IT Initiatives
Strategic Technology Planners and Consultants

4 June 2015

Structured Cabling Request for Proposal

owner

Gateway Community Action Partnership

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project

Structured Cabling and Related Equipment

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schedule

RFP submitted to vendors - 4 June 2015

Vendor authorization submittal – 11 June 2015

Proposal deliverables – 18 June 2015

SUBMITTED FOR BID

NOTES

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1 Introduction

1.1 Purpose and Intent

This Request for Proposal (RFP) is issued by IT Initiatives, Inc. on behalf of the Gateway Community Action Partnership. The purpose of this request for proposal is to solicit bid pricing for a new structured cabling plant and related equipment for a new early education center to be constructed. Materials and services as discussed herein shall be installed on their new academic campus, located in Atlantic City, New Jersey.

This document outlines the core materials required for the installation of the said systems. Additional materials may be required to implement the functionalities discussed within the specifications herein. Such materials shall be provided and installed by Contractor to provide a complete system.

1.2 Background

Gateway Community Action Partnership was founded in 1987 and is a federally-designated Community Action Agency for multiple counties in the State of New Jersey. Serving more than 53,000 clients per year, the Head Start program is an integral part of the agency, with this new facility providing essential education services to fulfill the regional need of residents within the Atlantic City and surrounding area.

The project scope of work includes those items that require assistance to manage the construction of an approximately 44,660 square foot, three (3) story plus penthouse building. The structure consisting of a steel framed composite concrete slab structure, is located at 1433 Bacharach Boulevard, block 293, and lot 1 for the use of an Early Head Start / Head Start day nursery, educational center and administration with landscaping and related site improvements. The first floor is above flood elevation and is slab on grade approximately four (4) feet above the existing sidewalk supported on imported fill contained in retaining wall perimeter foundations.

The existing site will have remediation and will be cleared prior to the project scope of work. The building includes; play surfaced outdoor play areas both on grade and over vacant building areas with walled enclosures.

The project will be a public bid, single prime General Contractor with a prevailing wage workforce. Construction Manager and all sub-Contractors shall be aware of the Sales Tax regulations governing non-profit corporations. All bids shall exclude sales tax on all items that are tax exempt.

The scope of work, provided by the structured cabling Contractor, includes all terminations, racking, labeling and cable testing as directed herein. Patch cordage and cross connections of all endpoint cabling shall also be included within the structured cabling scope of work. A fully turn-key cable infrastructure shall be provided. Cutover support shall also be provided.

Core objectives for this implementation involve quality installation, adherence to the project specifications and conformity to the project timeline. This project begins several strategic technology initiatives to be taken by Gateway to implement new technologies. The ability for the Contractor to follow the project Gantt charts is extremely important to this process; as delays impact general construction of the facility and overall plan.

1.3 Labor Rate Structure

All work completed for this project shall be prevailing wage. No workers maintaining an illegal status with the federal government may work on this project. The Contractor shall maintain I-9 forms for all employees engaged with this project.

1.4 Vendor Proposal Guarantee

Vendors planning on bidding on this project shall forward a completed pre-authorization form to the address below on or before the cut-off date. Vendors not completing this requirement as per the schedule may not be authorized to bid on this project.

1.5 Bid Bond

Bid bonds are required for all contracts associated with this project in excess of $ 150,000.

1.6 Performance Bond

Performance bonds are required for all contracts associated with this project in excess of $ 150,000.

1.7 E-Questions

Contractors submitting a proposal for this solution may submit questions and inquiries regarding the specifications included herein. To submit a question, send an electronic mail to info@itinitiatives.com . Questions shall relate directly to a matter discussed in the specifications herein. E-questions may be submitted up to and including the cut-off date discussed in this document.

1.8 Project Time Table

The project timetable shall be as follows:

1.	RFP submitted to vendors	4 June 2015
2.	Notice of intent to bid (via email)	11 June 2015
3.	Proposal deliverable by 12 noon	18 June 2015

1.9 Bidding Objectives

A. Participating Contractors are recommended to follow the objectives set forth for this project. These include:

1. Provide a cost effective solution.
2. Provide a detailed proposal with all documents requested.
3. Substantiate your ability to meet all requirements set forth.
4. Understand the facility and cabling paths to be used for implementation.
5. Meet or exceed all specifications set forth.
6. Communicate your organization's commitment and experience to the owner.

1.10 Addendum Policy

In the event a modification is made to the specifications set forth in this document during the submittal period, each Contractor requesting to have their bid reviewed will receive, via electronic or courier service an addendum with the revised information. Contractors must modify their proposal based on materials provided in the addenda documents. In the event that an addenda is made that can affect a Contractor's ability to provide a proposal, the bid proposal due date may be modified. Such information will be relayed to all parties involved.

2 Definitions

2.1 Definitions - Terminology

A. **Provide –** Design, engineer, integrate, furnish, install, connect, complete, test, certify, and guarantee.

B. **Work –** materials furnished and completely installed by Contractor.

C. **Shall –** Context refers to a mandatory requirement.

D. **Will –** Context refers to a mandatory requirement.

E. **May –** Context refers to a recommended requirement.

F. **Should –** Context refers to a desired requirement.

G. **Approved Equal (or equivalent) –** A substitute for the specified item may be offered for approval by the consultant. The proposed substitution must, in every technical sense, provide the same or better capability and functionality as the specified item. Such requests for approval shall be submitted in accordance with the provisions of section 3 – SUBMITTALS, and must be obtained within the time frames outlined.

2.2 Definitions – Participants

2.2.1 Owner

The term "Owner" refers to the Gateway Community Action Partnership. The term "owner" and "client" are used interchangeably in this document.

2.2.2 Contractor

The term "Contractor" refers to the selected bidder selected for installing the specified equipment and cabling in this document. The term "Physical Security Contractor" also applies.

2.2.3 Consultant

The term “consultant” refers to IT Initiatives, Inc. of Manalapan, New Jersey, responsible for design, project management and coordination of this solution. The term “consultant”, “project manager” and “owner’s representative” are used interchangeably in this document.

2.2.4 General Contractor

The term “General Contractor” refers to the Contractor responsible for the overall construction and coordination of the physical building and all associated sub-Contractors.

2.2.5 Electrician

The term “Electrician” refers to General Contractor’s Electrical Contractor responsible for the installation of high-voltage electrical facilities as specified for this project.

2.2.6 Network Integration Contractor

The term “Unified Communications Contractor” or “Network Integrator” refers to the unified communications Contractor responsible for the installation of the communications system platform and associated programming as specified for this project.

3 Proposal Preparation and Submittals

3.1 Bid Response

A. The deliverable schedule for this solution shall consist of two documents, both submitted on a timely basis in accordance to the timetable discussed in section 1.8. These include:

i. Submit an email to areich@itinitiatives.com or fax to 800.650.1698 stating that your organization will bid on this project on or before 12 PM on the due date.

ii. Submit your proposal by the date specified to:

GCAP Structured Cabling Proposal

IT Initiatives, Inc.

198 US Highway 9 North

Suite 102

Manalapan, New Jersey 07726

B. The submitted proposal shall include three (3) original copies and one (1) electronic copy in Microsoft Word 2000+ format. This copy shall be provided on a standard CD-R type, finalized media device. Proposals not following the guidelines set forth in this submittal process shall be deemed void and may not be reviewed. **BIDS SHALL BE SEALED OR WILL NOT BE ACCEPTED.**

3.1.1 Bidding Liability

A. Deliverables submitted as discussed in the context of this document are done so without fee or cost to either IT Initiatives or Gateway Community Action Partnership. Organizations participating in this process do so with the intent of not receiving any

form of compensation for the work involved with completing any deliverable or submittal discussed herein during the bid review period.

3.1.2 Bidder's Responsibility

A. It shall be the Contractor's responsibility to verify actual conditions. The Contractor shall walk the site, review the specifications and drawings, and advise the Customer in writing of any conditions, which may adversely affect work. Dynamic site conditions are such that the drawings are accurate as of the date of production; however, Contractor must identify any changes that may affect the bid response. If no exceptions are presented, the Contractor shall become responsible for any changes to the work required as a consequence of such pre-existing conditions.

B. The bidder shall properly account for all cable lengths forecasted for the installation of all structured cablings required for this installation.

C. Prior to the ordering of any equipment, the Contractor shall confirm site conditions to verify all room conditions meet the requirements for racks or other equipment to be installed.

3.2 Business Associate Agreement

A. As required under the Health Insurance Portability and Accountability Act (HIPAA), a business associate agreement (BAA) is required between Gateway Community Action Partnership and all entities performing work on this project.

B. A BAA shall also be held between any subcontractors and the Contracted Entity. Failure to do so results in a violation of HIPAA which could result in Federal penalties imposed upon the Contractor should an audit be performed.

C. This law applies to any Contractor doing any form of business within a Healthcare Entity doing business in the United States of America.

3.3 Contract and Payment Standardized Forms

A. The selected Contractor shall be issued a standardized, AIA contract form to be executed by both parties. Modifications as required by the Owner will be made to the form prior to submission to the Contractor.

B. AIA forms 101 and 201 shall be used.

C. The Contractor shall present to the Consultant, on a monthly basis, applications for payment. Applications for payment shall be presented using AIA form G702. All applications for payment must be presented five (5) business days prior to the end of the calendar month in order to process for month end submission to the Owner for payment processing.

3.4 Submittals

A. Submittals shall be prepared and forwarded to the consultant for review in accordance with the specifications outlined in this document. This shall include all data sheets, catalog cuts, shop drawings, electronic media or other forms of documentation required for this project. All submittals shall be provided in both electronic and paper format. Two (2) copies of all submittals shall be retained by the consultant; one for internal records and one for the official project records for turnover to the owner upon completion. Electronic copies shall be emailed to submittals@itinitiatives.com, where 3835 is the project number associated with this project.

B. All submittals shall have required project information on the submittal cover sheet. This shall include the following pertinent information:

i. Submittal date

ii. Owner name – Gateway Community Action Partnership.

iii. Project name – Structured Cabling

iv. Contractor's name, address, phone number, email address

v. Contractor's contact name

vi. IT Initiatives project ID number – 3835

C. All submittals approved shall be stamped with the consultant's stamp with the word APPROVED, as well as the date, name of firm, and consultant's signature. Approvals shall be sent electronically in PDF format to the email address denoted on the submittal cover sheet.

3.5 Post-Contract Award Requirements

3.5.1 Requirements after acceptance of bid

Within ten (10) business days of contract award, submit for approval two (2) copies of the following:

3.5.1.1 Catalog Sheets

Support all materials included within the scope of the proposal with final descriptive materials, including cut sheets, data sheets, CAD drawings, and other manufacturer documents as required for analysis. Each material shall be stamped with the Contractor's APPROVED stamp and signature for conformity to specifications set forth within this document.

3.5.1.2 Shop Detail Drawings

Drawings shall indicate the accurate locations of all equipment associated with each system with respect to architectural and structural conditions. Drawings of components, equipment layouts, and other small size areas shall be dimensioned to the common scale of ½" or 1" per foot. Drawings of larger areas shall be dimensioned to the common scale of ¼" or 1/8" per foot. Drawings shall include explicit notes on the termination of all conductors and shields for each location. Architectural backgrounds shall be in accordance with the latest architectural drawings and shall be complete with elevations, sections, and details as required depicting the installation. If, upon preliminary

submittal of drawings, there are corrections to be made, they shall be made to the drawings and resubmitted for approval without extra cost to the Customer. These drawings shall be approved prior to starting work. The decision of the consultant shall be final on all items. These drawings and changes, at completion of the job, shall become a part of the Contract Documents.

3.6 Confidentiality

A. Organizations selected to bid on this project understand the materials included within this document are confidential and shall not be used for any other purpose than the bidding of this project. The use of information for purposes outside the intent discussed within the scope of this document constitutes theft of intellectual material.

3.7 Time is of the Essence

A. The Contractor is required to follow the project timeline identified within this document. Failure to do so has the potential to delay new system installation. In the event the Contractor is unable or unwilling to certify availability of resources to accomplish the scope of work identified in this document, the Contractor shall make such information known to the consultant prior to bidding on this project. The submission of a bid proposal constitutes acceptance of the project schedule and the Contractor's ability to provide the scope of work outlined in a timely manner as per the project specifications. Failure to complete the project as per the project schedule shall result in a decrease in contract price in the amount of five hundred dollars per calendar day for each day the project completion is delayed due to Contractor-associated issues.

3.8 Prequalification

A. Prior to providing a proposal for this project, bidders shall complete a bidder pre-qualification form with the consultant's office. Bidders not completing this form or not meeting the qualification requirements shall not be authorized to bid on the project, unless otherwise noted or authorized.

3.9 Pricing Schedule

A. Pricing provided in the bid materials for the system shall be provided in a line-item format. An item by item breakdown is required to facilitate a proper bid review and analysis process. A bid submitted with a lump-sum pricing hinders said process and could jeopardize the acceptability of said bid. Bids received without a proper breakdown will be rejected and returned to be revised and resubmitted. Material and labor costs shall be shown independently. Detail shall be provided and all materials included must meet the specifications set forth

B. At a minimum, pricing shall be shown in the following format:

i. Single outlet installation

ii. Duplex outlet installation

iii. Wireless access point outlet installation

iv. Video surveillance camera outlet installation

v. IDF racking materials

vi. MDF racking materials

vii. Associated project materials

C. The Contractor shall also provide cost per additional run should additional cabling be added to the project. This shall include pricing for additional category 6 outlets; non-plenum rated.

3.10 Bidder Qualifications

A. At the time of bid, the bidder shall have installed other systems of similar size, complexity, and general operation as the system described in this specification. The bidder shall furnish in

writing to the owner proof of compliance with manufacturer's system installation certification program.

B. The Contractor shall hold all legally required state Contractor licenses necessary to accomplish the installation and activation of the described system at the facilities indicated. Contractor shall submit copies of licenses to the Customer prior to the start of work.

C. The Contractor shall have a local office staffed with factory trained technicians, fully capable of engineering, supervising installation, system start-up and servicing of both hardware and cabling for systems of similar complexity and function as the system described in this specification. If a local office does not exist, Contractor shall furnish documentation on estimated time required from request for service to actual time onsite to perform service. Information supplied by references shall substantiate this data. A local office is that is which located within fifty (50) miles of the facility in question.

D. The Contractor shall indicate complete and total compliance with the provisions of this specification by letter, signed by an officer of the corporation, or a principal if other ownership currently exists. This letter shall also clearly identify any exceptions to specification requirements.

E. The Contractor shall have installed a minimum of three (3) fiber backbone systems of equal size and complexity of the system discussed herein. Each system shall have been installed successfully (as per the owners interpretation) for a minimum period of one (1) year after final acceptance. The Contractor shall include the names, location, scope of work, address, point of contact for each installation within the proposal submittal.

F. Documentation shall be provided, certified by the manufacturer stating Contractor is an authorized distributor, installer and service company for each product quoted (multiple products from same manufacturer must be applicable for all products presented in proposal). Contractor shall be certified to warranty all products installed.

G. The Contractor shall certify the design, installation, operation and support policies for the said system. This document shall be certified and provided to the owner upon execution of the contract documents.

H. The Contractor's installation technician and all others performing the system installation (defined as an individual responsible for setting up, programming, developing, provisioning, commissioning or performing other related tasks with the exception of running low voltage cabling) shall be fully trained, qualified, and certified by the original equipment manufacturer on the engineering, installation, operation and testing of the system. The Contractor shall provide such documentation within the submittal documentation before worker is assigned any work associated with this project.

3.11 Business Registration Certificate

A. The submitted proposal package shall include a copy of the business registration certificate issued by the state of incorporation of the business. Failure to provide such documentation may render a proposal void.

3.12 Certificate of Insurance

A. The proposal package shall include a copy of the organization's certificate of insurance with "Gateway Community Action Partnership." as the certificate holder. The certificate of insurance shall be valid throughout the period of work discussed in this document and shall include the amounts of insurance subscribed to as well as the date of termination / renewal for the policy. Failure to provide such documentation or proof of business insurance may render a proposal void. A certificate of worker's compensation shall also be furnished.

3.13 Joint Venture / Subcontracting

A. In the event a bidder must subcontract or is participating in a joint venture with another firm, such information must be provided in the bid proposal. The name, contact information, certificate of insurance and business registration certificate of the additional firm(s) must be provided within the original proposal package.

4 Outside Plant (OSP) Backbone Cabling

4.1 Underground Conduit System (by others)

4.1.1 Description

A. The Electrical Contractor shall furnish, install and commission a precast manhole (vault), pull box and conduit system to form a complete underground raceway system for the purposes of optical fiber cabling.

B. The Contractor shall review the conduit system drawings prior to presentation of their proposal to verify all requirements have been met to perform an installation as identified herein.

C. Duct and conduit are used interchangeably in this document.

D. The Electrical Contractor shall be responsible for exaction, granular fill, conduit installation, backfilling, re-grading and cleanup. Pavement in any areas where asphalt is disturbed shall also be returned to their previous state prior to the installation of the conduit system.

4.1.2 Vaults

A. The Electrical Contractor shall furnish, install and commission vaults as required throughout the installation. Vaults shall be provided as per the locations identified on the contract drawings.

B. Assembly and installation of vaults equipment shall meet all manufacturer installation instructions and recommendations. Devices shall be installed level and plumb. Fill beneath shall be level.

C. Vaults shall be installed on a twelve (12) inch level bed of compacted granular fill which shall be well graded. Fill shall be compacted.

D. Vaults shall be sealed properly using primer to ensure they are watertight.

E. Top of pull box and cover shall be flush with the finished grade to ensure future accessibility.

F. Vaults shall be installed at a minimum of every two-hundred (200) feet or as shown on the Contract drawings. Refer to construction drawings.

4.1.3 Conduit (Duct) System

A. A primer joint sealant shall be used throughout the system to join conduit pieces to one another.

B. All conduit systems shall be four inches and installed between each building noted on the contract drawings.

C. Plastic (PVC) ductwork shall be provided, meeting UL 651 ad 651A Schedule 40 PVC standards.

D. Ductwork shall meet NEMA TC2 and TC3 standards.

E. Conduit spacers shall be made of prefabricated plastic.

F. Ductwork shall be suitable for use with conductors rated at 167 degrees.

G. A 4-mil polyethylene warning tape shall be used to warn of the conduit below the tape. The tape shall be a minimum of three (3) includes in width and must contain the imprint of "Caution – buried fiber optic cable below". This shall be placed above the conduit system beneath the earth.

H. High-strength Kevlar by Greenlee pull tape shall remain in the conduit post implementation for future use. Catalog number 39244 shall be used or approved equal.

I. Ductwork system shall be grounded with grounding rods and ground wire.

J. Areas where open trenches are located shall be covered and access prevented to ensure residents and visitors to the campus are not injured.

K. Upon the completion of the earthwork, the area shall be returned to its previous condition. This involves the replacement of both asphalt and grass (through fertilization, seed and water) in areas affected. Products installed post installation shall be comparable with what exists in the surrounding areas.

L. Any surplus satisfactory soil shall be moved to a designated area as directed by the Owners Representative.

4.2 Underground Fiber Backbone System

A. The Contractor shall provide and install a fully functional and complete fiber optic backbone system to interconnect each parking lot enclosure (typical of two) to the MDF room.

B. The cabling shall be installed between each IDF and MDF shall be installed within a conduit system provided by the Electrical Contractor.

C. The conduit system shall terminate in each outdoor enclosure.

D. The conduit system shall terminate in the MDF room located on the third level of the education center.

E. All cabling shall be rated for indoor / outdoor use and shall have interlocking armor to minimize interaction between it and other materials, substances and / or animals should a conduit be compromised.

F. Installation procedures shall meet or exceed those identified in ANSI/TIA-758 which identifies Customer-owner Outside Plant Telecommunications Infrastructure Standard.

G. Optical fibers shall be terminated in rack mount fiber enclosures installed in each new rack enclosure, as well the MDF rack.

H. All adapters shall be intermateable to the TIA/EIA-604-3A standard.

I. The Contractor shall install all appropriate “DANGER” labels as required for laser discharge.

J. PFM gel shall be provided on the optical fiber cable.

K. The cable shall provide six (6) strands of fiber between the MDF room and each IDF closet.

L. Fiber shall have a core diameter of 50 +/- 2.5 um.

M. Fiber shall have the ability to transmit data at ten (10) Gb/Ethernet at a minimum of 300 meters.

N. Cabling shall provide a state-of-the-art water-blocking capability using SAP technology.

O. Installed cabling for the outside plant shall be multi-mode, interlocking, and indoor / Outdoor and plenum rated. Cabling shall be constructed of flexible, heavy duty interlocking aluminum of steel table helically applied over the inner cable core. Additional protection shall be achieved through projection provided by an outer jacket. Superior Essex 10G/300 (part number W4012J1NG) rated cabling shall be used.

5 Structured Cabling – Outside Plant Voice / Data Specifications

5.1 General

5.1.1 Section Summary

A. Work identified within this document includes system design review, engineering, work hours, material, products, and associated services for the complete installation of a new outdoor cabling system as defined herein.

B. Work shall be completely functional, tested, labeled, integrated, and certified as functional and ready for operation by facility without additional assistance from Contractor.

5.1.2 Related Documents and Systems

A. Data Network System

B. Network Core System

C. Uninterrupted Power Systems

5.1.3 References

A. The system shall meet or exceed the requirements set forth for all governing authorities, laws, ordinances, regulations, codes, standards including but not limited to:

i. Code of Federal Regulations, Title 15

ii. National Telecommunications and Information Administration

iii. Code of Federal Regulations, Title 29

iv. Underwriters Laboratories

1. 65 Standards for wired cabinets
2. 468 Standards for grounding and bonding equipment
3. 1449 Standards for transient voltage surge suppressors
4. 60950 Information technology equipment – safety section

v. Communications Certifications Laboratory

vi. Intertek Testing Services, Inc.

vii. Title 29 – Subpart 36 – Design and construction requirement for exit routes

viii. Title 29 – Subpart 268 Telecommunications

ix. Title 29 – Subpart 305 – Wiring methods, components and equipment for general use

x. Meet all guidelines for life, personal and public safety as well as essential and emergency communications.

B. National Codes

i. American National Standards Institute/Electronic Industries Association/Telecommunications Industry Association

1. 568-B Commercial building telecommunications wiring standards
2. 569 Commercial building standard for telecommunications pathways and spaces
3. 606 Administration standards for telecommunications infrastructure of communications buildings.
4. REC 127-49 Power supplies

ii. Institute of Electrical and Electronics Engineers

1. 0739-5175:2008 Medical grade – Mission critical – Wireless network
2. C62.41 Surge voltages in low-voltage AC power circuits

iii. National Fire Protection Agency

1. 70 National Electrical Code
2. NFPA 72, National Fire Alarm Code, 2007 Edition
3. IES Lighting Handbook, 10th Edition
4. 75 Standards for protection of electronic computer data-processing equipment
5. 77 Recommended practice on static electricity

iv. International Building Code (IBC) – 2009

v. New Jersey State Code

vi. Local City Code

5.1.4 Codes and Permits

A. The Contractor shall provide all necessary permits for the successful implementation of the system and schedule all inspections as required. The Contractor shall be present for all meetings with the code official reviewing all work performed for the system. The system shall be ready for operation on the date directed by the owner for 100 percent operation without delay.

B. The Contractor is responsible to adhere to any and all codes described herein, whether specifically noted or referred to as well as all federal, state and local codes associated with such work.

5.1.5 Product Data Submittals

A. The Contractor shall include, within the proposal submittal, one copy of each product or material proposed. The document shall provide product data of the item in question as well as a CAD image, diagrams, drawing or image. In the event there are multiple items on the same data sheet, the Contractor shall circle the material to be provided in the project scope of work. This shall be provided within 10 days of project engagement.

5.1.6 Equipment List

A. All materials provided shall be new, unused and UL listed if electronic. No remanufactured materials shall be used.

B. The Contractor shall provide a detailed and thorough equipment list for all materials for the scope of work. The quantities required shall meet or exceed all items listed within this document. Spares, as identified herein, shall be included within the equipment list. The Contractor shall also provide product data submittals for any item included within the equipment list for review.

5.1.7 Project Schedule and Gantt Charts

A. The Contractor shall meet all project scheduling requirements as set forth by the consultant.

B. The Contractor shall be responsible for coordinating activities with other trades as required for the successful implementation of the system. This shall be performed throughout the project during pre-planning, planning, integration, rough-in, general construction, finishing as well as all other construction timeline items. **The owner will not be liable for any additional costs that result from the Contractor's failure to meet specified deadlines or the Contractor's failure to properly coordinate with other trades.**

5.1.8 Project Record Documentation (PRD)

A. The Contractor shall maintain copies of project record documentation throughout the entire timeline of the project. Formal PRD documents shall be provided at each milestone identified in the project schedule. Such documentation shall track work progress throughout the project. The Contractor shall accurately maintain such documentation and provide updates, on a regular basis to the consultant for review.

B. Upon project completion, three (3) final, certified copies of all PRD's shall be forwarded to the consultant for review and distribution. The Contractor shall also include one (1) electronic copy including CAD files in Auto/Cad 2004 or greater format.

5.1.9 Site Use

A. The Contractor shall be provided with access to the job site during normal business hours. This shall be between the hours of 7:30 AM and 3:30 PM. Site access shall be provided by the General Contractor.

B. Before entering the job site, the Contractor shall provide an updated copy of their certificate of insurance in the event an expiration has occurred.

C. It shall be understood that a storage facility will not be provided to the Contractor for the storage of installation materials. The Contractor shall be responsible for all materials brought onto the job site and stored within this room. Theft, misplacement or loss of any materials shall be the responsibility of the Contractor. Claims associated with such losses shall be processed against the Contractor's identified insurance policies or other means.

D. The Contractor shall coordinate all work with the General Contractor for proper project management.

E. The Contractor shall attend project meetings onsite or remotely as per the requirements set forth by the consultant.

F. The Contractor shall remove all debris, waste material, rubbish, and tools at the completion of each workday. All work areas shall be thoroughly cleaned.

G. The Contractor shall be responsible for patching, repairing and painting any areas disturbed by the work completed. Existing paint colors shall be provided by the General Contractor should construction be disturbed.

5.1.10 Project Closeout Documents (PCD) and Materials

A. The Contractor shall be responsible for submitting project materials providing evidence that work completed meets or exceeds all specifications set forth. These shall include, but not limited to:

i. Final certificates of inspection for all low-voltage work completed by governing authorities.

ii. Project record documents including final as-built(s).

iii. Instruction materials as identified in proper quantities, in both electronic (PDF) and paper formats, bound and binder form.

iv. Spare materials as identified in scope of work, if any.

v. Certificate of warranty.

B. The Contractor shall provide an electronic file, in Excel (or approved) format, a list of all device assignments within the system. This shall be provided on finalized, electronic media. This shall include port numbers, patch panels ID's, location and cross-connect information as required. Final payment shall not be issued until documentation is provided to and approved by consultant.

C. The Contractor shall remove all debris, rubbish, waste material, tools, construction equipment, machinery and other materials from the job site at the completion of the project. This shall include all boxes from installed materials. All disturbed areas shall be thoroughly cleaned by the Contractor. Acceptance of work shall not be given if the above requirements have not been met.

D. The Contractor shall submit a certified document, stating the following:

i. All contract documents and specifications have been reviewed and complied with.

ii. Project has been thoroughly inspected by a duly authorized representative of Contractor and has met all manufacturer's specifications and installation requirements.

iii. All work has been completed and met or exceed all specifications and requirements set forth.

5.2 General System Requirements

5.2.1 System Overview

A. The specifications set forth in this document, outline the core materials required for operation of the said plant structured cabling. The Contractor is responsible for providing all components required for successful operation of the specified solution.

B. The Contractor shall be responsible for providing all equipment, accessories and equipment to provide a complete solution to achieve the operation of the system described.

5.2.2 Outside Plant Copper Cabling System

A. The Contractor shall provide and install copper cabling for outdoor applications as identified on the Contract Drawings.

B. The Contractor shall provide a full copper cabling system, including cable installation, pulling, mounting, terminating, testing, cross connecting and performing all actions to provide a "go live" system.

C. The Contractor shall identify the outlet types and quantities displayed on the Contract Drawings.

D. The Contractor shall provide a cross connect detail document, depicting all relevant information regarding the port, rack, and switch location of all cabling installed throughout the system upon completion. This document shall be provided in Microsoft Excel format. Handwritten documentation shall not be accepted.

E. The Contractor shall provide and install plenum-rated shielded twisted pair category six cable for outlets, rated for outdoor use as identified.

F. All cabling shall comply with ANSI/TIA/EIA-568-B: 2-1, UL 444 and Css.2 No. 214-02 standards.

G. Cabling shall provide high-speed data transmission for the application of IEEE 802.3 1000BASE-T and TIA/EIA-854 1000BASE-TX applications. Both shall provide 1 Gb/s data connectivity.

H. Cabling shall support IEEE 802.af.

I. Cabling shall provide 23 AWG bare copper conductors.

J. Jackets shall be sunlight and weather resistant polyethylene.

K. Cabling shall be characterized to 550 MHz, exceeding all requirements set forth for the Category six (6) standard.

L. Contractor shall be responsible for determining all cabling lengths and exact quantities required.

5.2.2.1 Copper Installation Materials

A. The Contractor shall provide and install Category 6, Outside Plant, Shielded rated UTP cabling for each copper cable run specified. This shall include all outdoor video surveillance camera and parking control cabling shown on all contract drawings. Superior Essex 77-240-x-B shall be used. Color blue (color code 2) shall be used for data outlets, color white (color

code 4) shall be used for voice, color orange (color code D) and color black (color code E) shall be used throughout the installation. PLEASE NOTE: x represents the color code noted.

B. The Contractor shall provide and install Ortronics TracJack faceplates, Shielded Clartiy6 jacks, and blanks throughout the installation. Finish shall be cloud white.

C. Blanks shall be used throughout on all faceplates with available ports.

D. The Contractor shall provide and install a surface mount box at each terminating side of the shielded cable. Ortronics surface mount boxes, part number OR-40400055-88 shall be used with shielded tracjacks.

E. The Contractor shall provide and install shielded patch cords for a complete cabling system. Ortronics Clarity6 modular four-pair UTP stranded 24 AWG assemblies shall be used throughout. Color code gray shall be used. Ortronics part number OR-MCS6A15-08 shall be used.

F. Superior Essex 04-001-64 coated aluminum tape shielded cable shall be provided and installed.

6 Indoor Plant Backbone Cabling

6.1 Indoor Plant Fiber

A. The Contractor shall provide and install a fully functional and complete fiber optic backbone system to interconnect each IDF closet and MDF room.

B. The inside plant backbone cabling scope of work shall include cable installation, pulling, mounting, terminating, testing, cross connecting, labeling and performing all actions to provide a “go live” system.

C. Inner-duct shall not be required for this application for the installation of fiber connectivity.

D. Indoor cabling shall be multi-mode, armored, tight buffer fiber. Premise jackets shall be aqua in color.

E. Fiber shall be made from a flexible, heavy duty interlocking aluminum or steel tape helically applied over the inner cable core.

F. The Contractor shall provide the cabling medium, equipment racks, fiber cabinets, ladder systems, patch cables, connectors and other equipment to provide a complete system.

G. Cabling shall have an effective modal BW of 4900 MHz-km at 850 nm.

H. Optical fibers shall be terminated in rack mount fiber cabinets installed in each new rack. Fiber cabinets shall be installed in both the IDF and MDF ends of the cable.

I. The Contractor shall provide and install one (1) rack mount fiber cabinet in each IDF room. Each fiber cabinet shall provide capacity for, at a minimum, the number of fibers distributed to the location. Ortronics OR-625-MMC-24PL1RB shall be used. Cabinets shall be pre-loaded with LC duplex adapters with phosphor-bronze alignment sleeves. Caution labels shall be installed on all cabinets.

J. The Contractor shall provide and install one (1) rack mounted fiber cabinets in the MDF room; located on the third floor of the education center. The fiber cabinet shall provide capacity for a minimum of forty-eight (48) fibers. Ortronics OR-625MMC-96PL1RB shall be used. Cabinets shall be loaded with LC adapters with phosphor-bronze alignment sleeves. An additional OR-625MMC-24PL1RB shall also be provided. Caution labels shall be installed on all cabinets. A total of sixty (60) fibers shall terminate in the MDF room; twelve from each IDF closet.

K. Two (2) fiber assemblies shall be installed per IDF; and ten (10) within the MDF (third floor). Ortronics OR-P3DF2LRGZGZ003M shall be used.

L. The fiber shall meet UL 1569, UL 1651, CSA C22.2 (no. 232), UL 1666, NFPA 262, Telcordia GR-409-CORE Issue 1 & 2, ANSI/ICEA S-83-596, ANSI/ICEA S-104-696, ANSI/ICEA 568-C.3 and RoHS-compliant performance requirements.

M. All adapters shall be intermateable to the TIA/EIA-604-3A standard.

N. The Contractor shall install all appropriate “DANGER” labels as required for laser discharge.

O. Optical fiber cabling between the each IDF and MDF shall provide twelve (12) strands of fiber.

P. Optical fibers shall be terminated in rack mount fiber cabinets installed in each new rack. Fiber cabinets shall be installed in both the IDF and MDF ends of the cable.

Q. Installed cabling for the inside plant shall be multi-mode, interlocking, Indoor/Outdoor and plenum rated. Cabling shall constructed of flexible, heavy duty interlocking aluminum of steel table helically applied over the inner cable core. Additional protection shall be achieved through projection provided by an outer jacket.

R. Indoor fiber shall be Superior Essex 10G/300 (part number L4012N401).

7 Structured Cabling – Inside Plant Voice / Data Specifications

7.1 General

7.1.1 Section Summary

A. Work identified within this document includes system design review, engineering, work hours, material, products, and associated services for the complete installation of a new station (work area) cabling system as defined herein.

B. Work shall be completely functional, tested, labeled, integrated, and certified as functional and ready for operation by facility without additional assistance from Contractor.

7.1.2 Related Documents and Systems

A. Data Network System

B. Network Core System

C. Uninterrupted Power Systems

7.1.3 References

A. The system shall meet or exceed the requirements set forth for all governing authorities, laws, ordinances, regulations, codes, standards including but not limited to:

i. Code of Federal Regulations, Title 15

ii. National Telecommunications and Information Administration

iii. Code of Federal Regulations, Title 29

iv. Underwriters Laboratories

1. 65 Standards for wired cabinets
2. 468 Standards for grounding and bonding equipment
3. 1449 Standards for transient voltage surge suppressors
4. 60950 Information technology equipment – safety section

v. Communications Certifications Laboratory

vi. Intertek Testing Services, Inc.

vii. Title 29 – Subpart 36 – Design and construction requirement for exit routes

viii. Title 29 – Subpart 268 Telecommunications

ix. Title 29 – Subpart 305 – Wiring methods, components and equipment for general use

x. Meet all guidelines for life, personal and public safety as well as essential and emergency communications.

B. National Codes

i. American National Standards Institute/Electronic Industries Association/Telecommunications Industry Association

1. 568-B Commercial building telecommunications wiring standards
2. 569 Commercial building standard for telecommunications pathways and spaces
3. 606 Administration standards for telecommunications infrastructure of communications buildings.
4. REC 127-49 Power supplies

ii. Institute of Electrical and Electronics Engineers

1. SP/TR 21730:2007 Use of mobile wireless communication and computing technology in healthcare facilities
2. 0739-5175:2008 Medical grade – Mission critical – Wireless network
3. C62.41 Surge voltages in low-voltage AC power circuits

iii. National Fire Protection Agency

1. 70 National Electrical Code
2. NFPA 72, National Fire Alarm Code, 2007 Edition
3. IES Lighting Handbook, 10th Edition
4. 75 Standards for protection of electronic computer data-processing equipment
5. 77 Recommended practice on static electricity

iv. International Building Code (IBC) – 2009

v. New Jersey State Code

vi. Local City Code

7.1.4 Codes and Permits

A. The Contractor shall provide all necessary permits for the successful implementation of the system and schedule all inspections as required. The Contractor shall be present for all meetings with the code official reviewing all work performed for the system. The system shall be ready for operation on the date directed by the owner for 100 percent operation without delay.

B. The Contractor is responsible to adhere to any and all codes described herein, whether specifically noted or referred to as well as all federal, state and local codes associated with such work.

7.1.5 Product Data Submittals

A. The Contractor shall include, within the proposal submittal, one copy of each product or material proposed. The document shall provide product data of the item in question as well as a CAD image, diagrams, drawing or image. In the event there are multiple items on the same data sheet, the Contractor shall circle the material to be provided in the project scope of work. This shall be provided within ten (10) days of project engagement.

7.1.6 Equipment List

A. All materials provided shall be new, unused and UL listed if electronic. No remanufactured materials shall be used.

B. The Contractor shall provide a detailed and thorough equipment list for all materials for the scope of work. The quantities required shall meet or exceed all items listed within this document. Spares, as identified herein, shall be included within the equipment list. The Contractor shall also provide product data submittals for any item included within the equipment list for review.

7.1.7 Project Schedule and Gantt Charts

A. The Contractor shall meet all project scheduling requirements as set forth by the consultant.

B. The Contractor shall be responsible for coordinating activities with other trades as required for the successful implementation of the system. This shall be performed throughout the project during pre-planning, planning, integration, rough-in, general construction, finishing as well as all other construction timeline items. **The owner will not be liable for any additional costs that result from the Contractor's failure**

to meet specified deadlines or the Contractor's failure to properly coordinate with other trades.

7.1.8 Project Record Documentation (PRD)

A. The Contractor shall maintain copies of project record documentation throughout the entire timeline of the project. Formal PRD documents shall be provided at each milestone identified in the project schedule. Such documentation shall track work progress throughout the project. The Contractor shall accurately maintain such documentation and provide updates, on a regular basis to the consultant for review.

B. Upon project completion, three (3) final, certified copies of all PRD's shall be forwarded to the consultant for review and distribution. The Contractor shall also include one (1) electronic copy including CAD files in Auto/Cad 2004 or greater format.

7.1.9 Site Use

A. The Contractor shall be provided with access to the job site during normal business hours. This shall be between the hours of 7:30 AM and 3:30 PM. Site access shall be provided by the General Contractor.

B. Before entering the job site, the Contractor shall provide an updated copy of their certificate of insurance in the event an expiration has occurred.

C. It shall be understood that a storage facility will not be provided to the Contractor for the storage of installation materials. The Contractor shall be responsible for all materials brought onto the job site and stored within this room. Theft, misplacement or loss of any materials shall be the responsibility of the Contractor. Claims associated with such losses shall be processed against the Contractor's identified insurance policies or other means.

D. The Contractor shall coordinate all work with the General Contractor for proper project management.

E. The Contractor shall attend project meetings onsite or remotely as per the requirements set forth by the consultant.

F. The Contractor shall remove all debris, waste material, rubbish, and tools at the completion of each workday. All work areas shall be thoroughly cleaned.

G. The Contractor shall be responsible for patching, repairing and painting any areas disturbed by the work completed. Existing paint colors shall be provided by the General Contractor should construction be disturbed.

7.1.10 Project Closeout Documents (PCD) and Materials

A. The Contractor shall be responsible for submitting project materials providing evidence that work completed meets or exceeds all specifications set forth. These shall include, but not limited to:

i. Final certificates of inspection for all low-voltage work completed by governing authorities.

ii. Project record documents including final as-built(s).

iii. Instruction materials as identified in proper quantities, in both electronic (PDF) and paper formats, bound and binder form.

iv. Spare materials as identified in scope of work, if any.

v. Certificate of warranty.

B. The Contractor shall provide an electronic file, in Excel (or approved) format, a list of all device assignments within the system. This shall be provided on finalized, electronic media. This shall include port numbers, patch panels ID's, location and cross-connect information as required. Final payment shall not be issued until documentation is provided to and approved by consultant.

C. The Contractor shall remove all debris, rubbish, waste material, tools, construction equipment, machinery and other materials from the job site at the completion of

the project. This shall include all boxes from installed materials. All disturbed areas shall be thoroughly cleaned by the Contractor. Acceptance of work shall not be given if the above requirements have not been met.

D. The Contractor shall submit a certified document, stating the following:

i. All contract documents and specifications have been reviewed and complied with.

ii. Project has been thoroughly inspected by a duly authorized representative of Contractor and has met all manufacturer's specifications and installation requirements.

iii. All work has been completed and met or exceed all specifications and requirements set forth.

7.2 General System Requirements

7.2.1 System Overview

A. The specifications set forth in this document, outline the core materials required for operation of the said plant structured cabling. The Contractor is responsible for providing all components required for successful operation of the specified solution.

B. The Contractor shall be responsible for providing all equipment, accessories and equipment to provide a complete solution to achieve the operation of the system described.

7.2.2 Copper Voice and Data Cabling

A. The Contractor shall provide and install copper work area cabling for all identified locations on the Contract Drawings for voice, data, fax, data, wireless access points, physical access control and video surveillance.

B. The Contractor shall provide a full copper cabling system, including cable installation, pulling, mounting, terminating, testing, cross connecting and performing all actions to provide a "go live" system.

C. The Contractor shall identify the room types displayed on the contract drawings. Construction drawings identify the quantity of copper cables required for each resident room or common area.

D. The Contractor shall provide a cross connect detail document, depicting all relevant information regarding the port, rack, and switch location of all cabling installed throughout the system upon completion. This document shall be provided in Microsoft Excel format. Handwritten documentation shall not be accepted.

E. The Contractor shall provide and install plenum-rated unshielded twisted pair category six cable for all voice and data cabling throughout the facility.

F. All cabling shall comply with ANSI/TIA/EIA-568-B: 2-1, UL 444 and Css.2 No. 214-02 standards.

G. Cabling shall provide high-speed data transmission for the application of IEEE 802.3 1000BASE-T and TIA/EIA-854 1000BASE-TX applications. Both shall provide 1 Gb/s data connectivity.

H. Cabling shall provide twenty-three (23) AWG bare copper conductors.

I. Cabling shall be characterized to 550 MHz, exceeding all requirements set forth for the Category six (6) standard.

J. Contractor shall be responsible for determining all cabling lengths and exact quantities required.

K. Contractor shall verify in field exact location of all runs for wireless access points prior to installation.

7.2.2.1 Copper Installation Materials

A. The Contractor shall provide and install Category six (6) Plenum rated UTP cabling for each copper cable run specified. This shall include voice, data, video surveillance, management and wireless access point cabling noted on all contract drawings. Superior Essex 6T-272-xB shall be used. Color blue (color code 2) shall be used for data outlets (including management), color white (color code 4) shall be used for voice, color orange (color code D) and color black (color code E) shall be used throughout the installation. PLEASE NOTE: x represents the color code noted.

B. The Contractor shall provide and install Ortronics TracJack faceplates, Clartiy6 jacks, and blanks throughout the installation. Finish shall be cloud white.

C. Blanks shall be used throughout on all faceplates with available ports.

D. The Contractor shall provide and install Ortronics OR-PHD66U24, twenty-four port category 6-patch panels for all twenty-four port patch panels required.

E. The Contractor shall provide and install Ortronics OR-PHD66U48, forty-eight port category 6-patch panels for all forty-eight port patch panels required.

F. Wire managers shall be provided for all patch panels as per the Contract Drawings. One (1) Ortronics OR-MM6HM62RU shall be provided for each patch panels.

G. The Contractor shall provide and install patch cords for a complete cabling system. Ortronics Clarity6 modular four-pair UTP stranded 24 AWG assemblies shall be used throughout. Color code white shall be used. Patch cordage shall be provided for both the outlet and patch panel ends of the cable.

H. The Contractor shall include twenty (20) additional cable runs within the proposal scope of work for any additional possible locations to be added during the project. Cable runs shall be inside plant cabling between an IDF and an outlet. Patch cords shall be provided as per section F above.

8 Inside Plant Cable Television Cabling

8.1 General Requirements

A. The Contractor shall provide and install a cable television system infrastructure for the purposes of transmitting signals from a service provider's distribution network. This shall include all cables, outlets, attenuators, and all other parts required for the reception of cable television signals.

B. Cabling shall be used to distribute cable channels to all television outlets which shall be interconnected to EIA standard high definition television (HDTV) receivers.

C. Delivery of television signals to all installed outlets shall be provided without signal distortion.

D. Signals shall be transmitted to the video endpoint at the picture fidelity equal to that which is received from the cable television company.

E. Delivery shall be provided at a minimum of +6.0 bDmx and maximum of +20dBmx for each channel at each outlet location.

F. All installed equipment shall meet all Federal Communication Commission standards for the distribution of radio frequency signals.

G. All installed components shall prevent the addition of signals to the system from other equipment within the building or the actual facility structure.

8.2 System Description

A. The Contractor shall provide and install RG6 coaxial cable from each television outlet location.

B. Cabling shall be installed between each television as noted on the contract drawings and terminated in the local IDF closet.

C. The IDF closet shall have a lockbox installed by the service provider where cabling shall be terminated. The Contractor shall coordinate with the service provide.

D. All cabling shall meet NFPA 262, UL 1569, UL 13, UL 444, CSA C22.2 No. 214-08, UL 1685, UL 1666, NFPA 262 and RoHS-compliancy standards and ratings.

E. Cabling conductors shall be made of copper clad steel and be eighteen (18) AWG.

F. Inner braids of cabling shall be thirty-four (34) AWG aluminum.

G. Outer braids of cabling shall be thirty-four (34) AWG aluminum.

H. Cabling jackets shall be made of polyvinyl chloride.

I. Cabling shall meet or exceed bandwidths of 3 GHz.

J. All cabling shall perform at an impedance level of seventy-five (75) ohms.

K. All cabling shall be terminated using proper terminating resistors used for RF signals.

L. The Contractor shall provide and install a faceplate with an "F" connector insert in each outlet location. Ortronics OR-40300548-88 and OR-63700006-88 shall be used. Colors shall be cloud white.

M. Lockboxes shall be installed adjacent to rack cabinets in each IDF closet. Locations shall be as per the Contract Drawings.

N. All cabling shall be home runs from each outlet to the termination location in the IDF closet. Berk-Tek Superior Essex quad-shielded plenum cabling (part number 78-14C-91) shall be used. Cabling shall be white in color.

9 Equipment Racking

9.1 MDF Racking Equipment

9.1.1 General Requirements

A. The Contractor shall provide and install equipment racks in MDF rooms as described herein.

B. Racks associated with the UPS system are excluded from the Structured Cabling Contractor's scope of work and shall be provided by the network integrator.

C. The Contractor shall provide and install support structure for all equipment racks installed throughout the project. Materials shall be property secured to the support structures provided.

D. The racking system shall be designed to provide a secure, managed environment for server and network equipment.

E. The unit shall conform to EIA-210-E Standard for Cabinets, Racks, Panels and Associated Equipment and accommodate industry standard 19" rack mount equipment.

F. The unit shall be available with a vertical equipment mounting space of forty-five (45) rack units. Each rack unit shall be 1.75" in height.

G. The MDF rack shall have a static rating of 3000 pounds.

H. The MDF rack shall have a perforated front door, perforated split rear doors, four (4) half-height side panels, tool-less room, four (4) vertical frame post and four (4) adjustable vertical mounting rails.

I. The MDF rack shall support a minimum of two (2) and maximum of four (4) vertical PDU mount cable organizers and four (4) leveling feet and four (4) casters.

J. The MDF rack shall have grounding hardware pre-installed by the manufacturer. The Contractor shall be responsible for physically grounding each rack as per EIA standards.

9.1.2 Equipment Access and Installation

A. Vertical mounting rails shall be easily adjustable to allow different mounting depths.

B. Each vertical mounting rail shall be marked on both sides with lines showing the top and bottom of each U and the number U space next to the middle hole. Each U consists of three (3) square holes and is 1.75 inches (44.45 mm) high.

C. The unit shall include M6 caged nuts, bolts and cup washers, and caged nut tool for the mounting of equipment inside the unit. Cage nuts shall be provided upon the completion of the rack installation.

D. Both the front and rear doors shall be designed with lift-off hinges allowing for quick and easy detachment without the use of tools.

E. The front and rear doors shall open a minimum of one hundred-twenty (120) degrees to allow easy access to the interior.

F. The front door of the unit shall be reversible so that it can be mounted on either side.

G. Split rear doors are provided for increased service clearance.

H. The front door of the unit shall be capable of being installed on the rear of the unit, and the rear doors shall be capable of being installed on the front of the unit.

I. The unit shall include half-height side panels that are removed without tools using easy finger latches for fast access to cabling and equipment.

J. The side panels on the unit shall double as privacy panels when the units are bayed together.

K. Side panels are flush with the frame so the overall width of the unit does not change with the side panels installed.

L. Baying brackets must provide two set of mounting holes for standard enclosure spacing of 24" or 600mm.

9.1.3 Material Requirements

A. All weight bearing components shall be constructed from steel with a thickness no less than 0.9mm (20 gauge).

B. All sheet metal parts shall be painted using a powder coat paint process.

C. Plastic materials shall comply with Underwriters Laboratory Specification 94 with HB rating (UL94 V-1) or better.

D. All interior components of racks shall not have electroplated zinc coating to minimize zinc whiskers near active equipment.

9.1.4 Grounding Requirements

A. All enclosure components such as doors, side panels, roofs, etc. should be bonded directly to the frame.

B. Grounding points should be provided on frame to externally bond each unit to building ground.

9.1.5 Environment and Safety Requirements

A. The unit shall have a minimum of IP twenty (20) rating for protection against touch, ingress of foreign bodies, and ingress of water.

B. Manufacturer must certify products are RoHS and China RoHS compliant.

C. The enclosure shall both protect the user from mechanical hazards and generally meet the requirements for a mechanical enclosure (stability, mechanical strength, aperture sizes, etc.) as defined in IEC 60950 Third Edition.

9.1.6 Ventilation

A. The unit shall have ventilated front and rear doors to provide adequate airflow required by the major server manufacturers.

B. The unit shall have a minimum total ventilation area for the front door, split rear doors, and roof as specified below.

C. The unit shall provide the means to mount optional cooling accessories for high-density.

D. The manufacturer shall offer an optional tool less blanking panel kit to prevent the recirculation of hot exhaust air.

E. The manufacturer shall ensure all gaps are blocked to prevent recirculation of hot air.

9.1.7 Cable Access

A. Cable access shall be provided by the top cable management system on the rack.

B. Cable opening edges must be protected with plastic grommets or raised edges.

C. Bottom cable management openings shall be provided in the enclosure base.

9.1.8 Security

A. The unit shall include front door lock, rear door lock and side panel locks that are keyed the same; two (2) keys included.

B. Keys shall be provided to the owner at the completion of the project. Keys shall be stored in a safe location during construction to ensure theft does not occur.

C. Replacement key lock cylinders from the handle manufacturer should be available to provide a minimum of 220 unique key combinations on front and rear doors.

D. The manufacturer shall provide optional products and accessories that allow the enclosure environment to be monitored for temperature, humidity, and electronic pass key door access.

E. The unit shall have mounting provisions for optional door alarm switch to monitor access to the enclosure doors.

9.1.9 Stabilization

A. The unit shall ship with provisions for stabilization in the field with pallet mounting brackets.

B. The manufacturer shall have optional stabilizer plate kit, consisting of a plate, and mounting hardware that can be attached to the enclosure frame, and that can be bolted to the floor.

C. The manufacturer shall have optional bolt down brackets, consisting of four (4) brackets and mounting hardware that attach to the enclosure frame on the front and rear (on the interior or exterior), and which must be anchored to the sub-floor for compliance with the local Uniform Building Code (UBC).

D. The manufacturer should supply structural calculations by a professionally registered engineering firm showing compliance with the local UBC for floor anchoring.

E. The unit shall have four (4) adjustable leveling feet to help provide a stable base in the event of an uneven floor surface and to prevent rolling.

F. The Contractor shall level the rack during installation and prior to installation completion.

9.1.10 Packaging

A. The unit shall ship on a wooden pallet. Optional packaging should be available for shipping racks with 1250 lbs. and 2000 lbs. of installed equipment.

B. The unit shall be bolted to the wooden pallet for stability during shipment.

C. The unit shall be protected by corrugated corners, which are stretch-wrapped to limit damage during handling.

D. The unit shall have a label, which instructs customers to call a toll-free customer support number to resolve possible shipping damage issues.

9.1.11 MDF Racking Products

A. Two (2) APC AR3105 racks shall be provided and installed by Structured Cabling Contractor.

9.2 IDF Racking Equipment

9.2.1 General Requirements

A. Provide all labor, materials, and equipment for the complete installation of equipment racks in IDF rooms as described in the racking schedule.

B. This section includes the minimum requirements for wall-mounted racks for use as telecommunications consolidation point in communications equipment rooms.

C. One (1) IDF rack shall be installed in each new IDF closet (typical of three within the education center).

D. One (1) rack enclosure shall be provided by the General Contractor for each outdoor parking area.

C. Included in this section are the minimum requirements and installation methods for IDF racking systems to be installed.

9.2.2 IDF Racking Products (Type A)

A. Floor or wall-mounted cabinets shall be manufactured from steel sheet.

B. Each cabinet will have a rear panel that attaches to the wall, a hinged cabinet body that swings open from the rear panel providing easy access to the rear of equipment and a locking front door.

C. The rear panel will be 5” (130 mm) deep and will provide cable access with pre-punched knockouts for conduit along the top and bottom edges of the panel. There will be a minimum of (4) combination 1/2” and 3/4” conduit knockouts (2 top/2 bottom) and (8) combination 2-1/2” and 3” knockouts (4 top/4 bottom). The back edge of the knockouts will be located 1-5/8” (41 mm) from the back surface of the panel (cabinet/wall) allowing conduit to be attached to the wall with auxiliary framing strut. The cabinet will include rubberized or plastic/composite grommets that fit within the 3” knockouts to protect cables when conduit is not used to route cables. There will also be one 6” (150 mm) high by 6” (150 mm) wide cutout in the back of the rear panel so that cables can enter the panel through the wall. The rear panel will provide attachment points for accessory equipment mounting brackets and cable tie points within the panel (cabinet). The manufacturer of the cabinet will sell compatible equipment mounting brackets and cable ties as separate accessories.

D. The cabinet body will include a single pair of vertical 19”EIA equipment mounting rails; mounted in both the front and rear of the rack. The mounting rails will be EIA-310-D compliant with the Universal hole pattern. Mounting holes will be spaced vertically on alternating 5/8”-5/8”-1/2” (15.9 mm – 15.9 mm – 12.7 mm) centers and will be roll-formed

with #12-24 threads. Mounting rails will provide 12, 18, or 26 rack-mount unit (U) spaces for equipment as specified below.

E. Mounting rails will be adjustable in depth so that they can be positioned at any point within the cabinet body. The design of all cabinets will allow an additional pair of mounting rails (for a total of two pairs of mounting rails per cabinet) to be added to the cabinet. The manufacturer of the cabinet will sell compatible mounting rails as a separate accessory.

F. Mounting rails will bolt in place directly to the cabinet frame. The mounting rails will be L-shaped. The side of the mounting rails will be punched to provide lacing points for cables.

G. The hinge design that attaches the cabinet body and the rear panel will allow the rear panel to be removed during installation.

H. The hinge that attaches the cabinet body and the rear panel will allow the cabinet body to open at least 90°. The hasp used to secure the rear panel and the cabinet body together will assist in drawing the components together during the locking action.

I. The cabinet body will include vents that are designed to accept fan kits. Four (4) OEM fan kits shall be provided and installed with each rack.

J. The front door will be hinged and locking. The front door and rear panel will be keyed alike. The front door will have rounded edges and corners. The cabinet body will allow the front door to be attached so that it will swing open from the right or left. The front door shall have a tinted window.

K. Finish shall be epoxy-polyester hybrid powder coat (paint) in the color of black. Tinted windows in doors shall be bronze acrylic (not clear) with a UL flammability classification of 94HB or better.

L. The cabinet shall be delivered fully assembled and will include installation hardware (hex lag screws) for wood studs and 50 each #12-24 equipment mounting screws.

M. Load bearing capacity for cabinets will be 200 pounds (90.7 kg) per cabinet. Load bearing capacity will be stated in the manufacturer's product literature.

N. Cabinets will be UL Listed under category NWIN to standard UL 60950. UL Listing will be stated in the manufacturer's product literature.

O. Chatsworth 13493-260 shall be provided with four (4) Chatsworth interior lights (part number 12803-701) per rack. Lights shall be installed on all four sides of the rack, with the front rack rails recessed into the rack to allow for display of the racking equipment from the glass doors and hallway for students to see inside equipment.

P. The Contractor shall order racks without front doors for the equipment to be easily visible from the hallway.

Q. The Contractor shall also provide and install one (1) Chatsworth 20A, 120V power stripe for rack (part number 12820-708). Lighting cords shall be connected to this unit.

R. Provide additional equipment-mounting hardware if required to attach equipment to the equipment mounting rails in the cabinet.

S. Equipment mounting hardware will be combination pan head, pilot point mounting screws, threaded #12-24, and 5/8" long.

T. Mounting rails will be punched with the EIA-310-D Universal hole pattern. Installation materials shall be included with mounting rails.

U. Support structure shall be provided as required.

9.2.3 Grounding Requirements

A. All enclosure components such as doors, side panels, roofs, etc. should be bonded directly to the frame.

B. Grounding points should be provided on frame to externally bond each unit to building ground.

9.2.4 IDF Racking Fan Kits (Types A)

A. The Contractor shall provide and install a fan kit for each IDF rack cabinet.

B. Two (2) fan kits shall be supplied for each IDF rack.

C. The fan shall be attached to the outside of the cabinet over vents in each side panel.

D. The fan shall be rated for 115 Volts or 230 Volts Alternating Current and 100 CFM and shall include power cord and installation hardware.

E. The fan assembly shall be UL Recognized.

F. The Contractor shall provide a total of six (6) Chatsworth 12804-701 fan kit units.

9.2.5 Equipment Accessories

A. Backboards shall be provided throughout the installation where required.

B. All backboards provided shall be flame-retardant wood and properly painted.

C. The Contractor shall provide ladder tray cable management in the MDF and IDF rooms to provide a pathway to each rack. Runways shall be twelve (12) inches in width and black in color. Chatsworth U.L. Classified cable runways or approved equal shall be used. Support structure shall be installed every five (5) feet.

D. The unified communications Contractor shall be responsible for installing all switches and UPS devices in all racks.

9.2.6 General Network Requirements

A. All equipment interconnected to the IP communication network (also referred to and known as a Local Area Network (LAN)), shall meet the following minimum requirements:

i. Federal Information Processing Standards Publication 142

ii. Underwriters Laboratories 60950-1

iii. Underwriters Laboratories 60950-2

iv. Federal Communications Commission Part 15 Listed Radio Equipment

B. The Contractor shall provide and install additional patch cords for building management equipment installed in the data center. This shall include twenty (20) patch cords; including ten (10), 10’ units and ten (10) 20’ units.

C. One (1) UTP patch cord shall be supplied per IDF rack to be used for each UPS system. One UPS system shall be installed in each IDF closet. Each patch cord shall be 10'.

D. Twenty (20) patch cords shall be provided within the MDF, ten (10), 10' units and ten (10) 15' units.

9.3 Outdoor Enclosure Systems

9.3.1 General Requirements

A. The General Contractor shall provide and install equipment as described herein.

B. Provide all labor, materials, and equipment for the complete installation of outdoor enclosures in parking lot area.

C. Outdoor enclosure systems shall be mounted at elevations as described on the contract drawings.

D. Two (2) outdoor enclosure OD30DXC shall be provided by the General Contractor for each outdoor parking area at locations as identified on the Contract Drawings.

9.3.2 Equipment Accessory

A. Each Outdoor enclosures shall include cooling unit (ACP-2000-T20), and Heater Fan (HVL-126T).

B. Contractor shall provide Tiger Drylac Exterior Powder Coating paint (RAL 8022) for each Outdoor Enclosures.

C. Contractor should paint the Two (2) Outdoor Enclosures Black (RAL 8022). The General Contractor shall verify matching color with the poles prior to proceeding with the paint selection.

10 Cabling, Conduit and Miscellaneous Equipment Installation

10.1 Cabling

A. The Contractor shall install plenum rated cabling throughout the installation, including copper and fiber. Cabling shall be installed in accordance to the specifications set forth by the EIA and NEC and all other governing entities described herein.

B. Prior to optical fiber ordering, the Contractor shall verify actual cabling lengths to ensure the installation shall meet the specifications set forth and achieve said standards.

C. After installation, and before termination, all wiring and cabling shall be checked and tested to ensure no grounds, opens, or shorts on any conductors or shields exist. A V.O.M. shall be utilized to accomplish these tests and a reading of greater than 20 Megohms shall be required to successfully complete the test.

D. Visually inspect wire and cable for faulty insulation prior to installation. Protect cable ends at all times with acceptable end caps except during actual termination.

E. Protect wire and cable from kinks of any kind. Any cabling found to be kinked during installation shall be replaced. Kinked cabling shall be rejected during visual inspection.

F. Provide grommets and strain relief material where necessary, to avoid abrasion of wire and excess tension on wire and cable.

G. All cables, wires, wiring forms, antennas, terminal blocks, and terminals shall be identified by labels, tags, or other permanent markings. The markings shall clearly indicate the function, source, and destination of all cabling, wiring and terminals. All cables and wires shall be identified, utilizing heat-shrunk, pre-printed, wire markers.

H. All terminal points shall be appropriately labeled.

10.2 Conduit and Grounding

A. The Contractor shall run all cabling in ceilings above the acoustical grid or hard ceiling. Cabling shall be installed using "J" and "D" hooks above the finished ceilings throughout the building.

B. Horizontal cabling installed throughout the building without conduit shall follow all paths authorized for the installation of low voltage cabling.

C. Conduit sleeves shall be provided by the Contractor in locations where penetrations through full-height and fire rated walls are required. In locations where sleeves are not installed, the Contractor shall be responsible for such installations and required materials. All fire stops must meet the rating requirements of the area in question. All areas with firewalls will be inspected prior to project closeout.

D. The Contractor shall provide ground cable shields and related equipment to eliminate the possibility of shock hazards.

E. The Contractor shall not mix grounding equipment not rated or approved to work with one another.

F. The Contractor shall install grounding electrodes as required throughout the installation.

G. The Contractor shall also provide and install tray systems in open ceiling areas as identified on the Contract Drawings. Chatsworth 36821-612 shall be used.

11 Delivery, Storage and Handling

A. General: Delivery, storage, and handling of all installed equipment shall be in accordance with the manufacturer's recommendations.

B. Ordering: The manufacturer's ordering instructions and lead-time requirements must be followed in order to avoid installation delays.

C. Delivery: All installed equipment shall be delivered in the manufacturer's original, unopened, undamaged container with identification labels intact.

D. Storage and Protection: All installed equipment shall be stored and protected from exposure to harmful weather conditions and at the environmental conditions recommended by the manufacturer.

12 Project Execution

12.1 Examination

A. Submission of a proposal confirms the contract documents and site conditions are accepted without qualifications unless exceptions are specifically noted.

B. The site shall be visited on a regular basis to appraise ongoing progress of other trades and Contractors, make allowances for all ongoing work, and coordinate the requirements of this contract in a timely manner. All coordination must be processed through the consultant's office.

C. All installed equipment must be inspected before installation, and shall be free of any cosmetic defects or damage.

12.2 Installation

A. All work shall be installed to meet all National, State and local codes, regulations and ordinances.

B. Contractor shall recognize the work areas shall be a clean workplace. Foul language shall not be tolerated. Employees found to be in violation shall be asked to leave the job site and will not be granted further access to the facility.

C. Installers and those representing the Contractor shall wear proper attire when visiting or working on the project job site. Uniforms or other clothing depicting the company under contract shall be worn at all times.

D. All work shall be installed in a manner consistent with industry standard concepts. Site conditions shall be properly assessed before commencing any work.

E. The Contractor shall be responsible for all materials installed or not until final acceptance by the owner.

F. The Contractor shall provide and install any and all hardware, adapters, brackets, support structures, rack mount equipment, and accessories required for successful operation of said system.

G. The Contractor shall be completely responsible for the method of design, review, implementation and certification of all support structures for materials installed throughout the project.

H. The Contractor shall firmly mount all equipment in place, mounted to a viable support structure for the weight and dimensions of each device installed. A 5:1 safety factor shall be used on all hanging materials.

I. All finished shall be approved through the consultant's office. This shall include all cover plate covers and any other viewable materials. Such shall be approved by the consultant before being ordered.

J. The Contractor shall protect all electronic devices properly from electrostatic discharge that may occur. Installers shall wear wrist straps as approved by OSHA.

K. The Contractor shall be responsible for all patching, core drilling, fitting, painting and cutting for the installation of said equipment.

L. The Contractor shall be responsible for any area of the building that is damaged or destroyed due to work performed or activities of the Contractor.

M. All core drilling shall be approved by plant management before work is performed. The Contractor shall be responsible by ensuring no structural elements of the building are distributed when drilling is performed.

N. All products must be installed, programmed, and tested in accordance with the manufacturer's instructions.

O. In order to ensure a complete solution; where information is not available from the consultant upon request, the worst-case condition shall be assumed.

P. Interfaces shall be coordinated with the consultant's office, where appropriate.

Q. All necessary back boxes, connectors, supports, conduit, cable, and wire must be furnished and installed to provide a complete and reliable installation. Exact location of all boxes, conduit, and wiring runs shall be presented to the consultant for approval in advance of any installation. Only conduit located on drawings by others is excluded from the scope of work.

R. All conduit, cable, and wire shall be installed parallel and square with building lines, including raised floor areas. Conduit fill shall not exceed forty percent (40%). All wires shall be gathered and tied up to create an orderly installation. All possible options must be considered and investigated before any type of visible cable is explored.

S. All cable ties shall be clipped upon installation completion.

12.2.1 Cabling Installation

A. All wiring, boxes, raceways, conduits, etc. shall comply with all requirements set forth the National Electric Code, EIA/TIA, local building codes, and standard industry practices.

B. Any cabling damaged in any way during installation shall automatically be removed and replaced by the Contractor.

C. Any existing cable damaged during installation shall be replaced and tested for functionality immediately upon detected trouble.

D. Cable shall not be installed on top of or may lay on ceiling tiles, ceilings, mechanical equipment, light fixtures, ductwork, high voltage or low voltage cabling. Two foot clearance shall be maintained throughout the installation from all other cabling or equipment which may interfere with the transferring of signals through the cabling installed.

E. Lubricants shall be used in accordance with the manufacturer's recommendations when pulling any cabling where tension may occur.

F. Copper cabling throughout the entire project shall not be spliced for any single run. All cables shall have proper shielding and insulation.

G. Cabling throughout the installation shall be run parallel to all walls.

H. All cabling shall be de-reeled during times of normal temperature.

I. All cabling shall be properly terminated by qualified personnel in accordance to manufacturer's specifications.

J. Grommets shall be used throughout the installation where cutouts are located.

K. Service loops for cabling shall be installed throughout the implementation. Each service loop (whip) shall be twenty (20) feet long and coiled in the ceiling for future relocation or service requirements.

L. Strain relieve shall be provided on all cables or cable wire ways with an outside diameter more than one inch.

M. Velcro tie rates shall be installed throughout the installation. Plastic tie wraps shall not be installed.

N. All pulled cabling shall be stored properly until the time of final terminations. Cabling shall not be left hanging from ceilings or left on floors. Cabling shall be properly looped and tie wrapped until final terminations are completed.

O. Cabling shall not in any way be installed through or come in contact with mechanical ducts, pipes or other items that may damage or decrease the functionality of cabling.

P. All materials, tools and cabling shall be kept out of the reach of residents. Pathways must remain open upon the approach of a resident unless an alternate path is cleared.

12.3 Labeling Requirements

A. Contractor shall clearly, neatly, consistently, logically and permanently mark all installed equipment installed throughout the system.

B. Before beginning the labeling process, the method used shall be approved by the consultant for viability.

C. All rack-mounted equipment shall be labeled with engraved lettering with white lettering and a black background. Labeling shall be located on both the front and back of all rack-mounted equipment.

D. Rack mounted equipment shall be labeled with the facility, building, room, rack number ID (as per the consultant's schedule), port, and name.

E. Cabling shall be permanently labeled at both sides of cable using an approved labeling system.

F. Cabling shall include all industry-required markings, such as UL certification, EIA/TIA cabling type, etc.

12.4 Testing and Certification

12.4.1 Pretesting Requirements

A. Upon the implementation of approximately ninety (90) percent of the installation components, the Contractor shall begin pre-testing the functionalities of the system. All functionalities of the said system shall be functional and certified to work in accordance to the specifications set forth.

B. The Contractor shall submit a letter of certification that all systems have been pre-tested, inspected and certified to meet all requirements.

C. All testing shall be performed by a certified representative of the Contractor. All testing shall be witnessed by the consultant.

D. The testing process shall include the following process:

a. All deficiencies noted in the above test shall be corrected.

b. Test results shall be submitted to the consultant.

c. The test and correction of any deficiencies shall be witnessed by the owner's representative, and note.

d. The Owner's representative shall accept the system.

e. The system test shall be witnessed by the Authority Having Jurisdiction. Any deficiencies noted during the testing must be corrected.

12.4.2 Testing Equipment

A. The Contractor shall provide and use testing equipment having a calibration tag of certified status dated not more than twelve (12) months prior to the test. Within the submittal documentation, the Contractor shall include the name and date of last test of the equipment used for testing purposes.

B. The testing equipment used shall analyze spectrum, signal levels, volt-ohm.

C. An oscilloscope shall also be used during the testing procedure.

12.4.3 Acceptance Testing

A. The Contractor shall submit written certification from the manufacturer that all wiring and connection diagrams meet the specification requirements as well as instructions, recommendations, requirements and other information submitted by the original equipment manufacturer for viable performance of the system.

B. The Contractor shall submit a letter of certification that all systems have been pre-tested, inspected and certified to meet all requirements.

C. All testing shall be performed by a certified representative of the Contractor. All testing shall be witnessed by the consultant.

D. The Contractor shall test components with testing equipment approved by the manufacturer.

E. The Contractor shall verify all components installed meet the system specifications and associated functionalities.

F. The Contractor shall ensure the system does not produce any unwanted results, including:

i. Signal distortion

ii. Audio humming

iii. Pulsing

iv. Functionality problems

v. Integration failures

G. Each system component shall be tested for full compliance to specifications. This shall include copper cables, fiber, patch panels, cords and other installed and provided materials.

H. Each and every individual item shall be tested for operational functionality.

I. Failure of any major component of the system, as determined by the consultant, shall deem the test as failed and shall be rescheduled upon resolution of the issue.

J. All spare equipment shall be presented to the owner during the acceptance test and located in storage as per the location determined by environmental services.

K. All system drawings, record drawings, equipment manuals, CADD files, testing results shall be presented at the time of the acceptance test.

L. The system test shall be considered failed in the event 100% of components are not completely functional.

M. Any issues found during the testing shall result in a punch list and resolved by the Contractor before an additional acceptance test is rendered. All rescheduled testing expenses shall be paid by Contractor.

N. A letter of certification and completion shall be provided to indicate that the tests have been performed, and all devices are 100% operational.

12.5 Contractor Project Management and Certifications

A. The Contractor shall appoint a single project manager responsible to be a point of contact for the consultant, construction manager, Electrical Contractor and all others involved with the project.

B. The Contractor shall have a BICSI certified installer onsite at all times and verify all work is installed as per specifications.

C. The Contractor shall be an Ortronics certified installer.

D. The Contractor shall have a RCDD on staff to monitor the activities of installers. The RCDD shall verify all work completed meets all standards set forth by BISCI and others described in this document.

E. The project manager shall maintain a project schedule, work proactively in all work schedules, and coordinate all activities related to implementation with all parties involved.

F. The project manager shall work with the consultant to coordinate all activities related to the implementation and requests from the owner for information.

12.5.1 Specific Coordination Requirements

A. All junction boxes, conduits, penetrations, and other requirements shall be properly documented and provided to the consultant for distribution.

B. The project manager shall attend all coordination meetings as required and defined by the consultant.

13 System Warranty

A. The Contractor shall warranty the installation of all materials and services provided to be free from defect in material and workmanship for a period of five (5) years from the date of project acceptance by the owner. The date of project acceptance is defined as the date from which the consultant has signed off on the project and noted 100% completion. The Contractor shall agree to respond to requests from the owner for resolution of problems that occur with products or services provided within four (4) hours of such information being provided to Contractor. This service shall be provided for all issues related to major failures, those which impede the functionality of the system, or a portion of the system.

B. The Contractor shall be onsite to respond to an emergency trouble call (critical call) within four (4) hours of the issue being reported to the Contractor.

C. In addition to the Contractor warranty, the system shall be registered with the manufacturer for a warranty for a period of twenty-five (25) years. The warranty shall include all network cable, pathway and connectivity hardware products to:

i. Be free from Bit Errors caused by the structured cabling system components.

ii. Meet or exceed applicable ratified TIA/EIA transmission performance standards in force at the time of installation for a Structure Cabling Link/Channel.

iii. Support any current or future copper application which is designed for transmission over a Structured Cabling System as designed by the TIA/EIA standards and the Netclear Data Sheets in effect at the time of installation.

iv. Support any current or future multimode or single-mode fiber application which is designed for transmission over a structured cabling system as defined by the above referenced TIA/EIA standards and the NetClear Data Sheets (or equivalent) at the time of installation.

v. Conform to the transmission performance specification of the NetClear Data Sheet (or equivalent) in effect at the time of installation

vi. Be free from defects in material and workmanship on the products installed.

14 Project Planning

14.1 Owner Project Management and Coordination

Project management for this solution shall be conducted and managed by a project manager assigned by the managing consulting firm for this solution, IT Initiatives, Inc. The Contractor is responsible for coordinating and communicating all aspects of the project with the project manager. The owner's project manager shall be responsible for managing all aspects of the project, including specification, bidding, bid review, execution, installation and post-installation coordination.

14.2 Contractor Project Management and Coordination

The Contractor shall appoint a project manager representing the Contractor's organization responsible for the coordination of all affairs related to the installation of the said systems based on the specifications set forth.

15 Appendix

Project Drawings

- IT Initiatives drawing set