

# Oxford County Regional Communications Center

Request for Proposal  
for

## Regional Public Safety Communications System Upgrade

The purpose of this document is to provide interested parties with information to enable them to prepare and submit a proposal for a regionwide Public Safety transmitter simulcast radio, microwave network, and communications dispatch console.

August 18, 2022

Preproposal Conference	9:30AM – Tuesday, September 6, 2022
Proposal Due Date	3:00PM – Wednesday, October 5, 2022

**Deliver Proposal to:** Geff Inman, Director, Oxford County Communications, South Paris, Maine 04281

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## 1 INVITATION TO SUBMIT PROPOSAL

You are invited to submit a proposal as described by this Request for Proposal [RFP], in accordance with Oxford County's General Terms and Conditions, for the upgrade of the existing communications dispatch console, land mobile radio equipment and microwave radio infrastructure, as well as installation and maintenance services.

This RFP represents an effort undertaken by Oxford County and its user groups to provide a comprehensive specification with the goal of implementing regional VHF simulcast radio system to support its Fire, EMS, and Law Enforcement operations. When completed, the system will increase reliable communications coverage throughout Oxford County.

The existing VHF radio and microwave infrastructure equipment is beyond the manufacturer life-cycle.

The successful proposer will assume complete responsibility for all equipment, and system acceptance tests of systems equipment provided under this specification. All RFP responses shall address the entire system, to ensure a complete system, and that nothing remains to be purchased by Oxford County.

The Vendor must provide a detailed response to all items listed in these documents. The vendor must understand that all documents submitted will become part of the contract between Oxford County and the Vendor.

The Vendor is required to meet all applicable State Prevailing Wage requirements, where required.

### 1.1 Project Risks and Latent Delays

The County has identified potential project risks that may alter the proposed system configuration or cause delays in implementation of the proposed solution.

The Contractor agrees to be flexible and work with the County should any of these risks arise. The County and the Contractor shall assess the problem, and identify a resolution to the satisfaction of the County. The contractor shall manage the agreed upon solution, which may require network reconfiguration, new transmitter site, new microwave path, etc., that may increase or decrease system costs. The contractor and the County will develop a revised scope of work, identify equipment changes or services, and agree to the terms of a Change Order.

Risks include the following:

#### 1.1.1 Site Acquisition

The County has contacted and is negotiating site leases with tower owners. This is an ongoing tasks that is approximately 90% completed. Should any site fail due to inability to agree to lease terms, the County may cease negotiations and seek an alternative site.

#### 1.1.2 Tower Structure

The Proposer will be responsible for performing structural analyses on all of the proposed towers. These towers may have deficiencies, or the proposed antenna loading may fail structural analysis.

#### 1.1.3 Microwave Radio Links

The contractor shall be responsible to perform physical microwave path surveys to ensure line-of-sight and to identify final antenna centerlines. The results of the field survey may identify an obstructed path.

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### 1.1.4 FCC Licensing

The Proposer is responsible for FCC licensing existing frequencies to additional new sites. The Frequency Coordinator may ascertain that moving a licensed frequency to a new site may cause interference to another co-channel or adjacent licensee and may require Letter of Concurrence, reduce transmitter power, or reduce antenna heights.

### 1.2 Current State

Oxford County system is comprised of two [2] separate VHF systems; one for Law Enforcement and one for the Fire Services.

Today, the system is comprised of five [5] sites. The sites are integrated with the dispatch center using 960 MHz microwave.

### 1.3 Existing System Diagram, Frequencies, and FCC Information



Function	Call Sign	Transmit	Receive
Fire	WQMK711	154.0700	151.4525
Police	WMQK760	155.0700	151.2350

SITE	LAT	LON	ERP [w]	AGL [ft]
Black	44 35 02.7	70 38 14.8	175	120
Peaked	43 50 17.7	70 49 08.5	175	153
Pleasant	44 01 07.0	70 49 27.0	175	80
Spruce	44 24 27.0	70 35 05.5	175	65
Streaked	44 15 00.3	70 25 23.3	175	68

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## **1.4 Project Overview**

The equipment and services to be supplied under this procurement include:

- Update Zetron MAX Communications Dispatch Console
- Complete System Design for Oxford County countywide system
- VHF Transmitter Simulcast Repeaters for Law Enforcement and Fire Services
- Receiver Voting System
- Antennas and Feeder Systems [transmission lines, duplexers, lightning protection, etc.]
- IP Gateways
- GPS Synchronization Equipment
- IP Microwave Network
- Microwave Antenna and Feeder Systems
- Alarms / System Monitoring
- Site Facilities Grounding Upgrades Installation and System Provisioning
- Optimization of Simulcast Timing
- Project Management
- System Testing and Acceptance
- Documentation Including As-Built Drawings
- Sign-off by County

## **1.5 RFP Issuing Office, Inquiries, and Point of Contact**

Questions regarding this bid shall be made in writing only and be sent to Geff Inman, Oxford County Communications on the date identified in the RFP schedule.

Please email all questions to Geff Inman at [gjinman@oxfordcounty.org](mailto:gjinman@oxfordcounty.org)

Questions and the resulting answers to the specifications will be in the form of a written addendum and sent to all bid holders registered in the County.

All inquiries concerning any commercial or technical aspect of the project should be directed to:

Geff Inman  
Director  
Oxford County Regional Communications Center  
26 Western Avenue  
South Paris, Maine 04281  
207-743-9554 x109

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1.5.1 RFP Schedule and Key Dates

EVENT	DATE
RFP Issued to Proposers	Thursday, August 18, 2022
Deadline for Submission of written Pre-Bid Questions email [to be answered at prebid conference]	COB – Wednesday, August 31, 2022
Pre-RFP Conference & Site Tour	9:30 AM – Tuesday, Sept 6, 2022
Deadline for additional written questions/email	COB – Monday, September 19, 2022
Answers to final questions by email	COB – Thursday, September 22, 2022
Proposal Due Date:	3:00 PM – Wednesday, October 5, 2022

## 2 Pre-Proposal Conference

A Pre-Proposal conference will be held on the date shown above to discuss items of this RFP. The Conference will be held at Oxford County Courthouse in South Paris.

Attendance of this pre-bid conference is not mandatory; however, vendors are encouraged to attend.

### 2.1 RFP Conference Process

**Step-1:**

Questions, request for interpretation or clarification, petition for changes, additions or deletions to technical or commercial items in this RFP, shall be submitted in writing [via email] prior to the Pre-Bid Conference. Questions are due by the date listed in the RFP Schedule.

**Step-2:**

All Proposers will convene jointly on the date and time specified to receive answers to the vendor questions submitted in advance; to submit additional questions or requests; and, to receive any updated information regarding the project.

Responses to questions or changes in an official, written set of responses and/or clarifications will be provided to all bidders in the form of an Addenda and will be sent via email within 5-business days after the Pre-Bid Conference.

#### Site Survey and Inspection

At the completion of the Pre-Bid conference, Bidders will have the opportunity to tour the communications center [Oxford County] and equipment room located at the Dispatch Center.

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**Upon contract execution** - the required initial task of the selected Contractor will be to conduct detailed site review and inspections, to identify existing conditions to include available space, electrical [AC and DC], grounding conditions, lightning protection devices, and other site facilities to determine if suitable for the proposed equipment.

The Contractor shall also confirm site parameters such as tower and antenna heights, shelter condition, and identification of facility discrepancies.

Evaluation of electrical service at each site to supply AC power to the proposed equipment, or any electrical modifications required, should also be considered. This would include environmental controls [HVAC] to determine their ability to maintain the proposed equipment within its specified operating parameters as needed by the vendor's proposed equipment.

Upon completion of site inspections, the contractor will submit to the County a written summary report identifying site discrepancies or issues, updated incorrect or missing site information, and provide resolution. Cost associated with any newly identified requirement will also be provided in this summary report.

### **3 RFP INSTRUCTIONS**

The County will accept sealed proposals identified in the bid schedule where they will be publicly opened.

Proposals may be hand-delivered or mailed to the County at the address identified in the bid schedule but must be in a sealed envelope clearly marked "OXFORD COUNTY REGIONAL COMMUNICATIONS UPGRADE." Late, unsigned proposals or proposals submitted electronically shall not be accepted. Bids shall remain open to acceptance for 120-days from their opening.

Please submit one [1] original and three [3] copies of the proposal on the due date.

Proposal shall also be submitted in a Flash Drive on the date identified in the schedule table. Note that the file must mirror the paper versions exactly and shall be a single PDF file.

#### **3.1 RFP Information & Work Conditions**

This RFP establishes the requirements for this Project, and it is believed that all information necessary to complete a response is included in this RFP.

All Vendors are expected to carefully examine the RFP documents. Any ambiguities or inconsistencies should be brought to the attention of Oxford County via email, as appropriate. It is the responsibility of the Vendor to clarify any information, which is contained in this RFP and not fully understood.

The Vendor, by and through the submission of a response, agrees to be held responsible for:

- having become familiar with the existing radio system and microwave routing
- having become familiar with the existing site facilities
- having completely understood the nature and scope of the work, and
- any local conditions that may affect the materials, parts, labor and work to be done.

Nothing in this RFP shall relieve the Vendor from supplying a totally turn-key system package, including, but not limited to all materials, hardware, cabling and labor FOB Destination to be furnished under this contract. The Vendor shall, in all cases, be solely responsible for the delivered system, and for furnishing complete system documentation for each and every part of the provided system.

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### **3.2 Termination for Unavailability of Funds**

In the event that Oxford County grants or funds for the contract become unavailable, Oxford County shall have the right to terminate the contract immediately in writing to the contractor without penalty. Availability of funds will be determined at the sole discretion of Oxford County. The contractor shall be entitled to receive and shall be limited to, just and equitable compensation for any satisfactory authorized work performed as of the termination date.

### **3.3 Rights of Oxford County**

Oxford County reserves the right, for any reason, to accept or reject in part or in its entirety any or all proposals; to postpone or cancel this RFP; to waive technical errors or any informalities in bids, or to negotiate with qualified Vendors if it is determined to be in the best interest of Oxford County to do so.

It is the discretion of Oxford County to accept the lowest and most compliant response, which may or may not necessarily be the lowest cost response.

Oxford County is not liable for any costs incurred in the preparation of proposals or for any work performed. Late proposals will not be considered for evaluation. All submitted materials become the property of Oxford County. All proposals received will be evaluated by the County's Project Team, who reserve the right to award or not to award a contract.

Oxford County reserves the right to substantiate any or all bidder qualifications, assertions, capability to perform, availability, including past performance record.

### **3.4 Confidentiality**

Oxford County is subject to the Freedom of Access law. Under this law, it must make public information that it receives in the solicitation of proposals.

The Freedom of Access law does, however, have an exception applicable to "proprietary information." In the event that the proposal you submit contains any proprietary information, Oxford County agrees that it will not disclose such information to any third party, and that such disclosure shall occur only if Oxford County is compelled to disclose such information by a final judgment, after giving the proposer the opportunity to litigate the issue.

As an option to the Proposer, the Proposer can submit a second proposal document with proprietary information/confidential information redacted or removed. Oxford County will use this copy to submit to entities requesting copies of proposals under the Freedom of Access law. This copy shall clearly indicate that sensitive and confidential information has been removed from the document.

### **3.5 Insurance Requirements**

- a.) Contractor shall maintain, at his own expense, insurance in the amount set below. Certificates of insurance, evidencing this coverage is required at bid. Certificates naming the County as additional insured' shall be furnished to the County Finance Director within ten days of notification of the receipt of this award.
- b.) Workers Compensation in accordance with the laws of the State of Maine.
- c.) Liability Insurance: Comprehensive General Liability Insurance including contractual insurance in the amount of \$1,000,000 each occurrence and Automobile liability insurance in the amount of \$ 1,000,000 each occurrence and property damage insurance of \$1,000,000.00 each occurrence.

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### **3.6 Contractor Project Manager**

The proposer shall identify an individual who will serve as the contractor's Project Manager [PM] if awarded a contract. This individual shall serve as the single point of contact between the successful contractor, its sub-contractors, and Oxford County PM.

The identified PM shall be an employee of the proposer at the time of the response submission. The PM shall have a proven record of experience in projects of similar scope. Oxford County reserves the right to accept or reject the identified PM. If, during the term of the contract, it is necessary to replace the PM, Oxford County reserves the right to accept or reject the newly identified PM.

The response shall include the following information on the identified PM:

- Name
- Employment history with proposer
- Home base of operations
- Relevant experience for each listed project, provide name, title and telephone number of a reference
- Contact possessing a technical background
- Education & training

### **3.7 Standards & Codes**

In all instances, offered and delivered goods shall be new, unused, in current production and meeting or exceeding all applicable standards and codes of:

All facilities constructions, labor, equipment and cabling installations shall comply with the following applicable codes:

#### **General**

ADA - American with Disabilities Act  
OSHA - Occupational Safety and Health Administration  
EIA - Electronic Industry Association  
FCC - Federal Communications Commission  
IEEE - Institute of Electronic and Electrical Engineers

#### **Electrical**

Installation of all electrical equipment, power distribution, lighting and outlet assemblies, alarm and grounding systems, including associated wire ways, and wiring, shall comply with the most recent edition of:

NEC - National Electrical Code  
NFPA - National Fire Protection Association  
UL - Certified by Underwriters Laboratories  
NEMA - National Electrical Manufacturers Association

#### **Radio**

TSB-88 - Performance in Noise and Interference-Limited Situations - Recommended Methods for Technology-Independent Modeling, Simulation, and Verification  
NFPA 1221 – Standards for the Installation/Maintenance and Use of Emergency Services Communications Systems  
EIA/TIA 603 - Land Mobile FM Communications Equipment Measurement and Performance Standards  
EIA/TIA 329B - Minimum Standards for Communications Antennas

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**Towers/Shelters**

R-56 - Standards and Guidelines for Communications Sites

TIA/EIA 222-H – Structural Standards for Steel Antenna Towers and Antenna Supporting

**Microwave Radio**

RS-252-A – Standard Microwave Transmissions Systems

TSB-10-F – Interference Criteria for Microwave systems

EIA-195 (latest revision) – Electrical and Mechanical Characteristics for Terrestrial Microwave Relay System Antennas and Passive Reflectors

EIA- 210 – Terminating and Signaling Equipment for Microwave Communications Systems

### **3.8 Exceptions and Clarifications**

Vendors taking exception to or clarifying the requirements, or offering substitutions, shall state so in their response. All exceptions and clarifications shall be submitted in a separate section of the response. Oxford County is the final judge that determines what is a clarification or an exception.

The absence of exceptions, clarifications and/or substitutions shall indicate that the Vendor has accepted all the requirements of the RFP in the manner described and shall hold the Vendor responsible to perform in strict accordance with the requirements of the RFP. Oxford County reserves the right to accept or reject any or all of the exceptions, clarifications and/or substitutions, in whole or in part, if it is deemed to be in the best interest of Oxford County.

### **3.9 Delivery, Storage and Risk of Loss**

The contractor shall be responsible for coordinating, unloading, inspecting, accepting and storing all material deliveries. Oxford County personnel shall be excluded from performing any of these activities.

All claims necessary as a result of damage or loss during shipment shall be the responsibility of the contractor. The contractor shall assume all risk of loss or damage to the equipment while it is at the vendor's storage or service facilities; while it is shipped to the installation locations; and, until the completed system is accepted by Oxford County.

All stored materials shall remain the responsibility of the successful contractor until accepted by Oxford County. The PM or contractor's designate shall be the only individuals authorized to accept materials delivered to Oxford County. The contractor shall present to Oxford County's PM a receipt of items being delivered. Oxford County's PM signature on the receipt shall constitute acceptance of the materials.

Proposers shall list in their response the facilities where they plan to deliver the major system items prior to installation.

The contractor assumes full responsibility for the acts and omissions of all its employees and all sub-contractors, their agents and employees, and all other persons performing any of the work under the contract.

### **3.10 Detailed Equipment List by Site**

Proposals must contain detailed equipment list [model numbers, description, etc.] as required by the RFP. The detailed equipment list must be cross-referenced to the vendor's itemized pricing sheets required in the submittal.

Where applicable, detailed equipment lists must be provided by location and include details of requirements needed for the installation and operation of their equipment as deemed necessary.

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The equipment list will be an appendix to the Contract Agreement.

Furthermore, upon completion of installation and a condition for acceptance, the vendor shall provide Oxford County an updated “as-built” equipment list by site showing location, quantities, model number and description, and serial numbers.

### **3.11 Software Licensing**

Vendors responding to this RFP shall provide detailed information on all software licensing, use or access to computer programs that will be part of the vendor's offering. All costs, terms and conditions of use and access must be defined and clearly indicated as part of the vendor's offering.

Vendors proposing software to support the network, either by leasing, renting, or selling, shall clearly define the ownership or associated costs. Vendors are to provide definitions of software upgrades, enhancements and the costs, terms, leasing arrangements, use, etc. must be clearly defined as part of the vendor's proposal.

## **4 BASIS OF EVALUATION AND AWARD**

This section will outline the evaluation criteria to be used by the Oxford Evaluation Committee in the selection of the submitted proposals. After review of the written proposals, the Evaluation Committee may request some or all Proposers to provide oral presentations. After any oral presentations, the technical proposals will be ranked based on the criteria set forth in this RFP. The cost proposals will then be opened and evaluated by Oxford County. The contract will ultimately be awarded to that Proposer whose proposal, conforming to the RFP, that best meets the needs of Oxford County, as reflected by the requirements of this RFP, technical and cost factors considered.

### **4.1 Criteria for Proposal Acceptance**

The contract resulting from the RFP process will be awarded only to responsible proposers. In order to qualify as responsible, a Proposer must be able to demonstrate that they can meet the following criteria in providing the services contemplated:

- Have the adequate technical resources for performance or have the ability to obtain such resources as required.
- Have the necessary experience, organization and technical skill to provide required services proposed to be supplied in the proposal.
- Have a satisfactory record of performance in past contracts with Oxford County or provide at least three references if the Proposer has not previously performed services for Oxford County.

### **4.2 Evaluation Process**

Technical proposals will be reviewed first. The Evaluation Committee will independently evaluate and score the technical proposals received by using the evaluation factors defined below. The factors may not all be given the same weight in the evaluation process. The Technical Evaluation Committee will then use each committee member's evaluation to rank the technical proposals that meet the criteria of this RFP and are deemed capable of fulfilling this RFP.

The scores and ranks will be submitted to the Oxford County Project Manager.

Oxford County will then open the Cost Proposals and transmit them to the Evaluation Committee for review and comment. Oxford County shall then use each committee member's information to numerically rank the Cost

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Proposals. Oxford County will then combine the Technical and Cost Scores and will determine the total score for each Proposer.

Oxford County may enter contract negotiations with the Proposer with the highest total score. If Oxford County and a Proposer are unable to enter into a contract for any reason, Oxford County may begin contract negotiations with the next lowest ranked Proposer.

### **4.3 Technical Scoring Criteria**

The technical proposal will be given more weight than the cost proposal as follows:

<b>70%</b>	<b>Technical</b>	
	25%	Technical satisfaction of meeting Oxford County's requirements
	25%	Overall responsiveness to the RFP
	20%	Experience/Qualifications/Past performance on similar projects
<b>30%</b>	<b>Cost</b>	
		Total cost for material and services

Evaluation criteria will be as follows:

**System Architecture and Features:** Extent to which Proposer's proposal achieves the objective of a state of the art Analog/Project-25 voice radio system.

**Radio Coverage:** The coverage performance goal is to provide 95% DAQ-3.0 in-street portable coverage. Proposers shall discuss in their coverage narrative and maps areas where this is not achievable. NOTE: The proposed system shall provide, at minimum, 100% of coverage that the current system provides.

**Migration Capability:** Extent to which the Proposer's system design can accommodate alternate manufacturer subscriber radios without losing existing functionality.

**System Reliability:** Extent to which the Proposer's proposal achieves objectives of enhanced system availability/reliability to minimize system failures.

**Redundancy:** Extent to which the Proposer's proposal has no single points of failure, especially the proposed microwave system design and routing

**System Expansion Capability:** Extent to which Proposer's proposal facilitates shared use and provides additional features, and functions in the future without the replacement of infrastructure.

**System Integration:** Extent to which and the ease with which Proposer's proposed System can be integrated with existing equipment and sub-systems.

**System Interoperability:** Extent to which and the ease with which internal (e.g., Oxford County departments) and external users [e.g., state, local] can interoperate.

**Overall Compliance:** Extent to which proposal is compliant with the RFP and capable of completing the proposed SOW.

**Experience and Qualifications:** Evaluation of the experience and qualifications of the Successful Proposer and proposed project team, including demonstrated successful performance on systems similar in size and scope specified by this RFP.

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**Local Support Performance:** Evaluates the availability and qualifications of local service and maintenance facilities, and availability, location, and quality of training for maintenance and user group personnel.

Local service shop shall be within 100-miles of South Paris, ME.

**Implementation Plan:** Evaluates the proposal's feasibility and engineering competence of phase plan and schedules.

**Optional:** Proposer oral presentation, graded as extra points, for technical clarity, understanding of Oxford County's needs and concerns, willingness to work with Oxford County, and overall SOW implementation.

#### **4.4 Best and Final Offers**

After Oxford County computes the Proposer's final scores, discussions may be conducted with potential Proposer whose proposals have been determined by the Evaluation Committee to be eligible for award. Discussions may be held for purposes of clarification to assure full understanding of and responsiveness to the RFP requirements. Proposer shall be accorded fair and equal treatment with respect to any opportunity for discussion and revisions of proposals, and revisions may be permitted after submissions and before award for the purpose of obtaining best and final offers. In conducting discussions, there shall be no disclosure of any information derived from proposals submitted by competing Proposers.

Oxford County shall notify each qualified Proposer of the scope of the requested best and final offer. Oxford County shall establish a date and time for the submission of best and final offers and discussions. If more than one submission of best and final offers is requested, a Proposer's immediate previous offer shall be construed as its best and final offer unless the Proposer submits a timely notice of withdrawal or another best and final offer. Oxford County may consult with and seek the recommendation of the Evaluation Committees during the best and final offer process.

#### **4.5 Award and Contract**

Oxford County will award a contract to the most qualified Proposer based upon evaluation criteria used and other considerations deemed appropriate by Oxford County. Oxford County reserves the right, in its discretion to accept the lowest and most compliant response, which may or may not necessarily be the lowest cost response. The right is reserved to reject any or all responses, accept all or any portion of a response, and to waive technical errors, discrepancies or information if, to do so, is deemed to best serve the interest of Oxford County.

Any personnel or subcontractors assigned to this project may not be substituted with other personnel or subcontractors unless approved by Oxford County in writing. Any proposal to substitute shall be in writing and include the substitute's qualifications. Oxford County reserves the right to reject any substitute.

The contract shall consist of the following:

1. General Terms & Conditions
2. Actual Contract Document with Exhibits
3. Exhibit-1 Request for Proposal
4. Exhibit-2 Vendor Response
5. Exhibit-3 Issued Addenda, Correspondence, etc.
6. Exhibit-4 Equipment list

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No oral statement of any person shall modify, otherwise change or affect the terms, conditions or requirements stated in the resulting contract. All changes will be made in writing and incorporated in the contract by amendment executed by the appropriate parties.

If Contractor and Oxford County are unable to arrive promptly at a completed agreement within an acceptable period of time as determined by Oxford County in its sole discretion after the initial offer to Contractor, Oxford County reserves the right to rescind the offer at any time.

**Purchase Order**

Upon the approval of Oxford County, a purchase order will be generated by Oxford County to the successful vendor. The purchase order number must appear on all itemized invoices and packing slips. Oxford County will not be held responsible for any orders placed, delivered, or installed without a valid, current purchase order number.

**Change Orders**

No oral statement of any person shall modify, otherwise change or affect the terms, conditions or requirements stated in the resulting contract. All changes will be made in writing and incorporated in the contract by amendment executed by the appropriate parties.

**4.6 Contract Design Review [CDR] Process**

During contract negotiations, and before a contract is signed between Oxford County and the selected Proposer, a CDR session will be held by Oxford County. The CDR is to ensure in more detail that equipment and services recommended by the contractor meet the requirements of the specification; to clear any misinterpretation of equipment and services to be provided; and to ensure that all items have been considered thoroughly.

Furthermore, during negotiations, Oxford County may suggest that tasks be added, deleted, expanded or reduced, thereby modifying the total maximum. Oxford County may desire to contract for some, but not all tasks at this time, depending on time constraints and/or budgetary limitations.

In addition, Oxford County may also authorize in writing additional work to be performed, which was not specifically called for in the RFP. Once the agreed upon work is discussed and accepted, the successful contractor submit a cost proposal to Oxford County to be included in the final contract.

**4.7 Detailed Design Review [DDR] Process**

Once the contract has been executed, Oxford County requires that the initial project task to be undertaken by the Contractor is detailed site inspection and reviews to obtain the necessary data and information for a DDR process, where Oxford County and Contractor perform a comprehensive final design review prior to equipment ordering, to ensure that the correct material and equipment are supplied.

Oxford County shall actively participate in the DDR of the entire system with the Vendor. The Vendor shall note, however, that Oxford County's participation in the DDR shall in no way relieve the Vendor from full responsibility for system performance.

Completion of the DDR process shall take place in accordance with the overall project schedule requirements. DDR documents shall be supplied to Oxford County in both electronic (original file format) and paper format. The Vendor shall supply three (3) copies of the DDR document in both electronic (Flash Drive) format and paper format. The DDR shall include, at a minimum, the following items to finalize all system elements and the system design, as applicable:

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- Project Management Plan
- Radio coverage maps
- Microwave path certifications and path surveys
- Detailed Statement of Work [SOW]
- Detailed implementation plan
- Project schedule
- Frequency plan
- Structural Analysis
- Network and Subsystem Block Drawings
- Line Item Equipment Lists
- Infrastructure and Network Element Programming Parameters
- Microwave Configuration and Site Connectivity Requirements
- Rack Drawings
- Floor Plans Showing New Equipment at Each Site
- Power and HVAC Requirements
- Antenna Configurations by Site
- IP Network Addressing Scheme
- Interference Analysis (IM & TNRD)
- Plan for a Phased Cutover
- Training plans for staff
- Acceptance Test plans
- Recommended critical spares
- Final acceptance by the County

#### **4.8 RFP PROPOSAL FORMAT AND CONTENTS**

Proposals shall contain the following information in the format and order set forth below; and in two [2] volume

Volume-1	RFP contents as outlined below
Volume-2	Equipment information, specification sheets and brochures

##### **VOLUME-1**

###### **COVER LETTER**

Respondents must include a cover letter transmitting the proposal to Oxford County, signed by an official authorized to contract for the firm. The letter must contain the name, title, address, telephone number and email of the firm's contact person for the Proposal. The letter shall contain a statement that the respondent understands and agrees with the scope of work and accepts all other requirements and terms and conditions of the RFP.

Immediately following the cover letter shall include any forms required by Oxford County.

Note that the original signature of the above listed documents is required in the response copy marked as 'ORIGINAL'.

###### **TABLE OF CONTENTS**

SECTION 1 – SYSTEM OVERVIEW, REFERENCES, AND WARRANTY

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- **System Overview** - Submit an executive summary of your proposed system and/or equipment provided, covering the main features and benefits that distinguish it, in non-technical terms.  
Do not exceed two [2] pages.
- **Prime Proposer** - Introduction of the prime Proposers company including history, qualifications, experience, main line of business, how business is organized (corporation, partnership, public, private, etc.).  
Do not exceed two [2] pages.
- **Sub-contractors** - Introduction of the Sub-contractors including history, qualifications, experience, main line of business, how business is organized (corporation, partnership, public, private, etc.). Identify all Sub-contractors by listing name, address, phone and contact person. State whether the prime Proposer has worked with the Sub-contractors in the past. If so, provide brief descriptions on the projects - no more than 3; the system elements; the Scope of each Sub-contractors responsibility; the approximate start date and duration of the project.  
No greater than one [1] page.
- **List of References** - For both Prime and Sub-contractors. Provide a list of three (3) references with radio systems having similar requirements of this solicitation. The systems identified shall have been accepted no less than six (6) months and no greater than two (2) years from the due date of this response. Include a brief description of the system, approximate date of acceptance, contact name and telephone number.
- **Warranty** - This sub-section shall also contain all the information requested in the 'WARRANTY' & 'PREVENTIVE MAINTENANCE' sections of the procurement specification.

**SECTION 2 – COMPLIANCE SECTION**

- If there are any exceptions, clarification, or other notes of concern, please list in detail all exceptions and related discussion to the specification. In addition, discussion regarding any clarification points shall also be provided in this section. Use as many pages as necessary to describe each exception or clarification. Please provide clear references to the Specification document where needed.
- Note that Oxford County will have final interpretation of what is a clarification or an exception. In no instance shall the Proposer deemed an exception as a clarification.
- Please identify the anticipated responsibilities of Oxford County in this section.
- Any item of clarification or exception that is not included in this section will be deemed to have been accepted and agreed to by the Proposer.
- For clarifications or substitutions, provide an explanation of the difference between what the specification requested and what the Proposer will supply. Proposer shall explain why they believe their method of accomplishing the requested functionality will be equal or better.
- It is the Proposer's choice to submit a point-by-point response to the specifications.

**SECTION 3 – STATEMENT OF WORK AND SCHEDULE**

- Provide a Project Schedule
- Provide a proposed project organizational chart.
- Describe the work to be performed in detail by the prime Proposer by identifying all major project tasks and milestones.

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- Describe the work to be performed by each Sub-contractor by identifying all major project tasks and milestones. Group all project tasks by their associated sub-contractors.

**SECTION 4 - TECHNICAL SYSTEM INFORMATION**

- Include block system diagrams, network configuration, equipment interfaces, plan views and diagrams that clearly depict the proposed system, its equipment, and components. These diagrams shall be provided on a per site basis.
- Description of the system or equipment being offered.
- Description of specification items requesting a detailed response
- Other diagrams as required.
- Include a detailed itemized list and quantities, in matrix form, of all equipment supplied and their intended installed location. Matrix should have equipment items on the vertical scale [rows], and site locations on the horizontal scale [columns]. Do not include costs.

**SECTION 5 – COVERAGE RESPONSE**

This section shall contain all detailed discussion regarding signal propagation and shall include coverage maps required, and other items as specified in this document.

**SECTION 6 – MICROWAVE SYSTEM RESPONSE**

This section shall contain all detailed discussion regarding the microwave system and shall include routing maps, point to point path profiles, antenna/path calculation sheets, and other items as specified in this document

**SECTION 7 - PRICING**

- Vendors shall submit their cost proposals based upon their best offer price at the time of the initial RFP submission, including any special discounts. The equipment proposed by the Vendors shall be a complete turnkey system, with firm pricing for all equipment and services described by the specifications. Oxford County shall not pay for any additions, omissions, or errors in the cost proposals.
- Final pricing submitted must be valid for twelve [12] months from the date of system final acceptance. A fixed price for all individual equipment and installation provided under this specification shall be held for an additional twelve [12] months to allow for procurement and installation of additional equipment as required.
- Cost for major services such as installation, licensing, systems engineering, program management, coverage testing, training, etc., shall be clearly identified as separate line items. Costs for these services shall not be lumped.
- Prices are not subject to increase during the term of the contract. Oxford County is not liable for escalation resulting from project delays caused by the Vendor. All pricing shall be FOB destination.
- Cost shall be submitted on the Summary Pricing Sheet found in the Attachment.
- Detailed cost sheets shall be in matrix form to the greatest extent possible. Intended locations of items shall appear as columns on the matrix.
- Identify all cost sheet items as line items, at a minimum and in the following order: item number, manufacturer, model number, descriptor, quantity and intended location, total quantity, unit cost and extended cost.
- Any costs for optional items or offerings shall be presented on a separate cost sheet.

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**VOLUME-2**

**SECTION 1 – Specification Sheets**

Include equipment catalog, cut sheets, brochures or specification sheets in this section.

**SECTION 2 – Appendices**

Appendices are optional. This section is for Proposers who wish to submit additional material that they believe will clarify or enhance their Proposal. Cross-references in the main RFP to the appendices are required.

Respondents may provide alternative proposals as long as they are in addition to the RFP requirements and clearly indicate that it is an alternative.

A detailed cost spreadsheet itemizing pricing of all equipment, sub-assemblies, and labor services per site shall be provided to allow deletion or addition of items following budgetary constraints or changes in plans concerning the distribution of equipment. All material and installation costs shall be itemized.

Upon execution of the contract, the Vendor shall submit a Schedule of Values identifying labor and material costs.

Oxford County is exempt from payment of excise, transportation and sales taxes imposed by the Federal Government and the State of Maine. Such taxes must not be included in proposal prices. Exemption certificates will be provided upon request.

Respondents should know that Oxford County will not make any advance payments under this Agreement. Oxford County will only accept Invoices upon completion of the tasks receipt of deliverables.

**5 COMMUNICATIONS DISPATCH CONSOLE**

Oxford County currently operates a four [4] position Zetron MAX dispatch console that was implemented in 2018.

The Dispatch Console may require modification to accommodate the new Oxford County communications system, which may include the number of sites, the number of external radio system interfaces, and the modification of operator screens.

The proposer shall identify hardware or software upgrades needed, and the cost to provision, install, and test in a manner that provides no loss of system functionality during the console upgrade, and that the communications system continues uninterrupted operations during system cutover.

**6 RADIO INFRASTRUCTURE REQUIREMENTS**

This section addresses the technical requirements of the radio portion of the project. The Proposer shall provide the most cost-effective solution to Oxford County for the upgrade of the VHF and microwave network.

Proposed equipment specifications should comply with the stated requirements. However, if there is any disparity, the Proposer shall explain how the equipment satisfies the intent of the particular requirement and how the end objective will be met. In all cases, Oxford County reserves the right to enforce the stated requirements. In addition, the Proposer may be required to demonstrate compliance with any requirement.

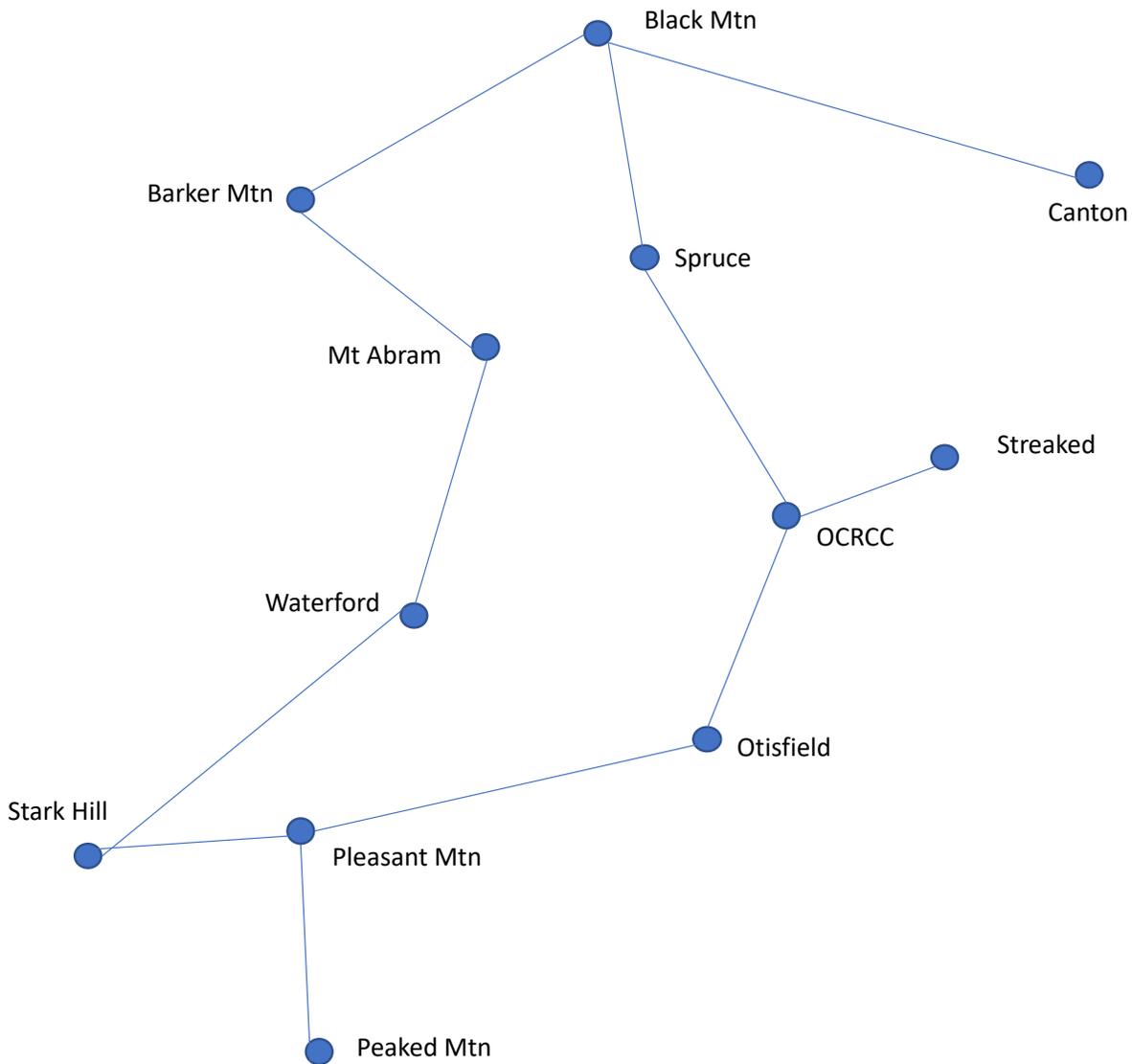
Proposers are required to provide in their proposal system diagrams based on equipment provided as well as their interconnections.

## 6.1 Analog / Digital Modulation

The County plans to initially operate in the analog mode as there isn't sufficient subscriber base for migrating to digital operations. Converting to digital will be a multi-year transition once the proposed system is purchased. The County is interested in identifying Proposer digital radio modulation offerings; specifically, identifying the bidder's Project-25 [P-25] and DMR radio capabilities. The bidder is required to provide a summarized narrative on their equipment capabilities, to include coverage performance and maps, and how their digital system design can accommodate either modulation types or both. The submittal shall also include pricing for P-25 and DMR.

## 6.2 Proposed System Conceptual Design

The proposed system upgrade configuration and site data is depicted in this section.



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OXFORD COUNTY TRANSMITTER SITE DATA										
SITE	ADDRESS	STRUCTURE	Tower Height [ft]	LAT	LON	FCC ASR No.	FAA Study No.	Generator	Contractor Structural Required	
1	Abram, Mt	Greenwood	Self support lattice	180	44 22 10.3	70 42 53			yes	yes
2	Barker Mtn	Sunday River, Skiway Rd, Bethel [Newry]	Self support lattice	120	44 27 26.6	70 51 59.1			yes	yes
3	Black Mtn	Horseshoe Valley Rd, Roxbury	4-leg self support lattice tower	175	44 35 02.7	70 38 14.8		1991ANE00230OE	no	no
4	Canton/Peru	2.8 mi NW Canton, ME	Self support lattice	230	44 28 01.0	70 21 31.0	1022299		yes	yes
5	OCRCC	26 Western Ave, South Paris	Self support lattice	140					yes	yes
6	Otisfield	264 Bell Hill Rd	Self support lattice	110	44 05 24.2	70 33 45.0				no
7	Peaked Mtn	Hiram	4-leg self support lattice tower	280	43 50 17.7	70 49 08.5	1023991			yes
8	Pleasant Mtn	Denmark	Self support lattice	199	44 01 07.0	70 49 27.0	1032422		yes	no
9	Rumford Cell	87 S Rumford Rd	Self support lattice	150	44 31 58.4	70 31 55.0	1253245			no
10	Spruce Mtn	Cushman Rd, Woodstock	Self support lattice	180	44 24 27.0	70 35 05.5				yes
11	Starks Hill	1/2 mi S Fryeburg	Self support lattice	100	44 00 05.8	70 59 06.1			no	no
12	Streaked Mtn	Whitman School Rd, Buckfield	ex Fire Tower	60	44 15 00.3	70 25 23.3			yes	yes
13	Waterford	Rice Rd, Waterford	Self support lattice	180	44 12 38.7	70 43 47.1		2008ANE00744OE	yes	no

### 6.3 System Upgrade Overview

A key requirement of the proposed system infrastructure radio equipment is the infrastructure shall be capable of operating Analog or Digital, particularly with respect to the capability of supporting user equipment from a variety of vendors/manufacturers.

It is the intent that the system be deployed for analog for Law Enforcement for the Fire & EMS Services, with digital transition in the future, as the current subscriber base is principally analog.

The upgraded system will provide improved radio coverage throughout the region. It is the desire of Oxford County to incorporate, at a minimum, into the new radio system the functionality of the existing systems. It is not Oxford County's intent, by accepting a new technology, to find itself in a position where any existing functionality or coverage is lost.

Furthermore, Oxford County does not find it desirable to have to maintain multiple systems and infrastructures. The Vendor will be expected to provide cost-effective solutions to this problem without sacrificing any existing system and console functionality. The new system will be installed while the current systems are still in place and operating. This provides the ability for both the current and the new systems to work together during the implementation phase. Alternative solutions can be discussed during CDR.

The existing system infrastructure shall continue to interface and be operational from the dispatch center. A training period will follow the installation period, where the dispatchers and radio users are to become familiar with the new systems and console operations prior to system cut-over.

The system is intended to support Oxford County's radio communications needs for at least the next 15 years. If other alternatives exist, Vendors are encouraged to present them as proposed solutions.

## 6.4 Proposed Transmitter Sites and Structural Analysis

The sites were selected based on tower locations with regards to increasing coverage reliability and to provide coverage in specific areas.

For the sites in the table found earlier in this section, the contractor is responsible to provide structural analysis to determine their feasibility in terms of tower loading based on the proposed equipment being offered.

The County has been working with the site owners to identify owner requirements, based on generic equipment proposed for the site.

## 6.5 Equipment Racks

All radio, microwave, and combining equipment shall be installed in a standard 2-post EIA 19-inch rack.

Racks shall be designed and installed to provide easy access to equipment controls and connection points. Racks shall meet the requirements of EIA-310-D.

All equipment racks shall be securely mounted to the floor. If necessary, racks shall be bolted together or braced from the ceiling to prevent swaying or being dislodged. Racks shall be isolated from floors and ceilings using suitable insulators, insulating plates, washers and sleeves.

Equipment racks shall be placed to allow a minimum of 30 inches access front and back [or 36 inches if egress row] unless all connection and maintenance points are in the front. Under no conditions shall an equipment rack need to be moved for maintenance after installation.

The radio, or the microwave rack, shall be supplied with a heavy duty sliding laptop tray at the appropriate height for ease of use servicing both racks.

## 6.6 RF Simulcast and Voting System

The VHF repeaters, simulcast, and voting equipment shall be public safety grade equipment to support mission critical applications.

To provide the required radio coverage, the communications system shall be configured with the appropriate transmitter sites that shall operate as transmitter IP simulcast. The proposer shall provide appropriate equipment to control transmitter frequency and audio synchronization throughout the system.

## 6.7 IP Simulcast Repeater

Each repeater station shall be of modular construction, and designed and constructed as a compact, highly reliable unit.

All repeaters shall be capable of analog or digital.

The simulcast transmitter shall be capable of interfacing with an external GPS high-stability frequency reference source. When simulcasting, the frequency difference between multiple co-channel transmitters shall not exceed 1-Hz.

All necessary interfaces with repeaters, peripheral computer hardware or the radio interconnect system shall be provided by the Vendor. Interfaces shall include cabling, switches and/or routers, gateways, all of which shall be identified by the Vendor's functional diagrams and description of the system.

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The equipment shall be capable of remote monitoring of its status and shall provide alarms for key operational parameters, and shall provide for remote inquiry, display, disablement and diagnostic functions via LAN connections. Alarms shall be displayed at the communications console.

Each station shall be equipped with a RF sensor to remotely monitor forward and reflected power of each transmitter. This sensor shall be installed in series with the station transmit output.

Service personnel shall have access to the radio for metering, alignment, programming and diagnostics by remote access through a network connection via the proposed network management and alarm systems or microwave network. Proposers shall describe their capability to monitor and control a repeater through an access port via a laptop PC.

## **6.8 Receiver Voting System**

The receiver voting system is to be configured as part of the radio communications systems upgrade. Interconnection requirements shall be made via links identified elsewhere. The VHF simulcast radio channels shall be supplied with a complete and independently functioning receiver voting system. It shall serve as the terminating and comparison point of the multiple audio circuits connecting the receivers used in the system.

### **6.8.1 Voting Receive**

System receivers shall generate the appropriate voting signaling protocol to the associated Voter- Comparator.

### **6.8.2 Voter-Comparator System**

County Law Enforcement and Fire voting equipment shall be located at Oxford County Dispatch Center.

The receiver voting system shall be designed and interconnected so that the highest quality audio signal being received is constantly being selected, and the weak and noisy signals by comparison are automatically rejected. The process shall be continuous and selective and provide for automatic switchover without interruption of speech to the best quality audio signals during a transmission, as changes of condition or location occur.

The voting comparator shall monitor the integrity of the incoming receive audio circuits and disable any circuit upon failure. Circuit failures shall be reported via the network monitoring system to be provided.

## **6.9 TX Combiner, and RX Multicoupler**

The Proposer shall provide a transmitter combiner and receiver multicoupler for each site. The Proposer is also encouraged to provide an antenna design that minimizes tower real estate [for example, single antenna, dual antenna] while not compromising coverage. Loading and real estate on the tower shall also be considered.

### **6.9.1 Combiners**

Combiners shall be compatible with the frequencies in use and provide for filtering and isolation so as not to impact the system operation. The Vendor shall state the manufacturer and model number of the transmitter combiner at each site. This equipment shall be installed in an open rack.

Note that preliminary combiner design has been established based on two [2] frequencies [Tx & Rx] combined on a single antenna. This is the preferred configuration.

A preliminary antenna combiner design has been established utilizing a single antenna with transmit losses less than 3.5 dB. This arrangement is preferred as there is limited antenna space on specific towers. The County will consider alternate design to meet the coverage objective.

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**6.9.2 Multicoupler**

The Vendor shall propose for all main radio sites a receiver multi-coupler. The multi-coupler shall be compatible with the frequencies in use and provide filtering and isolation so as not to impact system operation. The Vendor shall state the manufacturer and model number of the receiver multi-coupler system being proposed at each site. This equipment shall be installed in an open rack.

**6.9.3 Duplexer**

Where applicable, repeater stations shall be furnished with a duplexer to permit simultaneous transmission and reception from a common antenna system. Duplex operation shall cause no worse than a 1-dB degradation in the receiver 12 dB SINAD threshold sensitivity exclusive of duplexer insertion loss.

The transmitter output shall be followed, at a minimum, by a single stage isolator. The isolator load shall be rated for the full output power of the transmitter. The duplexer shall be rack mounted in the EIA 19-inch rack specified for the repeater station meeting the following minimum requirements:

To the extent that the repeater station requires less per channel duplexer isolation for the required duplex performance at the actual operating frequencies, the Proposer may propose an alternative duplexer design. However, any alternative design must be of the same or similar quality of construction and the electrical performance of the system must be justified.

**6.10 Antenna and Feeder System**

**6.10.1 Antennas**

The antenna system shall include compatible antenna, circulator, isolator and filter to reduce the potential for intermodulation or receiver desensitization, and to provide the required coverage within the restraints of the FCC ERP authorizations.

All antennas to be provided shall be PIM rated.

The antenna systems shall be furnished and installed with all necessary lightning and power surge protection devices to be compatible with the R-56 Standards and Guidelines for Communications Sites as appropriate for use with existing towers and equipment shelters.

Proposers shall state in their response to this RFP, the manufacturer, model number, mounting height/azimuth, electrical and mechanical characteristics of the antenna systems being proposed at each site, including sidearm brackets.

It is anticipated that VHF 5.25 [22-ft] whip antennas will be utilized; however, due to tower space limitations on some towers, the maximum whip length may be 10-feet.

The Proposer is encouraged to utilize, where needed, directional and/or downtilt antennas to maximize coverage performance or minimize interference in their coverage design.

**6.10.2 Antenna Feeder System**

The Vendor shall furnish and install coaxial antenna transmission lines from the LDF series of transmission cable. Vendors shall state the size and type of transmission line being proposed at each site. RF sensors to indicate VSWR and power level shall be furnished and installed for each transmission line provided and monitored by the alarm system.

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All connectors used shall be "DIN" type, as appropriate, and must be fully compatible with directly associated equipment or jumpers in the system. Connectors must be of non-ferrous construction. No splices or adapters shall be used under any circumstance. However, it is permissible to utilize different connectors on opposite ends of a cable to avoid the use of adapters. When transforming from one diameter cable to another, it is acceptable to use flange reducers, so long as the cable VSWR is not affected.

## 6.11 Transmitter Simulcast

The following specification element describes the simulcast sub-system.

### 6.11.1 Precision Frequency Source

A precision frequency source shall be provided at each simulcast site to stabilize frequency synthesizers in the transmitter stations and to provide critical synchronization of simulcast transmission equipment.

The primary precision frequency source shall be a GPS frequency locked stable source. Automated timing system shall allow for initial simulcast launch settings for each transmitter site. The system shall automatically readjust timing to maintain proper simulcast timing in the event a transport path reroutes and changes the transport delay.

The Proposer shall describe in detail the operation of the proposed frequency source and its redundancy capabilities and justify the technical suitability of the source to meet simulcast system requirements during normal, abnormal, or loss of GPS reference signal.

### 6.11.2 Amplitude and Phase Delay Equalization Equipment

Analog audio amplitudes of each transmitter shall be within 0.25 dB of each other. Digital audio shall be less than 0.1 kHz deviation.

Amplitude and phase delay equalization equipment shall be provided to minimize simulcast overlap distortion. Equipment shall be provided for each transmit channel, and shall have sufficient adjustment range to provide "over" and "under" adjustment of at least ten percent of the range.

The equipment may be an integral part of IP circuit equipment, or separate stand-alone equipment.

Amplitude and phase delay equalization for all remote RF sites shall be capable of adjustment from one central location (prime site) without manual intervention at the remote sites, or capable of automatic self-adjustment if feasible.

## 6.12 AC and DC Power

### AC Power

The contractor is responsible to provide connection to the existing site power and emergency generators, where applicable.

The County's goal to reduce possible system damage and failure due lightning, power surge strikes, or induced currents. The Contractor shall adhere to current industry practices in providing protection to sensitive electronic equipment.

The Contractor shall assess the current AC surge and lightning protection at the site. If inadequate, the Contractor will provide recommendations for installing AC surge suppression devices used for telecommunications equipment.

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The Proposer shall submit in their proposal their calculations in determining both AC and DC loads, battery loads [electrical and floor loads], including equipment duty cycles used and BTU calculations.

AC electrical panels at the transmitter site should have sufficient capacity to add additional circuit breakers for the new equipment. However, it is the Contractor's responsibility to confirm capacity and requirements. Where applicable, each electronic equipment shall have a dedicated circuit and breaker [R56]. This may be accomplished by using/installing new breakers in the panel, or providing a rack mounted power/breaker distribution panel with surge protection, fed by two [2] separate circuits.

**Generator**

For each site, the contractor shall calculate the proposed system electrical loads [AC & DC] and determine if the existing generator has sufficient capacity to power the new loads.

**DC Power**

All remote RF site equipment will operate at -48v DC for primary power.

Each electronic equipment shall have a dedicated circuit power/breaker distribution panel with surge protection.

The system shall include inverters, batteries, battery mounting or racking facilities, float-type battery chargers, low voltage disconnect, and DC load center with:

- Rectifier Modules (N+1)
- Monitoring and Control Unit
- Power Distribution Unit
- Battery Modules
- Equipment Racks

The DC power system shall be sized for the proposed equipment with a 10% reserve capacity for future equipment. Modular stationary batteries shall be the sealed maintenance-free type with sufficient ampere-hour capacity to provide a minimum twelve [12] hour operating period for the Vendor-furnished equipment following the loss of primary station power. This shall be based on a 25% transmit duty cycle for the fire and police systems operating simultaneously.

The ampere-hour rating of the batteries shall be based on an eight-hour discharge rate. Battery life expectancy shall be at least 10 years in normal float-type service. No venting facilities or special battery rooms shall be required for normal operating conditions. Secure mounting facilities shall be incorporated in the design of the battery bank including protection from ruptured battery cells. Battery chargers shall provide sufficient current output to supply station load requirements and simultaneous charging of a discharged battery bank to full capacity in 48 hours.

Battery chargers shall be capable of battery eliminator operation. The chargers' rectifier modules shall be provided on a redundant N+1 basis. The charger shall operate in ambient temperatures of 0 C to +50 C without degradation in performance. The battery chargers shall be rack-mounted in an EIA 19-inch rack. The battery chargers shall be provided with an AC circuit breaker, DC circuit breaker, minimum two-percent accuracy DC voltmeter and DC amp meter, current limiting and high voltage shutdown circuitry, continuous float and equalizing voltage adjustment, and 24-hour equalizing timer. These features may be integral to the chargers or provided in separate rack mount assemblies.

The charger shall have the following minimum alarm points:

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- Battery charger low voltage
- Battery charger high voltage
- Battery charger no charge

A rack-mounted DC load center with breakers shall be provided with the battery power system to provide a protected DC distribution to all -48 volt DC-powered equipment. Additionally, the Vendor shall furnish and install a minimum of two (2) spare DC circuit breakers of the same type supplied on the panel for future use. To protect the battery supply, an automatic low-voltage disconnect shall be provided to remove the load from the battery bank at the point when the battery voltage reaches a preset dropout voltage level. All DC power equipment shall be included in one rack.

### **6.13 Site Camera Surveillance System**

OPTION- This feature shall be priced as an option on the pricing sheet.

Oxford County requires the provision and installation of a transmitter site surveillance system. It is intended that this system be a stand-alone that includes IP video cameras, video encoder/decoder, monitors, intrusion detection, as well as digital video recording.

The Proposer shall have a clear and concise understanding of Oxford County video monitoring requirements that includes remote site connectivity, recording and storage.

The site surveillance system shall accommodate control of the camera network and recording.

Oxford County's intent for camera devices is not to have streaming video from each camera, but to have the capability to detect motion in preset viewing zones. When motion is detected, an alarm is sent to the Supervisor position at Oxford County, with an image or other display indicating motion. Video recording shall commence at this time and Oxford County shall have the option to be able to view live or recorded video of this event.

Storage capability for each camera shall be for seven [7] days.

If a camera lens is zoomed by the control operator, the camera shall revert back to a preset condition automatically after a programmed length of time.

Video transport to Oxford County will be via IP/Ethernet utilizing the proposed microwave radio system provided under this specification. Camera data rates shall not exceed 650 kbps at 30-fps.

The system shall be capable of minimizing false positive alarms [detection of birds, leaves, wind debris, etc.].

Cameras shall be installed at each location at approximately the 50-ft level of the tower. Outdoor equipment shall consist of a weatherproof, domed pan/tilt/zoom [PTZ]. The dome must have a rugged and protected bubble with appropriate mounting hardware. Positioning of cameras on the tower shall consider potential ground obstructions, and capture critical areas of the communications compound perimeter. Sunlight or night glare shall be minimized.

PTZ shall be 360° pan and -5, -90 tilt, and capable of preset positions.

As an option, a second camera shall be installed inside the shelter.

Tower mounting equipment shall include hardware to install the camera on a tower leg. Each camera shall also have a hood or ice shield to protect it from falling ice.

The system shall also have a tower mounted instant-on flood lamp placed to maximize camera-viewing area.

All outside conductors shall be routed in watertight secured conduit and be appropriately grounded per R56.

It is desired that the camera equipment be powered via the site -48 volt system.

## 6.14 Physical and Functional Interface Requirements

The contractor is responsible for the physical interface [connectors, terminal strips, punchblocks, etc.] for network, audio and control between the new equipment, proposed simulcast repeaters, and the communications console.

The successful contractor shall be responsible for the functional interface between the equipment and the proposed simulcast repeaters. It is the contractor's responsibility to confirm interface compatibility between equipment types.

The functional interface is expected to include, at a minimum, the following:

- Provisioning of Radio and Microwave radio equipment
- Provisioning of IP/Ethernet/LAN equipment
- Adjustments of the input signal level to/from the voting/audio network
- Adjustments of the output signal level from the repeater/base stations
- Precise modulation level adjustment for simulcast
- Adjustments of the input/output levels and to /from the console
- Adjustment of simulcast audio launch delays/timing

## 6.15 Electromagnetic Interference

Shielding and filtering shall be provided to prevent interference from, or to, other radio frequency equipment installed near or in the vicinity of the proposed equipment. The equipment shall meet or exceed spurious frequency emissions, conducted or radiated, as outlined in Part-15 of the FCC Rules and Regulations, Subpart J, Class B Computing Devices. Equipment shall be operationally compatible with the following types of equipment located at the site:

- IP/Ethernet gateway equipment
- Ethernet switches & routers
- VHF Base Transmitters & Receivers
- DC Power System

## 6.16 Frequency Expansion and FCC Licensing

The Law Enforcement and Fire Services frequencies, currently licensed for the existing transmitter sites, will require expansion to the proposed new transmitter sites. The Contractor shall determine the expansion requirements to include successful frequency coordination and licensing. Any change in system parameters, such as the use of directional antennas, lower RPPs, antenna heights, etc. shall be reflected in updated coverage maps to be submitted to the County.

## 7 SYSTEM COVERAGE PERFORMANCE REQUIREMENTS

Coverage is defined as providing the minimum design signal level while delivering the specified audio quality. The coverage design and performance testing shall comply, at a minimum, with the current version of TIA/EIA-TSB-88.

References to coverage reliability in this document refer to area reliability. For example, 95% coverage is defined as the total service area of Oxford County segmented into test tiles, a minimum of 95% of the test tiles will yield a DAQ of at least a 3.0 per TSB-88.

The hand-held portable radio configuration for coverage design is a portable worn at the hip, with a swivel case and the use of a standard lapel speaker/microphone.

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## 7.1 Defined Coverage Area

The defined service area is the bounded area comprised of Oxford County jurisdictional boundary.

For each coverage map provided, coverage prediction shall not stop at these borders. An understanding of the extent of coverage outside this boundary is required for mutual aid purposes. Note that the radio coverage that extends outside of the defined boundaries will not be included in the Radio Coverage Acceptance testing.

Note that based on the transmitter sites selected and available, Oxford County borders may not meet the 95% reliability specification. Coverage locations where coverage does not meet the design coverage criteria should be clearly marked on the maps. The contractor shall guarantee coverage within their coverage “painted area” areas identified on their maps. An overall percentage of coverage within Oxford County borders shall also be provided.

The coverage design goal for the system are:

- 95% reliability for mobile talkout/talkback throughout the defined service area
- 95% reliability for portable in-street talkout/talkback coverage throughout the defined service area
- 95% reliability for in-street alert paging

## 7.2 RF Coverage Method

The Proposer shall provide radio system coverage predictions in its response to this specification with a radio wave propagation model that has been developed from theoretical and empirical data, and shall consider terrain irregularity, foliage, urban clutter, building penetration losses, noise, and long and short-term signal variations.

The Proposer is required to design the antenna system to provide the required coverage and maintain the FCC filing parameters. The Proposer shall describe their approach to meeting this requirement as defined in TSB-88A.

The Proposer shall provide the parameters used such as, but not limited to, propagation model used, simulcast parameters, effective radiated power, antenna model, antenna gain, antenna height, directional/downtilt, system gains, system losses, portable antenna losses at belt and receive level assumptions. Proposers are required to provide a detailed explanation of their calculations relative to TSB-88.

Oxford County reserves the right to have the Proposer revise coverage predictions as required.

**OPTION:** As a cost option, measurement and verification methodology shall be provided by the Proposer to ensure compliance with the predicted maps.

## 7.3 RF Coverage Prediction Submittals

**Parameters Table:** Proposer shall provide a complete listing in its response to this specification of all sites, component, and system parameters used to calculate and generate the predicted RF coverage. Proposer shall also state the RF coverage prediction model(s) utilized. If multiple models are used to generate a composite prediction, then a detailed explanation shall also be included. Proposer shall utilize 30-meter resolution digitized terrain database used for the predictions. The Proposer shall supply the parameters used to predict coverage in the format of the FCC Form 601 for each site/frequency.

**Prediction Maps:** Proposer shall provide in its response to this specification prediction maps indicating a signal reliability of 95% coverage/DAQ-3.0. Prediction maps shall indicate RF site locations, and areas of non-coverage.

Composite coverage maps shall be provided for Oxford County regional system as follows:

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- Map-1 Mobile coverage for fire and police using a 40 W ERP mobile with a unity gain antenna – analog and digital [P25 & DMR]
- Map-2 Portable in-street coverage for fire and police – analog and digital [P25 & DMR]
- Map-3 Portable coverage inside residential buildings for fire and police – analog and digital [P25 & DMR]
- Map-4 Alert and voice paging in-street coverage for fire – analog and digital [P25 & DMR]
- Map-5 Alert and voice paging coverage inside residential buildings for fire – analog and digital [P25 & DMR]

The Proposer shall include interstate, state, local roads as well as lakes and rivers. In addition, the RF coverage prediction maps shall be developed using a topographic base map scale for optimum information on an 8.5" x 11" page.

## **8 IP MICROWAVE NETWORK**

This section defines the requirements for IP backhaul microwave links and connections between designated transmitter sites and the Oxford County communications center.

The County has developed a proposed microwave route map based on enhancing radio coverage, microwave line-of-site [LOS] requirements, and the availability of towers in the area. Physical path surveys are required to confirm LOS and antenna centerlines.

While the County has identified a preliminary route map, the Proposer may reconfigure routing based on their path analysis and system design.

The Contractor shall provide the County with link verifications based on line-of-sight projections taking into consideration the terrain and obstructions detailing their effect on Fresnel interference as part of the proposal submission.

**Tree Growth:** The Proposer shall include a tree growth factor to be added to measured tree heights at critical points along all microwave paths. This tree growth factor shall be a minimum of 10-ft. Path profile data sheets included with final path engineering documents shall clearly denote the tree growth factor used at each critical point.

**Path Outage:** All paths in the system, including rings and spurs, shall be designed for a minimum two-way path reliability of 99.999% EFS (error free seconds) per year.

**Fade Margin:** minimum composite Fade Margin of 35dB.

**Scalable QAM Reliability:** All paths shall include calculations providing percent reliability based on throughput of higher and lower order QAMs.

**Rain Outage Model:** The Crane model shall be used to predict rain outage in all paths in the 11GHz band, or other bands where rain outage is a significant factor.

### **8.1 General Microwave Requirements**

The equipment shall be designed and manufactured for continuous duty operation in a fixed station application and have an expected operational service life of at least 15 years with proper maintenance and service.

The microwave radios shall utilize modulation schemes necessary to maintain overall system bandwidth performance and reliability.

The equipment proposed can be an all-outdoor unit [ODU].

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The contractor shall furnish and install all pipe mountings, as required, for support of the microwave antenna/radiohead. Stiff arms are required of every antenna.

Microwave antennas shall be selected by the Proposer to meet the system reliability requirements defined within this specification. All antennas shall be single polarized, low VSWR, standard type antennas, unless path designs dictate otherwise.

All microwave antennas, including standard, high performance, and maximum or ultra-high performance types, shall be provided with protective radomes. Radomes shall be colored to minimize visual impact of the antenna system installation.

Furthermore, when applicable, the microwave antenna design should be taken into consideration to minimize tower loading conditions.

Oxford County desires a protected ring configuration, which may be unattainable due to terrain forcing additional relay sites.

If the ring configuration requires excessive relay sites, Oxford County will accept the inclusion of hot-standby hops for redundancy. At all times the Proposer shall ensure that its final design is cost effective that provides a high level of redundancy.

Should the proposed paths fail, the contractor is responsible for reconfiguring the system and provide recommendations to the County.

Proposed bandwidth is 50 Mbps minimum – Proposers shall discuss the merits of lower/higher bandwidths in their proposal.

Compatibility with Simulcast. Microwave radios, gateways, multiplexers, switches and routers provided shall reliably maintain the relative simulcast delays at each site under normal conditions.

### ***8.1.1 Path Design***

The Proposer shall provide in their proposal response the following microwave information and data:

- Path design calculations showing path reliability and fade margins
- Path profiles with trees/obstructions
- Path profile characteristics
  - ✓ K-factor(s) used
  - ✓ Path clearances at critical points along the path
  - ✓ Potential reflection points and natural/manmade shielding along the paths shall be identified /noted and discussed in detail
- Dish sizes, types, sizes, and tower loading requirements for each site
- Equipment rack profiles and floor space requirements for each site

### **CONTRACTOR REQUIREMENT**

Physical path surveys shall be performed upon contract execution.

The Proposer shall provide pricing for microwave field surveys for the hops proposed, plus three [3] additional hops.

The Contractor shall be responsible to provide all personnel, maps, proper instrumentation and any other equipment or material necessary to perform the physical path surveys based on a final statement of work. In executing the path

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surveys, the Contractor shall search for existing construction plans, permits, etc. for proposed structures along the projected path. If a particular location along the path is already developed with existing structures not likely to be re-built or extended/expanded, the Contractor shall state the pre-existence of these objects. If the new structure(s) are proposed, the contractor shall take the new construction into account in the microwave path calculations.

The Contractor shall be required to provide a report of the field path surveys on every site and path. These submittals shall provide, as a minimum, the following information and material:

- Certified geodetic coordinates
- Verified site ground elevations
- Microwave system schematic drawings
- Sites plotted on maps
- Final path profiles
- Obstruction heights along microwave paths
- Reflection Analysis for all obstructions on all paths
- Path antenna calculation sheets
- Path profile characteristics, path clearances at critical points along the path, potential reflection points and natural/manmade shielding along the paths shall be identified /noted and discussed in detail

#### **8.1.2 Technical Requirements**

The unit shall be suitable for mounting on antenna tower structures, water tanks or building roof

The unit shall be comprised of either a self-contained integral antenna or a separate antenna meeting these specifications.

- Specified path reliability specifications
- Operating Temperatures: -35°C to 60°C / -31°F to 140°F Humidity 95% non-condensing.
- Shock and Vibration Standard: EN 300 019-2-4 IEC 60068-2 Class 4M5

Microwave Radio Technical Requirements

- Frequency Band: 6 / 11 / 18 / 23 GHz FCC Licensed bands selected by the Contractor
- Radio transmission must comply with FCC-47CFR Part 101
- Modulation: OFDM (BPSK)/QPSK: 16QAM/ 64QAM/ 128QAM/ 256QAM/ 512QAM/ 1024QAM/ 2048QAM/4096QAM
- Capacity: No less than 50 Mbps data rate (bi-directional) – software upgrade capable for future bandwidth increase
- Channel Bandwidth: As required for the proposed capacity
- Max TX Power: to meet FCC rules and provide the required availability specification
- Sensitivity: to meet FCC rules and provide the required availability specification
- Network interface is to be a 10/100/1000 Base-T Ethernet port(s)
- Ethernet POE switch
- 100% encrypted [AES128]

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## 8.2 Network Management

Proposers shall provide capability to monitor and control a system access port of selected contiguously linked radios via a laptop PC. The user shall have access to the far end radio as well as each of the radios in the selected chain. This feature shall be totally independent of other network management and alarm systems.

Proposers shall describe their offering and provide detailed information on remote monitoring functions, remote control functions software, laptop/desktop PC requirements, and method/medium of accessing this information.

Proposers shall describe the local and remote programming parameters and options are performed. A description of this feature and the details associated with its operational use shall be included as part of the Proposer's response. The description shall contain a list of programmable items, software options, computer access requirements, and manner of access to the microwave radios.

## 8.3 IP/Ethernet Switches and Routers

The Proposer shall provide LAN switches and routers [core & edge] as deemed necessary. Units shall be capable of both AC and DC power. Equipment shall provide all end user feature set and end user licenses to support specified products.

## 8.4 Microwave Licensing

The contractor will be responsible for all FCC licensing and frequency coordination activities.

Frequency availability shall be determined by the contractor as part of any plan for new microwave links. The contractor shall be responsible for preparing any coordination and licensing documentation for Oxford County signature.

## 9 IP PERFORMANCE CONSIDERATIONS

This Section provides information regarding IP connectivity to all sites including the dispatch center.

The proposed transmitter simulcast radio system design as specified elsewhere in this specification shall utilize IP gateways. The contractor is required to provide connectivity to these devices as well as LAN switches and routers to be interfaced with the microwave system.

**Latency:** The IP performance for round-trip delay of packets across paths between redundant sub-site link pairs shall be measured and recorded; [Latency or IP Packet Transfer Delay is defined pursuant to RFC 2681].

Latency link budgets for IP voting and IP transmitter simulcast shall be designed to be fully functional for less than 10-ms to the remote RF sites.

**Jitter:** In an IP network system, the jitter shall be based upon 99th percentile (Y.1541), end-to-end jitter specifications shall be measured and recorded during peak activity daytime periods for the five longest anticipated routes and shall be demonstrated to be below the contractor's maximum jitter guarantee.

Jitter for IP voting and IP transmitter simulcast shall be designed to be fully functional for less than 10-ms.

**Packet Loss:** Packet loss can result from exceeding jitter budgets or actual packet loss in the network as "Type-P-One-Way-Packet-Loss" as defined pursuant to RFC 2680. Any packet loss will have an immediately effect on audio; end-to-end packet loss shall be tested and documented.

Packet Loss for IP voting and IP transmitter simulcast shall be designed to be fully functional for less than .01% packet loss

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**Packet Reordering.** Packet reordering manifests itself as lost packets. The contractor shall design and implement the IP communications network to ensure that access times and audio quality will be acceptable.

## **10 EQUIPMENT STATUS MONITORING SYSTEM**

The system shall provide the capability of automatically monitoring in real-time the status of key infrastructure components, and to provide an alarm and visual display of operational status and/or failures.

The monitoring system shall provide a complete alert call management system for all remote sites. When an alarm occurs, the monitoring system will send an alert message to a workstation monitor at the communications center with audible alarm conditions. Moreover, it is also desirable to send either a SMS text message or email the alarm conditions to selected individuals. Final solution to be determined at the CDR.

The Vendor shall identify and discuss in their proposal a cost effective solution of proposed equipment and software resources needed to accomplish this function, as well as functionality it can provide, or not provide.

The desirable features for the status monitoring system shall include reports indicating the equipment that generated the alarm, time stamp, when it occurred and how long before the alarm was cleared.

Real time status of all equipment by indicating either in the active or alarm state, including:

- Transmitter power output monitoring/VSWR
- Voting comparator/voter
- Equipment alarms
- Microwave hop failure
- LAN switches, routers failures
- Site alarms, such as site environmental sensors, door open, temperature, etc.
- Primary power and generator status
- Other equipment functionality to be identified by the contractor

## **11 EXISTING SITE FACILITIES**

The contractor will be required to assess site conditions prior to installation of any equipment or site facilities and make recommendations to Oxford County on upgrades the facility may require such as cable management and grounding.

The following provides guidance for improving site facilities.

### **11.1 Grounding System**

The primary grounding system at each site is the responsibility of the existing site owner and is presumed to be in good order, although this may not be the case .

The contractor shall measure ground resistance per R56 to determine existing conditions. The goal is for a 5-ohm ground resistance

The contractor shall inspect the grounding system, which includes the master ground bar, internal ground ring, external ground rod system, cable entry port, and tower grounding. If deficiencies are noted, the contractor shall provide a written report delineating the deficiencies and recommendation for remedies on a site-by-site basis.

An assessment will be made by Oxford County if it should continue to use existing grounding facilities or install an independent ground system for its equipment only.

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The contractor shall furnish and install any additional required grounding and bonding conductors, connections, ground bars, etc. and make connections to the proposed communications equipment specified in this RFP, including the communications centers. The conductors shall be No. 2 AWG solid copper wire or larger. Bonding conductors shall be used to bond the various pieces of equipment, conduit, trays, etc. together.

All connections to equipment room or shelter ground halos shall be made as straight as possible with a minimum number of bends. The minimum bending radius of any ground wire shall be one foot.

Grounding of Radio Equipment Cabinets, Racks, and associated Cable Trays shall conform to the latest version of the Lightning Protection Institute LPI-175 and LPI-176 codes.

## **11.2 Electrical Systems**

See Section 4.11 for site and equipment power requirements.

## **11.3 Telecommunications Circuits**

If applicable, any leased circuits or other twisted pair cable which may enter an electronic equipment room or shelter shall be equipped for electrical transient protection utilizing a device which will protect up to 150V, with a clamping voltage of 200Vpk and a response time of less than 5 nanoseconds similar to the Northern Technologies TMC-50, or equivalent. These arrestors shall be intrinsic to the punch blocks being used, and shall be grounded to the equipment shelter/room ground ring.

## **12 NEW TOWER SITES**

The existing Stark Hill 60' tower in Fryeburg will require replacement. The existing radio equipment is currently housed in an outdoor cabinet.

The contractor shall install a new 100' tower, new 10' x 16' equipment shelter, generator, and compound work to include fencing.

The existing tower is to be demolished.

### **12.1 Communications Compound Development**

The Contractor shall develop / update site civil work for following communications compounds:

Stark Hill: New tower, shelter and generator

Spruce: New generator; may require building side-mounted tower for microwave LOS

Streaked Mtn: New generator

Black Mtn: New generator

The maximum distance of the proposed structure from the proposed shelter shall be no greater than ten [10] feet, with the maximum elevation above grade of the foundation not more than six [6] inches.

#### **12.1.1 Access Road**

No access road work required.

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**12.1.2 Site Clearing**

The Contractor shall clear only the site areas occupied by the compound and access areas. Remove everything on or above the site surface, including rubbish, scrap, vegetation matter, organic debris, scrub, timber, stumps, boulders, rubble, and the like. Grub out stumps and roots over 3-inches in diameter to a minimum depth of 1-foot below finished surface. Strip and separately store topsoil on site for later reinstatement landscape works.

**12.1.3 Excavation Work**

Before excavating any public area including roads, footpaths, reserves, and the like, the Contractor shall obtain the approval of Town and County authorities [e.g. DigSafe] and comply with their requirements for public access and fall prevention barriers, alternative traffic arrangements, excavation methods, backfilling, and reinstatement.

The Contractor shall restore areas outside the limits of the compound that have been disturbed by the works to their original condition on completion of excavation. Reinstatement surfaces to their original level without subsidence and without cracking at junctions with existing surfaces.

The Contractor shall restore pavements to match existing and reinstatement retained topsoil and for the new/restored grassed areas.

**12.1.4 Erosion Control**

The Contractor shall stage the compound such that the agents of erosion are minimized. Plan, carry out and maintain the work to avoid erosion, contamination, and sedimentation of the site, surrounding areas and drainage systems.

**12.1.5 Maximum Slope**

Limit the slope of embankments to a maximum of 1:4 unless specified otherwise elsewhere in the design documents. Do not exceed the grades recommended in the geotechnical report.

Where applicable, depending on the amount of foundation excess soil, soils may be graded on site, compacting to 3500-psi, or removed from the site, based on the tower foundation type as how excess soils will be disposed of. Prior to all site completion, a drainage and weed barrier fabric will be installed throughout the compound area of 50' X 50' and then covered with not less than four [4] inches of #1 & 2 washed stone.

**12.1.6 Spoil Ground**

Should unexpected and/or unsuitable material be encountered in the excavation, or soft, wet and unstable areas develop during excavation, consult the geotechnical engineer who carried out the original and/ or undertake supplementary site investigation to determine appropriate remedial works. Submit to SRAC, or their authorized representative, details of any alterations to the submitted construction documents resulting from such advice, before undertaking any additional work.

**12.1.7 Site Restorations**

Upon completion of the compound, restore the natural ground surfaces of the site (i.e., the surfaces which the contract does not require to be altered) to the condition existing at the commencement of the work under the contract.

If filling is required, provide filling free from perishable matter, imported onto the site from an approved source unless the specified filling type can be provided from spoil recovered from the excavations.

Suitably prepare the ground surface to receive filling. Place and compact filling in layers, to the required dimensions, levels, grades, and cross section.

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Under bearing surfaces such as footings, slabs and paving, compact the filling, and where necessary the subgrade, to the recommendations of the geotechnical report, whichever is more critical.

**12.1.8 Weed Prevention**

As necessary, the Contractor shall treat the fenced area with an approved herbicide used in accordance with Local, State, and Federal regulations. Install a woven plastic weed barrier in accordance with manufacturer's recommendations prior to gravel installation with a minimum 10% overlap for each barrier section and secure the edges of the mat with stakes.

**12.1.9 Service Trenches**

Backfill and adequately compact service trenches under footings, grounding system, slabs and pavements to prevent loss of support to and settlement of any new or existing structure above.

**12.1.10 Security Fence**

The Contractor will provide a security fence around the tower compound perimeter [50' x 50'] with 12-ft double. The top rail will be not less than 6-ft above grade. Barbed wire will be placed 1-ft above the top elevation. Fence fabric will be flush to grade.

All material and workmanship shall be in accordance with the ASTM requirements for industrial fence systems, and include but not be limited to: Metallic coated carbon steel barbed wire, galvanized before weaving steel fence fabric, metal-coated steel wire for chain-link fence fabric and tension wire, ready mixed concrete, installation of chain link fence, fence fittings, industrial swing gates, strength and protective coatings on metal industrial chain-link framework, pipe, pipe caps, steel **and hot-dipped (2.oz) galvanized weld for** fence structures. All pipes will be Sch-40. The 4 corners posts and 2 gateposts will be bonded to the halo ground.

Other minimum requirements include but are not limited to: Fence mesh wire not lighter than 9-ga., mesh size 2-inches, top rail not smaller than 1-5/8-inches, line post not smaller than 2.5-inches and terminal post not less than 3-3/4-inches. All terminal posts will be placed in an excavated pier 10-inches in diameter and to a depth of not less than 42". Line posts will be placed in an excavated pier 8-inch in diameter, and to a depth of not less than 36-inches. There will be not less than an additional 6-inch of #2 stone placed at the bottom of each excavated pier.

Gate framework will be not less than 3-3/4-inches OD Sch-40 galvanized pipe top, and the bottom not less than 2.5-inches OD Sch-40. Horizontal up rights will be not less than 2.25-inches OD, and galvanized tubing diagonal members not less than 2-inches. Gate fabric and barbed wire will be the same as the fence.

**12.1.11 Site Commercial Power**

The Contractor shall supply and install any necessary AC power lines and electrical facilities to a designated power connection pole to the local utility source, from the shelter generator transfer switch and meter socket. The Contractor will contact the local utility and work with the utility to arrange for any on site work, services, materials, and project coordination to ultimately end up with a working electrical service suitable for the proposed site. The Contractor will provide any needed services and materials to make the site connections to the local utility provided services. The County will assist for the administrative tasks to establish the utility service, with the contractor providing the labor and materials at each of the sites. Costs for the electrical service connection will be included in the Proposer's pricing sheet.

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## 12.2 Foundation Design

A Geotechnical Engineer shall be employed by the contractor to identify soil conditions to determine final tower foundation design. Borings shall be taken at tower legs and the base of the anchor points. A soil properties report shall be provided with recommended type of foundation.

### 12.2.1 Soil Exploration

For bid pricing purposes, soil conditions shall be considered presumptive clay soil as described by the latest version of ANSI/EIA-222.

If actual soil conditions are found to be different from those assumed in the design, the County can negotiate equitable adjustment of the quoted foundation cost.

### 12.2.2 Foundation Design

The Contractor will be responsible for an engineered foundation design based upon the soil analysis. The Contractor shall provide the County with copies of the foundation design sealed by a registered State of Maine P. E. [subject to review by an independent engineer]. Concrete samples shall be taken from each concrete delivery and test results shall be provided based upon 7 and 28-day break test. The two samples shall be taken at the beginning of the pour and near the delivery's end. Each sample will be marked with the project name, delivery ticket number, date and time.

Structure footings shall be designed to match the ultimate capacity of the proposed structures. This shall allow for additional future equipment to be installed on the tower without being limited by the foundation capacity.

Where practical and cost effective, consideration should be given for minor over-dimensioning [~20%] the foundation to accommodate potential future structure upgrades.

The County's Project Manager must be onsite prior to the installation of concrete. Steel reinforcing rods [rebar] will be tied; no welds will be permitted. Lift chairs will be used when and where necessary to prevent reinforcing steel from protruding through the concrete encasement. When and where sleeves/caissons are used, the sleeves or caissons will be removed when/or as the concrete is poured. No sleeves or forms of any kind will be left on/in the foundation.

The tower foundation concrete will be 4000-psi and must be prepared and delivered by a company using Massachusetts certified sand and gravel.

Concrete, reinforcing rod, construction methods and concrete installation will meet the applicable standards of the American Concrete Institute (ACI), and American Society for Testing and Materials (ASTM) for structural foundation designs, and as required by the communication tower manufacturer's sealed engineering document(s) to meet all load requirements.

## 12.3 Tower Description and Design Requirements

The service life the lattice structure should be designed to meet or exceed 40 years.

### 12.3.1 Tower Design

Towers shall be designed and installed in accordance with, and shall meet or exceed all requirements of the latest version of TIA-222 structural standards; and, the most current revisions for steel antenna towers and antenna supporting structures, OSHA, and these specifications.

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TIA-222 specifications shall be for the structure is to be constructed, or by specifications superior to the guidelines as addressed in this document. It is the intent of these specifications to describe the minimum requirements to install structures.

The Contractor will be responsible for the complete provisioning of all material to construct the towers, including all site preparation, tower foundation, fencing, and grounding [per R-56] for the proposed communications sites. The tower structure shall have provisions for safe access to all antennas, equipment, and cabling.

**12.3.2 Certification**

All tower and foundation design and installation drawings and calculations shall be certified and stamped by a State of Maine Professional Engineer [P.E.]. Complete and detailed tower stress analysis showing loading considerations, towers weight, towers base reactions, allowable stresses and maximum computed forces is required.

**12.3.3 FAA/FCC Registrations**

All FAA and FCC tower registration to be completed by the Contractor including construction notifications.

**12.3.4 Local and Industry Standards**

The Proposer's design team shall take into consideration the aesthetic aspects of the site and tower design and ensure that the tower configuration and all of its components are addressed, as far as reasonable, any visual concerns.

The tower shall be designed to meet all Federal, State, local code requirements.

**12.3.5 Structures**

ACI	American Concrete Institute
ASCE:	American Society of Civil Engineers Standard 7-02: Minimum Design Loads for Buildings and Other Structures
FAA:	Federal Aviation Administration Advisory Circular 70/6460: Obstruction Marking and Lighting
OSHA:	Occupational Safety & Health Regulations
TIA/EIA:	Telecommunication Industry Association/Electronic Industries Association: ANSI Standard 222-(H) Structural Standards for Steel Antenna Tower and Antenna Supporting Structures
MIL-STD-188-124B	Lightning protection, grounding, bonding and shielding for common Long Haul/Tactical Communications Systems
NFPA 780	Standard for the Installation of Lightning Protection Systems.
Oxford County and Local Wireless Facilities Regulations	

**12.3.6 Electrical**

Installation of all electrical equipment, fire alarm systems, power distribution, lighting assemblies and associated wiring shall comply with the most recent edition of:

- BOCA
- National Electric Code (NEC)
- NFPA 70
- Underwriters Laboratories (UL)
- Occupational Safety and Health Administration (OSHA) regulations

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**12.3.7 Structure Classification**

For the purpose of this specification, the following structural classification shall be considered:

- **Structural Classification:** Class III - Public Safety. When the classification is not specified or cannot be determined the Contractor should assume the most stringent classification.
- **Topography:** New generator
- **Exposure:** New generator Structure Steel Requirements

Steel provided for the towers structure and all attachments shall be hot-dipped galvanized, after fabrication, with a minimum of 2 ounces/sq-ft of zinc coating. All steel shall be cleaned of all foreign material, such as oil or rust, prior to being factory galvanized. The structural material shall be galvanized per ASTM standard A-123 and towers hardware per ASTM standard A-153.

The tower members shall include but not be limited to: anchor bolts; all and any nuts, bolts, Pal-nuts (ASTM A325 or A490), legs, and diagonal bracing (which shall be of the most recent standards of the American Institute of Steel Construction (AISC). All welding shall be per the AISC or AISI specifications, whichever is the most recent.

Note: Any material delivered found to have a thin coating, excessive discoloration or excessive slag will not be accepted. Ultra-sonic test may be randomly conducted to verify both steel and galvanize thickness. The Contractor or the manufacturer supplying the tower must certify that the tower product delivered meets the latest standards as above noted and described. Contractor shall furnish the offered tower manufacturer "mill reports" for all steel, including foundation embedment and hardware used for the erection of the tower for each tower order delivered.

**12.3.8 Tower Wind and Ice Loads Design**

The Contractor shall be responsible for accounting for all permanent, imposed, and other actions including structure self-weight, mounting brackets, platforms, access ladder and cages, cable ladders, etc.

The new tower shall be designed according to the recent editions of TIA-222 including:

1. Location: Town of Fryeburg in Oxford County, ME
2. Minimum/Maximum Basic Wind Speed = 100 MPH
3. Minimum/Maximum Basic Wind Speed w/Ice = 40 MPH
4. Minimum/Maximum Design Snow and Ice Thickness = 0.75" / 1.0" dependent on site per RS-222

**12.3.9 Twist, Sway and Displacement**

Rigidity limits for twist and sway shall be +/- 0.5 degrees. Both twist and sway rotations must be shown.

**12.3.10 Antenna Physical and Wind Loading**

The Contractor shall take into consideration the physical and wind loading characteristics of individual antennas in the design of the structure. The effective sail area shall be calculated from antenna physical dimensions multiplied by the appropriate drag coefficient. The calculation shall include antenna mounts and any ancillary attachments.

The allowable rotation limit of coverage antennas is to meet the antenna manufacturer's specification. The limit applies to the combined rotation of the structure, its foundation, and mounts.

Microwave parabolic dish antennas have stringent rotation limits, and these are critical for the structure design. The rotation limits for specific dish antennas may be more stringent than the general limit at the top of the tower.

The designer shall ensure that rotation limits for link antennas intended to be supported on the structure combined with the rotation of the mounts at the microwave antenna fall within the manufacturer's specified limits. Where

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rotational limits for operational performance are not specified by SRAC or antenna manufacturer, the rotational limit shall be 50% of the 3dB antenna beamwidth as measured from the nominal antenna azimuth angle.

**12.3.11 Tower Structure and Antenna Design Load**

The tower will be designed to accommodate the antenna system loads indicated in Attachment-1; at a minimum, when applicable, the top twenty (20) feet of the self-supporting tower shall be straight with no taper for antenna mounting requirements.

The tower shall be designed to accommodate an additional 20% loading for future antenna and mounting of equipment.

**12.3.12 Lattice Tower**

Where practical, self-supporting lattice towers shall be designed and fabricated as a modular system, such that the individual sections can be added or removed from towers of different height.

Lattice towers shall be designed with steelwork of individual mounts to support antennas, ancillary equipment, and cables identified in this document.

For maintenance purposes hot rolled open steel sections are preferred for the structure and antenna mounting design and construction. Ensure the joint connections are detailed to prevent the build of debris and water and that all connections to footings are supported on reinforced concrete upstands 6-inches minimum height above the finished ground level.

Where closed hollow steel sections are utilized as a structural element, provide minimum 0.75-inch diameter drain holes at opposite ends of the member. Hole positions should be selected such that member naturally drains in its installed position. Holes exposed to water or debris ingress should be sealed after galvanizing and prior to final installation.

Large diameter microwave antennas shall be face mounted with sufficient spacing for panning, e.g., microwave dishes greater than 3-feet in diameter.

Small diameter microwave antennas may be face mounted or leg mounted. The mounting pipe shall have a minimum 10-inch standoff from the exterior of the supporting structure.

**12.3.13 Appurtenances**

The tower design will also include the following appurtenances:

**Climbing Facilities:** The tower shall be equipped with anti-fall device appropriate for use for the type of structure proposed that meets the requirements of ANSI and OSHA.

**Anti-Climb Device:** where applicable, an anti-climb device shall be provided to prevent unauthorized climbing of the structures with an access point located 10-feet above ground. The anti-climb device shall be designed, supplied and certified by the tower manufacturer.

**Falling Ice – Protection Measures:** Where possible, the support structure deployed shall be manufactured to suit the expected ice conditions of the site to protect equipment and maintenance personnel from falling ice and snow discharged by the tower.

**Step Bolts:** step-bolts installed at a point fifteen-foot above the foundation, a safety-climb DBI/SALA [or equal] shall be provided.

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**Waveguide Ladder:** The tower is to be designed to accommodate separate waveguide ladders with horizontal braces spaced no more than three feet [3'] apart and shall accept a minimum of fifteen [15] runs of coax/waveguide each. The support shall be punched to accept ¾" snap-in clips. The waveguide ladder shall be provided with the tower and installed on the tower, mounted next to the designated climbing leg that is closest to the equipment shelter from the bottom to the ultimate height of the tower and parallel to the angle of the leg.

Waveguide runs shall have a short horizontal span before connection to the antenna feedhorn. The short horizontal span shall be supported to completely relieve stress on the waveguide flange connector. The vertical to horizontal transition bend radius shall not exceed manufacturer's recommendations.

**Waveguide Bridge:** A bridge shall be provided of adequate length to reach the furnished equipment shelter of approximately ten [10] feet. The bridge shall be of Grip Strut construction and utilize four, four [4] inch support poles. The bridge shall utilize two [2] levels of trapeze type hangers to support a minimum of fifteen [5] coax/waveguide each. All material to meet the same galvanized specifications as the tower, ASTM-123. Grip Strut shall be 24-in wide by 2.5-in 12-Ga steel. Each support post shall be grounded and made a part of the halo ground system. All bonding to the support poles and ground rods and any integrated splices will be by exothermic bonding only.

**Signage:** A sign that includes owner contact information, emergency information, and safety instructions, or signs that are required by a federal, state shall be provided. The sign shall be no larger than 2' x 2'.

**Nameplate:** The tower provided shall be marked with a nameplate fastened to the base of the tower identifying tower model number, design reference number, height, and date of construction

**Tower Painting:** Tower does not require painting.

**Tower Lighting:** Tower does not require lighting.

#### **12.3.14 Tower Grounding**

The structure shall be grounded as part of the overall communications site grounding plan [tower, shelter, generator, compound]. All grounding shall meet current Motorola R-56 Standards.

The Contractor shall install a ground ring around the base of the tower, consisting of 10'x 5/8" ground rods driven to a depth necessary to meet the required resistance measurement of five [5] ohms, adjacent to the foundation of the tower at each leg. Ground rods are to be interconnected by a minimum #2/0 AWG solid copper wire, which is to be exothermically welded to the top of each ground rod. Copper wire and ground rods are to be installed in a trench of a minimum depth of 30-inches below finished grade or local frost line. Maximum spacing between rods shall be 20-feet.

Each tower leg shall be bonded to the ground ring using #2/0 AWG solid copper cable, which has been exothermically welded to a flat, square solid steel tab located near the base of each tower leg. Each cable lead will run to the closest ground rod through an insulated sleeve to minimize wire damage. The upper end of the sleeve should be sealed with a non-shrinking compound such as RTV to prevent water from collecting within the sleeve. The Contractor shall avoid making any acute bends as the ground wire transitions from the foundation. Bends should be a minimum of 9 inches in radius. To complete the exothermic welding process, the attachment area on the tower tab shall be cleaned and coated with a cold galvanizing compound.

A tower-mounted lower ground bar, complete with proper insulators, connecting rods, and copper conductors, to be located approximately two feet above the ice bridge, will be supplied with a # 2/0 ground wire lead that is extended and exothermically welded to the tower ground ring. The ground conductor lead must be sleeved so that it is protected from physical damage. Like above, the upper end of the sleeve shall be sealed with a non-shrinking

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compound like RTV to prevent water from entering and collecting within the sleeve. This ground wire lead shall be installed at the time the tower ground ring is installed.

Ground system ring around the tower base shall be located a minimum of 36 inches away from the tower foundation. The tower ground system ring shall be connected to the equipment shelter ground ring in at least 2 places, on the closest corners of the shelter ring.

The Contractor shall electrically bond all transmission line outer shields to the structure at the top of the tower immediately below the antenna and at the line midpoint if the tower's height is over 200- feet. Likewise, bond all transmission line shields near the bottom segment of the tower on a copper bus bar, approximately one-foot above the bend made to enter the waveguide bridge and again at the shelter's antenna entry port/panel. Use only transmission line grounding kits approved by the manufacturer for use on the type and diameter of transmission lines provided. All installed grounding kits shall be appropriately weather sealed.

Fencing shall be grounded to the ground ring via #2AWG solid copper wires, bonded via exothermic welding at each fence post. All exothermic welds shall be cleaned and protected with a minimum two coats of cold galvanize material.

Grounding system resistance shall be measured to be 5-ohms or less between any point on the ground system and earth ground. Measurement shall be done with a 4-point ground resistance tester and not by a clamp on resistance tester.

## **12.4 Demolition of Existing Facilities**

Demolition work: Stark Hill

The work to be done under these Specifications shall include all labor, materials, equipment and services necessary to complete all demolition of the existing 60' structure; complete removal of foundations and slab-on-grade, and redirect utilities and utility lines to the new facility.

The contractor is responsible to locate and protect all active utilities at the site that may be affected by the demolition.

Demolition work shall be carefully planned before the work commencement. Planning involves identifying hazards, assessing risks, and determining appropriate control measures in consultation with the Landowner, and Town and County personnel involved in the work.

Suitable barriers shall be erected and maintained around the operations as long as such operations constitute a hazard or dangerous condition. Stability of the tower must be maintained during the demolition operation.

Bracing or guying shall be utilized as required to ensure safe working conditions. Under no conditions shall free-falling of tower or sections be permitted.

The tower foundation shall be removed to one foot below grade and the material shall be properly disposed.

All materials and debris, including tower sections, antennas and transmission lines, resulting from the dismantling, demolition and removal operations shall become the property of the contractor and shall be disposed off-site in compliance with local and state codes or regulations.

The contractor shall fill all voids created from the removal operations with approved backfill. Under no circumstance should material or debris from the demolition be used.

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The contractor shall restore any paved or grassy area damaged during the work. Any fencing, structures, or landscaping damaged during the work shall be replaced or repaired by the contractor. The contractor shall leave the site clean and presentable condition as approved.

All hazardous materials and waste that has the potential to exert a detrimental effect on people or the environment shall be correctly identified on site and safely disposed of in an environmentally and socially acceptable manner.

### **13 EQUIPMENT SHELTER**

Furnish and install an 10' x 16' equipment shelter at the site indicted in the sites matrix. Ensure that all materials furnished, assembled, fabricated, or installed are new products to last a minimum of 40-years.

#### **13.1 General**

Ensure that the shelter includes a secure door; power distribution panels, air conditioning system; lightning protection, grounding, cable management, and any other components necessary for a completely integrated communication shelter. Ensure that the shelter is constructed and installed according to local building codes.

Provide a shelter designed to withstand loads as follows:

Wind: 120 MPH

Floor: 200 lbs. per square foot

Roof: 100 lbs. per square foot

#### **13.2 Shelter Construction**

The shelter's exterior shall be constructed with wood. Wooden siding shall be earth tone exterior color, alternative exterior colors shall be approved by the County.

Flooring shall be ¾" floor sheathing on 2" x 6" with 12" on-center joist spacing. The equipment room's interior floor covering is to be industrial-grade vinyl flooring fastened to the shelter floor with waterproof adhesive.

Interior wall construction of 5/8" wood sheathing with 2" x 4" studs on 16' on-center spacing.

The exterior door is to be 36" wide by 78" tall, with a door check and doorstop secured with a mortised deadbolt security lock keyed as directed. The door is to have a lever type handle on both the inside and outside.

The equipment shelter must not bend or break during moving, towing, or hoisting.

#### **13.3 Foundation**

The shelter shall be installed on a concrete pad that is two [2] feet wider than the shelter. The entrance door shall have a 3' x 3' pad entrance.

#### **13.4 Roof and Ceiling**

A pitched roof with asphalt shingles with 8" soffit overhang.

The interior room height is to be no less than 8' above the floor and capable of supporting the proposed electrical fixtures and cable trays.

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### **13.5 Lighting**

Fluorescent light fixtures are to provide a uniform initial light level of 125 to 150 foot candles at 4 feet above the floor with a 3:1 ratio of maximum to minimum light levels as measured throughout the shelter's interior. Mount a light switch inside the shelter, adjacent to the entry door, for the interior lighting.

Install one approx. 2250 lumen floodlight that is vandal resistant and mounted on the outside near the entrance door with a photocell and interior light switch. Install an auxiliary powered interior emergency light that illuminates when primary power fails.

### **13.6 AC System**

Install appropriately sized exterior wall-mounted air conditioner. Ensure the system has a dry contact closure alarm output for failure monitoring and has an installed adjustable start time delay, initially set to 5 minutes.

### **13.7 Cable Trays**

Cable trays are to be 6-inches wide capable of supporting the transmission lines, control and data wires, and alarm wires associated with communication equipment. Use cable trays constructed of aluminum or painted steel fabricated in an open ladder type arrangement that are suspended from the ceiling. Electrically bond by mechanical means, on non-painted surface areas, all rack and cable tray units together. Cable trays and rack frames are to be connected to the shelter interior ground.

The clearance height between the top of a 7 1/2' equipment rack and bottom of the cable tray is to be no less than 6". The cable tray shall be 12" below the ceiling. Secure the top of each rack to the cable tray above using C channel/J hook hardware and to the floor.

Equip the cable trays with overhead AC power receptacles.

### **13.8 Fire/Smoke Detection and Suppression**

Install at least one smoke detector that operates on alternating current. Mount the smoke detector on the ceiling 1 foot clear of all obstructions and ensure that it includes a dry contact closure that will activate during prescribed conditions.

### **13.9 Alarm Specification**

Wire, label and terminate all alarms on a Type-66 block. Provide the following shelter alarms:

1. A magnetic dry contact door alarm.
2. A dry contact air conditioner failure alarm for each installed unit.
3. Dry contact fire alarms.
4. Dry contact high- and low-temperature alarms with thresholds adjustable between 50 and 90oF.
5. A power failure alarm that is wired from a dedicated circuit breaker.
6. A main fuse alarm that is wired from the main fuse disconnect.

Provide provisions on each exterior side of the shelter that can be used for installation of security cameras. Provide these weatherproof conduit entries at locations near the corner of the shelter just below the roofline to allow wiring for cameras and other security devices to pass into the shelter.

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### **13.10 Electrical**

The standard electrical configuration is single-phase 120/240 VAC at 60 Hz with a 100 A minimum service and a 42 circuit distribution panel.

Install and connect electrical power to the equipment shelter and install all wires and cables in a neat, orderly fashion. Underground power service is preferred.

Make all electrical connections from the service drop to the equipment shelter's receptacles. Use a minimum of No. 12 AWG copper wires to install the receptacles, switches, and light fixtures. Run all wire in a minimum 0.75 inch inside diameter electrical metallic conduit. Divide the electrical loads among as many load centers as necessary to contain the quantity of circuit breakers required to protect the equipment shelter facility.

Load centers must contain separate, appropriately sized circuit breakers for the AC unit, each major branch as is necessary, each receptacle, and each remaining location in the 42 circuit panel. Two of the interior side of the four walls will have a duplex receptacle 18 inches above the floor. Protect receptacles with an individual 20 A circuit breaker. Install a separate 20 A single-pole circuit breaker to protect the lighting circuits.

### **13.11 Primary AC Surge Protective Device**

Install a primary AC surge protective device (SPD), wired to protect the system while utilizing either utility or emergency power.

### **13.12 Cable Entry Port**

Install four [4] each, 4-inch diameter exterior wall penetrations with weather-sealed boots.

### **13.13 Circuit Termination Backboard**

Install a backboard for the termination of communication circuits of 3/4 inch AC-grade plywood no less than 48 inches square and painted with two coats of gray, flame-retardant paint. All ground wires and conductors are to be insulated from the backboard, which must be securely mounted to the wall and capable of supporting the hardware fastened to it.

### **13.14 Provision for Backup Power**

The equipment shelter must be capable of connecting to a portable emergency generator. The emergency generator connection shall include an external pin and sleeve plug to allow the County to power the site from a portable generator in the event that both the utility power and emergency power is lost.

Install a primary power switch to allow for the disconnection of commercial power at the main power entrance that is interconnected to an automatic transfer switch to facilitate a switch to emergency generator power in the event utility power is lost. Emergency generator power must route through a manual power switch on the outside of the shelter prior to connection to the automatic transfer switch panel.

Provide design drawings that meet all minimum design standards and are signed and sealed by a registered Professional Engineer in the State of Maine.

## **14 EMERGENCY POWER GENERATOR**

Furnish and install standby generator, conduits, foundation and propane fuel tanks.

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The Vendor will insure prior to shipment that the generator is fully functional and in operating condition. The Vendor will ensure that all field setup work is completed on the day of delivery. Note: Utility power may not be available at the time of delivery.

Field setup shall include but not be limited to: removal of lifting lugs if any, install tie downs as required, inspect all fluid levels, operation of gauges, muffler and fuel system.

The standby generator shall include:

- KW rating: to be determined by proposer for equipment and electrical facilities proposed plus 50% growth
- continuous output
- 120/240 VAC
- Single phase
- Propane fuel
- Approved outdoor operation w/weatherproof enclosure
- Electric starting system with battery and charger
- 48 hour operation at 100% load capacity on a full tank
- Sound attenuation enclosure and muffler
- Exhaust mounted spark arresting screen
- Delivery of generator to the site
- Full tank of fuel
- 100% load bank test for one hour at installation

Remote annunciator panel mounted inside the shelter with an external I/O punch block for connection to the vendor supplied alarm system; the Vendor shall be responsible to connect all wiring up to the I/O punch block.

A 100 amp automatic transfer switch, with Transtector AC surge and lightning protector [or approved equal] mounted in NEMA 1 cabinet will supplied as part of the equipment shelter and include:

- Auxiliary contacts, one NO and NC, engine start contacts,
- Programmable weekly exerciser,
- Pilot lights, emergency and normal position,
- Normal and emergency available,
- Time delay prior to engine start,
- Adjustable from 0.5 – 6 seconds,
- Time delay on retransfer to normal, adjustable from 0 to 60 minutes.
- Time delay engine cool-down, adjustable from 0 – 60 minutes,
- 3-phase under voltage sensing, normal source,
- 1-phase under voltage sensing, emergency source,
- Load test switch
- In-phase monitor,
- Time delay bypass switch,
- Load/no-load exerciser.

The generator operation shall be fully automatic when the voltage drops below a preset value. When the voltage returns to the normal value, the generator will automatically return the power feed to the utility grid and turn off the generator. The generator shall include a local display with latching relays for warnings and shutdowns for:

- High temperature alarm
- Low oil pressure
- Under speed

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- Over speed
- Low oil level
- Over crank
- Low fuel level
- Under frequency
- Under voltage
- Low/high battery voltage
- No load exercise time

## **15 EQUIPMENT INSTALLATION REQUIREMENTS**

The Contractor shall perform a pre-installation visit to survey the locations for all equipment to be installed. If conditions not under the control of the Contractor require a change in the items and/or services proposed, a revised proposal shall be supplied to the County. No equipment shall be delivered, or work started until approval has been received from the County's Project Manager. Installation shall include all necessary wire/cables.

All existing radio communications systems shall remain fully operational during installation of the new equipment and until Oxford County provides final acceptance. Because existing systems support public safety operations, interruptions in service due to contractor or contractor activities are not acceptable. If interruptions in service are deemed necessary by the contractor to be unavoidable, then written notification detailing the nature and duration of such interruptions shall be provided to Oxford County for review and approval.

All installation work performed shall be in accordance with laws and regulations of the U.S. Dept. of Labor, State of Maine, and Oxford County policies. Technicians shall have a valid Federal Communications Commission General Radiotelephone Operators License or its approved equivalent to work on RF equipment.

The Contractor shall provide all the necessary personnel, tools, equipment and transportation for the successful delivery and installation of all equipment provided.

### **15.1 General Requirements**

The Contractor will be required to begin installation according to the approved schedule for material delivery to the installing Contractor location. The installation Contractor shall be prepared at this time. The Contractor shall ensure that all material and components are delivered to the proposed sites and according to the approved schedule.

The Contractor is responsible, and shall provide all the hardware and supplies necessary for the proper and complete installation of the radio and microwave equipment, this includes bolts, clamps, wire wraps and other hardware, as required.

Provisioning, optimization, troubleshooting, and adjustment of each subsystem shall be the Contractor's responsibility. Any equipment or parts required to provide a complete and operational system, and not specifically mentioned herein, shall be provided by the Contractor without any claim for additional payment. It shall be understood that the proposed contract and agreement contemplates and requires a 'turnkey' construction and installation of a completely operational communications system that meets the standards of Oxford County.

Notwithstanding the details presented in these specifications, it is the responsibility of the Contractor's Project Manager to verify the correctness of the material lists and suitability of devices proposed to meet the intent of the specifications. The Contractor shall be responsible for providing or arranging for all parts necessary for the equipment and its installation up to and including final system acceptance.

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The Contractor shall disconnect legacy equipment after the network has been accepted and after Oxford County has authorized the Vendor in writing to do so. The Contractor shall remove all legacy radio and control equipment to include antennas and transmission lines, and ensure that the area is clean. All equipment shall be transported to a location within the South Paris area for disposal by Oxford County.

### **15.2 Personnel Safety**

The contractor shall be required to provide a Certificate of Insurance indicating the coverage limits as outlined by Oxford County. The contractor shall bear responsibility for the safety of its workers and all others during the installation phase.

All employees of the Contractor who work for Oxford County shall be instructed in and be familiar with safety rules and regulations applicable to the nature of the work being performed under this contract. The Contractor shall have sole responsibility to see that its employees are so informed and that they follow requisite safety practices.

All applicable OSHA rules and requirements shall be rigorously complied with, as well as applicable FCC and FAA requirements including RF exposure guidelines. For antenna installations, under no circumstances shall an individual be allowed to work alone. It is crucial and imperative that all current OSHA fall protection rules are followed. This includes but is not limited to "full body harness" and 100% "TIE OFF". contractor employees found not following all OSHA rules and directives will be ordered from the job site by Oxford County.

### **15.3 RF Base/Repeater Stations**

For RF equipment installed at fixed sites, and upon completion of staging the equipment, the contractor shall deliver and install the equipment at the sites.

Equipment and physical facilities shall be installed in a neat and professional manner, employing the highest standard of workmanship and in compliance with applicable standards.

All sites shall be left in a neat, presentable condition throughout the installation phase of the project. All rubbish, temporary structures, and equipment generated or used by the contractor shall be removed after completion of the work, and prior to acceptance.

### **15.4 Simulcast Alignment**

Parameters for simulcast alignment shall be determined by the contractor in order to minimize simulcast delay distortion.

Simulcast system alignment procedures shall be straightforward and logical. After the system is initially aligned and accepted, there shall be procedures and alignment test facilities in place to allow routine verification of system alignment and equalization. There shall further be procedures and alignment equipment and facilities in place to allow realignment and re-equalization of the system under extraordinary situations such as replacement or repair of system components.

Routine verification of system alignment shall be possible using a single maintenance technician, preferably at a single location. Contractor shall describe equipment capabilities in their response.

A simulcast system shall be designed so that, once aligned, it shall remain aligned and shall not need routine realignment.

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**15.4.1 Simulcast Re-Alignment**

After the system has been aligned, optimized and accepted, the vendor shall, during the warranty period, assist Oxford County in corrective actions and make recommendations of potential remedies of simulcast problems that may develop as users on the system identify potential simulcast distortion areas.

The Proposer shall provide pricing for a second round of simulcast optimization once the system has been accepted and utilized. This is to ensure that any simulcast problem be corrected based on user input.

The contractor shall be prepared to perform re-alignments during the first year, and once per year over for the remainder of the warranty period. If additional equipment is needed, or antenna work is required, the contractor and Oxford County shall negotiate pricing to perform this additional work.

**15.5 Microwave Radio**

The installation of the microwave equipment will be provided by the Contractor at the designated location within the equipment shelters at the sites. The contractor shall supply and install all required equipment, accessories, punchblocks, terminal strips or cables needed to interface to new or existing facilities.

Inspection of the completed microwave network equipment installation shall be performed to ensure compliance with standards set forth in final contract and the specifications.

**15.5.1 Microwave Parabolic Antenna**

Adjustments on horizontal and vertical azimuths shall be capable of a minimum extension of +/- 5-degrees. After completion of antenna panning, the side struts and stiff arms shall be cut to a suitable length past their mounting, not to exceed 3-feet.

Transmission line [t-line] shall not exceed its bending radius or twisted. At antenna level, the t-line shall be terminated to the antenna via short jumper that will allow the antenna to be panned through +/- 2-degrees without creating any stress on the waveguide or its connector. Appropriate seals shall be used at the cable entry port of the shelter.

The antenna shall be capable of being panned +/- 2-degrees, and panned by noting the 3dB and 15dB points on both sides of the antenna pattern in both the horizontal and vertical planes.

All microwave antennas, regardless of size and frequency band, shall be provided with stiff arms for mounting.

Ice shields shall be provided, where required, with all mounting hardware for each size of microwave antenna. Stiff-arms and ice shield mounts shall be attached to the tower in accordance with the requirements of the tower and microwave antenna manufacturers.

**15.6 Transmission Line Grounding and Lightning Protection**

Where shelters use a single point ground system, RF and ancillary equipment supplied shall be grounded to the single point ground system. All grounding interconnections shall be made by using #2 AWG solid copper wires.

The ground points shall be made by using copper ground straps from the same manufacturer as that supplying the transmission line and in accordance with the manufacturer's installation practices.

No grounding to tower cross braces is allowed only direct conductor to ground. Braided ground straps are not acceptable.

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Cuts made in the outer jacket of the transmission line to install the ground straps shall be thoroughly sealed with a water-resistant tape (no vinyl tape) or compound. Ground connections to galvanized tower legs shall be made with transition clamps thereby reducing the oxidation effect of dissimilar metals.

Each transmit or receive transmission line shall be protected by coaxial surge/lightning protectors, Polyphaser, or equivalent, between the transmitter combiner output and the antenna. Lightning arrestors shall be grounded to the bulkhead panel.

Control stations with outdoor antennas shall be equipped with a coaxial lightning arrestor, Polyphaser IS-50NX-C2, or equivalent. These lightning arrestors shall be grounded to a 5/8" X 8 foot driven ground rod by a #2 AWG tinned solid copper wire attached to the rod using exothermic welding. It is preferred that the grounding system used for the control station lightning arrestor shall be connected back to the building ground system at the power service entrance.

Each coaxial transmission line shall be grounded at a point above the bend required to exit the tower mounted cable ladder to the ice bridge leading to the radio equipment shelter or room. These grounds shall be installed in accordance with the manufacturer's specifications, and shall be sealed against entry of moisture at any location where the outer sheath of the transmission line has been cut or removed.

Transmission line identification – each transmission line shall be color coded with colored tape at three locations: at the cable entry inside the shelter; at the base of the tower at approximately 10-ft level; and at the top near the antenna.

## **15.7 GPS Receivers**

The proposed GPS receivers used in the simulcast system shall have the antenna line equipped with a gas tube surge arrestor Polyphaser IS-MR50LNZ+6 or +15, or equivalent.

GPS antennas shall be installed outside the shelter in an elevated and unobstructed location, typically near the waveguide bridge.

## **15.8 Equipment and System Acceptance Testing**

Prior to installation at the sites, the contractor shall stage the equipment in Oxford County area to ensure all equipment is properly connected, provisioned, and operational prior to delivery at the sites.

The Acceptance Testing for all systems shall consist of a series of tests, inspections, and verifications that are defined in this section. The ATP shall cover all field testing procedures and which inspections shall be made in order to show Contractor compliance to the specifications as well as define each and every required sub-system interface. Oxford County's representative and the Contractor's representative shall conduct these tests and inspections as defined.

Test Methods are defined as follows:

- **Test:** Verification based upon measurements (e.g., RSL, RFC-2544 and Y1564 tests, transmitter output, sensitivity, signal levels, etc.)
- **Inspection:** Verification based upon visual review or physical measurement status lamps, (e.g., equipment racks, grounding, antenna mounting, frequency selection, etc.)
- **Demonstration:** Non-instrumented verification of a response given a stimulus (e.g., a, battery chargers, proper receiver voting, etc.)

At minimum, the tests and inspections listed below shall be performed. Final Acceptance of each individual transmitter shall include, but not be limited to, the following list of tests and inspections. The results of the tests and

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the associated punch list of outstanding items to be compiled or re-tested shall be signed by both parties and forwarded to Oxford County for review and acceptance.

Radio System

- Transmit frequency and deviation
- Transmit output and reflected power
- Receiver threshold sensitivity
- Effective receiver sensitivity
- Receiver frequency
- Alarm function
- Adjustment of control line levels to proper levels
- Simulcast optimization
- Proper setting of audio phase delays
- Proper setting of audio amplitude levels
- Proper operation of frequency standard

Microwave, Multiplexers, Switches & Routers

The following tests, in addition to other standard manufacturer's test procedures, shall be performed. Complete documentation of Field Acceptance Test results shall be provided to Oxford County upon completion of testing.

Perform/Verify Complete Terminal Provisioning. Provision microwave terminal and IP devices in accordance with Oxford County requirements.

Provide screen shots of provisioning parameters.

Path Alignment

- The Vendor shall be responsible to perform microwave dish alignments for all microwave paths
- Dishes shall be aligned for maximum RSL
- The Vendor shall provide all material, equipment, and personnel required to perform path alignments

IP/Ethernet Testing

RFC-2544 and Y1564 tests for all hops is required.

Audio Quality

- Audio quality measurements shall be performed following integration of microwave and RF radio systems per the RF radio manufacturer
- Mutually agreed upon procedure to be developed and implemented for microwave and RF radio system test

Ground Resistance Testing

A component of the system acceptance test plan to be completed by the successful contractor will be the testing of all existing grounding systems and any grounding systems installed, or utilized, for equipment associated with this procurement. This includes grounding at all base stations, dispatch centers, control stations and microwave terminal/repeater sites associated with this RFP.

All grounding systems shall be tested using an AEMC, or equivalent, clamp-on ground resistance tester or Biddle 500V Null Megger or equal (3-terminal fall-of-potential method). The resistance to ground shall measure 5 ohms or less.

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Ground tests shall be conducted in the presence of an Oxford County installation representative and results shall be recorded on a form approved by Oxford County Project Manager. These forms shall be included as a part of the acceptance test documentation and are a component of final acceptance of the radio communications system.

## **15.9 Coverage Testing and Verification**

It is important that the new system provide 100% of coverage currently provided by the existing system.

Oxford County and the contractor shall initiate audio performance testing to ensure that the simulcast system is operating as specified. Oxford County and the contractor will jointly develop a subjective test plan and method to evaluate simulcast audio.

### **15.9.1 Simulcast Proof of Performance**

**Acceptance Testing** - The contractor shall demonstrate to Oxford County's Project representative that all requirements stated in this document have been provided and are operating in accordance with Oxford County and manufacturer specifications.

Because the coverage performance requirement cannot be guaranteed without a proper testing methodology, acceptance testing shall include coverage performance testing to verify the proposed coverage design.

Since Oxford County is specifying all of the fixed sites to be used, the contractor is not required to meet a bounded area coverage requirement [Oxford political boundaries]. However, the contractor is required to provide minimum delivered audio quality [DAQ-3.0 / 95%] when a minimum mean signal level is present in the absence of external interference within the proposed coverage area shown on contractor coverage prediction maps [painted areas].

The purpose of the coverage requirement and associated coverage testing is to ensure all other elements of the network, including but not limited to site transmitters and receivers, antennas, microwave backhaul, voting system and subscriber receiver are performing properly.

Of primary concern is audio quality and simulcast delay settings, and the associated delay spread from multipath and from simulcast interference in the simulcast overlap areas.

The system shall operate for 30 days without failure before the warranty period commences. Any failure occurring within the 30-day period shall reset the 30-day clock. The contractor must obtain written acceptance from Oxford County's Project Representative to initiate the warranty period.

## **15.10 Installation Documentation**

Prior to Final System Acceptance, three [3] complete sets of Maintenance and Service Manuals shall be submitted outlining all systems and equipment provided under this contract, including all software user documentation and licenses.

Each site shall be equipped with appropriate manuals that pertain to the equipment on the site.

Documentation shall consist of equipment test data, software documentation (which describes system and equipment software), "as-built" drawings and diagrams in both electronic (PDF) and paper formats. Detailed equipment maintenance, setup and alignment manuals shall also be provided. Oxford County prefers this information on flash drive media.

Where applicable, paper documentation shall be inserted and organized in appropriately labeled three ring binders – no loose papers allowed.

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The manuals shall include complete maintenance instructions, wiring diagrams, as-built diagrams, and troubleshooting instructions and a complete collection of manufacturers' product and catalog literature for equipment and systems installed.

System service instructions for work that the manufacturer recommends being performed by the users and complete parts lists for each major item of equipment and/or system shall be supplied.

Procedures for the administration of user identifications, passwords, remote access controls and confidentiality of information consistent with Oxford County security standards and procedures shall be included.

**System Diagrams** - showing "as-built" configuration for all parts of the RF systems. The contractor shall develop detailed schematic drawings showing the various equipment components in the system, the interconnections, and the identifying circuit numbers, etc.

**Maintenance Drawings** - Each item that is capable of replacement for maintenance purposes shall be shown in an appropriate drawing that clearly indicates its position and relationship to the communications system. Exact names, part, and identification numbers shall be shown with instructions and information for future procurement.

**Equipment List** - Upon completion of installation and a condition for acceptance, shall provide the County an updated "as-built" equipment list by site showing: location, quantity, model number, description, and serial number.

**Cabling, Conduit and Terminal Plans.** All interconnecting cables shall have permanent identification markings to indicate cable function, origination and destination. Cable identification (tag, label, etc.) shall be accomplished in a manner that will allow visual cable identification after complete installation. The cable identification shall be uniform and consistent throughout the system. It is essential that this information be stored in a computer database for future reference and update, if required.

**Wiring Diagrams and Circuit Identification** - The Proposer shall develop drawings indicating the specific method of wiring used on each item of equipment, and interconnection wiring between items of equipment clearly indicating the relationship to the rest of the communications system.

The above documentation shall also be provided on Flash Drives in PDF format.

**IP Addresses** – Prior to final acceptance, the Contractor shall provide the County with IP addressing schemes and configuration parameters including passwords.

Wherever possible, the above documentation shall also be provided on Flash/Thumb Drives as PDF files.

### **15.11 System Cutover**

The Vendor is to describe in their RFP response a cutover plan. This plan shall include a chronological chart with the tasks to be accomplished and the time for achievement of each task shown. A smooth operational transition from the existing systems to the replacement system is the goal. Key elements will be how active dispatching and fire alerting will be supported throughout implementation.

The detailed cutover plan shall include a narrative description of the sequential cutover steps and a clear delineation of which tasks are the responsibility of the Vendor and which tasks is the responsibility of Oxford County. Please describe any additional or temporary equipment that may be required to accomplish the transition.

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## **16 WARRANTY, MAINTENANCE AND TRAINING**

The Contractor shall provide manufacturer warranty and extended maintenance support during the life of the contract including all option periods exercised by Oxford County.

The Contractor shall warrant that all goods and services supplied, systems, equipment, designs and work shall be satisfactory for its intended purpose, shall conform to and perform as called for in the Contract and shall be free from all defects and faulty materials and workmanship.

Defects related to faulty workmanship, including all damages to surrounding work caused by such defects, shall be without delay, repaired to Oxford County's satisfaction at the Contractor 's expense.

During subsequent maintenance periods the Contractor may use Oxford County's inventory of spare equipment or parts, or a Proposer maintained depot.

Any services supplied, systems, equipment, designs, or work found to be defective within the time specified elsewhere in this section shall be repaired, remedied, or replaced, by the Contractor, free of all charges including, without limitation, transportation.

The Contractor shall provide a copy of the formal signed equipment and software warranties as part of the Maintenance and Procedures Plan Manual upon final acceptance of the system.

Failed equipment may be brought to the selected Contractor's service facilities for repair and return to Oxford County's spare parts inventory.

In cases where the manufacturer, Contractor, or Oxford County discovers a defective product or component, the Contractor shall have sole responsibility for new replacements at no cost to Oxford County.

**IMPORTANT:** Should any specific equipment item [such as a repeater station, station circuit board, power amplifier, etc.] fail three times during the warranty period, the Contractor shall replace that equipment item and warranty the replacement for one additional year from the time of replacement.

### **16.1 Duration of Warranty**

The Proposer shall warrant for a period of ONE [1] year from the date of Final System Acceptance all defects or damages due to faulty materials or workmanship.

In addition, pricing for years TWO [2] through FIVE [5] for maintenance shall be submitted in the proposal.

As an OPTION, please provide pricing for years SIX [6] through TEN [10].

The additional year's contract maintenance period shall begin on the date that the warranty period maintenance expires or the date that Oxford County exercises the option for that year of maintenance services.

Batteries, including UPS batteries, shall have warranties greater than one-year as specified in the DC Power section of the RFP.

### **16.2 Maintenance Plan**

The Contractor shall prepare and submit for Oxford County's approval, a comprehensive Maintenance Plan to follow during the Warranty and Maintenance periods.

The Plan shall include descriptions of the Proposer's warranty/maintenance management system and detailed procedures for all corrective/repair and preventive work.

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Once approved, the Plan shall be used by both Oxford County and the Contractor to guide the management of all maintenance work.

The Plan shall be a living controlled document, updated as necessary by the Contractor and Oxford County.

Within the Maintenance Plan, the Contractor shall describe procedures and activities to be performed as part of the preventive maintenance program, including the frequency of each activity.

The Plan shall include all procedures recommended by the equipment manufacturers. This includes performing regularly scheduled operational tests and alignments on the system and sub-systems as recommended by the manufacturer; including third party equipment. Tests and alignments results shall be recorded and included as part of the plan for future reference.

The Maintenance Plan shall also include inspection and maintenance of all field equipment, racks, and all electronic equipment including the inspection and replacement of filters; ensure that equipment is clear from material and clutter; cleaning of equipment and accessories when in for repair; and checks that all hardware and software is working properly.

Inspection of the Communication Console equipment such as servers, software, and computer equipment, such as keyboards, monitors, mice, storage drives, etc., shall be discussed.

The Plan shall also include inspection of microwave system equipment, including routers and switches, and performing manufacturer's diagnostic tests.

Physical inspection of the infrastructure equipment to include equipment racks, local alarm indicators, cables, connections, emergency generator, UPS/battery maintenance, and HVAC.

Visual inspection of the compound, including the shelter, tower, antennas, and transmission lines.

The classification of the hardware, software, and/or system/subsystem failure as documented in the Maintenance Plan shall govern repair time requirements.

This includes all equipment, hardware or software failure that renders Radio System or any subsystem ineffective. If the failure affects multiple devices, this also shall constitute a Hardware/Software Critical Failure. Examples include: malfunctioning LAN, controllers, Control Center or damage to the radios and/or any supporting equipment provided by the Proposer.

It also includes a failure of the microwave system that renders the entire system or any subsystem ineffective.

Also, non-critical failure of any individual equipment, hardware or software that does not affect the overall operation of the system. Examples include: malfunctioning radio control stations, microphones and speakers, or any radio accessory, dispatcher keyboards, mice, etc., or any item that could reasonably be replaced by Oxford County personnel under telephone direction of qualified maintenance personnel.

### **16.3 Maintenance Service Levels and Response Times**

Throughout the warranty and extended maintenance period, the Contractor shall provide the initial response to all trouble calls in order to maintain high system availability.

Normal, non-critical warranty maintenance shall be performed during normal business hours of 7:00 am-5:00 pm M-F. Some equipment and subsystems deemed critical by Oxford County shall be protected by warranty and extended maintenance that provides guaranteed response and restoration times on a 365-day by 24-hour basis. The following lists identify response and maintenance performance level required for the various subsystems:

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- **24 x 7-day**
  - 30-minute phone response
  - 2-Hour On-Site Response/4-Hour repair with spares
    1. Dispatch Console
    2. Radio System Infrastructure
    3. Microwave Network
  
- **10 x 5-day**
  - 8-Hour On-Site Response/8-Hour repair:
    1. Tower/Shelter Subsystems
    2. Alternative Support Systems and Specialized Equipment.

Repair time shall be measured from the time the Contractor's representative receives notification that a failure exists until the time corrective work is complete in a manner satisfactory to Oxford County and the equipment is returned to normal service.

The Contractor shall provide yearly Preventative Maintenance services, which include operational tests and alignments on the system and sub-systems as required by manufacturer

#### **16.4 End-of-Life of Proposed Equipment**

Proposers should fully disclose the end-of-life status of each major equipment component in their Proposal. End-of-production dates should be provided, minimally, for communications dispatch console, base stations, microwave radios, network controllers, etc. It is the intent, to the maximum extent possible, for Oxford County to avoid the purchase of any network equipment that is nearing the end of its production cycle.

#### **16.5 Service Facilities and Maintenance Personnel**

The contractor shall have qualified technicians available to meet the required response times.

The Proposer shall be certified by the system manufacturer as an authorized service provider for the system being proposed.

The Proposer shall maintain one or more properly stocked, equipped, and staffed service facilities to maintain the equipment supplied under this contract.

The Proposer shall provide experienced personnel to execute the required maintenance tasks during the warranty and any subsequent exercised service period options.

All maintenance personnel who perform maintenance on the system shall have completed all required manufacturer-approved training for that equipment and evidence thereof shall be provided to Oxford County.

The Proposer shall provide a brief bio of key maintenance personnel in their proposal along with certifications.

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## **16.6 Hardware Maintenance Services**

The Contractor shall be responsible for maintenance and support of all hardware from the time of installation through expiration of the warranty period and any subsequent optional extended maintenance periods exercised by Oxford County.

Maintenance services shall be performed in accordance with the Maintenance Plan and include all preventive maintenance services as specified.

These requirements apply during both warranty and purchase support periods, if enacted.

Oxford County shall have the option of purchasing directly from the appropriate Original Equipment Manufacturer [OEM] of computers and associated peripheral equipment on-call maintenance services in accordance with the various levels of service offered by such OEM.

No later than 30 days prior to the expiration of the warranty, and any subsequent maintenance period exercised by Oxford County under this contract, the Proposer shall have the equipment certified as being acceptable by the OEMs maintenance services, and shall request the OEM to provide written quotation to Oxford County for the provision of such services.

The Contractor shall work with Oxford County and its authorized contractors to resolve problems on the communications backbone network that may affect the overall operation of the new communications system.

## **16.7 Software Maintenance Services**

The Contractor shall be responsible for all aspects of system software maintenance and system/database administration during the warranty and extended maintenance periods agreed to in the contract.

This work shall include, without limitation, monitoring and tuning of all operating systems, network software, databases, and support of all other Proposer provided system software components.

The Contractor shall also be responsible for installation of third party software patches and revisions at no additional charge to Oxford County.

The Contractor shall provide software/firmware updates prior to final acceptance, during the warranty period and any exercised maintenance period.

A software-licensing fee should be included to ensure the latest software release is current at Final System Acceptance.

The Contractor shall notify Oxford County when any software updates are released following system acceptance for any licensed software associated with the system. Updates should be one per year with annual software refresh included.

Bug fixes are not considered a software refresh.

The refresh under the contract must be full implementation including installation, engineering, and project management.

Software updates shall include enhancements or corrections to existing features for all supplied system components, new features implemented in existing system components, software for product migrations, where a new generation of software is developed for a designated system component, rather than an update of the older generation of software.

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Software refresh must be a coordinated “system-centric” event, mitigating the risk of disparate software versions causing problems.

Oxford County shall be informed of updates for all software changes provided upon its release, including documentation and solution of software problems, improvements, updates, and new releases that could be made to the system provided to Oxford County.

This service shall commence at the time of Final Acceptance, and shall continue through the maintenance period or five years, whichever is longer.

The Contractor shall grant to or obtain in the name of Oxford County a perpetual, non-revocable, non-transferable, and non-exclusive license to use the Software and documentation related thereto for Oxford County communications system provided.

Any copies of the Software and documentation that Oxford County acquires pursuant to the Contract shall bear all copyright, trademark, and other proprietary notices, except as provided by law or authorized in the Contract.

The Contractor shall provide copies of software licenses, operating instructions, programming instructions, technical documentation and maintenance procedures to allow making maintenance and provisioning changes to all equipment included in the System.

### **16.8 Software Upgrade Agreement**

Upon the initial 1-year free warranty period, the contractor shall provide access to all minor, major and security software update releases, to include any or all hardware components that need to be refreshed.

To maximize system life and performance, the Contractor shall describe in their proposal their post warranty plan for years 2 through 5.

### **16.9 DC Power Systems and Batteries**

The Contractor is completely responsible for regular and preventative maintenance on all battery systems through the System Warranty period.

Preventative maintenance testing shall include, at a minimum, the following tests/ measurements/ inspections:

- (1) Measurement of a significant deviation (>25%) in the impedance, conductance or DC resistance of the cell as compared to the levels that were recorded at the time of commissioning.
- (2) A partial discharge test with the battery connected to the load in which the voltages of each cell in the string are recorded in a test that involves lowering the rectifier float voltage below the open circuit voltage and discharging the battery with the connected load current.
- (3) Periodic measurement and monitoring of cell temperature.
- (4) Measurement of cell voltage compared to midpoint voltage.
- (5) Complete inspection of all inter-battery buss connections.

### **16.10 Remote Diagnostics**

It is recommended that the Contractor have the capability to remotely monitor, diagnose, repair, and restore access the new system.

The remote maintenance access must run in the background and cannot impact system operations.

Contractor shall describe their remote maintenance access system and capabilities in their proposal.

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### **16.11 Spare Parts Inventory**

The Proposer shall determine the number of spares for each component and complete assemblies required to sustain day-to-day operation and maintenance for the warranty and the subsequent optional extended maintenance period.

This list shall include manufacturers' complete catalog identification numbers and model designators, quantities, options, and catalog "cut sheets".

The submission shall be in sufficient detail to enable Oxford County to readily identify the equipment.

Examples of equipment assemblies include field replaceable elements of servers, site controllers, central control system, and dispatcher workstations.

The spare parts list shall clearly identify all components including: Proposer name and contact information; part/version number; reliability, refurbishment and replacement requirements; and quantity of spares for each component necessary to ensure sustained operation of Oxford County's system.

The Contractor shall store the system spare parts inventory at a location approved by Oxford County.

Use of the spare parts inventory shall be documented, and equipment removed from service, whenever possible, shall be repaired and replaced into the spare parts inventory by the Proposer at no expense to Oxford County.

Alternatively, the Contractor may provide replacement equipment from a spare parts depot maintained by the Contractor.

The spare parts inventory, including any test equipment and/or software, shall remain the property of Oxford County at all times.

### **16.12 Third-Party Manufacturer Warranties**

All warranties, including Third-Party equipment, shall commence on the date of Final Acceptance.

The Contractor shall ensure that warranty on any Third-Party equipment meets the minimum warranty required elsewhere in this specification document.

For warranties that are provided directly from equipment manufacturers, the Contractor shall formally transfer all such warranties to Oxford County.

In the event that any Third-Party manufacturer customarily provides a warranty period greater than required elsewhere in this specification document, the warranty shall be for the greater period of time.

For each warranty manufacturer, provide name, address, and telephone number for service for each item of equipment or system with a copy of the formal signed equipment and software warranties.

Original software distribution media, and an itemized list of test equipment required supporting maintenance of the installed radio system.

### **16.13 System and Equipment Support**

The Contractor shall obtain from the manufacturer a warrant that replacement or compatible parts for all system components, including proprietary products but not subscriber equipment, shall be available for purchase at least ten [10] years after the final acceptance date.

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## **17 SUBSCRIBER EQUIPMENT**

The County desires preliminary unit pricing for subscriber radios that can be implemented on the proposed simulcast system. The proposer shall identify the different tier models and capabilities of portable and mobile radios to include standard analog, P-25 and DMR unit operation.

## **18 PRICING AND FINANCIAL CONDITIONS**

The equipment provided by the Proposer shall be a complete turnkey system, with firm pricing for all equipment and services described by the specifications. Proposers shall submit their pricing based upon their best offer price at the time of initial bid submission, including special discounts, trade-ins, cost incentives or signing bonuses.

The jurisdiction is exempt from all federal excise, transportation taxes, and state sales taxes. No exemption certificates are required for this procurement, and none will be issued.

All pricing shall be FOB destination.

This pricing structure shall remain in effect for a period of not less than 12 months following final system acceptance.

Pricing provided in the response to this RFP request must be all-inclusive. If a specific type of equipment is proposed, all pricing associated with that piece of equipment must be included. The price shall include all requirements to make that equipment operational. For example, a price for a mobile radio shall include the microphone, speaker, power cord, programming hardware and software, etc.

After the initial period, unit pricing shall escalate at no more than the annual Consumer Price Index (CPI) as calculated by the jurisdiction Finance/Purchasing Department. This section shall apply not only to purchases made by the Jurisdiction but shall also apply to other entities within the jurisdiction including fire, law enforcement, ambulance services, public works, and other agencies as authorized by the jurisdiction.

Pricing shall include the resources needed to decommission legacy equipment, including antennas and transmission lines, packaged and returned to the County for disposal as described in this specification.

Maintenance pricing for parts and labor shall also be included in the pricing sheets. This includes subsequent years after expiration of the Warranty period, years-2 through year-10.

### **18.1 Prevailing Wage**

Except as noted below, the Proposer shall comply with the current provisions of the Department of Labor of the State of Maine regarding Prevailing Wage. Additional information can be found at:

[https://www.maine.gov/labor/labor\\_stats/publications/wagerateconst/index.html](https://www.maine.gov/labor/labor_stats/publications/wagerateconst/index.html)

### **18.2 Pricing Sheets**

The Proposer shall submit all pricing for its proposal using pricing sheets to be provided to bidders at the PreBid conference.

All costs shall be rounded to the nearest dollar!

Design review, equipment delivery, freight, installation, programming, optimization, project management, engineering, training, testing, Proposer travel and waiting time, per-diem, and supplies shall be included in the pricing worksheets.

Summary Pricing Sheets and detailed Pricing Worksheets of the proposed system, sub-assemblies, installation and implementation labor services on a per site basis.

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Proposals should clearly and effectively communicate system concept, infrastructure configuration and user equipment options. Pricing should reflect both system and component level costs.

Partial payment shall be made by the County after the items awarded to the Proposer have been received, inspected, and found to comply with procurement specifications, to be free of damage or defect, and to be properly invoiced. A single itemized invoice of equipment, software, and services shall bear the contract number and purchase order number.

### **18.3 Proposed Payment Schedule**

Oxford County will pay the winning vendor for services performed in accordance with the signed Agreement.

Invoices will be submitted in the following schedule:

- 20% of contract price will be paid upon contract execution.
- 10% of contract price will be paid upon completion of Detailed Design Review [DDR].
- 20% of the contract price for services related to the infrastructure will be paid after the complete staging test.
- 10% of the contract price for services related to the microwave radio system infrastructure will be paid after equipment delivery and the completion of installation at all the sites.
- 20% of the contract price for services related to the VHF radio system infrastructure will be paid after equipment delivery and the completion of installation at all the sites.
- 20% Balance of the contract will be payable after field testing, final system acceptance, and after the 30-day operational system test

The Oxford County reserves the right to request substantiating information on any bill submitted. Oxford County will, within 30 days after receipt of an invoice requesting payment indicate the approval of payment and process the invoice.