

Division 27 - Communications

27.1.1

27.1.1

27.1.1

27.1.1

27.1.1

27.1.1

27.1.1

27.1.1

27.1.1

27.1.1

27.1.1

0

17

27.1.1.1. Overview: Communication technologies are a critical element in the design of all new and renovation building projects. Whether it be voice, data and video transmission, security and fire alarm systems, building automation systems, audio/visual systems, or other communication technologies, it is important that a team of experienced professionals be involved in the design of these complex systems.

A Structured Cabling Plant is a key concept in enabling Information Technology for the ODU community. In order to maximize network functionality, and to minimize labor and material costs, the Information Technology Services group (ITS) is charged with this responsibility.

Information Technology Services group (ITS) is charged with this responsibility. Additional requirements and should be consulted to ensure standards are met.

a. Definitions

- i. ODU IT: Old Dominion University Information Technology Services

- ii. ODU NST: Old Dominion University Network Services Team

and Construction oversees all of the University's major and minor construction and renovations.

27.1.1.2. General:

27.1.1.3. Telecommunications Projects Eligibility Requirements: All projects designed by an architect/consulting engineer, shall have the telecommunications infrastructure designed by the consultant team (Designer) and installed by the Contractor and ODU personnel. This infrastructure shall include all pathways and telecommunications room construction installed by the contractor, and cabling, terminations, and testing

completed by ODU personnel. The Designer shall provide these services in accordance with these standards and as directed by the ODU NS Construction Management.

- 27.1.4. Old Dominion University's Final Provisioning Work for all Projects:** For all construction projects for the Old Dominion University, construction budgets are required to fund all internal and external telecommunications assets. This includes all wiring, telecom rooms, connectivity products, electronics, etc. Furthermore, the construction budget is required to pay for any additions to outside plant infrastructure that

the telecommunications rooms to ensure proper equipment spacing and access as defined by electrical code. The designers should avoid placing an electrical panel(s) within the wall cavity adjacent to the telecommunications room.

- d. Electrical panels, except those exclusively for telecommunications equipment, shall not be located within the telecommunication rooms.
- 27.3.8. Grounding:** Provide a building ground cable, with bus bar, to the room. Locate the bus bar as noted on telecom room drawings on the fire rated backboard. Refer to Grounding section of these standards. (See Grounding and Bonding – Appendix 2)
- 27.3.9. Identification:** The Entrance Facility shall be identified and labeled per ODU Department of Design, & Capital Construction standard procedures.
- 27.3.10. Interior Finishes:** To minimize dust, floors shall be of vinyl composition tile or sealed concrete. All exposed concrete, brick and gypsum board walls shall be painted or sealed.
- 27.3.11. HVAC:** Per TIA/EIA Standard. If active electronics are installed in this space, environmental control system shall maintain temperature between 64 degrees F and 75 degrees F with a relative humidity between 30% and 55%.
- 27.3.12. Lighting:** Provide a minimum equivalent of 500 lux (50 foot candles) measured at 1 m (3 ft) above finished floor
- 27.3.13. Pathways entering the Entrance Facility:** The number and type of telecommunications circuits that will be brought into the building shall determine the number and size of inter-building conduits entering this room. The minimum number of conduits to a building is

- a. The backboard shall reach from corner to corner. Install the backboard vertically at 12" AFF and anchor securely to wall substrate with a minimum of five (5) equally spaced fasteners along each vertical edge and down the centerline of each panel. Backboard kits shall include fasteners for masonry, hollow block, steel frame and wood frame walls. Fasteners must be flush with surface of backboard. Fasteners shall be of the appropriate type for each substrate. Provide blocking or additional studs in framed walls to receive backboard panel fasteners.

27.3.17. Card Key Access and Security: ODU Security Policy calls for the protection of all IT infrastructure, equipment, and hardware located within a building. If a new or renovated building includes integration of an access control system, telecommunications rooms shall also be integrated into the access control system for secure entry and monitoring. Systems employed must match those currently being deployed throughout campus.

27.3 Main Telecommunications Room (Typically doubles as the Entrance Facility)

27.3.1. Overview: This space provides for the demarcation between inter-building and intra-building telecommunications service. This area contains the electronic equipment that transitions between the core campus data, voice and video backbones and the building backbone. This securable room is to be dedicated to this purpose with no other building services sharing the space. This space is typically co-located with the Entrance Facility, provided the room is sized for both functions. ODU typically does not differentiate in design or use a Main Telecommunications Room from other telecommunications rooms within a building with the exception of OSP conduit entering the room. This room would be located on the 1st floor of a building.

- a. A Main Telecommunications Room shall meet all the basic requirements as those previously indicated for the Entrance Facility. In addition, Main Telecommunications Rooms will have additional requirements as noted below.

27.3.2. Size: Each Main Telecommunications Room shall have the minimum size restrictions based on the overall square footages of the **total building area** being served. The following are minimum guidelines – consult ODU NST Construction Management for approval on final design:

In larger buildings, the size of the TR size should be increased in increments of 10 ft² for every increase of 100,000 ft² in gross building area.

Total Building Size in Gross Sq. Ft.
up to 500,000

Minimum MTR Size
9' x 11'

~~27.3.2.1. Size:~~

- b. Where a Main Telecommunications Room will also provide service as an Entrance Facility or Telecommunication Room, the minimum size of the room shall be determined by summing the square footage requirements of all services that will be supplied by that room.
- c. Security access control panels: Where a Main Telecommunications Room may house security access control panels, the minimum size of the room shall be provided, in fact, larger rooms may be needed depending on the amount of equipment proposed. Coordinate wall mounting of access control panels with ODU NST Construction Management prior to installation. No servers or other ancillary security equipment shall be installed in Telecommunication Rooms. Security panels shall have their own power

source and additional power should be designed into Telecommunications Rooms that house access control panels.

27.3.3. Location: The Main Telecommunications Room shall be located to ensure that the room has access to the intra- and inter-building backbone pathway, is accessible for delivery of equipment, away from potential sources of EMI, away from machinery that causes vibration, and away from steam pipes, drains, and clean-outs. If the Main Telecommunications Room is on a different floor than the Entrance Facility, it should be vertically aligned above the Entrance Facility Room.

27.3.4. Casework in the Main Telecommunications Room: Install 4-post 7' racks or cabinets, without panels, to support video, voice and data network termination devices and electronics. All data equipment shall be rack-mounted and the infrastructure design should reflect this. The amount of service required to support the building might require more than one rack or cabinet to be installed. Fasten the rack(s) or cabinet(s) to the floor and bond the rack or cabinet to the ground bus.

- a. Number and location of the racks or cabinets shall be supplied during the design phase of the project (see Telecommunications Room Examples – Appendix 3). Four post racks shall be secured to the wall behind them with a ladder rack. A good working environment for a telecommunications room includes at least three feet of clear space extending out from the front of the equipment mounted on a wall and at least three feet out from the front and back of equipment mounted in a rack with two feet of clearance on each side.
- b. All racks and cabinets shall be provided with cable management for horizontal and backbone cabling. (See Telecommunications Room Examples Appendix 3).

27.3.5. Disconnect Modules: As per Entrance Facility.

27.3.6. Door: As per Entrance Facility.

27.3.7. Electrical: There shall be six (6) 110V 5-20R outlets and four (4) 208V L6-30R outlets behind the proposed rack location(s). Each of these outlets shall be on a dedicated circuit. (Number of outlets varies depending on number of equipment racks – See Section 4.2 or Telecommunications Rooms Examples

- and 40% to 55% RH respectively. Additionally, design as needed heat dissipation of 5000 BTU/hr per cabinet to accommodate installed electronics. Temperature: 18 – 27°C (64 – 81°F)
- Maximum relative humidity (RH): 60%
- Minimum dew point: 5.5°C (42°F)
- Maximum dew point: 15°C (59°F)
- a. **HVAC Location:** The installed location of the HVAC unit and pipes feeding the unit shall be designed to minimize risk of dripping fluids on the network electronics and shall not be above the network electronics rack. (Ideal location – Split system above door – See Telecommunications Rooms Examples Appendix 3)

27.3.10. Identification: As per Entrance Facility.

27.3.11. Interior Finishes: As per Entrance Facility.

27.3.12. Lighting: Provide a minimum equivalent of 500 lux (50 foot candles) measured at 1 m (3 ft) above finished floor.

27.3.13. Pathways entering the Main Telecommunications Room: If the Entrance Facility room is not serving as the Main Telecommunications Room for the building then a minimum of (3) 4" conduits must be installed to connect these rooms. (May vary depending on building size and use)

- a. A minimum of three (3) 4" conduits shall be installed between each Telecommunications room and the Main Telecommunications Room. For Telecommunications bonding backbone, a 1" sleeve or conduit is required for proper grounding pathway. All conduits are required to be fire stopped per NEC. **3**

types of cable pathway devices should be avoided in any new construction or major renovation project design. MUTOA's, CP's, and TP's are not to be used unless authorization is approved during the design phase.

- 27.6.2. Cable Trays:** Cable Trays are the preferred pathways for supporting horizontal telecommunications cables. Cable trays shall be provided from the Telecommunications Rooms to support the horizontal cabling. Cable tray should be run in publicly accessible spaces, any cable tray run through private offices, conference rooms, classrooms, etc. that are intended as major cable paths will not be accepted.
- a. **The minimum cable tray width is 8” and minimum cable tray depth is 2”.** The actual cable tray size(s) shall be determined during the design phase of the project. The cable tray shall be installed in accordance with the applicable electrical code. The cable tray is to be dedicated for use only by low-voltage cabling systems. Cable tray should be trapeze supported or wall mounted. If wall mounted, additional threaded rod supports should be provided from the ceiling to the outer edge of the wall mounted tray. Center support cable trays shall not be accepted.
 - b. Cable Trays should have devices installed at all inside corners to prevent minimum cable bending radius from being exceeded.
 - c. The specification for this cable tray shall be provided along with the design layout.
 - d. Cable tray clearances shall follow ANSI/TIA 569-D Standards.
- 27.6.3. Horizontal Conduit: Conduit may feed WAO boxes directly from the Telecommunications Room (home-run). Conduits shall not run continuously for more than 100’ before installing a pull box.**
- a. Conduits shall not contain more than two 90-degree bends without a pull box. Directional changes shall be made outside pull boxes. At no time shall a pull box be accepted in favor of a bend in the conduit.
 - b. Label all conduits as per ODU Labeling Standard. (See ODU Labeling Standard in Appendix 1) Label all pull and junction boxes with the letters IT (See ODU Labeling Standard in Appendix 1).
 - c. A minimum of one (1) 1” conduit shall connect from the work area outlet box to the nearest cable pathway. Conduits connecting a Work Area Outlet and the Cable Tray shall terminate within 4” and above the cable tray. Conduit fills shall not exceed 40 percent of the conduit capacity.
 - d. Conduits shall be reamed and bushed.
 - e. Each conduit shall contain a nylon pull cord with a 200 LB pulling tension.
- 27.6.4. Prohibited Components:** No LB type fittings of any size are to be used for communication conduit. No PVC conduit or PVC sleeves are to be used for communications conduit within the confines of a building.
- 27.6.5. Conduit Grounding:** Horizontal pathway conduits shall be grounded to the cable tray to ensure a proper grounding path. This may be accomplished by bonding the conduit to the cable tray, using a grounding strap, and/or a grounding bushing.
- 27.7.0 Work Areas**
- 27.7.1. Overview:** Design of Work Area Outlets (WAO) change more often than any other piece of the design process. Different needs demand different solutions. As such, this section details only the most basic requirements and innovative designs that keep these minimal standards in mind are acceptable.
- 27.7.2. WAO Cable Count:** A Work Area Outlet must be able to support at least two unshielded twisted pair (UTP) cables to support telecommunications needs. Customer and department needs will dictate the number of connections needed. however, the standard is one cable per WAO. Wireless access points, IP cameras and emergency notification speakers will also have a single cable.

- d. Test for noise metallic and noise to ground, sampling can be used.
- e. Test for insulation resistance, sampling can be used.

27.9.5. Fiber Optic Cable Backbone: A minimum fiber optic intra-building backbone cable consisting of one 48-strand single-mode shall be installed from the Main Telecommunications Room to each individual Telecommunications Room.

27.9.6. Installation: The fiber-optic backbone cables shall be termi

- 27.9.2. Contractor Certification:** ODU has standardized on the Belden Structured Wiring System and all installers shall be Belden certified. Contractors new to ODU should provide certification documents along with bids.
- 27.9.3. Cabling Distance:** The cable run from the Telecommunications Room to the WAO, shall not exceed 295 feet and contain no splices. These cables are to provide service for both voice and data communications as an integrated telecommunications system.
- 27.9.4. Cable Installation:** Installation and physical protection of Category 6 cable is a critical element for the cable to deliver its rated bandwidth. A "kink", "pinch",

27.9.11. Elevator Communications: A single horizontal UTP cable shall be installed to support elevator telephone and emergency communications. There shall be a means of disconnecting and testing the telephone line at or adjacent to the elevator control panel.

27.9.12. Energy Management Systems: Those energy management systems employing the campus data network for communication shall install their physical infrastructure in accordance with these University Telecommunications standards.

27.9.13. Other low voltage cabling systems: Other low voltage cabling systems must adhere to the telecommunications standards as well. These cables may share the use of common cable trays as needed. These types of cables include, but are not limited to, HVAC control cables, fire control cables, and security systems cables.

- a. If other low voltage systems are to use the campus data network for communicating, these systems must also conform to the campus telecommunications standards. All low voltage systems using the ODU network shall be inspected by ODU NST Construction Management and the Network Security Group for compliance with these standards.

27.10.0 Grounding and Bonding

27.10.1. Overview: All cabling systems and electronics-distribution

- d. Concerning the UTP riser cable:
 - i. Cable identifier
 - ii. Cable type
 - iii. Size
 - iv. Pair counts
 - v. Length of the cable

27.11.5. Inspections:

- a. Each new structure shall be connected to the nearest core location or Communications Cabinet with a minimum 72SM fiber cable. This cable shall pass through the Entrance Facility and terminate in the Main Telecommunications Room. If the Entrance Facility and the TR are not collocated, 20 feet of managed slack shall be placed in the Entrance Facility. NOTE: per NEC code, non-rated OSP cables must be terminated or transitioned to rated cables within 50 feet of being exposed within the building. OSP cables in conduit are not considered to be exposed.

27.13.4. OSP backbone copper cable: ODU no longer installs new copper/ analog telephone service to buildings.

- b. Sod: The standard for sod shall follow guidelines set in the ODU Design & Construction Standards.
- c. Service Drives: Follow guidelines set in the ODU Design & Construction Standards. Service drives shall have an 8-inch base of rock compacted to 95% of maximum density. Paving should be 2-inch (min.) type S-1 asphalt. Cuts made through any paved surface must be repaired in a non-discernible fashion. Cuts through concrete must be repaired by replacing the section between the nearest two joints - either construction or expansion. Cuts through asphalt must be repaired so that depressions or humps do not develop during the warranty period. If depressions or humps develop, they shall have to be re-worked until corrected. When cuts extend through pavement markings, the replaced pavement shall be marked to match the existing pavement.

27.15.7. Paving and Surfacing: Follow guidelines set in the **ODU DESIGN & CONSTRUCTION STANDARDS**.

- a. Technical Specifications for Construction and Materials: Construction procedures must follow the usual practices of the Virginia Department of Transportation for work of similar character and extent. The provisions and specifications of the "Road and Bridge Specifications," Virginia Department of Transportation edition 2016 shall apply, where applicable, except where modified herein or specifically designated otherwise. References to compensation do not apply. Where reference is made to the "engineer," substitute the appropriate representative of ODU Facilities Services or ODU IT.
- b. The contractor must adequately and fully protect all parts of his work against damage until completed and accepted by ODU for maintenance. The contractor at no additional expense to ODU must properly repair damages prior to acceptance.
- c. The contractor must protect exposed surfaces adjacent to the work from physical damage resulting from construction activities and from becoming stained during application of paving materials. The contractor shall clean, repair, or replace, as required, surfaces damaged during the course of the work at no additional expense to ODU.
- d. The contractor must provide temporary barricades, properly lighted, to keep traffic off the work throughout the duration of the contract.
- e. Site Work: Preparation of a new paved road over a new base course:
 - i. Prepare rock base as detailed in the Virginia DOT Specifications: Allow additional rock for compaction of minimum 6" rock base prior to paving. This is to be in addition to compaction as required in the Virginia DOT Specifications. Asphalt Concrete Surface Course: Surfacing must consist of Type S-3 asphalt concrete in a ½" finishing course following the tack course.

27.15.8. Paved Restoration: Follow guidelines set in the ODU Design & Construction Standards. All roads, streets, sidewalks of concrete or asphalt construction must be restored or repaved within 3 days from the time of backfilling and compaction.

- a. 15.8.1 Newly poured concrete roads, streets, curbs, or sidewalks must be protected AND guarded from graffiti from passersby until the concrete has sufficiently cured to resist such molestation. Failure to prevent molestations (graffiti) shall result in the new concrete having to be removed and replaced. This requirement shall warrant the contractor in taking the necessary steps in preventing such incidents, which shall include guarding the project after hours.

27.15.9. Conduit: PVC Conduit and Fittings: Conduit must be made of poly-vinyl-chloride, PVC schedule 80 pipe. Solvent weld fittings are to be used and joints must be watertight. All conduits must be provided with a

Future innerduct and/or tube cable installation shall be necessary as the need develops. The following are mainline conduit allocations:

- I. Initial fiber placement for voice and network with four 1" innerducts. (Innerduct requirements will be determined on a case by case basis) a. Initial ODU IT and Energy Management Control System (EMCS) Network placement .
- II. Copper telephone cable, no innerducts.
- III. Maintenance duct, no innerducts.
- IV. Growth, no innerducts.
- c. Total: six 4" conduits, of which two (2) full sized conduits are equipped with innerducts. (Innerduct requirements will be determined on a case by case basis) This would be the ultimate configuration of mainline conduit.
- d. Lateral conduit to a communications cabinet shall consist of five (5) full-sized conduits. One (1) conduit may be equipped with four 1" innerducts , unless the fiber hub is within 30 feet of the hand hole or maintenance hole, and having no more than one 90-degree bend.
- e. Future innerduct and/or tube cable installation will be necessary as the need develops and shall be the responsibility of the department or project needing the additional facilities.

27.15.14. Innerducts: Innerducts used on campus must conform to standard C.I.S. 4-86, which is a standard specification for corrugated innerducts produced to I.P.S. dimensions. This specification establishes the parameters common to polyvinyl chloride (PVC) and polyethylene (PE) innerducts. Caution must be taken to use only polyvinyl chloride (PVC) innerduct in building entrance conduit.

27.15.15. Safety: Contractor is to ensure the safety of all students, faculty, staff and property during the installation or maintenance of underground pathways. Proper safety practices and supervision of work area must be adhered to at all times.

27.16.0 Vaults and Pedestals

27.16.1. Maintenance hole / Hand hole: Maintenance holes are recommended for roads, streets, parking lots and where a less obtrusive surface structure is desired. A 30" diameter cast iron lid is less noticeable and safer than a 4' x 4' or 4' x 6' steel plate.

- a. All maintenance holes, hand holes and pedestals shall be labeled in accordance with Appendix 1 of this standard.

27.16.2. Pre-cast: Contractors are encouraged to use pre-cast polymer concrete hand holes wherever possible. All hand holes and their associated covers must be rated as traffic bearing. Pre-cast hand hole designs must be in accordance with the requirements set forth by the American Association of State Highway and Transportation Officials.

27.16.3. Sizes: Typical hand hole sizes used at the University are as follows. Maintenance hole sizes will be determined on an as needed basis.

<u>Item</u>	<u>Size</u>	<u>Chimney</u>	<u>Cover Type</u>
Hand hole	36"x48"x24"	Ground Line	Traffic bearing Pre-Cast

constructed of pre-cast polymer concrete with an anti-skid design and be traffic-bearing. The hand hole shall be equipped with a recessed metal ring to accept and cradle the cover.

- b. Typical maintenance hole/hand hole sizes and racking requirements to be used at the University are the same sizes listed for pre-cast listed above.
- c. There will be times when access to an existing conduit formation is necessary. An intercept maintenance hole/hand hole would then be placed over the existing conduit formation. The new hole must be located so as to allow the existing conduit to parallel the length of the hole along one side. This allows the cables to be formed and racked along the wall once the conduit casing has been carefully removed within the boundary of the hole.

27.16.4. Construction Points: Concrete with 28-day compressive strength of 4000 psi. Reinforcing steel with yield strength of 60,000 psi grade 60. Reinforcing bars with kinks or bends are not be used except where bends are specified. Reinforcing bars should be clean and free of loose rust, oil or other matter that might weaken the concrete-metal bonding. Forms for cast-in-place maintenance holes should be designed to permit easy

- e. A diagonal pattern of rebars must be placed around all openings in slabs except where single duct subsidiaries can be located between the reinforcement. The diagonal reinforcement should consist of #5 rebars placed at 45 degrees to the slab sides and, where practical, extend to within 1 to 2 inches of the exterior slab edges. The first diagonal is placed 2" from the edge of the opening and each succeeding parallel bar is located 3 to 4 inches on center away from the opening. Diagonals located between the openings should extend uninterrupted to the slab edges to provide additional structural integrity to the slab.

27.16.5. Cable Bonding: A cable bonding ribbon must be provided in the center of each splicing bay of the maintenance hole/handhole. The bonding ribbons should be included in the roof slab in the case of a maintenance hole clamped to one of the reinforcement bars or to a reinforcement bar in the wall in the case of a hand hole. One continuous length of bonding ribbon can serve two (2)-splicing bays on opposite walls. The bonding ribbon should be run within the wall slab and brought into the maintenance hole at a point approximately 3" below ceiling level.

listed and Singlewire® Informacast® compatible. Talk- A-Phone has created SKUs unique to ODU specifications.

27.17.3. Power Connections: These units require a constant, dedicated 120VAC power source. The building, room, panel number, and position of the circuit breaker must be labeled at the receptacle.

27.17.4. Blue Light Strobe: To conform with NEC codes, the lights may need to be connected to and powered via a listed, outdoor direct current transformer.

Indoor IP Speaker Count	Coverage Area
Zero -- use IP phone	Less than 1,000 sq. ft.
1	1,000 sq. ft. to 3,000 sq. ft.
2	3,000 sq. ft. to 5,000 sq. ft.
3 or more	Over 5,000 sq. ft. -- design per manufacturer's recommendations

27.18.4. Outdoor IP Speaker: The outdoor IP speakers shall be Atlas Sound brand of Informacast compatible speakers. Power shall be provided by 802.3af compliant POE network switch or via local 12VDC to 18VDC power injector. Design and place outdoor IP speakers as directed by ODUEM.

27.18.5. Outdoor Loudspeaker System: Large outdoor areas are typically covered by furnishing an audio amplifier with an IP interface that uses long throw outdoor speakers. When ODUEM requests coverage of surrounding areas for a building, the design team shall follow these guidelines and coordinate all installation work with ODU IT Telecom and Network Infrastructure.

- a. Audio Amplifier: Use Atlas Sound Strategy Series (e.g. CP700) sized accordingly. Amplifier shall have dual channels and rated as a commercial audio amplifier. Provide power conditioner and surge suppression sized to meet the amplifier load.
- b. Enclosure: Amplifier shall be mounted in Atlas Sound AWR series tilt out wall mount rack, sized accordingly.
- c. Outdoor Loudspeaker: Building conditions and surrounding environments greatly affect the design and layout for an outdoor paging system. The design team shall recommend and provide an appropriate solution to meet ODUEM request for coverage. The solution shall use Atlas Sound equipment to be compatible with the existing system in place. Again, all outdoor equipment shall be sized accordingly with appropriate mounting brackets and accessories specified to meet the need.

27.18.6. WAO for MNS: The design team should conduct a mass notification survey and design the IP speaker(s) / phone placement. One work area outlet shall be dedicated to each IP speaker. WAO for MNS needs one cable only.

27.18.7. Test and Inspection: Coordinate test and inspection with ODU IT NST and ODU Police. ODU IT NST will test IP phones and IP speakers and put into production mode with the ODU Police approval.

27.19.0 Wireless Networks

27.19.1. Wireless Network Design: The wireless network design and Wireless Access Point selection shall be coordinated with the ODU NST Wireless engineering group so as to seamlessly integrate with the existing campus wireless system. The wireless network shall be designed to provide high quality wireless Internet coverage for the entire building, including all publicly accessible exterior spaces as defined by the project site plan. Incorporate specific needs of the user group into the wireless design for the project.

27.19.2. Wireless Access Point Locations for Interior Spaces: The ODU wireless engineers will provide a floor plan with WAP locations.

Constructing a name (location): There are four fundamental identifier types that shall be used at the beginning of any name: building names, telecommunications room identifiers, room numbers, and communications cabinet identifiers. These are used to designate locations and include all location types here at the Old Dominion University. Assignment of any location identifiers should be coordinated with the Department of Planning & Capital Construction in the case of building and room numbers, or the ODU IT in the

Fiber- Optic cable

The fiber optic cable should be labeled at both termination points on the outside jacket of the cable within 8 inches of the breakout point for the individual strands. This label will contain the full name of the cable. This label will be applied outside of the fiber panel.

Individual fiber strands should be inserted into any fiber panel following the standard color code for fiber with Blue being first, as per TIA-598-C. This color code should be followed so it can be read from left to right and from up to down for each module as viewed from the front of the fiber panel. In the documentation, strand numbers will begin at 1 and ascend in keeping with the color code, i.e., blue=1, orange=2, green=3, and so on.

Each fiber termination should be labeled on the boot by a number that corresponds to

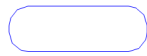
A documentation page will be supplied inside the panel that should be marked with which fiber strand matches up to which bulkhead. The installer may create a simple spreadsheet similar to that pictured below. In this case, labeling should make clear the identity of each bulkhead and the fiber strand that is connected to it. In the case of horizontal

panel port where they terminate will be labeled with the termination position of the other end of the cable. For example, where 0132-1A/0132-1B,CUT1 connects two TR's each patch panel would be labeled with the termination position of the other room. In 0132-1A, the port where this line terminates may be labeled 1B-1A05. This points to Rack #1, Panel

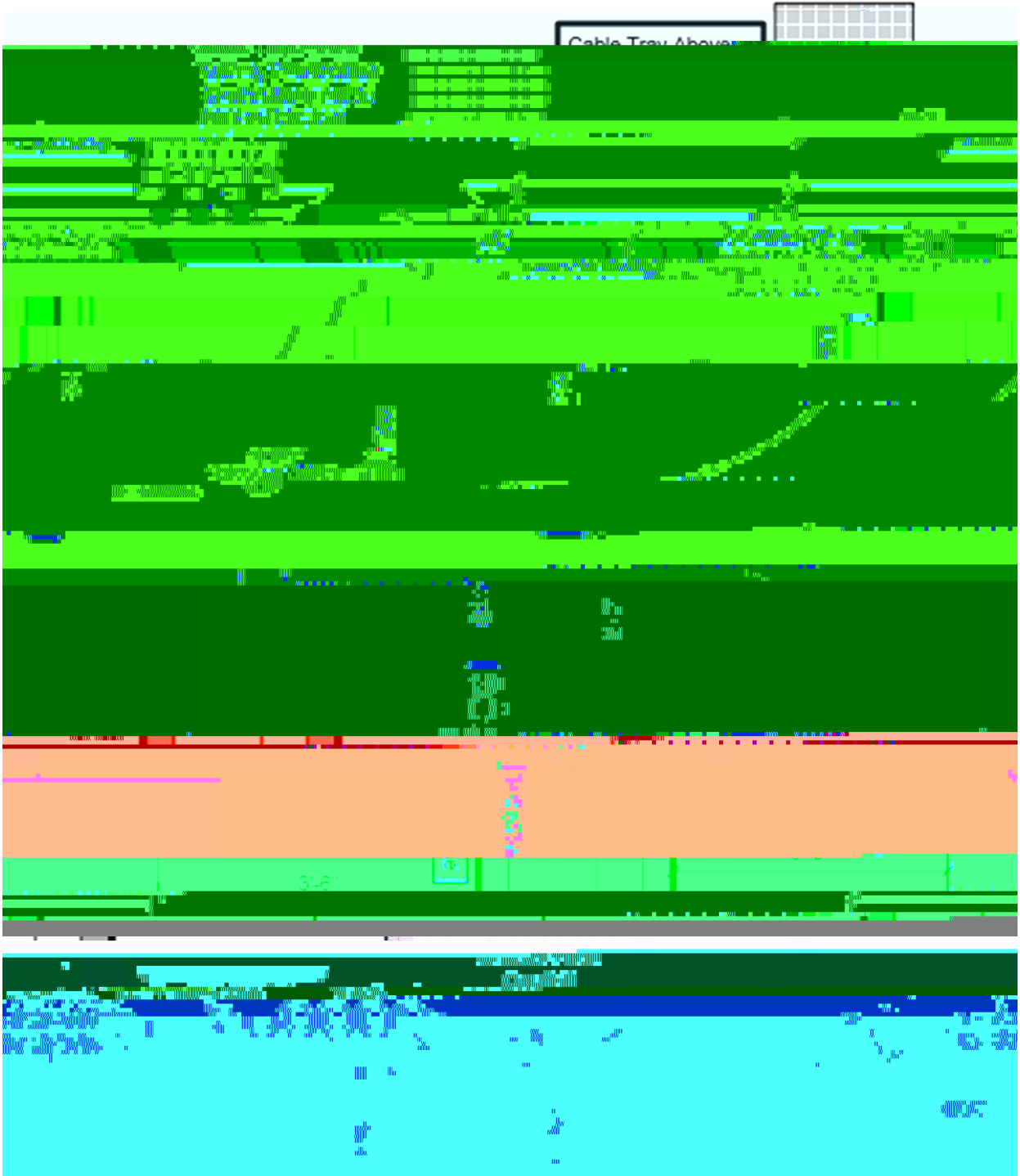


Supporting Documentation: All deliverables that are turned over to Old Dominion University will reference network-infrastructure equipment using this standard. At that point it is the responsibility of ODU ITS Network Services to maintain all records and documentation of network infrastructure. As such, those procedures are open to more regular review, procedural change and will not be addressed here.

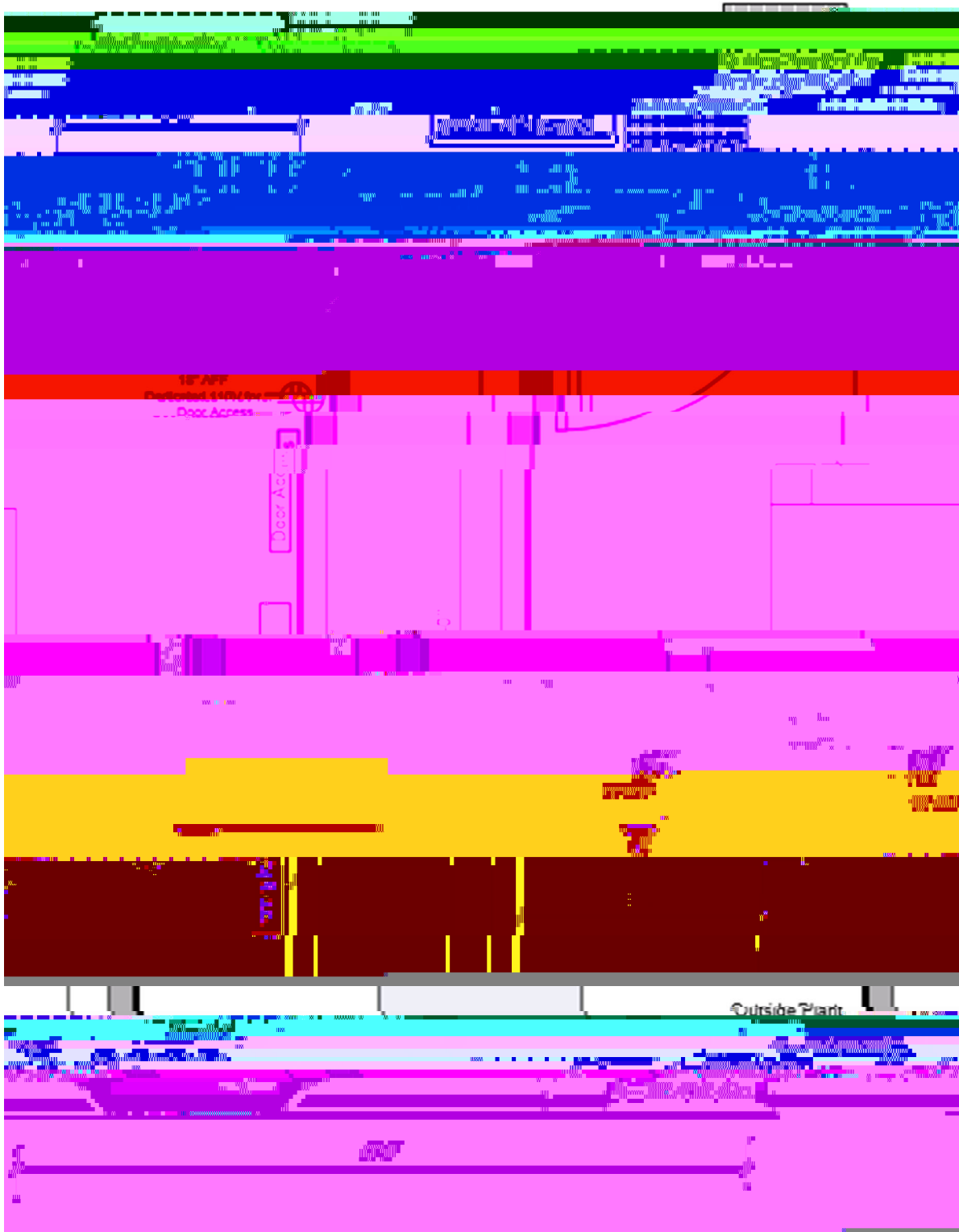
Conclusion: This document covers the most common labeling needs for the installation of network infrastructure across the Old Dominion University. There are a number of more specific situations covered in the ANSI/TIA-606-B administration standard including a standard fare of abbreviations for descriptors. If you have any questions concerning these standards and their interpretation in reference to the Old Dominion University, contact ODU ITS Network Services.

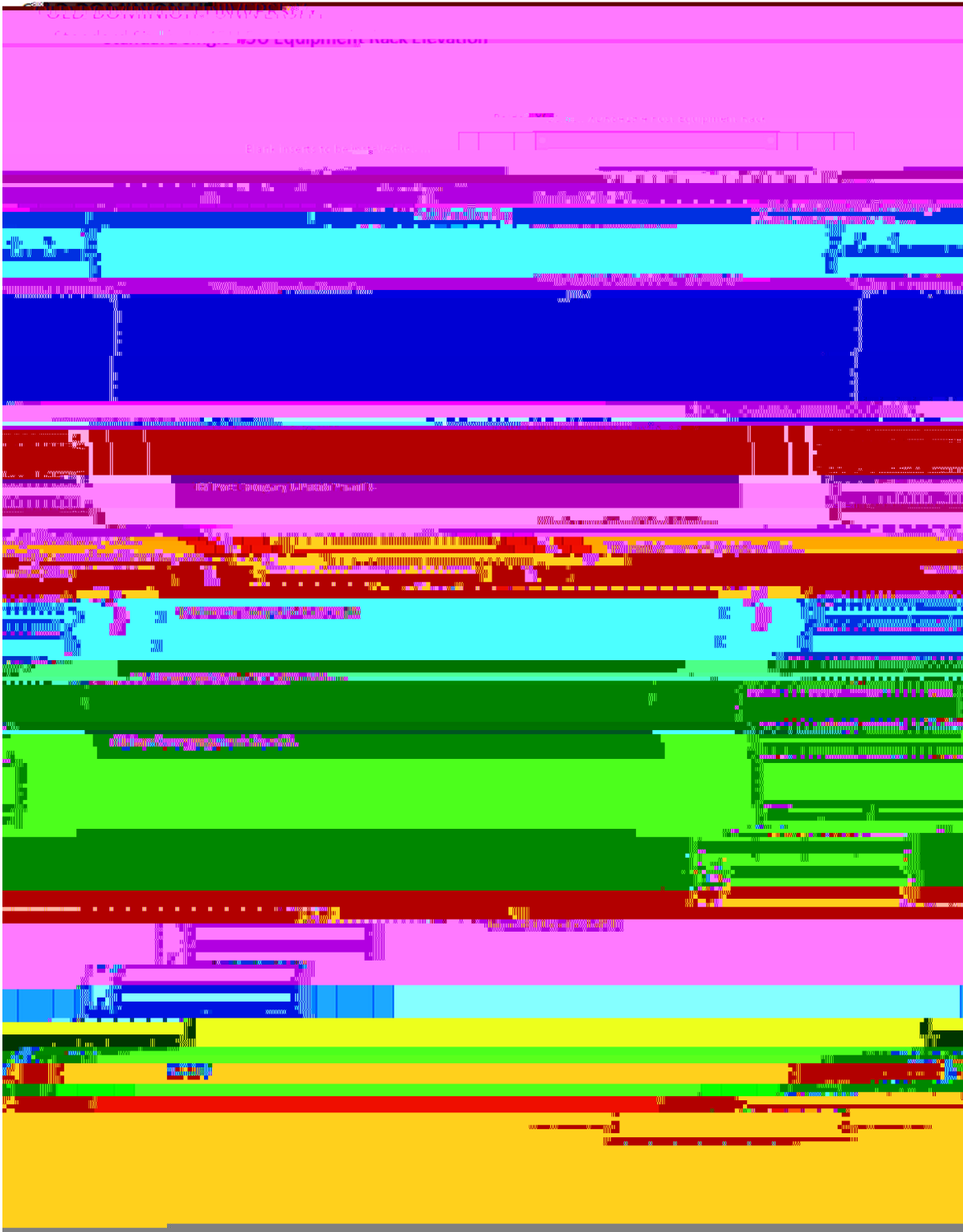


Typical 2 Equipment Rack Room



Typical 3 Equipment Rack Room







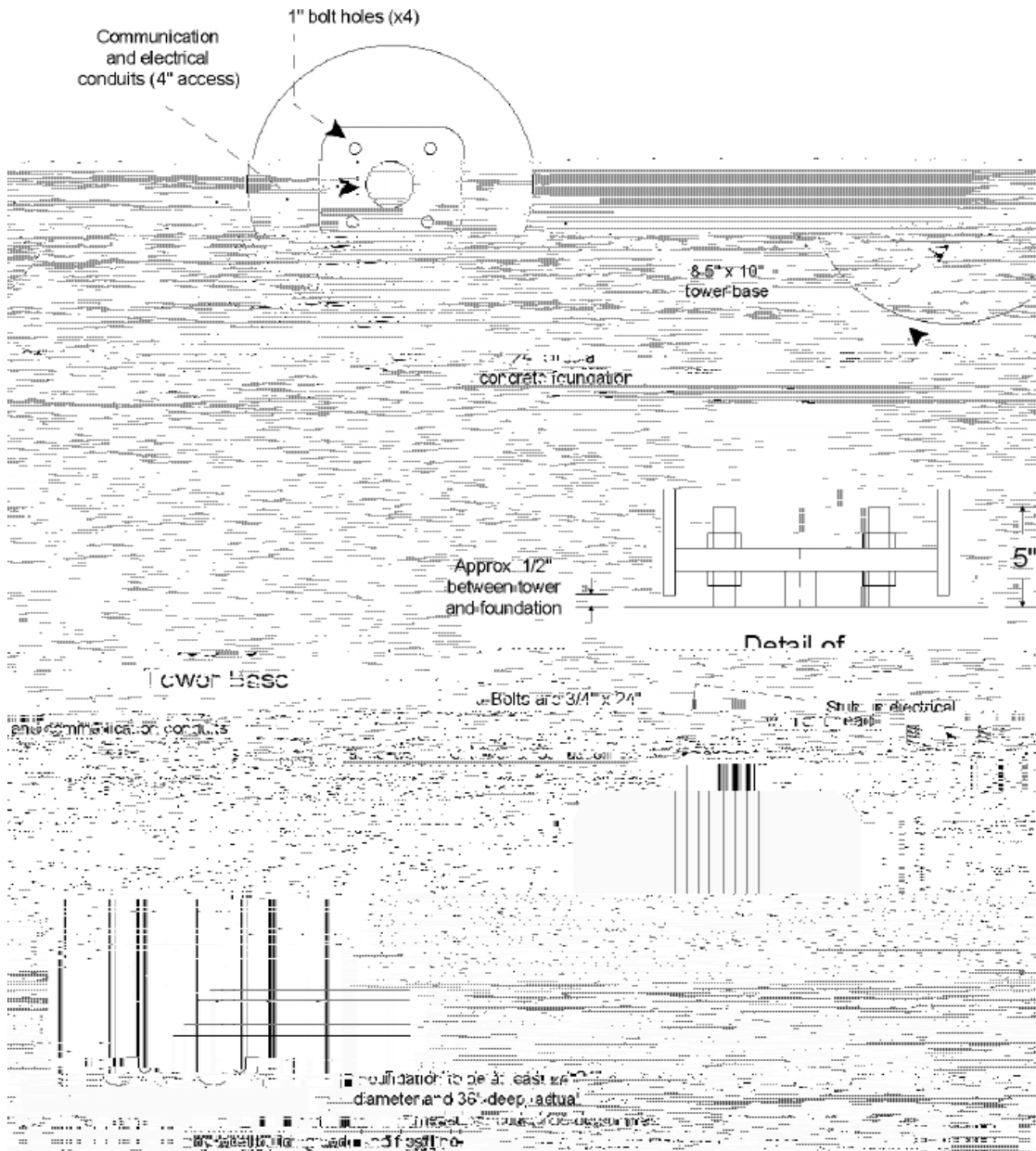
Appendix #4 – Blue Light Emergency Phone Tower Installation

ODU NST will coordinate installation of foundation pad for Talk-a-Phone tower units per the manufacturer's directions provided at:

http://www.talkaphone.com/sites/default/files/ETP-MT-R%20Anchor%20Bolt%20Install_1.pdf

Project shall furnish a 1" conduit with a dedicated power circuit and a separate 1" conduit for data communications.

Details of Tower Base:



Appendix #5 – ODU NST, and Other ODU Department Specific Guidelines

The Old Dominion University Telecommunication Standards shall be followed when designing an information transport system for any new construction and major renovation project. Procurement of the installation of these systems may vary slightly between ODU IT and ODU Housing or Athletics. Also, other ODU networking departments may have additional requirements and projects specific to those entities should be coordinated as noted below.

These guidelines are provided for informational purposes to assist with developing the scope of work for projects. The building design and drawings shall show all information transport systems work and then denote whether project furnished or "by others".

A. Housing Projects:

1. Follow ODU Telecom Standards.
2. Any additional requirements will be provided prior to bidding.

B. University Athletic Association Projects:

1. Follow ODU Telecom Standards.
2. Any additional requirements will be provided prior to bidding.

PURPOSE

The purpose of this document is to provide guidelines and direction for the selection and placement of electronic card access control devices. It is not intended to supersede any other door hardware or mechanical access control requirements.

1. Definitions:
 - a. EAC – Electronic Access Control – the overall system
 - b. CAC – Card Access Control – doors which are equipped with card readers for access.

2. Overview of Existing Electronic Access Control Environments

Old Dominion University currently employs CBORD - CSGold CS Access system as its EAC system. As of Aug. 2014 all new EAC hardware shall be compatible and use the CBORD – CSGold - CS Access system. ODU uses the “CSGold Campus ID Card System” to manage the ODU ID card. This card is used to access doors on both system equipment with CAC.

3. General Guidelines
 - a. Exterior doors shall be kept to a minimum.
 - b. All devices shall fully and completely integrate with the ODU EAC system from CBORD.
 - c. The contractor shall provide and install conduit, pull strings and junction boxes for each door as per EAC Conduit Diagrams provided by ODU.
 - d. The contractor shall provide and install all electronic lock sets and power transfer devices and prep all doors requiring EAC for the specified equipment, such as drilling(prepping) wood or metal doors for the AD300 lock set. See EAC Conduit Diagram – AD300.
 - e. All products and materials shall be new and approved in the pre-installation submittals.
 - f. All lock sets which require additional licenses from CBORD must be purchased from CBORD. The University does not want to incur additional fees.
 - g. No offline locks, No push button combination locksets or similar types on exterior doors or interior doors.
 - h. No magnetic locks.
 - i. All electronic locks shall fail secure.
 - j. All doors with electronic access shall have free egress at **ALL** times.
 - k. No dogging options on electrified devices.
 - l. EAC wiring will be installed by ODU are for following: Card reader, REX, DPS, MLR/Strike
 - m. Auto operator wiring will be installed by Contractor(All wiring, including for Actuators). Auto operator is expected to be operational without ODU access control. ODU will interact with the contractor wires afterwards to make ODU access control work. (Contractor wires need to be accessible (should we make it a standard to make it wired only?) yes
 - n. ODU will be the EAC vendor and will provide all CBORD Squadron EAC hardware and will activate the system.
 - o. ODU will configure the system and provide all core licenses.
 - p. Doors that require wires from Hinge/EPT to EAC hardware on the door is the responsibility of the contractor. I.E. AD300 on a door – (All prepping for the door handled by contractors)
 - q. Cores- constitution cores will be provided and maintained by contractor. Contractor will be responsible for issues keys and maintaining log of issuance.
 - r. Fire rating for doors need to be clearly stated on the template given and prepped by vendor.
 - s. Card readers: if there is a Box or flush mounted, if flush we need more space(¾ in hole minimum) for the MT readers
 - t. Door Cameras- Need to add stuff here..

4. Minimum Electronic Access Control Requirements
 - a. All exterior doors, regardless of whether they are electrified or not(Active leaf and inactive leaf), will be equipped with a prop sensor tied back to the CBORD EAC system.
 - b. All exterior “Exit Only” doors will remain locked at all times and be equipped with a prop sensor(DPS) and request to exit device(REX) tied back to the CBORD EAC system.
 - c. All exterior doors programmed to be unlocked at any time will be elec

- f. If one door in a bank of doors is electrified all the door in that bank shall be electrified and be locked/unlocked at the same time using the EAC system. If the bank is used for afterhours access only one of the doors shall have CAC.
- g. All ADA (auto operator) doors will be equipped with CAC. The auto operator system shall be tied in with the EAC to prevent the auto **p** from engaging when the door is locked, the auto operator should be operational before odu ties into it. This will only for the exterior set of doors(if there is a vestibule), expect for residence halls. Also, if there is a vestibule (open area between an outter and inner set of doors) an ADA actuator to open the doors will be placed in the vestibule.
- h. Class rooms, lecture halls and other teaching spaces which are equipped with EAC shall have locksets that enable the occupants to readily secure the door(s) from within the room, such as Function 40 (Privacy) and still provide free egress.(AD3

2. ANSI Function: 03-Key Retracts Latchbolt
 3. Trim: 1700C and 2000C
- g. Power Transfer
- i. Electric Hinge – Command Access ETH6WH - 2 Wire (18 gauge) + 4 Wire (28 gauge), (minimum requirements: 2x18 AWG and 4x28 AWG)
 - ii. EPT – Stanley EPT-12C, CEPT – 10 (minimum requirements: 2x18 AWG and 6x22 AWG)
- h. Relays for ADA/Auto Operators – see Wiring Diagrams w/ Auto Op
- i. BEA Br3 Logic Module - Used to prevent the auto operator from engaging when the door is locked. The interior ADA push button/actuator should signal the EAC to unlock the door when pushed and then engage the auto operator.