Request for Proposal

Outside Plant Fiber Construction for Five Michigan Health Care Providers

RFP 03

Funded by the FCC’s Rural Health Care Pilot Program (RHCPP) and Administered by the Michigan Public Health Institute (MPHI)
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1. Introduction

1.1 Overview of the Project

This RFP (Request for Proposal) solicits proposals from Contractors who are qualified to install outside plant (OSP) fiber optic cable.

The purpose of this “fiber-build” project is to help rural\(^1\) hospital systems and other types of rural health care provider (HCP) networks\(^2\) build fiber to their eligible satellite sites and/or to help major health care system networks link rural hospitals together or to their urban brethren. Urban HCPs may participate if they help network eligible rural health care sites. Except where an Indefeasible Right of Use (IRU) lease is sought, the HCP completing the Work Order (see next paragraph) will own the fiber. The FCC will pay for 85 percent of the cost; the HCP must pay the other 15 percent. The project will help pay for all costs associated with installing fiber optic connections up to a building’s demarcation line (demarc); it will not pay for anything on the HCP’s side of the demarc.

The Michigan Public Health Institute (MPHI) and the Michigan Health and Hospital Association (MHA) marketed the fiber-build project to Michigan’s HCP’s during October 2010.\(^3\) MPHI, the project manager (see Section 1.5 below), has posted this single RFP that includes all HCP fiber-build requests that MPHI received. Each HCP’s set of requests has been packaged as a separate “Work Order.” The 6 Work Orders are listed immediately below; the 41 Spans included in those 6 Work Orders are listed on the first page of Section 4 of this RFP; and the Work Orders and Spans are detailed in Section 4. Interested Contractors may bid on one or more Work Orders; however, if a Contractor bids on more than one Work Order, it must submit a completely separate, stand-alone bid for each. For fiber that will be owned by the HCP, the Spans described in the Work Order must be built for a fixed fee, which must cover route engineering, permitting, purchase of the fiber and all other required hardware components,

\(^1\) A rural area is one whose census tract has been assigned a RUCA Code equal to or greater than 4.0. RUCA stands for Rural Urban Commuting Area.

\(^2\) Three examples of “other types of rural health care provider networks” are a network of community health centers, a health department with multiple sites, and a network of tribal health clinics.

\(^3\) There are a number of advantages to owning your own fiber, but the major one is the elimination of the large, ongoing monthly service fees. One of the downsides, of course, is also cost: the cost to install fiber, and the ongoing costs to maintain and repair it. For this reason, MPHI has marketed the project primarily to hospital systems because, presumably, they are in a better financial position than other types of HCPs to cover the 15 percent share of the construction cost and pay for ongoing maintenance and repair.
installation, testing of the spans, and documentation. IRUs must be offered for at least 20 years and for a one-time, flat fee.

<table>
<thead>
<tr>
<th>Health Care Provider</th>
<th>Location</th>
<th>Type of Ownership Requested</th>
<th>No. of Fiber Spans</th>
<th>Total Mileage (Approx.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baraga County Memorial Hospital</td>
<td>L’Anse, MI</td>
<td>Construction/Outright Ownership</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Covenant Medical Center</td>
<td>Saginaw, MI</td>
<td>Construction/Outright Ownership</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>Covenant Medical Center</td>
<td>Saginaw, MI</td>
<td>20-Year IRU</td>
<td>7</td>
<td>38</td>
</tr>
<tr>
<td>Memorial Healthcare</td>
<td>Owosso, MI</td>
<td>Construction/Outright Ownership</td>
<td>13</td>
<td>100</td>
</tr>
<tr>
<td>Portage Health</td>
<td>Hancock, MI</td>
<td>Construction/Outright Ownership</td>
<td>9</td>
<td>201</td>
</tr>
<tr>
<td>Edward W. Sparrow Hospital Assn.</td>
<td>Lansing, MI</td>
<td>Construction/Outright Ownership</td>
<td>9</td>
<td>138</td>
</tr>
</tbody>
</table>

1.2 Contractor Qualifications

All Contractors submitting proposals must meet the following minimum qualifications:

- The Contractor must be capable of managing the construction and implementation of the entire Network (set of fiber Spans) described in a Work Order. However, the use of subcontractors is permissible (see Section 2.9).
- The Contractor must have a proven history of executing fiber-build projects.
- The Contractor must have a current Universal Service Administrative Company (USAC) Service Provider Identification Number (SPIN). More information about obtaining a SPIN can be found at [http://www.usac.org/rhc-pilot-program/vendors/step01/service-provider-id.aspx](http://www.usac.org/rhc-pilot-program/vendors/step01/service-provider-id.aspx).
- The Contractor must be in “good standing” with the FCC, the State of Michigan, and local governments in the service area. Any bidder found to be in FCC “Red-Light Status” will be automatically disqualified.
- The Contractor must be thoroughly familiar with any and all laws, statutes, rules, and regulations related to this project, including, but not limited to:
  - FCC Order 06-144
  - FCC Order 07-198 including correction
  - The Telecommunications Act of 1996
  - USAC’s Rural Health Care Pilot Program process

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6 [http://www.fcc.gov/telecom.html](http://www.fcc.gov/telecom.html)
1.3 Project Background

In 2007, the FCC funded a Rural Health Care Pilot Program (RHCPP) “to stimulate deployment of the broadband infrastructure necessary to support” healthcare, especially in rural areas.7 The Pilot Program is described at Appendix B and at http://www.fcc.gov/cgb/rural/rhcp.html. The Universal Service Administrative Company (USAC) administers the Pilot Program for the FCC. See http://www.usac.org.

At the State of Michigan’s request, MPHI applied to participate in the Pilot Program, and the FCC awarded Michigan a $20.91 million grant. To date, that funding has been used for two projects. The first project helped complete a tower-based, wireless network that connects eight hospitals in the thumb region of Michigan. The second project is building a statewide, 95%-fiber, 87-site broadband network dedicated to health care. This third and final project will help HCPs construct their own fiber optic connections between health care sites.

1.4 Structure of RFP

This document is a single master RFP that contains six Work Orders (listed in Section 1.1 and detailed in Section 4 of this RFP). Each Work Order consists of one or more Span (Node-to-Node) Fiber Installation Specifications Sheets, each one of which describes a fiber Span8 an HCP wishes to have installed. As noted earlier, interested Contractors may bid on one or more Work Orders; however, if a Contractor bids on more than one Work Order, it must submit a completely separate, stand-alone bid for each Work Order. Bids must be flat-fee. A bid on a Work Order must address all Spans within that Work Order. For construction, the fixed-price bid must cover route engineering, permitting, acquisition of the fiber and hardware components, installation of the fiber, testing, and documentation of the installation work. For IRUs, the fixed-price bid must cover a minimum of 20 years. The USAC process does not entertain the possibility of contingencies or change orders, so no FCC funds will be available for such exigencies; however, see Section 2.8, “Change Orders – Unexpected Increases in Costs.”

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7 http://www.usac.org/rhc-pilot-program/vendors/
8 1991 PA 179, as amended, MCL 484.2101 et seq.
9 2002 PA 48, as amended, MCL 484.3101 et seq.
11 A Span is a continuous, linear run of fiber from one location (node or site) to another location (node or site).
All work must be performed in compliance with applicable international, national, State of Michigan, and local standards and codes (see Section 3.4.7).

USAC will pay for work only after it has been completed. Therefore, to maintain cash flow, a Contractor should break down its bid on a Work Order into as many discrete work packages as possible. As each work package is completed, the cost can be invoiced. USAC does not permit billing on a percentage-of-completion basis, so the work packages must be defined in such a way that the work can actually be inspected/tested and formally accepted as fully compliant with the RFP and the Owner-Contractor-MPHI Contract. See Section 3.5 for more detail.

Ten percent of the cost for each work package for each fiber Span will be subtracted and transferred to a “retainer” work package for the Span. This Span retainer will be paid after the installed fiber has (successfully) endured one (1) freeze-thaw (season-long winter) cycle.12

All types of fiber installation are permitted: aerial, underground, direct buried, etc. Contractors may propose outright ownership or indefeasible rights of use (IRUs), but operating and capital leases are forbidden. Offers to sell extant dark fiber are also acceptable.

For each Contract resulting from bids on a Work Order, MPHI will employ a model three-way contract that will be signed by three parties: the Owner of the fiber (the health care provider), the Contractor (the telecommunications construction firm that installs the fiber), and MPHI (see Section 2.6.3).

1.5 **Michigan Public Health Institute (MPHI)**

This RFP has been issued by the Michigan Public Health Institute (MPHI). MPHI is a non-profit organization established in 1990 to help improve the health of Michigan’s citizens. Its 325 employees—researchers, data analysts, IT professionals, project managers, and scientists trained in a broad array of health fields—maximize positive health conditions in Michigan communities through collaboration, scientific inquiry, and applied expertise. MPHI is governed by a board of 12 directors representing government, three partner universities, foundations, and others. Historically, its strongest contracting relationship has been with the Michigan Department of Community Health (MDCH).

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12 The date on which this Span retainer may be invoiced (e.g., April 1) will be specified in the Owner-Contractor-MPHI Contract negotiated by the parties. If all parties agree that, due to the type of installation, such a retainer is unnecessary, the retainer requirement may be waived, in part or in whole.
2. Administrative Issues

2.1 Availability of the RFP, Amendments, and Q&A

Copies of this RFP may be obtained three ways.

- An Adobe Acrobat (PDF) version will be available on the USAC Pilot Program “Search Postings” website at: [http://www.usac.org/rhc-pilot-program/tools/search-postings-2009.aspx](http://www.usac.org/rhc-pilot-program/tools/search-postings-2009.aspx). Go to the list of Michigan RFPs, look for this RFP (designated as RFP #: 03), and click on the Project Scope Details link.

- A PDF version will also be available on MPHI’s fiber-build project website at: [http://fcc.mphi.org/fiber](http://fcc.mphi.org/fiber). Click on the RFP 03 link.

- Contractors may also request a Microsoft Word or PDF version by contacting the project team at [fcc@mphi.org](mailto:fcc@mphi.org).

Amendments to the RFP will be posted on MPHI’s “fiber-build” project website at: [http://fcc.mphi.org/fiber](http://fcc.mphi.org/fiber). Click on the RFP 03 Amendments link.

Questions from Contractors and other interested parties (submitted in writing to [fcc@mphi.org](mailto:fcc@mphi.org)) and MPHI’s responses will be posted on MPHI’s “fiber-build” project website at: [http://fcc.mphi.org/fiber](http://fcc.mphi.org/fiber). Click on the Q&A link. The identity of those asking questions will not be disclosed.

2.2 Inquiries about the RFP

All general correspondence and inquiries about this RFP should be submitted in writing to the project team. Contractors should not contact the health care providers (HCPs) directly; questions should be routed through MPHI so that, if appropriate in MPHI’s opinion, both the question and the answer can be posted on the project website (as discussed in the previous paragraph).

The primary RFP contact is:

<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
<th>Organization</th>
<th>Address</th>
<th>Phone</th>
<th>Fax</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>Harry Levins, PMP</td>
<td>Project Manager</td>
<td>Michigan Public Health Institute</td>
<td>Attn: FCC Project (Harry Levins)</td>
<td>2436 Woodlake Circle, Suite 300</td>
<td>517.324.6039</td>
<td><a href="mailto:fcc@mphi.org">fcc@mphi.org</a></td>
</tr>
</tbody>
</table>

Mr. Levins is responsible for managing the Contractor selection process.
2.3 Due Date for Contractor Proposals and Informational Sessions

The “Allowable Contract Date,” or ACD, is (approximately) 28 days after the date the RFP is posted on USAC’s “Search Postings” website. For example, if the RFP is posted on February 4, 2011, the ACD would be March 4. Proposals are due nine (9) weeks after the RFP is posted. For example, if the RFP is posted on February 4, responses would be due April 8 or April 11.

<table>
<thead>
<tr>
<th>Date - # of Calendar Days</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACD - 28</td>
<td>Date RFP is posted on USAC's &quot;Search Postings&quot; website</td>
</tr>
<tr>
<td>ACD - 14</td>
<td>1st Informational Session for Contractors</td>
</tr>
<tr>
<td>ACD</td>
<td>Letter of intent to bid must be delivered to MPHI</td>
</tr>
<tr>
<td>ACD</td>
<td>2nd Informational Session for Contractors</td>
</tr>
<tr>
<td>ACD + 21</td>
<td>Last day to submit questions</td>
</tr>
<tr>
<td>ACD + 34</td>
<td>Proposals due from Contractors</td>
</tr>
</tbody>
</table>

Two Informational Sessions for potential Contractors will be held at MPHI offices in Okemos, MI, ten (10) miles southeast of downtown Lansing. Within five (5) business days of the RFP actually being posted on USAC’s website, MPHI will post specific dates and times on its “fiber-build” project website at: [http://fcc.mphi.org/fiber](http://fcc.mphi.org/fiber). Click on the Informational Sessions link. We encourage Contractors to indicate how many individuals will be attending a Session by e-mailing fcc@mphi.org. A few days after each Informational Session, a summary of the discussion will be posted on the website under the Q&A link.

2.4 Letter of Intent to Bid

A Contractor that intends to respond to the RFP and bid on one or more Work Orders must submit a formal Letter of Intent to Bid that lists the Work Order(s) on which the Contractor might bid. The letter should be mailed to:

Michigan Public Health Institute  
Attn: FCC Project (Harry Levins)
Letters must be postmarked on or before the Allowable Contract Date (ACD) shown above. Alternatively, they may be submitted in person during the second Informational Session. A Letter of Intent to Bid is not a commitment to bid. The Letter should simply acknowledge that the Contractor has read the RFP and list the Work Orders on which the Contractor is considering bidding. The Letter should be printed on the Contractor’s letterhead stationery, and it should be signed by an executive officer of the Contractor. Letters of Intent to Bid will not be acknowledged by MPHI; if a Contractor wants proof of delivery, the Letter should be sent by certified mail or some other form of service that provides proof of delivery.

2.5 Proposal Submission and Format

The required contents of a proposal—what MPHI expects to receive—are defined in Section 3 of this RFP. A Contractor must submit a separate proposal for each Work Order on which it is bidding. A Contractor may submit more than one proposal for a Work Order if the proposals significantly differ, e.g., a proposal for an aerial installation of a Span and a second proposal for an underground installation of the same Span. Work Orders are presented in Section 4 of this RFP.

Each Contractor should submit its proposal(s) in both electronic and paper formats:

- **Electronic Submission Required.** One electronic copy of the proposal in Microsoft Word or Adobe Acrobat PDF format must be e-mailed to MPHI at fcc@mphi.org no later than 5 p.m. (Lansing, MI, time) on ACD + 34 (or on the date posted on the fiber-build project website). The total size of any single e-mail should not exceed nine (9) megabytes. If any file(s) will cause the e-mail to exceed that size limit, please separate the submission into two or more separate e-mails and clearly label them “1 of n”, “2 of n”, and so forth (where n = the total number of e-mails).

- **Paper Submission Required.** Five (5) hard copies printed on 8.5” x 11” paper, each copy in a separate three-ring binder, must be physically delivered to MPHI no later than three (3) business days after the e-mail version is due. Delivery may be made by the United States Postal Service, by express delivery service, or in person using the following physical address:

  Michigan Public Health Institute  
  Attn: FCC Team (Harry Levins)  
  2436 Woodlake Circle, Suite 300  
  Okemos, MI 48864
Late proposals will not be accepted. If there is any variance between the electronic and printed versions, except for signatures, a Work Order Evaluation Committee may reject a proposal in whole or in part. Do not submit proposals by fax.

Within three business days of receipt of both the electronic and paper versions of a Contractor’s proposal, MPHI will notify the primary contact by e-mail. If receipt is not acknowledged when expected, please contact MPHI at fcc@mphi.org.

### 2.6 Project Process and Calendar

<table>
<thead>
<tr>
<th>Time Period</th>
<th>Event or Process</th>
</tr>
</thead>
<tbody>
<tr>
<td>January-Early April 2011</td>
<td>RFP posting period</td>
</tr>
<tr>
<td>Mid-April 2011</td>
<td>Evaluation of proposals received</td>
</tr>
<tr>
<td>Mid-April thru May 27, 2011(^\text{13})</td>
<td>Negotiation and execution of three-way contracts</td>
</tr>
<tr>
<td>No later than June 30, 2011(^\text{13})</td>
<td>Submission of contracts and itemized costs to USAC</td>
</tr>
<tr>
<td>July 2011</td>
<td>USAC review of project and issuance of Funding Commitment Letter</td>
</tr>
<tr>
<td>Late Summer 2011</td>
<td>Fiber installation begins</td>
</tr>
</tbody>
</table>

#### 2.6.1 RFP Posting Period

As discussed above in Section 2.3, the RFP containing the participating HCPs’ Work Orders will be posted for nine (9) weeks. Potential Contractors can bid on one or more Work Orders.

#### 2.6.2 Evaluation of Proposals

Proposals will be evaluated using the following criteria:

- 35% - Cost (including an appropriate cost breakdown by work package for each fiber Span)
- 30% - Qualifications (experience performing similar work, reputation for quality work, demonstration of the availability of the manpower and resources to execute the work within the HCP’s requested timeframe, references, etc.)
- 25% - Technical solution (responsiveness to the technical specifications in the Work Order, the clarity and logic of the Contractor’s project plan, etc.)
- 10% - Implementation time frame

\(^\text{13}\) If USAC extends the deadline for submission of contracts and itemized costs beyond June 30, 2011, more time may be allowed for contract negotiation.
MPHI will form a separate Evaluation Committee for each Work Order. A Work Order Evaluation Committee will consist of one or more representatives from MPHI and one or more technical and financial representatives from the HCP that submitted the Work Order. Once an Evaluation Committee has been formed, the Contractor whose bid is being evaluated may not knowingly contact members of the Committee (other than the primary and alternate RFP contacts) regarding the Work Order or the Pilot Program except at MPHI’s request. Any intentional, unauthorized contact will disqualify the Contractor’s proposal.

MPHI will provide evaluation criteria (first paragraph above) and a scoring mechanism for use by all Work Order Evaluation Committees. Evaluation and selection will be based on the information submitted in the Contractor’s proposal, references, and any required oral presentations and/or demonstrations. MPHI will eliminate bids that do not meet minimum requirements (e.g., a complete set of itemized costs, which is a USAC requirement). Both the Contractor and its subcontractors may be evaluated.

MPHI expressly reserves the right to accept or reject any or all bids in whole or in part, to waive any irregularities therein, and to award a Contract to other than the low bidder. MPHI reserves the right to use any and all concepts presented in any proposal to achieve its desired goals for the project. Selection or rejection of proposals will not affect this right.

Each Work Order Evaluation Committee will select a single winning bidder. Each Work Order will be evaluated independently of the other Work Orders, so it is possible that a Contractor could submit identical bids for two identical projects and win one but not the other. If an HCP is dissatisfied with the winning bid for its Work Order (e.g., when the lowest responsible bid is still too costly), the HCP may reject all bids.

Depending on the size of the bids received, the RFP may contain more Work Orders than can be funded. Nonetheless, proposals received for all Work Orders included in the RFP will be evaluated. Once winning bidders have been selected, and based on priority levels that have been assigned to each Work Order, Work Orders will be funded one by one at the full 85-percent-subsidy level until the next Work Order cannot be fully funded. At MPHI’s sole discretion, the next Work Order may receive a subsidy of somewhere between 0 and 85 percent.

Every Contractor that submits a bid for a Work Order will be notified (by e-mail) of the results of the evaluation and selection process. MPHI will publicly announce the winners of funded Work Orders. HCPs whose Work Orders cannot be funded due to funding limitations, and the winning bidders for those projects, will be told that they have been wait-listed and will be notified if funding becomes available (e.g., due to failed contract negotiations or an HCP’s withdrawal from the project).
2.6.3 Negotiation and Execution of Three-Way Contracts

The Michigan Public Health Institute (MPHI) will employ a model three-way contract (“the Contract”) that will be signed by three parties: the Owner of the fiber (the HCP), the Contractor (the telecommunications construction firm that installs the fiber), and MPHI. MPHI must be a party to the Contract to serve two functions, which are requirements for receipt of the federal funding:

- To represent the interests of the FCC and USAC to ensure that Pilot Program funds are spent in accordance with the rules of that Program
- To facilitate USAC’s payment of Contractor invoices through formatting and certification of invoices

Around the time of the Allowable Contract Date (ACD—see Section 2.3), the model Contract will be posted on MPHI’s “fiber-build” project website at: http://fcc.mphi.org/fiber. Click on the Contractor-Owner-MPHI Contract link.

After (1) a winning bid has been selected for each of the Work Orders included in the master RFP, (2) the HCPs have evaluated the costs and indicated if they wish to proceed, and (3) MPHI has indicated which Work Orders can be funded, MPHI will prefer that its model be used, but it will not make that a requirement as long as the final Contract is acceptable to all three parties, such a Contract can be agreed upon and signed by May 27, 2011, and certain USAC-mandated, clearly identified sections in the model Contract are retained. The final Contract must contain all of the requirements and terms set forth in this RFP and a construction schedule.

If a Contract is awarded, it will be granted to the most responsive and responsible Contractor with whom MPHI and the HCP are able to negotiate a Contract that meets the objectives of the Pilot Program. If a Contract acceptable to MPHI cannot be agreed upon, MPHI may reject any and all bids. Any Contract entered into as a result of this RFP will also be contingent upon USAC approval.

The HCP and MPHI will share responsibility for driving the negotiations to conclusion. A contract must be signed by May 27, 2011, or the Work Order will not be funded. The Owner and Contractor are free to sign additional agreements between themselves.

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14 MPHI will decide which Work Orders can be funded based on Work Order Priority Levels, the cost of the winning bid for each Work Order, and the total amount of federal funding available for the project.
2.6.4 Submission of Itemized Costs to USAC

No later than June, MPHI will tabulate the itemized costs for all Work Orders for which contracts have been signed. MPHI will submit the bids, contracts, itemized lists of equipment and costs, and other paperwork to USAC for its approval. The current deadline for formal submission of that material is June 30, 2011, although it is possible that USAC may extend the deadline.

2.6.5 Fiber Installation

Once USAC has formally approved the submission described immediately above and issued a Funding Commitment Letter, Contractors may commence fiber installation described in the funded Work Orders.

2.6.6 Inspection, Acceptance, and Invoicing of Completed Work Packages

This RFP requests Contractors to submit bids that are composed of discrete work packages. Each work package should be defined in such a way that, when completed, it can actually be inspected/tested and formally accepted as fully compliant with the RFP and the Owner-Contractor-MPHI Contract. A Work Order bid must be broken down into a minimum of six (6) work packages for each Span of fiber (the costs for route engineering, permitting, purchase of the fiber and other hardware, installation, testing, and documentation). Breaking down the cost into additional work packages is recommended.

Ten percent of the cost for each work package for each Span of fiber will be subtracted and transferred to a “retainer” work package for the Span. This Span retainer will be paid after the installed fiber has (successfully) endured one (1) freeze-thaw (season-long winter) cycle.\(^\text{15}\)

Each HCP will be responsible for ensuring that its Work Order is executed IAW the Specifications in its Work Order and the terms of this RFP. To that end, each HCP will be expected to appoint an HCP Project Manager (“HCP Project Manager”) to oversee Contractor’s fulfillment of the HCP’s Work Order. However, to reduce the burden on HCPs contracting for new construction (but not for HCPs contracting for IRUs), MPHI will post a separate RFP that will hire OSP fiber construction consultants (“QA Inspectors”) to assist the HCPs in their quality

\(^{15}\) See footnote 12 on page 11.
assurance oversight of construction activities. For eligible Spans of fiber, the FCC will pay 85 percent of the cost of QA Inspector consultation; the HCP must pay the remaining 15 percent.

The HCP Project Manager shall have the authority to permit deviations from the Specifications in the Work Order.

As work packages are completed, the Contractor should notify the HCP Project Manager that a work package is ready for testing and acceptance. Using the requirements detailed in Section 3.4 of this RFP, the HCP Project Manager (or QA Inspector) will inspect/test the Contractor’s work and review the required documentation and/or documented test information. In addition, Contractor must furnish the HCP Project Manager satisfactory evidence that all persons and subcontractors who have performed work or furnished materials, equipment, or services of any type under the Contract have been fully paid. Assuming all requirements have been met and the work package is accepted, it can be invoiced IAW the process described in Appendix B, “Rural Health Care Pilot Program (RHCPP) Process.”

When a Span is ready for testing and acceptance, the HCP Project Manager or the QA Inspector and a representative of the Contractor will complete the checklist shown at Appendix C (Span Completion Checklist). To obtain acceptance, the Span must be fully functional, pass all tests detailed in Section 3.4.5, meet or exceed the performance Specifications detailed in the Work Order, and be completely documented IAW the various requirements set forth throughout Section 3.4, “Description of Work Contractor Will Perform.” Once these criteria have been met, the final work packages (except for the retainer) may be invoiced.

After a Span has successfully endured one (1) freeze-thaw cycle (season-long winter) cycle, the HCP Project Manager, in coordination with MPHI, will approve invoicing of the retainer work package.\footnote{Ibid.}

Contractors/subcontractors shall pay time, vehicle, and material charges of HCP and MPHI personnel when Contractor has made a commitment to be on site by a certain time and is either late or does not show up.

\section*{2.7 Construction Schedule, Delays, and Penalties}

The Contractor shall provide a Construction Schedule IAW Section 3.6 of this RFP. Contractor will provide an update of the Construction Schedule to the HCP Project Manager every week by noon on Friday. This base schedule of work shall detail the activities, tasks, and
manpower associated with the project. Contractor shall provide to the HCP Project Manager a person-load schedule showing all tasks associated with the project, the number of crews, and the crew sizes (number of personnel) available for each task. The schedules shall contain sufficient detail to ensure that the HCP Project Manager can measure project progress at least weekly throughout the project duration. The schedules shall comply with the requirements of the overall project schedule, and shall be updated by the Contractor as necessary or as required by the HCP. Contractor is required to coordinate work with the HCP Project Manager to assure orderly and expeditious progress of the work.

Delays caused by injunction or legal actions, abnormal weather conditions, damage by the elements, or other causes beyond the control of Contractor (of which MPHI shall be sole judge) shall entitle Contractor to a reasonable extension of time within which to complete the work. Contractor must provide a written request for an extension of time to the HCP Project Manager and to MPHI; the request must state the reason(s) and provide supporting documentation, if applicable. No extension of time shall be valid unless made in writing by the HCP and MPHI. Normal weather conditions cannot be used as the basis of a request for an extension of time.

Liquidated damages in the amount of Two Hundred Dollars ($200.00) per consecutive calendar day will be assessed for each day that the work shall remain uncompleted after the end of the Contract period, with due allowances for extensions of the Contract period granted IAW the previous paragraph or Section 2.8.

2.8 Change Orders – Unexpected Increases in Costs

If, through no fault of the Contractor, unexpected costs are encountered, there are limited remedies.

- Once the paperwork to launch a project is filed with the FCC, the itemized costs that USAC will reimburse become fixed, as do the prices. While costs may be reduced, they may not be increased. Nor can additional itemized costs be added. In other words, the Pilot Program does not include a provision for change orders.
- MPHI’s roles are to represent the interests of USAC and the FCC and to facilitate the invoicing process. MPHI has no financial stake in the outcome of the project and no financial resources of its own with which to support it.
- The HCP is the only entity with the financial resources to address change orders. Change orders will be negotiated by the Contractor and the HCP. The HCP must bear 100 percent of the incremental cost associated with a change order.

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MPHI must ensure that an extension does not conflict with any USAC-imposed deadline or administrative rule.
For example, if during the course of construction evidence of deposits of contaminated soils is found, by law the Contractor must cease operations affecting the find and notify the appropriate authorities (and the HCP Project Manager). No further disturbance of the deposits should be made until the nature of the contamination has been identified and the appropriate authorities have developed and approved remedial procedures. The cost of remediation and the value of any time lost by the Contractor must be borne by the Contractor, the HCP, or both. A change order process will be defined in the three-way Contract between Contractor, the HCP (Owner), and MPHI, or in a separate contract between Contractor and the HCP.

### 2.9 Use of Subcontractors

In any subcontracts entered into by the Contractor for the performance of services, the Contractor shall require any subcontractor, to the extent of the services to be performed by the subcontractor, to be bound to the Contractor by the terms of the Contract and to assume toward the Contractor all of the obligations and responsibilities that the Contractor, by the Contract, assumes toward the project. MPHI reserves the right to receive copies of, and review, all subcontracts, although the Contractor may delete or mask any proprietary information, including pricing, contained in such contracts before providing them to MPHI. The management of any subcontractor will be the responsibility of the Contractor, and the Contractor shall remain responsible for the performance of its subcontractors to the same extent as if the Contractor had not subcontracted such performance. The Contractor shall make all payments to subcontractors or suppliers of the Contractor. The HCPs and USAC will not be obligated for direct payments for services other than to the Contractor. An HCP’s or MPHI’s written approval of any subcontractor engaged by the Contractor to perform any obligation under the Contract shall not relieve the Contractor of any obligations or performance required under the Contract.

### 2.10 Security

Employees of the Contractor (or any subcontractor hired for this project) who are working at any HCP site must carry photo identification that shows the employee’s name, employer, and an employer phone number to verify identity. They will be required to provide the identification to HCP personnel upon request. Due to federal, state, and local privacy and security regulatory requirements, each HCP may add additional security requirements and checks.

### 2.11 Insurance
At all times during the term of its Contract, each Contractor shall maintain, in full force and effect, the insurance as listed below. All insurances shall be issued by insurers and for policy limits acceptable to MPHI, and the Contractor shall furnish to MPHI and the HCP certificates of insurance or other evidence satisfactory to MPHI evidencing the required insurance has been procured and is in force. The certificates shall include the following express obligation:

“This is to certify that the policies of insurance described herein have been issued to the insured for whom this certificate is executed and are in force at this time. In the event of cancellation, non-renewal, or material modification affecting the certificate holder, thirty (30) days prior written notice will be given to the certificate holder.”

MPHI and each HCP for whom a Contractor has won the right to install fiber described by the HCP’s Work Order, shall be additional insureds on the Contractor’s Commercial General Liability, Employer’s Liability, Automobile Liability, and Excess/Umbrella Liability insurance, and all other insurance described below; and the extent of the additional insured coverage afforded shall be no less broad than General Liability and Umbrella/Excess Liability, for Auto Liability, and other coverages, or substitute equivalent coverage. The additional insured coverage afforded under the Contractor’s policies shall include both ongoing operations (work in progress) and completed operations (completed work). The insurance coverage shall be purchased and maintained by the Contractor and shall be primary to any insurances, self-insurance, or self-funding arrangement maintained by MPHI or the HCP, which shall not contribute therewith, and include severability of interests under the insurance policies.
<table>
<thead>
<tr>
<th>Coverage</th>
<th>Minimum Limits of Liability, Terms, and Coverage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial General Liability</td>
<td>$1,000,000 bodily injury and property damage each occurrence, including advertising and personal injury, products and completed operations</td>
</tr>
<tr>
<td></td>
<td>$5,000,000 products/completed operations, independent contractor’s liability, contractual liability, and coverage for property damage from perils of explosion, collapse, or damage to underground utilities, commonly known as XCU</td>
</tr>
<tr>
<td></td>
<td>$5,000,000 general annual aggregate</td>
</tr>
<tr>
<td>Auto Liability Insurance</td>
<td>$1,000,000 each person, bodily injury and property damage, including owned, non-owned and hired auto liability</td>
</tr>
<tr>
<td>Workers’ Compensation</td>
<td>Statutory limits</td>
</tr>
<tr>
<td>Employer’s Liability</td>
<td>$1,000,000 bodily injury by accident, each accident</td>
</tr>
<tr>
<td></td>
<td>$1,000,000 bodily injury by disease, each employee</td>
</tr>
<tr>
<td></td>
<td>$1,000,000 bodily injury by disease, policy aggregate</td>
</tr>
<tr>
<td>Umbrella/Excess Liability</td>
<td>$5,000,000 each occurrence and annual aggregate</td>
</tr>
<tr>
<td></td>
<td>Underlying coverage shall include General Liability, Auto Liability, and Employer’s Liability</td>
</tr>
<tr>
<td>Pollution Legal Liability</td>
<td>$1,000,000 per claim</td>
</tr>
<tr>
<td></td>
<td>$1,000,000 annual aggregate covering damages or liability arising or resulting from Contractor’s services rendered, or which should have been rendered, pursuant to the Contract</td>
</tr>
<tr>
<td>Property</td>
<td>The Contractor shall purchase and maintain property insurance covering machinery, equipment, mobile equipment, and tools used or owned by the Contractor in the performance of services under the Contract. MPHI shall in no circumstance be responsible or liable for the loss or damage to, or disappearance of, any machinery, equipment, mobile equipment and tools used or owned by the Contractor in the performance of services under the Contract.</td>
</tr>
</tbody>
</table>

The Contractor shall be responsible for the payment of any and all deductible(s) or retention(s) under the policies of insurance purchased and maintained by it pursuant to the Contract. To the extent permitted by law, all or any part of any required insurance coverage may be provided under an approved plan or plans of self-insurance.

All insurance shall be issued by insurance carriers licensed to do business by the State of Michigan or by surplus line carriers on the Michigan Insurance Commission-approved list of companies qualified to do business in Michigan. All insurance and surplus line carriers must be rated A+ or better by A.M. Best Company.

The Contractor’s subcontractors shall carry in full force and effect commercial general liability, pollution liability, automobile liability, workers’ compensation, and employer liability insurance that complies with all terms of this section. In the alternative, the Contractor, at its expense, may provide such coverage for any or all of its subcontractors.
2.12 Miscellany

2.12.1 Fixed Price Period

All prices, costs, and conditions outlined in a Contractor’s proposal shall remain fixed and valid for acceptance for 120 calendar days starting on the due date for proposals.

2.12.2 Oral Presentations and/or Demonstrations

MPHI and the HCP may require a Contractor to make oral presentations to supplement its proposal. MPHI will make every reasonable attempt to schedule each oral presentation at a time and location that is agreeable to the Contractor. However, failure of a Contractor to make a required oral presentation may result in rejection of that Contractor's proposal.

2.12.3 Incurred Costs to Propose

MPHI and the HCP are not liable for any costs incurred by any Contractor prior to the execution of a Contract by all parties.

2.12.4 Maintenance of Requirements to Do Business and Provide Services

The Contractor and any subcontractors, at their cost, shall obtain and maintain all licenses, permits, and authority necessary to do business and render service under this RFP and any resulting contract(s) and, where applicable, shall comply with all applicable laws including, but not limited to, those regarding safety, unemployment insurance, disability insurance, and worker's compensation.

2.12.5 Errors and Omissions in a Contractor Proposal

A Contractor may revise a proposal on its own initiative at any time before the deadline for submission. The Contractor must submit the revised proposal in the same manner as the original was submitted.

2.12.6 Errors and Omissions in the RFP

If a Contractor discovers any significant ambiguity, error, conflict, discrepancy, omission, or other deficiency in this RFP, the Contractor should immediately notify MPHI (at fcc@mphi.org)
of such error and request modification or clarification of the RFP. In the event it becomes necessary to provide additional data or information, or to revise any part of this RFP, MPHI will post supplements and/or revisions on the project website at http://fcc.mphi.org/fiber under the RFP 03 Amendments link. Each Contractor is responsible for ensuring that its proposal reflects any and all supplements and revisions issued prior to the proposal due date, regardless of how early a Contractor submits a proposal.

2.12.7 Objections to RFP Terms

Should a Contractor object on any ground to any provision or legal requirement set forth in this RFP, the Contractor must set forth with specificity the grounds for the objection in its Contractor Certifications and Assurances document (shown at Appendix D), which is to be submitted as part of the Contractor’s proposal. The failure of a Contractor to object in this manner shall constitute a complete and irrevocable waiver of any such objection and the right to object. However, objections may become a differentiating factor during the bid evaluation process.

2.12.8 Acceptance of RFP/Proposal Content

The contents of this RFP and the Contractor’s proposal will become contractual obligations if a Contract ensues. Failure of the Contractor to accept these obligations will result in cancellation of the award.

2.12.9 No Waiver of RFP Provisions

No waiver by MPHI of any provision of this RFP shall be implied from any failure by MPHI to recognize or take action on account of any failure by a Contractor to observe any provision of this RFP.

2.12.10 Ownership and Disclosure of Proposals

Proposals submitted in response to this competitive procurement shall become the property of MPHI. MPHI will share all proposals with its internal staff. Other than MPHI staff, proposals submitted for a specific Work Order will be shared only with the members of that Work Order’s Evaluation Committee, which will include employees of the HCP that placed the Work Order in the RFP. All proposals received shall remain confidential, with the exception of any information MPHI is legally required to disclose.
2.12.11 Right to Audit / Cooperation with FCC/USAC Auditors

MPHI and the HCP for whom the fiber Spans in the Work Order are installed reserve the right to conduct, at their own expense, an independent audit of the Contractor’s records pertaining to the Work Order. In the event any question arises during an FCC/USAC audit of MPHI’s project records, the Contractor is required to reply to FCC/USAC auditor questions about the Michigan RHCPP project within five (5) business days. The FCC and or USAC may audit the winning Contractor; Contractors are expected to cooperate fully. Failure to cooperate with an audit may result in termination of the Contract.

2.12.12 Commitment of Funds

The Executive Director of MPHI is the only individual who may legally commit MPHI to the expenditures of funds for a Contract resulting from this RFP. No cost chargeable to the proposed Contract may be incurred before receipt of a fully executed Contract.

2.12.13 Laws That Apply

All proposals submitted in response to this RFP and any Contract shall be subject to all applicable laws and procedures, including, but not limited to, all FCC Orders, Statutes, and USAC requirements related to this project (see Section 1.2).

2.12.14 General Indemnification

MPHI and the participating HCPs are to be indemnified and held harmless by the Contractor and all subcontractors for the vicarious liability of MPHI and the participating HCPs as a result of this RFP and any resulting Contract(s).

Contractor agrees to indemnify, defend, and hold harmless MPHI, all participating HCPs, and their respective Boards of Directors, in their official and individual capacities, administrators, employees, agents, contractors, successors, and assignees, from and against any and all costs, expenses, damages, and liabilities, including reasonable attorney’s fees, arising out of the: (i) acts or omissions of the Contractor, its officers, directors, employees, successors, assignees, contractors, and agents; (ii) any breach of the terms of the Contract by Contractor; or (iii) any breach of any representation or warranty by Contractor under the Contract.

Contractor shall indemnify and hold harmless the HCP and MPHI against any liens filed for non-payment of Contractor’s bills in connection with Contract work.
2.12.15 Environmental Indemnification

Throughout the term of the Contract, Contractor shall not permit itself or any third party to use, generate, handle, store, or dispose of any Hazardous Substances in, on, under, upon, or affecting any HCP property in violation of any applicable law or regulation. Without limiting any other provisions of the Contract, Contractor shall indemnify, defend, and hold harmless all participating HCPs and MPHI from and against all liabilities, claims, losses, costs, and expenses (specifically including, without limitation, attorneys’, engineers’, consultants’, and experts’ fees, costs, and expenses) arising from (i) any breach of any representation or warranty made in this paragraph and/or (ii) environmental conditions or noncompliance with any applicable law or regulation that result, in the case of Contractor, from operations or services in or about any HCP property by Contractor or its agents or employees.

2.12.16 Access to HCP Facilities

Each HCP will provide reasonable access to facilities and locations of fiber terminations as specified in the Span (Node-to-Node) Fiber Installation Specifications Sheets.
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3. What to Submit: Mandatory Proposal Content

3.1 Cover Letter

Each Contractor submitting a proposal must provide a cover letter signed by an individual authorized and empowered to bind the Contractor to the provisions of this RFP and any Contract awarded pursuant to it. The letter should include the following:

- The legal name of the Contractor
- A statement that the proposal has been submitted in response to MPHI RHCPP RFP 03
- Identification of the Work Order that the proposal addresses
- For each Span within the Work Order, a paragraph describing the Contractor’s approach (e.g., primarily aerial or 100 percent underground), exceptions to that approach (e.g., although the primary method of installation will be aerial, the section from point E to point F will be direct buried), and any unusual difficulties with the route of the fiber Span (e.g., the cable crosses the Grand River via a pipeline at point Z)

3.2 Contractor Questionnaire

Each Contractor submitting a proposal must complete, sign, and submit the Contractor Questionnaire found at Appendix E. The Questionnaire requests basic information about the Contractor, e.g., the names of three customers who can serve as references for work performed on similar network projects completed within the last five years. MPHI may contact selected references to determine the quality of the work the Contractor performed and the quality of the personnel assigned to the project. The results of the reference checks will be provided to the Work Order Evaluation Committee and used in scoring the proposal.

3.3 Contractor Certifications and Assurances

Each Contractor submitting a proposal must complete, sign, and submit the Contractor Certifications and Assurances found at Appendix D.

3.4 Description of Work Contractor Will Perform

Each Contractor submitting a proposal must describe in detail how it plans to fulfill the Work Order. It must do so for each Span in the Work Order. The information must be responsive to the Specifications detailed in the Span (Node-to-Node) Fiber Installation Specifications Sheets (the template is shown at Appendix F). The Span Specifications for each Work Order are listed in Section 4.
For new construction (but not IRUs), the Contractor should describe its approach to each phase in the construction of a fiber Span, as listed in the following subsections. In addition, for each phase, the Contractor must either (1) state that its approach adheres to the standards and codes detailed in Section 3.4.7, “Compliance with Standards,” and Appendix G, “Detailed OSP Installation Specifications,” or (2) describe how its approach differs from the standards and, in each instance of difference, why the Contractor has taken that approach.

For an IRU, the Contractor should describe the fiber provided under the IRU and any associated hardware required to provide service (similar to Section 3.4.3 below). The Contractor must also describe its approach to Sections 3.4.5 (Testing) and 3.4.7 (Compliance with Standards and Codes). In addition, for all relevant phases, the Contractor must either (1) state that its approach adheres to the standards and codes detailed in Section 3.4.7 and Appendix G or (2) describe how its approach differs from the standards and, in each instance of difference, why the Contractor has taken that approach.

### 3.4.1 Route Engineering

The Contractor must determine the most cost-effective and reliable route for the fiber Span from termination point A to termination point B, unless the HCP’s Work Order explicitly dictates the route. If possible, routes should stay within the public right-of-way. If a longer or more expensive route is chosen for reasons of reliability, the Contractor should document the rationale.

The Contractor must describe the route of the Span, by segment, in detail. Every known impediment to construction or use of the Span must be clearly documented. In general, fiber must be installed using the method specified in the Work Order (aerial, direct buried, underground, etc.). However, if, in the Contractor’s judgment, the Owner would be better served by using a different method in a specific segment of the route, the Contractor should specify that method and provide a rationale. The Contractor should also take advantage of value engineering opportunities, e.g., “share the trench” or “share the duct” opportunities, IRU opportunities for part or all of a Span’s route, future risk mitigation to the fiber cable facility, permit or right-of-way issue mitigations, or more efficient approaches to Network design. Again, the reasons for the Contractor’s choices should be clearly explained.

Utility engineering fees and make-ready fees must be included in the fixed-price bid. While it may be difficult for a prospective Contractor to estimate these, time constraints do not permit a serial approach (i.e., an initial RFP for route engineering, then a second RFP for installation). Such fees may be specified as a separate, itemized cost (work package) in the Contractor’s bid—see Section 3.5, “Fixed-Price Bid.”
Lack of knowledge of the make-ready costs makes it especially difficult for a Contractor to offer a fixed-price bid for aerial work. Unless route engineering and permitting have been completed beforehand, fixed-price bids for aerial work must convincingly explain the Contractor’s basis for its cost estimates. Work Order Evaluation Committees may reject bids that do not appear to have a sound basis for estimating the make-ready costs of aerial work.

### 3.4.2 Permitting

On behalf of the Owner, in order to install fiber along the chosen route, the Contractor must obtain approval for pole attachments from power and other companies; acquire permits from departments and/or agencies of cities, counties, the State of Michigan, the federal government, railroads, and/or other entities; possibly acquire rights-of-way; and possibly purchase deeds to property. In its response to Section 3.5 of this RFP (“Fixed-Price Bid”), the Contractor must provide the cost of acquiring all such pole attachment agreements/permits/rights-of-way/deeds. In response to this Section 3.4.2, Contractor must provide an itemized list of the expected agreements, permits, rights-of-way, and deeds that will have to be acquired, given its chosen route for the fiber Span. All property deeds that will have to be purchased and the rights-of-way that will have to be acquired in order to install fiber must be purchased/acquired in the Owner’s name (preferred approach) or transferred to the Owner after the permitting work package has been invoiced and the Owner and USAC have paid their respective shares. Contractor will have to purchase deeds or acquire rights-of-way with one-time payments; recurring charges are not acceptable. However, where recurring charges are unavoidable, see the last paragraph of Section 3.5. The permitting documentation must dovetail with route engineering.

### 3.4.3 Acquisition of the Fiber and Hardware Components

The Contractor must secure all fiber and hardware detailed in the Span (Node-to-Node) Fiber Installation Specifications Sheet and any other hardware or material necessary to install the Span. The fiber and hardware must meet or exceed the Specifications.

All hardware—transmitters, amplifier regenerators, receivers, power supplies and backup, etc.—must be “industry-standard.” Industry-standard is defined as the most current version of relative standard(s) set by an American National Standards Institute (ANSI) or International

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18 In Sections 3.4.2 and 3.5, Contractor will probably have to make estimates, and since it must submit a fixed-price bid, its estimates must be priced conservatively (high enough) to account for unknowns and estimating errors, as cost overruns will have to be absorbed by the Contractor. While not ideal, this approach is necessitated by a project milestone deadline imposed by the FCC.
Organization for Standardization (ISO)-accredited Standards Developing Organization (SDO), such as the Institute of Electrical and Electronics Engineers (IEEE), Telecommunications Industry Association (TIA), or Electronic Industries Alliance (EIA). As part of its response to this section of the RFP, the Contractor must provide manufacturer specification/data sheets for all hardware that is proposed.

### 3.4.4 Installation of the Fiber

Fiber must be installed IAW the Specifications within the Work Orders and the Specifications detailed in Appendix G. The Contractor must provide all of the labor and services needed to install the fiber between the two termination points specified in the Span (Node-to-Node) Fiber Installation Specifications Sheet. In general, fiber must be installed using the method (aerial, direct buried, underground, etc.) requested in the Specifications. However, if, in the Contractor’s judgment, the Owner would be better served using a different method in a specific section of the route, the Contractor should specify that method for that section in its proposal and provide the rationale for the change.

### 3.4.5 Testing

The Contractor must test each strand in the Span bi-directionally from termination point A to termination point B as follows:

- Continuity testing and end-to-end insertion loss using an OLTS power meter and source in accordance with TIA/EIA 526-7 (single mode @ 1310 and 1550 nm)
- OTDR testing to verify the quality of the cable installation and splice performance

Documentation (IAW ANSI/TIA/EIA-606) of both methods of testing and test results at every link in the Span (including insertion loss data) must be provided to the Owner, preferably in a format compatible with the HCP’s computer-aided design (CAD) system, if it has one. To obtain acceptance, the strands in the Span must be fully functional and meet or exceed the performance Specifications detailed in the Work Order. Unacceptable (out-of-specification) strands must be corrected.

### 3.4.6 “As-built” Documentation

Comprehensive documentation for each and every phase of the project must be provided to the Owner, either at the end of each phase or soon after completion of testing, and preferably in a format compatible with the HCP’s computer-aided design (CAD) system, if it has one. All documentation should be completed IAW ANSI/TIA/EIA-606. Overview maps and distances, computerized design maps and detailed CAD drawings, site drawings, permit drawings, and electronically stored consolidated field notes for the entire route must be included in the
documentation. The method of installation will dictate the additional types of documentation that should be provided. For example, documentation of aerial installation should include pole attachment inventories, pole attachment applications, pole attachment agreements between Contractor and other utilities, GPS points of reference for utility poles, and photo images of poles to which fiber is attached. Documentation of underground installation should include conduit design, conduit detailing, manhole detailing, preparation of all forms and documentation for approval of conduit construction and/or installation, verification of as-built, and computerized maps.

3.4.7 Compliance with Standards and Codes

All work that the Contractor performs and all fiber, hardware, and material that the Contractor purchases for the project should be compliant with applicable State, national, and international standards and codes such as, but not limited to, the following:

- Alliance for Telecommunications Industry Solutions (ATIS)
- American Association of State and Highway Transportation Officials (AASHTO)
- American National Standards Institute (ANSI), e.g.,
  - ANSI/TIA-758-A, Customer-owned Outside Plant Telecommunications Infrastructure Standard, May 2004
- American Society for Testing and Materials (ASTM)
- Building Industry Consulting Service International (BICSI)
- Electronic Industries Alliance (EIA)
- Institute of Electrical and Electronics Standards Association (IEEE-SA)
- International Code Council, aka Building Officials and Code Administrators International (BOCA), National Codes and International Standards
- Michigan Department of Transportation (MDOT) Utility Accommodation Policy
- Michigan Occupational Safety and Health Act (MiOSHA)
- National Electrical Code (NEC)
- National Electrical Safety Code (NESC)
- National Electrical Manufacturers Association (NEMA)
- National Fire Protection Association (NFPA)
- Occupational Safety and Health Act of 1970 (OSHA)
- Rural Utilities Service (RUS), e.g.,
  - Applicable fiber optic-relevant standards contained in USDA Rural Utilities Service (RUS) 7 CFR Part 1755, Telecommunications Standards and Specifications for Materials, Equipment and Construction
- Telecordia GR-20-CORE, Issue 3, Generic Requirements for Optical Fiber and Optical Fiber Cable, May 2008, plus GR-20-ILRs, Issue List Reports
• Telecommunications Industry Association (TIA)
• Underwriters Laboratories (UL)
• Applicable local standards, codes, and ordinances of the particular legal jurisdiction where construction is taking place
• Other standards and codes that may be applicable to acceptable standards of the industry for equipment, materials, and installation under contract

3.5 Fixed-Price Bid

Each proposal that a Contractor submits must address only one (1) Work Order, and the bid must address all Spans within the Work Order. A single, fixed-price bid will be required for the entire set of Spans contained in a Work Order. For new construction, the fixed-price bid must cover route engineering, permitting, acquisition of the fiber and hardware components, installation of the fiber, testing, and documentation of the installation work. For IRUs, the single, fixed-price bid must cover installation and maintenance over the (minimum 20-year) term of the IRU.

USAC will pay for work only after it has been completed. Therefore, to maintain cash flow, a Contractor should break down its bid on a Work Order into as many discrete work packages as possible. As each work package is completed, the cost can be invoiced. USAC does not permit billing on a percentage-of-completion basis, so the work packages must be defined in such a way that the work can actually be inspected/tested and formally accepted as fully compliant with the RFP and the Owner-Contractor-MPHI Contract.

At a minimum, for new construction, the fixed-price bid for a Work Order must be broken down into the following set of work packages for each Span:
• The cost for route engineering of the Span
• The cost of permitting for the Span
• The cost of purchasing the fiber and other hardware components
• The cost of installing the fiber
• The cost of testing the installed fiber
• The cost of documenting the as-built fiber, where the documentation is not already included in the above phases

To the extent possible, any individual hardware component, permit, deed, right-of-way, or other discrete item that costs more than $2,500 should be separately itemized. For each hardware item, provide a description of the item (e.g., transceiver or UPS), manufacturer, model number, number of items, cost per item, and total cost.
The Contractor must allocate each and every cost associated with a Work Order to a specific fiber Span. Any cost attributable to multiple Spans must be allocated on a reasonable and demonstrable basis to the individual Spans. Use the “Name of Span” specified in the Span (Node-to-Node) Fiber Installation Specifications Sheet.

Ten percent of the cost for each work package for each Span of fiber will be subtracted and transferred to a “retainer” work package for the Span. This Span retainer will be paid after the installed fiber has (successfully) endured one (1) freeze-thaw (season-long winter) cycle.19

Failure to submit all of the required information could lead to automatic disqualification of the bid. An example bid follows:

<table>
<thead>
<tr>
<th>Work Order</th>
<th>Span</th>
<th>Work Package</th>
<th>Cost ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alpha-Omega Hospital</td>
<td>A - B</td>
<td>Route Engineering, A to AB1</td>
<td>20,000</td>
</tr>
<tr>
<td>Alpha-Omega Hospital</td>
<td>A - B</td>
<td>Route Engineering, AB1 to B</td>
<td>20,000</td>
</tr>
<tr>
<td>Alpha-Omega Hospital</td>
<td>A - B</td>
<td>Permitting, A to AB1</td>
<td>12,500</td>
</tr>
<tr>
<td>Alpha-Omega Hospital</td>
<td>A - B</td>
<td>Permitting, AB1 to B</td>
<td>12,500</td>
</tr>
<tr>
<td>Alpha-Omega Hospital</td>
<td>A - B</td>
<td>Fiber, Lucent Std. SM, loose tube, aerial, 24-strand,</td>
<td>20,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>…</td>
<td></td>
</tr>
<tr>
<td>Alpha-Omega Hospital</td>
<td>A - B</td>
<td>End terminals, 2 (Alcatel model ET5) @ $1,250 each</td>
<td>2,500</td>
</tr>
<tr>
<td>Alpha-Omega Hospital</td>
<td>A - B</td>
<td>Transceivers, 2 (Lucent model T2) @ $1,250 each</td>
<td>2,500</td>
</tr>
<tr>
<td>Alpha-Omega Hospital</td>
<td>A - B</td>
<td>Power, backup, UPS, et al., 20 @ $250 each</td>
<td>5,000</td>
</tr>
<tr>
<td>Alpha-Omega Hospital</td>
<td>A - B</td>
<td>Fiber Install</td>
<td>140,000</td>
</tr>
<tr>
<td>Alpha-Omega Hospital</td>
<td>A - B</td>
<td>Testing</td>
<td>10,000</td>
</tr>
<tr>
<td>Alpha-Omega Hospital</td>
<td>A - B</td>
<td>As-built Documentation</td>
<td>5,000</td>
</tr>
<tr>
<td>Alpha-Omega Hospital</td>
<td>B - C</td>
<td>Route Engineering, B to BC1</td>
<td>20,000</td>
</tr>
<tr>
<td>Alpha-Omega Hospital</td>
<td>B - C</td>
<td>Route Engineering, BC1 to BC2</td>
<td>17,000</td>
</tr>
<tr>
<td>Alpha-Omega Hospital</td>
<td>B - C</td>
<td>Route Engineering, BC2 to C</td>
<td>13,000</td>
</tr>
<tr>
<td>Alpha-Omega Hospital</td>
<td>B - C</td>
<td>Permitting, B to BC1</td>
<td>13,000</td>
</tr>
<tr>
<td>Alpha-Omega Hospital</td>
<td>B - C</td>
<td>Permitting, BC1 to BC2</td>
<td>12,000</td>
</tr>
<tr>
<td>Alpha-Omega Hospital</td>
<td>B - C</td>
<td>Permitting, BC2 to C</td>
<td>10,000</td>
</tr>
<tr>
<td>Alpha-Omega Hospital</td>
<td>B - C</td>
<td>Fiber, Lucent Std. SM, loose tube, underground, 24-strand,</td>
<td>35,000</td>
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<tr>
<td></td>
<td></td>
<td>…</td>
<td></td>
</tr>
<tr>
<td>Alpha-Omega Hospital</td>
<td>B - C</td>
<td>End terminals, 2 (Alcatel model ET5) @ $1,250 each</td>
<td>2,500</td>
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<tr>
<td>Alpha-Omega Hospital</td>
<td>B - C</td>
<td>Transceivers, 2 (Lucent model T2) @ $1,250 each</td>
<td>2,500</td>
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<td>Alpha-Omega Hospital</td>
<td>B - C</td>
<td>Power, backup, UPS, et al., 20 @ $250 each</td>
<td>5,000</td>
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<tr>
<td>Alpha-Omega Hospital</td>
<td>B - C</td>
<td>Fiber Install</td>
<td>400,000</td>
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<td>Alpha-Omega Hospital</td>
<td>B - C</td>
<td>Testing</td>
<td>15,000</td>
</tr>
<tr>
<td>Alpha-Omega Hospital</td>
<td>B - C</td>
<td>As-built Documentation</td>
<td>5,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total Cost (Bid)</td>
<td>800,000</td>
</tr>
</tbody>
</table>

19 See footnote 12 on page 11.
In addition to the fixed-price bid, the Contractor must also specify any ongoing annual costs that the HCP will be obligated to pay due to the Contractor’s approach to engineering, permitting, and/or installation, e.g., annual maintenance fees required by Michigan’s Metro Act.

3.6 Construction Schedule

Each Contractor submitting a proposal must provide a Construction Schedule for each Span within the Work Order. At a minimum, the schedule must provide the following:

- The start and completion dates (“completion” means the span is fully tested, documented, and operational)
- The completion date of each major phase (route engineering, permitting, installation, testing, provision of as-built documentation)
- The completion date for each subsection of fiber within the Span, including the percentage completion as each subsection is built

3.7 Staffing/Subcontractors

Each Contractor submitting a proposal must provide resumes describing the educational background and work experiences of each of the key staff who will be assigned to the project. The Contractor must also identify all subcontractors that will be paid more than ten percent (10%) of the overall project budget. At a minimum, a resume must be submitted for the project manager. Additionally, the Contractor must describe the role of each such subcontractor and the subcontractor’s experience in that role.

3.8 (Optional) Maintenance Costs

If the Contractor also maintains installed fiber and wishes to offer such a service, please provide a comprehensive description of what an ongoing maintenance agreement for the fiber Span would cover, the costs for such an agreement, and the possible duration(s) of the maintenance agreements being offered (e.g., renewing annually, five-year fixed-price, etc.). In addition, describe the Contractor’s ability to provide maintenance support, including repair time intervals, service level agreements, etc.
4. Work Orders

This section contains six (6) Work Orders:
- Subsection 4.1 – Baraga County Memorial Hospital – 1 Span (outright ownership)
- Subsection 4.2 – Covenant Medical Center – 2 Spans (outright ownership)
- Subsection 4.3 – Covenant Medical Center – 7 Spans (20-year IRU)
- Subsection 4.4 – Memorial Healthcare – 13 Spans (outright ownership)
- Subsection 4.5 – Portage Health – 9 Spans (outright ownership)
- Subsection 4.6 – Edward W. Sparrow Hospital Association – 9 Spans (outright ownership)

The 41 Spans are listed below and are detailed in the subsequent subsections.

<table>
<thead>
<tr>
<th>Health Care Provider</th>
<th>Type of Ownership Requested</th>
<th>RFP Section #</th>
<th>Span Designator</th>
<th>Span Name (Street Address to Street Address)</th>
<th>Span Mileage (Approx.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baraga</td>
<td>Outright</td>
<td>4.1.1</td>
<td></td>
<td>18341 U. S. Hwy. 41, L'Anse 49946 to 17 W. Broad St., L'Anse 49946</td>
<td>2.5</td>
</tr>
<tr>
<td>Covenant</td>
<td>Outright</td>
<td>4.2.1</td>
<td>G - A</td>
<td>515 N. Michigan Ave., Saginaw 48602 to 700 Cooper Ave., Saginaw 48602</td>
<td>1.1</td>
</tr>
<tr>
<td>Covenant</td>
<td>Outright</td>
<td>4.2.2</td>
<td>G - H</td>
<td>515 N. Michigan Ave., Saginaw 48602 to 5400 Mackinaw Rd., Saginaw 48604</td>
<td>5.3</td>
</tr>
<tr>
<td>Covenant</td>
<td>20-Yr. IRU</td>
<td>4.3.1</td>
<td>P - J</td>
<td>6614 Dixie Hwy., Bridgeport 48722 to 600 N. Main St., Frankenmuth 48734</td>
<td>7.0</td>
</tr>
<tr>
<td>Covenant</td>
<td>20-Yr. IRU</td>
<td>4.3.2</td>
<td>E - P</td>
<td>600 Irving Ave., Saginaw 48602 to 6614 Dixie Hwy., Bridgeport 48722</td>
<td>10.0</td>
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<tr>
<td>Covenant</td>
<td>20-Yr. IRU</td>
<td>4.3.3</td>
<td>A - E</td>
<td>700 Cooper Ave., Saginaw 48602 to 600 Irving Ave., Saginaw 48602</td>
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<tr>
<td>Covenant</td>
<td>20-Yr. IRU</td>
<td>4.3.4</td>
<td>G - M</td>
<td>515 N. Michigan Ave., Saginaw 48602 to 5570 State St., Saginaw 48603</td>
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<td>Covenant</td>
<td>20-Yr. IRU</td>
<td>4.3.5</td>
<td>G - O</td>
<td>515 N. Michigan Ave., Saginaw 48602 to 3875 Bay Rd., Saginaw 48603</td>
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<tr>
<td>Covenant</td>
<td>20-Yr. IRU</td>
<td>4.3.6</td>
<td>L - U</td>
<td>8767 Gratiot Rd., Saginaw 48609 to 16440 Gratiot Rd., Hemlock 48626</td>
<td>8.3</td>
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<tr>
<td>Covenant</td>
<td>20-Yr. IRU</td>
<td>4.3.7</td>
<td>G - L</td>
<td>515 N. Michigan Ave., Saginaw 48602 to 8767 Gratiot Rd., Saginaw 48609</td>
<td>6.7</td>
</tr>
</tbody>
</table>

**Total of 2.5 miles**

**Total of 6.4 miles**

**Total of 37.6 miles**

Continued on the next page
### List of Spans within the Six (6) Work Orders

<table>
<thead>
<tr>
<th>Health Care Provider</th>
<th>Type of Ownership Requested</th>
<th>RFP Section #</th>
<th>Span Designator</th>
<th>Span Name (Street Address to Street Address)</th>
<th>Span Mileage (Approx.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Memorial</td>
<td>Outright</td>
<td>4.4.1</td>
<td>Main - A</td>
<td>826 W. King St., Owosso 48867 to 305 S. Saginaw St., Chesaning 48616</td>
<td>17.2</td>
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<tr>
<td>Memorial</td>
<td>Outright</td>
<td>4.4.2</td>
<td>A - B</td>
<td>305 S. Saginaw St., Chesaning, to 300 S. Chapman St., Chesaning 48616</td>
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</tr>
<tr>
<td>Memorial</td>
<td>Outright</td>
<td>4.4.3</td>
<td>Main - D</td>
<td>826 W. King St., Owosso 48867 to 115 N. Shiawassee St., Corunna, MI 48817</td>
<td>4.3</td>
</tr>
<tr>
<td>Memorial</td>
<td>Outright</td>
<td>4.4.4</td>
<td>Main - E</td>
<td>826 W. King St., Owosso 48867 to 239 N. State Rd., Owosso 48867</td>
<td>3.9</td>
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<tr>
<td>Memorial</td>
<td>Outright</td>
<td>4.4.5</td>
<td>Main - F</td>
<td>826 W. King St., Owosso 48867 to 300 W. Genesee St., Durand, MI 48429</td>
<td>13.0</td>
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<tr>
<td>Memorial</td>
<td>Outright</td>
<td>4.4.6</td>
<td>Main - G</td>
<td>826 W. King St., Owosso 48867 to 225 S. Ovid St., Elsie 48831</td>
<td>17.3</td>
</tr>
<tr>
<td>Memorial</td>
<td>Outright</td>
<td>4.4.7</td>
<td>Main - H</td>
<td>826 W. King St., Owosso 48867 to 7200 N. Woodbury Rd., Laingsburg 48848</td>
<td>15.3</td>
</tr>
<tr>
<td>Memorial</td>
<td>Outright</td>
<td>4.4.8</td>
<td>Main - I</td>
<td>826 W. King St., Owosso 48867 to 113 S. Main St., Ovid 48866</td>
<td>11.0</td>
</tr>
<tr>
<td>Memorial</td>
<td>Outright</td>
<td>4.4.9</td>
<td>Main - J</td>
<td>826 W. King St., Owosso 48867 to 503 E. Main St., Owosso 48867</td>
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</tr>
<tr>
<td>Memorial</td>
<td>Outright</td>
<td>4.4.10</td>
<td>Main - K</td>
<td>826 W. King St., Owosso 48867 to 812 Bradley St., Owosso 48867</td>
<td>1.0</td>
</tr>
<tr>
<td>Memorial</td>
<td>Outright</td>
<td>4.4.11</td>
<td>Main - L</td>
<td>826 W. King St., Owosso 48867 to 317 S. Elm St., Owosso 48867</td>
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<tr>
<td>Memorial</td>
<td>Outright</td>
<td>4.4.12</td>
<td>Main - M</td>
<td>826 W. King St., Owosso 48867 to 3337 W. Britton Rd., Perry 48872</td>
<td>13.2</td>
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<tr>
<td>Memorial</td>
<td>Outright</td>
<td>4.4.13</td>
<td>M - N</td>
<td>337 W. Britton Rd., Perry 48872 to 3737 W. Lansing Rd., Perry 48872</td>
<td>0.6</td>
</tr>
</tbody>
</table>

**Total of 99.5 miles**

| Portage              | Outright                    | 4.5.1         | A - B           | 500 Campus Dr., Hancock 49930 to 56901 S. Sixth St., Calumet 49913 | 10.0                   |
| Portage              | Outright                    | 4.5.2         | B - C           | 56901 S. Sixth St., Calumet 49913 to 945 Ninth St., Lake Linden 49945 | 5.0                    |
| Portage              | Outright                    | 4.5.3         | C - D           | 945 Ninth St., Lake Linden 49945 to 540 Depot St., Hancock 49930 | 12.0                   |
| Portage              | Outright                    | 4.5.4         | D - H           | 540 Depot St., Hancock 49930 to 921 W. Sharon Ave., Houghton 49931 | 3.0                    |
| Portage              | Outright                    | 4.5.5         | H - I           | 921 W. Sharon Ave., Houghton 49931 600 Macinnes Dr., Houghton 49931 | 2.5                    |
| Portage              | Outright                    | 4.5.6         | I - A           | 600 Macinnes Dr., Houghton 49931 to 500 Campus Dr., Hancock 49930 | 5.4                    |
| Portage              | Outright                    | 4.5.7         | A - L           | 500 Campus Dr., Hancock 49930 to 751 W. Seventh St., Ontonagon 49953 | 55.0                   |
| Portage              | Outright                    | 4.5.8         | A - J           | 500 Campus Dr., Hancock 49930 to 18341 U. S. Hwy. 41, L'Anse 49946 | 39.0                   |
| Portage              | Outright                    | 4.5.9         | J - K           | 18341 U. S. Hwy. 41, L'Anse 49946 to 420 W. Magnetic St., Marquette 49855 | 69.0                   |

**Total of 200.9 miles**

| Sparrow              | Outright                    | 4.6.1         | A1 - B1         | 1215 E. Michigan Ave., Lansing 48912 to 2909 E. Grand River Ave., Lansing 48912 | 3.0                    |
| Sparrow              | Outright                    | 4.6.2         | A1 - C1         | 1215 E. Michigan Ave., Lansing 48912 to 405 W. Greenlawn Ave., Lansing 48910 | 4.0                    |
| Sparrow              | Outright                    | 4.6.3         | A1 - D1         | 1215 E. Michigan Ave., Lansing 48912 to 2900 Hannah Blvd., East Lansing 48823 | 7.0                    |
| Sparrow              | Outright                    | 4.6.4         | A1 - E1         | 1215 E. Michigan Ave., Lansing 48912 to 1600 W. Grand River Ave., Okemos 48864 | 8.0                    |
| Sparrow              | Outright                    | 4.6.5         | A1 - F1         | 1215 E. Michigan Ave., Lansing 48912 to 800 E. Columbia St., Mason 48854 | 20.0                   |
| Sparrow              | Outright                    | 4.6.6         | A1 - G1         | 1215 E. Michigan Ave., Lansing 48912 to 479 E. Lafayette St., Ionia 48846 | 45.0                   |
| Sparrow              | Outright                    | 4.6.7         | A1 - H1         | 1215 E. Michigan Ave., Lansing 48912 to 805 S. Oakland St., St. Johns 48879 | 20.0                   |
| Sparrow              | Outright                    | 4.6.8         | H1 - I1         | 805 S. Oakland St., St. Johns 48879 to 406 E. Elm St., Carson City 48811 | 28.0                   |
| Sparrow              | Outright                    | 4.6.9         | A2 - B2         | 1210 W. Saginaw St., Lansing 48915 to 1200 E. Michigan Ave., Lansing 48912 | 3.0                    |

**Total of 138.0 miles**
4.1 Baraga County Memorial Hospital, L’Anse, MI

Baraga County Memorial Hospital, L’Anse, MI
1 Span within Work Order:
Section 4.1.1
Single Flat-Fee Construction Bid Required

Baraga County Memorial Hospital is requesting the construction of a 2.5-mile-long Span between its new main hospital, which is scheduled to open in mid-2011, and its Rehab and Fitness Center. While this is a small Work Order, Contractors should note that Baraga County Memorial Hospital is one of the nodes in Portage Health’s 9-site Network, which is a 9-Span Work Order described in Section 4.5. MPHI encourages Contractors who bid on Portage Health’s Work Order to also bid on this Baraga Work Order. All other things being equal, Contractors who bid on the Portage and Baraga Work Orders (which will require two separate bids) will be viewed more favorably than Contractors who bid only on the 9-Span Portage Work Order. On the other hand, Contractors who bid only on the single-Span Baraga Work Order will not be at a disadvantage when compared to Contractors who bid on both Work Orders. MPHI does not wish to place small telecommunication construction firms at a disadvantage to much larger firms.
4.1.1 Baraga County Memorial Hospital to BCMH Rehab & Fitness Center

Span Specifications

1. **Name and Address of Your Organization:**
   Baraga County Memorial Hospital
   770 N. Main St.
   L’Anse, MI 49946

2. **Name of Span:** Baraga County Memorial Hospital to BCMH Rehab & Fitness Center

3. **Applications:** Ethernet Data and VOIP services.

4. **Type of ownership interest desired.** Outright ownership preferred, but not required.

5. **Preferred method of installation.** To be determined by contractor, underground or direct buried preferred.

6. **Fiber (individual strand) specifications.**
   Single Mode 1310/1550 nm or as recommended by contractor.

7. **Fiber optic cable specifications.**
   Standard 12 or 24 strands

8. **Specifications for hardware or other components.** Contractor determination

9. **Termination point A**
   - Baraga County Memorial Hospital, 18341 U.S. Highway 41, L’Anse, MI 49946
   - Terminated in Server room

10. **Termination point B**
    - BCMH Rehab & Fitness Center, 17 W. Broad St., L’Anse, MI 49946
    - Termination in switch/maintenance closet

11. **Preferred route.** Approximately 2.5 miles in length. Specific route: Contractor determination.

12. **Frequency of splice points.** Contractor determination

13. **Required completion date.** The required completion date for this span is approximately mid-2012. Please specify a completion date in the bid.
4.2 Covenant Medical Center, Saginaw, MI – Work Order A: 2 Spans

Covenant Medical Center, Saginaw, MI
2 Spans within Work Order:
Sections 4.2.1 through 4.2.2
Single Flat-Fee Construction Bid
Required
(Covenant also requests a flat-fee bid for each Span.)

This Work Order consists of two (2) Spans designated as Modules 6-1 and 5-1 in the following diagram:

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Mod 1.2.3. & 4 circuits are combination aerial/buried cable of 2 strands each.
Mod 5 & 6 circuits which are entirely buried
144 strands G-A
96 strands G-H

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Covenant Medical Center also requests a flat-fee bid for each Span in case it cannot afford to construct both Spans but wishes to proceed with one.
4.2.1  515 N. Michigan Ave., Saginaw, to 700 Cooper Ave., Saginaw

Span (Node-to-Node) Specifications

1. Name and Address of Your Organization.
   Covenant Medical Center, Inc.
   Gary Henry
   Manager Information Technology
   1447 North Harrison
   Saginaw, MI 48602
   Office Phone: 989-583-6714
   Pager: 989-258-0392@myairmail.com
   Fax Number: 989-583-1001
   Email: ghenry@chs-mi.com

2. Name of Span. Specify a name for this Span.
   515 North Michigan to 700 Cooper, Module 6-Section 1, Site G to Site A

3. Application(s). Describe how you intend to use the Span, e.g., what type(s) of data it will carry (e.g., Ethernet data).
   Covenant plans to use the Span for Ethernet data: video diagnostics, long distance learning, transmission of x-ray and other medical information, etc.

4. Type of ownership interest desired. IRUs must include contractor maintenance and repair of the Span during the full term of the IRU and must be paid for with a one-time, upfront, lump sum payment.
   Outright ownership

5. Preferred method of installation. Choose aerial, underground, direct-buried, or to be determined by Contractor as part of its bid. It is permissible to specify different methods for different segments of a Span. Regardless of what is specified here, all Contractors are expected to apply their professional judgment in the formulation of their installation recommendations and bids.
   To be determined by Contractor, but Covenant prefers underground (inside conduit) installation

6. Fiber (individual strand) specifications.
   Single mode (SM). See item 7.

7. Fiber optic cable specifications.
The fiber Span between sites G and A must contain one hundred forty-four (144) SM strands in one or more cables. The specifications for the cable(s) must meet or exceed the specifications for Corning ALTOS All-Dielectric Gel-Free Cables. A copy of those specifications is available at http://fcc.mphi.org/fiber. Click on the Corning Altos Specs link.

8. Specifications for hardware or other components. Besides the fiber and fiber optic cable, specify the additional hardware that is required, if known. In its bid, the Contractor will have to specify the hardware or other components required to install the fiber/cable that has been specified above to the locations specified below.

Covenant wants fusion splicing and anaerobic field termination SC connectors. Any other necessary hardware/component specifications are to be determined by the Contractor.

9. Termination point A
   - Building address (complete street address, city, county, and zip – no P.O. Boxes)
     Covenant HealthCare Michigan (Site G)
     515 North Michigan Ave.
     Saginaw, MI 48602
   - Location of entrance facility
     South and west sides of building
   - Location of equipment room or suite where terminated
     Basement
   - Description of support structure for termination of fiber optic cable
     Rack-mounted patch panel
   - Method of termination, e.g., fusion splicing pigtails on each fiber
     Anaerobic field termination SC connectors

10. Termination point B
    - Building address (complete street address, city, county, and zip – no P.O. Boxes)
      Covenant Medical Center Cooper (Site A)
      700 Cooper Ave.
      Saginaw, Michigan 48602
    - Location of entrance facility
      SE side of building
    - Location of equipment room or suite where terminated
      First floor, Cooper Data Center
    - Description of support structure for termination of fiber optic cable
      Data rack
    - Method of termination, e.g., fusion splicing pigtails on each fiber
      Anaerobic field termination SC connectors
11. Preferred route.

   Approximately 1.1 miles; route to be determined by Contractor

12. Frequency of splice points. How frequently should splice points be placed?
   One (1) mile for underground and two (2) miles for aerial

13. Required completion date. What is the substantial required completion date for the Span?
   Covenant would like this Span completed by the end of 2011. However, in its bid Contractor should specify the earliest construction completion date to which it can contractually commit.
4.2.2  515 N. Michigan Ave., Saginaw, to 5400 Mackinaw Rd., Saginaw

Span (Node-to-Node) Specifications

1. Name and Address of Your Organization.
   Covenant Medical Center, Inc.
   Gary Henry
   Manager Information Technology
   1447 North Harrison
   Saginaw, MI 48602
   Office Phone: 989-583-6714
   Pager: 989-258-0392@myairmail.com
   Fax Number: 989-583-1001
   Email: ghenry@chs-mi.com

2. Name of Span. Specify a name for this Span.
   515 N. Michigan to 5400 Mackinaw, Module 5-Section 1, Site G to Site H

3. Application(s). Describe how you intend to use the Span, e.g., what type(s) of data it will carry (e.g., Ethernet data).
   Covenant plans to use the Span for Ethernet data: video diagnostics, long distance learning, transmission of x-ray and other medical information, etc.

4. Type of ownership interest desired. IRUs must include contractor maintenance and repair of the Span during the full term of the IRU and must be paid for with a one-time, upfront, lump sum payment.
   **Outright ownership**

5. Preferred method of installation. Choose aerial, underground, direct-buried, or to be determined by Contractor as part of its bid. It is permissible to specify different methods for different segments of a Span. Regardless of what is specified here, all Contractors are expected to apply their professional judgment in the formulation of their installation recommendations and bids.
   **To be determined by Contractor, but Covenant prefers underground (inside conduit) installation**

6. Fiber (individual strand) specifications.
   Single mode (SM). See item 7.

7. Fiber optic cable specifications.
The fiber span between sites G and H must contain ninety-six (96) SM strands in one or more cables. The specifications for the cable(s) must meet or exceed the specifications for Corning ALTOS All-Dielectric Gel-Free Cables. A copy of those specifications is available at http://fcc.mphi.org/fiber. Click on the Corning Altos Specs link.

8. Specifications for hardware or other components. Besides the fiber and fiber optic cable, specify the additional hardware that is required, if known. In its bid, the Contractor will have to specify the hardware or other components required to install the fiber/cable that has been specified above to the locations specified below.

Covenant wants fusion splicing and anaerobic field termination SC connectors. Any other necessary hardware/component specifications are to be determined by the Contractor.

9. Termination point A
- Building address (complete street address, city, county, and zip – no P.O. Boxes)
  Covenant HealthCare Michigan (Site G)
  515 North Michigan Ave.
  Saginaw, MI 48602
- Location of entrance facility
  South and west sides of building
- Location of equipment room or suite where terminated
  Basement
- Description of support structure for termination of fiber optic cable
  Rack-mounted patch panel
- Method of termination, e.g., fusion splicing pigtails on each fiber
  Anaerobic field termination SC connectors

10. Termination point B
- Building address (complete street address, city, county, and zip – no P.O. Boxes)
  Covenant HealthCare Mackinaw (Site H)
  5400 Mackinaw Road
  Saginaw, MI 48604
- Location of entrance facility
  East side of building
- Location of equipment room or suite where terminated
  Third floor
- Description of support structure for termination of fiber optic cable
  Data rack
- Method of termination, e.g., fusion splicing pigtails on each fiber
  Anaerobic field termination SC connectors
11. **Preferred route.**
   Approximate length is 5.25 miles. The route is to be determined by the Contractor.

12. **Frequency of splice points.** How frequently should splice points be placed?
    One (1) mile for underground and two (2) miles for aerial

13. **Required completion date.** What is the substantial required completion date for the Span?
    Covenant would like this Span completed by the end of 2011. However, in its bid Contractor should specify the earliest construction completion date to which it can contractually commit.
4.3 Covenant Medical Center, Saginaw MI – Work Order B: IRU for 7 Spans

Covenant Medical Center, Saginaw, MI

7 Spans within Work Order:
Sections 4.3.1 through 4.3.7

Twenty-Year IRU Bid Required
(Covenant also requests a 20-year IRU bid for each Span.)

This Work Order consists of seven (7) Spans designated as Modules 1-1, 1-2, 1-3, 2-1, 3-2, 4-1, and 4-2 in the following diagram:
Covenant Medical Center also requests a flat-fee, IRU bid for each Span. Covenant requests a price breakdown by Span in case it cannot afford to purchase an IRU for all seven Spans but wishes to proceed with a subset of the seven.
4.3.1 6614 Dixie Hwy., Bridgeport, to 600 N. Main St., Frankenmuth

Span (Node-to-Node) Specifications

1. Name and Address of Your Organization.
   Covenant Medical Center, Inc.
   Gary Henry
   Manager Information Technology
   1447 North Harrison
   Saginaw, MI 48602
   Office Phone: 989-583-6714
   Pager: 989-258-0392@myairmail.com
   Fax Number: 989-583-1001
   Email: ghenry@chs-mi.com

2. Name of Span. Specify a name for this Span.
   6614 Dixie in Bridgeport to 600 N. Main in Frankenmuth, Module 1-Section 1, Site P to Site J

3. Application(s). Describe how you intend to use the Span, e.g., what type(s) of data it will carry (e.g., Ethernet data).
   Covenant plans to use the Span for Ethernet data: video diagnostics, long distance learning, transmission of x-ray and other medical information, etc.

4. Type of ownership interest desired. IRUs must include contractor maintenance and repair of the Span during the full term of the IRU and must be paid for with a one-time, upfront, lump sum payment.
   Twenty (20)-year IRU

5. Preferred method of installation. Choose aerial, underground, direct-buried, or to be determined by Contractor as part of its bid. It is permissible to specify different methods for different segments of a Span. Regardless of what is specified here, all Contractors are expected to apply their professional judgment in the formulation of their installation recommendations and bids.
   To be determined by Contractor

6. Fiber (individual strand) specifications.
   Twenty (20)-year IRU for two (2) single mode (SM) strands

7. Fiber optic cable specifications.
   The specifications of the cable containing the two (2) SM IRU strands are to be determined by the Contractor. However, the fiber optic cable used for splicing must
meet or exceed the specifications for Corning ALTOS All-Dielectric Gel-Free Cables. A copy of those specifications is available at [http://fcc.mphi.org/fiber](http://fcc.mphi.org/fiber). Click on the Corning Altos Specs link.

8. **Specifications for hardware or other components.** Besides the fiber and fiber optic cable, specify the additional hardware that is required, if known. In its bid, the Contractor will have to specify the hardware or other components required to install the fiber/cable that has been specified above to the locations specified below.

   **Covenant wants fusion splicing and anaerobic field termination SC connectors.** Any other necessary hardware/component specifications are to be determined by the Contractor.

9. **Termination point A**
   - Building address (complete street address, city, county, and zip – no P.O. Boxes)
     
     **Covenant HealthCare (Site J)**
     
     600 North Main
     
     Frankenmuth, MI 48734
   - Location of entrance facility
     
     North side of building
   - Location of equipment room or suite where terminated
     
     Basement
   - Description of support structure for termination of fiber optic cable (wall- or rack-mounted patch panel, etc.)
     
     Rack-mounted patch panel
   - Method of termination, e.g., fusion splicing pigtails on each fiber
     
     Anaerobic field termination SC connectors

10. **Termination point B**
   - Building address (complete street address, city, county, and zip – no P.O. Boxes)
     
     **Bridgeport Family Physicians (Site P)**
     
     6614 Dixie Highway
     
     Bridgeport, MI 48722
   - Location of entrance facility
     
     North side of building
   - Location of equipment room or suite where terminated
     
     Basement
   - Description of support structure for termination of fiber optic cable (wall- or rack-mounted patch panel, etc.)
     
     Rack-mounted patch panel
   - Method of termination, e.g., fusion splicing pigtails on each fiber
     
     Anaerobic field termination SC connectors
11. **Preferred route.** What is the preferred route?
   Approximate length is 7 miles. The route is to be determined by the Contractor.

12. **Frequency of splice points.** How frequently should splice points be placed?
    One (1) mile for underground and two (2) miles for aerial

13. **Required completion date.** What is the substantial required completion date for the Span?
    Covenant would like this Span completed by the end of 2011. However, in its bid Contractor should specify the earliest construction completion date to which it can contractually commit.
4.3.2 600 Irving Ave., Saginaw, to 6614 Dixie Hwy., Bridgeport

Span (Node-to-Node) Specifications

1. **Name and Address of Your Organization.**
   Covenant Medical Center, Inc.
   Gary Henry
   Manager Information Technology
   1447 North Harrison
   Saginaw, MI 48602
   Office Phone: 989-583-6714
   Pager: 989-258-0392@myairmail.com
   Fax Number: 989-583-1001
   Email: ghenry@chs-mi.com

2. **Name of Span.** Specify a name for this Span.
   600 Irving to 6614 Dixie in Bridgeport, Module 1-Section 2, Site E to Site P

3. **Application(s).** Describe how you intend to use the Span, e.g., what type(s) of data it will carry (e.g., Ethernet data).
   Covenant plans to use the Span for Ethernet data: video diagnostics, long distance learning, transmission of x-ray and other medical information, etc.

4. **Type of ownership interest desired.** IRUs must include contractor maintenance and repair of the Span during the full term of the IRU and must be paid for with a one-time, upfront, lump sum payment.
   Twenty (20)-year IRU

5. **Preferred method of installation.** Choose aerial, underground, direct-buried, or to be determined by Contractor as part of its bid. It is permissible to specify different methods for different segments of a Span. Regardless of what is specified here, all Contractors are expected to apply their professional judgment in the formulation of their installation recommendations and bids.
   To be determined by Contractor

6. **Fiber (individual strand) specifications.**
   Twenty (20)-year IRU for two (2) single mode (SM) strands

7. **Fiber optic cable specifications.**
   The specifications of the cable containing the two (2) SM IRU strands are to be determined by the Contractor. However, the fiber optic cable used for splicing must meet or exceed the specifications for Corning ALTOS All-Dielectric Gel-Free Cables. A
copy of those specifications is available at [http://fcc.mphi.org/fiber](http://fcc.mphi.org/fiber). Click on the Corning Altos Specs link.

8. **Specifications for hardware or other components.** Besides the fiber and fiber optic cable, specify the additional hardware that is required, if known. In its bid, the Contractor will have to specify the hardware or other components required to install the fiber/cable that has been specified above to the locations specified below.

   **Covenant wants fusion splicing and anaerobic field termination SC connectors.** Any other necessary hardware/component specifications are to be determined by the Contractor.

9. **Termination point A**
   - Building address (complete street address, city, county, and zip – no P.O. Boxes)
     - **Bridgeport Family Physicians (Site P)**
       - 6614 Dixie Hwy
       - Bridgeport, MI 48722
   - Location of entrance facility
     - **North side of building**
   - Location of equipment room or suite where terminated
     - **Basement**
   - Description of support structure for termination of fiber optic cable (wall- or rack-mounted patch panel, etc.)
     - **Rack-mounted patch panel**
   - Method of termination, e.g., fusion splicing pigtails on each fiber
     - **Anaerobic field termination SC connectors**

10. **Termination point B**
    - Building address (complete street address, city, county, and zip – no P.O. Boxes)
      - **Covenant HealthCare Irving (Site E)**
        - 600 Irving
        - Saginaw, MI 48602
    - Location of entrance facility
      - **West side of building**
    - Location of equipment room or suite where terminated
      - **First floor**
    - Description of support structure for termination of fiber optic cable (wall- or rack-mounted patch panel, etc.)
      - **Rack-mounted**
    - Method of termination, e.g., fusion splicing pigtails on each fiber
      - **Anaerobic field termination SC connectors**
11. Preferred route. 
   Approximate length is 10 miles. The route is to be determined by the Contractor.

12. Frequency of splice points. How frequently should splice points be placed?
   One (1) mile for underground and two (2) miles for aerial

13. Required completion date. What is the substantial required completion date for the Span?
   Covenant would like this Span completed by the end of 2011. However, in its bid
   Contractor should specify the earliest construction completion date to which it can
   contractually commit.
**4.3.3 700 Cooper Ave., Saginaw, to 600 Irving Ave., Saginaw**

**Span (Node-to-Node) Specifications**

1. **Name and Address of Your Organization.**
   
   Covenant Medical Center, Inc.
   
   Gary Henry
   
   Manager Information Technology
   
   1447 North Harrison
   
   Saginaw, MI 48602
   
   Office Phone: 989-583-6714
   
   Pager: 989-258-0392@myairmail.com
   
   Fax Number: 989-583-1001
   
   Email: ghenry@chs-mi.com

2. **Name of Span.** Specify a name for this Span.

   700 Cooper to 600 Irving, Module 1-Section 3, Site A to Site E

3. **Application(s).** Describe how you intend to use the Span, e.g., what type(s) of data it will carry (e.g., Ethernet data).

   Covenant plans to use the Span for Ethernet data: video diagnostics, long distance learning, transmission of x-ray and other medical information, etc.

4. **Type of ownership interest desired.** IRUs must include contractor maintenance and repair of the Span during the full term of the IRU and must be paid for with a one-time, upfront, lump sum payment.

   **Twenty (20)-year IRU**

5. **Preferred method of installation.** Choose aerial, underground, direct-buried, or to be determined by Contractor as part of its bid. It is permissible to specify different methods for different segments of a Span. Regardless of what is specified here, all Contractors are expected to apply their professional judgment in the formulation of their installation recommendations and bids.

   **To be determined by Contractor**

6. **Fiber (individual strand) specifications.**

   **Twenty (20)-year IRU for two (2) single mode (SM) strands**

7. **Fiber optic cable specifications.**

   The specifications of the cable containing the two (2) SM IRU strands are to be determined by the Contractor. However, the fiber optic cable used for splicing must meet or exceed the specifications for Corning ALTOS All-Dielectric Gel-Free Cables. A
copy of those specifications is available at http://fcc.mphi.org/fiber. Click on the Corning Altos Specs link.

8. Specifications for hardware or other components. Besides the fiber and fiber optic cable, specify the additional hardware that is required, if known. In its bid, the Contractor will have to specify the hardware or other components required to install the fiber/cable that has been specified above to the locations specified below.

   Covenant wants fusion splicing and anaerobic field termination SC connectors. Any other necessary hardware/component specifications are to be determined by the Contractor.

9. Termination point A
   • Building address (complete street address, city, county, and zip – no P.O. Boxes)
     Covenant Medical Center Cooper (Site A)
     700 Cooper Ave.
     Saginaw, MI 48602
   • Location of entrance facility
     Southeast side of building
   • Location of equipment room or suite where terminated
     First floor, Cooper Data Center
   • Description of support structure for termination of fiber optic cable (wall- or rack-mounted patch panel, etc.)
     Data rack
   • Method of termination, e.g., fusion splicing pigtails on each fiber
     Anaerobic field termination SC connectors

10. Termination point B
    • Building address (complete street address, city, county, and zip – no P.O. Boxes)
      Covenant HealthCare Irving (Site E)
      600 Irving
      Saginaw, MI 48602
    • Location of entrance facility
      West side of building
    • Location of equipment room or suite where terminated
      First Floor
    • Description of support structure for termination of fiber optic cable (wall- or rack-mounted patch panel, etc.)
      Rack-mounted
    • Method of termination, e.g., fusion splicing pigtails on each fiber
      Anaerobic field termination SC connectors
11. **Preferred route.**
   Approximate length is 0.15 miles. The route is to be determined by the Contractor.

12. **Frequency of splice points.** How frequently should splice points be placed?
   One (1) mile for underground and two (2) miles for aerial

13. **Required completion date.** What is the substantial required completion date for the Span?
   Covenant would like this Span completed by the end of 2011. However, in its bid
   Contractor should specify the earliest construction completion date to which it can
   contractually commit.
4.3.4 515 N. Michigan Ave., Saginaw, to 5570 State St., Saginaw

Span (Node-to-Node) Specifications

1. Name and Address of Your Organization.
   Covenant Medical Center, Inc.
   Gary Henry
   Manager Information Technology
   1447 North Harrison
   Saginaw, MI 48602
   Office Phone: 989-583-6714
   Pager: 989-258-0392@myairmail.com
   Fax Number: 989-583-1001
   Email: ghenry@chs-mi.com

2. Name of Span. Specify a name for this Span.
   515 N. Michigan to 5570 State St., Module 2-Section 1, Site G to Site M

3. Application(s). Describe how you intend to use the Span, e.g., what type(s) of data it will carry (e.g., Ethernet data).
   Covenant plans to use the Span for Ethernet data: video diagnostics, long distance learning, transmission of x-ray and other medical information, etc.

4. Type of ownership interest desired. IRUs must include contractor maintenance and repair of the Span during the full term of the IRU and must be paid for with a one-time, upfront, lump sum payment.
   Twenty (20)-years- IRU

5. Preferred method of installation. Choose aerial, underground, direct-buried, or to be determined by Contractor as part of its bid. It is permissible to specify different methods for different segments of a Span. Regardless of what is specified here, all Contractors are expected to apply their professional judgment in the formulation of their installation recommendations and bids.
   To be determined by Contractor

6. Fiber (individual strand) specifications.
   Twenty (20)-year IRU for two (2) single mode (SM) strands

7. Fiber optic cable specifications.
   The specifications of the cable containing the two (2) SM IRU strands are to be determined by the Contractor. However, the fiber optic cable used for splicing must
meet or exceed the specifications for Corning ALTOS All-Dielectric Gel-Free Cables. A copy of those specifications is available at [http://fcc.mphi.org/fiber](http://fcc.mphi.org/fiber). Click on the Corning Altos Specs link.

8. **Specifications for hardware or other components.** Besides the fiber and fiber optic cable, specify the additional hardware that is required, if known. In its bid, the Contractor will have to specify the hardware or other components required to install the fiber/cable that has been specified above to the locations specified below.

   Covenant wants fusion splicing and anaerobic field termination SC connectors. Any other necessary hardware/component specifications are to be determined by the Contractor.

9. **Termination point A**
   - Building address (complete street address, city, county, and zip – no P.O. Boxes)
     
     Covenant HealthCare Michigan (Site G)
     
     515 North Michigan Avenue
     
     Saginaw, MI 48602
   - Location of entrance facility
     
     South and west sides of building
   - Location of equipment room or suite where terminated
     
     Basement
   - Description of support structure for termination of fiber optic cable (wall- or rack-mounted patch panel, etc.)
     
     Rack-mounted patch panel
   - Method of termination, e.g., fusion splicing pigtails on each fiber
     
     Anaerobic field termination SC connectors

10. **Termination point B**
    - Building address (complete street address, city, county, and zip – no P.O. Boxes)
      
      Covenant HealthCare State (Site M)
      
      5570 State St.
      
      Saginaw, Michigan 48603
    - Location of entrance facility
      
      North side of building
    - Location of equipment room or suite where terminated
      
      Second floor
    - Description of support structure for termination of fiber optic cable (wall- or rack-mounted patch panel, etc.)
      
      Data rack
    - Method of termination, e.g., fusion splicing pigtails on each fiber
      
      Anaerobic field termination SC connectors
11. Preferred route.
   Approximate length is 4 miles. The route is to be determined by the Contractor.

12. Frequency of splice points. How frequently should splice points be placed?
   One (1) mile for underground and two (2) miles for aerial

13. Required completion date. What is the substantial required completion date for the Span?
   Covenant would like this Span completed by the end of 2011. However, in its bid
   Contractor should specify the earliest construction completion date to which it can
   contractually commit.
4.3.5  515 N. Michigan Ave., Saginaw, to 3875 Bay Rd., Saginaw

Span (Node-to-Node) Specifications

1. Name and Address of Your Organization.
   Covenant Medical Center, Inc.
   Gary Henry
   Manager Information Technology
   1447 North Harrison
   Saginaw, MI 48602
   Office Phone: 989-583-6714
   Pager: 989-258-0392@myairmail.com
   Fax Number: 989-583-1001
   Email: ghenry@chs-mi.com

2. Name of Span. Specify a name for this Span.
   515 N. Michigan to 3875 Bay Rd., Module 3-Section 2, Site G to Site O

3. Application(s). Describe how you intend to use the Span, e.g., what type(s) of data it will carry (e.g., Ethernet data).
   Covenant plans to use the Span for Ethernet data: video diagnostics, long distance learning, transmission of x-ray and other medical information, etc.

4. Type of ownership interest desired. IRUs must include contractor maintenance and repair of the Span during the full term of the IRU and must be paid for with a one-time, upfront, lump sum payment.
   Twenty (20)-year IRU

5. Preferred method of installation. Choose aerial, underground, direct-buried, or to be determined by Contractor as part of its bid. It is permissible to specify different methods for different segments of a Span. Regardless of what is specified here, all Contractors are expected to apply their professional judgment in the formulation of their installation recommendations and bids.
   To be determined by Contractor

6. Fiber (individual strand) specifications.
   Twenty (20)-year IRU for two (2) single mode (SM) strands

7. Fiber optic cable specifications.
   The specifications of the cable containing the two (2) SM IRU strands are to be determined by the Contractor. However, the fiber optic cable used for splicing must
meet or exceed the specifications for Corning ALTOS All-Dielectric Gel-Free Cables. A copy of those specifications is available at [http://fcc.mphi.org/fiber](http://fcc.mphi.org/fiber). Click on the Corning Altos Specs link.

8. **Specifications for hardware or other components.** Besides the fiber and fiber optic cable, specify the additional hardware that is required, if known. In its bid, the Contractor will have to specify the hardware or other components required to install the fiber/cable that has been specified above to the locations specified below.

   Covenant wants fusion splicing and anaerobic field termination SC connectors. Any other necessary hardware/component specifications are to be determined by the Contractor.

9. **Termination point A**
   - Building address (complete street address, city, county, and zip – no P.O. Boxes)
     Covenant HealthCare (Site O)
     3875 Bay Road
     Saginaw, MI 48603
   - Location of entrance facility
     Southwest side of building
   - Location of equipment room or suite where terminated
     First floor
   - Description of support structure for termination of fiber optic cable (wall- or rack-mounted patch panel, etc.)
     Rack-mounted patch panel
   - Method of termination, e.g., fusion splicing pigtails on each fiber
     Anaerobic field termination SC connectors

10. **Termination point B**
    - Building address (complete street address, city, county, and zip – no P.O. Boxes)
      Covenant HealthCare Michigan (Site G)
      515 N. Michigan Ave.
      Saginaw, Michigan 48602
    - Location of entrance facility
      South and west sides of building
    - Location of equipment room or suite where terminated
      Basement
    - Description of support structure for termination of fiber optic cable (wall- or rack-mounted patch panel, etc.)
      Rack-mounted patch panel
    - Method of termination, e.g., fusion splicing pigtails on each fiber
      Anaerobic field termination SC connectors
11. **Preferred route.**  
   Approximate length is 1.5 miles. The route is to be determined by the Contractor.

12. **Frequency of splice points.** How frequently should splice points be placed?  
   One (1) mile for underground and two (2) miles for aerial

13. **Required completion date.** What is the substantial required completion date for the Span?  
   Covenant would like this Span completed by the end of 2011. However, in its bid Contractor should specify the earliest construction completion date to which it can contractually commit.
4.3.6 8767 Gratiot Rd., Saginaw, to 16440 Gratiot Rd., Hemlock

Span (Node-to-Node) Specifications

1. **Name and Address of Your Organization.**
   Covenant Medical Center, Inc.
   Gary Henry
   Manager Information Technology
   1447 North Harrison
   Saginaw, MI 48602
   Office Phone: 989-583-6714
   Pager: 989-258-0392@myairmail.com
   Fax Number: 989-583-1001
   Email: ghenry@chs-mi.com

2. **Name of Span.** Specify a name for this Span.
   8767 Gratiot to 16440 Gratiot, Module 4-Section 1, Site L to Site U

3. **Application(s).** Describe how you intend to use the Span, e.g., what type(s) of data it will carry (e.g., Ethernet data).
   Covenant plans to use the Span for Ethernet data: video diagnostics, long distance learning, transmission of x-ray and other medical information, etc.

4. **Type of ownership interest desired.** IRUs must include contractor maintenance and repair of the Span during the full term of the IRU and must be paid for with a one-time, upfront, lump sum payment.
   Twenty (20)-year IRU

5. **Preferred method of installation.** Choose aerial, underground, direct-buried, or to be determined by Contractor as part of its bid. It is permissible to specify different methods for different segments of a Span. Regardless of what is specified here, all Contractors are expected to apply their professional judgment in the formulation of their installation recommendations and bids.
   To be determined by Contractor

6. **Fiber (individual strand) specifications.**
   Twenty (20)-year IRU for two (2) single mode (SM) strands

7. **Fiber optic cable specifications.**
   The specifications of the cable containing the two (2) SM IRU strands are to be determined by the Contractor. However, the fiber optic cable used for splicing must meet or exceed the specifications for Corning ALTOS All-Dielectric Gel-Free Cables. A
copy of those specifications is available at http://fcc.mphi.org/fiber. Click on the Corning Altos Specs link.

8. **Specifications for hardware or other components.** Besides the fiber and fiber optic cable, specify the additional hardware that is required, if known. In its bid, the Contractor will have to specify the hardware or other components required to install the fiber/cable that has been specified above to the locations specified below.

   - **Covenant wants fusion splicing and anaerobic field termination SC connectors.** Any other necessary hardware/component specifications are to be determined by the Contractor.

9. **Termination point A**
   - Building address (complete street address, city, county, and zip – no P.O. Boxes)
     - **Covenant HealthCare – 16440 Gratiot (Site U)**
       - 16440 Gratiot
       - Hemlock, MI 48626
     - Location of entrance facility
       - **South side of building**
     - Location of equipment room or suite where terminated
       - **First floor**
     - Description of support structure for termination of fiber optic cable (wall- or rack-mounted patch panel, etc.)
       - **Rack-mounted patch panel**
     - Method of termination, e.g., fusion splicing pigtails on each fiber
       - **Anaerobic field termination SC connectors**

10. **Termination point B**
    - Building address (complete street address, city, county, and zip – no P.O. Boxes)
      - **Covenant HealthCare Gratiot (Site L)**
      - 8767 Gratiot (M-46)
      - Saginaw, Michigan 48609
    - Location of entrance facility
      - **East side of building**
    - Location of equipment room or suite where terminated
      - **First floor**
    - Description of support structure for termination of fiber optic cable (wall- or rack-mounted patch panel, etc.)
      - **Rack-mounted patch panel**
    - Method of termination, e.g., fusion splicing pigtails on each fiber
      - **Anaerobic field termination SC connectors**
11. Preferred route.
   Approximate length is 8.25 miles. The route is to be determined by the Contractor.

12. Frequency of splice points. How frequently should splice points be placed?
   One (1) mile for underground and two (2) miles for aerial

13. Required completion date. What is the substantial required completion date for the Span?
   Covenant would like this Span completed by the end of 2011. However, in its bid Contractor should specify the earliest construction completion date to which it can contractually commit.
4.3.7  515 N. Michigan Ave., Saginaw, to 8767 Gratiot Rd., Saginaw

Span (Node-to-Node) Specifications

1. **Name and Address of Your Organization.**
   - Covenant Medical Center, Inc.
   - Gary Henry
   - Manager Information Technology
   - 1447 North Harrison
   - Saginaw, MI 48602
   - Office Phone: 989-583-6714
   - Pager: 989-258-0392@myairmail.com
   - Fax Number: 989-583-1001
   - Email: ghenry@chs-mi.com

2. **Name of Span.** Specify a name for this Span.
   - 515 N. Michigan to 8767 Gratiot, Module 4-Section 2, Site G to Site L

3. **Application(s).** Describe how you intend to use the Span, e.g., what type(s) of data it will carry (e.g., Ethernet data).
   - Covenant plans to use the Span for Ethernet data: video diagnostics, long distance learning, transmission of x-ray and other medical information, etc.

4. **Type of ownership interest desired.** IRUs must include contractor maintenance and repair of the Span during the full term of the IRU and must be paid for with a one-time, upfront, lump sum payment.
   - Twenty (20)-year IRU

5. **Preferred method of installation.** Choose aerial, underground, direct-buried, or to be determined by Contractor as part of its bid. It is permissible to specify different methods for different segments of a Span. Regardless of what is specified here, all Contractors are expected to apply their professional judgment in the formulation of their installation recommendations and bids.
   - To be determined by Contractor

6. **Fiber (individual strand) specifications.**
   - Twenty (20)-year IRU for two (2) single mode (SM) strands

7. **Fiber optic cable specifications.**
   - The specifications of the cable containing the two (2) SM IRU strands are to be determined by the Contractor. However, the fiber optic cable used for splicing must
meet or exceed the specifications for Corning ALTOS All-Dielectric Gel-Free Cables. A copy of those specifications is available at http://fcc.mphi.org/fiber. Click on the Corning Altos Specs link.

8. Specifications for hardware or other components. Besides the fiber and fiber optic cable, specify the additional hardware that is required, if known. In its bid, the Contractor will have to specify the hardware or other components required to install the fiber/cable that has been specified above to the locations specified below.

   Covenant wants fusion splicing and anaerobic field termination SC connectors. Any other necessary hardware/component specifications are to be determined by the Contractor.

9. Termination point A
   • Building address (complete street address, city, county, and zip – no P.O. Boxes)
     Covenant HealthCare Gratiot (Site L)
     8767 Gratiot (M-46)
     Saginaw, MI 48609
   • Location of entrance facility
     East side of building
   • Location of equipment room or suite where terminated
     First floor
   • Description of support structure for termination of fiber optic cable (wall- or rack-mounted patch panel, etc.)
     Rack-mounted patch panel
   • Method of termination, e.g., fusion splicing pigtails on each fiber
     Anaerobic field termination SC connectors

10. Termination point B
   • Building address (complete street address, city, county, and zip – no P.O. Boxes)
    Covenant HealthCare Michigan (Site G)
    515 North Michigan Ave.
    Saginaw, MI 48602
   • Location of entrance facility
     South and west sides of building
   • Location of equipment room or suite where terminated
     Basement
   • Description of support structure for termination of fiber optic cable (wall- or rack-mounted patch panel, etc.)
     Rack-mounted patch panel
   • Method of termination, e.g., fusion splicing pigtails on each fiber
     Anaerobic field termination SC connectors
11. Preferred route.
   Approximate distance is 6.7 miles. The route is to be determined by the Contractor.

12. Frequency of splice points. How frequently should splice points be placed?
   One (1) mile for underground and two (2) miles for aerial

13. Required completion date. What is the substantial required completion date for the Span?
   Covenant would like this Span completed by the end of 2011. However, in its bid
   Contractor should specify the earliest construction completion date to which it can
   contractually commit.
4.4  Memorial Healthcare, Owosso, MI

Memorial Healthcare, Owosso, MI
13 Spans within Work Order:
Sections 4.4.1 through 4.4.13
Single Flat-Fee Construction Bid Required
(Memorial also requests a flat-fee bid for each Span.)

Memorial Healthcare also requests a flat-fee bid for each Span. Memorial realizes that a Contractor spreads project overhead across all Spans, and that a Contractor may not be able to install a single Span for the same price as installing that Span as part of a much larger, 13-Span project. Nonetheless, Memorial requests a price breakdown by Span in case it cannot afford to construct all 13 Spans but wishes to proceed with a subset of the 13.

Item 11 of each Span Specifications Sheet shows the preferred route for the Span. These maps are fairly small; larger scale maps of the fiber paths are available upon request from MPHI.

All fiber runs must follow the main cable entrance into the hospital.

As shown on the aforementioned maps, to the extent possible, fiber runs should follow the same path until deviation to separate end points is necessary. Where efficiencies can be gained, fiber strands following the same path may be consolidated into a single cable. (Efficiency can be gained by placing the fiber strands in a single cable and installing the appropriate splice casings, sparing additional boring and mounting costs.)

Contractors are encouraged to be flexible and propose these kinds of efficiencies as well as better route selection based on their experiences and any permitting issues such as railroad and river crossings. Such crossings are expensive, and creative routing could save money. While efficiency and cost savings are desirable, the reliability and integrity of the fiber cable
must not be jeopardized. Memorial’s Spans will eventually carry Voice over IP and electronic records, and avoidance of future outages through high quality construction is of utmost importance.
4.4.1 Main Campus to A: Chesaning Outpatient Services

Span (Node-to-Node) Specifications

1. Name: Memorial Healthcare
2. Span: A: Chesaning Outpatient Services
3. Application: Ethernet Data
4. Type of ownership interest desired. Outright Ownership by Memorial Healthcare
5. Preferred method of installation. Combination of aerial and underground to be determined by the contractor

6. Fiber (individual strand) specifications. Possible specifications include:
   - Compliant with appropriate standards, e.g., ITU-T G.652.D or OS2
     - ITU-T G.652.D
   - Single mode (SM or SSMF, standard single mode fiber)
     - Single Mode Fiber
   - Preferred manufacturer and/or product, e.g., Alcatel SMOF, Corning SMF-28, or Lucent Std. Single Mode
     - Corning 024EW4-T4101D20 or equivalent
   - Specialty application or type of SM fiber, e.g., G.652
     - G.652
   - Size (core/cladding diameter in microns)
     - .9/125
   - Attenuation coefficient (dB/km at appropriate wavelengths), e.g., 0.4/0.25 dB/km
     - .5dB/Km
   - Bandwidth, e.g., @ 1310/1550 nm
     - 1310/1383nm
   - Corning Altos All Dielectric Gel Free 9/125 microns, 0.4/0.3 dB/km@1310/1383nm or equivalent

7. Fiber optic cable specifications. Possible specifications include:
   - Loose tube or ribbon
     - Loose tube
   - Preferred manufacturer and/or product
     - Corning Altos Dielectric Gel Free or equivalent
   - Maintenance Costs per Year:
     - 1% of Installed Costs = 8,600.00
   - Strand (fiber) count (always add extra fibers)
     - 24
   - Disposition of each strand (lit, reserved, or dark)
     - 8 Lit, 16 reserved
   - Water protection, e.g., gel-filled or dry-water blocked
Dry-water blocked
• Crush loads or rodent penetration
  o Non-armor
• Grounding and bonding
  o Per N.E.C.
• Color coding
  o Standard
• Cable specs:
  o Corning 024FW4-T4101D20 loose tube, 24-strand or equivalent

8. Specifications for hardware or other components. Besides the fiber and fiber optic cable, specify the additional hardware that is required, if known. In its bid, the Contractor will have to specify the hardware or other components required to install the fiber/cable that has been specified above to the locations specified below.
• End terminals and transceivers (that include transmitters such as Fabry-Perot Laser [shorter digital links] and DFB Laser [longer, faster links])
  o Nortel/Avaya LX SFP or equivalent – Quantity 4
• Regeneration equipment (e.g., optical amplifiers)
  o None needed
• Other signal conditioning equipment
  o None needed
• Power, backup, UPS, grounding, etc.
  o None needed
• Splices (fusion) and connectors (for terminations)
  o To be provided by the contractor
• Other equipment and hardware components
  o None needed

9. Termination point A
• Building address (complete street address, city, county, and zip – no P.O. Boxes)
  o 826 West King Street, Owosso, MI 48867
• Location of entrance facility
  o Auditorium Building, 1st Floor, South Auditorium West Wall
• Location of equipment room or suite where terminated
  o Auditorium Building, 2nd Floor, Main IT Communications Room
• Description of support structure for termination of fiber optic cable (wall- or rack-mounted patch panel, etc.)
  o Rack-mounted 72 port Lucent Termination Blocks
• Method of termination, e.g., fusion splicing pigtails on each fiber
  o Fusion splicing pigtails
• Labeling
  o Clinic Name / strand number
10. **Termination point B**
   - Building address (complete street address, city, county, and zip – no P.O. Boxes)
     - 305 Saginaw, Chesaning, MI 48616
   - Location of entrance facility
     - West side of building next to employee entrance
   - Location of equipment room or suite where terminated
     - Just inside building next to employee entrance, near furnace room
   - Description of support structure for termination of fiber optic cable (wall- or rack-mounted patch panel, etc.)
     - Wall-mounted rack
   - Method of termination, e.g., fusion splicing pigtails on each fiber
     - Fusion splicing pigtails
   - Labeling
     - MHC / Strand number

11. **Preferred route.** What is the approximate length of the Span (distance from A to B using the preferred route)? What is the preferred route? **Approximately 17.2 miles. See map.**

![](map.png)

12. **Frequency of splice points.** How frequently should splice points be placed? **Minimum of 2 mile segments. 150 feet of slack per mile and at all major cross road intersections.**

13. **Required completion date:** 2012
4.4.2 A to B: Chesaning Outpatient Services to Chesaning Family Practice

Span (Node-to-Node) Specifications

1. Name: Memorial Healthcare
2. Span: B: Chesaning Family Practice
3. Application: Ethernet Data
4. Type of ownership interest desired. Outright Ownership by Memorial Healthcare
5. Preferred method of installation. Underground into existing conduit Building to Building

6. Fiber (individual strand) specifications. Possible specifications include:
   - Compliant with appropriate standards, e.g., ITU-T G.652.D or OS2
     - ITU-T G.652.D
   - Single mode (SM or SSMF, standard single mode fiber)
     - Single Mode Fiber
   - Preferred manufacturer and/or product, e.g., Alcatel SMOF, Corning SMF-28, or Lucent Std. Single Mode
     - Corning 024EW4-T4101D20 or equivalent
   - Specialty application or type of SM fiber, e.g., G.652
     - G.652
   - Size (core/cladding diameter in microns)
     - .9/125
   - Attenuation coefficient (dB/km at appropriate wavelengths), e.g., 0.4/0.25 dB/km
     - .5dB/Km
   - Bandwidth, e.g., @ 1310/1550 nm
     - 1310/1383nm
   - Corning Altos All Dielectric Gel Free 9/125 microns, 0.4/0.3 dB/km@1310/1383nm or equivalent

7. Fiber optic cable specifications. Possible specifications include:
   - Loose tube or ribbon
     - Loose tube
   - Preferred manufacturer and/or product
     - Corning Altos Dielectric Gel Free or equivalent
   - Maintenance Costs per Year:
     - $50.00
   - Strand (fiber) count (always add extra fibers)
     - 24
   - Disposition of each strand (lit, reserved, or dark)
     - 8 Lit, 16 reserved
• Water protection, e.g., gel-filled or dry-water blocked  
  o Dry-water blocked
• Crush loads or rodent penetration  
  o Non-armor
• Grounding and bonding  
  o Per N.E.C.
• Color coding  
  o Standard
• Cable specs:  
  o Corning 024FW4-T4101D20 loose tube, 24-strand or equivalent

8. Specifications for hardware or other components. Besides the fiber and fiber optic cable, specify the additional hardware that is required, if known. In its bid, the Contractor will have to specify the hardware or other components required to install the fiber/cable that has been specified above to the locations specified below.
• End terminals and transceivers (that include transmitters such as Fabry-Perot Laser [shorter digital links] and DFB Laser [longer, faster links])  
  o Nortel/Avaya LX SFP or equivalent – Quantity 4
• Regeneration equipment (e.g., optical amplifiers)  
  o None needed
• Other signal conditioning equipment  
  o None needed
• Power, backup, UPS, grounding, etc.  
  o None needed
• Splices (fusion) and connectors (for terminations)  
  o To be provided by the contractor
• Other equipment and hardware components  
  o None needed

9. Termination point A
• Building address (complete street address, city, county, and zip – no P.O. Boxes)  
  o 305 Saginaw, Chesaning, MI 48616
• Location of entrance facility  
  o East side of building, 1st floor
• Location of equipment room or suite where terminated  
  o Just inside of west entrance in furnace room
• Description of support structure for termination of fiber optic cable (wall- or rack-mounted patch panel, etc.)  
  o Rack-mounted 24 port Lucent Termination Blocks
• Method of termination, e.g., fusion splicing pigtails on each fiber  
  o Fusion splicing pigtails
• Labeling  
  o Clinic Name / strand number
10. **Termination point B**
   - Building address (complete street address, city, county, and zip – no P.O. Boxes)
     - 300 S. Chapman, Chesaning, MI 48616
   - Location of entrance facility
     - West side of building next to employee entrance
   - Location of equipment room or suite where terminated
     - Basement Communications room next to break room
   - Description of support structure for termination of fiber optic cable (wall- or rack-mounted patch panel, etc.)
     - Wall-mounted Rack
   - Method of termination, e.g., fusion splicing pigtails on each fiber
     - Fusion splicing pigtails
   - Labeling
     - Clinic Name / Strand number

11. **Preferred route.** What is the approximate length of the Span (distance from A to B using the preferred route)? What is the preferred route? About 200 feet building to building, from the east side of the building at 305 S. Saginaw St. to the west side of the building at 300 S. Chapman St. See satellite photo and marked connection route.

![Satellite photo](image)

12. **Frequency of splice points.** How frequently should splice points be placed? **None needed**

13. **Required completion date:** 2012
4.4.3 Main Campus to D: Shiawassee Family Practice

Span (Node-to-Node) Specifications

1. Name: Memorial Healthcare
2. Span: D: Shiawassee Family Medicine
3. Application: Ethernet Data
4. Type of ownership interest desired. **Outright Ownership by Memorial Healthcare.**
5. Preferred method of installation. **Combination of aerial and underground to be determined by the contractor**

6. **Fiber (individual strand) specifications.** Possible specifications include:
   - Compliant with appropriate standards, e.g., ITU-T G.652.D or OS2
     - ITU-T G.652.D
   - Single mode (SM or SSMF, standard single mode fiber)
     - **Single Mode Fiber**
   - Preferred manufacturer and/or product, e.g., Alcatel SMOF, Corning SMF-28, or Lucent Std.
     - Single Mode
       - **Corning 024EW4-T4101D20 or equivalent**
   - Specialty application or type of SM fiber, e.g., G.652
     - **G.652**
   - Size (core/cladding diameter in microns)
     - .9/125
   - Attenuation coefficient (dB/km at appropriate wavelengths), e.g., 0.4/0.25 dB/km
     - .5dB/Km
   - Bandwidth, e.g., @ 1310/1550 nm
     - 1310/1383nm
   - **Corning Altos All Dielectric Gel Free 9/125 microns, 0.4/0.3 dB/km@1310/1383nm or equivalent**

7. **Fiber optic cable specifications.** Possible specifications include:
   - Loose tube or ribbon
     - Loose tube
   - Preferred manufacturer and/or product
     - **Corning Altos Di-electric Gel Free or equivalent**
   - Maintenance Costs per Year:
     - 1% of Installed Costs = 1527.00/yr
   - Strand (fiber) count (always add extra fibers)
     - 24
   - Disposition of each strand (lit, reserved, or dark)
     - 8 Lit, 16 reserved
• Water protection, e.g., gel-filled or dry-water blocked
  o Dry-water blocked
• Crush loads or rodent penetration
  o Non-armor
• Grounding and bonding
  o Per N.E.C.
• Color coding
  o Standard
• Cable specs:
  o Corning 024FW4-T4101D20 loose tube, 24-strand or equivalent

8. Specifications for hardware or other components. Besides the fiber and fiber optic cable, specify the additional hardware that is required, if known. In its bid, the Contractor will have to specify the hardware or other components required to install the fiber/cable that has been specified above to the locations specified below.
• End terminals and transceivers (that include transmitters such as Fabry-Perot Laser [shorter digital links] and DFB Laser [longer, faster links])
  o Nortel/Avaya LX SFP or equivalent – Quantity 4
• Regeneration equipment (e.g., optical amplifiers)
  o None needed
• Other signal conditioning equipment
  o None needed
• Power, backup, UPS, grounding, etc.
  o None needed
• Splices (fusion) and connectors (for terminations)
  o To be provided by the contractor
• Other equipment and hardware components
  o None needed

9. Termination point A
• Building address (complete street address, city, county, and zip – no P.O. Boxes)
  o 826 West King Street, Owosso, MI 48867
• Location of entrance facility
  o Auditorium Building, 1st Floor, South Auditorium West Wall
• Location of equipment room or suite where terminated
  o Auditorium Building, 2nd Floor, Main IT Communications Room
• Description of support structure for termination of fiber optic cable (wall- or rack-mounted patch panel, etc.)
  o Rack-mounted 72 port Lucent Termination Blocks
• Method of termination, e.g., fusion splicing pigtails on each fiber
  o Fusion splicing pigtails
• Labeling
  o Clinic Name / strand number
10. Termination point B
   - Building address (complete street address, city, county, and zip – no P.O. Boxes)
     o 115 N. Shiawassee Street, Corunna, MI 48817
   - Location of entrance facility
     o West side of building next to Patient entrance.
   - Location of equipment room or suite where terminated
     o Inside building next to Garage
   - Description of support structure for termination of fiber optic cable (wall- or rack-mounted patch panel, etc.)
     o Wall-mounted Rack
   - Method of termination, e.g., fusion splicing pigtails on each fiber
     o Fusion splicing pigtails
   - Labeling
     o MHC / Strand number

11. Preferred route. What is the approximate length of the Span (distance from A to B using the preferred route)? What is the preferred route? **Approximately 4.3 miles. See map.**

12. Frequency of splice points. How frequently should splice points be placed? **Minimum of 2 mile segments. 150 feet of slack per mile and at all major cross road intersections.**

13. Required completion date: **2012**
4.4.4 Main Campus to E: State Road Outpatient Services

Span (Node-to-Node) Specifications

1. Name: Memorial Healthcare
2. Span: E: State Road Outpatient Services
3. Application: Ethernet Data
4. Type of ownership interest desired. **Outright Ownership by Memorial Healthcare**
5. Preferred method of installation. **Combination of aerial and underground to be determined by the contractor**

6. **Fiber (individual strand) specifications.** Possible specifications include:
   - Compliant with appropriate standards, e.g., ITU-T G.652.D or OS2
     - ITU-T G.652.D
   - Single mode (SM or SSMF, standard single mode fiber)
     - Single Mode Fiber
   - Preferred manufacturer and/or product, e.g., Alcatel SMOF, Corning SMF-28, or Lucent Std. Single Mode
     - Corning 024EW4-T4101D20 or equivalent
   - Specialty application or type of SM fiber, e.g., G.652
     - G.652
   - Size (core/cladding diameter in microns)
     - .9/125
   - Attenuation coefficient (dB/km at appropriate wavelengths), e.g., 0.4/0.25 dB/km
     - .5dB/Km
   - Bandwidth, e.g., @ 1310/1550 nm
     - 1310/1383nm
   - Corning Altos All Dielectric Gel Free 9/125 microns, 0.4/0.3 dB/km@1310/1383nm or equivalent

7. **Fiber optic cable specifications.** Possible specifications include:
   - Loose tube or ribbon
     - Loose tube
   - Preferred manufacturer and/or product
     - Corning Altos Dielectric Gel Free or equivalent
   - Maintenance Costs per Year:
     - 1% of Installed Costs = 1396.00/yr
   - Strand (fiber) count (always add extra fibers)
     - 24
   - Disposition of each strand (lit, reserved, or dark)
     - 8 Lit, 16 reserved
8. Specifications for hardware or other components. Besides the fiber and fiber optic cable, specify the additional hardware that is required, if known. In its bid, the Contractor will have to specify the hardware or other components required to install the fiber/cable that has been specified above to the locations specified below.

- End terminals and transceivers (that include transmitters such as Fabry-Perot Laser [shorter digital links] and DFB Laser [longer, faster links])
  - Nortel/Avaya LX SFP or equivalent – Quantity 4
- Regeneration equipment (e.g., optical amplifiers)
  - None needed
- Other signal conditioning equipment
  - None needed
- Power, backup, UPS, grounding, etc.
  - None needed
- Splices (fusion) and connectors (for terminations)
  - To be provided by the contractor
- Other equipment and hardware components
  - None needed

9. Termination point A

- Building address (complete street address, city, county, and zip – no P.O. Boxes)
  - 826 West King Street, Owosso, MI 48867
- Location of entrance facility
  - Auditorium Building, 1st Floor, South Auditorium West Wall
- Location of equipment room or suite where terminated
  - Auditorium Building, 2nd Floor, Main IT Communications Room
- Description of support structure for termination of fiber optic cable (wall- or rack-mounted patch panel, etc.)
  - Rack-mounted 72 port Lucent Termination Blocks
- Method of termination, e.g., fusion splicing pigtails on each fiber
  - Fusion splicing pigtails
- Labeling
  - Clinic Name / strand number
10. Termination point B
   - Building address (complete street address, city, county, and zip – no P.O. Boxes)
     o 239 N. State Road, Owosso, MI 48867
   - Location of entrance facility
     o North/West Side of Building
   - Location of equipment room or suite where terminated
     o Basement Communications Room
   - Description of support structure for termination of fiber optic cable (wall- or rack-mounted
     patch panel, etc.)
     o Wall-mounted Rack
   - Method of termination, e.g., fusion splicing pigtails on each fiber
     o Fusion splicing pigtails
   - Labeling
     o MHC / Strand number

11. Preferred route. What is the approximate length of the Span (distance from A to B using the
    preferred route)? What is the preferred route? **Approximately 3.9 miles. See map.**

12. Frequency of splice points. How frequently should splice points be placed? Minimum of 2 mile
    segments. **150 feet of slack per mile and at all major cross road intersections.**

13. Required completion date.: 2012
4.4.5 Main Campus to F: Durand Family Healthcare (300 W. Genesee St.)

Span (Node-to-Node) Specifications

1. Name: Memorial Healthcare
2. Span: F: Durand Family Healthcare
3. Application: Ethernet Data
4. Type of ownership interest desired. **Outright Ownership by Memorial Healthcare**
5. Preferred method of installation. **Combination of aerial and underground to be determined by the contractor**

6. Fiber (individual strand) specifications. Possible specifications include:
   - Compliant with appropriate standards, e.g., ITU-T G.652.D or OS2
     - ITU-T G.652.D
   - Single mode (SM or SSMF, standard single mode fiber)
     - Single Mode Fiber
   - Preferred manufacturer and/or product, e.g., Alcatel SMOF, Corning SMF-28, or Lucent Std. Single Mode
     - Corning 024EW4-T4101D20 or equivalent
   - Specialty application or type of SM fiber, e.g., G.652
     - G.652
   - Size (core/cladding diameter in microns)
     - .9/125
   - Attenuation coefficient (dB/km at appropriate wavelengths), e.g., 0.4/0.25 dB/km
     - .5dB/Km
   - Bandwidth, e.g., @ 1310/1550 nm
     - 1310/1383nm
   - Corning Altos All Dielectric Gel Free 9/125 microns, 0.4/0.3 dB/km@1310/1383nm or equivalent

7. Fiber optic cable specifications. Possible specifications include:
   - Loose tube or ribbon
     - Loose tube
   - Preferred manufacturer and/or product
     - Corning Altos Dielectric Gel Free or equivalent
   - Maintenance Costs per Year:
     - 1% of Installed Costs = 4390.00/yr
   - Strand (fiber) count (always add extra fibers)
     - 24
   - Disposition of each strand (lit, reserved, or dark)
• 8 Lit, 16 reserved
  • Water protection, e.g., gel-filled or dry-water blocked
    o Dry-water blocked
  • Crush loads or rodent penetration
    o Non-armor
  • Grounding and bonding
    o Per N.E.C.
  • Color coding
    o Standard
  • Cable specs:
    o Corning 024FW4-T4101D20 loose tube, 24-strand or equivalent

8. Specifications for hardware or other components. Besides the fiber and fiber optic cable, specify the additional hardware that is required, if known. In its bid, the Contractor will have to specify the hardware or other components required to install the fiber/cable that has been specified above to the locations specified below.
  • End terminals and transceivers (that include transmitters such as Fabry-Perot Laser [shorter digital links] and DFB Laser [longer, faster links])
    o Nortel/Avaya LX SFP or equivalent – Quantity 4
  • Regeneration equipment (e.g., optical amplifiers)
    o None needed
  • Other signal conditioning equipment
    o None needed
  • Power, backup, UPS, grounding, etc.
    o None needed
  • Splices (fusion) and connectors (for terminations)
    o To be provided by the contractor
  • Other equipment and hardware components
    o None needed

9. Termination point A
  • Building address (complete street address, city, county, and zip – no P.O. Boxes)
    o 826 West King Street, Owosso, MI 48867
  • Location of entrance facility
    o Auditorium Building, 1st Floor, South Auditorium West Wall
  • Location of equipment room or suite where terminated
    o Auditorium Building, 2nd Floor, Main IT Communications Room
  • Description of support structure for termination of fiber optic cable (wall- or rack-mounted patch panel, etc.)
    o Rack-mounted 72 port Lucent Termination Blocks
  • Method of termination, e.g., fusion splicing pigtails on each fiber
    o Fusion splicing pigtails
  • Labeling
10. Termination point B
   - Building address (complete street address, city, county, and zip – no P.O. Boxes)
     o 300 West Genesee Street, Durand, MI 48429
     o Note: Memorial Healthcare will use fiber already installed to complete the link from 300 W. Genesee St. to Durand Family Healthcare, which is located at 9099 E. Lansing Rd. in Durand.
   - Location of entrance facility
     o Main Cable Entrance for Frontier Communications
   - Location of equipment room or suite where terminated
     o Frontier Communications Central Office, CLEC Rack
   - Description of support structure for termination of fiber optic cable (wall- or rack-mounted patch panel, etc.)
     o Floor-mounted Rack
   - Method of termination, e.g., fusion splicing pigtails on each fiber
     o Fusion splicing pigtails
   - Labeling
     o MHC / Strand number

11. Preferred route. What is the approximate length of the Span (distance from A to B using the preferred route)? What is the preferred route? Approximately 13 miles. See map.

12. Frequency of splice points. How frequently should splice points be placed? Minimum of 2 mile segments. 150 feet of slack per mile and at all major cross road intersections.

13. Required completion date: 2012
4.4.6 Main Campus to G: Dr. Huff’s Office

Span (Node-to-Node) Specifications

1. Name: Memorial Healthcare
2. Span: G: Dr. Huff’s Office
3. Application: Ethernet Data
4. Type of ownership interest desired. **Outright Ownership by Memorial Healthcare**
5. Preferred method of installation. **Combination of aerial and underground to be determined by the contractor**

6. Fiber (individual strand) specifications. Possible specifications include:
   - Compliant with appropriate standards, e.g., ITU-T G.652.D or OS2
     - **ITU-T G.652.D**
   - Single mode (SM or SSMF, standard single mode fiber)
     - **Single Mode Fiber**
   - Preferred manufacturer and/or product, e.g., Alcatel SMOF, Corning SMF-28, or Lucent Std. Single Mode
     - **Corning 024EW4-T4101D20 or equivalent**
   - Specialty application or type of SM fiber, e.g., G.652
     - **G.652**
   - Size (core/cladding diameter in microns)
     - **.9/125**
   - Attenuation coefficient (dB/km at appropriate wavelengths), e.g., 0.4/0.25 dB/km
     - **.5dB/Km**
   - Bandwidth, e.g., @ 1310/1550 nm
     - **1310/1383nm**
   - **Corning Altos All Dielectric Gel Free 9/125 microns, 0.4/0.3 dB/km@1310/1383nm or equivalent**

7. Fiber optic cable specifications. Possible specifications include:
   - Loose tube or ribbon
     - **Loose tube**
   - Preferred manufacturer and/or product
     - **Corning Altos Dielectric Gel Free or equivalent**
   - Maintenance Costs per Year:
     - **1% of Installed Costs = 5805.00/yr**
   - Strand (fiber) count (always add extra fibers)
     - **24**
   - Disposition of each strand (lit, reserved, or dark)
     - **8 Lit, 16 reserved**
• Water protection, e.g., gel-filled or dry-water blocked
  o Dry-water blocked
• Crush loads or rodent penetration
  o Non-armor
• Grounding and bonding
  o Per N.E.C.
• Color coding
  o Standard
• Cable specs:
  o Corning 024FW4-T4101D20 loose tube, 24-strand or equivalent

8. Specifications for hardware or other components. Besides the fiber and fiber optic cable, specify the additional hardware that is required, if known. In its bid, the Contractor will have to specify the hardware or other components required to install the fiber/cable that has been specified above to the locations specified below.
• End terminals and transceivers (that include transmitters such as Fabry-Perot Laser [shorter digital links] and DFB Laser [longer, faster links])
  o Nortel/Avaya LX SFP or equivalent – Quantity 4
• Regeneration equipment (e.g., optical amplifiers)
  o None needed
• Other signal conditioning equipment
  o None needed
• Power, backup, UPS, grounding, etc.
  o None needed
• Splices (fusion) and connectors (for terminations)
  o To be provided by the contractor
• Other equipment and hardware components
  o None needed

9. Termination point A
• Building address (complete street address, city, county, and zip – no P.O. Boxes)
  o 826 West King Street, Owosso, MI 48867
• Location of entrance facility
  o Auditorium Building, 1st Floor, South Auditorium West Wall
• Location of equipment room or suite where terminated
  o Auditorium Building, 2nd Floor, Main IT Communications Room
• Description of support structure for termination of fiber optic cable (wall- or rack-mounted patch panel, etc.)
  o Rack-mounted 72 port Lucent Termination Blocks
• Method of termination, e.g., fusion splicing pigtails on each fiber
  o Fusion splicing pigtails
• Labeling
  o Clinic Name / strand number
10. Termination point B

- Building address (complete street address, city, county, and zip – no P.O. Boxes)
  - 225 S. Ovid Street, Elsie MI 48831
- Location of entrance facility
  - North Side of Building
- Location of equipment room or suite where terminated
  - Utility Closet inside the Procedure Room
- Description of support structure for termination of fiber optic cable (wall- or rack-mounted patch panel, etc.)
  - Wall-mounted Rack
- Method of termination, e.g., fusion splicing pigtails on each fiber
  - Fusion splicing pigtails
- Labeling
  - MHC / Strand number

11. Preferred route. What is the approximate length of the Span (distance from A to B using the preferred route)? What is the preferred route? Approximately 17.3 miles. See map.

12. Frequency of splice points. How frequently should splice points be placed? Minimum of 2 mile segments. 150 feet of slack per mile and at all major cross road intersections.

13. Required completion date: 2012
4.4.7 Main Campus to H: Laingsburg Primary Care

Span (Node-to-Node) Specifications

1. Name: Memorial Healthcare
2. Span: H: Laingsburg Primary Care
3. Application: Ethernet Data
4. Type of ownership interest desired. **Outright Ownership by Memorial Healthcare**
5. Preferred method of installation. **Combination of aerial and underground to be determined by the contractor**

6. Fiber (individual strand) specifications. Possible specifications include:
   - Compliant with appropriate standards, e.g., ITU-T G.652.D or OS2
     - ITU-T G.652.D
   - Single mode (SM or SSMF, standard single mode fiber)
     - Single Mode Fiber
   - Preferred manufacturer and/or product, e.g., Alcatel SMOF, Corning SMF-28, or Lucent Std. Single Mode
     - Corning 024EW4-T4101D20 or equivalent
   - Specialty application or type of SM fiber, e.g., G.652
     - G.652
   - Size (core/cladding diameter in microns)
     - .9/125
   - Attenuation coefficient (dB/km at appropriate wavelengths), e.g., 0.4/0.25 dB/km
     - .5dB/Km
   - Bandwidth, e.g., @ 1310/1550 nm
     - 1310/1383nm
   - Corning Altos All Dielectric Gel Free 9/125 microns, 0.4/0.3 dB/km@1310/1383nm or equivalent

7. Fiber optic cable specifications. Possible specifications include:
   - Loose tube or ribbon
     - Loose tube
   - Preferred manufacturer and/or product
     - Corning Altos Dielectric Gel Free or equivalent
   - Maintenance Costs per Year:
     - 1% of Installed Costs = 5147.00/yr
   - Strand (fiber) count (always add extra fibers)
     - 24
   - Disposition of each strand (lit, reserved, or dark)
     - 8 Lit, 16 reserved
• Water protection, e.g., gel-filled or dry-water blocked
  o **Dry-water blocked**
• Crush loads or rodent penetration
  o **Non-armor**
• Grounding and bonding
  o **Per N.E.C.**
• Color coding
  o **Standard**
• Cable specs:
  o Corning 024FW4-T4101D20 loose tube, 24-strand or equivalent

8. **Specifications for hardware or other components.** Besides the fiber and fiber optic cable, specify the additional hardware that is required, if known. In its bid, the Contractor will have to specify the hardware or other components required to install the fiber/cable that has been specified above to the locations specified below.

• End terminals and transceivers (that include transmitters such as Fabry-Perot Laser [shorter digital links] and DFB Laser [longer, faster links])
  o **Nortel/Avaya LX SFP or equivalent – Quantity 4**
• Regeneration equipment (e.g., optical amplifiers)
  o **None needed**
• Other signal conditioning equipment
  o **None needed**
• Power, backup, UPS, grounding, etc.
  o **None needed**
• Splices (fusion) and connectors (for terminations)
  o **To be provided by the contractor**
• Other equipment and hardware components
  o **None needed**

9. **Termination point A**
• Building address (complete street address, city, county, and zip – no P.O. Boxes)
  o **826 West King Street, Owosso, MI 48867**
• Location of entrance facility
  o **Auditorium Building, 1st Floor, South Auditorium West Wall**
• Location of equipment room or suite where terminated
  o **Auditorium Building, 2nd Floor, Main IT Communications Room**
• Description of support structure for termination of fiber optic cable (wall- or rack-mounted patch panel, etc.)
  o **Rack-mounted 72 port Lucent Termination Blocks**
• Method of termination, e.g., fusion splicing pigtails on each fiber
  o **Fusion splicing pigtails**
• Labeling
  o **Clinic Name / strand number**
10. Termination point B
   • Building address (complete street address, city, county, and zip – no P.O. Boxes)
     o 7200 N. Woodbury Road, Laingsburg, MI 48848
   • Location of entrance facility
     o West Side of Building
   • Location of equipment room or suite where terminated
     o Communications Room Central Building next to reception Desk
   • Description of support structure for termination of fiber optic cable (wall- or rack-mounted patch panel, etc.)
     o Wall-mounted Rack
   • Method of termination, e.g., fusion splicing pigtails on each fiber
     o Fusion splicing pigtails
   • Labeling
     o MHC / Strand number

11. Preferred route. What is the approximate length of the Span (distance from A to B using the preferred route)? What is the preferred route? Approximately 15.3 miles. See map.

12. Frequency of splice points. How frequently should splice points be placed? Minimum of 2 mile segments. 150 feet of slack per mile and at all major cross road intersections.

13. Required completion date: 2012
4.4.8 Main Campus to I: Ovid Health Care

Span (Node-to-Node) Specifications

1. Name: Memorial Healthcare
2. Span: I: Ovid Health Care
3. Application: Ethernet Data
4. Type of ownership interest desired. **Outright Ownership by Memorial Healthcare**
5. Preferred method of installation. **Combination of aerial and underground to be determined by the contractor**

6. **Fiber (individual strand) specifications.** Possible specifications include:
   - Compliant with appropriate standards, e.g., ITU-T G.652.D or OS2
     - ITU-T G.652.D
   - Single mode (SM or SSMF, standard single mode fiber)
     - Single Mode Fiber
   - Preferred manufacturer and/or product, e.g., Alcatel SMOF, Corning SMF-28, or Lucent Std. Single Mode
     - Corning 024EW4-T4101D20 or equivalent
   - Specialty application or type of SM fiber, e.g., G.652
     - G.652
   - Size (core/cladding diameter in microns)
     - .9/125
   - Attenuation coefficient (dB/km at appropriate wavelengths), e.g., 0.4/0.25 dB/km
     - .5dB/Km
   - Bandwidth, e.g., @ 1310/1550 nm
     - 1310/1383nm
   - Corning Altos All Dielectric Gel Free 9/125 microns, 0.4/0.3 dB/km@1310/1383nm or equivalent

7. **Fiber optic cable specifications.** Possible specifications include:
   - Loose tube or ribbon
     - Loose tube
   - Preferred manufacturer and/or product
     - Corning Altos Dielectric Gel Free or equivalent
   - Maintenance Costs per Year:
     - 1% of Installed Costs = 3732.00/yr
   - Strand (fiber) count (always add extra fibers)
     - 24
   - Disposition of each strand (lit, reserved, or dark)
     - 8 Lit, 16 reserved
• Water protection, e.g., gel-filled or dry-water blocked
  o **Dry-water blocked**
• Crush loads or rodent penetration
  o **Non-armor**
• Grounding and bonding
  o **Per N.E.C.**
• Color coding
  o **Standard**
• Cable specs:
  o **Corning 024FW4-T4101D20 loose tube, 24-strand or equivalent**

8. **Specifications for hardware or other components.** Besides the fiber and fiber optic cable, specify the additional hardware that is required, if known. In its bid, the Contractor will have to specify the hardware or other components required to install the fiber/cable that has been specified above to the locations specified below.
• End terminals and transceivers (that include transmitters such as Fabry-Perot Laser [shorter digital links] and DFB Laser [longer, faster links])
  o **Nortel/Avaya LX SFP or equivalent – Quantity 4**
• Regeneration equipment (e.g., optical amplifiers)
  o **None needed**
• Other signal conditioning equipment
  o **None needed**
• Power, backup, UPS, grounding, etc.
  o **None needed**
• Splices (fusion) and connectors (for terminations)
  o **To be provided by the contractor**
• Other equipment and hardware components
  o **None needed**

9. **Termination point A**
• Building address (complete street address, city, county, and zip – no P.O. Boxes)
  o **826 West King Street, Owosso, MI 48867**
• Location of entrance facility
  o **Auditorium Building, 1st Floor, South Auditorium West Wall**
• Location of equipment room or suite where terminated
  o **Auditorium Building, 2nd Floor, Main IT Communications Room**
• Description of support structure for termination of fiber optic cable (wall- or rack-mounted patch panel, etc.)
  o **Rack-mounted 72 port Lucent Termination Blocks**
• Method of termination, e.g., fusion splicing pigtails on each fiber
  o **Fusion splicing pigtails**
• Labeling
  o **Clinic Name / strand number**
10. Termination point B
   - Building address (complete street address, city, county, and zip – no P.O. Boxes)
     o 113 S. Main Street, Ovid, MI 48866
   - Location of entrance facility
     o South Side of Building
   - Location of equipment room or suite where terminated
     o Basement Communications Room
   - Description of support structure for termination of fiber optic cable (wall- or rack-mounted patch panel, etc.)
     o Wall-mounted Rack
   - Method of termination, e.g., fusion splicing pigtails on each fiber
     o Fusion splicing pigtails
   - Labeling
     o MHC / Strand number

11. Preferred route. What is the approximate length of the Span (distance from A to B using the preferred route)? What is the preferred route? **Approximately 11 miles. See map.**

![](map.png)

12. Frequency of splice points. How frequently should splice points be placed? **Minimum of 2 mile segments. 150 feet of slack per mile and at all major cross road intersections.**

13. Required completion date: 2012
4.4.9 Main Campus to J: Michigan Neurological Institute

Span (Node-to-Node) Specifications

1. Name: Memorial Healthcare
2. Span: J: Michigan Neurological Institute
3. Application: Ethernet Data
4. Type of ownership interest desired. Outright Ownership by Memorial Healthcare
5. Preferred method of installation. Combination of aerial and underground to be determined by the contractor

6. Fiber (individual strand) specifications. Possible specifications include:
   - Compliant with appropriate standards, e.g., ITU-T G.652.D or OS2
     - ITU-T G.652.D
   - Single mode (SM or SSMF, standard single mode fiber)
     - Single Mode Fiber
   - Preferred manufacturer and/or product, e.g., Alcatel SMOF, Corning SMF-28, or Lucent Std. Single Mode
     - Corning 024EW4-T4101D20 or equivalent
   - Specialty application or type of SM fiber, e.g., G.652
     - G.652
   - Size (core/cladding diameter in microns)
     - .9/125
   - Attenuation coefficient (dB/km at appropriate wavelengths), e.g., 0.4/0.25 dB/km
     - .5dB/Km
   - Bandwidth, e.g., @ 1310/1550 nm
     - 1310/1383nm
   - Corning Altos All Dielectric Gel Free 9/125 microns, 0.4/0.3 dB/km@1310/1383nm or equivalent

7. Fiber optic cable specifications. Possible specifications include:
   - Loose tube or ribbon
     - Loose tube
   - Preferred manufacturer and/or product
     - Corning Altos Dielectric Gel Free or equivalent
   - Maintenance Costs per Year:
     - 1% of Installed Costs = 639.00/yr
   - Strand (fiber) count (always add extra fibers)
     - 24
   - Disposition of each strand (lit, reserved, or dark)
     - 8 Lit, 16 reserved
• Water protection, e.g., gel-filled or dry-water blocked
  o **Dry-water blocked**
• Crush loads or rodent penetration
  o **Non-armor**
• Grounding and bonding
  o **Per N.E.C.**
• Color coding
  o **Standard**
• Cable specs:
  o **Corning 024FW4-T4101D20 loose tube, 24-strand or equivalent**

8. **Specifications for hardware or other components.** Besides the fiber and fiber optic cable, specify the additional hardware that is required, if known. In its bid, the Contractor will have to specify the hardware or other components required to install the fiber/cable that has been specified above to the locations specified below.

• End terminals and transceivers (that include transmitters such as Fabry-Perot Laser [shorter digital links] and DFB Laser [longer, faster links])
  o **Nortel/Avaya LX SFP or equivalent – Quantity 4**
• Regeneration equipment (e.g., optical amplifiers)
  o **None needed**
• Other signal conditioning equipment
  o **None needed**
• Power, backup, UPS, grounding, etc.
  o **None needed**
• Splices (fusion) and connectors (for terminations)
  o **To be provided by the contractor**
• Other equipment and hardware components
  o **None needed**

9. **Termination point A**
• Building address (complete street address, city, county, and zip – no P.O. Boxes)
  o 826 West King Street, Owosso, MI 48867
• Location of entrance facility
  o **Auditorium Building, 1st Floor, South Auditorium West Wall**
• Location of equipment room or suite where terminated
  o **Auditorium Building, 2nd Floor, Main IT Communications Room**
• Description of support structure for termination of fiber optic cable (wall- or rack-mounted patch panel, etc.)
  o **Rack-mounted 72 port Lucent Termination Blocks**
• Method of termination, e.g., fusion splicing pigtails on each fiber
  o **Fusion splicing pigtails**
• Labeling
  o **Clinic Name / strand number**
10. Termination point B
   - Building address (complete street address, city, county, and zip – no P.O. Boxes)
     o 503 E. Main, Owosso, MI 48867
   - Location of entrance facility
     o East Side of Building
   - Location of equipment room or suite where terminated
     o Basement Communications Room
   - Description of support structure for termination of fiber optic cable (wall- or rack-mounted patch panel, etc.)
     o Floor-mounted Rack
   - Method of termination, e.g., fusion splicing pigtails on each fiber
     o Fusion splicing pigtails
   - Labeling
     o MHC / Strand number

11. Preferred route. What is the approximate length of the Span (distance from A to B using the preferred route)? What is the preferred route? **Approximately 1.6 miles. See map.**

12. Frequency of splice points. How frequently should splice points be placed? **Minimum of 2 mile segments. 150 feet of slack per mile and at all major cross road intersections.**

13. Required completion date: **2012**
4.4.10 Main Campus to K: The Arnold Clinic

Span (Node-to-Node) Specifications

1. Name: Memorial Healthcare
2. Span: K: The Arnold Clinic
3. Application: Ethernet Data
4. Type of ownership interest desired. **Outright Ownership by Memorial Healthcare**
5. Preferred method of installation. **Combination of aerial and underground to be determined by the contractor**

6. **Fiber (individual strand) specifications.** Possible specifications include:
   - Compliant with appropriate standards, e.g., ITU-T G.652.D or OS2
     - ITU-T G.652.D
   - Single mode (SM or SSMF, standard single mode fiber)
     - Single Mode Fiber
   - Preferred manufacturer and/or product, e.g., Alcatel SMOF, Corning SMF-28, or Lucent Std. Single Mode
     - Corning 024EW4-T4101D20 or equivalent
   - Specialty application or type of SM fiber, e.g., G.652
     - G.652
   - Size (core/cladding diameter in microns)
     - .9/125
   - Attenuation coefficient (dB/km at appropriate wavelengths), e.g., 0.4/0.25 dB/km
     - .5dB/Km
   - Bandwidth, e.g., @ 1310/1550 nm
     - 1310/1383nm
   - Corning Altos All Dielectric Gel Free 9/125 microns, 0.4/0.3 dB/km@1310/1383nm or equivalent

7. **Fiber optic cable specifications.** Possible specifications include:
   - Loose tube or ribbon
     - Loose tube
   - Preferred manufacturer and/or product
     - Corning Altos Dielectric Gel Free or equivalent
   - Maintenance Costs per Year:
     - 1% of Installed Costs = 442.00/yr
   - Strand (fiber) count (always add extra fibers)
     - 24
   - Disposition of each strand (lit, reserved, or dark)
     - 8 Lit, 16 reserved
• Water protection, e.g., gel-filled or dry-water blocked
  o Dry-water blocked
• Crush loads or rodent penetration
  o Non-armor
• Grounding and bonding
  o Per N.E.C.
• Color coding
  o Standard
• Cable specs:
  o Corning 024FW4-T4101D20 loose tube, 24-strand or equivalent

8. Specifications for hardware or other components. Besides the fiber and fiber optic cable, specify the additional hardware that is required, if known. In its bid, the Contractor will have to specify the hardware or other components required to install the fiber/cable that has been specified above to the locations specified below.
• End terminals and transceivers (that include transmitters such as Fabry-Perot Laser [shorter digital links] and DFB Laser [longer, faster links])
  o Nortel/Avaya LX SFP or equivalent – Quantity 4
• Regeneration equipment (e.g., optical amplifiers)
  o None needed
• Other signal conditioning equipment
  o None needed
• Power, backup, UPS, grounding, etc.
  o None needed
• Splices (fusion) and connectors (for terminations)
  o To be provided by the contractor
• Other equipment and hardware components
  o None needed

9. Termination point A
• Building address (complete street address, city, county, and zip – no P.O. Boxes)
  o 826 West King Street, Owosso, MI 48867
• Location of entrance facility
  o Auditorium Building, 1st Floor, South Auditorium West Wall
• Location of equipment room or suite where terminated
  o Auditorium Building, 2nd Floor, Main IT Communications Room
• Description of support structure for termination of fiber optic cable (wall- or rack-mounted patch panel, etc.)
  o Rack-mounted 72 port Lucent Termination Blocks
• Method of termination, e.g., fusion splicing pigtails on each fiber
  o Fusion splicing pigtails
• Labeling
  o Clinic Name / strand number
10. Termination point B

- Building address (complete street address, city, county, and zip – no P.O. Boxes)
  - 812 Bradley Street, Owosso, MI 48867
- Location of entrance facility
  - North/East Side of Building
- Location of equipment room or suite where terminated
  - Communications Room next to reception desk
- Description of support structure for termination of fiber optic cable (wall- or rack-mounted patch panel, etc.)
  - Floor-mounted Rack
- Method of termination, e.g., fusion splicing pigtails on each fiber
  - Fusion splicing pigtails
- Labeling
  - MHC / Strand number

11. Preferred route. What is the approximate length of the Span (distance from A to B using the preferred route)? What is the preferred route? **Approximately 1 mile. See map.**

12. Frequency of splice points. How frequently should splice points be placed? **Minimum of 2 mile segments. 150 feet of slack per mile and at all major cross road intersections.**

13. Required completion date: **2012**
4.4.11  Main Campus to L: Woodard Station Physical Therapy

Span (Node-to-Node) Specifications

1. Name: Memorial Healthcare
2. Span: L: Woodard Station PT
3. Application: Ethernet Data
4. Type of ownership interest desired. **Outright Ownership by Memorial Healthcare.**
5. Preferred method of installation. **Combination of aerial and underground to be determined by the contractor.**

6. Fiber (individual strand) specifications. Possible specifications include:
   - Compliant with appropriate standards, e.g., ITU-T G.652.D or OS2
     - ITU-T G.652.D
   - Single mode (SM or SSMF, standard single mode fiber)
     - Single Mode Fiber
   - Preferred manufacturer and/or product, e.g., Alcatel SMOF, Corning SMF-28, or Lucent Std. Single Mode
     - Corning 024EW4-T4101D20 or equivalent
   - Specialty application or type of SM fiber, e.g., G.652
     - G.652
   - Size (core/cladding diameter in microns)
     - .9/125
   - Attenuation coefficient (dB/km at appropriate wavelengths), e.g., 0.4/0.25 dB/km
     - .5dB/Km
   - Bandwidth, e.g., @ 1310/1550 nm
     - 1310/1383nm
   - Corning Altos All Dielectric Gel Free 9/125 microns, 0.4/0.3 dB/km@1310/1383nm or equivalent

7. Fiber optic cable specifications. Possible specifications include:
   - Loose tube or ribbon
     - Loose tube
   - Preferred manufacturer and/or product
     - Corning Altos Dielectric Gel Free or equivalent
   - Maintenance Costs per Year:
     - 1% of Installed Costs = 474.00/yr
   - Strand (fiber) count (always add extra fibers)
     - 24
   - Disposition of each strand (lit, reserved, or dark)
     - 8 Lit, 16 reserved
• Water protection, e.g., gel-filled or dry-water blocked
  o Dry-water blocked
• Crush loads or rodent penetration
  o Non-armor
• Grounding and bonding
  o Per N.E.C.
• Color coding
  o Standard
• Cable specs:
  o Corning 024FW4-T4101D20 loose tube, 24-strand or equivalent

8. Specifications for hardware or other components. Besides the fiber and fiber optic cable, specify the additional hardware that is required, if known. In its bid, the Contractor will have to specify the hardware or other components required to install the fiber/cable that has been specified above to the locations specified below.
• End terminals and transceivers (that include transmitters such as Fabry-Perot Laser [shorter digital links] and DFB Laser [longer, faster links])
  o Nortel/Avaya LX SFP or equivalent – Quantity 4
• Regeneration equipment (e.g., optical amplifiers)
  o None needed
• Other signal conditioning equipment
  o None needed
• Power, backup, UPS, grounding, etc.
  o None needed
• Splices (fusion) and connectors (for terminations)
  o To be provided by the contractor
• Other equipment and hardware components
  o None needed

9. Termination point A
• Building address (complete street address, city, county, and zip – no P.O. Boxes)
  o 826 West King Street, Owosso, MI 48867
• Location of entrance facility
  o Auditorium Building, 1st Floor, South Auditorium West Wall
• Location of equipment room or suite where terminated
  o Auditorium Building, 2nd Floor, Main IT Communications Room
• Description of support structure for termination of fiber optic cable (wall- or rack-mounted patch panel, etc.)
  o Rack-mounted 72 port Lucent Termination Blocks
• Method of termination, e.g., fusion splicing pigtails on each fiber
  o Fusion splicing pigtails
• Labeling
  o Clinic Name / strand number
10. Termination point B
- Building address (complete street address, city, county, and zip – no P.O. Boxes)
  - 317 South Elm Street, Suite 116, Owosso, MI 48867
- Location of entrance facility
  - Main Demarc Room
- Location of equipment room or suite where terminated
  - 2nd Floor Communications Room next to Break Room desk
- Description of support structure for termination of fiber optic cable (wall- or rack-mounted patch panel, etc.)
  - Floor-mounted Rack
- Method of termination, e.g., fusion splicing pigtails on each fiber
  - Fusion splicing pigtails
- Labeling
  - MHC / Strand number

11. Preferred route. What is the approximate length of the Span (distance from A to B using the preferred route)? What is the preferred route? **Approximately 1.1 miles. See map.**

12. Frequency of splice points. How frequently should splice points be placed? **Minimum of 2 mile segments. 150 feet of slack per mile and at all major cross road intersections.**

13. Required completion date: 2012
4.4.12 Main Campus to M: Perry Family Practice

Span (Node-to-Node) Specifications

1. Name: Memorial Healthcare
2. Span: M: Perry Family Practice
3. Application: Ethernet Data
4. Type of ownership interest desired. **Outright Ownership by Memorial Healthcare**
5. Preferred method of installation. **Combination of aerial and underground to be determined by the contractor**

6. **Fiber (individual strand) specifications.** Possible specifications include:
   - Compliant with appropriate standards, e.g., ITU-T G.652.D or OS2
     - ITU-T G.652.D
   - Single mode (SM or SSMF, standard single mode fiber)
     - Single Mode Fiber
   - Preferred manufacturer and/or product, e.g., Alcatel SMOF, Corning SMF-28, or Lucent Std. Single Mode
     - Corning 024EW4-T4101D20 or equivalent
   - Specialty application or type of SM fiber, e.g., G.652
     - G.652
   - Size (core/cladding diameter in microns)
     - .9/125
   - Attenuation coefficient (dB/km at appropriate wavelengths), e.g., 0.4/0.25 dB/km
     - .5dB/Km
   - Bandwidth, e.g., @ 1310/1550 nm
     - 1310/1383nm
   - Corning Altos All Dielectric Gel Free 9/125 microns, 0.4/0.3 dB/km@1310/1383nm or equivalent

7. **Fiber optic cable specifications.** Possible specifications include:
   - Loose tube or ribbon
     - Loose tube
   - Preferred manufacturer and/or product
     - Corning Altos Dielectric Gel Free or equivalent
   - Maintenance Costs per Year:
     - 1% of Installed Costs = 4456.00/yr
   - Strand (fiber) count (always add extra fibers)
     - 24
   - Disposition of each strand (lit, reserved, or dark)
     - 8 Lit, 16 reserved
• Water protection, e.g., gel-filled or dry-water blocked
  o **Dry-water blocked**
• Crush loads or rodent penetration
  o **Non-armor**
• Grounding and bonding
  o **Per N.E.C.**
• Color coding
  o **Standard**
• Cable specs:
  o Corning 024FW4-T4101D20 loose tube, 24-strand or equivalent

8. **Specifications for hardware or other components.** Besides the fiber and fiber optic cable, specify the additional hardware that is required, if known. In its bid, the Contractor will have to specify the hardware or other components required to install the fiber/cable that has been specified above to the locations specified below.
• End terminals and transceivers (that include transmitters such as Fabry-Perot Laser [shorter digital links] and DFB Laser [longer, faster links])
  o **Nortel/Avaya LX SFP or equivalent** — **Quantity 4**
• Regeneration equipment (e.g., optical amplifiers)
  o **None needed**
• Other signal conditioning equipment
  o **None needed**
• Power, backup, UPS, grounding, etc.
  o **None needed**
• Splices (fusion) and connectors (for terminations)
  o **To be provided by the contractor**
• Other equipment and hardware components
  o **None needed**

9. **Termination point A**
• Building address (complete street address, city, county, and zip — no P.O. Boxes)
  o **826 West King Street, Owosso, MI 48867**
• Location of entrance facility
  o **Auditorium Building, 1st Floor, South Auditorium West Wall**
• Location of equipment room or suite where terminated
  o **Auditorium Building, 2nd Floor, Main IT Communications Room**
• Description of support structure for termination of fiber optic cable (wall- or rack-mounted patch panel, etc.)
  o **Rack-mounted 72 port Lucent Termination Blocks**
• Method of termination, e.g., fusion splicing pigtails on each fiber
  o **Fusion splicing pigtails**
• Labeling
  o **Clinic Name / strand number**
10. **Termination point B**
   - Building address (complete street address, city, county, and zip – no P.O. Boxes)
     - 3337 West Britton Road, Perry, MI 48872
   - Location of entrance facility
     - North/East Corner of Building, Furnace Room
   - Location of equipment room or suite where terminated
     - 2nd Floor Communications Room
   - Description of support structure for termination of fiber optic cable (wall- or rack-mounted patch panel, etc.)
     - Wall-mounted Rack
   - Method of termination, e.g., fusion splicing pigtails on each fiber
     - Fusion splicing pigtails
   - Labeling
     - MHC / Strand number

11. **Preferred route.** What is the approximate length of the Span (distance from A to B using the preferred route)? What is the preferred route? **Approximately 13.2 miles. See map.**

12. **Frequency of splice points.** How frequently should splice points be placed? **Minimum of 2 mile segments. 150 feet of slack per mile and at all major cross road intersections.**

13. **Required completion date:** 2012
4.4.13 Site M to Site N: Perry Family Practice to Perry Physical Therapy

Span (Node-to-Node) Specifications

1. Name: Memorial Healthcare
2. Span: N: Perry PT
3. Application: Ethernet Data
4. Type of ownership interest desired. *Outright Ownership by Memorial Healthcare*
5. Preferred method of installation. *Combination of aerial and underground to be determined by the contractor*

6. **Fiber (individual strand) specifications.** Possible specifications include:
   - Compliant with appropriate standards, e.g., ITU-T G.652.D or OS2
     - ITU-T G.652.D
   - Single mode (SM or SSMF, standard single mode fiber)
     - Single Mode Fiber
   - Preferred manufacturer and/or product, e.g., Alcatel SMOF, Corning SMF-28, or Lucent Std. Single Mode
     - Corning 024EW4-T4101D20 or equivalent
   - Specialty application or type of SM fiber, e.g., G.652
     - G.652
   - Size (core/cladding diameter in microns)
     - .9/125
   - Attenuation coefficient (dB/km at appropriate wavelengths), e.g., 0.4/0.25 dB/km
     - .5dB/Km
   - Bandwidth, e.g., @ 1310/1550 nm
     - 1310/1383nm
   - Corning Altos All Dielectric Gel Free 9/125 microns, 0.4/0.3 dB/km@1310/1383nm or equivalent

7. **Fiber optic cable specifications.** Possible specifications include:
   - Loose tube or ribbon
     - Loose tube
   - Preferred manufacturer and/or product
     - Corning Altos Dielectric Gel Free or equivalent
   - Maintenance Costs per Year:
     - 1% of Installed Costs = 277.00/yr
   - Strand (fiber) count (always add extra fibers)
     - 24
   - Disposition of each strand (lit, reserved, or dark)
8. Specifications for hardware or other components. Besides the fiber and fiber optic cable, specify the additional hardware that is required, if known. In its bid, the Contractor will have to specify the hardware or other components required to install the fiber/cable that has been specified above to the locations specified below.

- End terminals and transceivers (that include transmitters such as Fabry-Perot Laser [shorter digital links] and DFB Laser [longer, faster links])
  - Nortel/Avaya LX SFP or equivalent – Quantity 4
- Regeneration equipment (e.g., optical amplifiers)
  - None needed
- Other signal conditioning equipment
  - None needed
- Power, backup, UPS, grounding, etc.
  - None needed
- Splices (fusion) and connectors (for terminations)
  - To be provided by the contractor
- Other equipment and hardware components
  - None needed

9. Termination point A

- Building address (complete street address, city, county, and zip – no P.O. Boxes)
  - 3337 West Britton Road, Perry, MI 48872
- Location of entrance facility
  - North/East Corner of Building, Furnace Room
- Location of equipment room or suite where terminated
  - 2nd Floor Communications Room
- Description of support structure for termination of fiber optic cable (wall- or rack-mounted patch panel, etc.)
  - Wall-mounted Rack
- Method of termination, e.g., fusion splicing pigtails on each fiber
  - Fusion splicing pigtails
- Labeling
10. Termination point B
   - Building address (complete street address, city, county, and zip – no P.O. Boxes)
     o 3737 West Lansing Road, Perry, MI 48872
   - Location of entrance facility
     o South Side of Building, in Basement
   - Location of equipment room or suite where terminated
     o Basement Communications Rack
   - Description of support structure for termination of fiber optic cable (wall- or rack-mounted patch panel, etc.)
     o Wall-mounted Rack
   - Method of termination, e.g., fusion splicing pigtails on each fiber
     o Fusion splicing pigtails
   - Labeling
     o MHC / Strand number

11. Preferred route. What is the approximate length of the Span (distance from A to B using the preferred route)? What is the preferred route? Approximately 0.6 miles. See map.

12. Frequency of splice points. How frequently should splice points be placed? Minimum of 2 mile segments. 150 feet of slack per mile and at all major cross road intersections.

13. Required completion date: 2012
4.5 Portage Health, Hancock, MI

Portage Health, Hancock, MI
9 Spans within Work Order:
Sections 4.5.1 through 4.5.9
Single Flat-Fee Construction Bid Required

(Portage also requests a flat-fee bid for each Span.)

This Work Order consists of nine (9) Spans as shown in the following diagram:
The nine (9) sites that are linked by this fiber ring are shown in the following map, which displays a portion of Michigan’s Upper Peninsula to the northwest of Marquette. Please note that Baraga County Memorial Hospital, whose one-Span Work Order is described in Section 4.1, is a node on this fiber Network. MPHI encourages Contractors who bid on the Portage Health Work Order to also bid on the Baraga County Memorial Hospital Work Order. All other things being equal, Contractors who bid on the Portage and Baraga Work Orders (which will require two separate bids) will be viewed more favorably than Contractors who bid only on the Portage Health Work Order.

Portage Health also requests a flat-fee bid for each Span. Portage realizes that a Contractor spreads project overhead across all Spans, and that a Contractor may not be able to install a single Span for the same price as installing that Span as part of a much larger, 9-Span project. Nonetheless, Portage requests a price breakdown by Span in case it cannot afford to construct all 9 Spans but wishes to proceed with a subset of the 9.
4.5.1 A-B: Portage Health – Calumet Rehab

Span (Node-to-Node) Specifications

1. Name and Address of Your Organization:
   Portage Health
   500 Campus Drive
   Hancock, MI 49930

2. Name of Span:
   A-B Portage Health-Calumet Rehab Span

3. Application(s):
   *The A-B Portage Health-Calumet Rehab Span will be an approximate 10 mile long span. The A-B Portage Health-Calumet Rehab Span is an Ethernet connection which will initially be used to transmit data. This data will consist of patient electronic medical records (EMR) including: patient demographics (registration/ADT); insurance eligibility checking; orders; referrals; lab results; reports, such as radiology and ED; medications; treatment planning; testing; etc. It is envisioned that this infrastructure will develop to ultimately support convergence of technologies (data, voice, and video) to expand and promote the quality and efficiency of telemedicine, electronic medical records, and health information exchange (HIE).*

4. Type of ownership interest desired:
   Portage Health is interested in outright ownership of the A-B Portage Health-Calumet Rehab Span.

5. Preferred method of installation: *To be determined by contractor.*

6. Fiber (individual strand) specifications.
   *The fiber should be single mode fiber capable of sustaining a minimum connection speed of 1 Gbps over the A-B Portage Health-Calumet Rehab Span distance of approximately 10 miles.*

7. Fiber optic cable specifications.
   *In general cable should be loose tube with at least 24 strands. We propose lighting 4 strands on this span to support two 1 Gbps connections. The Contractor must determine specifics of installation type based on feasibility for this span.*

8. Specifications for hardware or other components:
   *Specific equipment to be determined by contractor. The provided equipment must support at least 1 Gbps connection over the link.*

9. Termination point A:
   • Building address - *500 Campus Drive, Hancock, MI 49930*
• Location of entrance facility – **Main Front Entrance**
• Location of equipment room or suite where terminated – *Take the stairs (located on the left) from the main lobby to the basement Garden Level. Turn left onto the main hallway. The communications closet is the second door on the left.*
• Description of support structure for termination of fiber optic cable (wall- or rack-mounted patch panel, etc.) **Wall Mount cabinet with SC connectors.**
• Method of termination, e.g., fusion splicing pigtails on each fiber – **fusion splicing pigtails.**
• Labeling **AB-1 through AB-24**

10. **Termination point B:**
• Building address – **56901 S. Sixth Street, Calumet MI 49913.**
• Location of entrance facility – **Main Front Entrance.**
• Location of equipment room or suite where terminated – **Main communications closet.**
• Description of support structure for termination of fiber optic cable (wall- or rack-mounted patch panel, etc.) – **Wall Mount cabinet with SC connectors.**
• Method of termination, e.g., fusion splicing pigtails on each fiber – **Fusion splicing pigtails.**
• Labeling **BA-1 through BA-24**

11. **Preferred route.** What is the approximate length of the Span (distance from A to B using the preferred route)? What is the preferred route? **Approximately 10 miles. Route to be determined by bidder.**

12. **Frequency of splice points:** *To be determined by bidder by following industry best practices.*

13. **Required completion date:** **Project completion date of December 31, 2012.**
4.5.2 B-C: Calumet Rehab – PHMG Lake Linden

Span (Node-to-Node) Specifications

1. Name and Address of Your Organization:
   Portage Health
   500 Campus Drive
   Hancock, MI 49930

2. Name of Span:
   B-C Calumet Rehab-PHMG Lake Linden Span.

3. Application(s):
   The B-C Calumet Rehab-PHMG Lake Linden Span will be an approximately 5 mile long span. The B-C Calumet Rehab-PHMG Lake Linden Span will be an Ethernet connection which will initially be used to transmit data. This data will consist of patient electronic medical records (EMR) including: patient demographics (registration/ADT); insurance eligibility checking; orders; referrals; lab results; reports, such as radiology and ED; medications; treatment planning; testing; etc. It is envisioned that this infrastructure will develop to ultimately support convergence of technologies (data, voice, and video) to expand and promote the quality and efficiency of telemedicine, electronic medical records, and health information exchange (HIE).

4. Type of ownership interest desired:
   Portage Health is interested in outright ownership of the B-C Calumet Rehab-PHMG Lake Linden span.

5. Preferred method of installation:
   To be determined by contractor.

6. Fiber (individual strand) specifications:
   The fiber should be single mode fiber capable of sustaining a minimum connection speed of 1 Gbps over the B-C Calumet Rehab-PHMG Lake Linden Span distance of approximately 5 miles.

7. Fiber optic cable specifications:
   In general cable should be loose tube with at least 24 strands. We propose lighting 4 strands on this span to support two 1 Gbps connections. The Contractor must determine specifics of installation type based on feasibility for this span.

8. Specifications for hardware or other components:
   Specific equipment to be determined by contractor. The provided equipment must support at least 1 Gbps connection over the link

9. Termination point A:
• Building address – **56901 S. Sixth Street, Calumet, MI 49913**.
• Location of entrance facility. **Main Front Entrance**.
• Location of equipment room or suite where terminated – **Main Communications closet in back of building**.
• Description of support structure for termination of fiber optic cable (wall- or rack-mounted patch panel, etc.) – **Wall Mount cabinet with SC connectors**.
• Method of termination, e.g., fusion splicing pigtails on each fiber - **Fusion splicing pigtails**.
• Labeling - **BC-1 through BC-24**.

10. Termination point B:
• Building address – **945 Ninth Street, Bootjack Road, Lake Linden, MI 49945**.
• Location of entrance facility – **Main Front Entrance**.
• Location of equipment room or suite where terminated – **Mechanical Room is located to the right of the front entrance**.
• Description of support structure for termination of fiber optic cable (wall- or rack-mounted patch panel, etc.) – **Wall Mount cabinet with SC connectors**.
• Method of termination, e.g., fusion splicing pigtails on each fiber - **Fusion splicing pigtails**.
• Labeling - **CB-1 through CB-24**.

11. **Preferred route**. What is the approximate length of the Span (distance from A to B using the preferred route)? What is the preferred route? **Approximately 5 miles. Route to be determined by bidder**.

12. **Frequency of splice points**: **To be determined by bidder by following industry best practices**.

13. **Required completion date**: **Project completion date of December 31, 2012**.
4.5.3 C-D: PHMG Lake Linden – WUPHD

Span (Node-to-Node) Specifications

1. Name and Address of Your Organization.
   Portage Health
   500 Campus Drive
   Hancock, MI 49930

2. Name of Span:
   C-D PHMG Lake Linden-WUPHD Span.

3. Application(s):
   C-D PHMG Lake Linden-WUPHD Span will be an approximately 12 mile long span.
   C-D PHMG Lake Linden-WUPHD Span will be an Ethernet connection which will initially be used to
   transmit data. This data will consist of patient electronic medical records (EMR) including: patient
demographics (registration/ADT); insurance eligibility checking; orders; referrals; lab results;
reports, such as radiology and ED; medications; treatment planning; testing; etc. It is envisioned
that this infrastructure will develop to ultimately support convergence of technologies (data,
voice, and video) to expand and promote the quality and efficiency of telemedicine, electronic
medical records, and health information exchange (HIE).

4. Type of ownership interest desired:
   Portage Health is interested in outright ownership of the C-D PHMG Lake Linden-WUPHD Span.

5. Preferred method of installation:
   To be determined by contractor.

6. Fiber (individual strand) specifications:
   The fiber should be single mode fiber capable of sustaining a minimum connection speed of 1 Gbps
   over the C-D PHMG Lake Linden-WUPHD Span distance of approximately 12 miles.

7. Fiber optic cable specifications:
   In general cable should be loose tube with at least 24 strands. We propose lighting 4 strands on
   this span to support two 1 Gbps connections. The Contractor must determine specifics of
   installation type based on feasibility for this span.

8. Specifications for hardware or other components:
   Specific equipment to be determined by contractor. The provided equipment must support at least
   1 Gbps connection over the link.

9. Termination point A:
• Building address – **945 Ninth Street, Bootjack Road, Lake Linden, MI 49945**
• Location of entrance facility - **Main Front Entrance.**
• Location of equipment room or suite where terminated – **Mechanical room, located to the right of the main entrance.**
• Description of support structure for termination of fiber optic cable (wall- or rack-mounted patch panel, etc.) – **Wall Mount cabinet with SC connectors.**
• Method of termination – **fusion splicing pigtailed.**
• Labeling - **CD-1 through CD-24.**

10. Termination point B:
• Building address – **540 Depot Street, Hancock, MI 49930.**
• Location of entrance facility – **Main Front Entrance.**
• Location of equipment room or suite where terminated – **Main communications closet.**
• Description of support structure for termination of fiber optic cable (wall- or rack-mounted patch panel, etc.) – **Wall Mount cabinet with SC connectors.**
• Method of termination, e.g., fusion splicing pigtailed on each fiber – **fusion splicing pigtailed.**
• Labeling **DC-1 through DC-24.**

11. **Preferred route.** What is the approximate length of the Span (distance from A to B using the preferred route)? What is the preferred route? **Approximately 12 miles. Route to be determined by bidder, except that the route should be designed so that a splice is placed on the east side of Highway M-26 at the intersection of M-26 and E. 12th Street in Hubbell, MI.**

12. Frequency of splice points: **To be determined by bidder by following industry best practices.**

13. Required completion date: **Project completion date of December 31, 2012.**
4.5.4   D-H: WUPHD – Express Care

Span (Node-to-Node) Specifications

1. Name and Address of Your Organization:
   Portage Health
   500 Campus Drive
   Hancock, MI 49930

2. Name of Span:
   D-H WUPHD-Express Care Span.

3. Application(s):
   D-H WUPHD-Express Care Span will be an approximately 3-mile long span.
   D-H WUPHD-Express Care Span will be an Ethernet connection which will initially be used to
   transmit data. This data will consist of patient electronic medical records (EMR) including: patient
demographics (registration/ADT); insurance eligibility checking; orders; referrals; lab results;
reports, such as radiology and ED; medications; treatment planning; testing; etc. It is envisioned
that this infrastructure will develop to ultimately support convergence of technologies (data,
voice, and video) to expand and promote the quality and efficiency of telemedicine, electronic
medical records, and health information exchange (HIE).

4. Type of ownership interest desired:
   Portage Health is interested in outright ownership of D-H WUPHD-Express Care Span.

5. Preferred method of installation:
   To be determined by contractor.

6. Fiber (individual strand) specifications:
   The fiber should be single mode fiber capable of sustaining a minimum connection speed of 1 Gbps
   over the D-H WUPHD-Express Care Span distance of approximately 3 miles.

7. Fiber optic cable specifications:
   In general cable should be loose tube with at least 24 strands. We propose lighting 4 strands on
   this span to support two 1 Gbps connections. The Contractor must determine specifics of
   installation type based on feasibility for this span.

8. Specifications for hardware or other components:
   Specific equipment to be determined by contractor. The provided equipment must support at least
   1 Gbps connection over the link.

9. Termination point A:
• Building address – **540 Depot Street, Hancock, MI 49930**
• Location of entrance facility - **Main Front Entrance.**
• Location of equipment room or suite where terminated – **Main Communications Closet.**
• Description of support structure for termination of fiber optic cable (wall- or rack-mounted patch panel, etc.) – **Wall Mount cabinet with SC connectors.**
• Method of termination, – **fusion splicing pigtales.**
• Labeling – **DH-1 through DH-24.**

10. **Termination point B:**
• Building address – **921 W. Sharon Avenue, Houghton, MI 49931.**
• Location of entrance facility – **Main Front Entrance.**
• Location of equipment room or suite where terminated – **Main Communications Closet.**
• Description of support structure for termination of fiber optic cable (wall- or rack-mounted patch panel, etc.) – **Wall Mount cabinet with SC connectors.**
• Method of termination, e.g., fusion splicing pigtales on each fiber – **fusion splicing pigtales.**
• Labeling – **HD-1 through HD-24.**

11. **Preferred route.** What is the approximate length of the Span (distance from A to B using the preferred route)? What is the preferred route? **Approximately 3 miles. Route to be determined by bidder.**

12. Frequency of splice points: **To be determined by bidder by following industry best practices.**

13. **Required completion date:** **Project completion date of December 31, 2012.**
4.5.5 H-I: Express Care – MTU

Span (Node-to-Node) Specifications

1. Name and Address of Your Organization:
   Portage Health
   500 Campus Drive
   Hancock, MI 49930

2. Name of Span:
   H-I Express Care-MTU Span

3. Application(s):
   H-I Express Care-MTU Span will be an approximately 2.5 mile long span.
   H-I Express Care-MTU Span will be an Ethernet connection which will initially be used to transmit data. This data will consist of patient electronic medical records (EMR) including: patient demographics (registration/ADT); insurance eligibility checking; orders; referrals; lab results; reports, such as radiology and ED; medications; treatment planning; testing; etc. It is envisioned that this infrastructure will develop to ultimately support convergence of technologies (data, voice, and video) to expand and promote the quality and efficiency of telemedicine, electronic medical records, and health information exchange (HIE).

4. Type of ownership interest desired:
   Portage Health is interested in outright ownership of H-I Express Care-MTU Span.

5. Preferred method of installation: To be determined by contractor.

6. Fiber (individual strand) specifications:
   The fiber should be single mode fiber capable of sustaining a minimum connection speed of 1 Gbps over the H-I Express Care-MTU Span distance of approximately 2.5 miles.

7. Fiber optic cable specifications:
   In general cable should be loose tube with at least 24 strands. We propose lighting 4 strands on this span to support two 1 Gbps connections. The Contractor must determine specifics of installation type based on feasibility for this span.

8. Specifications for hardware or other components:
   Specific equipment to be determined by contractor. The provided equipment must support at least 1 Gbps connection over the link.

9. Termination point A:
   • Building address – 921 W. Sharon Avenue, Houghton, MI 49931.
- Location of entrance facility - **Main Front Entrance**
- Location of equipment room or suite where terminated – **Main Communications Closet**.
- Description of support structure for termination of fiber optic cable (wall- or rack-mounted patch panel, etc.) – **Wall Mount cabinet with SC connectors**.
- Method of termination, – **fusion splicing pigtailed**.
- Labeling – **HI-1 through HI-24**

10. **Termination point B:**
   - Building address – **600 MacInnes Drive, Houghton, MI 49931**.
   - Location of entrance facility – **MacInnes Drive rear entrance. (Portage Health Signage)**
   - Location of equipment room or suite where terminated – **Communication Closet on the 3rd floor above Rehab. Access from Rehab**.
   - Description of support structure for termination of fiber optic cable (wall- or rack-mounted patch panel, etc.) – **Wall Mount cabinet with SC connectors**.
   - Method of termination, e.g., fusion splicing pigtailed on each fiber – **fusion splicing pigtailed**.
   - Labeling - **IH-1 through IH-24**.

11. **Preferred route.** What is the approximate length of the Span (distance from A to B using the preferred route)? What is the preferred route? **Approximately 2.5 miles. Route to be determined by bidder.**

12. **Frequency of splice points:** **To be determined by bidder by following industry best practices.**

13. **Required completion date:** **Project completion date of December 31, 2012.**
4.5.6 I-A: MTU – Portage Health

Span (Node-to-Node) Specifications

1. Name and Address of Your Organization:
   Portage Health
   500 Campus Drive
   Hancock, MI 49930

2. Name of Span:
   I-A MTU-Portage Health Span.

3. Application(s):
   I-A MTU-Portage Health Span will be an approximately 5.4 mile long span.
   I-A MTU-Portage Health Span will be an Ethernet connection which will initially be used to
   transmit data. This data will consist of patient electronic medical records (EMR) including: patient
demographics (registration/ADT); insurance eligibility checking; orders; referrals; lab results;
reports, such as radiology and ED; medications; treatment planning; testing; etc. It is envisioned
that this infrastructure will develop to ultimately support convergence of technologies (data,
voice, and video) to expand and promote the quality and efficiency of telemedicine, electronic
medical records, and health information exchange (HIE).

4. Type of ownership interest desired:
   Portage Health is interested in outright ownership of I-A MTU-Portage Health Span.

5. Preferred method of installation:
   To be determined by contractor.

6. Fiber (individual strand) specifications:
   The fiber should be single mode fiber capable of sustaining a minimum connection speed of 1 Gbps
   over the I-A MTU-Portage Health Span distance of approximately 5.4 miles.

7. Fiber optic cable specifications:
   In general cable should be loose tube with at least 24 strands. We propose lighting 4 strands on
   this span to support two 1 Gbps connections. The Contractor must determine specifics of
   installation type based on feasibility for this span.

8. Specifications for hardware or other components:
   Specific equipment to be determined by contractor. The provided equipment must support at least
   1 Gbps connection over the link.

9. Termination point A:
10. Termination point B:
   - Building address – 500 Campus Drive, Hancock, MI 49930.
   - Location of entrance facility – Main Front Entrance.
   - Location of equipment room or suite where terminated – Take the stairs (located on the left) from the main lobby to the basement Garden Level. Turn left onto the main hallway. The communications closet is the second door on the left.
   - Description of support structure for termination of fiber optic cable (wall- or rack-mounted patch panel, etc.) – Wall Mount cabinet with SC connectors.
   - Method of termination, e.g., fusion splicing pigtails on each fiber – fusion splicing pigtails.
   - Labeling - AI-1 through AI-24.

11. Preferred route. What is the approximate length of the Span (distance from A to B using the preferred route)? What is the preferred route? Approximately 5.4 miles. Route to be determined by bidder.

12. Frequency of splice points: To be determined by bidder by following industry best practices.

4.5.7 A-L: Portage Health – Ontonogan

Span (Node-to-Node) Specifications

1. Name and Address of Your Organization:
   Portage Health
   500 Campus Drive
   Hancock, MI 49930

2. Name of Span:
   A-L Portage Health-Ontonagon Span.

3. Application(s):
   A-L Portage Health-Ontonagon Span will be an approximately 55 mile long span.
   A-L Portage Health-Ontonagon Span will be an Ethernet connection which will initially be used to
   transmit data. This data will consist of patient electronic medical records (EMR) including: patient
demographics (registration/ADT); insurance eligibility checking; orders; referrals; lab results;
reports, such as radiology and ED; medications; treatment planning; testing; etc. It is envisioned
that this infrastructure will develop to ultimately support convergence of technologies (data,
voice, and video) to expand and promote the quality and efficiency of telemedicine, electronic
medical records, and health information exchange (HIE).

4. Type of ownership interest desired:
   Portage Health is interested in outright ownership of A-L Portage Health-Ontonagon Span.

5. Preferred method of installation:
   To be determined by contractor.

6. Fiber (individual strand) specifications:
   The fiber should be single mode fiber capable of sustaining a minimum connection speed of 1 Gbps
   over A-L Portage Health-Ontonagon Span distance of approximately 55 mile.

7. Fiber optic cable specifications:
   In general cable should be loose tube with at least 24 strands. We propose lighting 4 strands on
   this span to support two 1 Gbps connections. The Contractor must determine specifics of
   installation type based on feasibility for this span.

8. Specifications for hardware or other components:
   Specific equipment to be determined by contractor. The provided equipment must support at least
   1 Gbps connection over the link.

9. Termination point A:
• Building address – 500 Campus Drive, Hancock, MI 49930.
• Location of entrance facility - Main Front Entrance.
• Location of equipment room or suite where terminated – Take the stairs (located on the left) from the main lobby to the basement Garden Level. Turn left onto the main hallway. The communications closet is the second door on the left.
• Description of support structure for termination of fiber optic cable (wall- or rack-mounted patch panel, etc.) – Wall Mount cabinet with SC connectors.
• Method of termination, – fusion splicing pigtailed.
• Labeling – AL-1 through AL-24

10. Termination point B:
• Building address – 751 W. Seventh Street, Ontonagon, MI 49953.
• Location of entrance facility – Main Front Entrance.
• Location of equipment room or suite where terminated – Main Communications Closet.
• Description of support structure for termination of fiber optic cable (wall- or rack-mounted patch panel, etc.) – Wall Mount cabinet with SC connectors.
• Method of termination, e.g., fusion splicing pigtailed on each fiber – fusion splicing pigtailed.
• Labeling - LA-1 through LA-24.

11. Preferred route. What is the approximate length of the Span (distance from A to B using the preferred route)? What is the preferred route? Approximately 55 miles. Route to be determined by bidder.

12. Frequency of splice points: To be determined by bidder by following industry best practices.

4.5.8 A-J: Portage Health – Baraga County Memorial Hospital

Span (Node-to-Node) Specifications

1. Name and Address of Your Organization:
   Portage Health
   500 Campus Drive
   Hancock, MI 49930

2. Name of Span:
   A-J Portage Health-Baraga County Span

3. Application(s):
   A-J Portage Health-Baraga County Span will be an approximately 39 mile long span. A-J Portage Health-Baraga County Span will be an Ethernet connection which will initially be used to transmit data. This data will consist of patient electronic medical records (EMR) including: patient demographics (registration/ADT); insurance eligibility checking; orders; referrals; lab results; reports, such as radiology and ED; medications; treatment planning; testing; etc. It is envisioned that this infrastructure will develop to ultimately support convergence of technologies (data, voice, and video) to expand and promote the quality and efficiency of telemedicine, electronic medical records, and health information exchange (HIE).

4. Type of ownership interest desired:
   Portage Health is interested in outright ownership of A-J Portage Health-Baraga County Span.

5. Preferred method of installation: To be determined by contractor.

6. Fiber (individual strand) specifications:
   The fiber should be single mode fiber capable of sustaining a minimum connection speed of 1 Gbps over A-J Portage Health-Baraga County span distance of approximately 39 miles.

7. Fiber optic cable specifications:
   In general cable should be loose tube with at least 24 strands. We propose lighting 4 strands on this span to support two 1 Gbps connections. The Contractor must determine specifics of installation type based on feasibility for this span.

8. Specifications for hardware or other components:
   Specific equipment to be determined by contractor. The provided equipment must support at least 1 Gbps connection over the link.

9. Termination point A:
   • Building address – 500 Campus Drive, Hancock, MI 49930.
• Location of entrance facility - **Main Front Entrance.**
• Location of equipment room or suite where terminated – **Take the stairs (located on the left) from the main lobby to the basement Garden Level. Turn left onto the main hallway. The communications closet is the second door on the left.**
• Description of support structure for termination of fiber optic cable (wall- or rack-mounted patch panel, etc.) – **Wall Mount cabinet with SC connectors.**
• Method of termination, – **fusion splicing pigtails.**
• Labeling – **AJ-1 through AJ-24**

10. Termination point B:
• Building address – **18341 U.S. Highway 41, L’Anse, MI 49946.**
• Location of entrance facility – **Main Front Entrance.**
• Location of equipment room or suite where terminated – **Server Room.**
• Description of support structure for termination of fiber optic cable (wall- or rack-mounted patch panel, etc.) – **Wall Mount cabinet with SC connectors.**
• Method of termination, e.g., fusion splicing pigtails on each fiber – **fusion splicing pigtails.**
• Labeling **JA-1 through JA-24.**

11. **Preferred route.** What is the approximate length of the Span (distance from A to B using the preferred route)? What is the preferred route? **Approximately 39 miles. Route to be determined by bidder.**

12. **Frequency of splice points:** **To be determined by bidder by following industry best practices.**

13. Required completion date: **Project completion date of December 31, 2012.**
4.5.9 J-K: Baraga County Memorial Hospital – Marquette General Hospital

Span (Node-to-Node) Specifications

1. Name and Address of Your Organization:
   Portage Health
   500 Campus Drive
   Hancock, MI 49930

2. Name of Span:
   J-K Baraga County-MGH

3. Application(s):
   J-K Baraga County-MGH Span will be an approximately 69 mile long span.
   J-K Baraga County-MGH Span will be an Ethernet connection which will initially be used to transmit data. This data will consist of patient electronic medical records (EMR) including: patient demographics (registration/ADT); insurance eligibility checking; orders; referrals; lab results; reports, such as radiology and ED; medications; treatment planning; testing; etc. It is envisioned that this infrastructure will develop to ultimately support convergence of technologies (data, voice, and video) to expand and promote the quality and efficiency of telemedicine, electronic medical records, and health information exchange (HIE).

4. Type of ownership interest desired:
   Portage Health is interested in outright ownership of J-K Baraga County-MGH span.

5. Preferred method of installation:
   To be determined by contractor.

6. Fiber (individual strand) specifications:
   The fiber should be single mode fiber capable of sustaining a minimum connection speed of 1 Gbps over J-K Baraga County-MGH Span distance of approximately 69 miles.

7. Fiber optic cable specifications:
   In general cable should be loose tube with at least 24 strands. We propose lighting 4 strands on this span to support two 1 Gbps connections. The Contractor must determine specifics of installation type based on feasibility for this span.

8. Specifications for hardware or other components:
   Specific equipment to be determined by contractor. The provided equipment must support at least 1 Gbps connection over the link.
9. **Termination point A:**
   - Building address – **18341 U.S. Highway 41, L’Anse, MI 49946.**
   - Location of entrance facility - **Main Front Entrance.**
   - Location of equipment room or suite where terminated – **Server Room.**
   - Description of support structure for termination of fiber optic cable (wall- or rack-mounted patch panel, etc.) – **Wall Mount cabinet with SC connectors.**
   - Method of termination, – **fusion splicing pigtails.**
   - Labeling – **JK-1 through JK-24**

10. **Termination point B:**
    - Building address – **420 W. Magnetic Street, Marquette, MI 49855.**
    - Location of entrance facility – **Main Front Entrance.**
    - Location of equipment room or suite where terminated – **St. Luke’s Bldg. 2nd floor Communications Closet.**
    - Description of support structure for termination of fiber optic cable (wall- or rack-mounted patch panel, etc.) – **Wall Mount cabinet with SC connectors.**
    - Method of termination, e.g., fusion splicing pigtails on each fiber – **fusion splicing pigtails.**
    - Labeling - **KJ-1 through KJ-24.**

11. **Preferred route.** What is the approximate length of the Span (distance from A to B using the preferred route)? What is the preferred route? **Approximately 69 miles. Route to be determined by bidder.**

12. **Frequency of splice points:** **To be determined by bidder by following industry best practices.**

13. **Required completion date:** **Project completion date of December 31, 2012.**
4.6 Edward W. Sparrow Hospital Association, Lansing, MI

Edward W. Sparrow Hospital Association, Lansing, MI
9 Spans within Work Order:
Sections 4.6.1 through 4.6.9
Single Flat-Fee Construction Bid Required
(Sparrow also requests a flat-fee bid for each Span.)

The Edward W. Sparrow Hospital Association also requests a flat-fee bid for each Span. Sparrow realizes that a Contractor spreads project overhead across all Spans, and that a Contractor may not be able to install a single Span for the same price as installing that Span as part of a much larger, nine-Span project. Nonetheless, Sparrow requests a price breakdown by Span in case it cannot afford to construct all nine Spans but wishes to proceed with a subset of the nine.

Under item 7 in each of the following nine Span Specifications Sheets, Sparrow has listed twelve types of Systimax fiber optic cable. In its bid on this Work Order, a Contractor may use any of the 12 cable types, depending on the application (e.g., aerial v. underground) and the number of strands being installed within a specific segment of the Span. For example, for a half-mile, direct-buried segment that will serve two 24-strand sites, the Contractor will be required to use a Systimax 48-strand, direct-buried cable, or two Systimax 24-strand, direct-buried cables, or four Systimax 12-strand, direct buried cable—depending on the Contractor’s network design.
4.6.1 A1 – B1: Sparrow Main/Tower – Medical Dental Building

Span (Node-to-Node) Specifications

1. **Name and Address of Your Organization.**
   Edward W. Sparrow Hospital Association
   Judy Hubler
   Telecommunications Manager
   Sparrow St. Lawrence Campus
   1210 W Saginaw
   Lansing, MI 48915

2. **Name of Span.**
   Tower – Medical Dental Bldg (Site A1 to Site B1)

3. **Application(s).**
   The span will be used to carry site to site Ethernet and Fiber Channel data.
   The primary data type will be TCP-IP.

4. **Type of ownership interest desired.**
   The type of ownership desired for this span is “outright ownership by the HCP.”

5. **Preferred method of installation.**
   The preferred method of installation for this span is aerial.

6. **Fiber (individual strand) specifications.** Possible specifications include:

<table>
<thead>
<tr>
<th>Specification Description</th>
<th>Rating (if applicable)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Mode</td>
<td></td>
</tr>
<tr>
<td>ITU-T G.652.C/D compliant</td>
<td></td>
</tr>
<tr>
<td>Zero water peak single-mode fiber</td>
<td></td>
</tr>
<tr>
<td>Maximum Attenuation @ 1310nm 0.34 dB/km</td>
<td></td>
</tr>
<tr>
<td>Maximum Attenuation @ 1385nm 0.31 dB/km</td>
<td></td>
</tr>
<tr>
<td>Maximum Attenuation @ 1550nm 0.22 dB/km</td>
<td></td>
</tr>
</tbody>
</table>

7. **Fiber optic cable specifications.** Possible specifications include:
   - Strand Count:
     - 12

<table>
<thead>
<tr>
<th>Cable Description</th>
<th>Application</th>
<th>Systimax Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systimax 12 Strand</td>
<td>Direct Buried</td>
<td>O-012-LN-8W-F12NS/20T/HTS</td>
</tr>
</tbody>
</table>
### 8. Specifications for hardware or other components.

The specifications for additional required hardware are unknown at this time and are to be determined by the bidder.

### 9. Termination point A

- **Name:**
  - Medical Dental Building (2909) (Site B1)

- **Address:**
  - 2909 E. Grand River, Lansing, MI 48912

- **Entrance Location:**
  - Unknown

- **Termination Room and Description:**
  - TBD

### 10. Termination point B

- **Name:**
  - Sparrow Main / Tower (Site A1)

- **Address:**
  - 1215 E. Michigan Ave., Lansing, MI 48912

- **Entrance Location:**
  - Jerome Street, Tower entrance from duct bank

- **Termination Room and Description:**
  - HWB1 Communications Room (within 50’ of building entrance). Install in existing enclosed cabinet (19” rails). Label with Span Name.

### 11. Preferred route.

- **Route Distance (miles)**
  - 3

- **Estimated Footage**
  - 17,874.00
• Aerial Footage
  o 17,337.78
• Underground Footage
  o 536.22
• Number of Poles
  o 106
• Estimated Splices
  o 2
• Building Entrance Quantity
  o 2
• Terminations
  o 2
• Anchors
  o 35
• Hand Holes
  o 2
• Railroad Crossings
  o 1
• City, State, County Permit Quantity
  o 4

12. Frequency of splice points.
   Estimated number of splice points: 2

13. Required completion date.
   The required completion date for this span is approximately mid-2012. Please specify a completion date in the bid.
4.6.2 A1 – C1: Sparrow Main/Tower – TCI (Greenlawn)

Span (Node-to-Node) Specifications

1. **Name and Address of Your Organization.**
   Edward W. Sparrow Hospital Association
   Judy Hubler
   Telecommunications Manager
   Sparrow St. Lawrence Campus
   1210 W Saginaw
   Lansing, MI 48915

2. **Name of Span.**
   Tower – TCI (Greenlawn) (Site A1 to Site C1)

3. **Application(s).**
   The span will be used to carry site to site Ethernet and Fiber Channel data.
   The primary data type will be TCP-IP.

4. **Type of ownership interest desired.**
   The type of ownership desired for this span is “outright ownership by the HCP.”

5. **Preferred method of installation.**
   The preferred method of installation for this span is aerial.

6. **Fiber (individual strand) specifications.** Possible specifications include:

<table>
<thead>
<tr>
<th>Specification Description</th>
<th>Rating (if applicable)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Mode</td>
<td></td>
</tr>
<tr>
<td>ITU-T G.652.C/D compliant</td>
<td></td>
</tr>
<tr>
<td>Zero water peak single-mode fiber</td>
<td></td>
</tr>
<tr>
<td>Maximum Attenuation @ 1310nm</td>
<td>0.34 dB/km</td>
</tr>
<tr>
<td>Maximum Attenuation @ 1385nm</td>
<td>0.31 dB/km</td>
</tr>
<tr>
<td>Maximum Attenuation @ 1550nm</td>
<td>0.22 dB/km</td>
</tr>
</tbody>
</table>

7. **Fiber optic cable specifications.** Possible specifications include:
   - Strand Count
     - 24

<table>
<thead>
<tr>
<th>Cable Description</th>
<th>Application</th>
<th>Systimax Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systimax 12 Strand</td>
<td>Direct Buried</td>
<td>O-012-LN-8W-F12NS/20T/HTS</td>
</tr>
<tr>
<td>Systimax 24 Strand</td>
<td>Direct Buried</td>
<td>O-024-LN-8W-F12NS/20T/HTS</td>
</tr>
</tbody>
</table>
Systimax 48 Strand | Direct Buried | O-048-LN-8W-F12NS/20T/HTS
Systimax 96 Strand | Direct Buried | O-096-LN-8W-F12NS/20T/HTS
Systimax 12 Strand | In Duct | D-012-LA-8W-F12NS
Systimax 24 Strand | In Duct | D-024-LA-8W-F12NS
Systimax 48 Strand | In Duct | D-048-LA-8W-F12NS
Systimax 96 Strand (48 Strand x2) | In Duct | D-048-LA-8W-F12NS
Systimax 12 Strand | Aerial | D-012-LA-8W-F12NS
Systimax 24 Strand | Aerial | D-024-LA-8W-F12NS
Systimax 48 Strand | Aerial | D-048-LA-8W-F12NS
Systimax 96 Strand (48 Strand x2) | Aerial | D-048-LA-8W-F12NS

*** OR EQUIVALENT CABLES ***

8. Specifications for hardware or other components.
The specifications for additional required hardware are unknown at this time and are to be determined by the bidder.

9. Termination point A
   - Name:
     o TCI (Greenlawn) (Site C1)
   - Address:
     o 405 West Greenlawn, Suite 400, Lansing, MI 48910
   - Entrance Location:
     o Unknown
   - Termination Room and Description:
     o TBD

10. Termination point B
    - Name:
      o Sparrow Main / Tower (Site A1)
    - Address:
      o 1215 E. Michigan Ave., Lansing, MI 48912
    - Entrance Location:
      o Jerome Street, Tower entrance from duct bank
    - Termination Room and Description:
      o HWB1 Communications Room (within 50' of building entrance). Install in existing enclosed cabinet (19" rails). Label with Span Name.

11. Preferred route.
    - Route Distance (miles)
      o 4
    - Estimated Footage
      o 23,832.00
    - Aerial Footage
12. Frequency of splice points.
   Estimated number of splice points: 3

13. Required completion date.
   The required completion date for this span is approximately mid-2012. Please specify a completion date in the bid.
4.6.3 A1 – D1: Sparrow Main/Tower – Health Sciences Pavilion

Span (Node-to-Node) Specifications

1. Name and Address of Your Organization.
   Edward W. Sparrow Hospital Association
   Judy Hubler
   Telecommunications Manager
   Sparrow St. Lawrence Campus
   1210 W Saginaw
   Lansing, MI 48915

2. Name of Span.
   Tower – Health Sciences Pavilion (Site A1 to Site D1)

3. Application(s).
   The span will be used to carry site to site Ethernet and Fiber Channel data.
   The primary data type will be TCP-IP.

4. Type of ownership interest desired.
   The type of ownership desired for this span is “outright ownership by the HCP.”

5. Preferred method of installation.
   The preferred method of installation for this span is aerial.

6. Fiber (individual strand) specifications. Possible specifications include:

<table>
<thead>
<tr>
<th>Specification Description</th>
<th>Rating (if applicable)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Mode</td>
<td></td>
</tr>
<tr>
<td>ITU-T G.652.C/D compliant</td>
<td></td>
</tr>
<tr>
<td>Zero water peak single-mode fiber</td>
<td></td>
</tr>
<tr>
<td>Maximum Attenuation @ 1310nm</td>
<td>0.34 dB/km</td>
</tr>
<tr>
<td>Maximum Attenuation @ 1385nm</td>
<td>0.31 dB/km</td>
</tr>
<tr>
<td>Maximum Attenuation @ 1550nm</td>
<td>0.22 dB/km</td>
</tr>
</tbody>
</table>

7. Fiber optic cable specifications. Possible specifications include:
   - Strand Count
     - 48

<table>
<thead>
<tr>
<th>Cable Description</th>
<th>Application</th>
<th>Systimax Part Number</th>
</tr>
</thead>
</table>

Page 140 of 230 Pages
Systimax 12 Strand        Direct Buried        O-012-LN-8W-F12NS/20T/HTS
Systimax 24 Strand        Direct Buried        O-024-LN-8W-F12NS/20T/HTS
Systimax 48 Strand        Direct Buried        O-048-LN-8W-F12NS/20T/HTS
Systimax 96 Strand        Direct Buried        O-096-LN-8W-F12NS/20T/HTS
Systimax 12 Strand        In Duct             D-012-LA-8W-F12NS
Systimax 24 Strand        In Duct             D-024-LA-8W-F12NS
Systimax 48 Strand        In Duct             D-048-LA-8W-F12NS
Systimax 96 Strand (48 Strand x2)  In Duct    D-048-LA-8W-F12NS
Systimax 12 Strand        Aerial              D-012-LA-8W-F12NS
Systimax 24 Strand        Aerial              D-024-LA-8W-F12NS
Systimax 48 Strand        Aerial              D-048-LA-8W-F12NS
Systimax 96 Strand (48 Strand x2)  Aerial    D-048-LA-8W-F12NS

*** OR EQUIVALENT CABLES ***

8. **Specifications for hardware or other components.**
The specifications for additional required hardware are unknown at this time and are to be determined by the bidder.

9. **Termination point A**
   - Name:
     - Health Sciences Pavillon (Site D1)
   - Address:
     - 2900 Hannah Blvd., East Lansing, MI 48823
   - Entrance Location:
     - Unknown
   - Termination Room and Description:
     - TBD

10. **Termination point B**
    - Name:
      - Sparrow Main Hospital – Tower (Site A1)
    - Address:
      - 1215 E. Michigan Ave., Lansing, MI 48912
    - Entrance Location:
      - Jerome Street, Tower entrance from duct bank
    - Termination Room and Description:
      - HWB1 Communications Room (within 50' of building entrance). Install in existing enclosed cabinet (19" rails). Label with Span Name.

11. **Preferred route.**
    - Route Distance (miles)
      - 7
    - Estimated Footage
12. Frequency of splice points.
   Estimated number of splice points: 6

13. Required completion date.
   The required completion date for this span is approximately mid-2012. Please specify a completion date in the bid.
4.6.4 A1 – E1: Sparrow Main/Tower – Okemos 1600 Building

Span (Node-to-Node) Specifications

1. **Name and Address of Your Organization.**  
   Edward W. Sparrow Hospital Association  
   Judy Hubler  
   Telecommunications Manager  
   Sparrow St. Lawrence Campus  
   1210 W Saginaw  
   Lansing, MI 48915

2. **Name of Span.**  
   Tower – Okemos, 1600 Bldg (Site A1 to Site E1)

3. **Application(s).**  
   The span will be used to carry site to site Ethernet and Fiber Channel data.  
   The primary data type will be TCP-IP.

4. **Type of ownership interest desired.**  
   The type of ownership desired for this span is “outright ownership by the HCP.”

5. **Preferred method of installation.**  
   The preferred method of installation for this span is aerial.

6. **Fiber (individual strand) specifications.** Possible specifications include:

<table>
<thead>
<tr>
<th>Specification Description</th>
<th>Rating (if applicable)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Mode</td>
<td></td>
</tr>
<tr>
<td>ITU-T G.652.C/D compliant</td>
<td></td>
</tr>
<tr>
<td>Zero water peak single-mode fiber</td>
<td></td>
</tr>
<tr>
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<td>Maximum Attenuation @ 1385nm</td>
<td>0.31 dB/km</td>
</tr>
<tr>
<td>Maximum Attenuation @ 1550nm</td>
<td>0.22 dB/km</td>
</tr>
</tbody>
</table>

7. **Fiber optic cable specifications.** Possible specifications include:
   - Strand Count
     - 24

<table>
<thead>
<tr>
<th>Cable Description</th>
<th>Application</th>
<th>Systimax Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systimax 12 Strand</td>
<td>Direct Buried</td>
<td>O-012-LN-8W-F12NS/20T/HTS</td>
</tr>
<tr>
<td>Systimax 24 Strand</td>
<td>Direct Buried</td>
<td>O-024-LN-8W-F12NS/20T/HTS</td>
</tr>
</tbody>
</table>
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Systimax 96 Strand  Direct Buried  O-096-LN-8W-F12NS/20T/HTS
Systimax 12 Strand  In Duct  D-012-LA-8W-F12NS
Systimax 24 Strand  In Duct  D-024-LA-8W-F12NS
Systimax 48 Strand  In Duct  D-048-LA-8W-F12NS
Systimax 96 Strand (48 Strand x2)  In Duct  D-048-LA-8W-F12NS
Systimax 12 Strand  Aerial  D-012-LA-8W-F12NS
Systimax 24 Strand  Aerial  D-024-LA-8W-F12NS
Systimax 48 Strand  Aerial  D-048-LA-8W-F12NS
Systimax 96 Strand (48 Strand x2)  Aerial  D-048-LA-8W-F12NS

*** OR EQUIVALENT CABLES ***

8. **Specifications for hardware or other components.**
The specifications for additional required hardware are unknown at this time and are to be determined by the bidder.

9. **Termination point A**
   - Name:
     - Okemos SFMS / OB/GYN (Site E)
   - Address:
     - 1600 W. Grand River, Okemos, MI 48864
   - Entrance Location:
     - Unknown
   - Termination Room and Description:
     - Lower Level, Mechanical Room

10. **Termination point B**
    - Name:
      - Sparrow Main / Tower (Site A1)
    - Address:
      - 1215 E. Michigan Ave., Lansing, MI 48912
    - Entrance Location:
      - Jerome Street, Tower entrance from duct bank
    - Termination Room and Description:
      - HWB1 Communications Room (within 50' of building entrance). Install in existing enclosed cabinet (19" rails). Label with Span Name.

11. **Preferred route.**
    - Route Distance (miles)
      - 8
    - Estimated Footage
      - 59,580.00
    - Aerial Footage
- 53,622.00
- **Underground Footage**
  - 5,958.00
- **Number of Poles**
  - 352
- **Estimated Splices**
  - 6
- **Building Entrance Quantity**
  - 2
- **Terminations**
  - 2
- **Anchors**
  - 108
- **Hand Holes**
  - 12
- **Railroad Crossings**
  - 3
- **City, State, County Permit Quantity**
  - 12

12. **Frequency of splice points.**
   Estimated number of splice points: 6

13. **Required completion date.**
   The required completion date for this span is approximately mid-2012. Please specify a completion date in the bid.
4.6.5  A1 – F1: Sparrow Main/Tower – Mason 800 Columbia

Span (Node-to-Node) Specifications

1. **Name and Address of Your Organization.**
   Edward W. Sparrow Hospital Association
   Judy Hubler
   Telecommunications Manager
   Sparrow St. Lawrence Campus
   1210 W Saginaw
   Lansing, MI 48915

2. **Name of Span.**
   Tower – Mason, 800 Columbia (Site A1 to Site F1)

3. **Application(s).**
   The span will be used to carry site to site Ethernet and Fiber Channel data.
   The primary data type will be TCP-IP.

4. **Type of ownership interest desired.**
   The type of ownership desired for this span is “outright ownership by the HCP.”

5. **Preferred method of installation.**
   The preferred method of installation for this span is aerial (urban) / direct buried (rural).

6. **Fiber (individual strand) specifications.** Possible specifications include:

<table>
<thead>
<tr>
<th>Specification Description</th>
<th>Rating (if applicable)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Mode</td>
<td></td>
</tr>
<tr>
<td>ITU-T G.652.C/D compliant</td>
<td></td>
</tr>
<tr>
<td>Zero water peak single-mode fiber</td>
<td></td>
</tr>
<tr>
<td>Maximum Attenuation @ 1310nm</td>
<td>0.34 dB/km</td>
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<td>Maximum Attenuation @ 1550nm</td>
<td>0.22 dB/km</td>
</tr>
</tbody>
</table>

7. **Fiber optic cable specifications.** Possible specifications include:
   - Strand Count
     - 24

<table>
<thead>
<tr>
<th>Cable Description</th>
<th>Application</th>
<th>Systimax Part Number</th>
</tr>
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<td>Systimax 12 Strand</td>
<td>Direct Buried</td>
<td>O-012-LN-8W-F12NS/20T/HTS</td>
</tr>
</tbody>
</table>
8. Specifications for hardware or other components.
The specifications for additional required hardware are unknown at this time and are to be determined by the bidder.

9. Termination point A
   - Name:
     - Mason Urgent Care (Site F1)
   - Address:
     - 800 E. Columbia, Mason, MI 48854
   - Entrance Location:
     - Unknown
   - Termination Room and Description:
     - TBD

10. Termination point B
    - Name:
       - Sparrow Main / Tower (Site A1)
    - Address:
       - 1215 E. Michigan Ave., Lansing, MI 48912
    - Entrance Location:
       - Jerome Street, Tower entrance from duct bank
    - Termination Room and Description:
       - HWB1 Communications Room (within 50’ of building entrance). Install in existing enclosed cabinet (19” rails). Label with Span Name.

11. Preferred route.
    - Route Distance (miles)
      - 20
    - Estimated Footage
      - 59,580.00
- Aerial Footage
  - 44,685.00
- Underground Footage
  - 14,895.00
- Number of Poles
  - 352
- Estimated Splices
  - 6
- Building Entrance Quantity
  - 2
- Terminations
  - 2
- Anchors
  - 90
- Hand Holes
  - 30
- Railroad Crossings
  - 3
- City, State, County Permit Quantity
  - 12

12. **Frequency of splice points.**
   Estimated number of splice points: 6

13. **Required completion date.**
   The required completion date for this span is approximately mid-2012. Please specify a completion date in the bid.
4.6.6 A1 – G1: Sparrow Main/Tower – Sparrow Ionia Hospital

Span (Node-to-Node) Specifications

1. **Name and Address of Your Organization.**
   Edward W. Sparrow Hospital Association
   Judy Hubler
   Telecommunications Manager
   Sparrow St. Lawrence Campus
   1210 W Saginaw
   Lansing, MI 48915

2. **Name of Span.**
   Tower – Sparrow Ionia (Site A1 to Site G1)

3. **Application(s).**
   The span will be used to carry site to site Ethernet and Fiber Channel data.
   The primary data type will be TCP-IP.

4. **Type of ownership interest desired.**
   The type of ownership desired for this span is “outright ownership by the HCP.”

5. **Preferred method of installation.**
   The preferred method of installation for this span is aerial (urban) / direct buried (rural).

6. **Fiber (individual strand) specifications.** Possible specifications include:

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</tr>
<tr>
<td>Maximum Attenuation @ 1550nm</td>
<td>0.22 dB/km</td>
</tr>
</tbody>
</table>

7. **Fiber optic cable specifications.** Possible specifications include:
   - Strand Count
     - 48

<table>
<thead>
<tr>
<th>Cable Description</th>
<th>Application</th>
<th>Systimax Part Number</th>
</tr>
</thead>
<tbody>
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<td>Systimax 24 Strand</td>
<td>Direct Buried</td>
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</tr>
</tbody>
</table>
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Systimax 96 Strand  Direct Buried  O-096-LN-8W-F12NS/20T/HTS
Systimax 12 Strand  In Duct  D-012-LA-8W-F12NS
Systimax 24 Strand  In Duct  D-024-LA-8W-F12NS
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Systimax 96 Strand (48 Strand x2)  In Duct  D-048-LA-8W-F12NS
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Systimax 96 Strand (48 Strand x2)  Aerial  D-048-LA-8W-F12NS

*** OR EQUIVALENT CABLES ***

8. **Specifications for hardware or other components.**
   The specifications for additional required hardware are unknown at this time and are to be determined by the bidder.

9. **Termination point A**
   - **Name:**
     - Sparrow Ionia Hospital (Site G1)
   - **Address:**
     - 479 Lafayette St, Ionia, MI 48846
   - **Entrance Location:**
     - Unknown
   - **Termination Room and Description:**
     - TBD

10. **Termination point B**
    - **Name:**
      - Sparrow Main / Tower (Site A1)
    - **Address:**
      - 1215 E. Michigan Ave., Lansing, MI 48912
    - **Entrance Location:**
      - Jerome Street, Tower entrance from duct bank
    - **Termination Room and Description:**
      - HWB1 Communications Room (within 50' of building entrance). Install in existing enclosed cabinet (19" rails). Label with Span Name.

11. **Preferred route.**
    - **Route Distance (miles)**
      - 45
    - **Estimated Footage**
      - 268,110.00
    - **Aerial Footage**
12. Frequency of splice points.
   Estimated number of splice points: 27

13. Required completion date.
   The required completion date for this span is approximately mid-2012. Please specify a completion date in the bid.
4.6.7 A1 – H1: Sparrow Main/Tower – Sparrow Clinton Hospital

Span (Node-to-Node) Specifications

1. Name and Address of Your Organization.
   Edward W. Sparrow Hospital Association
   Judy Hubler
   Telecommunications Manager
   Sparrow St. Lawrence Campus
   1210 W Saginaw
   Lansing, MI 48915

2. Name of Span.
   Tower - Sparrow Clinton Hospital (Site A1 to Site H1)

3. Application(s).
   The span will be used to carry site to site Ethernet and Fiber Channel data.
   The primary data type will be TCP-IP.

4. Type of ownership interest desired.
   The type of ownership desired for this span is “outright ownership by the HCP.”

5. Preferred method of installation.
   The preferred method of installation for this span is aerial (urban) / direct buried (rural).

6. Fiber (individual strand) specifications. Possible specifications include:

<table>
<thead>
<tr>
<th>Specification Description</th>
<th>Rating (if applicable)</th>
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</thead>
<tbody>
<tr>
<td>Single Mode</td>
<td></td>
</tr>
<tr>
<td>ITU-T G.652.C/D compliant</td>
<td></td>
</tr>
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<td>Maximum Attenuation @ 1310nm</td>
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</tr>
<tr>
<td>Maximum Attenuation @ 1550nm</td>
<td>0.22 dB/km</td>
</tr>
</tbody>
</table>

7. Fiber optic cable specifications. Possible specifications include:
   - Strand Count
     - 48

<table>
<thead>
<tr>
<th>Cable Description</th>
<th>Application</th>
<th>Systimax Part Number</th>
</tr>
</thead>
</table>

Page 152 of 230 Pages
### Specifications for hardware or other components.

The specifications for additional required hardware are unknown at this time and are to be determined by the bidder.

### Termination point A
- **Name:**
  - Sparrow Clinton Hospital (Site H1)
- **Address:**
  - 805 South Oakland, St. Johns, MI 48879
- **Entrance Location:**
  - Unknown
- **Termination Room and Description:**
  - TBD

### Termination point B
- **Name:**
  - Sparrow Main Hospital – Tower (Site A1)
- **Address:**
  - 1215 E. Michigan Ave., Lansing, MI 48912
- **Entrance Location:**
  - Jerome Street, Tower entrance from duct bank
- **Termination Room and Description:**
  - HWB1 Communications Room (within 50' of building entrance). Install in existing enclosed cabinet (19" rails). Label with Span Name.

### Preferred route.
- **Route Distance (miles):**
  - 20
- **Estimated Footage**

---

<table>
<thead>
<tr>
<th>Systimax 12 Strand</th>
<th>Direct Buried</th>
<th>O-012-LN-8W-F12NS/20T/HTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systimax 24 Strand</td>
<td>Direct Buried</td>
<td>O-024-LN-8W-F12NS/20T/HTS</td>
</tr>
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<td>Direct Buried</td>
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</tr>
<tr>
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<tr>
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<td>Aerial</td>
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<td>Aerial</td>
<td>D-048-LA-8W-F12NS</td>
</tr>
</tbody>
</table>

*** OR EQUIVALENT CABLES ***
12. **Frequency of splice points.**
   Estimated number of splice points: 14

13. **Required completion date.**
   The required completion date for this span is approximately mid-2012. Please specify a completion date in the bid.
4.6.8 H1 – I1: Sparrow Clinton Hospital – Carson City Hospital

Span (Node-to-Node) Specifications

1. **Name and Address of Your Organization.**
   Edward W. Sparrow Hospital Association
   Judy Hubler
   Telecommunications Manager
   Sparrow St. Lawrence Campus
   1210 W Saginaw
   Lansing, MI 48915

2. **Name of Span.**
   Sparrow Clinton Hospital – Carson City Hospital (Site H1 to Site I1)

3. **Application(s).**
   The span will be used to carry site to site Ethernet and Fiber Channel data.
   The primary data type will be TCP-IP.

4. **Type of ownership interest desired.**
   The type of ownership desired for this span is “outright ownership by the HCP.”

5. **Preferred method of installation.**
   The preferred method of installation for this span is aerial (urban) / direct buried (rural).

6. **Fiber (individual strand) specifications.** Possible specifications include:

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<th>Specification Description</th>
<th>Rating (if applicable)</th>
</tr>
</thead>
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</tr>
</tbody>
</table>

7. **Fiber optic cable specifications.** Possible specifications include:
   - Strand Count
     - 24

<table>
<thead>
<tr>
<th>Cable Description</th>
<th>Application</th>
<th>Systimax Part Number</th>
</tr>
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<tbody>
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Systimax 48 Strand  In Duct  D-048-LA-8W-F12NS
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Systimax 96 Strand (48 Strand x2)  Aerial  D-048-LA-8W-F12NS

*** OR EQUIVALENT CABLES ***

8. **Specifications for hardware or other components.**
   The specifications for additional required hardware are unknown at this time and are to be
determined by the bidder.

9. **Termination point A**
   - Name:
     - Carson City Hospital (Site I1)
   - Address:
     - 406 East Elm St, Carson City, MI 48811
   - Entrance Location:
     - Unknown
   - Termination Room and Description:
     - TBD

10. **Termination point B**
    - Name:
      - Sparrow Clinton Hospital (Site H1)
    - Address:
      - 805 South Oakland, St. Johns, MI 48879
    - Entrance Location:
      - Unknown
    - Termination Room and Description:
      - TBD

11. **Preferred route.**
    - Route Distance (miles)
      - 28
    - Estimated Footage
      - 166,824.00
    - Aerial Footage
      - 150,141.60
• Underground Footage
  o 16,682.40
• Number of Poles
  o 986
• Estimated Splices
  o 17
• Building Entrance Quantity
  o 2
• Terminiations
  o 2
• Anchors
  o 301
• Hand Holes
  o 34
• Railroad Crossings
  o 7
• City, State, County Permit Quantity
  o 32

12. Frequency of splice points.
   Estimated number of splice points: 17

13. Required completion date.
   The required completion date for this span is approximately mid-2012. Please specify a completion
date in the bid.
4.6.9 A2 – B2: Sparrow St. Lawrence Campus – Sparrow Professional Bldg.

Span (Node-to-Node) Specifications

1. Name and Address of Your Organization.
   Edward W. Sparrow Hospital Association
   Judy Hubler
   Telecommunications Manager
   Sparrow St. Lawrence Campus
   1210 W Saginaw
   Lansing, MI 48915

2. Name of Span.
   Sparrow Professional Building – Sparrow St. Lawrence Campus (RDC) (Site A2 to Site B2)

3. Application(s).
   The span will be used to carry site to site Ethernet and Fiber Channel data.
   The primary data type will be TCP-IP.

4. Type of ownership interest desired.
   The type of ownership desired for this span is “outright ownership by the HCP.”

5. Preferred method of installation.
   The preferred method of installation for this span is aerial.

6. Fiber (individual strand) specifications. Possible specifications include:

<table>
<thead>
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</tr>
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<tbody>
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</tr>
</tbody>
</table>

7. Fiber optic cable specifications. Possible specifications include:
   • Strand Count
     o 96

<table>
<thead>
<tr>
<th>Cable Description</th>
<th>Application</th>
<th>Systimax Part Number</th>
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<tr>
<td>Systimax 12 Strand</td>
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<td>Systimax 96 Strand (48 Strand x2)</td>
<td>Aerial</td>
<td>D-048-LA-8W-F12NS</td>
</tr>
</tbody>
</table>

*** OR EQUIVALENT CABLES ***

8. **Specifications for hardware or other components.**
The specifications for additional required hardware are unknown at this time and are to be determined by the bidder.

9. **Termination point A**
   - **Name:**
     - Sparrow Professional Building (Site B2)
   - **Address:**
     - 1200 E. Michigan Ave., Lansing, MI 48912
   - **Entrance Location:**
     - Unknown
   - **Termination Room and Description:**
     - TBD

10. **Termination point B**
    - **Name:**
      - Sparrow St. Lawrence Campus (RDC) (Site A2)
    - **Address:**
      - 1210 W. Saginaw St., Lansing, MI 48915
    - **Entrance Location:**
      - Saginaw Street
    - **Termination Room and Description:**
      - TBD

11. **Preferred route.**
    - **Route Distance (miles)**
      - 3
    - **Estimated Footage**
      - 31,682.40
RFP 03 – Outside Plant Fiber Construction for Five Michigan Health Care Providers

- Aerial Footage
  - 23,761.80
- Underground Footage
  - 7920.60
- Number of Poles
  - 187
- Estimated Splices
  - 4
- Building Entrance Quantity
  - 2
- Terminations
  - 2
- Anchors
  - 48
- Hand Holes
  - 16
- Railroad Crossings
  - 2
- City, State, County Permit Quantity
  - 7

12. Frequency of splice points.
   Estimated number of splice points: 4

13. Required completion date.
   The required completion date for this span is approximately mid-2012. Please specify a completion date in the bid.
5. Appendices

This RFP contains seven Appendices:

- A – Definitions
- B – Rural Health Care Pilot Program (RHCPP) Process. This Appendix describes the Universal Service Administrative Company’s (USAC’s) administration of the Pilot Program, to include rules, processes, procedures, etc. It also describes the somewhat complicated, USAC-mandated invoicing process.
- C – Span Completion Checklist. When a Span is ready for testing and acceptance, the HCP Project Manager (or the QA Inspector) and a representative of the Contractor must complete this Checklist. See Section 2.6.6.
- D – Contractor Certifications and Assurances. Contractors who submit bids must complete this form. See Section 3.3.
- E – Contractor Questionnaire. Contractors who submit bids must complete this form. See Section 3.2.
- F – Span (Node-to-Node) Fiber Installation Specifications Sheets. For the purpose of collecting fiber specifications for inclusion in Section 4 of the RFP, Health Care Providers (HCPs) were asked to describe their fiber needs using this template.
- G – Detailed OSP [Outside Plant] Installation Specifications. The fiber installation specifications and requirements in this Appendix are intended to supplement and amplify the more general specifications and requirements stated in the main body of the RFP.
A. Definitions

Aerial  
Installation of fiber optic cable by means of new pole installation or attachment to existing utility poles, including over-lashing to extant fiber where feasible and permitted

Contractor  
A telecommunications construction firm that builds a Network as part of the fiber-build project

Cutover Date  
The date on which a specific element of a Network is formally accepted by the HCP under Section 2.6.6 of this RFP and placed in service

dB  
Decibel, a measure applied to relative signal strength

Direct-buried  
Installation of fiber optic cable underground without conduit, by means of directional boring, or in trenches plowed into the ground

Earth  
All materials including clay, silt, sand, gravel, hardpan, rock, shale, debris, junk, and brick that can be removed by use of suitable excavating equipment and pneumatic tools

Facilities  
When used in the context of telecommunications equipment, transmission lines or circuits available to provide service

FCC  
Federal Communications Commission (see http://www.fcc.gov)

FCC Order 07-198  

HCP  
Health care provider, e.g., a hospital, medical clinic, or public health department

HCP Project Manager  
The HCP’s representative who oversees Contractor’s fulfillment of the HCP’s Work Order and who has full authority to make decisions concerning any aspect of Contractor’s work. With permission of the HCP, the QA Inspector or other representative appointed by the HCP may act with the authority of the HCP Project Manager. In Appendix G, the term “HCP Project Manager” refers to anyone whom the HCP appoints to act with project management authority.

IRU  
Indefeasible Right of Use, a contractual agreement that gives the purchaser the right to use telecommunications facilities (e.g., fiber capacity) for a specific period of time, usually the remaining useful life of the asset, e.g., 20 years

Legal entity  
An organization that completed a Letter of Agency (LOA) for the statewide network project (RFP 02) or an entity that completes an LOA for the fiber-build project (RFP 03)

LOA  
Letter of Agency, a legal document signed by an HCP authorizing MPHI to act as the HCP’s agent before the FCC in matters relating to the RHCPP
MPHI: Michigan Public Health Institute, the project manager for the RHCPP grant that is funding the fiber-build project (see http://www.mphi.org)

Network: A set of Spans that an HCP wishes to install

Nm: Nanometer, a measure applied to the wavelength of light transmitted over an optical fiber

Owner: An HCP that will own a Network built as part of the fiber-build project

QA Inspector: Quality Assurance Inspector, an OSP fiber construction expert who will consult with the HCP concerning the Contractor’s route engineering and permitting work, the fiber and/or associated hardware purchased for the project, the Contractor’s construction activities, final testing and acceptance of the fiber Span(s), documentation, standards and codes, and any other aspect of the HCP’s fiber-build project

RHCPP: Rural Health Care Pilot Program, the $417 million program established by the FCC in 2007 to help public and non-profit HCPs deploy state or regional broadband health care networks (see http://www.fcc.gov/cgb/rural/rhcp.html)

Single Mode (SM): An optical fiber designed to carry a single ray of light (mode).

Span: A continuous, linear run of fiber from one location (node or site) to another location (node or site). For each Span, a *Span (Node-to-Node) Fiber Installation Specifications Sheet* will provide the technical specifications that will enable potential Contractors to bid on the installation of the Span.

Specifications: The detailed description of a fiber Span contained in a *Span (Node-to-Node) Fiber Installation Specifications Sheet*

Underground: Installation of fiber optic cable by placing it underground in conduit

USAC: Universal Service Administrative Company, which is administering the RHCPP for the FCC (see http://www.usac.org)

USF: Universal Service Fund, the source of the funding for the RHCPP (see http://www.universalservice.org/about/universal-service/)

Work Order: Owner-specified requirements for its desired Network that will be included in the fiber-build project’s master RFP. The Work Order will consist of a set of *Span (Node-to-Node) Fiber Installation Specifications Sheets* that will provide the technical specifications for the Spans the Owner wishes to install.
B. Rural Health Care Pilot Program (RHCPP) Process

1. Overview of Pilot Program
   The FCC established the RHCPP in its 2006 Pilot Program Order. The goal of the Pilot Program is to “stimulate deployment of the broadband infrastructure necessary to support innovative telehealth and, in particular, telemedicine services to those areas of the country where the need for those benefits is most acute. ... Applicants [for Pilot Program grants] were instructed to present a strategy for aggregating the specific needs of health care providers within a state or region, including providers that serve rural areas, and for leveraging existing technology to adopt the most efficient and cost-effective means of connecting those providers.”

   Pilot Program funds can be used to “support up to 85 percent of the costs associated with the construction of state or regional broadband health care networks and with the advanced telecommunications and information services provided over those networks.”

2. Competitive Bidding Requirement Overview
   The Pilot Program Selection Order requires the selected participants (such as MPHI) to conduct a competitive bidding process to choose the most cost-effective Contractor for construction of each Work Order’s set of fiber Spans (each set of fiber Spans within a Work Order is also referred to as a Network). To satisfy the competitive bidding requirement, among other things, MPHI must (1) submit an FCC Form 465 that includes a description of the services for which the health care providers (HCPs) are seeking support (in other words, this RFP) and (2) wait at least 28 days from the date the RFP is posted on USAC’s website before making commitments with the selected Contractor(s). MPHI will post the RFP for nine weeks (63 days) and, along with the HCPs, will conduct a formal evaluation of bids that are received.

3. Contractor Eligibility & Miscellaneous Requirements
   Any Contractor that provides services or equipment eligible for funding under the Pilot Program may submit bids. Eligible Contractors include all telecommunications providers, Internet service providers, network design firms, various types of construction companies, et al. To receive RHCPP support, Contractors must obtain a Service Provider Identification Number (SPIN) from USAC. USAC uses the SPIN to pay Contractors. For more information about SPINs,

Contractors or service providers participating in a Pilot Program competitive bid process are prohibited from assisting with or filling out MPHI’s service request (e.g., any of the Span Specifications Sheets within the RFP).

Prior to receiving any Pilot Program support, a Contractor must complete a certification stating that it will comply with Pilot Program rules and use Pilot Program funding only for the intended purposes.

Contractors must retain their project records for 5 years. Records are subject to USAC audit.

4. Eligible and Ineligible Costs
The Pilot Program will pay for the design, engineering, materials, and construction of fiber facilities or other broadband infrastructure, and engineering, furnishing, and installing network equipment. It will not pay for:

- Inside wiring or networking equipment (e.g., video/web conferencing equipment and wireless user devices) on HCP premises except for (1) equipment that terminates a carrier’s or other provider’s transmission facility and (2) any router/switch that is directly connected to either the facility or the terminating equipment
- Computers, including servers and related hardware (e.g., printers, scanners, laptops), unless used exclusively for network management
- Software, unless used for network management, maintenance, or other network operations; software development (excluding development of software that supports network management, maintenance, and other network operations); web server hosting; and website/portal development
- Telemedicine applications and software; clinical or medical equipment
- Internal networks beyond the demarcation point, including LAN equipment, structured cabling, and infrastructure

5. RFPs on Which Contractors May Bid
Contractors may view the posted service requests (i.e., RFPs) and associated documents on the Search Postings page of the RHCPP website. Posted information includes:

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24 Ibid., Footnote 277.
25 Ibid., Paragraph 74.
26 Ibid., Paragraph 75.
• Services requested (RFPs) in PDF format
• The associated FCC Form 465, “Description of Services Requested & Certification Form”
• Participating HCP sites
• The Project Coordinator’s (PC) name, location, and contact information. In MPHI’s case, the primary contact is not the PC; the primary contacts are the project managers noted in Section 2.2 of this RFP.
• The Allowable Contract Date, or the earliest date on which a contract can be awarded, or 28 days from the day on which the RFP was posted. However, the posting period often exceeds 28 days. (For this RFP, it is 63 days.) Multiple rounds of bidding and selection are permitted.

6. Selection Process
MPHI must evaluate all bids and select the most cost-effective service or facility provider available. In selecting the most cost-effective bid, in addition to price, the FCC’s 2007 Pilot Program Selection Order requires participants like MPHI to consider non-cost evaluation factors that include prior experience, including past performance; personnel qualifications, including technical excellence; management capability, including solicitation compliance; and environmental objectives (if appropriate). See Section 2.6.2 of this RFP, “Evaluation of Proposals.”

7. Submission of FCC Form 466-A
MPHI must submit the following documentation to USAC for its review and approval before MPHI and a Contractor can sign a contract:
• FCC Form 466-A
• Form 466-A Attachment, a list of HCP sites served and the services provided
• A Network Cost Worksheet, a list of itemized equipment, services, and costs
• Documentation describing the competitive bidding process and the contracts to be signed
• Certifications by MPHI and the Contractor
• Network diagram(s), if applicable
• A project sustainability plan

8. Funding Commitment Letter and Support Acknowledgement Letter
When USAC has approved a request for service support (FCC Form 466-A and the associated attachments listed immediately above), USAC will send a Funding Commitment Letter (FCL) to the Contractor and MPHI. The FCL indicates that the project is eligible for the support specified in the letter, contingent upon submission of a Connection Certification Form (FCC Form 467). After receiving the Form 467, USAC creates a Support Acknowledgement Letter and sends it to MPHI and the Contractor. The Support Acknowledgement Letter provides a detailed report of the approved service(s) and support information.
9. What to Do When the Funding Commitment Letter Is Received

Contractors should validate the SPIN on the FCL. If the SPIN is incorrect, please contact the Rural Health Care Pilot Program.

10. What to Do When the Support Acknowledgement Letter Is Received

Contractors should validate the SPIN on the Letter. Once the Contractor receives the letter, it can bill the project for services (work packages) completed. The entity that receives the bill and pays for the service is defined as the "billed entity."

11. USAC Invoicing Process

USAC will disburse Pilot Program funds to the Contractor based on the submission of detailed invoices for incurred eligible costs: hardware will have to have been installed, tested, and formally accepted; installation will have to have been completed, tested, and formally accepted; and service will have to have been rendered before the Contractor can invoice MPHI/USAC for any hardware, installation, or service, respectively. MPHI will only process invoiced items that are subject to acceptance and testing and that have, in fact, been tested and accepted. MPHI encourages bidding contractors to break up their bids into as many work packages as feasible, as described in Section 2.6.6 of the RFP.

The Contractor will invoice using the following five-step process:

- **Contractor Invoices HCP and Collects Payment.** The Contractor must first invoice the HCP for 100 percent of the cost and collect payment for the HCP’s 15 percent share before it can invoice MPHI.

- **Contractor Invoices MPHI.** After receipt of payment from the HCP, the Contractor may invoice MPHI by submitting three items: (1) an invoice that shows the full cost and contains the items listed under “Invoice Requirements” immediately below; (2) proof that the HCP has paid its required percentage; and (3) a copy of the Network Cost Worksheet (NCW) page(s) that contains the invoiced items. These items should be highlighted.

- **MPHI Processes Invoice.** MPHI will review the invoice, proof of HCP payment, and marked-up NCW. MPHI will reformat the invoice to USAC specifications, certify the invoice, and return it to the Contractor. At the same time, MPHI will submit documentation supporting the invoice to USAC.

- **Contractor Certifies Invoice.** The Contractor will also certify the invoice MPHI has prepared and then submit it to USAC for payment. Invoices may be submitted on a semimonthly basis.

- **USAC Reviews and Pays.** USAC will review the invoice submitted by the Contractor and the supporting documentation submitted by MPHI and then pay the Contractor 85 percent of the total cost. USAC pays invoices twice a month.
12. Invoice Requirements
At a minimum, every invoice a Contractor submits to MPHI must contain the following data elements:

- Invoice number
- Invoice date
- Contractor’s Billing Account Number (BAN)
- Total invoice amount
- **Costs.** Every identifiable cost must be allocated to a single Span. Each cost should be described using the following fields:
  - Identification of the fiber Span specified in the Work Order
  - Information sufficient to uniquely identify the item on the Network Cost Worksheet (NCW)
  - Optional expanded description/details/comments
  - The number of items
  - The cost per item
  - The total cost for this line item, i.e., the “number of items” times “the cost per item”
C. Span Completion Checklist

Health Care Provider (HCP): ________________________________
Span Designation: ______________________________________

AT EACH OF THE TWO SPAN TERMINATION POINTS:
• Cable was installed in a workmanship-like manner, and any exposed cable or jumpers were treated IAW applicable codes.
• Fiber optic cable is properly tagged and identified.
• Conduit was installed IAW the HCP’s instructions.
• Fiber distribution panels (FDPs) and bulkheads are properly and securely mounted, and all FDPs and bulkhead connectors are covered with dust covers.
• Fiber is appropriately grounded.
• All building, firewall, and building partition penetrations were properly sealed.
• Initial restoration was adequately performed, and all construction debris and dirt were removed to the satisfaction of the HCP.
• Locate-wire pedestal locations are readily identifiable and connected.

SPAN ROUTE
• Cable was installed IAW the HCP’s work Order Specifications.
• All hand-holes and tubs have been readjusted for settling.
• All open ends of duct installed along the route have been sealed with appropriate duct plug material.
• Any pavement cracked during the cable installation process has been repaired.
• Pictures that were taken of pre-existing pavement conditions have been compared to those taken during final route reconnaissance and reviewed without exception by the HCP, affected property owners, and the appropriate governmental entity.
• Initial restoration was adequately performed.

TESTING OF FIBER OPTIC CABLE
• Test equipment was calibrated within ninety (90) days prior to testing, and a sticker with the date of calibration was affixed to the equipment. A calibration certificate was presented to the HCP or its authorized representative upon request.
• Each fiber strand within each cable was tested bi-directionally at 1310 nm and at 1550 nm from end point to end point, and a record of the results was submitted to the HCP for acceptance.
• Each Span trace was recorded so that each splice can be clearly expanded (long range, mid-range, or high resolution). (Some Spans will need all three traces.)
• A Span map was completed. The Span map recorded each splice loss from each direction, the optical length between splices, as well as any other required information.
• Locate-wires, cable sheathes, and/or locate-wire terminals have been tested for continuity end-to-end.
• Boring traces, as-built, and red-line construction drawings have been provided to the HCP.

SUMMARY
• Is the Span fully functional?
• Has the Span passed all tests detailed in §3.4.5 of RFP 03?
• Does the Span meet or exceed the performance Specifications detailed in the HCP’s Work Order in RFP 03?
• Is the Span completely documented IAW the various requirements set forth in §3.4 of RFP 03?

Span Accepted? Yes __________ No __________
Reason for Non-Acceptance: __________________________________________
Contractor Representative(s): __________________________________________ Date: _________
HCP Representative(s): __________________________________________ Date: _________
D. Contractor Certifications and Assurances

The Contractor must complete and sign this document and initial each page. It must be signed by an individual empowered to bind the Contractor to the provisions of this RFP and any Contract awarded pursuant to it.

Contractor’s Legal Entity Name: ____________________________________________

Contractor’s Federal Employer Identification Number: _______________________

Contractor’s USAC SPIN: ____________________

I/we make the following certifications and assurances as a required element of the proposal to which it is attached, understanding that the truthfulness of the facts affirmed here and the continuing compliance with these requirements are conditions precedent to the award or continuation of the related Contract(s):

1. I/we declare that all answers and statements made in the proposal are true and correct.

2. The prices and/or cost data have been determined independently, without consultation, communication, or agreement with others for the purpose of restricting competition. However, I/we may freely join with other persons or organizations for the purpose of presenting a single proposal.

3. The attached proposal is a firm offer for a period of 120 calendar days following receipt, and it may be accepted by MPHI and the Health Care Provider (HCP) for whom the fiber Network (defined in the Work Order) is built without further negotiation (except where obviously required by lack of certainty in key terms) at any time within the 120-day period.

4. I/we agree that the cost of the proposal will not be increased as a result of truly minor modifications to a fiber Span’s Specifications (e.g., change in the location of one of the termination points to a different room in the same building). For modifications that are not minor (e.g., change in the location of one of the termination points to a building at some distance from the original location), I/we agree that the relative magnitude of the change will be the starting point for negotiating cost adjustments (increases or decreases). For example, if moving the termination location changes the length of a Span from 6,000 yards to 6,600 yards, the starting point for negotiations should be an increase of 10 percent in the relevant costs (fiber, installation, et al.). Of course, issues such as the difficulty installing the fiber over the additional 600 yards should also impact negotiations.
5. In preparing this proposal, I/we have not been assisted by any current or former employee(s) of the State of Michigan, the Michigan Public Health Institute (MPHI), or the participating HCP whose duties relate (or did relate) to this proposal or prospective contract and who was assisting in other than his or her official, public capacity. Any exceptions to these assurances are described in full detail on a separate page and attached to this document.

6. I/we understand that MPHI will not reimburse me/us for any costs incurred in the preparation of this proposal. All proposals become the property of the MPHI, and I/we claim no proprietary right to the ideas, writings, items, or samples, unless so stated in this proposal.

7. Unless otherwise required by law, the prices and/or cost data that have been submitted have not been, and will not be, knowingly disclosed by the above-named Contractor, directly or indirectly, to any other contractor or to any competitor prior to MPHI opening bids.

8. I/we agree that submission of the attached proposal constitutes acceptance of the Request for Proposals (RFP) contents. If there are any exceptions to these terms, I/we have described those exceptions in detail on a page(s) attached to this document.

9. No attempt has been made or will be made by the Contractor to induce any other person or firm to submit or to not submit a proposal for the purpose of restricting competition.

10. I/we grant MPHI the right to contact references and others, who may have pertinent information regarding the Contractor’s prior experience and ability to perform the services contemplated in this procurement.

11. I/we have read and understand the RFP, all related legal documents, and related laws applicable to this proposal and shall comply with all aforementioned items, including, but not limited to:
   - FCC Order 06-144
   - FCC Order 07-198 including correction
   - The Telecommunications Act of 1996
   - USAC’s Pilot Program process
   - Local, State, and Federal Laws

12. I/we understand and, if selected, will comply with the all terms, conditions, and specifications of this RFP, including supplements or revisions thereto published on MPHI’s “fiber-build” project website (http://fcc.mpHI.org/fiber), except as expressly stated below:
13. I/we agree to use the “standard Contractor-HCP-MPHI Contract” written by MPHI and published on MPHI’s “fiber-build” project website (http://fcc.mphi.org/fiber)\(^{27}\) under the conditions described in Section 2.6.3 of the RFP, except for sections to which the Contractor objects and wishes to negotiate if it wins the bid. The Contractor should attach a separate page listing each such section and a request to either delete the section or to substitute the Contractor’s alternative language as proposed and presented on the separate page. Also list on the separate page the text of additional provisions that the Contractor wishes to add to the standard Contract.

---

\(^{27}\) The standard Contract will be posted on MPHI’s “fiber-build” project website (http://fcc.mphi.org/fiber) around the time of the Allowable Contract Date (ACD—see Section 2.3 in the main body of the RFP).
14. Neither the Contractor nor any employee of the Contractor has any familial relationship with any member of the MPHI Board of Directors or the individuals identified in Section 2.2 of the RFP, and neither the Contractor nor any employee of the Contractor has any familial relationship with any member of the HCP’s Board of Directors or the HCP’s executive management, except as disclosed in full detail on a separate page and attached to this document.

15. The information contained in the attached bid proposal is true and accurately portrays all aspects of the goods and services or both contemplated by this RFP. The Contractor is aware that any substantive misinformation or misrepresentation may disqualify the bid proposal from further consideration.

On behalf of the firm submitting this proposal, my Signature below attests to the accuracy of the above statements.

Authorized Signature: ______________________________________________________________________
Printed Name: __________________________________________________________________________
Date: ___________________________________________________________________________________
Title: ___________________________________________________________________________________
Contractor (firm name): _____________________________________________________________________
Telephone Number(s): ______________________________________________________________________
E-mail: __________________________________________________________________________________
Fax Number: ______________________________________________________________________________
E. Contractor Questionnaire

### Contractor Questionnaire (page 1)

#### Contractor / Corp. HQ Information

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<thead>
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<th>Name of legal entity</th>
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<td>dba, assumed, or operating names</td>
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<tr>
<td>Total company revenue in 2009 (Smillions)</td>
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</tr>
<tr>
<td>Form of business entity (C-Corp., S-Corp., LLC, et al.)</td>
<td>Year co. founded</td>
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<tr>
<td>If corp., state of incorporation / if LLC, state of formation</td>
<td>No. of years installing fiber</td>
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<tr>
<td>Business focus (services offered)</td>
<td></td>
</tr>
<tr>
<td>Main office - street address 1</td>
<td></td>
</tr>
<tr>
<td>Main office - street address 2</td>
<td></td>
</tr>
<tr>
<td>Main office - city, state, &amp; zip</td>
<td></td>
</tr>
<tr>
<td>Main office - telephone #</td>
<td>Main fax #</td>
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Is another office managing this project? Y or N (circle) If Y, please provide address & tel. on an attached sheet.

#### Primary Point of Contact for Questions about RFP

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<thead>
<tr>
<th>Printed name</th>
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<tbody>
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<td>Job Title</td>
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<td>Street Address 2</td>
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<tr>
<td>Office telephone #</td>
<td>Fax #</td>
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<tr>
<td>Cell phone #</td>
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#### Alternate Point of Contact

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#### Project Manager

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<td>Fax #</td>
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**Contractor Questionnaire (page 2)**

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<th>Accounting Liaison</th>
<th>Title (Mr., Mrs., Ms., Dr., etc.)</th>
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<td>Cell phone #</td>
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<td>E-mail address</td>
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</table>

**Interrogatories**

During the past five (5) years, has the Contractor incurred any damages or penalties or given up or traded anything of value under any of its existing or past contracts as they relate to services performed that are similar to the services contemplated by this RFP and the resulting Contract? Y or N? (circle one) If Y, attach a separate page indicating the reason for the damages/penalties/etc. and an estimated cost of each incident to the Contractor.

During the past five (5) years, under any order, judgment, or decree issued by a Federal or State authority, has the Contractor been barred, suspended, or otherwise limited from engaging in any business, practice, activity? Y or N? (circle one) If Y, attach a separate page that provides the legal citation to the administrative and/or court case(s) and describes the nature of the order/judgment/decree(s) and the reason for its/their issuance.

As a result of any fiber optic installation work the Contractor has performed within the last ten (10) years, were any lawsuits filed or legal actions taken against the Contractor? Y or N? (circle one)

If Y, attach a separate page describing the litigation or action(s).

The person signing below certifies under penalty of perjury that the responses to the three questions immediately above are truthful and accurate to the best of his or her knowledge, information, and belief. This is also to certify that this person/firm/corporation has neither been barred from submitting a proposal on contracts by any agency in the State of Michigan, nor is this person/firm/corporation a part of any firm/corporation that has been barred from submitting a proposal on contracts by any agency in the State of Michigan.

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### Contractor Questionnaire (page 3)

#### References from Similar, Previous Projects

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F. Span (Node-to-Node) Fiber Installation Specifications Sheet

Why This Form Is Necessary

- Each health care provider is required to describe, in detail, the fiber Network it wishes to build. The Network consists of one or more Spans, where a Span is a continuous, linear run of fiber from one location (node or site) to another location (node or site). (Each node/site is described in a separate Node/site Eligibility Checklist.) For each Span, this Specifications Sheet will provide all of the information necessary for bidders to knowledgeable respond to your request for bids.
- The set of Specification Sheets you provide will comprise your organization’s Work Order that will be included in the RFP. Each bidder will have to bid on your entire Work Order (all Spans). Bids on a subset of Spans will be rejected.
- You are responsible for the technical requirements specified in this document, not the Michigan Public Health Institute (MPHI). MPHI is administering the project and facilitating funding but does not claim any expertise in fiber installation. Nonetheless, MPHI will review each Specifications Sheet and reserves the right to reject any clearly inadequate submission (i.e., an incomplete submission, one that contains incongruous requirements, etc.).
- For more information, see the Technical and RFP links on the “Overview of Fiber-build Project” page on this website (http://fcc.mphi.org/fiber/overview).

Instructions

- The requirements common to all Work Orders will be specified in the body of the RFP; this Specifications Sheet should focus on the unique technical specifications of the fiber Span you wish to install.
- The RFP will request bidders to provide a fixed-price quote for the fiber Span’s route engineering, permitting, fiber and hardware components, installation, testing, and documentation. To do that, a bidder will need a crystal clear understanding of what it is being asked to do. Therefore, please address all of the specifications that you believe are relevant. An incomplete or inadequate description will simply generate more questions for the technical contact you list in your Contact Information sheet.
- The following specifications consist of bullet-pointed lists of information that bidders will need, but the lists are not exhaustive. Talk with potential bidders and perhaps consultants about what to specify in this document. The more you know, the better job you will do describing your fiber needs.
- One (1) Specifications Sheet should be completed for each Span. If you attempt to describe more than one Span in a Specifications Sheet, MPHI will not accept it unless there is virtually no possibility that bidders would be confused.
- You may depart from this format, but we encourage you to follow it to the extent you can. Your specifications will be included in the RFP more or less exactly as you submit them.
Span (Node-to-Node) Specifications

1. **Name and Address of Your Organization.** Please specify the legal (incorporated) name of your health care organization and the name and address at which you wish to receive correspondence regarding the project. The name and address should be the same as a name and address on the Contact Information sheet.

2. **Name of Span.** Specify a name for this Span. You might use the names of the termination points specified in numbers 9. and 10. below, e.g., the Alpha Hospital-Omega Clinic Span.

3. **Application(s).** Describe how you intend to use the Span, e.g., what type(s) of data it will carry (e.g., Ethernet data).

4. **Type of ownership interest desired.** To avoid multiple contracts, you must specify the same type of ownership for all of the Spans in your Work Order. Choose either (1) outright ownership by the HCP, (2) IRU (indefeasible right of use), or (3) no preference. Operating (short-term) and capital (long-term) leases are forbidden. IRUs must adhere to the following requirements:
   - The minimum acceptable term is twenty (20) years.
   - The IRU must include contractor maintenance and repair of the Span during the full term of the IRU.
   - IRUs must be paid for with a one-time, upfront, lump sum payment.

5. **Preferred method of installation.** Choose aerial, underground, direct-buried, or to be determined by Contractor as part of its bid. It is permissible to specify different methods for different segments of a Span. Regardless of what is specified here, all Contractors are expected to apply their professional judgment in the formulation of their installation recommendations and bids.

6. **Fiber (individual strand) specifications.** Possible specifications include:
   - Compliant with appropriate standards, e.g., ITU-T G.652.D or OS2
   - Single mode (SM or SSMF, standard single mode fiber)
   - Preferred manufacturer and/or product, e.g., Alcatel SMOF, Corning SMF-28, or Lucent Std. Single Mode
   - Specialty application or type of SM fiber, e.g., G.652
   - Size (core/cladding diameter in microns)
   - Attenuation coefficient (dB/km at appropriate wavelengths), e.g., 0.4/0.25 dB/km
   - Bandwidth, e.g., @ 1310/1550 nm
   - Other
7. **Fiber optic cable specifications.** Possible specifications include:
   - Loose tube or ribbon
   - Preferred manufacturer and/or product
   - Aerial, underground, direct buried, or Contractor determination. Contractors should be required to provide estimates of expected maintenance and repair costs over an expected 20-year lifespan of the fiber.
   - Strand (fiber) count (always add extra fibers)
   - Disposition of each strand (lit, reserved, or dark)
   - Water protection, e.g., gel-filled or dry-water blocked
   - Crush loads or rodent penetration
   - Grounding and bonding
   - Color coding
   - Other
   - Sample cable specs: Loose tube, aerial, 24-strand, etc.

8. **Specifications for hardware or other components.** Besides the fiber and fiber optic cable, specify the additional hardware that is required, if known. In its bid, the Contractor will have to specify the hardware or other components required to install the fiber/cable that has been specified above to the locations specified below.
   - End terminals and transceivers (that include transmitters such as Fabry-Perot Laser [shorter digital links] and DFB Laser [longer, faster links])
   - Regeneration equipment (e.g., optical amplifiers)
   - Other signal conditioning equipment
   - Power, backup, UPS, grounding, etc.
   - Splices (fusion) and connectors (for terminations)
   - Other equipment and hardware components

9. **Termination point A**
   - Building address (complete street address, city, county, and zip – no P.O. Boxes)
   - Location of entrance facility
   - Location of equipment room or suite where terminated
   - Description of support structure for termination of fiber optic cable (wall- or rack-mounted patch panel, etc.)
   - Method of termination, e.g., fusion splicing pigtails on each fiber
   - Labeling

10. **Termination point B**
    - Building address (complete street address, city, county, and zip – no P.O. Boxes)
• Location of entrance facility
• Location of equipment room or suite where terminated
• Description of support structure for termination of fiber optic cable (wall- or rack-mounted patch panel, etc.)
• Method of termination, e.g., fusion splicing pigtails on each fiber
• Labeling

11. **Preferred route.** What is the preferred route? Is this Span part of a loop? What address(es) must the A-to-B Span pass by? On which side of the street? What is the approximate length of the Span (distance from A to B using the preferred route)?

12. **Frequency of splice points.** How frequently should splice points be placed?

13. **Required completion date.** What is the substantial required completion date for the Span? Do not limit the number of bids your receive by unnecessarily imposing an early completion date, especially given the enormous amount of federally funded fiber that will be installed across the State of Michigan over the next couple of years.
G. Detailed OSP Installation Specifications

Applicability of These Specifications

1. Overriding Authority of the Main Body of the RFP

1.1 The specifications and requirements in this Appendix G are intended to supplement and amplify the more general specifications and requirements stated in the main body of the RFP.

1.2 If there are any conflicts or areas of ambiguity, the specifications and requirements stated in the main body of the RFP shall override any specifications and/or requirements stated in this Appendix G, notwithstanding any erroneous written denial the HCP Project Manager may issue under subparagraph 1.3 of this Appendix.

1.3 For the sake of clarity and to ensure that the Contractor is aware of the appropriate specification and/or requirement to use in specific circumstances, Contractor should identify, in writing, how a specification or requirement in this Appendix G conflicts with any specification or requirement in the main body of the RFP or with any standard or code specified in Section 3.4.7 of the RFP. The HCP Project Manager will review Contractor’s statement and, within five (5) business days, issue a written acceptance of Contractor’s statement or a written denial with explanation. If Contractor disagrees with the HCP Project Manager’s denial, Contractor may appeal to MPHI, whose decision is final.

2. Substitution for These Specifications

2.1 Contractor may use different specifications and/or requirements than those stated in this Appendix G if:

2.1.1 They do not conflict with the main body of the RFP.

2.1.2 They do not conflict with any standard or code specified in Section 3.4.7 of the RFP.

2.1.3 Contractor can provide a rationale for using a different specification or standard.

2.1.4 Contractor has obtained written approval from the HCP Project Manager for use of the alternative specification or requirement.

2.2 Notwithstanding the HCP Project Manager’s written approval for Contractor’s usage of an alternative specification or requirement, Contractor will still be liable for failure of a Span to be accepted IAW Section 2.6.6 of the RFP or subsequent technical failure of a Span, regardless of whether such failure is due, in part or in whole, to Contractor’s substitution of a specification or requirement under this Section 2.2 of Appendix G. Contractor will be responsible for the remediation of such failure at Contractor’s own expense.
3. **Standard Industry Practice**

3.1 In the event that neither the main body of the RFP nor this Appendix G describes a specification or requirement that should be used in specific circumstances, Contractor should use the appropriate standard or code specified in Section 3.4.7 of the RFP or, in the absence of such a reference, standard industry practice. Written approval from the HCP Project Manager is not required.

3.2 Contractor will still be liable for failure of a Span to be accepted IAW Section 2.6.6 of the RFP or subsequent technical failure of a Span within the provided warranty period. In such circumstances, Contractor will be responsible for the remediation of such failure at Contractor’s own expense.

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**General Requirements**

4. **Intent**

4.1 To supplement the provisions of Section 3.4.4 of the RFP, “Installation of the Fiber,” by outlining special conditions applicable to project.

4.2 To set forth requirements of performance, type of equipment or structure desired, and standards of materials and construction.

4.3 To describe work set out in Contract Documents, unless otherwise specifically indicated.

4.4 To require performance of complete work in spite of omission of specific reference to any minor component parts.

4.5 Contractor will provide for new materials and equipment unless otherwise indicated.

5. **Right-of-Way**

5.1 Contractor will obtain permits from departments and/or agencies of city, state, county, and federal governments, railroads, and other entities that provide for the placement of facilities within their respective rights of way, unless otherwise indicated.

5.2 Contractor will provide easements for construction on private lands.

5.2.1 Easements and the purchase of property should be avoided, if practical.

5.2.2 All easements must be HCP-approved prior to implementation.

5.2.3 It is required that all easements be acquired through up-front payments with no recurring charges.

5.2.4 Costs for easements must be carefully estimated and included in Contractor’s bid.

5.3 Confine movements of equipment and personnel, storage of materials, excavation, and all other construction operations within the right-of-way provided.
5.4 Contractor will be held liable by Michigan Department of Transportation, local government jurisdictions, schools, and adjacent property owners for damages outside of rights-of-way and easements.

5.5 Ingress and egress will vary according to right-of-way agreements. If necessary, the Contractor will provide gates in fences and remove after completion.

5.6 On freeways, installation must be accomplished without entering the through traffic roadway or ramps. No vehicles, equipment or materials shall be parked or stored upon any portion of the median, through traffic roadway and ramps or shoulders thereof or within the clear zone.

6. **Interruptions to Service**

6.1 Existing utilities will remain in continuous operation during construction.

7. **Construction Facilities by Contractor**

7.1 Provide telephone at which Contractor can be reached by the HCP Project Manager at all times during the working day; provide liaison between telephone and construction personnel for expeditious handling of messages.

   7.1.1 Provide the HCP Project Manager with at least two telephone numbers where Contractor’s representative can be reached evenings, weekends and holidays in event of emergency. Place on construction schedule.

7.2 Location of all construction facilities, including storage yard, subject to approval by the HCP Project Manager; remove all construction facilities upon completion of work.

7.3 Provide and maintain suitable sanitary facilities for construction personnel for duration of work; remove upon completion of work.

7.4 Provide fence, barricades, and/or watchmen to prevent access of unauthorized persons to site where work is in progress.

8. **Plans, Position, Line, and Grade**

8.1 Contractor shall provide HCP Project Manager with one set of plans and specifications (to include “Construction Drawings”) within forty (40) business days after execution of Contract unless otherwise stated in RFP.

8.2 Contractor shall provide the HCP Project Manager with additional and supplemental plans as may be required to show details of construction after approval of Contractor’s Construction Drawings and data on materials and equipment.

8.3 Contractor shall provide the HCP Project Manager with such revised plans and specifications as may be required to show any authorized changes or extra work.

8.4 Contractor shall construct to lines and grades shown on plans or as specified hereinafter.
8.5 Contractor shall establish required benchmarks and base lines as shown on plans.
8.6 Contractor to provide detailed survey and staking for location and elevation of construction.
8.7 Contractor shall provide, without extra compensation, all people and necessary tools to make all test holes and exploration, at any time, for purpose of determining location of existing structures beneath ground surface that might conflict with work of Contractor.
8.8 Contractor shall preserve all monuments, reference points, stakes, and benchmarks set by other entities. In case of destruction by Contractor’s negligence or carelessness, Contractor will be charged with resulting expense of replacement and responsibility for any mistake or loss of time caused thereby.

9. Work Included

9.1 Furnish all plans, materials, labor, and equipment to construct as set out in the RFP, specific Work Order to which the Contractor responded, and the Contractor’s response to the RFP.

10. Information for HCP Project Manager

10.1 After award of contract, submit the following information and Construction Drawings for the HCP Project Manager’s review: manufacturer’s specifications and catalog data for material and such other data as requested by RFP.
10.2 Within 40 business days after award of contract, provide construction schedule showing start and completion of various portions of work and construction plans.
   10.2.1 Purchase orders and subcontracts without prices.
   10.2.2 All materials test reports.
   10.2.3 Proposed equipment and method for boring/jacking; details of boring/jacking pit.
   10.2.4 Proposed equipment and method for trenching.
   10.2.5 Proposed equipment and method for plowing.
   10.2.6 Construction plans, unless otherwise indicated:
       10.2.6.1 Location of facility in relationship to established landmarks.
       10.2.6.2 Public or private right-of-way. Furnish a copy of permit and/or easement in the HCP’s name, unless otherwise indicated.

11. Plans and Specifications

11.1 Contractor will furnish two (2) sets of plans and specifications to the HCP Project Manager after award of contract unless otherwise stated in RFP.
11.2 Contractor will provide one set of plans and specifications for each foreman or superintendent in charge of each crew on job.

12. Responsibility of Contractor

12.1 Protection of Contractor’s work.
12.2 Protection of all property from injury or loss resulting from Contractor’s operations.
12.3 Replace or repair objects sustaining any such damage, injury, or loss to satisfaction of the HCP Project Manager.
12.4 Without limiting these General Requirements (Sections 4 through 20 of this Appendix G), protect flagpoles, sidewalks, streets, pavements, fences, pipe, conduit, utilities, trees, shrubs, and structures.
12.5 Cooperate with the HCP Project Manager and representative of utilities in locating underground utility lines and structures; incorrect, inaccurate, or inadequate information concerning location of utilities or structures shall not relieve Contractor of responsibility for damage thereto caused by Contractor’s operations.
12.6 Contractor will locate underground lines of third parties in the cable route area. Contractor will call the “Miss Dig” System or an appropriate alternative prior to any work commencement. Contractor will directly contact any utilities not participating in the “Miss Dig” System. Contractor will hold a single locate “precon meeting” for all utilities. It will be the Contractor’s responsibility to document the name, address, phone, and fax number of all persons present at meeting plus the location confirmation number by project. All the aforementioned documentation will be supplied to the HCP as part of the “as built” package. Contractor will be responsible for hand digging any crossing such as pipeline, drainage tile, cable, or any other buried facility prior to working in the area. Since all drawings are generally diagrammatic and not all utilities are included on them, the Contractor will take every precaution necessary to avoid damage to any underground facility.
12.7 Keep cleanup current on a daily basis with construction operations.
12.8 Comply with all federal, state, and city laws and ordinances.
12.9 Contractor shall assume full responsibility for safekeeping of all materials and equipment and for all unfinished work until final acceptance by the HCP. Materials and equipment that are damaged or destroyed from any cause shall be replaced at Contractor’s expense.
12.10 Contractor shall issue written receipts for all such property and account to HCP for any damage to or loss of such property while in its custody or control.
12.11 If HCP is providing warehousing with security for cable, conduit, and other OSP materials on a temporary basis, it will be the responsibility of the Contractor to arrange for their own storage facilities and delivery of material from the HCP’s warehouses. Should a Contractor elect to provide its own storage facilities in its particular area, then Contractor will be solely responsible for any materials supplied to that facility by HCP. The HCP may require the
subcontractor to furnish Builders Risk Insurance for this material at the Contractor's expense. Security for the job site areas is the responsibility of the Contractor. Subcontractor is to comply with the security requirements of Owner’s site security and other applicable entities.

13. Contractor’s/Subcontractor’s Employees

13.1 Contractor shall personally supervise subcontracted work or provide a capable superintendent satisfactory to the HCP Project Manager. Superintendent shall be authorized to receive instructions from the HCP Project Manager or his or her representative.

13.2 Contractor/subcontractor shall have its company name clearly displayed on each owned or leased vehicle and on all equipment.

13.3 Each contractor/subcontractor employee shall carry a business card with his or her employer’s company name, phone number, and fax number listed.

13.4 Contractor/subcontractor shall at all times be deemed to be representing and/or performing as an independent contractor and not as an agent or employee of HCP or MPHI.

14. Safety

14.1 No job is so urgent that one cannot take time to perform work safely.

14.2 Safety is the foremost concern in any contract operation. Unsafe acts or operations will not be tolerated, to the point of termination of the Contract.

14.3 Compliance with all Federal, State, and local laws, ordinances, and regulations concerning health and safety is mandatory.

14.4 Hard hats must be worn by all personnel in installation areas at all times.

14.5 During work in right-of-ways of interstate, secondary, and other roadways, hard hats and reflective vests will be worn.

14.6 Traffic cones, flagmen, and warning signs will be inspected each day at each work site.

14.7 Contractor will provide evidence that a written Confined Space Procedure, complying with the latest OSHA standards, will be adhered to. The Contractor will provide a copy of its written procedure to HCP prior to any work that may involve entering a confined space.

14.8 All excavations left unattended or open shall be properly barricaded or plated (steel plate if in the street) until temporarily backfilled or complete restoration has been performed. During any non-working hours, Contractor shall place steel plates over any open trenches that would pose a threat to vehicular traffic. The steel plates shall be of sufficient thickness to withstand the weight of a vehicle and anchored in place to prevent movement. Open trenches and holes, not exposed to vehicular traffic, will be encircled by flexible orange snow fence and shall also be covered with plywood (or equal) and anchored in place.
Plywood (or equal) shall be of sufficient thickness to withstand the weight of the anticipated traffic.

15. **Barricades and Lights**

12.1 For protection and warning of pedestrians and vehicles, erect and maintain barricades and lights and/or provide watchmen in conformance with the current Manual of Uniform Traffic Control Devices (MUTCD). All barricades, lights, and/or watchmen must be provided at the expense of Contractor.

12.2 All signs, barricades, lights, and other traffic control devices used on the project shall be furnished, installed, and maintained by Contractor; all traffic control devices shall be maintained in a state of good repair and shall be cleaned and washed periodically as needed.

16. **Line and Grade**

16.1 Contractor shall provide benchmarks, base lines, and other reference points. Contractor shall provide competent men and tools, stakes, and other materials as required, establishing temporary or permanent reference marks in connection with the work. Contractor shall perform such detailed measurements as required to properly lay out and construct work.

17. **Testing Cable**

17.1 The Contractor/Subcontractor shall be responsible for on-reel verification of cable quality prior to placement.

17.2 Completed test forms on each reel shall be submitted to the HCP Project Manager.

17.3 Contractor assumes responsibility for the cable after testing. This responsibility covers all fibers in the cable.

17.4 The Contractor shall supply all tools, test equipment, consumables, and incidentals necessary to perform quality testing.

17.5 The cable ends shall be sealed upon completion of testing.

18. **Decisions by HCP Project Manager**

18.1 The HCP Project Manager shall make decisions, in writing, on claims between Contractor and HCP within a reasonable time after presentation. Such decisions shall be regarded as final except for appropriate legal recourse.
19. HCP Right to Do Work

19.1 If Contractor neglects to prosecute work properly or fails to perform any provision of this contract, the HCP, after three (3) days’ written notice to Contractor, may, without prejudice to any other remedy it may have, make good such deficiencies and may deduct the cost thereof from the payment then or thereafter due the Contractor from HCP, provided, however, that the HCP Project Manager and MPHI shall approve both such action and amount charged to Contractor.

20. Cleaning Up

20.1 Contractor shall keep premises free from accumulations of waste material or rubbish caused by its employees or work. After completion of work, it shall remove all its rubbish and all its tools, scaffolding, and surplus materials from work site. It shall leave its work “broom clean” or its equivalent, unless more exactly specified. In case of dispute, the HCP may remove rubbish and charge cost to Contractor, as the HCP Project Manager shall determine to be just.

Special Construction

21. General

21.1 Procedures outlined below are not intended to fully cover all special procedures or emergencies which may arise during construction. Contractor will cooperate with government entities, hospitals, schools, and other institutions to minimize inconvenience, construction delays, and interruptions to continuous operation of existing fiber facilities.

21.2 Determine location of all underground utilities before starting excavation work; locations of underground appurtenances are approximate and not guaranteed by HCP.

21.3 Remove and replace all signs and other appurtenances that interfere with construction operations; replace damaged signs at no cost to HCP.

21.4 Limit construction operations to all provided property, rights-of-way, and easements. Provide barricades, lights, signs, and detours as necessary to reroute traffic around construction areas.

21.5 Arrange with operating utilities for relocation or temporary removal of utilities in conflict with construction and for service needed during construction, at no cost to HCP.

21.6 Dispose of materials removed during construction at locations as approved by Contractor’s Engineer.

21.6.1 Dispose of waste products containing prescribed materials at approved landfill.
21.6.2 Dispose of surfacing, broken concrete or rubble, excess excavated materials, and spoil.
21.6.3 Place excess excavated material at locations designated by Contractor’s Engineer.
21.7 Notify businesses and residents two days in advance when construction will disrupt or block access to property.
21.8 Provide snow fence along boundaries of construction area as specified hereinafter and as directed by the HCP Project Manager.
   21.8.1 Install snow fence when area is prepared for excavation. Install on steel posts with maximum spacing of 8’. Maintain until work is complete.
   21.8.2 Provide snow fence around all open trenches or open structures when left unattended.
   21.8.3 Provide snow fence to keep livestock away from construction activities.
21.9 Backfill trench as construction progresses.
21.10 Cleanup and provide surface restoration as work progresses.
21.11 Protect survey markers of lot corners.

22. Cooperation with Others

22.1 Advise all utilities (telephone, electrical power, natural gas, water, cable television, et al.) prior to excavating in area where construction might affect underground telephone, electrical power, natural gas, water, cable television, or other service. Advise each utility of proposed construction schedule as it relates to services the utility provides.

23. Continuity of Existing Utility Systems

23.1 Prepare detailed construction procedure schedule after award of contract: show definite and positive action to be taken to minimize disruption to utility systems.
23.2 Meet with all utilities to determine operability of isolation to determine area for which service would be shut off for each utility.

24. Survey Markers

24.1 Contractor is responsible for hiring registered land surveyor to inventory existing pipe, pins, and registered survey lot corners disturbed by construction. Land surveyor is responsible for setting reference markers required to re-establish location of existing pipe, pins, and registered survey lot corners. Land surveyor will not be required to certify pins or pipe replace as being lot corners. Replace all markers disturbed by construction, including where more than one pipe, pin, or other marker are present at a location, replacing all markers in same location as removed. Provide drawing to HCP showing locations where
markers were found and reset (dimensional data not required on drawing). Each pipe, pin, or marker replaced must be the identical marker removed at that location.

25. Payment

25.1 No separate payment will be made for work covered under this part of the Specifications.

Excavation and Backfill

26. General

26.1 Protect existing pavement from damage during construction if not being removed; if damage occurs, replace in kind at no cost to HCP.
26.2 Remove, replace, and repair items such as fences, storm drains, signs, hanging wires, and other obstructions to accommodate construction equipment or to facilitate excavation; cost to remove and replace is incidental to construction.
26.3 Haul away and stockpile excavated material suitable for backfill; haul remainder of excavated material to an authorized waste site.
26.4 Remove soil not suitable for backfill; removal is incidental to construction.
26.5 Where new work crosses existing utilities or utility services, excavate in advance of construction; determine crossing arrangement including exact construction line and grade. As specified in Section 12 of this Appendix G, “Responsibility of Contractor.”
26.6 Bore or jack under existing streets, utilities, and structures except as noted on plans or as modified by the HCP Project Manager.

27. Excavation for Structures

27.1 Includes excavation for manholes and other appurtenances.
27.2 Excavate as required to firm, undisturbed soil for laying conduit. In the case of hand-holes/manholes, excavate six (6”) inches below bottom of structure and fill with six (6”) inches of ¾” river rock at no expense to HCP.
27.3 Provide sheeting, shoring, and bracing where required to hold walls of excavation or to protect existing structures or utilities.
27.4 When unstable material is encountered which will not, in the opinion of the HCP Project Manager, provide suitable foundation, remove and replace with granular stabilizing material as directed by the HCP Project Manager in writing, cost incidental to construction.
28. Trench Excavation

28.1 Keep width of trench as narrow as possible and still provide adequate room for backfilling and jointing.
28.2 Keep sides of trench as nearly vertical as practicable; comply with federal and state safety regulations.
28.3 Excavate by hand:
   28.3.1 Under and around utilities.
   28.3.2 Where overhead clearance prevents use of machines.
   28.3.3 To protect trees and shrubs.
28.4 Remove top 18” of topsoil and store in segregated stockpiles for backfill prior to trench excavation.
28.5 The trench shall be as straight as practical. The bottom of the trench shall be smooth and free from any sharp edges. The trench shall be kept clear of debris and loose rock. All changes in trench grade shall be gradual.
28.6 The length of open trench shall not exceed 100’ feet at the end of each working day. Any open trench, bore pit, or pothole shall be fenced, covered, or otherwise barricaded to protect the general public at all times. Exceptions are subject to approval by the HCP Project Manager. Good judgment and care must be exercised to prevent persons from falling into the open trench, or other damages.

29. Rock Sawing

29.1 Solid rock is defined as a consolidated rock that cannot be plowed to the specified depth. Frozen ground is not considered solid rock.
29.2 Where solid rock is encountered, the cable will be protected by steel, PVC conduit, or high-density polyethylene conduit (HDPE) at the discretion of the HCP or its authorized representative.

30. Rock Excavation (Not Recommended)

30.1 Use of explosives: submit detailed plans outlining all proposed blasting operations, locations, methods, and use of mats and other safety measures.
   30.1.1 Obtain written approval from the HCP Project Manager and Contractor’s Engineer before using explosives.
   30.1.2 Provide Special Hazard Insurance covering liability for all blasting operations.
   30.1.3 Use thoroughly experienced demolition personnel.

31. Rubble Excavation

31.1 Rubble, as specified and defined herein, may be encountered along the route.
31.2 Removal: as specified for rock.
31.3 Use of explosives: as specified for removal of rock.

32. Sheeting, Shoring, and Bracing

32.1 Minimum shoring requirement: equivalent construction procedure to use of “sand box” to provide 8’ vertical protection; provide stacked sand boxes as required to maintain construction within construction limits.
32.2 Construct sheeting, shoring, and bracing to hold walls of excavation to provide safety for workmen, to protect existing utilities or structures, or to permit construction in the dry. Sheetin operations which, in the opinion of the HCP Project Manager, cause excessive vibration will not be allowed.
32.3 Leave sheeting and shoring in place when removal, in the opinion of the HCP Project Manager, might damage new facility, existing utilities, or structures.
32.4 Sheetin, shoring, and bracing are incidental to construction; include cost in appropriate unit cost.

33. Dewatering

33.1 All work must be done in a dry environment; if the method of dewatering might raise concerns, obtain the HCP Project Manager’s approval.
33.2 Provide for handling of water encountered during construction.
33.3 Lay no pipe/fiber in or pour no concrete on excessively wet soil.
33.4 Prevent surface water from flowing into excavation; remove water as it accumulates.
33.5 Divert stream flow away from areas of construction.
33.6 Do not pump water onto adjacent property without approval of the HCP Project Manager.
33.7 Dewatering is incidental to construction; include cost in appropriate unit cost.

34. Existing Utilities

34.1 Hold a preconstruction meeting 3 days prior to beginning construction. Document meeting with a sign-in sheet detailing names, addresses, and phone & fax numbers of company representatives present. Take minutes of meeting and provide documentation with as-built package.
34.2 Locations of utility lines, mains, cables, and appurtenances are the responsibility of Contractor. Confirm locations of underground utilities by excavating ahead of work. Contractor is fully responsible for damage to utilities during construction.
34.3 Protect services during construction.
   34.3.1 If utility services are in direct conflict with line and /or grade of new facility, notify HCP immediately; provide all necessary shut-down,
repair, and relocation where conflicts occur; furnish labor, equipment, pipe, and fittings; repair and relocation will be paid by Contractor; when broken due to carelessness, repair is incidental to construction.

34.3.2 Support and protect, by timbers or other means, all utility pipes, conduits, poles, wire, and other apparatus that will not be moved; protective measures are subject to the approval of the HCP Project Manager.

34.3.3 No utility or utility service will be moved to accommodate equipment employment, to accommodate method of operation, or for the convenience of Contractor when utility or utility services does not conflict directly with line and grade of work.

35. Tree Removal

35.1 Remove trees only in conflict with alignment of trenches or location of structures.
35.2 Removal includes grubbing and removing stump and roots, removal from site, disposal of debris, and backfilling.
35.3 Tree and bush removal is incidental to construction; include cost in applicable unit price.

36. Backfill for Structures

36.1 Backfill after concrete, masonry, or glue has cured, and waterproofing, if specified, has been inspected and approved by the HCP Project Manager and Contractor’s Engineer.
36.2 Backfill with material removed from excavation; use no debris, frozen earth, large clods, stones, or other unsuitable material.
36.3 Backfill simultaneously on all side of structure; save structure from damage at all times.
36.4 Terminate at original grade or at elevation shown on plans; dispose of excess excavation as directed by Contractor’s Engineer.
36.5 Prepare backfill for surface restoration as specified for adjacent trench.

37. Trench Backfill

37.1 Backfill trench immediately after Contractor has recorded sequence marking on cable or location of connections and appurtenances or at the HCP Project Manager’s direction; backfill with select material excavated from trench.
37.2 Use no large stones, large clods, organic matter, rubbish, or frozen or unsuitable materials in backfill; furnish extra soil from site to complete backfilling at no extra cost to HCP; remove and dispose of unsuitable material; backfill simultaneously on both sides of pipe to prevent displacement.
37.3 Hand place and carefully compact backfill to 1’ over top of facility.
37.4 Backfill 1’ over top of facility in layers not to exceed 18”; where compacted backfill is shown on plans, compact to minimum 95% maximum density.
37.5 Backfill above PVC pipes:
   37.5.1 Backfill with pipe bedding material to minimum 6” above top of pipe; do not drop pipe bedding material from equipment bucket more than 2’ above pipe; all pipe bedding material, including backfill material, is incidental to construction.
   37.5.2 Above pipe bedding material, backfill with excavated material, except frozen material, shale, and other non-suitable material; do not drop backfill material from equipment bucket more that 2’ above bottom of trench until backfill material is in place 18” above bedding backfill material.
   37.5.3 Consolidate bottom 6” of trench backfill with hand tools and tampers; do not use vibratory plate compactor until above bottom 18” of trench backfill.
   37.5.4 Cable marking ribbon shall be installed above all trenched direct-buried HDPE/conduits. The ribbon shall generally be placed at a depth of 12” inches below grade and directly above the fiber/HDPE/conduits.
   37.5.5 Splice boxes/hand-holes will be placed at all splice locations. Hand-holes will be placed at intervals of approximately 1,000’ feet, change of direction greater than 15%, and as shown on Construction Drawings and typical drawings. Hand-holes may be moved to locations more practical when necessary upon approval by the HCP Project Manager.

38. Surface Restoration

38.1 All trenches: replace 18” of topsoil removed during excavation.
38.2 Grade tops of trenches to smooth, uniform lines without large lumps, clods, or debris.
38.3 Dispose of all brush and rubbish IAW Section 21.9 of this Appendix G; removal is incidental to construction.
38.4 Sod/seed all areas disturbed by construction unless otherwise shown on plans or as directed by the HCP Project Manager.
38.5 Prepare site for seeding by diskimg, harrowing, and hand raking, or by other means, following site grading; work soil to depth of 3”.
38.6 Precede seeding with uniform application of commercial grade fertilizer at rate per acre of 20 lbs. of nitrogen, 40 lbs. of phosphorous, and 20 lbs. of potassium (400 lbs. of fertilizer grade 5-10-5 per acre, or approved equal), or as appropriate for soil type and climate; cultivate area 3” deep and work with harrow within 24 hours before seeding; smooth surface to eliminate clods and lumps before seeding.
38.7 Seeding in street parking, lawns, and developed areas (Type 1): Seed at rate of 85 lbs. per acre.
38.8 Seeding in City rights-of-way, railroad rights-of-way, pastures, farm fields, and creek banks (Type 2). Seed at the rate of 1.25 lbs. per 1,000 square feet.
38.9 Seed between dates of August 15 and October 15 or between dates of April 1 and May 30.
38.10 Cover seed by rolling with cultipacker, or by dragging or hand raking.
38.11 Mulch all seeded areas. Mulch: dry oat straw at a rate of 4,000 lbs. per acre. Stabilize mulch with tiller designed to anchor mulch to soil.
38.12 Water seeded area sufficiently to saturate seed bed; continue watering all areas until growth is established.
38.13 Contractor is responsible for growing a full stand of grass; replant or redevelop bare spots or areas not attaining full stand of grass during first growing season.
38.14 No separate payment will be made for work covered in this part of the specifications.

39. Street and Driveway Replacement

39.1 Replace surface with new surfaces to match construction for type, size, and surface texture unless otherwise specified.
39.2 Gravel or crushed stone:
   39.2.1 Place 6” compacted crushed stone in top of trench and compact in two lifts.
   39.2.2 Place additional compacted crushed stone beyond trench limits to widths shown on plans to restore to existing conditions; minimum thickness of 2”.
   39.2.3 No separate payment will be made for work covered in this part of the specifications.

40. Field Drain Lines

40.1 Field drain lines may be encountered along route of new sewer; notify the HCP Project Manager if drain conflicts with facility construction.
40.2 Where new facility crosses under field drain lines, replace with a length of Schedule 40 PVC pipe; match size of existing drain line; cut 1/8” to 1/4” wide slots at 12” centers transverse to pipe for slots on bottom; replacement paid for by Contractor.
40.3 Where new facility parallels field drain lines, replace damaged field drain lines; match size and material of existing drain line.
40.4 No separate payment will be made for work covered in this part of the specifications.

41. Fence Removal and Replacement
41.1 Remove fence for construction access as required within easements.
41.2 Miscellaneous fence removal and replacement is incidental to construction; restore fence to original or better condition; replace wooden fence posts with new posts unless directed otherwise by the HCP Project Manager or Contractor’s Engineer.
41.3 No separate payment will be made for work covered in this part of the specifications.

42. Directional Boring

42.1 This includes all labor, equipment, and materials to install a minimum of one 1.25-inch-diameter HDPE using directional boring techniques. The running line of the duct shall be kept straight and level unless otherwise specified in the final Construction Drawings. Any changes, either vertical or horizontal, shall be gradual and not to exceed 1.5” (inches) deviation in less than 6” (inches). Special care shall be taken to insure that the duct connection between bores be kept straight and level. When installing inner-ducts, conduits shall be color coded or marked to aid in identifying the respective ducts. This color-coding shall be observed during connection to assure duct continuity.
42.2 This unit also includes any pothole excavation for whatever purpose along with the pothole restoration. The barricading and safeguarding of pothole excavations shall comply with the Excavation and Backfill sections of this Appendix G (Sections 26 through 43). Backfill and restoration of excavation shall comply with Federal, State, or local governing agency requirements.
42.3 Entrance of HDPE conduits into manholes and hand-holes/splice boxes shall be in a level and straight line to facilitate installation of fiber optic cable.
42.4 Every effort shall be made to maintain a minimum of twelve (12”) inches of clearance between HCP’s conduit and other utilities.
42.5 The boring machine shall be grounded at all times during operation. The grounding method shall comply with the manufacturer’s guidelines and requirements. Adequate barricades shall be erected to limit access to boring machine operation personnel only.

43. Payment

43.1 No separate payment will be made for work covered in this part of the specifications.

Pipes and Structures
44. Pipe Materials

44.1 Polyvinylchloride pipe (PVC)
44.2 Steel casing pipe: 0.25” under roadway; use for casing pipe where shown on plans.
44.3 HDPE
44.4 Plenum raceway

45. Pipe Joints

45.1 Polyvinylchloride (PVC) schedule 40: couplings and/or integral bell
45.2 HDPE connectors: approved by the manufacture
45.3 Steel pipe
45.4 Plenum connectors approved by the manufacture

46. Joint Protection and Inspection

46.1 Carefully protect joints from injury while handling and storing pipe.
46.2 Use no deformed, gouged, or otherwise impaired joints.
46.3 Clean bell and spigot surface of dirt and foreign matter before jointing pipe.
46.4 Use cleaner or primer.
46.5 Make joints in strict accordance with manufacturer’s recommendations.

47. Pipe Installation

47.1 All inner-duct, HDPE or conduit shall be tagged or color-coded.
47.2 Before laying pipe, verify all measurements at site; make necessary field measurements to accurately determine pipe make-up lengths or closures.
47.3 Keep pipe free of all dirt and foreign material
47.4 Use no defective pipe; check each length for defects and hairline cracks at ends prior to lowering into trench.
47.5 Lower pipe carefully into trench.
47.6 Pull joints together with equipment recommended by pipe manufacturer; do not use backhoe or similar equipment to push joints together.

48. Connections between Dissimilar Pipes

48.1 Provide manufactured adaptor or coupling.

49. Pipe Conflicts
49.1 Where pipe parallels an existing facility, maintain at least 1 foot of separation.
49.2 Where pipe crosses an existing facility, maintain at least 1 foot of separation.
49.3 Provide all necessary shut-down, repair, and relocation of existing facilities where conflicts occur; furnish labor, equipment, pipe, and fittings; repair and relocation will be paid by Contractor. When existing facility is damaged due to carelessness, repair is incidental to construction.
49.4 Resolve conflicts as specified in Sections 26 through 43 of Appendix G, “Excavation and Backfill.”

50. Tracer Wire Installation

50.1 Tracer wire shall be placed with all HDPE conduit installed unless armored or traceable cable is used. The Contractor will provide the tracer wire and shall install, splice, and test (for continuity) the tracer wire. If the tracer wire is not placed or is broken during installation, the Contractor shall notify the HCP Project Manager immediately. The area of the route that does not have tracer wire installed shall be identified on the as-built documents submitted by the Contractor.

50.2 For multi-duct installation, install a 5/8” x 8’ copper clad ground rod in the hand-hole located on public right-of-way. Place a #12 insulated copper locate wire from the ground rod to the fiber optic termination room or to the outside of the building directly below the pull box and terminate on one side of an insulated indoor/outdoor terminal block with copper connectors. Run a #12 copper wire from this terminal block to the master ground bar in the fiber optic termination room or place a ground rod on the outside of the building. Locate block in an accessible location. This is for “locate purposes only,” not for grounding purposes. Note on as-built where ground is placed and tag locate wire as “locate wire.”

51. Proofing the Duct

51.1 All inner-duct, conduit/multi-duct will be proofed upon completion to verify continuity and integrity of the duct by pulling a solid rubber mandrel or a mandrel of other solid material such as steel or aluminum. The mandrel shall be at least 6” long and 1” in diameter. The preinstalled mule tape of polypropylene rope may be used for this purpose, but the tape or rope must be reinstalled upon completion of proofing. The reinstalled tape or rope must be free of damage, equal to its original integrity, and free of other defects that would render it unsuitable for cable pulling.

52. Multiple Duct Installation
52.1 This item includes all labor, equipment, and certain materials required to install four (4) 1.25” I.D. HDPE conduits in controlled access roadways and other locations as provided in the utility accommodation policy. The HDPE conduits will be of different colors and will be plowed in place in such a manner that the duct to contain the HCP cable will be on top. The duct containing the HCP cable will be pre-inserted with a .25” nylon rope. All ducts shall have continuity.

52.2 Hand-holes will be installed every mile to facilitate pulling, preferably at highway mileposts. However, hand-holes may be moved to locations more practical when necessary upon approval by the HCP Project Manager. All ducts shall enter and exit the hand-holes. Should mid-assist points become necessary when pulling the cable, the ducts shall be spliced together in a watertight condition. Upon completion of cable placement, hand-holes will be duct-plugged and gopher-proofed.

53. Manholes/Hand-Holes

53.1 Use non-shrink grout between pipe and manhole block out.

54. Payment

54.1 No separate payment will be made for work covered under this part of the specifications. Where per-item pricing is included in Contractor’s bid, the following shall apply.

54.2 Pipe in Place, LF

54.2.1 Unit price includes furnishing pipe, handling, laying pipe bedding if required, materials, trench excavation, dewatering, connections between dissimilar pipes, connections to existing system, connections of existing pipes and appurtenances, sheeting, shoring and bracing, backfilling, service connections, tree and brush removal, surface restoration including seeding, fencing, and miscellaneous associated work.

54.2.2 Length will be measured along centerline of pipe with no deduction for manholes, i.e., including manholes.

54.3 Standard Manholes. Each unit price includes furnishing, installing, excavating, concrete, frame and cover, connections of or to existing facilities, backfill, and miscellaneous associated work for manholes 0 - 10’ deep. The diameter of manhole should be as shown on plans or as specified.

54.4 Hand-holes. Each unit price includes furnishing, installing, excavating, frame and cover, connections of or to existing facilities, backfill, and miscellaneous associated work.

55. Bedding Requirements
55.1 Bedding for manholes/hand-holes: lay manholes/hand-holes on 6” deep bedding material (3/4”river rock). Fill around perimeter of manholes/hand-hole to minimum depth of 6” deep bedding material (3/4”river rock). Compact all bedding material by vibration.

56. Payment

56.1 No separate payment will be made for work covered under this part of the specifications.

**Specifications for Buried Installation of Fiber Optic Cable**

57. General

57.1 This specification covers the buried installation of a fiber optic cable by various methods for the HCP’s Network. Methods of direct burial are plowing, trenching, or boring. Sections designated by the Contractor and crossings such as roads and streams shall be installed with external protection as specified herein. Installation of hand-holes for use as pull boxes and splice boxes is covered herein, as is any work required at regenerator sites.

57.2 As required, the cable shall be removed from the reel by approved methods and pulled through the pipe crossings or under other utilities and replaced on the reel to continue the installation operation. The cable will be installed in various lengths as determined by the Work Order and Contractor.

57.3 Hand-holes will be installed per the applicable standard drawing at intervals or locations called for in the specifications or drawings. Bends of small radii and twists that might damage cable shall be avoided. During the placing operation, cable shall not be bent in a radius less than 20 times the outside diameter of the cable.

58. Material

58.1 Compatible/Specified Material: Contractor will furnish the materials listed below:

58.1.1 All rack mounted bulkheads or FDP’s shall be equipped with SC style connectors.

58.1.2 Warning tape

58.1.3 Hand-holes

58.1.4 S.I.P. pedestals

58.1.5 Sign post & signs

58.1.6 Ground rods & clamps, bare #6 wire
58.1.7 PVC pipe - Schedule 40
58.1.8 GIP
58.1.9 BIP
58.1.10 Cable lubricant
58.1.11 Pulling rope - 600 lb test
58.1.12 Concrete for sidewalk, curb, and gutter replacement shall conform to standard specifications for highway and bridge construction.

59. Bridge Attachments

59.1 Bridge Attachments. Pipe for bridge attachments shall be hot-dipped galvanized rigid steel. Attachments to steel bridges will be accomplished by the use of approved galvanized beam clamps and hangers. Drilling steel bridge structures is not allowed. The attachment to concrete bridge structures will be accomplished by the use of expanding anchor bolts in drilled holes. The use of driven or explosive set anchors will not be permitted when not shown on plans. Exposed ducts shall be supported at intervals of 6' or less. Approved expansion joints will be installed at all bridge structure joints and in no case will exceed 100 LF intervals. Weep holes of 1/4" diameter will be drilled at 20' intervals, and 12" above ground level.

60. Protection of Material

60.1 Contractor shall be responsible at all times for protecting the exposed portions of the cable from damage, including intrusion of water. Cable ends will be left at splice locations with sufficient protection to prevent water from entering the cable ends. The Contractor shall replace or repair at the HCP's option, and damage that occurs to the cable as a result of insufficient or improper protection of the cable.

61. Reporting Cable Damage

61.1 The cable may be inspected by the HCP during the plowing or trenching operation prior to its installation in the project to be certain that it is free from defects. Cable damage due to the Contractor negligence will be the responsibility of the Contractor. Every instance of damaged cable observed at any time shall be immediately called to the attention of the Contractor, whether prior to installation, during construction, or during test or observation subsequent to installation. The method of repair or correction of such damage shall be in accordance with the written instructions of the HCP Project Manager. The Contractor shall make repairs or corrections promptly.
62. Cable Repairs

62.1 Minor damage to the outer jacket of the cable observed prior to or occurring during construction shall be repaired in accordance with instructions from the HCP Project Manager.

62.2 Cable damage in excess of minor damage to the outer jacket, which is observed prior to or during construction, shall be corrected as follows:

62.2.1 The damaged section of cable shall be enclosed in (1) a buried housing located as specified by the HCP Project Manager or in (2) a buried cable splice enclosure if approved by the HCP Project Manager, buried to the same depth as that specified for the cable. If the shield has been broken or the conductor insulation damaged, the cable shall be restored to the equivalent of new condition. This may require cutting out the damaged section of cable if required by the HCP Project Manager. It may also require the replacement of an entire section between two existing hand-holes. Determination of the method of correction will be at the HCP's sole discretion.

62.3 Damage to cable discovered after burial, either through test or observation, shall be repaired as follows:

62.3.1 The damaged section of the cable shall be repaired as approved by the HCP Project Manager. This may require cutting out the damaged section and replacing it with a short section of new cable with splices made in (1) buried hand-holes or (2) buried cable splice enclosures, if approved by the HCP, which are buried to the same depth as required for the cable. It may also require the replacement of an entire section between two splice points. Determination of the method of correction will be at the HCP's sole discretion.

63. Depth of Burial

63.1 Except where otherwise specified, the cable shall be placed to a minimum depth of 36 inches unless otherwise approved by the HCP Project Manager. Greater cable depth will be required at the following locations.

63.2 Where cable route crosses roads, the cable shall be placed at a minimum depth of 48" below the pavement or 36" below the parallel drainage ditch, whichever is greater, unless the controlling authority requires additional depth, in which case the greatest depth will be maintained.

63.3 Where the cable route crosses railroad rights-of-way, the cable shall be placed at a minimum depth of 60" below the railroad surface or 36" below the parallel drainage ditch, whichever is greater, unless the controlling authority requires additional depth, in which case the greatest depth will be maintained.

63.4 Where cable crosses existing sub-surface pipes, cables, or other structures: at foreign object crossings, the cable will be placed to maintain a minimum of 12" clearance from the object or the minimum clearance required by the object’s owner, whichever is greater.
63.5 Where cable crosses small gullies, ditches, or washes, the cable will be placed at a minimum depth of 48” below the flow line of the waterway unless the HCP Project Manager specifically waives this requirement. Such determination shall be made by the Contractor’s field representative and recorded on the as-built drawings. In no case shall the cable be placed at less than the 36” minimum depth.

63.6 Where cable crosses large/major gullies, ditches, streams, rivers, washes, or areas prone to flooding, the cable will be placed at a minimum depth of 10’ below the flow line of the waterway unless the HCP Project Manager specifically waives this requirement. Such determination shall be made by the HCP Project Manager and recorded on the as-built drawings. In no case shall the cable be placed at less than the 36” minimum depth.

63.7 Additional cable depth required to satisfy the preceding items shall not be construed as Extra Work.

63.8 Where rock excavation is required, a minimum cable depth of 24 inches may be allowed, with the HCP’s written approval, when the cable has additional protection of Contractor-provided PVC or HDPE conduit. Otherwise, the minimum depth for placement in rock will be 36”.

63.9 Where there is a layer of soil over rock, the minimum depth that the Contractor may be allowed shall be the shallower of: 1) the minimum depth of trench in rock, measured to the soil-rock interface; or 2) the minimum depth in soil, measured to the surface.

63.10 At other locations, depth shall be specified by the HCP Project Manager.

64. Cable Marking Ribbon

64.1 The cable marking ribbon shall be installed above all direct-buried cable and conduit. The ribbon shall generally be placed at a depth of 12 inches below grade and directly above the cable or conduit.

65. Hand-Holes (Splice Boxes)

65.1 At all splice locations, hand-holes will be placed as splice vaults. Hand-holes may also be placed at the end of conduit runs to serve as pull boxes for the cable, at the option of the Contractor.

65.2 Hand-holes will be set at all regeneration stations, at entrances to terminal stations, and at other locations required by the Contractor and/or shown on the Construction Drawings.

65.3 Hand-holes shall be of the type shown on the applicable standard drawing. Hand-holes shall be installed in accordance with the standard drawing.

65.4 Hand-holes shall be spaced to allow sufficient length (75”) of cable at each end of the reel to be coiled in the hand-hole.

65.5 After placing the hand-hole, Contractor shall backfill to a level even with the top of the hand-hole. The excavation shall be left in the above condition until
The splice has been completed by others. The Contractor shall complete the backfill of hand-hole pit in accordance with the Construction Drawings and with the “Excavation and Backfill” sections (Sections 26 through 43) of this Appendix G.

66. Cable Plowing

66.1 General
66.1.1 The Contractor shall be familiar with general guidelines covering the construction of buried communications cable.
66.1.2 The equipment and construction methods used by the Contractor shall be such as to cause minimum displacement of the soil.
66.1.3 Damage to banks, ditches, driveways, and roads caused by the equipment shall be immediately repaired to the satisfaction of the HCP Project Manager and public authorities having jurisdiction over highway and road rights-of-way.
66.1.4 Where cable is buried near the edge of pavements, the Contractor shall take particular care to avoid damaging the pavement. If such damage does occur, repairs shall be made immediately to meet the complete satisfaction of state or local authorities having jurisdiction over the pavement.

67. Plowing Equipment Requirements

67.1 The plowing equipment shall be subject to the approval of the Contractor and the public authorities having jurisdiction over highway and road rights-of-way.
67.2 Plowing shall be performed by a prime mover with hydrostatic type steering and a static plow.
67.3 The design of the plowshare shall be such that the buried cable passing through the plow will not bind and shall not be bent in a radius less than 20 times the outside diameter of the cable. The feed chute must be a removable gate for the purpose of inspection and to allow the cable to be removed from or inserted into the feed chute at any intermediate point between splice locations. The cable path inside the feed chute must have low friction surfaces and be free of burrs and sharp edges to prevent damage to the cable as it passes through. Any welds must be smoothed. Internal guide rollers shall not be used.
67.4 The equipment shall be capable of extending the plow in order to maintain the required minimum depths under all terrain conditions.
67.5 The reel carrier shall be of adequate size and be configured so that the reel sizes being used can be safely handled.

68. Plowing Requirements
68.1 The slot made in the soil by the cable plows shall be closed immediately by driving a vehicle track of sufficient weight over the plow slot to thoroughly compact the plow slot or by other suitable means approved by the Contractor.

68.2 Start and finish pits and pits at points of intersection, as needed, must be excavated in advance of plowing cable. Ends of casings and crossings of foreign utilities shall be exposed prior to start of cable plowing operations.

68.3 The Contractor shall exercise particular care in the use of trenching equipment and shovels in joining trenches to the slots made by the plow to be certain that the cable is not damaged.

68.4 To avoid possible damage to buried cable from exposure to traffic, livestock, and other hazards, trenching of laterals, trenching around culverts, construction of aerial inserts, and similar operations shall be completed as soon as practicable behind the plowing operation, but never more than 48 hours behind the plowing operation unless additional protective measures, as approved by the Contractor, are employed. Notwithstanding this provision, the Contractor remains responsible for the cable throughout the installation and acceptance phases of the project.

68.5 Care is to be exercised during the plowing operation to feed the cable into the ground through the plow loose and at no tension. Equipment and construction methods shall be such as to assure compliance with this requirement. The Contractor shall furnish competent supervision at all times at the site of plowing operations to assure compliance with this requirement.

68.6 If during the plowing operation, the plow should strike a buried object or rock that stops the equipment and necessitates removal of the plow from the ground, the precautions shall be observed to avoid damage to the cable. Should it be necessary to back the plow to remove it from the ground, the cable shall be uncovered by hand a sufficient distance back for inspection by the HCP Project Manager to determine whether the cable has been damaged.

68.7 Where casing pipe or a foreign utility is encountered, the cable shall be unrolled and placed in a figure-8 configuration. After the cable is pulled through the casing pipe(s) or under the foreign utility(ies), it shall be replaced on the reel and the plowing operation restarted. Extreme care must be used whenever the cable is handled so that it will not be kinked or damaged in any manner.

69. Plowing Precautions

69.1 Failure to observe precautions concerning proper operation of the prime mover and plow contributes to unnecessary cable damages. The following precautions shall be reviewed with equipment operators and shall be strictly observed.

69.1.1 The tractor shall always be started slowly and speed increased gradually after all cable slack is removed from the cable delivery system.

69.1.2 Plow attitude and depth shall be changed gradually. Such changes shall be made only while prime mover is moving.

69.1.3 Should it be necessary to raise the plow share to the surface when the plow is not moving, the cable to the rear of the feed chute shall be
excavated and slack pulled so that the cable is not kinked over the feed chute exit.

69.1.4 Do not plow with the share set at extreme forward rake angles without a share specifically designed for this purpose.

69.1.5 When rigging for off-set plowing, the cable shall be re-routed over the cable feed systems to conform to the new configuration.

69.1.6 Abrupt changes in terrain along the cable path shall be graded off ahead of the plow. Such grading must be approved by the HCP Project Manager.

69.1.7 The plowing operation shall be observed continuously for obstructions, proper feeding of cable, maintaining proper depth, etc.

69.1.8 Under no circumstances shall the plow be backed or the share moved to the rear with cable in the chute.

69.1.9 At no time shall the plow be wobbled either vertically or horizontally to break through an obstruction.

69.1.10 At no time shall the plow deviate from the normal route to seek an "on grade" crossing level for farm roads. Unless the road is bored, Contractor shall level the plow train path in order to make a level crossing of the road. Subcontractor shall repair the road after passage, including repaving or gravelling, as required.

69.1.11 No practice will be allowed that will cause an abrupt change in direction of the plowed-in cable.

70. Cable Plowing in Rock Areas

70.1 Solid rock is defined as a consolidated rock that cannot be plowed to specified depth. Frozen ground is not considered to be solid rock.

70.2 Where solid rock is encountered, the cable will be installed by the trench method described in the Section 72 of this Appendix G while also being protected by steel PVC conduit or high-density polyethylene conduit (HDPE), at the discretion of the Contractor.

71. Placing Cable at Reel Ends

71.1 The cable will be placed to provide sufficient cable for splicing at ground level. This should be a minimum of 75 feet. Inside the regenerator station buildings, sufficient cable will be allowed to connect to the equipment.

72. Cable in Trench

72.1 Excavation

72.1.1 The trench shall be as straight as practicable. The bottom of the trench shall be smooth and free from any sharp edges. The trench shall be
kept clear of debris and loose rock. All changes in trench grade shall be gradual.

72.1.2 The length of open trench shall not exceed 100' at the end of each working day. Any open trench shall be fenced. Exceptions are subject to approval by the HCP Project Manager. Good judgment and care must be exercised to prevent livestock or persons from falling into the open trench.

72.1.3 Driveways, lanes, or roadways that are open cut shall be opened just prior to placing the conduit and/or cable. In no case shall the driveway, lane, or roadway be left impassable at the end of the day. The general public safety is paramount, and appropriate steps shall be taken to ensure safety at all times.

72.2 Backfill

72.2.1 Except at splice locations, the trench shall be promptly backfilled and compacted behind the pipe and/or cable placing to the satisfaction of the HCP Project Manager or local authorities. In general, the backfill shall consist of the earth removed from the trench.

72.2.2 Where a carrier, pipe, conduit, duct, or cable is placed by trenched construction beneath a roadway or a driveway or within five feet of the edge of an existing or proposed pavement or base course, the backfill within the roadway shall be placed and compacted in not more than 6" lifts, from the top of the installation to the ground line. The backfill shall be of suitable material free from boulders, frozen clods or roots, or excessive sod or other vegetation. The fill shall be carefully hand-tamped under and around the installation in lifts not to exceed 4" in loose thickness.

72.2.3 In areas inaccessible to tamping-type rollers but where compaction is required, a mechanical tamper of a size suitable for the work involved shall be used.

72.2.4 Pneumatic tampers shall be operated at pressures no less than those recommended by the manufacturer.

72.2.5 Compaction of backfill shall be consistent with good highway construction methods.

72.2.6 On public right-of-way, all backfilling must conform to the requirements of the authority having jurisdiction.

72.3 Trenched Road and Driveway

72.3.1 Generally all hard surfaced areas will be bored.

72.3.2 Pavement replacement shall match existing paving in type of pavement appearance, wear surface, and durability to the maximum extent practical. Replacement shall match existing structure and shall include curbing, walkways, or any other concrete structure damaged during construction. Pavement repair shall be subject to approval by the HCP Project Manager and must conform to the requirements of the local governing authority having jurisdiction, including required cutbacks, or
"T" topping. Pavement repair not installed in accordance with the requirements of these Specifications shall be removed and replaced.

72.4 Trench In Rock
   72.4.1 Where solid rock (defined elsewhere) is encountered, the trench may be excavated using a rock saw or other rock cutting equipment. The excavation, backfill, and road crossings in solid rock areas shall conform to appropriate sections of these specifications (Appendix G to the RFP) unless specifically exempted in this section.

72.5 Placing Cable
   72.5.1 The cable will be placed to provide sufficient cable for splicing at ground level. This should be a minimum of 75 feet. Inside the regenerator station buildings, sufficient cable will be allowed to connect to the equipment.

73. Duct Installation

73.1 The duct that will contain HCP cable will be pre-inserted with a .25" nylon rope. The duct shall have continuity.
73.2 Hand-holes will be installed every mile to facilitate pulling, preferably at highway mile posts. However, when necessary and upon approval by the HCP Project Manager, hand-holes may be moved to locations more practical. The duct containing the HCP cable shall enter and exit hand-holes.
73.3 Should mid-assist points become necessary when pulling cable, the ducts shall be spliced together in a water-tight condition. Upon completion of cable placement, hand-holes will be duct-plugged and gopher-proofed.

74. Cable Pulling

74.1 The optical fiber cable provides high capacity transmission channels. To ensure that the cable's qualities and characteristics are not degraded, excessive pulling tensions or excessively short bending radii should be avoided. The maximum pulling tension is 600 lbs. The minimum bending radius is: dynamic (cable in movement) = 20 times the outside diameter of the cable, and static (cable in place) = 10 times outside diameter of the cable. These rules should be followed at all times when placing excess cable in hand-holes for splicing and slack coils.
74.2 When pulling fiber, a break-away swivel, along with a Slip Clutch Capstan Winch that shows the dynamometer reading at all times, shall be used.
74.3 Cable lubrication shall be used to reduce the pulling tension on longer segments of the cable placement operation. Contractor approved lubricants shall be used.
74.4 At each pulling hand-hole, a 35' coil of fiber will be left coiled in the bottom of the box. At each splice location, 75' will be left on each cable end for splicing.
Tags will be placed on fiber showing the direction of the cable. The cable ends will be sealed watertight to keep water from entering the cable.

75. Subsurface Obstructions

75.1 Contractor is responsible to locate and avoid all subsurface obstructions. It is the Contractor's responsibility to verify the locations of subsurface obstructions shown on the Construction Drawings as well as any additional obstructions not identified on the Construction Drawings. Contractor shall notify owners and operators of foreign pipelines or other utilities at least 48 hours prior to excavation near the utility. Contractor shall keep a log of all telephone contacts to notify foreign utilities of excavation. Such log shall include date, time of day, name of individual contacted, name of company contacted, telephone number, and confirmation number.

75.2 When crossing buried pipes, cables, and other utility lines, the cable shall be placed under the foreign utility line with a minimum separation of 12 inches. However, if the foreign utility line is 55 inches or more deep, the cable may be placed over the utility at the normal placing depth unless the utility owner specifically requires placing of facilities below their lines. In this situation, the new facilities will be placed a minimum of 12" below the existing line.

76. Inspection of Buried Cable

76.1 The installed cable will be tested as a part of the cable splicing operation. Contractor shall be liable for the cost of any and all repairs or replacement necessary to correct any defect in the installed cable that can be attributed to actions by the Contractor that are disallowed by these specifications, by the Cable manufacturer, or by good industry practice, as determined by the HCP Project Manager. The term "defect" as used in the preceding sentence shall mean any defect that the HCP Project Manager determines to have an effect on current or future operations of the completed fiber optic communication system.

77. Highway, Railroad, and Other Bored Crossings

77.1 All crossings of state or federal highways and railroads rights-of-way shall be made by boring and placing a pipe casing. The cable shall be placed through the pipe casing. Country roads and other roadways shall be bored, trenched, or plowed, as directed by the HCP Project Manager and approved by the appropriate local authority.

77.2 All work performed on public right-of-way or railroad right-of-way shall be done in accordance with requirements and regulations of the authority having jurisdiction there under.
77.3 At anytime the pipe casing bored under the roadway exits below the prescribed depth, a backhoe will be used to gradually return the bored ditch to plowed grade.

77.4 In no case shall the completed crossing be less than 48" deep at its shallowest point.

77.5 Certain roadways may be allowed to be crossed by trenching. In those cases, it shall be the Contractor's option to split conduit and place it around the cable in lieu of placing whole conduit and pulling the cable through the conduit. Contractor shall split the casing and install it around the cable in a manner approved by the Contractor. Split conduit will be secured after cable placement in such a fashion as to prohibit collapsing to less than its un-split diameter. Split conduit shall be sealed or plugged to prevent entry of dirt, water, and rodents.

77.6 In areas that the cable is being laid in conduit, the ends of the conduit shall be capped or plugged to prevent entry of dirt, water, and rodents.

77.7 Under railroads rights-of-way, the bore shall extend from toe of fill to toe of fill.

77.8 In no case shall an encasement extend less than toe of slope to toe of slope except along freeway rights-of-way, in which locations the encasement shall extend from right-of-way to right-of-way.

78. Stream and Canal Crossings

78.1 General

78.1.1 In general, the cable shall be placed by direct bury methods (plow or trench) with additional conduit protection, when directed by the HCP Project Manager, across small streams and washes. Stream or river crossings may be made on non-freeways through conduit attached to a highway or railroad bridge. Where required by local authorities, irrigation canals will be bored in the same manner as a road crossing.

78.2 Buried Crossings

78.2.1 Lake, canal, stream, and river crossings shall be installed and restored in accordance with the applicable Construction Drawings; in accordance with the requirements of the permit, if any; and in accordance with the requirements of respective Federal, State, and Local agencies, including those agencies concerned with water pollution and the protection of sport fisheries. Cable shall be laid across lakes, canals, streams, and rivers as nearly level as practicable. Extreme care shall be taken to prevent damage to the cable during these installations.

78.2.2 The cable is to be installed in accordance with Section 63 of this Appendix G, “Depth of Burial.” The banks of stream crossings shall be graded as necessary to provide the required burial depth under the stream and to provide a proper pathway for the plow train or trencher to traverse the bank and make a smooth transition to the stream bottom. Transitions from normal depth to stream-crossing depth shall be made smoothly.
without sharp bends in the cable. All cuts in banks and diversion berms shall be re-graded to match existing facilities and re-compacted to not less than 90% of maximum cf density at plus or minus 5% of optimum moisture content, as determined by ASTM D698.

78.2.3 The banks of all canals, streams, and rivers shall be restored to their former condition, and bank protection materials or bulkheads will be installed where required. The methods of restoration and erosion control shall be as required by the landowner or agency having jurisdiction and as approved by the HCP Project Manager. The HCP Project Manager reserves the option to change the erosion control method in the field. Banks will be reseeded and mulched with grass seed and mulching material as required by the local governing authority. Berms will be constructed, where practicable, to divert water away from the trench line and disturbed bank areas. Costs for restoration of banks and installation of bank protection material and bulkheads shall be included in the price for completing the work.

78.2.4 As nearly as possible, the beds of all lakes, canals, streams, and rivers shall be restored to their former elevation and grade, and spoil, debris, piling, cofferdams, false work, excavation, construction materials, and obstructions resulting from installation of the cable shall be removed from the crossing to prevent interference with normal water flow and interference with any normal use of such canals, streams, and rivers, and shall be disposed of in a manner and at locations satisfactory to the HCP Project Manager. Underwater spoil shall be spread to a height not to exceed six inches above the bed of lakes, canals, streams, and rivers.

78.2.5 Contractors shall not begin work on lake, canal, stream, or river crossings before obtaining approval from the HCP Project Manager.

78.2.6 It is the intent of these specifications to require Contractor to install the cable underneath the bed of the lake, canal, stream, river, or water course at a depth of ten feet below the flow line that shall prevent flood waters from affecting the cable by reason of the scouring action of the water. Particular attention shall be given to the location of sag bends in the cable so that they shall be located back in the lake, canal, stream, or riverbanks beyond any point that would be affected by a change due to erosion of the banks.

78.2.7 Contractor shall give all notices and comply with all laws, ordinances, rules, and regulations bearing on the conduct of the Work as drawn.

78.2.8 Unless specified otherwise, at individual stream crossings, the Contractor shall be required to:

78.2.8.1 Grade banks of stream crossings by pulling the spoil back from the bank. Subcontractor shall not push the spoil out into the stream to grade the approaches.

78.2.8.2 Refrain from the use of cofferdams or from diverting the stream in any way in order to construct a stream crossing.
78.3 Attachment to Bridges (Non-Freeway)

78.3.1 Pipe for bridge attachments shall be hot-dipped galvanized rigid steel. Attachments to steel bridges will be accomplished by the use of approved galvanized beam clamps and hangers. Drilling steel bridge structures is not allowed. The attachment to concrete bridge structures will be accomplished by the use of expanding anchor bolts in drilled holes. The use of driven or explosive set anchors will not be permitted when not shown on plans. Exposed ducts shall be supported at intervals of 6' or less. Approved expansion joints will be installed at all bridge structure joints and in no case will exceed 100 LF intervals. Weep holes of 1/4" diameter will be drilled at 20' intervals, and 12" above ground level.

78.4 Bored Canal Crossings

78.4.1 Irrigation canals requiring boring shall be bored in accordance with Section 77 of this Appendix G, “Highway, Railroad, and Other Bored Crossings.”

79. Cable Markers

79.1 Location

79.1.1 Cable markers shall be placed within 48 hours of cable installation. Cable markers shall be placed at all change in directions, splices, fence line crossings, at road and stream crossings, and at other points on the route not more than 1,000 feet apart.

79.1.2 Cable markers shall be located as directed by the HCP Project Manager.

79.1.3 In addition, on highway (non-freeway) rights-of-way, the markers shall be located at the highway right-of-way line. Markers shall always be located so that they can be seen from the location of the cable.

79.1.4 In addition, in freeway right-of-way, the markers shall be placed not more than 1,000 feet apart in rural areas and 500 feet apart in urban areas. Signs will be required on each side of all transversing public roads on streets at a point where the freeway right-of-way line intersects the transversing public road or street right-of-way line. Signs shall be placed within the right-of-way fence line, at line of sight.

80. Right-of-Way Protection and Restoration

80.1 General

80.1.1 The Contractor shall protect the right-of-way and minimize the damage from construction operation.

80.1.2 Good soil erosion practices shall be practiced during all construction operations.
80.1.3 Depending on the location of the work, the Federal Environmental Protection Agency, the State Environmental Protection Agency, or others may stipulate construction practices and crew behavior requirements in or around environmentally sensitive areas, such as cultural resource sites. Contractor shall adhere to any such stipulated construction practices and crew behavior requirements.

80.2 Restoration

80.2.1 Contractor shall keep the premises where work is being performed in a neat, clean, and orderly condition, and on completion of the work hereunder, Contractor shall remove from the premises all of its tools and equipment, and any debris shall be removed and disposed of by Contractor.

80.2.2 The right-of-way shall be restored to its original or better condition within 24 hours or as soon as practicable, in the HCP Project Manager's opinion, following cable placing operations.

80.2.3 Where the cable is plowed in place, restoration shall be accomplished by driving a tractor or heavy truck over the plow furrow until the plowed area conforms to the surrounding terrain. A vibratory roller having a weight of three tons and a width of 4-6' may also be used.

80.2.4 In areas where open trench methods were used and backfill mounded over the trench, grading or filling will be required for final restoration of the right-of-way.

80.2.5 All rock and debris brought to the surface and left after backfilling shall be removed and disposed of, as directed by the HCP Project Manager.

80.2.6 Improved landscape, lawns, shrubs, and hedge removed or damaged on the right-of-way shall be replaced. Lawns shall be repaired by re-seeding with like grasses.

80.2.7 The Contractor shall promptly repair or replace any other property damaged during construction.

81. Coexistence on Highway Right-of-Way

81.1 The cable route will parallel public highways, and the cable will be laid within the highway right-of-way.

81.2 All work performed on public road right-of-way shall be completed in accordance with requirements and regulations of the authority having jurisdiction. It is the Contractor's responsibility to be aware of, and comply with, all regulations and requirements pertaining to its work. The Contractor shall be familiar with the location of "scenic enhancement areas" and with special requirements for construction on highway rights-of-way in such areas.

81.3 Unless otherwise specified on the Construction Drawings or by the Contractor, the cable shall be installed as close as practicable to the highway Right-of-Way line. If terrain or man-made obstruction(s) block the route, Contractor shall
modify the route with approval of the HCP Project Manager and the proper
governmental authorities to avoid the obstruction.
81.4 Generally, the cable shall be buried in accordance with Section 63 of this
Appendix G, “Depth of Burial.” At particular locations, the cable depth will be
controlled by depths of the facilities crossed (i.e. drainage, bridge structures,
buried cables, and/or other facilities).

82. Fencing

82.1 The temporary fencing erected around Contractor's excavations located outside
of city limits shall be type 47 field fence or as approved by the HCP Project
Manager. Temporary fencing around excavations inside the city shall be
installed utilizing safety fencing to the satisfaction of the HCP Project Manager.
82.2 Contractor, having first informed the HCP Project Manager that permission has
been secured from the landowner and/or tenant, shall build suitable temporary
fencing and/or wire gaps in the fences crossing the route of the cable and
maintain the same so that livestock shall be prevented from entering or leaving
the property. Before cutting such fences to make these gates, Contractor shall
brace the fence to prevent damage. Gates shall be so constructed that they can
be securely closed, and where necessary Contractor shall furnish a watchman to
maintain gates to prevent livestock from entering or leaving property and shall
also furnish watchmen in any instance where required to do so by the HCP
Project Manager. Such temporary fences or gates shall be provided with
suitable fasteners and shall be kept closed at all times except when necessary to
be opened for construction purposes.
82.3 Following the completion of the cable construction, temporary gates shall be
removed. All fences that have been cut or removed during the construction
work shall be repaired by Contractor in a first class and substantial manner and
to match the original style of the fence, as far as possible. Where there is any
doubt in the opinion of the HCP Project Manager as to the usability of old fence
material, Contractor, at its own expense, shall furnish new wire and suitable
post to rebuild said fence. Fence repairs shall be subject to approval of both the
property owner and the HCP Project Manager.

83. Building Specifications

83.1 Installation Requirements
83.1.1 Installation shall comply with the latest edition of The National
Electrical Code and other national, state, and local codes as applicable.
83.1.2 Pull boxes will be required after 180 degrees of directional change
and after every 120 feet of vertical rise (10 floors). Pull boxes will be
mounted securely to the building structure and will not depend on the
conduit for support. Pull boxes shall have removable covers and will be
installed in such a way that the covers will be accessible.
83.1.3 Relocating and/disconnecting of any existing equipment within the building shall be coordinated with building management.
83.1.4 All metallic conduits shall be bonded to the building ground system.
83.1.5 All conduits shall be sealed (plugged) after cable installation at the point of interface and will be clearly marked to facilitate location.
83.1.6 Pull boxes should be clearly marked with the HCP’s name on the cover for identification.

83.2 Material Requirements
83.2.1 Materials will comply with those standards as established by UL or NEMA and shall be commercial grade. All materials will be new and free from defects.
83.2.2 Conduits shall be one and one quarter inch (1 1/4") EMT (Electrical Metallic Tubing). EMT fitting shall be gland or set screw type, and each conduit shall be equipped with a graduated pull tape or rope. The exact requirements for location of conduit within the building shall be verified with the building owner.
83.2.3 Large-radius sweeps shall be provided where required for offset or change in direction of conduit. The minimum radius recommended is 36", and the minimum radius acceptable is 24". If it is not possible to provide 24" minimum radius sweeps, pull boxes providing the same radii capability will be required.
83.2.4 Pull through pull boxes will be typically 6" high x 6" wide x 24" long with the conduit entering at each end. Pull boxes shall meet code requirements and will generally be placed to improve ease of pulling cable and inner-duct.
83.2.5 The cable will be secured at pull boxes on vertical runs with an HCP Project Manager-approved split Kellum grip or equivalent.

84. Splicing

84.1 Direct Buried Splices - At points where the HCP Project Manager determines a buried splice should be placed, Contractor will excavate, secure, fence, and protect a splice pit to accommodate placing the cable splice (by others) at the same depth as the cable installation. The splice pit will be left open until the splice is completed, at which time Contractor will return and complete backfill and restoration work as required by the authority with jurisdiction in the area. Slack cable footage will be coiled and placed vertically in line with the cable route at sufficient depth that the highest point in the loop and splice closure is a minimum of 36" below the surface. The coil diameter will be a minimum of 30". Contractor shall backfill with selected fines to a level 6" above the closure and coil and continue the backfill as required.
84.2 Splicing at Hand-holes - At points where branch splicing occurs, as shown on Construction Drawings, or as directed by the HCP Project Manager, the
Contractor will place a hand-hole as per the specifications and manufacturer's suggested methods. Contractor will secure, fence, and protect the hand-hole excavation and maintain a safe open pit to allow a splice to be completed (by others) and placed in the hand-hole. After the splice is placed, Contractor will return and complete backfill and restoration work as required by the authorities with jurisdiction in the area.

84.3 At all splicing locations Contractor shall also install a SIP 40 pedestal and an 8' ground rod and connect the two via a #6 ground wire. Contractor shall also install a 1-1/4" HDPE conduit at 36" depth between the hand-hole/splice pit and the SIP 40 for use by others.

85. Concrete

85.1 Description
85.1.1 This section covers the material requirements and placing of Portland cement concrete for roadways, driveways, sidewalks, and other planned concrete works.
85.1.2 Concrete shall consist of a mixture of Portland cement, water, fine aggregate, coarse aggregate, and approved additives, when required, mixed in the proportions as specified below or approved by Contractor.
85.1.3 Where permits apply to Work, concrete shall conform to the permit requirements.

86. Material Requirements

86.1 Concrete Materials
86.1.1 Portland cement shall conform to the requirements of AASHTO M-85 and shall be Type II (low alkali).
86.1.2 Aggregate shall conform to the requirements of MDOT for the specific use.
86.1.3 Water used in mixing or curing shall be reasonably clean and free of oil, salt, acid, alkali, sugar, organic vegetation, or other substance injurious to the finished product. Water may be tested in accordance with and all requirements of AASHTO T-26. Water known to be of potable quality may be used without test.
86.1.4 Air-entraining mixtures, when required, shall conform to the requirements of AASHTO M-154 (ASTM C-260).
86.1.5 Reinforcing steel for concrete reinforcement shall meet Grade 60 requirements of ASTM A-615. Welded wire fabric for concrete shall conform to AASHTO M-55 (ASTM A-185). All bars and welded wire fabric shall be properly bundled and tagged with weather resistant tags.
86.1.6 The Subcontractor shall submit a supplier's mix design and material certifications for the mix being supplied one (1) week in advance
for review and approval by Contractor. No concrete shall be used on the project before mix design has been submitted and approved.

86.2 Concrete Classes
86.2.1 Concrete shall be of the class specified and as appropriate for the item for which it is being placed. Water content shall be controlled to produce a slump between two (2) and four and one-half (4 1/2) inches.

86.2.2 Classes of concrete and minimum strength and cement content shall be as follows:
86.2.2.1 Encasement Concrete. Class 3000 S&G shall be as sand/gravel mix with not less than 5.5 sacks (516 lbs) Portland cement per cubic yard to produce a twenty-eight (28) day compressive strength of 3,000 psi. This class may be used for bedding concrete and encasement concrete in most locations.

86.2.2.2 Sidewalk and Driveway Concrete. Class 3000 CA shall be fine aggregate/coarse aggregate mix with not less than 5.5 sacks (516 lbs) of Portland cement to produce a twenty-eight (28) day compressive strength of 3,000 psi. This class may be used for bedding, encasement concrete, sidewalks, and driveways.

86.2.2.3 Paving Concrete. Class 4000 CA shall be a fine aggregate/coarse aggregate with not less than 6.5 sacks (610 lbs) of Portland cement to produce a twenty-eight (28) day compressive strength of 4,000 psi. This class may be used in structures or roadway pavement. The mix proportions including air entrainment and other additives shall meet MDOT requirements.

86.3 Placing
86.3.1 The Subcontractor shall notify the Contractor at least twenty-four (24) hours in advance of placing concrete to permit proper inspection and approval of forms and reinforcement by the Contractor.

86.3.2 Concrete and reinforcing steel shall be placed at the locations and in accordance with the details shown on the Plans.

86.3.3 No concrete work shall be done when the air temperature is below forty (40) degrees F, or if freezing weather is predicted before final set of the concrete, unless special means of heating and/or protecting the work are used for a period of at least seventy-two hours after it is poured. Concrete shall not be placed on frozen sub-grade.

86.3.4 Where splices in reinforcing steel are necessary, the bars shall be lapped twenty-four (24) times their least diameter.

86.3.5 Concrete shall be of workable consistency with slump between two (2) and four and one-half (4 1/2) inches when placed. It shall be compacted by spading or by mechanical vibrator to prevent honeycomb. The concrete shall be spouted so that the total free drop will not exceed six (6) feet. No concrete shall be used which has partially set before final
placing or which has segregated in transport. Re-tempering will not be permitted.

86.3.6 All concrete shall be placed monolithically so that fresh concrete shall not be placed against concrete that has taken initial set except where construction joints are required.

86.3.7 All surface concrete shall be cured for a period of seven (7) days with a water saturated covering or by other approved methods that will keep all surfaces continuously wet.

86.4 Measurement and Pavement

86.4.1 Concrete shall not be measured and paid as a separate item but shall be subsidiary to the cost of applicable item for which the concrete is placed.

86.4.2 The furnishing and installation of reinforcing steel shall not be measured separately but shall be considered subsidiary to concrete work.

Specifications for Aerial Placement of Fiber Optic Cable

87. General

87.1 General. All HCP-owned poles and/or cable will be identified with ID tags. All cables will meet all standards set up by NESC; agencies of cities, counties, states, and the federal government; railroads; or other entities that provide for the placement of HCP facilities within their respective rights of way.

87.2 Lengths. Use the longest lengths to facilitate construction costs, placement, and splicing. Entire reels can be placed without splice points to minimize transmission loss and reduce splicing costs.

87.3 As-built. As-built documentation will reflect span measurements, size, class, and ownership (percent of ownership if applicable) of all joint-use and HCP-owned poles. All HCP-owned/leased poles shall be identified with ID tags and size of messenger. If over-lashing is used, the identifying information should include who owns the messenger and/or other cables (type, size, and gauge if applicable) involved in over-lashing. The clearance height at mid-span at the completion of construction and all sequence numbers at each pole will be recorded as well as the location of all MGN grounds, size and lead of guyings, and size and type of anchor.

88. Placement

88.1 Minimum Bending Radius

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<tr>
<th>Nominal Cable Diameter</th>
<th>Minimum Bend Radius (No Tension) Installed</th>
<th>Minimum Bend Radius (Under Tension)</th>
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88.2 Figure-eighting Cable. If the cable must be unreel’d during installation, use the “figure - eight” configuration to prevent kinking or twisting. Fiber optic cable should not be coiled in a continuous direction except for lengths of 30 meters (100 ft) or less. The preferred size of the “figure - eight” is about 4.5 m / 15 feet in length, with each loop about 1.5 m / 5 feet to 2.4 m /8 feet in diameter. Do not cut the cable under any circumstances without consulting the HCP Project Manager.

88.3 Dip Pole. At a dip pole, form a minimum of a 100-foot expansion loop using “snowshoes”. Identify the cable with a caution tag. Protect the cable on the pole with “U guards,” 18” inches below the strand to just above ground level.

88.4 Planning and Preparation.

88.4.1 Poles. Determine the ability of existing pole lines and guys to support the new cable plant, as well as any restrictions imposed by the pole owner. The guying should remove all of the lateral stress on each pole so that the pole simply supports the weight of the cables, hardware, and equipment attached to it. Stated another way, the facility being constructed should be supported independent of all other facilities on the pole line. Obtain a written contract from the owner of poles, with the HCP as the owner of the facility being placed on the pole line. Contract will state all the fees associated with the attachment, preferably on a one-time basis. The written contact with owner of poles will also state the pole/strand replacement policy and the cost involved. Obtain all necessary permits from the governing bodies involved. Contact the appropriate Michigan authorities when placing new poles and anchors.

88.4.2 Clearances and Separations. On a case-by-case basis, determine the clearances between the proposed fiber optic cable and the existing facilities. Be certain that the proposed facility is constructed according to the National Electrical Safety Code (NESC) and the appropriate local safety code. The fiber optic cable should occupy the uppermost available communication space on the pole due to its small weight and resultant sag.

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<td>6.0-10.0</td>
<td>¼ -3/8</td>
<td>10.0</td>
<td>4.0</td>
<td>15.0</td>
<td>4.0</td>
</tr>
<tr>
<td>10.1 - 15.0</td>
<td>4/10 - 6/10</td>
<td>15.0</td>
<td>6.0</td>
<td>22.5</td>
<td>9.0</td>
</tr>
<tr>
<td>15.1 - 20.0</td>
<td>10/16 - 8/10</td>
<td>20.0</td>
<td>8.0</td>
<td>25.0</td>
<td>10.0</td>
</tr>
<tr>
<td>20.1 - 23.0</td>
<td>13/16 - 9/10</td>
<td>23.0</td>
<td>9.0</td>
<td>25.0</td>
<td>10.0</td>
</tr>
<tr>
<td>23.1 - 25.0</td>
<td>15/16 - 1.0</td>
<td>25.0</td>
<td>10.0</td>
<td>30.0</td>
<td>12.0</td>
</tr>
</tbody>
</table>

Where cables guys, line, or drop wires run along and within the limits of:

a) Public highways, streets, and roads 18’
| Where cables, guys, line, or drop wires cross over private property or ground |
|-------------------------------|----------------|
| a) Accessible to pedestrians only | 9.5’ |
| b) Accessible to people on horses or loaded farm vehicles | 16’ |

| Where cables, guys, line, or drop wires cross over: |
|---------------------------------|----------------|
| a) Public highways, streets, and roads | 18’ |
| b) Public alleys | +15.5’ |
| c) Driveways in general unless the height of the loaded vehicle or equipment intending to use the drive requires extra clearance. | +15.5’ |
| d) Farm driveway—accessible to combines | 18’ |
| e) Driveways—residential garages | 15.5’ |
| f) Ways accessible to pedestrians only | 12’ |
| g) Obstacles (billboards, roofs) | 2’ |
| h) Flat roofs that may be used by tenants or workmen | 9.5’ |
| i) Railroads—cable on messenger | 27’ |
| j) Waterways (rivers, canals, etc.—provide clearance specified by proper authorities and on work plans (human with fishing pole) + Secure additional clearance on new construction when warranted at specific locations | 14’ |

### MINIMUM CLEARANCE ABOVE GROUND FOR TELEPHONE FACILITIES

<table>
<thead>
<tr>
<th>TYPE OF CROSSING WIRES &amp; CABLE</th>
<th>TELEPHONE CABLES, MESSENGER, DROPS, AND GUYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>CROSSING OVER</td>
<td>CROSSING UNDER</td>
</tr>
</tbody>
</table>

| Open supply wires 0-750 volts & supply cables having effectively grounded sheath or messenger - all voltages |
|----------------------------------------|----------------|
| a) Line wires | 4’ |
| b) Service wires | 2’ 4’ |

| Open supply, line, or service wires |
|-------------------------------------|----------------|
| a) 750 - 8700 volts | 6’ |
| b) 8700 - 50,000 volts | 6’ |

| Foreign guys, span wires, and lightning protection wires |
|--------------------------------------------------------|----------------|
| 2’ 2’ |

| Foreign communication wires, cables, and fire alarm wires |
|----------------------------------------------------------|----------------|
| 2’ 2’ |

| Trolley contact conductors. |
|----------------------------|----------------|
| a) 750 volts or less | 4’ |
| b) 750 - 8700 volts | 6’ |

* Clearance for (a) may be reduced to 4 feet if crossing is more than 6’ from communication pole.

Note: The above clearances apply where the crossing span length of the upper conductor or wire does not exceed 175 feet. For greater span lengths, increase clearances in accordance with NESC.
89. Lashed Aerial Plant

89.1 General. Fiber optic cables must be installed without loose lashing, twisting, or weaving along the strand.

89.2 Suspension Strands

89.2.1 Suspension strands are susceptible to fatigue failure near pole-mounted suspension clamps if left under critical stringing tensions without supporting a load. Refer to the table below for the rated breaking strength and the type of steel used.

<table>
<thead>
<tr>
<th>DIAMETER</th>
<th>RATINGS</th>
<th>EHS</th>
<th>UG</th>
</tr>
</thead>
<tbody>
<tr>
<td>6M</td>
<td>¼”</td>
<td>5/16”</td>
<td></td>
</tr>
<tr>
<td>10M</td>
<td>5/16”</td>
<td>3/8”</td>
<td></td>
</tr>
<tr>
<td>16M</td>
<td>3/8”</td>
<td>7/16”</td>
<td></td>
</tr>
<tr>
<td>20M</td>
<td>7/16”</td>
<td>½”</td>
<td></td>
</tr>
</tbody>
</table>

“M” indicates the approximate breaking strength in thousands of pounds. “UG” or “EHS” indicates the tensile strength of the steel used in the messenger.

89.2.2 Refer to the table below for the minimum and critical stringing tensions for a particular cable weight using different messenger grades. Messenger tensions listed are the minimum tensions required for each span to reduce cable strain.

Minimum & Critical Messenger Tensions in Pounds Prior to Aerial Installation of Fiber Optic Cable

| Maximum 0.18 lb/ft, 0.80 Inches Diameter Cable, (Using EHS Messenger, Not UG) |
|---------------------------------------------|-------------|-------------|-------------|-------------|
| Messenger        | Span        | Critical Tension |
| 6M EHS ¼”       | Up to 200’  | 1200 lbs     | 1600 lbs    | ----        | 2000 lbs    |
| 10M EHS 5/16”   | 200 - 300’  | 1500 lbs     | 1800 lbs    | 2400 lbs    | 3000 lbs    |
| 16M EHS 3/8”    | 300 -400’   | 1800 lbs     | 2200 lbs    | 2600 lbs    | 6000 lbs    |

| Maximum 0.16 lb/ft, 0.68 Inches Diameter Cable (Using UG Messenger, Not EHS) |
|---------------------------------------------|-------------|-------------|
| 6M UG 5/16” | Up to 200’ | 1600 lbs    | ---         |
| 10M UG 3/8” | 200 - 300’ | 1800 lbs    | 2200 lbs    |

89.2.3 When specifying a strand for fiber optic cable, the two most important considerations are: (1) the strength of strand and (2) that excess cable stretch does not occur. When the diameter of a strand is enlarged to increase its strength, its weight and the effect of wind and ice loading are
increased, which increases cable strain. Normally the “best” stand is not the question, but rather if the normal strand is satisfactory. Technically, the smallest EHS messenger with a satisfactory strength is “best.” When installing a dedicated suspension strand for fiber optic cable, standard hardware (eyebolts, clamps, etc) should be used.

89.3 Overlashing

89.3.1 Considerations
89.3.1.1 Maximum span length (pole spacing)
89.3.1.2 Size of the existing messenger
89.3.1.3 Messenger: EHS or UG?
89.3.1.4 Weight and diameter of the existing copper (or fiber) cable(s)
89.3.1.5 Initial messenger tension (If not available, what is the present messenger tension? Measured at what temperature?)
89.3.1.6 Age of the existing copper (or fiber) cables
89.3.1.7 Loading conditions. In the Midwest, only a heavy loading will be considered.
89.3.1.8 Size of the fiber cable being installed (cable, weight, O.D., etc).

89.4 Bonding and Grounding

89.4.1 If dielectric aerial cable is used, maintain the dielectric properties by using non-metallic lashing materials.
89.4.2 If using a metallic messenger or non-dielectric aerial cable on a joint-use pole, or if using a separate pole line forms a continuous bond between all metallic items being placed and the MGN (multi-grounded neutral) used by the power company and/or any other entity occupying the same pole the line uses, then eliminate any different electric potentials between independently owned facilities occupying the same pole line. No communication cable on a MGN system will have less than 4 grounds per mile. A non-dielectric aerial cable must occupy the communication space as defined by the National Electrical Safety Code. A dielectric fiber optic cable may occupy either the supply or the communication space on joint-use construction. No communication cable shall occupy the space between what is defined as the communication and the supply space. Refer to NESC Section 224, par. 4 & 230F. Quoting from NESC Section 235C, E3: “Note that a fully dielectric fiber optic cable carried on a nonmetallic messenger is considered as a supply neutral meeting Rule 230E1 (if located in the supply space) or an ordinary communication cable (if located in the communication space). Such cables must be located either in the supply space or the communication space, not in the safety zone between the two spaces.”

89.5 Drip Loop Definition. A “drip loop” is a smooth-curve-type loop form at each pole. The use of the 3” drip loop at each pole is required for two reasons: 1) the
extra slack provides for expansion and contraction by the messenger, and 2) it provides extra slack if an object falls on the messenger. Example: Prevents cable damage if a tree falls on the strand. Do not exceed the minimum bending radius of the cable. If contact is likely between the loop and the pole, a cable guard will be required. The cable sequence numbers for each drip loop must be recorded, and the HCP’s cable must be identified with an HCP ownership tag.

89.6 Lashing. Fiber optic cables must be installed without loose lashing, twisting, or weaving along the strand. Contractor will replace any cable showing a deformation. Example: Rippling or kinking. Requirements: Contractor will provide one wrap of lashing wire per linear foot when lashing H-P fiber optic cable to messenger. Cable must be double lashed in 3 different circumstances: 1) over-lashing over existing aerial cables, 2) right-of-way to right-of-way over railroads, and 3) right-of-way to right-of-way over roadways. Cable will be lashed up on a span-by-span basis. All lashing wire should be terminated at each pole with a lashing wire clamp. Lashing wire will be terminated by placing a cable spacer between the fiber optic cable and strand. Locate the lashing wire clamp 2 inches from the strap and spacer. Pull out enough lashing wire for termination on to the lashing wire clamp. Wrap the lashing wire 3 times around only the strand between the lashing wire clamp and the planned location of the first wrap around both the strand and the fiber optic cable. Lashing wire should follow the spiral of the strand wires.

89.7 Splicing and Slack Storage. All cables will be butt-spliced. All slack-cable loops will be placed a minimum of 4 feet from the pole using snowshoes. The minimum cable coil required at a splice location will be from the strand to ground level plus 20 feet on each side of the splice. In no case shall the splicing be done from a bucket. All splicing will be done on the ground in a protected environment (tent, van, or trailer). A minimum of a 100-foot cable coil (placed in snowshoes) will be required in the following circumstances: 1) railroad crossings, 2) highway crossings, 3) Interstate crossings, and 4) main thoroughfares in cities.

**Splicing and Testing**

90. General

90.1 This document addresses the HCP’s requirements for splicing, testing, documenting, and enclosing fiber optic cable for use as part of the HCP’s Network.

91. Access to Work
91.1 Contractor is required to provide access to all splice locations.
91.2 Access to splice points at all locations other than the freeways can be made from the shoulder of the road. In no case is access from freeways allowed from the shoulder of the road or ramps. No stopping or parking is allowed on the freeway.
91.3 Contractor shall be responsible to repair any damages that it may cause to the right-of-way.
91.4 The cable will be stored in hand-holes at all splice locations. Contractor shall be responsible to access the cable at the splice locations and shall have equipment for removal of loose dirt and water or the removal of other obstructions to the performance of Contractor's work.

92. Material

92.1 Contractor shall be required to supply all material, tools, test equipment, splicing equipment, consumable items, and incidentals necessary to access the cable at the splice locations and perform quality splicing, termination, and testing to include, but not necessarily be limited to, the following:
92.1.1 Enclosure, inner-closure, splice trays, heat shrink sleeves, and encapsulate.
92.1.1.1 The splice closure shall be the Raychem FOSC 450 Fiber Optic Gel Closure or equivalent.
92.1.1.2 Wire tags with clear heat shrink tubing for #6 insulated ground wire such as Panduit #HSDL9-50-31 or approved equal.
92.1.2 #6 green insulated ground wire, mechanical lugs and bolts, nuts and washers for grounding terminations, and cable sheath bonds.

93. Pre-Placement Cable Testing

93.1 In order to minimize the amount of rework in the right-of-way that may be required and to check for fiber optic cable defects, Contractor shall be responsible for on-reel verification of cable quality prior to placement.
93.2 One hundred percent (100%) of the cable's fiber count shall be tested at 1310 and 1550nm with a Tektronix TFP2 or equivalent Optical Time Domain Reflectometer (OTDR), a stabilized light source, and optical power meter, or equivalent test equipment. Test results will be recorded on a form supplied by the HCP. Completed test forms on each reel shall be handed over to the HCP Project Manager.
93.3 Cable ends shall be sealed upon completion of testing.

94. Ultimate Responsibility

94.1 Contractor shall be ultimately responsible for providing installed fiber cable in which each fiber meets the specifications set forth in this standard.
95. Splices

95.1 All splices shall be placed in hand-holes. There are to be no direct buried splices.
95.1.1 Cable and closure preparation shall conform to the manufacturer's standards and installation manuals.
95.1.2 Hand-holes and pedestals shall be compatible with existing HCP components
95.2 All fibers are to be spliced according to the splice assignment sheets provided by the HCP.
95.3 All fibers are to be fusion spliced and placed in a Raychem FOSC 450 Fiber Optic Gel enclosure or equivalent according to the manufactures technical installation instructions and a workmanlike manner.
95.4 All spliced fibers shall be protected by using the appropriate organizer tray and associated incidental items. If fiber optic heat shrink sleeves are used, a heat oven shall be used to shrink all sleeves. Care must be exercised to prevent damage to exposed fibers by overheating.
95.5 To insure acceptable splices prior to closing and encapsulating the splice case, Contractor shall monitor the splicing while it is being performed using an OTDR or a splicer with some type of optimizing capability, such as an LID unit or an optimizing alignment screen, or equivalent.
95.6 Splice Grounds
95.6.1 A number six (#6) insulated ground wire shall be installed from the SIP (pedestal) through the existing conduit to the splice enclosure and terminated at both ends. SIP termination nuts shall have a 3/8 inch head.
95.6.2 The ground wire at the SIP shall be identified with major direction associated with the running line of each of the links within a Span, e.g., “West,” on heat-shrink ID tags.
95.7 The HCP Project Manager reserves the right to accept a splice at any time and waive the above requirements on a case-by-case basis as relates to splice loss. A waiver at any time shall not be construed to be a relinquishment of any requirements as spelled out in this specification.
95.8 Contractor must verify that all fibers are compatible end-to-end, i.e., fiber number 24 at location A is fiber number 24 at location Z.

96. Loss Specifications

96.1 The maximum acceptable loss for the cable shall be 0.35 dB/km @ 1310 nm and 0.25 dB/km @ 1550 nm.
96.2 The maximum acceptable loss per splice shall be:
96.2.1 Maximum splice loss in one direction shall be 0.2 dB.
96.2.2 Maximum bi-directional average splice loss shall be 0.2 dB.
96.3 Maintenance splice loss allocation. At acceptance, each fiber Span shall have sufficient reserve loss margin to accept the loss associated with six (6) future maintenance splices and still meet the Span unallocated gain margin.

97. Splicing at Active Locations

97.1 Contractor shall be notified of fibers in the area that are active. It shall be Contractor’s responsibility to coordinate and supervise all work so that there is no interruption of service on these active fibers during cable/closure prep, splicing, testing, etc. at end points.

97.2 Contractor shall notify the HCP Project Manager at least five (5) working days prior to the commencement of any work at splice points with active fibers.

97.3 Contractor shall have a responsible supervisor monitoring all work being done at all splice locations having active fibers present.

97.4 Unless the HCP Project Manager or a governing agency (such as the ICN) grants an exception, all splicing on fiber sheaths containing active fibers will be done between the hours of midnight (00:00) and 6:00 AM local.

97.5 Contractor shall have all the materials required to make a temporary and or a permanent repair in the event a fiber is damaged in the course of work. The materials shall be at the site of the work prior to any work beginning. The Contractor shall notify the HCP Project Manager immediately in the event an active fiber is damaged.

97.6 In the event that active fibers are damaged by Contractor, Contractor shall supply all resources necessary and directed by the HCP Project Manager to reestablish service on the active fibers. All costs relating to the damage of the active fibers shall be the responsibility of Contractor.

98. Testing

98.1 All test equipment shall be calibrated within ninety (90) days prior to testing. A sticker with the date of calibration shall be fixed to the equipment. A calibration certificate shall be presented to the HCP Project Manager upon request.

98.2 Each Span shall be tested bi-directionally from end point to end point. Each span trace shall be recorded so that each splice can be clearly expanded (long range, mid range, or high resolution). Some Spans will need all three traces. A Span map shall be filled out recording each splice loss from each direction and the optical length between splices as well as any other information required by the Span map.

98.3 Contractor shall be required to perform the following tests:

98.3.1 Damaged Cable. In the event it is suspected that the cable has been damaged by Contractor at any time, Contractor will be required to test the cable with an OTDR. A hard copy of the OTDR test shall be submitted to the HCP Project Manager. Contractor shall be prepared to
test the damaged cable within 24 hours of notification by the HCP Project Manager.

98.3.2 End to End Bi-directional OTDR Span & Splice Test. As directed by the HCP Project Manager, each fiber of each span is to be tested bi-directionally at 1310 nm and/or 1550 nm from end point to end point and record of results submitted to the HCP for acceptance.

98.3.3 Cable Sheath. The cable sheath of each installed reel of cable shall be tested for continuity and the results recorded on the span map.

99. Acceptance Criteria

99.1 The acceptance criteria shall satisfy, as applicable, the requirements of this standard, which includes:

99.1.1 Verifying, and documenting, that at least a 3 dB unallocated margin of gain exists, at 1310 nm, on each Span.

99.1.2 All as-built drawings

100. Markers

100.1 All splice hand-holes shall be marked with an HCP Cable signs at the top of the post and an HCP splice sign mounted on the post just below the HCP Cable sign.

101. Documentation

101.1 Splice Identification

101.1.1 Link Splices. Splices interconnecting one or more links will be defined by HCP by the characters LS (link splice) and additional identification characters.

101.1.2 Backbone Splices. Splices placed at the end of reels are referred to as backbone splices and numbered by Contractor in sequence for a given Span.

101.1.3 Maintenance Splices. Splices that are required because of a maintenance or repair to the cable are referred to a maintenance splices and shall be identified as MS with additional identification characters, including the date and the time the splice was made.

101.2 Documentation Package

101.2.1 The following hard copy documentation package shall be submitted to the HCP on the applicable forms within five (5) working days after completion of the Span splicing and testing, or a minimum of thirty days prior to the commencement of acceptance testing. Each package shall be neatly organized, with dividers in a separate loose leaf, 3-ring binder or other HCP-approved binder. All forms shall be completely filled.
out. All forms and OTDR shall be legible and reproducible. All sheets/forms shall have a revision log and be titled and dated.

101.2.1.1 A splice identification sheet
101.2.1.2 A span map for each span
101.2.1.3 The splice assignment sheets
101.2.1.4 Reproducible copies of each span trace
101.2.1.5 Reproducible copies of splice traces

As-built Drawings

102. Introduction

102.1 Delivery Method. Two sets of legible, reproducible as-built drawings on 11 X 17 inch, white paper, in a hard cover binder shall be provided for each Span. If the HCP has a computer aided design (CAD) system, Contractor should provide a CD or DVD in a format compatible with the HCP’s CAD system.

102.2 Symbols and Conventions. The as-built drawings are to use symbols and conventions typically used in telecommunications engineering drawings. The Contractor must provide to the HCP a key to the symbols, icons, model, blocks, etc. that are used in the as-built drawings.

102.3 Consistency. The symbols, conventions, practices, scale, etc., must be consistent from one drawing to the next.

102.4 Governing/Authorization Agency Permits. Where there is a governing agency permit associated with an as-built drawing, Contractor should correlate the method used to show something in one with that used in the other.

102.5 Span As-Built Drawings. An HCP Work Order consists of a set of Spans. Each Span is identified by a name used in this RFP’s Table of Contents (see pages 3 and 4). Contractor’s as-built drawings should use the Span names provided in the Work Order and Table of Contents.

102.5.1 Each as-built drawing shall use the unique Span name, e.g., “A1 – B1: Sparrow Main/Tower – Medical Dental Building,” as part of the title. The Span name should be included in the drawing number, e.g., “A1 – B1: Sparrow Main/Tower – Medical Dental Building – 08 of 20.”

102.5.2 Drawing Revisions. As part of the title and status blocks, each drawing shall list the reason(s) that an individual drawing was changed.

102.5.3 The first sheet of a set of Span drawings shall be numbered as page 0. It is a title page and shall contain:

102.5.3.1 Span name/title.
102.5.3.2 A revision table for each of the Span drawings listing the current revision of each drawing.
102.5.3.3 Cable specifications.
102.5.3.4 To-from information, including start and end point identification such as mile post numbers, highway station numbers, and or other readily recognizable identifiers.

102.5.3.5 A table listing each splice associated with the Span, and, the drawing number containing that splice.

102.5.3.6 A revision record for “A1 – B1: Sparrow Main/Tower – Medical Dental Building.”

102.6 Scale. While no drawings scale is specified, to achieve consistency the typical landscape drawing should have 14 to 15 inches of running line covering about 0.5 miles. Where appropriate, a single 17 x 11 sheet may contain 2 drawings. No specific scale is required for the direction perpendicular to the running line except that it shall be consistent, and reasonable distance differences shall be obvious. Individual drawings may deviate from the above scale requirements for the sake of clarity.

102.7 Span Drawing Order/Sequence. Each set of Span drawings shall read from left to right. That is, when the major direction of the Span is east/west, the left side or edge of a drawing will show the match line for a more westerly/lower numbered drawing. When the major direction of the Span is north/south, the left side or edge of a drawing will show the match line for a more southerly/lower numbered drawing.

102.8 Highway Plan Drawings. If available, MDOT highway plan drawings may be used to add additional information to an as-built drawing.

103. Specific Requirements

103.1 Highway Location Signs/Markers. When available, drawings shall show highway mile post numbers and highway stationing numbers.

103.2 Street, Road, and Highway Identification

103.2.1 The highway marker number, e.g., County E-16, I-80, and so on, will be shown on all county, state, and federal highways that are on a drawing.

103.2.2 Most Michigan counties have assigned names to all county roads that are to be included on the drawings.

103.2.3 Multiple Identifiers: Where there is more than one identifying name and/or number for a street, road, or highway, all identifiers shall be shown on the drawing, e.g., M-43 / Saginaw Highway.

103.3 County, Township, Range, Section(s). As a minimum, the first and last drawing of a set of Span as-built drawings shall show the county, township name and identifier, and section number(s) peculiar to that particular drawing. When the county or township changes in a Span drawing sequence, the previous and new county, township, and section shall be shown. The city, county, and state boundary symbols shown on the Legend and Symbol sheet should be used. The preference is to have the county, township, and section specified on each drawing.
103.4 Fiber Cable Specifications. The fiber cable specification shall be shown on each page.

103.5 Span Continuity. The first and last page of each set of Span drawings shall show the connections/splices to the connecting Span(s). The connecting Spans shall be shown with their respective Span identification.

103.6 Revision Log. Each drawing shall include a revision table that is used once a drawing has been distributed and or released, whether it is a pre-release, bid issue, as-built, etc. The reason for the change shall be included in the table.

103.7 Splice Identification

103.7.1 Link Splices (LS). Splices interconnecting one or more links within a Span will be identified as “LS” within the splice identifier.

103.7.2 Backbone Splices (B). Splices placed at the end of reels are referred to as backbone splices and will be identified with a “B” within the splice identifier.

103.7.3 Maintenance Splices (MS). Splices that are required because of a maintenance or repair to the cable are referred to a maintenance splices and will be identified with an “MS” within the splice identifier.