APPENDIX – Communications and IT Closets

Document revision history: 08/2019 – Original Publication

Date	Section	Description of Change

PART 1 – GENERAL

1.1 Design Summary

a. This document is intended to provide a high level overview of the requirements of network communications to be followed during the design process of any building renovation or new construction project.

b. It should be noted that the University of Oregon provides its own network systems engineering and design services through its Information Services department. This design work shall be coordinated with the design team on any project. All design work will be approved by Information Services.

c. Network communications in this context is broadly defined as virtually any communications technology in use at the University of Oregon. For the purpose of this document, we will focus on telephone and computer networking, both wired and wireless.

d. There are four major areas that must be accommodated in the design of a facility: space, pathway, cabling, and network communications equipment.

1.2 Spatial Requirements

a. *Building Entrance Terminal (BET):* This is a space where the communications cabling enters the building from the campus tunnel or conduit system. Each building is required to have this space. It space must be located near the electrical service entrance and is the location where primary and secondary protection is installed on all metallic cabling entering the building to protect building occupants and equipment from stray voltages, currents, and lightning strikes. This room must provide adequate space to provide for the protection as well as cross connects to the building backbone cabling system. If the BET is not combined with the MDF described below, no special environmental conditioning is required beyond the general building HVAC.

b. *Main Distribution Frame (MDF):* This is a centralized, environmentally conditioned facility that houses networking equipment that is common to the building as a whole. There will only be one MDF per building. The MDF houses centralized building service equipment such as telephone system modules, local area networking equipment, specialized network services, Distributed Antenna System (DAS) and other building- level networking equipment. The MDF shall be a minimum of 14’ x 8’. If the MDF will house the buildings DAS, the size of the MDF will need to be 20’ x 8’ to accommodate this additional equipment.

c. The BET and MDF should be combined to optimize space planning. It is anticipated that all U of O facilities will have combined BET and MDF spaces.

d. *Intermediate Distribution Frame (IDF):* IDF’s are similar to the MDF’s described above, but provide a much more limited function. The equipment in an IDF will provide service only to a floor or part of a floor of a building. The IDF shall be centrally located to minimize cabling length to station outlets. In some instances, it will be acceptable to combine multiple floors or multiple parts of floors into one IDF. An IDF will be a minimum

of 10'x 8'. Information Services will make the final determination of IDF size based on the density of equipment and infrastructure required in the space.

1.3 Program Requirements

a. Communication spaces are not to be shared with another program or use. (These spaces may not double as a custodial closet, storage, etc.)
   - Within renovations, these spaces may be shared with electrical room functions, however, if these spaces are shared with electrical, sufficient cooling shall be provided to cool the heat load of electrical devices.

1.4 Qualifications

a. Access
   - The doorway shall be one outward opening lockable 36 inch by 84 inch door. The threshold shall be flush with the finished floor.

PART 2 – PRODUCTS

2.1 Finishes

a. Refer to Division 09 for finishes.

2.2 MEP Systems

a. Mechanical
   - The MDF and IDF require that HVAC be provided on a 24-hour-a-day, 7-day-a-week basis with standby power. The environmental limits of these rooms are 65 to 75 degrees Fahrenheit (70 degree set point) and 30 to 55 percent relative humidity.

b. Electrical
   - Electrical power to MDF and IDF rooms shall be provided with standby power.
     i. If these rooms are located below grade, they must be equipped with a sump pump system on standby power.
     ii. HVAC systems to be on standby power.
   - These rooms must be lit with a minimum illumination of 50 foot candles with fixtures coordinated with network communications equipment to ensure good lighting throughout the rooms.

c. Pathways
   - The building BET or BET/MDF combination shall be equipped with at least two 4" conduits stubbed to the campus steam tunnel system for provision of campus network services to the building. These conduits shall either be PVC encased in concrete or RMC/IMC conduit. In certain instances, additional 4" conduits may be requested by Information Services.
   - There shall be at least two 4" conduits running from each IDF to the MDF.
   - Building pathways shall consist of cable tray in hallways or other common and direct path through the building.
     i. The cable tray or large conduits from the cable tray shall stub into the serving MDF or IDF.
   - Building pathways shall consist of cable tray in hallways or other common and direct path through the building.
   - Conduits from station locations shall stub to the cable tray.
     i. Conduits sized 2" or larger shall have no more than 180 degrees of bend or 100 feet between pull points. Conduit bodies are not allowed on conduits 2" and larger.
     ii. Conduits smaller than 2" shall have no more than 270 degrees of bend or 100 feet between pull points. Pull points shall be appropriate sized junction boxes.

- Individual station outlets will be served by at least a 1" conduit run from the nearby cable tray to station location that will be equipped with a 4" deep square box with a single gang mud ring. Station outlets that require Cat 6A cable will be served by a 1 ¼" conduit.
- Additional pathway requirements will be outlined during the detailed design process.

d. Cabling
   - The University of Oregon Information Services department will provide detailed specifications for cabling installed on any University of Oregon project. As of this writing, the University of Oregon horizontal cabling standard is:
     i. Four (4) extra headroom category 5e cables to each station outlet.
     ii. Augmented Category 6 (Cat6a) cabling will be specified and installed for some applications.
     iii. Cable TV is supported via RG6 with at least 66% braid.
     iv. Backbone cabling includes single mode fiber optic cable, multi-pair telephone cable, and .500 rigid cable TV cable (if applicable).

e. Plumbing
   - Water, sewer, or steam lines are not allowed to pass through either the MDF or IDF. If these rooms are located below grade, they must be equipped with a sump pump system powered off of the standby power source. These rooms should not be located under locations that would introduce water (kitchens, restrooms, etc.).

PART 3 – EXECUTION

3.1 Installation

a. Owner Furnished Owner Installed Materials
   - Network Communications Equipment:
     i. Equipment Installation and Services: All network communications equipment necessary to provide network services (wired and wireless) and voice services will be provided by Information Services. Vendors and other U of O groups will not be allowed to provide equipment to distribute these services. This includes but is not limited to the installation of routers, hubs, switches, phones and wireless access points (WAP) on the U of O network.
   - All network design work will be performed by Information Services.

3.2 Interface with other systems

a. Building Systems: All building systems that depend on connectivity to the U of O network will be required to receive approval from Information Services. These systems include, but are not limited to:
   - Building automation systems (BAS)
   - Electrical metering
   - Audio/video
   - Access control/security.

b. Each vendor or U of O group that intends to connect a system to the U of O network will need to provide detailed network specifications for each system. These specifications will be reviewed for approval by Information Services. Once a particular system is approved, it will be added to a master list of approved systems.

c. Below is a list of required specifications, recommended specifications, and unsupported features to consider when proposing a new system. This list may not be all-inclusive, but is intended to serve as a starting point.

d. Requirements:
   - Must have;
     i. an RJ45 Ethernet port

- Must support;
  i. a star based cabling topology
  ii. 100-Base-T Ethernet or greater
  iii. IPV4 networking
  iv. unicast
  v. Dynamic Host Configuration Protocol (DHCP)

e. Recommended:
- Supports;
  i. IPv6 networking
  ii. multicast
  iii. Role Based Access Control (RBAC)
  iv. 802.1x
  v. Access Control Lists (IP Filtering)
  vi. Stateless Auto Configuration (SLAAC)
  vii. Power Over Ethernet (PoE)
  viii. Link Aggregation Control Protocol (LACP)

f. Features not supported on the UO Network:
- Wireless only devices
- Broadcast only systems
- Quality of Service (QoS)
- Serial connected devices
- Fiber only devices
- Daisy-chained or ring cabling topology

3.3 Testing

3.4 Training