Briefing to Operators - For Fibre Ready Scheme

- **Design and Specifications of Infrastructure Enhancement**

By Mr Low Chee Kiong
National Information Infrastructure
8 July 2014

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Agenda

1. Cable Tray
2. Vertical Metal Trunking
3. ABF Microduct Network
4. ABF Microduct Network Planning - Fibre Ready Scheme
5. Building Plan Submission & Requirement
6. Q&A

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1 Cable Tray

Cable Tray

A. For existing building, the BM or Building owner is required to refer and comply with the **COPIF 2013 & Internal Wiring Code of Practice** when planning or installing the new telecommunication cables network - **(ABF Cable Tray/Trunking & Microduct Installation)**.

Cable Tray with Access Panels - Basic Requirements

- Where cable trays/trunking are concealed in false ceilings of ceiling strips or boards that are not easily accessible, **access panels should be provided** for easy and unrestricted access to the cable trays (refer to Figure 5.17, pg 48)

- The dimension of the access panels should not be less than **600mm x 600mm**, and they should preferably be provided at **regular intervals of 6m** as well as at positions where there is a **change in the direction** of the cable trays/trunkings

- The passage between the ceiling trays/trunkings and the ceiling slabs should ideally be **free from obstructions** such as airconditioning ducts, fire sprinklers, electrical trunkings, water pipes, etc. When obstructions are unavoidable, a minimum clearance as indicated in **Figure 5.18** should be maintained

Reference: Guidelines for Info-Communications Facilities in Building, Part 5.2d Ceiling distribution system for non-residential buildings, Pg 25-26

Cable Tray with Access Panels - Basic Requirements

FIGURE 5-17 : CEILING DISTRIBUTION SYSTEM - TYPICAL DETAIL OF CABLE TRAY/TRUNKING LINK WITH CONDUIT IN UNDETACHABLE FALSE CEILING BOARDS/ STRIPS THAT ARE NOT EASILY REMOVABLE

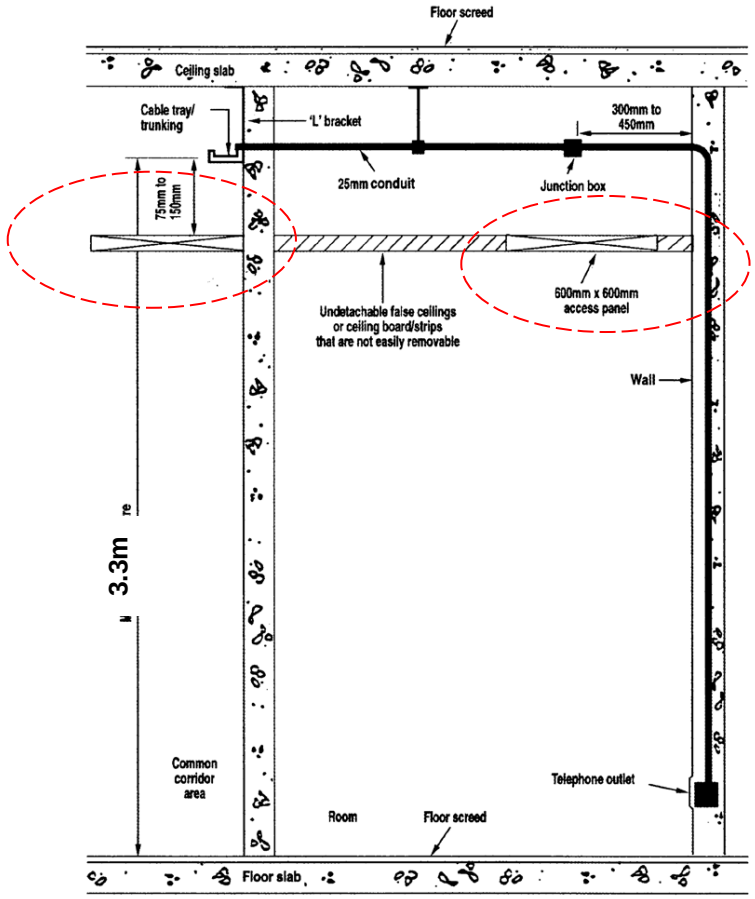
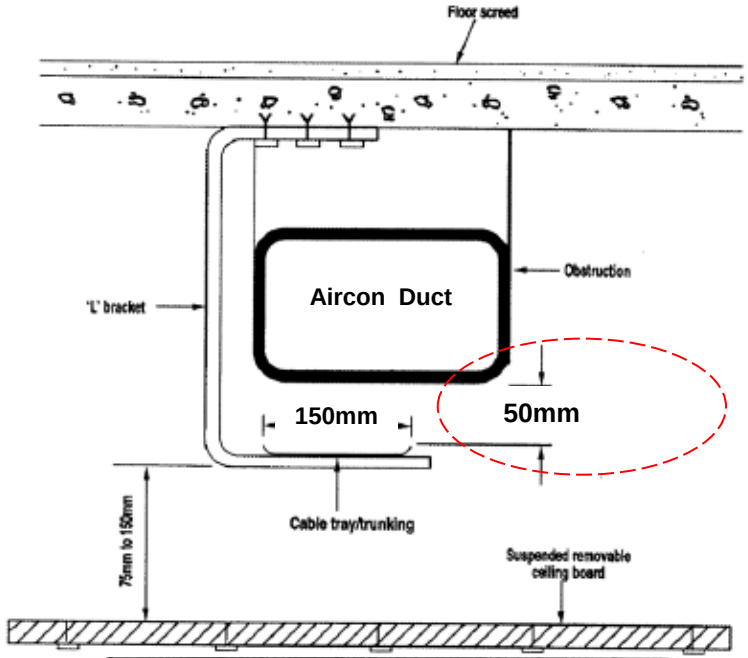


FIGURE 5-18 : CLEAREANCE BETWEEN CABLE TRAY / TRUNKING AND OBSTRUCTIONS



Width of Cable tray/trunking	Minimum clearance between cable tray & obstruction
150mm	50mm
300mm	75mm
450mm	100mm
1000mm	150mm

Reference: Guidelines for Info-Communications Facilities in Building, Figure 5-17 and 5-18, Pg 48-49

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Cable Trays - Basic Requirements

- The material used for the cable tray should be **perforated and galvanized**
- All cable trays should be truly aligned and **securely mounted**
- Cable trays **should not** be routed through toilets, high-tension(HT) switch rooms, and other non-accessible areas
- Cable trays **should be straight run**, and for any change in direction, the bend should have **a minimum radius of 600 mm** (refer to COPIF Guidelines, Figure 5.26, pg 55)
- **No bolts, screws or sharp objects should protrude** through the cable-bearing surface of the trays
- The cable tray support must be **L-shaped or inverted T-shaped**

Reference: Guidelines for Info-Communications Facilities in Building, Part 5.2h Cable Trays, Pg 29

COPIF 2013 Guidelines

Cable Trays - Basic Requirements

- Where cable trays **run alongside or across** electrical cable, they should be separated for their entire length by a clearance as specified in Chapter 2, paragraph 2.2 of these Guidelines. The electrical cables should be clearly indicated by signs or symbols

- The minimum clearance between ceiling/beam and cable tray should be **300mm**

- For cable trays installed within false ceiling, there may be instances that require cable trays to be **replaced with pipes for easy installation of cable**. For such cases, access must be provided in the false ceiling at appropriate locations

- **Slots provided** in the wall for cable trays to go through should have a minimum **height of 300 mm**

- Where cable trays are concealed in false ceilings, the panels of the false ceiling **should be fully and easily removable** to allow unrestricted access

Reference: Guidelines for Info-Communications Facilities in Building, Part 5.2h Cable Trays, Pg 29

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Open Access of In-Building Infrastructure

- Cable trays are shareable by **multiple operators** for use of Fibre cables only.

- "**Fibre Only**" should be printed at every 3m interval.

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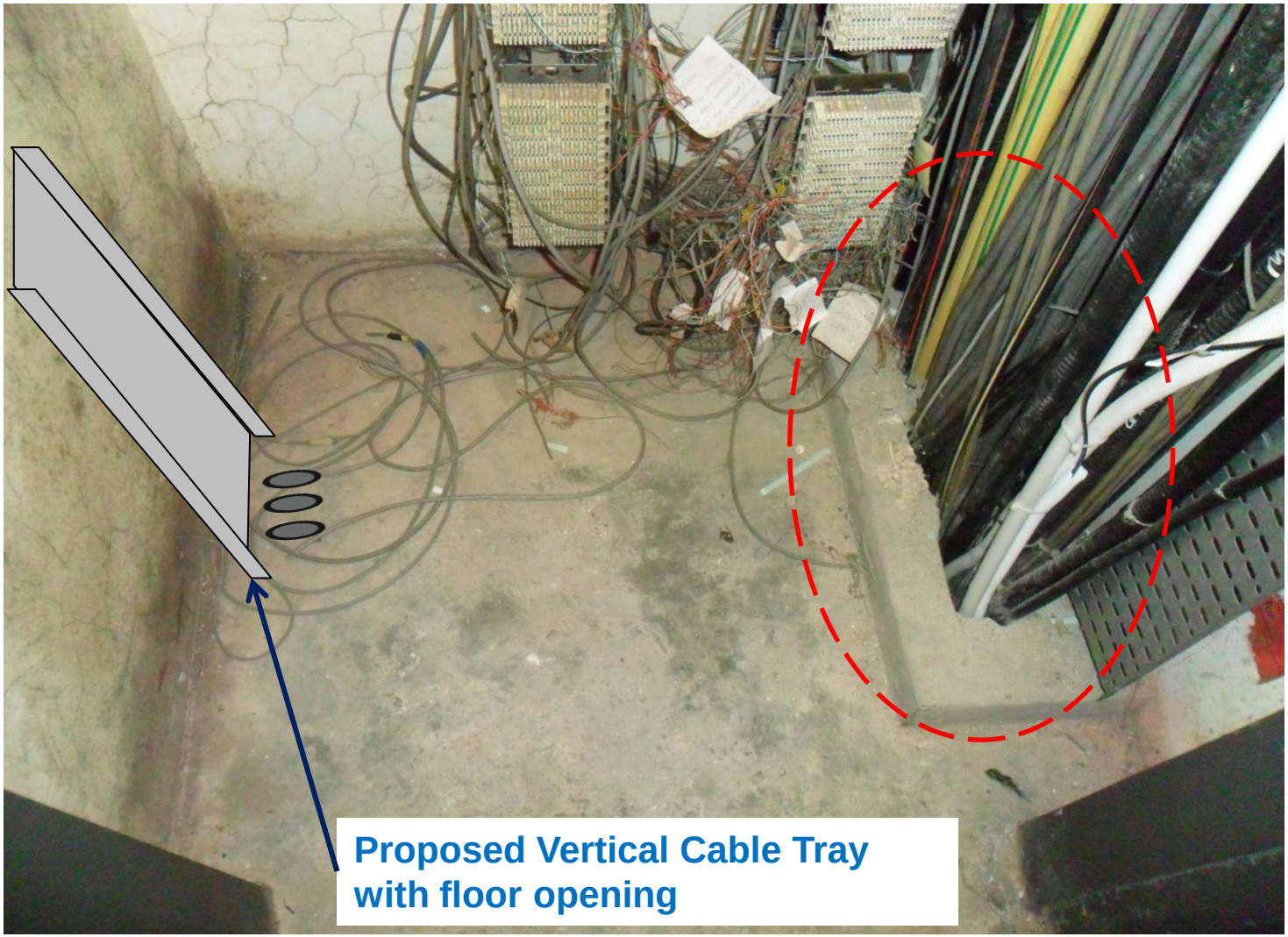
Vertical Cable Tray with Floor Opening



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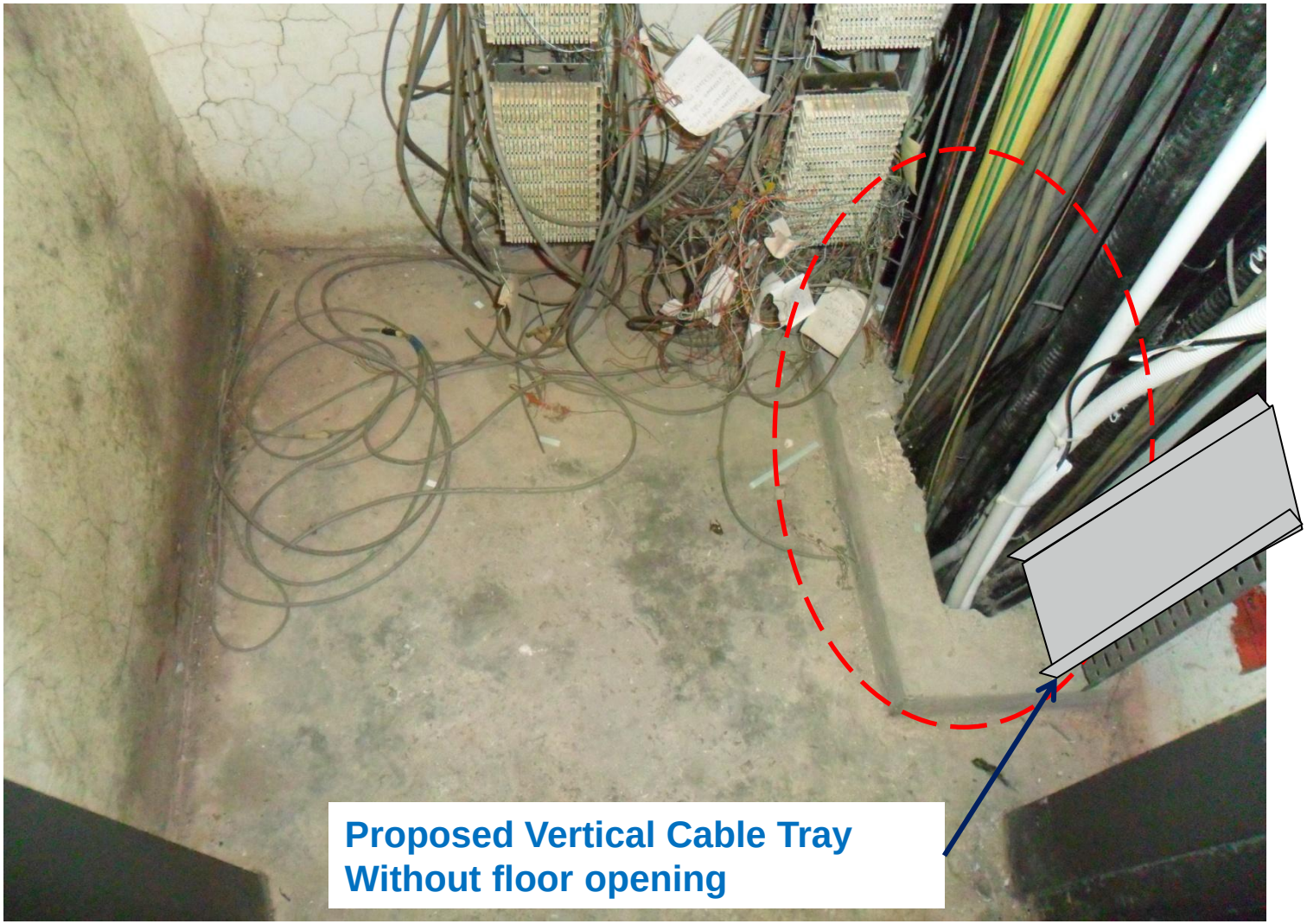
Vertical Cable Tray without Floor Opening



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2 Vertical Metal Trunking

COPIF 2013 Guidelines

Vertical Metal Trunking – Basic Requirements (1/2)

- Size of the trunking should be such that the cross-sectional area of all the cables placed in the trunking does **not exceed 30%** of the cross-sectional area of the trunking

- Trunking provided should be **as straight as possible** and should be rigidly mounted

- Maximum height of the trunking for horizontal cabling should **not exceed 3.3 m** from the floor level

- Trunking should be mounted so that access to the trunking is **from the top**. If access to the trunking **is from the side**, **cable retainers** must be provided at regular intervals inside the trunking to ensure that the cables are held in position when the covers are removed

COPIF 2013 Guidelines

Vertical Metal Trunking – Basic Requirements (2/2)

- The cover of the trunking should preferably be **friction fit** or secured by **simple device (not screws)** to permit easy access

- The trunking should be **free from internal roughness, sharp edges, moisture and dirt**

Metal trunking claimed under Fibre Ready Scheme is for Fibre cables only

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Common Sizing of Metal Trunking

Size (mm)	Steel Thickness (mm)		Approx. Weight Kgs/Length
	Body	Cover	
150 x 50	1.2	1.2	10.6
150 x 75	1.2	1.2	11.8
150 x 100	1.2	1.2	13.1
200 x 50	1.6	1.6	16.4
200 x 75	1.6	1.6	18.0
200 x 100	1.6	1.6	19.8
225 x 100	1.6	1.6	21.4
225 x 150	1.6	1.6	25.3
250 x 100	1.6	1.6	23.0
300 x 100	1.6	1.6	26.3

If insufficient space in riser, one possible way is to put metal trunking outside the riser, subject to approval from the relevant party (e.g. Building Owner, BCA)

Cable Trunking Accessories

Reducer

External Cover 90° Bend

Flat Bend 45°

Flat Bend 90°

Flat Equal Tee

Coupler

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3 ABF Microduct Network

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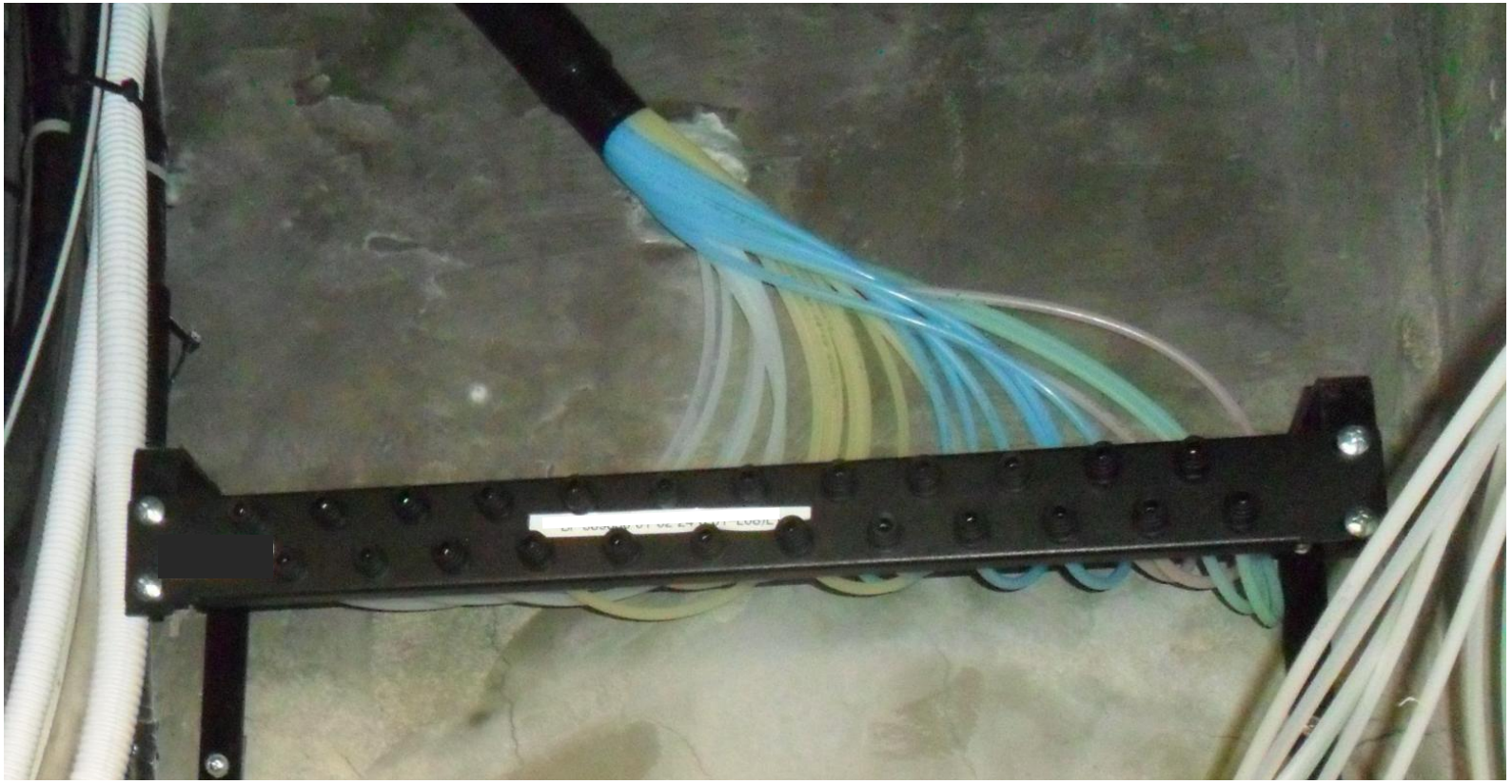
ABF Microduct Network – Commercial Building

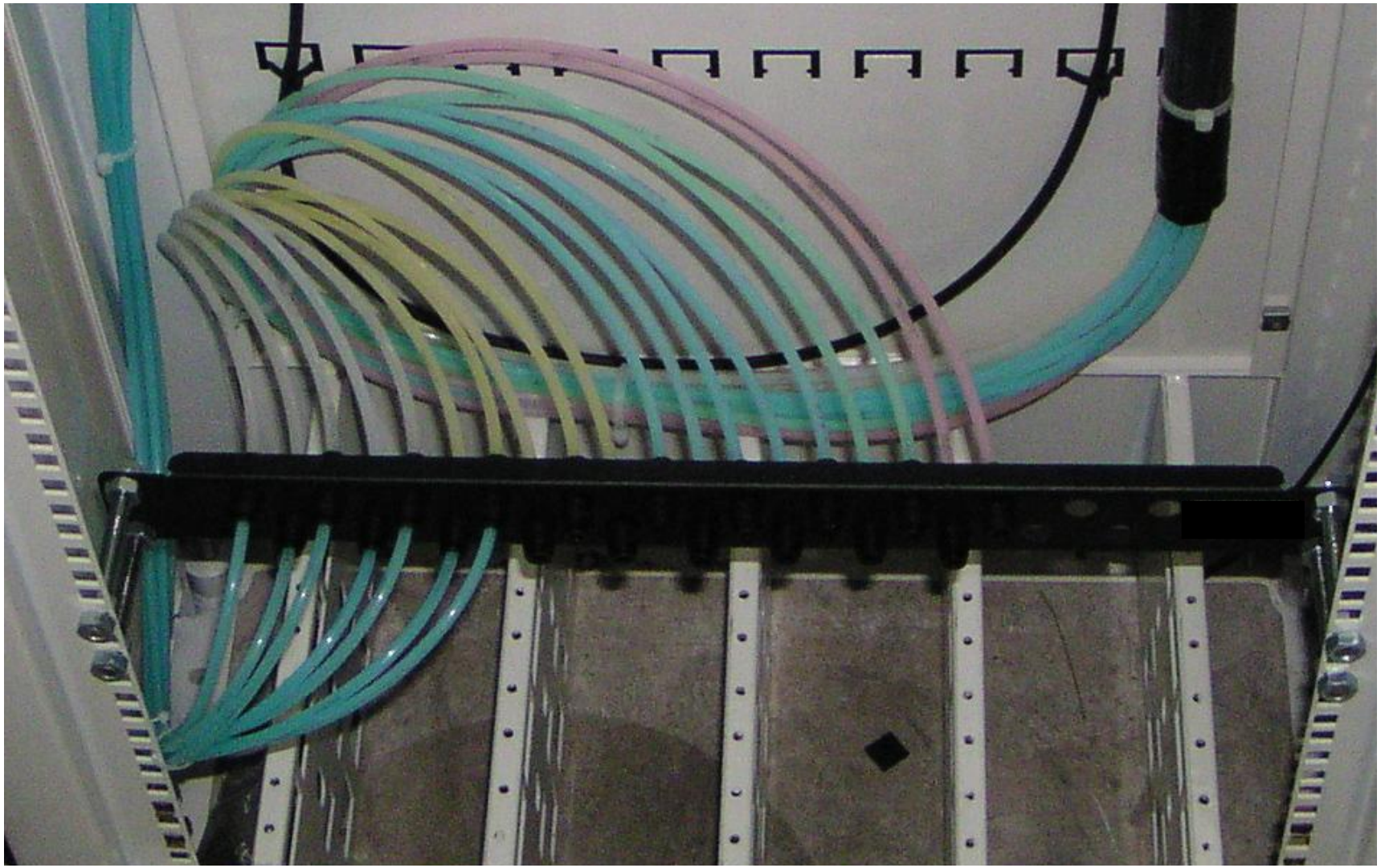
- Pros
  - Good for concealed and congested false ceiling
  - No hacking
  - No noise, no pollution
  - Fast (Expedite deployment)
  - Minimize environmental impact

- Cons
  - Cost higher
  - Cable management system
  - Planning of fibre tubing to tenants

ABF Microduct with Tube Patch Panels in Existing Riser



19 Ways ABF Microduct with Tube Patch Panel mounted at 19 Inch Cabinet



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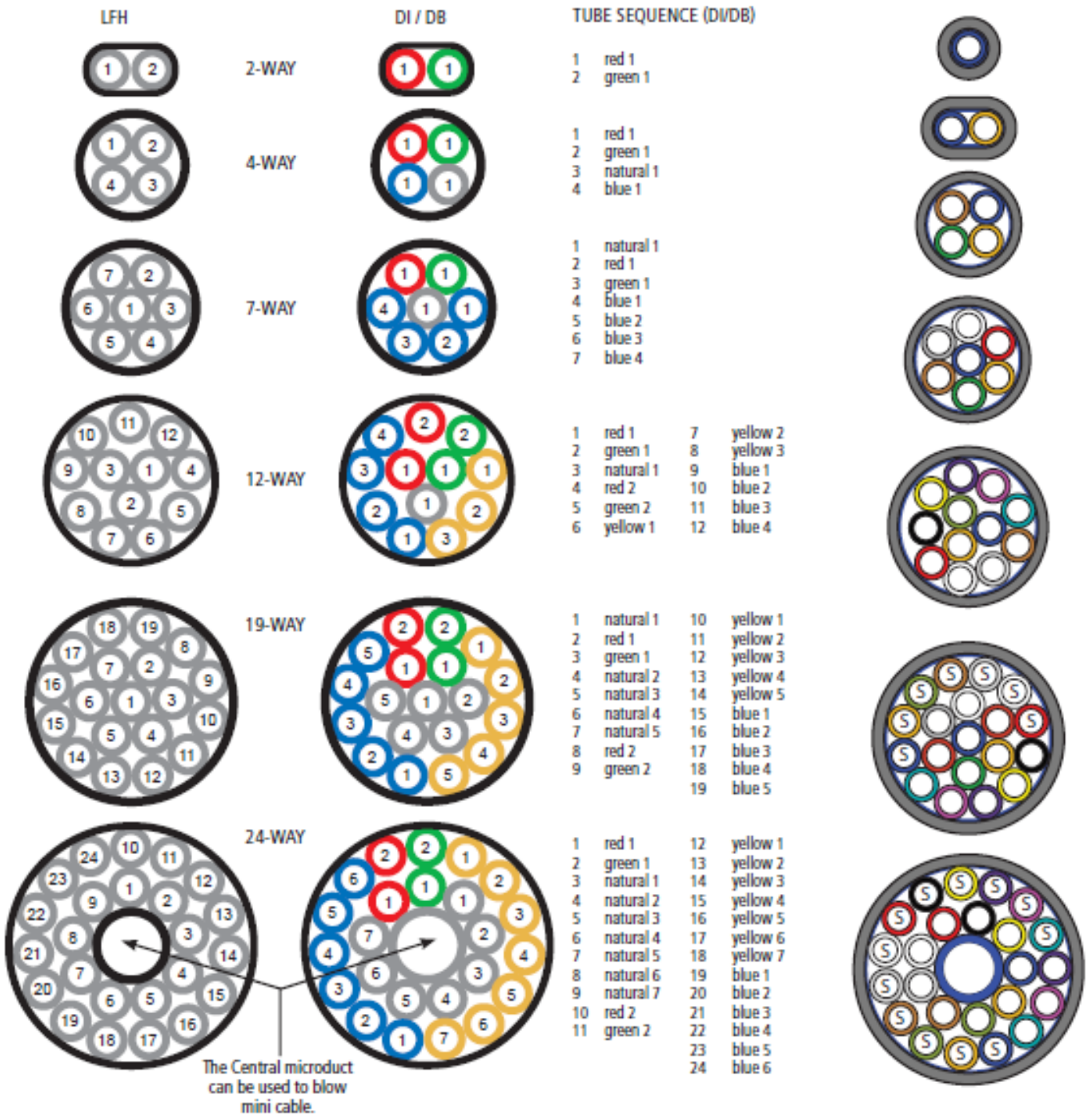

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ABF Microduct Sizes And Micro Fibre

Microduct size mm	Microcable FU fibre count				
	2	4	6	8	12
3.0/2.1	✓	✓			
5.0/3.5	✓	✓	✓	✓	✓
8.0/6.0	✓	✓	✓	✓	✓

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Factors Which Permit Greater Blow Distances

- Smaller fibre product (lower weight)
- Larger microduct
- More air pressure, eg use 13 bar instead of 10 bar.
- Straighter route
- Downwards direction, eg down a building or hill rather than up
- Improved fibre product/tube design

Considerations

- Minimium **2 microducts** per tenant/unit
- 2 microducts or **more may be needed**, depending on the type of business (e.g. security, bank)
- Slack allowance of approx. **5 meters** per tenant/unit
- **Labeling** on both ends of the ABF microduct
  - At Tenant location: refer to the MDF/riser location
  - At MDF/Riser: refer to the tenant/unit address
- **Retrieval of fibre cable** from the ABF microduct upon termination of service

4 ABF Microduct Network Planning - Standard and Requirements for Fibre Ready Scheme

A) Existing Buildings
B) Existing Small Buildings and New Buildings

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Legend For ABF Microduct Planning & Installation

T01-24W(5/3.5or7/3.5)

The Proposed 1st 24Ways Indoor ABF Microduct from MDF/Riser

# 04-01
P2(5-6)
190.0m

2 x ABF Microduct from TPP nos 2 - Port 5 & 6 are coiled 5.0m at unit address #04-01.

Stump [4]
P2(17-20)
200.0m

Proposed 4 x ABF Microduct from TPP nos 2 Ports 17 to 20 are stump and coiled above ceiling for future expansion.

T04 & T05 - 24W(5/3.5)
P4, & P5(1 - 24) - 185.0m

Riser 2

The Proposed 4th & 5th 24 ways ABF Microduct Main Link from (MDF Room) TPP nos 4 & 5 are connected and linked to Riser nos 2, The total length is 185.0m.

MDF

MDF Room

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4A Existing Buildings – Commercial Buildings

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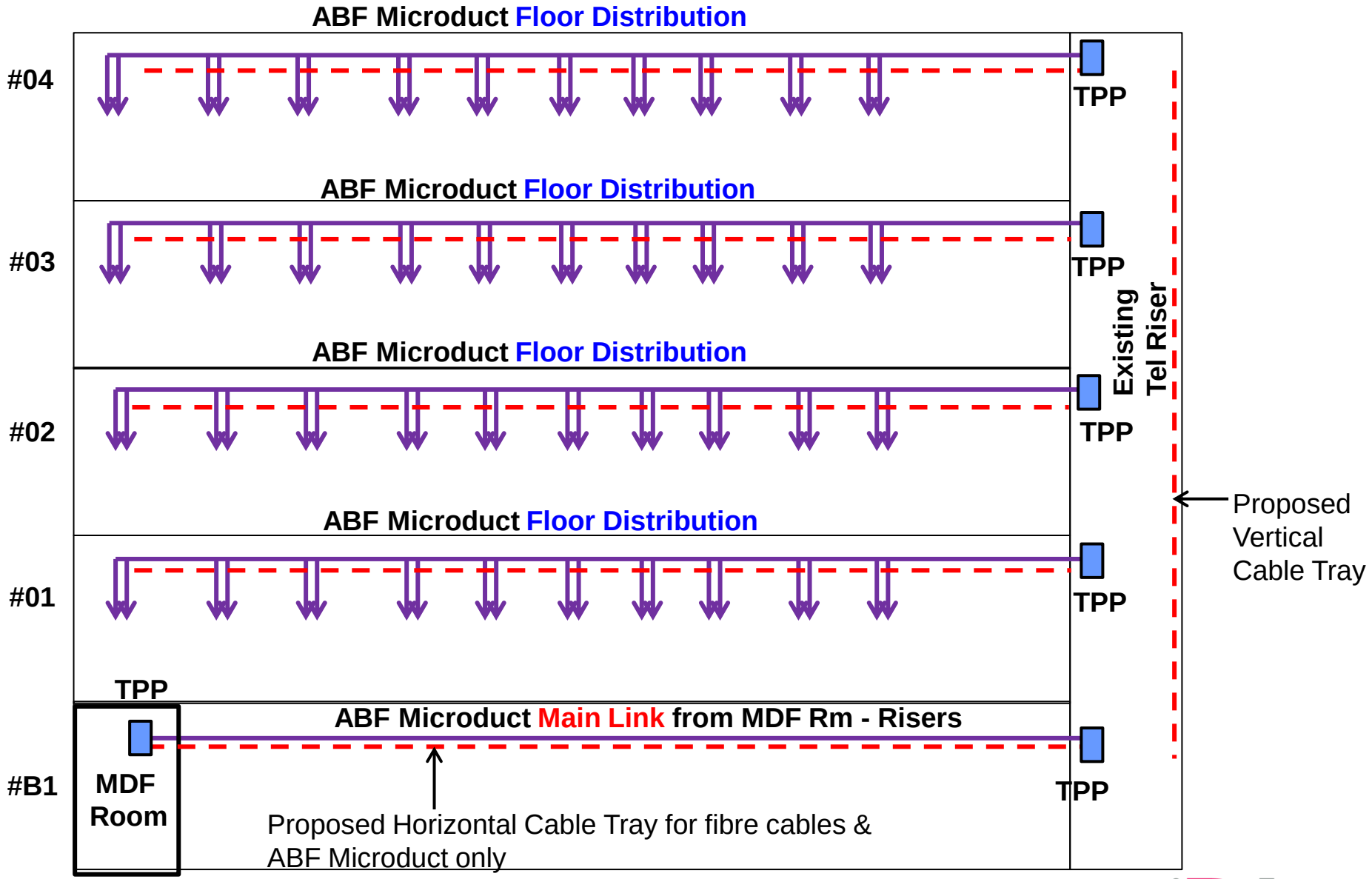
ABF Microduct Floor Distribution and Main Link Network



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ABF Microduct Installation Standard and Requirements For Existing Non-Residential Buildings

Requirements For Floor Distribution Network from Tel Riser to Floor Units.

1. 2 nos of ABF Microduct with sizes **(5/3.5)** to be provided for each unit
2. Maximum serving units up to **60 units** per Riser/Floor
3. Microduct with end cap to be **coiled 5.0m** at customers end
4. Labelling must be provided at the user end and with **cross reference** back to serving Riser
5. All Microduct must be **properly connected** to a Tube Patch Panel(TPP) at Riser
6. Position of TPP to be mounted below **2.1m** of height for easy connectivity
7. ABF Microduct Installer must ensure that the material used are **safe** to their workers and the Public in the area
8. ABF Microduct Installer must also ensure that the products used to be enable to last for **10 to 15 years** after the ABF Microduct installation
9. All (2/4/7/12/19/24)W Microduct Cable Jacket must come with **purple colour stripe**
10. The ABF Microduct Floor Distribution Network's Record to be **keep and maintained by BM/Building Owner**

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ABF Microduct Installation Standard and Requirements For Existing Non-Residential Buildings

Requirements For Main Link Network from MDF Room/TER to Risers

1. Use only **24W(5/3.5)** ABF Microduct link between MDF Room/TER to Risers
2. Use only **12 cores** ABF cables per tube
3. Both ABF Microduct end at MDF Room/TER and Riser end must be properly connected to Tube Patch Panel(TPP)
4. Both TPP at MDF Room/TER and Riser end must be **cross reference** to each other
5. Position of Tube Patch Panels(TPP) to be mounted below **2.1m** of height
6. ABF Microduct Installer must ensure that the material used are **safe** to their workers and also to the Public in the area
7. ABF Microduct Installer must also be ensured that the products used to be enable to last for **10 to 15 years** after the ABF Microduct installation
8. All 24W Microduct Cable Jacket must come with **purple colour stripe**
9. The ABF Microduct Main Link Network's Record to be keep and maintained by BM/Building Owner

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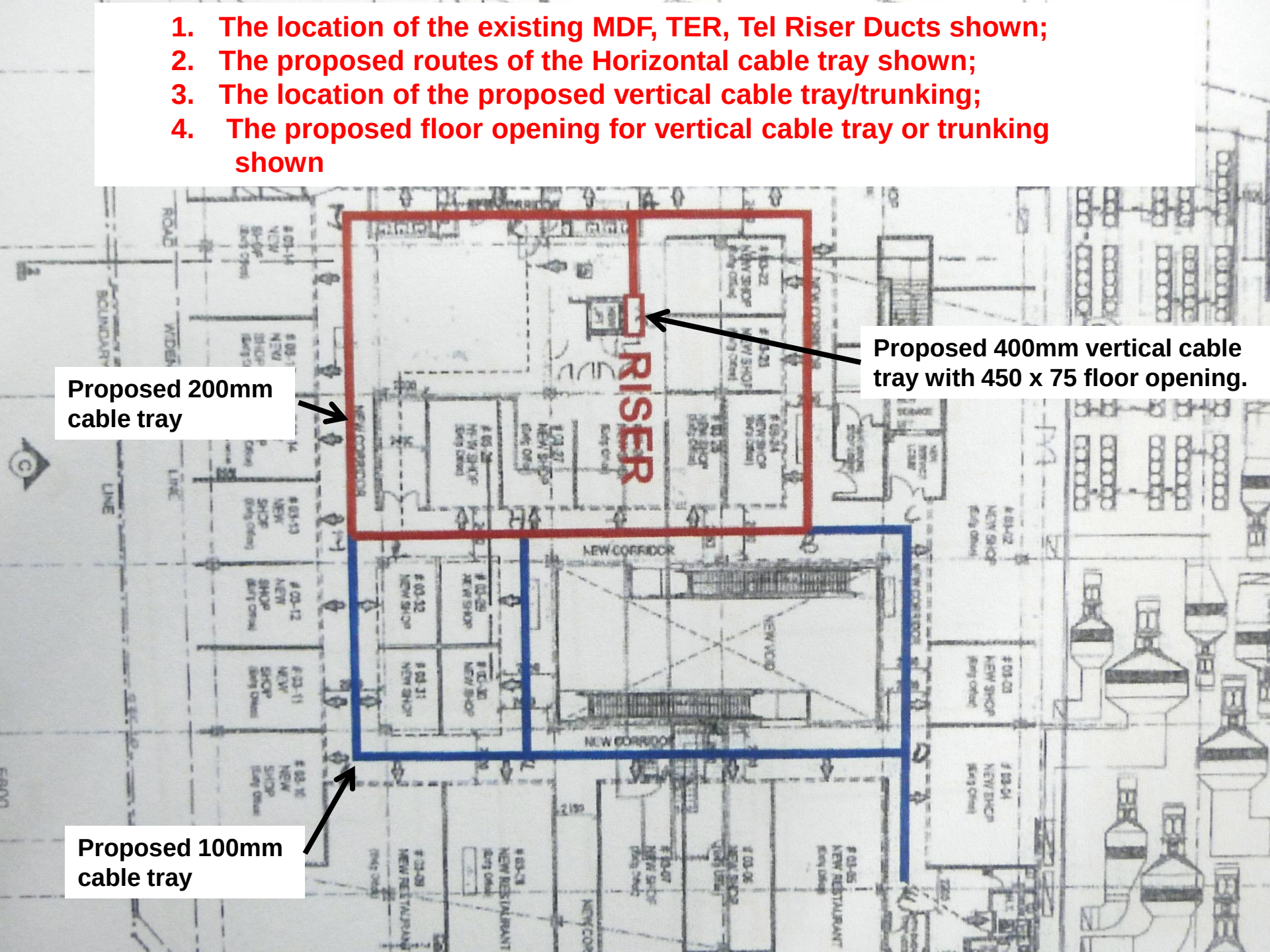
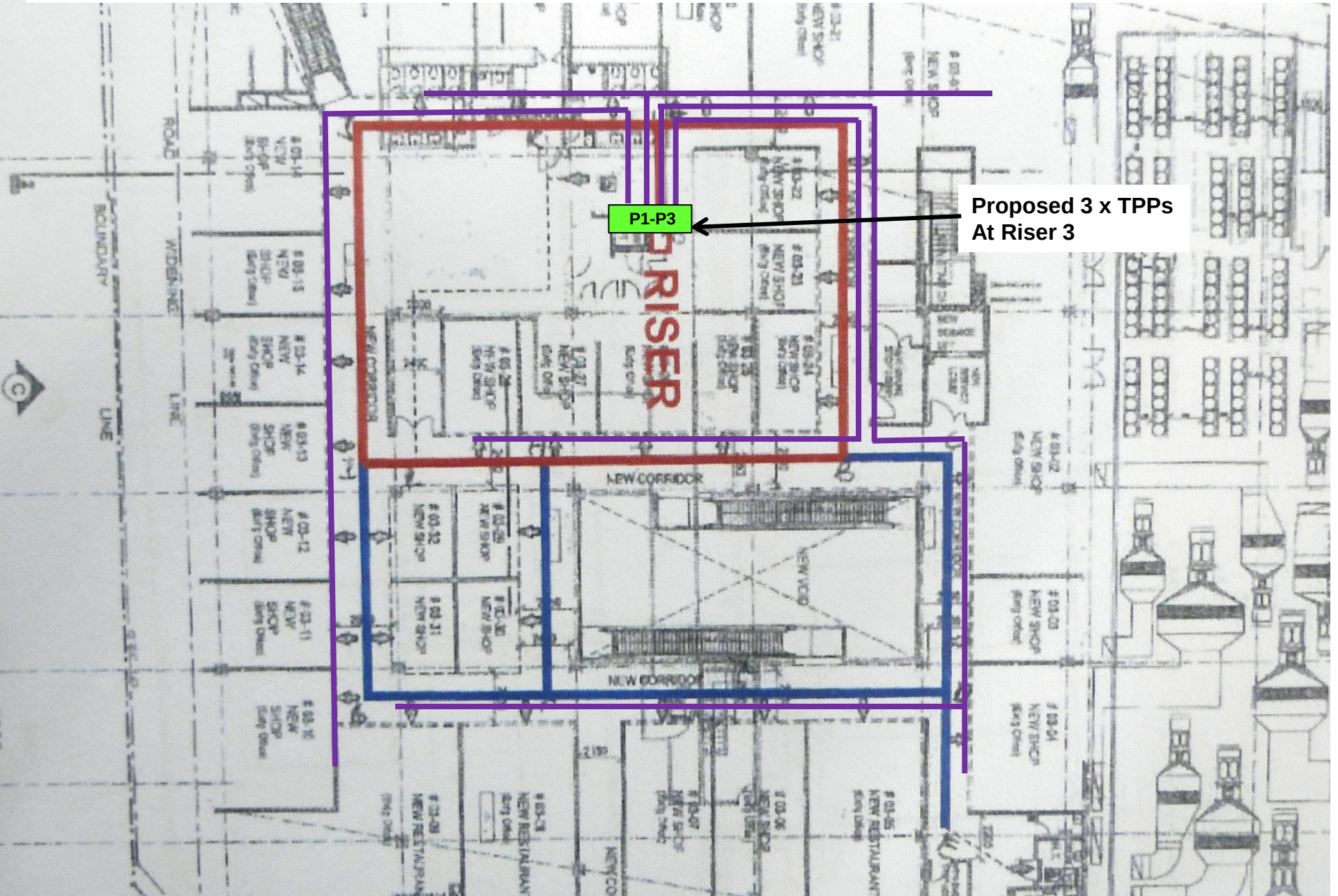
1. The location of the existing MDF, TER, Tel Riser Ducts shown;
2. The proposed routes of the Horizontal cable tray shown;
3. The location of the proposed vertical cable tray/trunking;
4. The proposed floor opening for vertical cable tray or trunking shown



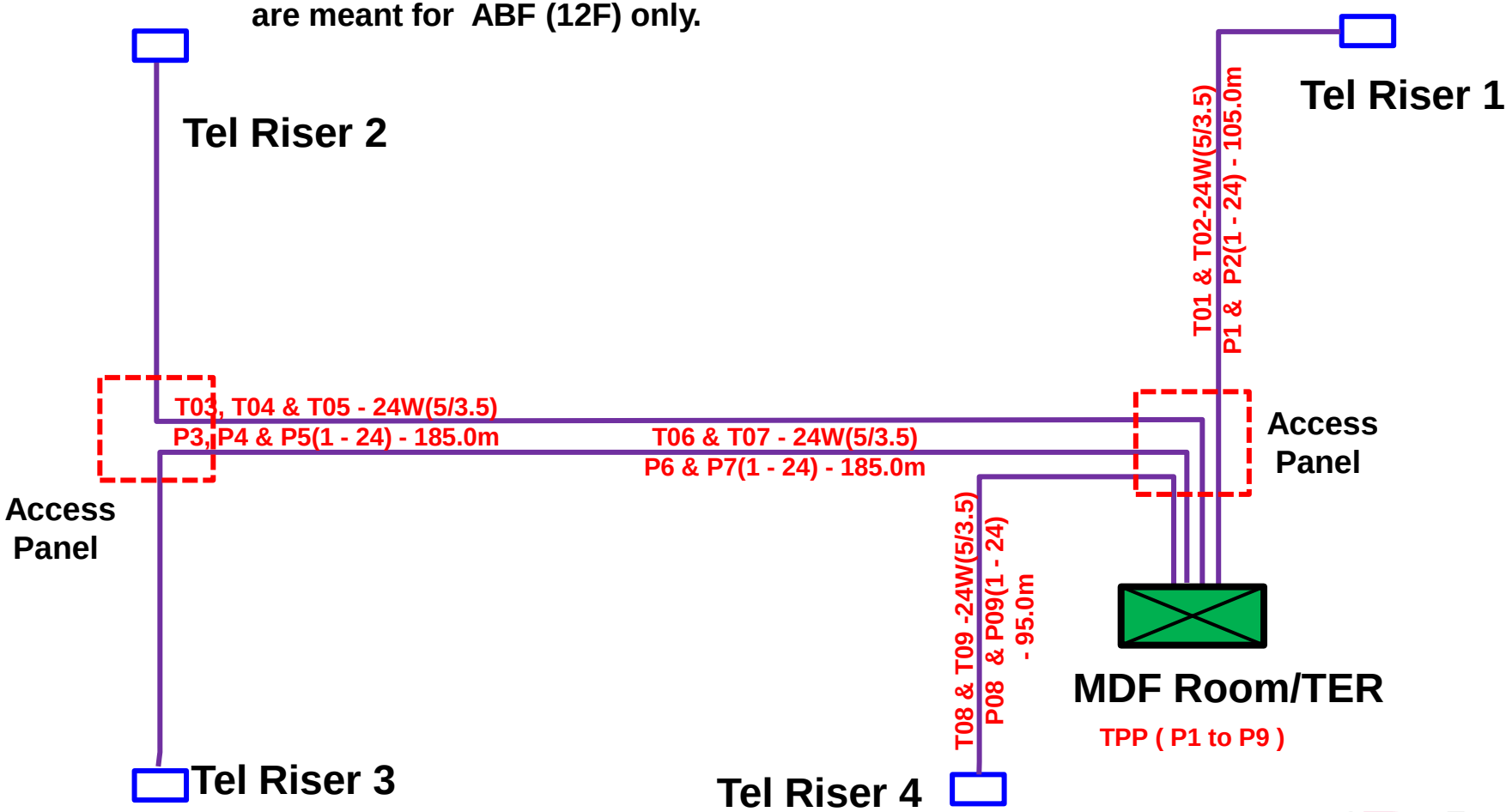
The proposed ABF Microduct routes and the **nos of TPP**(Tube Patch Panel) used to be shown in Tel Riser/TER/MDF room



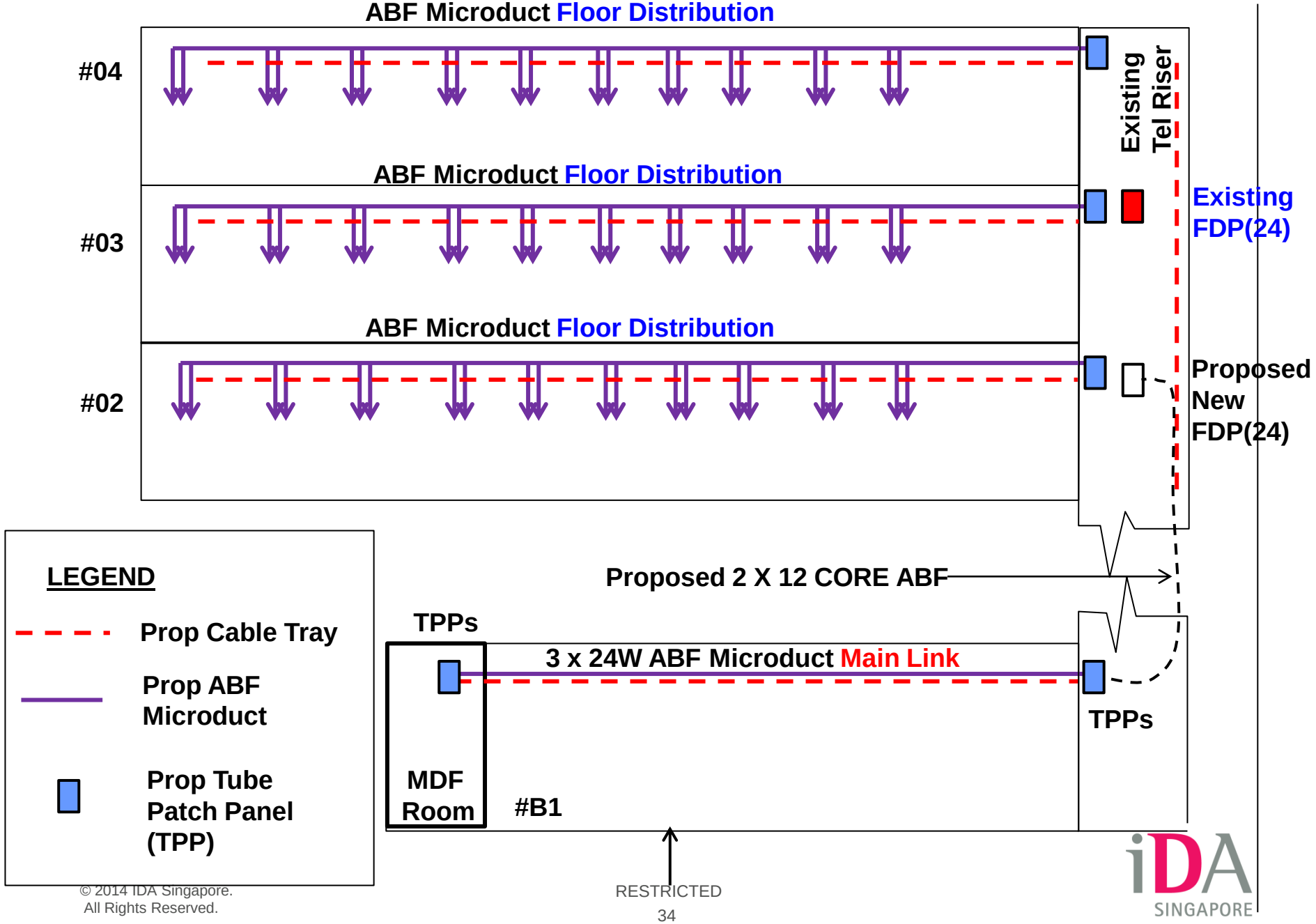
The proposed ABF Microduct Main Link 24W(5/3.5) Routes Plan From MDF Room/TER to Tel Risers

Note:

1. **ABF Microducts 24W(5/3.5) Main Link from MDF Room/TER to Risers are meant for ABF (12F) only.**



ABF Microduct Floor Distribution and Main Link Network



ABF Microduct Main Link Network 24W(5/3.5) Testing & Record (To be updated and maintained by BM)

Building Name :

Building Address :

Flr Level	MDF/TER to	Tel Riser	TPP		Duct(5/3.5) Distance	Duct Status	Use ABF (12F) only	Operator	Remarks
			Panel Nos	Port nos					
#B1	MDF	R1	P1	1	105.0m	A	12F	SingTel	3-Jun-14
#B1	MDF	R1	P1	2	105.0m	A	12F	SingTel	3-Jun-14
#B1	MDF	R1	P1	3	105.0m	A	12F	SingTel	3-Jun-14
#B1	MDF	R1	P1	4	105.0m	A	12F	StarHub	15-Jun-14
#B1	MDF	R1	P1	5	105.0m	A	12F	StarHub	15-Jun-14
#B1	MDF	R1	P1	6	105.0m	A	12F	StarHub	15-Jun-14
#B1	MDF	R1	P1	7	105.0m	A	12F	M1	19-Jun-14
#B1	MDF	R1	P1	8	105.0m	A	12F	M1	19-Jun-14
#B1	MDF	R1	P1	9	105.0m	A	12F	M1	19-Jun-14
#B1	MDF	R1	P1	10	105.0m				
#B1	MDF	R1	P1	11	105.0m				
#B1	MDF	R1	P1	12	105.0m				
#B1	MDF	R1	P1	13	105.0m				
#B1	MDF	R1	P1	14	105.0m				
#B1	MDF	R1	P1	15	105.0m				
#B1	MDF	R1	P1	16	105.0m				
#B1	MDF	R1	P1	17	105.0m				
#B1	MDF	R1	P1	18	105.0m				
#B1	MDF	R1	P1	19	105.0m				
#B1	MDF	R1	P1	20	105.0m				
#B1	MDF	R1	P1	21	105.0m				
#B1	MDF	R1	P1	22	105.0m				
#B1	MDF	R1	P1	23	105.0m				
#B1	MDF	R1	P1	24	105.0m				

ABF Microduct Installer :

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Guide For calculation of ABF Microduct Main Link From MDF Room to Risers

	Serving Units			
Flr Level	Riser (1)	Riser (2)	Riser (3)	Riser (4)
1	30	35	30	25
2	35	35	40	35
3	40	45	40	42
4	20	25	20	20
5	18	25	18	18
6	18	18	18	18
7	10	18	10	10
8	10	10	5	6
Total Units	181	211	181	174
Use 12F with 24W	0.79	0.92	0.79	0.76
Need 50 - 60% spare for New Operators & Expansion	2.0	2.3	2.0	1.9
ABF Microduct 24W(5/3.5)	2 nos	3 nos	2 nos	2 nos

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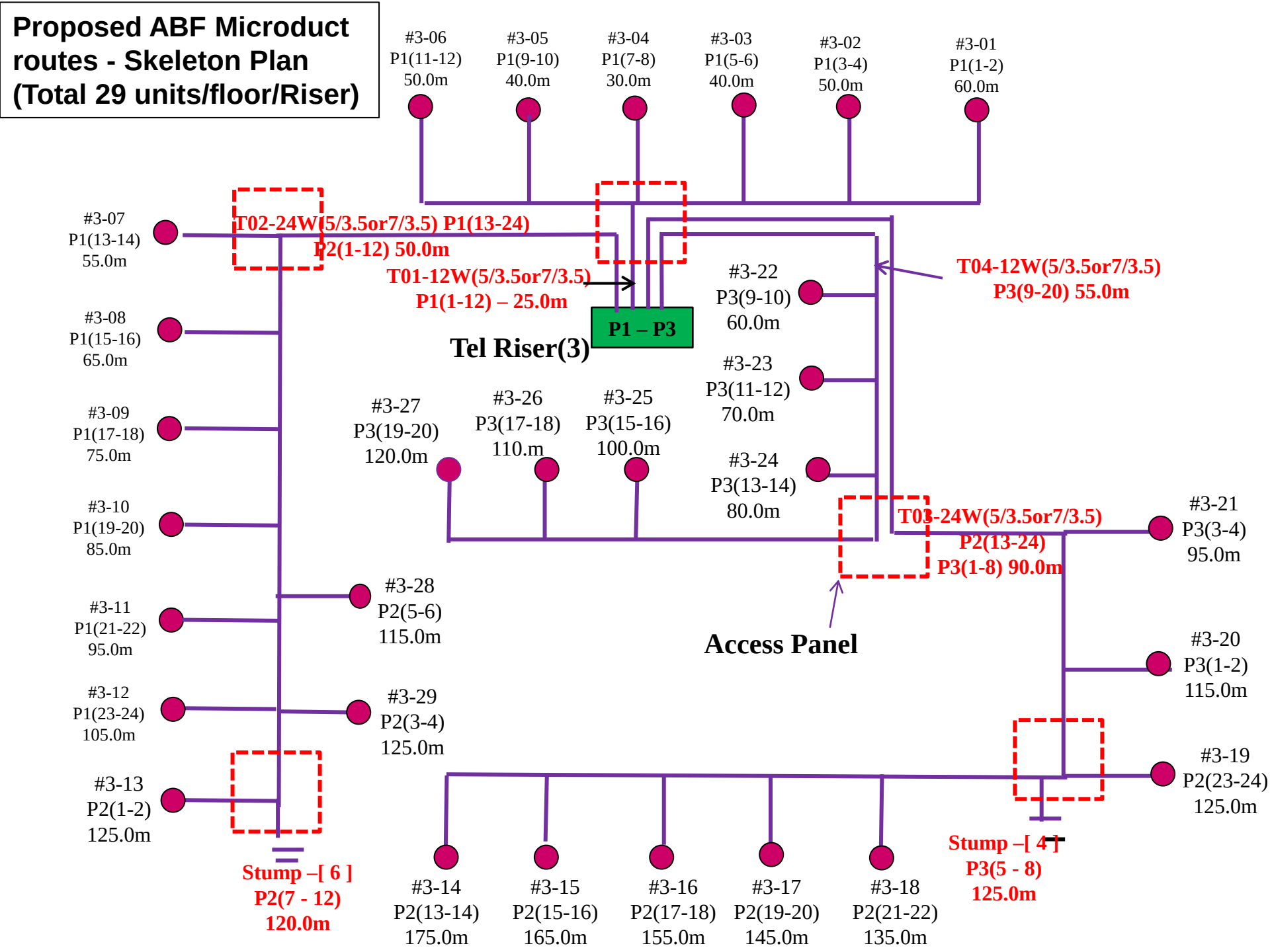
Proposed ABF Microduct routes - Skeleton Plan (Total 29 units/floor/Riser)



ABF Microduct Floor Distribution Network 4/12/24W(5/3.5) Testing & Record (to be updated & maintained by BM) - Pg 3/28

Building Name :

Building Address :

Flr Level	MDF/TE R/Riser	TPP		Duct Distance	Duct Status	Serving Unit	Operator	Remarks
		Panel Nos	Port nos					
#03	R3	P1	1	90.0m	A	#04-01	SingTel	5-Jun-14
#03	R3	P1	2	90.0m		#04-01		
#03	R3	P1	3	100.0m		#04-02		
#03	R3	P1	4	100.0m		#04-02		
#03	R3	P1	5	110.0m		#04-03		
#03	R3	P1	6	110.0m		#04-03		
#03	R3	P1	7	120.0m		#04-04		
#03	R3	P1	8	120.0m		#04-04		
#03	R3	P1	9	130.0m		#04-05		
#03	R3	P1	10	130.0m		#04-05		
#03	R3	P1	11	140.0m		#04-06		
#03	R3	P1	12	140.0m		#04-06		
#03	R3	P1	13	100.0m	A	#05-01	StarHub	3-Jun-14
#03	R3	P1	14	100.0m		#05-01		
#03	R3	P1	15	110.0m		#05-02		
#03	R3	P1	16	110.0m		#05-02		
#03	R3	P1	17	120.0m		#05-03		
#03	R3	P1	18	120.0m		#05-03		
#03	R3	P1	19	130.0m		#05-04		
#03	R3	P1	20	130.0m		#05-04		
#03	R3	P1	21	140.0m		#05-05		
#03	R3	P1	22	140.0m		#05-05		
#03	R3	P1	23	150.0m	A	#05-06	M1	29-May-14
#03	R3	P1	24	150.0m		#05-06		

ABF Microduct Installer :

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4B Existing Small Buildings and New Buildings

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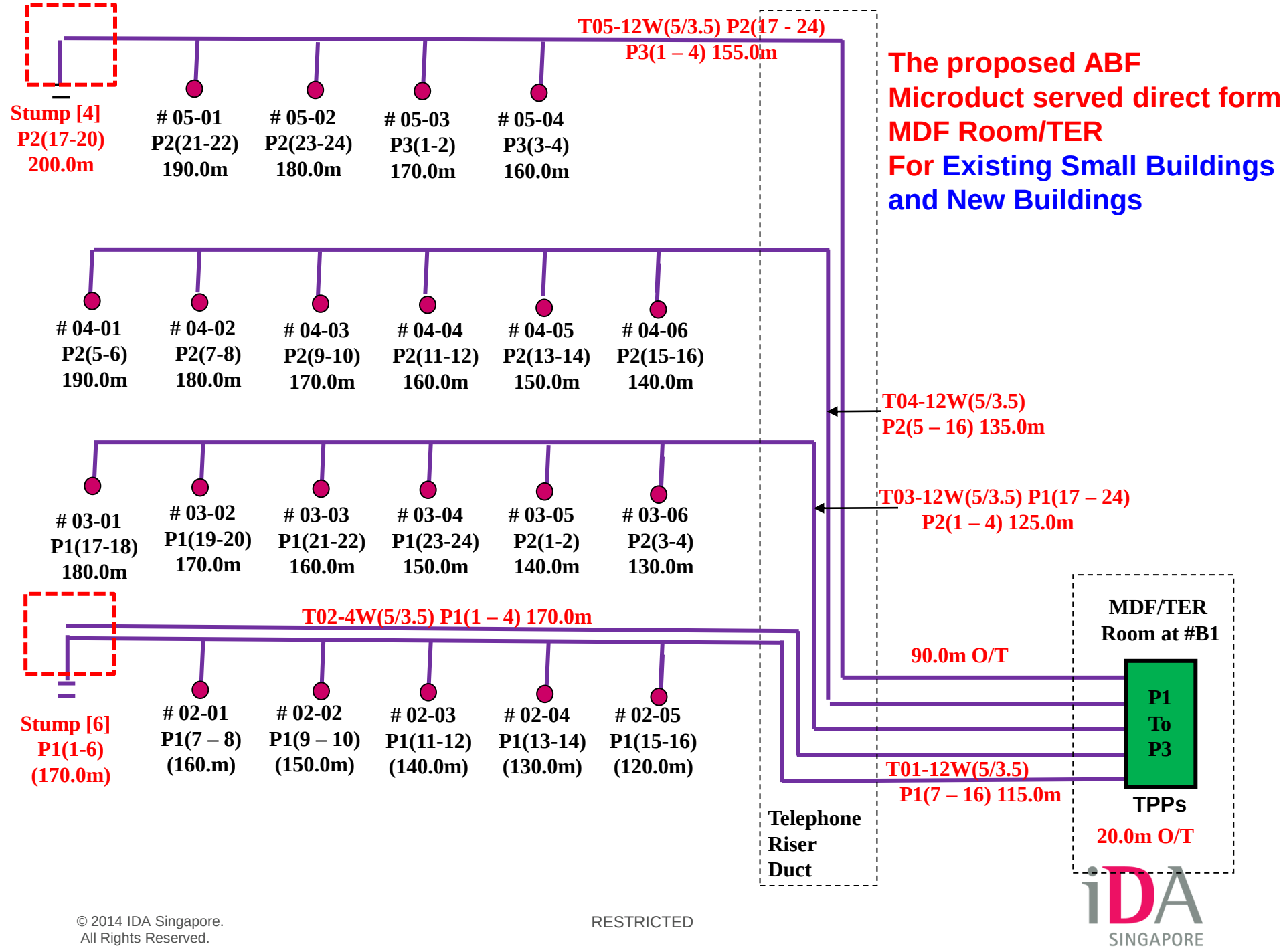

RESTRICTED

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Requirements For FRS

Existing Small Buildings (Non-Residential)

1. 2 nos of ABF Microduct with sizes **(5/3.5)** to be provided for each unit
2. Maximum serving units up to **60 units** per Building
3. Microduct with end cap to be **coiled 5.0m** at customers end
4. Labelling must be provided at the user end and with **cross reference** back to serving TPPs at MDF Room/TER
5. All Microduct must be **properly connected** to a Tube Patch Panel(TPP) with 19 Inch rack at MDF Room/TER
6. ABF Microduct Installer must ensure that the material used are **safe** to their workers and the Public in the area
7. ABF Microduct Installer must ensure that the products used to be able to last for **10 to 15 years** after the ABF Microduct installation
8. All (2/4/7/12/19/24)W Microduct Cable Jacket must come with **purple colour stripe**
9. The ABF Microduct TPP's Record to be **keep and maintained by BM/Building Owner**
10. Use 2/4/6/8/12 cores ABF cable per ABF microduct and **all Operator's FDPs** to be mounted at MDF Room/TER only

Requirements For FRS

New Buildings (Non-Residential)

1. All Telephone facilities must be comply with **COPIF 2013** and to be approved by **TFCC**
2. **The requirement** of the FRS is in additional to the above
3. 2 nos of ABF Microduct with sizes **(5/3.5)** to be provided for each unit
4. Microduct with end cap to be **coiled 5.0m** at customers end
5. Labelling must be provided at the user end and with **cross reference** back to serving TPPs at MDF Room/TER
6. All Microduct must be **properly connected** to a Tube Patch Panel(TPP) with 19 Inch Rack at MDF Room/TER
7. ABF Microduct Installer must ensure that the material used are **safe** to their workers and the Public in the area
8. ABF Microduct Installer must ensure that the products used to be able to last for **10 to 15 years** after the ABF microduct installation
9. All (2/4/7/12/19/24)W Microduct Cable Jacket must come with **purple colour stripe**
10. The ABF Microduct TPP's Record to be **keep and maintained by BM/Building Owner**
11. Use 2/4/6/8/12 cores ABF cable per ABF microduct and **all Operator's FDPs** to be mounted at MDF Room/TER only

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ABF Microduct Building Distribution Network 2/4/7/12/19/24W(5/3.5) Testing & Record (to be updated & maintained by BM) – Pg 1/3

Building Name :

Building Address :

Flr Level	MDF/TER/Riser	TPP		Duct Distance	Duct Status	Serving Unit	Operator	Remarks
		Panel Nos	Port nos					
#B1	MDF	P1	1	170.0m		Stump		
#B1	MDF	P1	2	170.0m		Stump		
#B1	MDF	P1	3	170.0m		Stump		
#B1	MDF	P1	4	170.0m		Stump		
#B1	MDF	P1	5	170.0m		Stump		
#B1	MDF	P1	6	170.0m		Stump		
#B1	MDF	P1	7	160.0m		#02-01		
#B1	MDF	P1	8	160.0m		#02-01		
#B1	MDF	P1	9	150.0m	A	#02-02	StarHub	10-Jun-14
#B1	MDF	P1	10	150.0m		#02-02		
#B1	MDF	P1	11	140.0m		#02-03		
#B1	MDF	P1	12	140.0m		#02-03		
#B1	MDF	P1	13	130.0m	A	#02-04	SingTel	3-Jun-14
#B1	MDF	P1	14	130.0m		#02-04		
#B1	MDF	P1	15	120.0m		#02-05		
#B1	MDF	P1	16	120.0m		#02-05		
#B1	MDF	P1	17	180.0m		#03-01		
#B1	MDF	P1	18	180.0m		#03-01		
#B1	MDF	P1	19	170.0m		#03-02		
#B1	MDF	P1	20	170.0m		#03-02		
#B1	MDF	P1	21	160.0m		#03-03		
#B1	MDF	P1	22	160.0m		#03-03		
#B1	MDF	P1	23	150.0m	A	#03-04	M1	29-May-14
#B1	MDF	P1	24	150.0m		#03-04		

ABF Microduct Installer :

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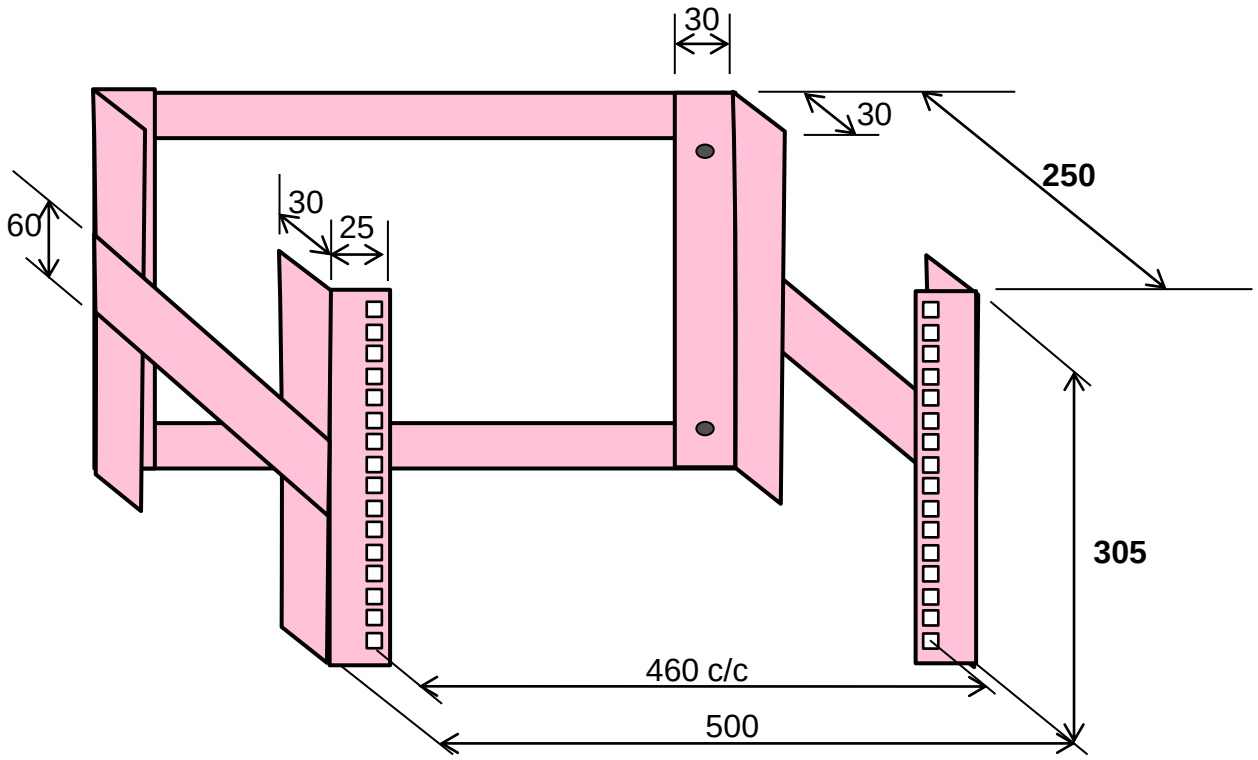
19 Inch Mounting Rack For (1 to 3) ABF Microduct TPPs Installation



Note: 1. All dimension are in mm.
2. Material – Cold rolled steel 1.2mm thick with power coated.
3. All cold rolled steel plate and angle plate to be welded with power coated.

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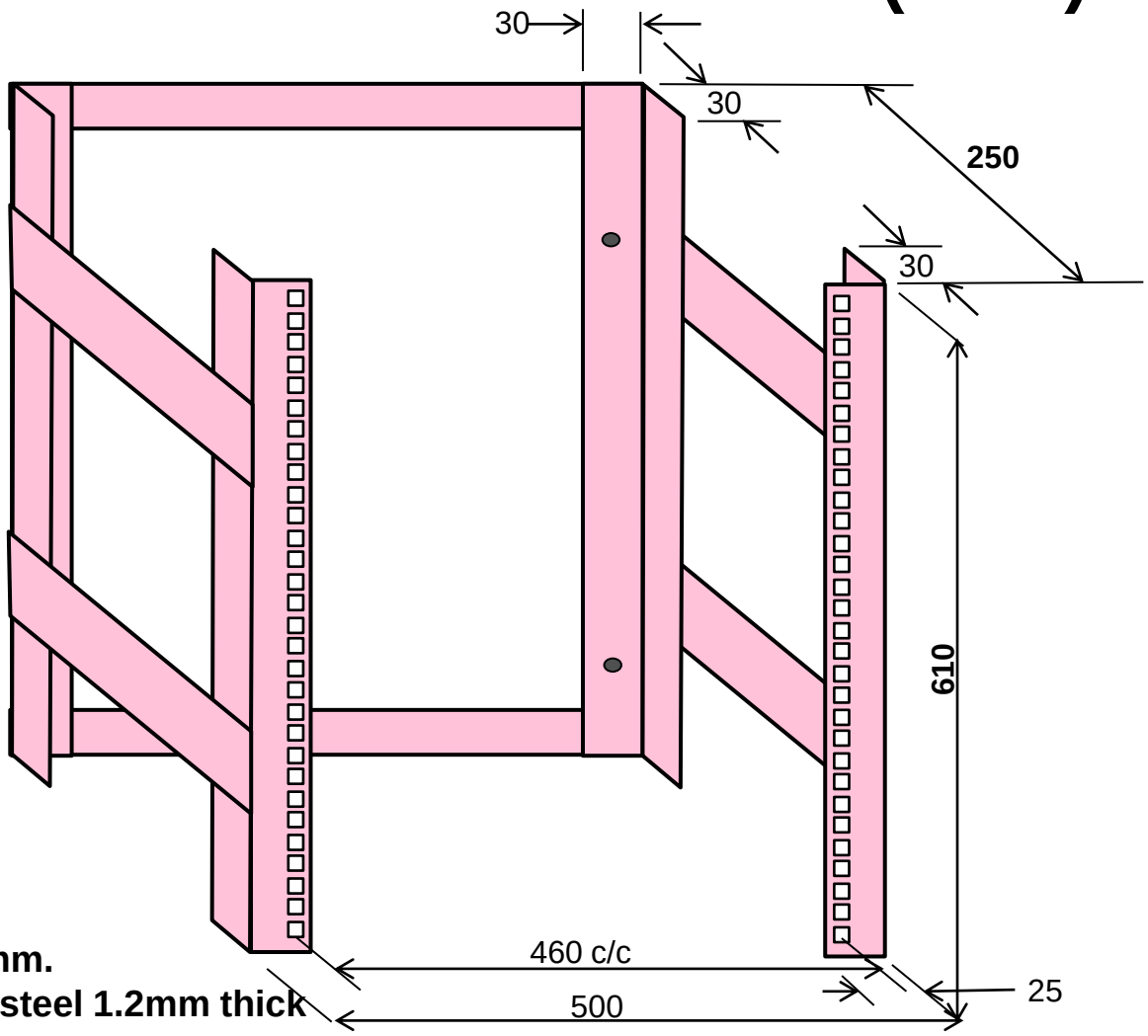
19 Inch Mounting Rack For (4 to 6)
ABF Microduct TPPs Installation (MDF)



Note: 1. All dimension are in mm.

2. Material – Cold rolled steel 1.2mm thick with power coated.

3. All cold rolled steel plate and angle plate to be welded with power coated.

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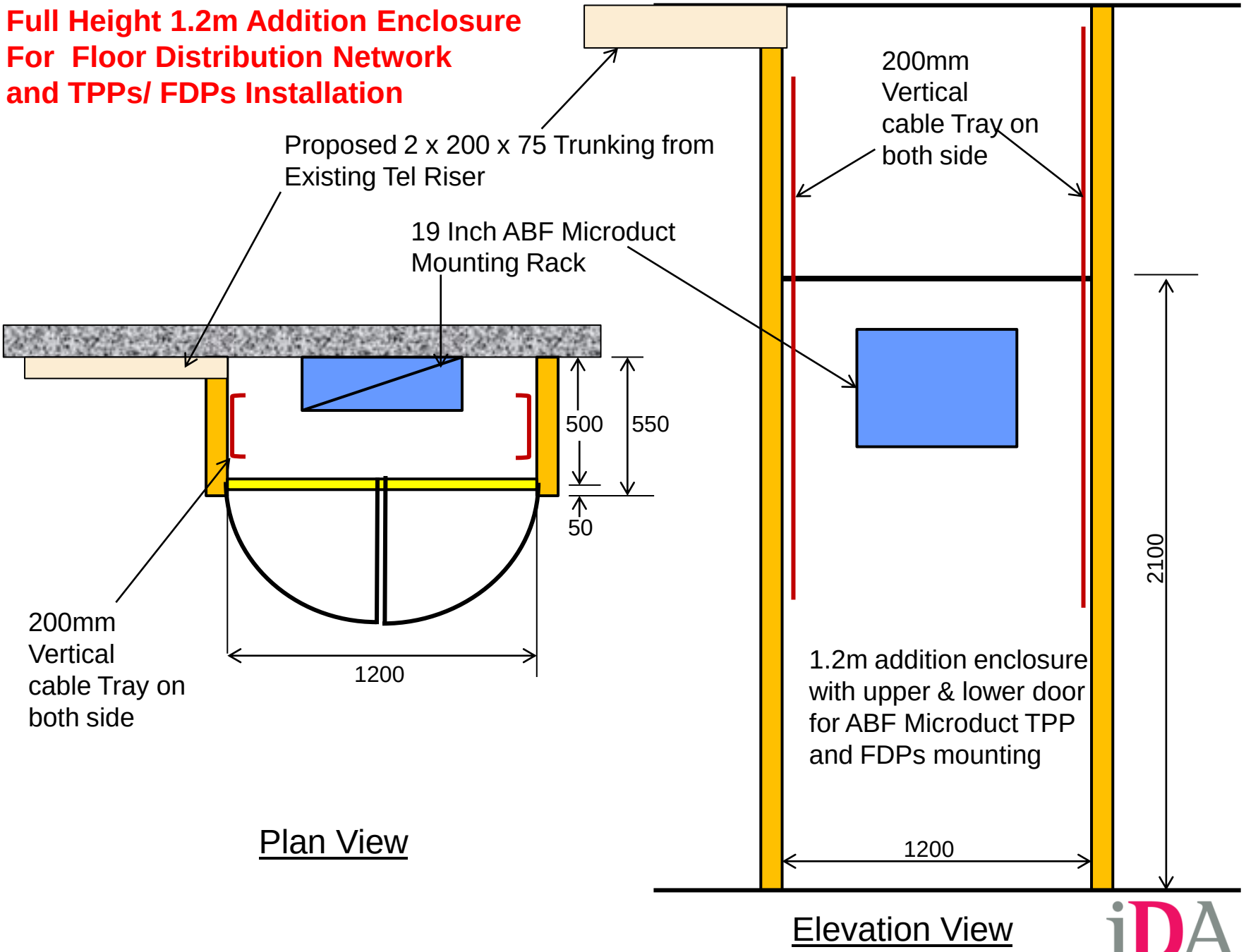
Full Height 1.2m Addition Enclosure For Floor Distribution Network and TPPs/ FDPs Installation



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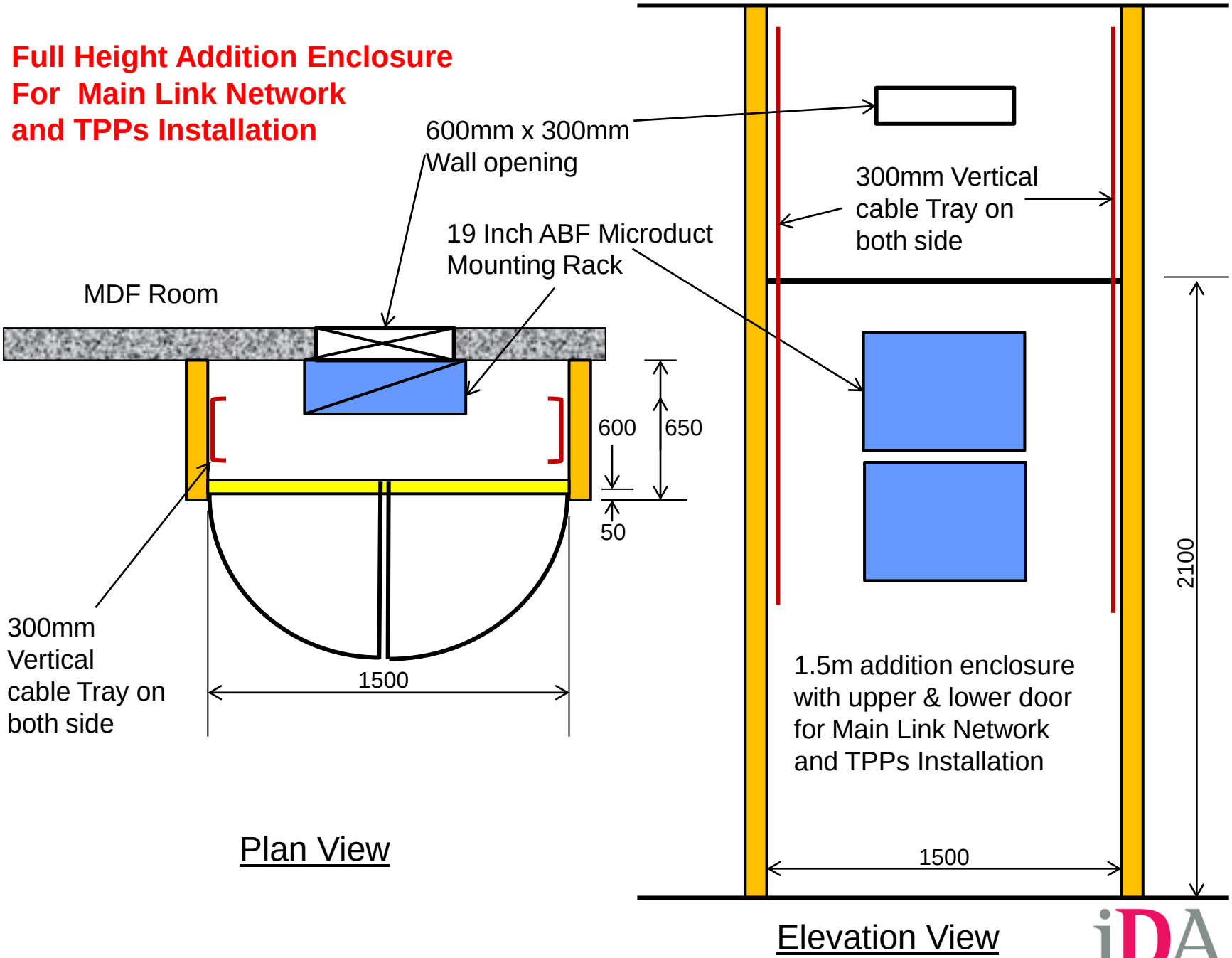
Full Height Addition Enclosure For Main Link Network and TPPs Installation



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5 Building Plans Submission Requirements

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Building Plans Submission Requirements

1. The building location plan

2. Floor plan with the following shown
   a) The location of the existing MDF, TER, Tel Riser Ducts with photos
   b) The proposed Horizontal cable tray routes
   c) The proposed vertical cable tray/trunking location
   d) The proposed floor opening for vertical cable tray or trunking
   e) The proposed 600mm x 600mm Access Panels
   f) The proposed additional enclosure for TPPs and FDPs installation

3. The proposed ABF Microduct **specification** and the **manufacturer**

4. Any amendment or changed in proposal must be approved by IDA

5. The costing of the above and the **proposed installation schedules**

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As-Built Building Plans and Record Submission

1. Floor plan with the following shown;
   a) The as-built Horizontal cable tray routes
   b) The as-built vertical cable tray/trunking location with photos
   c) The as-built floor opening for vertical cable tray or trunking with photos
   d) The as-built Access Panels with photos
   e) The as-built additional enclosure for TPPs and FDP Boxes with photos

2. The as-built ABF Microduct Floor Distribution and Main Link Networks **skeleton Plan** for each Tel Risers and MDF Room/TER respectively with **the ABF microduct information, nos of Access Panels and the serving address** shown

3. The as-built Floor Distribution Network's TPPs Record for all Risers to be updated and maintained by BM

4. The as-built Main Link Network's TPPs Record from MDF Room/TER to be updated and maintained by BM

5. The Final costing with Invoice of the above

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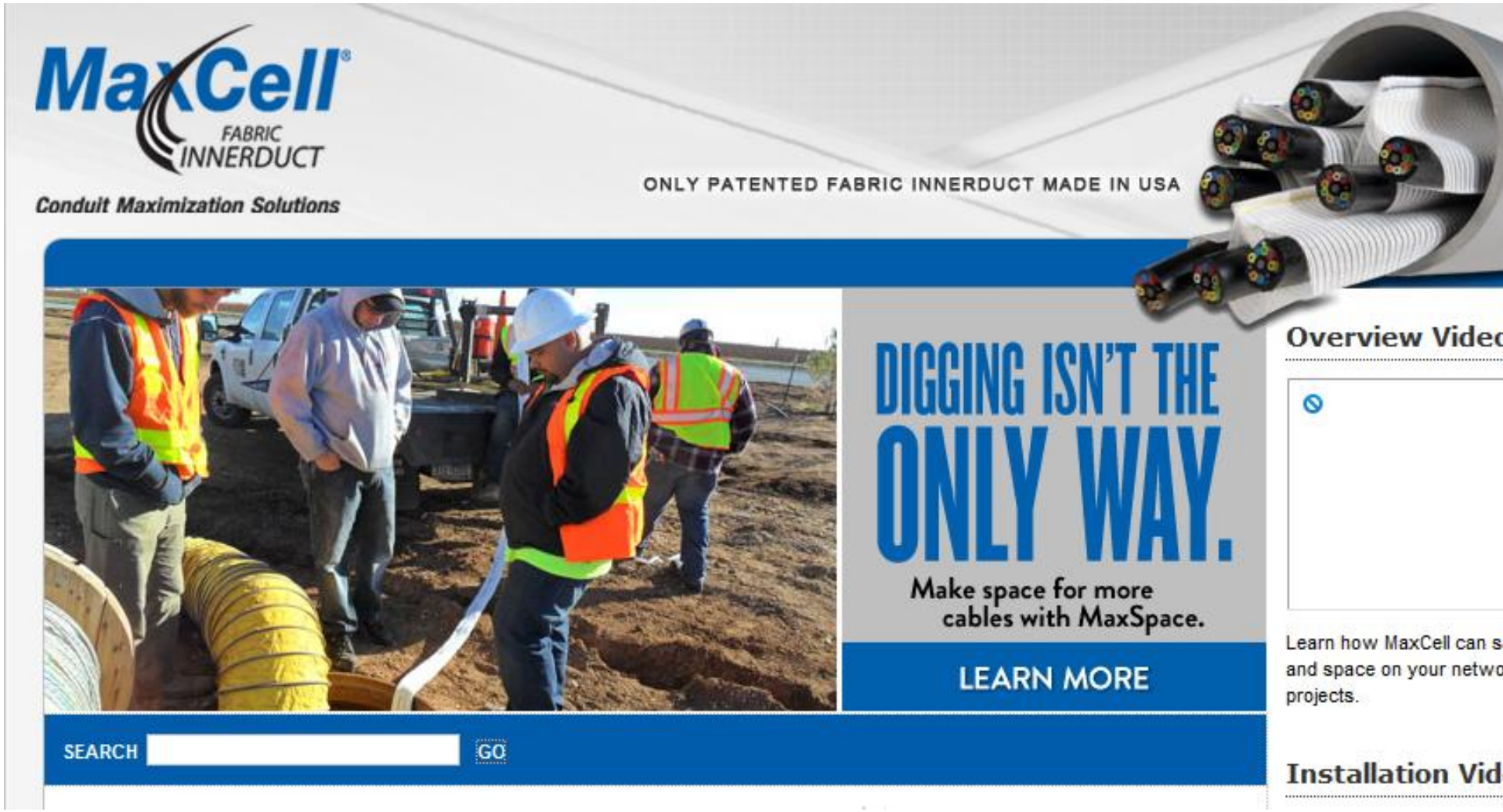
Another Possibility For In-Buildings Cabling (For Info)



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Q & A

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Thank you!