MOODY•NOLAN INC.
300 SPRUCE STREET
COLUMBUS, OHIO 43215

BID OPENING: May 09, 2016 ADDENDUM DATE: May 4, 2016
REVISED BID OPENING: May 12, 2016

ADDENDUM NO. 2

TO THE PLANS AND SPECIFICATIONS FOR:

CITY OF DUBLIN
SERVICE CENTER ADDITION/RENOVATION
6555 SHIER RINGS ROAD
DUBLIN, OHIO 43016

TO ALL BIDDERS:

Addendum No. 2 to the Drawings and Project Manual, dated April 14, 2016, for City of Dublin Service Center Addition / Renovation, as prepared by Moody Nolan, Inc., 300 Spruce St. Suite 300, Columbus, OH 43215.

Acknowledge receipt of this Addendum on the Form of Proposal.

This Addendum supplements and amends the original plans and specifications and shall be taken into account in preparing proposals and shall become a part of the Contract Documents.

NOTE: Bidders are responsible for becoming familiar with every item of this Addendum.

I. BID QUESTIONS

Question 1: Coded note 13 on sheet C1.1 states to remove the existing 6" water line. Please clarify the limits of the water line removal.

See revised sheet C1.1

Question 2: Coded note 6 on sheet C1.2 references a detail on sheet C4.1 for a curb cut. There is no curb cut detail on sheet C4.1. Please provide this detail.

See sheet C4.1. Curb cut detail is at the bottom left.

Question 3: Please provide a detail of the existing curb/curb & gutter that we are to match per coded note 1 on sheet C1.2.

Field measure existing curb and match.

Question 4: Please confirm that the 12" storm line shown on sheet C2.1, south of the

new parking lot is to be part of Alternate #3 pricing.

The 12" storm line is part of base bid. It will be installed even if Alternate #3 is not accepted.

Question 5: Specifications call for waterproofing only to be located where floor slab is below grade, however in some details of the drawings i.e. details 2 & 4 on sheet A5.01 waterproofing is shown below the floor slab. Please confirm all locations waterproofing is to be placed on this project.

Provide waterproofing from top of footing to top of CMU foundation wall for all masonry foundation walls at the building addition. This is especially important for the foundation walls adjacent to the retention pond on the east side of the building.

See revision to Section 07 10 00 below.

Question 6: Are the south foundations of the building to receive waterproofing.

Yes. See response to Question 5 above.

Question 7: Please confirm the head and jamb details of door 139 and EX03. Currently the details show hollow metal frame with an aluminum door.

Door 139 – see head detail 7/A7.01 and jamb detail 8/A7.01.
Door EX03 – see revised details 3/A7.01 and 4/A7.01

Question 8: Are doors EX01, EX02, and EX03 new or existing doors to remain as is.

EX01, EX02 and EX03 are new doors. "EX" prefix indicates exterior door.

Question 9: Please confirm whether the TPO roof areas are to receive an insulated concrete topping as indicated in details on sheet A1.35 or rigid board insulation as indicated in the specifications.

TPO roof areas shall receive rigid board insulation as indicated in the specifications.

Question 10: Is spray-applied fireproofing required on the project. If so, please confirm the locations and provide specifications.

Spray-applied fireproofing is not required.

Question 11: Specification Section 23 90 10 references an Alternate 4 to provide McQuay single zone VAV rooftop units. Please clarify if the intent is that this pertains to RTU-5 and 6 only, and that all base bid RTUs are to be Carrier.

Alternate 4 shall be for removal and replacement of RTU-5 and 6. The units shall be the same manufacturer as the base bid units.

Question 12: In the specifications, there are specs for marker board, projection screens, TV mounting brackets, and roller window shades. These items are not shown on the

drawings. Please clarify if these items are part of this project.

Marker boards, projection screens and TV mounting brackets will be purchased are not part of this project. The items will be purchased and installed by the Owner.

Roller window shade locations were clarified in Addendum #1.

Question 13: Coded note on sheet A1.11, A1.12, A1.13, A1.21, and A1.22 states to provide in-wall blocking as directed by architect. Please clarify or provide an allowance for the amount of blocking that will be needed at these locations.

Where indicated on the plans by coded note 24, assume 24" wide blocking from 56" AFF to 80" AFF. FRT plywood or 16 Ga. metal strapping is acceptable. Assume blocking length to be one-half of lineal footage of each indicated wall.

Provide 2x FRT wood blocking at casework.

Question 14: The (structural steel) specifications state that you must be A.I.S.C. certified, what is the possibility of getting this requirement waived?

This requirement will not be waived. Fabricator must be A.I.S.C. certified.

Question 15: How many cables are wanted per data/communication outlet?

Two data drops per outlet (unless specifically noted otherwise)

Question 16: Is it a plenum or non-plenum space?

Plenum-rated cabling is to be used

Question 17: Please clarify if the new wood doors are to be FSC Certified.

FSC Certification is not required.

Question 18: Please confirm that all the DIRTT Wall Systems are to be removed, relocated, and reinstalled by the Owner.

Yes, all DIRTT Wall Systems to be salvaged and reused will be removed, relocated and reinstalled by the Owner.

Question 19: Please clarify the extent of the existing floor finish demolition on the 1st floor and mezzanine.

See revised sheets AD1.12, AD1.13 and AD1.22.

Question 20: Is the breakdown of the parking lot and entrance drive for accounting purposes only? Or, can the Owner select a contractor for the building work and a separate contractor for the parking lot and entrance drive work?

The breakdown is for accounting purposes only. The building work and parking

lot/entrance drive work will be awarded to the same contractor.

Question 21: Section 07 41 13 Metal Roof Panels 2.04/A states IMETCO series S300 and DMI SL2016 are acceptable metal roof panels. These panel profiles do not seem to match the existing roof profile. Is this acceptable?

Design intent is to match the existing metal roof as closely as possible. See revision to Section 07 41 13.

Question 22: On sheet S102 all of the new columns are indicated to be HSS5x5x1/4" but detail 1/S302 depicts the columns as I-beams. Please clarify the steel connections for the tube steel columns.

Sheet S102 is correct. See revised details on sheets S302 and S303.

Question 23: Drawing S201; there are no connection details for the K bracing.

See revised sheet S201.

Question 24: Please be advised that details 1 and 2 on S302 are for WF columns of which there are none. They are all HSS columns. Therefore no real details as to Beam to Column connections.

See revised details on sheets S302 and S303.

Question 25: The Vestibule on S102. No elevation (top/steel). Architecturals do not show as well, other than top of wall at 110'-8". Column sizes are not shown on S201. There are no connection details as well.

Top of steel elevation is 109'-6". See revised sheet S102.

Question 26: Electrical drawings provide general notes and a coded notes legend on the right hand side of the documents. General notes and legends do not appear on the Fire Suppression, Plumbing or HVAC drawings. Please provide coded notes for all of the fire suppression, mechanical and plumbing work.

Refer to sheets FP0.01, P0.01 and H0.01 for general notes / legends for Fire Protection, Plumbing, and HVAC.

Fire suppression, mechanical and plumbing work is described with text notes on each plan in lieu of coded notes.

Question 27: No hot water heater is shown on the plans. Please confirm that we are tying the hot water supply and return to an existing hot water loop.

Refer to sheet P0.01 for water heater information. Detail for water heater is on P5.01. The water is located on the second floor janitor's closet by the restrooms (sheet P1.21).

Question 28: The drawings do not show any additional gas line work. Please confirm that there are existing gas lines at all RTU locations, and that no additional work will be

required to extend them to new locations.

There is no major gas work. The contractor needs to disconnect the existing gas lines and reconnect the gas lines to the new units.

Question 29: Please provide routing of all refrigerant lines, as none are shown on the drawings.

Per the note on the drawings, the stairwell unit refrigerant piping shall be extended up above the mezzanine ceiling and over to condensing unit located on grade by the new RTU. The IT AC-2 unit refrigerant piping can be extended above the first floor ceiling (restroom core) over to the condensing unit by the RTU.

Question 30: Reference Roof Framing Plan S103, Column Schedule S201, and Section 3 on A4.01. According to the structural drawings, the bearing elevation of the Column Line 3 Beams is 120'-6" which conflicts with clear space above lay-in ceiling shown on A4.01. Please confirm the height of the truss bearing beams on Column Line 3.

The truss bearing beams can run through the clear space. Bearing elevation for beams along Column Line 3 is 124'-9". See revised sheet S103.

Question 31: Refer to drawing A9.10. Coded note 2 conflicts with finish schedule calling to paint walls in Rooms 220-235. Please clarify if walls in these rooms are to be painted.

The finish schedule is correct. Walls in Rooms 220-235 are to be painted.

Question 32: Please confirm all exposed ceilings are to be painted, and what schedule of paint is to be used.

Refer to specification section 09 91 00 Painting for paint schedule for exposed ceilings and Sheets A9.11 & A9.12, General Finish Plan Notes No. 5 – "Paint exposed ceilings, including all ductwork, structure, etc., P-6 in the addition only."

Question 33: Refer to Reflective Ceiling Plans: Please clarify if Coded Note 2 "Open to Above" is to mean exposed ceiling above.

Where Coded Note 2 is applied on the RCPs, "open to above" refers to the exposed ceiling/roof structure in the existing building to be renovated.

II. GENERAL REVISIONS

A. Invitation to Bid

1. The Bid Date has been changed to 2:00 p.m. (local time), Thursday, May 12, 2016.

2. The Architect's Base Bid Estimate has been changed to $3,046,000. This increase includes a $75,000 estimate for the front parking lot and entry drive milling/resurfacing scope of work.

B. General

1. All bid questions received to date are addressed herein or in Addendum 1. No subsequent addenda will be issued.

2. The Contractor should be prepared for a scope review meeting next Friday, May 13. Time to be determined.

III. SPECIFICATION REVISIONS

A. Section 07 10 00 – Waterproofing

1. Paragraph 1.01A: Change to read as follows:

1. Wall areas where floor slab is below grade; **masonry foundation wall, where indicated on the drawings**: Semi-liquid or sheet membrane, Contractor's option.

B. Section 07 41 13 – Metal Roof Panels

1. Article 2.03: Change to read as follows:

"2.04 MANUFACTURER AND DESIGN

A. Subject to compliance with the specified requirements, roofing systems by the following manufacturers are acceptable:

1. IMETCO
2. DMI
3. AEP-SPAN.
4. FABRAL
5. CENTRIA
6. BERRIDGE
7. FIRESTONE

B. Design roofing system in accordance with the dimensions and general arrangements indicated on the drawings.

C. Clarification: Appearance of proposed roofing system is to match existing roof as closely as possible in finish, texture, height of standing seam and width of panels."

B. Section 10 11 00 – Visual Display Surfaces: Delete this section entirely.

C. Section 11 52 13 – Projection Screens: Delete this section entirely.

D. Section 11 52 23 – Television Mounting Brackets: Delete this section entirely.

E. Section 26 36 23 – Transfer Switch

1. Kohler shall be an acceptable manufacturer for ATS

F. Section 27 12 00 – Communications Horizontal Cabling

1. Section revised throughout. A copy is attached hereto.

IV. DRAWING REVISIONS

CIVIL

A. C1.0 – Site Layout Plan

1. Revise parking lot addition as shown in clouded area.

B. C1.1 – Site Demolition Plan

1. Added dimensions to clarify extent of water line removal limit

C. C1.2 – Site Layout Plan

1. Revise parking lot addition as shown in clouded area.

D. C2.1 – Site Grading & Utility Plan

1. Revise parking lot addition as shown in clouded area.

STRUCTURAL

E. S102 – Mezzanine Framing Plan

1. Entry Vestibule Roof Framing – top of structural steel el. **109'-6"**

F. S103 – Roof Framing Plan

1. Revise top of steel elevation to **124'-9"** for beams along column line 3.
2. Revise elevations for beams along column line E as shown.

G. S201 – Column Schedule

1. Revise columns E-2 and E-3 as shown.
2. Add details 5, 6 and 7 to the sheet.

H. S302 – Framing Details
1. Revise details 1 and 2 as shown

I. S303 – Roof Framing Details
1. Add detail 4 to the sheet

ARCHITECTURAL

J. AD1.12 – First Floor Demolition Plan – Area ‘B’

1. Revise to show extents of finish floor demolition

K. AD1.13 – First Floor Demolition Plan – Area ‘C’

1. Revise to show extents of finish floor demolition

L. AD1.22 – Mezzanine Level Demolition Plan – Area ‘B’

1. Revise to show extents of finish floor demolition

M. A1.11 – First Floor Plan – Area ‘A’

1. Revise coded note 24, **56”** to 80” AFF.
2. Detail 3/A1.11 – Revise blocking width from 8”-12” to **24”**

N. A1.35 – Roof Details

1. Detail 1/A1.35 – Delete spray-applied fireproofing from detail.
2. Detail 2/A1.35 – Revise to show tapered roof insulation on metal roof deck in lieu of insulated concrete topping.
3. Detail 3/A1.35 –
   i. Revise to show tapered roof insulation on metal roof deck in lieu of insulated concrete topping.
   ii. Revise scupper detail reference to **4/A1.35**

O. A2.21 – Mezz / Upper Level RCP – Area ‘A’

1. In Open Office 200 and Open Office 212, delete soffits along column line 3 and references to details 2/A2.21 and 3/A2.21.
2. Details 2 & 3 are not used. Remove from sheet.

P. A5.01 – Wall Sections

1. Sections 1, 2, and 4, and Detail 5 – Revise note to clarify “Waterproofing – from top of footing to top of floor slab, typ.”

Q. A5.02 – Wall Sections

1. Section 2/A5.02 – Add note to clarify “Waterproofing – from top of footing to top of floor slab.”

R. A7.01 – Door Schedules

1. Schedule – EX03, reference head detail 3/A7.01 and jamb detail 4/A7.01

2. Schedule – 139, reference head detail 7/A7.01 and jamb detail 8/A7.01
3. Revise details 3/A7.01 and 4/A7.01 to show aluminum door and frame in lieu of hollow metal frame

S. A9.10 – Finish Details / Schedule

1. Revise Coded Remark No. 2 to “Existing floor in this area to remain. Floor finishes damaged during construction to be replaced to match existing adjacent finish.”

PLUMBING

T. P1.21 – Mezz Level Domestic Hot & Cold Water Plan – Area ‘A’

1. Clarify water heater location

ELECTRICAL

U. ED1.12 – First Floor Electrical Demo Plan – Area B

1. Phase I plan added to clarify demo to facilitate Area A work
2. Phase 2 work revised to facilitate new egress door

V. ED1.13 – First Floor Electrical Demo Plan – Area C

1. Alternate #2 scope of electrical work added to plan

W. E2.11 – First Floor Power Plan – Area A

1. General Note F added to clarify data drops
2. IDF Room T109 Detail Plan added to break out details from floor plan
3. Devices added in room T109, and communications pathways added
4. Access control devices added
5. Floor devices where no furniture is shown have been deleted
6. Conference room data outlets clarified

X. E2.12 – First Floor Power Plan – Area ‘B’

1. General Note F added to clarify data drops
2. Access control devices added
3. Floor devices where no furniture is shown have been deleted
4. Data outlets in powered furniture added
5. Existing racks and pathways in MDF added for reference, with new equipment called out

Y. E2.13 – First Floor Plan – Area C

1. General Note F added to clarify data drops
2. Alternate #2 scope of power/data work added

Z. E2.21 – Mezz Level Power Plan – Area A

1. General Note F and notation on drawings added to clarify data drops
2. Exterior surveillance cameras added
3. Access control devices added
4. Data outlets in powered furniture added
5. Poke through designations updated to reflect changes in Floor Device Legend
6. Communications pathways added

AA. E2.22 – Mezz Level Power Plan – Area B

1. General Note F added to clarify data drops
2. Existing communications pathways added for reference

BB. E4.02 – Electrical Panel Schedules

1. Panels revised per changes herein

CC. E5.01 – Electrical Schedules and Details

1. Floor Device Legend updated to coincide with revised power plans
2. Fixtures S3, S4, and T1 added to light fixture schedule
3. Equivalent manufacturers, electrical characteristics, and remarks added to Light Fixture Schedule
4. IDF T109 Voice/Data Frame Elevation added to clarify equipment and cabling per specifications.

V. ATTACHMENTS

A. Specifications: 27 12 00 Communications Horizontal Cabling

B. Civil: C1.0, C1.1, C1.2, C2.1

C. Structural: S102, S103, S201, S302, S303

D. Architectural: AD1.12, AD1.13, AD1.22, A1.11, A1.35, A2.21, A1.35, A5.01, A5.02, A7.01, A9.10

E. Plumbing: P1.21

F. Electrical: ED1.12, ED1.13, E2.11, E2.12, E2.13, E2.21, E2.22, E4.02, E5.01

END OF ADDENDUM

SECTION 27 15 00

COMMUNICATIONS CABLING

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY OF WORK

A. Section Includes:
1. Fiber Optic backbone cabling.
2. Pre-terminated fiber optic assemblies
2. UTP cabling.
3. Multiuser telecommunications outlet assemblies.
4. Cable connecting hardware, patch panels, and cross-connects.
5. Telecommunications outlet/connectors.
6. Cabling system identification products.
7. Cable management system.
8. Grounding.

B. The Contractor shall furnish, install, terminate, label, test, certify, and document fiber optic and UTP backbone cables from the existing MDF to the new IDF as specified herein and shown on the drawings. The Contractor shall include patch panels and backbone termination equipment at both ends of the new backbone cabling.

C. The Contractor shall furnish, install, terminate, label, test, certify, and document all horizontal station cables, workstation outlets, patch panels, jacks, patch cables, station cords, and accessories as specified herein and shown on the drawings.

D. All work shall be performed in accordance with the manufacturer's published installation standards and guidelines.

E. Prior to the start of work, the Contractor shall submit a copy of a written Agreement they have with the cabling system manufacturer stating that the manufacturer will inspect and certify the installation for a 25-year extended warranty.

F. The Contractor shall submit in writing a letter identifying which portions of the cabling plant are included in the 25-year extended warranty and which portions are not. The Contractor is responsible for workmanship and installation practices in accordance with the Panduit cabling solutions Certified Program. The

Contractor shall fulfill all requirements under the Panduit Cabling Solutions Certified Program. At least 30 percent of the installation and termination crew must be certified by Panduit with a Technicians Level of Training. Also, Panduit must certify 10 percent of the installation and termination crew for Optical Fiber Training.

G. At the completion of the cable plant installation and successful testing of the installed cabling system, the Contractor will provide the Owner with all test reports on each strand of fiber and full warranty documentation.

H. For Reference of the drops or work area outlets, each Standard drop will consist of two (2) terminations that can be interoperable to accommodate either voice or data applications.

I. Install, terminate, test, and guarantee each drop according to applicable standards and these specifications.

J. Horizontal cables will be rated Cat 6 enhanced in performance rated to connector outlets at the work area. The Horizontal cables will home run back to a floor serving telecommunications room (IDF) and will terminate on individual Cat 6 enhanced rated jacks to populate a modular 48 port angled patch panel. All cables will be patched at cutover as an interconnection into the floor serving active equipment using RJ45 modular equipment cables rated to Cat 6 enhanced.

K. The existing Main Telecommunications Room (MDF) will be interconnected to the new Telecommunications Room (IDF) serving data equipment via a fiber backbone with supplemental UTP backbone terminated in 19” rack mounted 48 port enclosures which will utilize LC connections for fiber optic cable and RJ45 patch panels for UTP cable. The new backbone cabling will serve to connect the Main Telecommunications Room to an additional Telecommunications Room serving the locations that exceed the distance limitations (90 meters) of the Main Telecommunications Room for the horizontal Data and Voice drops.

1.03 DEFINITIONS

A. BICSI: Building Industry Consulting Service International.

B. Cross-Connect: A facility enabling the termination of cable elements and their interconnection or cross-connection.

C. EMI: Electromagnetic interference.

D. IDC: Insulation displacement connector.

E. LAN: Local area network.

F. MUTOA: Multiuser telecommunications outlet assembly, a grouping in one location of several telecommunications outlet/connectors.

G. Outlet/Connectors: A connecting device in the work area on which horizontal cable or outlet cable terminates.

H. RCDD: Registered Communications Distribution Designer.

I. UTP: Unshielded twisted pair.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordinate layout and installation of telecommunications cabling with Owner's telecommunications and LAN equipment and service suppliers.

B. Coordinate telecommunications outlet/connector locations with location of power receptacles at each work area.

C. Coordinate project schedule and sequencing with the prime contractor and other trades to maintain all critical path sequences.

1.05 ACTION SUBMITTALS

A. Shop Drawings:
   1. System Labeling Schedules: Electronic copy of labeling schedules, in software and format selected by Owner.
   2. System Labeling Schedules: Electronic copy of labeling schedules that are part of the cabling and asset identification system of the software.
   3. Cabling administration drawings and printouts.
   4. Cross-connects and patch panels. Detail mounting assemblies, and show elevations and physical relationship between the installed components.

1.06 INFORMATIONAL SUBMITTALS

A. The Listing of three (3) projects of similar size and scope as described in Section 1.4 "Quality Assurance"

B. Qualification Data: For Installer, qualified layout technician, installation supervisor, and field inspector. Include Resume of RCDD, BICSI with Certified Telecommunications Installer Certificate(s).

C. Source quality-control reports.

D. Field quality-control reports.

1.07 CLOSEOUT SUBMITTALS

A. Maintenance Data: For splices and connectors to include in maintenance manuals.

B. Upon completion of work, the Contractor shall provide as-built drawings showing cable routes, outlet locations, connectivity codes and labels, telecom room layouts, and any other devices or items involved in the project.

C. All applicable testing documentation.

D. Warranty documentation

1.08 QUALITY ASSURANCE

A. Installer Qualifications: Cabling Installer must have personnel certified by BICSI on staff.

1. Installer shall have at least 5 years of successful installation experience on projects of similar size and scope and provide three (3) references for past installations of similar size and scope. References should include the following:
   a. The. Installation start and finish dates.
   b. Brief description of project scope (include quantity of horizontal cables).
   c. Customer's contact information.

2. Installer shall have on staff a Registered Communications Distribution Designer (RCDD®), certified by the Building Industry Consulting Service International (BICSI®) that will be ultimately responsible for the project:
   a. RCDD must be employed with the structured cable installation company (e.g., If a subcontractor is installing the structured cable the RCDD must be employed with the subcontractor).
   b. RCDD must have experience in projects of this size and scope and possess the expertise require to provide technical support to the installation personnel.
   c. Include RCDD's resume and certificate with proposal

3. Thirty percent of installation personnel must be BICSI Registered Telecommunications Installers.
   a. Include installer certificate(s) with proposal.

4. Subcontractors shall assume all rights and obligations toward the contractor that the contractor assumes toward the Owner and engineer/designer.

5. Manufacturer Qualifications: Engage firms experienced in manufacturing components listed and labeled under EIA\TIA-568A and who comply with these Project Documents.

6. Single-Source Responsibility: The structured cabling system shall be provided from a single source that assumes responsibility for compatibility of the system components and warranties the system for the specified warranty period.

7. Installer Qualifications: Engage experienced factory-authorized and BICSI certified installers to perform work of this Section.

B. NEC Compliance
   1. NEC Article 800 applicable to wiring methods, construction and installation of data and telecommunication cabling systems.

C. NFPA Compliance:
   1. Comply with NFPA, National, State and Local building codes as applicable to wiring methods, construction and installation of data and communication cabling systems.
   2. Comply with the following ANSI/TIAIEIA industry standards:
      a. ANSIITIAIEIA-568-C –Commercial Building Telecommunications Cabling Standard, Part 1: General Requirements
      b. ANSIITIAIEIA-568-C -Commercial Building Telecommunications Cabling Standard, Part 2: Balanced Twisted Pair Cabling Components
      c. ANSIITIAIEIA-568-C. - Addendum 1 – Transmission Performance Specifications for 4-pair 100 Ohm Category 6 Cabling
      d. ANSIITIAIEIA-569 -Commercial Building Standard for Telecommunications Pathways and Spaces
      e. ANSIITIAIEIA-606-B -The Administration Standard for the Telecommunications Infrastructure of Commercial Buildings
      f. ANSIITIAIEIA-607-B --Commercial Building Grounding and Bonding Requirements for Telecommunications
      a. TIA-526-14-A Optical Power Loss Measurement of Installed Multimode Fiber Cable Plant

D. Install cabling according to the most recent edition of the following BleSI publications:
   1. BICSI -Telecommunications Distribution Methods (TDM) Manuals
   2. BICSI -Cabling Installation Manual
   3. BICSI -LAN Design Manual

E. Federal, state, and local codes, rules, regulations, and ordinances governing the work, are as fully part of the specifications as if herein repeated or hereto attached. If the contractor should note items in the drawings or the specifications, construction of which would be code violations, promptly call them to the attention of the Owner's representative in writing. where the requirements of other sections of the specifications are more stringent than applicable codes, rules, regulations, and ordinances, the specifications shall apply
   1. Comply with IEEE, ANSI and ISO applicable standards for data and telecommunications components and methods.
   2. Listing and Labeling: Provide products specified in this Section that are listed and labeled.
   3. The terms "Listed" and "Labeled": as defined in the National Electrical Code, Article 100.

4. Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" (NRTL) as defined in OSHA Regulation 1910.7.

F. Work Coordination: Coordinate Work of this Section with workstation equipment suppliers and local area network (LAN) personnel.
   1. Meet jointly with representatives of the above organizations, the associate and Owner's representatives to exchange information and agree on details of equipment arrangements and installation interfaces.
   2. Record agreements reached in meetings and distribute record to other participants.
   3. Adjust the arrangements and locations of distribution frames, patch panels, and cross connects in equipment rooms and wiring closets to accommodate and optimize the arrangement and space requirements of the telephone switch and LIU equipment.

G. Testing Agency: In the event of non-performance of specified certified testing procedures or submittals or contested materials or workmanship, a qualified independent testing agency will be employed by the Owner. The expense of the testing agency will be deducted from the contract plus 10% for administrative efforts.

H. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

I. Telecommunications Pathways and Spaces: Comply with TIA/EIA-569-A.

J. Grounding: Comply with ANSI-J-STD-607-A.

K. Testing Agency's Field Supervisor: Currently certified by BICSI as an RCDD to supervise on-site testing.

1.09 SYSTEM WARRANTY

A. System shall carry a performance-based warranty (i.e. an applications assurance warranty) by the manufacturer and contractor, that guarantees that for a period of not less than 25 years, the horizontal cabling infrastructure; (to cover cable, patch panels, patch cables, and any other element that affects the cable's performance) will support any current or future application that has been engineered to operate across the specific category of cable to be installed in this project. The applications assurance warranty must be ultimately extended from and honored by either the cable or connectivity manufacturer and must include parts and labor. Documentation of this warranty must be submitted to the Owner prior to system acceptance.

B. The remaining portions of the system shall be warranted for a period of two (2) years from date of substantial completion.

C. Transfer manufacturer's warranties to the Owner in addition to the General System Guarantee. Submit these warranties on each item in list form with shop

drawings. Detail specific parts within equipment that are subject to separate conditional warranty. Warranty proprietary equipment and systems involved in this contract during the guarantee period. Final payment shall not relieve you of these obligations.

D. The Contractor shall provide the Owner with a warranty document describing the essential system elements, associated warrantees and the Owner's responsibility for maintaining the integrity of the cabling system over time. This document shall include, at a minimum, guidelines for system expansion and modification (moves, adds and changes) as well as cable and hardware records and as-built drawings.

PART 2 PRODUCTS

2.01 FIBER OPTIC BACKBONE CABLING DESCRIPTION

A. Fiber optic backbone cabling and its connecting hardware provide the means of transporting signals between the Main Telecommunications Room (MDF) and the new remote Telecommunciations Room (IDF). The fiber optic cables will connect into factory-terminated assemblies which will install into the high-density distribution shelf located it the MDF and IDF equipment racks.

B. Fiber optic backbone cabling will consist of an armored, 6-strand, OM3, multimode, buffered fiber cable.
   1. Panduit - FOPPX06Y

C. Fiber optic terminations shall include factory-terminated pigtails, splice cassette, slack plates, adapter plates:
   1. LC pigtails - Panduit – FX1BN1NNNSNM001.
   2. Fiber Enclosure - Panduit – FRME2U
   3. UTP backbone Adapter Plate – FRME-RJ45
   4. LC Adapter Plate – Panduit – FAP6WAQDLCZ
   5. Slack Plate – Panduit – FLEX-PLATE1U
   6. Splice Cassette – Panduit – FHSXO-12-10P

2.02 HORIZONTAL CABLING DESCRIPTION

A. Horizontal cable and its connecting hardware provide the means of transporting signals between the telecommunications outlet/connector and the horizontal cross-connect located in the communications equipment room. This cabling and its connecting hardware are called a "permanent link," a term that is used in the testing protocols.
   1. Horizontal cabling shall contain no more than one transition point or consolidation point between the horizontal cross-connect and the telecommunications outlet/connector.
   2. Bridged taps and splices shall not be installed in the horizontal cabling.
   3. Splitters shall not be installed as part of the optical fiber cabling.

B. The maximum allowable horizontal cable length is 295 feet (90 m). This maximum allowable length does not include an allowance for the length of 16 feet (4.9 m) to the workstation equipment or in the horizontal cross-connect.

2.03 PERFORMANCE REQUIREMENTS

A. General Performance: Horizontal cabling system shall comply with transmission standards in TIA/EIA-568-B.1 when tested according to test procedures of this standard.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

C. Grounding: Comply with J-STD-607-A.

2.04 UTP CABLE

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   1. General Cable – GenSpeed 6

B. Description: 100-ohm, four-pair UTP, covered with a blue thermoplastic jacket.
   1. Comply with ICEA S-90-661 for mechanical properties.
   2. Comply with TIA/EIA-568-B.1 for performance specifications.
   3. Comply with TIA/EIA-568-B.2, Category 6.
   4. Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 444 and NFPA 70 for the following types:
      a. Communications, General Purpose: Type CM or CMG
      b. Communications, Plenum Rated: Type CMP, complying with NFPA 262.
      c. Communications, Riser Rated: Type CMR, complying with UL 1666.
      d. Multipurpose, Riser Rated: Type MPR, complying with UL 1666.

2.05 UTP CABLE HARDWARE

A. Manufacturers: All connectivity products must be of the same manufacturer (i.e. no mixing of jacks, patch panels or patch cord brands). Subject to compliance with requirements, provide products by the following:
   1. Panduit.

B. General Requirements for Cable Connecting Hardware: Comply with TIA/EIA-568-B.2, IDC type, with modules designed for punch-down caps or tools. Cables shall be terminated with connecting hardware of same category or higher.

C. Jacks and Jack Assemblies: Modular, color-coded, eight-position modular receptacle units with integral IDC-type terminals.
   1. Panduit CJ688TGxx

D. Patch Cords: Factory-made, four-pair cables in min 36-inch (900 mm) lengths; terminated with eight-position modular plug at each end.
   1. Patch cords shall have color-coded boots for system identification.
   2. Provide two (2) patch cords for each work area jack.
   3. Panduit UTP28SPaxx

E. Patch Panel: Angle-face modular panels housing multiple-numbered jack units with IDC-type connectors at each jack for permanent termination of pair groups of installed cables.
   1. Number of Jacks per Field: One for each four-pair UTP cable indicated.
   2. For 24-port - Panduit CPPA24FMWBLY
   3. For 48-port – Panduit CPPA48FMWBLY
   4. Strain Relief Bar – Panduit SRB19BLY

2.06 TELECOMMUNICATIONS OUTLET/CONNECTORS

A. Jacks: 100-ohm, balanced, twisted-pair connector; four-pair, eight-position modular. Comply with TIA/EIA-568-B.1.
   1. Panduit Mini-Com – CMBEI-x

B. Workstation Outlets: As shown on drawings.
   1. Plastic Faceplate: High-impact plastic. Coordinate color with Section 262726 "Wiring Devices.". Use four port angled faceplate Panduit CFPL4Exx.
   2. For use with snap-in jacks accommodating any combination of UTP and coaxial work area cords. Panduit Mini-Com – CMBEI-x
      a. Flush mounting jacks, positioning the cord at a 45-degree angle.
   3. Legend: Snap-in, clear-label covers and machine-printed paper inserts.

C. Surface-mounted outlet box: wireless access points
   1. Panduit CBX2xx-A

D. Patch Panel: Modular panels housing multiple-numbered jack units with IDC-type connectors at each jack for permanent termination of pair groups of installed cables.

   1. Number of Jacks per Field: One for each four-pair UTP cable indicated.

2.07 GROUNDING

A. Comply with requirements in Section 260526 "Grounding and Bonding for Electrical Systems" for grounding conductors and connectors.

B. Comply with J-STD-607-A.

C. Copper Grounding Bus Bar:
   1. Panduit GB4B0612TPI-1

D. Grounding cables accessories:
   1. Grounding Strip – Panduit - RGS134-1Y
   2. Grounding Jumper – Panduit – RGCBNJ660P22

3. Bonding Screw – RGTBSG-C
4. Bonding Cage Nut – CNB4K

2.08 LABELING

A. Comply with TIA/EIA-606-A and UL 969 for labeling materials, including label stocks, laminating adhesives, and inks used by label printers.

B. Comply with requirements in Section 260553 "Identification for Electrical Systems."

C. Th All pieces of voice and data equipment, including wires, cables, fibers and their respective terminations, shall be labeled and identified in accordance with TIAIEIA-606. Contractor to install all faceplate and equipment labels in accordance with the specifications. All labels shall be neatly installed and shall be level with the floor and properly aligned on the faceplate.

D. Wire and cable identification shall consist of Brady B-292, Lat-18 or LAT-19 self-laminating markets as required, and all other identification shall consist of high-performance materials.

E. These labels must withstand the requirements of UL 969 as outlined in the TIA Standard. Self-adhesive labels other than Brady Brand shall be pre-approved by the Engineer.

F. All horizontal copper cables shall be labeled at each end.

G. Cable identification shall be by means of permanently applied, pre-printed wraparound wire markets (i.e. Brady Wrap or Engineer approved equal). Marker to be located within 3-6" of the termination.

H. At the faceplate end of the cable, the labels shall be neatly installed within 3-6 inches of the associated voice/data module; shall be neatly aligned and clearly marked; and shall not be visible from the outside of the faceplate or surface mounted box assembly.

I. Additional labeling shall be required at intermediate locations such as conduit ends and pullboxes. All cables passing through pullboxes shall be clearly labeled. All pullboxes shall be clearly labeled and their final locations shall be transferred to the detailed Engineering Drawings as part of the Contractor's "as-built" package.

J. Workmanship
1. All faceplate and equipment labels that in the Engineer's opinion are misaligned or improperly installed shall be removed and replaced by the Contractor at the Contractor's expense.
2. Contractor to insure that all faceplate assemblies, labels and associated surface mounted mouldings and equipment are properly aligned,

centered and installed either perpendicular or parallel to the floor as required. No rough edges or gaps shall be present.

3. All faceplates and surface mouldings that in the Engineer's opinion are misaligned or improperly installed shall be removed and replaced by the Contractor at the Contractor's expense.

2.09 CABLE MANAGEMENT SYSTEM

A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings.

B. Document physical characteristics by recording the network, TIA/EIA details, and connections between equipment and cable.

C. System shall interface with the following testing and recording devices:
   1. Direct upload tests from circuit testing instrument into the personal computer.
   2. Direct download circuit labeling into labeling printer.

2.10 SOURCE QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to evaluate cables.

B. Factory test UTP and optical fiber cables on reels according to TIA/EIA-568-B.1.

C. Factory test UTP cables according to TIA/EIA-568-B.2.

D. Cable will be considered defective if it does not pass tests and inspections.

E. Prepare test and inspection reports.

2.11 Racks and Cable Management

A. Equipment rack - 4-post, 45U, open equipment rack with hardware and bonding kit:
   1. Panduid - R4P

B. Vertical Cable Manager – 8” wide dual-sided with hinged door and slack spools:
   1. Panduit – PRV8 with PRSP7
   2. Panduit – PRD8

C. Horizontal Cable Manager – 1 and 2 RU with hinged front and rear covers:
   1. Panduit – NM1
   2. Panduit – MN2

D. J-hooks for station and backbone cabling above lay-in ceilings:
   1. Panduit – J-Pro

PART 3 EXECUTION

3.01 WIRING METHODS

A. The Wiring Method: Install cables in raceways and cable trays except within consoles, cabinets, desks, and counters and except in gypsum board partitions where unenclosed wiring method may be used unless noted otherwise on drawings. Conceal raceway and cables except in unfinished spaces.
   1. All horizontal UTP cabling shall be plenum rated.
   2. Comply with requirements for raceways and boxes specified in Section 260533 "Raceway and Boxes for Electrical Systems."Comply with TIA/EIA-568-B.1.
   3. Comply with BICSI ITSIM, Ch. 6, "Cable Termination Practices."
   4. Install 110-style IDC termination hardware unless otherwise indicated.Terminate conductors; no cable shall contain unterminated elements. Make terminations only at indicated outlets, terminals, cross-connects, and patch panels.
   5. Cables may not be spliced. Secure and support cables at not more than 6 inches (150 mm) from cabinets, boxes, fittings, outlets, racks, frames, and terminals.

B. Wiring Method: Conceal conductors and cables in accessible ceilings, walls, and floors where possible.

C. Wiring within Enclosures: Bundle, lace, and train cables within enclosures. Connect to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Provide and use lacing bars and distribution spools.

D. Install components as indicated, according to manufacturers' written instructions. Use techniques, practices, and methods that are consistent with the rating of the components and that assure performance of completed signal paths, end-to-end.

E. Do not bend cable in handling or installation to smaller radii than minimums recommended by manufacturers. Install cable free of kinks, binding and tension.
   1. Cables requiring service loops shall be coiled at 2-times the recommended bending radii. Support coil same as cable run above the work station.

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

G. Pull cables simultaneously where more than one is being installed in the same raceway.

H. Use pulling compound or lubricant where necessary. Use compounds that will not damage conductor or insulation as recommended and approved by the cable manufacturer.

I. Wiring within Telecom Rooms and Cabinets:
   1. Take measures to ensure that all cables are of sufficient length to reach their termination points via the same path. (e.g., cables that are inadvertently cut short shall not take "short-cuts" that deviate from the path the other cables take within the Telecom Room / Cabinet).
   2. Provide adequate length of conductors. Train the conductors to terminal points. Use lacing bars to restrain cables, to prevent straining connections, and to prevent bending cables to radii smaller than allowed.
   3. Do not untwist UTP cables more than 1/2 inch (12 mm) from the point of termination to maintain cable geometry

J. Separation of Wires: Comply with EIAITIA-S69 rules for separation of unshielded copper voice and data system cables from potential EMI sources, including electrical power lines and equipment. A void routing cables parallel to power circuits for the same distances.
   1. Recommended distances from EMI sources are as follows:
      a. Power lines 2KV or less: 6··inches
      b. Power lines SKV or greater: 40··inches
      c. Electric Motors: 40-inches
      d. Fluorescent or H.LD. lighting: 20-inches

K. Modular Furniture: It is intended that any modular furniture involved in this project meets all requirements of the cabling system. Any discrepancies shall be brought to the immediate attention of the Engineer before proceeding with the installation.

L. Make terminations only at indicated outlets, terminals, and cross-connect and patch panels. Splicing of cables are not permitted. Install all cables as a single continuous run from each workstation outlet to the nearest distribution frame.

M. Penetrations through floor and fire-rated walls shall utilize intermediate metallic conduit (IMC) or galvanized rigid conduit (ORC) sleeves and shall be fire-stopped after installation and testing, utilizing a fire-stopping assembly approved for that application.

N. All cable, conduits, trays and other raceways shall be routed parallel with or perpendicular to the building structure. No diagonal runs will be permitted.

O. Grommet all conduits and openings to prevent damage to cable jacket.

P. No wiring devices or outlet boxes shall be installed back-to-back.

Q. In cases where and outlet location is not equipped with an outlet box or conduit, the cable must either be "fished" through the wall cavity or surface-mounted. Utilize a single or double gang mounting plate (Caddy MPLS or equal)

R. If the cable must penetrate a metal stud, grommet the hole to prevent damage to the cables.

S. If the wall is not "fishable" the cables, pathway and outlet-box may be surface-mounted with prior engineer approval.

T. Attach cables to permanent structure with J-hooks or other approved hanger assembly at intervals of 48 inches. Bundles must not exceed neither the cable nor hanger manufacturer recommendations

U. Spacing shall allow cables to be installed free of excessive "drooping" without utilizing tywraps above the ceiling.

V. Provide 10 foot of horizontal cable slack at each Telecom Room. Service slack shall be routed in a "S" pattern or other method that does not coil the cable on itself and facilitates quick and clean additions to the bundle. .

W. Cables within Telecom Rooms / Cabinets shall be bundled using "Velcro" tywraps that will not pinch the cables and will facilitate quick and clean additions to the bundle that will not require cutting and reapplying plastic tywraps.

X. Provide overvoltage protection on both ends of cabling exposed to lightning or accidental contact with power conductors.

Y. Removal of abandoned Cable:
1. All abandoned cables within all renovated building areas shall be identified and removed.

3.02 INSTALLATION OF PATHWAYS

A. Cable Trays: Comply with NEMA VE 2 and TIA/EIA-569-A.

B. Comply with TIA/EIA-569-A for pull-box sizing and length of conduit and number of bends between pull points.

C. Comply with requirements in Section 260533 "Raceway and Boxes for Electrical Systems" for installation of conduits and wireways.

D. Install manufactured conduit sweeps and long-radius elbows whenever possible.

E. Pathway Installation in Communications Equipment Rooms:
1. Install cable trays to route cables if conduits cannot be located in these positions.
3. Secure conduits to backboard when entering room from overhead.
4. Extend conduits up to cable tray or into cabinets.
5. Install metal conduits with grounding bushings and connect with grounding conductor to grounding system.

F. Conceal conductors and cables in accessible ceilings, walls, and floors where possible.

G. Wiring within Enclosures:

1. Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's limitations on bending radii.
2. Install lacing bars and distribution spools.
3. Install conductors parallel with or at right angles to sides and back of enclosure.

3.03 FIRESTOPPING

A. Comply with requirements in Section 078413 "Penetration Firestopping."

B. Comply with TIA-569-B, Annex A, "Firestopping."

C. Comply with BICSI TDMM, "Firestopping Systems" Article.

3.04 FIELD QUALITY CONTROL

A. Structured Cabling Contractor Perform tests and inspections.

B. Visually inspect UTP jacket materials for NRTL certification markings. Inspect cabling terminations in communications equipment rooms for compliance with color-coding for pin assignments, and inspect cabling connections for compliance with TIA/EIA-568-B.1.

C. Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.

D. The cabling contractor shall provide a minimum of 48-hours prior notice to the Engineer before commencing any cable testing.

E. The Engineer, at his discretion, observe any and/or all testing procedures.
1. All testing procedures shall be acceptable to the Engineer.

F. Cabling certification readings shall be used to determine the acceptability of the installed cabling system using the latest revision of the TINEIA 568 wiring standard.

G. Horizontal Cable Field Testers:
1. Submit data sheets, including certificates of calibration, for all field testers to be used to the engineer for approval prior to testing.
2. Field tester must be calibrated to the type, manufacturer and catalog number of the cable to be tested.
3. As a minimum, the Horizontal Copper field tester must produce test report that contain the following information:
   a. Test Date
   b. Cable ID
   c. Test Performed
   d. Wire Map
   e. Length
   f. Delay Skew

g. Worst Case Attenuation
h. Worst Case Return Loss
i. Worst Case NEXT
j. Worst Case PS-NEXT
k. Worst Case ELFEXT
l. Worst Case PS-ELFEXT m Worst Case Return Loss
m. Worst Case ACR
n. Worst Case PS-ACR

H. Submit two hard copies of all test reports to Owner within 90 days of final completion.

I. Submit two copies of all test reports in electronic format to Owner within 90 days of final completion.

J. Incorporate viewing software on disk so that no additional software loading will be required to view the test reports.

K. Independent system certification may be required at the Cabling Contractor's expense in the event of non-performance of specified testing procedures and submittals or contested material and/or installation practices.

L. Document data for each measurement. Data for submittals shall be printed in a summary report that is formatted similar to Table 10.1 in BICSI TDMM, or transferred from the instrument to the computer, saved as text files, and printed and submitted.

M. End-to-end cabling will be considered defective if it does not pass tests and inspections.

End of Section