READ THIS FIRST

Notice to the Design Engineer; please refer to the Port of Seattle, Facilities and Infrastructure standards for reference before editing this specification.

This Project Spec Document **REQUIRES** an approved Competition Waiver per [CPO-6](http://compass.portseattle.org/corp/legal/Documents/CPO-6%2001%2006%2010%20FINAL.pdf) for Systimax Solutions Communication Backbone Cabling (including UTP copper backbone and tie cables, UTP cat 6/6a copper termination hardware, fiber optic cable, fiber optic cable termination and splice hardware) and Horizontal Cables (including optic fiber cable, patch panels, connectors, couplers, UPTP copper backbone, data patch panels, blocks, wall plates, boxes, jumper/patch cords).

This Project Spec Document may need additional modifications to suit your project. It is recommended that you proofread each section, paying attention to any “Notes” boxes such as this one--you should remove these “Notes” sections as you go. Also, do a search for all bracket characters “ [ ] “ as they are used to show you areas containing options or project specific details (you can use Microsoft Word’s Find feature {Ctrl-F} to jump to an open bracket “ [ “ character quickly). Again, these bracket characters should be removed.

It is important that every paragraph be numbered to allow for easy referencing. If you use the document’s built in styles and formatting your outline should be fine (turn on the formatting toolbar by going to View > Toolbars > Formatting). Most paragraphs will use the style “Numbered Material” and can be promoted (Tab) or demoted (Shift-Tab).

You should not have to manually enter extra spaces, carriage returns or outline characters such as A, B, C, or 1.01, 1.02; the formatting will do this for you. The entire document is 11 pt. Arial. If you paste items in, you may need to reapply the “Numbered Material” format.

1. GENERAL
   1. SUMMARY
      1. This Section includes requirements for Communications Systems Equipment Rooms at the Seattle-Tacoma International Airport.
      2. Work described in this section includes providing and installing:
         1. Termination Wallboards
         2. Termination panels for fiber optic cable and copper cables.
         3. Cable runways.
         4. Low-voltage grounding system.
         5. Equipment racks.
      3. All rack assemblies shall be accordance to Section 26 05 48 – Seismic Controls for Electrical and Communication Work.
      4. Products Furnished or Supplied but Not Installed Under This Section.
      5. Products Installed but Not Furnished or Supplied Under This Section.
   2. GOVERNING CODES, STANDARDS, AND REFERENCES
      1. References to codes and standards called for in the Specifications refer to the latest edition, amendments, and revisions to the codes and standards in effect on the date of these Specifications.
         1. American National Standards Institute (ANSI):
            1. ANSI/TIA/EIA -606-A Administration Standard for Commercial Telecommunications Infrastructure
            2. ANSI/TIA/EIA -607 Commercial Building Grounding and Bonding Requirements for Telecommunications
            3. ANSI/TIA/EIA –758-A Customer-Owned Outside Plant Telecommunications Infrastructure Standard
            4. ANSI/TIA/EIA – 854 A Full Duplex Ethernet Specification for 1000Mb/s (1000BASE-TX) Operating over Category 6 Balanced Twisted-Pair Cabling.
            5. ANSI/TIA/EIA – 862 Building Automation Systems Cabling Standard for Commercial Buildings.
            6. ASTM E814 Standard Test Method For Fire Tests Of Penetration Firestop Systems.
         2. BICSI Telecommunications Distribution Methods Manual (Current Edition)
         3. FCC 47 Part 68 Code of Federal Regulations, Title 47, Telecommunications.
         4. IEEE National Electrical Safety Code (NESC).
         5. ISO/IEC 11801 Information Technology - Generic Cabling For Customer Premises.
         6. NFPA-70 National Electric Code.
   3. SUBMITTALS
      1. Product Data: For each type of product indicated.
      2. Shop Drawings: For communications equipment room fittings. Include plans, elevations, sections, details, and attachments to other work.
         1. Detail equipment assemblies, and location and size of each field connection.
         2. Equipment racks and cabinets: Include workspace requirements and access for cable connections.
         3. Grounding: Indicate location of grounding bus bar and its mounting detail.
      3. Qualification Data: For Installer, qualified layout technician, installation supervisor, and field inspector.
   4. DEFINITIONS
      1. Unshielded Twisted Pair cable (UTP cable)
         1. The following UTP cable types shall be utilized for data and voice circuits:
            1. Data circuits: 4-pair Category 6/6a
            2. Voice circuits: 25-pair Category 5/5e
            3. Voice circuits: [50-pair] or [100-pair] Category 3
   5. QUALITY ASSURANCE
      1. Installer Qualifications: Cabling Installer must have personnel certified by BICSI on staff.
         1. Layout Responsibility: Preparation of Shop Drawings shall be under the direct supervision of an RCDD, or BICSI Installer, Level 2.
         2. Installation Supervision: Installation shall be under the direct supervision of BICSI Technician Level 2 Installer, who shall be present at all times when Work of this Section is performed at Project site.
         3. Field Inspector: Currently registered by BICSI as RCDD, or BICSI Installer, Level 2 to perform the on-site inspection.
      2. 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.
      3. Telecommunications Pathways and Spaces: Comply with ANSI/TIA-569-A.
      4. Grounding: Comply with ANSI/TIA-607-B and ANSI/NECA/BICSI-607.
   6. PROJECT CONDITIONS
      1. Environmental Limitations: Do not deliver or install equipment frames and cable trays until spaces are enclosed and weather-tight, wet work in spaces is complete and dry, and work above ceilings is complete.
   7. COORDINATION
      1. Coordinate layout and installation of communications equipment with Owner's telecommunications and LAN equipment and service suppliers. Coordinate service entrance arrangement with local exchange carrier or telecommunications service provider.
         1. Meet jointly with telecommunications and LAN equipment suppliers, local exchange carrier representatives, and Owner to exchange information and agree on details of equipment arrangements and installation interfaces.
         2. Record agreements reached in meetings and distribute them to other participants.
         3. Adjust arrangements and locations of distribution frames, cross-connects, and patch panels in equipment rooms to accommodate and optimize arrangement and space requirements of telephone switch and LAN equipment.
         4. Adjust arrangements and locations of equipment with distribution frames, cross-connects, and patch panels of cabling systems of other communications, electronic safety and security, and related systems that share space in the equipment room.
      2. Coordinate location of power raceways and receptacles with locations of communications equipment requiring electrical power to operate.

1. PRODUCTS AND MATERIALS

A. If only one product is acceptable (single or sole source product), obtain an approved Competition Waiver and submit to the CPO Construction, Contract Administrator. The language shall read as: “Manufacturer Name, Product # XXXXX, No Equal.” Refer to CPO-6 Competition Waiver Policy for more information.

B. If a Competition Waiver is not approved or more than one product is acceptable, this section must list a minimum of 2 products plus the language “Or Approved Equal,” along with salient characteristics. Refer to CPO Construction’s Salient Characteristics Guidelines for more information.

* 1. GENERAL
     1. Communication rooms to be dedicated to designated equipment and services only. Space shall not be used for storage of equipment not related to designated equipment and services.
     2. Each communication room shall be equipped with fire detection, fire extinguishing system and prevention devices.
     3. Foreign piping systems such as water pipes, steam pipes, etc. shall not be installed or pass through communication rooms.
     4. Communication rooms to have access control system at the door and at least one camera inside the room.
     5. Maintain communication rooms at an average of 75 +/- 3 degree F and a relative non condensing humidity of <60%.
     6. Normal and emergency power source available and have enough power receptacles to support equipment and service.
     7. Provide uniform illumination of at least 50 foot-candles; do not install light fixtures over cable tray.
     8. Label all racks and equipment per Section 27 05 53 – Identification and Labeling.
  2. CABLE RUNWAY
     1. General: The Contractor shall provide and install cable runways and supports in each communications room as shown on the Drawings and specified herein.
     2. Cable Runways: Cable runways shall have the following characteristics, at a minimum:
        1. Manufacturer: Subject to compliance with requirements, provide products by one of the following:
           1. Chatsworth (CPI)
           2. Commscope
           3. B-Line.
           4. Or Approved Equal.
        2. Type: 1-1/2” tubular stringer trough with removable post.
        3. Stringers: 3/8” x 1-1/2” ASTM A513 steel tube.
        4. Rungs: 1/2” x 1” ASTM A513 steel, welded rungs, welded on interior face of stringers at 9” spacing.
        5. Finish: Yellow zinc dichromate (YZN)
        6. Listing compliance: UL labeled or Washington State Labor and Industry recognized.
        7. Retaining posts: Removable cable retaining posts, 7” height above stringer, and 14 posts supplied per runway section.
        8. Dimensions:18” wide by 119½” long sections
        9. UL cross sectional area: 0.40 in2
        10. Design factors (2 rails):
            1. Area = 0.210 in2
            2. Sx = 0.066 in3
            3. Ix = 0.050 in4
        11. Load ratings: [4 ft span @ 149 lbs/ft], [5 ft span @ 95 lbs/ft], [6 ft span @ 66 lbs/ft], [7 ft span @ 49 lbs/ft], [8 ft span @ 37 lbs/ft].
     3. Fittings:
        1. General: Provide fittings necessary for a complete installation, including but not limited to, stringer splices, horizontal tees, support brackets, and standoffs. Materials shall be UL listed Or listed Approved Equal.
        2. Stringer splices: Heavy duty stringer splice kit, CPI, Commscope, B-Line, Or Approved Equal, ASTM A1011 structural steel, black over zinc dichromate finish, UL classified, for 1½” single stringers. Kit shall include two clamps and 1/4”-20 hardware, 4 bolts/nuts/lock washers per splice.
        3. Horizontal tee splice: 90 degree horizontal tee splice kit, CPI, Commscope, B-Line, Or Approved Equal, ASTM A1011structural steel, black over zinc dichromate finish, UL classified, for 1-1/2” stringers. Kit shall include two clamps and 3/8”-16 hardware, 1 bolt/nut/lock washer per clamp.
        4. Support bracket: Runway support bracket kit, CPI, Commscope, B-Line, Or Approved Equal [for 5/8” all threaded rod (ATR)] or SB-2116-D Or Approved Equal (for 1/2” ATR) as required, ASTM A1011 structural steel, black over zinc dichromate finish, for 1-1/2” stringers Or Approved Equal. Kit shall include two hanger supports and hardware.
        5. Standoff supports: CPI, Commscope, B-Line, Or Approved Equal, provides 12” spacing between decks, for parallel or perpendicular runways, kit includes two angle supports, four clamps, and 3/8”-16 hardware, ASTM A36 structural steel, black over zinc dichromate finish.
  3. UTP COPPER CABLING
     1. Provide and install termination blocks, cabling, and accessories as shown on the drawings, and as specified in Section 27 13 00 – Communications Backbone Cabling.
  4. FIBER OPTIC CABLING
     1. Provide and install patch panels and accessories as shown on the drawings and as specified in Section 27 13 00 – Communications Backbone Cabling. [Install fiber optic cabling, to be provided by the Port.]
  5. GROUNDING SYSTEM AND CONDUCTORS
     1. Bonding and grounding shall meet the requirements specified in
        1. Section 27 05 26 – Grounding and Bonding for Communications Systems
        2. Section 26 05 26 – Grounding
        3. ANSI/TIA 606-A, 607, and 607B.
  6. EQUIPMENT RACKS AND ACCESSORIES
     1. General: Provide and install 19 inch wide EIA standard equipment racks as shown in the drawings and specified herein. Racks shall be bolted to the floor and seismically braced. Label all racks with an engraved phenolic label attached to the top rail with screws.
     2. Provide galvanized steel plate between floor and rack such that there is no direct contact between aluminum and concrete.
     3. Equipment racks:
        1. Manufacturer: Subject to compliance with requirements, provide products by one of the following:
           1. Commscope
           2. Chatsworth universal rack, part number 48353-503
           3. Mid-Atlantic (Fiber To Back Stand (FTBS)) racks only)
           4. Or Approved Equal.
        2. Construction: 6061-T6 high strength aluminum extrusion, two (2) top angles, self-support base, and heavy-duty assembly hardware.
        3. Mounting holes: Roll-formed for stronger threads, universal 5/8” – 5/8” –½” alternating hole pattern, holes back and front of side rail flanges, 12-24 threads, (50) 12-24 mounting screws with combination Phillips/slotted heads and pilot points included with each rack.
        4. Channels: EIA channel, 3” x 1.265” x 1/4” thick flange.
        5. Base angles: 3½” x 6” x 3/8” thick, one (1) pair per rack.
        6. Top angles: 1-1/2” x 1-1/2” x 1/4” thick, one (1) pair per rack.
        7. Hardware: Assembly hardware included.
        8. Listing: Washington State Labor and Industry recognized.
        9. General dimensions: 7’ high, 19” wide rack spacing unless otherwise shown on drawings.
     4. Vertical Cable mangers:
        1. Nominal 7’ high vertical wire managers, minimum 8” (225 mm) wide by 8” (225 mm) deep.
        2. Front and Rear cable organizers with cable guides at 1 RU spacing.
        3. Front and Rear removable or hinged covers.
        4. Snap on/off protective covers front and rear.
     5. Horizontal Cable mangers (where required):
        1. 19” (480 mm) rack mountable, 1 RU and 2 RU high.
        2. Provide front and rear cable organizers with minimum 5 support rings of 3-1/2” (89 mm) width protrusion minimum.
        3. Snap on/off protective covers front and rear.
  7. EQUIPMENT/SERVER CABINETS
     1. General: Provide and install cabinets for network and special systems equipment’s as shown in the drawings. Cabinets shall be bolted to the floor and seismically braced. Label all cabinets with an engraved phenolic label attached to the top rail with screws.
     2. Manufacturers
        1. CPI Chatsworth
     3. Cabinets:
        1. Minimum of 42 RU space for equipment in the vertical plane. Refer to drawings for the size.
        2. Finish: Black - powder coated.
        3. Mounting Rails:
           1. Mounting rails running from top to bottom, with a minimum of 42 RU space for equipment in the vertical plane.
        4. Vertical Wire Management:
           1. Provide vertical cable management rings with strain relief on both sides of each cabinet.
        5. Provide (2) integrated PDUs per cabinet.
        6. Front and rear doors:
           1. Ventilated
           2. Hinged and lockable
        7. Grounding kit
        8. Adjustable feet for leveling
        9. Cable access provisions in the roof and base
        10. Removable and lockable side panels
        11. UL listed – 7N69.
  8. TERMINATION WALLBOARDS:
     1. Communication rooms shall be furnished with communication distribution backboards and accessories on all wall surfaces. These products shall be installed in compliance with local, state and federal codes and industry standards. Coordinate power outlet locations prior to placement of plywood backboards and TC cable tray.
     2. Furnish and install 8’ x 4’ x 3/4” AC Marine Grade plywood backboards as indicated. Paint each backboard with two coats of light-gray, non-conductive fire retardant paint. Do not paint over fire rating seal. Backboards shall be free of surface defects such as knots and cracks. Unless detail drawings illustrate differently, each backboard shall be installed and oriented with the 8’ dimension vertical. Each backboard shall be sufficiently anchored to the wall to support the expected load and seismic Design Category D requirements.
     3. Cabling restraints and routes: Each cable termination location shall be provisioned with industry standard, cable restraint hardware. Provide sufficient quantities to ensure cables routed on plywood backboards are restrained at intervals not exceeding 1 foot. All cables shall be routed parallel and perpendicular to communication room floors. Two types of restraints are required for plywood backboards:
        1. 6-inch D-Ring-type cable restraints shall be utilized for backbone and horizontal cabling on the wallboards.
        2. Nylon saddles shall be used to secure the 25 pair cables to the backboards.

1. EXECUTION
   1. INSTALLERS
      1. The Contractor shall install system components and appurtenances in accordance with the manufacturer’s installation instructions and as shown on plans and details.
      2. Each device shall be mounted such that its horizontal dimension is level and in no case out of level by 0.03” over 3’ in any direction. In cases where more than one device is mounted, they shall be aligned vertically. Wiring blocks shall be terminated in accordance with the manufacturer’s instructions and recommendations. Installation of accessories shall be conducted in accordance with the manufacturer’s instructions and recommendations.
      3. Fiber and Copper Cables: Where fiber optic or UTP cable enters an equipment room it shall be neatly bundled and fastened. All cable runs shall be horizontal or vertical.
      4. Contractor shall provide structural support and seismic bracing for cable runways as specified in Section 27 05 28 – Pathways for Communications Systems.
      5. Contractor shall provide structural support and anchorage for racks and panels as shown on the plans and details.
2. MEASUREMENT AND PAYMENT
   1. GENERAL
      1. No separate measurement or payment will be made for the Work required by this section. The cost for this portion of the Work will be considered incidental to, and included in the payments made for the applicable bid items in the [Schedule of Unit Prices] [Lump Sum price bid for the Project].

End of Section

Revision History:

10/15/2014 New Section

10/15/2014 Added Sole Source and Salient Characteristics Note to Part 2

10/11/2018 Updated Specification to current standards and renamed