Veterans Benefits Administration
Information Technology Design Guide

VBA Regional Office - Enhanced Use Performance Specification
Telephone & Data Cable Plant: Spaces & Pathways, Cable Distribution

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The Enhanced Use Developer shall provide ***Telephone & Data (T/D): Cable Plant, spaces, pathways, and distributed cables as called for in this document and the Telephone / Data Requirements Analysis attached*** for the <u>exclusive</u> use of the Veterans Benefits Administration Regional Office (VARO). The deliverables for telephone and data systems shall include the features and meet the performance requirements stated herein.

Features

F1.   Cable Plant Spaces

The cable plant spaces consist of the Building Demarcation space, where connections from the Local Exchange Carrier (LEC) are terminated, the Telephone and Data Main Distribution Frames located in the Computer Room, and Intermediate Distribution Frames (Telephone / Data Closets) required to house the cable and equipment necessary to provide voice and data service throughout the Regional Office. Cable pathways (conduit, walker ducts, cable trays) interconnect these spaces with backbone cabling and distribute horizontal cabling to workstations, equipment and telephones throughout the Regional Office. These spaces shall be constructed in accordance with the current revision of ANSI/EIA/TIA 569, Commercial Building Standard for Telecommunications Pathways and Spaces and the VBA Regional Office Design Guide. They shall have a telecommunications grounding system installed per ANSI/EIA/TIA 607.

> **Main Distribution Facility**
> The Cable Plant shall include two(2) Main Distribution Frames (MDF), one for telephone and one for data. The MDF's act as the center of the "star topology" of the VBA's structured, telephone / data local networks and provide the demarcation points between the VARO the Local Exchange Carrier(LEC). The designs provided to implement the MDF backbones and their equipment shall be capable of adapting to failed backbone circuits without the need to pull additional backbone circuits by providing contigency.

It is recommended that the Computer Room be located on the interior ground floor and utilize a raised floor over a depressed slab. This space will receive and house large pieces of equipment as specified in the attached Telephone/Data Requirements Analysis. The Computer Room shall be designed as a controlled access space. If windows are provided for the Computer Room, they shall be located so as prevent viewing into the Computer Room from uncontrolled access space.

The telephone MDF is located in the Computer Room. This room may act as the building demarcation for LEC services. The telephone MDF contains the patch panels used to cross connect the closet voice backbone circuits to the Phone switch tails. The telephone MDF is the junction through which the data backbone and the telephone backbone are distributed to the telephone/data closets throughout the building via a conduit system.

The data MDF is also located in the Computer Room. The MDF consists of the rack(s), multi-mode fiber optic patch panels, jumper cables and the main LAN Ethernet switch and the router connecting the RO to the VBA WAN. All data backbone servicing the Regional Office IDF's are terminated at these patch panels. There may also be a need to provide rack space for a IDF in the Computer Room if the RO is to service workstations in and adjacent to the data MDF (Refer

to Requirements Analysis attached). The main Ethernet switch links all the workstations, local network servers and the VBA wide area network(WAN). Equipment to be provided by Developer is defined in the attached Requirements Analysis. The backbone is routed from each IDF through conduit and innerduct via the telephone MDF to the data MDF in the Computer room. The telephone MDF as the central pull point for all backbone cabling, voice and data.

Intermediate Distribution Facility

The Cable Plant shall include Intermediate Distribution Frames (IDFs) used to house Local Area Network (LAN) electronics and for cross-connecting horizontal telephone and data cables onto their respective backbones - IDFs are commonly referred to as Telephone/Data (T/D) Closets. It is highly recommended that these closets be centrally located in the area they are to service, so as to minimize horizontal cable lengths.   In no case shall a horizontal cable traverse more than 280 ft to reach a workstation outlet.

Rack space and patch panel capacity must be designed in to allow for expansion and contingency.   In multi-story structures, vertically aligned T/D Closets are encouraged. If T/D closets are not vertically aligned, install conduits per ANSI/EIA/TIA 569 connecting the closets to provide a pathway for the backbone cabling. T/D Closet quantity, size and placement within the facility shall be in accordance with ANSI/EIA/TIA - 568-A and 569 Standards to support high speed Ethernet, multi-mode fiber optic data backbone, Category 3 or better, UTP telephone backbone, Category 6 or better, horizontal UTP cabling and the workstations, telephones and equipment identified in the attached Requirements Analysis.

F2.   Cable Plant Pathways

Pathways shall be designed and installed in accordance with most recent revision of BICSI and ANSI/EIA/TIA 569 Standards.

Horizontal: In floor Walker ducts, cable tray systems within suspended ceilings and/or raised floors and other methods approved by BICSI and ANSI/EIA/TIA 569 are acceptable. No "poke-thru's" are allowed - floor coring should be used only when providing penetrations for backbone pathways serving MDF and IDF spaces. Pathways should terminate in convenient, flush mounted, wall or floor mounted jacks to allow for ease of furniture moves and office reconfigurations. In no case shall a horizontal cable traverse more than 280 ft to reach a workstation outlet.

Vertical: Backbone cabling shall be in 4" conduit from the Telephone MDF junction box to each of the 1st floor T/D closets. Fiber (data) backbone will be within inner duct in 4" conduit from the computer room subfloor by the data MDF, through the main JB in the telephone MDF then to each T/D closet. Vertical runs shall be through 4" sleeved cores to each successive floors T/D closet. T/D closets on the same floor should be interconnected by a minimum of 1 - 4" conduit.

F3.   Telephone & Data Cable Requirements

The cable distribution system provided shall be based on structured cabling concepts to support High Speed Ethernet Protocol for data and voice grade transmission for the telephone system selected. All cables must be terminated to be compatible with patch panels, jumpers and equipment provided new or relocated from the existing Regional Office location.

Data backbone circuits shall be multi-mode(62.5/125) fiber optic cable routed through inner-duct within the vertical pathways described in F2 above. Horizontal cabling shall be Category 6 or better,, UTP for both voice and data. As a minimum VBA requires Category 3 voice backbone. Cabling shall be installed in a star topology in accordance with the most recent revisions of EIA/TIA 568, 569, 606 and 607.   This design shall allow for ease of moves, adds and changes(MACs). The design implemented shall not require floor coring to accommodate such changes.

VBA requires 3 Category 6 or better, horizontal UTP cable circuits (a triplex drop) to each workstation to service a PC, telephone, and other miscellaneous network equipment such as printers, scanners or fax modems. Additional cable drops are sometimes required to service stand-alone telephone equipment such as wall phones. Actual site specific requirements are included in the attached Requirements Analysis.

To accommodate future MACs, a cable drop contingency shall be included. The Furniture Plans should show these drops proportionately allocated , 1 triplex drop per 200 ft^2 , in those usable areas where the current RO business lines do not locate workstations - an example of such an area is the space designated as file cabinet storage area. All horizontal pairs shall be terminated in the T/D closets on rack mounted patch panels with patch cords provided for active circuits. Innovative approaches such as horizontal cabling consolidation points in large open office areas to minimize cable pulls for MACs are encouraged.

F4.   Telephone System Equipment

The Developer shall work with the Phone switch vendor to connect and test the telephone system equipment and features described in the attached Requirements Analysis.

F5.   Data Network Equipment

The Developer shall work with VBA personnel to connect and test the data network equipment and features described in the attached Requirements Analysis. This Government Furnished Equipment equipment provided shall conform to the requirements of the standard RO LAN architecture as specified by VBA's Office Of Information Management, Systems Architecture Division 20S31C. This information is included in the attached Requirements Analysis.

The Data Network Electronics will be Government Furnished Equipment. The Developer is to provide the proper housing and environment conditions needed by this equipment.   The specifications are included in the attached Requirements Analysis.

F6.   Cable Plant: Labeling & Documentation

VARO T/D Cable Plant administration requires an accurate baseline. The Developer shall devise and implement a labeling & records management system in accordance with EIA/TIA 606 and provide appropriate "as-built" drawing documentation. Computer readable "as-builts" are encouraged.

Performance/Maintenance

P1.   Security

Security for the Computer Room, T/D closets, and network cabling shall be in accordance with the VBA RO Design Guide, VA Directive 6210, "VA Automated Information Systems Security" and VBA IRM Directive No. 5.00.01, "Information Security Program" to preclude unauthorized access to sensitive and personal Veteran's information and critical network equipment.

Summary
Computer Room security is covered in the VBA RO Design Guide. The T/D closets shall have self closing, self locking hollow metal doors or equal with limited key access. In the Computer Room, the telephone and data MDFs will share a common underfloor plenum for air distribution and cooling. Return air dampers or grating must be provided near computer room suspended ceiling level.

P2.   Horizontal Circuit Performance, End-to-End Certification, and Maintenance

All voice and data horizontal cable drops shall be certified by test to provide at least Category 6 or better, performance characteristics to accommodate high speed Ethernet at 250 Megabit minimum bandwidth or better, from the workstation end of the equipment cable to the hub end of the patch cable in T/D Closet. Voice horizontals shall be tested before cross-connection to lower bandwidth voice backbone. The Developer shall be responsible for repair or replacement if the cable plant does not meet these minimum performance specifications at any time during VBA's occupancy of the facility.

P3.   Data Backbone Performance, T-D Closets to Data MDF

Fiber shall be certified by test to ANSI/EIA/TIA 568 standards using an optical time domain reflectometer (OTDR) meter at 850 and 1300 NM. The Developer shall be responsible for repair or replacement if the cable plant does not meet these minimum performance specifications at any time during VBA's occupancy of the facility.

P4.   Voice Backbone Performance, T-D Closets to Telephone MDF

After cross connects are installed, the voice backbone circuits shall be minimally tested for continuity, crossed pairs, and wire map on 10 % of the installed circuits from telephone instrument to the MDF. The Developer shall be responsible for repair or replacement if the cable plant does not meet these minimum performance specifications at any time during VBA's occupancy of the facility.

P5.   Controlled Environment For Cable Plant Spaces

Main Distribution Frames

Redundancy: The Computer Room shall be cooled and humidified by 2 double stage computer room air conditioning (CRAC) down-flow units located in the Computer Room. These units should be sized so that one unit can handle the entire design sensible heat load. Building air should be provided to the space to remove other heat. The building AC system, used for cooling the CRAC units, must have built in redundancy to preclude single point failures. Computer Room conditions: 68 - 75 deg. F drybulb, 40 - 60% RH non-condensing

Intermediate Distribution Frames

So long as power is available to the T/D closet electronics, the means shall be provided to maintain the temperature of the T/D Closets at or below 90° F.

P6.   Special Power Requirements

Uninterruptable Power Supply (UPS)

Refer to the RO Design Guide for Computer room UPS requirements and related power requirements.

Standby Power

If the Developer or Regional Office has justified the need for an standby generator for the facility, the Requirements Analysis and Technical Requirements Section IV of the VBA Regional Office Design Guide identify the equipment which requires Standby power. The Developer will include these loads when sizing the Standby Power System.

IG Circuits

Isolated Ground type circuits, receptacles (orange receptacles), panels and associated wiring shall be provided for all telephone / data network equipment in the above cable plant spaces. Computer grade, isolated power shall be provided for these circuits in accordance with the Technical Requirements section IV of the VBA Regional Office Design Guide.