Briefing to Contractors

- **Fibre Ready Scheme**

By Mr Koh Wee Sain
Assistant Director, National Information Infrastructure
5 June 2014

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Agenda

1. ICT for Productivity and Growth (IPG)
2. Fibre Ready Scheme
3. Applying for the Grant
4. Q&A

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1 ICT for Productivity and Growth (IPG)

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Background – Announced at Budget 2014

Adopting ICT Solutions to Increase Productivity

<u>Enabling High-Speed Connectivity for Businesses</u>

"We will promote **high-speed connectivity for SMEs**. It is difficult for SMEs to take full advantage of cloud computing and data analytics solutions without high-speed Internet access.

We will ***subsidise SMEs' fibre broadband subscription plans of at least 100 Mbps* (Megabits per second)** and provide support for them to implement *Wireless@SG services* at their premises.

We will also ensure that more buildings have facilities to bring fibre broadband to their business tenants. **We will *subsidise building owners for up to 80%* of the costs of *new in-building infrastructure*, capped at $200,000 per building.**"

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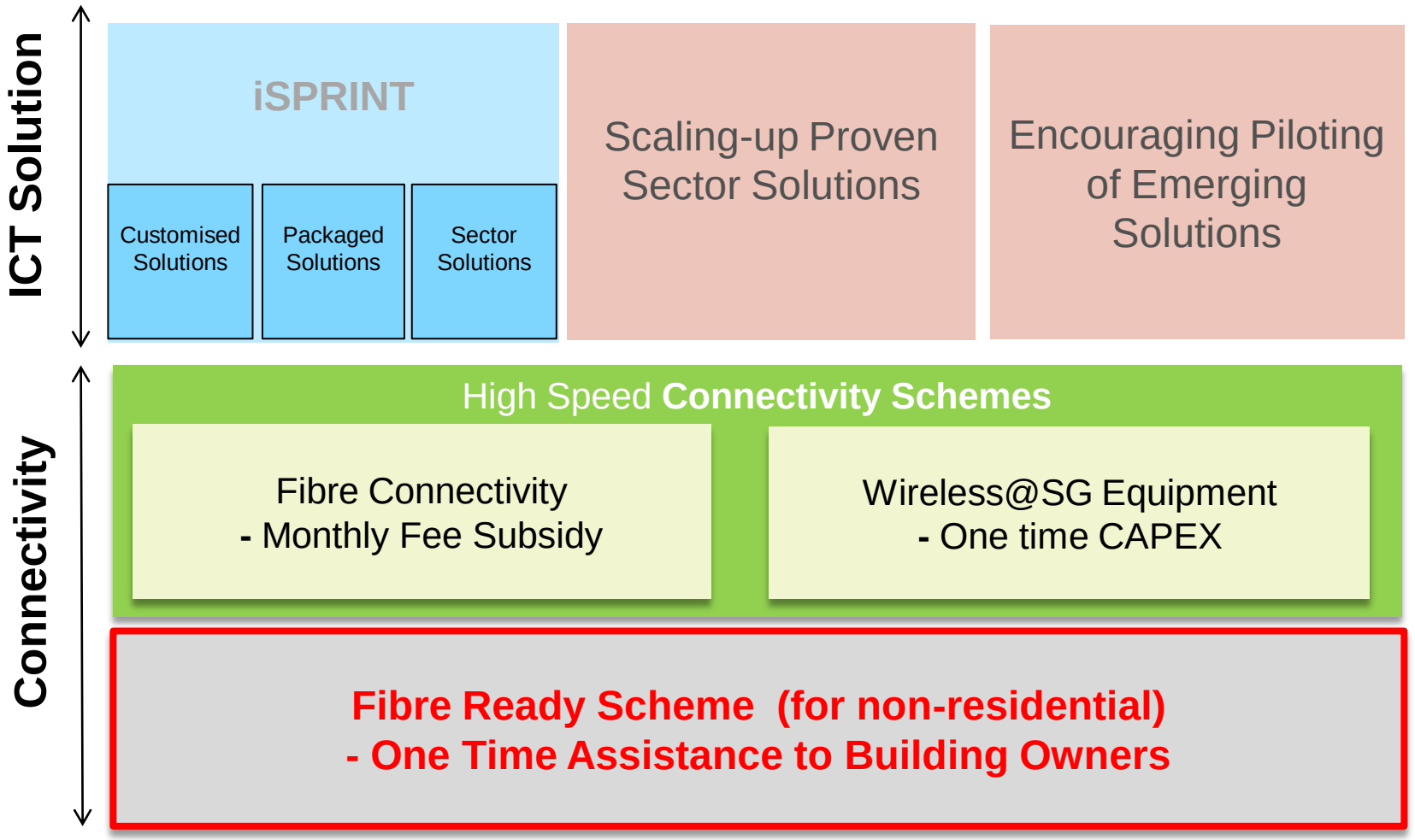
ICT for Productivity & Growth (IPG) Programme



Government keen to pair ICT solutions with connectivity to enhance and grow SME productivity in Singapore

2 Fibre Ready Scheme

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IDA's Role

- Statutory board under the Ministry of Communications and Information (MCI)

- Responsible for the development and growth of the info-communication sector in Singapore

- Code of Practice for Info-communication Facilities in Buildings (COPIF)
  - Developers and/or owners of buildings and developments are to provide adequate space and telecommunication facilities for the deployment and operation of installation and plant

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Purpose of Fibre Ready Scheme

- To facilitate seamless installation of fibre broadband for enterprises, **Government has set aside $200m to prepare buildings for fibre infrastructure**

- Grant to Building Owners / Building Managers for additional infrastructure costs (cable trays, access panels, etc.)

- Operators remain responsible for installation and maintenance of fibre cables

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Terms and Conditions

Draft Guidelines – Final Terms and Conditions after Launch

- Subsidy amount will be pegged at 80% of incurred cost, up to a max of $200,000 per building

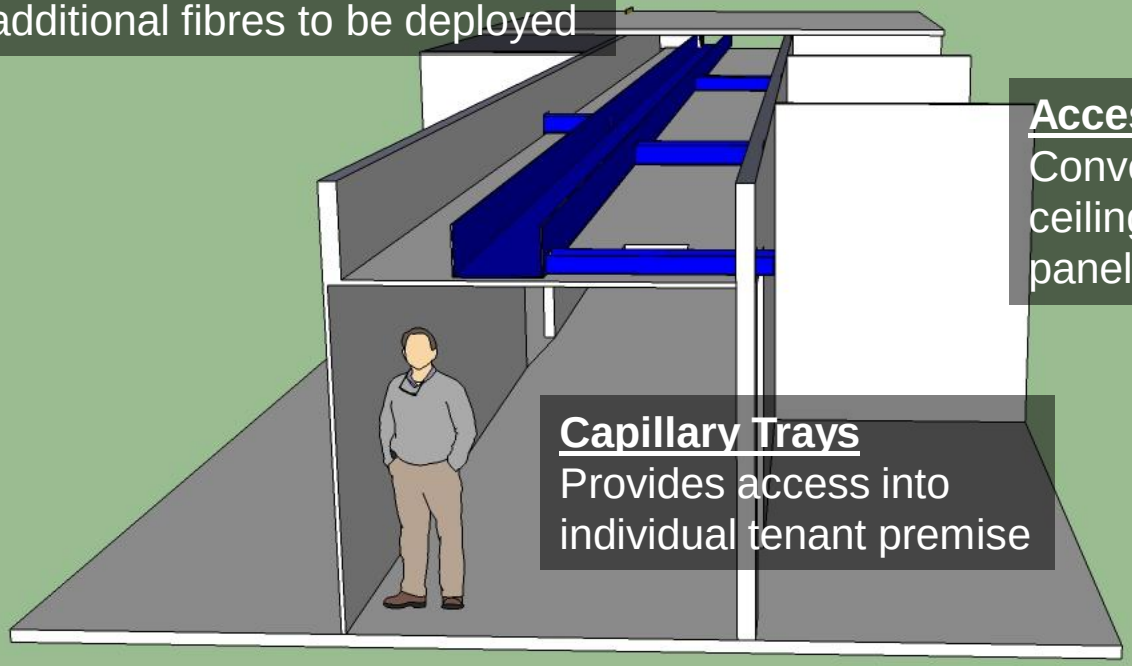
- For Building Owners/Managers to qualify
  1. Applies to commercial premises only
  2. Buildings must be multi-tenanted i.e. 5 tenants and above
  3. **No additional charges to tenants, operators or other providers or consumers of fibre services when fibre services are taken up**
  4. Infrastructure must be able to facilitate fibre services to 100% of tenants
  5. Must support RSP / Operator Marketing efforts over 3 years from payment of grant e.g. No charge to RSPs for roadshows within buildings

- See next slides for examples of eligible infrastructure

Type of Facilities Enhancement Supported (1/4)

Fish-bone structure to serve all premises

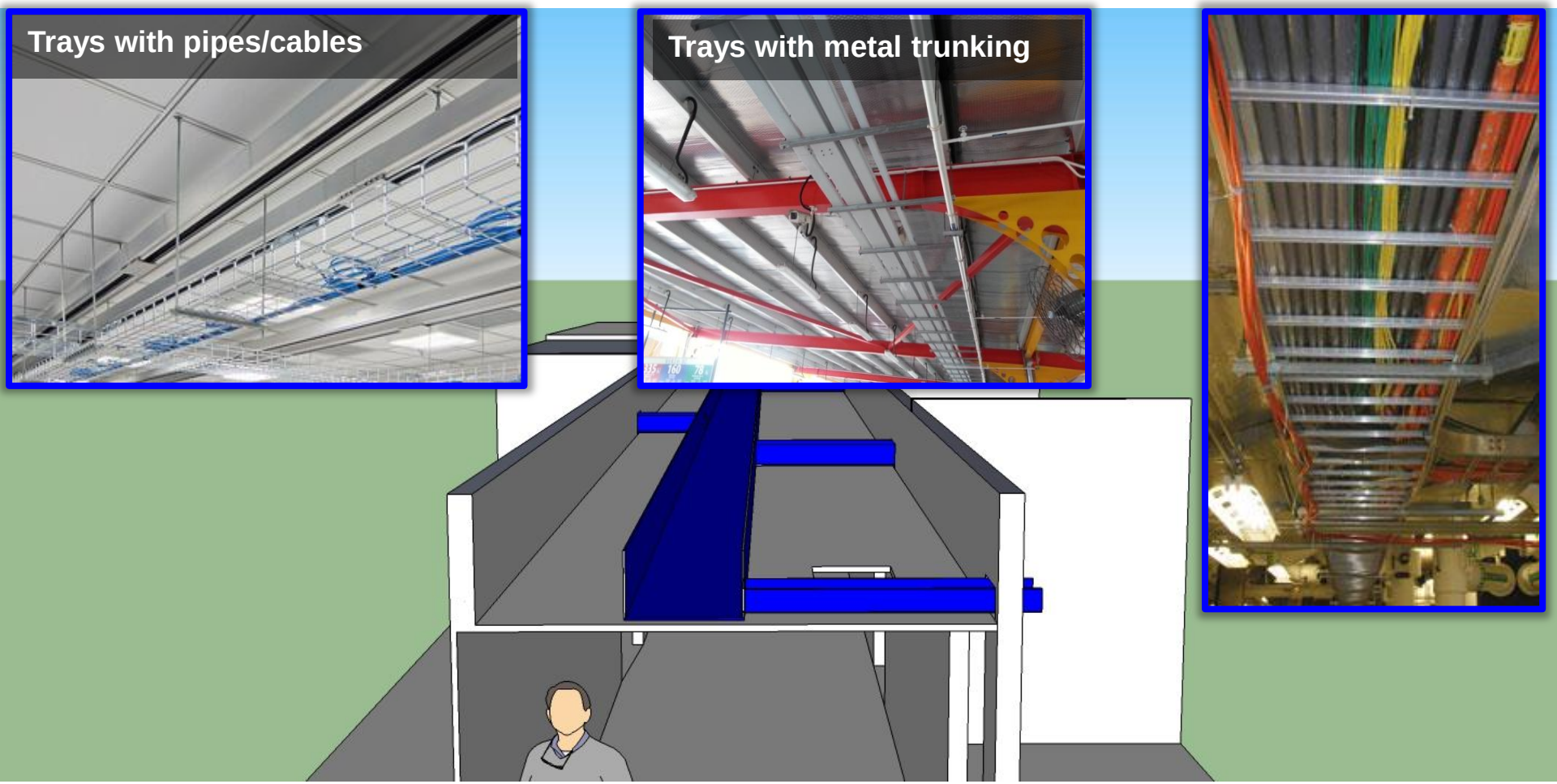
Main Cabling Tray
Expand with new cabling trays to support additional fibres to be deployed



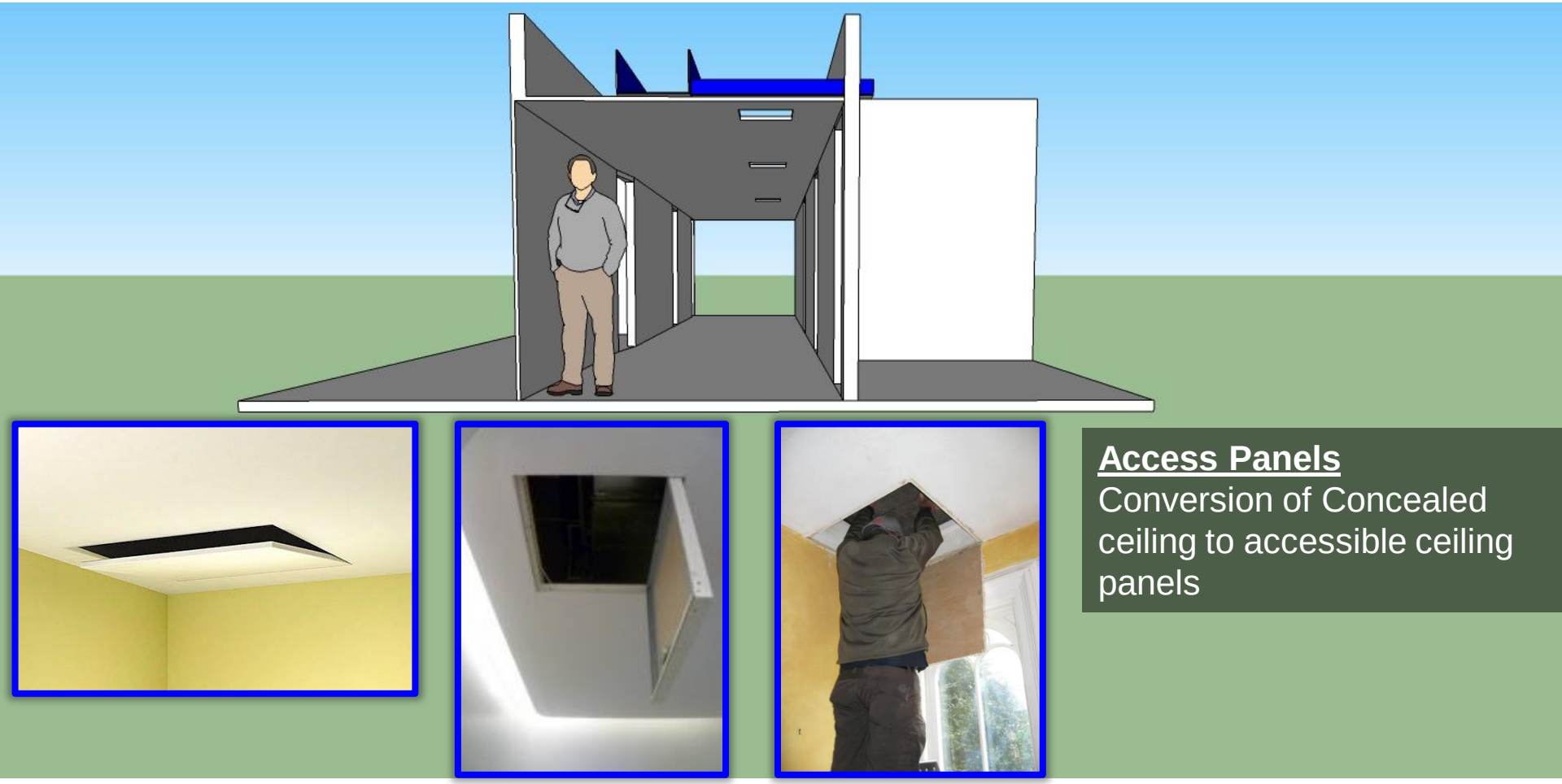
Access Panels
Conversion of Concealed ceiling to accessible ceiling panels

Capillary Trays
Provides access into individual tenant premise

Type of Facilities Enhancement Supported (2/4)



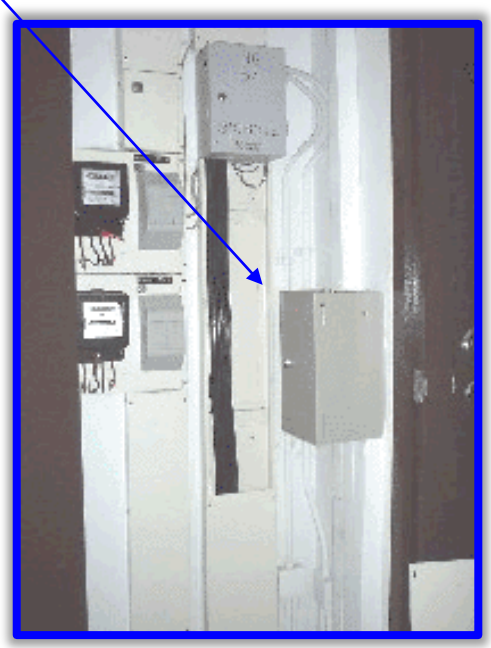
Type of Facilities Enhancement Supported (3/4)



Access Panels
Conversion of Concealed ceiling to accessible ceiling panels

Type of Facilities Enhancement Supported (4/4)

New Trunkings in riser



Open Access of In-Building Infrastructure

- Infrastructure such as cable trays are shareable by multiple operators

- When Building Owners take up grant, they are encouraged to install their in-building infrastructure concurrently with as many RSPs as possible in the deployment of their fibre to minimise disruption to their tenants

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3 Applying for the Grant

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“Soft Launch” and Launch

“Soft” Launch

- IDA will work with Building Owners/Managers, RSPs to fund rollout to an initial number of buildings
- Purpose –
  - To understand key challenges arising from installation and facilitation
  - To understand likely costs involved and any operational challenges
- Application Open from 16 April 2014

Launch

- Final Terms and Conditions to be published
  - Infrastructure supported
  - Obligations of Building Owners/Managers
  - Terms & Process for Claim
- Application tentative to open in July 2014

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Grant Process

Draft Process – Final Process After Launch

1. Registration	*Recommended step to facilitate dialogue with IDA* *Registration Form:* https://www.ida.gov.sg/Infocomm-Landscape/Infrastructure/Wired/Fibre-Ready-Scheme/FRSregister.aspx
2. Submission	*Submission of proposal, see next page for more information*
3. Evaluation	*Estimated 3 months for IDA to complete evaluation process*
4. Letter of Offer	*Letter of Offer will state terms of grant, require Building Owners/Managers to complete installation within a certain period (provisionally 3 months)*
5. Proof of Completion	*Proof of completion – requires invoicing, as well as allowing access for random audits by IDA appointed auditors*
6. Grant Disbursement	*Disbursement of grant – IDA reserves the right to claw back grant if Building Owners/Managers found not to comply with T&Cs*
7. Listing	▪ ***Building to be listed on Fibre Ready Scheme Web Portal*** ▪ *Building Owners/Managers to keep contacts updated* ▪ *As-built report to be uploaded for Operators to login and download from the Portal when needed*

Grant Application Information Requirements

Brief Draft Application – Final Template After Launch

- Address
- Owner (if not owner, *certification of manager status*)
- Management category, i.e. Building Managers / MCST / Private / REIT
- Names/Number of tenants (including business reg no)
- Proposal for new infrastructure
  - Description of current infrastructure capacity
  - Costing of build out materials
  - Floor plans and routing of infrastructures, including trunking, openings, location of MDF and last mile access (in CAD format)
- Partnership with RSPs/OpCos, if any
- Declaration of relationship with contractor (Related Party Transactions)

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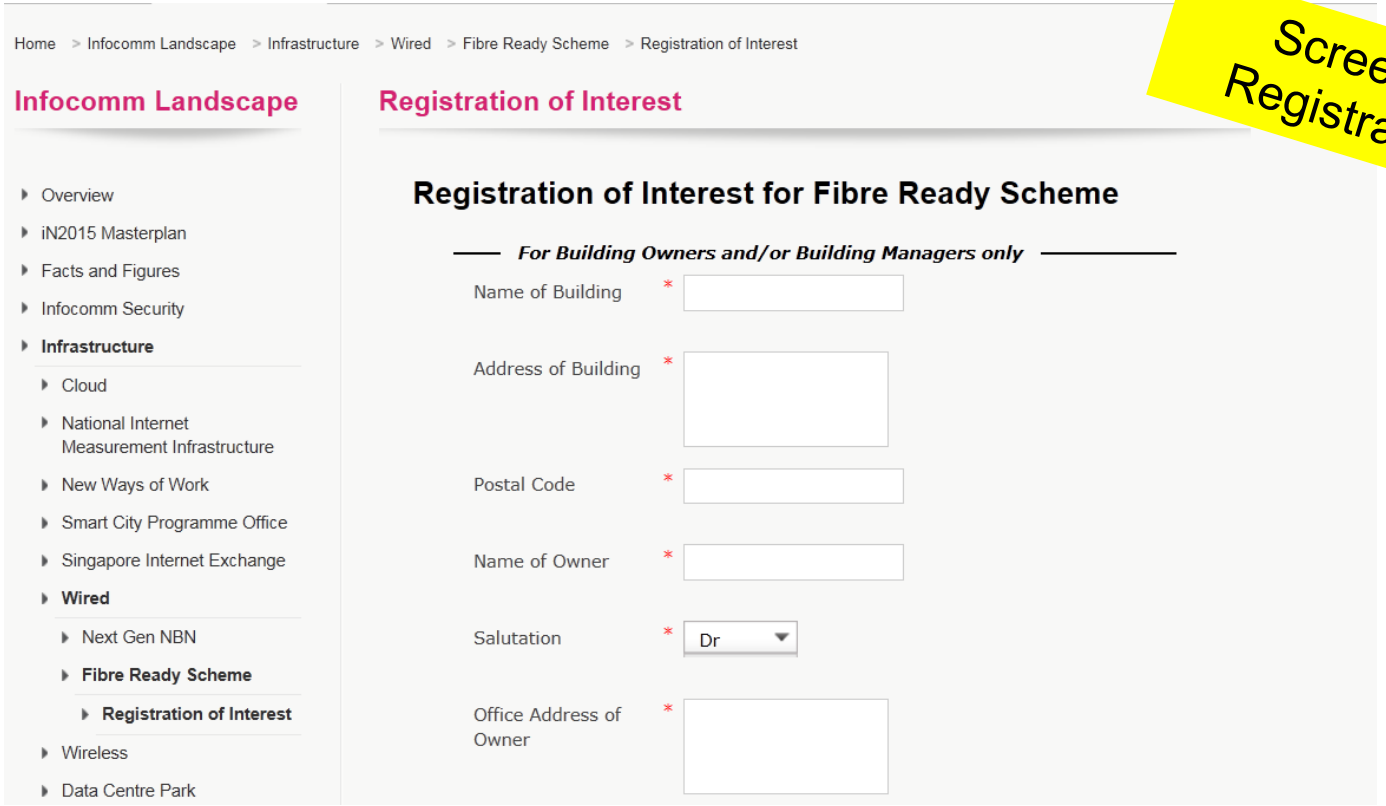
Next Steps for Building Owners/Managers

- To register interest for Fibre Ready Scheme
  - https://www.ida.gov.sg/Infocomm-Landscape/Infrastructure/Wired/Fibre-Ready-Scheme/FRSregister.aspx



Screen shot of Registration page

- To provide feedback on Fibre Ready Scheme
  - Send feedback via email to broadband@ida.gov.sg; or
  - Provide contact details via the above email to arrange a meeting for discussion with IDA

After Registration

- Approach contractors for site visit and quotation

- Submit the following to apply for grant
  - Description of current infrastructure capacity, and proposal on new infrastructure for fibre broadband
  - Costing of build out materials
  - Existing and proposed floor plans and routing of infrastructures, including trunking, openings, location of MDF and last mile access (in CAD format)

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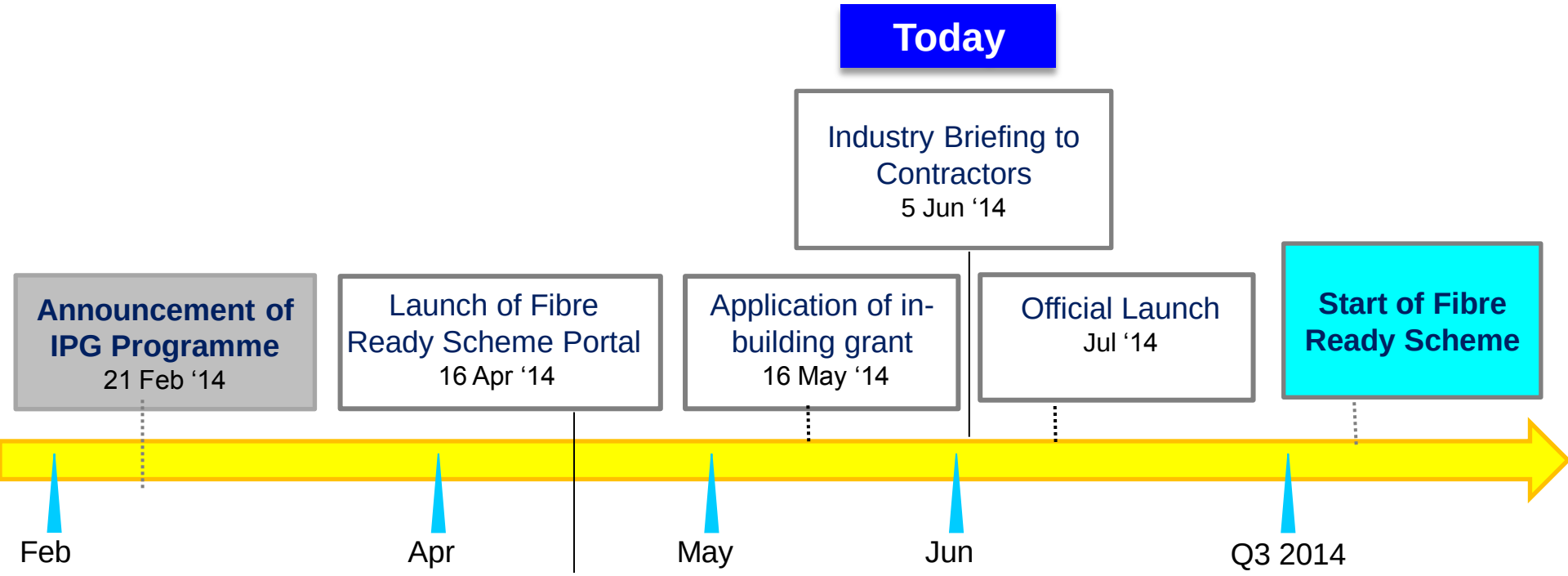
Timeline for Fibre Ready Scheme



Fibre Ready Scheme Portal

- FAQs
- Registration of Claimants
- List of RSPs/Operators' Contacts
- List of buildings covered by scheme (Coming soon)

URL: http://www.ida.gov.sg/Infocomm-Landscape/Infrastructure/Wired/Fibre-Ready-Scheme/

Briefing to Building Contractors For Fibre Ready Scheme

- **Design and Specifications of Infrastructure Enhancement**

By Mr Low Chee Kiong
National Information Infrastructure
5 June 2014

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Agenda

1. Cable Tray
2. Vertical Metal Trunking
3. ABF Microduct Network
4. Next Steps
5. Q&A

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1 Cable Tray

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

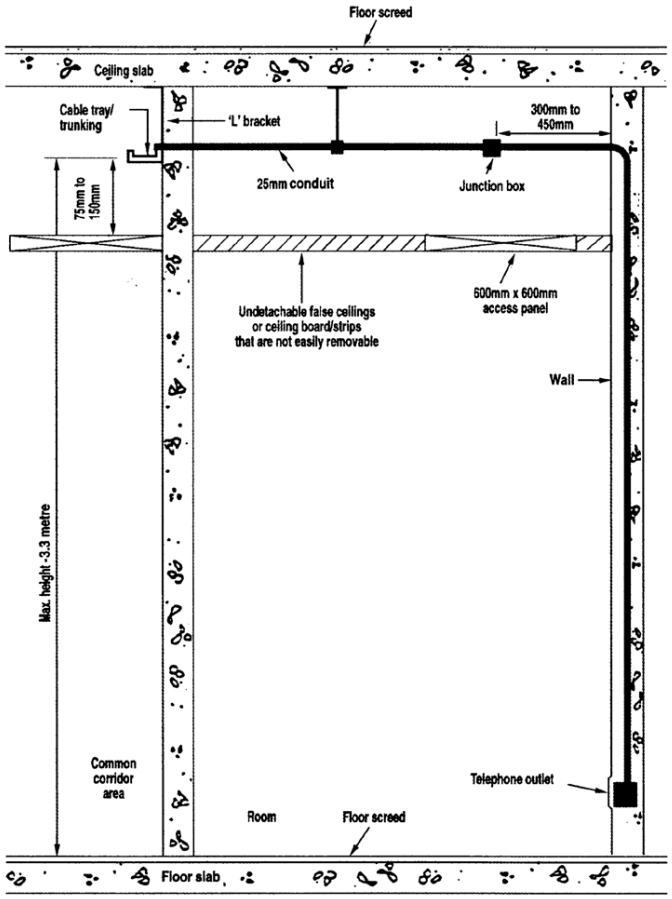
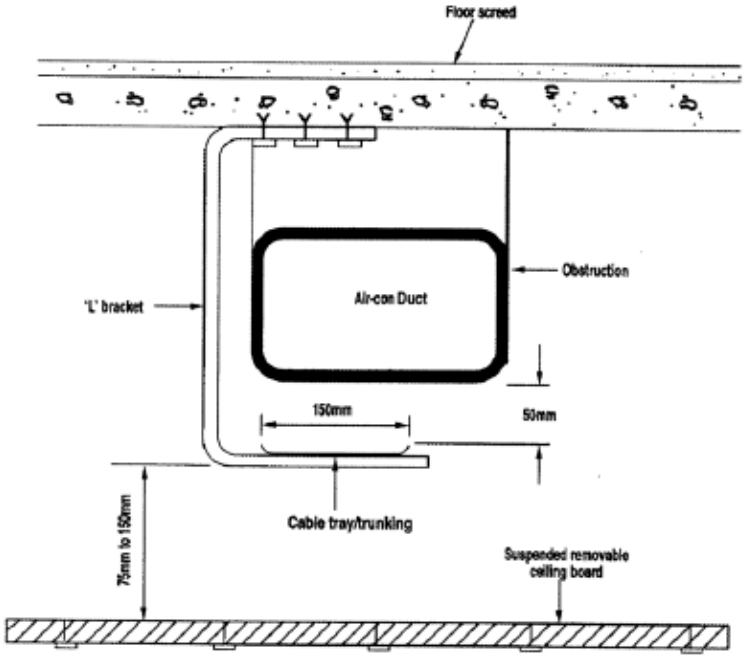


FIGURE 5-18 : CLEAREANCE BETWEEN CABLE TRAY / TRUNKING AND OBSTRUCTIONS



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

Cable Trays - Basic Requirements (1/3)

- The material used for the cable tray should be **perforated and galvanised**
- 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

Cable Trays - Basic Requirements (2/3)

- 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

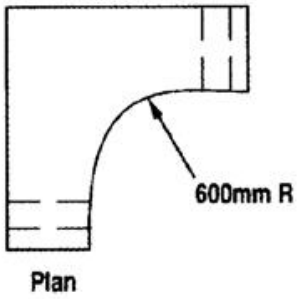
- **Slots provided** in the wall for cable trays to go through should have a minimum **height of 300 mm**

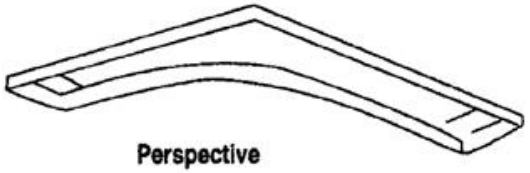
- Where cable trays are concealed in false ceilings, the panels of the false ceiling **should be fully and easily removable** to allow unrestricted access

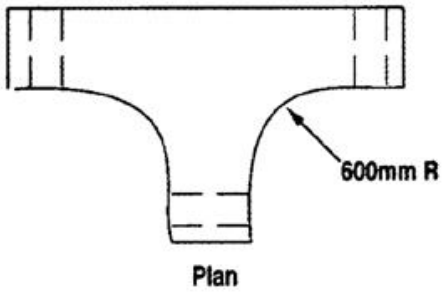
Reference: Guidelines for Info-Communications Facilities in Building, Part 5.2h Cable Trays, Pg 29

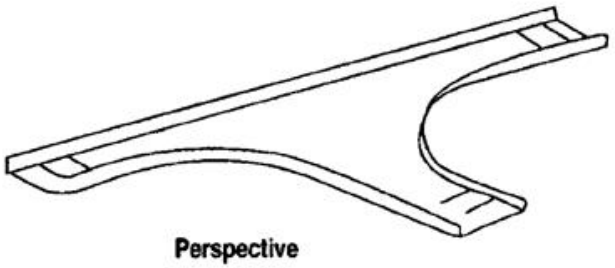
Cable Trays - Basic Requirements (3/3)

FIGURE 5-26 : CABLE TRAY BENDS & FITTING WITH 600MM MINIMUM RADIUS









Reference: Guidelines for Info-Communications Facilities in Building, Figure 5-26, Pg 55

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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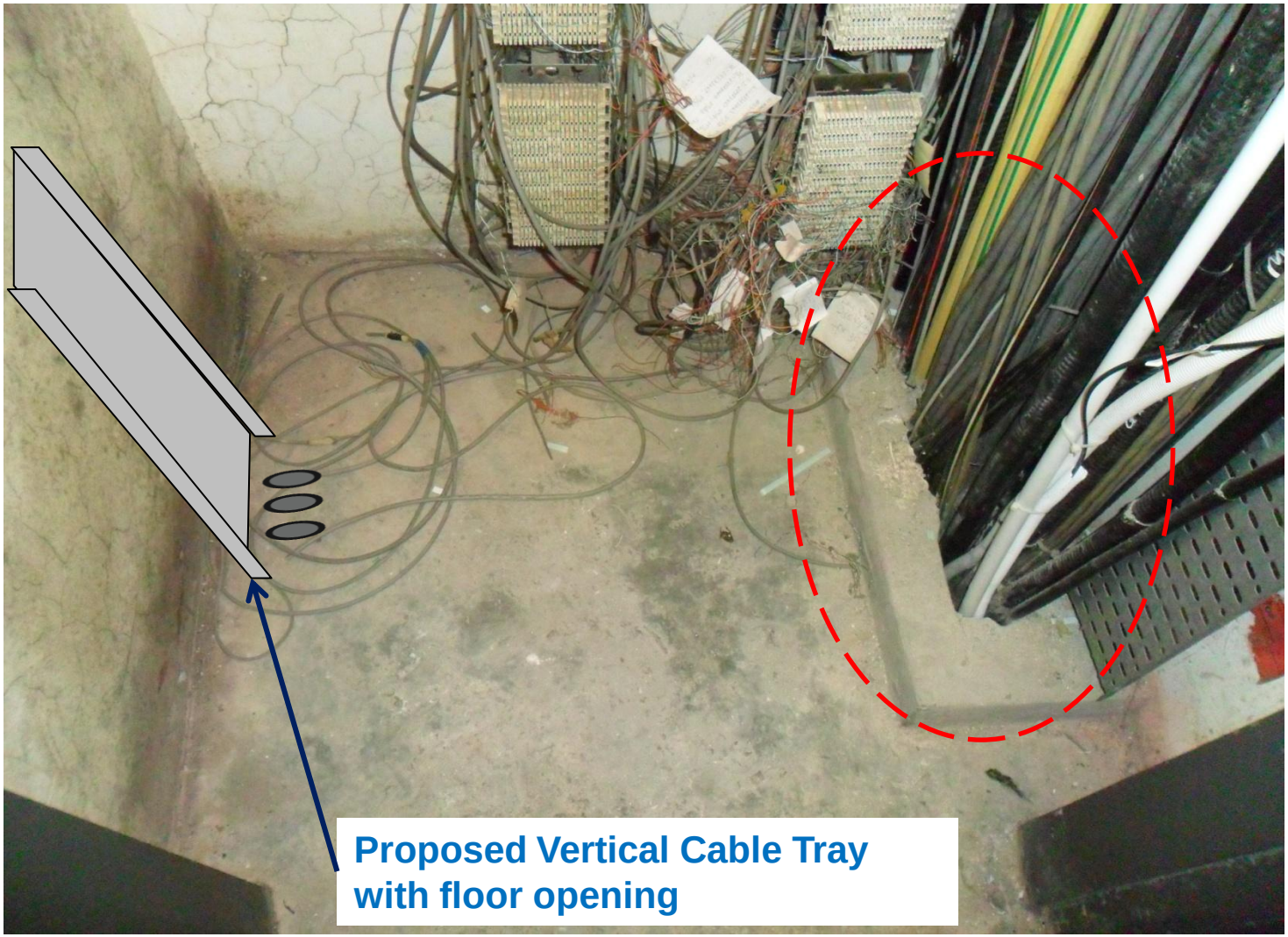
Vertical Cable Tray with Floor Opening



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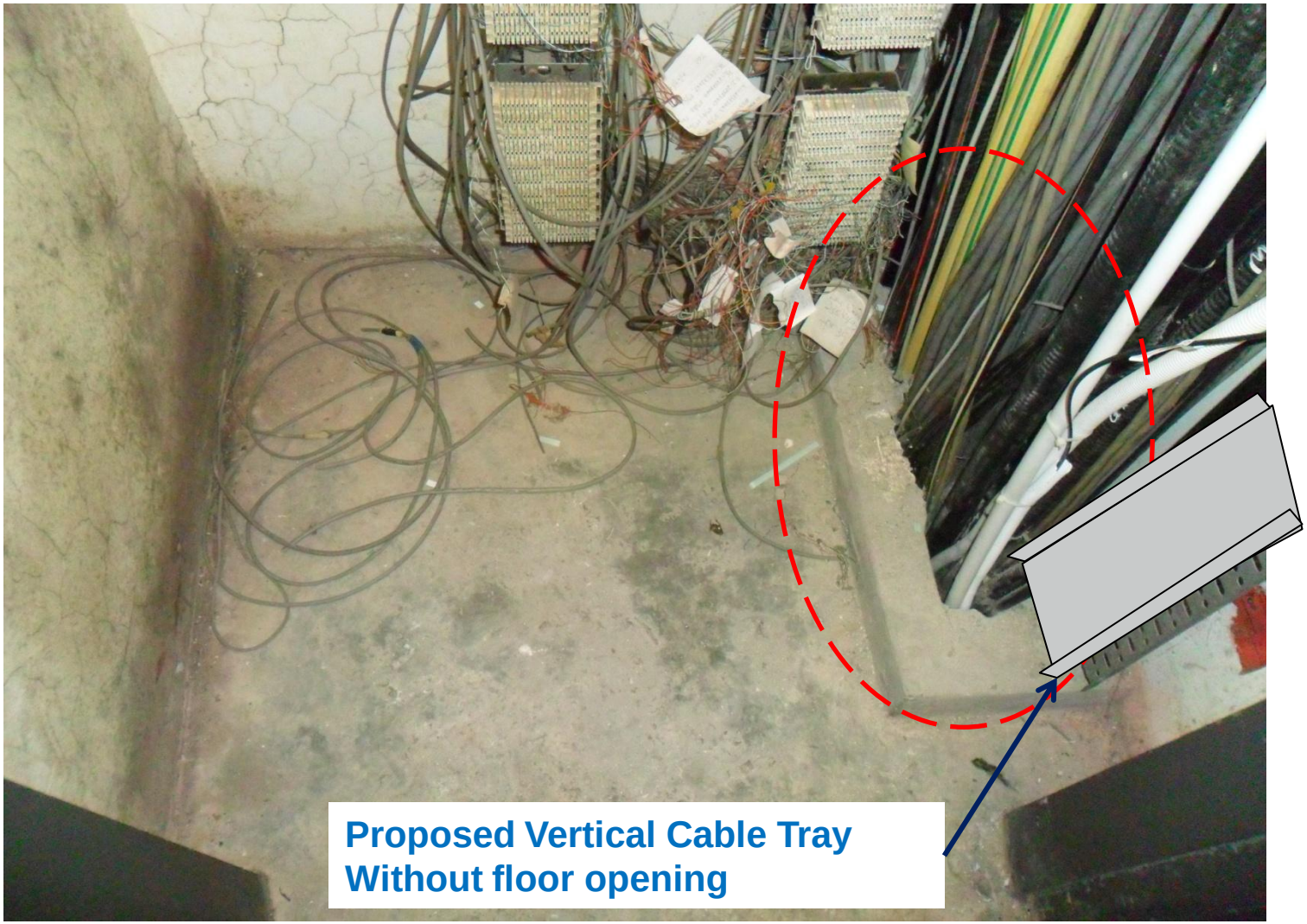
Vertical Cable Tray without Floor Opening



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Standard Sizes of the Horizontal Cable Tray

1.6 mm thick

- 100 x 40
- 200 x 40
- 300 x 40
- 400 x 40
- 500 x 40
- 300 x 50
- 500 x 50
- 600 x 50

2 Vertical Metal Trunking

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

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
- Outlets should be provided along the side of the trunking
- 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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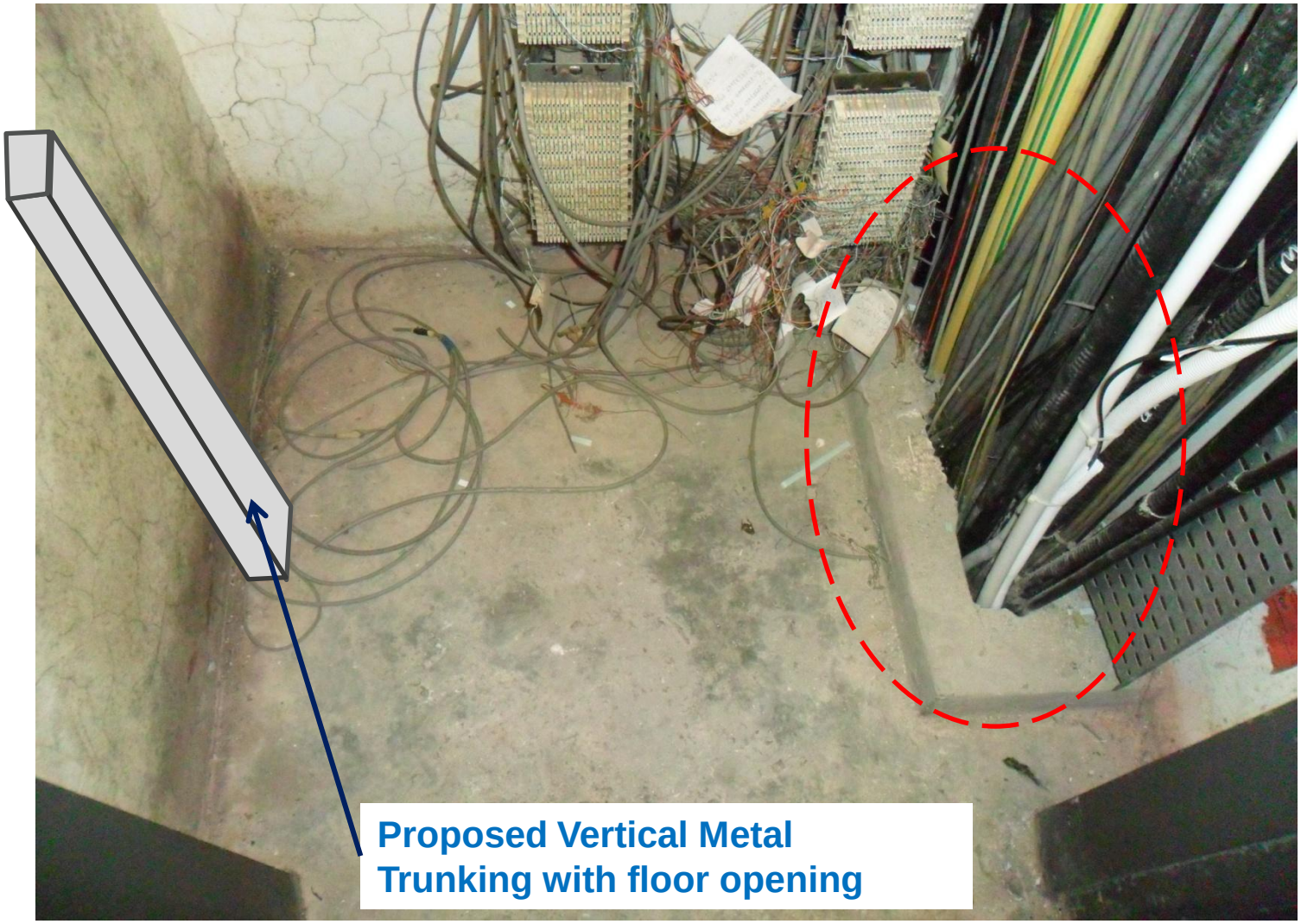
Vertical Metal Trunking with Floor Opening



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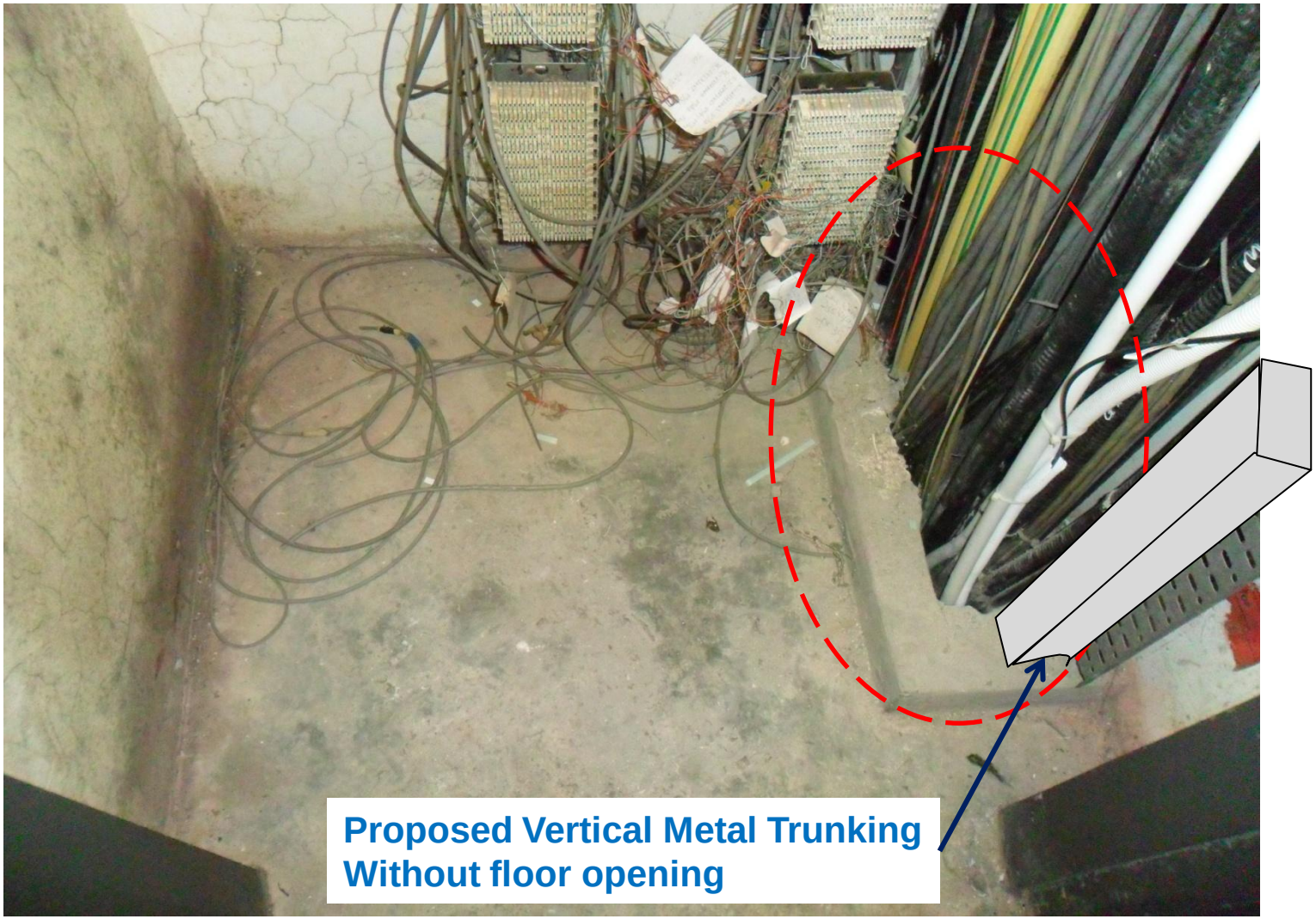
Vertical Metal Trunking without Floor Opening



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3 ABF Microduct Network

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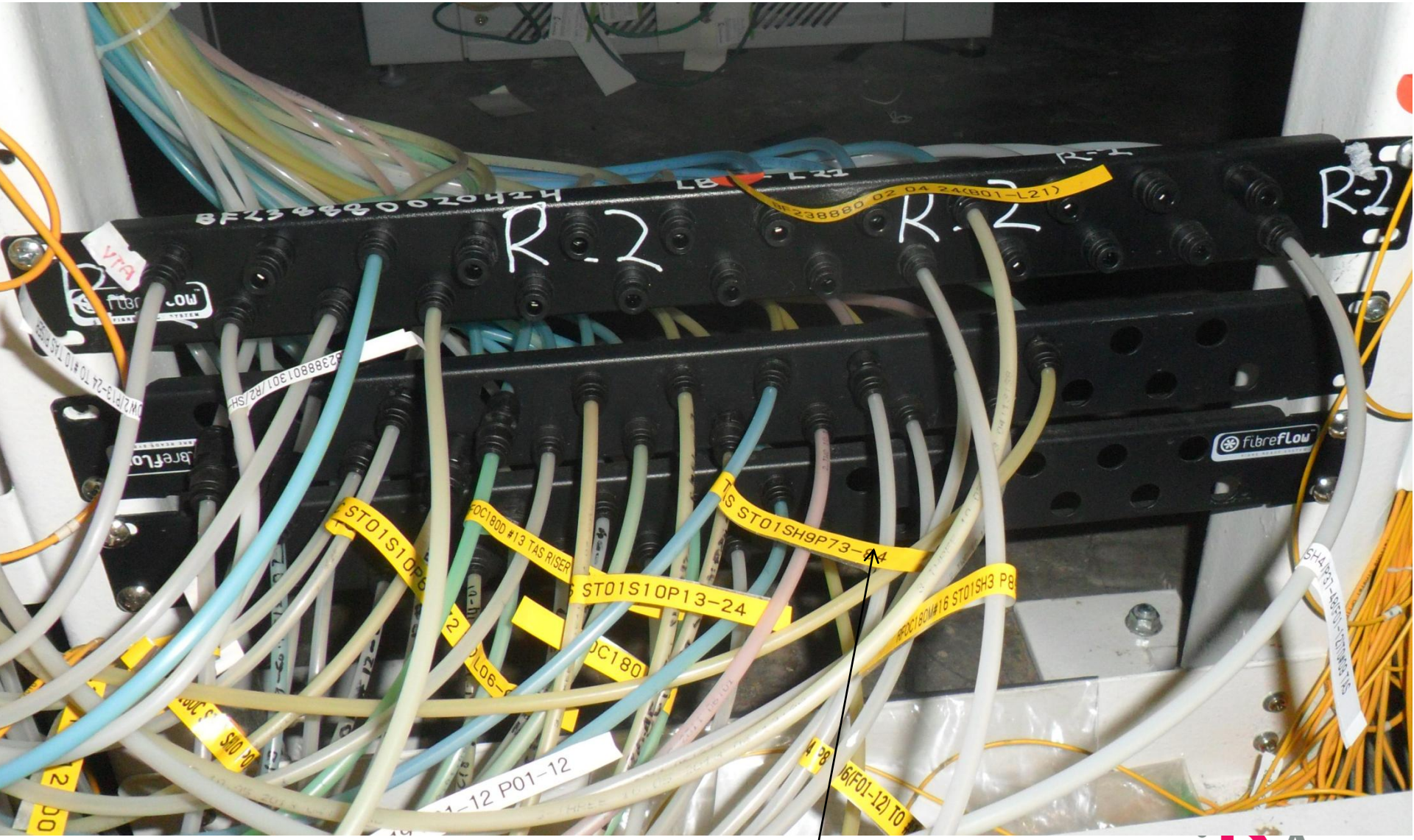
ABF Microduct Network – Commercial Building

- 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 Distribution Units - Existing MDF Room



Labeled Record for 12 ABF Fibre

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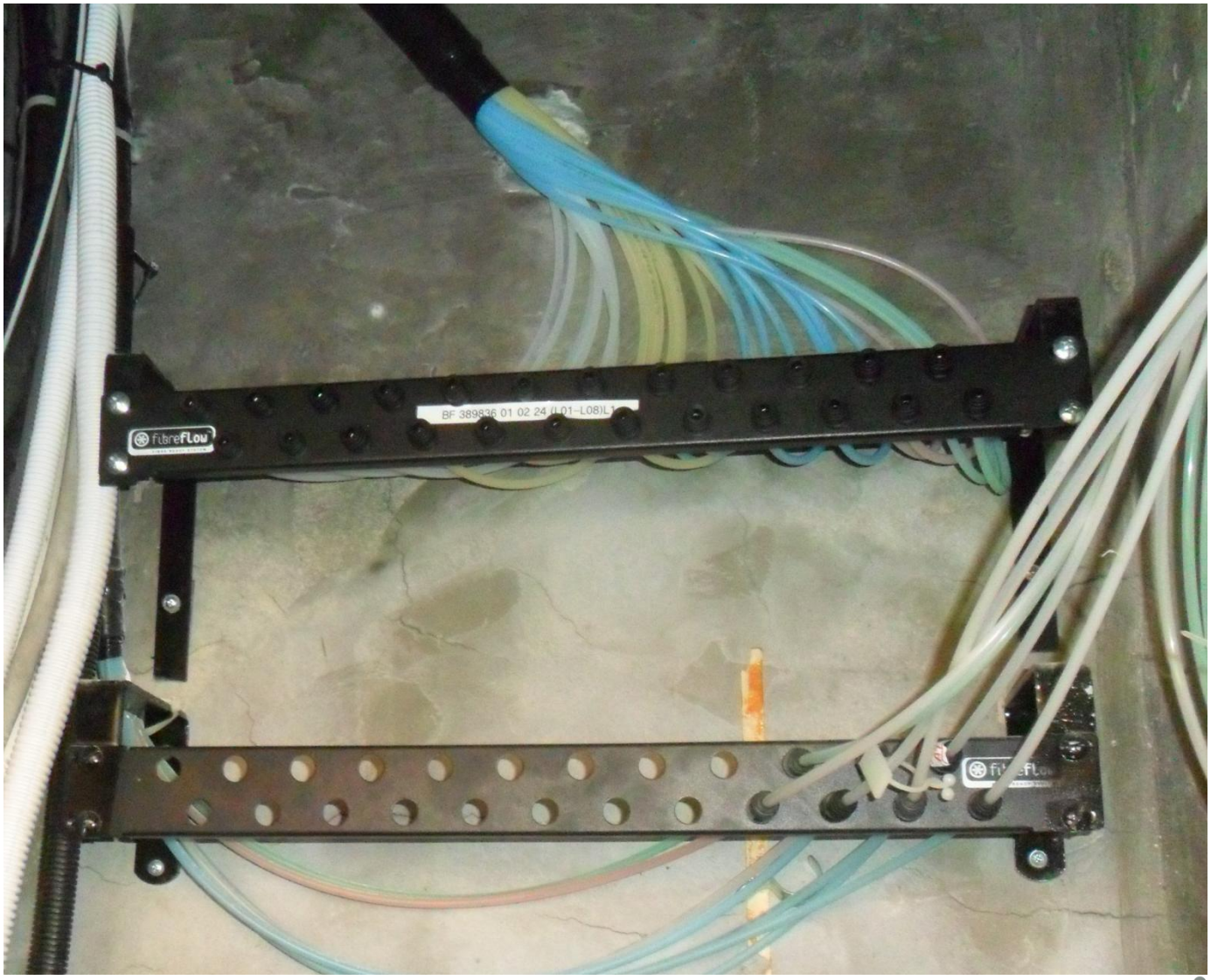
ABF Microduct with Tube Distribution Unit - Existing Riser



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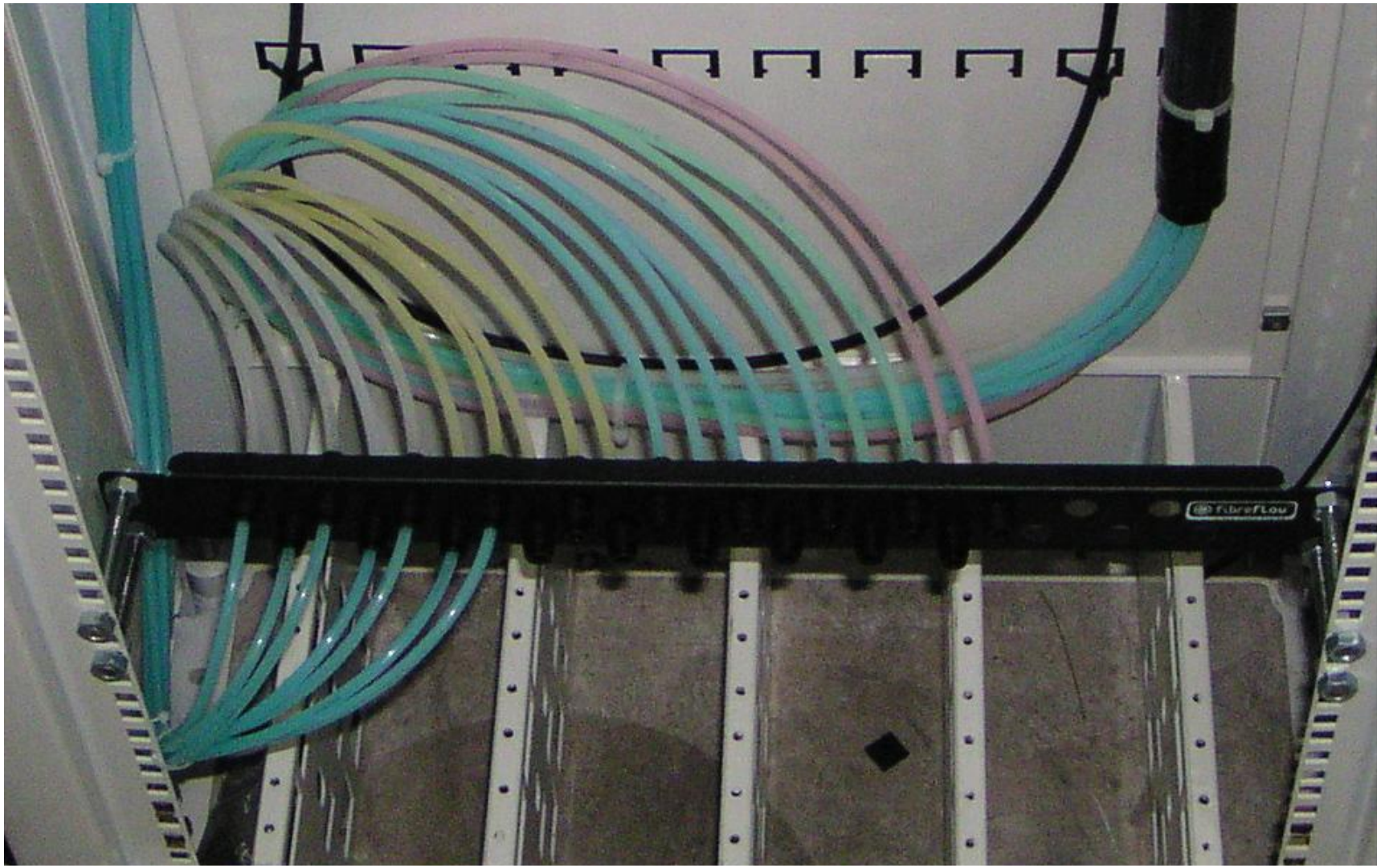
19 Ways ABF Microduct with Tube Distribution Unit



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Microduct Connectors

Simple Microduct Connectors, no splices

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Standard For Colour Code

Fibre And Tube Identification

Colours to EIA 598 or customer requirement

No.	1	2	3	4	5	6	7	8	9	10	11	12
Colour	Blue	Orange	Green	Brown	Grey	White	Red	Black	Yellow	Violet	Pink	Aqua

Sheath Marking

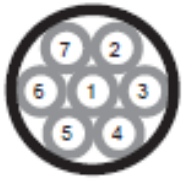
Marked every 1m with standard Emtelle printing or to customer requirement

Emtelle Standard Microduct Numbering System

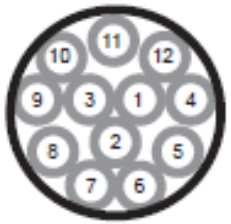
LFH

2-WAY

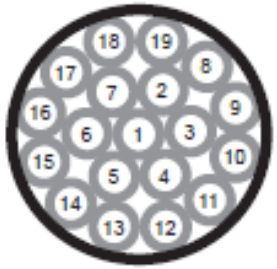
4-WAY



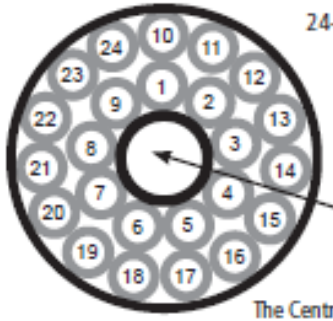
7-WAY



12-WAY



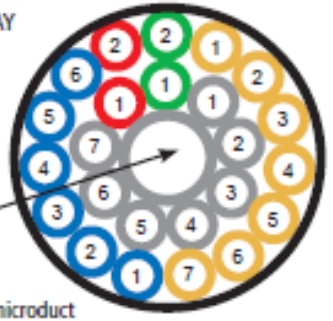
19-WAY



24-WAY

The Central microduct can be used to blow mini cable.

DI / DB



Microduct Sequence (DI/DB)

TUBE SEQUENCE (DI/DB)

1	red 1
2	green 1

1	red 1
2	green 1
3	natural 1
4	blue 1

1	natural 1
2	red 1
3	green 1
4	blue 1
5	blue 2
6	blue 3
7	blue 4

1	red 1	7	yellow 2
2	green 1	8	yellow 3
3	natural 1	9	blue 1
4	red 2	10	blue 2
5	green 2	11	blue 3
6	yellow 1	12	blue 4

1	natural 1	10	yellow 1
2	red 1	11	yellow 2
3	green 1	12	yellow 3
4	natural 2	13	yellow 4
5	natural 3	14	yellow 5
6	natural 4	15	blue 1
7	natural 5	16	blue 2
8	red 2	17	blue 3
9	green 2	18	blue 4
		19	blue 5

1	red 1	12	yellow 1
2	green 1	13	yellow 2
3	natural 1	14	yellow 3
4	natural 2	15	yellow 4
5	natural 3	16	yellow 5
6	natural 4	17	yellow 6
7	natural 5	18	yellow 7
8	natural 6	19	blue 1
9	natural 7	20	blue 2
10	red 2	21	blue 3
11	green 2	22	blue 4
		23	blue 5
		24	blue 6

EIA598 Colour Sequence

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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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ABF Micro Fibre Blowing Distance

	2 Fibre	4 Fibre	6 Fibre	8 Fibre	12 Fibre
Diameter	1.1 mm	1.1 mm	1.3 mm	1.5 mm	1.6mm
Weight (mass)	1.0 g/m	1.0 g/m	1.6 g/m	1.8 g/m	2.2 g/m
Breakout	typically 2 mins for 3m				
Blowing distance	1400 m typical				
Fibres	2 + 2 mechanical fibres as ripcords	4	6 + 1 mechanical	8	12
Fibre colours	Blue, orange	Blue, orange, green, red	Blue, orange, green, red, grey, yellow	Blue, orange, green, red, grey, yellow, brown, violet	Blue, orange, green, red, grey, yellow, brown, violet, black, aqua, pink, white
Packaging	fibre rosette into pan				
Fibre types	single mode ITU-T G.652d				
	single mode ITU-T G.657A1				
	single mode ITU-T G.655				

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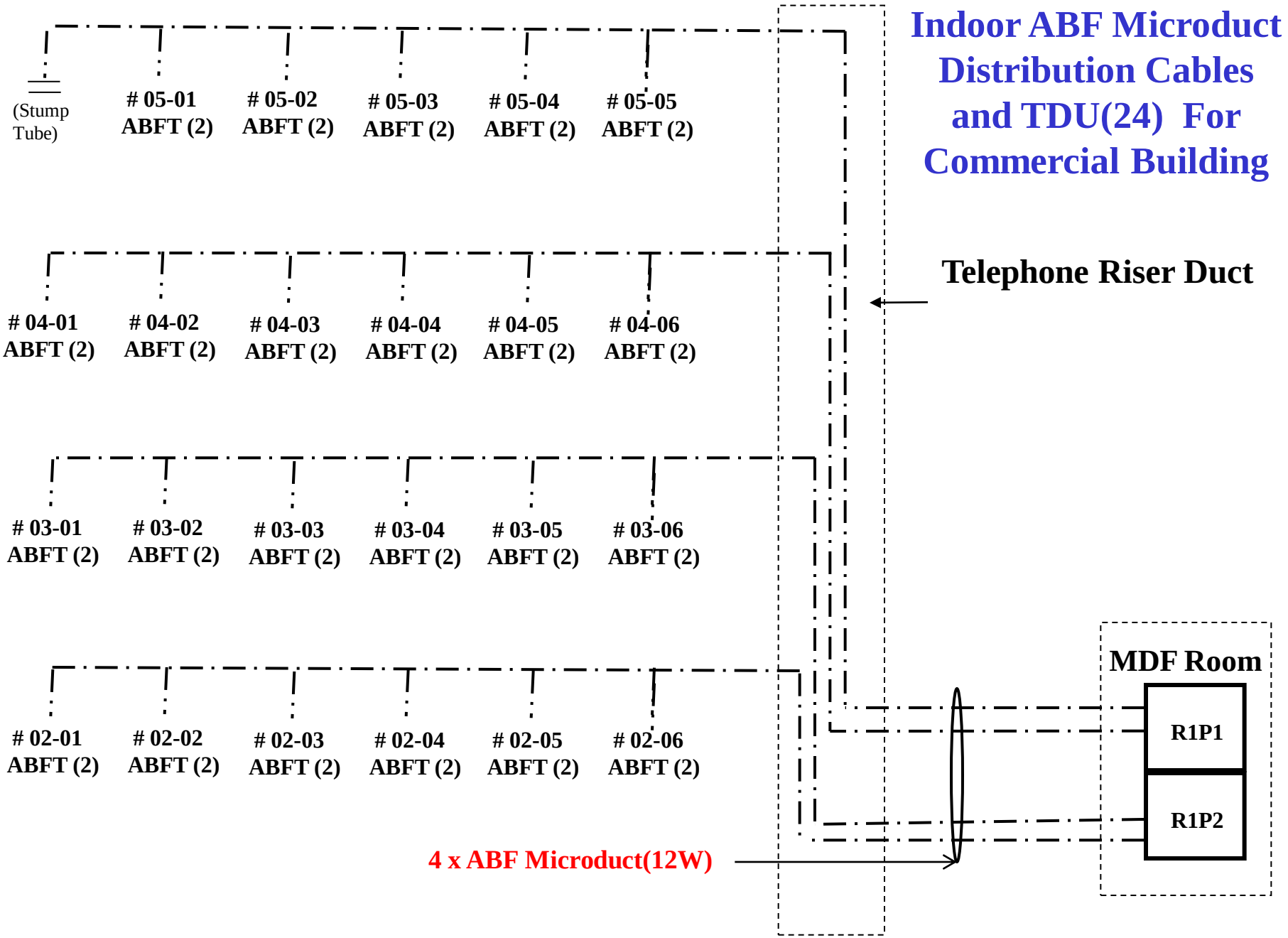
Factors Which Permit Greater Blow Distances

- 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

ABF Planning Diagram



ABF Microduct Testing & Record Format

Black: Contractor to fill in
Blue: BM to fill in

Sample Draft

Name of Building : _____ABC Building_____

Address of Building : _____333 Pandan Loop_____

TDU		Duct nos	Flr Level	Duct Distance	Duct Status (A/S)	Serving Unit	Operator (By BM)	Remarks
Panel Nos	S/nos							
R1P1	1	red 1	#04	90.0m	Active	#04-01	SingTel	5-Jun-14 (12 core fibre FDP)
R1P1	2	green 1	#04	90.0m		#04-01		
R1P1	3	natural 1	#04	100.0m		#04-02		
R1P1	4	red 2	#04	100.0m		#04-02		
R1P1	5	green2	#04	110.0m		#04-03		
R1P1	6	yellow 1	#04	110.0m		#04-03		
R1P1	7	yellow 2	#04	120.0m		#04-04		
R1P1	8	yellow 3	#04	120.0m		#04-04		
R1P1	9	blue 1	#04	130.0m		#04-05		
R1P1	10	blue 2	#04	130.0m		#04-05		
R1P1	11	blue 3	#04	140.0m		#04-06		
R1P1	12	blue 4	#04	140.0m		#04-06		
R1P1	13	red 1	#05	100.0m	A	#05-01	StarHub	3-Jun-14
R1P1	14	green 1	#05	100.0m		#05-01		
R1P1	15	natural 1	#05	110.0m		#05-02		
R1P1	16	red 2	#05	110.0m		#05-02		
R1P1	17	green2	#05	120.0m		#05-03		
R1P1	18	yellow 1	#05	120.0m		#05-03		
R1P1	19	yellow 2	#05	130.0m		#05-04		
R1P1	20	yellow 3	#05	130.0m		#05-04		
R1P1	21	blue 1	#05	140.0m		#05-05		
R1P1	22	blue 2	#05	140.0m		#05-05		
R1P1	23	blue 3	#05	150.0m				Stump Tube
R1P1	24	blue 4	#05	150.0m				Stump Tube

4 Next Steps

Next Steps

- The Contractor shall conduct their own site surveys as requested by building owner or building Management.

- Any amendment to the Vertical Trunking, Horizontal Perforated Cable Tray and ABF Micro Fibre Tube cable route must be approved by IDA and building owner/management

- Upon completion of the Vertical Trunking, Cable Tray or Microduct Cabling installation, the Contractor shall provide the following to Building Management for record purpose:
  - Two copies of the final hardcopy (A2 or A3 size)
  - Softcopy
  - Final ABF Micro Fibre Tube cabling test report

iDA SINGAPORE

Thank you!