



# REQUEST FOR PROPOSALS

## Fiber Optic Network Construction

A project funded by Old Town – Orono Fiber Corporation and the Northern Border Regional Commission  
Award # NBRC 15 G ME 00002

Old Town – Orono Fiber Corporation  
59 Main Street  
Orono, ME 04473

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# 1 Introduction

The Old Town - Orono Fiber Corporation (OTO Fiber) seeks proposals from qualified respondents to construct a fiber optic network in the communities of Orono and Old Town as discussed below. Respondents shall include in their response their approach and cost proposal for building the fiber optic network described in Section 4 and Exhibits B, C and D. It is expected that the selected respondent will operate as a General Contractor. The General Contractor shall be responsible for network construction and materials purchasing. A full enumeration of the General Contractor's responsibilities is contained herein.

## Federal Participation Disclosure

This project will be partially funded with Federal funds from the Northern Border Regional Commission (NBRC), and therefore is subject to the Federal laws and regulations associated with that program, some of which are discussed in Section 5.

# 2 Background

OTO Fiber is a nonprofit 501(c)(3) corporation formed by three entities: the City of Old Town, the Town of Orono, and the University of Maine System, having its flagship campus located within these two municipalities. The corporate website can be found at [www.OTOFiber.com](http://www.OTOFiber.com). The three founding entities have joined with the goal of bringing open-access, high-speed, symmetric, fiber-based network connectivity to the communities, for economic growth, improved access to University resources, and improved entrepreneurial and innovation opportunities. The University of Maine System provides networking to schools and libraries across the State of Maine and provides multiple paths into and out of the State for research and education. Furthermore, the University is the largest concentration of computational resources and data storage in the State. These connections and resources, both computational and human, are expected to help make the proposed project successful.

The network infrastructure will be realized in a phased deployment, with the initial pilot (i.e., this project) being a backbone and build-out of a limited amount of coverage within each community. The network backbone will be designed and built such that full coverage of the commercial and developed residential areas of both communities can ultimately be served. The initial pilot deployment will be a gauge of take rates and the effect of gigabit or higher symmetric connectivity on economic development and initial success will fuel continued growth of the network.

## About the Network

It is the objective of this project to build the first phase of OTO FiberNet, a network backbone of approximately three road-miles in each community, in a variety of neighborhoods, opportunistically picking up subscribers along or near the path. The network has been designed with the following characteristics:

- Entirely aerial on existing poles in the public right of way;
- Utilizes overlash construction as practical;
- Fiber Concentration Points (FCP) centrally located in each community;
- Generally, home-run fibers to the FCP;
- Network head-end to be co-located with NetworkMaine's NOC in Neville Hall, Flagstaff Road, Orono, ME 04469;
- Pre-connectorized multipoint service terminals used throughout;
- OTO Fiber has completed the pole-application process and make-ready is complete.

OTO Fiber's Architect & Engineering firm, Tilson Technology Management, has completed a detailed engineering design of the network included in Exhibits B, C, and D.

## 3 General Information

### RFP Contact Information

All questions and comments should be directed via email to Belle Ryder, President, OTO Fiber, at [bryder@orono.org](mailto:bryder@orono.org). Responses should be mailed to:

Belle Ryder  
Town of Orono/OTO Fiber  
59 Main Street  
Orono, ME 04473

### Notification of Intent to Respond

OTO Fiber requests that prospective bidders who intend to respond to notify OTO Fiber by the date noted in Section 3.6 of this RFP. Notifications should be sent via email to Belle Ryder at [bryder@orono.org](mailto:bryder@orono.org).

### Questions and Inquiries

An optional pre-bid conference call will be held on the date noted. All prospective bidders who have notified OTO Fiber of their intent to respond will be provided with details on how to participate no later than 3 days before the conference call. Please note that the mandatory deadline for notification of intent to respond is after the pre-bid conference. To accommodate

bidders who have not yet responded, participation details will also be posted on OTOFiber.com no later than 3 days before the conference call.

Prospective respondents should email questions to the designated contact by the dates noted in the below table. Responses to questions that involve a change or interpretation to the RFP will be issued in writing and emailed to all parties that have expressed an intent to respond to the RFP. Only written responses to questions will be considered binding.

Materials submitted in response to this request become the property of the OTO Fiber and may become a part of any resulting contract. Respondents agree that they will bear all costs associated with responding to this RFP.

If any changes are made to this RFP, e-mail notification will be provided to all bidders who have notified OTO Fiber of their intent to bid.

## Response Delivery

Please mail eight hard copies and one digital copy of the complete response, including all relevant attachments, to the designated contact in Section 3.1.

## Schedule

Event	Date
<b>RFP Released</b>	Friday, May 24, 2019
<b>Pre-Bid Meeting/Conference Call (Optional)</b>	Tuesday, June 4, 2019
<b>Questions due at 5 PM EST</b>	Friday, June 7, 2019
<b>Notification of Intent to Respond (Mandatory)</b>	Friday, June 7, 2019
<b>Responses to Questions Posted on OTOFiber.com</b>	Friday, June 14, 2019
<b>RFP Responses due by 5 PM EST</b>	Friday, June 28, 2019
<b>Award Announced (Estimated)</b>	Wednesday, July 31, 2019

## Evaluation Criteria

OTO Fiber seeks firms that:

- Can meet the project's timeline.
- Can demonstrate past performance and experience on similarly sized fiber builds.
- Are flexible and can efficiently work around the kinds of issues that often arise in construction projects.
- Are stable and well-capitalized enough to meet the insurance and bonding requirements mandated by the federal government.

Respondents shall describe in their responses to this RFP their project understanding and approach, experience building similar networks, regulatory plan, financial wherewithal, warranty, and firm, fixed price bid for constructing the full scope detailed herein. For bids

consisting of teams of firms, one firm should identify itself as the General Contractor. The General Contractor shall be responsible for the scope of work detailed in this RFP, insurance, and bonding.

Respondents that address the entire RFP will be evaluated by the evaluation criteria in the below table:

Item	Points Possible
<b>Project Understanding and Approach</b>	25
<b>Respondent’s Experience Building Similar Networks</b>	15
<b>Respondent’s Regulatory Plan</b>	10
<b>Respondent’s Timeline to Completion</b>	10
<b>Warranties, Documentation, and Demonstrated Financial Wherewithal</b>	15
<b>Bid Price</b>	25
<b>Total</b>	100

- **Project Understanding and Approach.** OTO Fiber seeks to partner with a contractor that understands the goals for the project. Respondents should demonstrate their understanding of the project and its goals and provide a project plan in sufficient detail to provide a high degree of confidence they will successfully construct the project as scoped, scheduled, and budgeted.
  - Method of Points Award
    - Project schedule that conforms with the RFP requirements: 0-15 points
    - Clearly articulated project plan supporting the schedule: 0-10 points
- **Experience Building Similar Networks.** The ideal respondent will have at least five years of experience successfully deploying municipal-scale or similar fiber optic networks on time and on budget. Respondents should demonstrate ability to advise OTO Fiber on industry construction methods that may minimize cost.
  - Method of Points Award
    - Experience building similar networks: 0-15 points
- **Regulatory Plan.** Respondents should demonstrate ability and experience in following appropriate regulatory requirements. Ideal respondents will have experience constructing federally-funded projects, but in any case, all respondents should show understanding of the NBRC requirements outlined in this document and its Exhibits. Respondents must not be currently debarred from participating in Federally-funded projects. Lastly, respondents should provide a plan for meeting the NBRC requirements.
  - Method of Points Award
    - Demonstrated understanding of regulatory requirements: 0-5 points
    - Experience constructing federally-funded projects in the last three years: 0-5 points
- **Timeline to Completion.** Respondents should include a timeline for the construction of the project. In addition, respondents should demonstrate experience constructing similar



projects on time and in budget. While OTO Fiber has a flexible delivery date, they expect that construction, once started, will continue until the network is complete.

- Method of Points Award
  - Detailed construction timeline: 5 points
  - Demonstrated experience building fiber optic networks within original timeline: 0-5 points
- **Warranties, Documentation, and Demonstrated Financial Wherewithal.** Respondents should demonstrate ability to warranty their design and work products and to generate documentation such as red-line mark-ups of the design documents to reflect as-built conditions in accordance with industry standards. In addition, respondents should provide assurance (confidentially if desired by so noting in their response) of their ability to secure the required performance, payment, and bid bonds, as well as insurance requirements.
  - Method of Points Award
    - Warranty specifications included in response: 0-5 points
    - Confirmation of ability to comply with required documentation aspects: 0-5 points
    - Demonstrated ability (e.g., bank letter or other confirmation) of ability to secure required bonding and insurance: 5 points
- **Bid Price.** The bid pricing should include the following items:
  - Firm, fixed-price bid for the primary networks in both communities, including fit-out of the fiber concentration points.
  - Firm fixed-price bid for additional drops as described in Section 4.6.3.

## Proposal Acceptance

OTO Fiber reserves the right to accept or reject any or all proposals as deemed to be in the best interest of OTO Fiber.

## Costs of Preparation

The Respondent shall be solely responsible for all expenses it incurs in responding to this RFP. This includes any presentations or demonstrations associated with the RFP.

# 4 Project

## Overall Design

### 4.1.1 Old Town Design

The network design includes a dedicated buffer tube to serve the large shopping center along Stillwater Ave. This and other design features are marked on the design prints in Exhibit D.

### 4.1.2 Orono Design

The network is primarily overlashed to NetworkMaine fiber assets. This and other design features are marked on the design prints in Exhibit D.

### Installation Materials

Contractor will be responsible for procuring all materials and providing a warranty for the major materials. Materials and quantities are listed in Exhibit C. Substitutions are acceptable, however any substitutions made to this bill of materials must meet or exceed the warranty specifications of the materials listed in Exhibit C. OTO is particularly interested in substitutions that may save costs.

The Contractor is held responsible for all materials through OTO Fiber's acceptance of the network. If the materials supplied by the Contractor are found to be defective, or do not conform to the specifications upon testing, OTO Fiber reserves the right to have the Contractor immediately replace the materials at the contractor's expense and through its procurement process. Excess materials purchased but not used during the construction will become property of OTO Fiber upon acceptance of the network.

### Staging Area

If the Respondent determines that a staging area is necessary to meet the project requirements, it should clearly indicate this in its response. If the proposed staging area is on City, Town, or University property, or its access is otherwise controlled by the City, Town or University, Respondent should make clear its requirements for access to the proposed staging area, including but not limited to desired term, hours, and space needed.

Proposed staging areas should be located within the geographic Project area. Respondents shall warrant that their use of the area for staging purposes will follow applicable regulations and laws.

### Pole Licensing, Make Ready, and Permitting

The project will span approximately 142 poles for the network in the City of Old Town. The network in the Town of Orono spans approximately 156 poles. The vast majority of poles in Orono have existing carrier strand to which new fiber will be overlashed as part of this project. Respondents will not be responsible for pole or conduit licensing or make ready.

The fiber route is in the public right-of-way or on private property for which easements and agreements have already been secured, as needed.

### Construction Scopes

This section outlines the scopes of construction for the project. Respondents are required to respond to all scopes outlined; they are separated here only for convenience's sake.

### 4.1.3 Construction Scope A

OTO FiberNet will require connection to Maine Fiber Company's Three Ring Binder, which is primarily comprised of Corning SMF28e+ fiber. Fiber cable for OTO FiberNet shall be of equivalent quality to that used for Three Ring Binder and meet applicable industry guidelines, including Telcordia GR-20 and ITU-T G.652.D.

OTO Fiber seeks respondents to perform the following:

1. Review the final, engineered design and determine a viable construction plan.
2. Identify any probable constructability issues or concerns in the network design, and work with OTO Fiber to arrive at suitable remedies.
3. Procure adequate amounts of fiber optic cable conforming to the project's specifications to build the network as specified by the final engineered network design.
4. All required anchors or guying will be per pole owner guidelines as noted in the Design Prints (Exhibit D).
5. Install fiber optic cable aerially, per the project design specifications in Exhibit B – Statements of Work and Exhibit D – Design Prints.
6. Develop and execute a traffic management plan in coordination with the municipal Public Works Directors and in compliance with applicable regulations of the State of Maine, the City of Old Town and the Town of Orono.
7. Perform ongoing quality control checks of the as-built network throughout the construction period. Escalate issues to OTO Fiber as needed.
  - i. Perform OTDR testing on each fiber strand installed.
  - ii. For all terminated strands, report true span loss not to exceed 0.35 dB/km.
8. Participate in weekly construction update meetings/phone calls with OTO Fiber representatives.
9. Perform all testing required by OTO Fiber after construction is completed or as required by federal grant conditions.
10. OTO Fiber will schedule a final inspection after construction has been completed. Any defects identified must be remedied before final project acceptance and payment.
11. Document and deliver all as-built specifications as red-line mark-ups on the design documents.
12. Complete outstanding issues and close the project.

### 4.1.4 Construction Scope B: Fiber Concentration Points

The winning bidder shall:

1. Construct the fiber concentration facilities in the two fiber concentration points, one located in each community, per the project requirements.
2. Procure and install cabinets, patch panels, and other materials as defined in Exhibit C - Bills of Materials.

#### 4.1.5 Additional Drops

Bidders are asked to provide a price to install drops to premises along the route that request service, as directed by OTO Fiber. The price bid for these additional service drops is outside the scope of the OTO Fiber- and Federally-funded network construction and will be an optional additional service.

Additional service drops under this scope are limited to those to be constructed at the same time as initial network construction. The price bid herein is only considered binding during this time, and not after the network construction is complete.

Bidders are encouraged to identify a quantity discount mechanism whereby the price for all drops could be reduced as the number of additional drops increases. Bidders' responses to this scope should include:

- A firm fixed price per additional drop, specifying labor and materials breakdown. Multiple prices can be quoted for varying drop lengths or underground/aboveground. Drop price can also be quoted per foot if preferred.
- Required amount of advance notice of an additional drop to be constructed.
- Suggested quantity discount mechanism, if any.

#### Other Installation Requirements

- All construction is to be per industry standards including, but not limited to, Telcordia Blue Book and NESC code.
- All fiber optic cable shall be installed per manufacturer's best practices and tensioned per manufacturer's specifications.
- The Contractor is responsible to install all necessary pole hardware suitable for the provided cable.
- High visibility cable tags or markings containing the Owner's information shall be installed at every pole, splice enclosure, and riser guard, and be visible while standing on the ground.
- Serving terminals are to be installed approximately 18 inches to the right of the pole, and drop ports are to be installed on the left side of the terminal.
- An 8-foot slack loop shall be placed at all serving terminal locations for splicing. The remaining slack not used for splicing is to be coiled in the back of the serving terminal for storage and proper access to the fibers.
- Labeling of the cable sizes and direction is required. All fiber strands spliced into ports will be tagged and identified per terminal splice design.
- At each aerial splice location 150 feet of cable will be left on each cable end for splicing, or as otherwise indicated on the construction drawing. The cable ends must be sealed watertight to prevent water from entering the cable.

## Splicing Requirements

- All splicing shall be completed as per splice details included in the design documents.
  - Any changes shall be approved prior to completion.
- All fibers and connector assemblies (pigtails) shall be fusion spliced.
  - All splices are to be organized and secured within an approved fiber optic splice closure.
  - The Contractor shall follow the manufacturer's recommended cable preparation and routing procedures for cable entry into the provided fiber optic splice closure.
- The Contractor shall maintain a Splice Log Book for each splice enclosure.
  - Each splice enclosure will have a unique identifier as per the design prints and shall be large enough to be visible from the road. The splice enclosure identifier shall also be referenced on the Splice Log Book cover.
  - The Splice Log Book shall include a copy of the original splice detail sheet, a red-lined copy of the as-built detail, LID readings from the fusion splicer, Optical Time Domain Reflectometer (OTDR) Test results of the fibers spliced at that location, pictures of the organization and layout of the interior of the enclosure, and pictures of the enclosure on the cable or strand.
  - The Splice Log Book shall also include any additional pertinent information not listed.
  - The Splice Log Book shall be delivered to the OPM electronically upon request and at the end of the project.
- All splicing shall be monitored with an OTDR and tested to ensure acceptable splice loss values are achieved.
- Labeling of the cable sizes and direction is required. All fiber strands spliced into ports will be tagged and identified per terminal splice design. All labeling is expected to meet applicable standards and recognized best practices.
- All tools and equipment used shall be in excellent working order and all splicing equipment shall have been calibrated within 6-months prior to use on this project.
- Certificates of calibration for splice equipment shall be submitted to OTO Fiber for review and approval.

## Testing Requirements

Contractor shall test the network in accordance with the testing requirements in Exhibit A.

## Change Orders

If a need arises to change the scope of the project in a reasonably significant way, a change order shall be requested in writing prior to starting work or incurring costs. Change orders shall clearly state the Contractor's expected profit and overhead accruing from the associated change in scope and conform to the requirements of Sections 4.6 – Section 4.8.

All change orders shall be subject to approval by OTO Fiber.

## Documentation Requirements

As-built drawings, including any and all changes implemented, may be provided as AutoCAD drawings, ESRI shapefiles, or as red-line mark-ups of the design drawings. Respondents may request digital copies of the design files to use as the basis of their as-built drawings.

- Detailed splicing report consisting of:
  - Network
  - FDH
  - Fiber concentration points
  - Splice cases
  - Terminals
- Fiber span footages
- Terminal splice locations
- Strand grounding locations
- Multi-port locations
- Slack loop locations
- Routes of all wire/cables installed
- Test results for optical fiber testing
- Warranty Package to include dates (Product Warranty)
- Certificate of Acceptance (pre- and post-installation)
- Summary sheet of test results for quick reference
- Fiber concentration point drawings

## Job Completion

Job completion occurs when the following conditions are satisfied:

1. Contractor submits last invoice.
2. Contractor notifies OTO Fiber that construction is complete.
3. Final inspection has occurred.
4. All punch list items have been completed.
5. All equipment and material warranties have been transferred to OTO Fiber.
6. All construction materials and fiber reels have been returned with a list of remaining items.
7. All the Documentation for the Fiber Project is submitted:
  - Design As-Built
  - Fiber Organization Drawing
  - Fiber testing results end to end for attenuation and continuity
  - OTDR results, including each individual Splice Enclosure Log Book.

## Warranty Requirements

1. The Contractor shall warrant that all materials furnished shall be new, and free from defects.
2. The Contractor shall warrant that the materials and workmanship used in this installation are as herein specified and shall provide all material and labor required to make good any defects due to faulty materials or workmanship which become apparent within a one-year period from substantial completion.
3. The equipment and materials manufacturers are expected to recognize that they are responsible for the failure of their products to perform in accordance with data furnished by them or their authorized representatives, as well as misrepresentations of such data.
  - When the products have been installed in accordance to the manufacturer's published or written instructions and recommendations, and such products fail, then the Contractor and the manufacturers are responsible for replacement of the products and all associated work and materials without additional cost to the Owner.
4. Warranty information is required for all materials supplied by the Contractor.
5. Damage by vandals, fire, traffic accidents or “acts of God” is excluded from warranty

## 5 General Conditions

The following are required of General Contractors responding to this solicitation.

### Bid Submission

Final responses are due via mail or hand-delivery by the date and time specified in Section 3.6 to the RFP point of contact. OTO Fiber reserves the right to reject any bids that fail to meet this deadline. OTO Fiber reserves the right to issue extensions to this deadline at its discretion. Responses should be submitted on thumb drives as Adobe PDF files with eight hard copies. Schedules and cost estimates can be included in the PDF or detailed in an accompanying Excel workbook.

### Proposal Life

Respondents shall assert that their proposals are valid for 120 days post bid deadline. If the deadline is extended, proposals shall remain valid for 120 days post the extended deadline. This includes all equipment costs, labor costs, and other costs associated with the network construction.

### Disclosure of Proprietary Records

Bidders may preserve proprietary rights as to confidential or business process information provided that: (i) Bidder shall inform OTO Fiber upon submission of its Bid, in writing, that such

records are going to be furnished, are proprietary and are not to be disclosed; and (ii) said records shall be sufficiently identified; and (iii) Bidder shall state the reasons why the information should be exempted from disclosure; and (iv) designation of said records as exempt from disclosure is reasonable and accepted by OTO Fiber. Acceptance of the claimed materials does not constitute a determination on the exemption request, which determination will be made in accordance with statutory procedures.

## Northern Border Regional Commission Bonding Requirements

This project is funded with money from the Northern Border Regional Commission. The Northern Border Regional Commission has the minimum requirements as follows:

- A. A bid guarantee from each bidder equivalent to five percent of the bid price. The “bid guarantee” must consist of a firm commitment such as a bid bond, certified check, or other negotiable instrument accompanying a bid as assurance that the bidder will, upon acceptance of the bid, execute such contractual documents as may be required within the time specified.
- B. A performance bond on the part of the contractor for 100% of the contract price. A “performance bond” is one executed in connection with a contract to secure fulfillment of all the contractor’s obligations under such contract.
- C. A payment bond on the part of the contractor for 100% of the contract price. A “payment” bond” is one executed in connection with a contract to assure payment as required by law of all persons supplying labor and material in the execution of the work provided for in the contract.

## 6 Response Format and Content

### Cover Letter

Respondent(s) must submit a cover letter signed by an authorized representative with power to legally bind the respondent. The cover letter must include the following:

- The number of years the entity has been in business.
- An overview of the experience and background of the entity and its key personnel.
- Identify the legal name of the entity, its headquarters address, its principal place of business, and its legal form (i.e. corporation, joint venture, limited partnership, etc.).
- Identify the name, address, and telephone number(s) of the principal contact for all communications pertaining to the RFP.

### Executive Summary

Respondents shall provide an executive summary, that explains the respondent’s understanding of the OTO Fiber’s objectives, lists the capital cost estimate, and describes the construction plan at a high level. This summary should discuss the respondent’s approach to implementing their



solution, their approach to project management, strategies, tools, and safeguards for ensuring performance of all required services.

Respondents should include any additional factors they wish considered in the summary, particularly any cost-reduction strategies proposed in the response.

## Professional Qualifications and Experience

The Respondent shall provide a detailed description of its experience building fiber optic networks and working on projects funded by government grants. The Respondent shall provide names and resumes of key personnel to be involved in the project.

### 6.1.1 Past Performance

The Respondent shall list relevant past performance building fiber optic networks. In their description of past performance, the respondent shall list:

- Description of the technology employed
- The number of premises served
- Description of the physical environment (urban, rural)
- Description of available speeds at premises
- Dates of performance
- Project size (in subscribers and cost)
- Customer contact information (name, title, phone, email, physical address)

### 6.1.2 References

Respondent shall provide at least three references for similar projects completed within the last five years. Similar projects include construction of municipal-scale fiber networks, projects involving Federal grants, or both.

## Timeline for Completing Work

The Respondent shall discuss its proposed timeline. OTO Fiber prefers a completion date before December 31, 2019

## Capital Cost Proposal

The bidder shall use the attached spreadsheet for providing their capital cost proposal for building the network in compliance with the specification outlined in Appendix A. All bids shall be either not-to-exceed or flat fee.

## Federal Requirements

Bidders shall affirm they have read, understood, and can meet all the requirements outlined in Section 5.4 of this RFP.

## Exhibit A – Fiber Testing

OTO Fiber requires OTDR testing that verifies an end-to-end signal on the network that meets future performance requirements.

### Required Equipment

Equipment required for testing will consist of OTDR, Pulse Suppression Box, Fiber Scope, and SC/APC fiber jumpers.

Contractor will test with a certified OTDR, to be within manufactures required re-calibration period, usually one years' time.

### Acceptance Test

The following tests shall be performed as part of the Acceptance Test:

#### Optical Time Domain Reflectrometer Tests (OTDR) Continuity Uniformity Tests:

Each fiber shall be tested end-to-end, bi-directionally at 1310 nm and 1550 nm using an OTDR. The test will include fiber loss, splice loss, and connector loss. Test results are to be saved and provided to client electronically for review.

Splices within spec (bi-directional average of  $\leq 0.15$ dB per splice and  $\leq 0.08$ dB average for the entire span) or documented on the out of spec splice form with appropriate OTDR Re-burn traces.

Fiber connectors shall meet fiber loss requirements no greater than .3 db loss per connector, measured with a 1km pulse suppression box. If connectors do not meet these standards and new connector shall be installed.

All connectors shall be fiber scoped and screen shot to prove that connector passed software test. Results will be labeled, saved and provided to client electronically

#### Optical Length and Loss:

The OTDR will be used to determine the end-to-end optical length and loss of the cable. True span loss is not to exceed 0.35 dB/km.

Prior to testing, all fiber jumpers will need to be scoped, cleaned, and tested.

## Exhibit B – Statements of Work

### Network

#### Old Town (3.39 Miles)

Starting at Old Town's Fiber Concentration Point (FCP) at 160 Center St, Old Town, ME 8,488' of 288ct loose-tube fiber cable is to be placed from Consolidated Communication's (CCI) P. 1 heading in a southwesterly direction along Center St to CCI's P. 62 along Stillwater Ave. 640' of 48ct loose-tube fiber cable will be spliced and placed from CCI's P. 3 at the intersection of Center and 4th St along 4th St to CCI's P. 4 with strand continuing one additional pole through the intersection with Middle St.

Additionally, a second 288ct loose-tube fiber cable 2,026' in length is to be placed from 160 Center St, overlashing one span from CCI's P. 1 to P. ½, to N Brunswick St and ending at CCI's P. 6 at the intersection with Stillwater Ave. There will be two 48ct loose-tube fiber cable laterals required off of N Brunswick St. The first will be 2,042' from CCI's P. 5 heading northeasterly along Middle St connecting onto Water St and ending at an unidentified pole at 44.933512, -68.644246. An additional 48ct lateral will branch off of Middle St at CCI's P. 3 and be placed 424' down Shirley St to CCI's P. 2. The second lateral along N Brunswick St will begin at the intersection with Stillwater Ave at CCI's P. 6 and travel 1,624' along Stillwater Ave to CCI's P.5 on Main St

A 48ct loose-tube fiber cable will also be required from 160 Center St placed 437' northeast two spans to an unidentified pole located at 44.934471, -68.646519.

To complete the Old Town network, 818' of 48ct loose-tube fiber cable will be placed from the Old Town FCP and over-lashed to the 288ct fiber cable along Center St to CCI's P. 4. Here we will splice into an existing Maine Fiber Company (MFC) FOSC-450 splice case to provide transport between the headend on UMaine's campus and the FCP.

Fiber slack loops (18 at 100' each), serving terminals (74), anchors (16), and down guys (20) have been designed to adequately meet all network requirements and will be installed along the above routes.

#### Orono (2.2 Miles)

Starting at Orono's Fiber Concentration Point (FCP) at 59 Main St., Orono, ME, 2,395' of 288ct loose-tube fiber cable is to be overlashed to the existing University of Maine System Network (UMaine) from Emera's P. (44.883182, -68.673836) heading in a north towards Forest Ave to Emera's P. (44.884385, -68.673063) along Bennoch Rd. Continuing on Bennoch Rd., a slack loop will be left at Emera's P. (44.887701, -68.675919) for future expansion along Bennoch Rd. Six serving terminals will be placed to accommodate businesses and residents along Bennoch Rd.

Additionally, a second 288ct loose-tube fiber cable 8,454' in length is to be placed from 59 Main St, overlashing on to UMaine Network, south to Emera's P.3 to Emera's P. 8 on Goodridge and

Main St (Rt.2) intersection. The 288ct loose-tube fiber will then continue South on Main St to Emera's P.64 at the intersection of Old Kelley Ave.

Next, 400' of 48ct loose-tube fiber will be placed and leaving the FCP, heading south towards Goodridge Drive in which it will stop at the splice location between Emera's P.3 and P.4. The 48ct loose-tube transport fiber will be spliced into the existing UMaine Network splice case to provide transport between the headend on UMaine's campus and the FCP.

To complete the Orono network, 24 fibers from the 288ct loose-tube cable will be spliced into the existing 96ct loose-tube fiber provided by OTO Fiber Corporation. Fiber counts used from the existing 96ct fiber will start from the intersection of Old Kelley Rd. and Main St (Rt. 2) to Emera's P. 6.5 at the Kelley Road Self Storage (130 Kelley Rd). Serving terminals (7) will be placed at existing OTO slack locations. Existing OTO slacks will remain in place or may need to be migrated to accommodate residents and businesses. Please note in the drawing, the red figure-8 slack loops represent where the slack loops currently reside and the snow shoes represent the slack loops new location according to the design. Additional to the serving terminals, 14 multiport service terminals (MST) will be overlashed on existing Town of Orono Strand 400' from the serving terminals to serve more residents and businesses and reduce the usage of serving terminals along Old Kelley Rd. Forty-five serving terminals and fourteen MSTs are required.

Fiber slack loops (15 at 100' each), serving terminals (52), MSTs (14), anchors (1), and down guys (3) have been designed to adequately meet all network requirements and will be installed along the above routes.

## Fiber Concentration Points

### Old Town

Location: 160 Center Street, Old Town, Maine

The Fiber Concentration Hut is located in the basement of 160 Center St, Old Town, Maine. The cabinets will be shipped to 59 Main Street Orono. This is where the contractor will pick up the cabinets and overall project major material for the installation of the FCH. The contractor will be responsible to transport and install the 2 main cabinets.

The cabinets will be assembled on site to become one unit, there is one cabinet for the Future DC Power Plant and Future Electronics. The Load Center will come preinstalled. The contractor will unpack and assemble the Main Cabinet from the factory. This will include, fastening the cabinet to the concrete floor, the doors, battery shelf, and all misc. hardware to complete the installation.

Cabinet #2 is the Fiber Distribution Cabinet. The contractor will unpack and assemble the second Cabinet from the factory. This will include, fastening the cabinet to the concrete floor, the doors, the Fiber Distribution Panels and all misc. hardware to complete the installation. The joining collar is to be installed to join the cabinets making the unit one assembly.

Install Fiber Distribution Panels and Splice Fibers Per Fiber Design. Install (2) 48 Fiber Distribution Panels and (2) 288 Fiber Distribution Panels and Splice Fibers per Design. A total of 516 HO-1 Splices are designed to be terminated in the Panels.

## Orono

Location: 59 Main Street, Orono, Maine

The Fiber Concentration Hut is located in the garage connected to the Town Hall, 59 Main Street Orono, Maine. The cabinets will be shipped to 59 Main Street Orono. This is where the contractor will pick up the cabinets and overall project major material for the installation of the FCH. The contractor will be responsible to install the 2 main cabinets.

The cabinets will be assembled on site to become one unit, there is one cabinet for the Future DC Power Plant and Future Electronics. The Load Center will come preinstalled. The contractor will unpack and assemble the Main Cabinet from the factory. This will include fastening the cabinet to the concrete floor, the doors, and all misc. hardware to compete the installation.

Cabinet #2 is the Fiber Distribution Cabinet. The contractor will unpack and assemble the second Cabinet from the factory. This will include fastening the cabinet to the concrete floor, the doors, the Fiber Distribution Panels and all misc. hardware to compete the installation. The joining collar is to be installed to join the cabinets making the unit one assembly.

Install Fiber Distribution Panels and Splice Fibers Per Fiber Design. Install (1) 48 Fiber Distribution Panel and (2) 288 Fiber Distribution Panels and Splice Fibers per Design. A total of 432 HO-1 Splices are designed to be terminated in the Panels.

## Exhibit C – Bills of Materials

### Network

#### Old Town

Assembly	Status	Description	Part Number	Number	Length	Amount
10(M)	Planned	5/16 EHS		2	885	885
6.6 (M)	Planned	6.6M Strand		13	13943	13943
CFO 288	Planned	AERIAL DIELECTRIC - LOOSE TUBE - DRY CABLE	288EU4-T4100D20	8	11420	11420
CFO 48	Planned	AERIAL DIELECTRIC - LOOSE TUBE - DRY CABLE	048EU4-T4100D20	7	6494	6494
Down Guy	Planned	Aerial Down Guy PE-1-3		4	0	4
Expansion Anchor	Planned	PF1-5a		16	0	16
PM2A	Planned	GROUND WIRE ASSEMBLY		11	0	11
SCA-9T-24 (4:2)	Planned	AERIAL TERMINAL (4 PORT)	SCA-9T24-046CPL-BR	13	0	13
SCA-9T-24 (4:3)	Planned	AERIAL TERMINAL (4 PORT)	SCA-9T24-046CPL-BR	2	0	2
SCA-9T-24 (4:4)	Planned	AERIAL TERMINAL (4 PORT)	SCA-9T24-046CPL-BR	11	0	11
SCA-9T-34 (4:0)	Planned	AERIAL TERMINAL (4 PORT)	SCA-9T34-046CPL-BR	3	0	3
SCA-9T-34 (4:2)	Planned	AERIAL TERMINAL (4 PORT)	SCA-9T34-046CPL-BR	23	0	23
SCA-9T-34 (4:3)	Planned	AERIAL TERMINAL (4 PORT)	SCA-9T34-046CPL-BR	2	0	2
SCA-9T-34 (4:4)	Planned	AERIAL TERMINAL (4 PORT)	SCA-9T34-046CPL-BR	20	0	20
Snow Shoes	Planned	Snow Shoes		18	0	18
Terminal Splicing	Planned	Terminal Splicing		4	120	120

Orono

Assembly	Status	Description	Part Number	Number	Length	Amount
10(M)	Planned	5/16 EHS		1	174	174
CFO 288	Planned	AERIAL DIELECTRIC - LOOSE TUBE - DRY CABLE	288EU4-T4100D20	2	11356	11356
CFO 48	Planned	AERIAL DIELECTRIC - LOOSE TUBE - DRY CABLE	048EU4-T4100D20	3	450	450
Down Guy	Planned	Aerial Down Guy PE-1-3		2	0	2
Expansion Anchor	Planned	PF1-5a		1	0	1
PM2A	Planned	GROUND WIRE ASSEMBLY		1	0	1
SCA-9T-24 (4:1)	Planned	AERIAL TERMINAL (4 PORT)	SCA-9T24-046CPL-BR	2	0	2
SCA-9T-24 (4:2)	Planned	AERIAL TERMINAL (4 PORT)	SCA-9T24-046CPL-BR	4	0	4
SCA-9T-24 (4:3)	Planned	AERIAL TERMINAL (4 PORT)	SCA-9T24-046CPL-BR	1	0	1
SCA-9T-34 (4:2)	Planned	AERIAL TERMINAL (4 PORT)	SCA-9T34-046CPL-BR	14	0	14
SCA-9T-34 (4:3)	Planned	AERIAL TERMINAL (4 PORT)	SCA-9T34-046CPL-BR	5	0	5
SCA-9T-34 (4:4)	Planned	AERIAL TERMINAL (4 PORT)	SCA-9T34-046CPL-BR	26	0	26
Snow Shoes	Planned	Snow Shoes		15	0	15
Migrate Slack	Planned	Migrate Slack		1	1000	1000
Terminal Splicing	Planned	Terminal Splicing		21	101	101
4 Port MST	Planned	4 Port MST - 400ft tail	MST-04MH00-A0400U	13	13	13
4 Port MST	Planned	4 Port MST - 600ft tail	MST-04MH00-A0600U	1	1	1

## Fiber Concentration Points

Old Town

Assembly	Status	Description	Part Number	Quantity	Unit
		<b>Cabinet Details</b>	<b>OC-OTH-PWXX-023</b>		
AM78P-2630-42RU		78" INDEPENDENCE CABINET (42RU)	AM78P-2630-42RU	2	each
AM58-84P-BP		58-84" SIDE BLANK PANEL OPTION	AM58-84P-BP	1	each
AM58-84P-CLR		JOINING COLLAR ASM 58IN	AM58-84P-CLR	1	each
Plinth		6" Mounting Plinth	AM6P-2630-MP	2	each
LABOR		Assembly Charges	LABOR	TBD	hour
<b>Cabinet Install &amp; Fiber Management</b>					
Install	Planned	Install Cabinets & Fiber Distribution		1	each
Fiber Jumpers	Planned	TBD		50	each
Fiber Management	Planned	Fiber Management for cabinets & fiber jumpers		1	each
<b>Fiber Distribution Panels &amp; Splicing</b>					
FDP-48	Planned	Century Fiber Distribution Panel	FTS-350-48SCDLS48P-4/S-2/B	1	each
Splicing		Splicing Fibers into Fiber Distribution Panel 48		12	each
FDP-288	Planned	Century Fiber Distribution Panel	FTS-210-288SCDLS288P-12/24S	1	each
Splicing		Splicing Fibers into Fiber Distribution Panel 288		288	each
FDP-288	Planned	Century Fiber Distribution Panel	FTS-210-288SCDLS288P-12/24S	1	each
Splicing		Splicing Fibers into Fiber Distribution Panel 288		192	each
FDP-48	Planned	Century Fiber Distribution Panel	FTS-350-48SCDLS48P-4/S-2/B	1	each
Splicing		Splicing Fibers into Fiber Distribution Panel 48		24	each



Orono

Assembly	Status	Description	Part Number	Quantity	Unit
		<b>Cabinet Details</b>	<b>OC-OTH-PWXX-023</b>		
AM78P-2630-42RU		78" INDEPENDENCE CABINET (42RU)	AM78P-2630-42RU	2	each
AM58-84P-BP		58-84" SIDE BLANK PANEL OPTION	AM58-84P-BP	1	each
AM58-84P-CLR		JOINING COLLAR ASM 58IN	AM58-84P-CLR	1	each
Plinth		6" Mounting Plinth	AM6P-2630-MP	2	each
LABOR		Assembly Charges	LABOR	TBD	hour
<b>Cabinet Install &amp; Fiber Management</b>					
Install	Planned	Install Cabinets & Fiber Distribution		1	each
Fiber Jumpers	Planned	TBD		50	each
Fiber Management	Planned	Fiber Management for cabinets & fiber jumpers		1	each
<b>Fiber Distribution Panels &amp; Splicing</b>					
FDP-48	Planned	Century Fiber Distribution Panel	FTS-350-48SCDLS48P-4/S-2/B	1	each
Splicing		Splicing Fibers into Fiber Distribution Panel 48		12	each
FDP-288	Planned	Century Fiber Distribution Panel	FTS-210-288SCDLS288P-12/24S	1	each
Splicing		Splicing Fibers into Fiber Distribution Panel 288		288	each
FDP-288	Planned	Century Fiber Distribution Panel	FTS-210-288SCDLS288P-12/24S	1	each
Splicing		Splicing Fibers into Fiber Distribution Panel 288		144	each

## Exhibit D – Design Drawings

Please download at [www.OTOFiber.com](http://www.OTOFiber.com)

## Exhibit E – Make Ready

Please download at [www.OTOFiber.com](http://www.OTOFiber.com)