



Adept Network Technologies

Network Design Proposal

for

Control Safety Equipment

Prepared on 12/10/2021

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Introduction

Adept Network Technologies is a networking company which is started by the 4-member group who are experts in their respective IT sectors. Our motto is to grow along with our clients. The company is mainly involved with providing network and infrastructure solutions to companies that are starting up or wanting to expand the exciting empire. We believe there is a boundary when it comes to implementing the right-sized networking solutions for different companies. We provide our customers with agile, reliable, and secure network solutions, they have insight and control into everything going on in their network. Our services range from wireless connectivity to switching and routing, and we cover a wide range of end-to-end connectivity solutions. The team working on the projects can work in minimum time and give the best solution in a cost-efficient way with all the requirements fulfilled by the customer. The team worked on a project assigned by Control Safety Equipment who are changing their head office to a new 3 story building as they are appointing new employee and the networking infrastructure is done by us which includes logical network diagram which shows the how to set up the network, floor cabling and the equipment required for networking and the cost of the networking and IT equipment. The task in this project is to get a large number of employees sorted according to the requirement of customers. Here 330 employees are divided into 3 floors with floors having 4 to 5 departments and around 110 employees on each floor. Here the challenge is to make sure each floor is working properly and the major challenge is the number of few employees. The count is high that we divide them within the design to fit all other departments properly. We designed the network logical and physical diagrams which are the most complex as the sorting the department according to the space and then finding space for networking devices and major complexity was in cabling as all 3 floors are to be connected and they should also be interconnected place the department a right spot was a task as the spot was wrong then the cost of cabling may get increase and the company could have gone out of the budget. The next documentation will show what work was done by the Adept Network Technologies to complete the project assigned by the Control Safety Equipment.

Executive Summary

Control Safety has asked Adept Network Technologies to bid on an upcoming network buildout at their new head office. Our proposal includes 1 Router, 2 Distribution switches, and 13 Access level switches. As for the cabling, 7183 meters of category 6 cable, 5141 meters of multimode fiber cables, and 81 meters of riser level or above multimode fiber cables. Total hardware costs are estimated to be \$278,000, with a buffer in case the cheaper cabling is not available. The annual support cost will be \$5,300, plus the tax. Installation labor costs for this job are not a factor as Adept Network Technologies will use a government program to employ co-op and newly graduated students, therefore labor costs will be covered. Internet access will cost \$5500 in year one, and \$2700 on an annual basis.

In summary, first-year costs will be \$306,000. Total annual upkeep should be budgeted at \$29,000 to include the monthly costs for Internet access, the annual support cost, and to accommodate changing office layouts and, of course, new runs of cabling.

Business Profile

Control Safety Equipment, an 11-year-old firm of safety equipment supplier, has been good over the last few years and have outgrown their current offices. They planning to move to a new building, occupying three floors with 330 employees.

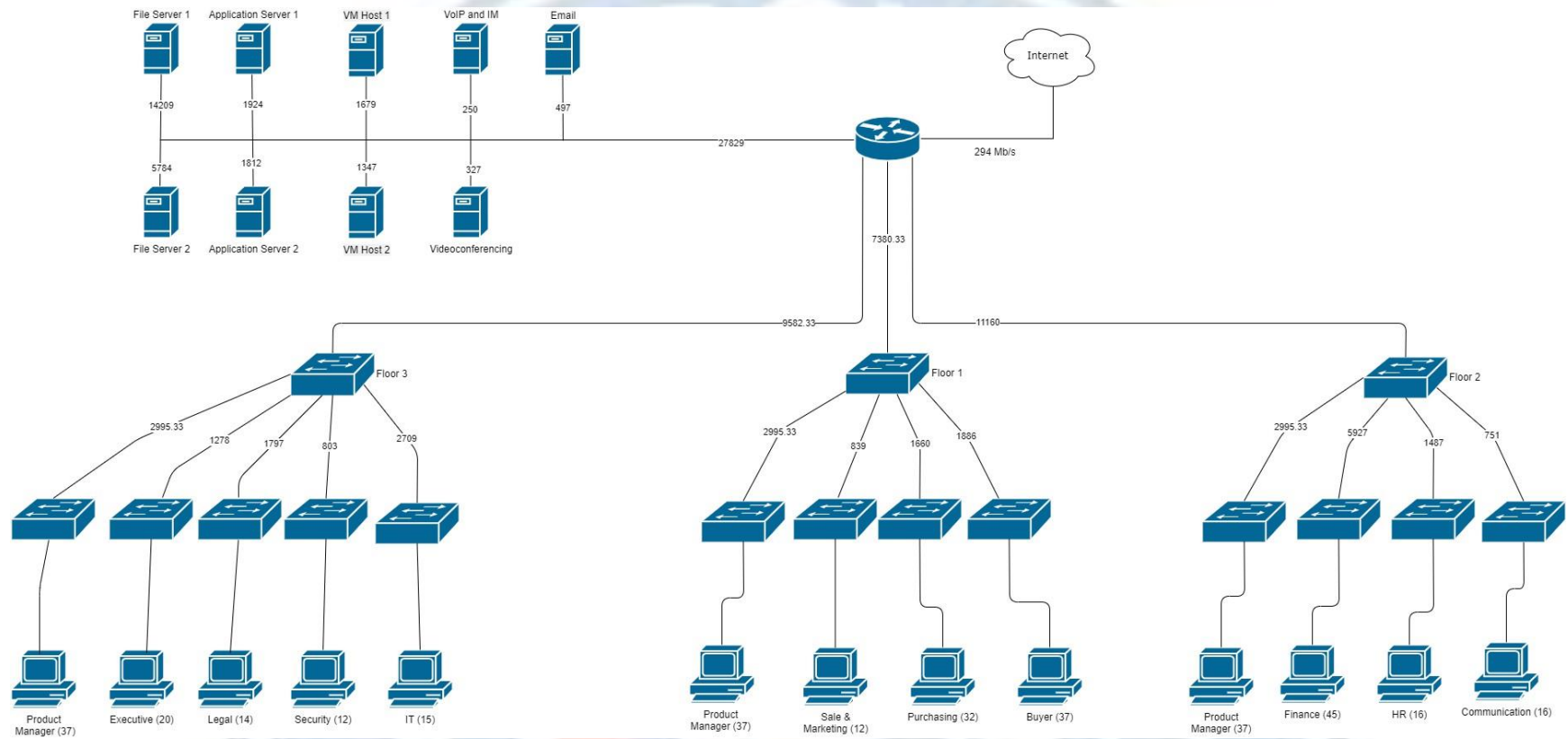
Control Safety Equipment has determined that the following departments will be in the new offices:

Executive Staff	20
Buyers	37
IT	15
HR	16
Legal	14
Finance	45
Sales and Marketing	12
Security	12
Communications	16
Purchasing	32
Product Managers	111

The business has identified the following major servers/services:

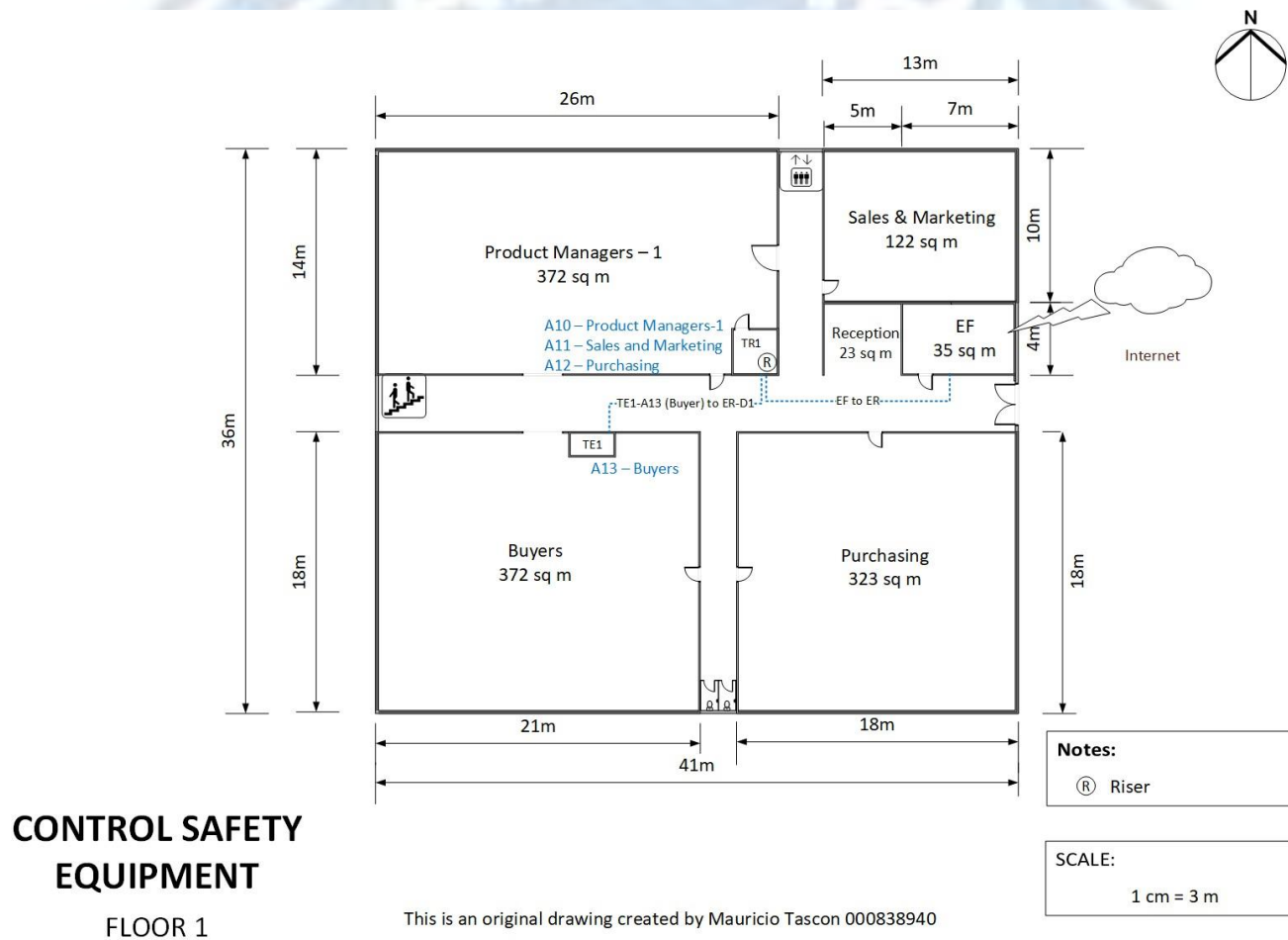
- E-mail
- Internet use
- A collection of file servers

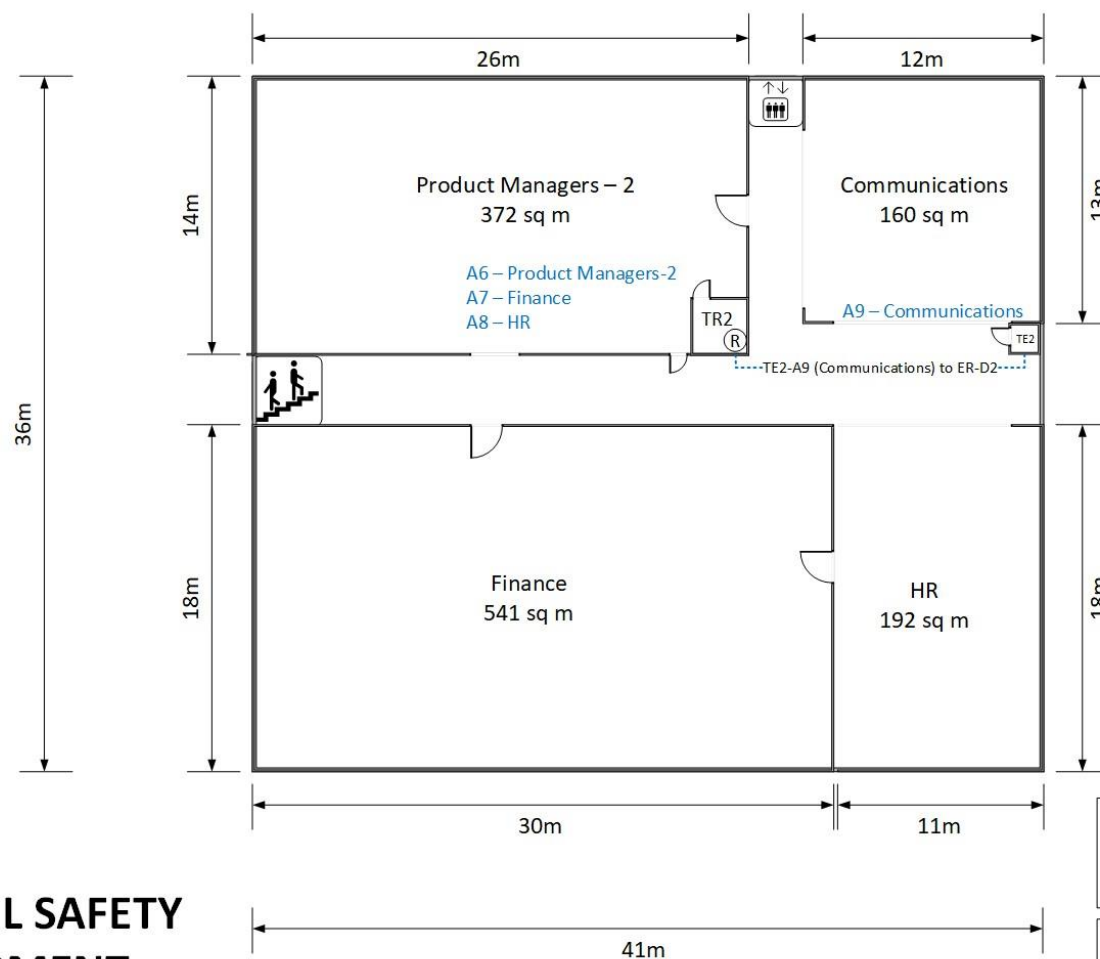
Proposed Logical Network Layout



Proposed Physical Network Layout

The following drawings illustrate the proposed physical network layout for Control Safety Equipment's new offices. They detail the major cable runs and locations of key IT infrastructure.





CONTROL SAFETY EQUIPMENT

FLOOR 2

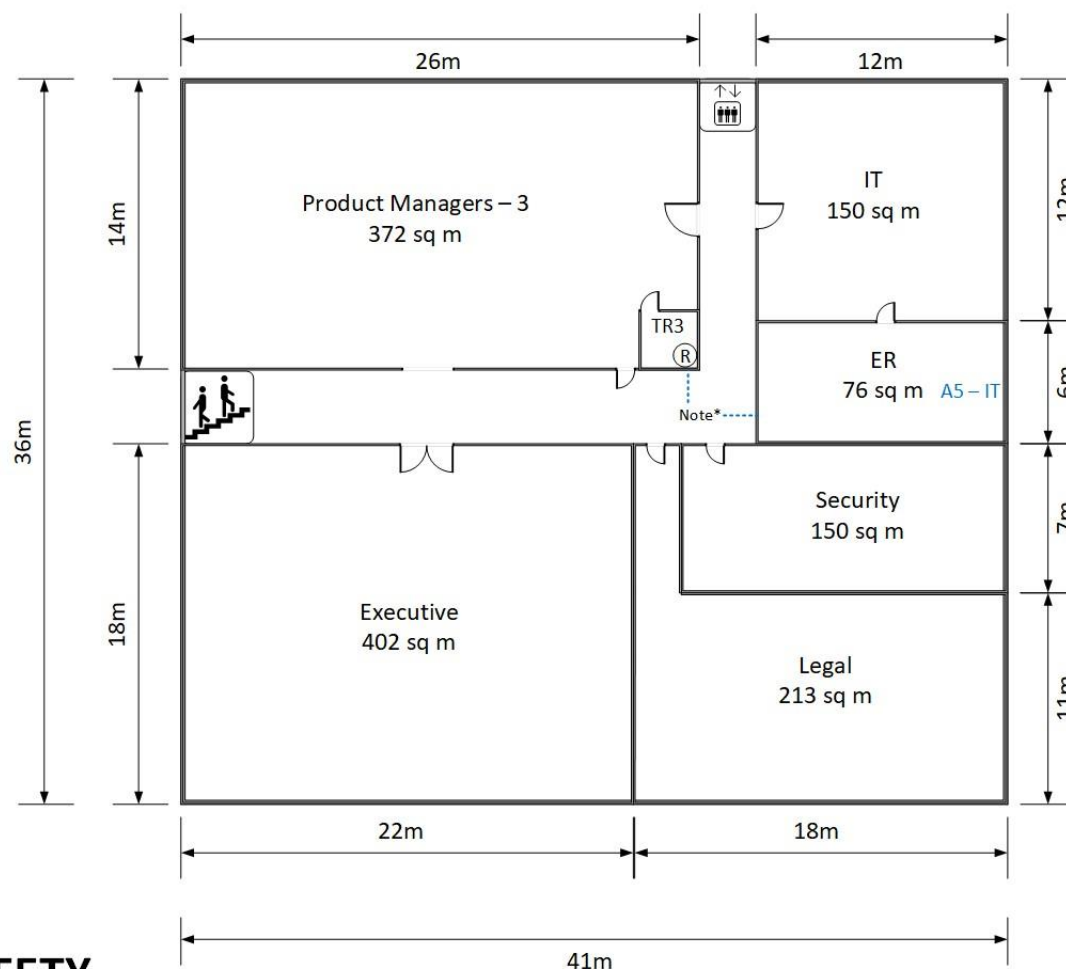
This is an original drawing created by Mauricio Tascon 000838940

Notes:

The 4 sq m TR room as
auxiliary

SCALE:

1 cm = 3 m



Note*

ER-D1 to TR1-A10 (Product Managers-1)
ER-D1 to TR1-A11 (Sales and Marketing)
ER-D1 to TR1-A12 (Purchasing)
ER-D1 to TE1-A13 (Buyer)
ER-D2 to TR2-A6 (Product Managers-2)
ER-D2 to TR2-A7 (Finance)
ER-D2 to TR2-A8 (HR)
ER-D2 to TR2-A9 (Communications)
ER-D3 to TR3-A1 (Product Managers-3)
ER-D3 to TR3-A2 (Executive)
ER-D3 to TR3-A3 (Legal)
ER-D3 to TR3-A4 (Security)

CONTROL SAFETY EQUIPMENT

FLOOR 3

This is an original drawing created by Mauricio Tascon 000838940

SCALE:

1 cm = 3 m

Legend



Server



Router



Workgroup Switch



Terminal



Riser



Multimode Fiber

ER

Equipment Room

EF

Entrance Facility

TR

Telecommunications Room

TE

Telecommunications
Enclosure

Cost Estimates

As Control Safety Equipment will be moving into new offices which have suitable wiring closets and plenty of space to run cable, this proposal focuses on hardware and recurring costs to build out the new head office LAN.

Buildout and recurring costs have been estimated as follows:

Item	Quantity	Purchase Cost (each)	Monthly Costs	Annual Support Costs (each)	Acquisition Cost	Total Yearly Costs	Notes
Internet Connection	1	2,500.00	200.00		2,825.00	2,712.00	Includes termination hardware and five static IP external addresses
Core Router	1	21,929.96		2,193.00	24,780.85	2,478.09	ISR4451-X-AX/K9 Supplier: Cisco
Distribution Layer switches	3	23,054.71		2,305.47	52,103.64	5,210.36	Cisco Nexus 9300 W Supplier: Cisco
Access Layer switches	13	7,793.68		779.37	184,944.03	18,494.40	Cisco Catalyst 9300 Supplier: Cisco
Cat6 UTP (per meter)	7183	0.60			4899.63		Supplier: Prime Cables
Multimode Fiber-optic Cable - OFNP (per meter)	81	3.39			309.93		Supplier: Prime Cables
Multi-mode Fiber-optic Cable (per meter)	5141	1.93			11,222.46		Supplier: Monoprice
RJ45 Cat6 Pass-Through Connectors (10 pcs)	3	14.38			48.75		Supplier: Dolaer
Buffer					25,557.64		

Total one-time costs are \$306,436.40 (including a \$25,302.09 allowance for unexpected issues) with total yearly recurring costs of \$28,894.85.

Additional Comments

The following information shows the criteria that we used for office distribution and cabling.

On the first floor, the Entrance Facility is located near the main entrance, bordering an exterior wall to allow the access provider's line to be terminated within a few meters inside the building.

A Telecommunications Room was placed on this floor inside the Product Manager's office, with a riser to support cable runs on different floors in which would be cables from Entrance Facility to Equipment Room, Telecommunications Room, and Encloser to the Equipment Room in this case. Inside the buyer's office, it was placed a Telecommunications Enclosure to account for rearrangement of the offices and business growth in the future. As for the cabling in this unit, UTP Cat6 is recommended for Horizontal and Work Area cabling for Purchasing and Buyers offices. Cat 6 will provide the necessary speed needed at a much cheaper cost.

Multimode fiber optic cable is recommended for Horizontal and Work Area cabling for Product managers and Sales & Marketing offices to reduce possible interference from the elevator since those offices are right beside the elevator.

And a riser level cable is recommended for safety reasons for the Backbone Cabling that goes from the entrance facility and the Telecommunication Enclosure to the Equipment Room.

For guaranteeing a reliable connection and a network speed that exceed your expectations, we decided to go with Riser-level multimode fiber optic.

On the second floor, there is the Telecommunications Room with the riser in the same location as the first floor. This is where the cabling from the first floor will pass through and where cabling from the Telecommunication Enclosure on this floor will pass through, going to the Equipment Room where UTP Cat6 is recommended for Horizontal and Work Area cabling for Finance and Human Resource offices.

Multimode fiber optic cable is recommended for Horizontal and Work Area cabling for Product managers and Sales & Communication offices to reduce possible interference from the elevator.

On the third floor, there is another Telecommunication Room, where all the cabling from the previous floors will arrive, and then this connection will go to the Equipment Room that is located next to the IT department so it can easily be accessed to ensure a fast response in case of

failures. An extra Telecommunication Room or Enclosure would not be necessary as the Equipment Room can act like one if needed.

As for the cabling in this unit, UTP Cat6 is suggested for Horizontal and Work Area cabling for Executive, legal, and security offices.

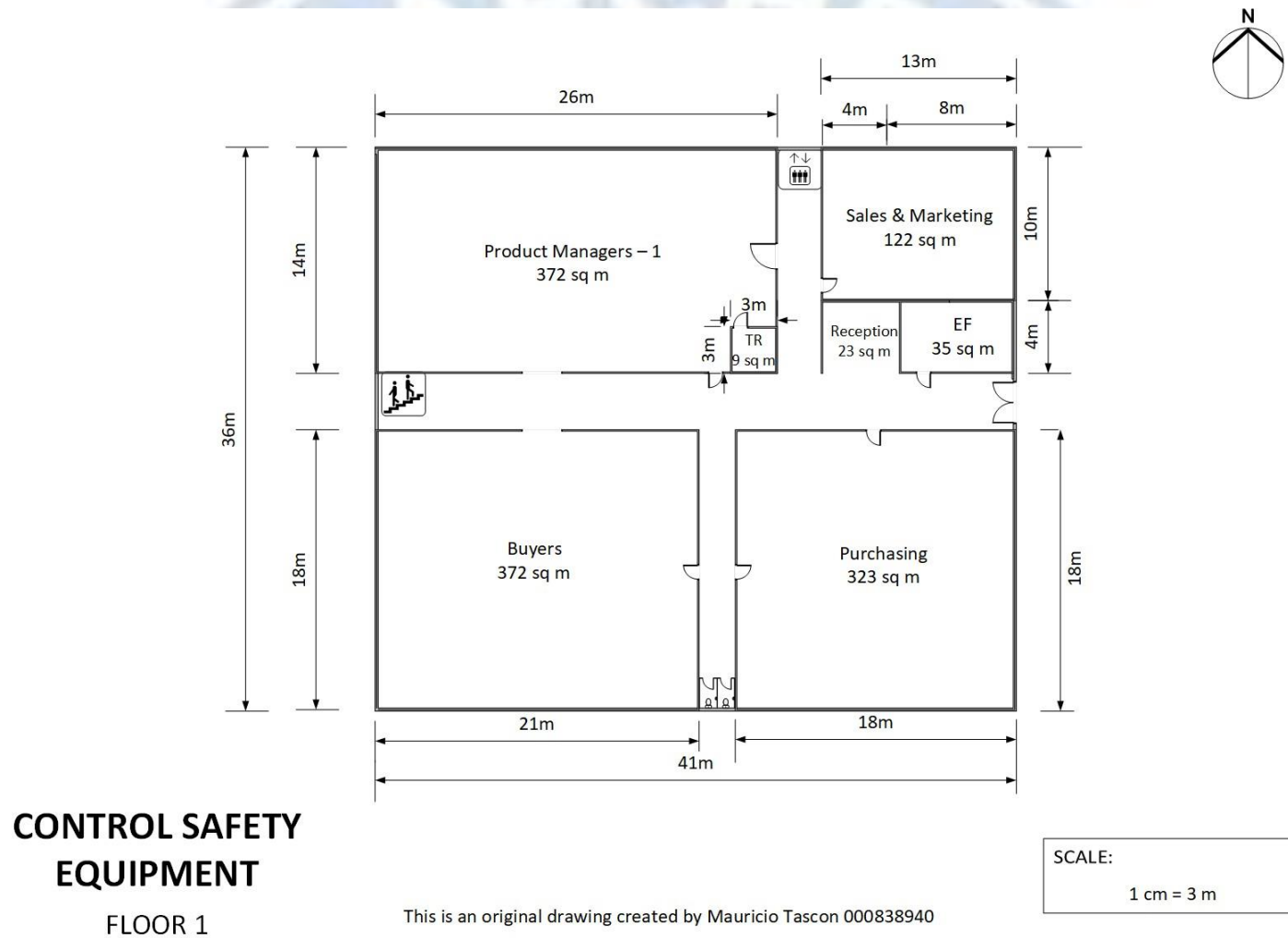
Multimode fiber optic cable is recommended for Horizontal and Work Area cabling for Product managers and Sales & IT offices to reduce possible interference from the elevator.

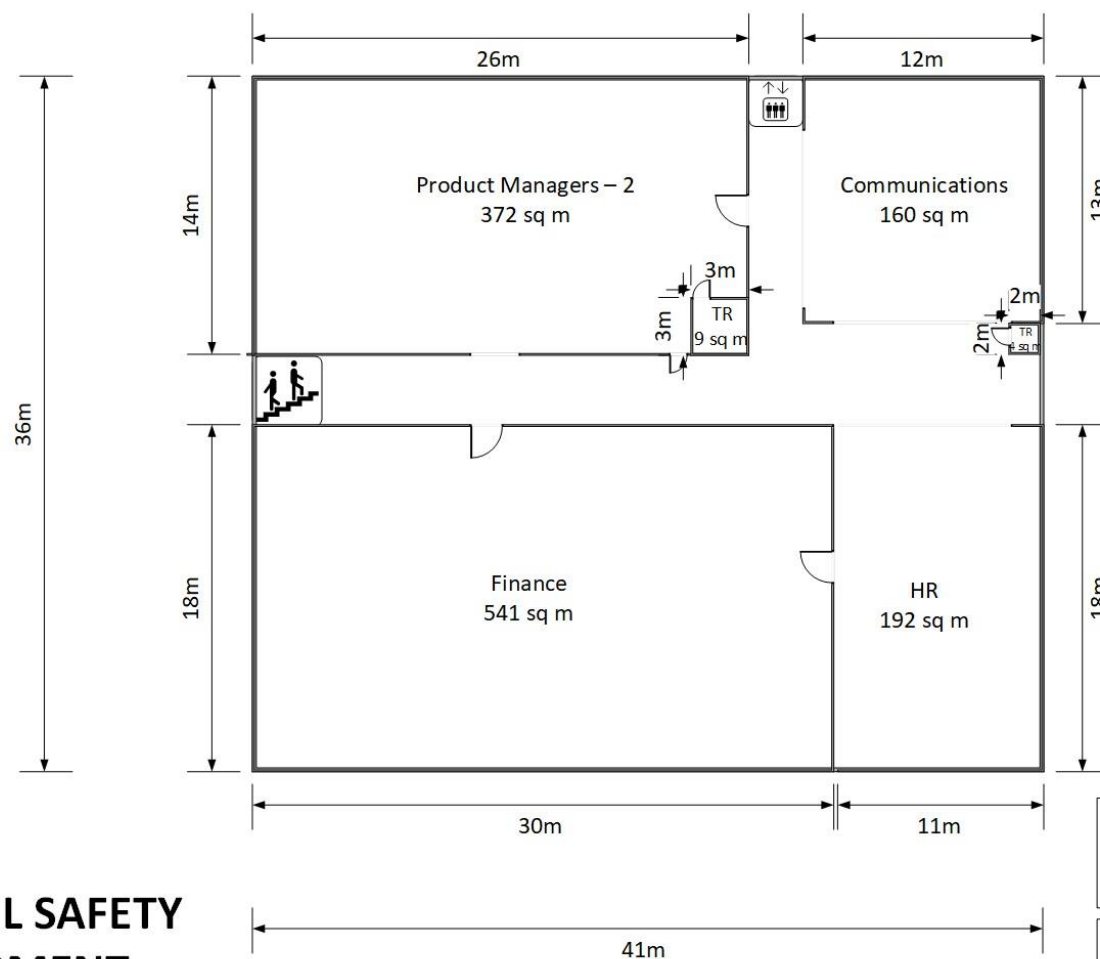
And riser-level multimode fiber optic cable is recommended for the Backbone Cabling that connects Telecommunication Enclosure on this unit to the Equipment Room.



Appendix A – Current Office Layout

The unoccupied offices are currently configured as follows:





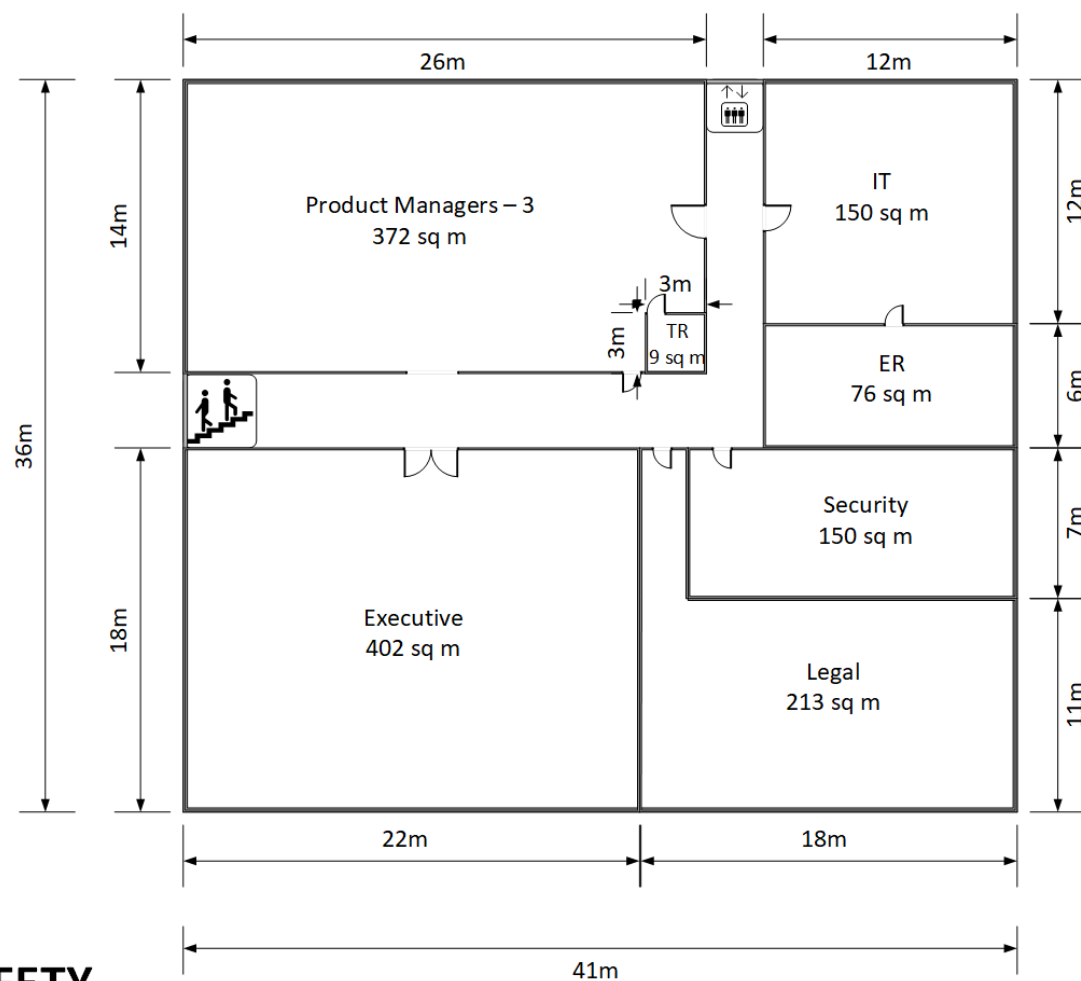
CONTROL SAFETY EQUIPMENT

FLOOR 2

This is an original drawing created by Mauricio Tascon 000838940

Notes:
The 4 sq m TR room
serves as riser for cabling

SCALE:
1 cm = 3 m



CONTROL SAFETY EQUIPMENT

FLOOR 3

This is an original drawing created by Mauricio Tascon 000838940

SCALE:

1 cm = 3 m

References

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<https://www.connection.com/product/cisco-nexus-9300-w-48-ports-10g-sfp-and-6p-40g-qsfp/n9k-c9372px/18115017>

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<https://www.primecables.ca/p-359008-cab-fo-458b-all-multimode-duplex-lclc-50-micron-om4-aqua-fiber-cable-2mm-lszh#sku372809>

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