrights, trademarks, trade secrets, trade names, and other proprietary rights in or relating to the Software and Documentation (including any corrections, bug fixes, enhancements, updates, modifications, adaptations, translations, de-compilations, disassemblies, emulations to or derivative works from the Software or Documentation, whether made by Motorola or another party, or any improvements that result from Motorola's processes or, provision of information services). No rights are granted to Licensee under this Agreement by implication, estoppel or otherwise, except for those rights which are expressly granted to Licensee in this Agreement. All intellectual property developed, originated, or prepared by Motorola in connection with providing the Software, Designated Products, Documentation or related services, remains vested exclusively in Motorola, and Licensee will not have any shared development or other intellectual property rights.

Section 6 LIMITED WARRANTY; DISCLAIMER OF WARRANTY

6.1. The commencement date and the term of the Software warranty will be as set forth in the Primary Agreement (the "Warranty Period"). If Licensee is not in breach of any of its obligations under this Agreement, Motorola warrants that the unmodified Software, when used properly and in accordance with the Documentation and this Agreement, will be free from a reproducible defect that eliminates the functionality or successful operation of a feature critical to the primary functionality or successful operation of the Software. Whether a defect occurs will be determined by Motorola solely with reference to the Documentation. Motorola does not warrant that Licensee's use of the Software or the Designated Products will be uninterrupted, error-free, completely free of Security Vulnerabilities, or that the Software or the Designated Products will meet Licensee's particular requirements. Motorola makes no representations or warranties with respect to any third party software included in the Software.

6.2 Motorola's sole obligation to Licensee and Licensee's exclusive remedy under this warranty is to use reasonable efforts to remedy any material Software defect covered by this warranty. These efforts will involve either replacing the media or attempting to correct significant, demonstrable program or documentation errors or Security Vulnerabilities. If Motorola cannot correct the defect within a reasonable time, then at Motorola's option, Motorola will replace the defective Software with functionally-equivalent Software, license to Licensee substitute Software which will accomplish the same objective, or terminate the license and refund the Licensee's paid license fee.

6.3. Warranty claims are described in the Primary Agreement.

6.4. The express warranties set forth in this Section 6 are in lieu of, and Motorola disclaims, any and all other warranties (express or implied, oral or written) with respect to the Software or Documentation, including, without limitation, any and all implied warranties of condition, title, non-infringement, merchantability, or fitness for a particular purpose or use by Licensee (whether or not Motorola knows, has reason to know, has been advised, or is otherwise aware of any such purpose or use), whether arising by law, by reason of custom or usage of trade, or by course of dealing. In addition, Motorola disclaims any warranty to any person other than Licensee with respect to the Software or Documentation.

Section 7 TRANSFERS

Licensee will not transfer the Software or Documentation to any third party without Motorola's prior written consent. Motorola's consent may be withheld at its discretion and may be conditioned upon transferee paying all applicable license fees and agreeing to be bound by this Agreement. If the Designated Products are Motorola's radio products and Licensee transfers ownership of the Motorola radio products to a third party, Licensee may assign its right to use the Software (other than RSS and Motorola's FLASHport® software) which is embedded in or furnished for use with the radio products and the related

Documentation; *provided* that Licensee transfers all copies of the Software and Documentation to the transferee, and Licensee and the transferee sign a transfer form to be provided by Motorola upon request, obligating the transferee to be bound by this Agreement.

Section 8 TERM AND TERMINATION

8.1 Licensee's right to use the Software and Documentation will begin when the Primary Agreement is signed by both parties and will continue for the life of the Designated Products with which or for which the Software and Documentation have been provided by Motorola, unless Licensee breaches this Agreement, in which case this Agreement and Licensee's right to use the Software and Documentation may be terminated immediately upon notice by Motorola.

8.2 Within thirty (30) days after termination of this Agreement, Licensee must certify in writing to Motorola that all copies of the Software have been removed or deleted from the Designated Products and that all copies of the Software and Documentation have been returned to Motorola or destroyed by Licensee and are no longer in use by Licensee.

8.3 Licensee acknowledges that Motorola made a considerable investment of resources in the development, marketing, and distribution of the Software and Documentation and that Licensee's breach of this Agreement will result in irreparable harm to Motorola for which monetary damages would be inadequate. If Licensee breaches this Agreement, Motorola may terminate this Agreement and be entitled to all available remedies at law or in equity (including immediate injunctive relief and repossession of all non-embedded Software and associated Documentation unless Licensee is a Federal agency of the United States Government).

Section 9 UNITED STATES GOVERNMENT LICENSING PROVISIONS

This Section applies if Licensee is the United States Government or a United States Government agency. Licensee's use, duplication or disclosure of the Software and Documentation under Motorola's copyrights or trade secret rights is subject to the restrictions set forth in subparagraphs (c)(1) and (2) of the Commercial Computer Software-Restricted Rights clause at FAR 52.227-19 (JUNE 1987), if applicable, unless they are being provided to the Department of Defense. If the Software and Documentation are being provided to the Department of Defense, Licensee's use, duplication, or disclosure of the Software and Documentation is subject to the restricted rights set forth in subparagraph (c)(1)(ii) of the Rights in Technical Data and Computer Software clause at DFARS 252.227-7013 (OCT 1988), if applicable. The Software and Documentation may or may not include a Restricted Rights notice, or other notice referring to this Agreement. The provisions of this Agreement will continue to apply, but only to the extent that they are consistent with the rights provided to the Licensee under the provisions of the FAR or DFARS mentioned above, as applicable to the particular procuring agency and procurement transaction.

Section 10 CONFIDENTIALITY

Licensee acknowledges that the Software and Documentation contain Motorola's valuable proprietary and Confidential Information and are Motorola's trade secrets, and that the provisions in the Primary Agreement concerning Confidential Information apply.

Section 11 LIMITATION OF LIABILITY

The Limitation of Liability provision is described in the Primary Agreement.

Section 12 NOTICES

Notices are described in the Primary Agreement.

Section 13 GENERAL

13.1. **COPYRIGHT NOTICES.** The existence of a copyright notice on the Software will not be construed as an admission or presumption of publication of the Software or public disclosure of any trade secrets associated with the Software.

13.2. **COMPLIANCE WITH LAWS.** Licensee acknowledges that the Software is subject to the laws and regulations of the United States and Licensee will comply with all applicable laws and regulations, including export laws and regulations of the United States. Licensee will not, without the prior authorization of Motorola and the appropriate governmental authority of the United States, in any form export or re-export, sell or resell, ship or reship, or divert, through direct or indirect means, any item or technical data or direct or indirect products sold or otherwise furnished to any person within any territory for which the United States Government or any of its agencies at the time of the action, requires an export license or other governmental approval. Violation of this provision is a material breach of this Agreement.

13.3. **ASSIGNMENTS AND SUBCONTRACTING.** Motorola may assign its rights or subcontract its obligations under this Agreement, or encumber or sell its rights in any Software, without prior notice to or consent of Licensee.

13.4. **GOVERNING LAW.** This Agreement is governed by the laws of the United States to the extent that they apply and otherwise by the internal substantive laws of the State to which the Software is shipped if Licensee is a sovereign government entity, or the internal substantive laws of the State of Illinois if Licensee is not a sovereign government entity. The terms of the U.N. Convention on Contracts for the International Sale of Goods do not apply. In the event that the Uniform Computer Information Transaction Act, any version of this Act, or a substantially similar law (collectively "UCITA") becomes applicable to a party's performance under this Agreement, UCITA does not govern any aspect of this Agreement or any license granted under this Agreement, or any of the parties' rights or obligations under this Agreement. The governing law will be that in effect prior to the applicability of UCITA.

13.5. **THIRD PARTY BENEFICIARIES.** This Agreement is entered into solely for the benefit of Motorola and Licensee. No third party has the right to make any claim or assert any right under this Agreement, and no third party is deemed a beneficiary of this Agreement. Notwithstanding the foregoing, any licensor or supplier of third party software included in the Software will be a direct and intended third party beneficiary of this Agreement.

13.6. **SURVIVAL.** Sections 4, 5, 6.3, 7, 8, 9, 10, 11 and 13 survive the termination of this Agreement.

13.7. **ORDER OF PRECEDENCE.** In the event of inconsistencies between this Exhibit and the Primary Agreement, the parties agree that this Exhibit prevails, only with respect to the specific subject matter of this Exhibit, and not the Primary Agreement or any other exhibit as it applies to any other subject matter.

13.8. **SECURITY.** Motorola uses reasonable means in the design and writing of its own Software and the acquisition of third party Software to limit Security Vulnerabilities. While no software can be guaranteed to be free from Security Vulnerabilities, if a Security Vulnerability is discovered, Motorola will take the steps set forth in Section 6 of this Agreement.

Exhibit B

Payment Schedule

Except for a payment that is due on the Effective Date, Customer will make payments to Motorola in accordance with the contract payment terms. Customer will make payments when due in the form of a check, cashier's check, or wire transfer drawn on a U.S. financial institution and in accordance with the following:

System

25% of the contract price excluding Subscribers upon Contract execution

50% of the contract price excluding Subscribers upon equipment shipment;

20% of the contract price excluding Subscribers upon Installation

5% of the contract price excluding Subscribers upon Final Acceptance

Subscribers

Subscribers will be billed separately upon shipment to customer designated ship-to location.

Motorola reserves the right to make partial shipments of equipment and to request payment upon shipment of such equipment. In addition, Motorola reserves the right to invoice for installations or civil work completed on a site-by-site basis, when applicable.

Exhibit D

Service Terms and Conditions

Motorola Solutions, Inc. ("Motorola") and the customer named in this Agreement ("Customer") hereby agree as follows:

Section 1 APPLICABILITY

These Service Terms and Conditions apply to service contracts whereby Motorola will provide to Customer either (1) maintenance, support, or other services under a Motorola Service Agreement, or (2) installation services under a Motorola Installation Agreement.

Section 2 DEFINITIONS AND INTERPRETATION

2.1. "Agreement" means these Service Terms and Conditions; the cover page for the Service Agreement or the Installation Agreement, as applicable; and any other attachments, all of which are incorporated herein by this reference. In interpreting this Agreement and resolving any ambiguities, these Service Terms and Conditions take precedence over any cover page, and the cover page takes precedence over any attachments, unless the cover page or attachment states otherwise.

2.2. "Equipment" means the equipment that is specified in the attachments or is subsequently added to this Agreement.

2.3. "Services" means those installation, maintenance, support, training, and other services described in this Agreement.

Section 3 ACCEPTANCE

Customer accepts these Service Terms and Conditions and agrees to pay the prices set forth in the Agreement. This Agreement becomes binding only when accepted in writing by Motorola. The term of this Agreement begins on the "Start Date" indicated in this Agreement.

Section 4 SCOPE OF SERVICES

4.1. Motorola will provide the Services described in this Agreement or in a more detailed statement of work or other document attached to this Agreement. At Customer's request, Motorola may also provide additional services at Motorola's then-applicable rates for the services.

4.2. If Motorola is providing Services for Equipment, Motorola parts or parts of equal quality will be used; the Equipment will be serviced at levels set forth in the manufacturer's product manuals; and routine service procedures that are prescribed by Motorola will be followed.

4.3. If Customer purchases from Motorola additional equipment that becomes part of the same system as the initial Equipment, the additional equipment may be added to this Agreement and will be billed at the applicable rates after the warranty for that additional equipment expires.

4.4. All Equipment must be in good working order on the Start Date or when additional equipment is added to the Agreement. Upon reasonable request by Motorola, Customer will provide a complete serial and model number list of the Equipment. Customer must promptly notify Motorola in writing when any Equipment is lost, damaged, stolen or taken out of service. Customer's obligation to pay Service fees for this Equipment will terminate at the end of the month in which Motorola receives the written notice.

4.5. Customer must specifically identify any Equipment that is labeled intrinsically safe for use in hazardous environments.

4.6. If Equipment cannot, in Motorola's reasonable opinion, be properly or economically serviced for any reason, Motorola may modify the scope of Services related to that Equipment; remove that Equipment from the Agreement; or increase the price to Service that Equipment.

4.7. Customer must promptly notify Motorola of any Equipment failure. Motorola will respond to Customer's notification in a manner consistent with the level of Service purchased as indicated in this Agreement.

Section 5 EXCLUDED SERVICES

5.1. Service excludes the repair or replacement of Equipment that has become defective or damaged from use in other than the normal, customary, intended, and authorized manner; use not in compliance with applicable industry standards; excessive wear and tear; or accident, liquids, power surges, neglect, acts of God or other force majeure events.

5.2. Unless specifically included in this Agreement, Service excludes items that are consumed in the normal operation of the Equipment, such as batteries or magnetic tapes.; upgrading or reprogramming Equipment; accessories, belt clips, battery chargers, custom or special products, modified units, or software; and repair or maintenance of any transmission line, antenna, microwave equipment, tower or tower lighting, duplexer, combiner, or multicoupler. Motorola has no obligations for any transmission medium, such as telephone lines, computer networks, the internet or the worldwide web, or for Equipment malfunction caused by the transmission medium.

Section 6 TIME AND PLACE OF SERVICE

Service will be provided at the location specified in this Agreement. When Motorola performs service at Customer's location, Customer will provide Motorola, at no charge, a non-hazardous work environment with adequate shelter, heat, light, and power and with full and free access to the Equipment. Waivers of liability from Motorola or its subcontractors will not be imposed as a site access requirement. Customer will provide all information pertaining to the hardware and software elements of any system with which the Equipment is interfacing so that Motorola may perform its Services. Unless otherwise stated in this Agreement, the hours of Service will be 8:30 a.m. to 4:30 p.m., local time, excluding weekends and holidays. Unless otherwise stated in this Agreement, the price for the Services exclude any charges or expenses associated with helicopter or other unusual access requirements; if these charges or expenses are reasonably incurred by Motorola in rendering the Services, Customer agrees to reimburse Motorola for those charges and expenses.

Section 7 CUSTOMER CONTACT

Customer will provide Motorola with designated points of contact (list of names and phone numbers) that will be available twenty-four (24) hours per day, seven (7) days per week, and an escalation procedure to enable Customer's personnel to maintain contact, as needed, with Motorola.

Section 8 PAYMENT

Unless alternative payment terms are stated in this Agreement, Motorola will invoice Customer in advance for each payment period. All other charges will be billed monthly, and Customer must pay each invoice in U.S. dollars within twenty (20) days of the invoice date. Customer will reimburse Motorola for all property taxes, sales and use taxes, excise taxes, and other taxes or assessments that are levied as a result of Services rendered under this Agreement (except income, profit, and franchise taxes of Motorola) by any governmental entity.

Section 9 WARRANTY

Motorola warrants that its Services under this Agreement will be free of defects in materials and workmanship for a period of ninety (90) days from the date the performance of the Services are

completed. In the event of a breach of this warranty, Customer's sole remedy is to require Motorola to re-perform the non-conforming Service or to refund, on a pro-rata basis, the fees paid for the non-conforming Service. MOTOROLA DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

Section 10 DEFAULT/TERMINATION

10.1. If either party defaults in the performance of this Agreement, the other party will give to the non-performing party a written and detailed notice of the default. The non-performing party will have thirty (30) days thereafter to provide a written plan to cure the default that is acceptable to the other party and begin implementing the cure plan immediately after plan approval. If the non-performing party fails to provide or implement the cure plan, then the injured party, in addition to any other rights available to it under law, may immediately terminate this Agreement effective upon giving a written notice of termination to the defaulting party.

10.2. Any termination of this Agreement will not relieve either party of obligations previously incurred pursuant to this Agreement, including payments which may be due and owing at the time of termination. All sums owed by Customer to Motorola will become due and payable immediately upon termination of this Agreement. Upon the effective date of termination, Motorola will have no further obligation to provide Services.

Section 11 LIMITATION OF LIABILITY

Except for personal injury or death, Motorola's total liability, whether for breach of contract, warranty, negligence, strict liability in tort, or otherwise, will be limited to the direct damages recoverable under law, but not to exceed the price of twelve (12) months of Service provided under this Agreement. ALTHOUGH THE PARTIES ACKNOWLEDGE THE POSSIBILITY OF SUCH LOSSES OR DAMAGES, THEY AGREE THAT MOTOROLA WILL NOT BE LIABLE FOR ANY COMMERCIAL LOSS; INCONVENIENCE; LOSS OF USE, TIME, DATA, GOOD WILL, REVENUES, PROFITS OR SAVINGS; OR OTHER SPECIAL, INCIDENTAL, INDIRECT, OR CONSEQUENTIAL DAMAGES IN ANY WAY RELATED TO OR ARISING FROM THIS AGREEMENT OR THE PERFORMANCE OF SERVICES BY MOTOROLA PURSUANT TO THIS AGREEMENT. No action for contract breach or otherwise relating to the transactions contemplated by this Agreement may be brought more than one (1) year after the accrual of the cause of action, except for money due upon an open account. This limitation of liability will survive the expiration or termination of this Agreement and applies notwithstanding any contrary provision.

Section 12 EXCLUSIVE TERMS AND CONDITIONS

12.1. This Agreement supersedes all prior and concurrent agreements and understandings between the parties, whether written or oral, related to the Services, and there are no agreements or representations concerning the subject matter of this Agreement except for those expressed herein. The Agreement may not be amended or modified except by a written agreement signed by authorized representatives of both parties.

12.2. Customer agrees to reference this Agreement on any purchase order issued in furtherance of this Agreement, however, an omission of the reference to this Agreement will not affect its applicability. In no event will either party be bound by any terms contained in a Customer purchase order, acknowledgement, or other writings unless: the purchase order, acknowledgement, or other writing specifically refers to this Agreement; clearly indicate the intention of both parties to override and modify this Agreement; and the purchase order, acknowledgement, or other writing is signed by authorized representatives of both parties.

Section 13 PROPRIETARY INFORMATION; CONFIDENTIALITY; INTELLECTUAL PROPERTY RIGHTS

13.1. Any information or data in the form of specifications, drawings, reprints, technical information or otherwise furnished to Customer under this Agreement will remain Motorola's property, will be deemed proprietary, will be kept confidential, and will be promptly returned at Motorola's request. Customer may not disclose, without Motorola's written permission or as required by law, any confidential information or data to any person, or use confidential information or data for any purpose other than performing its obligations under this Agreement. The obligations set forth in this Section survive the expiration or termination of this Agreement.

13.2. Unless otherwise agreed in writing, no commercial or technical information disclosed in any manner or at any time by Customer to Motorola will be deemed secret or confidential. Motorola will have no obligation to provide Customer with access to its confidential and proprietary information, including cost and pricing data.

13.3. This Agreement does not grant directly or by implication, estoppel, or otherwise, any ownership right or license under any Motorola patent, copyright, trade secret, or other intellectual property, including any intellectual property created as a result of or related to the Equipment sold or Services performed under this Agreement.

Section 14 FCC LICENSES AND OTHER AUTHORIZATIONS

Customer is solely responsible for obtaining licenses or other authorizations required by the Federal Communications Commission or any other federal, state, or local government agency and for complying with all rules and regulations required by governmental agencies. Neither Motorola nor any of its employees is an agent or representative of Customer in any governmental matters.

Section 15 COVENANT NOT TO EMPLOY

During the term of this Agreement and continuing for a period of two (2) years thereafter, Customer will not hire, engage on contract, solicit the employment of, or recommend employment to any third party of any employee of Motorola or its subcontractors without the prior written authorization of Motorola. This provision applies only to those employees of Motorola or its subcontractors who are responsible for rendering services under this Agreement. If this provision is found to be overly broad under applicable law, it will be modified as necessary to conform to applicable law.

Section 16 MATERIALS, TOOLS AND EQUIPMENT

All tools, equipment, dies, gauges, models, drawings or other materials paid for or furnished by Motorola for the purpose of this Agreement will be and remain the sole property of Motorola. Customer will safeguard all such property while it is in Customer's custody or control, be liable for any loss or damage to this property, and return it to Motorola upon request. This property will be held by Customer for Motorola's use without charge and may be removed from Customer's premises by Motorola at any time without restriction.

Section 17 GENERAL TERMS

17.1. If any court renders any portion of this Agreement unenforceable, the remaining terms will continue in full force and effect.

17.2. This Agreement and the rights and duties of the parties will be interpreted in accordance with the laws of the State in which the Services are performed.

17.3. Failure to exercise any right will not operate as a waiver of that right, power, or privilege.

17.4. Neither party is liable for delays or lack of performance resulting from any causes that are beyond that party's reasonable control, such as strikes, material shortages, or acts of God.

17.5. Motorola may subcontract any of the work, but subcontracting will not relieve Motorola of its duties under this Agreement.

17.6. Except as provided herein, neither Party may assign this Agreement or any of its rights or obligations hereunder without the prior written consent of the other Party, which consent will not be unreasonably withheld. Any attempted assignment, delegation, or transfer without the necessary consent will be void. Notwithstanding the foregoing, Motorola may assign this Agreement to any of its affiliates or its right to receive payment without the prior consent of Customer. In addition, in the event Motorola separates one or more of its businesses (each a "Separated Business"), whether by way of a sale, establishment of a joint venture, spin-off or otherwise (each a "Separation Event"), Motorola may, without the prior written consent of the other Party and at no additional cost to Motorola, assign this Agreement such that it will continue to benefit the Separated Business and its affiliates (and Motorola and its affiliates, to the extent applicable) following the Separation Event.

17.7. THIS AGREEMENT WILL RENEW, FOR AN ADDITIONAL ONE (1) YEAR TERM, ON EVERY ANNIVERSARY OF THE START DATE UNLESS EITHER THE COVER PAGE SPECIFICALLY STATES A TERMINATION DATE OR ONE PARTY NOTIFIES THE OTHER IN WRITING OF ITS INTENTION TO DISCONTINUE THE AGREEMENT NOT LESS THAN THIRTY (30) DAYS OF THAT ANNIVERSARY DATE. At the anniversary date, Motorola may adjust the price of the Services to reflect its current rates.

17.8. If Motorola provides Services after the termination or expiration of this Agreement, the terms and conditions in effect at the time of the termination or expiration will apply to those Services and Customer agrees to pay for those services on a time and materials basis at Motorola's then effective hourly rates.

Exhibit E

System Acceptance Certificate

Customer Name: Lake Havasu City

Project Name: _____

This System Acceptance Certificate memorializes the occurrence of System Acceptance. Motorola and Customer acknowledge that:

1. The Acceptance Tests set forth in the Acceptance Test Plan have been successfully completed.
2. The System is accepted.

Customer Representative:

Motorola Representative:

Signature: _____

Signature: _____

Print Name: _____

Print Name: _____

Title: _____

Title: _____

Date: _____

Date: _____

FINAL PROJECT ACCEPTANCE:

Motorola has provided and Customer has received all deliverables, and Motorola has performed all other work required for Final Project Acceptance.

Customer Representative:

Motorola Representative:

Signature: _____

Signature: _____

Print Name: _____

Print Name: _____

Title: _____

Title: _____

Date: _____

Date: _____