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April 30, 2014

ADDENDUM NO. 1
LPS Security & Technology Ready Facilities Project "B"
Lincoln, Nebraska - 2014
OA Project No. 014-0452

TO ALL WHO HAVE RECEIVED PLANS AND SPECIFICATIONS FOR THE REFERENCED PROJECT.

FRONT-END DOCUMENTS:

1. Refer to the NOTICE TO BIDDERS, (3) Pages

   a. ADD: Paragraph PRE-AWARD INTERVIEW to page 2,

      "Prior to approval of the apparent low bid, LPS will interview the apparent low bid to confirm all specified qualifications are met. Information to be reviewed will include but is not limited to:

      a. Project Manager experience
      b. List of Installers that "will be working" on the project
      c. List of installer certifications
      d. Residence of Installers
      e. Similar project experience (size and scope)
      f. Ability to meet the project schedule
      g. Supply and availability of product
      h. Questions for LPS
      i. List of all Subcontractors
      j. Present workload or limitations
      k. Projects completed last 5 years / references
      l. Resolution of issues process
      m. Prosed staffing for the project."

TECHNICAL SPECIFICATIONS:

1. Refer to Section 270501 – COMMON WORK RESULTS FOR COMMUNICATIONS IN THE PROJECT SPECIFICATIONS.

   a. Delete Section 270501 in its entirety and replace with attached. (1.13 Quality Assurance was revised).

      See Attachment.

SECTION 270501 - COMMON WORK RESULTS FOR COMMUNICATIONS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. This Section describes the general telecommunications infrastructure requirements of these specifications and applies to all phases of the work specified, indicated on the drawings, or required to provide for the complete installation of telecommunications infrastructure for this project.

1.2 ALTERNATES

A. Alternates, if required, shall be as described in the “Alternates” section of this Project Manual, as described on the proposal form, or as indicated on the drawings.

1.3 ALLOWANCES

A. Allowances, if required, shall be as described in the “Allowances” section of this Project Manual, as described on the proposal form, or as indicated on the drawings.

1.4 UNIT PRICES

A. Provide unit pricing for the following work situations. Keep unit pricing in effect until the Owner has final acceptance for the building. Submit unit pricing on bid form documents.

B. Unit Prices shall be as described on the bid form.

1.5 QUESTIONS OF INTERPRETATION DURING BIDDING PHASE

A. If questions arise during the bidding process regarding the meaning of any portion of the contract documents, the prospective bidder shall submit the questions to the Architect for clarification.

B. Any definitive interpretation or clarification of the contract documents will be published by addenda, properly issued to each person holding documents, prior to the bid date. Questions shall be made in writing 7 calendar days prior to bid date.

C. Verbal interpretation or explanation not issued in the form of an addendum shall not be considered part of the bidding documents.

D. When submitting questions for clarification, adequate time for issuance and delivery of addenda must be allowed.

E. The Architect shall be the sole judge regarding interpretations of conflicts within contract documents.

1.6 CONTRACT DOCUMENT DISCREPANCIES

A. If any ambiguities should appear in the contract documents, request clarification from the Architect before proceeding with the work.

B. If the Contractor fails to make such request, no excuse will thereafter be entertained for failure to carry out the work in a manner satisfactory to the Architect.

C. Should a conflict occur within the contract documents, the Contractor is deemed to have estimated the more expensive way of doing the work unless a written clarification from the Architect was requested and obtained before submission of proposed methods or materials.

D. The Architect shall be the sole judge regarding interpretations of conflicts within contract documents.

1.7 DEFINITIONS

A. Inside Plant Cable (ISP): That part of the Information Transport System running within a building. This definition does apply to Inside Cable Plant elements passing through any element of the outside plant pathway. Inside plant includes the work area outlet assembly (WAO), backbone and horizontal cabling, network racks, network equipment and all termination hardware not terminating Outside Plant (OSP) cables.

B. Outside Plant Cable (OSP): That part of the Information Transport System running between buildings, from a building to a definable exterior point, between definable exterior points or from another outside source to the building or exterior definable point. It includes termination hardware, transition splices and any other device into which the cable attaches. The Outside Plant includes underground and overhead cabling.

C. Pathways: A cable distribution system consisting of raceways, cable trays, racks, and ladders; conduits; distribution rings and mechanical cable supporting devices.

D. Telecommunications Cables: Term includes horizontal and backbone copper, fiber optic, and coaxial cabling; copper and optical outside plant cables; copper audio/visual (AV) cables; CATV cables, CCTV cables; building environmental, automation, and security cabling systems.

E. Work Area Outlet (WAO): A connecting device for termination of horizontal media.

F. Telecommunications Closets or Spaces: Rooms and areas where telecommunications cabling systems are terminated and telecommunications equipment is installed.

G. Telecommunications Enclosure (TE): A case or housing for telecommunications equipment, cable terminations and cross-connect cabling.

H. Telecommunications Room (TR): An enclosed architectural space for housing telecommunications equipment, cable termination and cross-connect cabling.

1.8 SYMBOLS

A. Items of equipment and materials are indicated on the drawings in accordance with the symbols on the plans.

1.9 ABBREVIATIONS

A. The following abbreviations apply throughout the contract documents:

1. ACR: Attenuation-to-Crosstalk Ratio
2. ADA: Americans with Disabilities Act
3. AFF: Above finished floor
4. ANSI: American National Standards Institute
5. ASME: American Society of Mechanical Engineers
6. ASTM Specification: Standard specifications of the American Society for Testing Materials
7. AWG: American wire gauge
8. BICSI: Building Industry Consulting Service International
9. CATV: Community Antenna Television (cable television)
10. CCTV: Closed Circuit Television (security)
11. CSA: Canadian Standards Association
12. EF: Entrance Facility
13. ELFEXT: Equal level far-end crosstalk
14. EMC: Electromagnetic Compatibility
15. EMI: Electromagnetic interference
16. ER: Equipment Room
17. ETL: Electrical Testing Laboratories
18. FCC: Federal Communications Commission
19. FDDI: Fiber distribution data interface
20. FEXT: Far-end-crosstalk
21. FM or Factory Mutual: Factory Mutual Engineering Corporation
22. FO: Fiber optic
23. GND: Ground
24. HH: Handhole
25. Hz: Hertz
26. IC: Intermediate cross-connect
27. IDC: Insulation displacement connector
28. IDF: Intermediate Distribution Frame
29. ISP: Inside Plant Cable System
30. IEEE: Institute of Electrical and Electronics Engineers
31. LAN: Local area network
32. Mbps: Megabits per second

33. MC: Main Cross-Connect
34. MDF: Main Distribution Frame
35. MH: Manhole
36. MM: Multimode
37. NEC: National Electrical Code, latest edition
38. NEMA: National Electrical Manufacturers Association
39. NFPA: National Fire Protection Association
40. OFL: Overfilled launch condition
41. OSHA: Occupational Safety and Health Administration
42. OSP: Outside Plant Cable System
43. Pr: Pair
44. PVC: Polyvinyl chloride
45. RCDD: Registered Communications Distribution Designer
46. RFI: Radio Frequency Interference
47. SCS: Structured cabling system
48. ScTP: Screened twisted pair
49. SM: Single mode
50. STP: Shielded twisted pair
51. TBB: Telecommunications bonding backbone
52. TGB: Telecommunications grounding bus bar
53. TMGB: Telecommunications main grounding bus bar
54. TR: Telecommunications Room
55. UL or Underwriters: Underwriters Laboratories, Inc.
56. UPS: Interruptible Power Supply
57. UTP: Unshielded twisted pair
58. WAO: Work Area Outlet

1.10 CODES AND STANDARDS

A. The work shall be performed by competent craftsmen skilled in the trade involved and shall be done in a manner consistent with normal industry standards. All work shall conform to all applicable sections of currently adopted editions of the codes and standards listed below or the codes, standards, and specifications published by the organizations listed below:

1. Safety and Health Regulations for Construction.
2. Occupational Safety and Health Standards (OSHA), National Consensus Standards and Established Federal Standards.
3. National Electrical Code (NEC), latest edition.
4. American National Standards Institute (ANSI).
5. National Electrical Manufacturer s Association (NEMA).
6. Institute of Electrical and Electronics Engineers (IEEE).
7. National Fire Protection Association (NFPA).
8. Insulated Power Cable Engineers Association (IPCEA).

9. American Society for Testing Materials (ASTM).
10. Life Safety Code (NFPA 101).
11. Underwriters Laboratories, Inc., Standards (UL).
12. Independent Testing Laboratories (ITL).
13. Electrical Testing Laboratories (ETL).
14. National Electrical Safety Code (NESC).
15. Factory Mutual Engineering Corporation or other recognized national laboratories.
16. Uniform Building Code (UBC).
17. Building Officials and Code Administrators International, Inc. (BOCA).
18. Building Industry Consulting Service International (BICSI).
19. Telecommunications Industry Association (TIA).
20. State and Local Codes.

B. Where there is a conflict between the code or referenced standards and the contract documents, the code or standard shall have precedence only when it is more stringent than the contract documents. Items that are allowed by the code but are less stringent than those specified shall not be substituted.

C. Follow Owner installation standards LPS Design Guidelines and Supplements Issued for this Project unless otherwise shown on the drawings or stated herein. Where requirements of Installation Standards conflict with Performance Standards or manufacturer's recommendations, refer to Owner for a decision before proceeding.

1.11 MATERIALS AND EQUIPMENT MANUFACTURERS

A. Options in selecting materials and equipment are limited by requirements of the contract documents and governing regulations. They are not controlled by industry traditions or procedures experienced on previous construction projects.

B. Materials and equipment shall be provided in accordance with the following:

1. Primary Design Products: Primary design products are those products around which the project was designed in terms of capacity, performance, physical size and quality.

   a. Primary design products are indicated by use of a single manufacturer's name, model number or similar data on drawings or schedules or within the specifications.
   b. Provide primary design products unless substitutions are made in accordance with the following paragraphs.

2. Acceptable Equivalent Substitutions: Acceptable equivalent substitutions are products of manufacturers other than those listed for the primary design products. Equivalent acceptable substitutions shall meet each of the following requirements:

a. The product shall be manufactured by one of the acceptable manufacturers listed in the Project Manual, drawings, or addenda.
b. The product shall meet or exceed the requirements of the contract documents in terms of quality, performance, suitability, appearance, and physical characteristics.
c. The Contractor providing the substitution shall bear the total cost of changes due to substitutions. These costs may include additional compensation to the Architect for redesign and evaluation services, increased cost of work by the Owner or other Contractors, and similar considerations.
d. Performance Requirements: Where the contract documents list performance requirements or describe a product or assembly generically, provide products that comply with the specific requirements indicated and that are recommended by the manufacturer for the respective application.
e. Compliance with Standards, Codes and Regulations: Where the specifications require only compliance with an imposed standard, code or regulation, the Contractor has the option of selecting a product that complies with specification requirements, including the standards, codes and regulations.

3. Proposed substitutions will be judged on the basis of quality, performance, appearance and on the governing space limitations. The reputation of the manufacturer, delivery time requirements, and the availability of repair or replacement parts may also be considered.
4. The Architect shall be the sole and final judge as to the suitability of substitution items.

1.12 SUBMITTALS

A. Bid Submittals

1. Qualification Data: For Installer.

a. A resumes of qualification shall be submitted with the Contractor's proposal indicating the following:

1) A list of five recently completed projects of similar type and size with contact names and telephone numbers for each.
2) Installer Qualifications

B. Pre-Approved Components Submittals

1. A Pre-Approved Components List has been provided to expedite the Shop Drawing Assembly and Review Process. Where these components are proposed by the contractor Submittal information can be simplified.
2. Include the Pre-Approved Components List indicating items selected to be provided in the project.

3. Provide equipment cuts for each item in addition to the components lists.

C. Shop Drawings, Product Data and Samples:

1. Other section in the Project Manual shall be adhered to if more stringent than the following paragraphs.
2. When required by other sections of this Project Manual, submit shop drawings, product data or samples to the Architect for review.
3. Submittals deemed unnecessary by the Architect shall be returned indicating "No Action Taken".
4. A completed copy of the transmittal form included with the Project Manual shall accompany each submittal.
5. Submittals shall be numbered consecutively.
6. Unless otherwise noted, submit one copy electronically of shop drawings and product data for review. Review comments will be returned electronically. A hard copy of the electronic submittal will be returned if requested.
7. Where samples are required, submit one (1) sample of each required item.
8. Shop drawings are drawings, diagrams, schedules and other data specifically prepared for this project by the Contractor, Manufacturer, Supplier, or Distributor to illustrate some portion of the work. Shop Drawings shall also detail fabrication and installation for metal and wood supports and anchorage for mechanical materials and equipment.

    a. Shop drawings shall be drawn to accurate scale and of adequate size to illustrate required details.
    b. Maximum sheet size shall be 30 inches by 42 inches. For each hard copy shop drawing sheet larger than 11 inches by 17 inches, submit one drawing on reproducible media.
    c. The Architect's action shall be indicated on the reproducible drawing and the drawing shall be returned to the Contractor.

9. Product data are illustrations, standard schedules, performance charts, instruction brochures, diagrams and other information furnished by the Contractor, Manufacturer, Supplier, or Distributor to illustrate a material, product or system for some portion of the work.
10. Samples are physical examples furnished by the Contractor, Manufacturer, Supplier, or Distributor to illustrate materials, equipment or workmanship and to establish the standards by which the work will be performed.
11. Each submittal shall clearly indicate proposed items, capacities, characteristics and details in conformance with contract documents. Equipment items shall be marked with the same item number as used on drawings or schedules. Capacities, dimensions and special features required shall be certified by the manufacturer.
12. Submittals shall indicate manufacturer's delivery time for the item after review by the Architect.
13. When required by other sections of this Project Manual, the Contractor shall submit a Specification Compliance Review consisting of a paragraph-by-paragraph review of the specifications and addenda with the following marked

for each paragraph. Markings may be made in the margins of the original specification or addenda. Unless a deviation or exception is specifically noted in the Specification Compliance Review, it is assumed that the equipment, product, or material is in complete compliance with the contract documents. Submit Specification Compliance Review with shop drawings and product data.

a. "C": Comply with no exceptions.
b. "D": Comply with minor deviations. For each deviation, provide the reasons for the deviation and how the intent of the specification can be satisfied.
c. "E": Exception. Equipment, product, or material does not comply. For each exception, provide reasons for the exception, and suggest possible alternatives for the Owner's consideration.
d. "N/A": The paragraph does not apply to the proposed equipment, product, or material.

14. The Architect shall review or take other appropriate action upon the Contractor's submittals such as shop drawings, product data and samples, but only to determine conformance with the design concept of the work and the information given in the contract documents.
15. Contractor shall not be relieved of responsibility for any deviation from the requirements of the contract documents by the Architect's review of shop drawings, product data or samples.
16. Contractor shall not be relieved from responsibility for errors or omissions in the shop drawings, product data or samples by the Architect's review of those drawings.
17. No portion of the work requiring submission of a shop drawing, product data or sample shall be commenced until the submittal has been reviewed by the Architect. Such portions of the work shall be in accordance with reviewed submittals.
18. The successful Contractor/Supplier may, at their option, obtain DXF or AutoCad DWG electronic drawing files on CD-ROM for use in preparation of shop drawings.

    a. This information is available from The Clark Enersen Partners subject to provisions of this specificaiton upon written request.
    b. The use of these drawing files is intended solely for the preparation of drawings as required by these contract documents.
    c. Any other use is strictly prohibited by copyright laws.
    d. The user of these electronic drawing files assumes full responsibility for their accuracy and scale.

D. Post-Construction Submittals

1. Field quality-control test reports.
2. Construction Record Drawings including station outlet numbers.

3. When required by specification sections, submit manufacturer's printed instructions for delivery, storage, assembly, installation, adjusting, and finishing, in quantities specified for shop drawings and equipment brochures.

1.13 QUALITY ASSURANCE

A. Match the wiring system installed in any existing facility and maintain the exisiting warranty. Provide the following warranties:

1. Systimax SCS, 20-year warranty.
2. CommScope Uniprise warranty.
3. Panduit Solutions warranty (Kooser Elementary ONLY).

B. The Contractor shall prepare and submit all required manufacturers performance warranty paperwork to the manufacturer and shall deliver all complete and final warranty information to the owner prior to project close-out.

C. The Contractor shall have an existing quality assurance and quality control plan for the installation. Upon request the Contractor shall submit a quality assurance and control plan for the project.

D. The Contractor shall have extensive experience (5+ years) with the specified manufacturers, hardware and cabling.

E. Installer Project Lead Qualifications: Shall be an experienced lead installer supervising the project and who is a Registered Communications Distribution Designer (RCDD) certified by the Building Industry Consulting Service International (BICSI) or alternatively substantiate a minimum of ten (10) years' experience with similar projects installing and commissioning telecommunications infrastructure solutions.

1. Only installers trained and certified by the manufacturer shall be allowed to terminate and test the products.
   Others may pull/place cable and product only if under the direct supervision of the lead installer.
2. Installer shall be experienced in all aspects of this work. Installer shall have the manufacturer s recommended number of employees on the job site to satisfy the warranty requirements of the specified end-to-end solutions. Projects of this size will require a minimum two (2) to a preferred quantity of Three (3) installers be trained to insure familiarity with the material installation requirements and the overall work quality effort.
3. Installer shall be certified by the system manufacturer for the project location to install and warranty product specified herein.

F. Installers seeking the opportunity to pursue Uniprise certification for the purpose of this project shall, prior to the bid date, notify LPS and in addition contact local CommScope representatives to arrange the appropriate product training. Training will include a combination of hands-on and on-line training to be completed prior to the bid date.

G. Requests for training shall be received in writing or by email to CommScope and LPS (Gordon Hardle: ghardle@lps.org) on or before 9:00 A.M., Friday May 2, 2014. It shall be the responsibility of the installer requesting training to confirm receipt, approval and payment. Requests shall be sent to Jerry Lampe – CommScope contact info: (jlampe@systimax.com , Cell: 402-203-6828, Office: 402-691-3010)

H. A Hands on training session will be held on Monday May 5 at Lincoln Public Schools at location to be determined) and time to be determined based on the requests for training. Online Training can begin in advance of the hands on however both online and hands on training shall be completed with CommScope prior 10:00 AM Wednesday May 7, 2014 in order to receive approval of the installers bid.

I. Training costs payable to CommScope in advance are estimated to be $895 per company with an additional charge of $500 per technician. Verify all training costs and requirements with CommScope

J. The Contractor must provide proof of installer qualifications, experience and certifications as an attachment to the Bid Proposal Form.

K. Installer project experience resumes and experience of the installers who will be assigned to the project will also be reviewed after the bid date but prior to approval of the bid to confirm all qualifications are met.

L. Installer Demonstration: After the bid is awarded and prior to the commencement of cable installation, installers may be requested to provide installation session to demonstrate installer qualifications. Demonstrations shall be arranged at a time acceptable and scheduled with LPS and the project consultants. As a minimum this demonstration work will include a patch panel installation, cable installation, wire management and field termination of up to twenty four (24) category 6 and/or 6A cables along with the installation of up to six (6) ST fiber optic connections to specified fiber optic cable. A copper and fiber optic testing demonstration of the above along with test report examples shall be included. All materials and equipment required for the demonstrations shall be per the specifications and shall be provided by the contractor. Installers performing the demonstrations shall be those assigned to the project installation

1.14 WARRANTIES

A. The Contractor shall warrant all materials, workmanship, and equipment against defects for a period of one year after the date of substantial completion. Certain equipment shall be warranted beginning at the time of final acceptance or for longer periods of time as specified in those sections of the Project Manual. The Contractor shall repair or replace, at no additional cost to the Owner, any item which may become defective within the warranty period. Any manufacturers warranties concerning any item installed will run to the benefit of the Owner. The Contractor agrees not to void or impair, or to allow Sub-Contractors to void or impair, any warranties regarding products or items installed as part of this project. The repair of faulty workmanship shall be considered to be included in the contract.

1.15 REFERENCE STANDARDS

A. The Contractors performance of work shall comply with applicable federal, state and local laws, rules and regulations. The Contractor shall give required notices, shall procure necessary governmental licenses, permits and inspections and shall pay without burden to the owner all fees and charges in connection therewith unless specifically provided otherwise. In the event of violation, the contractor shall pay all fines and penalties including attorney's fees and other defense costs and expenses in connection therewith.

B. Federal Communications Commission (FCC) registration or approval for any equipment requiring such approval shall be appropriately identified and obtained by the Contractor.

C. Comply with NFPA 70.

D. Design, manufacture, test and install communications cabling networks per manufacturer’s requirements, state codes, local codes, requirements of authorities having jurisdiction and particularly the following standards:

1. Comply with ANSI/TIA/EIA-568-B.1 Commercial Building Telecommunications Cabling Standard Part 1 General Requirements.
2. Comply with ANSI/TIA/EIA-568-B.2 Commercial Building Telecommunications Cabling Standard Part 2 Balanced Twisted-Pair Cabling Components.
3. Comply with ANSI/TIA/EIA-568-B.3 Optical Fiber Cabling Components Standard.
4. Comply with ANSI/TIA/EIA 569-A Commercial Building Standard for Telecommunications Pathways and Spaces.
5. Comply with ANSI/TIA/EIA 606(A) the Administration standard for the Telecommunications Infrastructure of Commercial Buildings.
6. Comply with ANSI/TIA/EIA 607(A) Commercial Building Grounding and Bonding Requirements for Telecommunications.
7. Comply with ANSI/TIA/EIA 526-7 Measurement of Optical Power Loss of Installed Single-Mode Fiber Cable Plant.
8. Comply with ANSI/TIA/EIA 526-14A Measurement of Optical Power Loss of Installed Multimode Fiber Cable Plant.
9. Comply with ANSI/TIA/EIA-758(A) Customer-Owned Outside Plant Telecommunications Standard.
10. TIA/EIA TSB 67 Transmission Performance Specifications for Field Testing of Twisted-Pair Cabling Systems.

E. Install cabling in accordance with the most recent addition of BICSI publications:

1. BICSI Telecommunications Distribution Methods Manual (TDMM)
2. BICSI Customer-Owned Outside Plant Design Manual (OSP)
3. BICSI Network Design Reference Manual (NDRM)
4. BICSI Wireless Design Reference Manual (WDRM)
5. BICSI Electronic Safety and Security Design Reference Manual (ESSDRM)

F. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

G. Federal, state, and local rules, regulations and ordnances governing the work as fully a part of the specifications as if herein attached. Where requirements of the drawings or specifications are more stringent than the applicable codes, rules, regulations and ordinances the specifications shall apply.

1. American Society for Testing and Materials (ASTM): ASTN E.814 - Fire Tests of Through-Penetration Firestops.
2. Underwriters Laboratories, Inc. (UL): U.L. 1479 - Fire Tests of Through-Penetrations Firestops.
3. National Fire Protection Association (NFPA): NFPA 70 - National Electrical Code.
4. Americans with Disabilities Accessibility Guidelines (ADA)
5. Code of Federal Regulations, Title 29, Chapter XVII, part 1910 (OSHA).
6. Uniform Building Code (UBC).
7. International Building Code (IBC).

1.16 COORDINATION

A. Coordinate and schedule all construction work with the General Contractor prior to beginning work. Do not interrupt building activities without strict coordination with the General Contractor. Unscheduled appearance to work in the spaces without prior scheduling with the General Contractor is not allowed.

B. The Contractor shall attend all meetings as required by the General Contractor.

C. Convene a meeting one week prior to commencing the work of this section.

1. Agenda:

a. Tour, inspect and discuss building conditions related to the structured cabling system.
b. Review submittals both completed and yet to be completed.
c. Review plans, specifications and proposed equipment.
d. Review construction schedule, availability of materials, personnel, equipment and facilities needed to proceed without delay.
e. Review required inspections and testing.
f. Review cable routing, cable support, primary pathways and communications spaces location and environmental conditions.

D. The Contractors Project Manager must be available on-site when needed and readily available.

E. Coordinate layout and installation of voice and data communication cabling with Owner's telephone switch, telephone instrument, workstation, telecommunications and LAN

equipment suppliers. Coordinate service entrance arrangement with local exchange carrier where new services are necessary (new construction).

F. Meet jointly with the design engineers, telecommunications and LAN equipment suppliers, local exchange carrier representatives, LPS Facilities and LPS Computing Services to exchange information and agree on details of equipment arrangements and installation interfaces.

G. Record agreements reached in meetings and distribute to other participants.

H. Adjust arrangements and locations of distribution frames, cross-connect blocks, and patch panels in equipment rooms and telecommunications rooms to accommodate and optimize arrangement and space requirements of telephone switch and LAN equipment.

I. Coordinate chases, slots, inserts, sleeves, and openings with general construction work and arrange in building structure during progress of construction to facilitate the electrical installations that follow.

J. Fully examine the drawings and specifications for other trades and coordinate the installation of telecommunications work with the work of the other trades. Consult and cooperate with the other trades for determining space requirements and for determining that adequate clearance is allowed with respect to his equipment, other equipment, and the building.

K. Coordinate installation of telecommunications cabling with the raceway installer. Verify raceways are installed according to current EIA/TIA standards before installing cable.

L. Environmental Conditions: Do not deliver or install cables and connecting materials to the installation location until areas are complete and dry and temporary HVAC systems are operating and maintaining acceptable ambient temperature and humidity conditions for the remainder of the project.

M. Provide offsets and elevation changes in cable trays, conduit and devices as required to complete the Layout and Coordination Process. Offsets and elevation change information shall be indicated in the coordination process documentation and must be submitted for review.

1.17 STRUCTURAL COORDINATION

A. In cases where the Contractor determines that superimposed loads such as suspended or floor mounted mechanical, electrical, plumbing system or equipment exist which exceed design loads indicated on structural contract documents, Contractor shall submit load data to Design Professionals for review prior to proceeding with work.

B. Distribute the maximum load hung from any structural member for mechanical, electrical, plumbing, ductwork, piping, etc. over the member’s tributary area in a way that the design superimposed dead loads listed in structural contract documents are not exceeded. The Contractor shall coordinate the loads and provide additional support or distribution framing as required achieving the allowable load distribution.

C. Connections of systems designed by Contractor's engineer such as, but not limited to mechanical, electrical, plumbing loads are assumed to impose vertical and/or horizontal loads on the base building structural members without generating torsion in the supporting structural members. Contractor is responsible for furnishing and installing all supplementary bracing members as required to prevent torsion on the base building structure.

1.18 OPERATING TRAINING [NOTE: COORDINATE TRAINING NEEDS WITH LPS]

A. Complete operating instructions for each system and item of equipment shall be provided to the Owner s designated personnel. Operation and maintenance manuals must be reviewed and accepted by the Architect/Engineer and provided to the Owner prior to operating training. Training shall be scheduled at the convenience of the Owner. A minimum of 2 hours of training shall be provided.

B. In addition to the instructions required above, wherever possible the Contractor shall perform the operations being described in order to fully illustrate system operation.

C. At the completion of training, the Contractor shall turn over to the Owner all required keys and special tools for installed equipment. Each key or tool shall be labeled with its use.

D. Train Owners maintenance personnel in cable-plant management operations including, but not limited to, rerouting signals in failed cables.

PART 2 PRODUCTS

2.1 PERFORMANCE, CAPACITIES AND CHARACTERISTICS

A. See Drawings for Equipment Schedules for Equipment Performance Requirements when capacities and characteristics are not indicated in the specifications.

2.2 MATERIALS

A. Unless otherwise specified, all materials and equipment shall be new, unused, and undamaged. Materials and equipment shall be the current and standard designs of manufacturers regularly engaged in their production and shall bear the UL listing, or listing by other recognized testing laboratory when such listings are available. Materials shall be free of damage or corrosion and shall be of the best quality obtainable for the purpose intended.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following pre-approved manufacturers. All cabling and connectivity components shall be coordinated in a coordinated solution to provide the specified solution warranties:

1. Copper Horizontal Cable and Patch Cords:

a. CommScope

b. Systimax Connectivity Solutions
c. Panduit

2. Fiber Optic Cable:

a. CommScope.
b. Systimax Connectivity Solutions.
c. Panduit

3. Broadband Coaxial Cable:

a. Belden.
b. CommScope.
c. Mohawk.
d. CCT

4. Copper Termination Equipment:

a. CommScope.
b. Systimax Connectivity Solutions.6.
c. Panduit

5. Fiber Termination Equipment:

    a. Commscoope
    b. Systimax Connectivity Solutions.
    c. Panduit

6. Copper Splice Equipment:

    a. Commscope.
    b. Raychem.
    c. Systimax Connectivity Solutions.
    d. 3M.

7. Fiber Optic Splice Equipment:

    a. Commscope
    b. Systimax Connectivity Solutions.
    c. 3M.

8. Telecommunications Racks:

    a. B-Line.
    b. Chatsworth.
    c. Commscope
    d. Homaco.
    e. Systimax Connectivity Solutions.
    f. Panduit

9. Cable Trays for Telecommunications Rooms and Entrance Facilities:

    a. [B-Line.]
    b. Cabofil.
    c. GS Metals.

10. Firestopping Materials:

    a. Metacaulk.
    b. Nelson Fire Stop.
    c. Specified Technologies, Inc.
    d. 3M Fire Protection Products.
    e. Tremco Sealants and Coatings.
    f. Hilti
    g. EZ Path

11. Innerduct:

    a. Arnco.
    b. Carlon.
    c. Endot.
    d. Maxcell Fabric Innerduct.
    e. Pyramid.

12. Mounting Elements:
    a. B-Line.
    b. Chatsworth.
    c. Erico.
    d. Homaco.
    e. Senior Industries.

13. Metallic Surface Raceway:

    a. Hubbell.
    b. Panduit.
    c. Wiremold.

14. Cable Management and Support:

    a. B-Line.
    b. Cabofil.
    c. Chatsworth Products.
    d. Erico/Caddy.
    e. Great Lakes Case and Cabinet.
    f. GS Metals.
    g. Homaco.
    h. Panduit.
    i. Senior Industries.
    j. Tyton.
    k. Velcro Brand.

15. Access Doors

    a. J.L. Industries
    b. Karp Associates
    c. Larsons Manufacturing
    d. Micor, Inc.
    e. Miller Limited
    f. Nystrom Inc.

16. Audiovisual (AV) Gear Box

    a. Premier Mounts

17. HDMI Cables
    a. Monoprice

2.3 COMPLETENESS OF WORK

A. The contract documents depict low voltage systems which are intended to be complete and functioning systems. All products, labor and programming necessary to render a full and functional system to fulfill the design intent shown on the documents shall be provided by the Contractor.

B. Catalog numbers referenced throughout the drawings and specifications are intended to convey the understanding of the type and quality of the product required. Where written descriptions differ from information conveyed by a catalog number the written description shall govern. No extra charge will be allowed because a catalog number is found to be incomplete or obsolete.

2.4 MATERIALS AND EQUIPMENT FURNISHED BY OTHERS

A. Where materials and equipment are indicated as furnished by others and installed or connected under this contract, it shall be the Contractor's responsibility to verify installation details and requirements.

2.5 QUANTITY OF SPECIFIED ITEMS REQUIRED

A. Wherever in these specifications an article, device or piece of equipment is referred to in the singular number; such reference shall apply to as many such articles as are shown on the drawings or required to complete the installation.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine pathway elements intended for cables. Check raceways, cable trays, and other elements for compliance with space allocations, installation tolerances, hazards to cable installation, and other conditions affecting installation. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Wiring Method: Provide wiring in conduit, raceway and cable tray except within consoles, cabinets, desks, and counters and except in accessible ceiling spaces and in gypsum board partitions where unenclosed wiring method may be used. Conceal raceway and cables except in unfinished spaces.

B. Use UL-listed plenum cable in environmental air spaces, including plenum ceilings.

C. Existing Buildings:

1. Relocation of any existing telecommunications equipment within a closet shall be provided by the Owner and shall be coordinated with the Owner.
2. Arrange for moving of furniture to access outlet in the work area.
3. Protect the existing electronics, cables, and enclosures from possible damage as there are active circuits and equipment in the building.

D. Install cables using techniques, practices, and methods that are consistent with Category rating of components and that ensure Category performance of completed and linked signal paths, end to end.

E. Install cables without damaging conductors, shield, or jacket.

F. Furnish tools and test equipment. Provide all specified materials, installation hardware, and labor required to complete work shown on drawings and specified in this Section.

This shall include work and miscellaneous items not specified but necessary to build a complete telecommunications installation including test equipment accessories and appurtenances required for testing the system. All systems shall be complete and ready for operation.

G. Use cable bundling hardware rated for the environment and application in which used. Applications include, but are not limited to, general purpose, outdoor, chemical resistant, flame retardant, high temperature, and vibration.

H. Provide reusable cable management straps for bundling and securing cables. Do not use nylon cable ties.

I. Do not bend cables, in handling or in installing, to smaller radii than minimums recommended by manufacturer.

J. Pull cables without exceeding cable manufacturer's recommended pulling tensions.

K. Install exposed cables parallel and perpendicular to surfaces or exposed structural members and follow surface contours where possible.

L. Secure and support cables at intervals not exceeding 48 inches and not more than 6 inches (150 mm) from cabinets, boxes, fittings, outlets, racks, frames, and terminals.

M. Wiring within Wiring Closets and Enclosures: Provide conductors of adequate length.

N. Train conductors to terminal points with no excess.

O. Separation of Wires: Comply with TIA/EIA-569-A rules for separating unshielded copper voice and data communication cabling from potential EMI sources, including electrical power lines and equipment.

P. Make splices and terminations only at indicated outlets, terminals, cross-connects, patch panels, and splices.

Q. Use splice connectors compatible with media types.

3.3 FIRESTOPPING

A. Firestop all smoke and fire rated walls, partitions and openings after the installation of communications cabling in sleeves and pathways. Firestop material shall be approved for use with the communications cables and jackets being installed.

3.4 RECORD DRAWINGS

A. Maintain current documents at the construction site.

B. Record drawings shall include all information required for shop drawings and, in addition, shall indicate the following:

1. Routing of cables between communications rooms and from communications rooms to entrance facilities.
2. Revisions to construction documents (addenda and field changes).
3. Record drawings shall include all construction changes posted to all portions of the documents including but not limited to communications floor plans, expanded plans, wall and rack elevations, schematics, labeling and installation details. Record documents shall include and clearly show final cable labeling designations down to the individual outlet and port.
4. Record drawings shall be complete and organized to be suitable for use as disaster recovery and cable infrastructure administration documents.

C. Post a complete set of record documents in the MDF serving the project. In each MDF/IDF post a final floor plan of the outlets served by each IDF on the wall behind a protective plexi-glass wall frame.

3.5 TRENCHING, EXCAVATION, BACKFILLING AND REPAIRS

A. Trenching, excavation, backfilling and repairs are the responsibility of the Contractor. Coordinate the extent of all work wit the General Contractor where applicable and coordinate related work with all trades. Failure to properly coordinate this effort resulting in additional trenching, excavation, backfilling or repairs shall be performed at no additional cost by the contractor.

3.6 OBSERVATIONS

A. Specifications and drawings represent work to be done in view of the total project requirements. Final locations of all conduits, jacks, outlets, racks, components etc. to eliminate possible conflict with other trades is the responsibility of this contractor. Contractor to provide all project management and supervision required for his personnel to insure installation is made in accordance with the plans and specifications and that all codes, safety rules and regulations are observed. In the event of conflicts with other trades, this Contractor is to make every reasonable effort to resolve the conflict with other trades involved, by preparation of drawings or sketches or by other appropriate action. Only after this on-site coordination has taken place, and a resolution cannot be found, is the Contractor to request assistance. Assistance shall be requested in adherence with the RFI process defined for this project.

3.7 DEMONSTRATION

A. Participate in project site observations, walk-throughs and punch lists as requested by the owner or the Architect/Engineer.

B. Demonstrate completeness of work relative to completion percentages submitted for payment.

3.8 CLEANING

A. After completing system installation, including outlet fittings and devices, inspect exposed finish.

B. Remove burrs, dirt, and construction debris and repair damaged finish, including chips, scratches, and abrasions.

3.9 TELECOMMUNICATIONS SUBMITTAL SCHEDULE

Section Number	Section Name	Product Data	Shop Drawings	Maintenance Data	Qualifications	Warranty	Test Reports
27 05 01	Common Work Results for Communications					X	
27 05 27	Grounding and Bonding for Communications Systems	X	X	X	X		X
27 05 28	Pathways for Communications Systems						
27 05 53	Identification for Communications Systems	X	X	X			
27 11 01	Communications Room Fittings	X	X	X			
27 13 23	Communications Optical Backbone Cabling	X	X	X	X		X
27 13 43	Communications Services Cabling	X	X	X			X
27 15 13	Communications Copper Horizontal Cabling	X	X	X	X		X
27 15 43	Communications Faceplates and Connectors	X	X	X			

END OF SECTION 270501