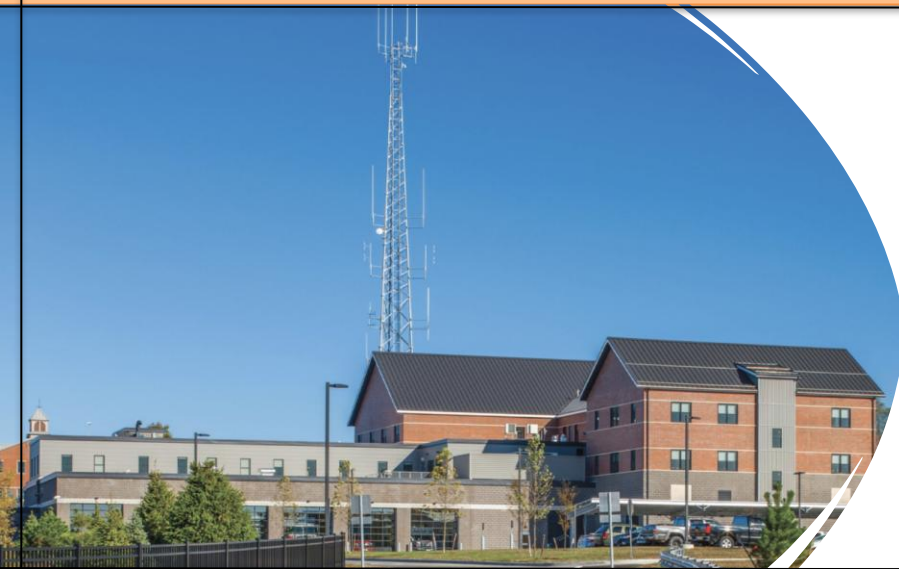


Town of Scarborough, ME

Request for Proposal #152026

September 16, 2025



Municipal Two-Way Radio 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 regional P25 Phase-2, 800 MHz Trunked Radio Network

Pre-Proposal Conference: September 30, 2025

Proposals Due: November 13, 2025

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1 INVITATION TO SUBMIT A PROPOSAL

Prospective vendors are hereby invited to submit proposals in accordance with this Request for Proposal [RFP]. This RFP is the result of a joint initiative effort between the Towns of Scarborough and Old Orchard Beach. Both towns seek to develop a comprehensive specification for the replacement of their respective conventional VHF radio systems. The purpose of this initiative is to implement a regional Project 25 [P25], 800 MHz trunked simulcast radio communications system to serve the operational needs of public safety and public service departments within both municipalities.

Scarborough shall serve as the lead contracting authority for this project, bearing responsibility for all procurement-related contractual obligations, including system acquisition, installation, and ongoing maintenance. Old Orchard Beach shall be designated a co-participating municipality, with shared commitments to system funding and operations.

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 the Town.

The proposer must provide a detailed response to all items listed in this document and must understand that all documents submitted will become part of the contract between the Town of Scarborough and the proposer

Proposers must respond directly to the requirements outlined in this RFP. However, if a proposer identifies alternative approaches or cost-saving measures that could effectively meet the Town's objectives, such proposals may also be submitted for consideration under a separate section. The Town will review these alternatives at its sole discretion but does not guarantee approval unless they are clearly demonstrated to be beneficial and, in the Town's best interest.

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2 RFP SCHEDULE AND KEY DATES

EVENT	DATE
RFP Issued to Proposers	September 16, 2025
Deadline for Submission of written Pre-Bid Questions email [to be answered at prebid conference]	COB – September 25, 2025
Pre-Bid Conference - MANDATORY	8:30 AM September 30, 2025
Deadline for additional written questions/email	COB – October 31, 2025
Answers to final questions by email	COB – November 3, 2025
Proposal Due Date	2:00 PM November 13, 2025
Bid Award - estimate	By January 2, 2026
Voter Referendum – Scarborough & Old Orchard NOTE: The contract will only be executed if approved by voter referendum	November 3, 2026

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2.1 Instructions for Submitting a Proposal

Sealed Proposals will be received in the Town Clerk's Office, Scarborough Town Hall, 259 US Route 1, Scarborough, Maine 04074 until 2:00 pm on November 13, 2025 from parties interested in providing a submittal package for Public Safety Radio Communications Upgrade.

Proposers must submit the following complete proposal:

One [1] original hard copy of with original signatures

One [1] flash drive with an electronic copy of the proposal. The soft copy must be a PDF file, and shall be exactly the same as the hard copy. Differing versions are subject to disqualification

Faxed proposals will not be considered.

The proposals, if mailed, should be addressed as noted below.

Town of Scarborough
Purchasing Agent
RFP #152026
259 US Route One
PO BOX 360
Scarborough, ME, 04070-0360

The Town reserves the right to accept or reject any and all proposals.

These proposals will not be publicly opened.

A Vendor's failure to submit its proposal prior to the deadline will cause the proposal to be disqualified. Late proposals or amendments will not be opened or accepted for evaluation.

All proposals submitted shall become property of Town of Scarborough and will not be returned.

2.2 Contact Information

For questions related to the RFP process:

Kim Morrison, Purchasing Specialist
Email: kmorrison@scarboroughmaine.org
Phone 207 - 730-4083 / Fax 207-730 4088

The preferred contact method is email. All inquiries or requests concerning this Request for Proposals shall be made in writing and must be received before the close of business two days prior to the deadline to the attention of Kim Morrison, Purchasing Specialist. The Town is not responsible for oral interpretations given by any Town employee or representative.

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2.3 Intent to Submit a Proposal Form

INTENT TO BID FORM
Town of Scarborough Radio Project

Please complete and return this Notice of Intent to Bid Form to confirm your organization's interest in participating in the procurement process associated with the referenced Request for Proposals.

Submitting this form does not obligate your organization to submit a proposal; however, it ensures that you will receive all future communications, including addenda, clarifications, updates, and responses to bidder questions. Your timely submission also assists the issuing agency in planning for proposal evaluations, coordinating site visits or pre-bid meetings, and maintaining an accurate list of prospective respondents.

Bidders who do not return this form may risk missing critical information that could affect the preparation or validity of their proposal submission.

Will you be attending the MANDATORY Pre-Proposal Conference: YES NO

Reason if 'NO': _____

PLEASE EMAIL THIS FORM TO:

Kim Morrison, Purchasing Specialist

Email: kmorrison@scarboroughmaine.org

Date: _____

Submitted by:

Company: _____

Name: _____

Email: _____

Phone: _____

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2.4 Pre-Proposal Conference and Location

A Pre-Proposal Conference will be conducted on the date specified in the RFP Schedule. This session is intended to provide prospective Proposers with an overview of the project, clarify the scope of work, and address questions related to the RFP requirements, submission procedures, and evaluation process.

Location:

Scarborough Public Safety
2nd Floor Conference Room
275 US Route 1
Scarborough, Maine 04074

Attendance at this Pre-Proposal Conference is MANDATORY for all prospective bidders. Failure to attend will result in disqualification from the bidding process.

Meeting minutes and any resulting addenda will be distributed to all in attendance.

RSVP Instructions: Proposers must confirm attendance by emailing the Form on Page-6 to the Project Manager.

2.5 Pre-Proposal Conference Process

Step-1:

All inquiries, requests for clarification, appeals, or proposed modifications—whether pertaining to the technical specifications or commercial terms of this RFP must be submitted in writing via email prior to the Pre-Bid Conference. Submissions must be received by the deadline listed in the RFP Schedule

Step-2:

All prospective Proposers shall convene on the date and time specified in the RFP Schedule for the Pre-Bid Conference. This meeting is intended to promote a clear and shared understanding of the project by addressing any questions previously submitted in writing, allowing for the submission of additional inquiries or appeals, and distributing any new or updated project information that may assist Proposers in the preparation of their responses.

Following the conference, all official responses to inquiries, clarifications, and any revisions or modifications to the RFP will be documented and issued in writing. These materials will be disseminated to all registered Proposers in the form of an Addendum, which will be transmitted via email within five [5] business days of the Pre-Bid Conference. The Addendum will serve as an official component of the RFP and shall be considered in the preparation of all proposals.

Please note: Any verbal statements made during the Pre-Bid Conference shall not be considered binding. Only information formally issued in writing by the Town through an Addendum shall be recognized as official and enforceable.

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2.6 Site Surveys and Inspection

To assist Proposers in accurately determining the scope of work, a site tour will be conducted on the same day as the Pre-Bid Conference. The tour is expected to take the remainder of the day. Its purpose is to allow each prospective vendor to assess site conditions necessary for the proper estimation of installation labor, equipment, materials, and any required site improvements.

The Town will escort attendees to each location and will provide bus transportation for the tour. Each company is asked to limit attendance to two representatives.

During the site visit, Proposers shall inspect existing grounding systems, lightning protection devices, and other site infrastructure to evaluate their suitability for the proposed equipment. Vendors are also expected to assess electrical service at each location to determine its adequacy for supplying AC power. Any modifications deemed necessary must be identified and included in the submitted proposal.

In addition, Proposers should evaluate environmental controls at each site to ensure they are capable of maintaining the proposed equipment within its required operating conditions.

Please note: This site visit is the only opportunity for Proposers to inspect the Town's communications facilities. Attendance is mandatory for all vendors intending to submit a proposal.

2.7 Additional Requirements and Conditions

All proposals must remain valid and open to acceptance for a period of one hundred twenty (120) calendar days from the date of the opening.

It is solely the responsibility of the Proposer to ensure timely and accurate delivery of all required materials. Failure to comply with any of the above instructions may result in the proposal being deemed non-responsive.

3 TERMS AND CONDITIONS

This RFP establishes the information necessary for a Proposer to complete a response.

All Proposers are expected to carefully examine the RFP document. Any ambiguities or inconsistencies should be brought to the attention of the Town of Scarborough via email, as appropriate. It is the responsibility of the Proposer to clarify any information, which is contained in this RFP and not fully understood.

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

- having become familiar with the existing radio system
- 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 Proposer 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 Proposer shall, in all cases, be solely responsible for the

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delivered system, and for furnishing complete system documentation for each and every part of the provided system.

The Town of Scarborough reserves the right to amend this RFP prior to the proposal due date. All amendments and additional information will be posted on the Town website: www.scarboroughmaine.org. The Town reserves the right to waive any informality in proposals, to accept the proposals or portions thereof, and to reject any and all proposals, should it be deemed in the best interest of the Town to do so. Nothing in this document shall require the Town of Scarborough to proceed with Engineering and/or any of the identified services. The Town reserves the right to substantiate Respondent's qualifications, capability to perform, and availability and past performance record.

The cost for developing the proposal is the sole responsibility of the Proposer. All proposals submitted become the property of the Town.

The Town reserves the right to approve subcontractors. All work performed under contract to the Town becomes the property of the Town in the format specified by the Town.

A Certificate of Insurance is required from all consultants, contractors and vendors doing business with the Town of Scarborough. Within two (2) weeks of the Notice of Award, Consultant must submit a Certificate of Insurance naming the Town of Scarborough as "additional insured." Failure to furnish the required certificate within the required timeframe may result in the proposal being rejected.

The successful Proposer (s) selected shall agree to defend, indemnify and hold the Town harmless from any and all claims, demands, suits, causes of action and judgments arising from or related to Consultant's performance, including claims of professional malpractice or negligence. Such indemnity shall include the Town's reasonable attorneys' fees as well.

The above referenced indemnity shall be in addition to and as a complement to the below described insurance coverage, which coverage is a mandatory requirement of this RFP and any award hereunder.

3.1 Insurance Requirements

Specifically, the successful Proposer(s) shall provide the following coverage(s) and amount(s).

Commercial General Liability	\$2,000,000.00
Automobile Liability	\$2,000,000.00
Workers Compensation	\$1,000,000.00
Errors and Omissions	\$2,000,000.00
Umbrella Coverage	\$2,000,000.00

All policies shall be underwritten by companies licensed to sell insurance in Maine and who are rated A+ or better by AM Best Company. Self-insurance pools or trusts are not an acceptable substitute for the referenced commercial coverage.

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3.2 Funding Contingency and Contract Termination

This project is subject to the availability and appropriation of funds, including approval through a public referendum in both the Town of Scarborough and the Town of Old Orchard Beach. In the event that such funding is not approved, is reduced, or otherwise becomes unavailable, the Town of Scarborough reserves the right to terminate any resulting contract immediately, upon written notice to the contractor, without penalty or further obligation.

The determination of fund availability shall be made solely at the discretion of the Town of Scarborough. In the event of termination under this provision, the contractor shall be entitled to receive, and shall be limited to, just and equitable compensation for any satisfactory and authorized work performed up to the effective date of termination.

3.3 Town Rights and Proposal Conditions

The Town of Scarborough 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 Proposers if it is determined to be in the best interest of the Town of Scarborough to do so.

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

The Town of Scarborough 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 the Town of Scarborough. All proposals received will be evaluated by the Town's Project Team, who reserve the right to award or not to award a contract.

The Town of Scarborough reserves the right to verify and evaluate the qualifications of any or all bidders, including sub-contractors. This includes, but is not limited to, validating statements made in the proposal, confirming the bidder's technical and financial capacity to perform the required services, assessing current availability of necessary resources, and reviewing the bidder's record of past performance on similar projects. The Town may request additional documentation or references as needed to ensure that each bidder is capable of fulfilling the obligations of the contract to the Town's satisfaction.

3.4 Town-Directed Adjustments to Site Planning

The Town is actively pursuing lease agreements with selected site owners and anticipates execution of these agreements early in the project timeline. Notwithstanding this, should a change in site location become necessary - due to unresolved lease terms, failed structural analysis, or an unsatisfactory microwave path survey - the Contractor shall provide technical support as required to assist the Town in identifying and evaluating suitable alternatives.

Such support may include, but is not limited to:

- Technical assessment of alternative sites identified by the Town
- Preparation of additional microwave path profiles
- Development of revised RF coverage maps
- Revised equipment list where needed

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All decisions regarding site selection, substitution, system rerouting, or required deliverables shall rest solely with the Town and the Contractor agrees to work with the Town.

3.5 Confidentiality

The Town of Scarborough is subject to the Freedom of Access law. Under this law, it must make public information which 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, the Town agrees that it will not disclose such information to any third party, and that such disclosure shall occur only if the city is compelled to disclose such information by a final judgment, after giving you the opportunity to litigate the issue. Proprietary information must be submitted in a separate sealed envelope to the Town along with your sealed proposal. The outside of the envelope must clearly be marked “Proprietary information/confidential.” The Town agrees that proprietary information will only be viewed by Scarborough officials, and will be reviewed only on a “need to know” basis. The information will not be shared with any third party without your express consent or a court order.

3.6 Protected Information Disclosure

As a supplement to this RFP, the Town of Scarborough will issue a separate document containing information deemed security-sensitive, including, but not limited to, transmitter site locations, system diagrams, and operating frequencies. Recognizing that such information is necessary for bidders to prepare a comprehensive response, access will be provided upon execution of a Non-Disclosure Agreement [NDA] between the Town and the requesting party.

This supplemental document is the exclusive property of the Town of Scarborough and may not be copied, disclosed, or distributed in any form. Access is governed by the terms of the Non-Disclosure Agreement (NDA), which will be executed during the Pre-Proposal Conference.

3.7 Performance Bond

The successful contractor shall, within ten (10) business days after award notice or at the signing of the contract, whichever comes first, furnish a Performance Bond for 100% of the expected costs of services under the proposal for one year. In lieu of a Performance Bond, the town may consider a cash surety or other surety, which, in the opinion of the Town Manager and Town Attorney, shall provide sufficient protection to the Town. Scarborough will not be liable for the accrual of interest on any certified or cashier’s check submitted.

3.8 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 the Town of Scarborough 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. the Town of Scarborough reserves the right to accept or reject the identified PM.

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If, during the term of the contract, it is necessary to replace the PM, the Town of Scarborough 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
- Relevant experience for each listed project, provide name, title and telephone number of a reference.
- Contact possessing a technical background
- Education & training

3.9 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
TIA - Telecommunications Industry Association
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

FCC - Federal Communications Commission
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

FAA – Federal Aviation Administration
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

3.10 Exceptions and Clarifications

Proposers who seek to clarify, take exception to, or propose alternatives to any stated requirements shall explicitly identify such matters within their submission. All exceptions, clarifications, and proposed substitutions must be presented in a clearly labeled, separate section of the response. the Town of Scarborough shall retain sole discretion in determining whether a matter constitutes a clarification or an exception.

Important: The absence of exceptions, clarifications and/or substitutions shall indicate that the Proposer has accepted all the requirements of the RFP in the manner described and shall hold the Proposer responsible to perform in strict accordance with the requirements of the RFP. the Town of Scarborough 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 the Town of Scarborough.

3.11 Delivery, Storage and Risk of Loss

The contractor shall be responsible for coordinating, unloading, inspecting, accepting and storing all material deliveries. the Town of Scarborough 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 contractor's storage or service facilities; while it is shipped to the installation locations; and, until the completed system is accepted by the Town of Scarborough.

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

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3.12 Detailed Equipment List by Site

Proposals must include a comprehensive equipment list -complete with model numbers, descriptions, and other relevant details - as specified in the RFP. This equipment list must be clearly cross-referenced with the contractor's itemized pricing sheets included in the proposal.

Where applicable, equipment lists should be organized by location and must detail any specific requirements necessary for proper installation and operation. NOTE: two equipment list are required, one for Scarborough and one for Old Orchard Beach

This equipment list will be incorporated as an appendix to the final Contract Agreement.

Additionally, as a condition of acceptance following installation, the contractor must provide the Town of Scarborough with an updated "as-built" equipment list for each site. This list must include the location, quantities, model numbers, descriptions, and serial numbers of all installed equipment.

3.13 Equipment Inventory Tagging Requirements

The selected Contractor shall affix durable, tamper-resistant inventory tags to all equipment furnished under this contract. Each tag shall include, at a minimum, the following information:

- Vendor name
- Equipment description (type/model)
- Unique equipment identification number such as serial number
- Date of installation or delivery
- QR code or barcode linked to asset data, if applicable

Tags must be securely affixed in a clearly visible location on each unit and constructed of materials suitable for indoor/outdoor use, resistant to weather, abrasion, and fading.

The Contractor shall also provide a complete inventory list in electronic format, such as Excel, organized by site location, that includes the tagged information for each item delivered. This inventory shall be submitted within fifteen (15) calendar days of final equipment installation and accepted as a deliverable prior to project closeout.

3.14 Software Licensing

Proposers shall provide comprehensive information regarding all software included in their proposal. This must include, at a minimum:

- Licensing terms, usage rights, and access conditions for all software components;
- A complete itemization of all associated costs, including but not limited to license fees, subscriptions, support, and maintenance;
- Ownership rights associated with any software provided, whether offered through purchase, lease, or rental.

For any software proposed to support the network, Proposers shall also define the scope, frequency, and terms of software updates, upgrades, and enhancements. This shall include associated pricing, licensing impacts, and any leasing or support arrangements.

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All such information must be clearly and explicitly documented in the submitted proposal.

3.15 Proposal Format and Content Requirements

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 the Town of Scarborough, 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 the Town of Scarborough, if required.

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

- **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 ONE [1] page.

- **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 ONE [1] page.

- **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

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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 the Town of Scarborough 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 the Town of Scarborough 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.
- The Proposer has the option to provide a point-by-point response to the specifications.

SECTION 3 – STATEMENT OF WORK AND SCHEDULE

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

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- 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.
- Technical items requested by the RFP such as battery calculation loads, floor loading, etc.
- 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. the Town of Scarborough 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. the Town of Scarborough 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 to be provided at the Pre-Bid Conference.
- Detailed cost sheets shall be in matrix form to the greatest extent possible. Intended locations of items shall appear as columns on the matrix.

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- 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.

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.

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.

4 BASIS OF EVALUATION AND AWARD

This section will outline the evaluation criteria to be used by the Town's 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 the Town of Scarborough. The contract will ultimately be awarded to that Proposer whose proposal, conforming to the RFP, that best meets the needs of the Town, as reflected by the requirements of this RFP, technical and cost factors considered.

4.1 Criteria for Proposal Acceptance

The contract resulting from this RFP shall be awarded only to proposers determined to be responsible, in accordance with applicable procurement regulations. A responsible proposer is one who demonstrates, to the satisfaction of the Town of Scarborough evaluation team, the capability, integrity, and reliability necessary to perform the services as specified.

The contractor shall have:

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

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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 Town's Project Manager.

The Town of Scarborough will review all cost proposals, which will be evaluated using a mathematical formula. The lowest cost proposal will serve as the benchmark and receive the maximum available points. All other proposals will be scored proportionally, based on their relative proximity to the benchmark.

The Town of Scarborough shall then use each committee member's information to numerically rank the Proposals. The Project Manager will then combine the Technical and Cost Scores and will determine the total score for each Proposer.

The Town of Scarborough may enter contract negotiations with the Proposer with the highest total score. If the Town of Scarborough and a Proposer are unable to enter into a contract for any reason, the Town of Scarborough 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:

70% Technical

25% Technical satisfaction of meeting the Town of Scarborough's requirements

25% Overall responsiveness to the RFP

20% Experience/Qualifications/Past performance on similar projects

30% Cost

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 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.

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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., the Town of Scarborough 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.

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.

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 the Town of Scarborough's needs and concerns, willingness to work with the Town of Scarborough, and overall SOW implementation.

4.4 Best and Final Offers

After reviewing the proposals, the Town of Scarborough may have follow-up discussions with Proposers who are still in the running. These conversations are meant to clear up any questions, align expectations, and make sure everyone's on the same page about what the RFP is asking for.

This is part of a proposal leveling process, where we work to clarify assumptions, ensure comparability between offerors, and address any differences in scope, pricing, or approach. The goal is to evaluate all proposals based on consistent information.

All Proposers will be treated fairly and given the same chance to update their proposals. Before a contract is awarded, we may request revisions to obtain each firm's best and final offer (BAFO). No information from other proposals will be shared during this process.

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If any scope changes occur, qualified Proposers will be notified and given a deadline to submit revised proposals. If multiple rounds of BAFOs are conducted, the most recent version will be treated as final—unless a new offer or withdrawal is submitted before the deadline.

Throughout this process, the Town will seek input from the Evaluation Committee to help guide final decisions.

4.5 Award and Contract

the Town of Scarborough will award a contract to the most qualified Proposer based upon evaluation criteria used and other considerations deemed appropriate by the Town of Scarborough. The Town of Scarborough 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 the Town of Scarborough.

Any personnel or subcontractors assigned to this project may not be substituted with other personnel or subcontractors unless approved by the Town of Scarborough in writing. Any proposal to substitute shall be in writing and include the substitute's qualifications. the Town of Scarborough 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 Vendor Proposal Response
4. Exhibit-2 Request for Proposal
5. Exhibit-3 Issued Addenda, Correspondence, etc.
6. Exhibit-4 Equipment list

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

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 the Town of Scarborough and the selected Proposer, a detailed CDR session will be held by the Town of Scarborough.

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The CDR is to ensure in more detail that equipment and services proposed by the contractor meets 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, the Town of Scarborough may suggest that tasks be added, deleted, expanded or reduced, thereby modifying the total maximum. the Town of Scarborough may desire to contract for some, but not all tasks at this time, depending on time constraints and/or budgetary limitations.

In addition, the Town of Scarborough 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 the Town of Scarborough to be included in the final contract.

4.7 Detailed Design Review [DDR] Process

Once the contract has been executed, the Town of Scarborough 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 the Town of Scarborough and Contractor perform a comprehensive final design review before equipment ordering, review of final equipment list, system drawings and diagrams, power calculations, etc. to ensure that the correct material and equipment are supplied.

The Town of Scarborough shall actively participate in the DDR of the entire system with the contractor. The contractor shall note, however, that the Town of Scarborough's participation in the DDR shall in no way relieve the contractor 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 the Town of Scarborough 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:

- Project Management Plan
- Final coverage maps
- Final microwave path certifications and path surveys
- Detailed Statement of Work [SOW]
- Detailed implementation plan
- Project schedule
- Final frequency plan
- Structural Analysis
- Network and Subsystem Block Drawings
- Line Item Equipment Lists
- Microwave Configuration and Site Connectivity Requirements
- Rack Drawings
- Floor Plans Showing New Equipment at Each Site

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- Power and HVAC Requirements
- Tower elevation drawings
- Tower compound / site plans
- Antenna Configurations by Site
- IP Network Addressing Scheme
- Interference Analysis (IM & TNRD)
- Plan for a Phased Cutover
- Training plans for staff
- Acceptance Test plans
- Final acceptance by the Town

4.8 Town's Right to Modify Scope

During contract negotiations or after the Agreement has been executed, the Town reserves the right to make reasonable modifications that may arise that require modifications to the design, specifications, or scope of work. In such cases, the Contractor will be expected to accommodate reasonable changes that remain within the general intent and scope of the procurement, by providing updated documents, design, or costs based on the proposed changes. These changes may involve adjustments to address operational needs, regulatory requirements, funding restraints, or technical considerations that were not fully known at the time of bidding.

5 PROJECT OVERVIEW

The Town of Scarborough currently provides emergency dispatch services for both Scarborough and Old Orchard Beach, serving as a vital hub for public safety communications in the region. This partnership reflects a long-standing commitment by both municipalities to enhancing regional collaboration, improving operational efficiency, and ensuring timely emergency response for their residents and visitors.

Recognizing the growing need for seamless coordination across agencies, both communities are actively working to strengthen inter-town cooperation through strategic planning and resource sharing. Their shared vision includes modernizing and integrating communications systems to support interoperability among first responders, address known coverage gaps in both jurisdictions, and improve situational awareness during routine operations and emergencies alike.

5.1 Current State

At the core of this effort is a focus on resiliency and reliability. Many key components of the existing radio infrastructure, including repeaters, controllers, and other mission-critical hardware, have reached or exceeded their expected service life. Much of this equipment is no longer supported by the original manufacturers, making it difficult to repair or replace when failures occur. This aging infrastructure presents a significant risk to system performance, increasing the potential for communication outages that could impact public safety operations.

The selected contractor will be expected to commit adequate resources and collaborate closely with municipal stakeholders to identify potential risks and implement responsive mitigation

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strategies. This partnership will emphasize performance optimization, lifecycle sustainability, and system resiliency to meet the evolving needs of both communities.

Currently, a variety of VHF and UHF radio systems are used across both towns by critical departments including Police, Fire, EMS, Public Works, Schools, Community Services, Recreation, Lifeguards, the Sanitary District, and Wastewater. The goal is to streamline these disparate systems into a cohesive network that improves interoperability and simplifies long-term support.

5.2 Existing System Diagram

The existing system diagram and other related site information is found in the Protected Information Disclosure document to be provided at the pre-bid conference.

5.3 Project Goals

To overcome these challenges and establish a sustainable communications framework, both towns are jointly pursuing the development of a unified, modern radio network. This initiative will consolidate existing systems into a single, regionally integrated platform, strengthening operational efficiency and enhancing the reliability, scalability, and effectiveness of emergency communications throughout Scarborough and Old Orchard Beach.

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

- Complete system design for the upgraded the Town of Scarborough and Town of Old Orchard system
- Installation of new P25 Trunked Radio network and simulcast repeaters at eleven [11] sites
- Interconnection of sites utilizing microwave radio links
- Continued use of fiber network
- New antennas, combiners, and transmission lines
- Integration with the network and dispatch console
- New control stations and antennas at dispatch
- IP Gateways
- GPS Synchronization Equipment
- Optimization of Simulcast Timing
- Alarms / System Monitoring
- Site Facilities Grounding
- New towers at three [3] locations
- Upgrade Installation and System Provisioning
- Project Management
- System Testing and Acceptance
- Documentation Including As-Built Drawings
- Sign-off by Town

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6 PROJECT-25 PHASE-2 TRUNKED RADIO NETWORK

Scarborough seeks to acquire and implement a new six [6] channel 800 MHz Project-25 simulcast trunked radio system that will replace the existing VHF radio systems.

The system shall guarantee portable in-street radio coverage reliability within the jurisdictional boundaries of Scarborough and Old Orchard Beach.

The proposed system upgrade design shall comply with APCO Project-25 minimum recommendations and EIA/TIA 102 standards for Project-25 Phase-II TDMA digital voice Public Safety 800MHz trunked radio systems.

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 phases. 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 operations prior to system cut-over. Technical training for Scarborough's technical staff shall also be provided.

The system is intended to support Scarborough well into the future. System size, capacity, functionality and flexibility must be sufficient to support Scarborough's growth and changing needs, as well as the possibility of other agencies within Scarborough participating in the system. The design approach shall have the flexibility to accommodate additional users, which may enter the system at a later time.

Scarborough seeks a system design that will:

- Upgrade overall coverage design
- License on behalf of the Town six [6] 800 MHz frequencies for Trunking operations
- Implementation of regional NPSPAC channels [ICALL, 8TAC] and VCALL/VTAC
- Implement new Communications Dispatch IP Console
- New logging recorder
- Use new and/or existing radio sites for coverage
- Continue use of Scarborough fiber network for site connectivity

Suppliers are cautioned that throughout the implementation of this project; existing operations cannot be disrupted. The dispatch consoles at the current center shall remain fully operational during the installation.

Scarborough has determined that competition in the procurement of subscriber equipment in the future is of importance to its operations. While Scarborough understands that the base station and interconnecting infrastructure comprising the initial system may contain certain unique and proprietary technologies, the future addition of subscriber units must be open to competition from multiple P25 manufacturers.

Supplier shall name in their proposal other manufacturers who have obtained the necessary technology licenses and who are manufacturing, or have proposed the manufacture of,

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compatible subscriber equipment. Mobile radios, portable radios, radio modems, control stations and conventional base stations are of interest to Scarborough.

6.1 Proposed P25 Network Diagram

The existing system diagram and other related site information is found in the Protected Information Disclosure document to be provided at the pre-bid conference.

6.2 Proposed Sites

The existing system diagram and other related site information is found in the Protected Information Disclosure document to be provided at the pre-bid conference.

6.3 Basic Requirements

The system design must comply with APCO minimum recommendations for Project-25 Phase II digital trunked radio systems including, but not necessarily limited to, the following operational and functional characteristics:

- Multiple, Software-Controlled Talk Groups
- Emergency communications priority by talkgroup or by subscriber
- 800 MHz linear simulcast Trunking design
- System Management Capabilities
- Interoperability with outside conventional/trunked radio networks
- Capability of direct interconnectivity with other Project-25 compliant network switches

6.4 Basic Functions and Features

The 800 MHz trunked system shall be managed by Server[s] that selects the communications channel requested from a subscriber unit; acknowledges that request and assigns an idle channel for communications. The proper talkgroup also shall be assigned.

Should system traffic be at a level where all channels are busy, the system will automatically give preference to higher priority units attempting. The system shall indicate to the user that channels are busy, that the unit is placed in queue and will be offered a channel in a call back mode. The Supplier shall describe in their proposal the extent of priority the system offers.

The mobile and portable units shall be equipped with a dedicated switch or function that allows emergency access. The switch shall be easily accessed, but minimizing the chances for accidental activation. Upon emergency activation, the field unit shall transmit the emergency message on a periodic basis until acknowledged by the dispatch/console operator.

The proposed system shall include RF site monitoring and infrastructure alarm equipment that reports major/minor infrastructure alarms to a Network Management Terminal located at Scarborough. The alarm reporting system shall have the capability of being remotely accessed for the monitoring and remote-interrogation of conditions, status, and alarms via a VPN network connection.

The proposed infrastructure, without limitation, shall support other sub-systems or applications that may include Computer Aided Dispatch [CAD] interfaces; Automatic Vehicle Location [AVL]

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interfaces; encryption; low speed text data; and audio recording of talk groups and conventional radio equipment.

6.5 System Operating Modes

The trunked radio system shall be capable of operating in the following modes:

Trunked Mode - Day-to-day communications by all users occur using this mode. While in the trunked mode, for the control of trunked channels at all sites. Expansion capabilities to support additional RF channels and dispatch consoles that may be required in the future.

Direct Mode - Mobile, Portable and Control Station radios shall be capable of transmitting and receiving on simplex frequencies for localized "Off Network" communications. The Direct Mode, or talk-around mode, shall be user selectable to allow communications between subscriber units.

Failure Mode - Trunking algorithms shall employ redundant design to ensure that a single point of failure does not result in any complete system failure. Should the system encounter a controller/server failure, the system should not lose any system features and shall continue to function in the trunked mode with all features operational. Supplier to clearly designate their failure mode.

Should the trunked backbone fail, the system shall revert to stand alone repeater operation. For worst case failure and if all base stations are operational, the system shall utilize all repeater stations to provide communications. The console dispatch operation should continue to be able to talk (Tx/Rx) into the system during this mode of operation. Dispatching should not be orphaned during any mode of operation.

The following trunked failure modes shall be discussed in the proposal.

Each response shall address impact to the users; impact to dispatch; if operations continue or hindered

Master Site – describe site master components failures individually. Please include all network equipment and servers. Include failures affecting system operations but not related to components.

Dispatch – describe system component failures related to dispatch individually. Include failures affecting dispatch operations but not system components.

Site Equipment – describe system component failures related to site equipment individually. Please include failures affecting system operations but not related to system components

Connectivity - provide analysis of the results of connectivity link failures, proposed networking component failures. Identify weak links.

Encryption Mode - All trunked digital RF channels, if provisioned for this mode, shall be capable of processing AES/DES voice encryption that is supported under the P-25 standards. This includes end-to-end encryption [subscriber to dispatch console]. All equipment provided by the Supplier must be capable of AES/DES multi-key encryption. Any other supported types of encryption shall be clearly identified by the Supplier. Furthermore, encrypted talk groups will require recording.

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6.6 P25 Core Network Architecture

The P25 core is a critical component of the system. The design shall provide high reliability under extreme conditions that allows continued Trunking operation in the event of a controller or link failure.

Scarborough requires redundant, geographically spaced server/controller. One server/controller shall be installed at Scarborough's Prime site and the other at the Dunstan Station. Switching to an alternate controller [or redundant controller; standby controller; or dual controller] shall not stop Trunking operations. The alternate controller shall have complete control of wide-area call processing and assignments, utilizing the same user database and functionality.

General tasks to be performed by the Server include receipt and decoding of digital data from mobile, portable or control station radios; selection and assignment of vacant radio channels; transmission and encoding of digital data sent to mobile, portable or control station radios; control of base repeaters; transmission of station identification required by the FCC; and, monitoring of alarm functions.

6.7 Reliability and Redundancy

It is the intent of this specification to provide a trunked system that will not suffer the loss of Trunking capability as a result of the failure of a single system component, in particular the Network Server/Controller. Should any component of the NS/C fail, sufficient redundancy shall be incorporated in the system design so that full Trunking operation continues without interrupting existing communications. Trunking capability is defined in this context as the ability of the system to assign voice channels to independent talkgroups, as required, and the ability of the system user groups to remain functionally independent.

Any system component enclosure or power distribution design that could render the system or 50% of its channel resources useless for communication from a single point of failure, shall incorporate redundancy.

In the case of redundant controllers, both controllers shall remain online continuously with parallel updating of the system database to provide minimal interruption of service in the event of failure of the main controller. Switching from main to alternate operation shall be fully automatic, with audible and visual indication of the switchover provided to the supervisory console positions at the dispatch center.

Remote switching from main to standby operation shall be provided at the supervisory console as a manual override to automatic switchover.

Switching between controllers (manually or automatically) shall not cause subscriber units to attempt to roam away from the site or subsystem they are currently on. Also, subscriber units shall not have to re-affiliate themselves with the system after a controller switch has occurred. This is to prevent inbound signaling overload of the controller.

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6.8 System Functions and Features

Software/firmware to provide functions and features described shall reside in the Network Controller and associated computer software/hardware. The controller and its associated computer software/hardware shall provide the following functions:

Alarm Monitoring and Diagnostic Functionality - Monitoring of the operational status of all system devices and providing alarms when subsystems fail. Diagnostic functions shall allow an operator to view current status and status history of the system

Control Channel Backup - Automatic transfer of signaling functions to another control channel in the event of transmitter or receiver failure or interference on the signaling channel. The system shall have one active and be capable of backup signaling control channels. Backup is defined as a channel of different frequency.

Disablement of Failed Voice Channels - Automatic disablement of defective voice channels due to subsystem failure. Failures must be detected prior to the channel being assigned by the controller. Subsystem failures to be detected shall include, at a minimum: low forward power, high reflected power, unidentified carrier on unassigned voice channel, signaling interface failure between base and controller, audio circuit failure between controller and base, voter receiver failed, and voter receiver disabled.

System Usage Reports - Collection and processing of data with regard to system usage. Suppliers are to describe how the data is parsed for displaying at the System Managers terminals. Also, at a minimum, data to be routed to a printer shall include the following: configuration information for all components in the system, functional configuration of controllers, channels and sites, manager database, inhibited radios, commands (tasks)-in-Progress (regroups, inhibits), subscriber configuration and attributes (by individual, talkgroup and multigroup), channel usage, identification of calling units by talkgroup and unit identification number, time of channel access, duration of transmission, classification of call, channel assigned, fault management, current alarms, alarm history (daily, weekly, monthly)alarm history (by component).

Channel Access Priority Levels - As a minimum requirement, control radio channel assignments and system access shall be provided in accordance with APCO 16. Levels of priority shall be variable from any console in the system to allow assignment of specific talkgroup members to a higher system access priority for the duration of a special event or tactical operation.

Selective Disablement of Field Units - Selective disablement of individual mobile or portable radios shall be provided. Reactivation of such radios that have been disabled shall also be provided. These functions shall be performed on the signaling channel. Control of this feature is to be partitioned by manager username.

6.9 System Programming

Programming of system operational parameters shall be provided by operator workstations controlled by the trunked system management computer located at the radio shop Dispatch Center. These workstations shall provide for "user friendly" operation by trained personnel.

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Access to system programming functions shall be protected by password security. Hard copy printout of programming functions is required. Supplier shall provide laser printer.

To facilitate inter-departmental operations, system management shall be capable of being partitioned. The system shall allow the partitioning of subscribers and sub-system infrastructures. Partitioning shall be defined and protected by a username and a respective password.

6.10 Operational Functions

Unit Identification - A real time display of push to talk unit identification at the dispatch positions shall be provided in an alias format. Display of the ID shall be on the operator console position.

Control Channel Updating - The control channel shall continually transmit the current channel assignments of the system. This feature is intended to ensure that radios “signing on”, coming into range or switching talkgroup modes are directed to calls in progress on their selected talkgroup.

Voice Channel Embedded Signaling - Embedded or sub audible signaling shall be transmitted on assigned voice channels in order to prevent subscribers from being misdirected or allowed to transmit on an improperly assigned channel.

Emergency Alarm & Call - A display and audible alert to the dispatcher in an alias format upon activation of an emergency switch on portable or mobile radios shall be provided. The display shall identify the unit number of the radio initiating the emergency alarm. Upon activation of the “emergency unit’s” PTT, a channel shall be assigned for a predetermined amount of time. The emergency call hang time shall be adjustable by the system manager. In the event all voice channels are occupied, the system shall be capable of functioning in at least the following two (2) modes:

Emergency Preemption - If all voice channels are occupied when an emergency call is made, then the unit initiating the emergency shall be allowed access to the voice channel with the lowest priority user currently assigned.

Emergency Priority Queuing - If all voice channels are occupied when an emergency call is made, the unit initiating the emergency shall be placed at the top of the busy queue list and allowed access to the next available voice channel. The “emergency unit” shall be given the highest level of priority regardless of how many units are already in queue or what their priority is.

Private Call - Selected users and dispatchers shall have the ability to selectively communicate “privately” with another individual on the system regardless of what talkgroup either unit is in. The call shall allow the two users to utilize a single channel resource to communicate without the participation of other units in their respective talkgroups.

- The subscriber units on the system shall be programmable for at least the following three (3) private call modes of operation:
- Subscriber units shall be capable of Unlimited Private Call capability, if desired.

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- Subscriber units shall be programmable to hold a specific list of users that can be private called. Supplier shall specify the maximum size of this list and if this list is independent of the call alert list.

Subscriber units shall be programmable to only receive private calls from other users. These units shall never be capable (unless programmed otherwise) of initiating a private call.

Call Alert - Selected users and dispatchers shall have the ability to selectively alert another individual user on the system regardless of what talkgroup either unit is in. The call shall allow an individual to alert another user with a distinctive tone and their individual ID (on display radios only). The alert shall be accomplished over the signaling (control) channel and should not affect any voice channels on the system.

If the recipient of a call alert has a display-type radio, the radio shall display the ID of the alerting party. Respectively, the alerting party shall be able to determine if the recipient did not receive or is not available for the alert (i.e. recipients radio is turned off, out of range, etc.) by hearing a distinctive tone and receiving a message in their display.

Multi-Group Call - Multi-Group talkgroups shall allow multiple talkgroups to be affiliated to a single multi-group. When a call is placed on the multi-group talkgroup, all talkgroups associated with the multi-group shall be assigned to a single voice channel for the conversation. Every user involved in the multi-group call shall have talkback capabilities for the duration of the call (if message trunked). The system shall be programmable to allow for the following two (2) modes of operation:

System Wide Call - Shall allow a dispatcher to initiate a call that will transmit on all talkgroups on all sites or sub-systems.

Wait Mode - If a user initiates a multi-group call while calls are in progress on affiliated talkgroups, then the multi-group call will wait (busy-queued) until all participating talkgroups have finished their transmission. Initiating a multi-group call should transmission trunk all calls in progress on affiliated talkgroups in order to facilitate the multi-group call.

Scan - This function shall provide the ability to scan through multiple modes (talkgroups) within the same system. It shall also contain the capability to store and scan a list of conventional frequencies. Subscriber units shall be provided with at least one (1) scan list per system

Priority Scan - This feature shall provide the ability to apply two priority levels to a defined scan list. While in the scan mode, a Priority One transmission shall be received regardless of the activity on the Priority Two (or other non-priority modes). A Priority Two message is heard over all (except Priority One messages) non-priority modes.

6.11 Encryption and OTAR [Option]

The proposed system shall be capable of supporting P25 Phase-II digital voice encryption calls. All properly equipped subscriber units with multiple key encryption shall be able to scan between encrypted and clear talk groups. All dispatch positions shall be capable of end-to-end multiple key encryption.

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The encryption process shall not degrade the required delivered audio quality of the system. Encryption shall be available in trunked mode. Encryption shall be available in all proposed fallback modes of communication. Both DES and AES encryption algorithms shall be supported by the proposed system. The Supplier shall state the number of encryption algorithms available in its system and the encryption algorithm capacity of all proposed radio units. Multiple keys must be provided in the fixed equipment and the subscriber units. The system shall be capable of re-keying the encryption algorithm for all properly equipped subscriber radios over-the-air. The Supplier shall fully discuss the encryption scheme in the proposal response.

The system shall also support Over-the-Air-Rekeying [OTAR] of mobile and portable radios using Project-25 compliant OTAR. The system shall include an optional Project-25 compliant Key Management Facility [KMF] for management and wireless distribution of AES/DES keys.

One OTAR workstation to be provided at the Dispatch Center.

Two handheld key loaders shall be provided.

6.12 Over-the-Air Programming – OTAP [Option]

Supplier's proposal must use the P25 data capability to support radio configuration changes using the P25 data channel as a wireless transport to send configuration changes to the radio or to read the current configuration of a radio in operation.

Over the air programming can either be done by the trunked RF infrastructure or by WIFI connections on a per individual programming or in batches. Radio programming may also be done at a pre-scheduled time to be set up via the radio programming software.

Over the air programming transactions will not interfere with voice calls of any kind on the system. Voice calls on the system will have priority access over OTAP transactions or any other data transactions (GPS, text messaging, network management functions, etc.).

Once the radio has received programming information over the radio network, it will provide an acknowledgement to the system administrator via the radio programming application.

6.13 GPS Location [Option]

Scarborough is interested in the possibility of having Global Positioning System [GPS] location capability for their subscribers supported by a new radio infrastructure.

Supplier must support GPS location reporting from all mobile and portable radios proposed. GPS location hardware will be integral to both mobile and portable radios.

GPS location will be displayed for selected mobile and portable radios on Scarborough's GIS based mapping solution. Supplier will provide an application programmer interface document detailing how Scarborough's mapping solution Supplier can accept and display units at Scarborough CAD workstation positions.

6.14 Smartphone Interface [Option]

The proposed P25 system shall incorporate a PTT-over-Cellular [PoC] function whereby the system's radio traffic can be monitored, on a user-selected talkgroup basis, by use of a

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smartphone. It is also desired that this application provide limited “talkback” from the smartphone to the P25 system.

The interface shall provide secure and reliable voice PoC service that operates over Local / Wide Area Networks, commercial 4G/3G networks and Android/iOS devices.

6.15 Network Management System [NMS]

The intent of this section is to describe a fully integrated System Manager/Information Management System and Local Alarm and Control System. Both functionalities will be principal tools to assist the Scarborough in the provisioning, maintaining the performance, availability, and the integrity of the proposed equipment, including the transmission network, multiplex equipment, power equipment, and various other system components and housekeeping functions.

The radio system is comprised of subsystems, such as 800MHz Trunked radio, IP transport links, shelters, emergency generators, and towers. Each of these subsystems needs to be remotely monitored [in real-time] and controlled for management and maintenance purposes.

The NMS shall provide a complete alert call management system for all sites communications sites. When an alarm occurs, the NMS will transmit an alert call message to appropriate Scarborough personnel via email or SMS. The Supplier shall identify and discuss in their proposal the proposed equipment and software resources needed to accomplish this function. The number and types of end points to be alarmed will be discussed at the Detailed Design Review meeting.

6.15.1 Trunked System NMS

The system shall incorporate a graphical user interface (GUI) system manager/information management system to set selected parameters and allow the supervisory personnel to control and analyze system operation. It shall provide to a single workstation, alarm conditions of board level failures of all Trunking and network elements. Access to the management system shall be controlled through the use of an encrypted password.

The NMS workstation shall access to the system via the Trunked system LAN network.

Scarborough desires access to the radio system management and diagnostic functions for administrative and maintenance purposes from existing networked workstations through the existing LAN. Proposals shall describe how the s propose to achieve this requirement and if there are any limitations to the access of these functions.

Required system manager capabilities as a minimum shall include:

System Configuration - shall be able to control all of the programmable features of the Trunking controller and radio infrastructure.

Subscriber Management - shall allow an operator to view, set, or modify the talkgroup IDs, and the unique ID permission.

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Manager Partitioning - System subscriber management functions shall be capable of user (agency) partitioning. Manager partitioning shall allow a user to view, set or modify subscriber information pertaining to a particular agency while restricting access to other agencies. The highest level manager shall be capable of viewing all subscriber information. Partitioning shall allow access to as well as prohibit users from different sub-systems, programming and system management areas, and subscriber ID ranges (talkgroups and individual ID ranges)

Diagnostic Management - shall allow an operator to view current status and status history of the system.

It shall also allow for diagnostics to be performed on network devices (i.e. site controllers, base stations, comparators, etc.)

Sending and receiving of status messages to and from subscriber units. Selective radio status information regarding radio's operating status (i.e. on/off, inhibited), last talkgroup affiliation and last site registration.

Selective inhibit/uninhibited of control stations, mobile and handheld radios and trunked repeaters. Field equipment shall be equipped to respond to the system manager commands.

Activity reporting by unit, talkgroup, department (if available), and system wide.

User database maintenance with automatic sharing of data and updates between the console electronics and the Trunking system.

Activity monitor to display the status and activity of all RF channels of the active Prime Site controller.

Capability of automatically updating the backup site controller when data base changes are made.

One (1) workstation shall be provided to be located at Scarborough

6.15.2 Site Monitoring and Control System Requirements

The system shall provide the capability of automatically monitoring in real-time the status of various infrastructure components. In addition, remote control functions of site elements are also required.

Remote Terminal Unit [RTU]: The RTU units shall monitor status inputs and control outputs at the sites. The status inputs and control outputs must be capable of interfacing with wet and dry contact relay closures and openings as well as logic and TTL signals. The modular design of the RTU provides for flexible system expansion to handle the anticipated future growth of the network. The system shall be configured for sixteen [8] monitoring points [expandable] and four [4] control points.

Monitoring and Control Points: Monitoring points: Transport links, IP/Ethernet equipment, RF transmission line sensors, door entry, smoke/fire detection, loss of commercial power, generator on-line, high/low temperature, UPS systems, tower lights [if applicable], tower top amplifier [if applicable], receiver multicoupler, site frequency standard, generator condition.

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6.16 Talkgroup and Conventional Development Channel Plan cc

The Contractor shall be responsible for the development of the radio and console talkgroup structure for the P25 system.

The Contractor shall assign a technical resource thoroughly familiar with the development of trunked system talk groups and radio programming templates who will work with Scarborough and Old Orchard to develop required talk groups and radio templates.

The Contractor will be responsible for programming all radio equipment that is provided as part of the P25 system infrastructure, including “backup radios” at the 911 dispatch center

7 RFSS - RF SUBSECTION

The RF portion of the system includes all site-based equipment required for over-the-air communication, such as base station repeaters, antennas, combiners, transmission lines, and power systems. It is responsible for providing reliable signal coverage and channel access for subscriber radios. All components shall meet TIA-102 standards and be engineered to ensure clear, interference-free operation. Simulcast systems must maintain precise timing and signal alignment across all transmitters.

7.1 TX Combiner, RX Multicoupler and Tower-top Amp

The Supplier shall provide, for all RF sites, a transmitter combiner and receiver multicoupler, along with a tower-top amplifier [TTA] where necessary to ensure adequate talkback signal levels. Equipment utilizing low-noise, tower-mounted amplifiers shall be proposed as needed to maintain balanced system performance. Redundant TTAs and NPSPAC window filters where needed shall be included within each tower-mounted assembly.

The Supplier shall specify the manufacturer and model number of the proposed tower-top amplifier system for each site. The system shall include automatic switchover to a standby amplifier in the event of a failure, and the proposal shall describe the method used to perform this switchover. Failure of the primary amplifier shall be monitored and reported via the site alarm system. Additionally, a manual switchover capability shall be provided at the control panel, along with a clear indication of which amplifier is currently active.

7.2 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.

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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.

Contractor shall utilize the dedicated grounding lug provided by the manufacturer on equipment for connection to the facility ground system. Reliance on chassis grounding alone is not acceptable, as surface coatings, mechanical joints, or corrosion may prevent a reliable and continuous bond. The grounding lug design provides a direct, low-impedance path to ground, ensuring compliance with applicable codes, enhancing personnel safety, and minimizing electrical noise and interference.

7.3 IP Simulcast Repeater

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. 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.

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 dispatch console.

Each station shall be equipped with a RF sensor to remotely monitor forward and reflected power of each transmitter.

Service personnel shall have access to the radio for monitoring, metering, alignment, programming and diagnostics by remote access through a network connection via the proposed network management and alarm systems or microwave network.

7.4 Receiver Voting System

The receiver voting system is to be configured as part of the radio communications systems upgrade. The VHF radio system shall employ receiver voting function. Multiple IP voting receivers shall be connected to a processor with voting algorithm evaluating signal strength, signal-to-noise ratio, and latency to determine the highest quality audio stream being received. Voting process shall be continuous and constantly being selected, providing automatic switchover of audio, without interruption, for re-broadcast over the transmitter simulcast system. Voting equipment shall be geo-redundant.

7.5 Antenna and Transmission Line

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.

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7.5.1 Antennas

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/TIA607B, 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.

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

7.5.2 Transmission Lines

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.

7.5.3 VHF / 800 MHz Interoperability Radio

Scarborough and Old Orchard require that it continue to communicate on certain regional and local interoperability VHF conventional channels between the various radio sites and the Dispatch Console.

The Proposer shall provide base stations and control stations as identified in the Protected Information Disclosure document to be provided at the pre-bid conference.

8 TRANSMITTER SITE FACILITIES

Each RF site, whether an existing facility undergoing upgrades or a newly constructed communications compound, to include towers and shelters, shall be designed to support continuous, mission-critical operation.

Site infrastructure shall include secure and climate-controlled equipment shelters, emergency backup power via standby generators, automatic transfer switches, and appropriate utility service connections. All facilities must be engineered for physical security, environmental protection, and serviceability, with considerations for grounding, cable management, lighting, and access. The intent is to ensure that each site reliably houses and supports RF, power, and auxiliary systems required for uninterrupted public safety communications.

8.1 Existing Sites Structural Analysis

The Contractor shall be responsible for conducting and providing a detailed structural analysis of all existing tower structures and rooftop antenna support systems where new equipment is proposed to be installed. This analysis shall assess the feasibility and structural integrity of the existing infrastructure in relation to the proposed antenna, mounting hardware, cabling, and any other associated equipment. The analysis must confirm whether the existing structures can safely accommodate the additional loading in accordance with current industry standards,

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applicable codes, and safety requirements. Any deficiencies identified shall be clearly documented along with recommended mitigation measures or structural reinforcements necessary to support the proposed installation.

8.2 Proposed Site Work

The Contractor shall develop / update site civil/facilities work for following locations:

Dunstan Station:	New 130' tower
N Scarborough Station:	New 150' tower, shelter, & generator
Old Orchard DPW:	New 180' tower, shelter, & generator
Scottow Road:	Generator
Springbrook Road:	Generator
Oceanside, Linwood & Pine Point:	Rooftop antenna mounts
Black Point, Pleasant Hill, Springbrook:	Flagpole monopole structural

The communications compound, whether newly constructed or upgraded, shall be designed to securely house all critical infrastructure, including equipment shelters, standby generators, and associated utilities. The compound shall provide controlled access, proper grounding, and environmental protection to support continuous public safety communications.

8.2.1 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.

8.2.2 Excavation Work

Before excavating any public area including roads, footpaths, reserves, and the like, the Contractor shall obtain the approval of Town/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.

8.2.3 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.

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8.2.4 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.

8.2.5 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 the Town, or their authorized representative, details of any alterations to the submitted construction documents resulting from such advice, before undertaking any additional work.

8.2.6 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.

8.2.7 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.

8.2.8 Service Trenches

Where needed, 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.

8.2.9 Security Fence

Old Orchard Beach DPW. The Contractor will provide a security fence around the tower enclosing the only the tower perimeter with 12-ft double gate. The top rail will be not less than 6-ft above 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,

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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.

8.2.10 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 Town 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.

8.3 Tower Structure 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.

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.

8.3.1 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.

8.3.2 FAA/FCC Registrations

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

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8.3.3 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.

8.3.4 Standards

- ACI: American Concrete Institute
- ASCE: and Other Structures
- FAA: Advisory Circular 70/6460: Obstruction Marking
- NEC - National Electric Code
- NFPA 70
- OSHA: Occupational Safety & Health Regulations
- TIA/EIA: MIL-STD-188-124B Communications Systems
- NFPA 780 American Society of Civil Engineers Standard 7-02: Minimum Design Loads for Buildings
- Federal Aviation Administration
- Telecommunication Industry Association/Electronic Industries Association: ANSI Standard 222-(H) Structural Standards for Steel Antenna Tower and Antenna Supporting Structures
- Scarborough – Old Orchard Beach Local Wireless Facilities Regulations

8.3.5 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 : to be selected by tower structural design engineer
- Exposure: to be selected by tower structural design engineer

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

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may be required to provide tower manufacturer “mill reports” for all steel, including foundation embedment and hardware used for the erection of the tower for each tower order delivered.

8.3.6 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:

- Minimum/Maximum Basic Wind Speed = to be selected by tower structural design engineer
- Minimum/Maximum Basic Wind Speed w/Ice = to be selected by tower structural design engineer
- Minimum/Maximum Design Snow and Ice Thickness = to be selected by tower structural design engineer

8.3.7 Twist, Sway and Displacement

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

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

8.3.9 Tower Structure and Antenna Design Load

The tower will be designed to accommodate the antenna system loads determined by the Proposer required for the new system; 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.

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

Beside antennas needed for this project, the following should be considered for future growth:

- Two [2] whips above TOS; each 7/8" LDF coax
- Three whips 20' below TOS; each 7/8" LDF coax
- Two [2] 3' parabolic dishes with ODU with centerline 23' below TOS; each dish with 3/8" LDF coax
- Note: final tower loading to be determined at CDR

For sites with multiple repeaters or base stations, antenna combining systems are preferred, with insertion losses not exceeding 3.5 to 4.0 dB, depending on the licensed ERP. Where independent antennas are used, adequate spacing shall be provided to minimize on site interference.

8.3.10 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.

8.3.11 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.

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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.

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 ten [10] 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 port. 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.

8.3.12 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

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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 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.

8.3.13 Progress Photography Requirements

The Contractor shall provide dated, high-resolution photographs documenting key stages of the tower and grounding system construction. Photographs shall be clear, labeled with the date, activity, and location, and submitted to the Owner within forty-eight (48) hours of capture.

At a minimum, the Contractor shall document the following construction milestones:

- Pre-construction site conditions

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- Foundation construction, including rebar installation, formwork, concrete pour, and cured foundation
- Grounding system installation, including trenching, placement of ground rods and conductors, connection methods (e.g., exothermic welds), and final backfill
- Tower erection, including base setting, mid-section (if applicable), and completed tower structure
- Final site conditions, including installation of equipment, cable routing, fencing, and site grading

All photographs shall be submitted electronically in a format acceptable to the Town and may be used to verify progress and compliance with project specifications.

8.4 Equipment Shelters

All construction shall adhere to all local building codes.

At all times, proper flashing and sealing techniques are to be used.

Components provided are subject to modification at the Town's discretion to ensure suitability and compliance with shelter objectives

8.4.1 Structure Design

Purpose: Permanent communications shelter configured to accommodate radio equipment in standard 7-foot equipment racks, including provisions for rack-mounted battery systems.

Design Life: 40–50 years with minimal maintenance

Dimensions: 10' x 14'

Height: Interior room height is to be no less than 9' above the floor with a 6/12 pitched roof; gable style for runoff and snow load;

Designed to withstand wind loads up to 130 mph and snow loads per local code

Structure Frame

Exterior Framing:

- Studs: 2x6 spaced 16" OC
- Bottom & Top Plates: Double 2x6 pressure treated sill and top plates
- Sheathing:
 - If wood: Engineered wood siding or fiber cement board; glued and nailed, painted
 - If metal: 29-gauge steel, painted

Other, where applicable:

- Weather Barrier: Tyvek or equivalent behind cladding
- Vapor Barrier: perm-rated vapor retarder depending on climate
- Paint/Sealant: UV-rated acrylic exterior paint, 2 coats minimum
- Fasteners: Galvanized ring-shank nails, Simpson Strong-Tie connectors at all load points

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Floor Framing:

Joists: 2x10 pressure treated 16" OC

Subfloor: 3/4" tongue-and-groove Advantech OSB or marine-grade plywood

Skid/Foundation Contact: Double 6x6 PT timbers (or concrete piers).

Interior Framing:

- Fire-retardant-treated plywood, 3/4 inch, sealed and painted with mold resistance latex [OSB acceptable].
- Wall Insulation: closed-cell spray foam or mineral wool [R-19+].
- Ceiling: 5/8" drywall or acoustic panels with vapor barrier if needed

Flooring: Advantech or epoxy-coated plywood flooring or equivalent

Door and Access

- Door: Insulated steel door, 36" x 80" weather seals; tamperproof hinges
- Lever type handle on both inside and outside of door
- Door check and doorstop
- Mortised deadbolt security lock keyed

Threshold: ADA-rated aluminum with neoprene gasket

Metal Roofing System

- Rafters: 2x8, 16" OC
- Ridge Beam: Laminated Veneer Lumber (LVL), sized per span
- Material: 29-gauge Galvalume or equivalent standing seam panels
- Underlayment: high-temp synthetic roofing membrane – for example, Grace Ice & Water Shield or equivalent
- Fasteners: stainless steel, concealed clips, EPDM-sealed
- Flashing & Trim: metal trims with closure strips and snow guards where needed
- Insulation: closed-cell spray foam [2"–3"] on underside of sheathing, R-20 minimum

Foundation Options

- Choose based on site conditions [to be decided by contractor and PC representative]:
- Concrete Pier System: 12" diameter piers, 4' deep with 6x6 pressure treated lumber
- Concrete Slab: 6" thick, rebar grid, vapor barrier, and anchor bolts embedded
- Skid-Mounted: 6x6 pressure treated lumber on compacted gravel base, good for mobility
- Shelter shall be anchored to the ground by auger type anchors or anchor bolts with steel straps and cables if on a pad.

Facility Interior Systems and Equipment

- Electrical: Internal & external lighting; AC receptacles; external generator receptacle
- HVAC

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- Cable entry port and cable trays
- Master ground bar
- Internal/external grounding system
- Fire/smoke/CO2/temp detection linked to remote alerts

Delivery

- Shelter to be delivered on site and set up
- Include instructions or requirements for how the shelter will be delivered and installed on-site, including any necessary equipment or personnel
- Assist when needed identified below in 'provided by others'
- The shelter must not bend or break during moving, towing, hoisting, etc.

Maintenance Plan

- Goal 40- 50 Year Longevity
- Annual Inspection: roof panels, caulking, siding, electrical panel, HVAC
- Repainting: every 10–12 years (exterior); interior as needed
- Re-seal roofing penetrations: every 5 years minimum
- Annual HVAC service

8.5 Electrical Power

The Contractor shall be responsible for establishing connections to existing site power sources and emergency generators, where applicable.

In support of the Town's objective to minimize the risk of system damage or failure due to lightning strikes, power surges, or induced electrical currents, the Contractor shall implement appropriate protective measures. All such work shall conform to current industry standards and best practices for safeguarding sensitive electronic equipment.

8.5.1 AC Power

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.

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.

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8.5.2 DC Power

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

Each critical piece of equipment should be powered from a dedicated DC branch circuit

The system shall include inverters, converters, 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 Rack

The DC power system shall be appropriately sized to support the proposed equipment load, with an additional 10% reserve capacity to accommodate future expansion. The system shall utilize modular, sealed, maintenance-free stationary batteries with sufficient ampere-hour capacity to sustain a minimum of four (4) hours of operation for all Vendor-supplied equipment in the event of a primary power failure.

This operational duration shall be calculated based on a 25% transmit duty cycle, assuming simultaneous operation of fire and police communication systems. The Vendor shall perform and document the battery sizing calculation based on these static load conditions.

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.

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 12 hours.

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 ammeter, 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 rectifier shall have the following minimum alarm points:

- 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

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battery voltage reaches a preset dropout voltage level. All DC power equipment shall be included in one rack.

8.6 Emergency Power Generator

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

The Vendor will ensure that all field setup work is completed on the day 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:

- Delivery of generator to the site
- 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
- Full tank of fuel
- 100% load bank test for one hour at installation

Automatic transfer switch, with Transtector AC surge and lightning protector [or approved equal] mounted in NEMA 1 cabinet will be 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,
- 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:

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

8.7 Grounding System

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

For lease and Town sites, 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 notice to the Town PM a delineating the deficiencies and recommendation for remedies on a site-by-site basis.

For leased sites, an assessment will be made by the Town of Scarborough if it should continue to use existing grounding facilities or install an independent ground system for its equipment only.

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.

9 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 the Town of Scarborough 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.

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9.1 Defined Coverage Area

The defined service area is the bounded area comprised of the Town of Scarborough and Old Orchard Beach 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, the Town of Scarborough and Old Orchard Beach 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.

Proposers shall provide percent reliability calculation on their coverage prediction maps.

THE COVERAGE DESIGN STANDARD FOR THE SYSTEM IS DIGITAL MODULATION, TARGETING A MINIMUM OF 95% RELIABILITY AND A DAQ RATING OF 3.4 FOR A HIP LEVEL IN-STREET PORTABLE TALK-OUT AND TALK-BACK THE DESIGNATED SERVICE AREA.

Coverage prediction maps provided by proposers for portable will serve as the foundation for system testing and performance evaluation, with the proposer guaranteeing the coverage performance depicted in the maps.

9.2 Critical Buildings

The Contractor shall provide a detailed description of the anticipated level of reliable radio coverage that the proposed system will deliver within each of the critical facilities listed in the table below.

While the Town acknowledges that the Contractor is not required to guarantee in-building coverage performance at these specific locations, it is essential that the Town be provided with a clear, data-informed expectation of what level of coverage can reasonably be anticipated. This information should include any relevant modeling assumptions, and factors that may influence performance, and location relative to proposed infrastructure. This understanding will help the Town assess system adequacy for mission-critical communications and consider potential mitigation strategies where needed.

As such, the Town does not expect precise predictions but does expect a reasoned, experience-based estimate of expected coverage for each structure.

The following per building coverage estimate framework shall be employed. Note that the estimated % of area with reliable signal is based on RSSI $\geq$ -95 dBm or DAQ $\geq$ 3.4.

Classification	Predicted Reliable Coverage	Notes
Good	> 90%	Potentially coverage provided by the infrastructure
Marginal	50 – 90%	May need infrastructure and BDA/DAS depending on use case

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Poor	< 50%	Likely requires in-building BDA/DAS solution
No Coverage	≈ 0%	Shielded or completely shadowed

List of Critical Buildings

TOWN	BUILDING NAME	ADDRESS	Building Type	LAT	LON
SCAR	BLUE POINT SCHOOL	174 PINE POINT RD	Single story brick building w/windows	43 33 27.9	70 21 51.9
SCAR	COSTCO	455 SCARBOROUGH DOWNS RD	Large warehouse; front windows only	43 36 30.7	70 21 27.0
SCAR	EIGHT CORNERS SCHOOLS	22 MUSSEY RD	Single story brick & wood buildings	43 37 06.3	70 21 01.1
OOB	GRAND VICTORIAN	1 EAST GRAND AVE	5-story wood condo-hotel	43 30 57.2	70 22 25.5
OOB	JAMESON SCHOOL	20 JAMESON HILL RD	Single story wwood strcuture	43 30 46.1	70 23 40.7
OOB	LORANGER SCHOOL	148 SACO AVE	2-story brick; many outside windows	43 30 47.9	70 23 32.2
SCAR	MAINE MEDICAL CAMPUS BUILDINGS	84-102 CAMPUS DR	approx 6 brick buildings campus; up to 4-stories	43 36 16.4	70 18 52.0
SCAR	MAINE VETERANS HOME	290 ROUTE 1	Very large single story bricj facility	43 35 15.1	70 20 31.9
OOB	OLD ORCHARD BEACH HIGH SCHOOL	40 E EMERSON CUMMINGS BLVD	2-story brick; many outside windows	43 31 03.3	70 23 45.7
SCAR	PIPER SHORES	15 PIPER RD	3-story wood retirement community apartments	43 33 28.9	70 17 17.7
SCAR	PLEASANT HILL SCHOOL	143 HIGHLAND AVE	singl story brick & wood building	43 35 20.0	70 17 58.1
SCAR	SAMS CLUB	440 PAYNE RD	Large warehouse; front windows only	43 37 25.2	70 20 54.7
SCAR	SCARBOROUGH HIGH SCHOOL	11 MUNICIPAL DR	Large 2-story brick	43 35 31.0	70 20 11.4
SCAR	SCARBOROUGH MIDDLE SCHOOL	21 QUENTIN DR	Large single tory brick	43 35 53.6	70 20 31.7
SCAR	WALMART	500 GALLERY BLVD	Large warehouse; front windows only	43 37 20.5	70 20 36.1
SCAR	WENTWORTH SCHOOL	20 QUENTIN DR	Large single story brick; 2-story wing	43 35 45.6	70 20 23.5

9.3 RF Coverage Method

The Proposer shall provide radio system coverage predictions maps 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.

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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.

For accurate performance evaluation, the Town reserves the right to require the Contractor to furnish reasonable revisions, or supplemental coverage maps whenever needed to confirm that the system meets operational expectations.

9.4 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. 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 and DAQ-3.4. Prediction maps shall indicate RF site locations, and areas of non-coverage.

Composite coverage maps shall be provided for the Town of Scarborough and Old Orchard Beach regional system as follows:

- Map-1: P25 Mobile coverage for fire and police using a 30 W ERP mobile with a unity gain antenna
- Map-2 P25 Portable in-street coverage; include critical buildings
- Map-3 P25 Portable coverage inside residential buildings
- Map-4 P25 Portable coverage inside industrial buildings
- Map-5 P25 Alert Paging in street coverage
- Map-6 P25 Alert Paging inside residential buildings
- Map-7 P25 Critical Building coverage assessment

Prediction maps shall show areas of reliable coverage in WHITE. 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.

10 IP NETWORK BACKHAUL

This section defines the requirements for IP backhaul microwave links and fiber connections between designated transmitter sites and the Dispatch Center.

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10.1 Fiber Links

Existing receive-only sites are connected to the Dispatch Center via fiber-optic links, which are intended to remain operational in the upgraded system architecture. Microwave backhaul will be required to interconnect any newly established sites.

Current fiber-connected locations include: Black Point FD, Dunstan FD, Eight Corners School, N. Scarborough FD, Pine Point FD, Pleasant Hill FD, Scarborough PSB, Old Orchard Fire HQ.

10.2 Microwave Links

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 path reliability.

The equipment proposed can be a split unit or tower mounted.

All hops shall be configured in a hot-standby configuration for redundancy.

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 greater than 3' diameter.

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.

10.2.1 Path Design

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.

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

- Path design calculations showing path reliability and fade margins

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- 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

10.2.2 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: 11/18/21 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: The transport network shall support bi-directional bandwidth per site to be determined by the proposer, scalable via software, to accommodate simulcast timing, receiver voting audio, and control signaling with adequate headroom for future expansion
- 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]

10.2.3 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 the Town of Scarborough signature.

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10.3 IP/Ethernet Switches and Routers

Repeaters at each site shall be linked via IP/Ethernet to form a local area network utilizing routers/switches for connectivity to the microwave backbone. The Proposer shall provide LAN Switches and Routers [core & edge] as deemed necessary. Units shall be capable of both AC and DC power.

Network WAN/LAN components in the field shall have monitoring function with management capabilities to manage, configure and provision the switch remotely through a web-based interface. Router/Switches shall have sufficient Ethernet ports for future network connections. Equipment shall provide all end user feature set and end user licenses to support specified products.

10.4 IP Performance Requirements

This Section provides information regarding IP connectivity to all sites.

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.

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.

10.5 Automated Infrastructure Monitoring and Alerting System

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

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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 failure
- Cell modem switchover or failure
- 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 COMMUNICATIONS DISPATCH CONSOLE SUB-SYSTEM

The proposed Dispatch Console shall be expandable to easily accommodate Scarborough growth and expansion. This includes the number of sites, the number of external radio system interfaces, and the number of operator positions. A single point of failure shall not inhibit or interrupt console operations.

As an option, Scarborough desires a system that incorporates primary and backup servers at two geographically separated locations to help minimize the chance of a server failure forcing the system into a failure mode. The locations include Scarborough and the Dunstan Station. The Proposer shall describe their method of providing redundancy in their Proposal.

No loss of system functionality shall be suffered due to geographic separation of components.

The new system shall be developed, installed, and tested in a manner that provides for continued, uninterrupted full-featured communications of the current systems during system cutover. The new system shall be installed while the current systems are still in place and operating. The Contractor shall carefully plan and develop a detailed design and system cutover plan to ensure the continuous operation of both systems throughout system cutover.

Following the installation period, a training period shall follow, where management, telecommunicators and technical support staff are to become familiar with the new system's operations prior to cutover.

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11.1 Console Locations

Six [6] console positions to be installed at Scarborough Dispatch.

1. Two [2] standard remote for Scarborough Command Van
2. One [1] laptop to be utilized as remote console positions to be located in the EOC in conf room

All system elements shall be fully configurable via a password-protected administrator software application over a network connection, whether located on the local network or over a VPN.

11.2 Console Server/CPU

The system shall be provided with Server/CPU call processor [redundant as an option] that interfaces to all system RF stations and consoles using IP. This equipment shall be server grade with redundant power supplies and redundant NICs

The Server shall communicate and arbitrate control to all shared system resources, including base stations, VoIP telephone, and radio remote controller without incurring performance penalties.

Server administration shall be protected by user authentication. All updates and modifications shall take effect immediately after editing. Rebooting the gateway and/or console positions to enable a configuration change is unacceptable.

The Server shall be deployed in a redundant configuration with automatic failover capability to ensure continuous uptime. Failover capability shall provide a highly resilient system design that can continue to operate in numerous disaster or failure scenarios. Such redundant capability shall ensure that all RF stations continue to be available for uninterrupted control from all console positions.

The system shall be capable of deploying configuration changes to the Console Positions over the network that takes effect immediately without restarting system elements. Solutions that require each system element to be separately administered may not be acceptable due to maintainability issues.

11.3 Dispatch Console Positions

Each console position shall physically consist of a workstation, a dedicated processor, audio peripherals, monitor, footswitch, dual headset jacks and input device.

As an option, the console position's workstation [desktop or small form factor] shall be capable of remote installation, rack-mounted in the equipment room with all necessary cabling and interface/extension equipment required for remote operation.

The monitor shall display a graphical representation of RF stations, menus, controls, and system resource icons. Control of the user interface shall be via any workstation compatible pointing device.

The console position equipment shall connect to the system gateway via 1000BASE-T Ethernet to access RF stations or other consoles.

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The console graphical user interface shall be configurable by administrator software to include system control buttons, audio level controls, and RF resources. All aspects of the console presentation and operation parameters shall be configured from the administrator software and downloaded to the console position.

The Communications Center requires flat screen, touch screen monitors supporting 16:9 format displays.

A standard PC workstation shall be provided with each console position. The provided workstation shall contain a dual NIC interface to support redundant network connections for enhance reliability. Contractor shall state whether the console PC hardware may be optionally supplied by Scarborough.

At each operator position, the contractor shall provide position headset arbitration so that all contractor provided functionality audio are present in a single headset.

The console shall support Plantronics wireless optional wireless headset with noise cancelling: Plantronics HW251N corded headset with Plantronics SHS1890-15 PTT headset amplifier [6-wire, with PJ-7 or WE-425 connector], or approved equivalent

The console shall be able to provide cross muting function, including:

1. Console audio muting of nearby consoles speakers [or headset] when transmitting.
2. Channel audio muting of nearby consoles select or unselect speakers [or headset] when transmitting on a specific channel.
3. Console audio cross-muting between the Contractor-provided consoles and existing Scarborough consoles.

Each console position shall be capable of enabling user authentication to provide free seating of console operators. The free seating feature shall allow console operators to log in at any console and receive their unique configuration.

Each console position shall be configurable to display and/or access multiple unique user screens. These screens shall present the console operator with the RF stations, radio controls, and informational resources in the form of "electronic push buttons" [button] labeled with names and status colors.

Display and/or access items include:

1. Logging & Instant recall Recorder [IRR] recording functions. IRR must be selective based upon the resource and not a position recording
2. Patch function.

Each screen shall be administrator configurable to display any combination of RF stations and/or controls, screen change shortcut [button], pop-up windows, call queues, activity history or a variety of other functions at any location on a screen.

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Button size, colors, text, and fonts shall be programmable on a per object basis. Background highlights, images and selectable colors shall be available to accent application workspace groupings.

RF station graphic shall display the authorized RF stations available to the operator at a particular console.

RF station status shall be shown in a separate text field for select, unselect, patch, monitor, hold, busy and mute.

A call on a resource shall display flashing on that resource button for the duration of the call. The RF stations button color shall be used to identify RF stations status condition so that overall console status can be determined at a glance.

There shall be different RF stations status colors to identify the following conditions: select, unselect, patch, monitor, busy and mute.

Each RF station shall have an individual volume setting for the Select state and Unselect state. This volume level shall be retained when toggling the RF stations between different states and have an administrator configurable minimum level to prevent muting entirely. The volume level shall only affect a single console position.

A location configurable RF station receive audio indicator window shall be present to aid in visual identification of active audio on a specific RF stations. The RF station's activity window background normally will be one color; and another color when Receive Audio is present; and shall be a third color during active transmit. The system shall allow configurable icons to be added to RF station buttons enabling visual call indication to associate the call with the corresponding RF station.

The system shall support the display of programmable 12/24 hour clocks, a master PTT status bar, and VU meter.

Contractor shall synchronize the time of day clock to an external time source using industry standard Network Time Protocol method to be provided in this bid.

All resources shall have individually settable audio level adjustments for select and unselect conditions.

Console audio level presented to the console operator headset shall have memory such that when returned to a given state [select or unselect] the audio level returns to the level last used when in that state.

The console shall be equipped for Project-25 voice and data operations.

The console shall support DES/AES encryption.

The console position audio processor shall provide operator audio, all peripheral interfacing for headsets, desk microphone, and speaker audio. The processor shall be configurable to support interfaces for a select and unselect speaker, two microphone devices (headset or desk microphones).

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Audio peripherals shall be connected to the audio processor using industry standard USB connectors. Additionally, USB connected relays shall be available as an option to provide workstation state indications to external display devices.

The system shall support the following I/O controls at a minimum: eight [8] I/O to be shared by all operators at that facility and two [2] individual I/Os for each position.

11.4 Supervisor Position

The system shall provide a console monitor capability designated as supervisor console.

When configured, this function shall allow the supervisor's console to activate the function and select one or more other consoles to monitor.

While activated, the monitoring console shall hear all conversations in the monitored console's selected RF stations.

11.5 Remote Operating Positions [option]

The dispatch console system shall be capable of remote operation. Remote operation will consist of a PC, laptop or desktop, loaded with the appropriate contractor supplied software and connected to the network to operate as a fully functional operator position.

All of the functionality provided at the operator positions at the communications center shall be functional at the remote location. The remote console position must be functional whether connected to the radio infrastructure network directly, or VPN connection over Scarborough's network. The remote console connectivity must be properly firewalled to protect the integrity of the network and radio infrastructure networks.

11.6 Speakers and Headsets

Speakers: The console speakers shall be capable of providing audio and power from the audio processor. Each speaker shall have an individual volume control. The speaker shall be configurable so the volume control cannot fully mute the speaker output. Each speaker shall feature a multi-colored LED to indicate power and receive audio activity. Each position shall include select and unselect speakers and two (2) additional speakers programmed to receive dedicated audio (to be determined). Each position shall have the capability to add four (4) additional speakers.

Headset Jack Box: The headset jack box shall be designed to mount in proximity and accommodate headsets devices with an industry standard tip/ring/sleeve plug. The jack box shall be equipped with a single Ethernet patch cable providing audio and power from the audio processor. The jack box shall provide an industry standard PJ 327 dual tip/ring/sleeve jack supporting 4W [PTT] operation. The jack box shall provide an input for a hanger/hook switch for use with handsets. The headset shall be capable of interfacing with other audio sources, without operator action. Two (2) jacks shall be provided at each position to allow for training purposes.

The headset shall be integrated with the telephone system.

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11.7 Alert Paging Function

The console electronics shall be equipped with a processor based signaling encoder that will generate all formats and codes associated with the paging and signaling requirements that follow.

The encoder shall broadcast the chosen signaling format(s) and code(s) on the currently selected radio channels and/or on the selected radio channels defined by pre-programmed buttons. It shall also allow the simultaneous selection of multiple signaling formats and codes and broadcast them automatically using a 'first-in, first-out' stacking technique.

The selection and entry of the paging and signaling functions shall be from the PC monitor screen at each operator position. The encoder shall provide both a visual and audible indication of operation and proper signaling.

Paging Format: The console shall be capable of generating the existing Scarborough alert tone paging formats.

11.8 Fire Station Alerting

Scarborough is seeking proposals for a Fire Station Alerting System [FSA] capable of providing rapid, reliable, and redundant alerting to fire stations. The system must support integration with the existing public safety dispatch system, provide low-latency alerting, and be scalable to accommodate future growth.

11.8.1 Functional Requirements

- Seamless integration with proposed Dispatch Console, or its functional equivalent
- Dispatchers must be able to initiate alerts via dedicated user interface
- Interface with CAD via industry-standard protocols (XML, Web Services, or API)
- Automated dispatch alerting based on CAD call information

11.8.2 Alerting Capabilities

- Multi-zone and multi-station alerting
- Simultaneous alerting of multiple stations with different audio and visual profiles
- Pre-alert tones, text-to-speech, and live voice pass-through
- Visual display of call data such as incident type, location, units assigned, etc.
- Automated station relays such as opening bay doors, activating lights, etc.

11.8.3 Station Equipment

- Use town fiber for connectivity
- Integrated speakers with automatic volume leveling
- Redundant IP communications: fiber as primary, radio backup
- Status acknowledgment and heartbeat monitoring
- Visual display panels (e.g., LED or LCD) with call details
- Modular design to accommodate future station additions

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- Supports varied alerting hardware (strobes, bunkroom lighting, etc.)
- Email or SMS alerts for failure conditions
- Logging of all alerting activity

11.9 Subscriber ID and Emergency Function

Unit Identification - The console shall be capable of decoding [MDC1200] signaling and provide a real-time display of push-to-talk subscriber unit identification at the dispatch positions.

Emergency Alarm & Call - A display and audible alert to the dispatcher position upon activation of an emergency switch on a subscriber radio shall be provided. The display shall identify the unit number of the radio initiating the emergency alarm.

11.10 Instant Recall Recording [IRR]

The recording equipment shall provide Instant Recall Function at each dispatch position. The function shall provide continuous recording of the telecommunicator activity, including both telephone/911 audio and selected radio audio. The unit shall provide simultaneous record and playback capability, time stamping of messages, and a minimum of 20 minutes of recording time.

The IRR shall allow the operator to quickly replay recent audio on demand.

11.11 Logging Recorder Interface

Scarborough currently operates a NICE Inform Logging Recorder as its voice logging system. As part of the proposal, the selected vendor will be responsible for evaluating this recorder and determining whether it is capable of supporting the recording of audio from the new trunked radio system. This evaluation should not be limited to basic functionality but must also consider whether software updates, hardware modifications, or licensing upgrades are necessary to achieve full compatibility. Any such requirements should be clearly identified and included in the proposal, along with recommendations for configuration and implementation.

If the proposed approach involves the use of control stations to monitor and record channels, the vendor must describe this method in detail. This description should include the number and type of control stations required, how they will be integrated with the NICE Inform system, and what additional equipment or software will be needed to ensure reliable operation. The proposal should also outline the associated costs for equipment, installation, and support so that the Town has a clear understanding of both the technical and financial implications.

Logging audio inputs, existing and proposed, are found in the Protected Information Disclosure document to be provided at the pre-bid conference.

The outputs shall supply audio from all the telephone, conventional radio channels and talkgroups controlled by the console to the logging recorder. Both transmit and receive audio shall be provided.

For conventional radios, the outputs shall filter guard and function tones associated with tone remote controlled base stations.

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These audio sources shall be available in either traditional two-wire, 600-ohm analog output on the rear of the console or in standard streaming Real Time Protocol (RTP) format. For IP recording, the console shall transcode the IP audio into a user-selectable CODEC format.

The following audio resources are being recorded - need list of radio channels and telephone or other audio.

11.12 CAD Integration

The provided solution shall offer an API at the console position level allowing third-party applications to control the console resources. The API shall support simultaneous use of both the standard console GUI and the third party CAD application.

11.13 Dispatch Console Controls

Scarborough, through the use of a centralized administration tool may incorporate any of these parameters into the console screen design according to their functional requirements. The following configurable controls and capabilities shall be available in the system.

Operator screen shall have the capacity to display any combination of RF stations or controls, at any location on a screen.

Tabbed modules shall be definable allowing easy access to RF stations and controls when required. All tabbed backgrounds and the tabs themselves shall be administratively configurable for color, text, font, and size and the addition of icons when required.

Action Buttons [buttons] when placed on the operator screen shall provide a navigation feature enabling the dispatcher to switch screens or invoke a “pop-up” screen with a single button selection. These Buttons shall be configurable and shall contain the text necessary to identify the action to be taken.

Each console position shall be capable of providing an activity history display. Activity history shall display the operator console's receive audio activity to the dispatcher on a per-RF stations / per-transmission basis.

Activity History filters shall be included enabling an operator to segregate emergency calls from regular calls.

The activity history display shall provide a scroll function and allow the operator to search history to view call activity.

The activity history retention period shall be configurable from one minute to twenty-four [24] hours.

Required button and functions are listed below in alphabetical order followed by a brief description of the associated operation.

ALERT TONE button shall provide the control for generation of programmable alert tones. Each shall be programmable for frequency, duration, and level. When touched/clicked, the tone will be applied to all selected RF stations and will be displayed on the VU bar graph.

ALL MUTE button shall provide a timed mute function on all monitored RF stations. Mute time shall be owner configurable from 0 to 600 seconds. When active, the ALL MUTE function button shall be flashed to

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alert the workstation operator of a mute condition. To cancel an ALL MUTE command, the operator shall simply touch the function button again.

BROWSER CONTROL button, when directed to a specific IP address, website or local document, such as online help manuals, streaming media, weather alerts, etc., shall invoke a screen within the operator's display providing the pre-configured content. Configuration of the URL and/or content shall not be accessible to the dispatcher and will be administered by authorized personnel only. The operator shall have the ability to close browser screens when not in use.

CROSSPATCH button to provide cross connection of audio between desired channels. Operation of crosspatch shall not inhibit the dispatcher's ability to operate on other channels. The controls shall provide a visual indication of crosspatch activity and inactivity. Two (2) separate, distinct and simultaneous crosspatches shall be possible. Each crosspatch shall be able to accommodate any number of desired channels.

HEADSET MONITOR button shall temporarily override the select speaker mute function, which is automatically enabled when a headset is inserted into the console jack box. Automatic select speaker muting shall also be permanently disabled on a per console basis by editing the system database.

INPUT ALERT/ALARM Buttons shall represent an external input to the system. When the input is activated, the button shall provide a visual indication, and also an optional audible indication, of the activation. The indication shall be configurable to require touching/clicking the button to acknowledge, to acknowledge on de-activation of the input, or to automatically acknowledge after a settable period of time. Each alert/alarm shall be configurable to be logged and to create an SNMP trap on the network. The user or console that acknowledges the Alert shall be logged.

INSTANT TRANSMIT button shall provide the workstation operator with an integrated instant transmit function for an associated radio RF stations.

RF STATIONS button shall provide access to the circuits assigned to the console for the current shift in the form of "electronic push buttons." Each shall be labeled with names and status colors. The first two lines of text on an RF stations button shall identify the associated RF stations. The last line shall show the RF stations status. Each button shall be owner programmable to display visual call alerts, audible call alerts, and the default RF stations monitor status on a per console basis.

MULTI-SELECT button shall allow functions to be performed on a preset group of RF stations. Touching/clicking the RF stations group button will place all the RF stations in multi-select and allow PTT on the entire group. Likewise, the entire group may be placed in unselect or patch, or reverted to default state with a single touch of the proper function button.

MUTE FUNCTION button shall control the individual audio level of a given radio RF stations. If the RF station is presently in a monitor condition, receive audio shall be presented to the workstation via the workstation unselect speaker. Touching/clicking the mute function button and then touching/clicking the RF station button shall change the RF station to a mute condition. Likewise, if the RF station is in the mute condition, repeating the action shall reverse the process and place the radio RF stations in a monitor condition.

PUSH-TO-TALK - PTT [On-Screen] button shall automatically invoke a PTT transmit action on the Select or Simul-select RF stations.

PTT INDICATOR shall display the PTT status of that specific console when the respective console is transmitting.

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PTT FOOTSWITCH a rugged PTT footswitch with a non-skid weighted base shall be provided. The cable shall not require a proprietary connector to connect to the console position. When activated, the footswitch shall initiate a general PTT function on the selected RF stations.

SUPERVISORY TAKEOVER button shall allow the console to take control of an RF station that is being used at another console. Only the console that initiated the takeover shall be able to transmit on the RF station. Other consoles shall be able to have the RF station in select or unselect to monitor the audio activity. When the takeover console de-selects the RF station, its operation at other consoles shall return to normal.

SYSTEM CLOCK button/module shall be placed on the screen and be configurable for 12/24 hour display formats.

TEST TONE button shall cause a 1000 Hz tone to be generated and inserted into the transmit audio path. Tone level shall be indicated on the console VU bar graph.

VOLUME CONTROL button/module shall allow the operator to adjust a selected RF station's Select and Unselect audio levels. The Volume display shall indicate the name of the selected RF stations for clarity.

AUXILIARY CONTROL button or control module shall provide the dispatch operator with direct and reliable control over facility access points within the Public Safety Building (PSB). At a minimum, this control shall include the ability to secure (lock) the main lobby door and to remotely unlock designated internal or external doors as authorized by the Town.

11.14 System Reports

The console shall be equipped to produce usage activity information reports on demand. At a minimum, hourly, daily, weekly and monthly reports shall be possible. The reports shall include, at a minimum, the following, each event time and date stamped:

- Number of transmissions per position
- Number of transmissions per channel
- Total transmission time per position
- Total transmission time per channel
- Total receive time per position
- Total receive time per channel
- Captured activity data shall be able to be reviewed by operator position, channel, time, type of event, etc.

11.15 Power Requirements

It is the intent of Scarborough to utilize the existing for the 9-1-1 center. Note that the console positions are on this UPS.

The Contractor shall clearly define and provide power loads calculation, and circuit requirements for their equipment.

The contractor shall finalize the number of, and type of electrical circuits needed for their equipment and identify if new circuit breaker, conduit, and receptacles are required for their equipment.

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All equipment and cabling provided shall be grounded per Motorola R-56 standard or Harris Site Grounding Protection Guidelines: AE/LZT – 123 4618/1.

11.16 Dispatch Console Furniture and Accessories

The Supplier shall furnish and install dispatch console furniture purpose-built for public safety communications environments operating 24/7/365. The console system shall support the functional, ergonomic, and technological needs of public safety dispatchers, including but not limited to law enforcement, fire, EMS, and emergency management personnel.

The Bidder shall provide detailed specifications and pricing for dispatch console furniture from at least two [2] different manufacturers that are recognized in the public safety industry for high-quality, ergonomic workstation solutions. Both proposed manufacturer lines must meet the functional and technical requirements outlined in this specification.

All furniture and accessories shall be designed for high durability, ease of maintenance, and flexibility in configuration to accommodate future system changes or expansions.

11.16.1 Console Design and Construction

Each dispatch workstation shall include modular console furniture constructed of steel, high-pressure laminate, and other commercial-grade materials suitable for intensive use.

Work surfaces shall be smooth, durable, scratch-resistant, and capable of supporting multiple monitors, keyboards, and desktop equipment.

Surfaces shall include grommets or pass-throughs for cable routing and must be free of sharp edges or protrusions.

11.16.2 Monitor and Equipment Mounting

The console shall support a minimum of eight (8) flat-panel monitors per position, with articulating arms or adjustable mounts for height, tilt, and rotation.

Monitor arms must allow for individual adjustment or grouped configuration, depending on operator preference.

Provisions shall be included for mounting additional dispatch accessories such as:

- Desktop control heads
- Speakers
- Footswitches
- VoIP phones
- Microphones
- Clock/timer displays
- Under-surface or rear compartments shall accommodate computers and electronics with proper ventilation and cable access.

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11.17 Cable Management

Integrated cable management shall be provided to conceal, secure, and route power, data, and audio cables throughout the console structure.

Cabling shall be accessible for maintenance yet protected from accidental damage or disconnection. Cables shall be routed to avoid interference with operator legroom or chair movement.

Power strips and data ports shall be mounted inside accessible compartments or raceways within the console.

11.18 Ancillary Console Equipment Integration

The furniture shall allow for neat and functional integration of ancillary dispatch equipment including:

- Radio system control units
- Logging recorder interfaces
- Dual headset jacks and selector modules
- Touchscreen control panels or status displays

Equipment cutouts or shelves shall be designed to securely support the weight and footprint of such gear without modification to the furniture.

11.19 Seating - Intensive-Use Chairs

Each console position shall be furnished with one (1) 24/7-rated intensive-use task chair designed for continuous operations.

Chairs shall include:

- Multi-adjustable armrests
- Pneumatic height adjustment
- Lumbar support
- Tilt/rocking function
- Commercial-grade fabric or vinyl upholstery designed for extended durability and easy cleaning
- Weight capacity rating of at least 300 lbs

11.20 Electrical and Connectivity

Each console shall include sufficient internal power and data outlets to support the number of installed devices, including future expansion.

Power distribution shall include surge protection and shall be compliant with all local electrical codes.

Network cabling paths shall be separated from power conductors and appropriately labeled.

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11.21 Submittals and Approval

The Supplier shall submit the following for review and approval prior to installation:

- 3D layout rendition/visualization of the dispatch floor plan showing dispatch console placement
- Console layout drawings (plan and elevation views)
- Equipment mounting diagrams
- Cable routing diagrams
- Manufacturer cut sheets for all furniture and seating
- Warranty information

11.22 Console Transition Plan

The Supplier shall provide a detailed transition plan for the communications center installation. This plan shall include the fact that the new radio console will be installed in the same location as the existing radio console and furniture. Therefore, the Supplier must minimize the impact to on-going operations in the communications center.

The Supplier's proposal shall describe a high level transition plan to ensure simultaneous console operations. The final plan will be discussed at the Detailed Design Review meeting.

12 SYSTEM 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 Town. No equipment shall be delivered, or work started until approval has been received from the Town'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 the Town of Scarborough 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 the Town of Scarborough 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 the Town of Scarborough 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.

12.1 General Requirements

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.

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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 the Town of Scarborough.

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.

The Contractor shall disconnect legacy equipment after the network has been accepted and after the Town of Scarborough 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 the Town of Scarborough.

12.2 Personnel Safety

The contractor shall be required to provide a Certificate of Insurance indicating the coverage limits as outlined by the Town of Scarborough. 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 the Town of Scarborough 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 the Town of Scarborough.

12.3 RF 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.

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12.4 Transmitter Linear Simulcast

This section details the technical specifications for a transmitter simulcast system designed to provide reliable, seamlessly synchronized communication across multiple transmitters for high-quality coverage over a wide area.

A multi-channel GPS receiver must be capable of receiving signals from multiple GPS satellites to ensure an accurate time reference and maintain signal tracking even in adverse weather conditions. Timing accuracy must be maintained within 1-microsecond, with precise transmitter timing at 1-PPS. The system's algorithm should ensure that the transmitters remain synchronized even during temporary GPS signal disruptions.

For redundancy, dual GPS receivers should be proposed as an OPTION.

GPS antennas should be mounted on a stable structure with a clear line of sight to the GPS satellites.

The system must automatically readjust and compensate for audio delays to synchronize timing across all transmitters if transport routes or delays change. It should also ensure consistent audio levels, minimize distortion, and maintain a high signal-to-noise ratio for clear audio transmission throughout the coverage area.

12.5 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.

12.6 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.

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12.7 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.

12.8 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.

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.

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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.

12.9 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.

12.10 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
- 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

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13 ACCEPTANCE TESTING OF EQUIPMENT AND SYSTEMS

Prior to installation at the sites, the contractor shall stage the equipment at the contractor selected location 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. the Town of Scarborough'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/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 the associated punch list of outstanding items to be compiled or re-tested shall be signed by both parties and forwarded to the Town of Scarborough 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 the Town of Scarborough upon completion of testing.

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Perform/Verify Complete Terminal Provisioning

Provision microwave terminal and IP devices in accordance with the Town of Scarborough 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.

Ground tests shall be conducted in the presence of the Town of Scarborough installation representative and results shall be recorded on a form approved by the Town of Scarborough 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.

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13.1 Coverage Testing and Verification

The Town of Scarborough and the contractor shall initiate audio performance testing to ensure that the simulcast system is operating as specified. The contractor shall submit in their proposal a detailed test plan and method to evaluate simulcast audio and signal coverage based on the signal coverage specification design requirements for a mobile radio.

Coverage prediction maps provided by proposers will serve as the foundation for system testing and performance evaluation, with the proposer guaranteeing the coverage performance depicted in the maps.

13.2 Simulcast Coverage Proof of Performance

The contractor shall demonstrate to the Town of Scarborough and Old Orchard Beach project representatives that all requirements stated in this document have been provided and are operating in accordance with the Town of Scarborough 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.

The contractor is required **to provide portable in-street radio coverage**, with a minimum delivered audio quality [DAQ-3.4 / 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.

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.

To evaluate the quality of coverage within the limits of Town, a subjective audio test has been designated to gauge the system's coverage performance at a satisfactory level.

The audio quality will be evaluated based on the TSB88 DAQ table. Additionally, if desired, conduct a similar assessment using a mobile radio device.

During testing period, the test shall also focus on identifying any areas within the coverage boundary that exhibit notably weaker or no signal strength or audio quality.

Upon completion of the testing process, a summary report outlining the results of the test to include audio DAQ details, superimposing the collected data onto the coverage prediction map provided in the proposal to visually highlight the coverage performance across the Town.

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 the Town of Scarborough's Project Representative to initiate the warranty period.

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13.2.1 RF Coverage Testing Requirements

This section defines the minimum requirements for RF coverage testing and outlines the expectations for the Acceptance Test Procedure (ATP). Each proposer shall submit a detailed ATP that includes specific methods for demonstrating compliance with the coverage objectives described herein.

1. Coverage Verification Methodology

The coverage acceptance process shall include talk-out and talk-in audio quality testing, using Delivered Audio Quality (DAQ) 3.4 as the minimum acceptable standard. These tests shall validate the system's ability to meet the required RF performance levels and shall identify any areas where coverage falls short.

Coverage testing shall be performed under full foliage conditions, typically between June 1st and September 30th. If the system becomes ready for testing outside of this period, the contractor shall defer and be prepared to conduct testing once full foliage has returned.

2. Test Configuration and Conditions

Testing shall be conducted within defined grid tiles using a portable radio configured to simulate indoor residential conditions. The system is designed to support portable radio operation inside typical residential structures, and the test plan shall reflect this use case.

Suppliers shall:

- Execute testing using portable radios configured per the specifications of this RFP.
- Apply de-rating techniques to simulate in-building and in-street conditions, as appropriate.
- Clearly describe, justify, and demonstrate any attenuation techniques used to simulate environmental signal loss.
- Perform bench testing to validate the effectiveness and repeatability of the de-rating approach under simulated conditions.

3. Test Equipment

- The Supplier shall provide all equipment required to perform the coverage test, including but not limited to:
 - Portable and mobile radios
 - Signal measurement tools
 - GPS equipment
 - Radios shall be from the Town's newly procured inventory.

Any temporary modifications made for testing purposes (e.g., to simulate degraded signal conditions) shall be reversible and documented.

For townwide in-street and simulated in-building testing, the Supplier shall include any accessories or materials necessary to mimic indoor signal loss characteristics.

Modifications may include reducing transmitter power and adjusting receiver sensitivity to simulate signal degradation encountered inside typical structures.

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4. Test Grid Design

The Supplier shall define a statistically valid number of test grids (tiles) for the RF coverage evaluation. All test grids shall be square or rectangular in shape and shall not exceed ¼ mile by ¼ mile in dimension.

Test teams shall make a reasonable effort to access and test each grid. Grids that are inaccessible after reasonable attempts shall be excluded from the final coverage compliance calculations.

13.2.2 60-Day Performance Test

Upon completion of the RF Coverage Test, a Performance Test shall be executed that shall consist of 30 consecutive days of uninterrupted operation. Subscribers shall be equipped with the most current software and firmware for this test. During this test period, the Supplier shall keep detailed records of any failures or adjustments of the System or subscriber units. The test shall be considered a failure if any of the following events occurs; the test may be repeated at the discretion of the City.

- The System experiences a catastrophic failure that results in:
- Failure of system control equipment
- Failure of site control equipment
- Failure of 25% of the channel assets anywhere in the system
- Failure of all console positions
- The same device fails twice during the performance test

13.2.3 System Acceptance Sequence

System Acceptance shall take place in the following sequence:

- Notification by the Contractor that the System installation is complete
- Completion of inspections by Town Project Manager
- Notification by Contractor that final punch list is resolved and Acceptance Tests can commence
- Hardware acceptance tests
- Software testing test
- Coverage acceptance test
- 60 day performance test
- Supplier provides draft system acceptance test report
- Acceptance test results approval by Town Project Manager
- All deliverables received by Town Project Manager
- Final system acceptance

13.3 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.

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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. The Town of Scarborough 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.

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 the Town of Scarborough 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.

Screen Shots – for each site and associated equipment, the contractor shall provide provisioning data; that is, readable copies of screenshots of equipment configuration screens, copies of line sweeps, screenshots of key system provisioning data, printout of RFC-2544/Y1564 tests, and microwave hop performance information such as RSL levels and fade margins.

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 Town 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.

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IP Addresses – Prior to final acceptance, the Contractor shall provide the Town 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.

13.4 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 are the responsibility of the Town of Scarborough. Please describe any additional or temporary equipment that may be required to accomplish the transition.

14 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 the Town of Scarborough.

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 the Town of Scarborough's satisfaction at the Contractor's expense.

During subsequent maintenance periods the Contractor may use the Town of Scarborough'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 the Town of Scarborough's spare parts inventory.

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

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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.

14.1 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.

The additional year's contract maintenance period shall begin on the date that the warranty period maintenance expires or the date that the Town of Scarborough 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.

14.2 Maintenance Plan

The Contractor shall prepare and submit for the Town of Scarborough'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.

Once approved, the Plan shall be used by both the Town of Scarborough 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 the Town of Scarborough.

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 are performing manufacturer's diagnostic tests.

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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 the Town of Scarborough personnel under telephone direction of qualified maintenance personnel.

14.3 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 the Town of Scarborough 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:

- **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**
 - 10-Hour On-Site Response/10-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 the Town of Scarborough and the equipment is returned to normal service.

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

14.4 End-of-Life of Proposed Equipment

Proposers shall provide realistic life cycle data on the proposed radio system and should fully disclose the end-of-life [EOL] status of each major equipment component in their Proposal. While some components will have shorter life cycle, Town expects the proposed radio system to be in service for at least fifteen [15] years or more. EOL production dates should be provided, minimally, for base stations, microwave radios, network controllers, etc. It is the intent, to the maximum extent possible, for Town to avoid the purchase of any network equipment that is nearing the end of its production cycle.

Manufacturers shall provide EOL notification in writing of any and all components two [2] years before the last manufacturing date and provide firmware and software upgrades for two [2] additional years after last date of manufacture.

The manufacturer shall provide spare parts for ten [10] years after last date of system manufacture.

In accordance with the preceding discourse, the Proposer must obtain official letters from each primary manufacturer, affirming their commitment to providing support for the supplied equipment for a minimum of fifteen (15) years.

14.5 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 the Town of Scarborough.

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

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14.6 Maintenance and Support Requirements

The Contractor shall be responsible for maintaining and supporting all radio system components, network hardware, and associated infrastructure from the time of installation through the duration of the warranty period, as well as any extended maintenance periods exercised by the Town of Scarborough.

All maintenance shall be performed in accordance with the approved Maintenance Plan and shall include preventive maintenance, diagnostics, software updates, and hardware servicing as specified. These requirements apply during both the warranty period and any post-warranty support term procured by the Town.

The Town of Scarborough reserves the right to procure on-call maintenance services directly from the Original Equipment Manufacturer (OEM) for IT hardware, computing platforms, and peripheral devices, in accordance with service tiers offered by the OEM.

No later than thirty (30) calendar days prior to the expiration of the warranty or any exercised maintenance extension, the Contractor shall coordinate OEM inspection and certification of all equipment, confirming its eligibility for continued maintenance coverage. The Contractor shall obtain and submit a written service quote from the OEM to the Town.

In addition, the Contractor shall coordinate with the Town of Scarborough and any authorized third-party contractors to identify and resolve issues affecting the integrated radio and IT backbone network that could impact the performance or reliability of the overall communications system.

14.7 Software Maintenance and Licensing Requirements

The Contractor shall be fully responsible for software maintenance and system/database administration throughout the warranty period and any extended maintenance period defined in the contract. Responsibilities include monitoring, performance tuning, and support for all operating systems, network software, databases, and other Contractor-provided software components.

The Contractor shall Install all required third-party software patches, security updates, and revisions at no additional cost to the Town of Scarborough. This obligation applies prior to Final System Acceptance, during the warranty period, and throughout the full duration of any extended maintenance term.

A software licensing fee must be included to ensure that all system components are operating on the most current, stable software version at the time of Final Acceptance. After Final Acceptance, the Contractor shall notify the Town of all new software releases.

A minimum of one (1) coordinated software refresh per year is required, which shall include all necessary engineering, installation, testing, and project management. Routine bug fixes do not fulfill this requirement.

- Software updates shall include, but are not limited to:
- Enhancements or corrections to existing system features
- New features applicable to currently deployed components
- Software upgrades or migrations to next-generation product versions

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All updates must be implemented in a coordinated, system-wide manner to ensure compatibility and system integrity.

This service shall commence upon Final System Acceptance and remain in effect for the full contract maintenance period or five (5) years, whichever is longer.

The Contractor shall provide the Town of Scarborough with a perpetual, non-transferable, non-exclusive license to use all delivered software and related documentation. All copies must retain the original proprietary notices unless the Town is otherwise authorized in writing.

14.8 Post-Warranty Software Updates and Lifecycle Support

Following the initial one-year warranty period, the Contractor shall provide continued access to all minor, major, and security software update releases. This includes updates that necessitate refreshing or replacing any Contractor-provided hardware components to maintain software compatibility and system performance.

At the conclusion of the one-year warranty, the Contractor shall ensure that all system equipment is operating on the most current software versions available, at no additional cost to the Town of Scarborough.

To support long-term system reliability and performance, the Contractor shall include in their proposal a comprehensive post-warranty support plan covering years two (2) through five (5). This plan shall outline the approach to ongoing software and hardware maintenance, system refresh cycles, and any recommended enhancements.

14.9 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:

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.

14.10 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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14.11 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 the Town of Scarborough 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 the Town of Scarborough's system.

The Contractor shall store the system spare parts inventory at a location approved by the Town of Scarborough.

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 the Town of Scarborough.

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 the Town of Scarborough at all times

14.12 Third-Party Manufacturer Warranties

All warranties, including those covering Third-Party equipment and components, shall commence on the date of Final System Acceptance.

The Contractor shall ensure that all Third-Party equipment warranties meet or exceed the minimum warranty durations specified elsewhere in this document. If a Third-Party manufacturer customarily offers a longer warranty period than the stated minimum, the longer duration shall apply.

For any warranties issued directly by equipment manufacturers, the Contractor shall formally transfer those warranties to the Town of Scarborough upon Final Acceptance.

The Contractor shall provide the following for each warranted item:

- Manufacturer's name, address, and telephone number for service support
- A copy of the formal, signed warranty documentation for both equipment and software
- Original software distribution media

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- An itemized list of any specialized test equipment required to support ongoing maintenance of the installed radio and IT network systems

15 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 Maine sales taxes. No exemption certificates are required for this procurement, and none will be issued.

All pricing shall be FOB destination.

All civil construction work performed under this contract shall comply with applicable federal, state, and local prevailing wage laws and regulations. The Contractor shall ensure that all labor classifications involved in excavation, concrete work, utility installation, site preparation, shelter foundations, fencing, and any other site-related activities are compensated in accordance with the current prevailing wage schedules as published by the appropriate regulatory authority. Certified payroll documentation shall be submitted as required to demonstrate compliance.

This project represents a joint venture between two municipalities. As such, the pricing sheet shall clearly delineate detailed, itemized costs specific to each town. The Contractor shall break out all costs—equipment, labor, materials, and associated services—in a format that assigns each expense to the appropriate municipality. This level of detail is necessary to ensure accurate cost allocation, facilitate transparent budgeting, and support independent funding or grant tracking by each participating town. Shared costs, if any, shall be identified and explained separately, with a proposed method of allocation included for review and approval.

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.

The proposed pricing shall include all labor, materials, and associated resources required to decommission and remove legacy equipment. This scope specifically includes, but is not limited to, antennas, transmission lines, mounting hardware, and any other obsolete infrastructure identified during the project. The contractor shall be fully responsible for the proper handling, transport, and legal disposal of all removed equipment in accordance with federal, state, and local regulations.

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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.

15.1 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!

PRICE SHEET SHALL BE DIVIDED INTO TWO SECTIONS. ONE WITH ALL EQUIPMENT AND SERVICES FOR SCARBOROUGH AND ONE FOR OLD ORCHARD BEACH

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.

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 Town 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.

15.2 Proposed Payment Schedule

the Town of Scarborough will pay the selected vendor for services performed in accordance with the signed Agreement. Invoices will be submitted in the following schedule:

- 10% Upon contract signing and completion of final system design
- 25% Upon delivery of equipment to vendor staging facility
- 20% Upon completion of system staging and customer system acceptance
- 25% Upon completion of installation at sites
- 20% Upon customer final acceptance testing

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

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

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16 SUBSCRIBER RADIO EQUIPMENT

Subscriber radio is defined as a mobile radio, portable hand-held, control stations, and vehicular repeater radios.

Scarborough requires the Supplier to provide various types of radio subscriber equipment for the different agencies and participants, and intends to procure radio subscriber units that shall require a variety of different features and options depending on the various user departments and their respective operational needs.

Subscriber units shall support all analog and digital communications within this system.

16.1.1 General Subscriber Requirements

Subscriber radios available shall be categorized as Public Safety or Public Service in both mobile and portable radio families. The Supplier shall thoroughly describe the features and functionality provided by each of the subscriber tiers.

Public Safety:	Law, Fire, and EMA -Radios shall operate in both the VHF and 800 MHz bands
Public Service:	DPW, Schools, Water and Sewer, and Municipal departments -Radios shall operate in the 800 MHz band

All proposed subscriber equipment shall be type accepted under Part-90 of the FCC Rules & Regulations.

All subscribers shall have the following capabilities:

1. Subscribers provided shall be equipped for conventional analog and P25 Phase-I and Phase-II radio.
2. Subscriber radios shall consist of an integral radio set, capable of frequency synthesis of multiple RF channels, with automatic channel switching under the control of external channel and/or internal channel switching logic. Additionally, the radio shall include such other items as are necessary for a complete, highly reliable, two-way analog and P25 digital radio suitable for communications in a multi-channel/mode trunked and conventional system.
3. The unit shall perform a self-diagnostic test each time it is turned on. This test shall be automatic and shall include all radio operating parameters. At the conclusion of a successful test, no operator intervention shall be required. A test that is not successful shall notify the operator.
4. The unit's operating frequencies, features, functions and other operating parameters shall be field tailorable via PC based programmers.
5. Subscriber units shall be equipped to concurrently priority scan both conventional channels [8 minimum] and trunked talkgroups [8 minimum] in both the clear and encrypted voice.

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6. Channel or trunked mode scanning shall be completed in the minimum time necessary to reliably deliver audio traffic to the radio subscriber. The Supplier shall provide the maximum scan time required between Trunking and conventional reception. The scan shall be a selectable priority, which means that the transmitter channel or talkgroup selected by the user is configurable to be the priority channel or talkgroup.

16.1.2 Subscriber Characteristics

1. Subscriber assemblies and sub-assemblies shall be shielded to minimize electromagnetic interference that may be caused to/by electrical equipment co-located and/or adjacent to this equipment.
2. The equipment shall meet or exceed all the requirements of MIL-STD 810C, D and E standards for shock, vibration, salt, fog, dust and rain.
3. Unit identification modes shall include: Unit ID upon Push-To-Talk, Emergency Unit ID, Selective Alert, and Alphanumeric Text Messaging [Public Safety optional].
4. All radios shall be equipped with a button or switch that activates a programmable "Home" mode or preferred channel with a single key, button press, or switch change.
5. All proposed subscriber radios and associated accessories shall be equipped to operate consistently and reliably according to manufacturer and system specifications in environmental conditions ranging from -30 degrees Celsius to +60 degrees Celsius at a 90% non-condensing humidity level.
6. All subscriber radios with display capabilities shall utilize a hardened LCD display capable of withstanding non-abusive vibration and direct impact encountered in the normal daily radio use without being rendered inoperable. The LCD displays shall provide configurable contrast levels to enable proper usage in direct sunlight and low-light operating conditions. All display radios shall provide user-enabled backlighting for nighttime and low-light usage.
7. The LCD display shall provide contrast adjustment, and its brightness shall be user adjustable. The LCD display shall be equipped for dimming and complete turn-off for surveillance and covert operations.
8. GPS capability [option]. Provide details regarding how the GPS data can be displayed on Scarborough CAD mapping system.
9. Transmit Time-Out Timer to warn the user of excessive transmission length. Time out timer should automatically disable the radio's transmitter after a pre-determined period; thereby eliminating talk group/channel interference caused by either a defective speaker/microphone or PTT button.
10. Protected Emergency button to allow easy access when needed but incorporating an ergonomic design whereby the emergency function could not be accidentally activated. The Emergency button shall be capable of being programmed for activation delay and the radio shall have an "open/hot microphone" feature associated with the operation of the Emergency button.

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11. Subscriber shall be equipped to provide configurable button, switch, and menu layouts to customize the radio operational characteristics for the various users and agencies. All buttons, switches, and menu items that are labeled or inscribed shall match the programmable functionality so as not to confuse the radio operators.
12. All subscriber radios shall be equipped to provide multiple configurable folders or zones of talkgroups and channels to uniquely organize the available modes programmed into each radio. Each folder or zone shall be accessible through any defined combination of button, switch, or menu item setting. Trunking and conventional channels shall be capable of being interleaved within a programmable zone or folder.
13. Subscribers shall be equipped with a data port. This data port shall allow for connection of test equipment, radio programming devices, etc.
14. Radios shall have Wi-Fi capability to reprogram subscribers utilizing Wi-Fi 802.11n for firmware and code plug changes. Radio communications shall not be inhibited while the update is downloaded.

16.2 Handheld Portable Radio

Portable radios shall be comprised of a handheld transceiver, battery, antenna, and associated accessories.

The units shall be of current production and shall be capable of withstanding the harsh environment associated with use in emergency services personnel. Portable housing shall be of high impact polycarbonate or other high impact material.

Separate top-mounted rotary control knobs for volume and talkgroup/channel selection for public safety-type radios. A “single-control” type of radio is not acceptable for public safety use, but would be considered for public service use.

Incorporate electronic, alphanumeric (minimum eight-character) display to provide visual indication of system availability, system (“mode” or “zone”), channel/talk group selected, incoming user ID/Emergency ID, call alerts, and operational status such as scan, transmit or low battery.

Carrying case options should include leather carrying cases with a belt loop or “D- ring” swivel mount, as well as chemical-resistant cases (nylon or similar plastic material) for use by hazardous material groups. Additionally, battery-mounted belt clips shall be included with all portable radios, if available.

16.2.1 Desired Quantities

The number of units to be supplied: Refer to attached Exhibit

For each portable, including spares, shall be equipped with:

- a) Battery plus a spare
- b) Single unit charger.
- c) Flexible ½ wavelength antenna whip, plus a spare
- d) Remote speaker microphone
- e) Swivel leather carrying case with hold down strap [option]

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16.2.2 Portable Power Supply

Portable subscriber radios shall be equipped to provide a minimum of 12 hours operations having a duty cycle of 10% transmit/10% receive/80% Idle) operational behavior model. The battery shall be appropriately sized for this operation.

All portables shall be equipped to operate pocket-style 120VAC multiple unit charger that can simultaneously charge/condition a minimum of six portable batteries of any chemistry type. The proposed multi-unit charger shall be compatible with every proposed portable radio type, and different multi-unit chargers shall not be required based upon the radio or battery type.

All portable subscriber radios shall be equipped to provide an audible and visual battery status indication to warn of battery depletion and need to charge.

A quantity of [identified in pricing sheet] battery exercise/testers for standard units shall be supplied. Testers shall, at a minimum, perform analysis, conditioning and cycle testing of batteries.

16.2.3 Portable Operational Characteristic

All portable subscribers shall have the following characteristics:

1. All portables shall be capable of interfacing to the following accessories as required by Scarborough: man-down emergency activation switch, public safety speaker microphone (i.e., elevated antenna at shoulder height), multiple unit charger/conditioner, surveillance headsets/earpieces, Bluetooth accessories, RF adapter switch for vehicular mobile adapter assemblies, ear-buds, tactical headsets, stealth mics, GPS-speaker microphones, bone microphones, and temple transducers.
2. Programmable for a variable RF Output Power between 1-3 Watts across the entire frequency operating range.
3. Shall be equipped with a noise-cancelling remote speaker microphones that provides an emergency button, volume control, rotary channel selector knob, and audio earpiece jack.
4. Portable speaker audio output operating in a vehicular adapter shall be 5 Watts, minimum.
5. Handheld radios, not operating in a vehicular charger or adapter, should have greater than 500 milliwatts of audio output.

Police Portables

1. Optional surveillance accessories such as miniature microphones, earpieces and remote microphones and headset/speaker microphones shall be available.
2. The portable radio shall support multi-key digital voice encryption, using federally approved AES/DES coding, to provide enhanced security during transmission and reception of sensitive communications.
3. Subscriber radios shall be equipped to mute all radio tones and/or audio when operating in covert or sensitive tactical situations (e.g., surveillance, SWAT, etc.).

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Fire Portables

1. Fire service shall have “ruggedized” cases that can be gripped by a gloved hand. Controls shall be large enough to operate with gloved hands. The EMERGENCY button shall be of sufficient diameter to be operated by a gloved hand.
2. Incorporate heavy-duty construction, enclosures and controls to meet the IP67 standard for water (protected against the effect of immersion in water to 1 meter), shock, vibration, dust, humidity, and high/ low temperature performance.
3. Fire portables batteries and accessories proposed must be approved by Factory Mutual as intrinsically safe for the following hazardous environments: Class I and II Division I, groups C, D, E, F and G and non-incentive for Class I, Division 2, Groups A, B, C and D.
4. Speaker microphones shall be waterproof and be equipped with an earphone jack. Speaker microphones shall have an optional “fire rated” cable for use by fire services.
5. Radio Housing Color Specification – Portable radios shall be supplied with high-visibility housings for ease of identification in emergency environments. The following color requirements apply:

Standard Color: NIJ VIS Green or equivalent high-visibility lime green

Alternative Colors: Red (Incident Command), Yellow (EMS), or Black (Administrative use)

Visibility: Must remain visible in low-light or smoke-filled environments

16.2.4 Portable Accessories

Portable radio accessories are listed in the pricing sheet. Suppliers are to provide Unit Cost for each item. The final quantity of accessories will be finalized at the Detailed Design Review meeting.

16.3 Mobile Radio

Mobile equipment shall be comprised of a transceiver, palm mic, antenna, and external speaker. The units shall be of current production and shall be capable of withstanding the harsh environment associated with use in emergency service vehicles.

16.3.1 Desired Quantities

Proposed subscriber inventory and quantity and other related accessory information is found in the Protected Information Disclosure document to be provided at the pre-bid conference.

16.3.2 Power Supply

The equipment shall operate from an external negative ground primary power source supplying a nominal 13.8 VDC.

All power circuits shall provide for reverse polarity protection.

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16.3.3 Mobile Operational Characteristic

All mobile units shall have the following characteristics:

- Programmable for a variable RF Output Power between 5-30 Watts across the entire frequency operating range.
- Mobile external speaker audio output shall be 10 Watts, minimum.
- Trunk mounted transceiver housings shall be equipped with a base plate. The base plate shall allow for the removal of the transceiver from its mounted location for replacement or servicing. Removal of the transceiver from the base plate shall not expose its internal circuitry.
- Mobiles shall be equipped to operate powered on or in a switched mode, powered down with an ignition sense, as required on an individual basis by Scarborough and Old Orchard Beach.

16.3.4 Mobile Radio Features

All mobiles shall be capable of interfacing to the following accessories and ancillary assemblies: horn and lights activation relays, siren/PA control head, status/message control head, external emergency switch or button, motorcycle assembly, dual control head-single radio, multi-band radio-single control head, handheld control head/keypad microphone, and mobile-in-a-tray control station.

Incorporate electronic, alphanumeric displays (minimum of eight characters) to provide visual indication of system availability, channel/talk group selection, incoming user ID, call alerts and operational status such as system availability, scan, and channel occupancy.

On dual control head units, each control head shall be equipped with a switch to take over control of the unit. Transmit and receive audio shall, at all times, be available from both front and rear positions regardless of the position of the takeover control switch.

Police Mobile

The mobile radio shall support multi-key digital voice encryption, using federally approved AES/DES coding, to provide enhanced security during transmission and reception of sensitive communications.

Fire Mobile

Radios shall be compatible with the installation of common fire/emergency services apparatus headset intercom systems, such as Setcom, David Clark, Firecom, etc. The Supplier shall completely integrate and wire all new subscriber radios with the various headset interfaces in use or intended for use as required to fully complete a vehicle installation.

Mobile radios shall be capable of interfacing with internal intercom systems installed in fire apparatus. The proposal shall include a detailed description and associated pricing for replacement in-vehicle intercom systems, where applicable. In addition, the Supplier shall provide solutions and pricing for external audio interfaces—such as headset and microphone connections—at pump control panels or other operational positions as required.

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16.4 RF Control Stations

For various public safety and municipal office radios, proposed control stations shall be comprised of a desktop mobile radio, AC power supply, desktop mic, internal or external antenna system.

An external protected/isolated and impedance-matched received-audio connection may be required for Police or Fire Station public address or station alerting configurations. The installation Contractor shall provide any and all external audio interface materials to accommodate this requirement and will assist with connection and testing.

All equipment shall be equipped with an external surge protector with ground conductor.

16.4.1 Remote Desk Controller

A dedicated Control Station shall be provided for each console position to serve as a backup communications in the event of console system failure.

While Control Stations may be physically installed at each console position, it is preferred that radios be centrally located and “pooled,” with each position having a remote desktop controller accessing stations over a local IP network. This approach reduces equipment clutter at the console and facilitates more efficient maintenance and redundancy.

The remote desktop controller, which must include an internal speaker and desktop microphone, shall provide the dispatcher the ability to control channel selection (trunked and conventional), adjust volume, mute audio, and perform other essential functions directly from the desktop controller.

Desired Quantities six [6]

16.4.2 Power Surge & Lightning Protection

All antenna feedlines shall be equipped with an external lightning arrestor with ground conductor.

16.4.3 Antennas

Each unit shall be equipped with appropriate antenna providing 99% system access availability. For multiple control stations, the Supplier shall use antenna-combining techniques to minimize the number of antennas installed at dispatch. Control station shall not degrade the performance of any co-located radio over the operating bandwidth of the system.

No antennas shall be installed inside the equipment room.

16.5 Subscriber Pricing

The Town has provided a detailed pricing sheet covering all proposed subscriber equipment. This sheet includes unit pricing for portable radios, mobile radios, and control stations, along with applicable quantity discount tiers, optional features, accessories, and installation services. Proposers shall reference this sheet in their response and may supplement it with additional information for alternative configurations or pricing options.

Installation pricing must be broken down by vehicle type and configuration (e.g., single vs. dual control head, pump panel mounting, etc.). The Town reserves the right to request installation services as either a bundled component with the equipment or as a separate, clearly identified line item.

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Installation Pricing Assumptions

- Assume all vehicles to have a 12VDC, negative ground electrical system.
- Assumes roof mount antenna and radios mounted with standard equipment brackets unless previously identified as an alternative installation and material has been included.
- Vehicle installation types:
 - **Standard installation:** assumes a vehicle under one ton, including but not limited to sedan, pickup, SUV, etc
 - **Heavy duty vehicle installation:** vehicle over one ton, including but not limited to plow trucks, garbage trucks, etc.
 - **Specialty vehicle installation:** non-standard vehicle or machine, including but not limited to mower, tractor, sweeper, backhoe, loader, etc.

Note: alternate fuel, hybrid, electric vehicles may require additional parts/labor which will be quoted as required.