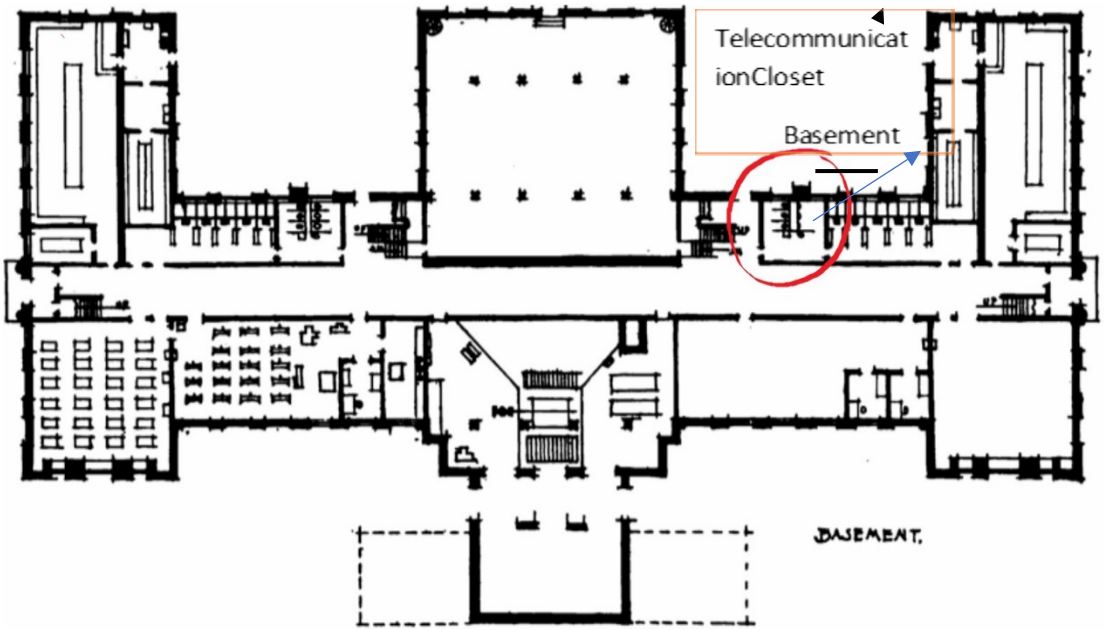
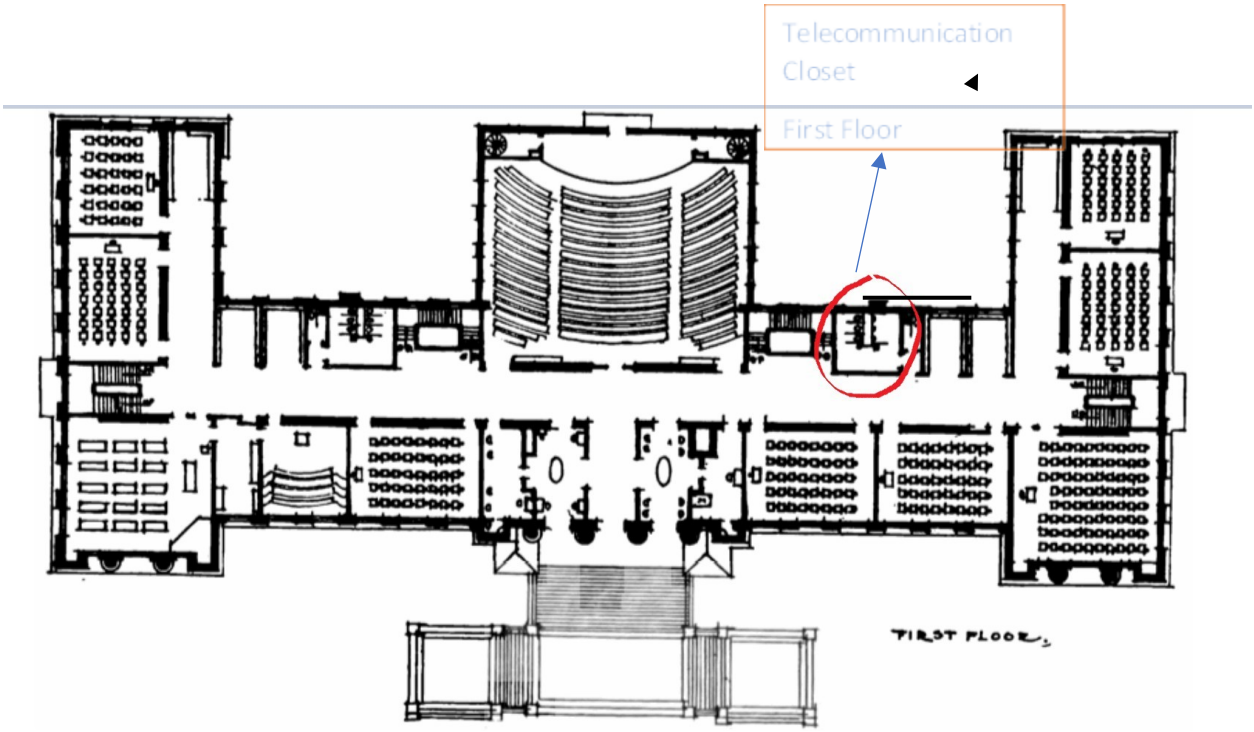
Muray High School Network Cabling Desing and Budget

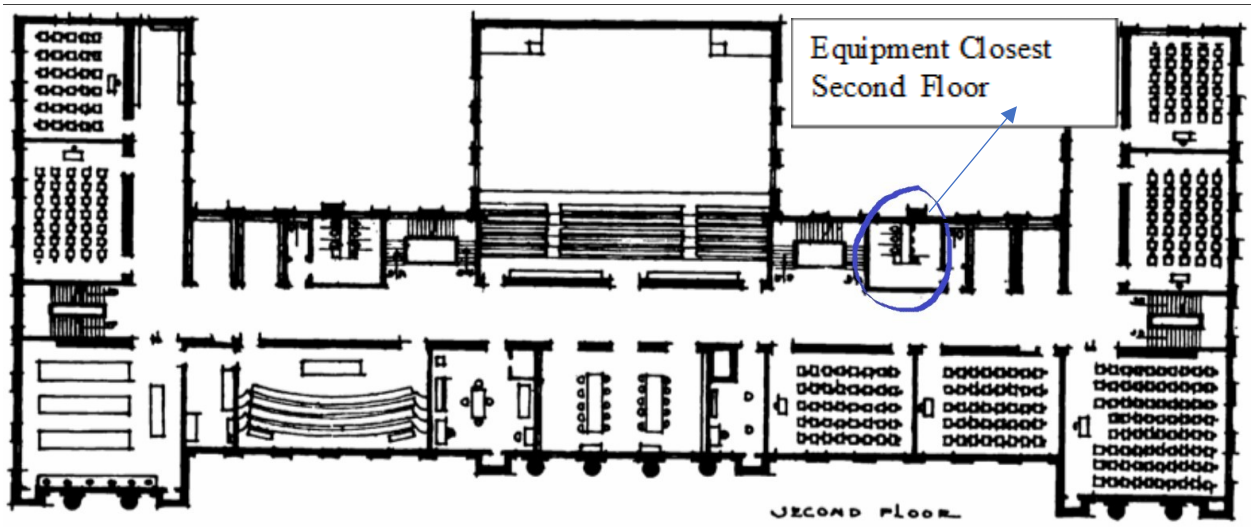
Aaron Jones

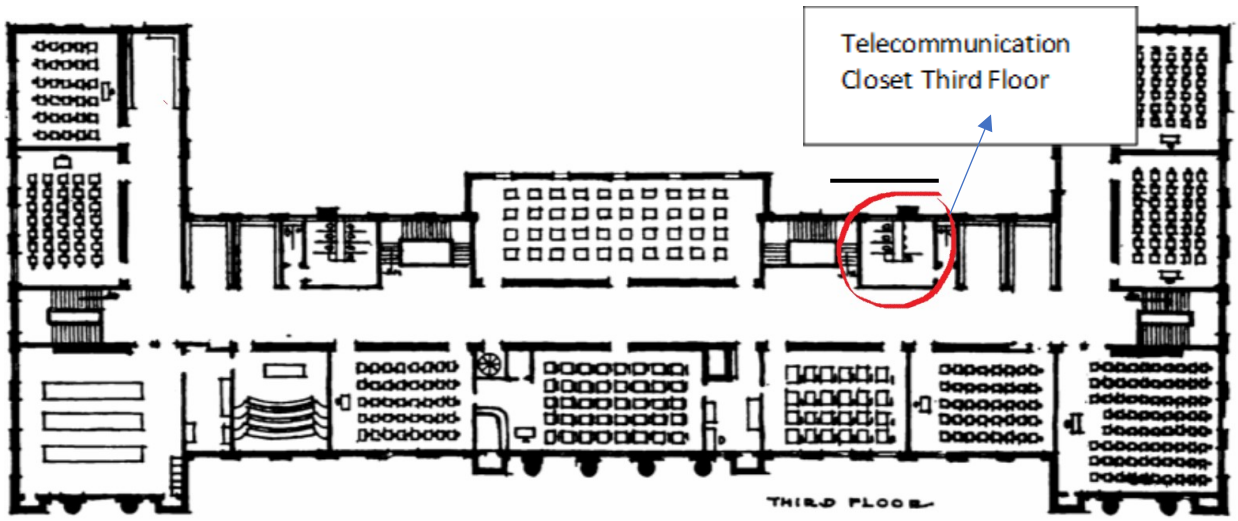
IT 315

4/22/2024


Telecommunicat
ionCloset
Basement
BASEMENT.


Telecommunication
Closet
First Floor
FIRST FLOOR.


Equipment Closest
Second Floor
SECOND FLOOR


Telecommunication
Closet Third Floor
THIRD FLOOR

Cabling plan and Budget

The wiring and networking plan for Maury High School is structured around its physical dimensions and the requirements for a robust Ethernet network. The width of the school is 95 meters, leading to a calculated longest cable run of forty-five meters (45 M). The distance between the telecommunication closet and the nearest room is only 1 foot, making it the shortest cable run.

To establish an average cable length for budgeting and planning purposes, I combined these extremes, resulting in an average cable run of 77 feet across all floors. This average is consistent across the basement, first, second, and third floors due to the uniform layout of the building.

For the basement, multiplying the average cable length by the number of cable runs (30) results in a total of 2,310 feet of cabling. On the first floor, with 34 cable runs, the total cabling comes to 2,618 feet. Both the second and third floors have 36 cable runs, equating to 2,772 feet of cabling each. Summing these figures, the total amount of cabling needed for the entire school is approximately 10,472 feet.

To meet these requirements, I sourced bulk Cat6 Green Ethernet Cable from CableWholesale, with each 1000-foot pullbox priced at $99.55. Purchasing 11 boxes, the total cost comes to $1,095.05. For connectivity, VCE 2-Pack 1 Port RJ45 wall plates are priced at $12.99 each on Amazon, leading to a total of $570 for the necessary quantity. The Cable Matters 24 Port Cat6 Patch Panel costs $37.99 each, amounting to $3,800 for the required panels, ensuring all cables are neatly organized and connected.

For network management, I opted for Cisco 250 Series Smart Switches, priced at $109 each. Purchasing five switches provides sufficient capacity and redundancy, totaling $545.

Network security is crucial, so a WatchGuard Firebox M270 with a 3-year basic security suite was chosen for $2,575.65, sourced from Amazon. This firewall is robust enough to handle the school's security needs, supporting up to 300 concurrent users with effective traffic management and threat prevention.

Summary of the Cabling Requirements for Muray High School

- The school spans 95 meters in width.
- The maximum cable length estimated for any single run is 45 meters.
- The minimum cable run, extending from the telecommunications closet to a nearby room, measures 1 foot.
- On average, the cable runs measure 77 feet, a value consistent across all levels of the school.
- For connectivity within the telecommunications closets, 30 feet of cables enter each room.
- Cable requirements per floor are as follows: 2,310 feet for the basement, 2,618 feet for the first floor, and 2,772 feet for both the second and third floors.
- The entire school requires a total of 10,472 feet of cabling.

Regarding the materials and costs:

- Eleven 1000-foot boxes of Bulk Cat6 Green Ethernet Cable are needed, costing $99.55 each, totaling $1,095.05. More info.
- Each RJ45 wall plate is priced at $12.99, summing up to $570 for all necessary units. See product.
- The total cost for Cable Matters 24 Port Cat6 Patch Panels, required for the setup, amounts to $3,800. Details here.

- Five Cisco 250 Series Smart Switches are necessary, each costing $109, which aggregates to $545. Product link.
- A WatchGuard Firebox M270, equipped with a 3-year Basic Security Suite, is priced at $2,575.65. Available here.

Total Cost: $8,5585

I decided to calculate the overall calculation by multiplying the number of cables going to the room with the evaluations of the shortest and longest cable runs to the equipment room or telecom closet. The cable lengths, both long and short, would be identical across each floor. The provided diagrams illustrate the precise locations of the telecommunication closets and the equipment room. Additionally, a star topology will be employed for organizing the network.