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ARCOS BULLETIN 2013-3

SUBJECT: IT Design Criteria Updates

1. REFERENCE:
 - a. UFC 4-171-05, Army Reserve Facilities
 - b. Army Reserve IT Manual, Change 3
 - c. Army Reserve Design Process Submittal Requirements (DPSR)
 - d. USARC G-2/6 IT Design Criteria Updates, 17 October 2013 (ENCLOSURE 1)
2. This memorandum is to serve as updated guidance currently defined in Army Reserve IT Manual, Change 3, UFC 4-171-05, and the Army Reserve DPSR. The attached document has been prepared and approved by USARC G-6 and provides updates applicable to the design of Army Reserve Facilities.
3. The updates represent recent lessons learned and frequent IT design issues and omissions. This document will be incorporated into future updates of the Army Reserve IT Manual, Design Guide, and DPSR and is intended to be utilized as interim requirements until those updates occur.
4. This ARCOS Bulletin supersedes ARCOS Bulletin 2013-2. All applicable criteria from that bulletin have been incorporated into the attached enclosure.

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USARC G-6

IT Design Criteria Updates

Last Updated: 17 October 2013

1. This document has been designed to be used as a tool in the creation and review of the Design Narrative, Specifications, and Drawing Sheets for all Army Reserve MILCON projects. This document is a bridging document that describes lessons learned, and updated and/or new IT Design Criteria. It will be periodically reviewed, updated, and issued until the next major revision of the Army Reserve IT Manual is issued.

2. IT Reference Documents

- 2.1. The Telecommunications Design and Construction for all MILCON projects follow basic industry standards and are required to be fully compliant with standards established by USARC G-6, ISEC and USACE.
- 2.2. To help ensure this compliance, in addition to the industry standard telecommunications references that are included in the Design Analysis and Specifications, the following IT Reference Document titles are to be incorporated in the Design Analysis Electrical and Telecommunications sections as required Reference Documents.
 - 2.2.1. Army Reserve IT Manual
 - 2.2.2. Technical Criteria for the Installation Information Infrastructure Architecture (I3A)
 - 2.2.3. UFC 4-171-05

3. Lessons Learned

3.1. USARC G-6 has identified several design errors that have occurred on a majority of the Telecommunications Designs reviewed. In order to avoid these IT design errors, a description of the item and method of avoiding the design error are listed below;

3.1.1. **Design Error:** RCDD stamp missing from the Certified Final Telecommunications Design Package.

3.1.1.1. **Method of Correction:** IAW I3A and the Army Reserve IT Manual, RCDD review, approval, certification is required prior to issuing Certified Final. The Certified Final must have the RCDD stamp on the Title Page of the drawing package.

3.1.2. **Design Error:** Voice and Data outlet termination “serving areas” are not clearly defined on telecommunications drawings.

3.1.2.1. **Method of Correction:** IAW I3A, in buildings with the TER and TR or multiple TRs on the same floor, each telecommunications floor plan sheet (i.e. 1T-XXX) should clearly indicate the TER/TR the voice and data outlets are to be terminated in. For example, a General Note which states, “All voice/data outlets on this sheet are to be terminated in TER/TR XXX)” could be added to each applicable sheet.

3.1.3. **Design Error:** Water, Gas, and Mechanical pipes that don’t serve the EF, TER, and TR(s) are often designed to pass thru, below, or above these spaces.

3.1.3.1. **Method of Correction:** IAW the Army Reserve IT Manual, this is not allowed. The Designer of Record should be cognizant of this requirement as the Fire Safety, Plumbing, and Mechanical designs are created. G-6 also requires that the following note be added to the Fire Safety, Plumbing, and Mechanical drawings general notes pages: “Equipment (piping, ductwork, machinery, etc) that does not serve the EF, TER, or TR(s) shall not be installed above, below (i.e. in or under slab) or in these IT spaces nor will this equipment pass through or enter the EF, TER, or TR(s).”

3.1.4. **Design Error:** Motors, transformers, or other electrical devices greater than 5KVA are located within 47” of the EF, TER, and TR(s). This can often cause an EMI issue. EMI issues are very difficult to isolate and often expensive to mitigate.

3.1.4.1. **Method of Correction:** To avoid the possibility of EMI, the Designer of Record should be cognizant of this issue as the Mechanical and Electrical designs are created. All motors, transformers, or other electrical devices greater than 5KVA are required to have a minimum of a 47” buffer from any wall of the EF, TER, or TR(s). G-6 also requires that the following note be added to the Mechanical and Electrical drawings general notes pages: “Any motor, transformer, or other electrical device greater than 5KVA will have a minimum of a 47” buffer from any wall of the EF, TER, or TR(s).”

3.1.5. **Design Error:** Windows are being included in the design of the EF, TER, and TR(s).

3.1.5.1. **Method of Correction:** IAW I3A, windows are not allowed in EF, TER, and TR(s). To avoid costly construction modifications and delays, the AE firm must thoroughly review the design to ensure that windows ARE NOT placed in the EF, TER, and TR(s). This includes the doors to these spaces.

4. IT Design Criteria Updates

4.1. New/Revised Requirements Updates

- 4.1.1. As the IDS Panel is no longer required in the SIPRNet Café, the IDS voice outlet and conduit from the SIPRNet Café to the TER is no longer required.
- 4.1.2. In order to allow for the DS-3 Circuit extension, add (2) 75 ohm RG-6 cables (Siamese type preferred) from the TER distribution rack to the EF. Terminate with BNC connectors. Cables shall be long enough so there is enough slack to reach the bottom of the distribution rack and 20 ft. of slack in the EF.
- 4.1.3. At the discretion of the IT DOR, the use of (2) 3 inch-3 cell Maxcell innerduct with tracer (or approved equal) is allowed in place of typical rigid innerduct.
- 4.1.4. The use of the Common Cabling System Approach is now required on all projects where this approach is feasible and cost effective. The basic details are;
 - 4.1.4.1. All Low-Voltage signal cable can share the same pathway (i.e. cable tray, conduit).
 - 4.1.4.2. The initial fill capacity for cable tray has been raised from 25% to 50%.
- 4.1.5. As DS-3 circuits are now used in all Army Reserve MILCON projects, the EF is now included in the list of telecommunications spaces requiring HVAC and must be conditioned IAW the requirements listed in I3A.
- 4.1.6. A minimum of 2-4 inch conduit sleeves are required for non-fire rated wall cable entry points in the TER and TR(s).
- 4.1.7. For all fire rated walls, the use of mechanical fire stops is required. Initial fill capacity is 40%.
- 4.1.8. All IT racks must have a minimum of 12 inches of clearance from the left or right side (whichever is closest to the wall). 36 inches of clearance is still required from the front and back of all IT racks.
- 4.1.9. Horizontal Cabling Conduit requirements
 - 4.1.9.1. All conduits must be sized for an initial fill ratio of 40% or less. This 40% fill ratio must be based on an O.D. of .26". Note that the minimum size conduit allowed to be used is 1 inch.
 - 4.1.9.2. Modular furniture system connections (up to 6 workstations) require a 2 inch liquid-tight flexible metal conduit and fittings to connect each floor box or wall box to the acoustic panel raceway.
 - 4.1.9.3. All in-slab floor box locations require 2-1.25 inch (minimum) conduits (**one in-use and one spare**) be installed. Only the first conduit can have cable installed. The second must remain empty.
- 4.1.10. IAW the Army Reserve IT Manual, the Category 6 cable installed in all on-grade in-slab conduits must be rated for use in wet locations.
 - 4.1.10.1. Consolidation Points for transition from Wet-rated to Plenum-rated cable must be included in the design if the distance from the conduit exit point to the TER/TR exceeds 49 ft and the cable will pass thru a plenum space.

- 4.1.11. USARC G-6 has developed a Standard Telecommunications Symbols Legend. This legend (see Section 5 Figure 1 of this document) is required to be used as the basis of design for the IT DOR's Telecommunications Symbol Legend.
- 4.1.12. Cable requirements from the TER to the UHS have been reduced. Only 6 pair of OSP copper cable is now required. There is no requirement for Fiber Optic cable.
- 4.1.13. Clean Power circuits as referenced in the Army Reserve IT Manual are no longer mandated. Where clean power circuits are referenced, power circuits are still required. The Electrical DOR shall design the electrical system to reduce or eliminate harmonics IAW current codes, standards, and best practices.

4.2. Previous Requirements Updates

4.2.1. Wireless Access Point Outlet infrastructure requirements

4.2.1.1. Areas served by the wireless access point outlets;

- 4.2.1.1.1. Classroom
- 4.2.1.1.2. Assembly Hall
- 4.2.1.1.3. Conference Room
- 4.2.1.1.4. Library
- 4.2.1.1.5. Learning Center
- 4.2.1.1.6. Work bay

4.2.1.2. Coverage and Outlet Density Requirements

- 4.2.1.2.1. 1 Wireless Access Point outlet is required for every 55 foot x 55 foot grid of the above areas.
- 4.2.1.2.2. If grid location will support less than 20 users, then provide one Cat6 cable per outlet. For grid locations with over 20 users, provide two (2) Cat6 cables per outlet.

4.2.1.3. Mounting Details

- 4.2.1.3.1. For all standard height drop ceiling locations, each Wireless Access Point outlet will be mounted 12 inches above finished ceiling. If feasible, locate these outlets in corridors adjacent to the areas they are designed to serve.
- 4.2.1.3.2. For high height ceilings (i.e. Assembly Halls and Work Bays), each Wireless Access Point outlet will be mounted on the wall at 12 feet AFF.
- 4.2.1.3.3. Mount in a location free from obstructions below.

4.2.2. Electrical Outlet requirements for the EF, TER, and TR(s) have been significantly revised.

- 4.2.2.1.1. The electrical panel for the EF, TER, and TR(s) must be located in the space that it serves.
- 4.2.2.1.2. Entrance Facility – Service Provider Outlet requirements for DS3 data circuits can vary greatly. IT DOR should coordinate with the Local LEC to determine the power receptacle(s) required for the Government Furnished Data (DS3) and Voice (PRI) circuits. If unable to determine the power receptacle(s) required, then indicate four dedicated circuits with two NEMA L6-30R (AKA L6-30R) (208/240), one NEMA L5-20, and one double duplex NEMA 5-20 receptacles. These receptacles will be installed on the plywood backboard at 18" AFF near the Service Provider Conduits.

- 4.2.2.1.3. TER and all TR(s) - New requirements call for one dedicated 120V/20 Amp circuit with one double duplex NEMA 5-20 receptacle for each 19 inch (480 mm) rack or cabinet in the TER and all TR(s). This receptacle shall be mounted 15" AFF on the rear of the rack.
- 4.2.3. HVAC requirements for the TER and TR(s) have also been revised. The following is provided as additional guidance to help the HVAC Designer meet the requirements as listed in the Army Reserve IT Manual and I3A.
 - 4.2.3.1.1. For heat load calculations use the heat dissipation information from the actual equipment to be installed in each rack. This information should be coordinated with the USARC G-6 representative for the project. If it is determined this information is not available, then 1650 Watts per IT rack will be used as a default value.
- 4.2.4. Conduit requirements from the TER to the UHS have been reduced. Only 1-4" conduit with 3-1.25" innerduct is now required.
- 4.2.5. The Arms Vault IDS System Panel locations now require a voice/data outlet from the IDS system panel to the nearest TER/TR. This voice/data outlet must be installed in 1" EMT conduit from the IDS panel and terminated in the appropriate patch panel. Terminate the voice and data cable in the IDS Panel with an RJ45 jack. Provide 8-12 inches of slack cable in the IDS panel.
- 4.2.6. Vertical Rack Grounding Bus-bars as defined in section 3.7.2.3 of the Army Reserve IT Manual are no longer required. All IT racks shall now be grounded directly to the TGB.
- 4.2.7. GPON as defined in section 3.2.7 of the Army Reserve IT Manual will no longer be considered as an IT design alternative and this section is no longer applicable to Army Reserve MILCON projects.
- 4.2.8. 12 Strands of SM fiber is now required from the EF to the Service Provider Point of Connection. This is in addition to the 50 pair copper cable already required. Both of these cables are typically furnished and installed by the Local LEC. However, it should be made clear on the design and in the design analysis that the contractor is responsible for the coordination of the installation of these cables and **ALL** costs for this cable installation.
- 4.2.9. Grounding and Bonding Requirements
 - 4.2.9.1. G-6 has determined that, as compared to the requirements listed in the Army Reserve IT Manual, ANSI-J-STD-607B gives grounding and bonding design alternatives. The Electrical DOR should consider ANSI-J-STD-607B when creating the IT Grounding and Bonding design.
- 4.2.10. Test Results Requirements
 - 4.2.10.1. All Low-voltage cabling tests must be performed IAW with the requirements listed in the specifications and I3A.
 - 4.2.10.2. The Low-Voltage Contractor is required to provide USARC G-6 with the following test results
 - 4.2.10.2.1. Ground to Earth Resistance of 10 Ohms or less for the TMGB and each TGB
 - 4.2.10.2.2. Backbone Fiber

- 4.2.10.2.3. Backbone Multi-Pair Copper
- 4.2.10.2.4. Horizontal Category 6 Cable

5. Figures

The following typical diagrams are designed to assist the IT DOR in the design/creation of the Telecommunications Plans.

Standard Telecommunications Symbols Legend

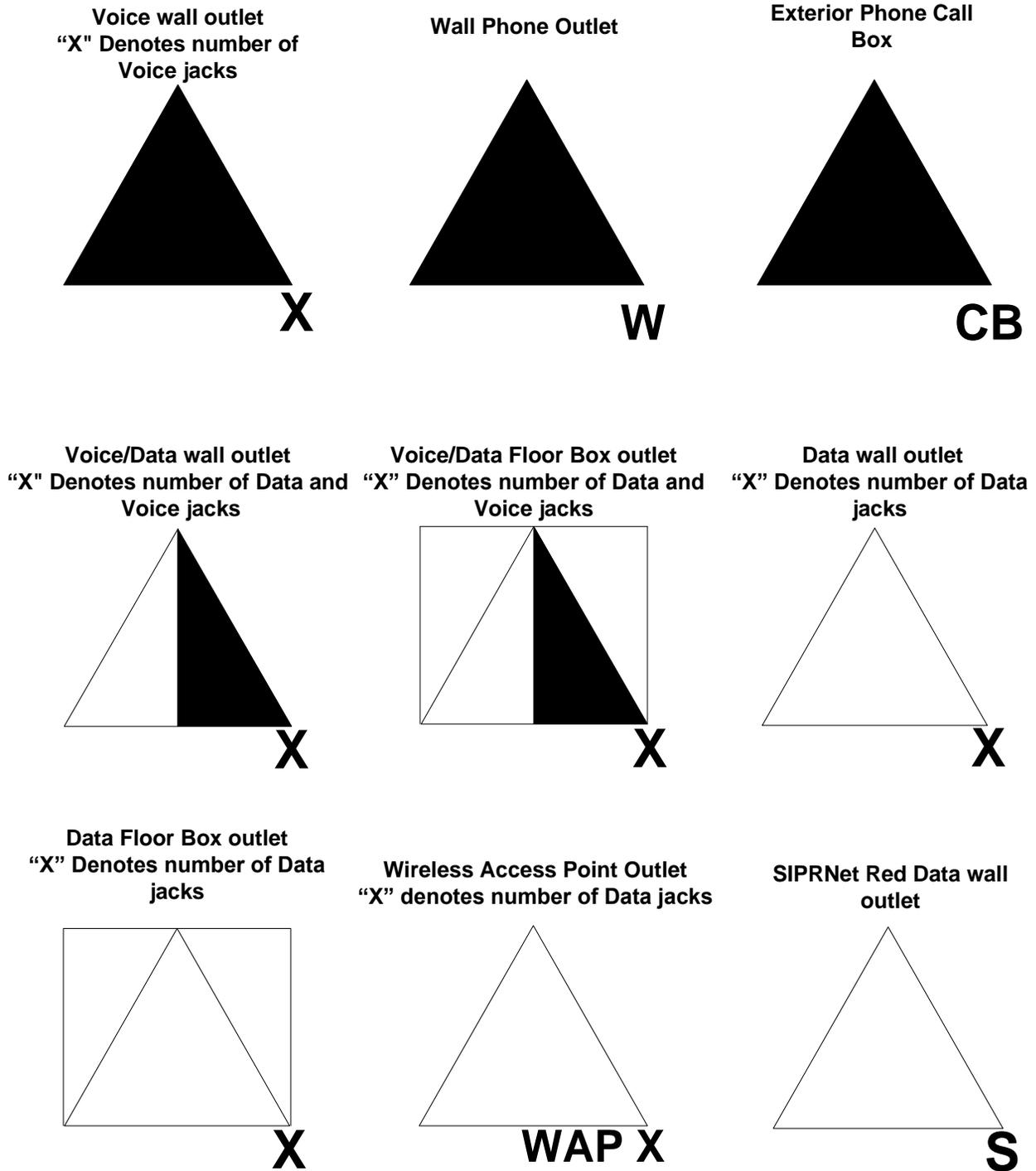


Figure 5.1

TER IT Racks (Typical)

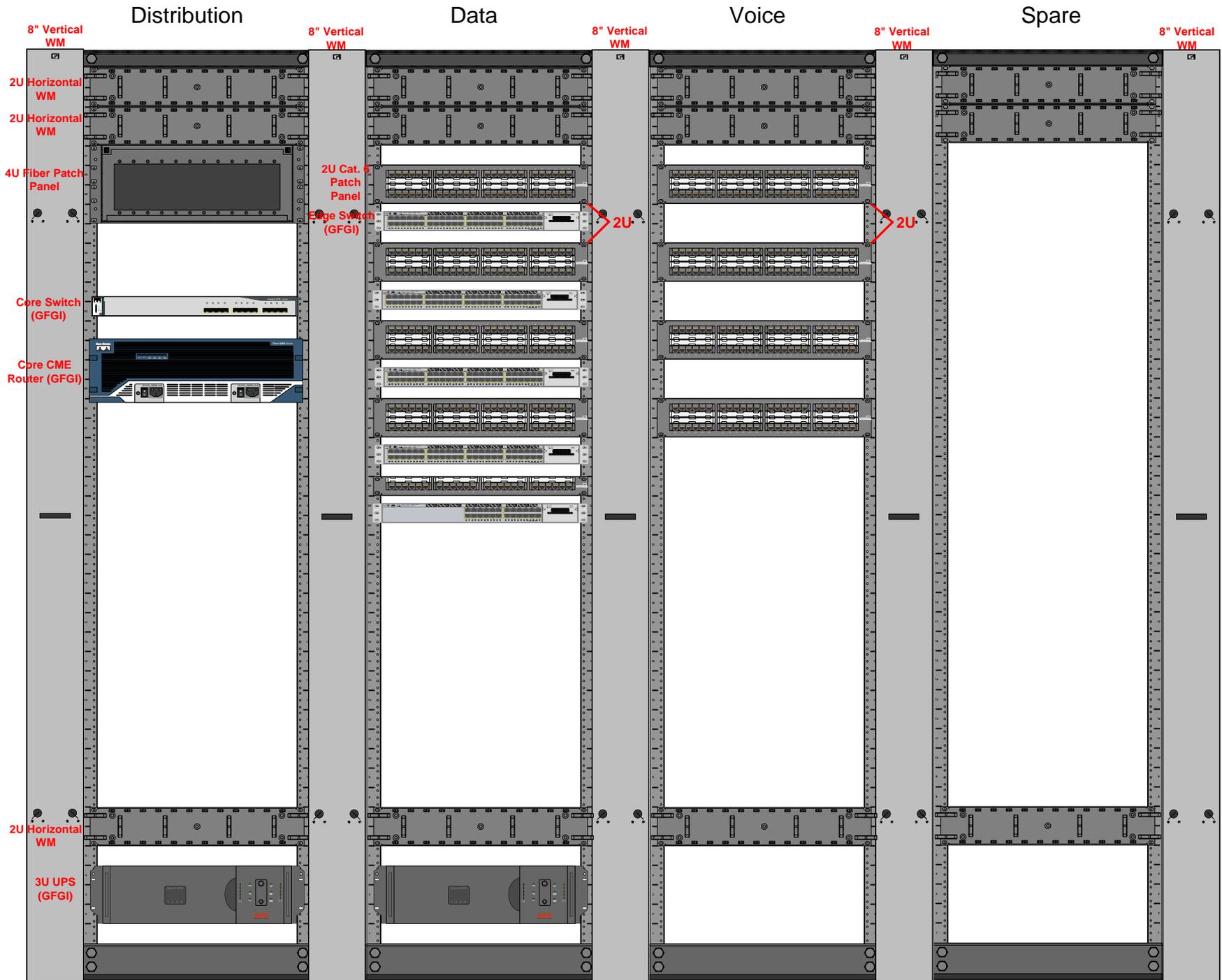
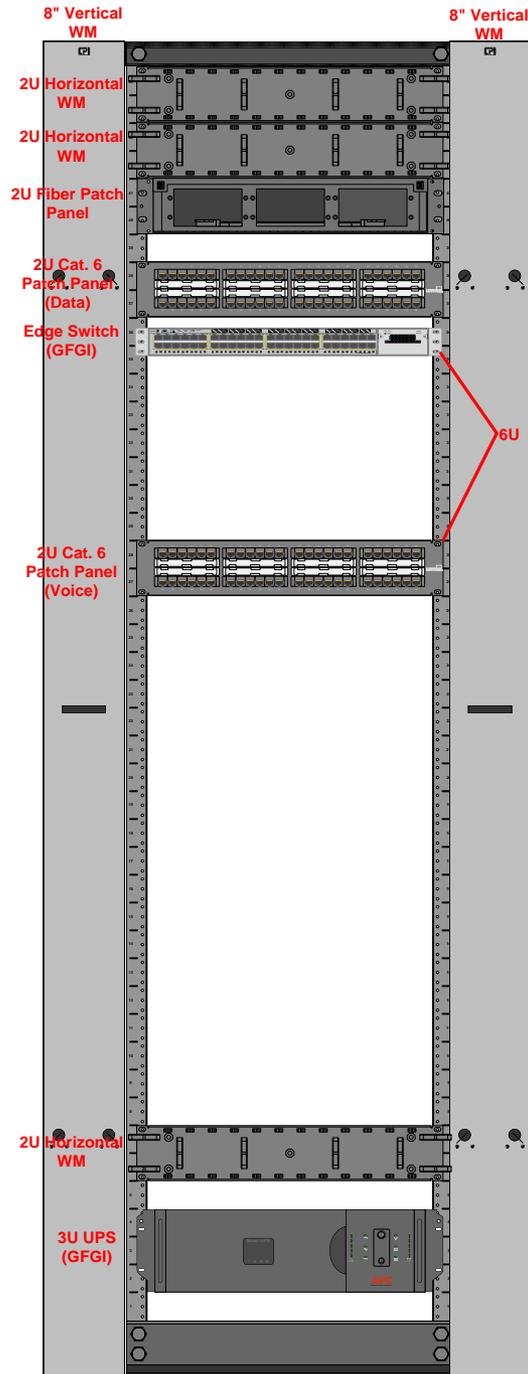


Figure 5.2

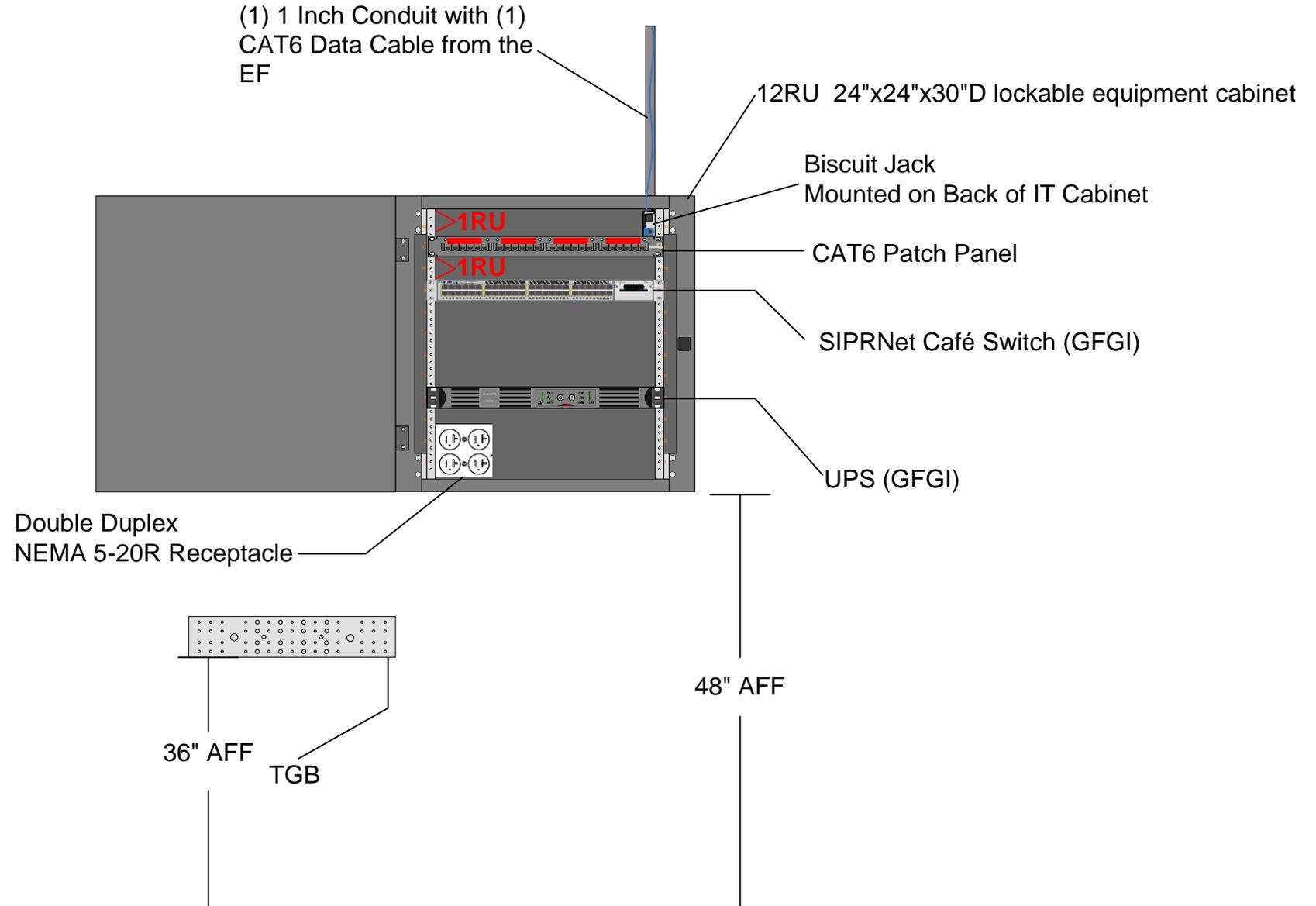
OMS TR IT Rack (Typical)

Figure 5.4



SIPRNet CAFÉ WALL MOUNTED EQUIPMENT CABINET LAYOUT (TYPICAL)

Figure 5.5



Army Reserve IT Backbone Cabling Diagram (Typical)

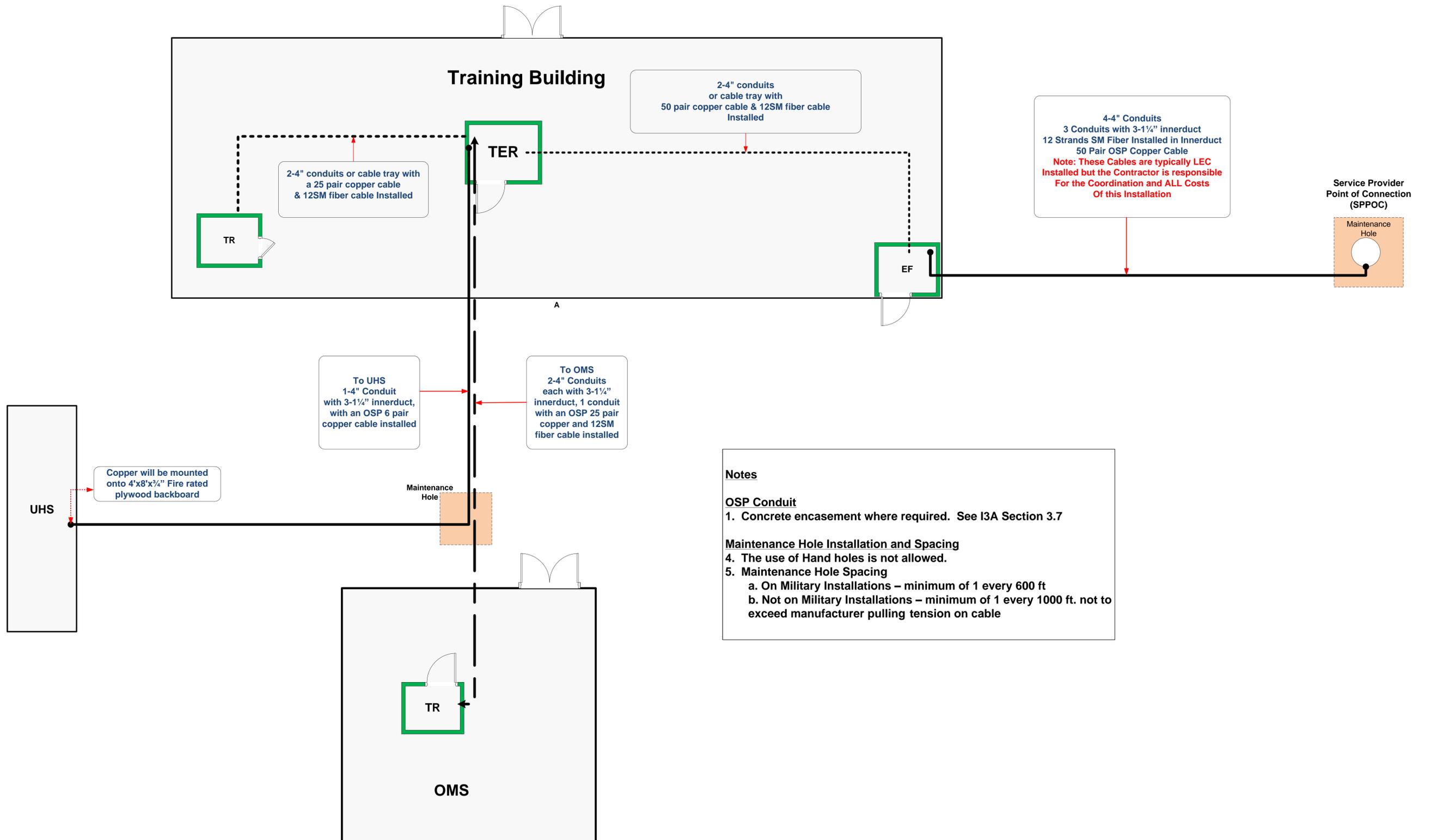


Figure 5.6