Structured Cabling System Requirements Policy

Accommodations for individuals with disabilities in accessing these policies are available upon request by emailing accessiblepolicy@wcupa.edu

Purpose and Scope
The purpose of this requirements document is to assist departments, engineers, architects, and contractors in creating a robust infrastructure to support present technologies and to insure the future addition of emerging technologies into the educational environment at West Chester University. Communication technologies are a critical element in the design of virtually all new and renovation building projects. Whether it be voice, data and video transmission, security and fire alarm systems, audio/visual systems, multimedia, or other communication technologies, it is important that a team of experienced professionals are involved in the design to ensure that West Chester University has a technology infrastructure that provides users with a highly available and resilient enterprise network which provides robust connectivity to both internal and external network-based resources.

In addition to providing technical assistance, these guidelines also recognize the important educational and fiscal implications of “future proofing” our technology infrastructure. Careful planning will extend the life of the investment and prevent premature obsolescence. For example, there is an ever-growing demand for bandwidth for telecommunications systems in learning environments. The upward trend in higher bandwidth demands will continue as computer assisted education and research become more sophisticated and will require higher speeds and increased reliability. Planning for future technological evolution is therefore essential and needs to be part of every construction/renovation project. Finally, a Structured Cabling System is a key concept in enabling Information Technology for West Chester University and because many projects are renovations, the guidelines provide more details that respond to the needs of rehabilitation and modernization. However, they apply equally to new construction projects as well.
Policy Statement

These specifications provide a minimum configuration that must be used when planning new construction or major remodeling of an existing facility. West Chester University reserves the right to amend or change these guidelines at any time for any reason.

Procedures

1. **Project Management**
   - The contractor shall designate a single point of contact (POC) who shall work with the WCU IT Infrastructure Services department and who will be responsible for reporting progress and updating WCU IT Infrastructure Services Network Operations Manager with issues that the University must address to facilitate the cabling system installation. The contractor's POC shall provide daily written reports which shall include photographs of incremental progress (preferably via email) to the IT Infrastructure Services Network Operations Manager detailing progress. Requests for access to limited access or restricted areas shall be made the day prior to the required access. Information critical to the completion of the task or project shall be communicated to the IT Infrastructure Services Network Operations Manager as the requirement becomes known. Casual information shall be passed during the scheduled progress report.
   - The contractor shall maintain the University's facility in a neat and orderly manner during the installation of the communications cabling system. The University's facilities shall be maintained in broom clean condition at the completion of work each day. At the completion of work in each area, the contractor will perform a final cleaning of debris prior to moving the installation crew to the next work area.
   - Contractor should be **BICSI certified**. All data cabling installation must be performed by installers holding BICSI ITS (Information Technology Systems) Installer and/or cabling manufacturer installation certifications. In addition, the company must have at least one BICSI certified RCDD (Registered Communications Distribution Designer) overseeing the project.

2. **Cabling System Acceptance**
   - The WCU IT Infrastructure Services Network Operations Manager will make periodic inspections of the project in progress. One inspection will be performed at the conclusion of cable pulling prior to closing the ceiling, to
inspect the method of cable routing and support, and the fire-stopping of penetrations. A second inspection will be performed at the completion of cable termination to validate that cables were dressed and terminated in accordance with ANSI/TIA/EIA specifications for jacket removal and pair untwist, compliance with manufacturer's minimum bend radius, and that cable ends are dressed neatly and orderly.

3. **As-Built Drawings**
   * If the installation contractor is provided with drawings at the start of the project, the contractor shall provide the central drawing set to WCU’s IT Infrastructure Services department at the conclusion of the project. The marked up drawing set will accurately depict the as-built status of the system including termination locations, cable routing, and all administration labeling for the cabling system. In addition, the contractor shall provide a narrative that describes any areas of difficulty encountered during the installation that could potentially cause problems to the telecommunications system. A separate and complete set of as-built drawings in digitized (AutoCAD and PDF) format on CD shall be supplied to the IT Infrastructure Services department.
   * The installation contractor shall provide a laminated as-built drawing documenting jack locations of the floor served by the network room. The laminated drawing shall be secured to the plywood in the corresponding network room.

4. **Application of Media**
   * Backbone Cable for Data Service: Use fiber-optic cable for cable runs between network rooms.
   * Data Center Cable for Data Service: Use UTP category 6A 10G cable within Data Center.
   * Horizontal Cable for Data/Voice: Use UTP category 6 cable runs between wiring closets and work area outlets.
   * Horizontal Cable for Wireless Access Points Flat Panel Displays, and TVs: Use UTP category 6A 10G cable runs between wiring closets and end-point terminations.

   a. **Data Center Backbone copper cabling**
      (Inside Data Center and between Data Center locations)

   * Data Center cabling shall be **Superior Essex 10Gain** and meet the standards for Category 6A performance requirements.
• Note: TIA/EIA 568B Wiring standards are the foundation of West Chester University’s network. The following are specific parts and techniques used in cooperation with the TIA/EIA 568B cabling standard. Installers must be Legrand Ortronics (CIP) Category 6/6A certified and follow cable manufacturers and EIA/TIA Installation procedures.

• Unacceptable Installation: Twisted pair cable can easily be damaged, preventing certification. Twisting, jacket tearing, and kinks in the cable are not allowed and such cables must be replaced. This damage is easily prevented by installers using proper pulling procedures. Remember the maximum tension allowed for the cable being used. Any tension above that amount and the cable HAS BEEN DAMAGED and must be replaced.

b. Copper Inside Cable

• Horizontal cabling (except for wireless access points, flat panel displays, and TVs) shall be Superior Essex DataGain, 23 AWG, 4-pair UTP, UNEC/NFPA CMP rated, as required. Cable jacketing shall be lead-free. Cable shall be 3rd party verified to ANSI TIA/EIA-568-B.2-1 and meet the performance requirements listed on pages 18/19 in addition to all other standard Category 6 performance requirements. Cable shall be supplied on reels or in reel-in-box. Cable shall be safety listed to ANSI UL 1666.

• Horizontal cabling for wireless access points, flat panel displays, and TVs shall be Superior Essex 10Gain CMP rated and meet the standards for Category 6A performance requirements. TIA/EIA 568B wiring standards are the foundation of West Chester University’s network. The following are specific parts and techniques used in cooperation with the TIA/EIA 568B cabling standard. Installers must be Legrand Ortronics (CIP) Category 6A certified and follow cable manufacturers and EIA/TIA Installation procedures.

• Backbone infrastructure cable can be any color as specified except for patch cables (see color plan on page 16).

• Leftover cable will be turned over to the WCU IT Infrastructure Services Department upon completion of the project.

• Below is the recommended fill chart for CAT6/6A and similar cables in areas where conduits are used. NOTE: These numbers are only valid for cables with identical nominal diameters of approximately .22 inches for CAT6 and .25 inches for CAT6A. Cables with varying outside diameters should not use this chart. The below chart is based on the maximum number of cables permitted by the NEC and calculated with 40% of the conduit filled.
c. Conduit Fill Chart

<table>
<thead>
<tr>
<th>Superior Essex CMP DataGain CAT6 Conduit Fill Nominal Diameter .22 inches</th>
<th>Superior Essex CMP 10Gain CAT6A Conduit Fill Nominal Diameter .25 inches</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trade Size</td>
<td># of Cables</td>
</tr>
<tr>
<td>1&quot;</td>
<td>9</td>
</tr>
<tr>
<td>1-1/4&quot;</td>
<td>15</td>
</tr>
<tr>
<td>1-1/2&quot;</td>
<td>21</td>
</tr>
<tr>
<td>2&quot;</td>
<td>35</td>
</tr>
<tr>
<td>2-1/2&quot;</td>
<td>54</td>
</tr>
<tr>
<td>3&quot;</td>
<td>77</td>
</tr>
<tr>
<td>3-1/2&quot;</td>
<td>104</td>
</tr>
<tr>
<td>4&quot;</td>
<td>134</td>
</tr>
</tbody>
</table>

d. Telecommunications - Telephone
- WCU does NOT pull separate cable for telephone. Telephone connections are included as one of the four (4) CAT6 cables at every location.
- Wall mounted telephones and emergency phones will be mounted per ADA forward-reach specifications.

e. Work Area Outlet Locations and Network Connections
- All work area outlet locations should be coordinated with furniture design plan.
- Faculty/Staff Offices - will have a minimum of (4) CAT6 cables, (2) CAT6 should be pulled and terminated on each side of egress in each room. Additional drops shall be pulled and terminated where required.
- Conference Rooms - will have a minimum of (2) CAT6 cables on each side of egress pulled and terminated to each room. A floor box shall be located under all conference tables. Tables with up to 7 seats shall have a minimum (4) CAT6 cables, and tables with 7 or more seats shall have a minimum (8) cables terminated in the floor box. Additional drops shall be pulled and terminated where required/requested. The WCU Facilities Project Manager will be responsible for determining the location of all conference room floor boxes which is usually dictated by the type/style of table. Additional floor
box information can be found in the Floor Boxes and Poke-Thru Devices section on page 14.

- **A/V Closets/Racks** – will have a minimum of (12) CAT6 cables pulled and terminated at the rear of the closet/rack. Additional drops shall be pulled and terminated where required/requested.
- **Digital Signage** - will have a minimum of (2) CAT6A cables pulled and terminated at the specified monitor location. Additional drops shall be pulled and terminated where required/requested.
- **Classroom Monitors/Smart TVs** - will have a minimum of (2) CAT6A cables pulled and terminated at the specified monitor/TV location. Additional drops shall be pulled and terminated where required/requested.
- **Pair untwist at terminations** shall not exceed .24 inch for Category 6/6A connecting hardware.
- **Cabling jacket** shall not be stripped back beyond .5 inch at terminations.
- **Bend radius of the cable** for the entire length of the run shall not be less than 4 times the outside diameter of the cable.

5. **Network Room**

- The network room shall house racks, termination fields, and required cable routing hardware. Racks shall be placed in a manner that will allow a minimum of 3 feet of clearance from the front and rear mounting surfaces. If one mounting rail of the rack is placed against a wall, the mounting rail shall be no closer than 6” to the wall to allow room for vertical management. Where there is more than one rack, the racks shall be ganged with 10” vertical management hardware to provide inter-bay management.
- The minimum room size for a building MDF (Main Distribution Frame) shall be 15ft. x 10ft.
- The minimum room size for all IDF (Intermediate Distribution Frame) shall be 10ft. x 10ft.
- **Zone distribution boxes, consolidation points, and telecom enclosures are not to be used.**
- The number of network rooms will depend on the number of end user locations and the distance from any given location to the network room. The maximum distance between the faceplate and the network room termination is 90 meters (290 feet).
• A minimum of one network room shall be located on every floor of a building.
• Network rooms should not have a suspended ceiling. However, if a suspended ceiling is present, it should be higher than any cable entry point in the room.
• A minimum of (4) 4” EMT sleeves from the communications room to the horizontal infrastructure should be installed (more as required by NEC fill requirements).
• All 4” EMT terminations with high performance communication cable entering/exiting the conduit shall be fitted with a device to control the bend radius of the communication cable to a minimum of a 4” radius. The device to control the bend radius must comply with all National Electrical Code requirements and TIA/EIA Standards. In addition, the product must be RoHS compliant to meet environmental requirements, be UL 94V-0 approved to reduce the spread of flame and be approved by UL for use in air handling spaces. The device to provide bend radius control must support a static load of 40 lbs. (177.9 N) and have a fastening device that allows for incremental adjustments to conform to variances in conduit diameters.
• Two (2) dedicated 20amp (L5-20R receptacle), 110volt circuits with isolated grounds shall be provided at the top of each rack. All outlets shall be on building/generator power. Each circuit will be terminated, and the receptacle cover labeled (panel number/location and breaker number) in a quad outlet. (Locations and rack placements to be determined.)
• The panel/sub panel that feeds the dedicated receptacles shall be mounted in the MDF/IDF that it serves. The WCU IT Infrastructure Services Network Operations Manager will work with the electrical contractor to determine placement of the panel in the room. No other circuits shall be run to these panels.
• All building/generator receptacles shall have a red cover.
• One (1) - 20-amp power distribution unit (Tripp-Lite PDUMH20-ISO) shall be furnished and installed on each cable rack.
• One (1) Tripp-Lite UPS (SMART2200RMXLN), Tripp-Lite rack mount kit (2POSTRMKITWM), and a 20-amp female plug to a 20 amp male locking plug adapter which is compatible with the L5-20R receptacle shall be furnished and installed in each rack as shown on pages 20/21 as part our typical rack layout.
• A Tripp-Lite UPS expansion battery pack (BP48V27-2US) shall be installed when 5 or more devices are plugged into a UPS.
• Wall linings shall be fire-resistant as required by the applicable AHJ (authority having jurisdiction) codes and regulations to reflect light and have at least two walls lined with AC grade or better, void-free plywood (8 ft.) high with a minimum thickness of (.75 in.). Plywood shall be painted with two coats of light-colored flame-retardant paint on all sides. To reduce warping, plywood shall be kiln-dried to a maximum moisture content of 15 percent. The bottom of the plywood shall be mounted 8” A.F.F. with the grade A surface exposed.

• LED light fixtures shall be installed in all network rooms (location to be determined by IT Infrastructure Services Network Operations Manager).

• Racks shall be securely attached to the concrete floor using the Chatsworth (CPI) Concrete Slab Install Kit (40604-003).

• Black Chatsworth (CPI) cable runway (ladder rack) and components shall be used inside all network rooms. Cable runway sizing shall be based off the Estimated Cable Fill Capacities for CPI Cable Management and Pathway Products (recommended fill of 50%) chart on the Chatsworth website. Proper cabling accessories such as elevation kits, wall brackets, supports, protective end caps, etc. shall be used where required.

• A properly sized black Chatsworth (CPI) cable runway radius drop shall be added where cable leaves the runway and transitions to either a rack or another runway at a lower level.

• Cable runway shall be mounted approximately 90 inches A.F.F.

• Grounding bus detail rated at 100 amps with a minimum of 5 termination points.

• All racks shall be grounded to the telecommunications ground busbar.

• All racks shall have a Chatsworth (CPI) Vertical Rack Busbar Kit 72” (40161-072) which is tied to the MTGB (main telecom grounding busbar)/TGB (telecom grounding busbar) in the room in which it is located. This busbar shall be mounted on the rear of the left post of every rack as to manufacturer’s specifications.

• Both vertical and horizontal penetrations are to be fire stopped.

• All station cables to MDF/IDF side shall be terminated on the rack installed distribution system.

• Please see page 20 for typical MDF Rack layout.

• Please see page 21 for typical IDF Rack layout.

• Please see pages 22/23 for room design. Room design is based on total number of racks.
a. Wire Rack Specifications
   • All components must be manufactured by Chatsworth (CPI).
   • Racks
     o Model Number 46353-703 - 19"EIA Two Post Rack; Two Heavy Duty Top Angles; 7'H; 45U; Black.
   • Vertical Wire Management (between each rack)
     o Model Number 30096-703 - vertical manager, 10" width, dual sided with doors; Black.
   • Vertical Wire Management (at the ends of the rack system)
     o Model Number 30095-703 - vertical manager, 6" width, dual sided with doors; Black.
   • Horizontal Wire Management (two per rack to be installed by WCU)
     o Model Number 30130-719 - 2U Horizontal Wire Management; Single Sided; Black
   • #12-24 Rack Screws, Black, 50 (One Bag Per Rack)
     o Model Number 40605-005

b. Fire-stop Systems
   • A fire-stop system is comprised of the item or items penetrating the fire rated structure; the opening in the structure and the materials and assembly of the materials used to seal the penetrated structure. Fire-stop systems comprise an effective block for fire, heat, vapor, and pressurized water stream.
   • All penetrations through fire rated building structures (walls and floors) shall be sealed with a properly sized and rated EZ-Path fire stop system installed according to manufacturer’s specifications. Other forms of fire stop are permitted if EZ-Path is not recommended/approved for certain penetrations/locations. This requirement applies to through penetrations (complete penetration) and membrane penetrations (through one side of a hollow fire rated structure). Any penetrating items e.g., riser slots and sleeves, cables, conduit, cable tray, and raceways, etc. shall be properly fire-stopped.

c. Ground System Installation
   • The Telecommunications Bonding Backbone (TBB) shall be designed and/or approved by a qualified PE, licensed (actual or reciprocal). The TBB shall be designed in accordance with the recommendations contained in the ANSI/NECA/BICSI-607 and ANSI/TIA-607-B Telecommunications Bonding and Grounding Standard.
   • The TBB shall be installed independent of the building’s electrical and building ground, and shall be installed in accordance with best industry practices.
• Installation and termination of the main bonding conductor to the building service entrance ground, at a minimum, shall be performed by a licensed electrical contractor.
• The TBB shall be used to ground all telecommunications cable shields, equipment, racks, cabinets, raceways, and other associated hardware that has the potential for acting as a current carrying conductor.
• Ground cable shields, drain conductors, and equipment to eliminate shock hazard and to minimize ground loops, common-mode returns, noise pickup, cross talk, and other impairments.
• Bond shields and drain conductors to ground at only one point in each circuit.
• Signal Ground Terminal: locate in each network room; isolate from power system and equipment grounding.
• Signal Ground Bus: Mount on wall of the MDF with standoff insulators.
• Signal Ground Backbone Cable: Extend from signal ground bus to signal ground terminal in each network room.
• Typical bonding connections shall be irreversible compression-type connections and two-hole lugs shall be used. Stainless steel bolts shall be utilized in conjunction with anti-oxidant joint compound when connecting the lugs to the TMGB, TGB, and Rack Busbar.
• Testing of the bonding and grounding system must be conducted.

d. Environmental Conditioning
• Recommended dry bulb temperature range for Telecommunications Wiring Closets is 18 – 27°C (64 – 80°F).
• Recommended Non Condensing Humidity Range for Telecommunications Wiring Closets is 5.5°C DP (Dew Point) (42°F DP) to 60% RH (Relative Humidity) and 15°C DP (59°F DP).
• Condensate pumps shall not be located within the network rooms.
• All HVAC units in the network rooms shall be dedicated and tied into the building/generator power. The thermostat for the unit will be independent of building automated controls and be located in the network room it serves.
• Air Conditioning tonnage will be calculated by WCU IT Infrastructure Services Network Operations Manager depending on the projected equipment BTU’s plus 50% for growth/additional vendor equipment.
  o 48 Port Switch – 3,754 BTU/Hr.
  o Distribution Router – 4,437 BTU/Hr.
  o UPS – 1,157 BTU/Hr.

6. Network Data - Outside Plant and Horizontal Pathway Copper Cable Specifications

a. Outside Plant Conduit –

• All buildings shall have a minimum 4-4” schedule 80 PVC conduits run to the building MDF from the closest telecommunications manhole. Two of the 4” conduits shall have (3) 1-1/4” corrugated innerducts installed and two 4” conduits shall remain empty.
• During construction/renovation of a building, a 1” schedule 80 PVC conduit shall be homerun into the base of every new outdoor light pole. These conduits can consolidate at a handhole with a larger size conduit running into the closest network room. This will provide a path for copper/fiber cables for pole mounted outdoor wireless access points and security cameras. These conduits shall contain a pull cord and a copper conductor for locating purposes.
• All innerducts shall have a pull cord that is properly tied off at either end.
• If an existing manhole/handhole can’t accommodate the new building conduit, a new manhole/handhole/conduit run will need to be installed.
• The end inside the building and manhole/handhole end of a conduit/innerduct shall be sealed to prevent rodents, gasses, or water from entering the building. Use rubber conduit plugs, a water plug, or duct sealer depending on the conditions.
• Any conduit or innerduct that has been used shall be sealed with a foam duct-sealing system that meets the following guidelines in the closest manhole/handhole and MDF:
  o Meets NEC Code Requirements – 2011 NEC Articles 225.27, 230.8, 300.5(G), 300.7 (A) on Raceway Seals, and 501.15 (B)(2).
  o Holds 22 feet (6.7m) of water head pressure and up to 90-foot (27m) surges.
  o Can seal conduits of all sizes and is reenterable.
  o Can use with a wide range of cable jacket and conduit materials.
  o Class 1, Div 2, cold storage entrances approximate R-Value of 6.5/inch.
• When cables need to be removed from a conduit, they shall be removed from both the point of origin to destination. This also includes removal of fiber optic enclosures/copper termination points inside buildings. Any openings that
remain from the removed cable shall be properly sealed by the methods listed above.

- If conduits are installed for future use, a copper conductor must be pulled in for the entire run for locating purposes.

b. Outside Plant Copper Cable
   - Outside copper cable shall be used for all exterior runs into MDF rooms from the Main Telecom Demarc - PMB (Peoples Bldg.) in all new construction and should be run in underground outside conduit. Manufacturer shall be Superior Essex.
   - OSP copper cable shall transition to listed cable or terminated within 50ft. of entering the building.
   - Run a minimum 50 pair/24 AWG from PMB (Peoples Bldg.) to MDF. A weather tight AT&T style waffle splice case shall be provided if needed. Testing is required after installation is complete for watertightness.
   - All terminations shall be on the MDF wall field using lightning protected 66 blocks. Lightning protection fuses shall not exceed 125v. Additional 66 blocks and cabling shall be provided and terminated to extend the cable pairs to a patch panel in the designated MDF data cabling rack.
   - All IDFs should include a minimum of a 25 pair cable terminated on a patch panel in the IDF data cabling rack and running back to a 66 block on the MDF’s wall field adjacent to the location of the 50 pair trunk from the outside plant cable.
   - Proper grounding/bonding is required at all termination points on wall field.
   - Any CAT6/6A cable used on the exterior should be OSP rated.
   - All CAT6 cable runs to exterior E Phones and CAT6A outdoor wireless access points should be properly grounded and installed to the manufacturer’s specifications using an in-line Ethernet surge protector (capable of 1 gig and PoE+). The surge protector shall be installed at the closest accessible location where the cable enters the building and in the MDF/IDF that it terminates. A printed label should be placed on the surge protector housing identifying what it is serving (ex. Ethernet Surge Protector-E Phone East).
   - All pair counts should be labeled, verified, and tested accordingly.

c. CAT6 & 6A Cable Guidelines
   - Communications pathways are the single most critical component of structured cable system. In general, WCU requires a minimum 1” conduit to wall box to the accessible cable pathway (e.g. hallway). In renovations where cable tray is not installed, the use of J-hooks are required.
• All cable shall be installed according to Legrand Ortronics and EIA/TIA cable installation specifications. Cable shall be installed when possible in multiple runs from reel jacks designed for the purpose or by pay-out boxes.
• During the installation, care shall be taken to ensure that nicks, abrasions, burning, and scuffing of cable is prevented. Cables found to be damaged will be replaced at the contractor's expense regardless of whether the cable passes CAT6/6A testing standards.
• A cable pulling swivel shall be used when pulling in all CAT6/6A cable.
• All punch blocks must have a mounted patch panel utilizing label holder; all labels shall be machine printed on both sides.
• All patch cables from the patch panels to the network switches must use the appropriate wire management for the type of installation.
• Telecommunications closet punch-down block specification: Must be CAT6/6A compliant.
• Proper installation practices must be closely followed to help reduce alien crosstalk on all CAT6A cables.

d. Cable Pathways
• Specifications for conduit runs shall be included in architect's design and drawings.
• Cables shall follow pre-designed pathway, approved by WCU. Design of pathway will follow the standards set forth in the EIA/TIA 569-A Commercial Building Standard for Telecommunications Pathways and Spaces document. These pathways will be constructed from J-hooks or properly sized cable tray hung from ceiling but above drop ceiling. J-Hooks or other cable routing/hanging devices shall be attached to independent supports and not attached to the existing drop ceiling grid wiring.
• Main cable pathways shall be run through accessible hallways and never run through electrical or mechanical rooms.
• Conduit must not be run through areas in which flammable materials may be stored or over or adjacent to boilers, incinerators, hot water lines, or steam lines.
• Conduit runs must be designed to follow the most direct route possible with no more than two 90° bends between pull boxes, with continuous sections no longer than 100 feet. Pull boxes must be accessible (after all mechanical systems are in place) and used for runs that exceed 100 feet in length. All conduits and racks must be bonded to ground on both ends.
• Cable runways or trays shall be used on horizontal and vertical cable runs where there is sufficient cable to warrant it. A cable runway or tray may serve more than one floor. Usually this is a tray run near the ceiling of one floor, which also serves the floor directly above it. Where possible, directional changes of 90-degrees should be made by combining two 45-degree turns, or by utilizing 'T' sections with rounded corners.

• Cable trays must be secured on 5-foot centers (unless they are designed for greater spans) using a standard trapeze type support system. They will be secured to the ceiling by either all thread or to I-beams. Grid wire cannot be used with cable tray due to cable's weight.

• Cable trays will be used only over areas with ceiling access and must transition to a minimum of (4) 4-inch EMT conduit when routed over fixed ceiling spaces larger than 15 feet.

• All metallic cable trays shall be grounded and all sections bonded in accordance with listing requirements for the particular type of system.

• Cable trays that penetrate into the MDF or IDF shall transition to a properly sized black Chatsworth (CPI) cable runway (ladder rack). The cable tray shall extend 6 inches past the wall, then utilize a cable runway radius drop (if needed) to protect station cables from potential damage caused by the end of the tray. See page 6 for additional information.

• Primary cable trays must be basket/snake or aluminum ladder trays. They must be a minimum of 18 inches wide and at least 6 inches deep. Smaller buildings and secondary tray sections may utilize a minimum 12 inch wide tray. A separate channel in the basket/tray shall be used to separate copper from fiber. Only network cable/fiber shall be permitted in the basket/tray. Fire alarm/building automation/security wire may not utilize communications cable pathways.

• After all the building’s systems (e.g. HVAC, sprinkler, electrical) are installed, the cable tray must be accessible for the entire length. "Accessible" is the ability to install cable rigging/pulling attachments and be able to retrofit the cable tray with cable isolation devices and attachments.

• A pull string for all directional pulls will be installed. Pull a new pull string separate of the cabling.

• Ceiling J-Hooks installation. Ceiling support shall be at four (4) foot intervals maximum. Cable pathways shall be so designed to avoid EMF and RFI interference. Common causes of this interference are fluorescent lighting fixtures, air handling motors, and many kinds of electrical controls including starters and power distribution panels. All cable runs must be at least 12"
away from all florescent lights and EMF sources. Any violations of this rule will be corrected at the contractor's expense.

- Always follow proper procedure to assure the bend radius is not exceeded when branching off to other areas along a pathway.
- Never run parallel with electrical conduits or strap to them.
- Cable ties are not to be used. Plenum rated Velcro shall be utilized.
- Every cable, whether individual or many grouped together, shall be supported. This means shooting grid wire and installing all J-Hooks on an independent cable pathway system. Remember...NEVER use the ceiling grid wire system. Install a separate grid wire. A J-Hook must be used. DO NOT wrap bare grid wire around the cable bundle for support. Plastic cable ties are NOT to be used as fasteners.
- Using the ceiling grid system is a violation of TIA/EIA 569 and NEC requirements.
- All cable pathways shall keep the cable bundle at least one foot (12 inches) off of the ceiling grid system.
- Cables should be properly supported and not sag between J-hooks. If the cable sags, another J-Hook should be used.
- Cable may also be installed using raised floor and architecturally designed soffit systems that permit ease of reentrance for future additions.
- It is required that proper distances be maintained between cable routes and sources of heat, electromagnetic producing devices (such as lighting ballasts), electric motors, and electronic controls.

7. **Copper Station Cabling, Terminations, and Work Area Outlets**

   a. **Faceplate Configuration**

   - Legrand Ortronics TracJack Faceplates will be used in all wall penetrations.
   - W.A.O.s that require a four (4) port faceplate; jacks shall be placed in the faceplate to follow the sequential labeling from left top/bottom, right top/bottom.
   - Each cable will be uniquely identified and will have the same I.D. at the jack and telecommunication closet.
   - All cables shall have 1ft. of slack available at the network jack location.
   - Stainless steel faceplates shall be used in sanitary environments and areas requiring added durability. Examples – food prep/service locations, medical areas, and lab environments.
   - All wall phones shall utilize the stainless steel faceplate listed below.
• An Ortronics TracJack Fog White blank insert shall be placed in any unused opening of the faceplate. Model # **OR-42100002**

• Faceplate model #s –
  • 4 Port Plastic Faceplate Color Fog White – **OR-40300546**
  • 6 Port Plastic Faceplate Color Fog White - **OR-40300545**
  • 12 Port Plastic Faceplate Color Fog White (Dual Gang) - **OR-40300620**
  • 4 Port Stainless Faceplate – **OR-40300456**
  • 6 Port Stainless Faceplate – **OR-40300457**
  • 12 Port Stainless Faceplate (Dual Gang) - **OR-40300459**
  • Stainless Wall Phone Faceplate – **OR-403STJ1WP**

b. Jacks and Jack Assemblies for UTP Cable
• All network jacks shall be manufactured by Legrand Ortronics and be Fog White in color.
  o CAT6 – **OR-TJ600**
  o CAT6A - **OR-TJ6A**

• Work area outlet boxes shall be installed within 3 feet of an electrical outlet and mounted at the same height.

• All jacks shall be terminated TIA/EIA 568B using the 568-B pin out.

• All wireless access point locations, where the access points are mounted to a drop ceiling grid, must have their cables terminated in an Ortronics TracJack surface mount outlet box (model **OR-404TJ2**) with a compatible Ortronics CAT6A jack that is located above, but not laying on, the ceiling grid. An accompanying green CAT6A Ortronics Ethernet patch cable is to be provided by the low voltage contractor. This patch cable should connect the wireless access point to the surface mount outlet box at the time of wireless access point installation.

c. Identification/Faceplate Labels
• Labels shall follow practices set forth in ANSI/TIA/EIA 606 ADMINISTRATION.

• All labels must be machine printed and must meet the University’s labeling standard which is listed below:
  o Typical Ethernet Data Labeling
    ▪ MDF/IDF Labeling
      • Each patch panel port must be labeled using the following format:
        o ROOM#-JACK# (e.g., if the room number was 315, then the third jack in that room would be labeled 315-3)
Jack Labeling

- Each jack must be labeled using the following format:
  - MDF#/IDF#-ROOM#-JACK# (e.g., if the cable originated from MDF room 109 and the destination room number for that cable was 315, then the third jack in that room would be labeled MDF109-315-3)
- Each jack should be numbered sequentially when entering the room from left to right. If there are two doors, use the left door and consider that the entry door.

Wireless Access Point Ethernet Labeling

- MDF/IDF Labeling
  - Single wireless access point room
    - Each patch panel port must be labeled using the following format:
      - ROOM#-AP (e.g., if the room number was 255 then the patch panel port would be labeled 255-AP)
  - Multiple wireless access point room
    - Each patch panel port must be labeled using the following format:
      - Each wireless access point should be numbered sequentially when entering the room from left to right. If there are two doors, use the left door and consider that the entry door.
        - ROOM#-AP# (e.g., if the room number was 255 and had three wireless access points and those access points were located in the front left, rear center, and front right, then the patch panel ports would be labeled 255-AP1, 255-AP2, and 255-AP3)
  - Hallway wireless access points
    - Each patch panel port must be labeled using the following format:
      - ROOM#-HALL-AP (e.g., if the access point is located near a door, and that room number
was 126, then the patch panel port would be labeled 126-HALL-AP)

- Exterior Wireless Access Points
  - Each patch panel port must be labeled using the following format:
    - BUILDING NAME ABBREVIATION-CARDINAL DIRECTION/INTERMEDIATE DIRECTION-AP (e.g., if the access point was located on the southwest corner of Anderson Hall, then the patch panel port would be labeled AND-SW-AP)
    - Building name abbreviation will be provided by the point of contact mentioned above.

- Surface Mount Box Labeling
  - Single Wireless Access Point Room
    - Each surface mount box must be labeled using the following format:
      - MDF#/IDF#-ROOM#-AP (e.g., if the cable originated from MDF room 109 and the destination room number for that cable was 315, then the surface mount box in that room would be labeled MDF109-315-AP)
  - Multiple Wireless Access Point Room
    - Each wireless access point surface mount box should be numbered sequentially when entering the room from left to right. If there are two doors, use the left door and consider that the entry door.
      - MDF#/IDF#-ROOM#-AP# (e.g., if the cable originated from MDF room 109 and the destination room number was 255 and had three wireless access points and those access points were located in the front left, rear center, and front right, then the surface mount
boxes would be labeled MDF109-255-AP1, MDF109-255-AP2, and MDF109-255-AP3)

• Hallway Wireless Access Point
  o Each surface mount box must be labeled using the following format:
    ▪ MDF#/IDF#-ROOM#HALL-AP (e.g., if the cable originated from MDF room 109 and is located near a door, and that room number was 126, then the surface mount box would be labeled MDF109-126HALL-AP)

• Exterior Wireless Access Points
  o Each surface mount box must be labeled using the following format:
    ▪ BUILDING NAME ABBREVIATION-MDF#/IDF#-CARDINAL DIRECTION/INTERMEDIATE DIRECTION-AP (e.g., if the cable originated from MDF.0 room 109 and the access point was located on the southwest corner of Anderson Hall, then the surface mount box would be labeled AND-MDF109-SW-AP)

  ▪ Building name abbreviation will be provided by the WCU IT Infrastructure Services Network Operations Manager.

• Double gang outlets will be numbered left top/bottom, right top/bottom.
• Single gang outlets will be numbered top/bottom.
• Jack labels will be numbered with the same number as attached cable.
• Each end of the CAT6/6A cable will be labeled at approximately 12 inches from the network data jack.
• Numbering format will be supplied by WCU IT Infrastructure Services Network Operations Manager.
• All cabling shall be punched down on MDF/IDF patch panels in sequential order by office/room number.

d. Floor Boxes and Poke-Thru Devices
• When installing poke-thru and floor boxes a complete manufacturer/vendor solution will be required to permit installation and termination of all CAT6 cables (up to 12 cables per location). This solution must take into account the size, length, position, and number of bends to the supply conduit. A
separate metal channel or conduit must be supplied for electrical and communication cables. The installer of floor boxes and poke-thru devices will be responsible to provide WCU with a complete solution including all covers, top plates, carpet rings, angle connectors, conduit, flex tube, jacks, and hinged covers which will provide a complete and useable cabling system. NOTE: designers of systems, which use floor devices that will be installed in tile floors must consider and take into account WCU’s use of floor buffers and liquid floor wax and design accordingly.

e. Renovation Concealed or Flush Mounted
   • Work area communication outlets shall exceed TIA/EIA-568-B.2-1 and IEC 60603-7-4 requirements for Category 6/6A component performance.
   • Terminate all jacks according to Legrand Ortronics and EIA/TIA 568B guidelines.
   • Concealed drops should be restricted to hollow wall spaces that are made up of sheet rock on at least one side with no fire blocks. Wall openings shall have a wall-box eliminator installed for the purpose of mounting the faceplate. The wall-box eliminator shall be securely fastened to the opening by mechanical means, top and bottom of bracket to ensure snug fit.
   • Electronic stud finders will be used at all times and before holes are cut into walls. This will eliminate hitting wall studs or in-wall cross bracing (e.g. chalkboards and cabinets).
   • In areas such as labs, teaching stations, and multimedia access portals where a poke-thru or a floor box is utilized, a complete manufacturer/vendor solution will be required.
   • Each cable will be uniquely identified and will have the same I.D. at the jack and network room. All numbering will begin with a number determined by West Chester University and continue sequentially in the MDF and IDF(s). Any out of sequence terminations will be corrected by the vendor. All jacks will be numbered with the same number as attached cable.

f. Renovation Exposed or Surface Mounted
   • Exposed pathways down walls or columns shall be installed with non-metallic ducts of the appropriate size that will sufficiently accommodate the cables being routed.
   • Care should be taken to ensure that cables are not exposed anywhere along the pathway. This means that proper fittings are required for all transition points (e.g. splice covers and drop ceiling fittings).
• Double-sided tape alone is NOT sufficient to hold the duct and should only be used in conjunction with anchoring devices mounted a minimum of every (5) five feet. Failure to comply will be corrected at the contractor’s expense.

• A minimum of two (2) -1/4” anchors shall also be used at every device and/or junction box. Failure to comply will be corrected at the contractor’s expense.

• Each cable will be uniquely identified and will have the same I.D. at the jack and network room and within one foot of termination; both station and cross connect sides.

**g. New Construction**

• At least one double gang outlet box will be installed on each wall opposing egress in every office. Where double gang outlet boxes are used and a plaster ring is required, the plaster ring (single or double gang) must have square inside corners.

• If a location requires more than (6) CAT6 cables, two 1” conduits or one 1 ¼” conduit should be run to a junction box that can accommodate up to (12 max) CAT6 cables. The specified dual gang Ortronics faceplate on page 11 shall be used.

• A 1” inch conduit shall connect the double gang outlet box to the nearest cable tray or J-hook. The conduit shall terminate within 6” of the nearest cable tray/J-hook and have appropriate bushing installed.

• Conduit will have a pull box after every 180-degree change in direction. Pull boxes will be in readily accessible locations.

• Exposed conduit, surface mount raceway, and raised flooring track is not allowed in new construction/renovations and can only be used with written permission from IS&T leadership.

• Minimum radius for bends shall be 10 ½” for 1” conduit, and the equivalent of long radius bends for larger sizes.

• Label all pull and junction boxes.

• A nylon pull string will be run in every empty conduit.

• Any conduit, pull box, or junction box that is not accessible or does not provide a clear and workable pathway will be replaced at contractor’s expense.

• During a renovation, **ALL** components of the existing telecommunications system shall be demolished (this includes removing outside plant cables/terminations/equipment back to the originating building) and
replaced with materials/practices/craftsmanship that comply with latest best practices and most recent University Structured Cabling Requirements document.

8. UTP Patch Panels
   • All CAT6A/CAT6 copper cables should be terminated using Legrand Ortronics - Clarity6 (or 6A where needed) 19-inch patch panels.
     • CAT6 Model - OR-PHA66U48
     • CAT6A Model - OR-PHA6AU48
   • WCU requires a mated cabling solution between the cable manufacturer and the patch panel/jack termination components for purposes of manufacturer warranty of the structured cabling system installation.
   • Provide minimum of 6 units (patch panels) at MDF and a minimum of 3 units (patch panels) at IDF locations. Provide additional units (patch panels) if required by quantity of cable runs to ensure that all ports shown are wired and terminated at patch panel.
     o CAT6 and CAT6A Angled- Patch Panels required in all MDF/IDF rooms.
     o CAT6A Angled- Patch Panels required in all DATA center installations.

9. UTP Patch Cords/Colors
   • Legrand Ortronics UTP patch cords shall be provided by the installation contractor for the entire project, both at MDF/IDF and for the corresponding end, for purposes of manufacturer warranty of the structured cabling system installation. All patch cables shall meet WCU’s standard coloring scheme as specified below.
     o 15’ patch cables shall be provided by the installation contractor for every network drop location and wireless access point drop.
       ▪ Blue CAT6 – Model # OR-MC615-06
       ▪ Green CAT6A – Model # OR-MC6A15-05
     o 9’ patch cables shall be provided by the installation contractor for every flat panel display and TVs.
       ▪ Blue CAT6A – Model # OR-MC6A09-06
     o 7’ patch cables shall be provided by the installation contractor for every patch panel termination.
       ▪ Blue CAT6 – Model # OR-MC607-06
       ▪ Green CAT6A (for wireless access point drops) – Model # OR-MC6A07-05
- Blue CAT6A (for flat panel displays and TV drops) – Model # OR-MC6A07-06
- CAT6 rated RJ45 will be used for MDF and IDF patching where CAT6 cables are terminated.
- CAT6A 10G rated RJ45 will be used for all DATA CENTER, WIRELESS ACCESS POINTS, FLAT PANEL DISPLAYS, and TV terminations.
  - Blue – Data/VoIP/HVAC/Vending/etc.
  - Green - Wireless Access Points

10. Network Data – Fiber Outside Plant and Riser Cable Specifications
- All OSP building feeder, riser, and horizontal optical fiber shall be manufactured by Corning. No Exceptions.
- A copper conductor shall be placed within the conduit system for locating purposes when nonmetallic optical fiber is installed, even if copper cabling is pulled in the same conduit system. This conductor shall be run from fiber source enclosure to fiber destination enclosure and labeled as to fiber count, source, and destination buildings.
- All fiber cables are to be terminated in a Corning 4U 19" rack-mounted enclosure (Model CCH-04U).
- All fiber shall be fusion spliced in conjunction with a Corning CCH Pigtailed Splice Cassette (Model CCH-CS12-59-P00RE) for OS2 single-mode.
- A six strand OS2 single-mode fiber shall be run from the MDF to the fire alarm control panel. The fiber shall be fusion spliced on either end using a Corning CCH Pigtailed Splice Cassette (Model CCH-CS06-D9-POORE) and terminate in a Corning wall mountable single panel housing (Model SPH-01P) as close as possible to the control panel. The MDF end can terminate in the 4U rack-mounted enclosure.

  a. Outside Plant Fiber Optic Cable
  - Outside plant cable shall be used for all applications where cable is run in underground conduits.
  - OSP fiber cable shall transition to listed cable or terminate within 50ft. of entering the building.
• Each tube shall contain up to 12 fibers. The number for fibers per cable will be determined.
• A minimum of 48 strands single mode fiber shall be run between buildings.
• All outside plant fiber shall be fusion spliced in conjunction with a Corning CCH Pigtailed Splice Cassette (Model CCH-CS12-59-P00RE) on both ends.
• Single mode fibers shall be terminated on “SC” connectors.
• Outside cable run underground shall be run in conduit.
• Outside cable shall be loose tube; gel filled utilizing non-hygroscopic, non-conductive, flooded core, homogenous gel.
• Use of EIA/TIA-598 color-coding is required.
• Buffer tubes requiring stripes shall have co-extrusion inlaid stripes of contrasting color.
• Pulling tension shall not exceed 400 pounds. If mechanical assistance is required to pull cable through conduit system, then the use of a tension limiting device and a force gauge is required.

b. Fiber Optic Riser Cable
• Riser cables are intra-building cables running between network rooms. These cables are run inside innerduct that is attached to a cable tray, J-hook system, or inside a separate 1” conduit connecting network rooms.
• A minimum of 24 strands of single mode fiber shall be installed (homeruns) between the MDF and every IDF network room. The fiber must be armored and plenum rated.
• Fiber optic riser cables shall be run without splices.
• All fiber cables are to be protected using innerduct or conduit.
• Single mode fibers shall be terminated on blue “SC” connectors.
• Installed single mode cable shall be 8.3/125 micron core/cladding, single mode glass fiber.
• Use of EIA/TIA-598 color-coding is required.
• Fiber riser cable shall be tight buffered, 900um, mechanically strippable.
• It is preferred that fiber be pulled through the cable tray/conduit system by hand power. The use of tension limiting devices is required when power winches or similar devices are utilized to pull cable.
• A service loop of 50’ minimum is required at each network room location.
• All enclosures shall have covers that can be closed.
• Each enclosure will be labeled, and each label will be machine printed with permanent ink.
c. Testing Riser, Underground, Aerial Fiber Cable
   • All fibers shall be tested after the termination process is complete.
   • It is the responsibility of the vendor to supply all equipment necessary to test and document all terminated fiber.
   • All fiber shall be tested to EIA/TIA specifications and standards.
   • All fiber shall be tested in one direction with an OTDR. The OTDR needs to be calibrated within the last year of the first test date prior to testing.
   • All fiber shall be tested in both directions with a power meter and source.
   • As built drawings for all fiber optic cable are required.
   • After testing, any fiber that is determined to have excessive attenuation due to broken fiber, excessive bending, bad splices, or defective connectors is not acceptable and will have to be replaced.

d. Fiber Patch Cords
   • Corning patch cords shall be provided by the installation contractor for the entire project, this includes all Single Mode patch cables for all termination points in both MDF and IDF closet LIU enclosures.
   • **Single Mode** - SC/LC  3 meters

11. Wireless Networking Specifications
   • WCU has standardized on Aruba Networks Access Points for campus wireless networking.
   • The WCU campus wireless network is an extension of the wired network into open spaces for mobility and convenience, as well as an overlay of the wired network inside buildings. While it is a more economical way to provide network access in dense client environments, such as classrooms and lecture halls, it is not meant to be a total replacement for the campus wired network.
   • All indoor and outdoor wireless access points are to be installed by the awarded low voltage contractor, and MAC address stickers are to be placed on provided prints as to note the location of access points. These prints shall be returned on a per floor basis to the WCU IT Infrastructure Services Network Operations Manager after all access points have been installed on a floor.
   • Wireless access point locations will be determined by the West Chester University networking staff.
   • The mounting height of all outdoor wireless access points should be no higher than 19 feet off finished grade and no lower than 13 feet off finished grade.
   • All outdoor wireless access points need to be properly grounded in accordance with the manufacturer’s specifications. This includes installing
Ethernet surge protectors (called out on in the Outside Plant Copper Cable section page 9).

Data Closet Security

MDF and IDF should be physically protected in proportion to the criticality, functional importance, and data classification.

1. **MDF and IDF closet protection measures include:**
   - Separated, locked, and designated limited access areas.
   - Access keys, which are compliant with the campus key plan for telecommunication closets.
     - Campus keyless entry system is to be implemented for access; doors should be categorized to be part of the already existing infrastructure services closets.
   - MDF closets should be equipped with cameras to monitor the protection of the equipment and access to the room.
     - IDF closets do not need to have camera protection.
   - All network rooms shall have a properly sized fire extinguisher located inside the room near the door.

Testing and Documentation

1. **Reference Documents**
   - This section further defines the complete end-to-end channel requirements for the proposed CAT6/6A structured wiring system.
   - The latest edition of referenced standards (from the latest available draft in the case of proposed standards) shall be the controlling document. Where the standards appear to conflict with one another, the one with the most stringent requirements shall be applicable.
     - ANSI/ICEA S-90-661
     - CSA
     - UL 444
     - ANSI/TIA/EIA-568-B series (supersedes TIA/EIA-568-A series) , Commercial Building Wiring Standards
     - ANSI/TIA-942, Telecommunications Infrastructure Standard for Data Centers
     - ISO/IEC 11801
     - CENELEC EN50173: 1995
     - NEC, NFPA70
2. **Applicable Testing Standards/Warranty**
   - Testing of individual components and channel shall be conducted in accordance with the following standards:
     - ANSI/TIA/EIA-568-A-1, Propagation Delay and Delay Skew Specifications for 100 Ω 4-pair cable, 1997
     - ANSI/TIA/EIA-568-A-4, Production Modular NEXT Loss Test Method and Requirements for Unshielded Twisted Pair Cabling, 1999
     - ANSI/TIA/EIA-568-A-5, Transmission Performance Specifications for 4-pair 100 Ω Category 5e Cabling, 1999
     - TIA/EIA-568-B.2-10
   - All test equipment to be used for certification tests on any and all Cat.3, 5,5e, 6 and CAT6A cabling installed on this campus must be approved by the university prior to testing. **Must be tested with the latest Fluke Networks cable testing equipment.**
   - Testing both ways per TIA/EIA TSB # 67 with documentation is mandatory **NO EXCEPTIONS!** All testing shall adhere to the TIA TSB 67 for certifying CAT6/6A installations or the installed medium’s required CATEGORY certifications test requirements (i.e. 5e or proposed CAT6).
   - Documentation is required in both a hard copy and an electronic copy upon completion. This includes as-builds of all jack locations and cable pathways.
   - This documentation is required for both copper and fiber installation.
• A full installation/certification **warranty** shall be provided upon completion of all work.
Typical MDF Layout

- Corning OSP 48 Strand SM: Terminated Using 12 Strand Corning CCH/Pigtailed Splice Cassette (CCH-C512-S9-PO4H)
- Corning Riser 6 Strand SM to Fire Panel, Terminated using 6 Strand Corning CCH/Pigtailed Splice Cassette (CCH-C512-S9-PO4H)
- Corning Fiber Housing (CCH-04U)
- Corning Fiber Housing (CCH-04U)
- 25 Pair Copper Punch Down Terminated on a 48 Port Patch Panel Ortronics PHA66U48 From Wall Field in MDF

Circuit A
- Building/Generator Power
- LS20R Receptacle (Dedicated)

Circuit B
- Building/Generator Power
- LS20R Receptacle (Dedicated)

Circuit C
- Building/Generator Power
- LS20R Receptacle (Dedicated)

Circuit D
- Building/Generator Power
- LS20R Receptacle (Dedicated)

Circuit E
- Building/Generator Power
- LS20R Receptacle (Dedicated)

Circuit F
- Building/Generator Power
- LS20R Receptacle (Dedicated)

Circuit G
- Building/Generator Power
- LS20R Receptacle (Dedicated)

Circuit H
- Building/Generator Power
- LS20R Receptacle (Dedicated)

Cisco VG310 Analog Gateway

Juniper EX4650 Routers

Chatsworth 30310-719 Front Panel Management, Black

Tripp Lite PXU/MP20-ISO Circuit A/B/C/D

Chatsworth 4633-703 12" Width Vertical Manager, Black

Tripp Lite SMART2000RMLXN On Circuit B/D/F/N
Tripp Lite rack mount 12" (2P0STRM12"WM)

Tripp Lite BR12V27-2US External Battery Pack

Chatsworth 30305-703 6" Width Vertical Manager, Black

Juniper EX4300 48-Port POE+ Network Switch

Chatsworth 10 Hide Racks, Black

Chatsworth Ladder Rack, Black

48 Port Patch Panel Ortronics PHA66U48

Building LOAD 520

Policy SMART-PRO - UPS

Circuit F

Chatsworth 30306-703 10" Width Vertical Wire Management, Black
Typical IDF Layout

Circuit A
Building/Generator Power
LS20R Receptacle (Dedicated)

Circuit B
Building/Generator Power
LS20R Receptacle (Dedicated)

Circuit C
Building/Generator Power
LS20R Receptacle (Dedicated)

Circuit D
Building/Generator Power
LS20R Receptacle (Dedicated)

Circuit E
Building/Generator Power
LS20R Receptacle (Dedicated)

Circuit F
Building/Generator Power
LS20R Receptacle (Dedicated)

Chatsworth Ladder Rack, Black

48 Port Patch Panel
Ortronics P666U4B

Chatsworth 3000-6703
12" Width Vertical Wire Management, Black

Chatsworth 4’-6” Standoff Bracket, Black

Tripp Lite PDUMH10-ISO
Circuit A/C/E

Tripp Lite SMART2000WMOLN
On Circuit B/D/F
Tripp Lite rack mount kit (2POSTRMK15WM)

Tripp Lite BMXVL7-2US
External Battery Pack

Chatsworth 30130-719
2U Horizontal Wire Manager, Black

Chatsworth 46353-703 19"EIA
Two Port Rack; Two Heavy Duty Top Angles, 7’H, 45U, Black

25 Pair Copper Punch Down Terminated on a 48 Port Patch Panel Ortronics P666U4B From Wall Field in MDF

Gomring Riser 24 Strand SM from MDF - Terminated Using 12 Strand Gomring CCH Pigtailed Splice Cassette (CCH-5112-59-0000E)

Gomring Fiber Housing (CCH-04U)

Network Switch
Typical MDF Layout

1- Fire Extinguisher
Typical IDF Layout

1- Fire Extinguisher
IS&T Policy Number: ISP-NET002
IS&T Domain: Networking

Reviewed by: Kevin Partridge, IS&T Executive Director of IT Infrastructure Services and Deputy CIO
Policy Owner: Dan Brader, Network Operations Manager
Approved by:
  JT Singh,
  AVP Information Services & Technology
  1/24/20
Effective Date: 1/24/20
Next Review Date: Under Review

History:
  2/23/2021 – Renumbered from ITP-NET002 to ISP-NET002

Initial Approval:
Review Dates:
Amended