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ARCOS BULLETIN 2013-2

SUBJECT: IT Design

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, 26 March 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-2/6 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, Deign Guide, and DPSR and is intended to be utilized as interim requirements until those updates occur.

4. This ARCOS Bulletin supersedes ARCOS Bulletin 2012-3. 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: 26 March 2013

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, typical IT design issues, and new IT Design Criteria. It will be periodically updated until the next major revision of the Army Reserve IT Manual is issued.

IT Reference Documents

The Telecommunications Design and Construction for all MILCON projects follow basic industry standards and are required to be fully compliant with standards established by the Army Reserve, ISEC and the Corps of Engineers.

To help ensure this compliance, in addition to the industry standard telecommunications references that are included in the Design Narrative and Specifications, the following IT Reference Document titles are to be incorporated in the Design Narrative and Specifications Electrical and Telecommunications sections as required Reference Documents.

1. Army Reserve IT Manual
2. Technical Criteria for the Installation Information Infrastructure Architecture (I3A)
3. UFC 4-171-05

IT Design Pitfalls

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

- **Pitfall:** No RCDD stamp on the Certified Final Telecommunications Design Package.
    - **Suggested Avoidance Method:** 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 telecommunications design.
- **Pitfall:** Voice and Data outlet termination "serving areas" are not clearly defined on telecommunications drawings.
    - **Suggested Avoidance Method:** 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 TR XXX)" could be added to each applicable sheet.
- **Pitfall:** Water, Gas, and Mechanical pipes that don't serve the EF, TER, and TR(s) are often designed to pass thru or above these spaces.
    - **Suggested Avoidance Method:** IAW the Army Reserve IT Manual, this is not allowed. To help avoid this issue, G-2/6 requests 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)." In addition to adding this note, this is an important item for the Designer to be mindful of as the Fire Safety, Plumbing, and Mechanical designs are created.
- **Pitfall:** 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 repair. That is why the BISCI TDMM 12th Edition recommends avoiding all possible EMI situations.
    - **Suggested Avoidance Method:** To avoid the possibility of EMI, G-2/6 requests 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)." In addition to adding this note, this is an important item for the Designer to be mindful of as the Mechanical and Electrical designs are created.

IT Design Criteria Updates

The following are updates to the latest version of the Army Reserve IT Manual, IT community changes and new IT Design methods/requirements of note;

- Army Reserve data cable jacket and outlet jack color are now blue. G-2/6 requests this item be added as a General note on the Telecommunications General Notes sheet. G-2/6 also requests that a General note be added to indicate that white is the required Army Reserve cable jacket and jack color for voice outlets.
- The required size and specifications for IT wall-mounted cabinets have changed. The new requirement is that the cabinet be 24"W, 24"H, and 30"D (12 RU high), lockable, with louvers and fan. G-2/6 requests that a Keynote be added to the design to indicate this requirement when IT cabinets are used in the design (i.e. SIPRNet Café).
- Copper and fiber patch cables are now GFGI items and do not need to be included in the Telecommunications Design Narrative or the Telecommunications Design.
- Wireless Access Point Outlet infrastructure is now required to be included in the Telecommunications Design.
    - Provide Wireless Access Point outlets for the following areas;
        - Training Building
            - Classrooms
            - Assembly Hall
            - Conference Rooms
            - Library
            - Learning Center
        - OMS/VMS/TEMF
            - Workbay
    - Coverage and Outlet Density Requirements
        - 1 Wireless Access Point outlet is required for every 55 foot x 55 foot square grid of the above areas.
        - 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.
    - Mounting Details
        - For all standard height drop ceiling locations, each Wireless Access Point outlet should be mounted 12 inches above finished ceiling.
        - For all Assembly Halls and Work Bays, each Wireless Access Point outlet should be mounted on the wall at 12 feet AFF.
        - Mount in a location free from obstructions below (i.e. furniture)
- Electrical Outlet requirements for the EF, TER, and TR(s) have been significantly revised. The changes are as follows;
    - Clean Power circuits are no longer required.
    - The electrical panel for the EF, TER, and TR(s) must be located in the space that it serves.

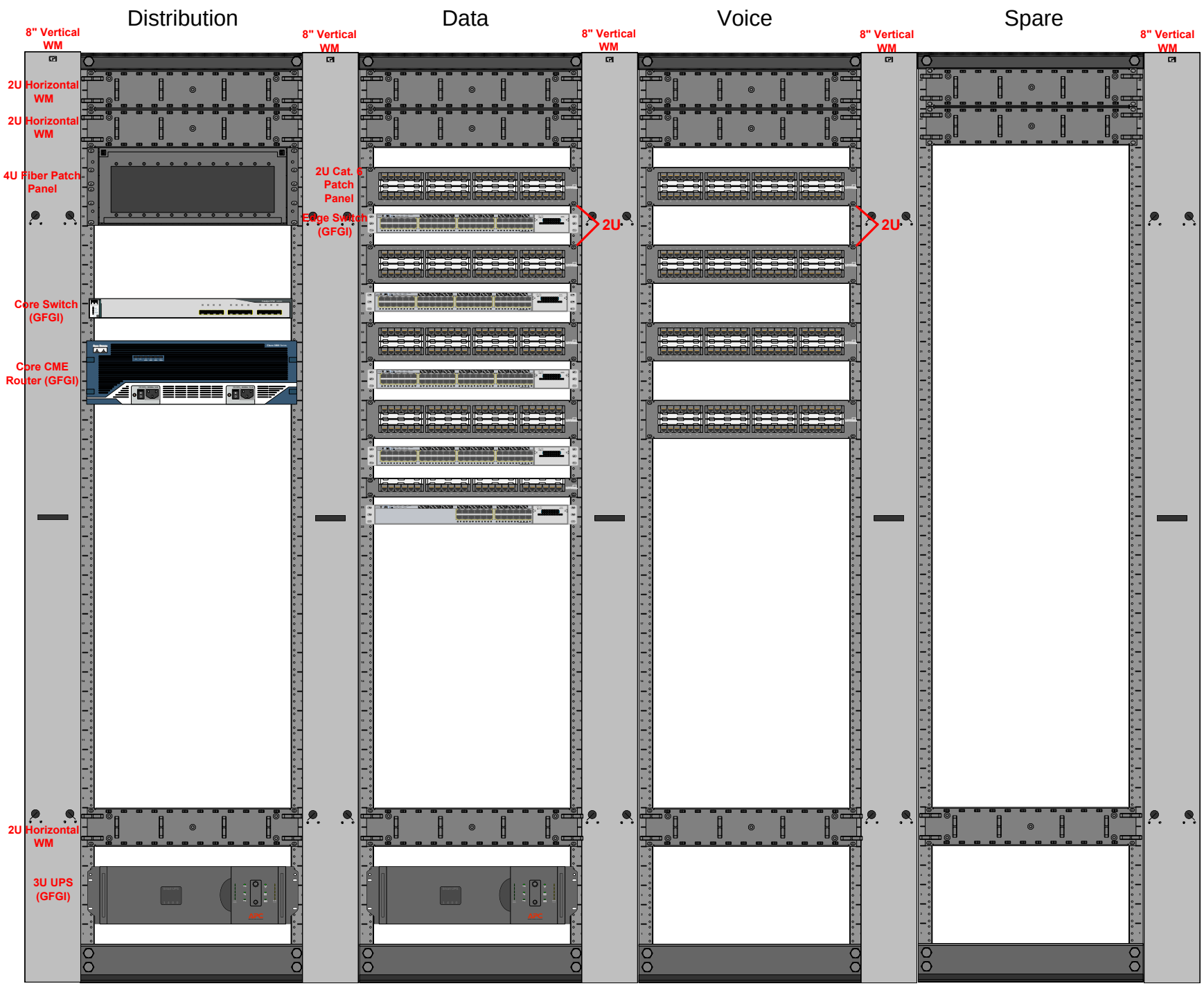
    - Entrance Facility – Service Provider Outlet requirements for DS3 data circuits can vary greatly. Coordinate with the Local LEC to determine the power receptacle(s) required for the Government Furnished Data (DS3) and Voice (PRI) circuits. If unable to determine the power receptacle(s) required, then 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.
    - 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.
- 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;
    - 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 G2/6 representative for the project. If it is determined this information is not available then 1650 Watts per IT rack should be used as a default value.
- IAW the BICSI TDMM and general manufacturer's specifications, the Army Reserve now requires the following to used for Category horizontal cabling conduit runs from the outlet box to the accessible ceiling space, cable tray, or TER/TR;
    - All horizontal cabling runs containing 4 or less Category 6 cables must use a 1" minimum EMT conduit.
    - All horizontal cabling runs containing 5-6 Category 6 cables must use a 1.25" minimum EMT conduit.
    - Poke-thru floor boxes for modular furniture system connections (up to 6 workstations) must have 1-2" conduit from the floor box to the accessible ceiling space, cable tray, or TER/TR.
    - For modular furniture system connections (up to 6 workstations), a 2" liquid-tight flexible metal conduit and fittings is required to connect each floor box or wall box to the acoustic panel raceway
    - All other horizontal cabling runs containing 7 or more Category 6 cables must be sized for an initial fill ratio of 40% or less. This 40% fill ratio must be based on a Category 6 cable diameter of .26".
- In-Slab Floor Box and Conduit Guidelines
    - IAW I3A, all in-slab floor box locations require that 2 conduits (**one in-use and one spare**) be installed. Only the first conduit can have cable installed. The second must remain empty.
    - IAW the Army Reserve IT Manual, the Category 6 cable installed in all in-slab conduits must be rated for use in wet locations.

    - 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.
- Conduit requirements from the TER to the UHS have been reduced. Only 1-4" conduit with 3-1.25" innerduct is now required.
- Cable requirements from the TER to the UHS have been reduced. Only 25 pair of OSP copper cable is now required. There is no requirement for Fiber Optic cable.
- All IDS System Panel locations will 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" conduit.
- 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 should now be grounded directly the TGB using a #6 AWG copper wire.
- 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.
- 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 that the contractor is responsible for the coordination and installation of these cables and ALL costs for this cable installation.
- New Grounding and Bonding Requirements
    - G-2/6 has determined that ANSI-J-STD-607B gives grounding and bonding design alternatives as compared to the requirements listed in the Army Reserve IT Manual. The Electrical DOR should consider ANSI-J-STD-607B when creating the IT Grounding and Bonding design.
- Test Results Requirements
    - Provide to USARC G-6 the following test results
        - Grounding/Bonding Test Results that indicate a resistance to earth of less than 10 Ohms (as measured at the TMGB and each TGB)
        - Backbone Single mode Fiber
        - Backbone Multi-Pair Copper
        - Horizontal Category 6 Cable

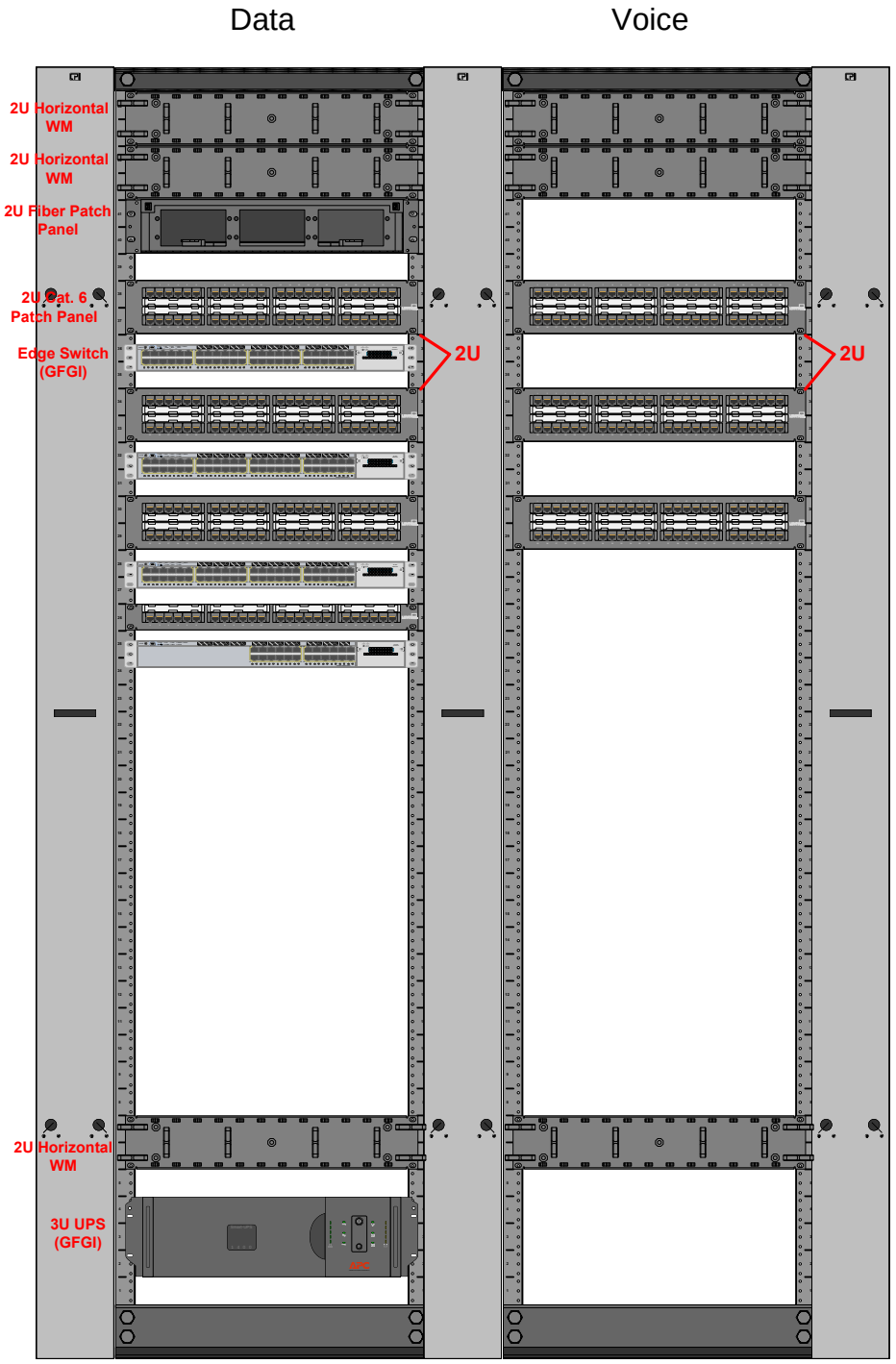
Helpful Diagrams

- The following pages contain diagrams of the Typical IT Rack Design for the TER, TR(s), and the OMS TR. There is also a Typical Army Reserve IT Backbone Cabling Diagram. These diagrams are designed to assist the Telecommunications Designer in their design of the Rack Elevation drawings, Telecommunications Site Plan, and Riser (One-Line) diagram.

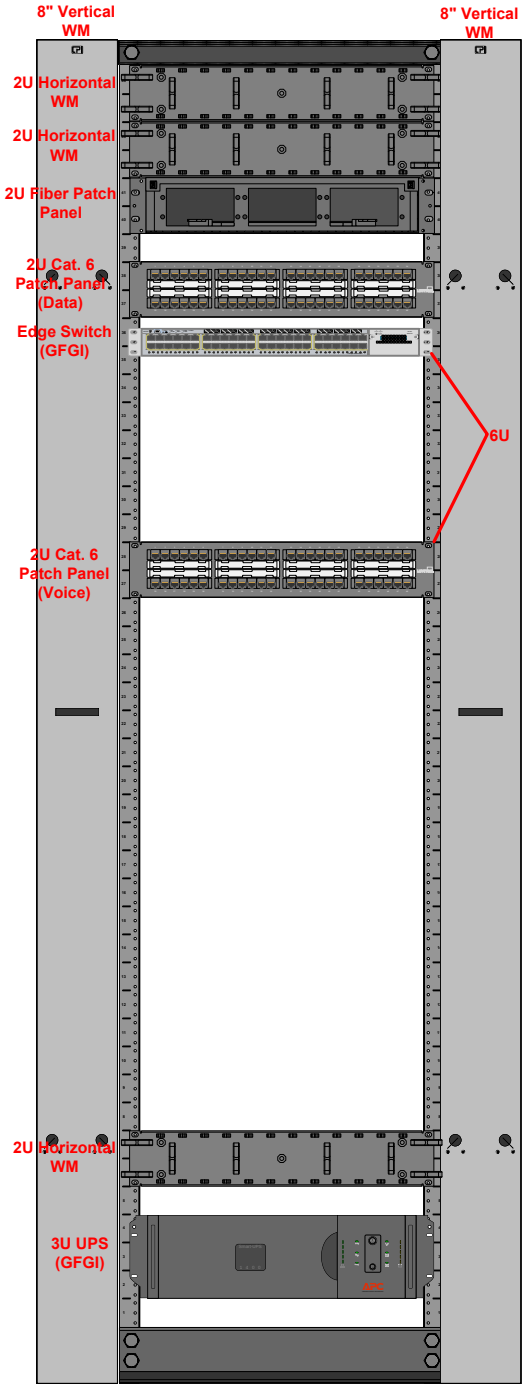
TER IT Racks (Typical)



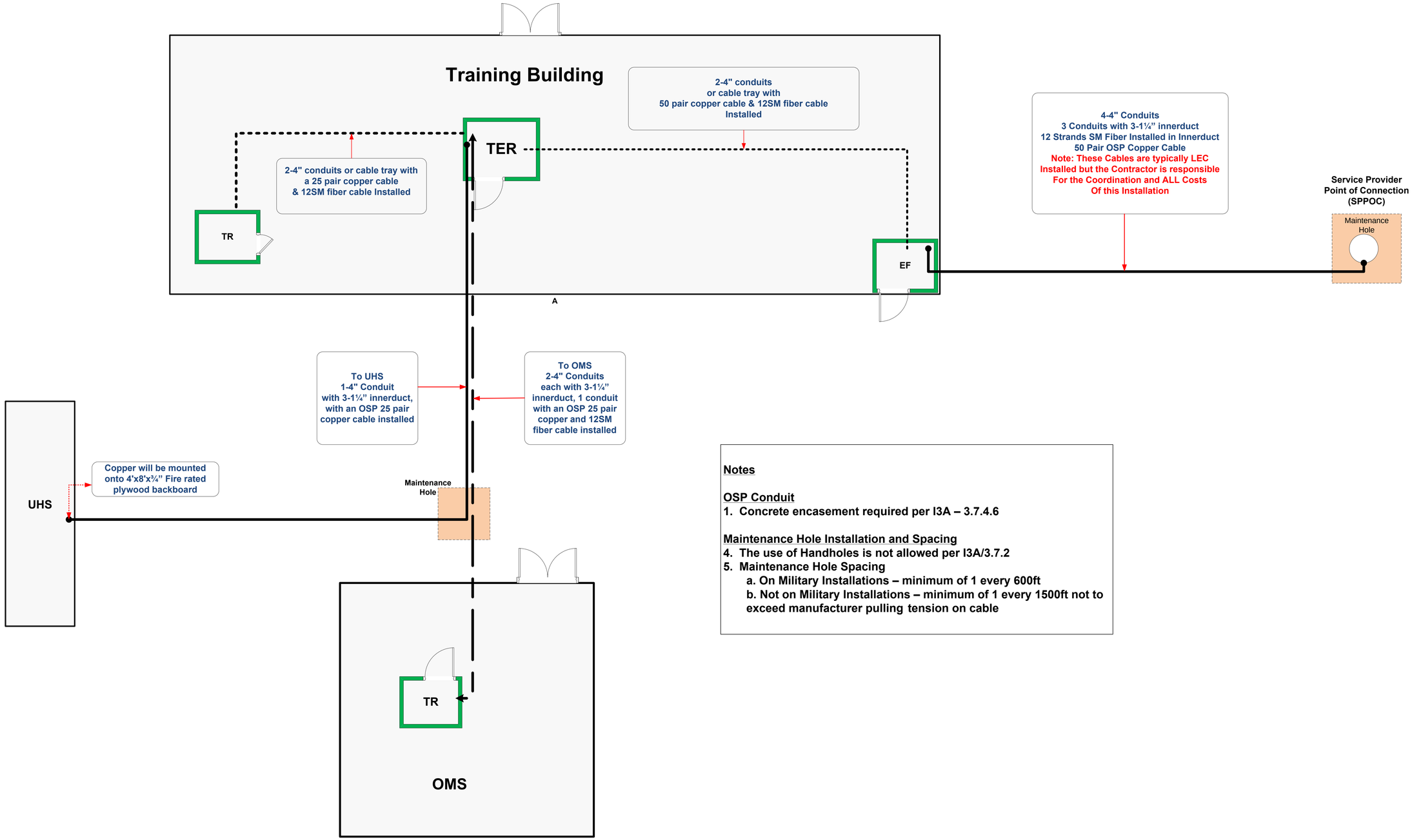
TR IT Racks (Typical)



OMS TR IT Rack (Typical)



Army Reserve
IT Backbone Cabling Diagram (Typical)



Notes

OSP Conduit

1. Concrete encasement required per I3A – 3.7.4.6

Maintenance Hole Installation and Spacing

4. The use of Handholes is not allowed per I3A/3.7.2
5. Maintenance Hole Spacing
   a. On Military Installations – minimum of 1 every 600ft
   b. Not on Military Installations – minimum of 1 every 1500ft not to exceed manufacturer pulling tension on cable