Tribhuvan University

Institute of Engineering

Pulchowk Campus

Internet and Intranet

Lab 5

Network Specialist Tasks

Task = 8(Group Number)% 8 + 1 = 1

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Project Group 8

Submitted to:

Department of Electronics and Computer Engineering

Pulchowk Campus

Submitted on:

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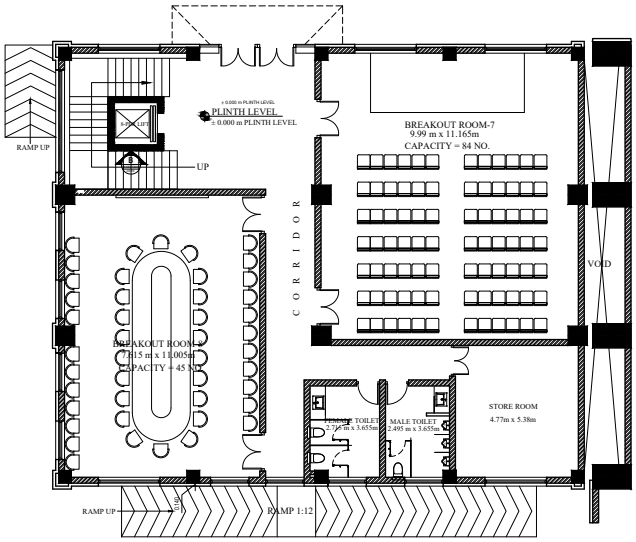
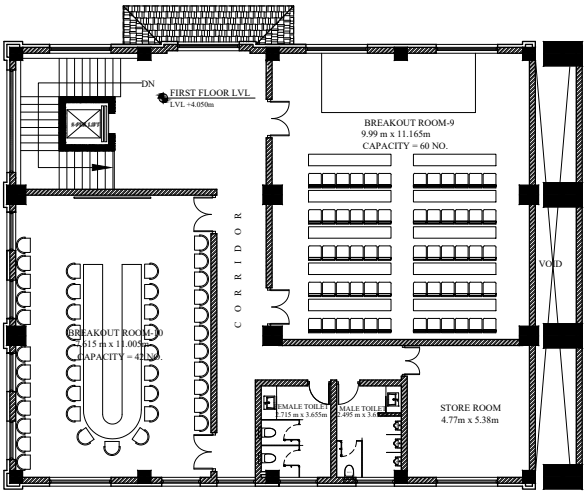


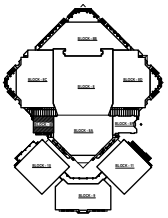
FURNITURE LAYOUT PLAN-GROUND FLOOR



FURNITURE LAYOUT PLAN-FIRST FLOOR

NOTE:

1. No changes (in whole or part) can be made without the prior permission of the consultant (Designer).
2. In case of any discrepancy found in the design and drawings that must be brought to the notice of consultant (Designer).
3. All dimension are in MKS System.



KEY PLAN

S.N.	REVISION NO.	DESCRIPTION	DATE
4.	REV d		
3.	REV c		
2.	REV b		
1.	REV a		

PROJECT:
5000 CAPACITY CONVENTION CENTER
AT MADHYAPUR THIMI, BHAKTAPUR, NEPAL

CLIENT: **GOVERNMENT OF NEPAL**
MINISTRY OF URBAN DEVELOPMENT
DEPARTMENT OF URBAN DEVELOPMENT BUILDING CONSTRUCTION,
BABARMAHAL, KTM

TITLE:
WORKING DRAWING(ARCHITECTURE)
BLOCK 8E - FURNITURE LAYOUT PLAN

CONSULTANT TEAM

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SCALE: **1:100**

SHEET NO.: **AR 07**

DATE: **BHADRA 2076**

Contents

1 Introduction

This lab report outlines the requirements for adding a network plan to block 8E of a convention centre with an existing backbone network and Network Control Room. The backbone and Network Control Room is considered to existing within the premises of the building. The project under consideration involves the installation of all the necessary equipments for the said block and its integration with the backbone network. The connection of new network to backbone also includes a connection to the building's Network Control Room. All audio-video control and management for the entire building is also considered to be handled from the NCR.

2 Assumptions

- Backbone network and Network Control Room already exists.
- There is a fibre ring connection throughout the blocks with a terminal in block 8E which can be accessed.
- All audio-video recording and managementis done by NCR and not in block.
- Following factors are considered :
  - Space
  - equipments
  - Cable management
  - Accessibility
- Following factors are ignored :
  - Cooling and Ventilation
  - Security

3 Scope of Project

1. Estimation of all networking devices, cabling, and face plates required for the project.
2. Provision of a reliable and efficient networking system that meets the needs of the building occupants.
3. Cable management system (fiber optic, UTP)
4. identification of all the cables and termination locations.

4 Analysis of Network Requirements

Assuming the building will follow the same plan upwards, the requirement for each floor is defined by:

1. **The dimension of the centre and rooms**
   Based on the layout of the building, on each floor there will be:
   - 2x2 breakout rooms in total
   - 2x1 Bathrooms
   - 2x1 Storerooms
   - Ramps
2. **The number of users and devices that will be accessing the network**
   The capacity of breakout rooms are 84, 45, 60 and 42 respectively.
3. **The types of data that will be transmitted**
   The network infrastructure is designed to accommodate the different types of data that will be transmitted, including audio, video, and data files.
4. **The desired network performance levels**
   Tthe breakout rooms need robust connection whereas other areas can work with a slower/weaker connection.

5 Project Requirement Analysis

1. Workmanship: Work should be properly done by mechanic who is skilled in the trade. Engineer shall point out the defects if they exist, it shall be fixed without extra cost.
2. Material quantity and rate (IN BOQ):
   - Information outlet
   - Intelligent door control system
   - IP telephone
   - CCTV system
   - Wireless AP
   - Socket-point wiring
   - End access POE switch

6 Project Specifications

Equipments required :

1. 2 routers (1 for each floor)
2. For each breakout rooms:

- 2x access control system
- 5x LAN sockets,
- 1x LAN socket for 1 cctv
- 1x Access point
- 1x IP telephone

3. For store rooms
    - 1x switch cabinet
    - access control system
    - 1x CCTV
    - 1x IP telephone
4. For corridor, ramp and stairs
    - 2x access control system
    - 2x CCTV

Accessories required :

1. 6.4.2 CAT6 UTP Cables
2. 6.4.3 CAT6 UTP Patch Cords
3. Automatic Door Access Control System (ACS): installation of:
    - Access Control Hardware
    - Contactless smart card reader
    - Access control software
    - Card printer
4. Lan sockets: RJ45 sockets
5. Cctv:
    - Fixed dome 1080p network camera for Cameras at the gate
    - Fixed dome 720p network camera for Indoor
    - Fixed dome 1080p network camera for building perimeter
6. Access point: Access Points should be at least MIMO 2x2 Wave2, Wi-Fi standards 802.11 a/b/g/n/ac should be supported.
7. IP telephone

7 Installation Approaches

Guidelines for Cat6, RJ45, CCTV, and Access Point installation are outlined in the given points. The key guidelines are as follows:

1. The installation of cabling should comply with International Structured Cabling System and designs.
2. Category 6 cablings compliant with ANSI/TIA/EIA-568-B and ISO/IEC 11801 standards should be used for each subsystem.
3. The Contractor should provide all necessary materials and components for the installation of the structured cabling system.
4. All network components should be connected to the earth wire, and cable routing should consider fiber optic cable with a minimum radius of curvature to be supported by existing facilities.
5. Cabling infrastructure should make provisions for possible future extensions.
6. The installation should consist of a Ring topology for fiber installation and a star topology horizontal UTP subsystem originating from switches and terminating at data points with RJ45 sockets.
7. Good cable management practices should be followed, and proper labeling should be used for easy identification.
8. All adapters must be compatible with the transmission capacities of the equipment to which they connect.
9. All cables and connectors must be labeled with permanent indelible ink mark labels or provide a proper tag.
10. The LAN installation should consist of a star topology with horizontal UTP subsystem originating from switches and terminating with RJ45 sockets.
11. Proper color-coding should be used for easy identification.
12. High-speed Fiber Optic Uplink Backbone cable should be used to link building blocks and floors to the main distribution facility location.
13. The primary media for horizontal cabling should be 4-pair Unshielded Twisted Pair (UTP) that must meet or exceed ANSI/TIA/EIA-568-B and ISO/IEC 11801 standards requirements.
14. UTP Category 6 or higher quality cables must be used.
15. Each room to be networked shall have wall plates installed and each outlet terminated with 8-pin modular jacks (RJ-45).
16. Bending radii should not be less than eight times the overall cable diameter.
17. All cable ties and fixings should be tightened to support the cable loom without distortion of the cable sheath.

18. There shall be no splicing of installed cables. Intermediate cross-connects and transition points are not allowed.

19. All user-area patch chords shall be at least 3-metre in length. However, 5-metre patch cords shall also be provided as indicated.

20. Data outlets shall be flash mounted on the metal trunking.

21. All user-area patch chords and cabinet patch cords will be supplied to match the total number.

8 BOQ

To provide an estimate of the cost of setting up the network, we have prepared a Bill of Quantities (BoQ) based on the components listed above. The following table provides a breakdown of the estimated costs:

SN	Description	Qty	Rate (NRS) (in figure)	Amount (Rs)
1	"Intelligent Door Controller (IDC) with IP Controller, Smart Door Lock/Reader"	6x2=12	28500	342000
2	IP Telephone	3x2=6	16322	97932
3	CCTV System	5x2=10	-	-
4	Interior Fixed DoME IP Camera	3x2=6	6299	37794
5	Exterior Fixed DoME IP Camera	2x2=4	13003	52012
6	Wireless Access Point:	3x2=6	21000	126000
7	Data/Voice Socket Outlet with information outlet	11x2=22	1600	35200
8	LAN Socket Point wiring(approx 54.4m per floor)	1.5x2=3	2121.05	6363.15
7	Data/Voice Socket Outlet with information outlet	11x2=22	1600	35200
8	LAN Socket Point wiring¡may be redundant after no 7 is added¿¡this might be used to connect everything to switch¿(approx 54.4m per floor)	1.5x2=3	2121.05	6363.15
10	End Access PoE Switch (48 ports)	1	271500	271500
Grand Total				968801.15
Total with contingency(20%)				1162561.38
Total with government tax(13%)				1313694.35

Table 1: BOQ

9 Testing and Acceptance

- Necessary to perform an end-to-end attenuation test to verify the quality of installations and to ensure high quality system performance Upon installation and completion; we must carry out tests and record the test results showing cable types and components used.
- The test should state the following:
  - Number of outlets
  - Type of cables used
  - Date completed
  - Type of warranty certificates specifying start and expiry dates
  - Connectivity and bandwidth tests

- All components must be tested after which a completion certificate shall be issued

Finally, The final acceptance is based on visual inspection and satisfaction of the worksdone as well as the technical tests carried out to ensure that they fully passed after project completion. Acceptance will only be sanctioned after all technical tests have been ascertained to be in order.