



ADDENDUM #01

SNL wishes to incorporate space into the existing program to accommodate an Intermediate Distribution Room (IDR). Program requirements for this space are as follows:

Telecommunication Systems Design

1. General

This subsection covers the design of a complete telecommunication system, to include an intermediate distribution room (IDR) backbone cabling, and backbone raceway systems for intra building telecommunication cabling projects for Sandia National Laboratories/New Mexico leased space. The subsection provides criteria to lay out and design an IDR and to design an associated horizontal distribution system.

The designer shall understand the telecommunication connectivity requirements so as to be able to provide a complete telecommunication system design. In some cases, it may be necessary to refer customers to Sandia's Telecommunication Operations Department's personal representative, hereafter referred to as the Department, to ensure its networking requirements are adequately addressed. (The Contact number for the Department is 844-2316.)

Network electronics are not included in the telecommunication system for any project and for that reason they are not addressed herein. The designer shall inform customers that the project will bear these costs and direct them to contact the Department for any additional telecommunication systems cost. The telecommunication infrastructure that is installed or modified as part of any construction activity is part of a laboratory-wide utility administered and maintained by the Department. Questions regarding intra-building cabling components, cabling test -procedures, or inter-building telecommunications should be directed to the Department. For standard product specifications, refer to Table 2 of "Construction Standard Specification, Intra-building Telecommunication for Leased Space," hereafter referred to as the "Specification." The designer shall review the preliminary design with the Department for conformance with these design standards.

2. Code Compliance

The designer shall provide designs that meet the following:

- International Building Code (IBC)
- National Fire Protection Association (NFPA)
- National Electrical Code (NEC)
- Life Safety Code
- State and local codes and permits

The IDR architectural design is not required to comply with the Uniform Federal Accessibility Standards (UFAS) because it is considered a non-occupied space.

3. Construction Drawings

The following is an approximate list of the construction drawings required to illustrate the scope of the telecommunication project or portion of the project. Specific project conditions may require additional drawings for clarification.

- IDR/MDR Plans and Elevations
- Floor Master Backbone and User Outlet location Plan
- Backbone Conduit Plans (If conduit is required by code)
- Power One-Line
- Lighting Plan





Receptacle Plan
Communications Riser Diagram (to include conduit-fill percentages if conduit is required)
Electrical Equipment List
All Telecommunications Standard Drawings
Architectural wall details
Mechanical/HVAC Systems Plan
Access Control Plan

4. Intra-Building Cabling

The Sandia/NM cabling infrastructure design can support two separate telecommunication networks. The Sandia Restricted Network (SRN) or Internal Web, and the Sandia Open Network (SON) or External Web, are both referred to as the BLACK system. Twisted pair copper is used for the voice cable systems and both data systems. Identical cabling media types of optical fiber cable may be needed for both systems.

The one SON connection, one SRN connection and the voice connection will share the same faceplate or multimedia outlet. If fiber is required, a maximum of two four-fiber 50-micron multimode cables to each user outlet location will also terminate in the same multimedia user outlet with the copper and a faceplate would not be used. Plenum cable is preferred if code allows. In addition to user outlets, cabling shall be provided to support other equipment such as emergency telephones, courtesy telephones, copy and facsimile machines, shared network printers, file servers, and computer room equipment. Check with the customer and building occupants for other specific telecommunication needs and coordinate any non-standard design requirements with the Department. In the event fiber and copper multi media outlets exist in the majority of an existing building, the existing outlet configuration shall be followed for new installations. If existing cables do not meet the minimum requirements as stated in the Specification Table 2, the existing cable shall be removed per the referenced Table 2. However, if the existing cables do meet the cable specified in Table 2, the cables will be retested and the results documented per the Specification. Submit the test results to the Department for final acceptance of existing cables.

5. Telecommunication Outlets

For new buildings and any renovations of an existing building, a full suite of copper cables will be installed to each riser outlet. A full suite of three copper cables shall be installed to each user outlet to include one voice cable and two data cables. Fiber when required shall share the same telecommunication outlet and shall be a four-fiber 50-micron fiber as listed in Table 2 of the Specification. Fiber cables will be terminated using LC connectors on the right half of the multimedia outlet. One twisted pair copper cable may be used for the voice installed in a separate single gang faceplate where wall phones are required.

The Contract documents shall indicate that the construction Contractor is required to contact the Department and the local inspector of any new work.

6. Inter-Building Cabling

A fiber-optic or copper trunk connection or both, as determined by the Department, shall be provided between each IDR when multiple buildings or IDR's exist and/or to the Telco demarcation point. Coordinate with the Department for locations and size of trunk fiber.

7. Intermediate Distribution Room

An Intermediate Distribution Room (IDR) is a special-purpose room that provides and maintains (1) a suitable operating environment for network communication equipment, (2) a connection point between backbone and horizontal pathways, and (3) the termination point of all horizontal cables. The IDR telecommunication design shall meet or exceed the latest approved ANSI/EIA/TIA standards, particularly EIA/TIA 568A and 569. Before beginning the IDR design, review ANSI/EIA/TIA standards, other industry standards, and published methods for system design.





7.1 Sizing the IDR

The IDR shall be designed to accommodate both current and future needs. In general, the IDR size is dictated by the number of outlets it could serve and the networking equipment and cabinets required to serve those outlets. Contact the Department for assistance in sizing and configuring IDRs. In general, the following may apply:

- One linear foot (300 mm) of horizontal wall space is required for every 18 outlets served by the IDR (assuming a standard suite of cables per outlet). A typical IDR shall have a minimum of two network equipment cabinets, and equipment cabinets for fiber terminations. Space may also be needed for telephone and UPS equipment. Contact the Department for assistance in sizing and configuring IDR's that will need telephone and or UPS equipment.
- Provide three linear feet (900 mm) of horizontal wall space for a voice copper termination frame, with a maximum of 3600 pairs on one termination frame or 3000 pairs if a building entrance protector frame is used.
- Approximately six linear feet (1.8 m) of horizontal wall space is required for the IDR power panel, access control cabinets, ISDN power, thermostat, and light switch.
- Allow 20 percent of the linear floor space for future expansion. Provide space in the center of the IDR for equipment cabinets that are 24 inches wide by 36 inches deep. A total of four cabinets minimum shall be installed in the center of the IDR floor. More fiber termination cabinets may be needed for larger buildings. Observe requirements for thirty-six-inch (910mm) clearances between equipment installed on walls and equipment installed in frames and racks. For buildings with minimal requirements, it may be possible to reduce walk-around floor space if adequate wall space exists, but floor space is limited. This may be accomplished by mounting equipment cabinets sideways, starting approximately 8 inches (200 mm) from the wall.
- Provide for integrated services digital network (ISDN) power for each telephone circuit using a multiple power supply and battery back-up unit. These units are designed to provide battery-back-up capability. At a minimum, large units provide 4 hours back up and small units provide 20 minutes to 1-hour back up. Locate the power supply unit and batteries adjacent to the voice termination frame to minimize extension cable distances. Provide building entrance protector frames with solid-state circuit protector units for all voice circuits as required. Protect copper telephone service within 50 feet (15 m) from its point of emergence through an exterior wall, a concrete floor slab, or from a rigid metal conduit, in accordance with Part E, Article 80D of the NEC.

8 IDR Architectural and Structural Requirements

An IDR consists of several architectural and structural components to ensure functionality yet maintain building aesthetics. In addition to the interior base wall construction, a single layer of plywood is applied over the gypsum board and secured to the metal studs to provide a medium for mounting lightweight equipment. Plywood is needed on all walls of the IDR. A final layer of gypsum board is added over the plywood to provide a finished wall surface. The interior wall and floor colors are designed to provide high light reflectivity for workers performing cable termination, detailed assembly operations, and continuing maintenance. Colors are standardized for all IDRs and shall not be changed to match building interiors. IDRs shall remain either square or rectangular. The Department shall approve any other shape. Contact the Department for IDRs that have greater than 200 user outlets. A mini-IDR design can be incorporated for buildings with less than 50 occupants; contact the Department for details.

8.1 Wall Construction

The IDR wall construction shall be a UL-type, one-hour fire-rated design. The intent of this criterion is not to provide a one-hour firewall meeting NFPA 101 requirements, but to set a minimum acceptable level of wall construction. Typically, the front wall of the IDR wall is constructed of six-inch (150-mm) metal studs to enclose the flush-mounted electrical power panel and access control equipment. Other walls of the IDR may be sized according to the building requirements.

The base layer of wall covering is type "X" gypsum board on both sides of the metal studs. Additional wall materials are added to the interior base layer of gypsum board. Fire-rated plywood is secured to the gypsum board,





and one layer of gypsum board is then attached to the plywood. This forms the equipment backboard that is used to attach such items as termination blocks and panels. See Sandia's Standard Drawing AE3034STD and AE5032STD for wall sections and details. The telecommunications designer is responsible to forward these requirements to the architectural design team members.

The exterior wall of the IDR is finished to match the corridor's wall finish in texture and color. Interior IDR walls shall be taped, textured, and painted white. Install a four-inch (100-mm) vinyl cove base around all wall perimeters.

9 IDR Mechanical System Requirements

The IDR heating, ventilating, and air conditioning (HVAC) system is designed to maintain an air temperature in the room of between 55°F - 72°F, with a humidity level of 15 - 30%. Design the system for the maximum amount of telecommunication equipment that the IDR could support. Cooling in the IDR is critical to the operation of the network electronics and shall be maintained continuously. The cooling system within the IDR shall remain independent of the building automated systems and/or building automatic shutdown system, if any, and shall not be subjected to building power-saving shutdowns (evenings, weekends, and holidays),

9.1 Heating Ventilation and Air Conditioning

The HVAC is a building-in dependent system located and serviceable from outside the ceiling space of the IDR. Building air is supplied and returned to and from the IDR for air circulation purposes only. Generally, only Cooling will be required because of the heat generation of the electrical and communication equipment. However, heating may be required and shall be coordinated with all other disciplines. Cooling is accomplished through the use of a single- or multiple-fan coil units ducted to ceiling diffusers. Condensate lines shall be taken out of the fan coil unit, and open condensate drains or lines are not permitted within the IDR.

Calculate heat loads using the heat loads of the electrical and communication equipment required for the, service area. At no time shall the IDR reach levels over 77°F. Coordinate equipment quantities and heat loads with the respective disciplines. Allow for adequate cooling capacity for future equipment growth within the IDR. Fan coil sizing shall incorporate equipment heating loads, building piping systems, and available ceiling space. Because of the great number of communication conduits entering the IDR, coordinate fan coil location with electrical and communication requirements to ensure maintenance accessibility. The thermostat for the IDR shall be mounted above lighting switches next to the entry door.

9.2 Fire Protection

The IDR fire protection system shall be installed and connected to the building fire protection system. Coordinate the IDR fire protection sprinkler head and piping placement and smoke detectors with the location of the lights and cable trays and conduits being installed in the IDR space. Typically, sprinkler heads are located in the areas between the cable trays and not directly above equipment cabinets.

10 IDR Electrical System Requirements

Telecommunication equipment can be very sensitive to power abnormalities. For this reason, the lighting, HVAC, and convenience receptacles in each IDR shall be fed from different branch circuits than the telecommunication equipment. Transformers and other EMI sources, including heat sources, shall not be located in the IDR or within 50 feet of an IDR.

