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OVERVIEW

1. Networking and Telecommunications Infrastructure Budgets

1.1. Emory Office of Information Technology (OIT) infrastructure budgets are required for all Emory owned properties or leased space. OIT infrastructure budgets are prepared in accordance with the OIT Building Design Standards outlined in this document, which are a collection of requirements that architects and engineering consultants must adhere to when addressing communication needs for new and renovated buildings as well as leased space. The standards provide a baseline for the design of pathways and spaces. Designing and budgeting with these standards in mind effectively allows Emory University to maximize the benefits of a common, facility based infrastructure, establish meaningful budgets, allocate space and more effectively plan how technology is integrated into a new construction project or existing facility. The Building Design Standards may be modified based on the size and scope of the project but must be approved by the OIT Project Manager (PM) assigned to the project. Once a request for budget is submitted to the Project Management Office (PMO) a PM is assigned and a feasibility budget is prepared. During this early stage of a project, specific site plans may not be available to accurately determine the true requirements of the occupants. To that end, the PM designs the space and cabling requirements based on the information provided.

1.2. Infrastructure Budgets may include but are not limited to the following:

- Required network service entrance – typical for remote sites (AT&T/Charter)
- Building entrance cable – copper/fiber
- Riser connectivity between floors – copper/fiber/coax
- Build-out of communications closets
- Estimated low voltage cabling for work stations
  - (2) Cat6 drops per workstation - typical
- Network electronics – sized for occupants
- Estimated Phone budget – new vs. relocations
- Emory CATV
- Wireless Access Points – Coverage based on feasibility drawings
- Distributed Antenna System (DAS) for Cellular/Radio/Messaging
- OIT labor – Engineer/Coordinator/Project Manager/Move-in
- Contingency – returned to project if not used

1.3. Once a budget has been submitted, the PM for the project will revise the estimate as more detailed information becomes available. It is important to understand the costs associated with a feasibility budget compared to a detailed estimate based off of occupant requirements so a meeting with the customer and OIT PM is strongly encouraged to review the budgetary numbers and provide details into the design and estimate criteria. If for any reason there are questions about the estimate, please work through the OIT PM for escalation or resolution to any areas of concern. It is our goal to provide an accurate and detailed budget so that the user can make an informed decision.

Please note: Exclusion of IT Infrastructure components (e.g., DAS, wireless) from any budget must be approved in writing by the Enterprise CIO and Senior Provost for Library Services and the Vice President for Campus Services.

2. Services

2.1. Private Emory-owned networks carry Data, Computer Services and Wi-Fi Services. The design of cable distribution should be coordinated and campus tie-in determined on a case-by-case basis through the OIT PM.

2.2. Voice Service is carried privately by Emory University, OIT. The design of cable distribution should be coordinated and campus tie-in determined on a case-by-case basis through the OIT PM.

2.3. Video Service is carried privately by Emory University, OIT. The design of cable distribution should be coordinated and campus tie-in determined on a case-by-case basis through the OIT PM.
2.4. **Paging and Two-way radio** is carried privately by Emory University, OIT. The design of cable distribution should be coordinated and campus tie-in determined on a case-by-case basis through the OIT PM.

2.5. **Audio Visual** – The design/installation of audiovisual technologies in support of conference rooms or digital displays, are **not** included in the OIT scope of work. Please coordinate this effort with occupants.

3. **Drawings**

3.1. Drawings **must be provided in the form of electronic files** during all phases of construction. Drawings and design documents should be delivered to the assigned OIT PM.

### DIVISION 27 STANDARDS

### SECTION 27 00 00 COMMUNICATIONS

1. **General**

1.1. The information in this section should be used as a guideline for the design of communication spaces. It is both owned and maintained by the Emory University, OIT Division with updates occurring on an annual basis. It should be used by the Architect for the programming of communications spaces as described within. This document is intended primarily for building infrastructure such as pathways and spaces in order to support voice, data and video cabling.

1.2. The major organizational sections are:
   - 27 05 26 Grounding and Bonding for Communications Systems
   - 27 05 28 Pathways for Communications Systems
   - 27 05 28.29 Hangers and Supports for Communications Systems
   - 27 05 28.31 Riser Pathways
   - 27 05 28.33 Conduits and Backboxes for Communications Systems
   - 27 05 28.36 Cable Trays for Communications Systems
   - 27 05 28.39 Surface Raceways for Communications Systems
   - 27 05 43 Underground Ducts and Raceways for Communications Systems
   - 27 10 00 Structured Cabling
   - 27 11 00 Communications Equipment Room Fittings
   - 27 21 33 Data Communications Wireless Access Points
   - 27 26 26 Data Communications Integration Services
   - 27 32 23 Elevator Phones
   - 27 32 26.01 Emergency Blue Light
   - 27 32 26.03 Gate Controls
   - 27 32 26.05 Fire Alarm Panels
   - 27 53 19 Internal Cellular, Paging, Distributed Antenna System

1.3. Refer to the appropriate industry standards listed below for any information that is not covered in the above sections.

### 2. Standards, Codes, & References

- Building Industry Consulting Service International (BICSI)
- Telecommunications Distribution Methods Manual (TDMM)
- Network Design Reference Manual
- Customer-Owned Outside Plant Design Manual
- Wireless Design Reference Manual (BICSI)
- Electronic Security (BICSI)
SECTION 27 05 26  GROUNDING & BONDING FOR COMMUNICATIONS SYSTEMS

1. Grounding & Bonding

1.1. A ground bus (CPI 13622-010 copper ground bar or equivalent and TIA/EIA 607 compliant) must be installed on the back wall of each Communications Room.

1.2. All wire used for communications ground applications must be no smaller than AWG #3/0.

1.3. Two paths to ground must be created and bonded to the ground bus bar in each communications room for the purpose of creating a redundant communications ground system (note accompanying vertical requirements diagram). One ground path leads to the building main electrical ground and should bond within two (2) to three (3) Feet of the ground connection for the main electrical panel. The second ground path leads to building metal frame in proximity to the Communications Room.

1.4. Communications ground systems must be Meggar tested to 10 ohms or less.

1.5. Ground bus bars must be mounted 18 inches above the finished floor and, along with the associated grounding riser, must be placed or routed in a manner that does not obstruct backboard space.
SECTION 27 05 28.29 HANGERS & SUPPORTS FOR COMMUNICATIONS SYSTEMS

1. Hangers & Supports

1.1. J-hook Pathways
   1.1.1. Cable hooks (J-hooks) are a suitable alternative to cable tray only when the planned capacity of the pathway system is 50 cables or less.
   1.1.2. Use and design of J-hook pathways must be coordinated with and approved by the OIT PM.
   1.1.3. Unless otherwise noted by the OIT PM for a particular project, J-hook routing and installation is part of the building infrastructure and is within the scope of the general contractor. The routing and design must be coordinated with the OIT PM.
   1.1.4. J-hook pathways are to be installed in accordance with industry standards (not to exceed 48-60 inches between supports).
   1.1.5. Pathways are not to be routed across adjacent office spaces.

END OF SECTION 27 05 28.29

SECTION 27 05 28.31 RISER PATHWAYS

1. Riser Pathways

1.1. A minimum of five (5) four-inch sleeves with bushings must be installed between stacked communications rooms. Sleeves must extend four (4) inches above and below the floor, and must be no farther than four (4) inches from the wall.
1.2. Cores only are not permitted.
1.3. With regard to non-stacked rooms, conduit turns must be installed with sweeping radiiuses having no more than two (2) 90-degree bends. The inside radius of the conduit bends must never be less than ten (10) times the internal diameter of the conduit.
1.4. All riser sleeves and conduits must have bushings, must be installed with measure tape (200 pounds or equivalent) and must be fire stopped.
1.5. All sleeves must be sealed or waterproofed around their perimeter to avoid any leakage to the floor below in the event of a water leak.
1.6. Space within the riser conduits specified in this document is intended for OIT only. Any planned use of the riser must be coordinated and approved by the OIT PM.

END OF SECTION 27 05 28.31

SECTION 27 05 28.33 CONDUITS & BACKBOXES FOR COMM. SYSTEMS

1. Workstation Conduit

1.1. Space within the workstation conduits specified in this document is intended for OIT only.
1.2. Where accessible lay-in type ceiling is used, a one-inch conduit with bushings must connect from the outlet box and run to the cable support system in the adjacent corridor.
1.3. In areas where the ceiling is inaccessible, the one-inch conduit with bushings must connect from the outlet box, run above the ceiling and continue to a point where it can be accessed for pulling cable. Pull String must be provided. A maximum of two (2) bends are allowed, and no breakout points are allowed. Inaccessible ceiling must be avoided where high concentrations of voice/data cabling are present or anticipated in the future. In situations such as an office with inaccessible ceilings, consideration should be given to include empty conduit and wall boxes on opposing ceilings in order to facilitate future moves, adds or changes. This will need to be coordinated with the OIT PM.
1. Although not preferred, the one inch conduit with bushings may home run from the outlet all the way back to the local communications room. A maximum of two (2) bends are allowed and no breakout points are allowed. Pull String must be provided.

1.5. Drop conduits longer than 25 feet, including home runs, must be labeled with room numbers where the conduit terminates, and must be installed with Pull String.

1.6. Flexible conduit is not allowed.

1.7. Firewall penetrations in corridors should be sized according to cable quantities and fire stop requirements.

2. **Workstation Outlet Boxes**

   2.1. **Wall Locations**
   
   2.1.1. Space within the outlet boxes specified in this document is intended for OIT only.
   
   2.1.2. Communications outlet boxes must be four inches by four inches by 2¼ inches electrical boxes with a single gang plaster ring.
   
   2.1.3. The outlet boxes must be mounted at least 18 inches on center above the finished floor.
   
   2.1.4. Outlets above counters must be 12 inches on center above the counter if the counter does not have a back splash, and six inches on center above the back splash if the counter does have one.
   
   2.1.5. A minimum of eight inches on center of clearance must be maintained around the outlet.

   2.2. **Wall Phone/Jack Locations**
   
   2.2.1. Communications outlet boxes for wall mount phones must have single gang electrical box. Plaster mud rings are not allowed for the stability of the phone.
   
   2.2.2. Communications outlet boxes for wall mount phones must meet ADA regulations which require 48" AFF with no more than 4 inches protrusion from the wall, phone inclusive.

   2.3. **Modular Furniture**
   
   2.3.1. Designers must consult with OIT PM when making a selection during schematic design phase.
   
   2.3.2. Any communications floor outlet applications must be coordinated and approved by OIT PM.
   
   2.3.3. The selection of modular furniture solutions must be coordinated with OIT PM.
   
   2.3.4. Furniture placement must be taken into consideration when lying out communications jacks and wiring schemes. The design including conduit sizing and wall box specifications must be coordinated with the OIT PM in the case of ganged modular furniture. Access to communications outlets must not be obstructed by furniture installations. If it appears that restricted access is unavoidable, special plans must be made in advance to either relocate the jacks on the wall or possibly install jacks directly in the furniture.
   
   2.3.5. Additional outlet boxes are required for video applications.

   2.4. **Power Outlets**
   
   2.4.1. Electrical power for connecting occupant voice/data/video devices must be made available wherever communications outlets are planned.
   
   2.4.2. One duplex electrical outlet must be installed in close proximity of each CATV outlet.

END OF SECTION 27 05 28.33

SECTION 27 05 28.36 CABLE TRAYS FOR COMMUNICATIONS SYSTEMS

1. **Cable Trays**

   1.1. Space within the horizontal pathway system specified in this document is intended for OIT only.
   
   1.2. Cable tray is required in any building requiring OIT services.
   
   1.3. Design of cable tray systems must be coordinated with appropriate OIT PM.

   1.4. The use of wire “basket tray” is acceptable and may realize a cost savings from both price and ease of installation.
   
   1.4.1. The cable tray must be single tiered and must be installed to allow 12 inches of open space above and to one side of the tray.
1.4.2. The volume of cable being installed at construction, as well as future growth projections, will determine actual type and dimensions of cable tray.
1.4.3. Cable trays are to be installed in all corridors and hallways and should not be installed above individual offices, conference rooms or restrooms.
1.4.4. A minimum of two (2) four-inch conduits must be used in place of a cable tray when installation involves passing over inaccessible ceilings and entrances into communications rooms. Additional conduits may be required as cable volume dictates. Determination of conduit requirements must be coordinated with appropriate OIT PM.

Appendix B: Typical Communications Horizontal Requirements

END OF SECTION 27 05 28.36

SECTION 27 05 28.39 SURFACE RACEWAY
1. Surface Raceway

1.1. The design of raceway, communications poles, modular furniture & floor-mounted devices will be coordinated with OIT PM.

END OF SECTION 27 05 28.39

SECTION 27 05 43 UNDERGROUND DUCTS & RACEWAYS FOR COMM. SYSTEMS
1. Underground Ducts & Raceway

1.1. An entrance conduit bank must be constructed from the building entrance communications room to an appropriate location, as determined by OIT, for the purpose of connection to existing OIT infrastructure.
1.2. Trenches for underground conduits should be excavated to required depths. Bottoms of trenches should be tamped hard and graded as required. If rock is encountered, trench should be excavated to a depth of six inches below bottom of pipe. Before laying pipe, the space between bottom of pipe and rock surface should be filled with gravel and thoroughly tamped. After testing, inspection and approval by Project Engineer and local inspecting authorities, trenches should be backfilled with clean dirt as follows:
   - Backfill should be installed in layers six inches deep, and should be adequately tamped and wetted or flushed before the next layer of earth is laid in place.
   - Backfill should be compacted to 95% density and this process continued until trenches are filled.
   - No roots, rocks, or foreign materials of any kind are to be used in back-filling trenches.
   - Contractor should furnish all additional material required, and should remove excess materials and debris from site.
1.3. A minimum of three (3) four-inch conduits (schedule 40) should run between the service manhole outside of the building and the entrance to the communications room. Outdoor conduit banks must be encased in concrete. The top of the conduit bank must be buried at least 24 inches below grade surface. Reduction in the quantity of entrance conduits must be approved by OIT PM.
1.4. Buried/encased conduit should be placed at a depth of no less than thirty inches below surface, except for locations where underground obstructions such as steam tunnels or gas lines prevent the practical installation at this depth, and shall be installed with a sensing tape.
1.5. Conduit runs should be placed as straight as possible with no more than two (2) 90 degree bends, using a minimum 40 inch radius (48 inch radius preferred). All new conduits and existing conduits used by the contractor should be roped and free from sharp edges or burs. All conduits should have a #10 gauge THHN or #10 steel galvanized pull wire.
1.6. Conduits must be clean, obstruction free, debris free, dry, and capped at both ends with a waterproof cap. Building entrance conduits that are used (populated with cable/fiber) should be waterproof-sealed to prevent water entrance into the building.
1.7. Building entrance conduits entering through the floor should be turned up six inches above the slab at the Plywood backboard. Conduits should be located as close to the wall as possible to allow for maximum utilization of the floor space.
1.2. Conduit turns must be installed with sweeping radii having no more than two (2) 90 degree bends without some form of breakout point (e.g. manhole or breakout box). The inside radius of the conduit bends must never be less than ten (10) times the internal diameter of the conduit.

1.9. Conduit runs must not exceed 500 feet without a breakout point.

2. NEC ARTICLE 800.2 DEFINITIONS

2.1. **Point of Entrance**: Within a building, the point at which the wire or cable emerges from an external wall, from a concrete floor slab, or from a rigid metal conduit or an intermediate metal conduit grounded to an electrode in accordance with *NEC 800.100(B).*

3. NEC ARTICLE 800.50

3.1. Outside plant cables are typically unlisted because of the sheath material and filling compounds used within the cables. In the United States the *NEC* allows the use of exposed OSP cable for the first 15m/50ft at the building entrance. Per BICSI TDM: “**further away than 15m/50ft** but still relatively close, the most cost effective solution is to enclose the cable in a **rigid or intermediate metal conduit** for the conductive cables, grounded in accordance with the *NEC* and local building codes.”

3.2. All conduits with bushings must be installed with measure tape, and must be non-corrosive with a pulling strength of 200 pounds or equivalent & must be obstruction-free and capped off at both ends.

3.3. The conduit design must take into account the proper slope to prevent water accumulation entering the building.

3.4. Space within the entrance conduits specified in this document is for OIT only.

**END OF SECTION 27 05 43**

**SECTION 27 10 00 STRUCTURED CABLING**

1. Structured Cabling

1.1. Horizontal cable selection, placement and termination shall be the sole responsibility of OIT.

1.2. **ABANDONED CABLING MUST BE REMOVED**, and shall be considered a part of the project’s budget. In the case of a renovation project, it is at the discretion of the OIT Project Manager to determine if existing cabling meets standards, or if replacement cabling will be required. Both removal and replacement are considered part of the project expense and should be budgeted as part of the project.

2. NEC 800.2 DEFINITIONS

2.1. **Abandoned Communications Cable**: Installed communications cable that is not terminated at both ends at a connector or other equipment, and is not identified for future use with a tag.

**END OF SECTION 27 10 00**

**SECTION 27 11 00 COMMUNICATIONS EQUIPMENT ROOM FITTINGS**

1. Communications Equipment Room Fittings

1.1. The construction project must include communications room requirements such as backboards, sleeves, conduits, and grounding components necessary for the managed routing and grounding of communications cabling within the communications rooms. Cable tray design and installation will be the responsibility of OIT PM.

1.2. The construction project will provide all space, power, lighting, and HVAC requirements necessary for the delivery of OIT.
1.3. Communications rooms must be placed on all floors. The doors must open out (unless prohibited by code) in order to enable maximum use of space. The room entrances must be placed on an adjacent hallway to allow easy access to rooms during system outages and future equipment installations, and to ensure that after-hours access is available (24 hours a day, 7 days a week).

1.4. Each room must be placed at a location, which minimizes the length of the vertical and horizontal distribution system and is as close as possible to the geographic center of the building, keeping average cable runs to 150 feet with a maximum of 295 feet.

1.5. Satellite rooms are required where horizontal cable runs exceed 295 feet or where circumstances such as high-density communications applications (more than three drops per 100 square feet) are required.

1.6. The minimum height of the ceiling in Communications Equipment Rooms should be no less than 102 inches. False ceilings are not permitted within the Entrance Facility Room and Communications Equipment Room. Obstructions such as lighting fixtures, air ducts, and cable trays should be no less than 90 inches from the floor throughout the rooms.

1.7. The Entrance Facility Room will be located close to where the voice, data and video cables actually enter the building; it must connect to both the entrance cable pathway and the building backbone pathway. The ideal location would be within 50 feet of the building cable entrance point (this may be 50 feet from the point where the cable exits the continuous entrance conduit) and situated either on the ground floor or in the basement. This location should provide accessibility for the delivery of large equipment.

1.8. The Communications Equipment Room should be vertically aligned with the building's vertical riser system. The room should be located in the center of the space that it serves, in order to minimize wiring distances from the room to the communications faceplate. The room must be connected to the building backbone pathway. The location should allow accessibility for the delivery of large equipment. These rooms should be used for communications equipment only; it is to be separate from spaces used for such things as building electrical services, fire alarm, building mechanical services, janitorial services and general storage. If security equipment will be placed in the room, OIT PM must approve placement and installation.

1.9. Access to Communication Equipment Rooms must be direct and not be through any other room.

1.10. Communications rooms must be sized according to floor space as follows:
   
   • Up to 10,000 square feet; 10 feet by 11 feet.
   • Up to 8,000 square feet; 10 feet by 9 feet.
   • Up to 5,000 square feet; 10 feet by 7 feet.

1.11. Plans for any floor exceeding 10,000 square feet will require additional space in the form of either an increased room size or the placement of a satellite room on the floor. Any requested changes in closet design or sizing will be coordinated with and approved by the OIT PM.

1.12. Satellite communications rooms must be no smaller than 6 feet by 8 feet and must meet the same specifications as standard communications rooms. A minimum of two (2) four-inch conduits must be installed between a satellite room and the main communications room for the same floor.

1.13. Communications room door size must be a minimum of three feet wide and six feet eight inches tall. (These measurements do not include the doorsill or center post.)

1.14. Room shape should be as square as possible, with continuous walls to maximize the use of space.

Appendix A: Communication Room Footprint

1.15. The communications room environment must have a temperature range of 64 to 75 degrees Fahrenheit. Typical BTUs for the space are approximately 17,000. The temperature must be measured at five feet above the finished floor, and must not vary by more than or less than five degrees Fahrenheit. Relative humidity must remain between 20% and 60%. The humidity change must not vary by more than or less than ten percent. Adequate lighting is required and must be a minimum of 50 foot-candles measured three feet above the finished floor. Floor loading must be at a range of 50 to 200 pounds per square foot.

1.16. Communications room HVAC circuits should be on generator power, when available. In the case of life critical situations, both generator back up with UPS back up and conditioning will be required. In some cases other critical technology based devices may also require a building UPS back up solution.

1.17. Under normal building operating conditions communications equipment rooms require the HVAC system to function properly at all times (24 hours per day, 365 days per year) which cannot be overridden by the building automation system. If
the building’s HVAC system cannot ensure continuous operation (including weekends and holidays), provide a stand-alone HVAC unit with independent controls for the Equipment Room. Condensation from a stand-alone HVAC unit must be addressed, i.e. drip pan, drain line, etc., so as not to compromise equipment operation. If emergency power and HVAC sources are available in the building, connect the Equipment Room to them.

1.18. The HVAC system that serves the Equipment Room should be tuned to maintain a positive air pressure differential with respect to surrounding areas. Equipment to control humidity and air quality will be provided as warranted.

1.19. There must be a minimum of two (2) four-inch conduit sleeves or OIT approved fireproofed access product installed from the ceiling area of the communications room to the corridor pathway system in an adjacent hallway. Additional sleeves may be necessary as cable quantities dictate.

1.20. All walls must be lined with ½ inch plywood, beginning at 24 inches above finished floor and extending upward to the cable tray, unless otherwise directed by the OIT PM. The plywood must be fire-treated and painted with two (2) coats of gray fire-resistant paint.

1.21. One duplex electrical outlet should be installed on each wall of the communications room. Each outlet must be on a separate 120V/20A dedicated circuit and should be connected to emergency power where available. This power is NOT for Emory OIT permanent network devices.

1.22. When High Availability (HA) is necessary, usually in Emory Healthcare facilities, communications room AC circuits should split between commercial/normal and generator/emergency power. If generator power is available in the communications room, split the necessary amount of circuits between normal and generator.

1.23. In the case of life critical situations, generator back up with UPS backup and conditioning may be required as indicated by the customer at the customer’s expense. In some cases, other critical technology devices may require a building UPS backup solution as indicated by the customer. UPSs purchased through Emory OIT Network Services should receive a 6-yr payment plan with monitoring/maintenance. If UPS backup is currently in use, existing UPS should be in proper working condition. If UPS is not in proper working condition, the customer is to be notified of repair or replace at the customer’s expense (unless UPS is under current Emory OIT payment/monitoring/maintenance plan).

1.24. For existing communications rooms: Verify current available power Voltage, verify Amperage (minimum 20A), verify commercial/normal power and generator/emergency power for High Availability (HA), verify number of available receptacles, and verify receptacle location to racks and network equipment location.

1.25. Coordinate the location of power for the equipment racks with the Emory OIT PM and Emory OIT Network Services Build teams. Ensure the rack space is suitable for power and network equipment. Plan for required quad outlets to be extended into the rack system by the electrical contractor (under the GC) utilizing seal-tight conduit or another pre-approved method. Coordinate the location of power in racks with OIT PM.

1.26. OIT PM To confirm qty. of power requirements based on electronics & racks:

1.26.1. Communications rooms with one to two (1-2) switches: Plan for a minimum of two duplex 120V/20A electrical outlets. Utilize proper conduit and other approved methods and extended to within a few feet of the rack system. Direct connect the power supplies to the 120V/20A electrical outlets. Incorporate 120V/20A PDUs if necessary.

1.26.2. Communications rooms with three to five (3-5) switches or one (1) chassis: Plan for a minimum of two 208V/30A electrical outlets with twist-lock L6-30R receptacles. Utilize proper conduit and other approved methods and extended to within a few feet of the rack system.

1.26.3. Plan for a minimum of two rack mount 208V/30A PDUs with 10ft input cable with NEMA L6-30P twist-lock power cord with NEMA 6-20R output type.

1.26.4. Alternatively, communications rooms with a single (1) chassis utilizing only two power supplies: Plan for a minimum of two 208V/20A electrical outlets with 6-20R receptacles. Utilize proper conduit and other approved methods and extended to within a few feet of the rack system. Direct connect the power supplies to the 208V/20A electrical outlets with NEMA 6-20P power cord type.

1.26.5. Communications rooms with a single (1) chassis utilizing four to six power supplies OR two to three (2-3) chassis utilizing only two power supplies each: Plan for a minimum of two 208V/30A-3 Phase electrical outlets with twist-lock L15-30R receptacles. Utilize proper conduit and other approved methods and extended to within a few feet of the rack system.*
1.27. Plan for a minimum of two rack mount 208V/30A-3 Phase PDUs with 10ft input cable with NEMA L15-30P twist-lock power cord with output/socket type of NEMA 6-20R.

*NOTE: for HA with UPS in this scenario(1.9) - UPS power must be hardwired with 208V/70A single phase input / normal power may require 208V/30A-3phase (L15-30R)

<table>
<thead>
<tr>
<th>Single AC Circuit</th>
<th>120V/20A (2400W)</th>
<th>208V/20A (4160W) (6-20R)</th>
<th>208V/30A (6240W) (L6-30R)</th>
<th>208V/30A-3phase (10807W) (L15-30R)</th>
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<td></td>
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<tr>
<td>3-5 Switches (1950W-5500W)</td>
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<td>2 circuits w/ 2 PDUs</td>
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<tr>
<td>1 Chassis (3200W)</td>
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<tr>
<td>1-3 Chassis (6400W-9600W)</td>
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<td></td>
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<td>2 circuits w/ 2 PDUs</td>
</tr>
</tbody>
</table>

Each power supply for a standalone switch is either 650W or 1100W; each power supply for a chassis is 3200W.

HA required for healthcare facility? 1/2 of total power supplies to normal power & 1/2 to generator or emergency power.

1.28. The room (including the ceiling) must be painted and the floor must be tiled to help reduce atmospheric dust. Paint and tile colors are restricted to either white or light gray.

1.29. All communications room doors must be installed with a lock that is keyed for use with the OIT key and the electronic security access system installed for the building prior to occupancy. All communications rooms on campus, including Oxford and locations in the immediate vicinity, will be keyed with the PPX-7 key. In the situation of off campus satellite facilities, the door will be secured with a push button door lock that allows for changeable lock codes. The approved choices from the Emory Security shop are the PRO5196 or the PRO5596 depending on the door type. Further information on these locksets can be found at: http://www.locknetics.com/pdf/Manually%20Programmable%20Locks.pdf

1.30. During construction, it is the responsibility of the GC to ensure that the seal around the door as well as other openings to the room are properly sealed to eliminate dust from being drawn into any OIT equipment placed within the rooms for the CO. Any damage to the equipment including replacement if required will be at the expense of the GC.

1.31. Due to the limited space requested for communications rooms, all space allocations are for Emory University, OIT’ requirements only. Spaces where water vapor exposure, steam pipes, drains, clean out, chemical exposure, air handling units, EMI or RFI situations or transformers, alarm panels and associated cabling, or electrical panels are present, or spaces where any non-OIT supported systems are present, are not permitted.

END OF SECTION 27 11 00
SECTION 27 21 33 DATA COMMUNICATIONS WIRELESS ACCESS POINTS

1. Data Communications Wireless Access Points

1.1. OIT provides and supports the managed, encrypted, authenticated, and secure wireless service for Emory.
1.2. Design and installation of WI-FI within projects is the sole responsibility of the OIT Wireless Engineer and is an integral part of all projects.
1.3. The inclusion of the wireless access point design into the communications layer of the prints should be coordinated with the OIT Wireless Engineer.
1.4. The building design itself should take into account wireless when it comes to design features which may interfere with wireless signal such as, but not limited to large mirrors, building materials and types of tinted glass. Examples of material conflicts are: metal lathe in stucco, perforated and non-perforated metal wall coverings, firebrick, rebar and glazed tiles. Any questions regarding potential signal conflicts should be coordinated with the OIT Wireless Engineer.
1.5. Inclusion for complete wireless coverage in living spaces such as dorms will be coordinated with the OIT Wireless Engineer. Wireless Access Points within living spaces are acceptable by OIT Standards.

END OF SECTION 27 21 33

SECTION 27 26 26 DATA COMMUNICATIONS INTEGRATION SERVICES

1. Communications Integration Services

1.1. HVAC control panels for monitoring along with IP configuration requests must be coordinated with OIT PM. A one inch conduit will be required from the nearest accessible ceiling into the control panel for cable routing.
1.2. Cabling for the above services is required.

END OF SECTION 27 26 26

SECTION 27 32 23 ELEVATOR PHONES

1. Elevator Phones

1.1. Elevator phones are critical to obtaining the certificate of occupancy (CO), and it is imperative that this installation be closely coordinated with the OIT PM. The elevator phone is part of the elevator car, and is not provided by OIT. However, the elevator phone should not be connected without OIT personnel present. In a typical installation, the phone cable should enter the elevator control panel through a one-inch conduit. A one-inch conduit should be extended from elevator control panel to the nearest accessible ceiling. There can be no exposed communication cable within the elevator control room.

Appendix D: Elevator Control Room diagram

END OF SECTION 27 32 23

SECTION 27 32 26.01 EMERGENCY BLUE LIGHT

1. Emergency Blue Light

1.1. Emergency Blue Light phones should be included into projects. A one-inch conduit should be placed from the location of the pole to the nearest OIT communication room.
1.2. Cabling for the above services is required.

Appendix E: Emergency Blue Light diagram

END OF SECTION 27 32 26.01
SECTION 27 32 26.03 GATE CONTROLS

1. Gate Controls

1.1. Parking gate control circuit connectivity must be coordinated with OIT. The Port controller equipment itself should be mounted in a location other than the OIT communication closets. There must be one (1) one inch conduit from the Gate Island into the OIT closet closest to the physical location of the ITR Gate Control Dialer equipment. Additionally, there must be coordination with the ITR team to determine their needs.

1.2. Cabling for the above services is required.

END OF SECTION 27 32 26.03

SECTION 27 32 26.05 FIRE ALARM PANELS

1. Fire Alarm Panels

1.1. Fire alarm systems are critical to obtaining the certificate of occupancy (CO) and it is imperative that this installation be closely coordinated with OIT PM.

1.2. The fire alarm panel will not reside in the OIT communication room and is not provided by OIT; however, the circuit by which it reports is provided by OIT.

1.3. The fire alarm panel should not be connected to the communication circuit without OIT personnel present.

1.4. A one inch conduit will be required from the nearest accessible ceiling into the fire alarm control panel.

1.5. Cabling for the above services is required.

END OF SECTION 27 32 26.05

SECTION 27 53 19 INTERNAL CELLULAR, PAGING & DISTRIBUTED ANTENNA SYSTEM

1. Distributed Antenna System – Cellular Coverage

Distributed Antenna System for Cellular coverage budget is required for all Emory Owned properties and/or leased space.

1.1. New Building Construction

1.1.1. The OIT PM will coordinate the design of infrastructure to support the DAS system and ensure that the requirements are incorporated into the project plans.

1.1.2. Based on the size and layout of the building, additional closet space beyond the OIT equipment room may be required at various points on the floor for distribution. Each of these break-out rooms will require a 3’ X 3’ ¾” fire rated plywood with (2) coats of fire rated paint and a dedicated 20Amp circuit located on the back board.

Appendix G: Distributed Antenna System Break-out Room

1.1.3. Additional conduit, sleeves, or alternative pathways may be needed for the DAS installation. The OIT PM will work with the GC and/or Campus Services PM to identify those instances to co-develop a solution that best supports the facility.

1.1.4. If the site location for the new building is not located on an Emory Campus with a DAS head-end established (1) 4” conduit would be required for roof access. (May be shared with other OIT DAS services)

1.2. Renovation of existing floor or Building

1.2.1. The OIT PM will determine the feasibility of DAS design and the impact on the project budget based on the following criteria:

- DAS is already present in the building in which case the design will need to be re-worked based on the new floor plan.
- DAS is not present in the building in which case the feasibility of placing DAS into the space will be reviewed with executive leadership for approval.

1.3. Leased Space
1.3.1. The OIT PM will determine the feasibility of DAS design and the impact on the project budget based on the following criteria:

- Existing cell tower coverage
- What Staff will occupy the space & how many
- Size of the location
- Type of lease & duration

1.4. Rooftop antenna by Cellular Provider

1.4.1. If the location of the building requires a rooftop antenna, the cell provider will determine the approval of cellular service based on the design of service for the given area.

*Please note: Exclusion of IT Infrastructure components (e.g., DAS, wireless) from any budget must be approved in writing by the Enterprise CIO and Senior Provost for Library Services and the Vice President for Campus Services.*

2. Distributed Antenna System – Radio Coverage

The OIT PM will coordinate the design of infrastructure to support the DAS system and ensure that the requirements are incorporated into the project plans along with providing a budget for the DAS installation on the project. Public Safety DAS is managed by Emory University OIT: Field Services Aux: Trunked Radio Operations.

The following guidelines are intended for prospective bidders and A&E firms and apply to all Emory University and Emory Healthcare “NEW” buildings and parking structures (to be called “buildings” throughout this document).

Emergency Responder Radio Coverage Systems (ERRC), two-way radio communication enhancement systems are meant to enhance and ensure communications between emergency responders for the interior of the building. All areas of the building must have code compliant radio coverage. Federal Communications Commission (FCC)-certified signal boosters, or other approved systems are required for such systems. These systems shall be designed and constructed to comply with NFPA 72 as well as meet or exceed all local, state and federal guidelines for the design, commissioning and operation.

The OIT: Field Services Auxiliary: Trunked Radio Operations team shall determine and approve the Contractor(s) and related work for Emory Emergency Responder Radio Coverage Systems (ERRC), two-way radio communications and public safety DAS for all Emory University and Emory Healthcare new buildings and parking structures.

Whereas this document may not be all-inclusive; there may be additional requirements determined by the Emory OIT: Field Services Auxiliary: Trunked Radio Operations teams, Commissioning Authority and/or AHJ, or Emory FM Fire Safety Division.

Buildings which will achieve radio coverage without amplification are exempt. Where it is determined by an approved radio signal strength test and clarity study that buildings and areas of buildings that meet the code compliant minimum radio coverage signal strength levels without the use of an indoor radio coverage system, the building is exempt.

Specification Requirements

Provide performance-based specifications. Require final and complete design, specifications and drawings be provided by the Contractor and submitted as part of the shop drawing process.

Include the following in the ERRC performance specification

- ERRC system equipment shall be FCC certified as required
• Contractor shall be FCC licensed as required by code
• Contractor shall submit detailed shop drawings for review to Emory OIT Field Services Auxiliary Manager, Emory OIT Trunked Radio Operations Admin and Emory OIT Construction Project Manager
• Components shall be industry standard and readily available to Emory University
• Performance specifications for major components
• Requirements for spare parts
• Required separation distances between ERRC equipment and other mechanical, electrical and telecommunications equipment
• Required separation distances between ERRC antennas and antennas of other radio systems
• Components shall be labeled with unique part or address numbers which correspond to numbers shown on the Contractor drawings
• Riser cables and cables for individual antenna feeders shall be installed in a neat and workman like manner. Each cable shall be individually supported
• Furnishing factory-authorized service representatives to supervise the field assembly, connection of components, commissioning and testing of their respective systems
• Contractor to submit a detailed work plan including narrative of how the Contractor will provide the scope of services
• Contractor to attend progress meetings as required by the Construction Manager to maintain a thorough understanding of the project schedule and associated coordination issues
• Utilizing iBwave Model Generation software, the Contractor shall perform a predictive RF propagation survey in native and AutoCAD formats and submit results to the Emory OIT

Shop drawing submittals shall include the following
• Proof of Contractor’s qualifications
• Detail technical design package
• Submittal of design to AHJ for approval in accordance with NFPA-72
• Testing and commissioning procedures
• An electronic copy of operation and maintenance manuals

Specify the following to support operation and maintenance activities
• When applicable: An electronic file containing the final system software including the master program generic to the system, the software associated with each programmable piece of equipment, and the software licenses and passwords required by the OIT Trunked Radio Operations Admin to perform programming changes
• A minimum of 8 hours of Owner training on operation and maintenance
• One year of customer service from the date of acceptance
• A parts and labor warranty for 1 year from date of acceptance
• The first code-required annual operational test at the end of 1 year at no cost

Emory OIT requires one set of ERRC technical information and documentation to be electronically filed and secured as well as filed with the Emory FM Fire Safety Division. Specify submittal of one set of the following
• ERRC bid specifications and drawings
• ERRC as-built drawings including vertical/riser and horizontal cabling runs
• Summary of ERRC frequencies utilized
• Summary drawing showing locations of ERRC headend equipment, node equipment, BDA and antenna sites
ERRC/Public Safety DAS - General System Requirements

- ERRC shall utilize a bidirectional amplifier (BDA) with a distributed antenna system to achieve the required radio coverage
- ERRC shall use a Class A channelized amplifier set up to use DeKalb County Public Safety, Emory University, and City of Atlanta radio channels
- ERRC shall be neutral host and nonproprietary
- Shall have ability to provide coverage on the 700 MHz and 800 MHz public safety bands
- Shall permit the simultaneous use and interoperability of analog and digital modulation radios
- Shall have expandability to permit future additions and changes to the emergency responder radio frequencies
- Shall be designed to maintain full system operation during a normal power outage
- Shall enclose active components in NEMA Type enclosures
- ERRC headend and node equipment shall be securely attached to racks or backboards
- Identify all required outside plant fiber optic cables required to connect ERRC to remote antennas and/or other systems in other buildings
- System and related equipment shall be FCC certified IFC.510
- Shall include 24 hours of battery backup per head end unit
- Shall include 24 hours of battery backup per remote location

Support Systems and Spaces

- System shall include supervision of the ERRC antennas, signal boosters, power supplies and UPS
- Supervisory and trouble alarm output contacts indicating an impairment - Connect the supervisory and trouble alarm contacts to the building fire alarm system
- Fire alarm system shall transmit ERRC supervisory and trouble alarm signals to the appropriate supervising station as well as EPD Dispatch Center
- Locate the headend equipment in the main telecommunications room or MDF whenever possible - Coordinate with the Emory OIT Trunked Radio Operations Admin and Emory OIT Construction Project Manager for space and power within telecommunication rooms
- Locate the node equipment in telecommunications rooms or IDF by design - Coordinate with the Emory OIT Trunked Radio Operations Admin and Emory OIT Construction Project Manager for space and power within telecommunication rooms
- All telecommunications rooms containing ERRC equipment shall have continuous air conditioning to alleviate heat build-up within the rooms - The ERRC equipment can operate at an elevated temperature during a power outage
- Active components shall be enclosed in a NEMA Type 4X enclosure
- For systems requiring donor antennas, Contractor shall provide and install non-penetrating rooftop sled mounts with donor antenna and cable runs as well as indicate roof penetration location(s)
- Contractor shall provide and install remotes on Contractor provided backboards when telecommunications rack is not used or available
- Emory shall provide access to (2) hour fire rated riser(s) or stairwell(s) for ERRC riser cables. If two hour rated riser(s) is not available, system and cabling will be designed to meet related code requirements

ERRC/Public Safety DAS - Passive Infrastructure
Passive infrastructure network shall be designed and tested in such a manner to distribute signals with acceptable loss to each antenna.

- Antennas, hardware and components shall be Low PIM rated to reduce signal mixing and creation of harmonics.
- Must utilize compression style fittings and tools for coaxial connections.
- Individual antenna feeds shall be ½” coaxial cable.

Individual antenna feeds in parking decks or structures without ceilings shall be installed in metal conduit (EMT) or air dielectric coaxial cable with corrugated copper sheathing and PVDF jacket.

- Install minimum 2” diameter conduit for routing cabling through inaccessible ceilings, finished spaces with open ceilings and unfinished spaces.
- Riser and feeder cables shall be plenum rated and installed in metal conduit (EMT) or air dielectric coaxial cable with corrugated copper sheathing and PVDF jacket.
- Cables shall be installed hidden from view except in open ceiling areas.
- Review antenna styles, conduit paths and equipment powering and mounting locations with Emory OIT Field Services Auxiliary Manager, Emory OIT Trunked Radio Operations Admin and Emory OIT Construction Project Manager for aesthetic concerns and approvals.
- Antennas shall be securely attached independently from the work of other trades.

Further Considerations – Pre-Installation, Acceptance Testing and Commissioning

- The Contractor shall perform pre-installation testing for percent coverage and signal strength in accordance with code. Testing shall not be performed until after the building is fully enclosed (roof, exterior skin, doors and windows are installed), and interior ceilings and walls are in place. Measure the percent coverage and signal strength in both the critical and general areas on each floor. Measure the signal strength receivable within the building and the signal strength received when transmitting from within the building.
- The Contractor shall perform acceptance testing for percent coverage and signal strength in accordance with code requirements.
- Final testing shall be scheduled and performed in conjunction with Emory FM Fire Safety Division and Emory OIT Trunked Radio Operations Admin.
- The Project’s Commissioning Authority and/or AHJ will witness the testing.
- Final testing will demonstrate full compliance with IFC and NFPA 72 requirements.
- Final testing will demonstrate full compliance with specification requirements.
- Final test results shall be spreadsheet form, along with building floor plans overlaid with test grid used in testing procedure. Each drawing grid shall show the test results for uplink signal, downlink signal and delivered audio quality (DAQ) measured. Testing and testing results shall comply with NFPA 72.
- Test results shall indicate date, time and weather conditions at the time of the testing.
- Meet or exceed all local, state and federal guidelines for the design, commissioning and operation of the quoted system(s).
- Contractor shall include design services as part of their proposal with all design revisions included.
- Contractor shall provide a public safety permit and AHJ coordination for the system(s).
- Contractor shall provide one round of post installation GRID testing.

Distributed Antenna System for Radio coverage is required for all Emory Owned properties and/or leased space.

2.1. New Building Construction
2.1.1. The OIT PM will coordinate the design of infrastructure to support the DAS system and ensure that the requirements are incorporated into the project plans.
2.1.2. Additional conduit, sleeves, or alternative pathways may be needed for the DAS installation. The OIT PM will work with the GC and/or Campus Services PM to identify those instances to co-develop a solution that best supports the facility.

2.1.3. (1) 4” conduit will be required from the OIT Equipment Room on the top floor to the roof for antenna placement (May be shared with other OIT DAS services)

2.2. Renovation of existing floor or Building

2.2.1. The OIT PM will determine the feasibility of DAS design and the impact on the project budget based on the following criteria:
   - DAS is already present in the building in which case the design will need to be re-worked based on the new floor plan
   - DAS is not present in the building in which case the feasibility of placing DAS into the space will be reviewed with executive leadership for approval

2.3. Leased Space

2.3.1. The OIT PM will determine the feasibility of DAS design and the impact on the project budget based on the following criteria:
   - Existing cell tower coverage
   - What Staff will occupy the space & how many
   - Size of the location
   - Type of lease & duration

2.4. Rooftop antenna by Radio Provider

2.4.1. If the location of the building requires a rooftop antenna, the provider will determine the approval of service based on the design of service for the given area

3. Distributed Antenna System – Messaging

Distributed Antenna System for Messaging coverage is required for all Emory Owned properties and/or leased space.

3.1. New Building Construction

3.1.1. The OIT PM will coordinate the design of infrastructure to support the DAS system and ensure that the requirements are incorporated into the project plans

3.1.2. Additional conduit, sleeves, or alternative pathways may be needed for the DAS installation. The OIT PM will work with the GC and/or Campus Services PM to identify those instances to co-develop a solution that best supports the facility

3.1.3. (1) 4” conduit will be required from the OIT Equipment Room on the top floor to the roof for antenna placement (May be shared with other OIT DAS services)

3.2. Renovation of existing floor or Building

3.2.1. The OIT PM will determine the feasibility of DAS design and the impact on the project budget based on the following criteria:
   - DAS is already present in the building in which case the design will need to be re-worked based on the new floor plan
   - DAS is not present in the building in which case the feasibility of placing DAS into the space will be reviewed with executive leadership for approval

3.3. Leased Space

3.3.1. The OIT PM will determine the feasibility of DAS design and the impact on the project budget based on the following criteria:
   - Existing coverage from provider
   - What Staff will occupy the space & how many
   - Size of the location
   - Type of lease & duration

3.4. Rooftop antenna by Messaging Provider

3.4.1. If the location of the building requires a rooftop antenna, the provider will determine the approval of service based on the design of service for the given area
END OF SECTION 27 53 19
APPENDIX A: COMMUNICATION ROOM FOOTPRINT

(5) 4” Conduits/Sleeves between stacked closets. Qty. may vary based on size of the building and should be coordinated with LITS PM.

Openings must be sealed to prevent water penetration to the floor below.

Allow for a Dedicated Quad 20 Amp Outlet located in Racks. Coordinate with Emory PM.

1/2” Fire rated Plywood on all walls with (2) coats of fire rated paint.

(2) 4” Sleeves or Equivalent Capacity
APPENDIX B: TYPICAL COMMUNICATIONS HORIZONTAL REQUIREMENTS

Communication Rooms should be centrally located in the floor space to reduce the necessity of additional satellite rooms. Satellite rooms are required if station cabling exceeds 295 ft in length.

Communications Closet

Cable Tray

Inaccessible Ceiling

Station conduit with sweeping elbow to accessible ceiling. If no accessible ceiling is present, conduit should be brought to Comm. Closet. Two turns maximum without breakout points.

Communications Outlet With 1" Conduit

(2) 4" conduit sleeves penetrating room wall adjacent to corridor. Depending on service density, additional sleeves may be required.

Extend station conduit to main corridor.

If conduits are not extended to the hallway, it is the responsibility of the GC to provide a 1" elbow on the wall adjacent to the cable pathway for each space.

(2) 4" Conduits providing access across inaccessible ceiling

Cable Tray located within corridor. 12" of access above and to one side of tray.
APPENDIX C: TYPICAL COMMUNICATIONS VERTICAL REQUIREMENTS

(1) 4" conduit for Distributed Antenna System from UTS Equipment Room to Roof Access.

Communication closets should be stacked and located in the center of the Bldg.

Communications near Gnd bus attached to main building Gnd and to Metal frame of Bldg.

(5) 4" conduits/sleeves must connect communications rooms. QTY of sleeves may be reduced based on the size of the building but must be approved by LITS P.M.

Main Electrical Gnd for Bldg (Metal frame, Copper water pipe, Driven rod, etc.)

(3) 4" conduits must connect from the building communications entrance room to a specified Emory communications manhole. Maximum of(2) sweeping bends allowed without a breakout point.

Main Electrical Panel for Bldg

Communication Gnd connection to the Bldg main electrical Gnd must be within 2-3' of the Gnd connection for the main electrical panel.

Emory Comm. Manhole
APPENDIX D: ELEVATOR CONTROL ROOM WIRING

Provide a 1” conduit from Control Panel to nearest accessible ceiling for UTS Cat6 cable. There can be no exposed communication cable within the elevator control room.
APPENDIX E: EMERGENCY BLUE LIGHT WIRING DIAGRAM

TOWER WITH ALARM EMERGENCY BLUE LIGHT WIRING

The Blue Light assembly as shown to the left must be installed to conform with accessibility guidelines as follows:

- Poles must be installed with or adjacent to an accessible ground surface measuring a minimum of \(30'' \times 48''\), with an approach whose slope and cross slope must not exceed 2%.

- Each location must be along an accessible route, to include appropriate \(36''\) minimum width and \(360\) degree turning radius to accommodate the average wheelchair.

Per ADA: “Highest operable part of device mounted no higher than \(48''\) AFF.”

Talk A Phone
ETP-MT/R OP4 “tower”
w/ camera arm & ETP 400 phone

Anixter p/n to meet Emory standards (color & graphics) is:
“EMORY - TTOWER - LOGO”
PARKING DECK EMERGENCY BLUE LIGHT WIRING

APPENDIX E: (Continued)

Sign, from UTS warehouse stock

Light: Edwards p/n 48SLED-B-NS 120vac or equivalent, provided / installed by general contractors electrician.

Comm. wiring exits wall behind phone back box.

**Standard versions:** A or B
A. Galtronics 239 AL-003
or
B. Talk A Phone ETP-400 w/ ETP-SM

Per ADA: “Highest operable part of device mounted no higher than 48” AFF”

Comm. and electrical wiring exits wall behind equipment box.

**Enhanced version:**
Galtronics 234WM w/297.003 phone
or
Talk A Phone ETP-WM/E w/ ETP-400 phone

NOTE: Telephone sets, back boxes and police signs from UTS warehouse stock. Enhanced version wall mount unit w/ light, supplier & installer to be determined on a case by case basis.

Parking Deck Emergency Phone
APPENDIX F: BUILDING ENTRANCE PHONE WIRING

SURFACE MOUNT

RAMTEL 926D surface mount enclosure, w/door, neutral gray

Comm. wiring exits wall behind phone back box, both surface & recessed units.

Use RAMTEL RR734 phone

Per ADA: “Highest operable part of device mounted no higher than 48” AFF”.

NOTE: Telephone sets & enclosures from UTS warehouse stock

FLUSH MOUNT

RAMTEL 906 flush mount enclosure, w/flush mount bezel

NOTE: Overall size w/Bezel: 9.219”W x 12.875”H x 3.125”D,

1. Cut opening to fit phone box 7 5/8 x 11 5/8

2. For wood mounting use (4) 3/16” x 5/8” long lag screws w/washers.

3. For Concrete/Brick/Masonry, use plastic flanged inserts for 3/16” screws w/washers.

Building Entrance Phones
APPENDIX G: Distributed Antenna System Break-out Room

The location of the Distributed Antenna System Break-out Room may be a shared space.

Back board must not be placed over a sink or blocked by storage.

UTS must have access to the room for service at all times.

Coordinate door key with UTS PM.

Height of the back board should not exceed 7' to allow for mounting of equipment.

3' x 3' ¾" Fire rated Plywood on one walls with (2) coats of fire rated paint.

Dedicated Duplex 20 Amp