

Request for Proposal

New Buffalo Area Schools
Outdoor Fiber Optic Network

Project 2205

June 20, 2007

Prepared by



Computers, networking and whatever else comes next.

6395 Technology Avenue, Kalamazoo, MI 49009
Phone: 269-375-8996 Fax: 269-375-4222 www.secantcorp.com

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1 Schedule of Events

RFP Released June 20, 2007

Project Specifications are available from:
Secant Technologies
6395 Technology Ave
Kalamazoo, MI 49009
269-375-8996

Pre-bid Meeting 6/27/2007 @ 1:00 PM

Meeting Location:
Office of the Superintendent
1112 East Clay Street
New Buffalo, MI 49117

Deadline for questions 7/5/2007 @ 5:00 pm

Bid Due Date 7/11/2007 @ 1:30 pm

New Buffalo Area Schools
1112 East Clay Street
New Buffalo, MI 49117

Provide three (3) sealed copies of your response
Late bids will not be accepted

Bid Opening 7/11/2007 @ 1:35 pm

New Buffalo Area Schools
Office of the Superintendent
1112 East Clay Street
New Buffalo, MI 49117

2 Project Background

2.1 Introduction

New Buffalo Area Schools is soliciting bids from qualified bidders for:

Underground Fiber Optic Cable and Conduit Installation

2.2 Work Sites

New Buffalo Middle School, 1112 East Clay Street, New Buffalo, MI 49117

New Buffalo Elementary School, 12291 Lubke Road, New Buffalo, MI 49117

Transportation Department (mandatory alternate), 711 East Clay Street, New Buffalo, MI 49117

2.3 Subcontractors

Bidders may use subcontractors to provide a total solution. All subcontractors are required to complete a separate technology vendor profile and technology reference forms. Failure to do so may disqualify bid.

2.4 Proposal Format

2.4.1 Bid Forms

All bidders submitting a response to this RFP must complete all bid forms provided. At least three references must be provided on the Technology Reference form.

2.4.2 Bid Security

Bids shall be accompanied by a bid security in the amount equal to five (5) percent of the amount of the total of the base bid and all additive alternates. The bid security shall secure the Owner from loss or damage caused by the withdrawal of the bid by the bidder within 90 days of the bid due date or by the failure of the bidder to enter into a contract with the owner if their bid is accepted by the Owner, or by the failure of the bidder to supply required bonds.

2.4.3 Performance Bond

The successful Bidder shall furnish a Performance and Payment Bond within 30 days of receiving written notice of award of the bid. Bond amount shall be equal to 100 percent of the contract sum. The cost of the bonds shall be included in the bid.

2.4.4 Executive Summary

Bidders should include an executive summary that gives an overview of their response. Please include any pertinent information not specifically asked for on the bid forms.

2.4.5 Project Timeline

Bidders should include a projected project timeline in their bid response including time required for permits, part procurement, installation and documentation.

2.4.6 Material Lists

Include a detailed Materials List for each section of your response. It is important that all items are listed. It will not be assumed that items are included, unless they are specifically listed.

2.4.7 Cut Sheets

Include manufacturer cut sheets for key components used in your design. Cut sheets are not required for items that exactly match the specified models in this RFP.

2.4.8 Voluntary Alternates

Owner may accept Voluntary Alternates or Value Engineering Suggestions consistent with the intent of the bidding documents. For each alternate provide a Materials List, Cut Sheets and Executive Summary explaining your alternate design and its benefits.

2.4.9 Sealed Copies

Three sealed copies of your bid response (marked "DO NOT OPEN") must be received no later than the deadline listed in the Schedule of Events section. **Late bids will be returned unopened.**

2.5 Inquiries

All inquiries related to this RFP should be in writing and can be faxed or e-mailed to:

Steven Burdick
Secant Technologies
E-Mail: sburdick@secantcorp.com
Fax: 269-375-4222

All requests for information and clarifications must be received by the deadline stated in the Schedule of Events section.

2.6 Bid Evaluation

It is the intent of the Owners to select the bid response that provides the greatest long-term value to the Owner. This may not be the response with the lowest initial purchase price. The following factors will be used to evaluate and award this project:

- Completeness of response
- Provides lower long-term cost of ownership
- Vendor's experience with similar projects
- Expertise and certification of vendor's staff
- Vendor's references
- Flexibility to expand and change with changing Owner requirements
- Initial purchase price

2.7 Bid Response Validity

Vendor shall honor bid response for not less than 90 days from the date upon which bid responses are due.

2.8 Bid Award

Owner will, at its sole discretion, award the RFP to a vendor or vendors of its choice. Owner may elect to not award any or all sections of the RFP. Owner reserves the right to revise all quantities up or down by 25 percent in the final award.

Bidder, by submitting bid, agrees to honor line item individual component pricing submitted on bid forms for the final quantity determined by Owner. Owner may elect to eliminate any individual line item or combination of line items contained on bid forms prior to contract award.

3 Performance of Work Requirements

This section specifies the terms and conditions upon which the performance of the work shall be judged.

3.1 SALES TAX

Owner is exempt from all taxes. The Contractor shall be responsible for the payment of any tax obligation it may incur in connection with the Work of this project, including but not limited to State sales and use taxes. The cost of these shall be included in the bid price.

3.2 PERFORMANCE AND PAYMENT BOND

- A. If the bid exceeds \$50,000.00, acceptable bidders shall be required, as a condition precedent to award of contract, to furnish in the amount of 100% of the contract price, satisfactory Performance Bond and Labor and Material Payment Bond on contract. Performance Bond and Labor and Material Payment Bond, by a quality surety licensed to do business in the State of Michigan with cost of bond included in the base bid amount.
- B. The bidder shall deliver the required bonds to the Owner within 15 days after award of the contract. If the work is to be commenced prior thereto in response to a letter of intent, the bidder shall submit evidence to the owner that such bonds will be furnished prior to commencement of the work.
- C. The proposed bonding company of the bidder shall be acceptable to the Owner. The Owner shall be listed as obligee on the bond.

3.3 BID SECURITY

- A. Each Proposal shall be accompanied by Bid Security pledging that the Bidder will enter into a contract with the Owner on the terms stated in the Proposal, and will furnish Bonds as described in Section 00600. Should the Bidder refuse to enter into such contract or fail to furnish satisfactory Bonds and insurances as required after Notice to Proceed, the amount of the Bid Security shall be forfeited to the Owner as liquidated damages, not as a penalty.
- B. Bid Security shall be in the amount of five percent (5%) of the Base Bid(s).
- C. Bid Security may take the form of a Bid Bond, Certified Check, Cashier's Check, or a Money Order. When submitting a Certified Check, Cashier's Check or Money Order for multiple Bids, it is recommended that a separate check or money order accompany each bid. AN UNCERTIFIED PERSONAL OR COMPANY CHECK DOES NOT CONSTITUTE A BID SECURITY.
- D. The Owner will have the right to retain the Bid Security of Bidders to whom an award is being considered until either (a) the Contract has been executed and bonds, if required, have been furnished, or (b) the specified time has elapsed so that Bids may be withdrawn or (c) all bids have been rejected.

3.4 INSURANCE

- A. Limitation of Liability – By signing the bid, the bidder acknowledges that he/she is skilled and experienced in the use and interpretation of the Specifications. He/she has reviewed the Specifications for this project and has found them to be free of ambiguities and sufficient for Bid purposes. Further, he/she has examined the site(s) of the Work and from his own observations, has satisfied himself/herself as to the nature and location of the Work; the character and quantity of work; the difficulties likely to be encountered; and other items that may affect the performance of the work. He/she has based his/her Bid solely on these documents and observations and has not relied in any way on any explanation or interpretation, oral or written, from any other source.
- B. Insurance Required – Prior to commencement of the Work, the Contractor shall provide to the Owner satisfactory proof of insurance and maintain during the term of the project such insurance as will protect him and the Owner from claims arising out of the Work described in this Contract and performed by the Contractor or Subcontractors consisting of:
 1. Worker's Compensation Insurance including Employer's liability to cover employee injuries or disease compensable under the Worker's Compensation Statutes of the State of Michigan, disability benefit laws, if any or Federal compensation acts such as U.S. Longshoremen or Harbor

- Workers', Maritime employment, or Railroad Compensation Acts, if applicable. Self-insurance plans approved by the regulatory authorities in the State of Michigan are acceptable.
2. A Comprehensive General Liability policy to cover bodily injury to persons other than employees and for damage to tangible property, including loss of use thereof, including the following exposures:
 - a. All premises and operations.
 - b. Explosion, collapse, and building damage.
 - c. Contractor's Protective coverage for independent contractors or subcontractors employed by him.
 - d. Contractual Liability for the obligation assumed in the Indemnification or Hold Harmless agreement found in the Supplemental Conditions section of this Contract.
 - e. The usual Personal Injury Liability endorsement with no exclusions pertaining to employment.
 - f. Products and Completed Operations coverage. This coverage shall extend through the Contract guarantee period.
 3. A Comprehensive Automobile Liability policy to cover bodily injury and property damage arising out of the ownership, maintenance or use of any motor vehicle, including owned, non-owned and hired vehicles. In light of standard policy provisions concerning (1) loading and unloading and (2) definitions pertaining to motor vehicles licensed for road use vs. unlicensed or self-propelled equipment, it is strongly recommended that the Comprehensive General Liability and the Comprehensive Auto Liability be written by the same insurance carrier, though not necessarily in one policy.
 4. Umbrella or Excess Liability: The Owner, for this project may waive the umbrella or excess liability coverage under the "Limits of Liability" below. This coverage may be considered when awarding this contract, however, it is not a requirement of this contract. The Contractor is granted the option of arranging coverage under a single policy for the full limit required or by a combination of underlying policies with the balance provided by an Excess or Umbrella Liability policy equal to the total limit(s) requested. Umbrella or Excess policy wording shall be at least as broad as the primary or underlying policy(ies) and shall apply both to the Contractor's general liability and to his automobile liability insurance. **The Owner, New Buffalo Area Schools, shall be listed as additional insured.**
 5. Property Insurance: The Contractor shall be solely and exclusively responsible for all of its equipment and materials used or located at the Project. The Owner is hereby released and shall not have any liability of any kind whatsoever for any damage, destruction, vandalism, theft or any other loss of any kind to Contractor's equipment and materials used or located at the Project.
 - a. The Contractor shall effect and maintain similar property insurance on portions of the Work stored off site or in transit when such portions of the Work are included in an application for payment.
- C. Limits of Liability – The required limits of liability for insurance coverage required under "Insurance Required" above shall be not less than the following:
1. Workers Compensation

| | |
|-----------------------------------|--------------|
| Coverage A – Compensation | Statutory |
| Coverage B – Employer's Liability | \$300,000.00 |
 2. Comprehensive General Liability

| | |
|--|--------------|
| Bodily Injury – Each Occurrence | \$500,000.00 |
| Bodily Injury – Aggregate (Completed Operation) | \$500,000.00 |
| Property Damage – Each Occurrence | \$500,000.00 |
| Property Damage – Aggregate | \$500,000.00 |

| | | |
|----|------------------------------------|----------------|
| | or combined single limit | \$500,000.00 |
| 3. | Comprehensive Automobile Liability | |
| | Bodily Injury – Each Person | \$250,000.00 |
| | Bodily Injury – Each Occurrence | \$500,000.00 |
| | Property Damage – Each Occurrence | \$500,000.00 |
| | or combined single limit | \$500,000.00 |
| 4. | Umbrella or Excess Liability | \$1,000,000.00 |

D. Insurance – Other Requirements

1. Notice of Cancellation or Intent Not to Renew – Policies will be endorsed to provide that at least thirty (30) days written notice shall be given to the Owner of cancellation or of intent not to renew.
2. Evidence of Coverage – Prior to commencement of the Work, the Contractor shall furnish to the Owner, Certificates of Insurance in force. The Owner reserves the right to request complete copies of policies if deemed necessary to ascertain detail of coverage not provided by the certificates. Such policy copies shall be “Originally Signed Copies,” and so designated.
3. Qualification on Insurers – In order to determine financial strength and reputation of insurance carriers, all companies providing the coverage required shall have a financial rating not lower than XII and a policyholder’s service rating no lower than A+ as listed in A.M. Best’s Key Rating Guide, current edition. Companies with ratings lower than A+: XII will be acceptable only upon written consent of the Owner.
4. Subrogation Clause – The following subrogation clause shall appear in all policies of insurance, “Subrogation Clause – It is hereby stipulated that this insurance shall not be invalidated should the insured waive in writing prior to a loss any or all right of recovery against any part for loss occurring to the property described herein.”
5. Additional Insured Provision on Policy(ies) is to read as follows:
“The New Buffalo Area Schools, its elected or appointed officers, officials, employees and volunteers are included as insured with regard to damages and defense of claims arising from:
 - a. activities performed by or on behalf of the Named Insured,
 - b. products and completed operations of the Named Insured,
 - c. premises owned, leased or used by the Named Insured, or
 - d. the ownership, operation, maintenance, use, loading or unloading of any auto owned, leased, hired or borrowed by the Named Insured.”

3.5 ENVIRONMENTAL STATEMENT AND RESPONSIBILITY OF CONTRACTORS AND SUBCONTRACTORS

- A. It shall be the responsibility of the Contractor to pay any and all costs incurred from the clean up related to any environmental hazard created by means of release, spill, leak or any other means of contamination caused by accident or negligence.
- B. It shall be the responsibility of the Contractor to dispose of any product(s) and/or material following EPA, DNR, and local applicable laws and regulations.
- C. It shall be the responsibility of the Contractor, if required, to purchase the proper permits and notify the proper authorities prior to commencing said project or, should a “release” take place, to notify proper authorities of any such release.
- D. It shall be the responsibility of the Contractor to maintain on site a blood borne pathogen plan and all necessary safety supplies associated with any spill or clean up that may occur.
- E. The Contractor shall not use the Owner’s dumpsters for any materials of any kind.
- F. Please be aware that New Buffalo Area Schools’ buildings contain various types of asbestos containing material (ACBM). Each building has been previously inspected with locations of ACBM being identified within the Asbestos Management Plan book located in each building’s administration office. This binder will identify known locations of asbestos materials within that particular building.

Asbestos containing materials include, but are not limited to: floor tile, linoleum, plaster, pipe insulation, spray on material to walls and ceilings/support structures, wallboard, and gaskets. If any building materials that are known or suspected of containing asbestos are encountered, stop work in that area immediately. It is New Buffalo Area Schools' policy that no outside contractor may touch ACBM without explicit permission from Facilities Management. Owner's representative will take samples and analyze and provide further instruction. Contractor is responsible for any fiber release that results in fiber concentration above the Permissible Exposure Limit (P.E.L.).

G. The Contractor shall submit verification and confirmation of the above.

3.6 Quality Assurance

3.6.1 Materials

Furnish only new, first-class quality materials and equipment to be delivered, erected, connected and finished in every detail, selected and arranged to fit properly into spaces. Where no specific kind or quality of material is specified, furnish first-class quality standard article, approved by Owner.

3.6.2 Current Versions

Supply most current version of all products being provided. Prior and/or old versions of products, unless specifically identified as an exception to this requirement, in this document or its subsequent addenda and/or bulletins, shall not be acceptable. In cases where a newer version of a product is available at the time of installation, request a clarification from the Owner, in writing, via fax, electronic mail, or letter, on which product is to be used.

3.6.3 Standards Compliance

Comply with latest edition or revision of each standard of code mentioned in these specifications for use in the intended environment as follows:

- American Insurance Association (AIA)
- American Insurance Service Group (AISG)
- American National Standard Institute (ANSI)
- American Society for Testing and Materials (ASTM)
- Alliance for Telecommunications Industry Solutions (ATIS) Bellcore
- Building Officials and Code Administrators International, Inc. (BOCA)
- Ceilings and Interior Systems Construction Association (CISCA)
- Electronics Industries Association (EIA)
- Federal Communications Commission (FCC)
- Federal Information Processing Standards (FIPS)
- General Services Administration (GSA)
- International Conference of Building Officials (ICBO)
- Institute of Electrical and Electronics Engineers, Inc. (IEEE)
- International Organization for Standardization (ISO)
- International Telecommunication Union (ITU) (Formerly CCITT)
- National Electrical Manufacturers Association (NEMA)
- National Fire Protection Association (NFPA)
- National Electrical Code (NEC) – NFPA 70-1993
- Telecommunications Industries Association (TIA)
- Underwriters' Laboratories (UL)
- National Institute of Standards and Technology (NIST)
- National Technical Information Service (NTIS)
- Occupational Safety and Health Administration (OSHA)
- Rural Utilities Services USDA/RUS (RUS Formerly REA)
- State and Local Municipality Codes and Ordinances
- Building Industry Consulting Service International (BICSI)

Where conflicts occur between codes and standards, or between codes and standards and Specifications and Plans, the one establishing the more stringent requirements shall be followed.

3.6.4 Warranty

Work product shall be covered with a 12 month workmanship and labor warranty provided by contractor.

3.7 Contract Documents

This document along with the completed Bid Form and Proposal Documents shall constitute the Contract Documents by which performance of work shall be judged. The Owner shall be the judge of performance regarding all work. Contracts that the bidder wishes the owner to approve must be submitted with the bidder's response.

3.8 Conformance

The Contractor warrants that all workmanship, materials, and equipment incorporated in this work will be of good quality and in conformance with the Contract Documents.

3.9 Quality Standard

The Contract Documents establish a standard of quality that the Owner has determined to be necessary for the Project. It is mandatory that items of material and equipment conform to the Contract Documents and meet the quality standards in every respect.

3.10 Conformity of Work

Execute all work in conformity with best practice to accommodate work to environment and surroundings. Perform all work in accordance with drawings, manufacturer's instructions, shop drawings, this specification, and other Contractors and Vendors.

3.11 Coordinate Locations

Coordinate locations and arrangements of equipment with requirements of all other Contractors, Vendors, and Owner. In cases of technical configuration or implementation difficulties, or if simplified installation is made possible by slight variance, bring such conditions to attention of Owner, in writing, via fax, electronic mail, or letter. Changes in arrangements may be made only if authorized by Owner.

Drawings are diagrammatic and indicate the general arrangement of systems and work included in these documents. Final placement and arrangement are the responsibility of the Installing Contractor.

3.12 Work Definition

Below is an outline of specific work the Contractor shall be responsible for performing:

- Project Management
- Systems Engineering
- Construction Scheduling
- Installation
- Configuration
- Testing
- Documentation

3.13 General Duties

The Contractor shall perform the following duties:

3.13.1 Supervision

The Contractor shall plan, direct, supervise, coordinate, and perform the work.

3.13.2 Qualified Personnel

Only certified, skilled, dependable persons who meet with the Owner's approval at all times in every capacity shall be utilized.

3.13.3 Product Delivery and Liability

The Contractor shall take responsibility for the delivery and installation of all equipment specified in the Bid Proposal. This shall include loss or damage during shipment or installation. The Contractor warrants that all materials and equipment incorporated in the work shall be new, unless otherwise specified in the Bidding Documents. The Contractor warrants that all materials and equipment incorporated in the work shall be free from faults and defects. The Contractor shall inspect all product shipments for damages and promptly replace damaged product. No damaged product shall be stored on site.

3.13.4 Structural Damage

The Contractor shall replace or repair any damage to structure, finishes, or resulting from work performed by the Contractor. The contractor shall REPLACE any damaged ceiling tiles.

3.13.5 Incidentals

The Contractor shall provide any incidental material, labor, or detail omitted from the Bid Proposal, yet required by governing codes and standards, local regulations, trade practices, operational functions, or good workmanship, as part of the contract work without extra charge.

3.13.6 Deviations

Deviations from Plans or Specifications shall not be permitted except upon written permission from Owner.

3.13.7 Asbestos

Under no circumstances is the Contractor to disturb asbestos containing materials or other hazardous materials without appropriate engineering controls as approved by the Owner.

3.14 Quality Assurance

3.14.1 Materials

Furnish only new, first-class quality materials and equipment to be delivered, erected, connected and finished in every detail, selected and arranged to fit properly into spaces. Where no specific kind or quality of material is specified, furnish first-class quality standard article, approved by Consultant.

3.14.2 Current Versions

Supply most current version of all products being provided. Prior and/or old versions of products, unless specifically identified as an exception to this requirement, in this document or its subsequent addenda and/or bulletins, shall not be acceptable. In cases where a newer version of a product is available at the time of installation, request a clarification from the Consultant, in writing, via fax, electronic mail, or letter, on which product is to be used.

3.14.3 Standards Compliance

Comply with latest edition or revision of each standard of code mentioned in these specifications for use in the intended environment as follows:

- American Insurance Association (AIA)
- American Insurance Service Group (AISG)
- American National Standard Institute (ANSI)
- American Society for Testing and Materials (ASTM)
- Alliance for Telecommunications Industry Solutions (ATIS) Bellcore
- Building Officials and Code Administrators International, Inc. (BOCA)
- Ceilings and Interior Systems Construction Association (CISCA)
- Electronics Industries Association (EIA)
- Federal Communications Commission (FCC)
- Federal Information Processing Standards (FIPS)
- General Services Administration (GSA)
- International Conference of Building Officials (ICBO)
- Institute of Electrical and Electronics Engineers, Inc. (IEEE)
- International Organization for Standardization (ISO)
- International Telecommunication Union (ITU) (Formerly CCITT)
- National Electrical Manufacturers Association (NEMA)
- National Fire Protection Association (NFPA)
- National Electrical Code (NEC) – NFPA 70-1993
- Telecommunications Industries Association (TIA)
- Underwriters' Laboratories (UL)
- National Institute of Standards and Technology (NIST)
- National Technical Information Service (NTIS)
- Occupational Safety and Health Administration (OSHA)
- Rural Utilities Services USDA/RUS (RUS Formerly REA)
- State and Local Municipality Codes and Ordinances

Building Industry Consulting Service International (BICSI)

Where conflicts occur between codes and standards, or between codes and standards and Specifications and Plans, the one establishing the more stringent requirements shall be followed.

3.15 Contract Documents

This document along with the completed Bid Form and Proposal Documents shall constitute the Contract Documents by which performance of work shall be judged. The Owner shall be the judge of performance regarding all work. Contracts that the bidder wishes the owner to approve must be submitted with the bidder's response.

3.16 Project Management

The Contractor shall provide complete project management for all aspects and phases of the project, including the following:

3.16.1 Project Manager

The Project Manager shall be experienced. He/she shall have managed at least 3 similar projects of similar scope. The project manager shall be authorized to make decisions on behalf of the company. The project manager shall inspect work and direct the crew on an on-going basis.

3.16.2 Planning and Management

Building work shall be coordinated with the Owner's technology coordinator and/or the project consultant.

3.17 Time and Scheduling

3.17.1 Owner Possession

It is the intention of the Owner to take possession of the Work by the established completion date or earlier, within the shortest time possible consistent with good construction practices.

3.17.2 Schedule of Work

Upon award of the contract, the Contractor shall meet with the Owner to prepare an agreed upon schedule of work. This schedule shall provide the Owner with dates upon which stages of the work may be reviewed or inspected. The Contractor shall keep the Owner informed at all times of any modifications to the agreed upon schedule.

3.17.3 Delay of Work

If the work is delayed through the fault of the Owner (or of any separate contractor employed by the Owner or of any condition by the Owner beyond the Contractor's control) the schedule may be extended within a period agreed upon by the Owner and the Contractor. The Contractor shall notify the Owner, in writing, of any condition or situation that in the Contractor's opinion warrants an extension of Contract Time.

3.17.4 Time Extension

The Contractor shall not be entitled to additional compensation or damages due to delays, interference's or interruptions to the Work or the Project, but shall be entitled only to an appropriate extension of time in accord with the General Conditions of the Contract for Construction.

3.18 Contractor Inspection of Work

The Contractor shall promptly facilitate inspection and testing of the Work regardless of expense as necessary or as requested by the Owner, regardless of whether or not the Work in question is his own or that of a subcontractor. The costs for such tests or inspections shall be born as follows:

3.18.1 Contractor Deficiencies

If such tests or inspections reveal deficiencies as measured by Construction documents or an independent consultant/testing agency, the Contractor shall bear all costs incurred to correct such deficiencies, including the cost of testing and inspection, and the cost to reconstruct any work by testing or inspection or by the correction of any deficiency.

3.18.2 Other Deficiencies

If such test and inspections do not reveal deficiencies attributable to the Contractor, the Owner shall

bear all costs incurred including the cost of testing and inspection, and the cost of reconstruction. Contracts shall be modified by Change Order to reimburse the Contractor for costs.

3.19 Inspection of Work

The Owner's Consultant will inspect and "punch" the project. The Contractor is responsible to correct any issues brought forth at no additional expense to the Owner.

Payment of retainage, as presented in this document, will be dependent upon complying with the final "punch out".

3.19.1 Deficiencies

The Contractor shall replace, repair or otherwise correct all deficiencies in the Work during the construction of the Project, within two years after the date of substantial completion, within the time period prescribed in any special warranties and guarantees, and any longer period prescribed by law.

3.19.2 Owner Option

The Contractor shall expediently correct all deficiencies brought to his attention in writing by the Owner. If, in the opinion of the Owner and the independent agency, the Contractor fails to correct deficiencies, or fails to act expeditiously to correct deficiencies, the Owner may:

3.19.2.1 Accept Deficiencies

Accept the deficiencies in the Work, and reduce the Contract Sum of the Contractor at fault by a unilateral Change Order issued and signed by the Owner in an amount to be determined by the Owner.

3.19.2.2 Deficiencies Removed

Have the deficiencies removed in any reasonable manner available to the Owner, and charge the Contractor at fault for the costs incurred, or reduce that Contractor's Contract Sum by a unilateral Change Order issued by the Owner for the costs incurred.

3.20 Cost of the Work

The Contractor shall pay all costs of the Work including, but not limited to, labor, materials, equipment, tools, transportation, freight, taxes, royalties, patent fees, support facilities, construction equipment, water, heat, utilities, supervision, overhead, and all other items necessary for the proper execution and completion of the Work.

3.21 Legal Compliance

The Contractor shall comply fully with all laws, statutes, ordinances, rules, regulations, codes, and lawful orders applicable to their work, including employment regulations, unless specifically exempted from compliance by the Contract Documents. Where local codes differ from codes of broader jurisdictions, the more stringent code shall apply. The Contractor shall promptly notify the Owner in writing, of items in the plans or specifications for this project that violate any applicable codes.

3.22 Permits

Unless otherwise specifically stated in the Contract Documents, the Contractor shall apply for, secure, and pay for all permits, licenses, and fees. The Contractor shall schedule, conduct or perform all tests, and give all notices required by governmental units for the Work of his Contract.

3.23 Site Housekeeping

The Contractor shall be responsible for his own site housekeeping and clean up of any waste generated in the execution of his Work. Unless otherwise specified, the Contractor is responsible for suitable off-site disposal of their waste and debris.

3.24 Cleanup

Clean all equipment at time of substantial completion. Clean interiors and exteriors of all cabinets, furniture, and equipment enclosures. Clean out all debris and rubbish related to the installation of the communication duct system. All equipment shall appear in first class new condition.

3.25 Cutting and Patching

Where applicable, do all cutting and patching necessary for installation of work with approval of the Consultant. Do not impair strength or function of work being cut or patched, e.g., do not weaken

structural members and maintain watertight integrity where necessary. Use rotary type drilling tools and concrete cutting saws to cut concrete and masonry walls. Use rotary type drilling tools to cut cabinets where knockouts are not available and cable access is required. Do not use torches for cutting metal.

3.26 Firestopping

Where applicable, provide firestop as required at all penetrations through fire rated or smoke rated walls, floors, or other surfaces. Replace or reinstall firestop material on all existing penetrations where others have installed firestop.

3.27 As-Built Drawings

Drawings shall indicate location of the following with their associated identifying label:

- Entrance facilities.
- Main cross connects.
- Telecommunications rooms.
- Equipment rooms.
- Handholes and manholes.
- Splices.
- Service entrances.
- Pull boxes.
- Station cables.
- Intra-building and inter-building backbone cables, copper, and/or fiber optic.
- Routing paths for bundles of cables larger than two (2) locations.
- Any other information required for proper maintenance of the system.

3.28 Attendance at Meetings

The Contractor shall be responsible for attending all meetings as required by the Owner or the Consultant.

3.29 Installation

The Contractor shall adhere to manufacturer's specifications during installation of all hardware.

3.30 Review of Documentation

Upon completion of work, the Contractor shall meet with the Owner to deliver and review system documentation, including test results. The work shall not be considered complete until the Review of Documentation has been completed.

3.31 Acceptance

All construction and installation work shall be done in a thorough and workman-like manner in accordance with the Plans, Specifications, and Construction Drawings and shall be subject to acceptance by the Owner.

3.32 Payment

3.32.1 Submission of Invoice

The contractor must provide an insurance certificate of materials allocated specifically for this project along with the initial AIA G702/G703 application.

3.32.2 Payment of Invoice

Invoices in question shall be communicated to the Contractor within eight (8) business days of reception. Once approved by owner and Consultant, payment shall be remitted within 30 days.

3.32.3 Retainage

Ten percent (10%) of all invoices will be retained. Retained amount will be paid within 60 days of final acceptance.

4 Technical Specifications

4.1 Work Summary

4.1.1 Work Required

- Permits and licenses
- Handhole installation
- HDPE Conduit installation
- Fiber Optic Cable Installation, Labeling and Termination
- Documentation

4.1.2 Project Description

This project includes the installation of approximately 2 miles of underground conduit system and fiber optic cabling in New Buffalo, Michigan. The project includes HDPE duct, handholes and directionally bored roadway crossings.

4.1.2.1 Base Bid

The base bid requires a single underground 1.5-inch HDPE conduit and 12-strands single mode fiber.

4.1.2.2 Alternate #1

In place of the 12-strand single mode fiber provide 24-strand single mode fiber.

4.1.2.3 Alternate #2

Provides a second underground 1.5-inch HDPE conduit with pull tape along the complete conduit pathway for future expansion.

4.1.2.4 Alternate #3

Provide a handhole with 50-foot maintenance loop long the conduit path at the driveway serving the New Buffalo Area Schools' Transportation Building.

4.1.2.5 High School Entrance Pathway

At the High School location an existing 4" underground conduit with pull tape is in place running from the building MDF to a handhole. Contractors are expected to use this pathway to route fiber to the building MDF.

4.1.3 Elementary Building Entrance Pathway

The elementary building entrance pathway does not exist currently and must be installed as part of this contract. Install (2) two, two-inch PVC conduits into building MDF from handhole at exterior of building. Install and secure pull tape in each conduit. Utilize first conduit for fiber optic cable. Leave 2nd conduit for future communications needs.

4.1.4 Project Schedule

Work can begin as soon as the district issues a letter of intent to initiate contracts. (anticipated vendor selection is July 17, 2007) All work must be completed by August 24, 2007.

4.2 General Specifications

4.2.1 Floor Plans and Diagrams

The site plans and diagrams provided with this document are considered part of this specification document.

4.2.2 Fiber Route

Sheet TS.01 shows the proposed route of the primary conduits, handhole locations, roadway crossing locations and fiber maker locations. All distances indicated are approximate. Contractor is to field verify all measurements prior to ordering materials.

4.2.3 Permits and Licenses

It shall be the Contractor's responsibility to acquire all governmental permits as well as any required utility and inspection permits.

The Contractor shall be responsible for acquiring riders for all the required permits and inspections at their own expense.

It shall be the Contractor's responsibility to coordinate all phases of construction with any various utility companies involved.

The Contractor is responsible for any overtime inspection costs incurred by the utility for work performed at the discretion of the Contractor outside normal working hours.

4.2.4 Existing Utilities

The contractor is responsible for locating all existing underground services including electrical, telephone, data, water, sewer and gas prior to beginning any underground work. Coordinate with Miss Dig for public utilities.

4.2.5 Engineering Fees

It shall be the Contractor's responsibility to pay any and all engineering and design fees associated with obtaining permits. The Contractor shall be responsible for coordinating any engineering surveys that are required.

4.2.6 Details Not Shown

Details not shown or specified, but necessary for the proper installation and operation, shall be included in the work and in the Contractor's bid. The Contractor shall be responsible for all accessories necessary to make the system complete in all respects and ready for operation, even if not particularly specified. All necessary components shall be furnished, delivered, and installed by the Contractor without additional expense to the Owner.

4.2.7 Design Review

The Contractor shall conduct a detailed design review of these systems prior to ordering supplies and equipment. This design review shall be held at the Consultant's facility. All drawings, schematic, material lists, and details shall be submitted for approval within 30 days after contract is awarded.

4.2.8 Site Survey

Contractor shall survey work site to familiarize the installation team with local conditions. Review plans, specifications and site. Verify the job overview and special requirements with Consultant.

4.2.9 Qualifications

The Contractor shall provide experienced installers who are certified, licensed, or otherwise qualified by the manufacturer as having the necessary experience, staff, and training to install the manufacturer's products per specified requirements. A manufacturer's willingness to sell its products to the Contractor or to an installer engaged by the Contractor does not, in itself, confer qualification on the buyer.

The Contractor shall have a minimum of three (3) years experience in the installation of Outside Plant Conduit Systems.

4.2.10 Workmanship

All work shall have a finished appearance. The contractor shall supply and repair/ install all trim, covers, fixtures, carpet, paint, hardware, brackets, landscape, etc., as needed.

4.2.11 Landscape Restoration

Contractor shall restore landscape to original condition after installation work is complete. Remove from site any excess fill material. Compact and level any disturbed soil to restore to original grade. Reseed grass in areas where existing grass has been disturbed using hydro-seeding method with green mulch.

4.2.12 Specifications

Should it appear that the work to be done is not sufficiently detailed or explained in the plans or specifications, the Contractor shall apply to the Consultant for such further explanation as may be necessary and shall conform to such explanation or interpretation as part of the contract.

4.2.13 Applicable Standards

This installation will be in accordance with but not limited to the following standards:

- National Electric Code
- TIA/ EIA-607, Commercial Building Grounding and Bonding Requirements for Telecommunications

TIA/ EIA-758- 1 Addendum 1, OSP Optical Fiber Cabling Practices
ASTM International, F 2160, "Standard Specification for Solid Wall High Density Polyethylene (HDPE) Conduit Based on Controlled Outside Diameter (OD)
ASTM International, F 2176, "Standard Specification for Mechanical Couplings Used on Polyethylene Conduit, Duct and Innerduct."
ASTM International, D 3350, "Standard Specification for Polyethylene Plastics Pipe and Fittings Materials"
ASTM International, F 1290, " Standard Practice for Electrofusion Joining Polyolefin Pipe and Fittings"
ASTM International, D 2657, " Standard Practice for Heat Fusion Joining of Polyolefin Pipe and Fittings"
ASTM International, D 2683, "Standard Specification for Socket-Type Polyethylene Fittings for Outside Diameter-Controlled Polyethylene Pipe and Tubing"
ASTM International, F 1056, "Standard Specification for Socket Fusion Tools for Use in Socket Fusion Joining Polyethylene Pipe or Tubing and Fittings"
National Electrical Manufacturers Association, NEMA TC 7, "Smooth-Wall Coilable Polyethylene Electrical Plastic Conduit"
Underwriters Laboratories, Inc., UL 651B, "Continuous Length HDPE Conduit"
Underwriters Laboratories, Inc., UL 2024, "Optical Fiber Cable Raceway"
UL 651A
Plastics Pipe Institute, Inc., *Handbook of Polyethylene Pipe*
BICSI Structured Cabling Standards and Practices

If any discrepancies exist between these standards and the technical specifications of this document, the technical specifications of this document will apply.

4.2.14 Grounding and Bonding

The contractor will be responsible for grounding all equipment installed in accordance with grounding standards listed above.

4.3 Materials & Methods

4.3.1 Conduit

Underground conduit shall be High Density Polyethylene (HDPE), with wall thickness of SDR-11. Conduit shall be rated for installation by plowing and directional boring.

4.3.1.1 Color

Parallel conduit runs shall be color coded as indicated on drawings.

4.3.1.2 Continuous Runs

All installed conduit runs are to be continuous from handhole to handhole without splices or couplers. Conduit shall be installed a minimum of twenty-four (24) inches below grade.

4.3.1.3 Conduit Installation in Open Areas

Installation of conduit may be performed using open trenching, continuous trenching, vibratory plowing or directional boring as dictated by site conditions.

4.3.1.4 Conduit Installation under Roadways

All conduits installed under existing driveway and roadways shall be installed using directional boring.

4.3.1.5 Conduit Installation near Utilities

Contractor is to exercise extreme caution when installing conduit in close proximity to existing underground utilities. Utilize hand digging as required to avoid damaging existing utilities.

4.3.1.6 Pull Tape

Conduit runs longer than 50 feet are to be provided with a polyester pull tape. Pull tape shall exit each end of conduit by a minimum of three feet and shall be secured.

4.3.1.7 Conduit Caps

All installed conduits shall be capped to reduce the chance of dirt and water infiltration. Caps shall be sized to fit the conduit installed. Caps shall be Carlon EC1.900 or equivalent.

4.3.2 Tracer Wire

Tracer wire shall be Copperhead Industries Direct Burial #12 AWG Solid (.0808" diameter), steel core hard drawn extra high strength horizontal directional drill tracer wire, 1150# average tensile break load, 45 mil high molecular weight-high density yellow polyethylene jacket complying with ASTM-D-1248, 30 volt rating.

Tracer wire shall be placed continuously in all trenches and bonded to grounding rods within a handhole or manhole.

4.3.2.1 Grounding

Grounding rods shall be 5/8" by 8-foot copper-coated steel and shall be installed at no more than 1 km spacing.

4.3.3 Warning Tape

Orange warning tape is required in all trenches containing conduit. The warning tape shall have bold black legend "CAUTION – BURIED FIBER OPTIC CABLE" with letters approximately 1 inch high and repeated at approximately three-foot intervals. The warning tape shall be 100 mm wide. Warning tape shall be Carlon MAT3O21 or equivalent.

4.3.3.1 Depth

Install warning tape one foot below grade.

4.3.4 Above Ground Markers

Provide above ground marker posts along the fiber path. Markers shall be orange in color/ Markers shall be Rhino FiberCurve or equivalent.

Provide a marker at the following locations along the conduit pathway:

- One every 500 feet along the conduit pathway
- One at each building entrance
- One at each change in conduit direction
- At any additional locations as indicated on provided drawings

4.3.4.1 Marker Decal

Install decal with "WARNING FIBER OPTIC CABLE" and "NO DIG" graphic on each side of marker post.

4.3.5 Handholes

Provide handhole along the conduit pathway to accommodate fiber installation and to hold splice cases and fiber maintenance loops. . Minimum handhole size shall be 24" wide by 36" long by 24" deep. Handholes are to be installed in non-traffic locations and shall be constructed of polymer concrete or HDPE. Handholes shall be PenCell PEM-2436PC or equivalent.

4.3.5.1 Locations

Provide a handhole at the following locations along the conduit pathway:

- One every 1000 feet along the conduit pathway to assist in fiber installation
- One at each building entrance
- One at each change in conduit direction
- At any additional locations as indicated on provided drawings

4.3.5.2 Covers

Handhole cover shall be constructed of polymer concrete and shall be embossed with "COMMUNICATIONS".

4.3.5.3 Gravel Base

Provide a minimum 8-inch washed gravel base under each handhole for drainage.

4.3.5.4 Handhole Installation

Install handholes level with the existing grade. Properly support handhole during backfilling and compaction of soil to prevent deformation of handhole. Verify that cover fits properly after backfilling is completed.

4.4 Fiber Optical Cable

Single Mode Fiber Optic Cable shall be Corning FREEDM LST Gel-Free or equivalent - with the following characteristics:

| Wavelength (Nm) | Maximum Attenuation (dB/Km) |
|--------------------|-----------------------------------|
| 1310 | 0.4 |
| 1383 | 0.4 |
| 1550 | 0.3 |

The mechanical and environmental specifications for indoor/outdoor fiber optic cable shall be in accordance with ANSI/ICE S-83-640.

All fibers in the buffer tube shall be usable fibers and shall be sufficiently free of surface imperfections and inclusions to meet the optical, mechanical, and environmental requirements of these Specifications.

The coating shall be dual layered, UV-cured crylate; the coating shall be mechanically strippable without damaging the fiber.

The cable shall comply with the optical and mechanical requirements over an operating temperature range of -40°C to $+70^{\circ}\text{C}$.

Each fiber shall be distinguishable from others in the same tube by means of color-coding and shall meet EIA/TIA-598 (Color Coding of Fiber Optic Cables).

All cable shall be appropriately rated for the specified applications and to the conditions to which they will be exposed.

Cable shall be riser or plenum rating as required by the installation environment.

4.5 Fiber Termination

4.5.1 Fiber Patch Panels

Fiber termination cabinets shall be rack-mount or wall-mount style and must provide storage space for fiber management and splices.

Cabinets shall be sized to hold all fiber strands in the entrance cable. Cabinets shall be loaded with the number of SC/APC couplers required to house all terminated fibers.

SC/APC couplers shall be duplex and shall be green in color.

All spare couplers shall have dust covers on both sides.

Cable accesses shall have grommets.

The fiber optic distribution patch panels shall be sized to contain sufficient connector module housing to handle the associated cables and their respective breakouts.

4.5.2 Fiber Patch Panel Sizes

| Building | Couplers Installed | Maximum Tray Strand Capacity | Type |
|------------------------|-----------------------|---------------------------------|---------------|
| NBAS-Middle School | 12 | 12 | SC/APC duplex |
| NBAS-Elementary School | 12 | 12 | SC/APC duplex |

4.5.3 Fiber Connectors

Fibers shall be terminated with SC/APC single-mode connector with ceramic ferrule and shroud.

4.6 Equipment Racks

Where space permits, install fiber patch panels into **existing** 19" equipment racks. Coordinate exact location of fiber terminations with building owner.

4.7 Fiber Splicing

4.7.1 Fiber Optic Cable Splicing

Splices shall meet the requirements of ANSI/TIA/EIA standards.

The splice location must have provisions for storing the resulting slack cable after splicing is complete.

All slack shall be physically protected.

All splicing shall be fusion splice; the maximum splice loss shall be 0.1 dB or less in accordance with ANSI/TIA/EIA 0568-A.

4.7.2 Fiber Optic Cable Break-Out

The jacketed cable shall be lashed with tie-wraps to the rack prior to entering the cabinets and when entering handholes.

The cable shall also be tie-wrapped to the inside of the fiber patch panel near point of entry.

The jacketed area and bare fibers shall be cleaned to remove any moisture blocking gel.

The transition from the buffer tube to the bundle of jacketed fibers shall be treated by an accepted procedure for sleeve tubing, shrink tube and silicone blocking of the transition to prevent future gel leak.

All fiber terminations shall include the use of a fan-out kit to protect loose tube fibers running from the buffer tube to the fiber connector.

4.7.3 Fiber Optic Splice Closures

The fiber optic splice closure for all single mode fiber optic runs shall be intended for outdoor aerial applications and shall conform to the following Specifications:

The fiber optic splice closure shall be suitable for a temperature range of -10 ° C to 50 ° C.

The size of the closure shall allow for all the fibers of the largest fiber optic cable to be spliced to a second cable of the same size, plus 12 additional pigtailed. The closure shall be not more than 36 inches in length and not more than 10 inches in diameter. The two outer closures shall fit into the fiber optic splice vault and shall leave sufficient space for routing of the fiber optic communications cables, without exceeding the minimum bending radius of any cable.

The closures shall be designed for butt splicing.

All materials in the closure shall be non-reactive and shall not support galvanic cell action. The outer closure shall be compatible with the other closure components, inner closure, splice trays, and cables.

The outer closure shall protect the splices from mechanical damage, shall provide strain relief for the cable, and shall be resistant to corrosion.

The splice closure shall be waterproof, re-enterable, and shall be sealed with a gasket.

4.8 General Fiber Installation

Installations of the Fiber Optic Network shall be in strict accordance with manufacturer's recommendations.

Follow all of the manufacturer's guidelines and industry standards on handling and installing fiber optic cable.

The installation of the fiber optic cable shall conform to the NEC standard and NESC standard.

The fiber optic cable plan shall be installed in accordance with the following guidelines:

Do not exceed the manufacturer's maximum tensile rating.

No more than two 90-degree changes of direction in any single cable pull.

Mechanical aids may be used, provided that a tension-measuring device is used at the end of the cable and the allowable tension does not exceed the manufacturer's recommended pulling tension.

The fiber optic cable shall be installed using a cable pulling lubricant recommended by the manufacturer and a non-abrasive pull tape.

Insure that the bend radius of the cable is no less than twenty times the cable's outside diameter during installation, and that the bend radius of the cable is no less than ten times the cable's diameter when permanently installed.

Make circuitous pulls by back feeding or center pulling. When a winch or pulling machine is used during installation, use a dynamometer to monitor the tension on the cable. No residual tension can remain on the cable after installation except that due to the cable's weight in the vertical rise.

Dress all cables in a neat work-man-like manner in strict accordance with industry-wide standards. The Contractor, at their expense, shall replace any cables that have had excessive strain and tension applied to them.

4.9 Underground Cable Installation

Where required, install cable underground using trenching or directional boring as required by site conditions.

4.9.1 Existing Services

The contractor is responsible for locating all existing underground services including electrical, telephone, data, water, sewer and gas prior to beginning any underground work. Coordinate with Miss Dig for public utilities and with owner for private utilities.

4.9.2 Subduct

All underground cable shall be installed in protective nonmetallic flexible raceway or subduct. Subduct shall be manufactured from High Density Polyethylene (HDPE) for use in underground and innerduct applications and shall have a minimum diameter of 1.5 inch.

4.9.3 Installation Depth

Underground fiber will be installed a minimum of twenty-four (24) inches below grade.

4.9.4 Tracer Wire

Jacketed #14 solid copper wire shall be placed continuously in all trenches and bonded to grounding rods within a handhole or manhole. Grounding rods shall be 5/8" by 10-foot copper-coated steel and shall be installed at no more than 1 km spacing. An approved location wire connection device shall be mounted to the sidewall of each handhole and manhole using a mounting rail. The locator wire shall be connected to the terminal block and the terminal block shall be connected to the ground.

4.9.5 Warning Tape

Orange warning tape is required in all trenches containing fiber optic cable. The warning tape shall have bold black legend "CAUTION – BURIED FIBER OPTIC CABLE" letters approximately 1 inch and repeated at approximately three-foot intervals. The warning tape shall be 100 mm wide.

4.9.6 Handholes

Provide a handhole along the cable path every 500 feet or after every two 90° bends. Handhole cover shall be marked "COMMUNICATIONS". Provide washed gravel base for handhole drainage.

4.10 Building Entrances

The Contractor shall install fiber from the closest utility pole to the building MDF. Entrances may be aerial or underground as best suits the site. It is desired that any new aerial cable follow the route of existing aerial cables.

Refer to the provided entrance drawings for suggested entrance route. Contractor may propose alternate entrance pathways. Any change to entrance pathways must be approved by Consultant prior to the start of work.

4.11 Interior Cable Pathways

4.11.1 Cable Rating

4.11.2 All fiber optic cable routed into buildings shall be indoor/outdoor plenum rated. Innerduct Provide a 1.5" innerduct from the building entrance to the MDF. Innerduct must be riser- or plenum-rated as required by the installation environment.

4.11.3 Cable Routing

All cable is to be concealed, either installed above drop ceilings, in access tunnels or in surface raceway. No exposed cable is allowed.

The cabling contractor may be required to install raceway or corings to complete routing of fiber inside building. The specification below applies to any raceway installed.

Installation methods must follow TIA/EIA-568A standards including cable support, pulling force, minimum bend radius and minimum distance from sources of electrical interference.

4.11.4 Wall Penetrations

Wall penetrations or corings must be provided with EMT sleeves and protective bushings to prevent damage to cable as it is pulled through sleeves. The maximum fill for all sleeves shall not exceed 60 percent of capacity. This will allow sufficient space for fire-stopping material.

4.11.5 Fire-stopping

All wall and floor penetrations must make use of EMT sleeves. Any penetrations of firewalls must be fire-stopped using an UL-approved material to restore the wall to its original fire rating. Proper fire-stopping is not possible if penetrations exceed a 60% fill ratio. Fire-stopping material must be removable to allow future cable system upgrades.

4.11.6 Cable Support

Cables must be supported at least every five feet. Cable trays and Caddy “J” hooks are the preferred method of cable support.

4.12 Maintenance loops

The following maintenance loops must be provided along the fiber path to accommodate moves and repairs.

4.12.1 Fiber Patch Panel

Provide neatly coiled and secured to a rack or backer board, a minimum 25-foot fiber maintenance loop at each fiber patch panel or cabinet.

4.12.2 Interior Splice

Provide, neatly coiled and secured to a rack or backer board, a minimum 25-foot fiber maintenance loop at each side of an interior splice.

4.13 Cable Identification

4.13.1 Cable ID Format

Each fiber cable will be assigned a unique cable ID that identifies the segment of the fiber backbone.

4.13.2 Fiber Optic Cable

Furnish and install smear-resistant computer generated vinyl film, self-laminating labels to identify all installed cables in compliance with specified identification scheme. Labels shall be permanently fixed to cables. Labels shall be Brady labels or approved equal.

Cables will be labeled at each termination point and at each side of all splice points.

4.13.2.1 Fiber Patch Panel Labels

Fiber patch panels shall be labeled so the origin and termination of all strands are readily apparent. Each fiber coupler will be labeled with the number of the fiber strand.

4.14 Testing

4.14.1 Fiber Testing

All fiber cables shall be tested using a laser source and power meter to record optical. Test must be performed at all frequency ranges appropriate for the fiber and must be performed in each direction. The tester must maintain an electronic log of test results. Each cable must be identified on the test equipment using its correct Cable ID and strand number.

Any cable that does not pass the testing requirements must be repaired or replaced at the contractor's expense. Any cables that are damaged during installation must be replaced.

Test results shall be presented to the client in both printed format and on CD-ROM in Excel format and in the raw format exported from the test equipment. The model and software version of the test equipment must be shown in a README file on the CD-ROM.

4.14.2 End-to-End Attenuation Test

Perform end-to-end attenuation test on all fibers to measure the optical power loss between cable termination points. Measure the end-to-end attenuation of the single mode fibers at the wavelengths of 1310 nm and 1550nm.

Utilize a stabilized light source and optical meter, and follow test procedure, which complies with EIA/TIA 526-14 Method B: bi-directionally optical power loss measurements of installed single mode fiber cable plant.

A fiber optic loss budget shall be computed using the specified loss for cable, connectors, and all other components. Actual measured loss must be no greater than the calculated loss budget plus a margin of 2 dB to be considered passing.

OTDR tests shall be performed at the wavelengths of 1310nm and 1550nm and must provide a complete graphic representation of the cable, as well as all associated losses.

4.15 Project Close Out

The contractor shall provide the documentation specified below to the owner and consultant at completion of the project.

4.15.1 Fiber Route Map

Provide a fiber route map showing the routing of all fibers along with street names, fiber strand counts, fiber segment lengths, and splice locations. Provide four paper copies and four electronic copies on CD-ROM in DXF or Acrobat PDF format.

4.15.2 Fiber Splicing Records

Provide a record of all fiber splicing detailing the physical location of all splices and the allocation of all fiber strands of each cable. All spare fiber strands that are available for future use at each splice location must also be detailed. Provide four printed copies and four on CD-ROM in Excel or Acrobat PDF format.

4.15.3 Entrance Plans

Provide a final as-built site plan that shows the routing of fiber from the closest utility pole to the building MDF. Provided four printed copies and four on CD-ROM in DXF or Acrobat PDF format.

4.15.4 Test Data

Provide all fiber test results. Provide four printed copies and four on CD-ROM in Excel format or Acrobat PDF format.

5 Vendor Profile

Company Name: _____

Address: _____

Contact Name: _____

E-Mail Address: _____

Phone: _____

Fax: _____

Date Founded: _____ Number of employees: _____

Total revenue last fiscal year: _____

Type of Organization (Corporation, Partnership, LLC, etc.): _____

Has organization ever had a contract terminated prior to completion: _____

Has organization ever failed to complete a project: _____

Has organization ever filed for bankruptcy, reorganization or receivership: _____

Number of full-time technicians qualified to perform work on this project: _____

Has organization ever been involved in a lawsuit with Owners, Engineers
or other contractors within the last five years: _____

List staff with BICSI RCDD certification: _____

List other applicable certifications: _____

List any subcontractors utilized for this project: _____

The undersigned certifies to the accuracy of the information provided on this form and attachments.

Signature: _____ Date: _____

Title: _____

6 Technology Vendor References

Include at least three references for similar projects. Each subcontractor must also provide references.

Customer Name: _____

Address: _____

Contact Name: _____

Contact Title: _____

Phone: _____

E-Mail Address: _____

Date Started & Completed: _____

Dollar Amount of Project: _____

Comments: _____

Customer Name: _____

Address: _____

Contact Name: _____

Contact Title: _____

Phone: _____

E-Mail Address: _____

Date Started & Completed: _____

Dollar Amount of Project: _____

Comments: _____

References Continued

Customer Name: _____

Address: _____

Contact Name: _____

Contact Title: _____

Phone: _____

E-Mail Address: _____

Date Started & Completed: _____

Dollar Amount of Project: _____

Comments: _____

Customer Name: _____

Address: _____

Contact Name: _____

Contact Title: _____

Phone: _____

E-Mail Address: _____

Date Started & Completed: _____

Dollar Amount of Project: _____

Comments: _____

7 Proposal Forms

FOR: NBAS2205 - Outdoor Fiber Optic Network

TO: New Buffalo Area Schools
1112 East Clay Street
New Buffalo, MI 49117

PROPOSAL BY: _____
(Name & address of firm)

BASE BID: We, the undersigned, having familiarized ourselves with local conditions affecting the cost of work and with the bidding documents on file at the office of the Consultant, hereby propose to perform the work required by said bidding documents in a workman-like manner for the Bid Categories as shown on this bid form for the above-named project in accordance with contract documents as prepared by the Consultant for the amounts hereinafter stated, such amounts constituting the base bid.

We acknowledge receipt of the following addendums: _____

| BID CATEGORY | SINGLE BASE BID |
|--|------------------------|
| BASE BID – UNDERGROUND FIBER OPTIC NETWORK | \$ _____ |
| PERFORMANCE BOND & LABOR AND MATERIAL BOND..... | \$ _____ |
| TOTAL OF ALL ABOVE | \$ _____ |

| ALTERNATES | BID AMOUNT |
|--|-------------------|
| ALTERNATE #1 – ADD for 24-strand single mode fiber | \$ _____ |
| ALTERNATE #2 – ADD for second 1.5" HDPE conduit with pull tape | \$ _____ |
| ALTERNATE #3 – ADD for handhole at transportation building location..... | \$ _____ |

The base bid must include applicable sales taxes.

BOND: The bid must include the cost for Performance and Labor and Material Payment Bonds if the amount of the proposal is equal to or greater than \$50,000.00.

Included with this proposal is a bid bond, certified or cashier's check in the amount of:

(\$ _____) _____ DOLLARS

payable to the Owner which it is agreed may be retained as liquidated damages by the Owner if the undersigned fails to execute the contract within fifteen (15) days after notification of the award of contract to the undersigned.

VOLUNTARY ALTERNATES: Attach a separate sheet if proposing Voluntary Alternates. Prices shall include all applicable costs for taxes, insurance, bonds and fees.

7.1 Unit Prices

Provide the following unit prices that will be used for additional and deletions from the project.

ADD or DELETE one 24" x 36" x 24" Handhole along primary conduit pathway\$ _____

7.2 Materials List

Provide a detailed materials schedule showing quantity, manufacturer name, manufacturer's part number, part description and unit price for all parts specified. **Failure to provide this schedule may disqualify your bid.**

7.3 Cut Sheets

Include manufacturer cut sheets for key components used in your design. Cut sheets are not required for items that exactly match the specified models in this RFP.

7.4 Signature

In submitting this bid, we understand the right is reserved by the Owner to reject any or all bids. It is further agreed that this bid is binding for the period of forty-five (45) days.

DATE _____ 2007

FIRM NAME _____

BY _____

(Authorized Signature)

(Typed or Printed Signature)

TITLE _____

OFFICIAL ADDRESS _____

PHONE NO. _____ FAX NO. _____