Notes on Cable Spec (Numbers are annotated on Cable Spec)

1. Racks
   a. Standard 42u enclosed and locking server racks QTY2
   b. Ability to mount vertical 0u PDU's
   c. 2.1.A.1 add APC as a preferred manufacturer (or functional equivalent)
2. Horizontal Cable
   a. Category 6A cabling to Access Points
   b. Alternate bid of dual Category 6A cabling to Access Points
   c. 6A cable/connectivity approved combos (or functional equivalent):
      i. Belden/Panduit
      ii. General/Panduit
      iii. Panduit/Panduit
   d. No color designations - all BLUE
3. Patch Panels
   a. Modular patch panels required - this was a late deviation from the original bid spec due to Cat6 and Cat6A cables landing on the same patch panel. Please bid Modular patch panels
   b. USD290 uses an alternating patch panel/switch layout in all MDF's and IDF's. Please plan to have a 24 port patch panel at the top of every rack, a 24 port patch panel under the last switch, and 48 port patch panels in between switches. No filler panels are necessary between patch panels and switches.
4. Jacks
   a. Sub Category 6A Panduit mini-coms as required for AP runs (or functional equivalent)
5. Wallplates
   a. Stainless steel is NOT required as noted in this spec. White faceplates are preferred
6. Fiber
   a. OM4 is preferred
   b. Armored cable is allowed and required if not quoting innerduct
   c. Unarmored cable quotes must include innerduct

We have 750 drops landed at our switches. After our mapping walkthrough, **we identified 456 cables**. To make everything easier to price, <u>we are requesting all bidders to bid what is shown on the building map</u>. We will work with the winning bidder outside of the e-rate process if additional drops are discovered during installation.

SECTION 271000 - TELECOMMUNICATIONS CABLING

RED LINE INDICATES THAT SECTION IS NOT APPLICABLE TO THIS PROJECT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A.   Section Includes:

1.   Telecommunications room fittings.
2.   Telecommunications horizontal cabling.
3.   Telecommunications backbone cabling.

B.   Related Sections:

1.   Section 260500 "Common Work Results for Electrical Systems" for sleeve and fire-rated pathway requirements.
2.   Section 260526 "Grounding and Bonding for Electrical Systems" for telecom grounding busbars.
3.   Section 260533 "Raceways and Boxes for Electrical Systems" for raceway, boxes installation requirements.
4.   Section 260536 "Cable Trays for Electrical Systems" for trays outside of the telecommunications rooms.

1.3 DEFINITIONS

A.   Basket Cable Tray: A fabricated structure consisting of wire mesh bottom and side rails.

B.   BICSI: Building Industry Consulting Service International.

C.   Consolidation Point: A location for interconnection between horizontal cables extending from building pathways and horizontal cables extending into furniture pathways.

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

E.   EMI: Electromagnetic interference.

F.   IDC: Insulation displacement connector.

G.   LAN: Local area network.

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

I.   OLTS: Optical Loss Test Set.

J.   OTDR: Optical Time Domain Reflectometer.

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

L.   RCDD: Registered Communications Distribution Designer.

M.   TR: Telecommunications Room.

N.   UTP: Unshielded twisted pair.

1.4   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 "permanent link," a term that is used in the testing protocols.

      1.   Horizontal cabling shall contain no more that 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.

B.   A work area is approximately 100 sq. ft. (9.3 sq. m), and includes the components that extend from the telecommunications outlet/connectors to the station equipment.

C.   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. The maximum allowable length does not include an allowance for the length of 16 feet (4.9 m) in the horizontal cross-connect.

1.5   SUBMITTALS

A.   Product Data: For each type of product indicated.

B.   Submit Owner-approved numbering scheme.

C.   Warranty documentation: Submit a sample of the warranty with product data. Submit copy of actual warranty after warranty has been issued by the manufacturer.

D.   Qualification Data: For Installer, both company and personnel.

E.   Field quality-control reports.

1.6   QUALITY ASSURANCE

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

   1.   Installation Supervision: Installation shall be under the direct supervision of Level 2 Installer, who shall be present at all times when Work of this Section is performed at Project site.
   2.   Firm with at least 3 years of successful installation experience with projects utilizing systems similar to those required for this project.
   3.   References: Provide a list of references for similar projects, including contact name, phone number, name of project, and type of project.
   4.   Certification: Confirm that the installer of the data cabling system has been certified prior to bid date by the manufacturer of the proposed products. Include details of the terms and expiration date of the arrangement.
   5.   Belden certified installer. Installer must have certification prior to the bid date.

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

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

1.7   PROJECT CONDITIONS

A.   Environmental Limitations: Do not deliver or install cables and connecting materials until wet work in spaces is complete and dry, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

1.8   COORDINATION

A.   Coordinate layout and installation of telecommunications pathways and cabling with other trades.

1.9   WARRANTY

A.   Limited 15-year minimum product and performance warranty from Panduit. Warranty shall cover the horizontal cabling system.

1.10   EXTRA MATERIALS

A.   Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

   1.   Patch-Panel Units: One of each type.

2.   Device Plates: One of each type.

PART 2 - PRODUCTS

2.1   TELECOMMUNICATION ROOM FITTINGS

   A.   Racks and Enclosures:

   1.   Manufacturers: Subject to compliance with requirements, provide products by one of the
        following:

        a.   Cooper B-Line
        b.   Chatsworth
        c.   Hoffman
        d.   Middle Atlantic Products, Inc.
        e.   Panduit

   2.   General Frame Requirements:

        a.   Distribution Frames: Freestanding and wall-mounting, modular-steel units
             designed for telecommunications terminal support and coordinated with
             dimensions of units to be supported.
        b.   Module Dimension: Width compatible with EIA 310 standard, 19-inch (480-mm)
             panel mounting.
        c.   Finish: Manufacturer's standard, baked-polyester powder coat.

   3.   Floor-Mounted Racks: Open frame, steel or aluminum construction, 84 inches tall
        minimum.

        a.   Vertical and horizontal cable management channels, and a grounding lug.
        b.   Baked-polyester powder coat finish.

   4.   Cable Management for Equipment Frames:

        a.   Provide with integral wire retaining fingers.
        b.   Baked-polyester powder coat finish.
        c.   Vertical cable management panels shall have front and rear channels, with hinged
             covers. Covers shall be Panduit model no. PRDc
        d.   Horizontal cable management is not required.

   5.   Filler Panels
        a.   Mount to standard EIA 19-inch racks or cabinets.
        b.   1 Rack Unit in height.
        c.   Black finish.
        d.   Panduit DPFP1 or equal.

   B.   Cable Runways:

SEE ATTACHED CABLE SPEC NOTES FOR ANNOTATION 1

1.   Manufacturers: Subject to compliance with requirements, provide products by one of the following:

      a.   Cooper B-Line.
      b.   Chatsworth.

2.   Ladder type tubular stringer style runway constructed of 1.5-inch by 3/8-inch tubular rails with tubular cross members on 9-inch centers. Provide with drop accessories to maintain proper bend radius of cables exiting the runway.
3.   Runways shall have a black finish.

C.   Grounding:

      1.   Comply with requirements in Section 260526 "Grounding and Bonding for Electrical Systems." for grounding conductors and connectors.
      2.   Comply with ANSI-J-STD-607-A.

D.   Labeling:

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

SEE ATTACHED CABLE SPEC NOTES FOR ANNOTATION 2

2.2   HORIZONTAL CABLING

A.   UTP Cable and Hardware:

      1.   Manufacturers: Subject to compliance with requirements, provide a structured cabling system (cable/connectivity) by one of the following. Combinations of cable/connectivity manufacturers other than those listed below are not acceptable.

            a.   Belden/Panduit
            b.   General/Panduit
            c.   Panduit/Panduit

      2.   Cable: 100-ohm, 4-pair UTP, category 6, formed into 4-pair, binder groups covered with an orange thermoplastic jacket.

            a.   Comply with ICEA S-90-661 for mechanical properties.
            b.   Comply with TIA/EIA-568-B.2 for performance specifications.
            c.   Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 444 and NFPA 70 for the following types:

                  1)   Communications, Plenum Rated: Type CMP, complying with NFPA 262.

            d.   Color: Cables shall be color coded based on service provided as follows:

                  1)   Access Points: Orange
                  2)   Projectors: Purple
                  3)   Video Surveillance (cameras): Yellow

    4)   Voice: Blue

    5)   Data other than noted above: Blue

e.   Product: Subject to compliance with requirements, provide the following; no substitutions:

    1)   General Cable GenSPEED 6000 Enhanced Category 6 cable or equal as manufactured by Belden or Panduit.

3.   Patch Panels: Flat 110-style component-rated UTP panels. Maximum size of 48 port.

a.   Product: Subject to compliance with requirements, provide the following; no substitutions:

    1)   Panduit DP6 PLUS Flat Patch Panels.
        a)   24-port: Panduit DP24688TGY
        b)   48-port: Panduit DP48688TGT
    2)   Provide custom machine printed labels on patch panels as directed by the Owner.

B.   Telecommunications Outlets:

1.   Jacks: 100-ohm, balanced, twisted-pair connector; four-pair, eight-position modular. Comply with TIA/EIA-568-B.1. Panduit mini-com TX6 jack modules, model CJ688TG*.

a.   Color: Jacks shall be color coded based on service provided as follows:

    1)   Projectors: Purple or Violet
    2)   Voice / Data: Blue

2.   Workstation Outlets: multi-port-connector assemblies mounted in single faceplate.

a.   Metal Faceplate: Stainless steel.
b.   Legend: Snap-in, clear-label covers and machine-printed paper inserts.
c.   Panduit mini-com stainless steel faceplate with labels, CFPL series.
d.   Provide blank fillers in all unused openings.

C.   Plugs:

1.   Terminate cable on plugs for direct connection to equipment where indicated on Drawings.
2.   Panduit TX6 PLUS UTP Modular Plug

D.   Patch Cords and Station Cords

1.   Patch Cords and Station Cords shall be provided by the Owner.

SEE ATTACHED CABLE SPEC
NOTES FOR ANNOTATION 3, 4, 5

2.3   BACKBONE CABLING

A.   OPTICAL FIBER CABLE - INDOOR

1.   Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a.   General Cable Technologies Corporation.
   b.   Panduit.

2.   Description: OM3, Multimode, 50/125-micrometer, multi-fiber, tight buffer, optical fiber cable, indoor interlocking armored cable.
   a.   Comply with ICEA S-83-596 for mechanical properties.
   b.   Comply with TIA/EIA-568-B.3 for performance specifications.
   c.   Comply with TIA/EIA-492AAAA-B for detailed specifications.
   d.   Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 444, UL 1651, and NFPA 70 for the following types:
       1)   Plenum Rated, Conductive: Type OFCP or OFNP, complying with NFPA 262.
   e.   Maximum Attenuation: 3.50 dB/km at 850 nm; 1.25 dB/km at 1300 nm.
   f.   Performance: Support 10Gigabit Ethernet for lengths up to 300meters at with short or long wavelengths.

3.   Jacket:
   a.   Cable cordage jacket, fiber, unit, and group color shall be according to TIA/EIA-598-B.
   b.   Imprinted with fiber count, fiber type, and aggregate length at regular intervals not to exceed 40 inches (1000 mm).
   c.   Overall interlocking armored cable covering with aqua colored plenum rated jacket.

B.   OPTICAL FIBER CABLE HARDWARE

1.   Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a.   Panduit.
2.   Cross-Connects and Patch Panels: Modular panels housing multiple-numbered, duplex cable connectors.
3.   Patch Cords: By Owner.
4.   Cable Connecting Hardware:
   a.   Comply with Optical Fiber Connector Intermateability Standards (FOCIS) specifications of TIA/EIA-604-2, TIA/EIA-604-3-A, and TIA/EIA-604-12. Comply with TIA/EIA-568-B.3.
   b.   Quick-connect, simplex and duplex, Type LC connectors. Insertion loss not more than 0.75 dB.

2.4   GROUNDING

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

SEE ATTACHED CABLE SPEC NOTES FOR ANNOTATION 6

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

2.5   IDENTIFICATION PRODUCTS

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."

2.6   SOURCE QUALITY CONTROL

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

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

C.   Factory test multimode optical fiber cables according to TIA/EIA-526-14-A and TIA/EIA-568-B.3.

D.   Factory-sweep test coaxial cables at frequencies from 5 MHz to 1 GHz. Sweep test shall test the frequency response, or attenuation over frequency, of a cable by generating a voltage whose frequency is varied through the specified frequency range and graphing the results.

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

F.   Prepare test and inspection reports.

PART 3 - EXECUTION

3.1   WIRING METHODS

A.   Wiring Method: Install cables in raceways, boxes, sleeves and cable trays provided ~~under division 26. Refer to drawings for extent of division 26 scope related to raceways.~~ Provide additional raceways, boxes, sleeves, supports, etc. as required. ~~Comply with requirements of related Division 26 sections.~~

    1.   Install plenum cable in environmental air spaces, including plenum ceilings.
    ~~2.   Comply with requirements for raceways and boxes specified in Section 260533 "Raceways and Boxes for Electrical Systems."~~

B.   Conceal conductors and cables in finished spaces.

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.

3.2   INSTALLATION OF PATHWAYS

A.   Comply with requirements for demarcation point, pathways, cabinets, and racks specified in Division 27 Section "Communications Equipment Room Fittings." Drawings indicate general arrangement of pathways and fittings.

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.   Pathways and Cable Supports:

1.   Install cable in cable tray where available.
2.   Install cable in conduit within walls, overhead where exposed, and above inaccessible ceilings. Avoid routing cable through areas with exposed structure ceilings where possible.
3.   Install cable within accessible space above finished ceilings per the following:

a.   Support cable with D-rings, j-hooks, or other products manufactured for the purpose of cable support. Cable supports shall be 60-inches apart maximum.
b.   Cable shall not be run through structural members or in contact with pipes, ducts, or other potentially damaging items.
c.   Route cable parallel and perpendicular to building structural elements.
d.   Suspend cable a minimum of 4-inches above finished ceilings.
e.   Locate supports such that supports are accessible for future cable additions, i.e. not at excessive heights or above ductwork.

3.3   INSTALLATION OF CABLES

A.   Comply with NECA 1.

B.   General Requirements for Cabling:

1.   Comply with TIA/EIA-568-B.1.
2.   Comply with BICSI ITSIM, Ch. 6, "Cable Termination Practices."
3.   Install 110-style IDC termination hardware unless otherwise indicated.
4.   MUTOA shall not be used as a cross-connect point.
5.   Consolidation points are not permitted unless indicated on Drawings.
6.   Terminate conductors; no cable shall contain unterminated elements. Make terminations only at indicated outlets, terminals, cross-connects, and patch panels.
7.   Cables may not be spliced.
8.   Secure and support cables at intervals not exceeding 60 inches and not more than 24 inches from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
9.   Install lacing bars to restrain cables, to prevent straining connections, and to prevent bending cables to smaller radii than minimums recommended by manufacturer.

10.   Bundle, lace, and train conductors to terminal points without exceeding manufacturer's limitations on bending radii, but not less than radii specified in BICSI ITSIM, "Cabling Termination Practices" Chapter. Install lacing bars and distribution spools.

11.   Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable between termination, tap, or junction points. Remove and discard cable if damaged during installation and replace it with new cable.

12.   Cold-Weather Installation: Bring cable to room temperature before dereeling. Heat lamps shall not be used for heating.

13.   Pulling Cable: Comply with BICSI ITSIM, Ch. 4, "Pulling Cable." Monitor cable pull tensions.

C.   Rack / Enclosure Installation: Install equipment furnished by the Owner. Arrange racks as directed by the Owner and permanently bolt enclosures to floor if desired by Owner.

D.   UTP Cable Installation:

1.   Comply with TIA/EIA-568-B.2.
2.   Do not untwist UTP cables more than 1/2 inch from the point of termination to maintain cable geometry.
3.   In the telecommunications room, install a 7-foot long service loop (in runway above racks, where available) prior to termination at patch panels.
4.   Above finished ceiling at telecom outlets and AV outlets, install a 7-foot long service loop.
5.   Provide a 20-foot long service loop at access point (AP's) and camera locations.
6.   Use Velcro straps for bundling groups of cables and service loops.

E.   Separation from EMI Sources:

1.   Comply with BICSI TDMM and TIA/EIA-569-A for separating unshielded copper voice and data communication cable from potential EMI sources, including electrical power lines and equipment.
2.   Separation between open communications cables or cables in nonmetallic raceways and unshielded power conductors and electrical equipment shall be as follows:

        a.   Electrical Equipment Rating Less Than 2 kVA: A minimum of 5 inches.
        b.   Electrical Equipment Rating between 2 and 5 kVA: A minimum of 12 inches.
        c.   Electrical Equipment Rating More Than 5 kVA: A minimum of 24 inches.

3.   Separation between communications cables in grounded metallic raceways and unshielded power lines or electrical equipment shall be as follows:

        a.   Electrical Equipment Rating Less Than 2 kVA: A minimum of 2-1/2 inches.
        b.   Electrical Equipment Rating between 2 and 5 kVA: A minimum of 6 inches.
        c.   Electrical Equipment Rating More Than 5 kVA: A minimum of 12 inches.

4.   Separation between communications cables in grounded metallic raceways and power lines and electrical equipment located in grounded metallic conduits or enclosures shall be as follows:

        a.   Electrical Equipment Rating Less Than 2 kVA: No requirement.

        b.   Electrical Equipment Rating between 2 and 5 kVA: A minimum of 3 inches.

        c.   Electrical Equipment Rating More Than 5 kVA: A minimum of 6 inches.

5.   Separation between Communications Cables and Electrical Motors and Transformers, 5 kVA or HP and Larger: A minimum of 48 inches.

6.   Separation between Communications Cables and Fluorescent Fixtures: A minimum of 5 inches.

3.4   FIRESTOPPING

A.   ~~Comply with requirements in Section ... ... Firestopping.~~

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

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

3.5   GROUNDING

A.   Install grounding according to BICSI TDMM, "Grounding, Bonding, and Electrical Protection" Chapter.

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

C.   Bond metallic equipment to the grounding bus bar, using not smaller than No. 6 AWG equipment grounding conductor.

3.6   IDENTIFICATION

A.   Identify system components, wiring, and cabling complying with TIA/EIA-606-A. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

B.   ~~...~~

C.   At a minimum label each of the following:

1.   Cable within 4 inches of each termination. Utilize flag-type labels.

2.   Telecom outlet jacks. Label affixed to faceplate.

3.   Telecom room racks.

4.   UTP Patch Panels. Include labeling of each port if directed so by the Owner.

5.   Fiber termination units.

D.   Labels shall be preprinted or computer-printed type with printing area and font color that contrasts with cable jacket color but still complies with requirements in TIA/EIA 606-A, for the following:

1.   Cables use flexible vinyl or polyester that flexes as cables are bent.

3.7   FIELD QUALITY CONTROL

A.   Perform tests and inspections.

B.   Tests and Inspections:

1.   Visually inspect UTP and optical fiber cable 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.
2.   Visually confirm proper category marking of outlets, cover plates, outlet/connectors, and patch panels.
3.   Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.
4.   UTP Performance Tests:

a.   Test for each outlet. Perform the following tests according to TIA/EIA-568-B.1 and TIA/EIA-568-B.2:

1)   Wire map.
2)   Length (physical vs. electrical, and length requirements).
3)   Insertion loss.
4)   Near-end crosstalk (NEXT) loss.
5)   Power sum near-end crosstalk (PSNEXT) loss.
6)   Equal-level far-end crosstalk (ELFEXT).
7)   Power sum equal-level far-end crosstalk (PSELFEXT).
8)   Return loss.
9)   Propagation delay.
10) Delay skew.

5.   Fiber Optic Cable Tests:

a.   Field-test instruments shall have the latest software and firmware installed.
b.   Link and channel test results from the OLTS and OTDR shall be recorded in the test instrument upon completion of each test for subsequent uploading to a PC in which the administrative documentation (reports) may be generated.
c.   Fiber end faces shall be inspected using a video scope with a field of view not less than 425 µm x 320 µm.
d.   Testing shall be performed on each cabling segment (connector to connector).
e.   Testing shall be performed on each cabling channel (equipment to equipment) that is planned for use per the owner's instructions.
f.   Testing of the cabling shall be performed using high-quality test reference cords of the same core size as the cabling under test, terminated with reference grade

connectors. Reference grade connectors are defined as having a loss not exceeding 0.1 dB for multimode. The test reference cords for OLTS testing shall be between 2 m and 5 m in length. The length of the launch and tail fibers for multimode OTDR testing shall be at a least 100 m (328 ft.).

g. Optical Loss Testing:

1) Multimode links shall be tested in one direction at 850 nm and 1300 nm in accordance with ANSI/TIA-526-14-B, one-cord reference method, with an Encircled Flux compliant launch.

2) Link attenuation does not include any active devices or passive devices other than cable, connectors, and splices, i.e. link attenuation does not include such devices as optical bypass switches, couplers, repeaters, or optical amplifiers.

h. OTDR Testing:

1) Fiber links shall be tested at the following wavelengths for anomalies and to ensure uniformity of cable attenuation, connector insertion loss and reflectance.

a) Multimode: 850 nm and 1300 nm.

2) Each fiber link and channel shall be tested in both directions.

a) The launch and tail fibers shall remain in place for the measurement in the opposite direction – failing to do so will result in an increase in measurement uncertainty.

b) The use of a loop back fiber at the far end with a tail fiber at the near end on the adjacent fiber is permitted for bi-directional testing, so long as the OTDR is able to split the trace automatically into two traces for the two fibers under test.

3) A launch cable shall be installed between the OTDR and the first link connection.

4) A tail cable shall be installed after the last link connection.

i. Magnified End Face Inspection:

1) Fibers shall be inspected using a video scope with a minimum field of view 425 µm x 320 µm to IEC 61300-3-35 Edition 1.0. The following test limits shall be used:

a) Multimode connectors; Table 6 of IEC 61300-3-35 Edition 1.0.

j. Length Measurement:

1) The length of each fiber shall be recorded.
2) Measure the optical length using an OLTS or OTDR.

k. Polarity Testing:

       1)   Paired duplex fibers in multi-fiber cables shall be tested to verify polarity in accordance with Clause E.5.3 of ANSI/TIA-568-C.0. The polarity of the paired duplex fibers shall be verified using an OLTS.

C.   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.

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

E.   Prepare test and inspection reports.

3.8   DEMONSTRATION

A.   Train Owner's maintenance personnel in cable-plant management operations, including changing signal pathways for different workstations, rerouting signals in failed cables, and keeping records of cabling assignments and revisions when extending wiring to establish new workstation outlets.

END OF SECTION 271500

Questions received during walkthroughs

Is there any new construction or is this all occurring within the existing building?
This is all in the existing building. No new construction.

Can you provide a floorplan?
One will be added to the CRW portal for download. It will contain port/drop counts per room, plate counts per room, camera locations, copier locations, and we are going to try to get fire penetration walls and vertical chases identified.

Are there any new drops?
Nope - with exception of 6a alternate bid for access points.

Should we quote a certain brand of snap-channel?
No preference. Feel free to reuse what is in place!

Are there J-hooks for cable management or any other cable management?
There are very few j-hooks throughout the building and almost no ladder racking.

How many access points?
43

OM3 or OM4?
We prefer OM4.

Daisy chained or star topology?
Star topology. All IDF's run back to the Library MDF. 600 room, 700 room, 800 room, Techlab, Admin office, Vocal. Techlab is not currently fiber - but this project will put fiber to the techlab.

When is the tentative start date?
Unknown still

Any armored fiber?
Unarmored Fiber run in innerduct, or armored fiber without innerduct.

Any outdoor fiber?
No outdoor fiber

How many strands of fiber between each IDF and the MDF?
6 strands

Is there red iron above the ceiling?
Yes

Any brand preference for patch panels?
Panduit patch panels please (or functional equivalent)

Punchdown or modular patch panels?
Modular to allow for mix of Cat6 and Cat6A

Plenum rated cable?
Yes

Termination?
Include termination of cables on both ends

Service loops?
Yes, both ends please. 7 feet on both ends, 20 feet for APs and cameras

Should we use Category 6 or 6a cabling?
6A to access points, 6 everywhere else. If you would like to, please submit an additional bid for a second 6A run to each access point. This second run will not be a deciding factor on the project.

How does the fiber terminate at the SFP transceiver?
LC connectors for fiber, both sides

Existing conduit down the walls?
Almost everywhere, yes.

Are there any jacks in the Floors?
There are a few floor jacks in the Library. There are possibly floor jacks in the rooms with movable walls in the 600, 700, and 800 pods. We are opening all of them to see if any have data drops, but most are waxed shut.

Is there a lift available for any high ceilings?
Yes. We have several lifts we can bring over as needed

Are there any difficult to reach drops above hard lid ceiling?
There is one for sure, right at the entry to the office, but you can still reach pretty easily from the hallway.

During the walkthrough we exposed some coax runs that were terminated in the wallplates, alongside network cabling. Do we need to replace those coax runs or terminations?
No coax will need to be saved during this project. If there is coax on a keystone jack, you do not need to put it back into the new wallplate.

Should our bid include demolition and removal of old wire?
No. But add it as a separate line ineligible line item if you wish to bid it. This will not be a deciding factor on the project.

THESE ANSWERS AND THE ATTACHED MAP, CABLE SPEC, AND NOTES WILL SUPERSEDE ANSWERS THAT WERE GIVEN DURING THE WALKTHROUGH. DEVIATIONS FROM THE WALKTHROUGH Q&A HAVE BEEN NOTED