CTS Group

Execution Design and Engineering Requirements Booklet

Revision Schedule

REV.	DATE	ORIG.	VERIF.	APPROV.	COMPANY	DESCRIPTION
P01	09/12/2024	JM	BC	FR	BIMMS	Draft - First Issue
P02	20/12/2024	JM	BC	FR	BIMMS	Draft – Second Issue
P03	13/01/2025	JM	BC	FR	BIMMS	Draft – Third Issue
P04	14/02/2025	JM	BC	FR	BIMMS	Draft – Forth Issue
P05	07/03/2025	JM	BC	FR	BIMMS	Draft – Fifth Issue
P06	11/04/2025	JM	BC	FR	BIMMS	Draft – Sixth Issue

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Glossary

COR	Corridor
DC	Data Centre
DCLC	Direct Contact Liquid Cooling
FWC	Fan Wall Cooling
GAN	Gantry
HS&E	Health, Safety and Environment
LDB	Loading Bay
LV	Low Voltage
MEP	Mechanical, Electrical and Plumbing
MV	Medium Voltage
RDC	Rear Door Cooling
RDDC	Rapid Deployment Data Centre
STA	Standard A
STB	Standard B
WSP	White Space

Execution Design and Engineering Requirements Booklet – Purpose

The purpose of this **Booklet** is to showcase CTS´s envisionment of Execution Design and Engineering Requirements for Health and Safety Accessibility Requirements, MEP 2nd Fix and Coordination Principles, and Electrical, Mechanical and Fire Protection Execution Details.

CTS is focused in developing standard solutions for the Data Centre industry, to deliver faster, better and cheaper Data Centres to its clients.

This focus includes, not only, the most efficient and standardized building layout, including CTSs EPOD solution combined with Chiller and Genset Gantries, and a standard definition of Execution Design and Engineering Requirements that are detailed on the following pages.

This booklet is a continuous Work in Progress as CTS will collect on-site Design and Construction inputs from its' Clients, Design Partners and Subcontractors to continue to develop the best fits for all the players involved in the Data Centre Industry.

Booklet Structure

Scope

Inside this **Booklet** you will find some examples of MEP 2nd Fix Installation Requirements for different areas within a Data Centre, namely Technical Areas, Corridors, Loading Bay, Office Space and Meeting Rooms.

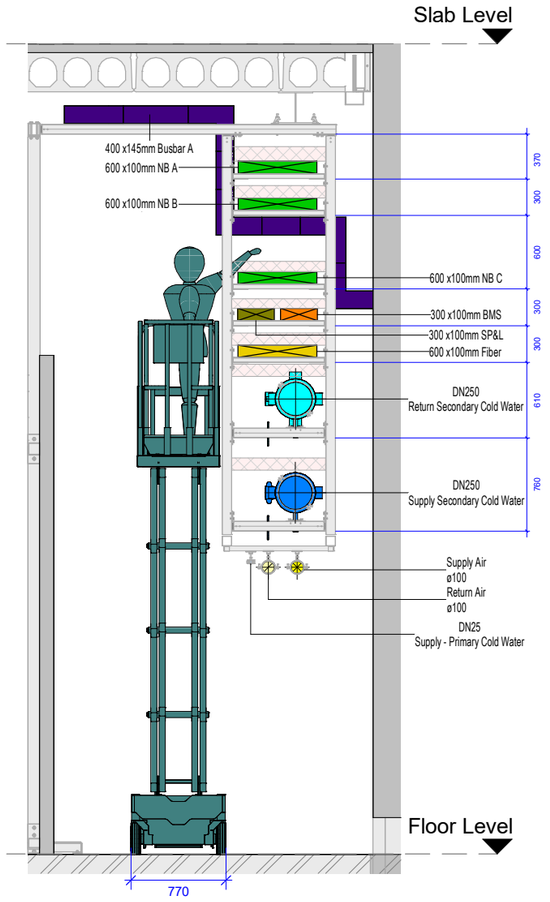
This **Booklet** also contains examples of Accessibility Principles for the Data Hall Rack Row Corridors and the Technical Corridors, both for the RDC solution and the FWC solution, as well as Typical Installation Details for Lighting, Earthing & Bonding, Containment, Builders Works and Distribution Board Cable Coordination.

This booklet may be applicable to all CTS Group projects, provided it is used in accordance with the regulations and standards of the country where the project is implemented.

1. 1. Health and Safety – Accessibility Principles

Purpose: in this chapter you will find H&S Accessibility and Coordination examples for Data Halls and Technical Corridors for both Rear Door and Fan Wall Cooling Equipped Datacentres.

You will find the best MEP Coordination Layout and minimum dimensions to ensure that cable installation and operation is correctly and easily executed, considering applicable HS&E standards.



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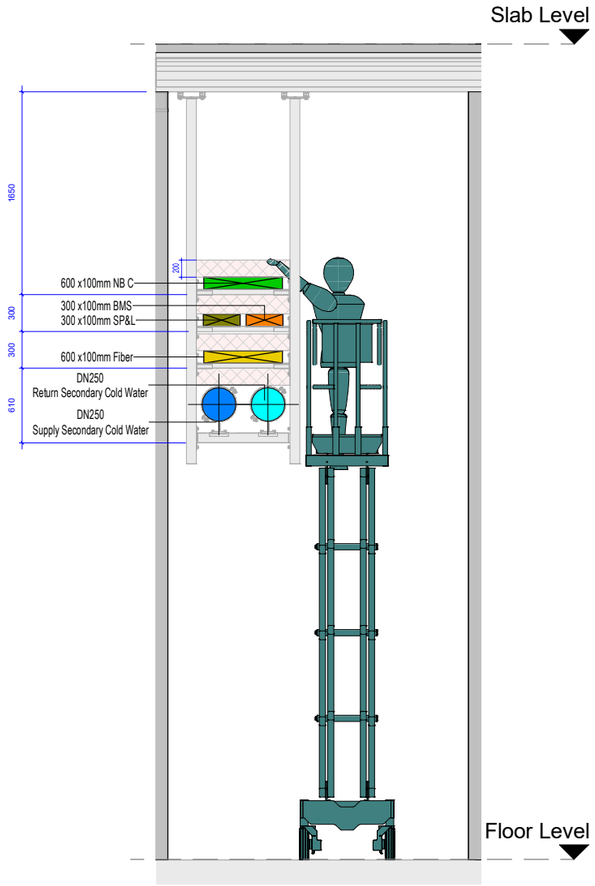

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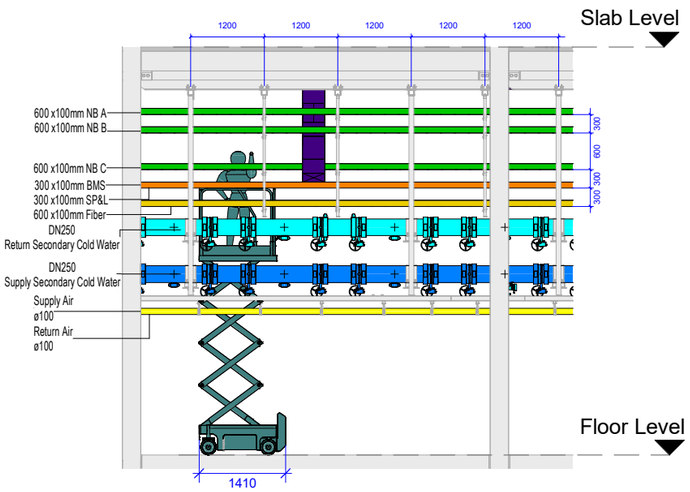

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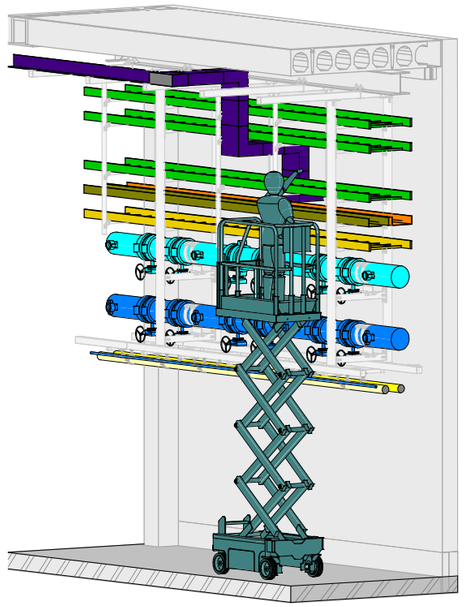


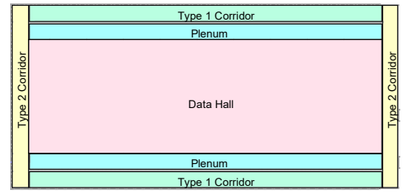
3D1 3D View - Type 1 Corridor

General Notes:

1. All dimensions are in milimeters unless otherwise noted.
2. This drawing is to be read in conjunction with all other architectural, structural, electrical, piping, mechanical, civils, landscape, specialists, temporary works, and main contractor drawings, specifications, equipment schedules, designers risk assessments and with most updated as built information.
3. For materials and equipment sizes/technical information refer to project specifications, schedules and product data sheets.
4. Final Locations of installation accessories to be reviewed with specialist subcontractor.
5. Do not scale from this drawing.

Legend:

Colour	Description
	Building Management Systems
	Small Power & Light
	Busbar
	No Break
	Fiber
	Supply Secondary
	Return Secondary
	Supply Air
	Return Air
	Minimum Space Required for Maintenance



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P02	04.04.2025	Revision 1	JR	JM
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DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

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PROJECT NAME:

Execution Design and Requirements Booklet

DRAWING NAME:

Accessibility Principles
Fan Wall Cooling DC Corridor

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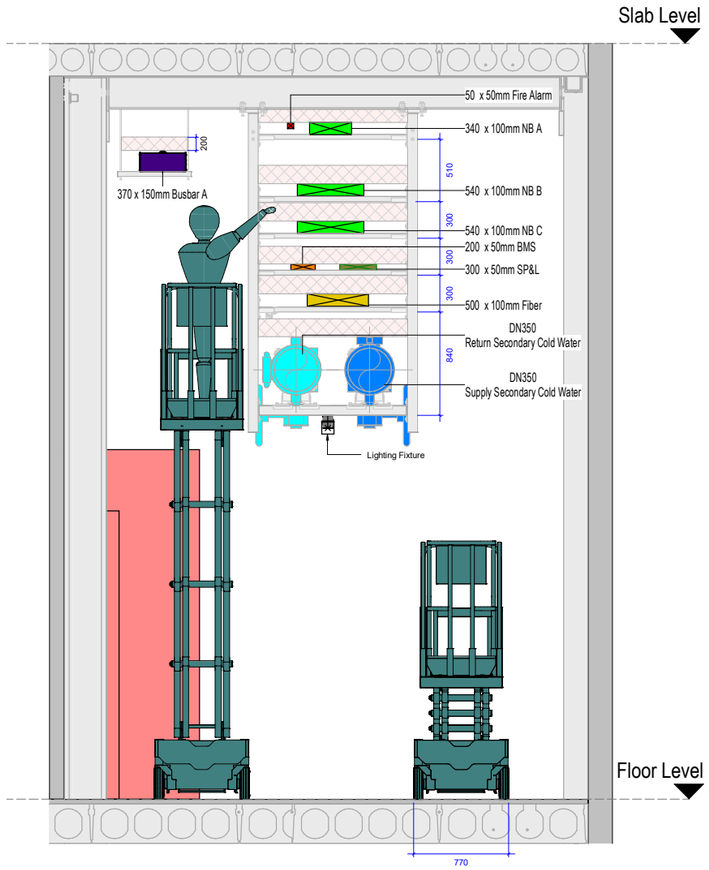

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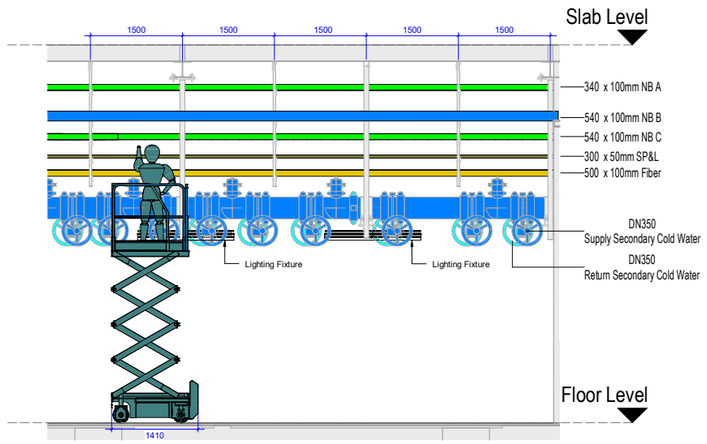

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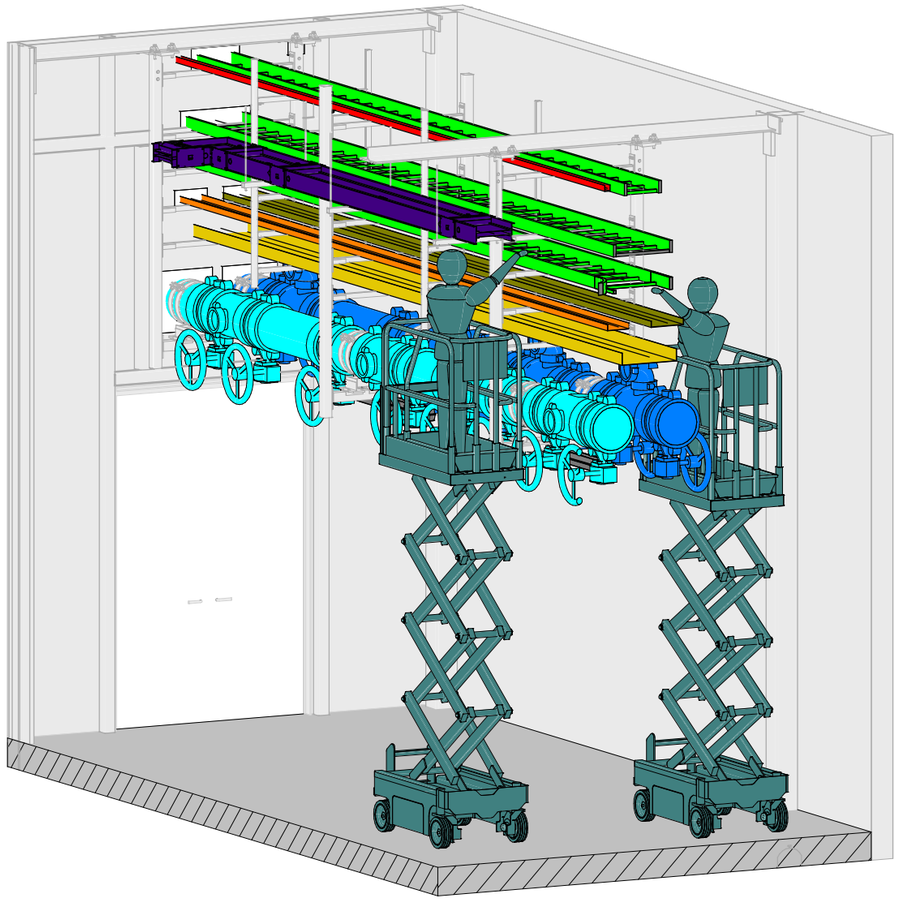

3D1 3D View - Type 1 Corridor

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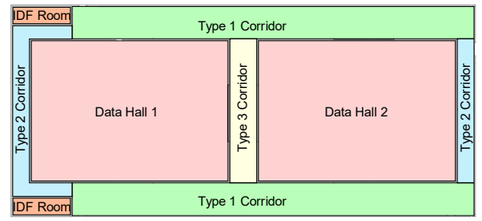
3. For materials and equipment sizes/technical information refer to project specifications, schedules and product data sheets.

4. Final Locations of installation accessories to be reviewed with specialist subcontractor.

5. Do not scale from this drawing.

Legend:

Colour	Description
	Building Management Systems
	Small Power & Light
	Fire Alarm
	Busbar
	No Break
	Fiber
	Supply Secondary
	Return Secondary
	Structural Framing
	Minimum Space Required for Maintenance



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CTS GROUP PARTNER:

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Execution Design and Engineering Requirements

DRAWING NAME:

Accessibility Principles
Critical Cooling DC Corridor 1

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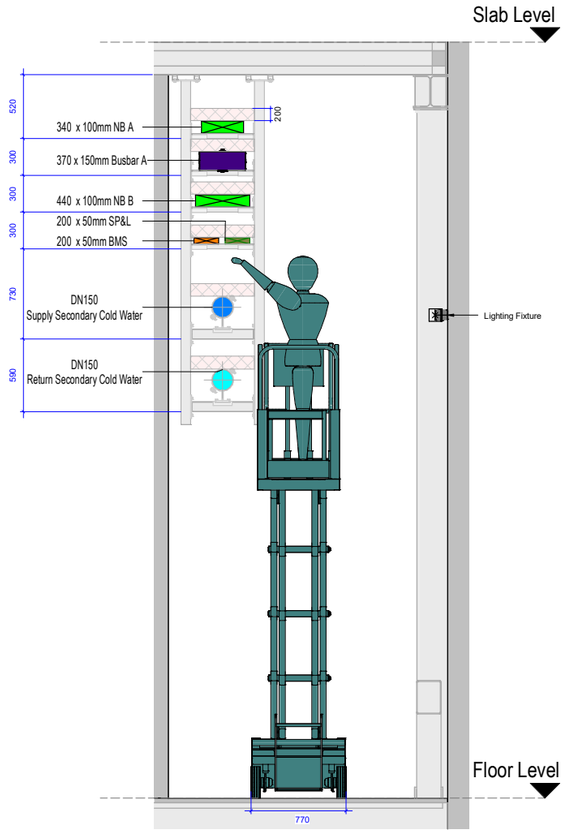

1 Type 2 Corridor
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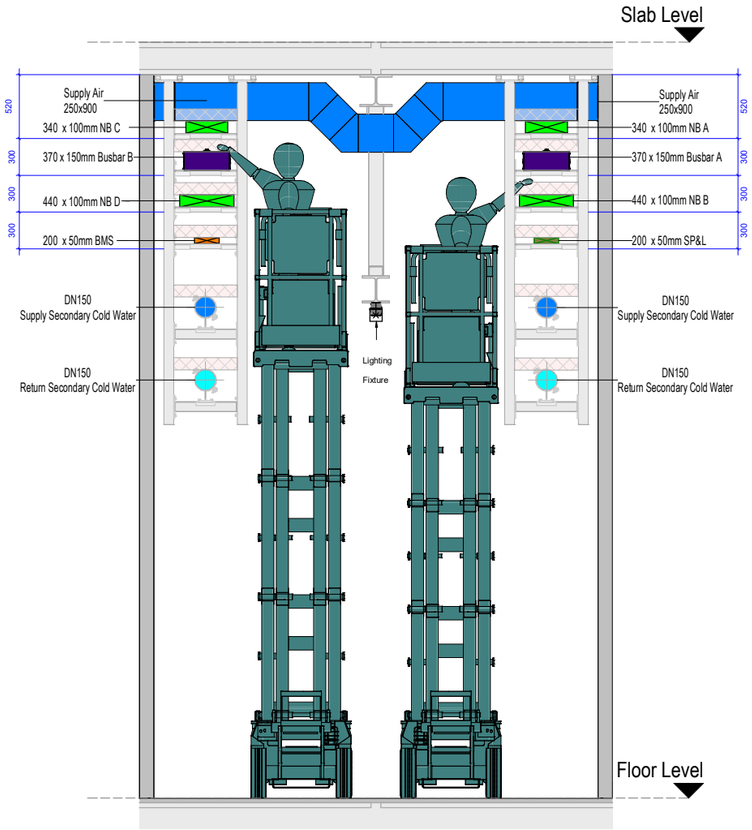

2 Type 3 Corridor
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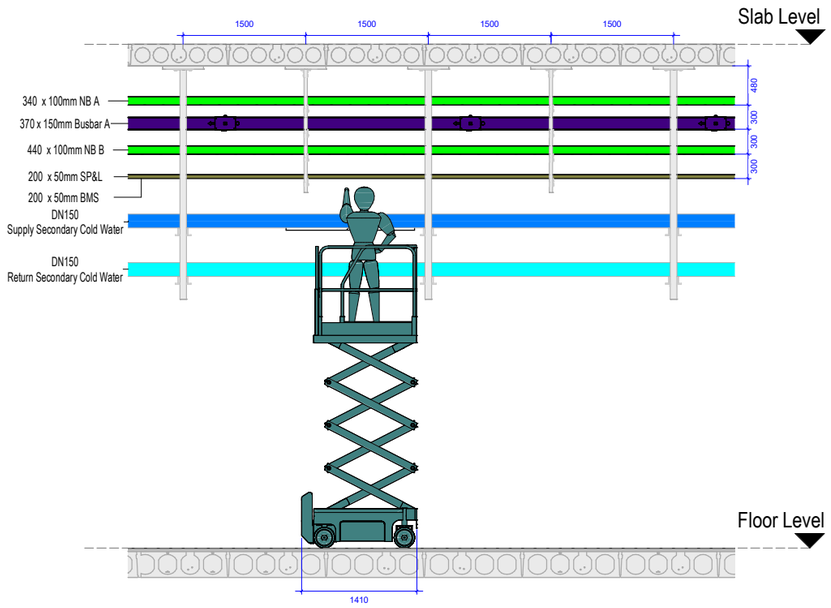

3 Type 2 Corridor
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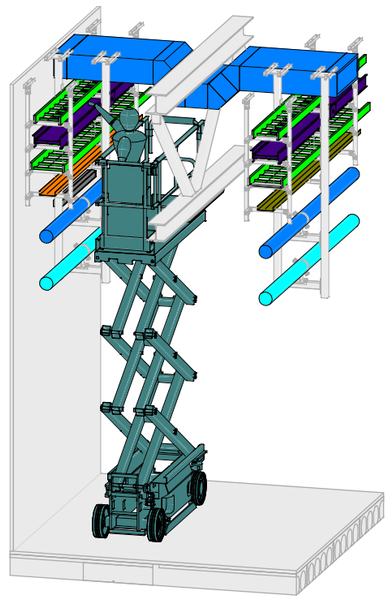

3D1 3D View - Type 3 Corridor

General Notes:

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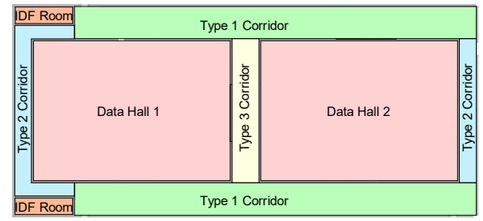
Legend:

Colour	Description
	Building Management Systems
	Small Power & Light
	Fire Alarm
	Busbar
	No Break
	Fiber
	Supply Secondary
	Return Secondary
	Structural Framing
	Minimum Space Required for Maintenance



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DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Accessibility Principles
Critical Cooling DC - Corridor 2

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**As Indic**	**S2**
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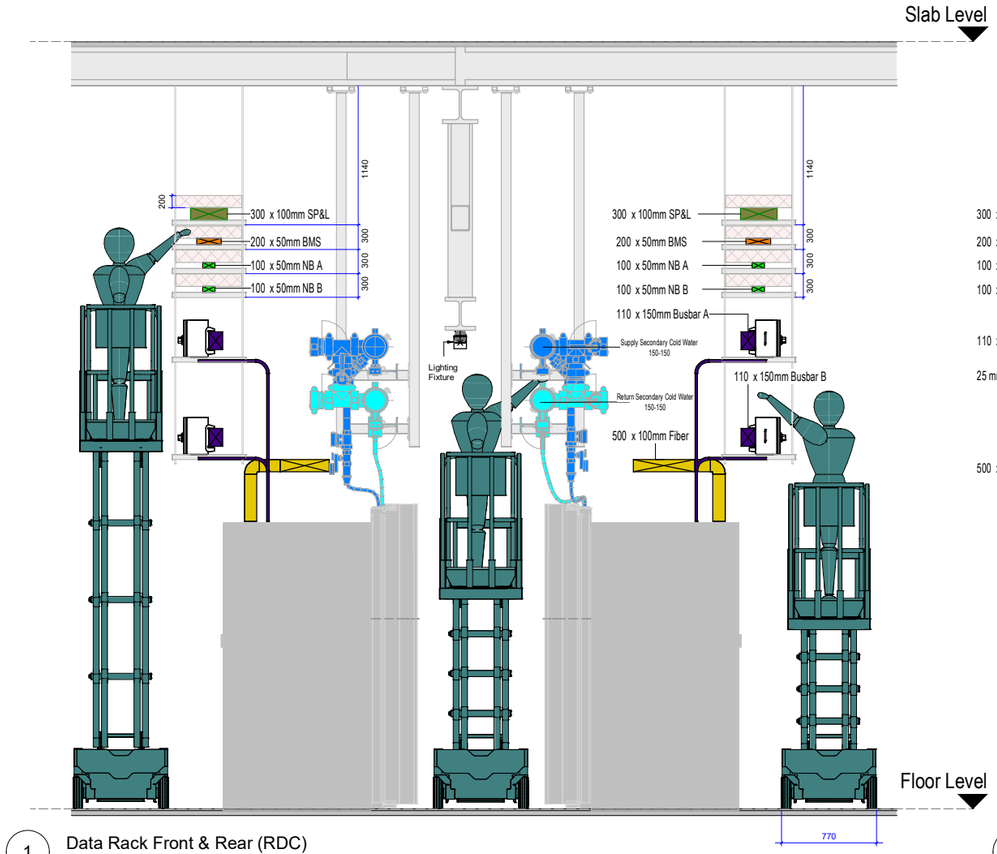
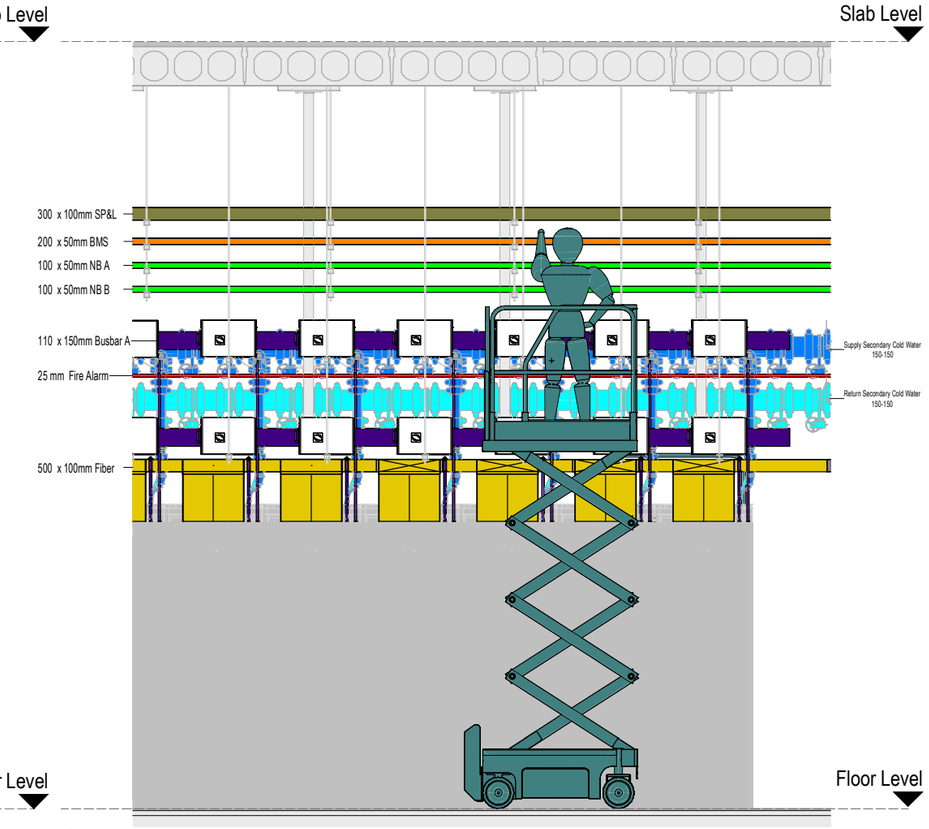


1 Data Rack Front & Rear (RDC)
1 : 50



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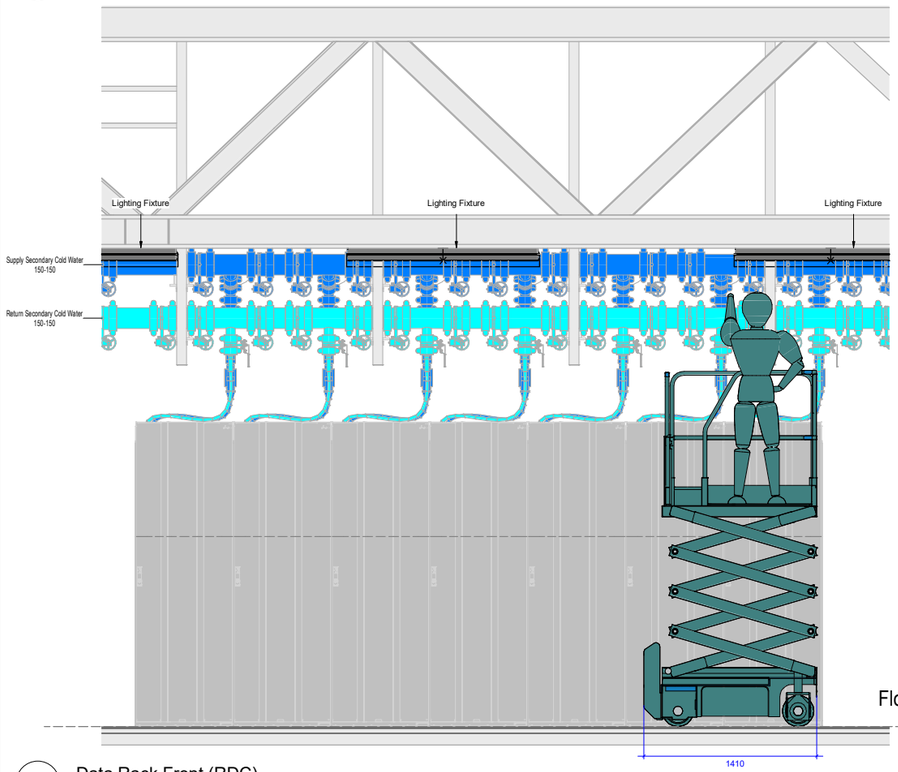

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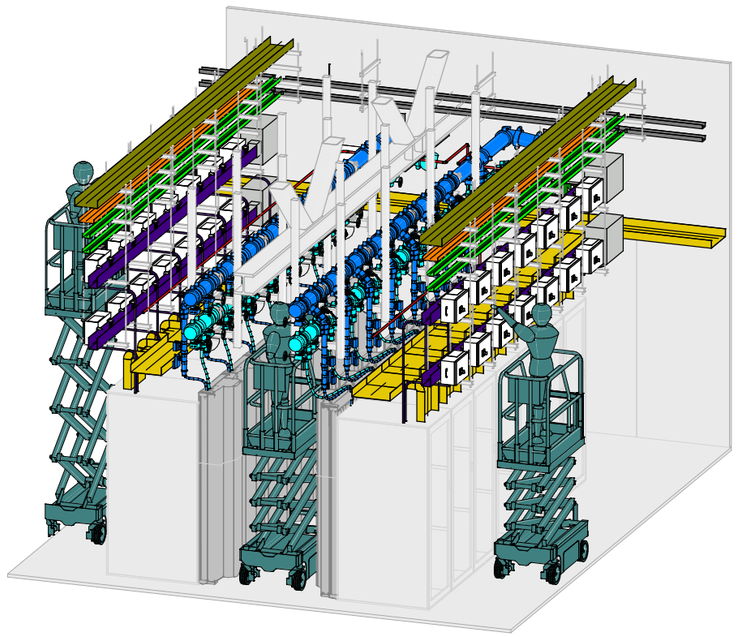

3D1 3D View - Data Racks Front & Rear (RDC)

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Colour	Description
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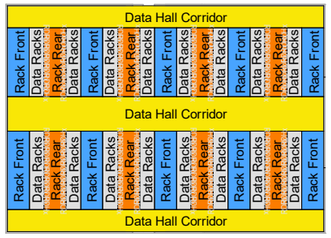
	Fire Alarm
	Busbar
	No Break
	Fiber
	Supply Secondary
	Return Secondary
	Structural Framing
	Minimum Space Required for Maintenance



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P02	04.04.2025	Revision 1	JR	JM
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DESIGN & BUILD CONTRACTOR:

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CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Accessibility Principles
Critical Cooling RDC - Data Hall

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Revision 1		**As Indic**	**S2**
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18.11.2024	**04.04.2025**	**JR**	**JM**
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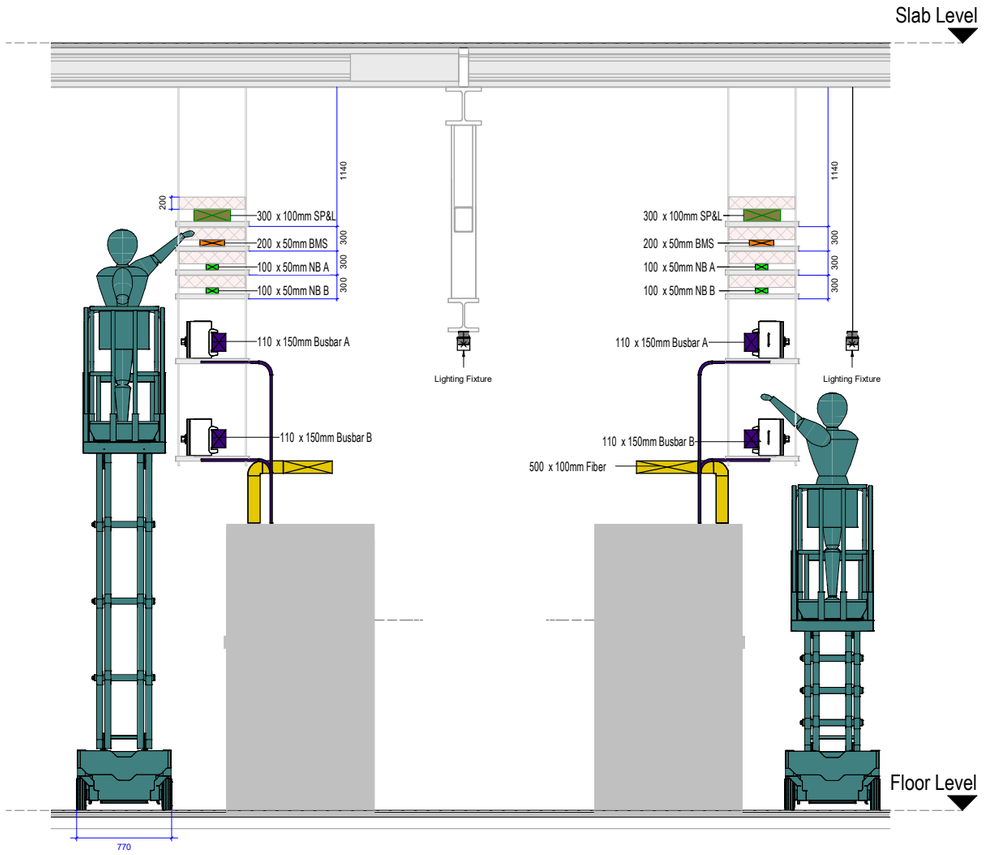

1 Data Rack Front & Rear (FWC)
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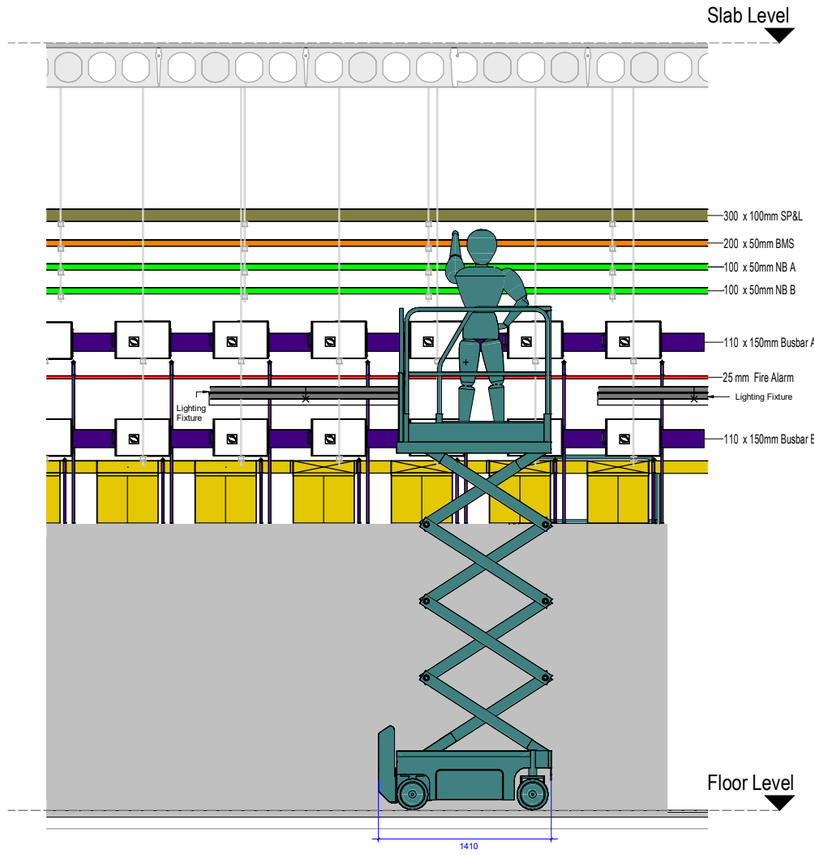

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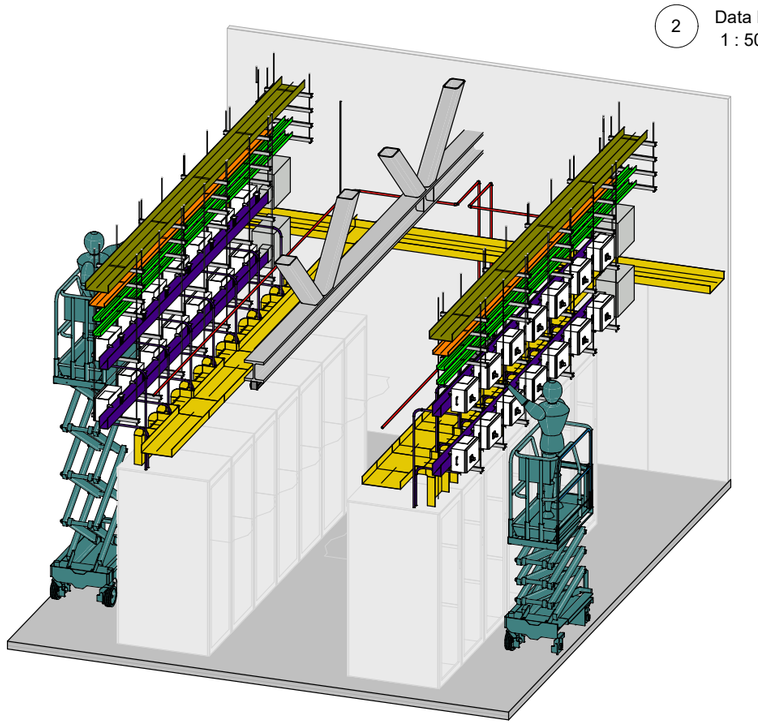

3D1 3D View - Data Racks Front & Rear (FWC)

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Legend:

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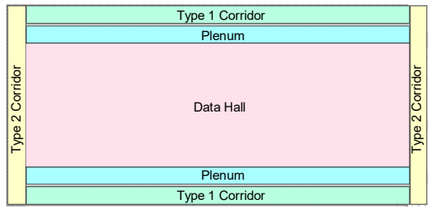
	Building Management Systems
	Small Power & Light
	Fire Alarm
	Busbar
	No Break
	Fiber
	Supply Secondary
	Return Secondary
	Structural Framing
	Minimum Space Required for Maintenance



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CTS Group

CTS GROUP PARTNER:

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PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Accessibility Principles
Critical Cooling FWC - Data Hall

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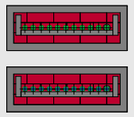
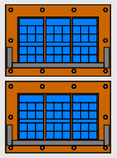
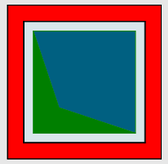
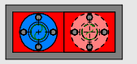
2. Wall and Floor Penetrations

Purpose: in this chapter you will find detailing of Wall and Floor Penetrations and best practices for most of the MEP services that might be encountered at a Datacentre, namely, electrical cable containment, chilled water piping, ventilation ducts and fire detection equipment, among other secondary services.

Sample Wall - Typical Penetrations

Fire Sleeve - Fiber Transits	Fire Block - MV Cabling	Roxtec - Generic Cables	Mortar - Plastic Pipe	Mortar - Duct	Mortar - Steel Pipe
					
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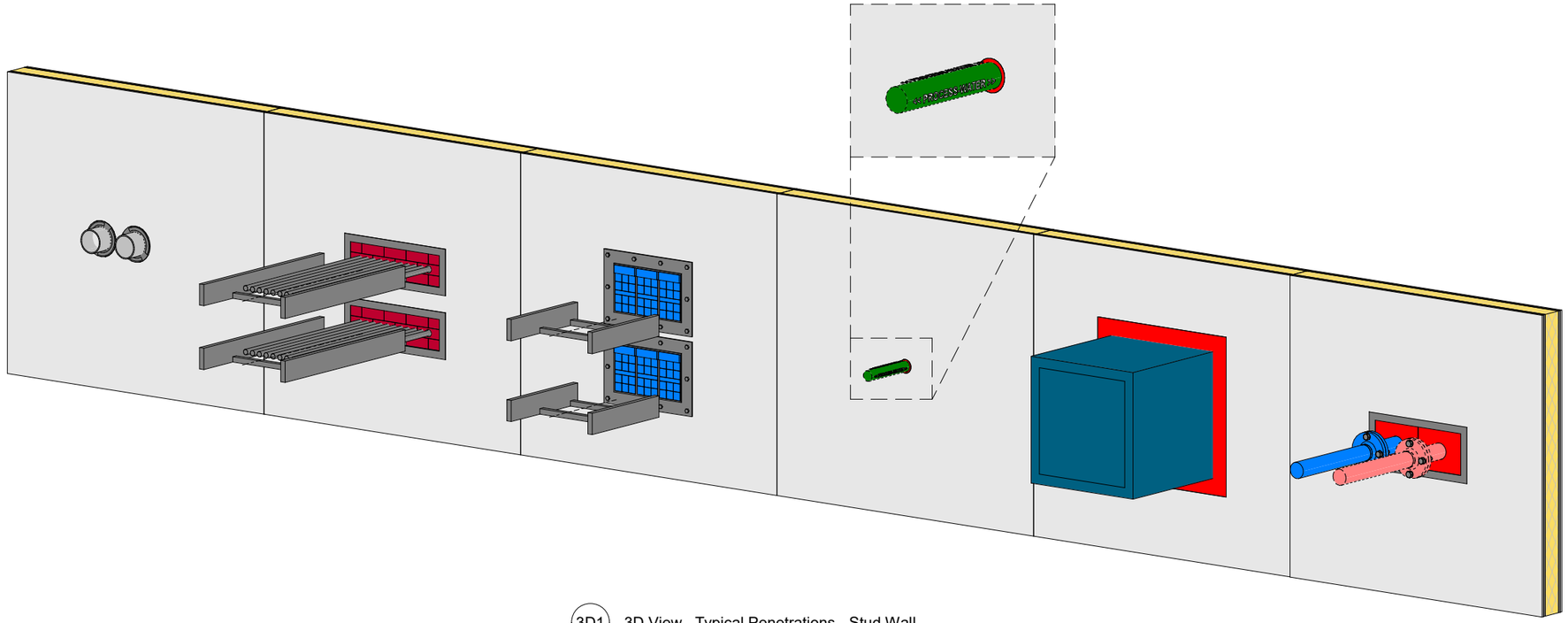
A Front View - Typical Penetrations - Stud Wall



3D1 3D View - Typical Penetrations - Stud Wall

General guidelines

1. Services crossing fire rated walls that need to be in independent OPEs:
   - Busbar;
   - Fire Extinguish pipes;
   - Dampers;
   - E90 containment;
   - Plastic pipes;
2. OPEs can't be shared between two different types of services (Elec, Mech, Plumbing);
3. Minimum distance between OPEs = 200mm;
4. Minimum distance between bottom of wall (on ground floor) and OPEs = 200mm;
5. Minimum distance between adjacent wall OPEs = 200mm;
6. Minimum distance between columns OPEs = 350mm;
7. Minimum distance between door and OPEs = 200mm, all around;
8. Minimum distance between an OPE and a service smaller than 50mm (no need for OPE) must be 150mm;
9. General gap between OPEs and each element shall be at least 50mm all around;
10. Damper's OPEs shall be based on the Manufacturer's Data Sheet;
11. Service E90 containment must be positioned on the higher position possible;
12. All services must be at least 150 mm away from the nearest wall / column;
13. Services shall not be less than 150mm away on top of each other for a length bigger than 1500mm.

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.

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DESIGN & BUILD CONTRACTOR:

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CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Wall and Floor Penetrations Sample Wall - Typical Penetrations - Stud Wall

DRAWING STATUS:		SCALE:	STATUS:
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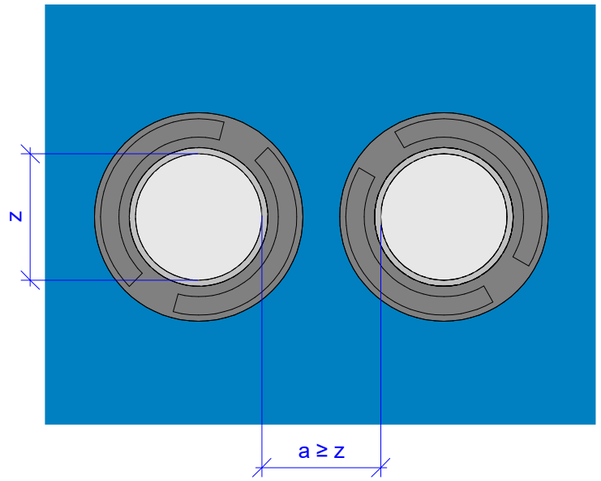
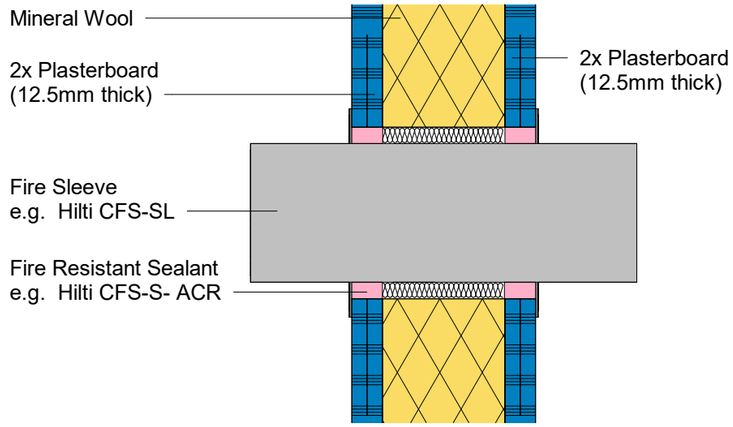
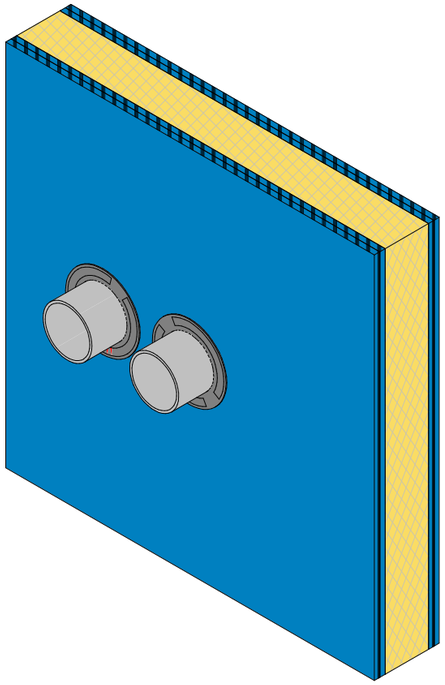


A Front View - Fire Sleeve - Stud Wall



1 Section View - Fire Sleeve - Stud Wall



3D1 3D View - Fire Sleeves - Stud Wall

General guidelines

1. Services crossing fire rated walls that need to be in independent OPEs:
   - Busbar;
   - Fire Extinguish pipes;
   - Dampers;
   - E90 containment;
   - Plastic pipes;
2. OPEs can't be shared between two different types of services (Elec, Mech, Plumbing);
3. Minimum distance between OPEs = 200mm;
4. Minimum distance between bottom of wall (on ground floor) and OPEs = 200mm;
5. Minimum distance between adjacent wall OPEs = 200mm;
6. Minimum distance between columns OPEs = 350mm;
7. Minimum distance between door and OPEs = 200mm, all around;
8. Minimum distance between an OPE and a service smaller than 50mm (no need for OPE) must be 150mm;
9. General gap between OPEs and each element shall be at least 50mm all around;
10. Damper's OPEs shall be based on the Manufacturer's Data Sheet;
11. Service E90 containment must be positioned on the higher position possible;
12. All services must be at least 150 mm away from the nearest wall / column;
13. Services shall not be less than 150mm away on top of each other for a length bigger than 1500mm.

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.

Rev	Date	Description	Sign.	Veri.
P02	04.04.2025	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	JR	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

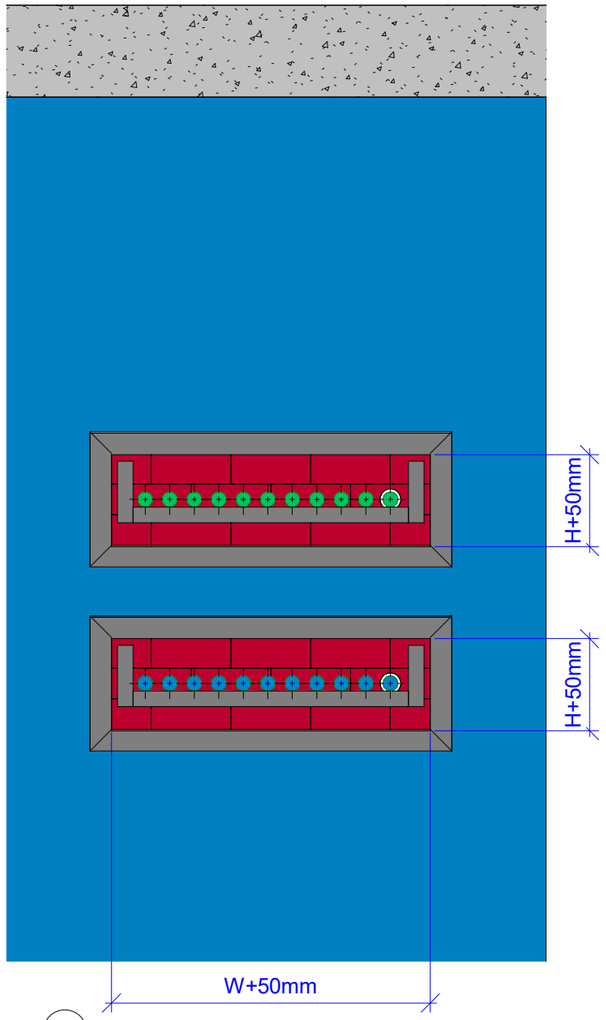
PROJECT NAME:

Execution Design and Engineering Requirements

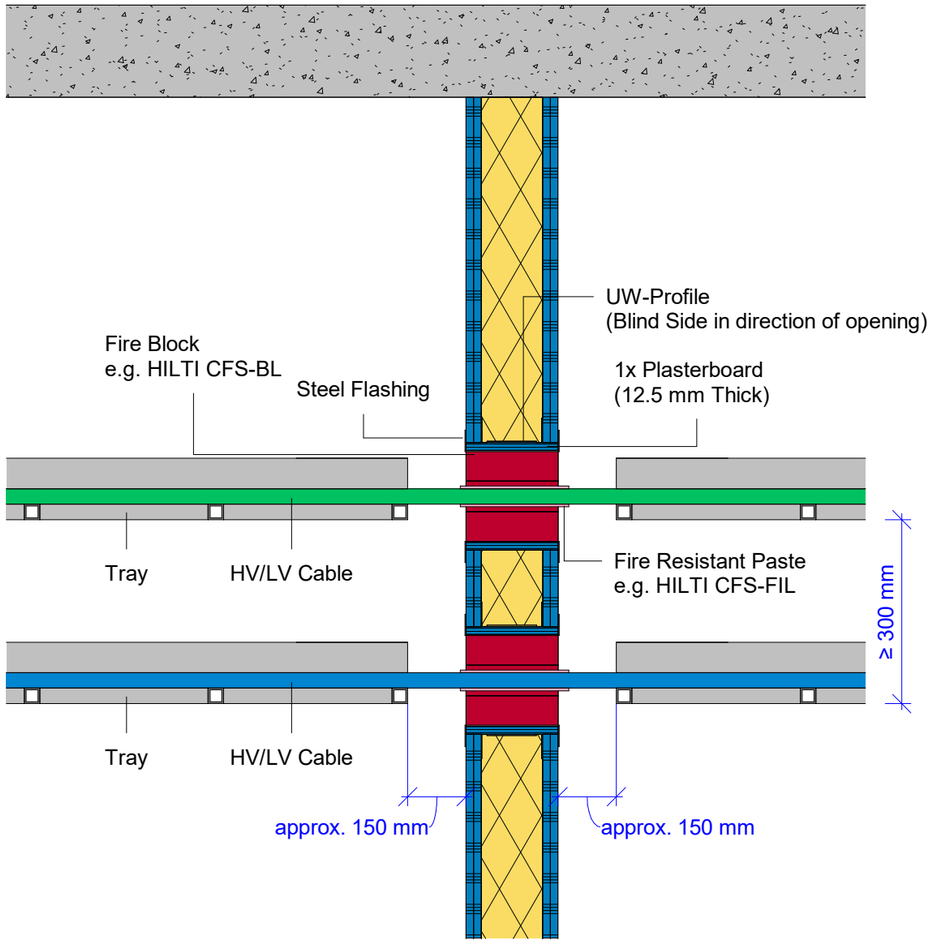
DRAWING NAME:

Wall and Floor Penetrations Fire Sleeve - Fiber Transits - Stud Wall

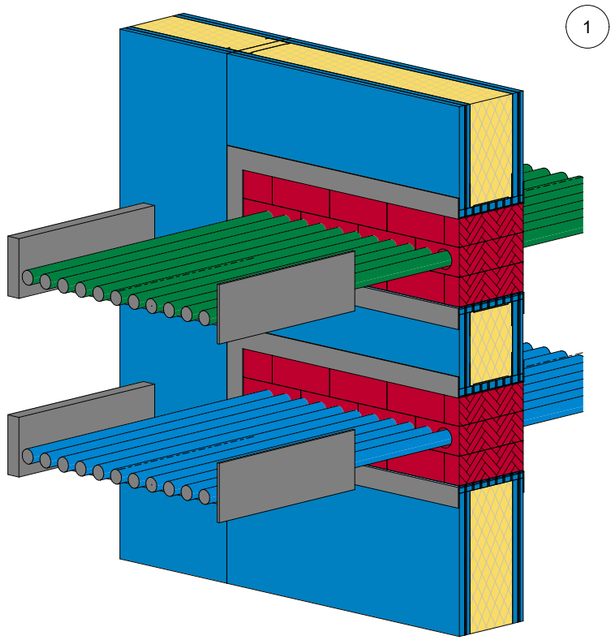
DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2025**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-G-91501		**A3**	**P02**



A Front View - MV Cabling - Stud Wall



1 Section View - MV Cabling - Stud Wall



3D1 3D View - MV Cabling - Stud Wall

General guidelines

1. Services crossing fire rated walls that need to be in independent OPEs:
   - Busbar;
   - Fire Extinguish pipes;
   - Dampers;
   - E90 containment;
   - Plastic pipes;
2. OPEs can't be shared between two different types of services (Elec, Mech, Plumbing);
3. Minimum distance between OPEs = 200mm;
4. Minimum distance between bottom of wall (on ground floor) and OPEs = 200mm;
5. Minimum distance between adjacent wall OPEs = 200mm;
6. Minimum distance between columns OPEs = 350mm;
7. Minimum distance between door and OPEs = 200mm, all around;
8. Minimum distance between an OPE and a service smaller than 50mm (no need for OPE) must be 150mm;
9. General gap between OPEs and each element shall be at least 50mm all around;
10. Damper's OPEs shall be based on the Manufacturer's Data Sheet;
11. Service E90 containment must be positioned on the higher position possible;
12. All services must be at least 150 mm away from the nearest wall / column;
13. Services shall not be less than 150mm away on top of each other for a length bigger than 1500mm.

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.

Rev	Date	Description	Sign.	Veri.
P02	04.04.2025	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	JR	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

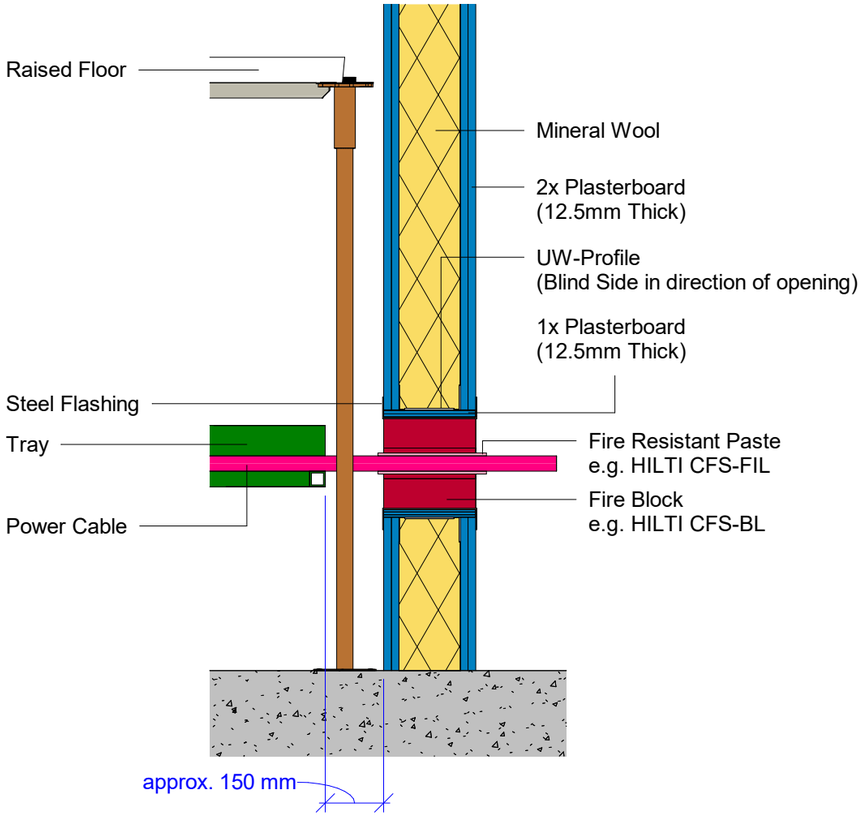
PROJECT NAME:

Execution Design and Engineering Requirements

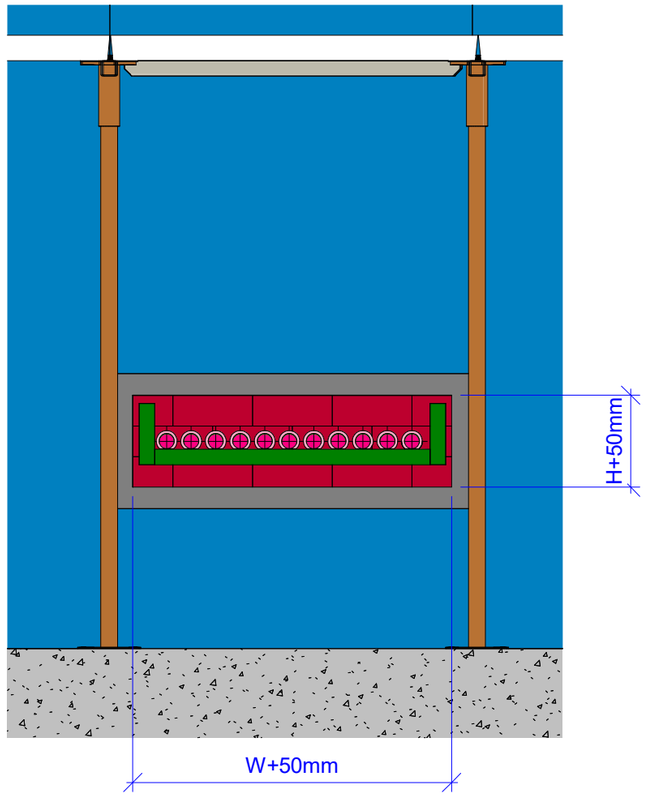
DRAWING NAME:

Wall and Floor Penetrations Fire Block - MV Cabling - Stud Wall

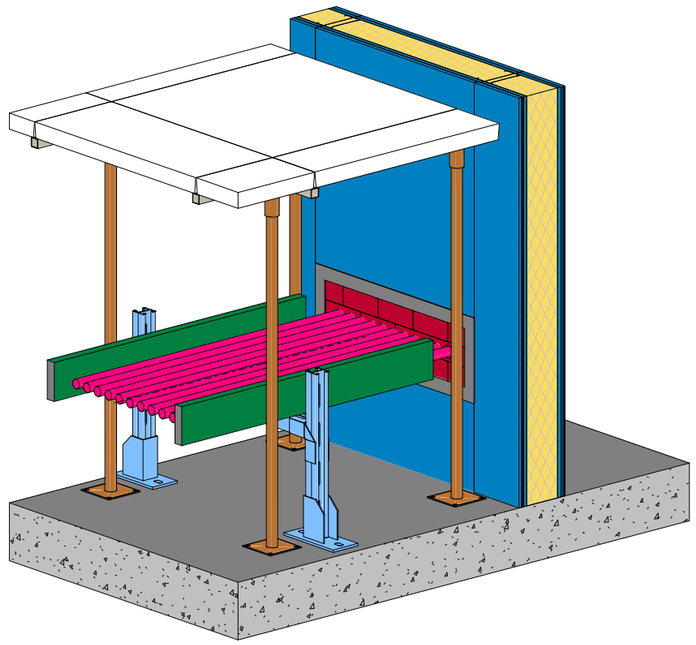
DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2025**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-G-91502		**A3**	**P02**



1 Section View - Fire Block - MV Cabling Under Raised Floor



A Front View - Fire Block - MV Cabling Under Raised Floor



3D1 3D View - Fire Block - MV Cabling Under Raised Floor

General guidelines

1. Services crossing fire rated walls that need to be in independent OPEs:
   - Busbar;
   - Fire Extinguish pipes;
   - Dampers;
   - E90 containment;
   - Plastic pipes;
2. OPEs can't be shared between two different types of services (Elec, Mech, Plumbing);
3. Minimum distance between OPEs = 200mm;
4. Minimum distance between bottom of wall (on ground floor) and OPEs = 200mm;
5. Minimum distance between adjacent wall OPEs = 200mm;
6. Minimum distance between columns OPEs = 350mm;
7. Minimum distance between door and OPEs = 200mm, all around;
8. Minimum distance between an OPE and a service smaller than 50mm (no need for OPE) must be 150mm;
9. General gap between OPEs and each element shall be at least 50mm all around;
10. Damper's OPEs shall be based on the Manufacturer's Data Sheet;
11. Service E90 containment must be positioned on the higher position possible;
12. All services must be at least 150 mm away from the nearest wall / column;
13. Services shall not be less than 150mm away on top of each other for a length bigger than 1500mm.

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.

Rev	Date	Description	Sign.	Veri.
P02	04.04.2025	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	JR	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

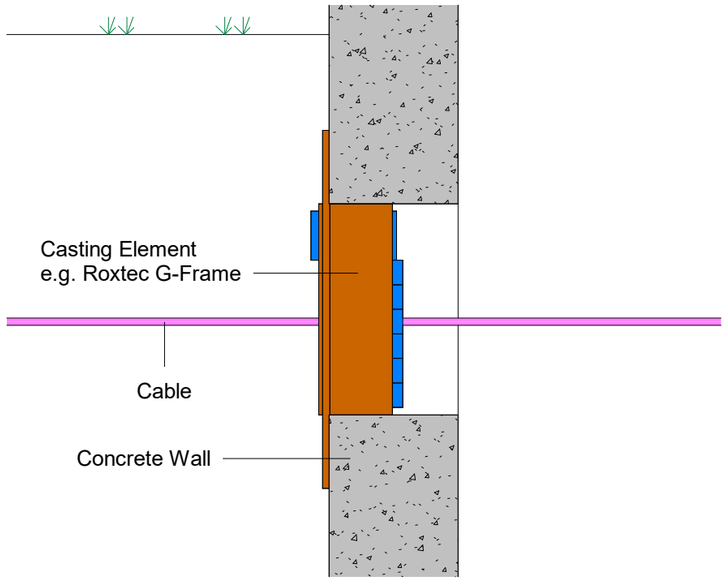
PROJECT NAME:

Execution Design and Engineering Requirements

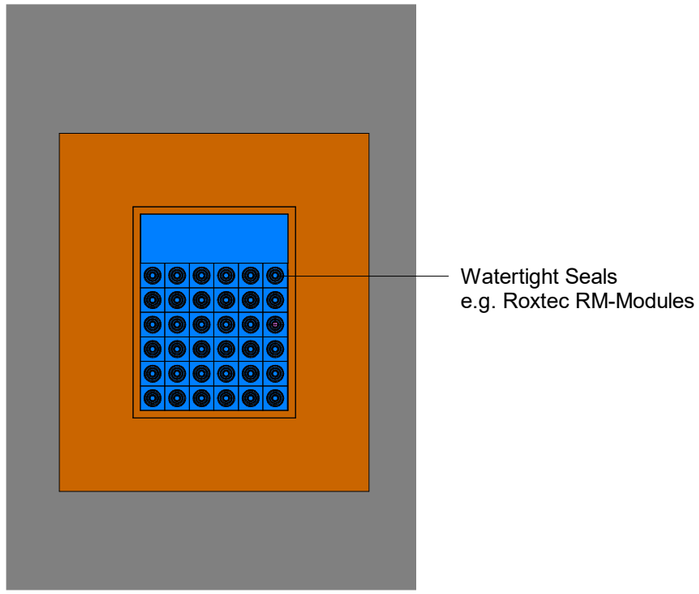
DRAWING NAME:

Wall and Floor Penetrations Fire Block - MV Cabling Under Raised Floor - Stud Wall

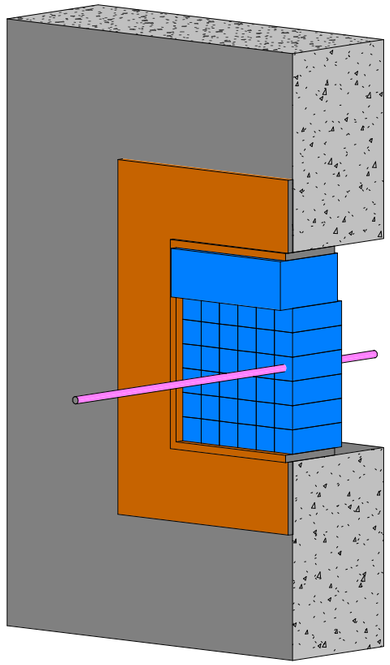
DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2025**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-G-91503		**A3**	**P02**



1 Section View - Smal Power - Concrete Wall



A Front View - Smal Power - Concrete Wall



3D1 3D View - Smal Power - Concrete Wall

General guidelines

1. Services crossing fire rated walls that need to be in independent OPEs:
   - Busbar;
   - Fire Extinguish pipes;
   - Dampers;
   - E90 containment;
   - Plastic pipes;
2. OPEs can't be shared between two different types of services (Elec, Mech, Plumbing);
3. Minimum distance between OPEs = 200mm;
4. Minimum distance between bottom of wall (on ground floor) and OPEs = 200mm;
5. Minimum distance between adjacent wall OPEs = 200mm;
6. Minimum distance between columns OPEs = 350mm;
7. Minimum distance between door and OPEs = 200mm, all around;
8. Minimum distance between an OPE and a service smaller than 50mm (no need for OPE) must be 150mm;
9. General gap between OPEs and each element shall be at least 50mm all around;
10. Damper's OPEs shall be based on the Manufacturer's Data Sheet;
11. Service E90 containment must be positioned on the higher position possible;
12. All services must be at least 150 mm away from the nearest wall / column;
13. Services shall not be less than 150mm away on top of each other for a length bigger than 1500mm.

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.

Rev	Date	Description	Sign.	Veri.
P02	04.04.2025	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	JR	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

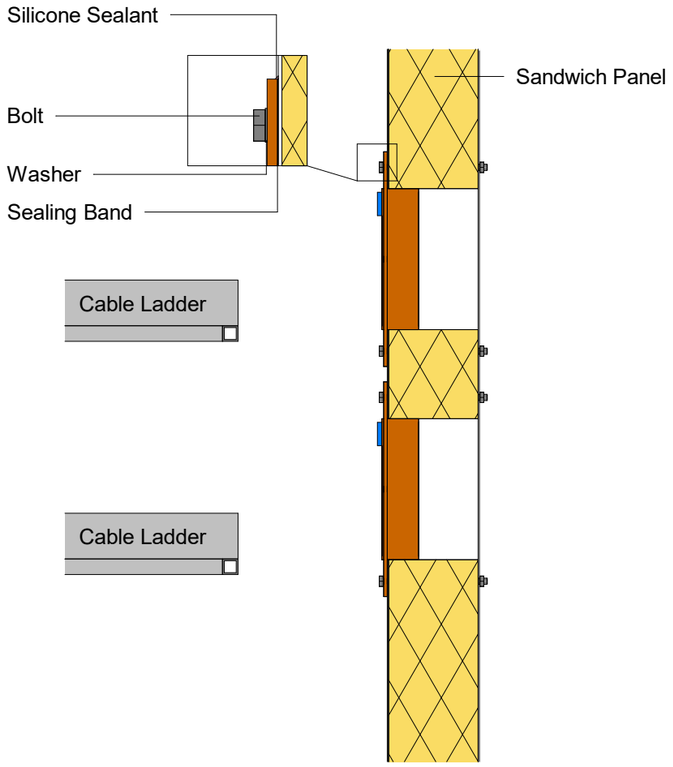
PROJECT NAME:

Execution Design and Engineering Requirements

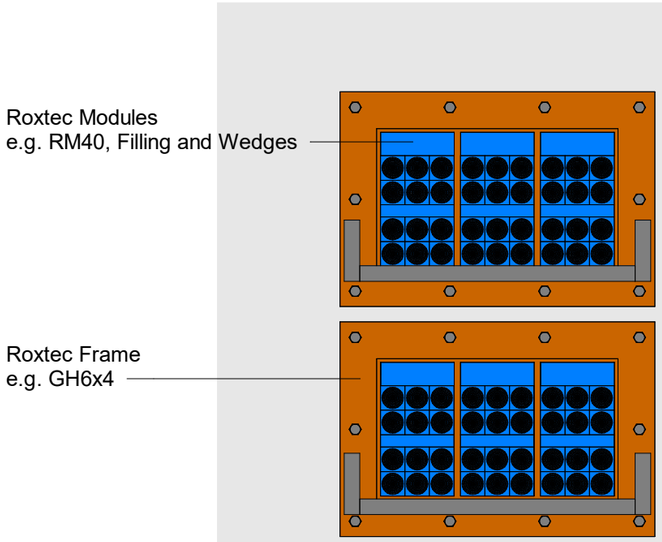
DRAWING NAME:

Wall and Floor Penetrations Roxtec - Small Power Cable Entries - Concrete Wall

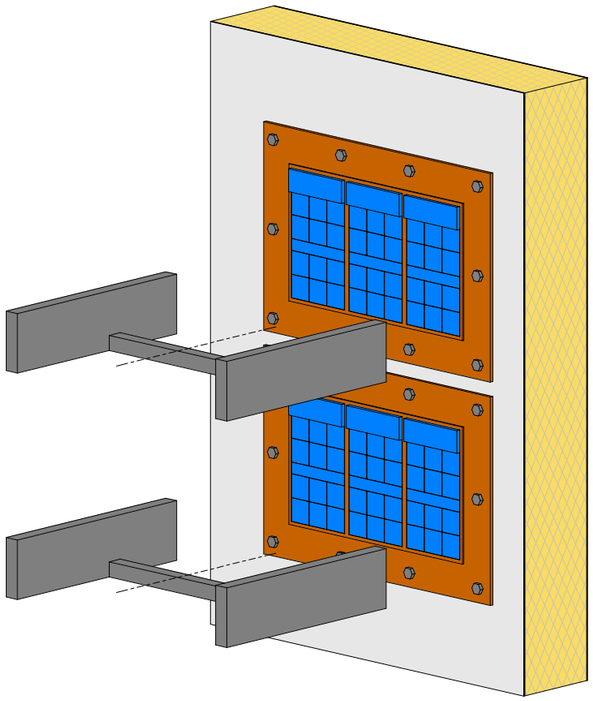
DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2025**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-G-91505		**A3**	**P02**



1 Section View - Generic Cables - Sandwich Panel Wall



A Front View - Generic Cables - Sandwich Panel Wall



3D1 3D View - Generic Cables - Sandwich Panel Wall

General guidelines

1. Services crossing fire rated walls that need to be in independent OPEs:
   - Busbar;
   - Fire Extinguish pipes;
   - Dampers;
   - E90 containment;
   - Plastic pipes;
2. OPEs can't be shared between two different types of services (Elec, Mech, Plumbing);
3. Minimum distance between OPEs = 200mm;
4. Minimum distance between bottom of wall (on ground floor) and OPEs = 200mm;
5. Minimum distance between adjacent wall OPEs = 200mm;
6. Minimum distance between columns OPEs = 350mm;
7. Minimum distance between door and OPEs = 200mm, all around;
8. Minimum distance between an OPE and a service smaller than 50mm (no need for OPE) must be 150mm;
9. General gap between OPEs and each element shall be at least 50mm all around;
10. Damper's OPEs shall be based on the Manufacturer's Data Sheet;
11. Service E90 containment must be positioned on the higher position possible;
12. All services must be at least 150 mm away from the nearest wall / column;
13. Services shall not be less than 150mm away on top of each other for a length bigger than 1500mm.

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.

Rev	Date	Description	Sign.	Veri.
P02	04.04.2025	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	JR	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

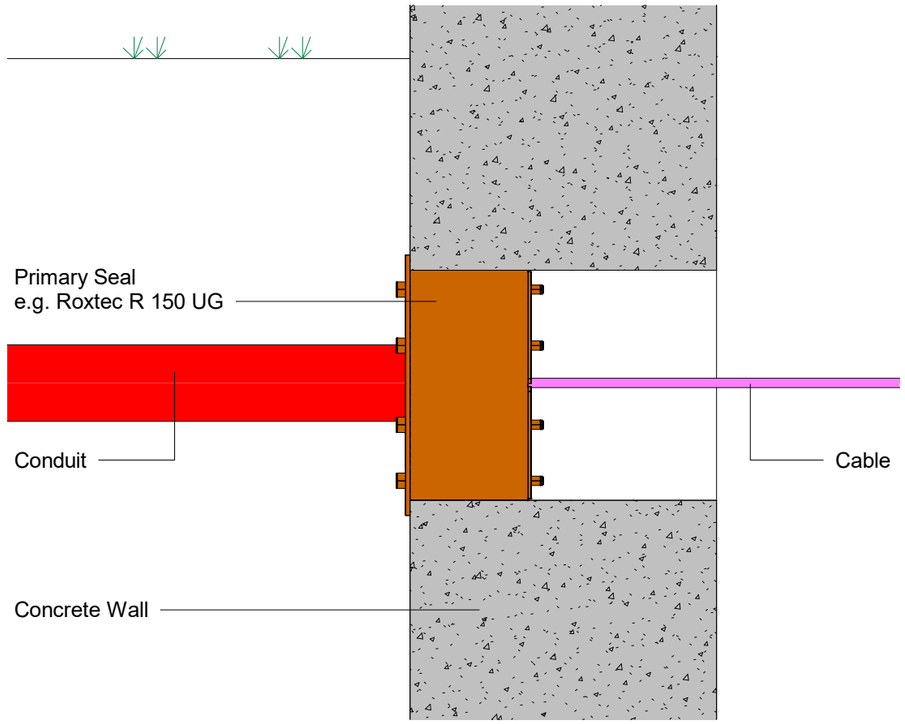
PROJECT NAME:

Execution Design and Engineering Requirements

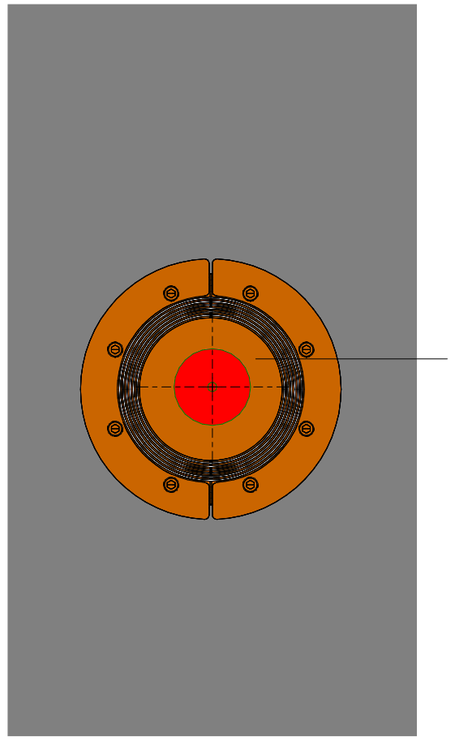
DRAWING NAME:

Wall and Floor Penetrations Roxtec - Generic Cables - Sandwich Panel Wall

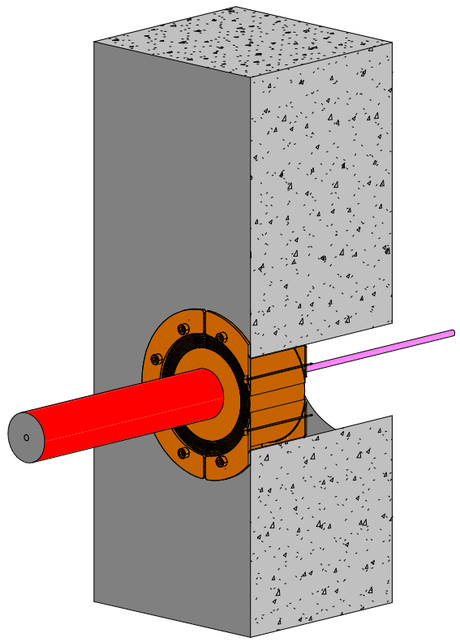
DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2025**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-G-91507		**A3**	**P02**



1 Section View - Cable & Conduit - Concrete Wall



A Front View - Cable & Conduit - Concrete Wall



3D1 3D View - Cable & Conduit - Concrete Wall

General guidelines

1. Services crossing fire rated walls that need to be in independent OPEs:
   - Busbar;
   - Fire Extinguish pipes;
   - Dampers;
   - E90 containment;
   - Plastic pipes;
2. OPEs can't be shared between two different types of services (Elec, Mech, Plumbing);
3. Minimum distance between OPEs = 200mm;
4. Minimum distance between bottom of wall (on ground floor) and OPEs = 200mm;
5. Minimum distance between adjacent wall OPEs = 200mm;
6. Minimum distance between columns OPEs = 350mm;
7. Minimum distance between door and OPEs = 200mm, all around;
8. Minimum distance between an OPE and a service smaller than 50mm (no need for OPE) must be 150mm;
9. General gap between OPEs and each element shall be at least 50mm all around;
10. Damper's OPEs shall be based on the Manufacturer's Data Sheet;
11. Service E90 containment must be positioned on the higher position possible;
12. All services must be at least 150 mm away from the nearest wall / column;
13. Services shall not be less than 150mm away on top of each other for a length bigger than 1500mm.

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.

Rev	Date	Description	Sign.	Veri.
P02	04.04.2025	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	JR	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

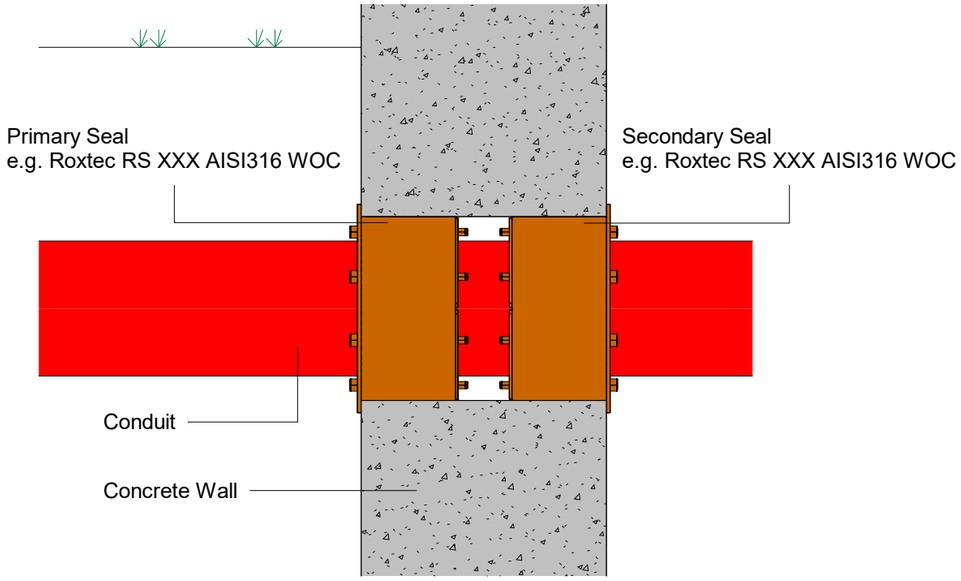
PROJECT NAME:

Execution Design and Engineering Requirements

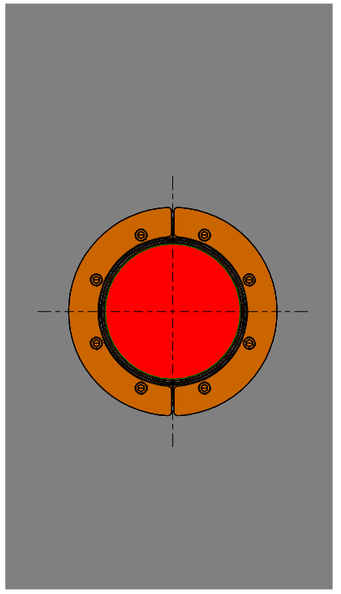
DRAWING NAME:

Wall and Floor Penetrations Roxtec - Cable & Conduit - Concrete Wall

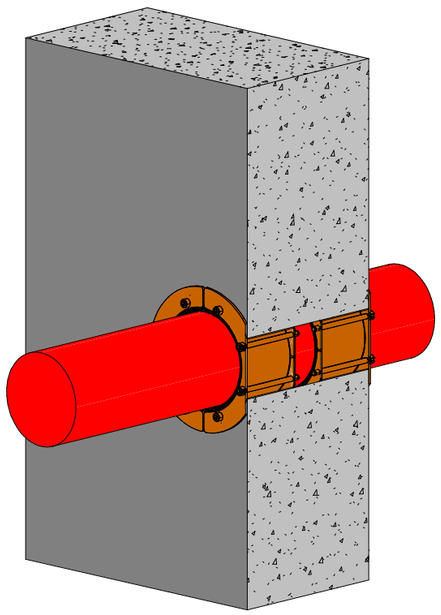
DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2025**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-G-91508		**A3**	**P02**



1 Section View - Conduit - Concrete Wall



A Front View - Conduit - Concrete Wall



3D1 3D View - Conduit - Concrete Wall

General guidelines

1. Services crossing fire rated walls that need to be in independent OPEs:
   - Busbar;
   - Fire Extinguish pipes;
   - Dampers;
   - E90 containment;
   - Plastic pipes;
2. OPEs can't be shared between two different types of services (Elec, Mech, Plumbing);
3. Minimum distance between OPEs = 200mm;
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5. Minimum distance between adjacent wall OPEs = 200mm;
6. Minimum distance between columns OPEs = 350mm;
7. Minimum distance between door and OPEs = 200mm, all around;
8. Minimum distance between an OPE and a service smaller than 50mm (no need for OPE) must be 150mm;
9. General gap between OPEs and each element shall be at least 50mm all around;
10. Damper's OPEs shall be based on the Manufacturer's Data Sheet;
11. Service E90 containment must be positioned on the higher position possible;
12. All services must be at least 150 mm away from the nearest wall / column;
13. Services shall not be less than 150mm away on top of each other for a length bigger than 1500mm.

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.

Rev	Date	Description	Sign.	Veri.
P02	04.04.2025	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	JR	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

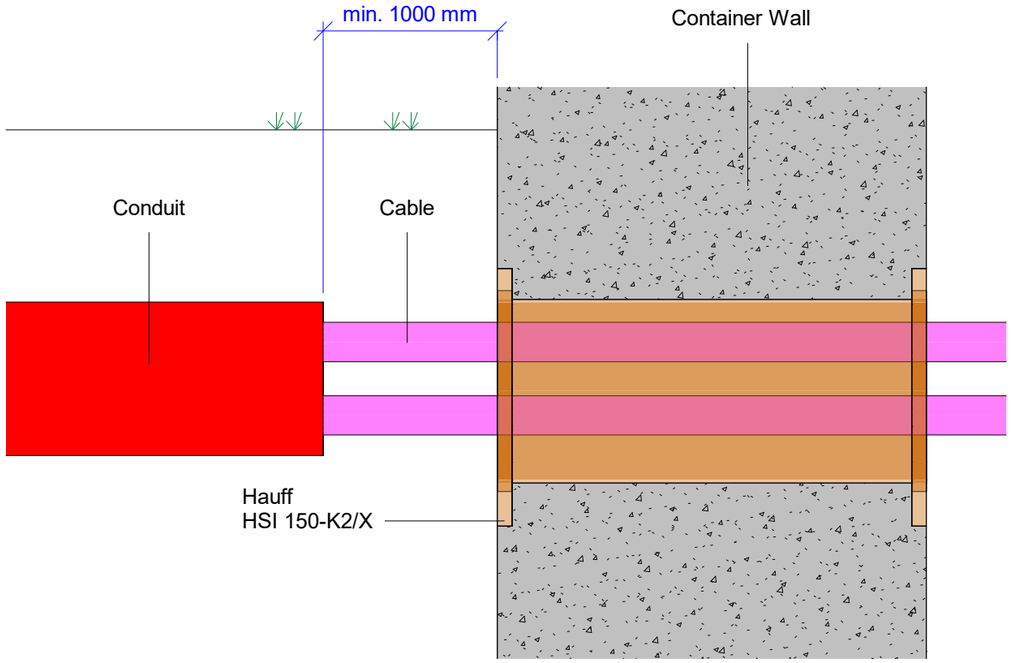
PROJECT NAME:

Execution Design and Engineering Requirements

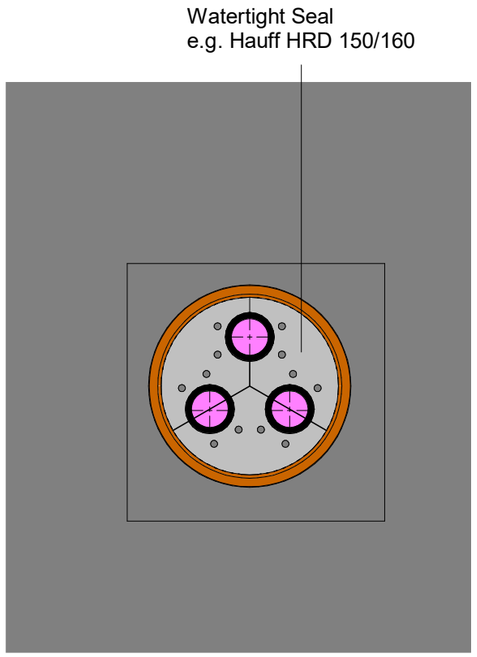
DRAWING NAME:

Wall and Floor Penetrations Roxtec - Conduits - Concrete Wall

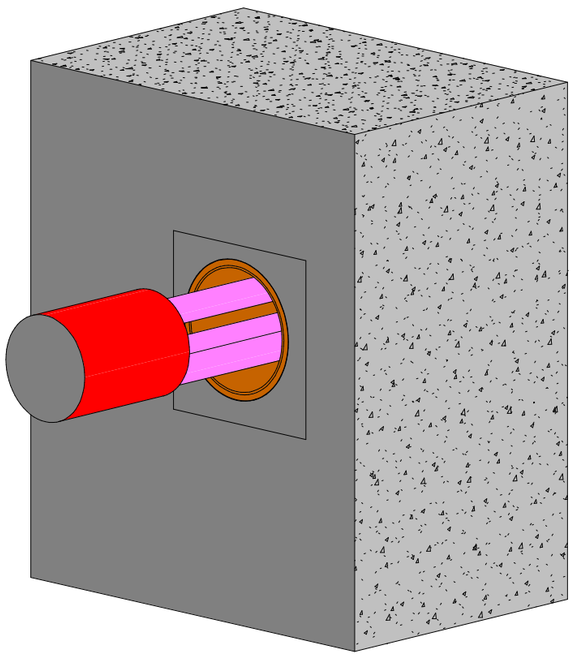
DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2025**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-G-91509		**A3**	**P02**



1 Section View - MV Cable Entries - Concrete Walls



A Front View - MV Cable Entries - Concrete Walls



3D1 3D View - MV Cable Entries - Concrete Walls

General guidelines

1. Services crossing fire rated walls that need to be in independent OPEs:
   - Busbar;
   - Fire Extinguish pipes;
   - Dampers;
   - E90 containment;
   - Plastic pipes;
2. OPEs can't be shared between two different types of services (Elec, Mech, Plumbing);
3. Minimum distance between OPEs = 200mm;
4. Minimum distance between bottom of wall (on ground floor) and OPEs = 200mm;
5. Minimum distance between adjacent wall OPEs = 200mm;
6. Minimum distance between columns OPEs = 350mm;
7. Minimum distance between door and OPEs = 200mm, all around;
8. Minimum distance between an OPE and a service smaller than 50mm (no need for OPE) must be 150mm;
9. General gap between OPEs and each element shall be at least 50mm all around;
10. Damper's OPEs shall be based on the Manufacturer's Data Sheet;
11. Service E90 containment must be positioned on the higher position possible;
12. All services must be at least 150 mm away from the nearest wall / column;
13. Services shall not be less than 150mm away on top of each other for a length bigger than 1500mm.

Notes

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2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.

Rev	Date	Description	Sign.	Veri.
P02	04.04.2025	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	JR	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

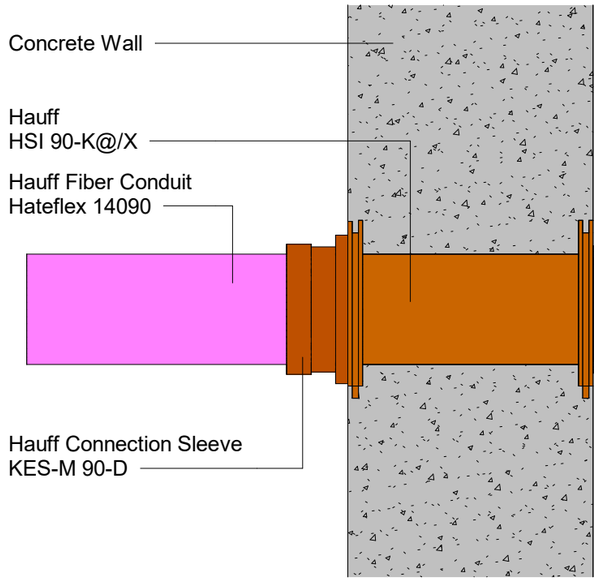
PROJECT NAME:

Execution Design and Engineering Requirements

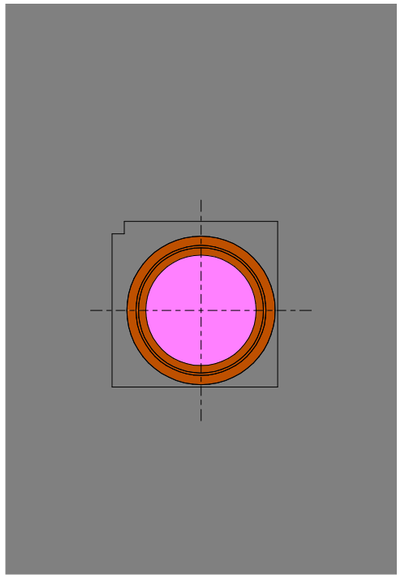
DRAWING NAME:

Wall and Floor Penetrations Hauff - MV Cable Entries - Concrete Wall

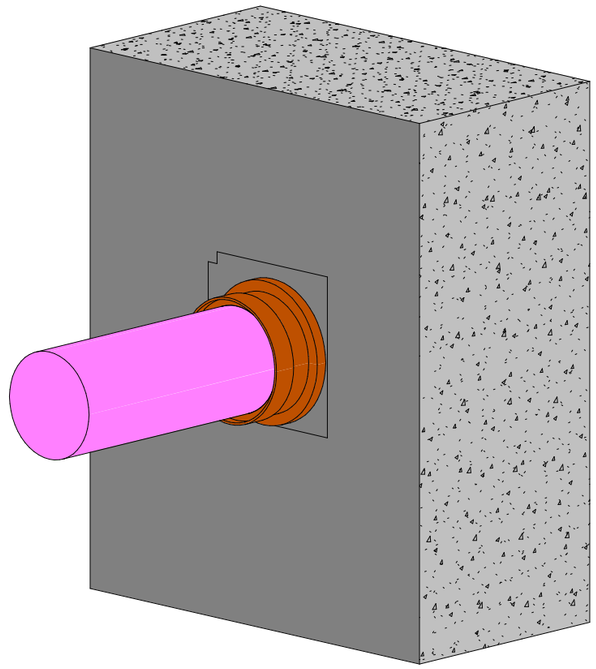
DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2025**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-G-91510		**A3**	**P02**



1 Section View - Fiber Conduit - Concrete Wall



A Front View - Fiber Conduit - Concrete Wall



3D1 3D View - Fiber Conduit - Concrete Wall

General guidelines

1. Services crossing fire rated walls that need to be in independent OPEs:
   - Busbar;
   - Fire Extinguish pipes;
   - Dampers;
   - E90 containment;
   - Plastic pipes;
2. OPEs can't be shared between two different types of services (Elec, Mech, Plumbing);
3. Minimum distance between OPEs = 200mm;
4. Minimum distance between bottom of wall (on ground floor) and OPEs = 200mm;
5. Minimum distance between adjacent wall OPEs = 200mm;
6. Minimum distance between columns OPEs = 350mm;
7. Minimum distance between door and OPEs = 200mm, all around;
8. Minimum distance between an OPE and a service smaller than 50mm (no need for OPE) must be 150mm;
9. General gap between OPEs and each element shall be at least 50mm all around;
10. Damper's OPEs shall be based on the Manufacturer's Data Sheet;
11. Service E90 containment must be positioned on the higher position possible;
12. All services must be at least 150 mm away from the nearest wall / column;
13. Services shall not be less than 150mm away on top of each other for a length bigger than 1500mm.

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.

Rev	Date	Description	Sign.	Veri.
P02	04.04.2025	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	JR	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

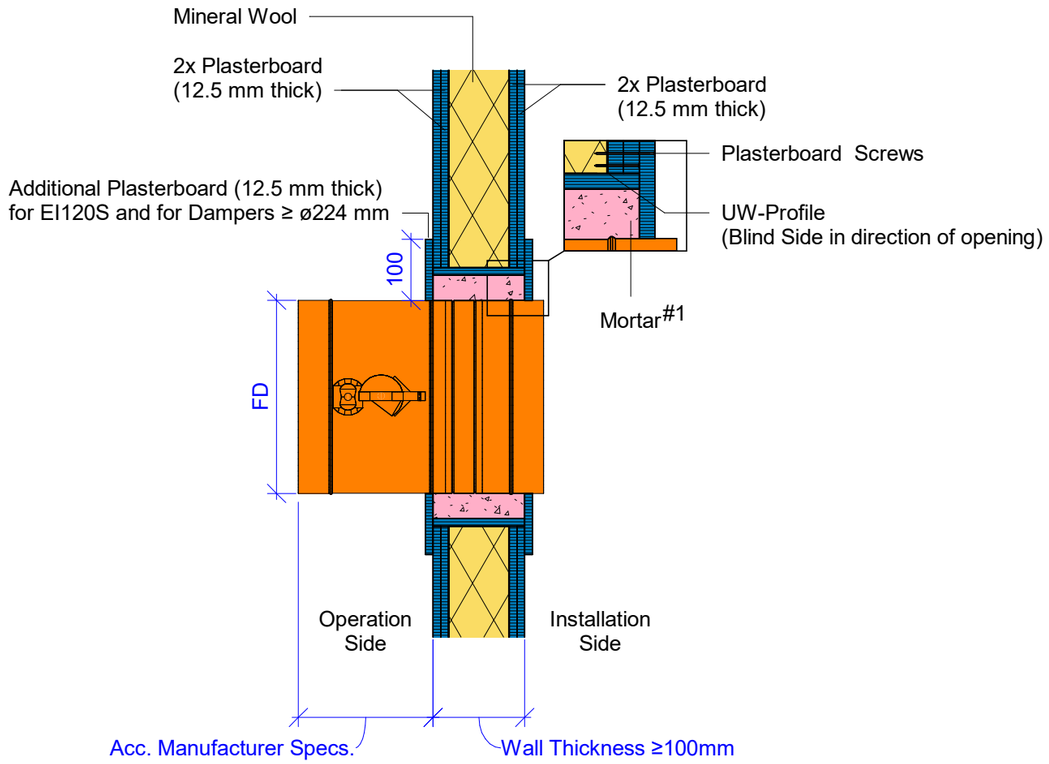
PROJECT NAME:

Execution Design and Engineering Requirements

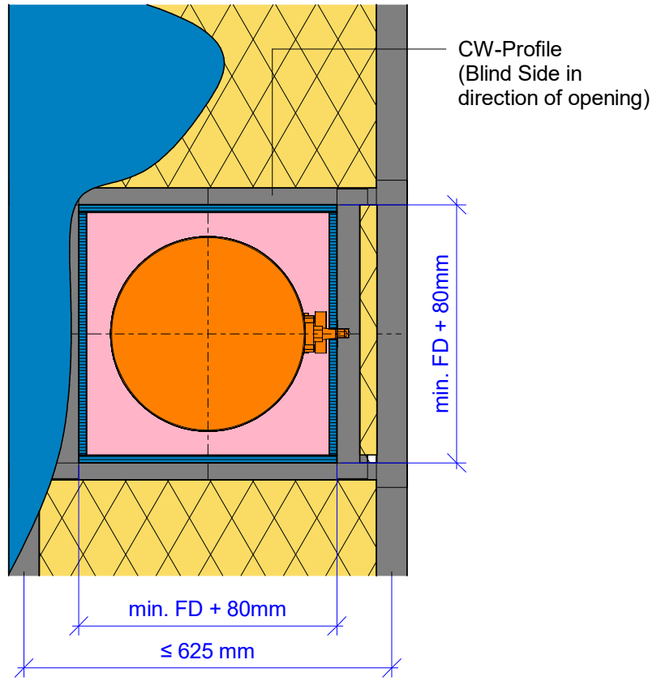
DRAWING NAME:

Wall and Floor Penetrations Hauff - Fiber Conduit - Concrete Wall

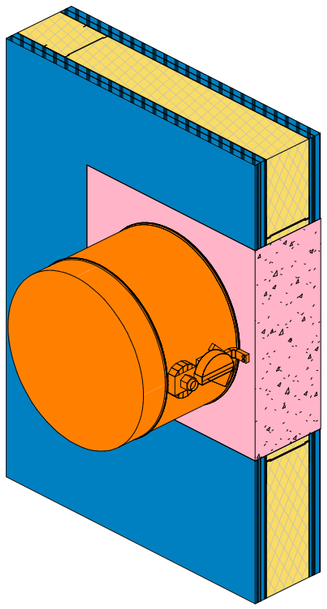
DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2025**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-G-91511		**A3**	**P02**



1 Section View - Motorized Fire Damper - Stud Wall

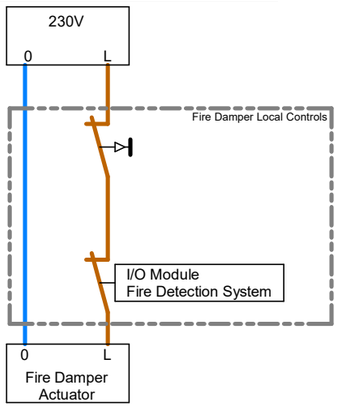


A Front View - Motorized Fire Damper - Stud Wall



3D1 3D View - Motorized Fire Damper - Stud Wall

Wiring (Motorized Damper):



Installation:

- The gap size for the Fire Damper to be:

Round:		Rectangular:	
min.	øDN + 80mm	min.	W + 80mm x H + 80mm
max.	øDN + 150mm	max.	W + 120mm x H + 120mm

- Fill the gap with a fire resistant mortar, mortar according DIN1053 or EN998-2
- Mortar depth to be equal as the wall thickness

Round Damper:	e.g. Trox FKRS-EU/DE	with spring return actuator
	or Trox FKR-EU/DE	with spring return actuator
Rectangular Damper:	e.g. Trox FK-EU/DE	with spring return actuator

#1 Allowed Mortar, e.g. Hilti CFS-M RG
DIN 1053: Mortar Group II, IIa, III, IIIa or Fire Resistant Mortar Group II, III
EN998-2: Mortar Class M2.5 till M10 or Fire Resistant Mortar Class M2.5 till M10

General guidelines

1. Services crossing fire rated walls that need to be in independent OPEs:
   - Busbar;
   - Fire Extinguish pipes;
   - Dampers;
   - E90 containment;
   - Plastic pipes;
2. OPEs can't be shared between two different types of services (Elec, Mech, Plumbing);
3. Minimum distance between OPEs = 200mm;
4. Minimum distance between bottom of wall (on ground floor) and OPEs = 200mm;
5. Minimum distance between adjacent wall OPEs = 200mm;
6. Minimum distance between columns OPEs = 350mm;
7. Minimum distance between door and OPEs = 200mm, all around;
8. Minimum distance between an OPE and a service smaller than 50mm (no need for OPE) must be 150mm;
9. General gap between OPEs and each element shall be at least 50mm all around;
10. Damper's OPEs shall be based on the Manufacturer's Data Sheet;
11. Service E90 containment must be positioned on the higher position possible;
12. All services must be at least 150 mm away from the nearest wall / column;
13. Services shall not be less than 150mm away on top of each other for a length bigger than 1500mm.

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.

Rev	Date	Description	Sign.	Veri.
P02	04.04.2025	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	JR	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

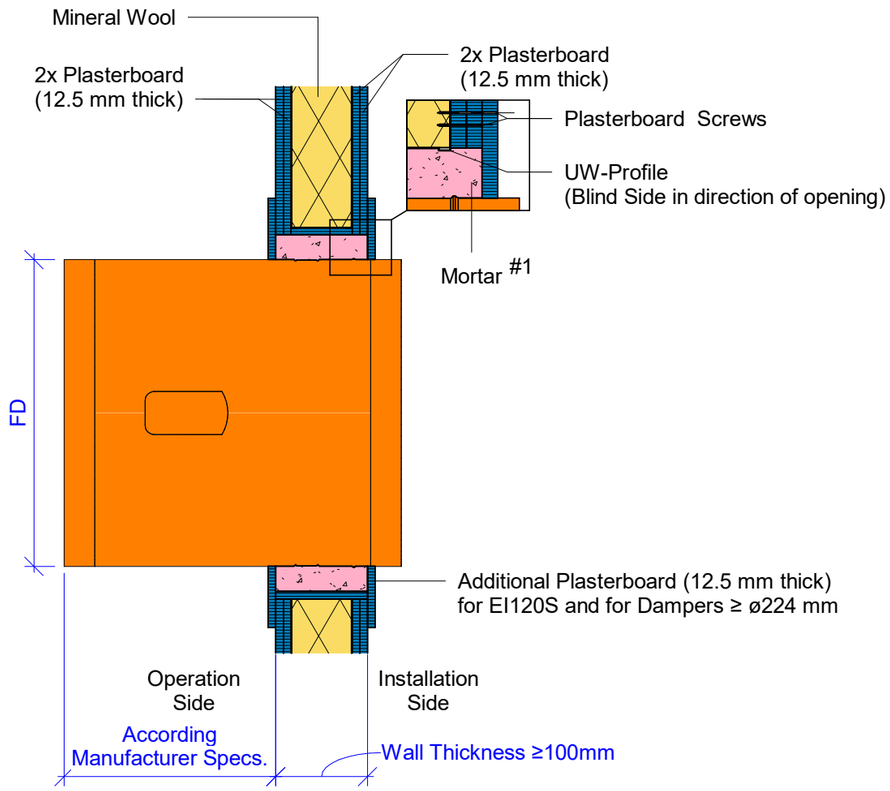
PROJECT NAME:

Execution Design and Engineering Requirements

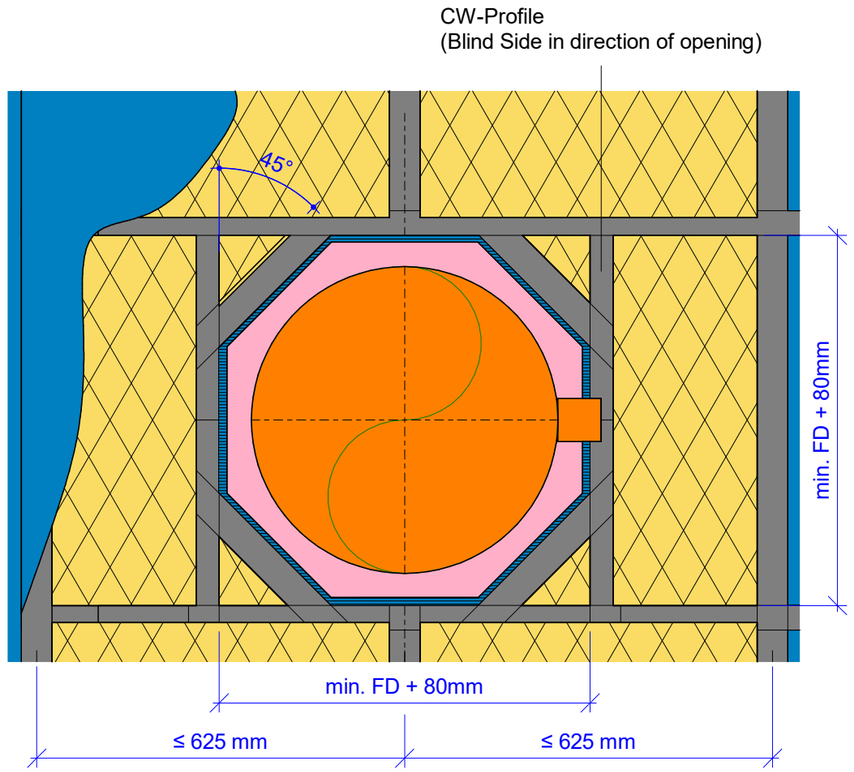
DRAWING NAME:

Wall and Floor Penetrations Mortar - Duct Systems - Fire Damper - Stud Wall - case 1

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2025**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-G-91571		**A3**	**P02**



1 Section View - MFD Big - Stud Wall



A Front View - MFD Big - Stud Wall

Installation:

- The gap size for the Fire Damper to be:

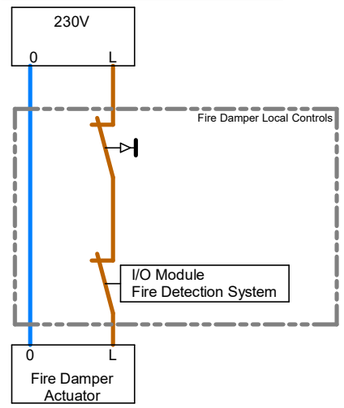
Round:		Rectangular:	
min.	øDN + 80mm	min.	W + 80mm x H + 80mm
max.	øDN + 150mm	max.	W + 120mm x H + 120mm

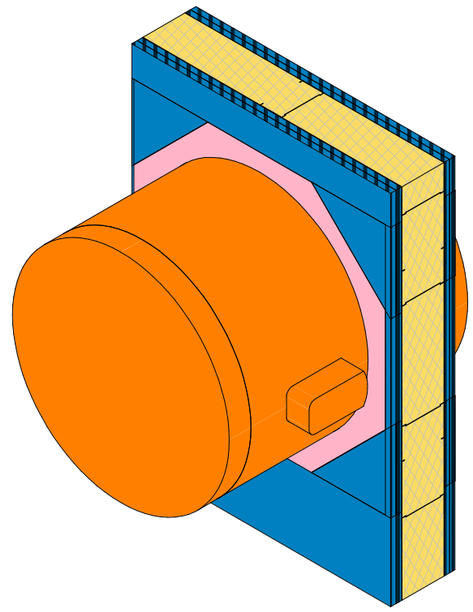
- Fill the gap with a fire resistant mortar, mortar according DIN1053 or EN998-2
- Mortar depth to be equal as the wall thickness

Round Damper:	e.g. Trox FKRS-EU/DE	with spring return actuator
	or Trox FKR-EU/DE	with spring return actuator
Rectangular Damper:	e.g. Trox FK-EU/DE	with spring return actuator

#1 Allowed Mortar, e.g. Hilti CFS-M RG
DIN 1053: Mortar Group II, IIa, III, IIIa or Fire Resistant Mortar Group II, III
EN998-2: Mortar Class M2.5 till M10 or Fire Resistant Mortar Class M2.5 till M10

Wiring (Motorized Damper):





3D1 3D View - MFD Big - Stud Wall

General guidelines

1. Services crossing fire rated walls that need to be in independent OPEs:
   - Busbar;
   - Fire Extinguish pipes;
   - Dampers;
   - E90 containment;
   - Plastic pipes;
2. OPEs can't be shared between two different types of services (Elec, Mech, Plumbing);
3. Minimum distance between OPEs = 200mm;
4. Minimum distance between bottom of wall (on ground floor) and OPEs = 200mm;
5. Minimum distance between adjacent wall OPEs = 200mm;
6. Minimum distance between columns OPEs = 350mm;
7. Minimum distance between door and OPEs = 200mm, all around;
8. Minimum distance between an OPE and a service smaller than 50mm (no need for OPE) must be 150mm;
9. General gap between OPEs and each element shall be at least 50mm all around;
10. Damper's OPEs shall be based on the Manufacturer's Data Sheet;
11. Service E90 containment must be positioned on the higher position possible;
12. All services must be at least 150 mm away from the nearest wall / column;
13. Services shall not be less than 150mm away on top of each other for a length bigger than 1500mm.

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.

Rev	Date	Description	Sign.	Veri.
P02	04.04.2025	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	JR	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

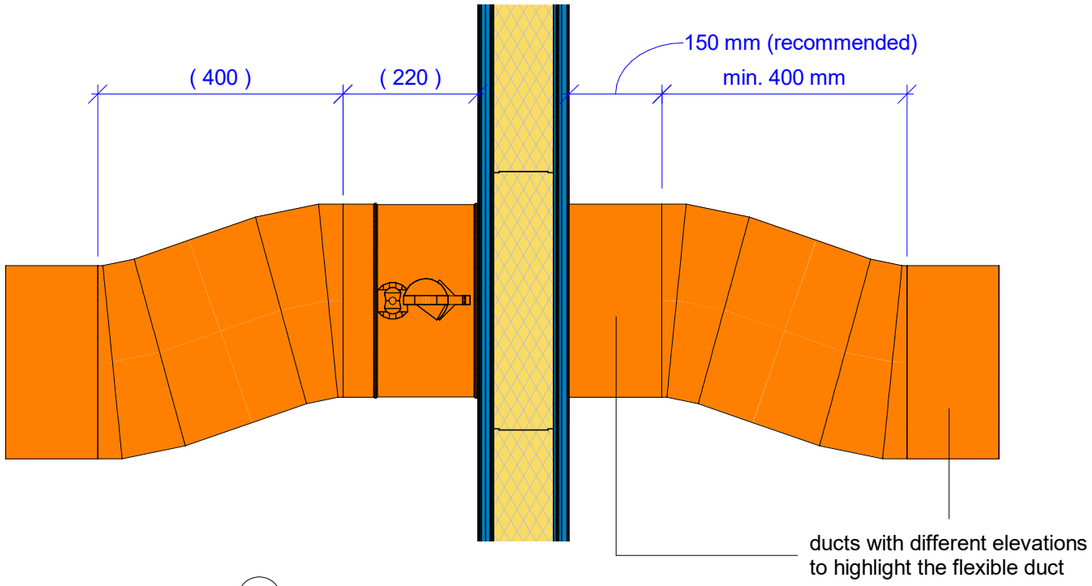
PROJECT NAME:

Execution Design and Engineering Requirements

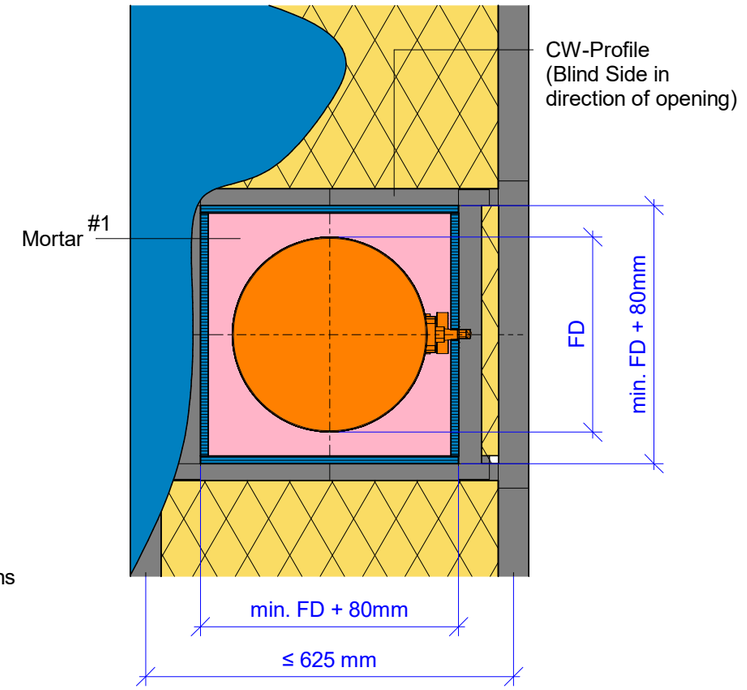
DRAWING NAME:

Wall and Floor Penetrations Mortar - Duct Systems - Fire Damper - Stud Wall - case 2

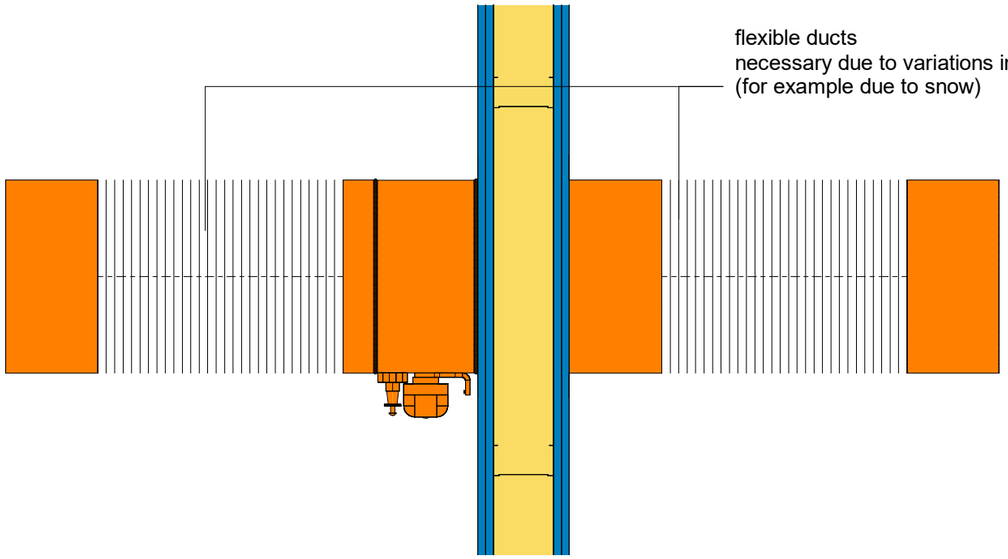
DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2025**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-G-91572		**A3**	**P02**



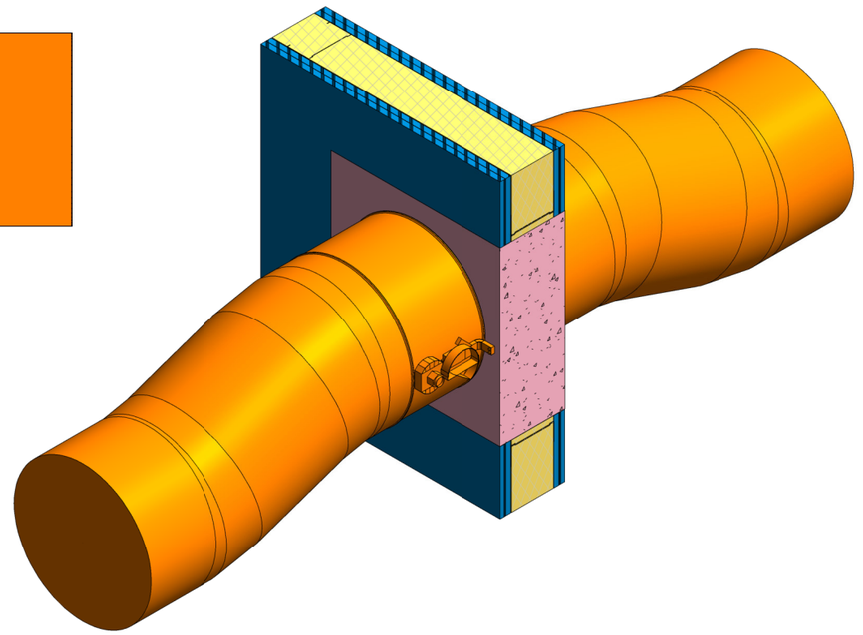
B Front View - Ventilation Flexible Connections - Telescopic Wall



1 Section View - Ventilation Flexible Connections - Telescopic Wall



A Top View - Ventilation Flexible Connections - Telescopic Wall



3D1 3D View - Ventilation Flexible Connections - Telescopic Wall

#1 Allowed Mortar, e.g. Hilti CFS-M RG
DIN1053: Mortar Group II, IIa, III, IIIa or Fire Resistant Mortar Group II, III
En998-2: Mortar Class M2.5 till M10 or Fire Resistant Mortar Class M2.5 till M10

General guidelines

1. Services crossing fire rated walls that need to be in independent OPEs:
   - Busbar;
   - Fire Extinguish pipes;
   - Dampers;
   - E90 containment;
   - Plastic pipes;
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7. Minimum distance between door and OPEs = 200mm, all around;
8. Minimum distance between an OPE and a service smaller than 50mm (no need for OPE) must be 150mm;
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10. Damper's OPEs shall be based on the Manufacturer's Data Sheet;
11. Service E90 containment must be positioned on the higher position possible;
12. All services must be at least 150 mm away from the nearest wall / column;
13. Services shall not be less than 150mm away on top of each other for a length bigger than 1500mm.

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.

Specific Note: - Please refer to RDC0000-BMS-ZZ-ZZ-DR-E-91511 for more information about fire damper installation details.

Rev	Date	Description	Sign.	Veri.
P02	04.04.2025	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	JR	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

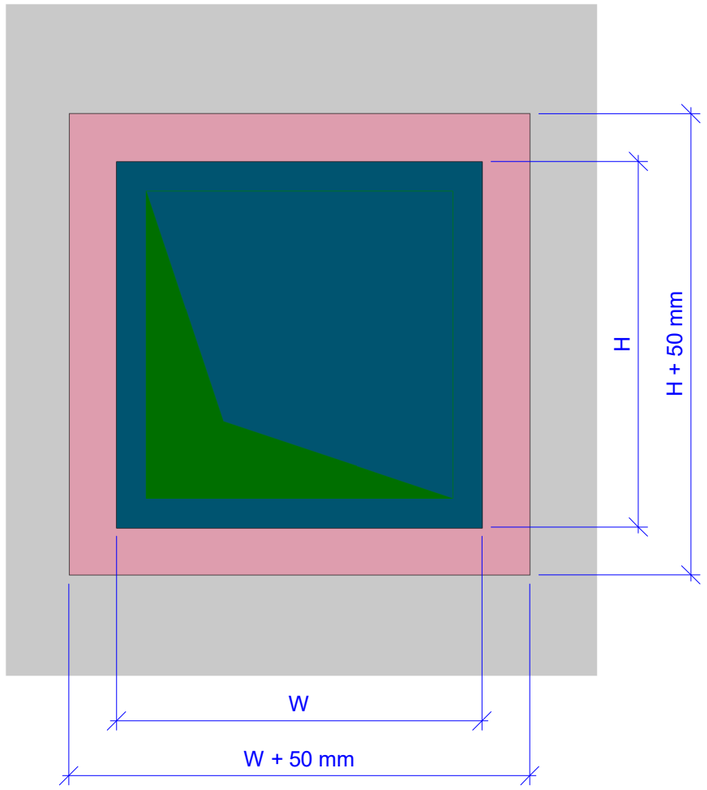
PROJECT NAME:

Execution Design and Engineering Requirements

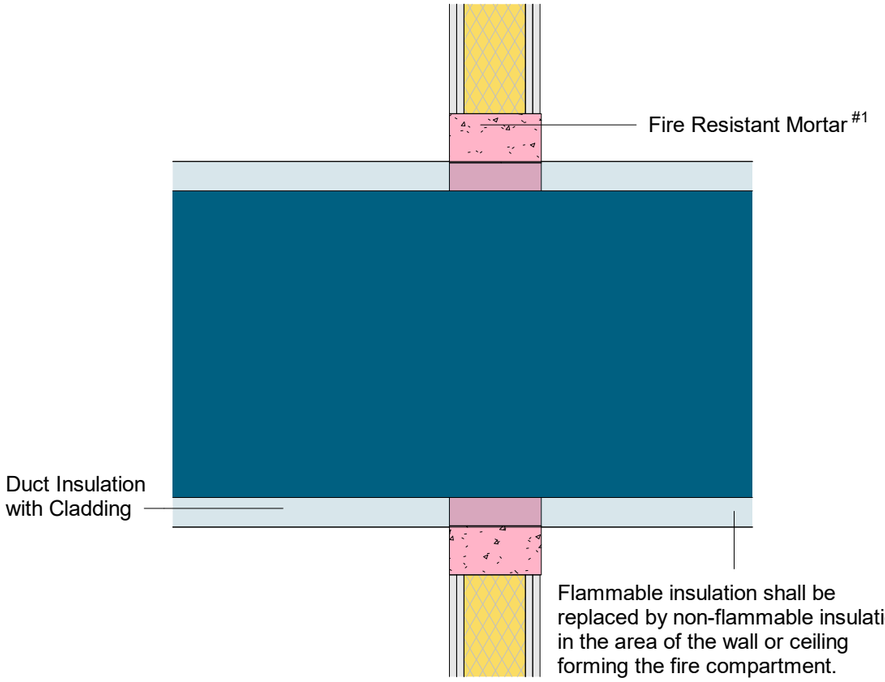
DRAWING NAME:

Wall and Floor Penetrations Mortar - Duct Systems - Flexible Connections - Telescopic Wall

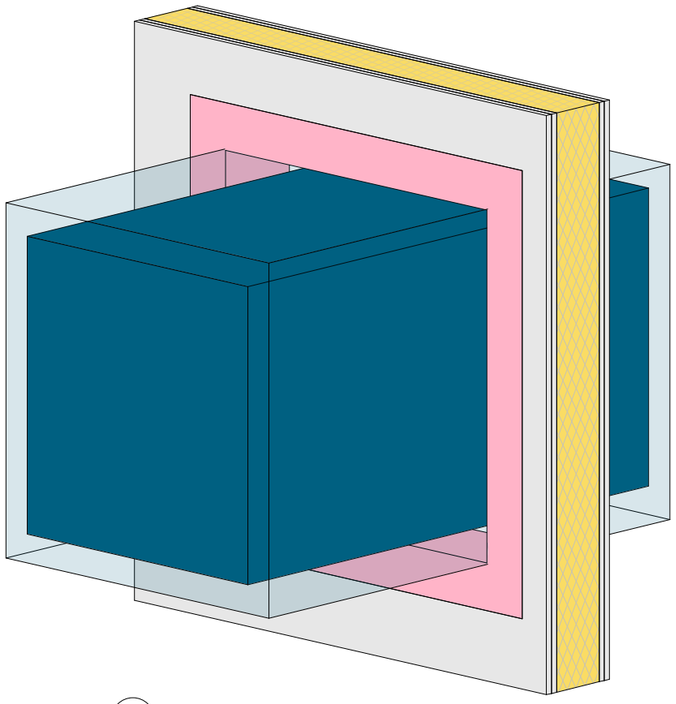
DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2025**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-G-91573		**A3**	**P02**



A Front View - Mortar Duct - Stud Wall



1 Section - Mortar Duct - Stud Wall



3D1 3D View - Mortar Duct - Stud Wall

#1 Allowed Mortar, e.g. Hilti CFS-M RG
DIN1053: Mortar Group II, IIa, III, IIIa or Fire Resistant Mortar Group II, III
En998-2: Mortar Class M2.5 till M10 or Fire Resistant Mortar Class M2.5 till M10

General guidelines

1. Services crossing fire rated walls that need to be in independent OPEs:
   - Busbar;
   - Fire Extinguish pipes;
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   - Plastic pipes;
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9. General gap between OPEs and each element shall be at least 50mm all around;
10. Damper's OPEs shall be based on the Manufacturer's Data Sheet;
11. Service E90 containment must be positioned on the higher position possible;
12. All services must be at least 150 mm away from the nearest wall / column;
13. Services shall not be less than 150mm away on top of each other for a length bigger than 1500mm.

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.

Rev	Date	Description	Sign.	Veri.
P02	04.04.2025	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	JR	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

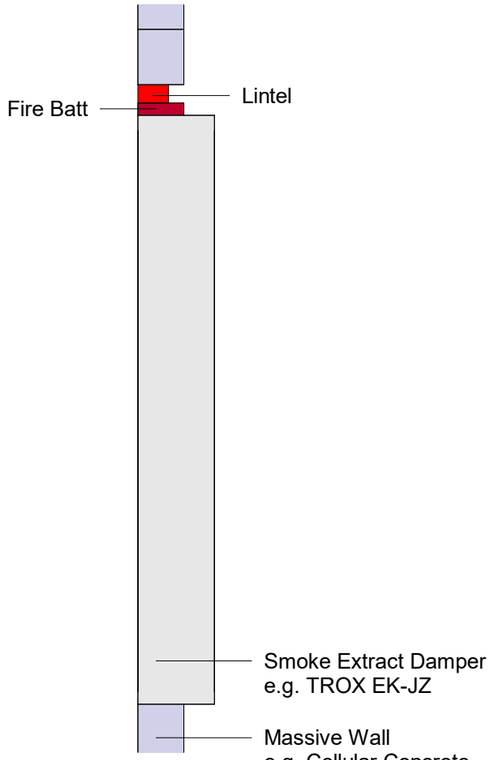
PROJECT NAME:

Execution Design and Engineering Requirements

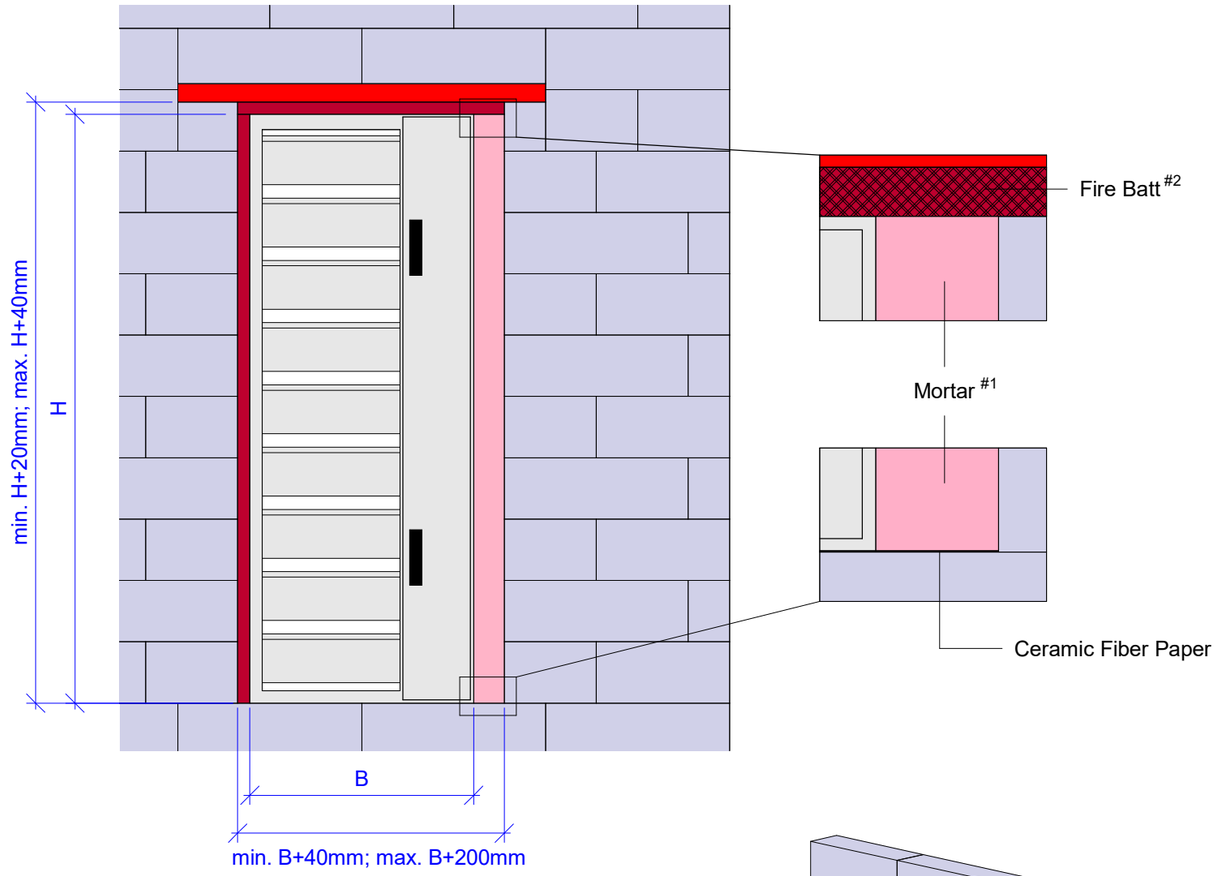
DRAWING NAME:

Wall and Floor Penetrations Mortar - Duct Systems - Stud Wall

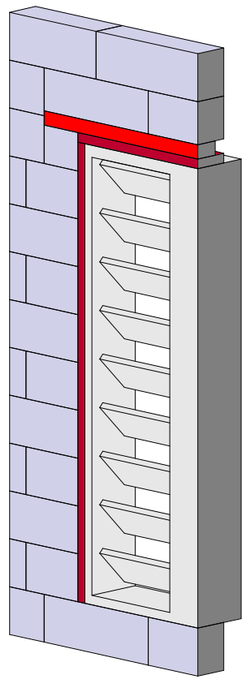
DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2025**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-G-91574		**A3**	**P02**



1 Section View - Smoke Extraction Damper -Cellular Concrete



A Front View - Smoke Extraction Damper -Cellular Concrete



3D1 3D View - Smoke Extraction Damper -Cellular Concrete

#1 Allowed Mortar, e.g. Hilti CFS-M RG
DIN1053: Mortar Group II, IIa, III, IIIa or Fire Resistant Mortar Group II, III
En998-2: Mortar Class M2.5 till M10 or Fire Resistant Mortar Class M2.5 till M10

#2 Allowed Fire Batt
Mineral Wool with a density of ≥80kg/m3 and a melting point of ≥1,000 °C

General guidelines

1. Services crossing fire rated walls that need to be in independent OPEs:
   - Busbar;
   - Fire Extinguish pipes;
   - Dampers;
   - E90 containment;
   - Plastic pipes;
2. OPEs can't be shared between two different types of services (Elec, Mech, Plumbing);
3. Minimum distance between OPEs = 200mm;
4. Minimum distance between bottom of wall (on ground floor) and OPEs = 200mm;
5. Minimum distance between adjacent wall OPEs = 200mm;
6. Minimum distance between columns OPEs = 350mm;
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8. Minimum distance between an OPE and a service smaller than 50mm (no need for OPE) must be 150mm;
9. General gap between OPEs and each element shall be at least 50mm all around;
10. Damper's OPEs shall be based on the Manufacturer's Data Sheet;
11. Service E90 containment must be positioned on the higher position possible;
12. All services must be at least 150 mm away from the nearest wall / column;
13. Services shall not be less than 150mm away on top of each other for a length bigger than 1500mm.

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.

Rev	Date	Description	Sign.	Veri.
P02	04.04.2025	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	JR	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

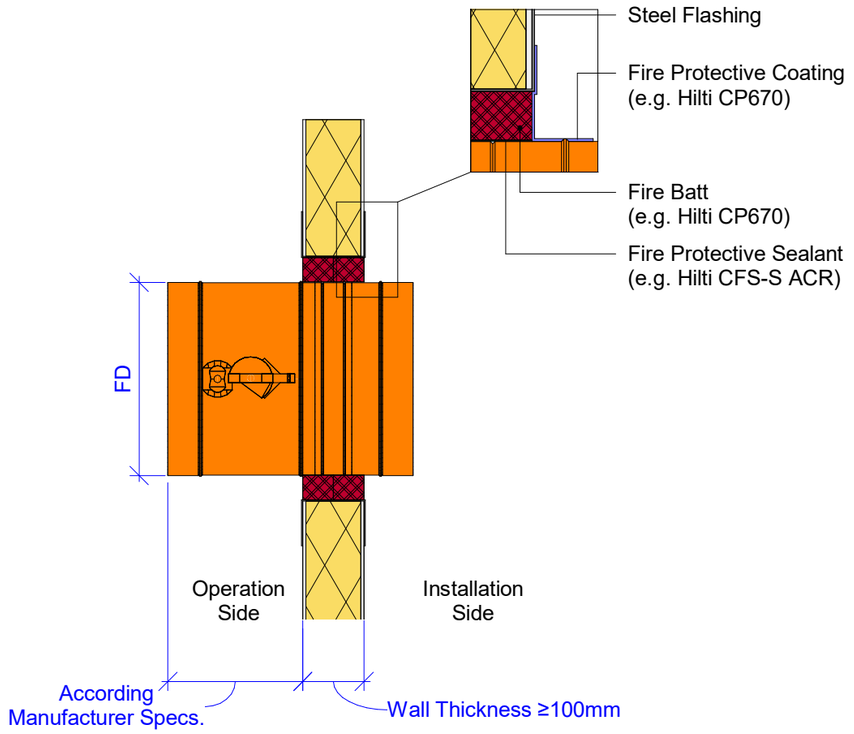
PROJECT NAME:

Execution Design and Engineering Requirements

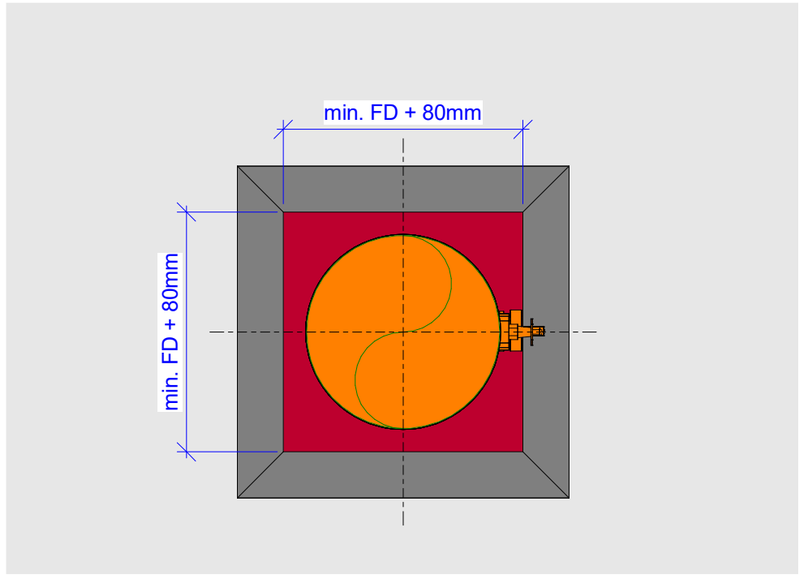
DRAWING NAME:

Wall and Floor Penetrations Mortar-Fire Batt -Smoke Exhaust Damper - Cellular Concrete Wall

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2025**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-G-91575		**A3**	**P02**



1 Section View - MFD - Sandwich Panel Wall



A Front View - MFD - Sandwich Panel Wall

General guidelines

1. Services crossing fire rated walls that need to be in independent OPEs:
   - Busbar;
   - Fire Extinguish pipes;
   - Dampers;
   - E90 containment;
   - Plastic pipes;
2. OPEs can't be shared between two different types of services (Elec, Mech, Plumbing);
3. Minimum distance between OPEs = 200mm;
4. Minimum distance between bottom of wall (on ground floor) and OPEs = 200mm;
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8. Minimum distance between an OPE and a service smaller than 50mm (no need for OPE) must be 150mm;
9. General gap between OPEs and each element shall be at least 50mm all around;
10. Damper's OPEs shall be based on the Manufacturer's Data Sheet;
11. Service E90 containment must be positioned on the higher position possible;
12. All services must be at least 150 mm away from the nearest wall / column;
13. Services shall not be less than 150mm away on top of each other for a length bigger than 1500mm.

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.

Installation:

- The gap size for the Fire Damper to be:

Round:		Rectangular:	
min.	øDN + 80mm	min.	W + 80mm x H + 80mm
max.	øDN + 120mm	max.	W + 120mm x H + 120mm

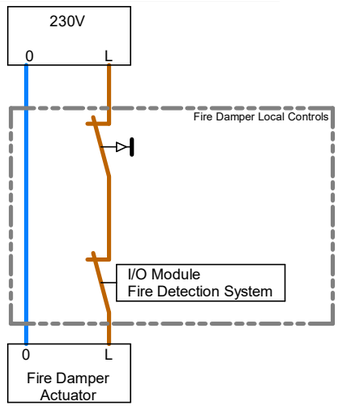
- Completely close off the gap between Fire Damper and wall opening with layers of Fire Batt (boards made of coated mineral wool) with a density of ≥ 140 kg/m³, e.g. Hilti CP670
  #2 layers for walls of 100 mm thickness
  #3 layers for walls of 150 mm thickness
  All cut edges of the fire batt shall be treated with fire protective sealant before installation.
  After installation all gaps, joints, transitions and any imperfecrtions shall be sealed with fire protective sealant, e.g. CFS-S ACR

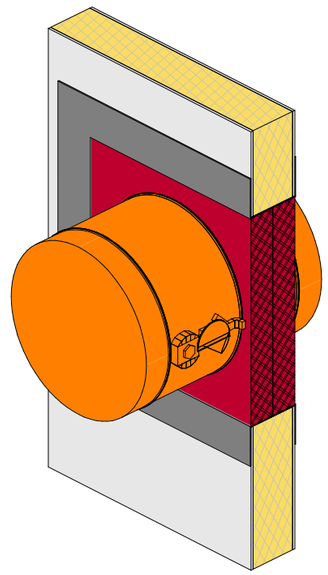
- Apply a fire protective coating (at least 2.5 mm thick) to the fire damper and the fire batt, on both sides of the wall, e.g. Hilti CP670
  On Installation Side the coating shall be up to the flange.
  On Operation Side the coating shall be up to approx. 50 mm from the wall.

- The actuator and release unit of the Fire Damper not to be coated with fire protective coating (Operation Side).

Round Damper: e.g. Trox FKRS-EU with spring return actuator or Trox FKR-EU with spring return actuator
Rectangular Damper: e.g. Trox FK-EU with spring return actuator

Wiring (Motorized Damper):





3D1 3D View - MFD - Sandwich Panel Wall

Rev	Date	Description	Sign.	Veri.
P02	04.04.2025	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	JR	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

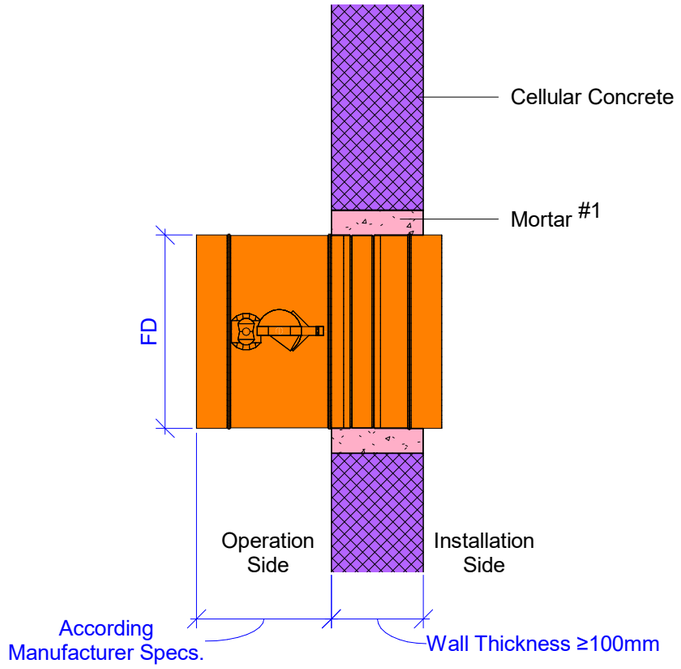
PROJECT NAME:

Execution Design and Engineering Requirements

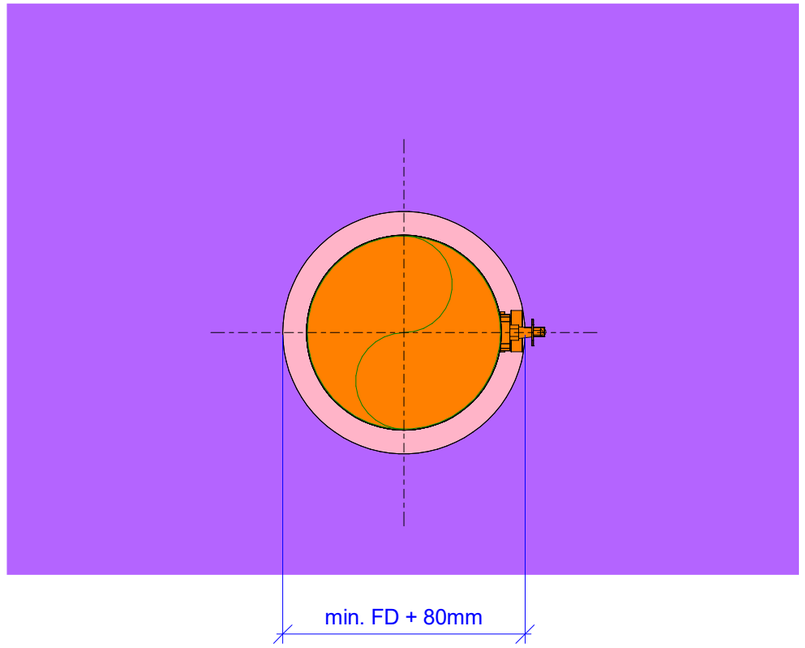
DRAWING NAME:

Wall and Floor Penetrations Fire Batt -Duct Systems - Fire Damper -Sandwich Panel Wall

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2025**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-G-91576		**A3**	**P02**



1 Section View - Round Mortar - MFD - Cellular Concrete



A Front View - Round Mortar - MFD - Cellular Concrete

Installation:

- The gap size for the Fire Damper to be:

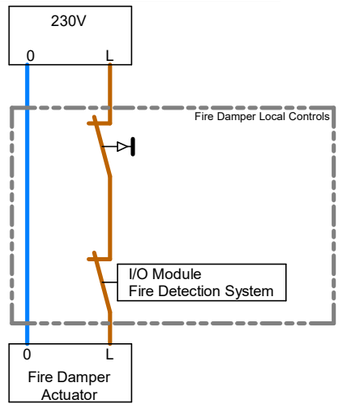
Round:		Rectangular:	
min.	øDN + 80mm	min.	W + 80mm x H + 80mm
max.	øDN + 150mm	max.	W + 120mm x H + 120mm

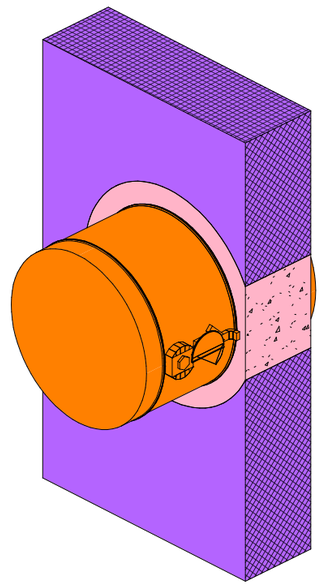
- Fill the gap with a fire resistant mortar, mortar according DIN1053 or EN998-2
- Mortar depth to be equal as the wall thickness

Round Damper:	e.g. Trox FKRS-EU/DE	with spring return actuator
	or Trox FKR-EU/DE	with spring return actuator
Rectangular Damper:	e.g. Trox FK-EU/DE	with spring return actuator

#1 Allowed Mortar, e.g. Hilti CFS-M RG
DIN 1053: Mortar Group II, IIa, III, IIIa or Fire Resistant Mortar Group II, III
EN998-2: Mortar Class M2.5 till M10 or Fire Resistant Mortar Class M2.5 till M10

Wiring (Motorized Damper):





3D1 3D View - Round Mortar - MFD - Cellular Concrete

General guidelines

1. Services crossing fire rated walls that need to be in independent OPEs:
   - Busbar;
   - Fire Extinguish pipes;
   - Dampers;
   - E90 containment;
   - Plastic pipes;
2. OPEs can't be shared between two different types of services (Elec, Mech, Plumbing);
3. Minimum distance between OPEs = 200mm;
4. Minimum distance between bottom of wall (on ground floor) and OPEs = 200mm;
5. Minimum distance between adjacent wall OPEs = 200mm;
6. Minimum distance between columns OPEs = 350mm;
7. Minimum distance between door and OPEs = 200mm, all around;
8. Minimum distance between an OPE and a service smaller than 50mm (no need for OPE) must be 150mm;
9. General gap between OPEs and each element shall be at least 50mm all around;
10. Damper's OPEs shall be based on the Manufacturer's Data Sheet;
11. Service E90 containment must be positioned on the higher position possible;
12. All services must be at least 150 mm away from the nearest wall / column;
13. Services shall not be less than 150mm away on top of each other for a length bigger than 1500mm.

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.

Rev	Date	Description	Sign.	Veri.
P02	04.04.2025	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	JR	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

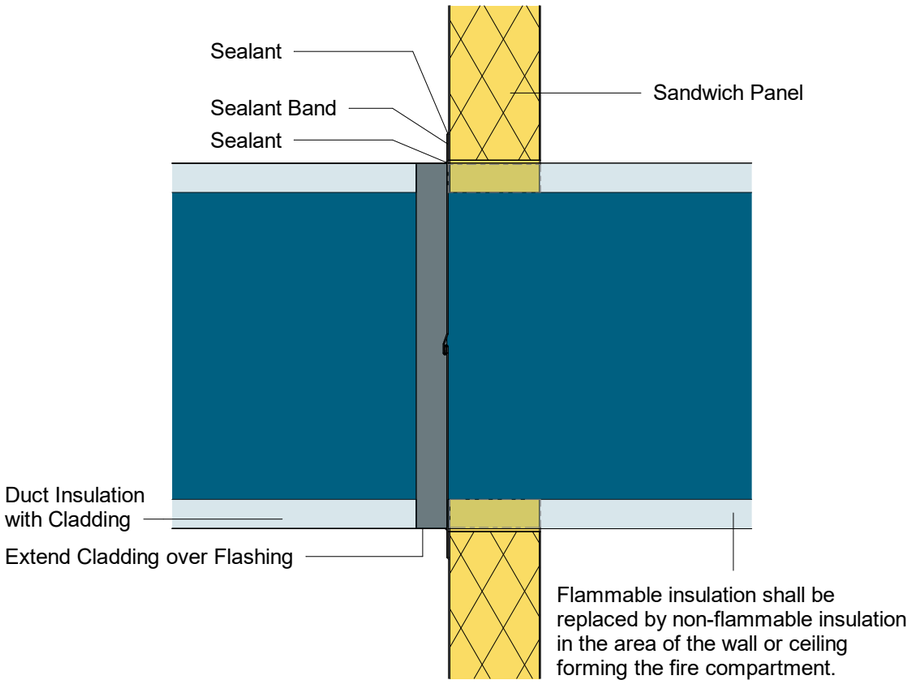
PROJECT NAME:

Execution Design and Engineering Requirements

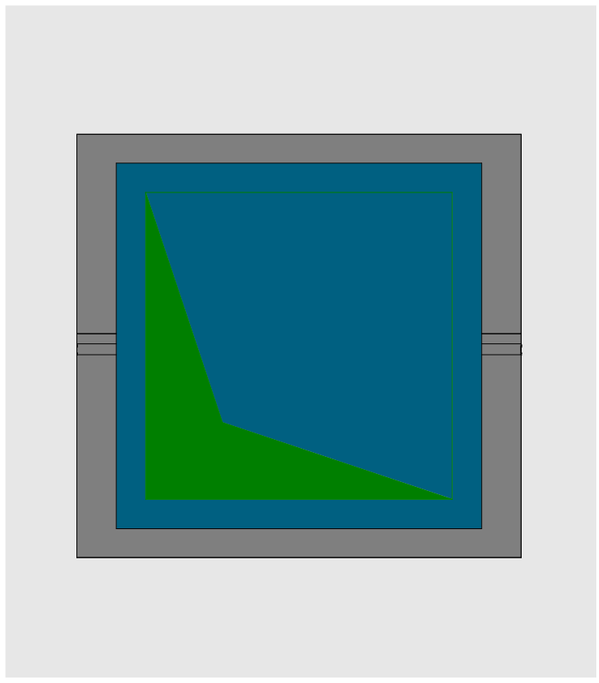
DRAWING NAME:

Wall and Floor Penetrations Mortar (Round) -Duct Syst -Fire Damper -Cellular Concrete Wall

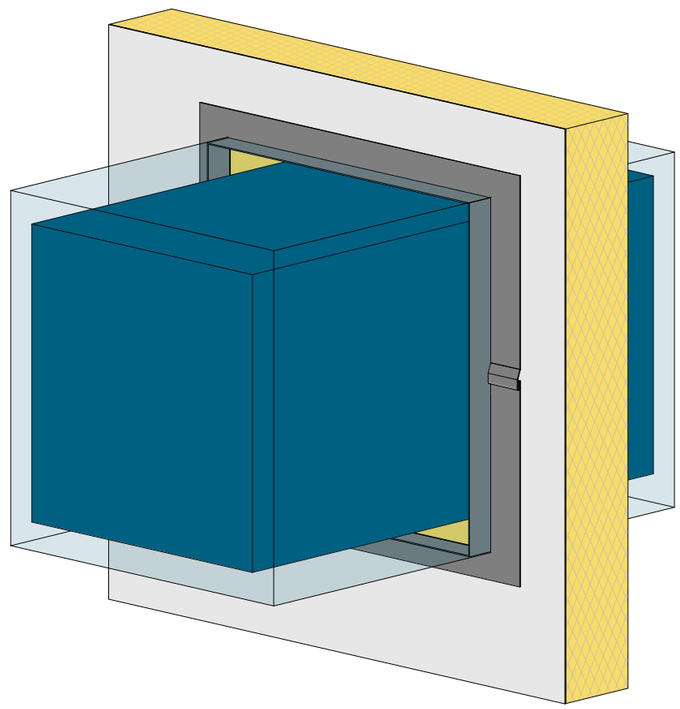
DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2025**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-G-91577		**A3**	**P02**



1 Section - Duct - Sandwich Panel Wall



A Front View - Duct - Sandwich Panel Wall



3D1 3D View - Duct - Sandwich Panel Wall

General guidelines

1. Services crossing fire rated walls that need to be in independent OPEs:
   - Busbar;
   - Fire Extinguish pipes;
   - Dampers;
   - E90 containment;
   - Plastic pipes;
2. OPEs can't be shared between two different types of services (Elec, Mech, Plumbing);
3. Minimum distance between OPEs = 200mm;
4. Minimum distance between bottom of wall (on ground floor) and OPEs = 200mm;
5. Minimum distance between adjacent wall OPEs = 200mm;
6. Minimum distance between columns OPEs = 350mm;
7. Minimum distance between door and OPEs = 200mm, all around;
8. Minimum distance between an OPE and a service smaller than 50mm (no need for OPE) must be 150mm;
9. General gap between OPEs and each element shall be at least 50mm all around;
10. Damper's OPEs shall be based on the Manufacturer's Data Sheet;
11. Service E90 containment must be positioned on the higher position possible;
12. All services must be at least 150 mm away from the nearest wall / column;
13. Services shall not be less than 150mm away on top of each other for a length bigger than 1500mm.

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.

Rev	Date	Description	Sign.	Veri.
P02	04.04.2025	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	JR	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

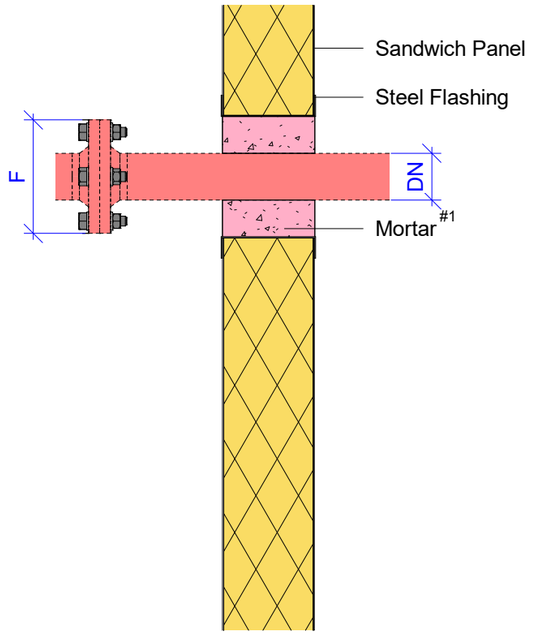
PROJECT NAME:

Execution Design and Engineering Requirements

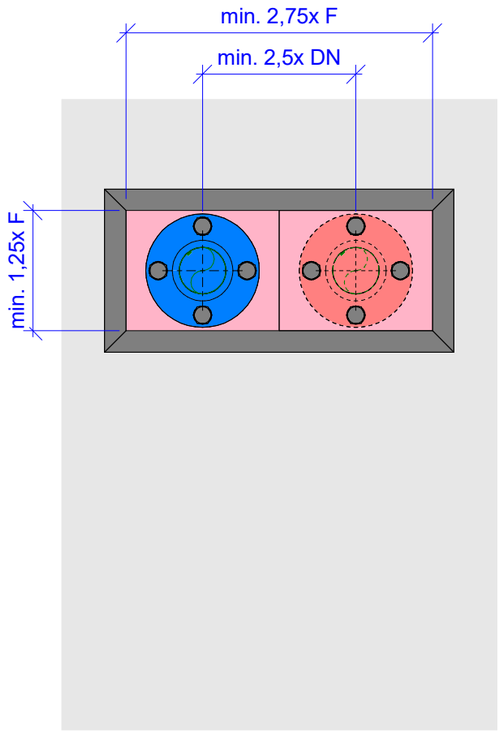
DRAWING NAME:

Wall and Floor Penetrations Sealant - Duct Systems - Sandwich Panel Wall

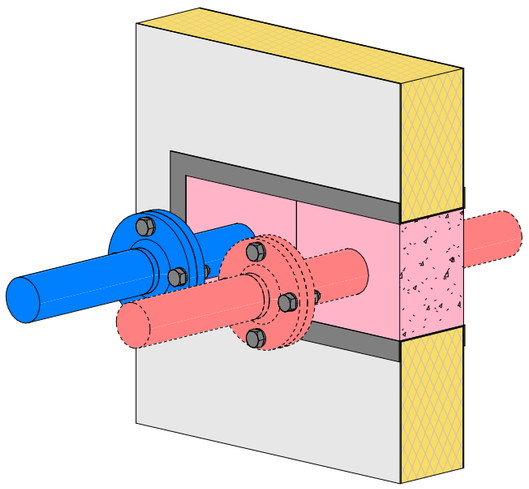
DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2025**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-G-91590		**A3**	**P02**



1 Section View - Mortar Steel Pipe - Sandwich Panel Wall



A Front View - Mortar Steel Pipe - Sandwich Panel Wall



3D1 3D View - Mortar Steel Pipe - Sandwich Panel Wall

#1 Allowed Mortar, e.g. Hilti CFS-M RG
DIN1053: Mortar Group II, IIa, III, IIIa or Fire Resistant Mortar Group II, III
En998-2: Mortar Class M2.5 till M10 or Fire Resistant Mortar Class M2.5 till M10

General guidelines

1. Services crossing fire rated walls that need to be in independent OPEs:
   - Busbar;
   - Fire Extinguish pipes;
   - Dampers;
   - E90 containment;
   - Plastic pipes;
2. OPEs can't be shared between two different types of services (Elec, Mech, Plumbing);
3. Minimum distance between OPEs = 200mm;
4. Minimum distance between bottom of wall (on ground floor) and OPEs = 200mm;
5. Minimum distance between adjacent wall OPEs = 200mm;
6. Minimum distance between columns OPEs = 350mm;
7. Minimum distance between door and OPEs = 200mm, all around;
8. Minimum distance between an OPE and a service smaller than 50mm (no need for OPE) must be 150mm;
9. General gap between OPEs and each element shall be at least 50mm all around;
10. Damper's OPEs shall be based on the Manufacturer's Data Sheet;
11. Service E90 containment must be positioned on the higher position possible;
12. All services must be at least 150 mm away from the nearest wall / column;
13. Services shall not be less than 150mm away on top of each other for a length bigger than 1500mm.

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.

Rev	Date	Description	Sign.	Veri.
P02	04.04.2025	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	JR	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

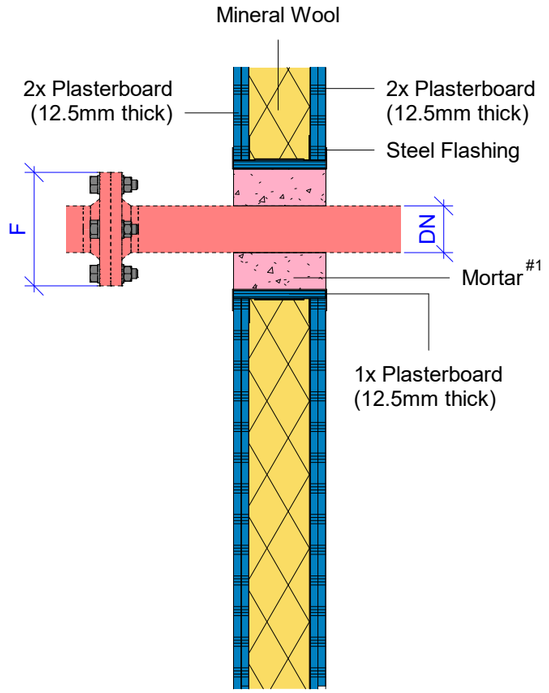
PROJECT NAME:

Execution Design and Engineering Requirements

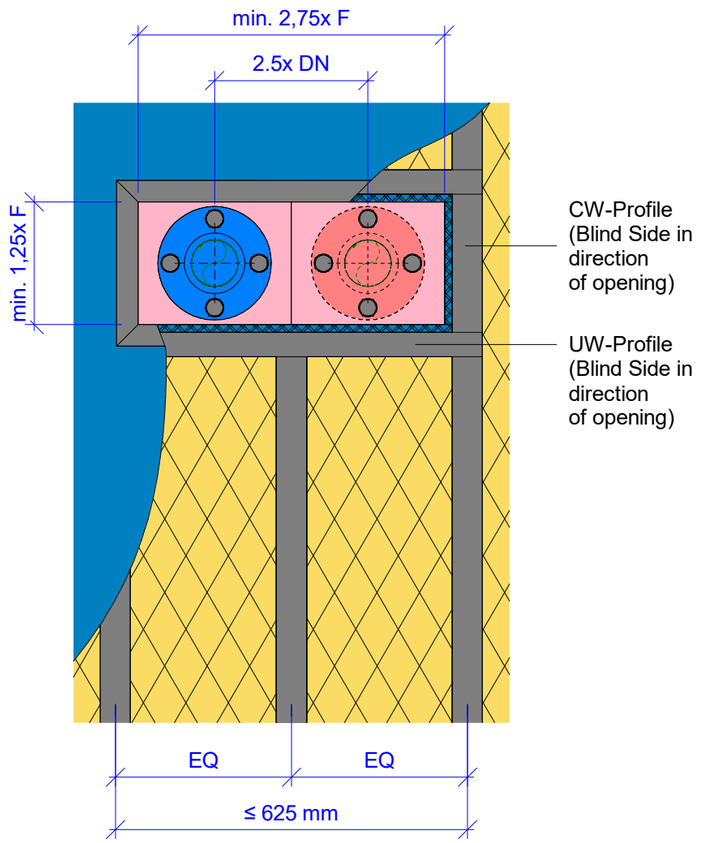
DRAWING NAME:

Wall and Floor Penetrations Mortar -Steel Pipe Systems - Sandwich Panel Wall

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2025**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-G-91596		**A3**	**P02**

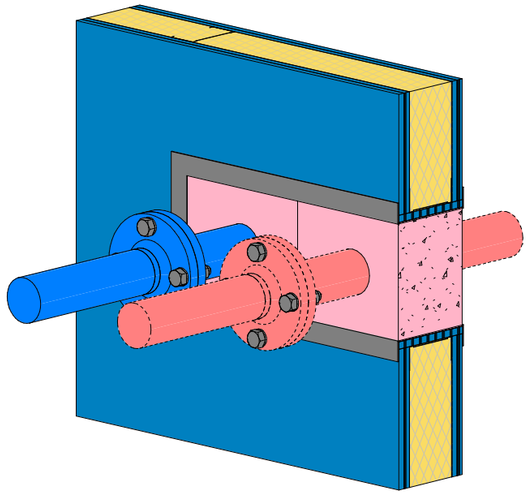


1 Section View - Mortar Steel Pipe - Stud Wall



(if distance > 625 mm, than add additional center profile)

A Front View - Mortar Steel Pipe - Stud Wall



3 3D View - Mortar Steel Pipe - Stud Wall

#1 Allowed Mortar, e.g. Hilti CFS-M RG
DIN1053: Mortar Group II, IIa, III, IIIa or Fire Resistant Mortar Group II, III
En998-2: Mortar Class M2.5 till M10 or Fire Resistant Mortar Class M2.5 till M10

General guidelines

1. Services crossing fire rated walls that need to be in independent OPEs:
   - Busbar;
   - Fire Extinguish pipes;
   - Dampers;
   - E90 containment;
   - Plastic pipes;
2. OPEs can't be shared between two different types of services (Elec, Mech, Plumbing);
3. Minimum distance between OPEs = 200mm;
4. Minimum distance between bottom of wall (on ground floor) and OPEs = 200mm;
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12. All services must be at least 150 mm away from the nearest wall / column;
13. Services shall not be less than 150mm away on top of each other for a length bigger than 1500mm.

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.

Rev	Date	Description	Sign.	Veri.
P02	04.04.2025	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	JR	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

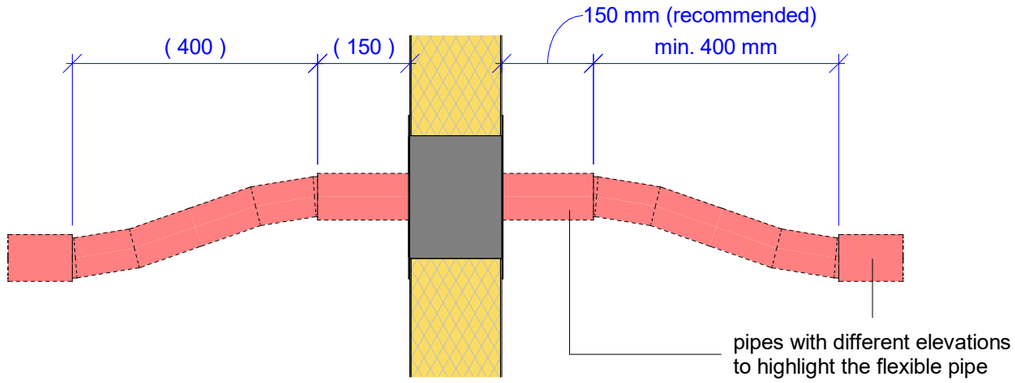
PROJECT NAME:

Execution Design and Engineering Requirements

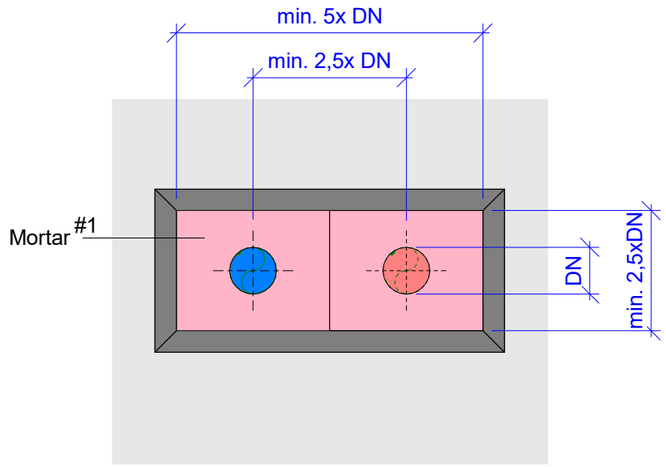
DRAWING NAME:

Wall and Floor Penetrations Mortar - Steel Pipe Systems - Stud Wall

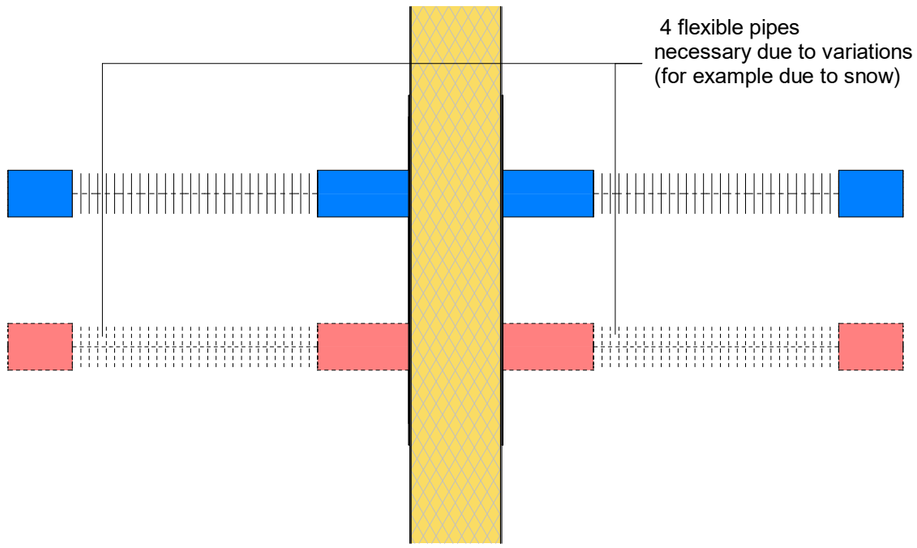
DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2025**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-G-91597		**A3**	**P02**



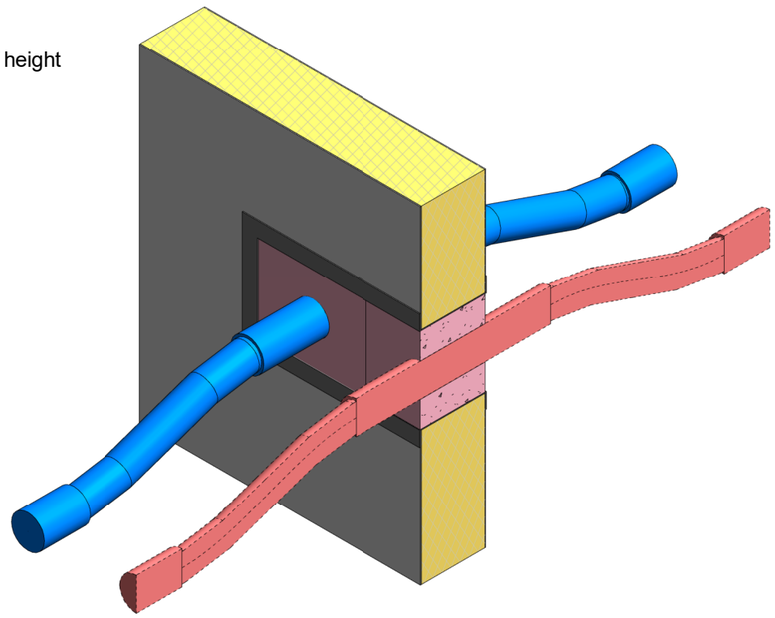
B Front View - Cooling Flexible Connections - Telescopic Wall



1 Section View - Cooling Flexible Connections - Telescopic Wall



A Top View - Cooling Flexible Connections - Telescopic Wall



3D1 3D View - Cooling Flexible Connections - Telescopic Wall

#1 Allowed Mortar, e.g. Hilti CFS-M RG
DIN1053: Mortar Group II, IIa, III, IIIa or Fire Resistant Mortar Group II, III
En998-2: Mortar Class M2.5 till M10 or Fire Resistant Mortar Class M2.5 till M10

General guidelines

1. Services crossing fire rated walls that need to be in independent OPEs:
   - Busbar;
   - Fire Extinguish pipes;
   - Dampers;
   - E90 containment;
   - Plastic pipes;
2. OPEs can't be shared between two different types of services (Elec, Mech, Plumbing);
3. Minimum distance between OPEs = 200mm;
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11. Service E90 containment must be positioned on the higher position possible;
12. All services must be at least 150 mm away from the nearest wall / column;
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Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.

Specific Note: - Please refer to RDC0000-BMS-ZZ-ZZ-DR-E-91514 for more information about pipe typical penetrations details.

Rev	Date	Description	Sign.	Veri.
P02	04.04.2025	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	JR	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

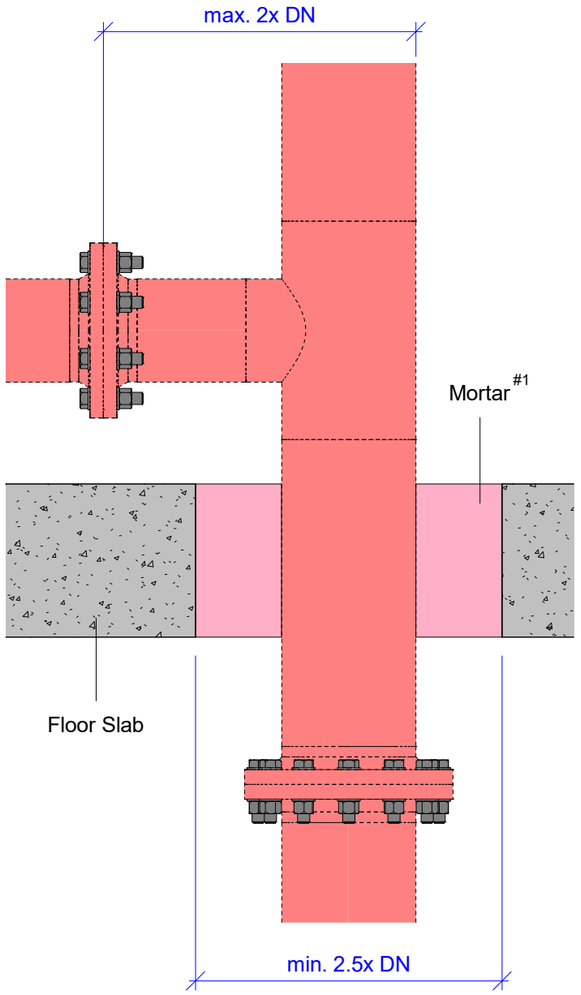
PROJECT NAME:

Execution Design and Engineering Requirements

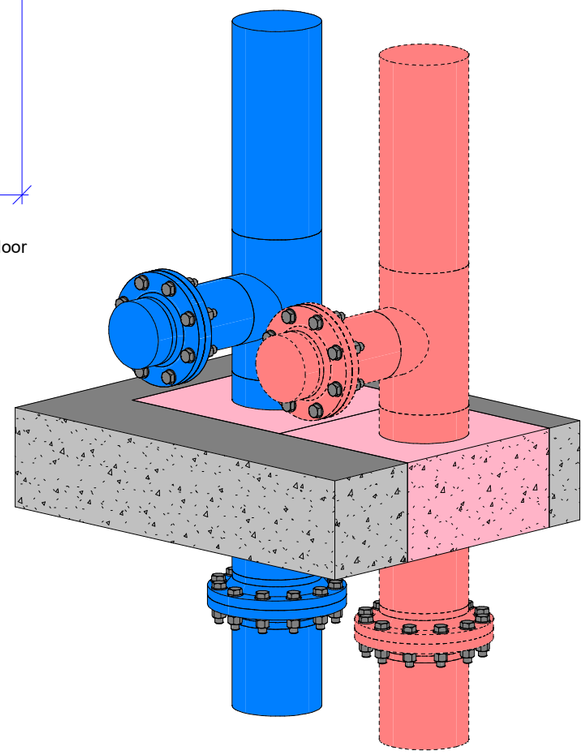
DRAWING NAME:

Wall and Floor Penetrations Mortar - Pipe Systems - Flexible Connections - Telescopic Wall

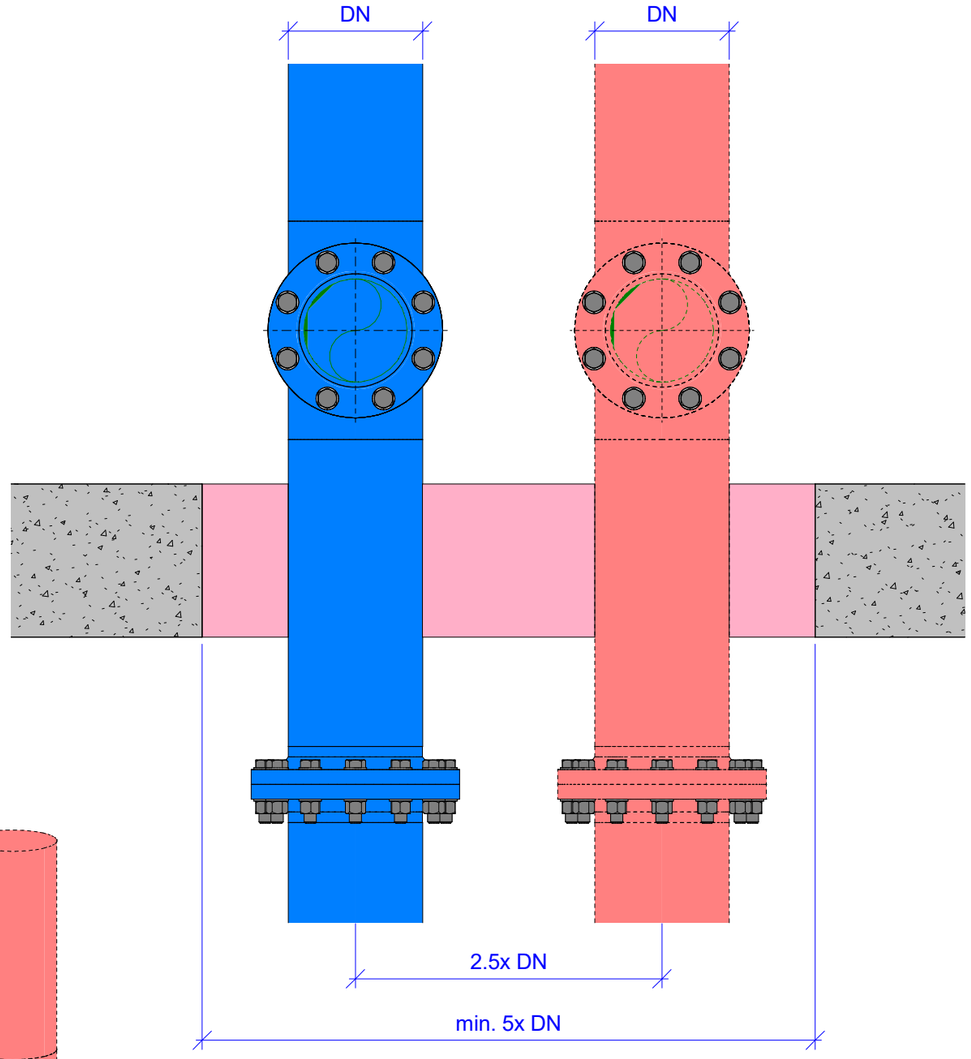
DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2025**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-G-91598		**A3**	**P02**



1 Section View - Mortar Steel Pipe - Concrete Floor



3D1 3D View - Mortar Steel Pipe - Concrete Floor



A Front View - Mortar Steel Pipe - Concrete Floor

#1 Allowed Mortar, e.g. Hilti CFS-M RG
DIN1053: Mortar Group II, IIa, III, IIIa or Fire Resistant Mortar Group II, III
En998-2: Mortar Class M2.5 till M10 or Fire Resistant Mortar Class M2.5 till M10

General guidelines

1. Services crossing fire rated walls that need to be in independent OPEs:
   - Busbar;
   - Fire Extinguish pipes;
   - Dampers;
   - E90 containment;
   - Plastic pipes;
2. OPEs can't be shared between two different types of services (Elec, Mech, Plumbing);
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13. Services shall not be less than 150mm away on top of each other for a length bigger than 1500mm.

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.

Rev	Date	Description	Sign.	Veri.
P02	04.04.2025	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	JR	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

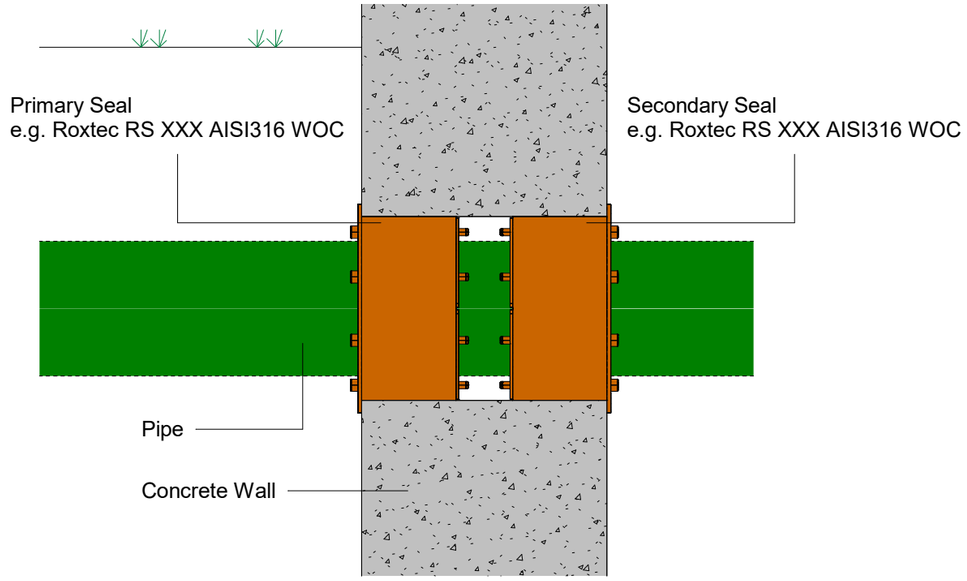
PROJECT NAME:

Execution Design and Engineering Requirements

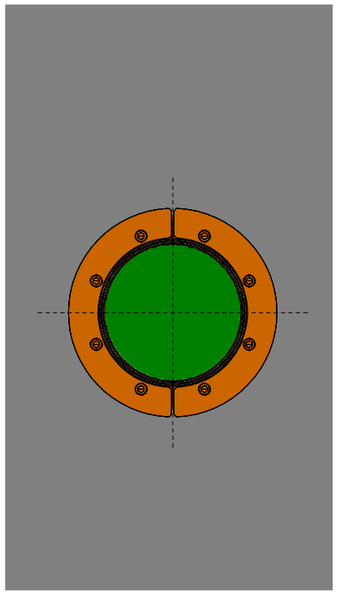
DRAWING NAME:

Wall and Floor Penetrations Mortar -Steel Pipe Systems - Concrete Floor

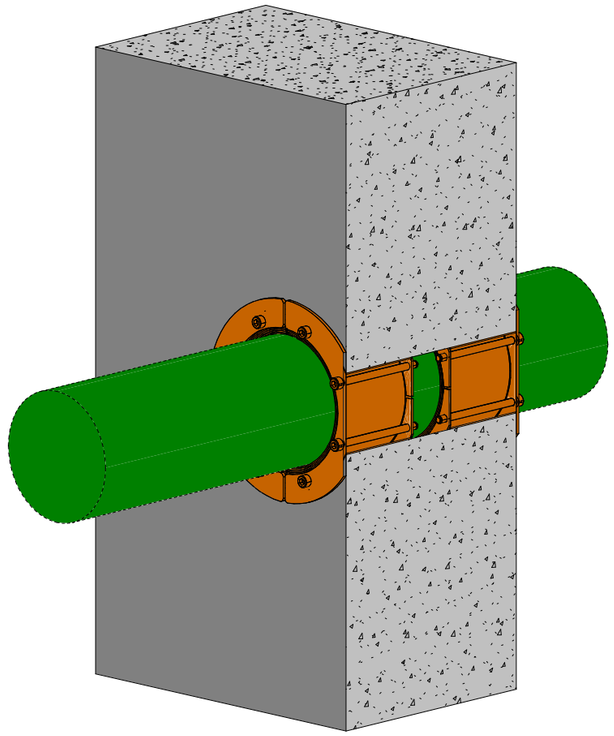
DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2025**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-G-91599		**A3**	**P02**



1 Section View - Pipe - Concrete Wall



A Front View - Pipe - Concrete Wall



3D1 3D View - Pipe - Concrete Wall

General guidelines

1. Services crossing fire rated walls that need to be in independent OPEs:
   - Busbar;
   - Fire Extinguish pipes;
   - Dampers;
   - E90 containment;
   - Plastic pipes;
2. OPEs can't be shared between two different types of services (Elec, Mech, Plumbing);
3. Minimum distance between OPEs = 200mm;
4. Minimum distance between bottom of wall (on ground floor) and OPEs = 200mm;
5. Minimum distance between adjacent wall OPEs = 200mm;
6. Minimum distance between columns OPEs = 350mm;
7. Minimum distance between door and OPEs = 200mm, all around;
8. Minimum distance between an OPE and a service smaller than 50mm (no need for OPE) must be 150mm;
9. General gap between OPEs and each element shall be at least 50mm all around;
10. Damper's OPEs shall be based on the Manufacturer's Data Sheet;
11. Service E90 containment must be positioned on the higher position possible;
12. All services must be at least 150 mm away from the nearest wall / column;
13. Services shall not be less than 150mm away on top of each other for a length bigger than 1500mm.

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.

Rev	Date	Description	Sign.	Veri.
P02	04.04.2025	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	JR	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

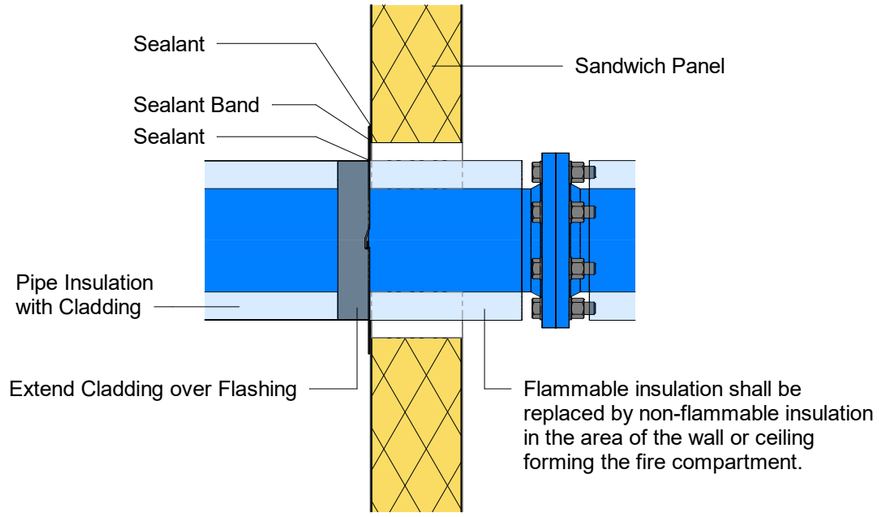
PROJECT NAME:

Execution Design and Engineering Requirements

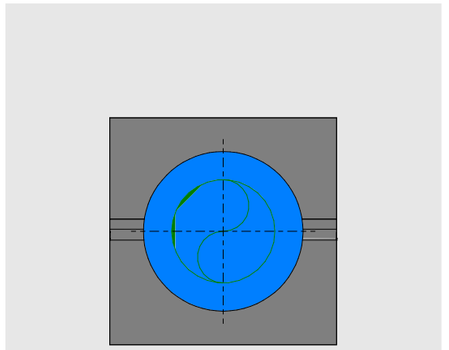
DRAWING NAME:

Wall and Floor Penetrations Roxtec - Pipes Systems - Concrete Wall

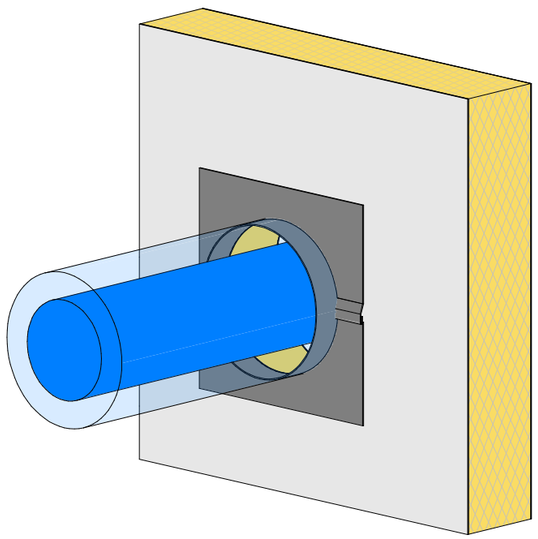
DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2025**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-G-91601		**A3**	**P02**



1 Section View - Steel Pipe - Sandwich Panel Wall



A Front View - Steel Pipe - Sandwich Panel Wall



3D1 3D View - Steel Pipe - Sandwich Panel Wall

General guidelines

1. Services crossing fire rated walls that need to be in independent OPEs:
   - Busbar;
   - Fire Extinguish pipes;
   - Dampers;
   - E90 containment;
   - Plastic pipes;
2. OPEs can't be shared between two different types of services (Elec, Mech, Plumbing);
3. Minimum distance between OPEs = 200mm;
4. Minimum distance between bottom of wall (on ground floor) and OPEs = 200mm;
5. Minimum distance between adjacent wall OPEs = 200mm;
6. Minimum distance between columns OPEs = 350mm;
7. Minimum distance between door and OPEs = 200mm, all around;
8. Minimum distance between an OPE and a service smaller than 50mm (no need for OPE) must be 150mm;
9. General gap between OPEs and each element shall be at least 50mm all around;
10. Damper's OPEs shall be based on the Manufacturer's Data Sheet;
11. Service E90 containment must be positioned on the higher position possible;
12. All services must be at least 150 mm away from the nearest wall / column;
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Notes

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P02	04.04.2025	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	JR	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

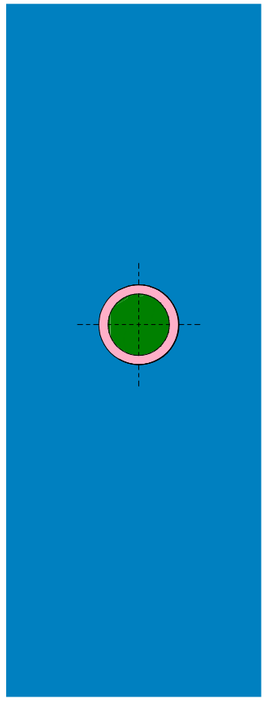
Execution Design and Engineering Requirements

DRAWING NAME:

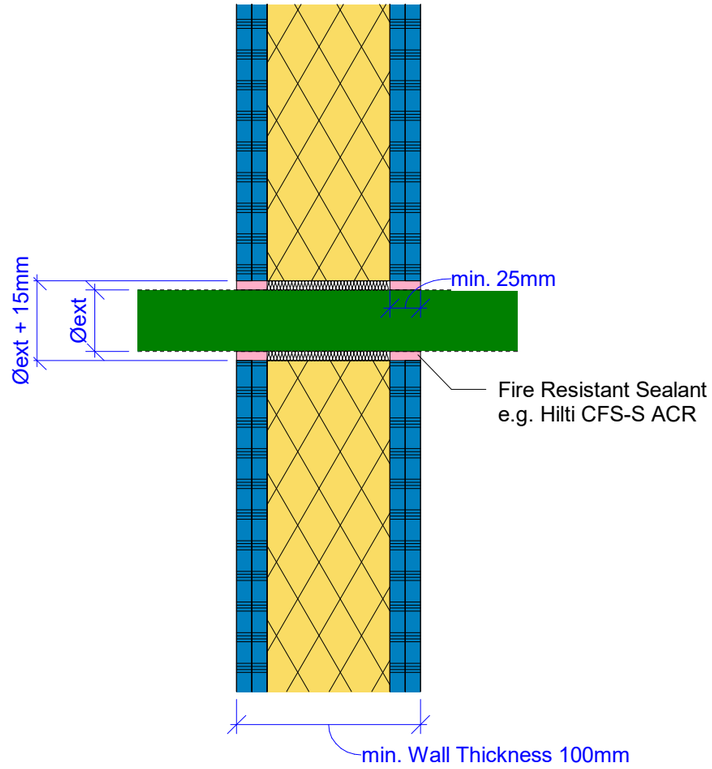
Wall and Floor Penetrations Sealant -Steel Pipe Systems - Sandwich Panel Wall

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2025**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-G-91602		**A3**	**P02**

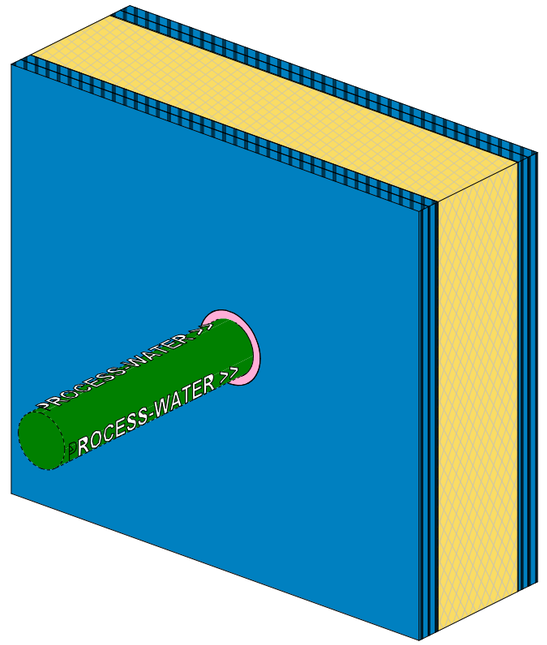
Wall Penetration



A Front View - Fire Sleeve Plastic Pipe - Stud Wall

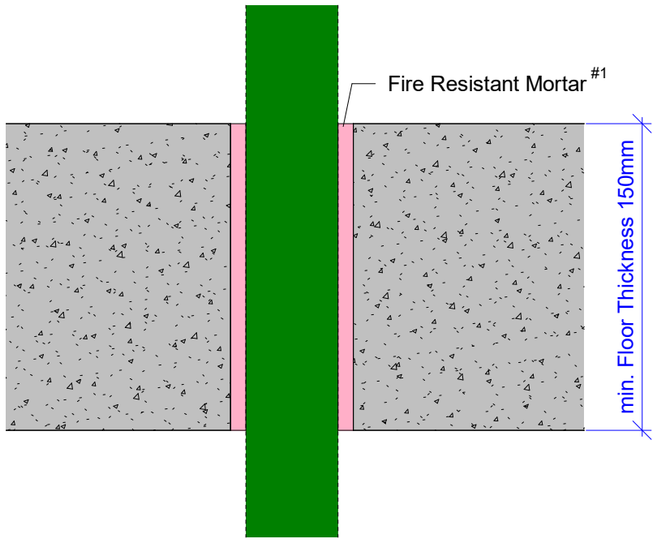


1 Section View - Fire Sleeve Plastic Pipe - Stud Wall



3D1 3D View - Fire Sleeve Plastic Pipe - Stud Wall

Floor Penetration



B Front View - Fire Sleeve Plastic Pipe - Floor

#1 Allowed Mortar, e.g. Hilti CFS-M RG
DIN1053: Mortar Group II, IIa, III, IIIa or Fire Resistant Mortar Group II, III
En998-2: Mortar Class M2.5 till M10 or Fire Resistant Mortar Class M2.5 till M10

General guidelines

1. Services crossing fire rated walls that need to be in independent OPEs:
   - Busbar;
   - Fire Extinguish pipes;
   - Dampers;
   - E90 containment;
   - Plastic pipes;
2. OPEs can't be shared between two different types of services (Elec, Mech, Plumbing);
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Notes

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P02	04.04.2025	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	JR	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Wall and Floor Penetrations Fire Sleeve - Plastic Pipe Systems - Wall and Floor

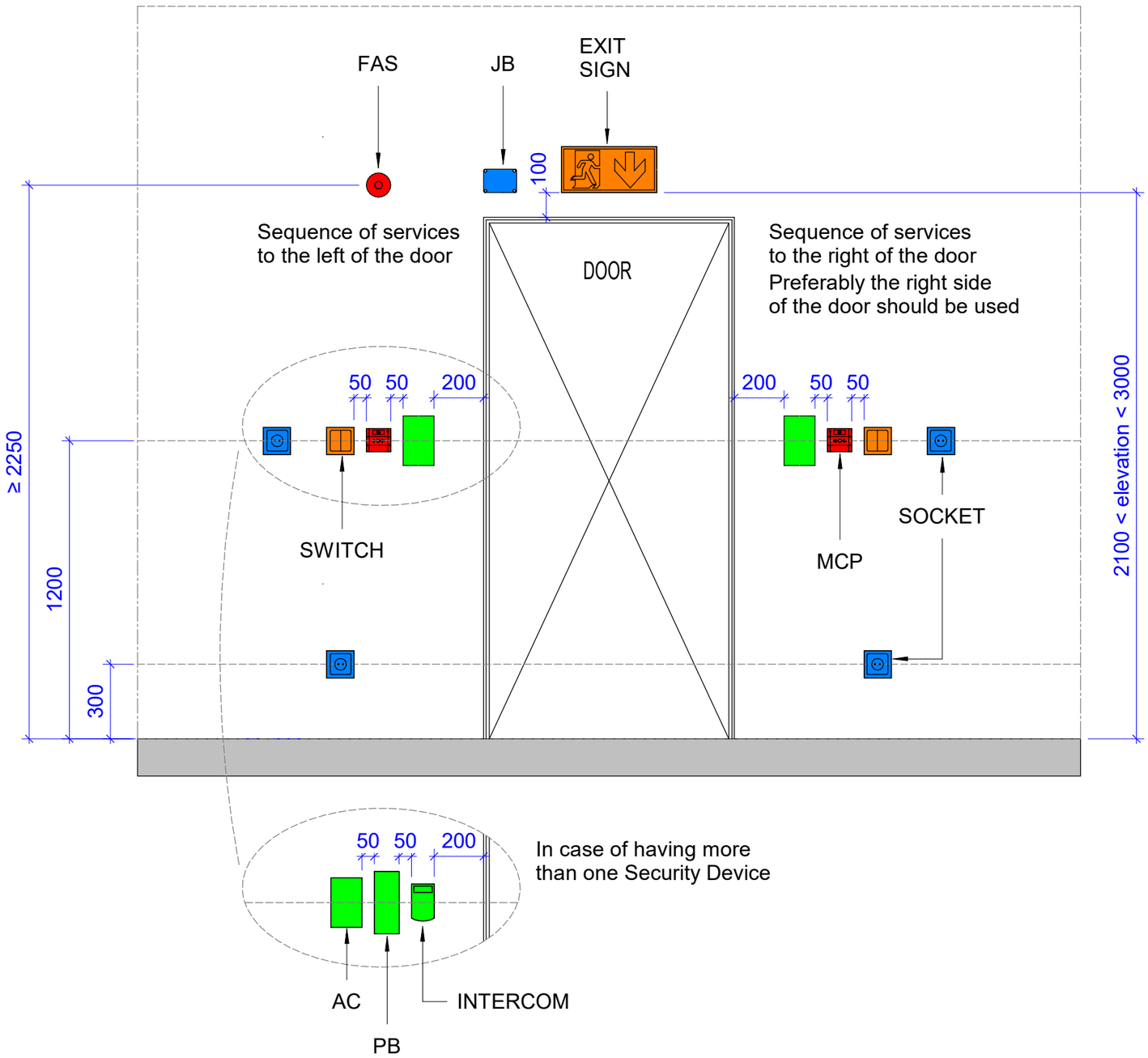
DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2025**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-G-91603		**A3**	**P02**

3. MEP Secondary Equipment (2nd Fix)

Purpose: in this chapter we intend to set a standard for Secondary MEP Equipment layout for the main social and technical areas of a Datacentre, namely Main Entrance Hall and Corridors, Canteen and ancillary areas, Toilets and Locker Rooms, Security Room, Loading Bay, Storage Rooms and Ventilation Technical room.

2nd FIX PRINCIPLE

Scheme for 2nd FIX coordination door



Legend
Security Devices
Fire Devices
Small Power Devices
Lighting Devices
Data Devices
Mechanical Heating
Emergency Lighting
Supply Air
Return Air
Exhaust Air

Abbreviations	
Code	Description
DC	Door Contact
AC	Access Control Card Reader
FAS	Flashing Beacon with Siren
MCP	Manual Alarm Call Point
ACMS	Door-Holding Magnets
JB	Junction Box
PB	Push Button for automatic Doors
AI	As Indicated

General Notes

1. All dimensions are in millimeters unless otherwise noted.
2. Align Sockets by Light Switch, whenever it is possible.
3. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.
4. Final Locations of installation accessories to be reviewed with specialist subcontractor.
5. All elevations are in regards to the Finished Floor Level unless otherwise noted.

Rev	Date	Description	Sign.	Veri.
P02	04.04.2024	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	JR	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

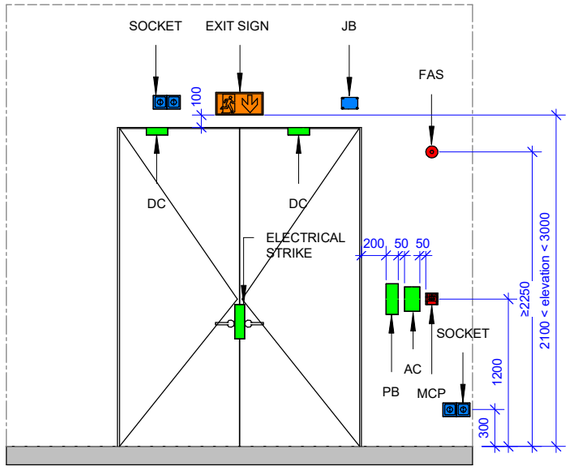
DRAWING NAME:

Typical Doors
Scheme for 2nd FIX coordination door

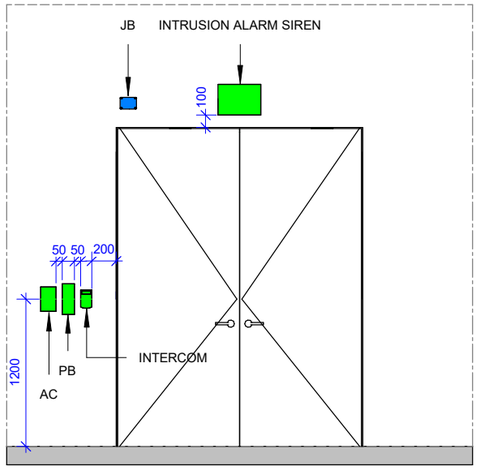
DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-J-62300		**A3**	**P02**

MAIN ENTRANCE (Office)

Inside → Outside



Outside → Inside



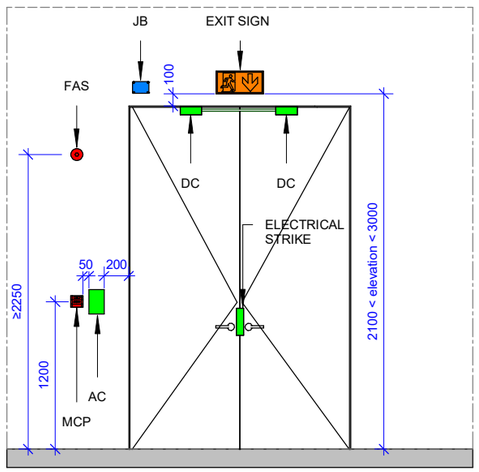
SERVICE DOOR (Corridor)

Inside → Outside

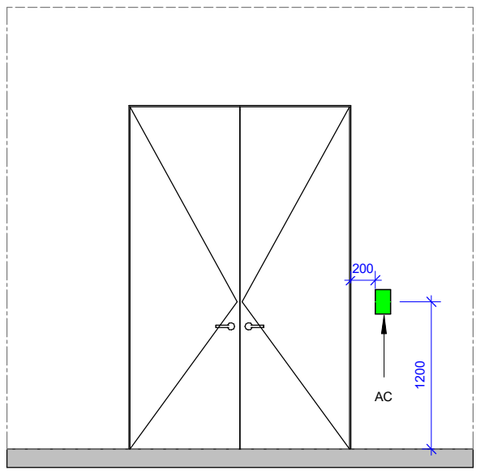
Outside → Inside

TECHNICAL AREA

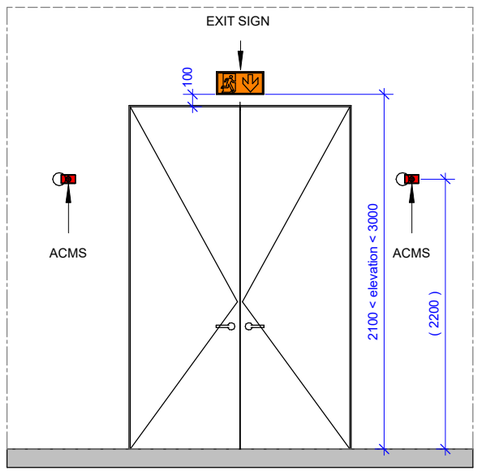
Data Hall → Corridor



Corridor → Data Hall



Corridor → Corridor



Legend

- Security Devices
- Fire Devices
- Small Power Devices
- Lighting Devices
- Data Devices
- Mechanical Heating
- Emergency Lighting
- Supply Air
- Return Air
- Exhaust Air

Abbreviations

Code	Description
DC	Door Contact
AC	Access Control Card Reader
FAS	Flashing Beacon with Siren
MCP	Manual Alarm Call Point
ACMS	Door-Holding Magnets
JB	Junction Box
PB	Push Button for automatic Doors
AI	As Indicated

General Notes

1. All dimensions are in millimeters unless otherwise noted.
2. Align Sockets by Light Switch, whenever it is possible.
3. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.
4. Final Locations of installation accessories to be reviewed with specialist subcontractor.
5. All elevations are in regards to the Finished Floor Level unless otherwise noted.

Rev	Date	Description	Sign.	Veri.
P02	04.04.2024	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	JR	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

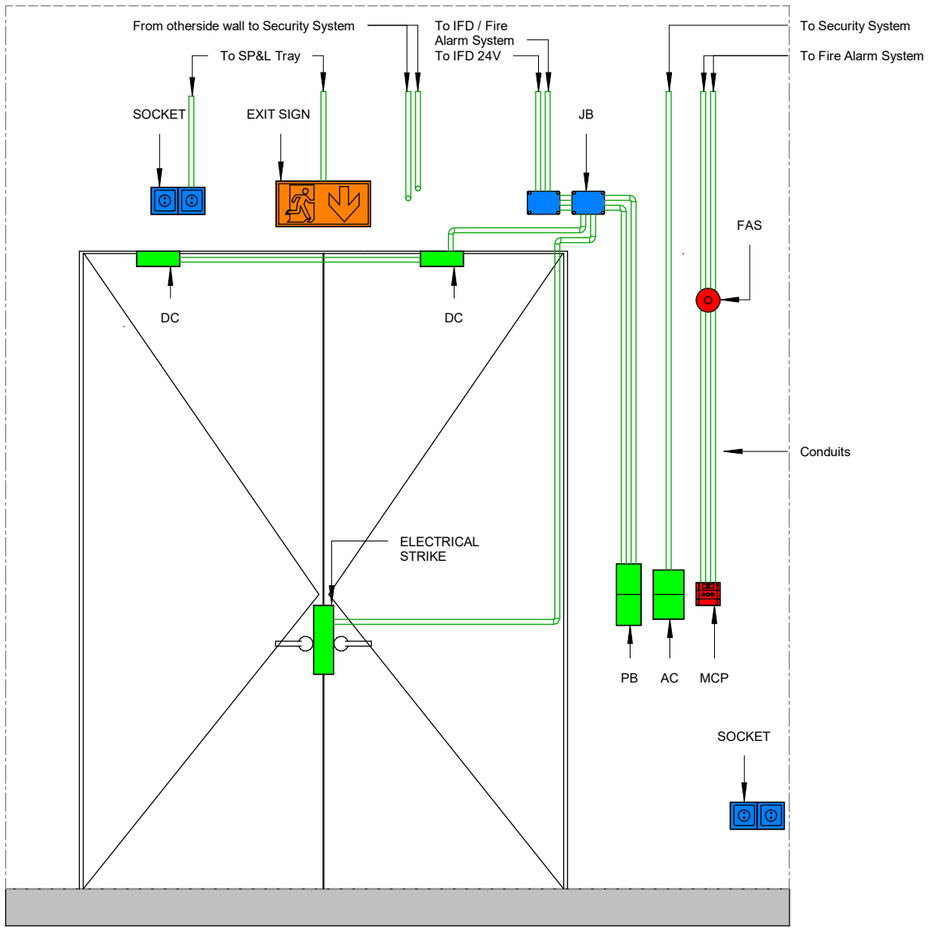
Typical Doors
2nd FIX typical coordination

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-J-62301		**A3**	**P02**

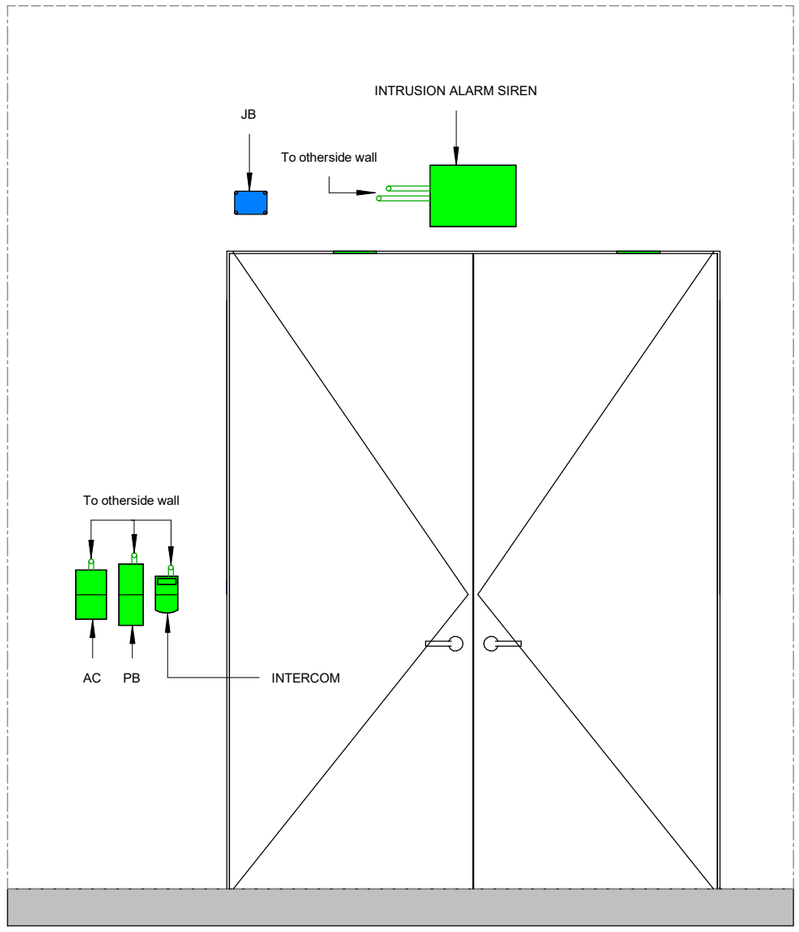
TYPICAL DOORS

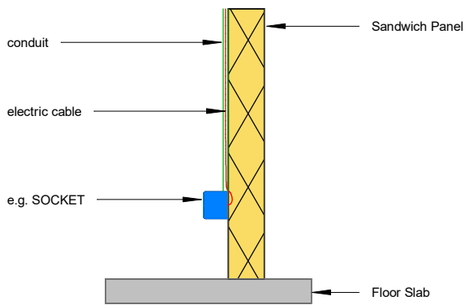
MAIN ENTRANCE (Office) - Conduits Representation

Inside → Outside



Outside → Inside





Hiding the electric cable in the wall

In case of hiding the 2nd Fix electrical cable entry in a fireproof solution (it comes out of the conduit, passes through the wall and only then goes to the 2nd Fix), a fireproof sealant must be used, for example Hilti CP 606.

Legend	Abbreviations	
Security Devices	Code	Description
Fire Devices	DC	Door Contact
Small Power Devices	AC	Access Control Card Reader
Lighting Devices	FAS	Flashing Beacon with Siren
Data Devices	MCP	Manual Alarm Call Point
Mechanical Heating	ACMS	Door-Holding Magnets
Emergency Lighting	JB	Junction Box
Supply Air	PB	Push Button for automatic Doors
Return Air	AI	As Indicated
Exhaust Air		

General Notes

1. All dimensions are in millimeters unless otherwise noted.
2. Align Sockets by Light Switch, whenever it is possible.
3. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.
4. Final Locations of installation accessories to be reviewed with specialist subcontractor.
5. All elevations are in regards to the Finished Floor Level unless otherwise noted.

Rev	Date	Description	Sign.	Veri.
P02	04.04.2024	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	JR	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

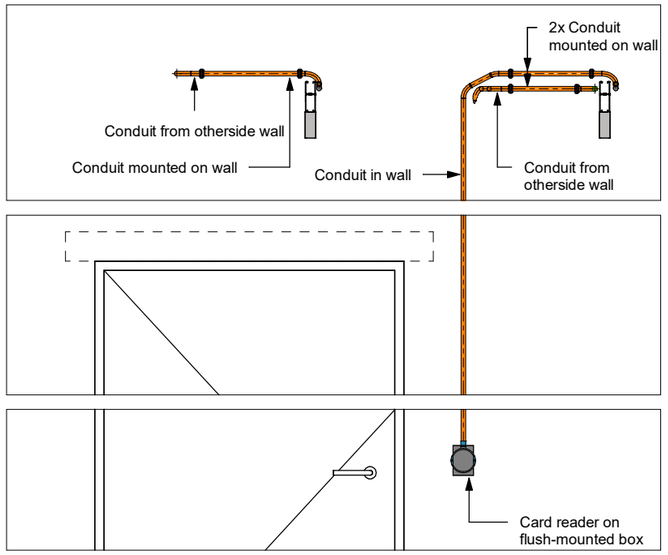
Typical Doors
Main Entrance - Conduits Representation

DRAWING STATUS:	SCALE:	STATUS:
Revision 1	**NTS**	**S2**

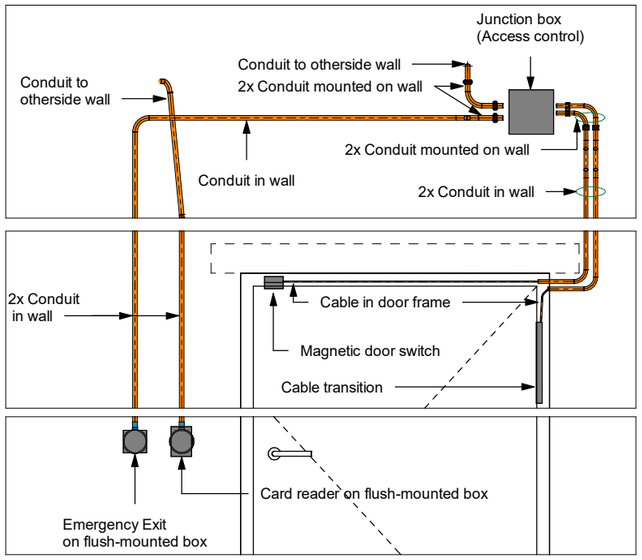
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**

DRAWING NUMBER:	FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-J-62383	**A3**	**P02**

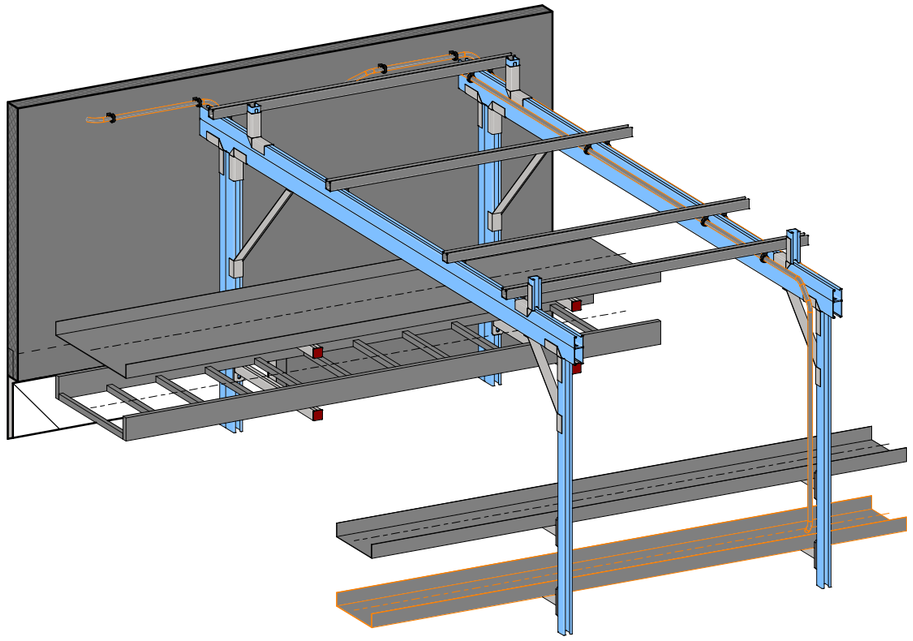
Door Access Control



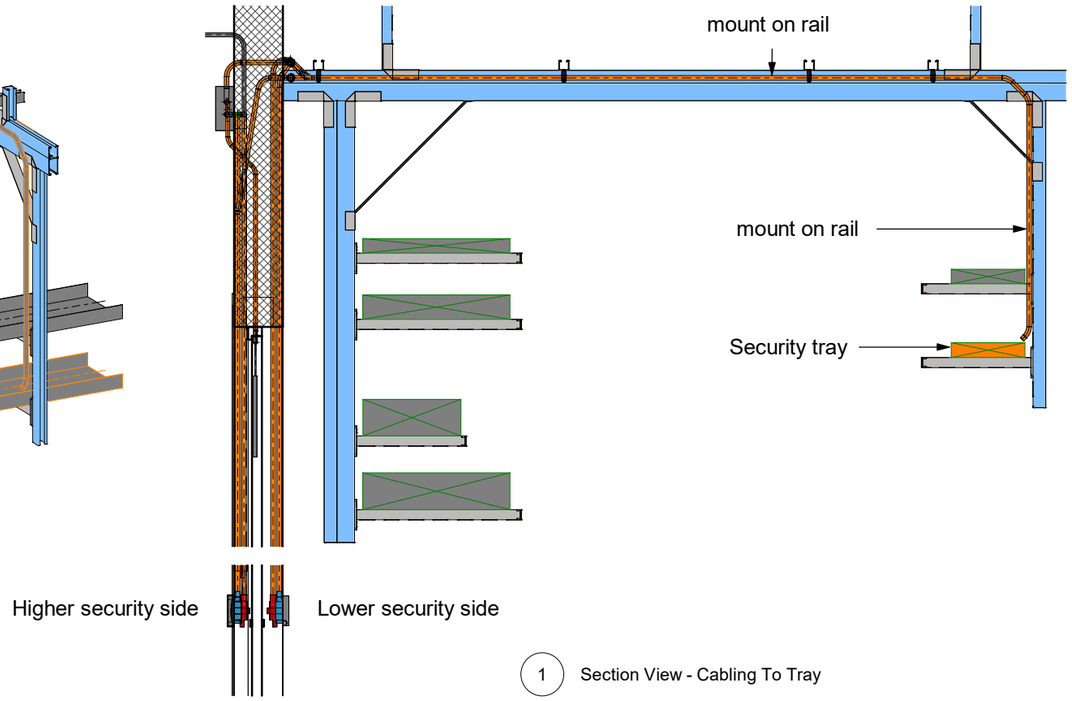
A Front View - Door Lower Security Side



B Front View - Door Higher Security Side



3D1 3D View - Cabling To Tray



1 Section View - Cabling To Tray

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
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Rev	Date	Description	Sign.	Veri.
P02	04.04.2025	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	JR	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

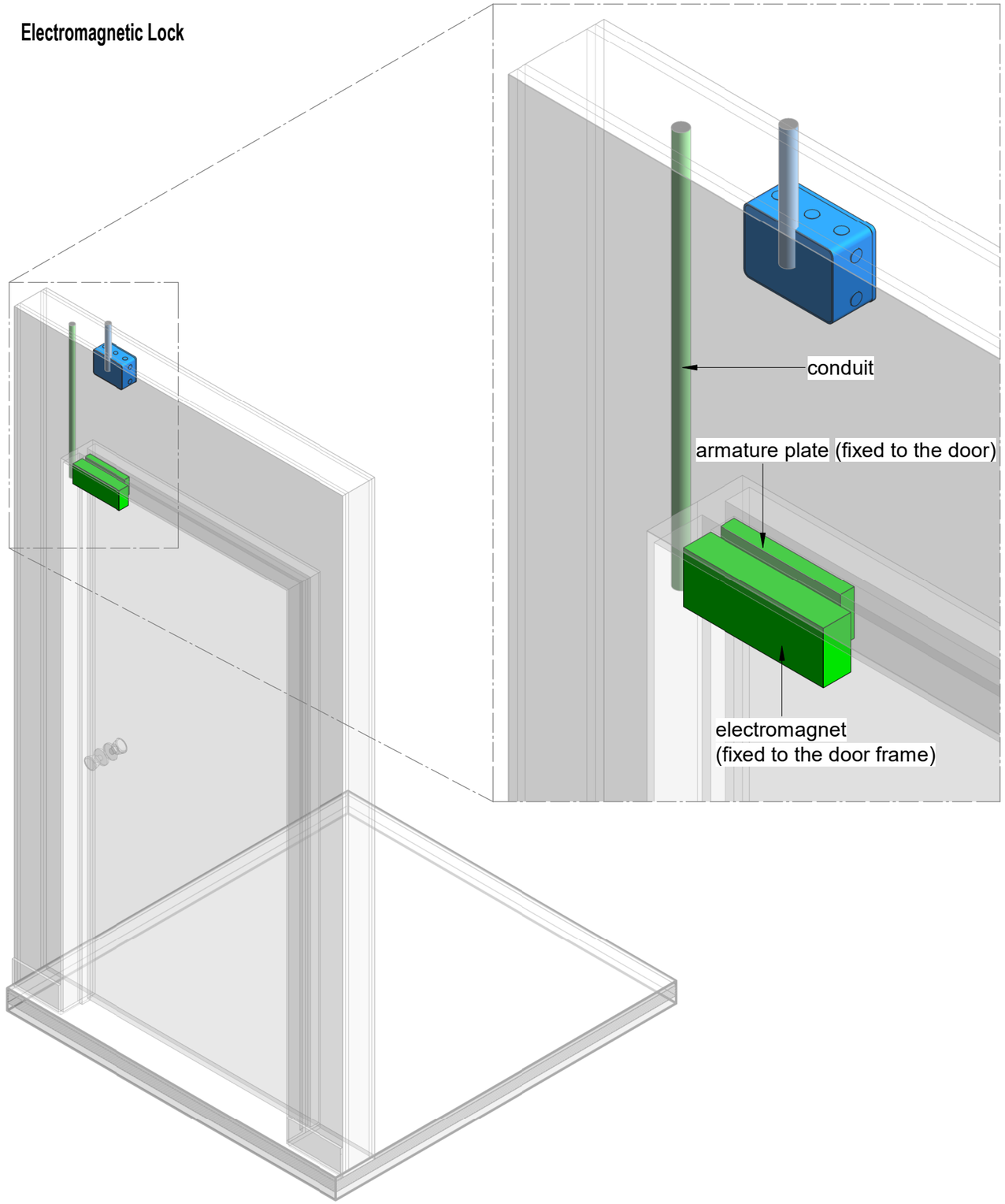
DRAWING NAME:

Typical Doors
Door Access Control

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2025**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-E-91551		**A3**	**P02**

TYPICAL DOORS

Electromagnetic Lock



What Is Electromagnetic Lock?

An electromagnetic lock, magnetic lock, or maglock, is a locking device that consists of an electromagnet and an armature plate. It is a magnet that is created when an electrical current is passed through a solenoid (coiled wire wrapped around a metal core).

Types of Electric Locking Devices

There are two main types of electric locking devices. Locking devices can be either “fail safe” or “fail secure”. A fail-secure locking device remains locked when power is lost. Fail-safe locking devices are unlocked when de-energized. Direct pull electromagnetic locks are inherently fail-safe.

How Does It Work?

An electromagnetic lock creates a magnetic field when energized or powered up, causing an electromagnet and armature plate to become attracted to each other strongly enough to keep a door from opening.

The principle behind a maglock is the use of electromagnetism to lock a door when energized. The holding force should be collinear with the load, and the lock and armature plate should be face-to-face to achieve optimal operation.

The magnetic lock relies upon some of the basic concepts of electromagnetism. Essentially it consists of an electromagnet attracting a conductor with a force large enough to prevent the door from being opened. In a more detailed examination, the device makes use of the fact that a current through one or more loops of wire (known as a solenoid) produces a magnetic field. This works in free space, but if the solenoid is wrapped around a ferromagnetic core such as soft iron the effect of the field is greatly amplified. This is because the internal magnetic domains of the material align with each other to greatly enhance the magnetic flux density.

Legend

Security Devices
Fire Devices
Small Power Devices
Lighting Devices
Data Devices
Mechanical Heating
Emergency Lighting
Supply Air
Return Air
Exhaust Air

Abbreviations

Code	Description
DC	Door Contact
AC	Access Control Card Reader
FAS	Flashing Beacon with Siren
MCP	Manual Alarm Call Point
ACMS	Door-Holding Magnets
JB	Junction Box
PB	Push Button for automatic Doors
AI	As Indicated

General Notes

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5. All elevations are in regards to the Finished Floor Level unless otherwise noted.

Rev	Date	Description	Sign.	Veri.
P02	04.04.2024	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	JR	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

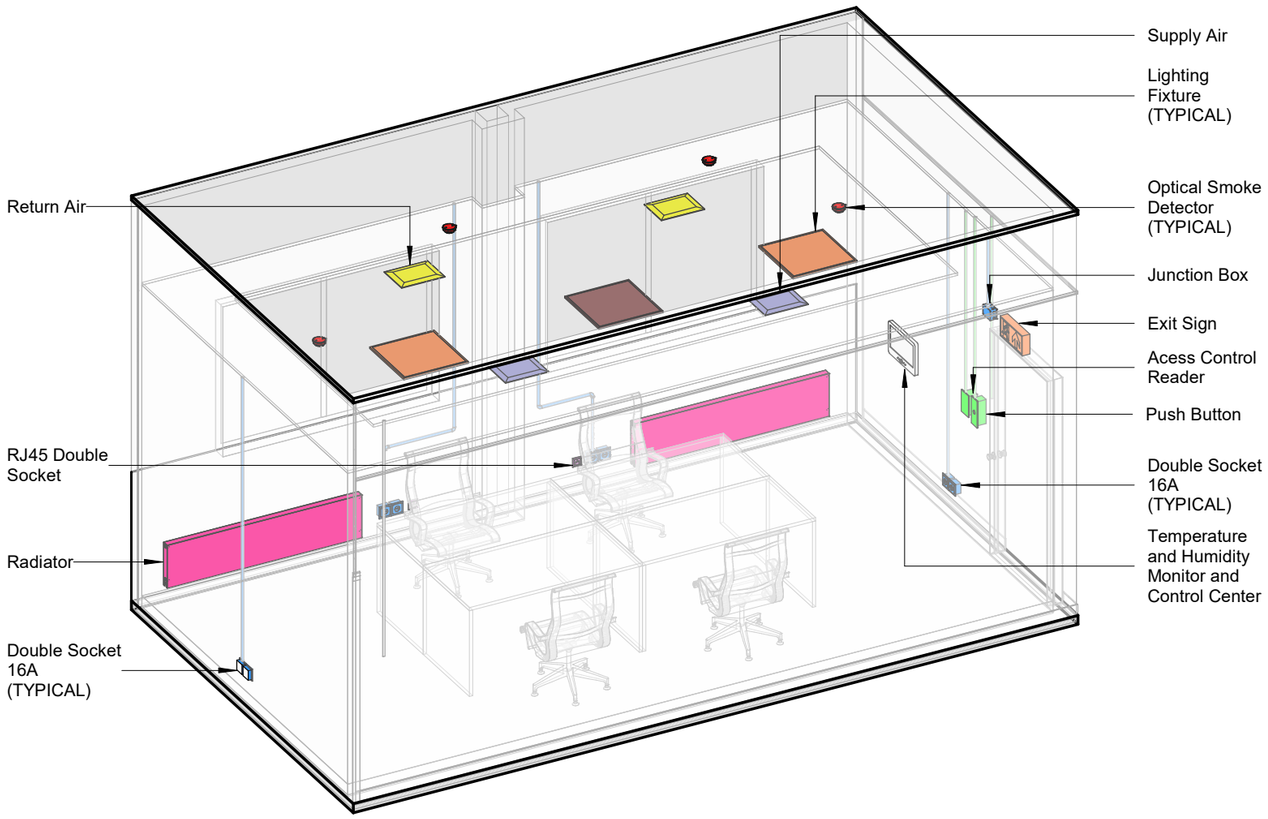
PROJECT NAME:

Execution Design and Engineering Requirements

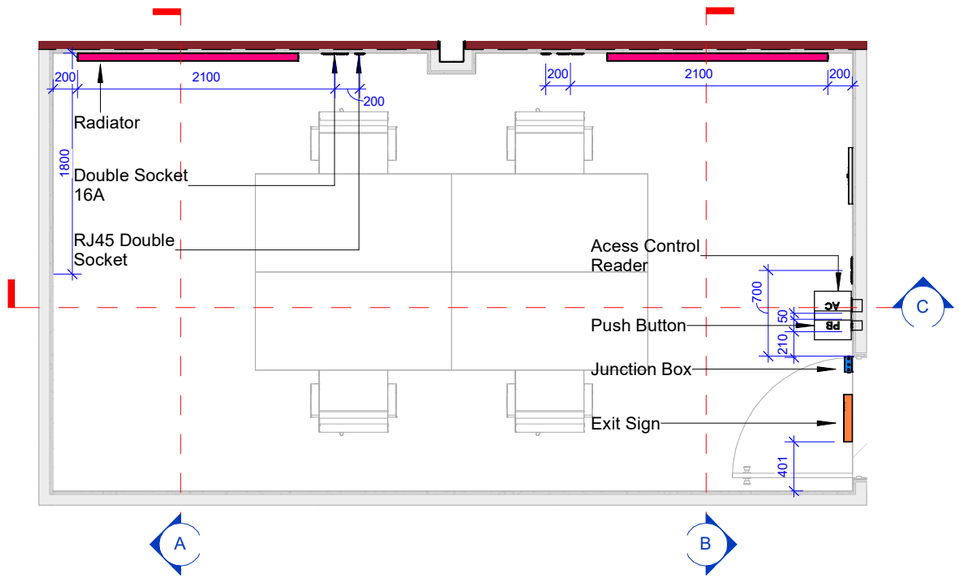
DRAWING NAME:

Typical Doors
Electromagnetic Lock

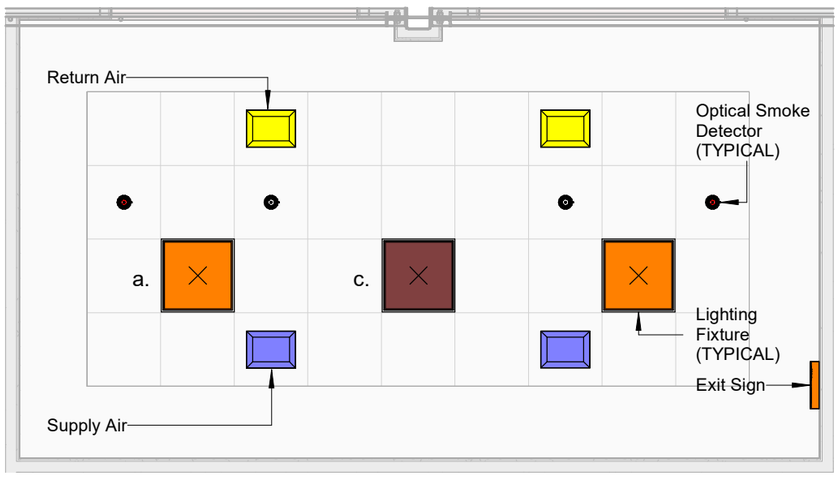
DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-J-62384		**A3**	**P02**



3D1 3D View Entrance Room



1 Ground Floor Entrance Room
1 : 50



2 Reflected Ceiling - Entrance Room
1 : 50

Legend

- Security Devices
- Fire Devices
- Small Power Devices
- Lighting Devices
- Data Devices
- Mechanical Heating
- Emergency Lighting
- Supply Air
- Return Air
- Exhaust Air

Abbreviations

Code	Description
DC	Door Contact
AC	Access Control Card Reader
FAS	Flashing Beacon with Siren
MCP	Manual Alarm Call Point
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Specific Notes

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b. Heat and optical smoke detector - One detector at low level and one at high level. To be aligned vertically on site. Displayed separate for better visibility
c. Emergency Lighting

Rev	Date	Description	Sign.	Veri.
P02	04.04.2024	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	LE	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Combined Services - Rooms
Entrance Room - Page 1 of 2

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**AI**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
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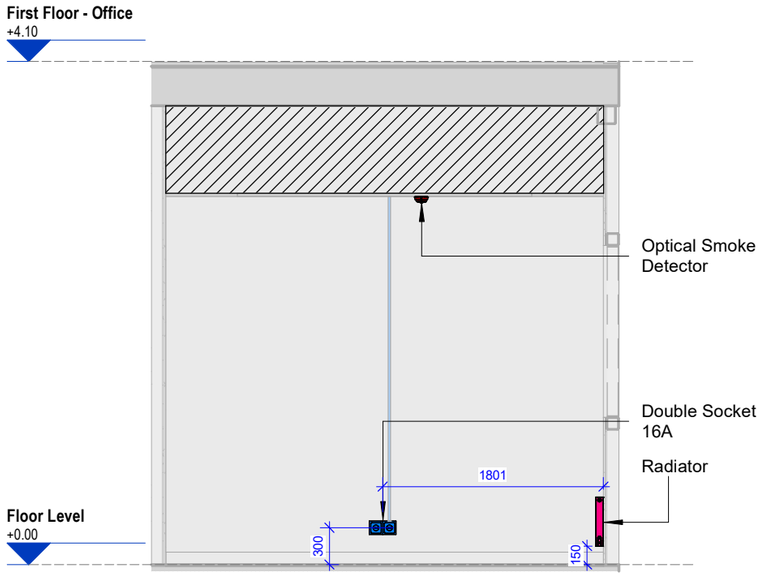
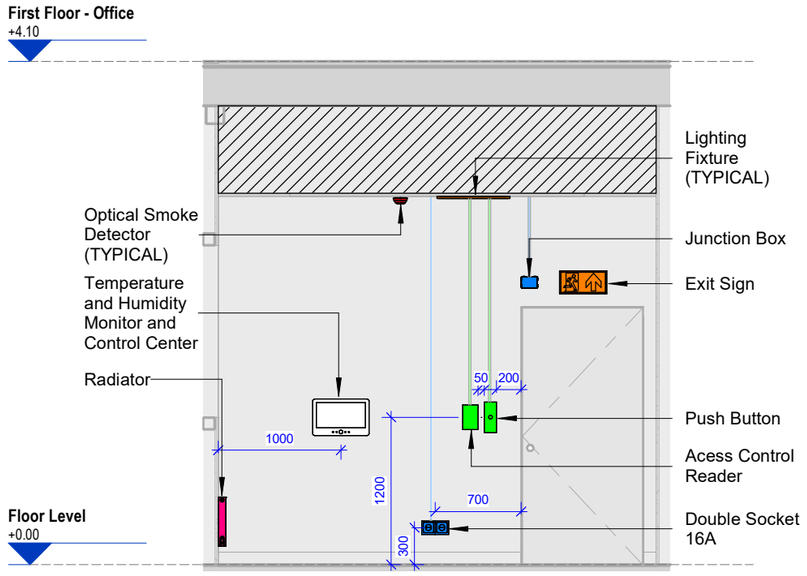
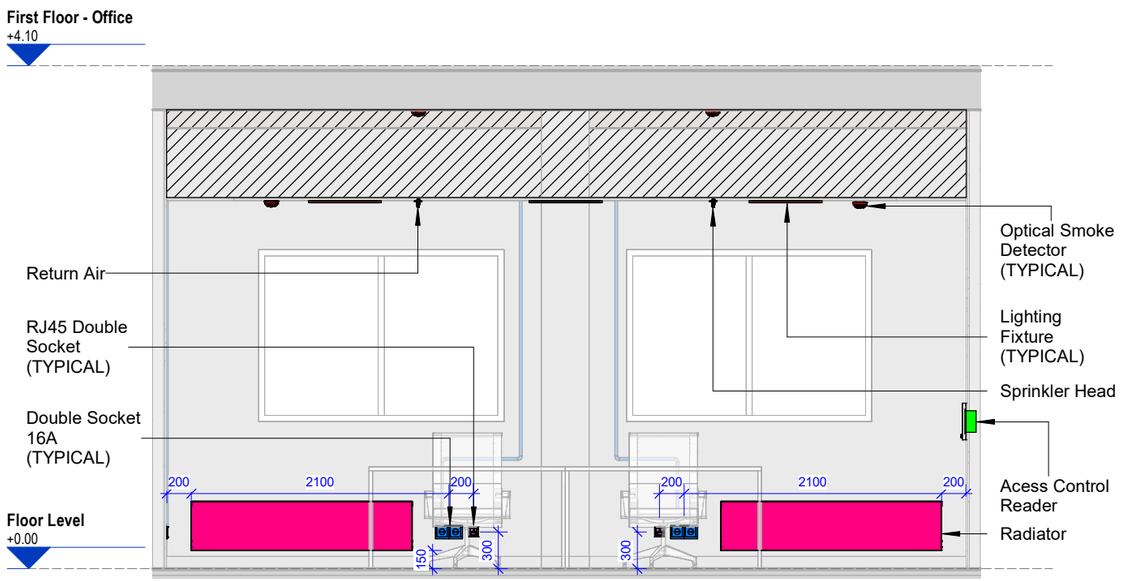


A **Section - Entrance Room - Left**
1 : 50



B **Section - Entrance Room - Right**
1 : 50



C **Section - Entrance Room - Front**
1 : 50

Legend

- Security Devices
- Fire Devices
- Small Power Devices
- Lighting Devices
- Data Devices
- Mechanical Heating
- Emergency Lighting
- Supply Air
- Return Air
- Exhaust Air

Abbreviations

Code	Description
DC	Door Contact
AC	Access Control Card Reader
FAS	Flashing Beacon with Siren
MCP	Manual Alarm Call Point
ACMS	Door-Holding Magnets
JB	Junction Box
PB	Push Button for automatic Doors
AI	As Indicated

General Notes

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P02	04.04.2024	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	LE	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Combined Services - Rooms Entrance Room - Page 2 of 2

DRAWING STATUS:	SCALE:	STATUS:
Revision 1	**AI**	**S2**

DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**

DRAWING NUMBER:	FORMAT:	REVISION:
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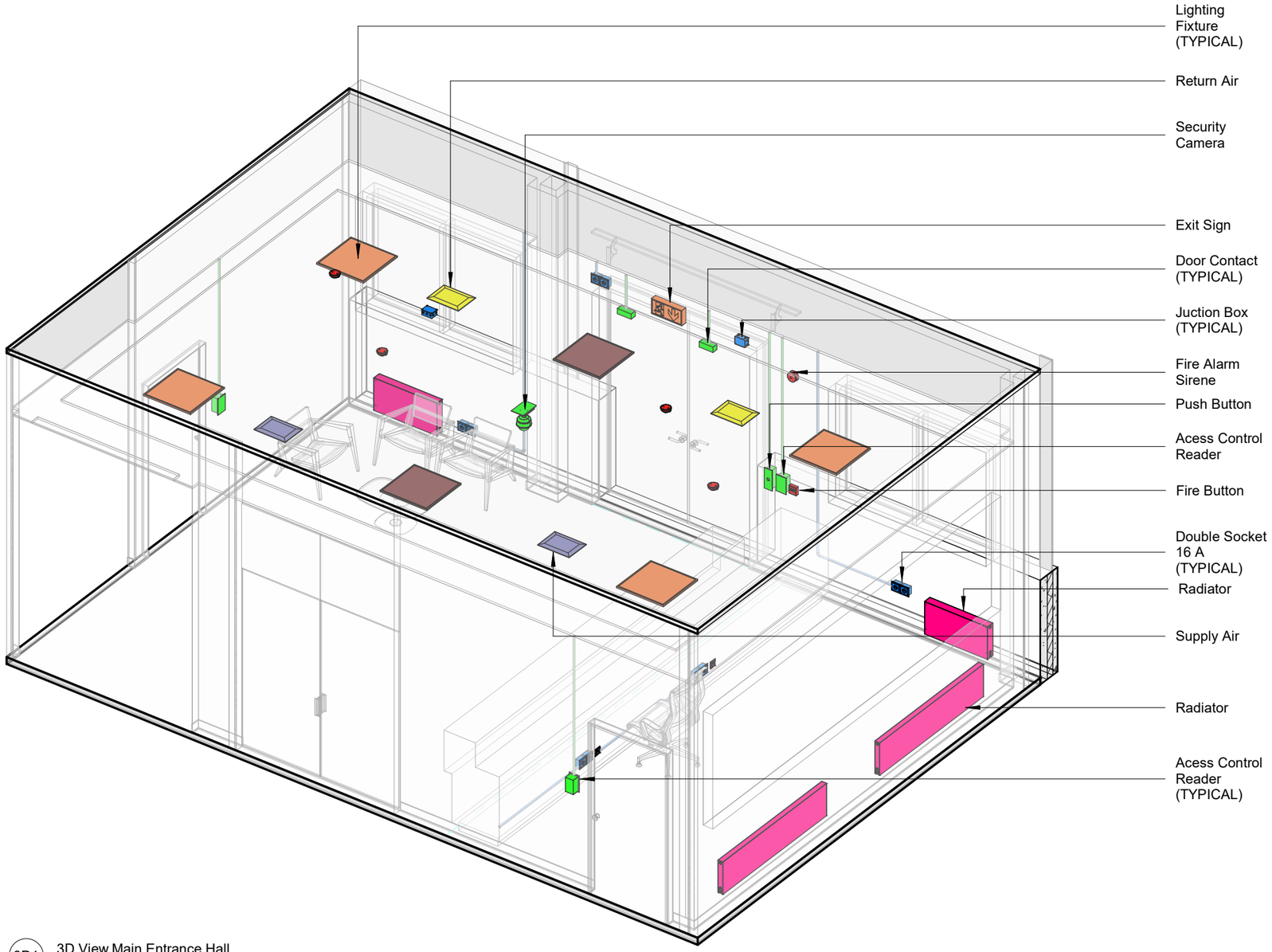

3D1 3D View Main Entrance Hall

Legend

- Security Devices
- Fire Devices
- Small Power Devices
- Lighting Devices
- Data Devices
- Mechanical Heating
- Emergency Lighting
- Supply Air
- Return Air
- Exhaust Air

Abbreviations

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DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

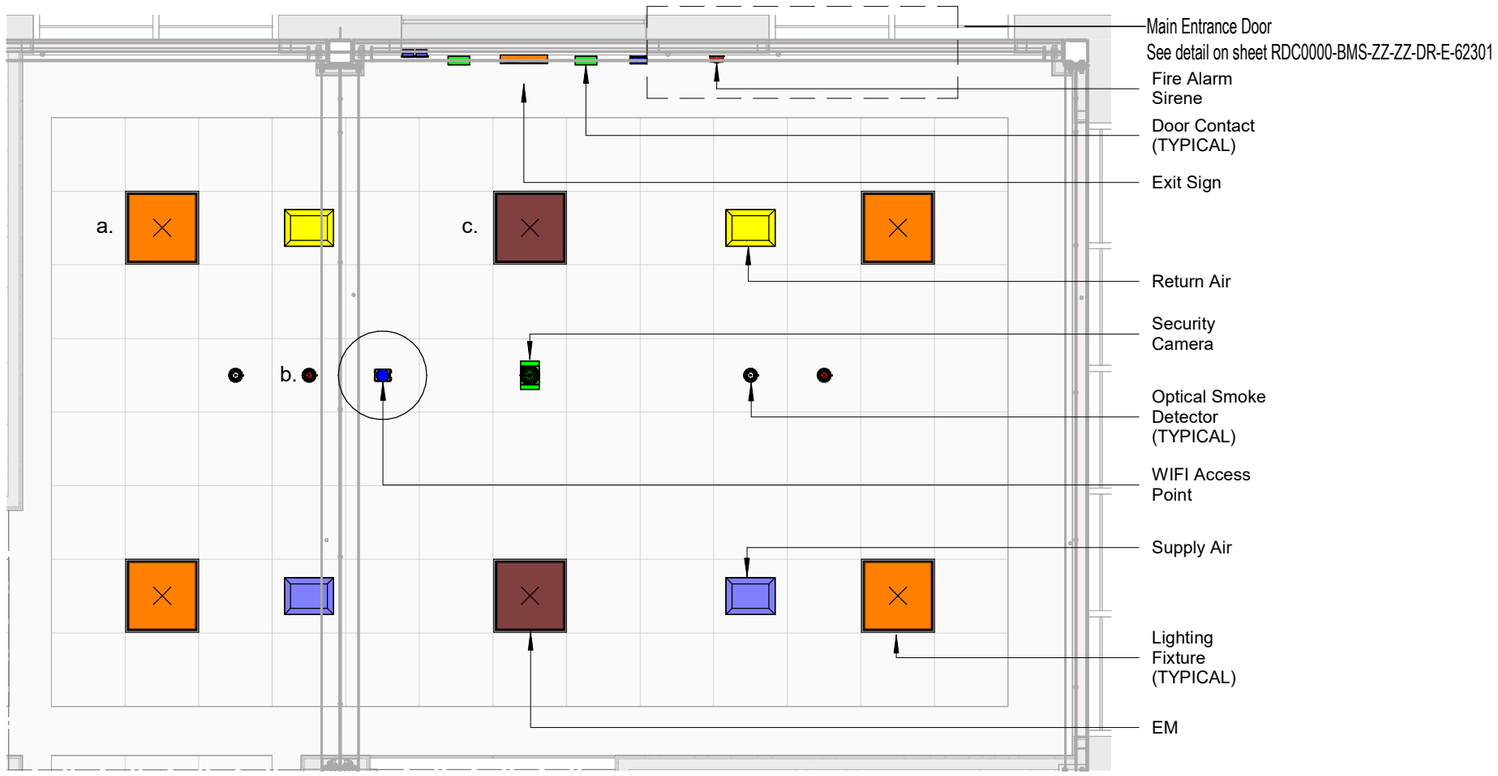
DRAWING NAME:

Combined Services - Rooms
Main Entrance Hall - Page 1 of 3

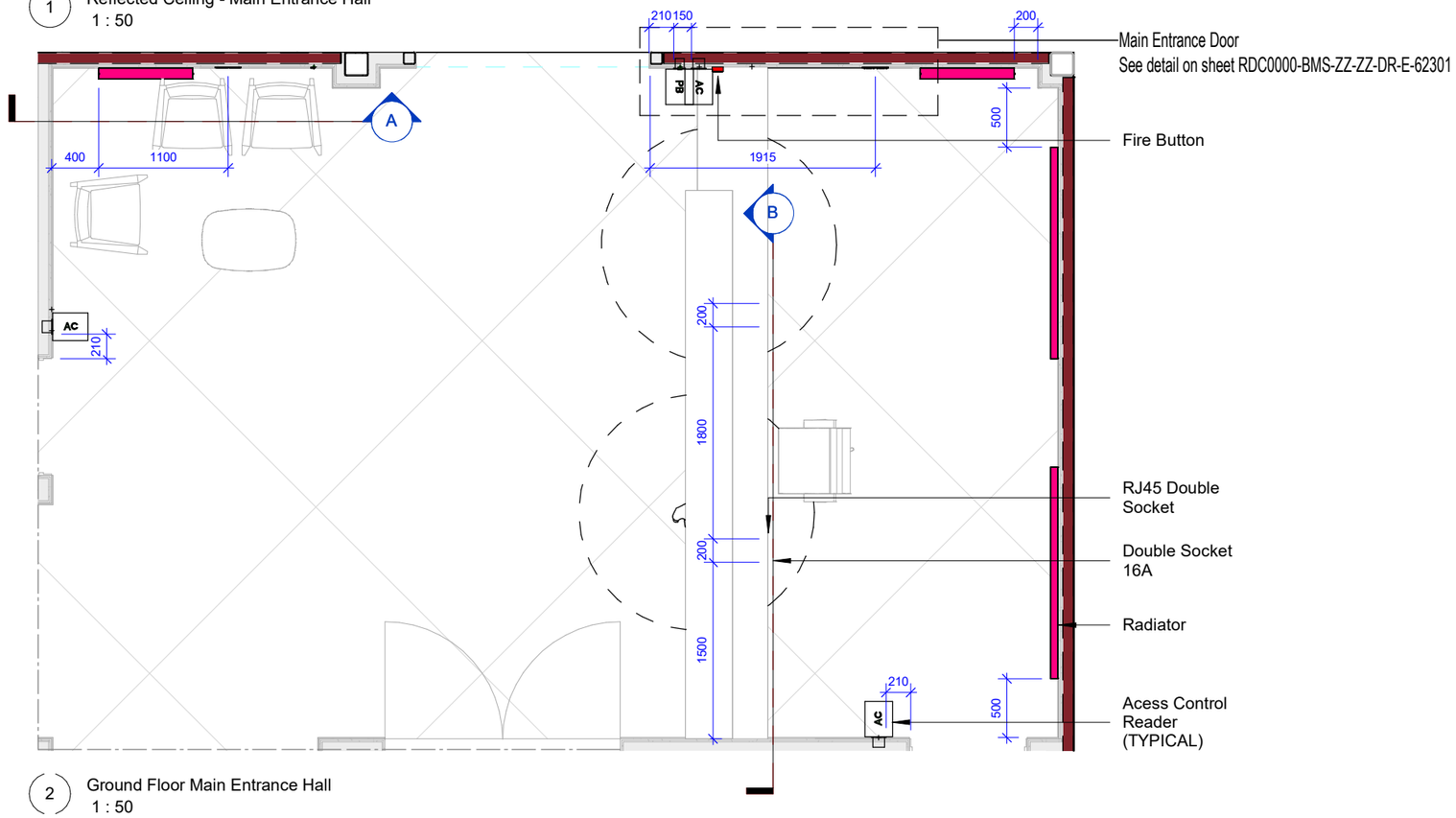
DRAWING STATUS:	SCALE:	STATUS:
Revision 1	**AI**	**S2**

DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**

DRAWING NUMBER:	FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-J-62317	**A3**	**P02**



1 Reflected Ceiling - Main Entrance Hall
1 : 50



2 Ground Floor Main Entrance Hall
1 : 50

Legend

- Security Devices
- Fire Devices
- Small Power Devices
- Lighting Devices
- Data Devices
- Mechanical Heating
- Emergency Lighting
- Supply Air
- Return Air
- Exhaust Air

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DESIGN & BUILD CONTRACTOR:

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CTS GROUP PARTNER:

BIMMS

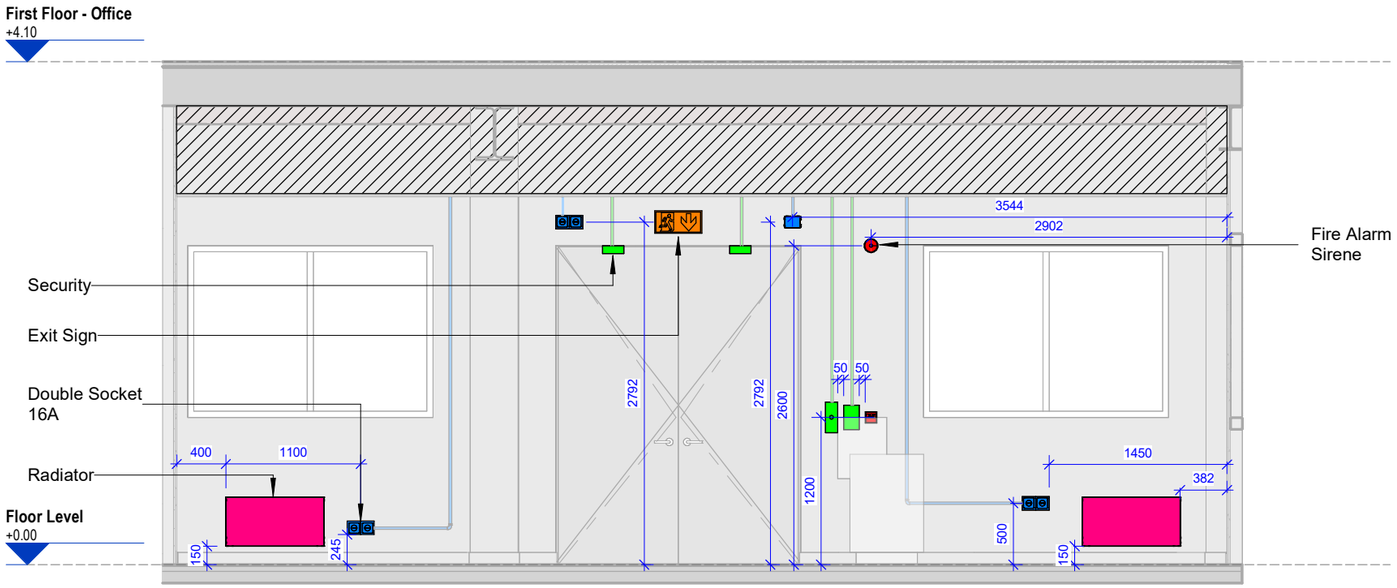
PROJECT NAME:

Execution Design and Engineering Requirements

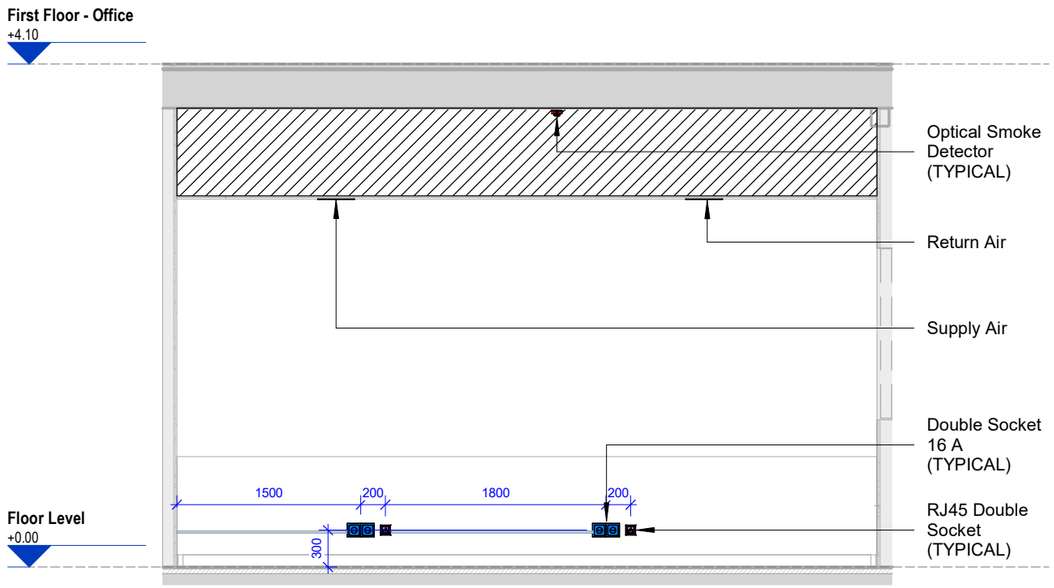
DRAWING NAME:

Combined Services - Rooms
Main Entrance Hall - Page 2 of 3

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**AI**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-J-62318		**A3**	**P02**



A Section - Main Entrance Hall - Front - Dependent 1
1 : 50



B Section - Main Entrance Hall - Left - Dependent 1
1 : 50

Legend

- Security Devices
- Fire Devices
- Small Power Devices
- Lighting Devices
- Data Devices
- Mechanical Heating
- Emergency Lighting
- Supply Air
- Return Air
- Exhaust Air

Abbreviations

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PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Combined Services - Rooms
Main Entrance Hall - Page 3 of 3

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**AI**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
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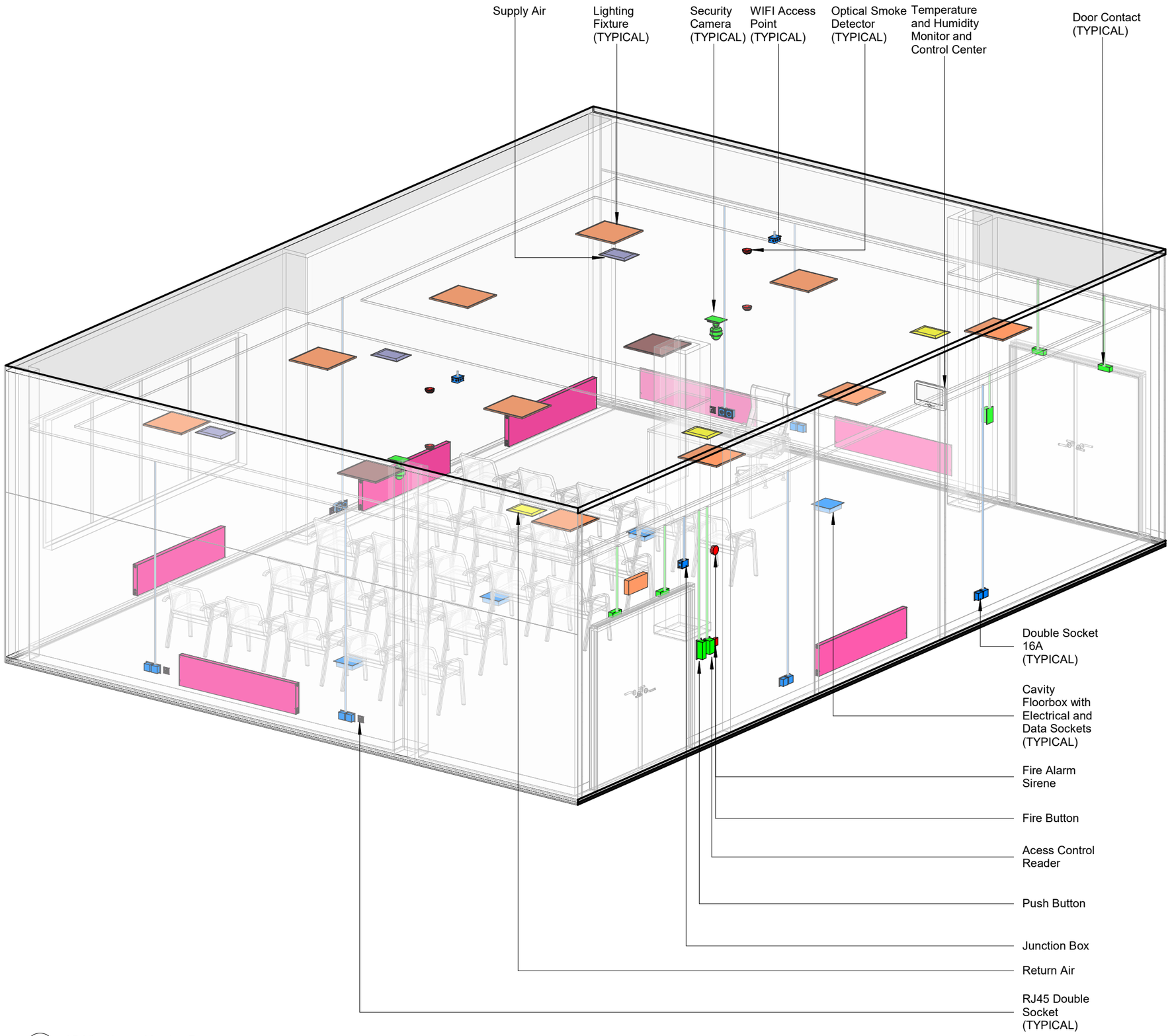

3D1 3D View Large Meeting Room

Legend

- Security Devices
- Fire Devices
- Small Power Devices
- Lighting Devices
- Data Devices
- Mechanical Heating
- Emergency Lighting
- Supply Air
- Return Air
- Exhaust Air

Abbreviations

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Execution Design and Engineering Requirements

DRAWING NAME:

Combined Services - Rooms Large Meeting Room - Page 1 of 4

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**AI**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
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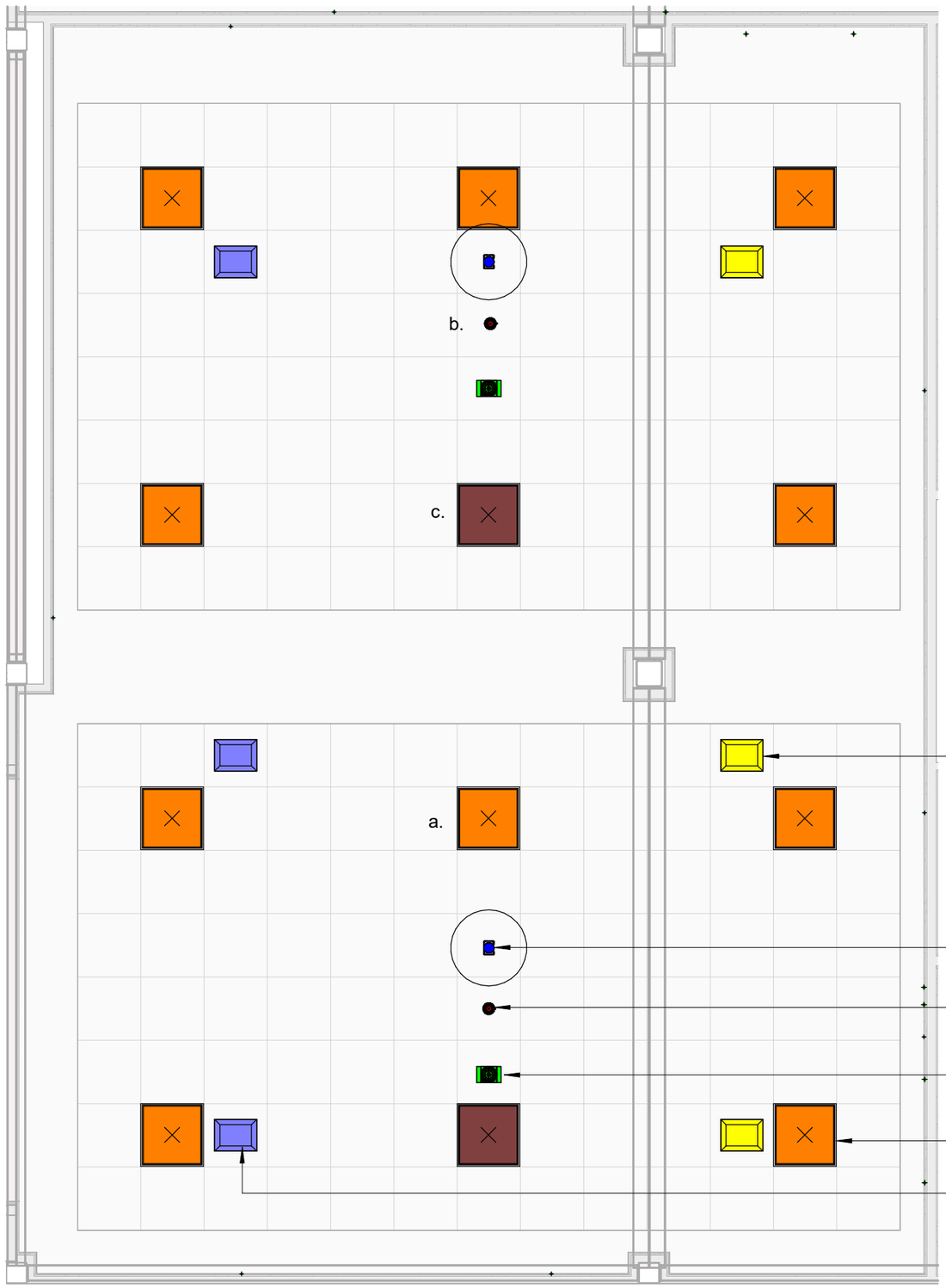

A Reflected Ceiling - Large Meeting Room
1 : 50

Legend

- Security Devices
- Fire Devices
- Small Power Devices
- Lighting Devices
- Data Devices
- Mechanical Heating
- Emergency Lighting
- Supply Air
- Return Air
- Exhaust Air

Abbreviations

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P02	04.04.2024	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	LE	JM

DESIGN & BUILD CONTRACTOR:

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CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Combined Services - Rooms Large Meeting Room - Page 2 of 4

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**AI**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**
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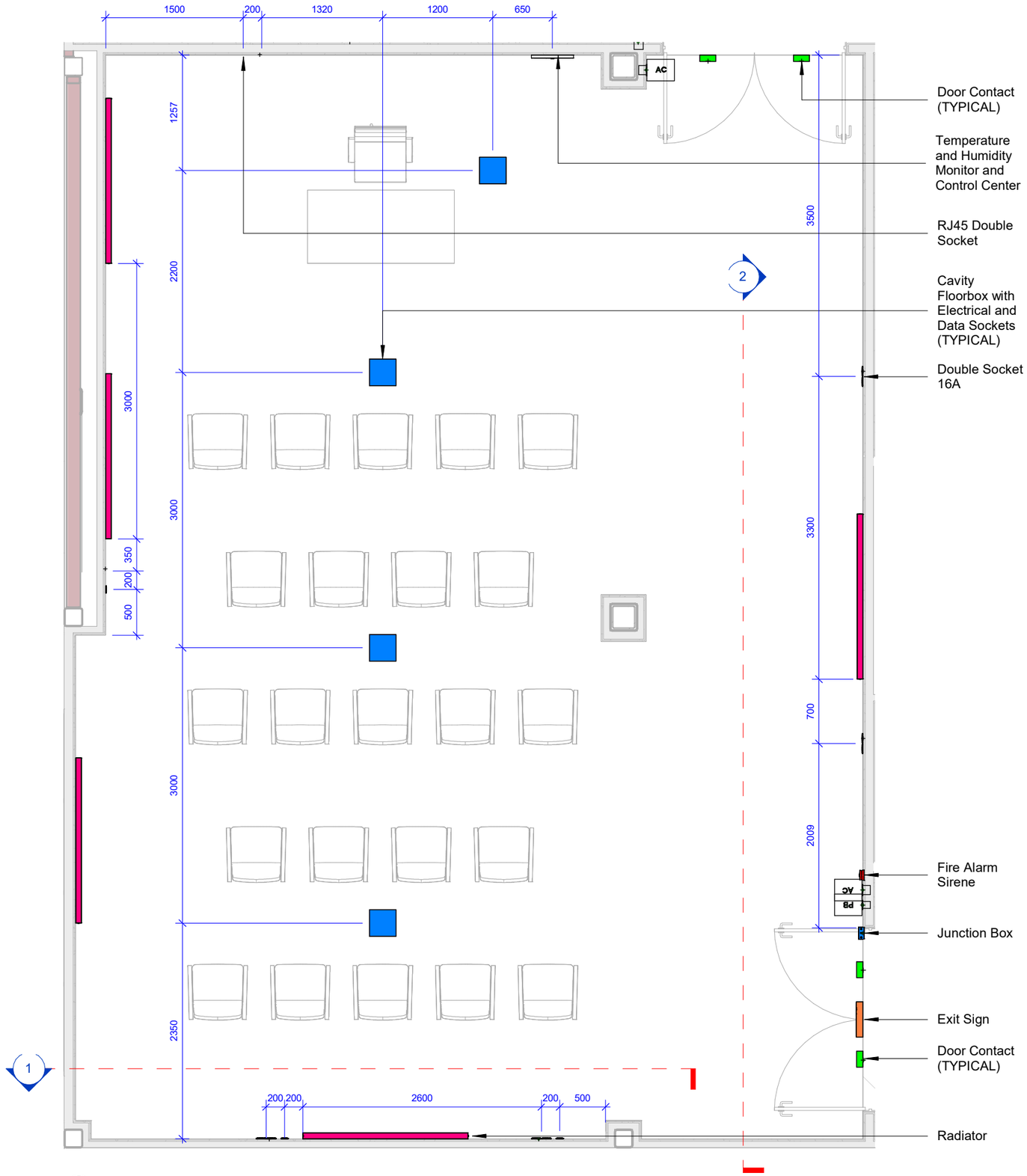

B Ground Floor Large Meeting Room
1 : 50

Legend

- Security Devices
- Fire Devices
- Small Power Devices
- Lighting Devices
- Data Devices
- Mechanical Heating
- Emergency Lighting
- Supply Air
- Return Air
- Exhaust Air

Abbreviations

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DESIGN & BUILD CONTRACTOR:

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CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Combined Services - Rooms Large Meeting Room - Page 3 of 4

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**AI**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**
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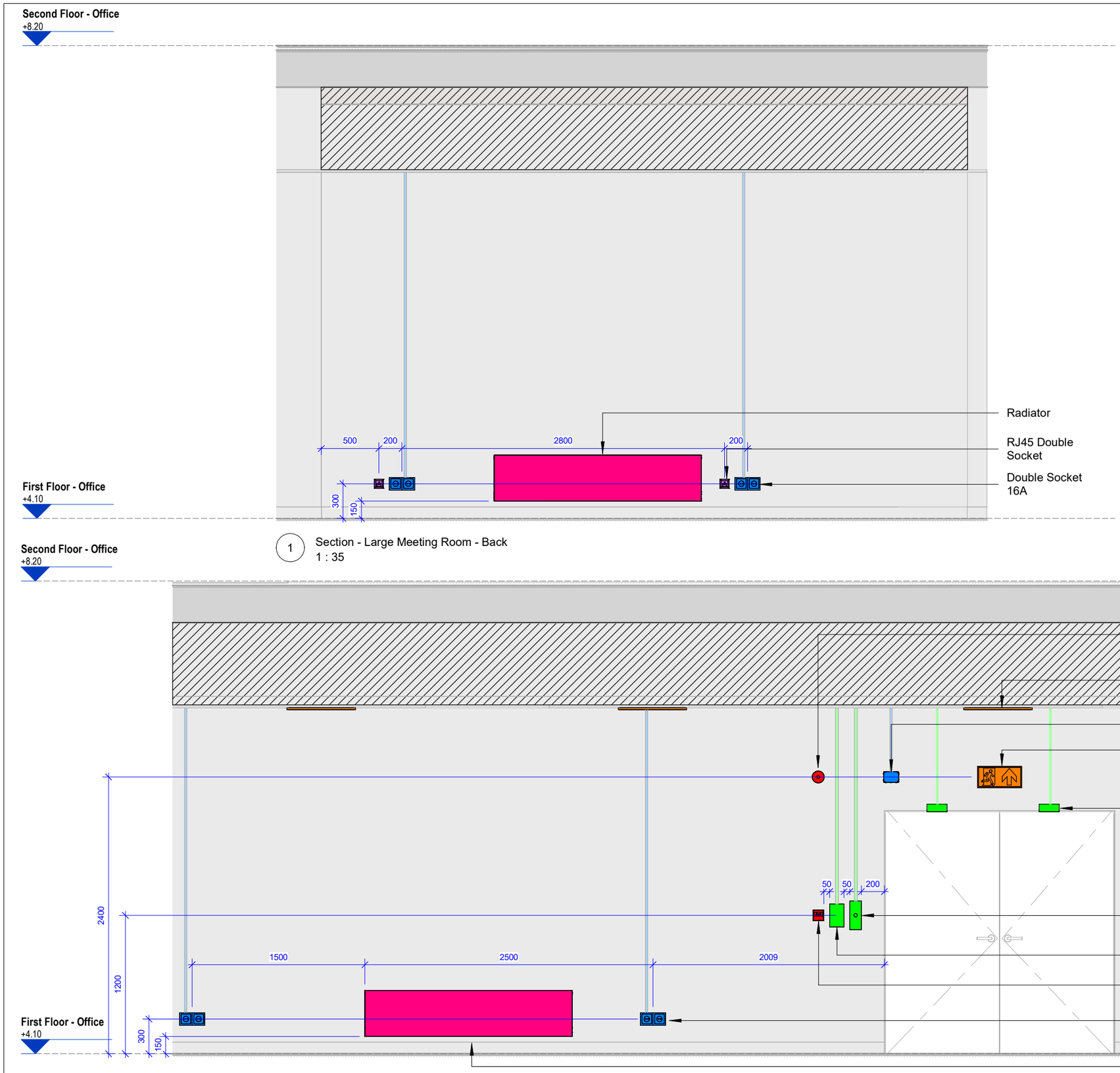

1 Section - Large Meeting Room - Back
1 : 35

2 Section - Large Meeting Room - Right
1 : 35

Legend

- Security Devices
- Fire Devices
- Small Power Devices
- Lighting Devices
- Data Devices
- Mechanical Heating
- Emergency Lighting
- Supply Air
- Return Air
- Exhaust Air

Abbreviations

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DESIGN & BUILD CONTRACTOR:

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CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Combined Services - Rooms Large Meeting Room - Page 4 of 4

DRAWING STATUS:	SCALE:	STATUS:
Revision 1	**AI**	**S2**

DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**

DRAWING NUMBER:	FORMAT:	REVISION:
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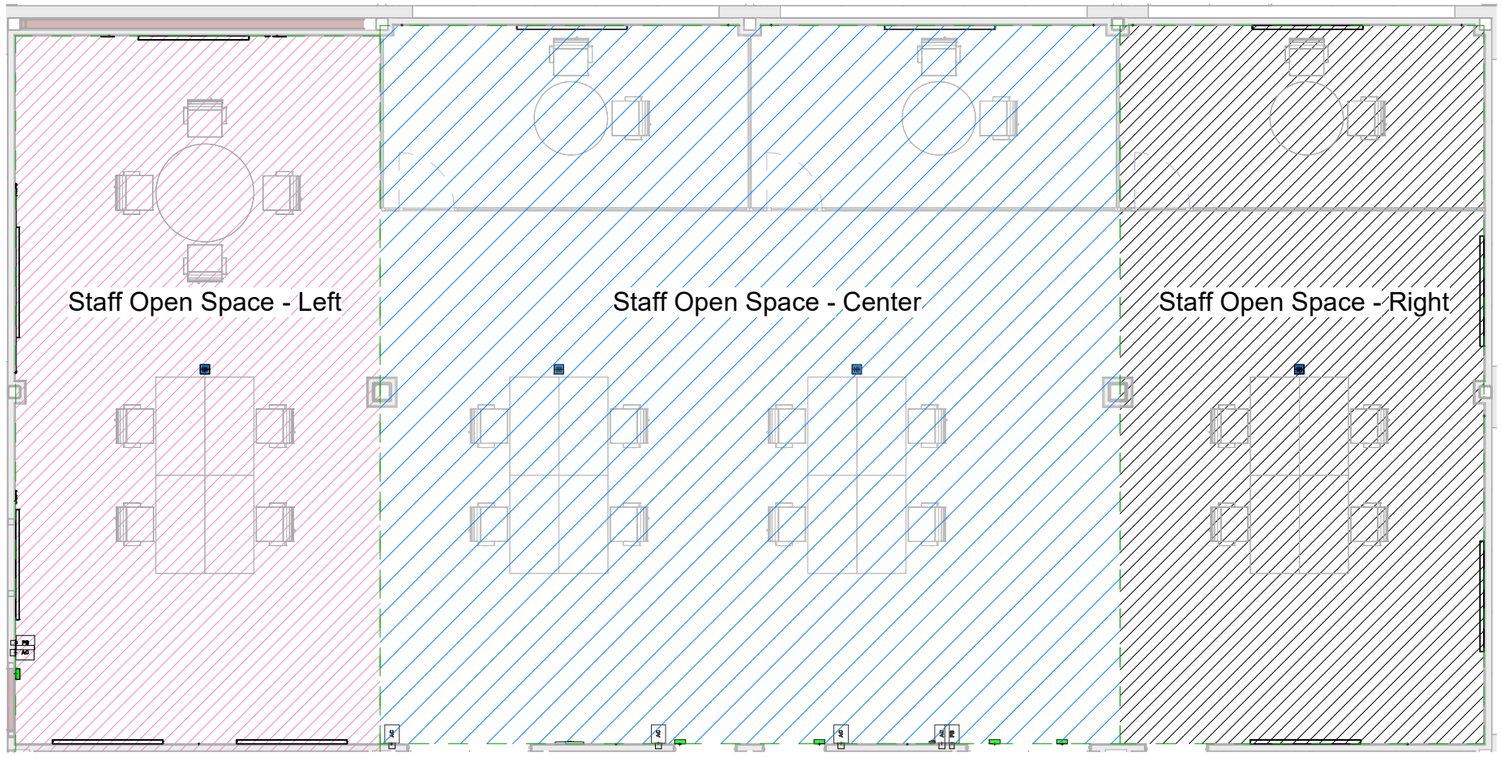

A Ground Floor Staff Open Space - Overview
1 : 100

Legend

- Security Devices
- Fire Devices
- Small Power Devices
- Lighting Devices
- Data Devices
- Mechanical Heating
- Emergency Lighting
- Supply Air
- Return Air
- Exhaust Air

Abbreviations

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P02	04.04.2024	Revision 1	JR	JM
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DESIGN & BUILD CONTRACTOR:

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BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Combined Services - Rooms Staff Open Space - Overview - Page 1 of 11

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**AI**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**
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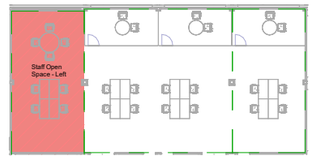

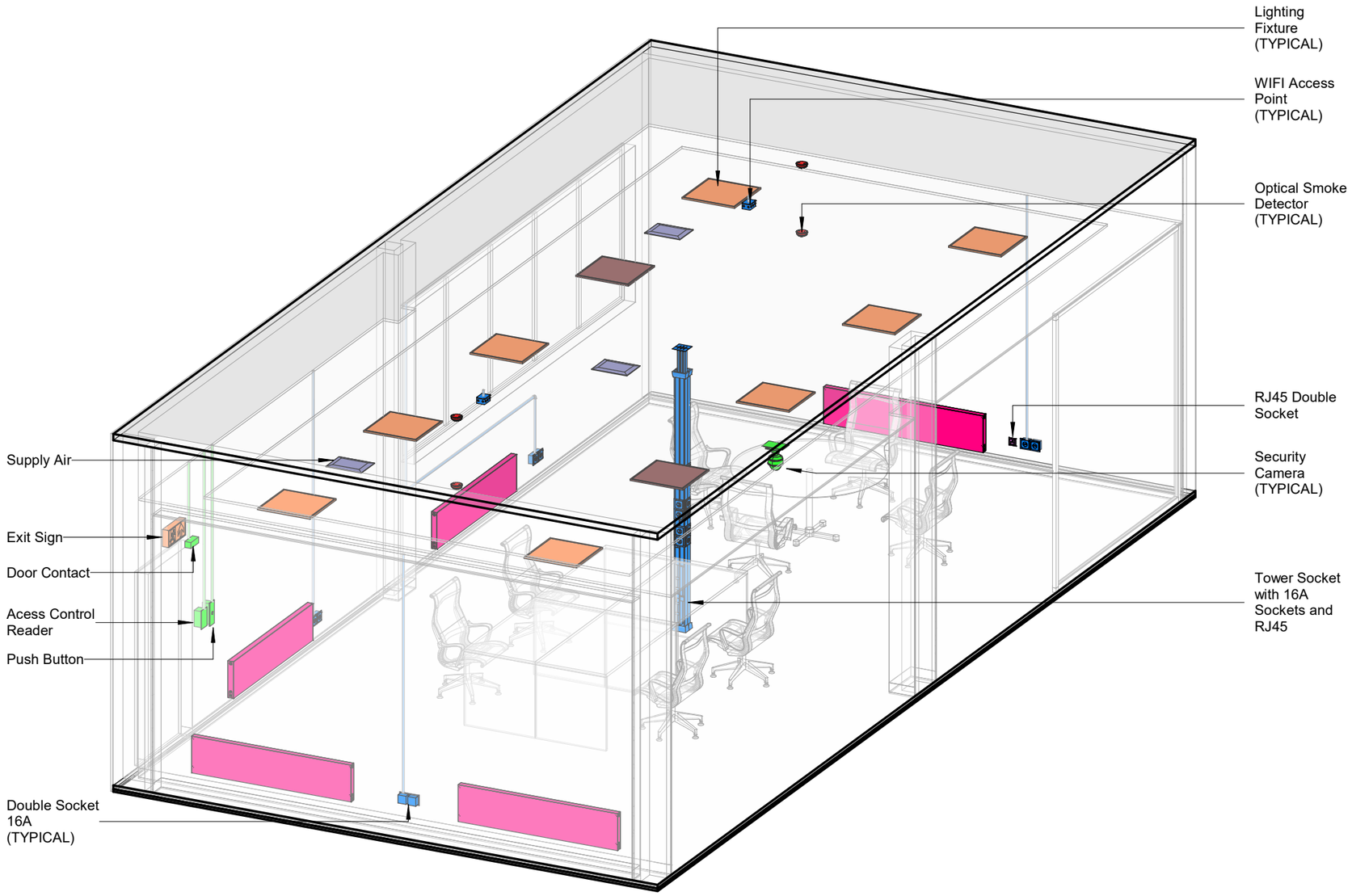

3D1 3D View Staff Open Space - Left

Legend

- Security Devices
- Fire Devices
- Small Power Devices
- Lighting Devices
- Data Devices
- Mechanical Heating
- Emergency Lighting
- Supply Air
- Return Air
- Exhaust Air

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DESIGN & BUILD CONTRACTOR:

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PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Combined Services - Rooms Staff Open Space - Left - Page 2 of 11

DRAWING STATUS:	SCALE:	STATUS:
Revision 1	**AI**	**S2**

DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**

DRAWING NUMBER:	FORMAT:	REVISION:
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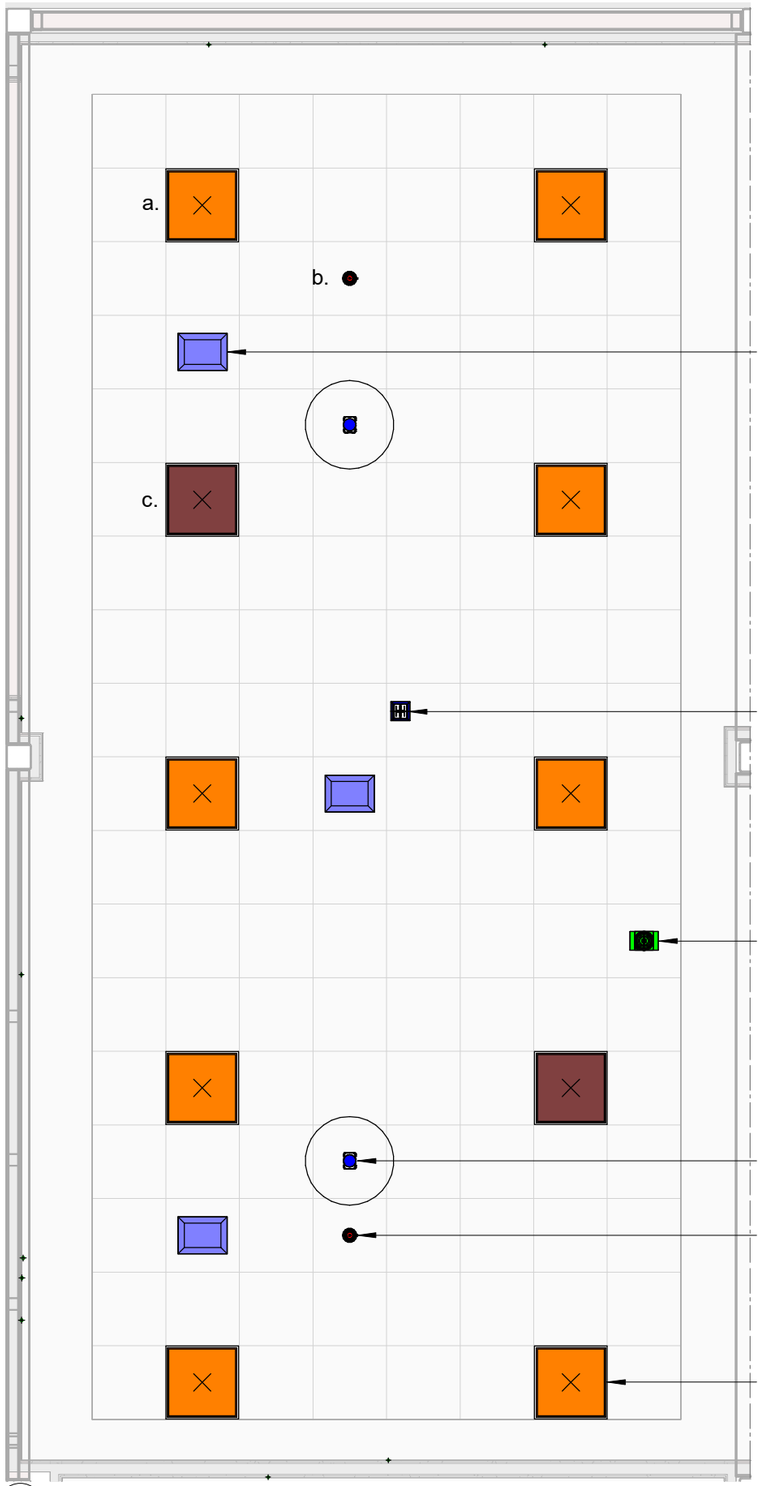
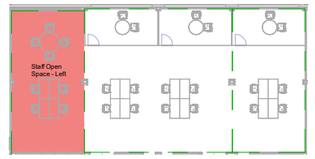
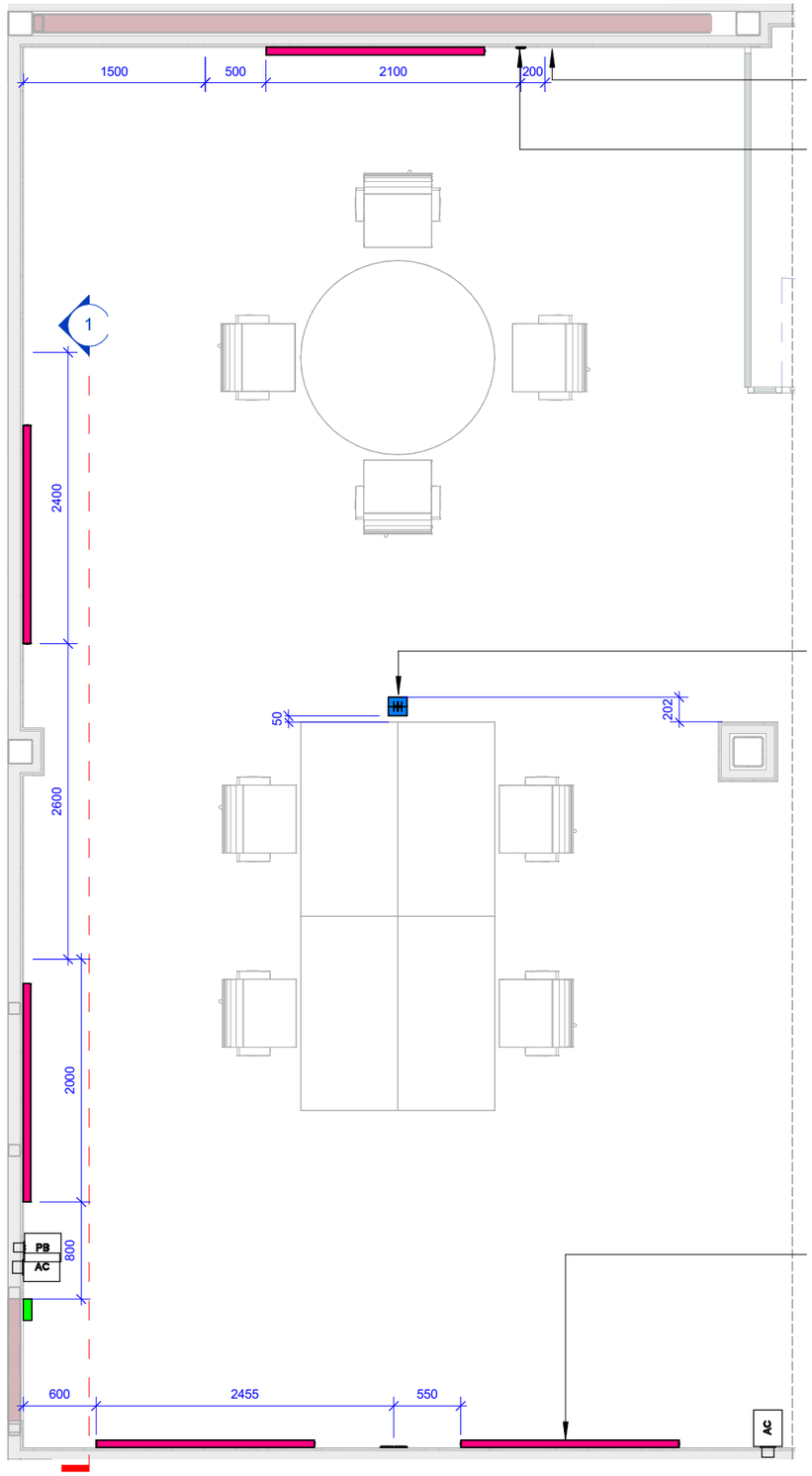


B Reflected Ceiling - Staff Open Space - Left
1 : 50





C Ground Floor Staff Open Space - Left
1 : 50

Legend

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- Fire Devices
- Small Power Devices
- Lighting Devices
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Rev	Date	Description	Sign.	Veri.
P02	04.04.2024	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	LE	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Combined Services - Rooms Staff Open Space - Left - Page 3 of 11

DRAWING STATUS:	SCALE:	STATUS:
Revision 1	**AI**	**S2**

DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**

DRAWING NUMBER:	FORMAT:	REVISION:
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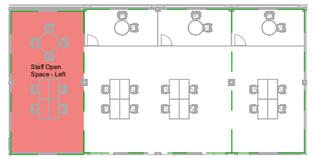

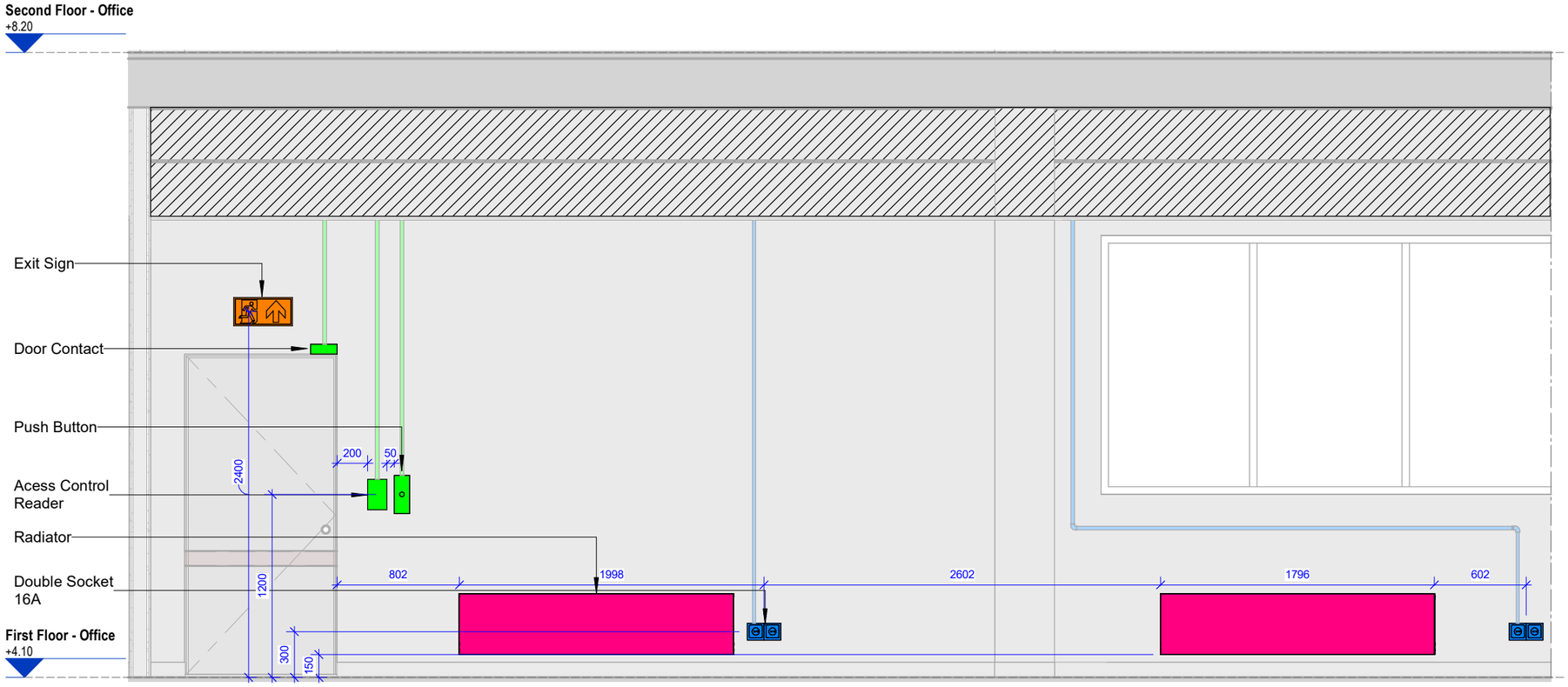

1 Section - Staff Open Space - Left
1 : 35

Legend

- Security Devices
- Fire Devices
- Small Power Devices
- Lighting Devices
- Data Devices
- Mechanical Heating
- Emergency Lighting
- Supply Air
- Return Air
- Exhaust Air

Abbreviations

Code	Description
DC	Door Contact
AC	Access Control Card Reader
FAS	Flashing Beacon with Siren
MCP	Manual Alarm Call Point
ACMS	Door-Holding Magnets
JB	Junction Box
PB	Push Button for automatic Doors
AI	As Indicated

General Notes

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P02	04.04.2024	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	LE	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Combined Services - Rooms Staff Open Space - Left - Page 4 of 11

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**AI**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**
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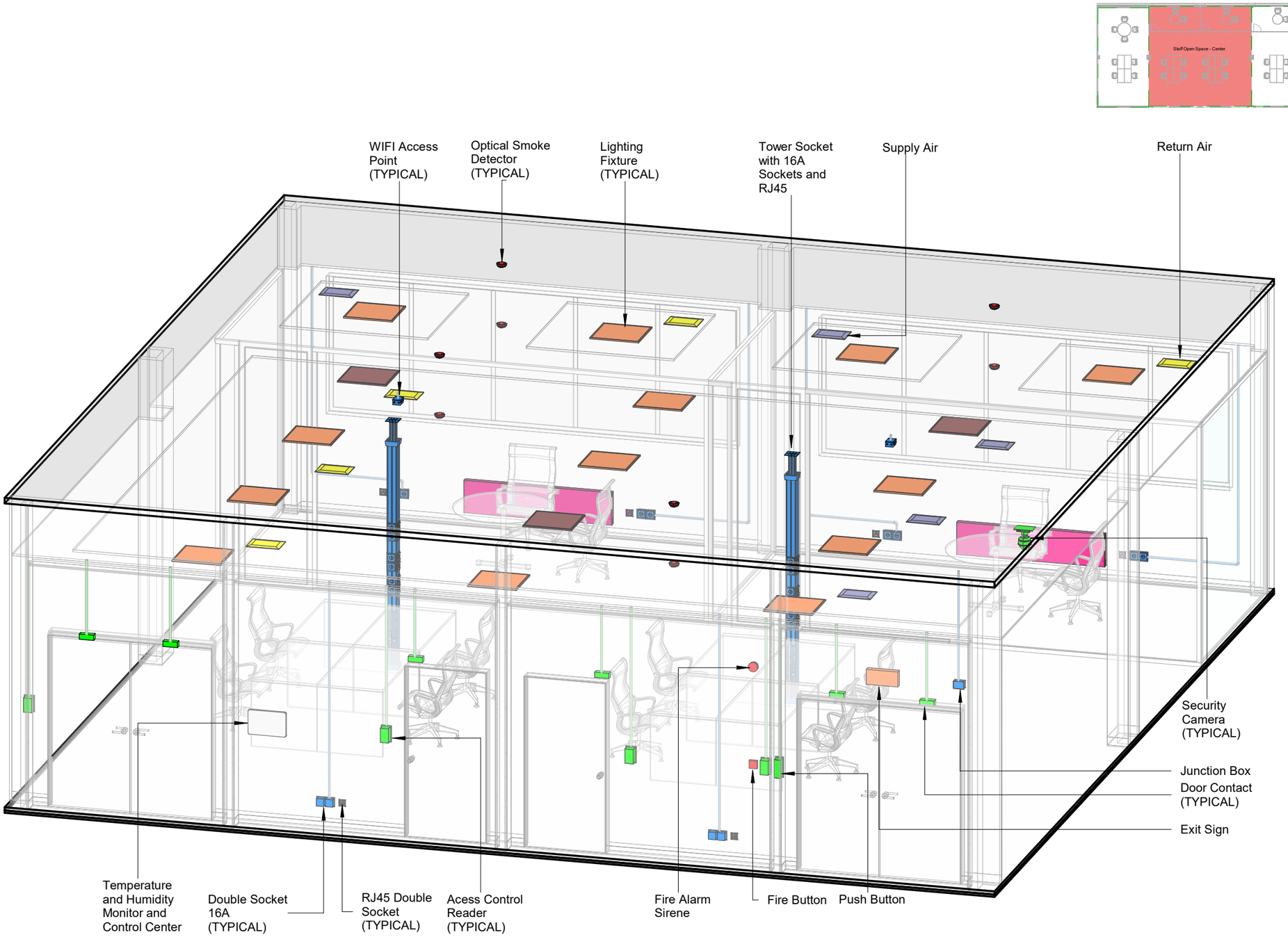

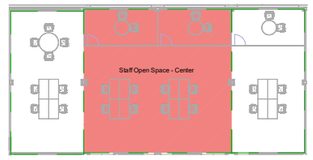

3D2 3D View Staff Open Space - Center

Legend

- Security Devices
- Fire Devices
- Small Power Devices
- Lighting Devices
- Data Devices
- Mechanical Heating
- Emergency Lighting
- Supply Air
- Return Air
- Exhaust Air

Abbreviations

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P02	04.04.2024	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	LE	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Combined Services - Rooms Staff Open Space - Center - Page 5 of 11

DRAWING STATUS:	SCALE:	STATUS:
Revision 1	**AI**	**S2**

DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**

DRAWING NUMBER:	FORMAT:	REVISION:
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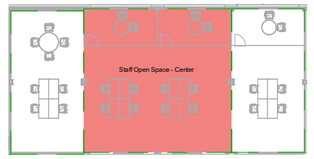

D Reflected Ceiling - Staff Open Space - Center
1 : 50

Legend

- Security Devices
- Fire Devices
- Small Power Devices
- Lighting Devices
- Data Devices
- Mechanical Heating
- Emergency Lighting
- Supply Air
- Return Air
- Exhaust Air

Abbreviations

Code	Description
DC	Door Contact
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P02	04.04.2024	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	LE	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Combined Services - Rooms Staff Open Space - Center - Page 6 of 11

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**AI**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
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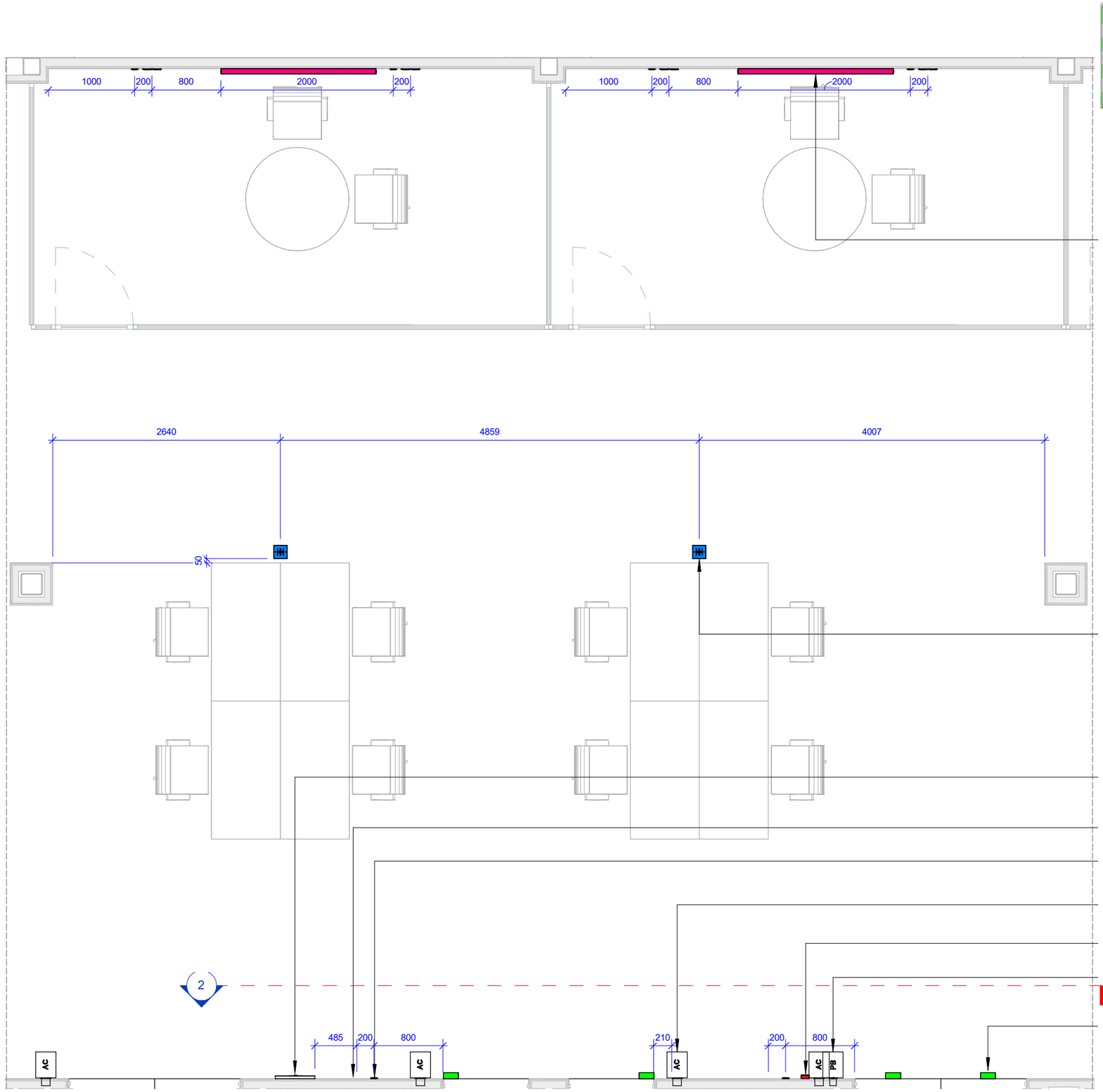

E Ground Floor Staff Open Space - Center
1 : 50

Legend

- Security Devices
- Fire Devices
- Small Power Devices
- Lighting Devices
- Data Devices
- Mechanical Heating
- Emergency Lighting
- Supply Air
- Return Air
- Exhaust Air

Abbreviations

Code	Description
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Rev	Date	Description	Sign.	Veri.
P02	04.04.2024	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	LE	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Combined Services - Rooms Staff Open Space - Center - Page 7 of 11

DRAWING STATUS:	SCALE:	STATUS:
Revision 1	**AI**	**S2**

DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**

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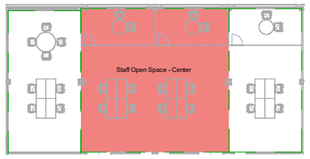

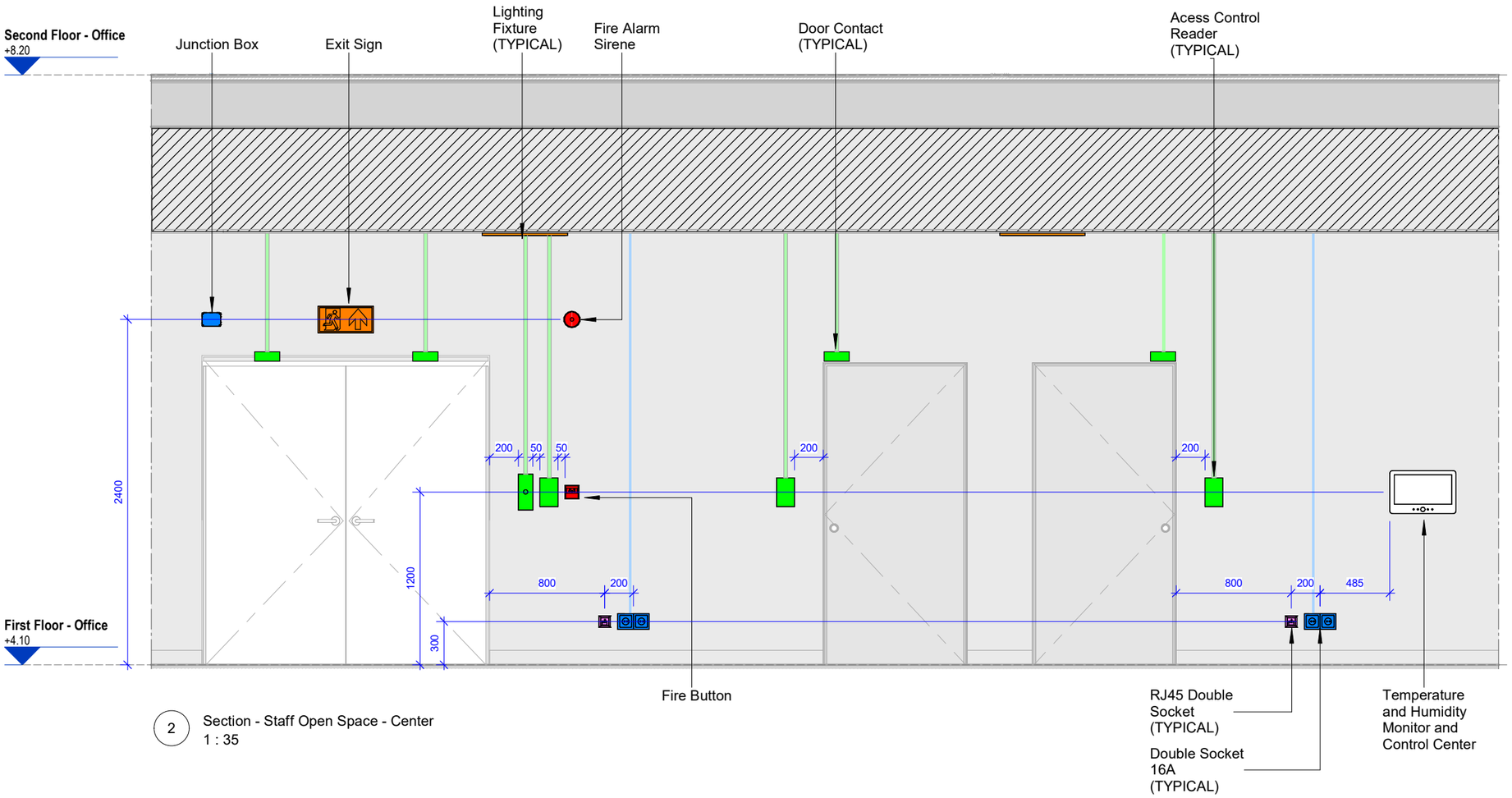

2 Section - Staff Open Space - Center
1 : 35

Legend

- Security Devices
- Fire Devices
- Small Power Devices
- Lighting Devices
- Data Devices
- Mechanical Heating
- Emergency Lighting
- Supply Air
- Return Air
- Exhaust Air

Abbreviations

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Rev	Date	Description	Sign.	Veri.
P02	04.04.2024	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	LE	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Combined Services - Rooms Staff Open Space - Center - Page 8 of 11

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**AI**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**
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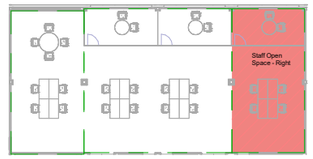

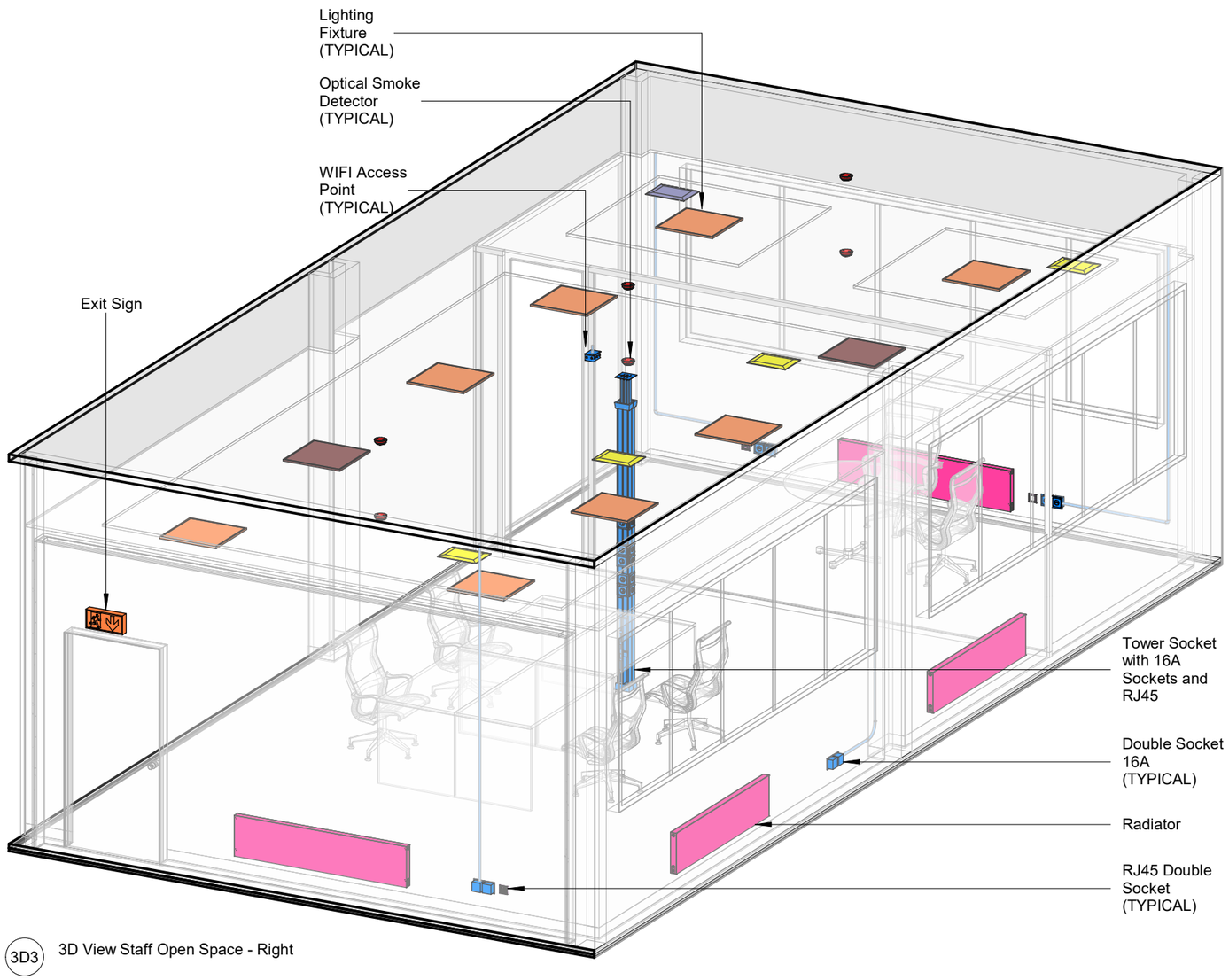

3D3 3D View Staff Open Space - Right

Legend

Security Devices
Fire Devices
Small Power Devices
Lighting Devices
Data Devices
Mechanical Heating
Emergency Lighting
Supply Air
Return Air
Exhaust Air

Abbreviations

Code	Description
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Rev	Date	Description	Sign.	Veri.
P02	04.04.2024	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	LE	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Combined Services - Rooms Staff Open Space - Right - Page 9 of 11

DRAWING STATUS:	SCALE:	STATUS:
Revision 1	**AI**	**S2**

DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**

DRAWING NUMBER:	FORMAT:	REVISION:
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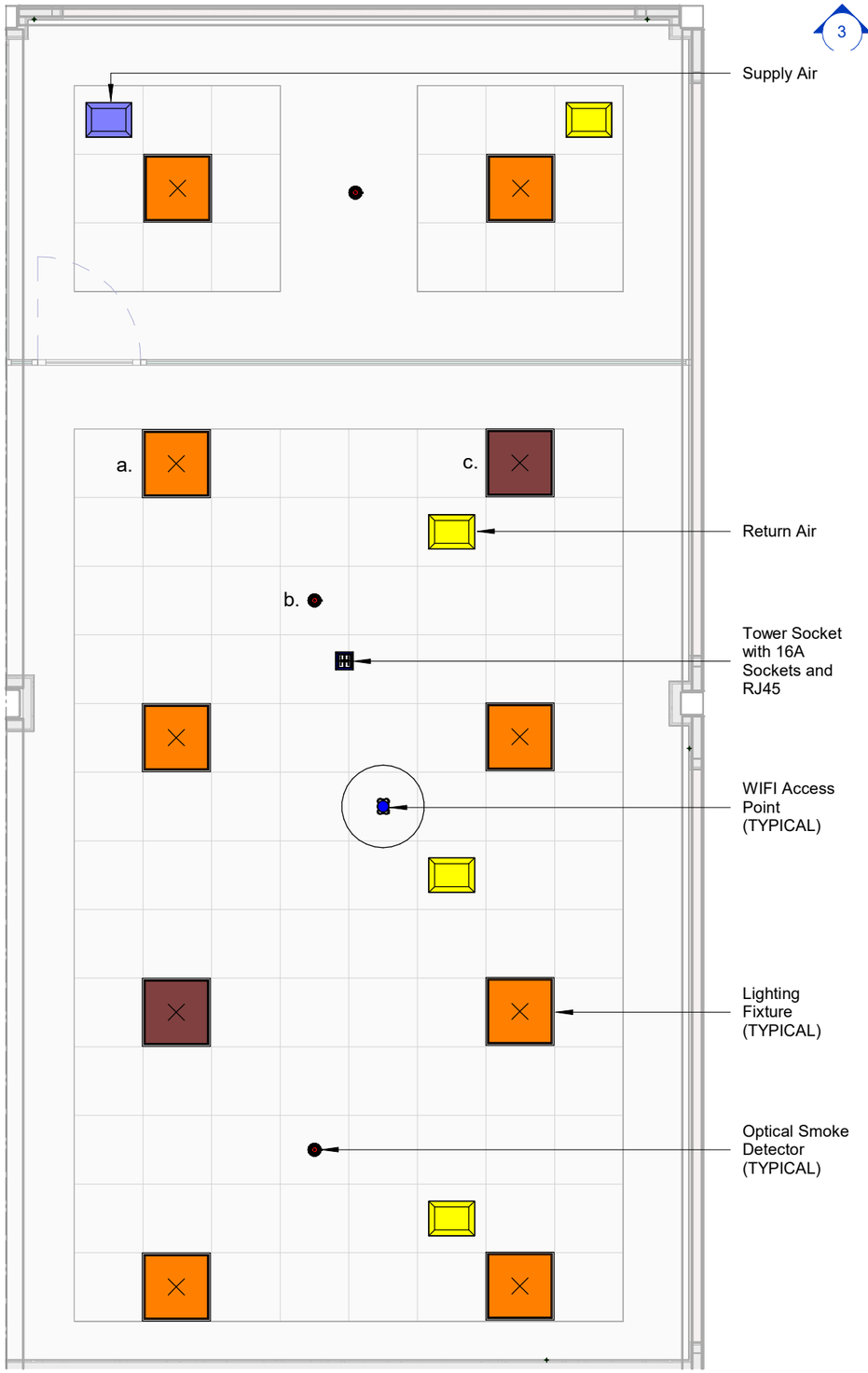
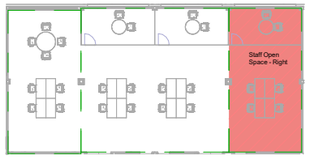
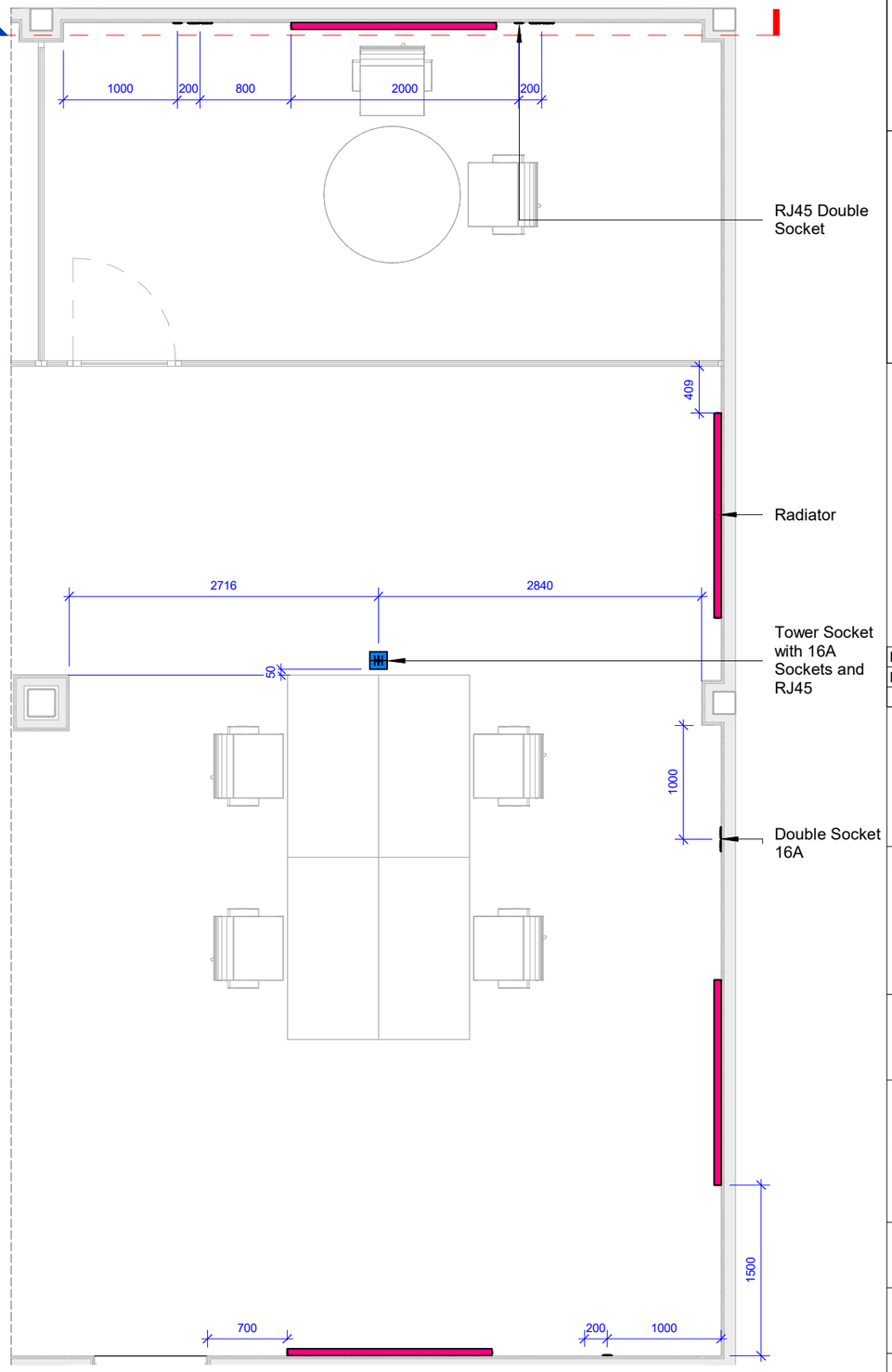


F Reflected Ceiling - Staff Open Space - Right
1 : 50





G Ground Floor Staff Open Space - Right
1 : 50

Legend

- Security Devices
- Fire Devices
- Small Power Devices
- Lighting Devices
- Data Devices
- Mechanical Heating
- Emergency Lighting
- Supply Air
- Return Air
- Exhaust Air

Abbreviations

Code	Description
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Rev	Date	Description	Sign.	Veri.
P02	04.04.2024	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	LE	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Combined Services - Rooms Staff Open Space - Right - Page 10 of 11

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**AI**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**
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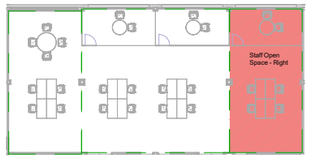

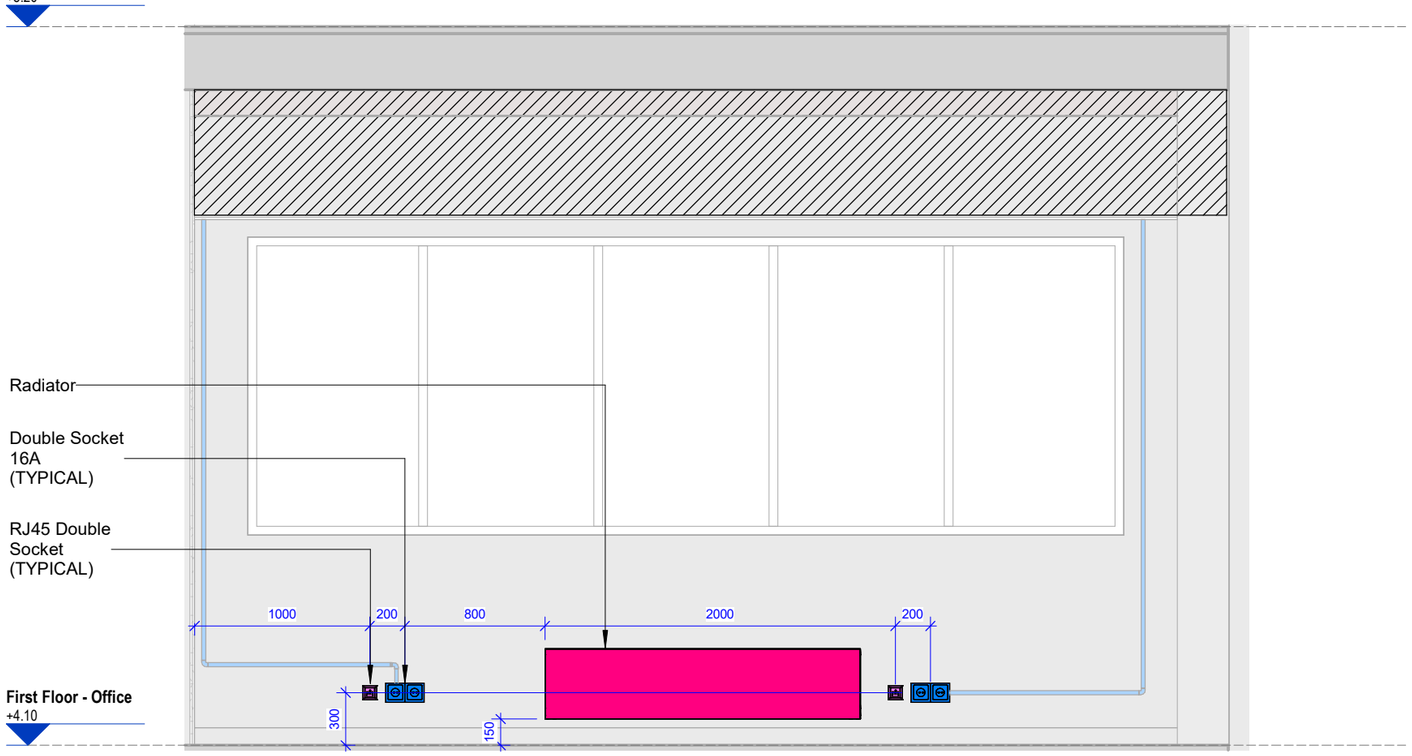

3 Section - Staff Open Space - Right
1 : 35

Legend

- Security Devices
- Fire Devices
- Small Power Devices
- Lighting Devices
- Data Devices
- Mechanical Heating
- Emergency Lighting
- Supply Air
- Return Air
- Exhaust Air

Abbreviations

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Rev	Date	Description	Sign.	Veri.
P02	04.04.2024	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	LE	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Combined Services - Rooms Staff Open Space - Right - Page 11 of 11

DRAWING STATUS:	SCALE:	STATUS:
Revision 1	**AI**	**S2**

DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**

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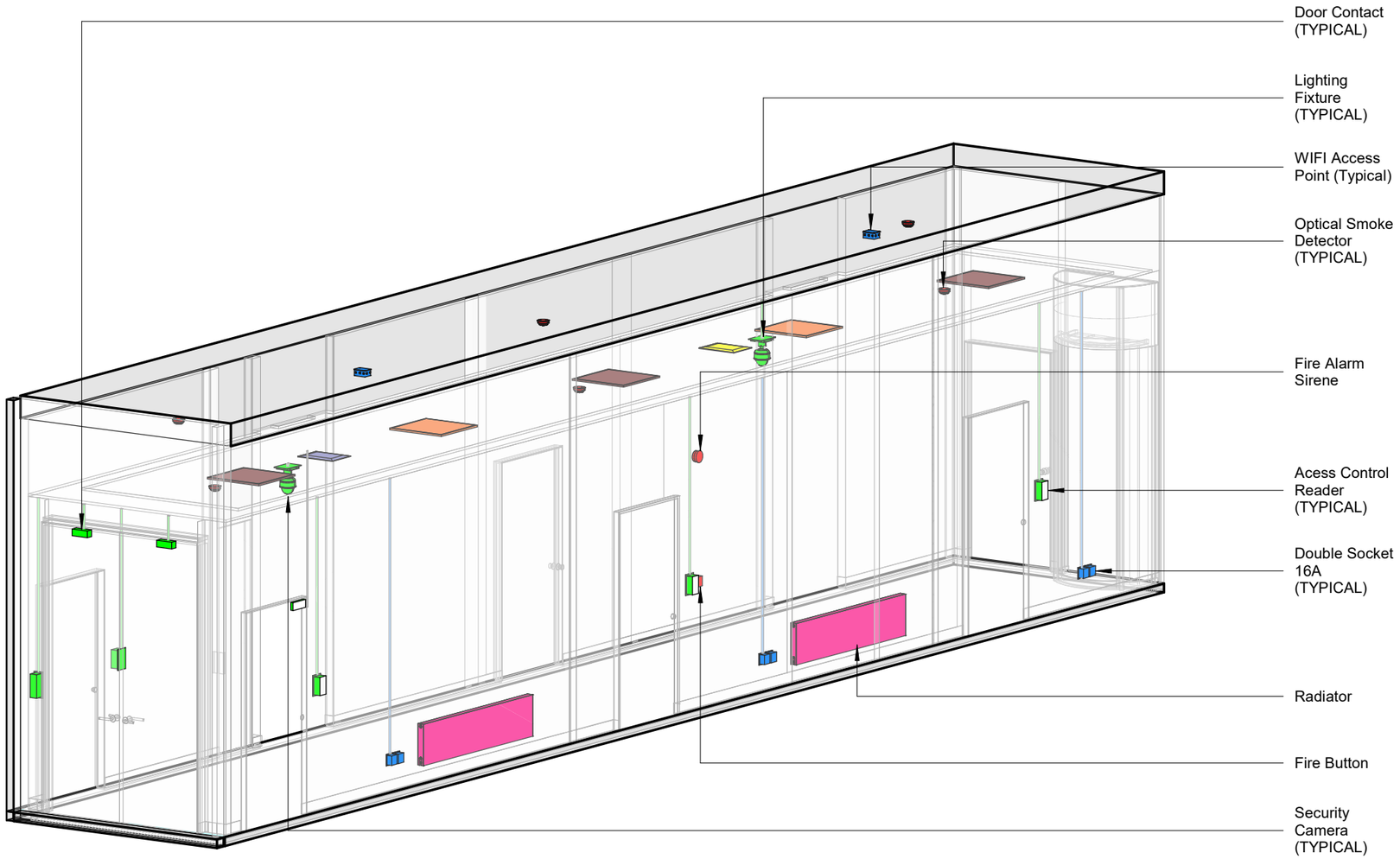

3D1 3D View Main Corridor

Legend

- Security Devices
- Fire Devices
- Small Power Devices
- Lighting Devices
- Data Devices
- Mechanical Heating
- Emergency Lighting
- Supply Air
- Return Air
- Exhaust Air

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Specific Notes

a. LED with motion detector.
b. Heat and optical smoke detector - One detector at low level and one at high level. To be aligned vertically on site. Displayed separate for better visibility
c. Emergency Lighting

Rev	Date	Description	Sign.	Veri.
P02	04.04.2024	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	LE	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Combined Services - Rooms Corridor - Page 1 of 2

DRAWING STATUS:	SCALE:	STATUS:
Revision 1	**AI**	**S2**

DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**

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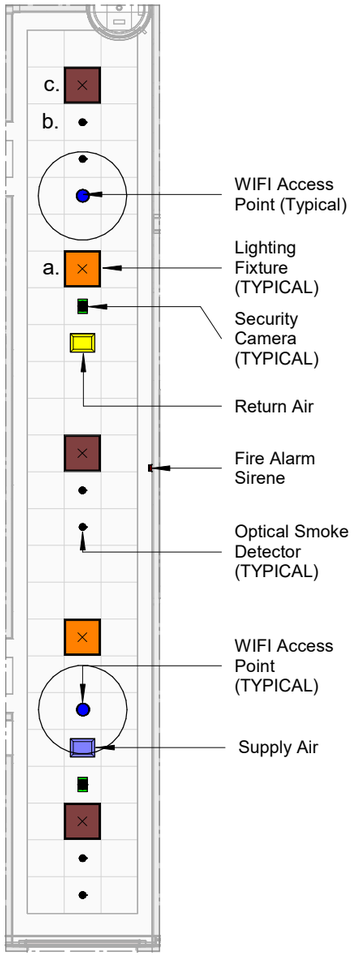
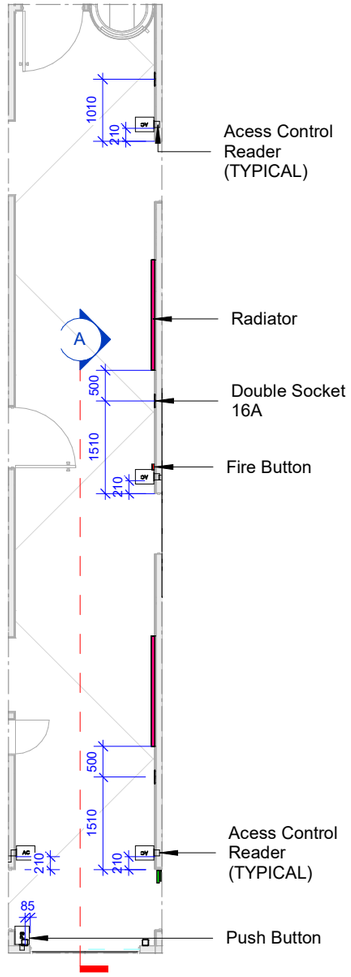
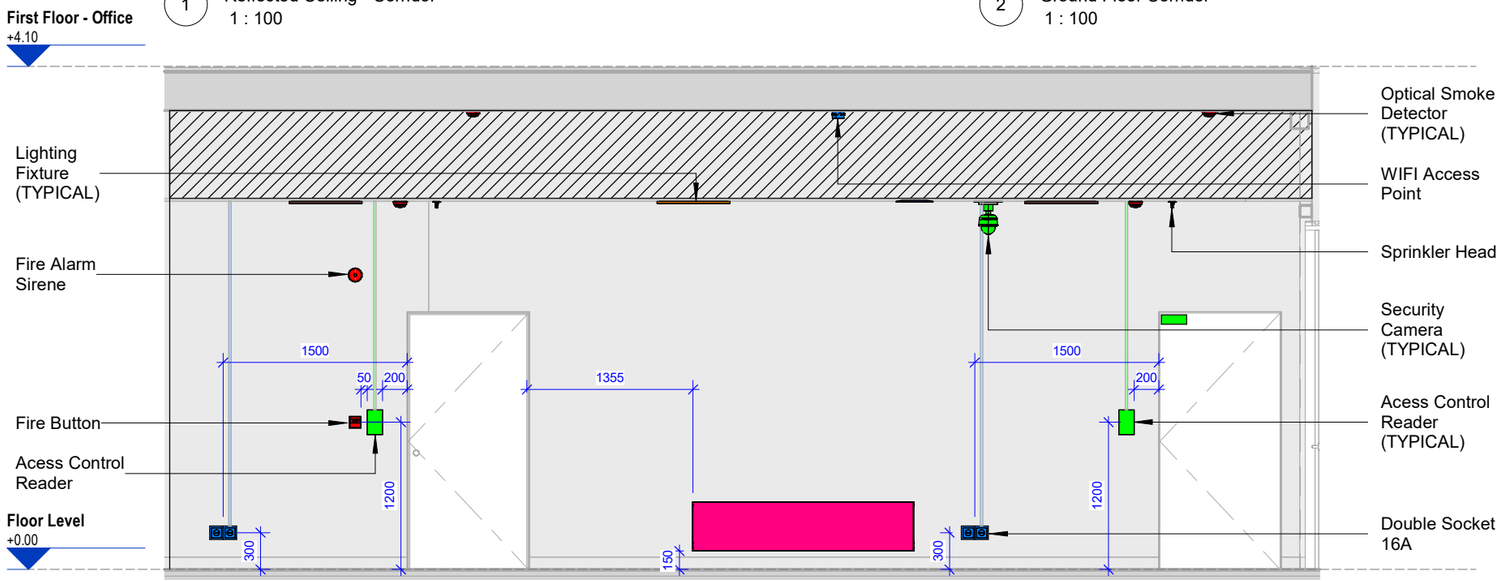


1 Reflected Ceiling - Corridor
1 : 100



2 Ground Floor Corridor
1 : 100



A Section - Corridor - Right
1 : 50

Legend

- Security Devices
- Fire Devices
- Small Power Devices
- Lighting Devices
- Data Devices
- Mechanical Heating
- Emergency Lighting
- Supply Air
- Return Air
- Exhaust Air

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c. Emergency Lighting

Rev	Date	Description	Sign.	Veri.
P02	04.04.2024	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	LE	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Combined Services - Rooms Corridor - Page 2 of 2

DRAWING STATUS:	SCALE:	STATUS:
Revision 1	**AI**	**S2**

DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**

DRAWING NUMBER:	FORMAT:	REVISION:
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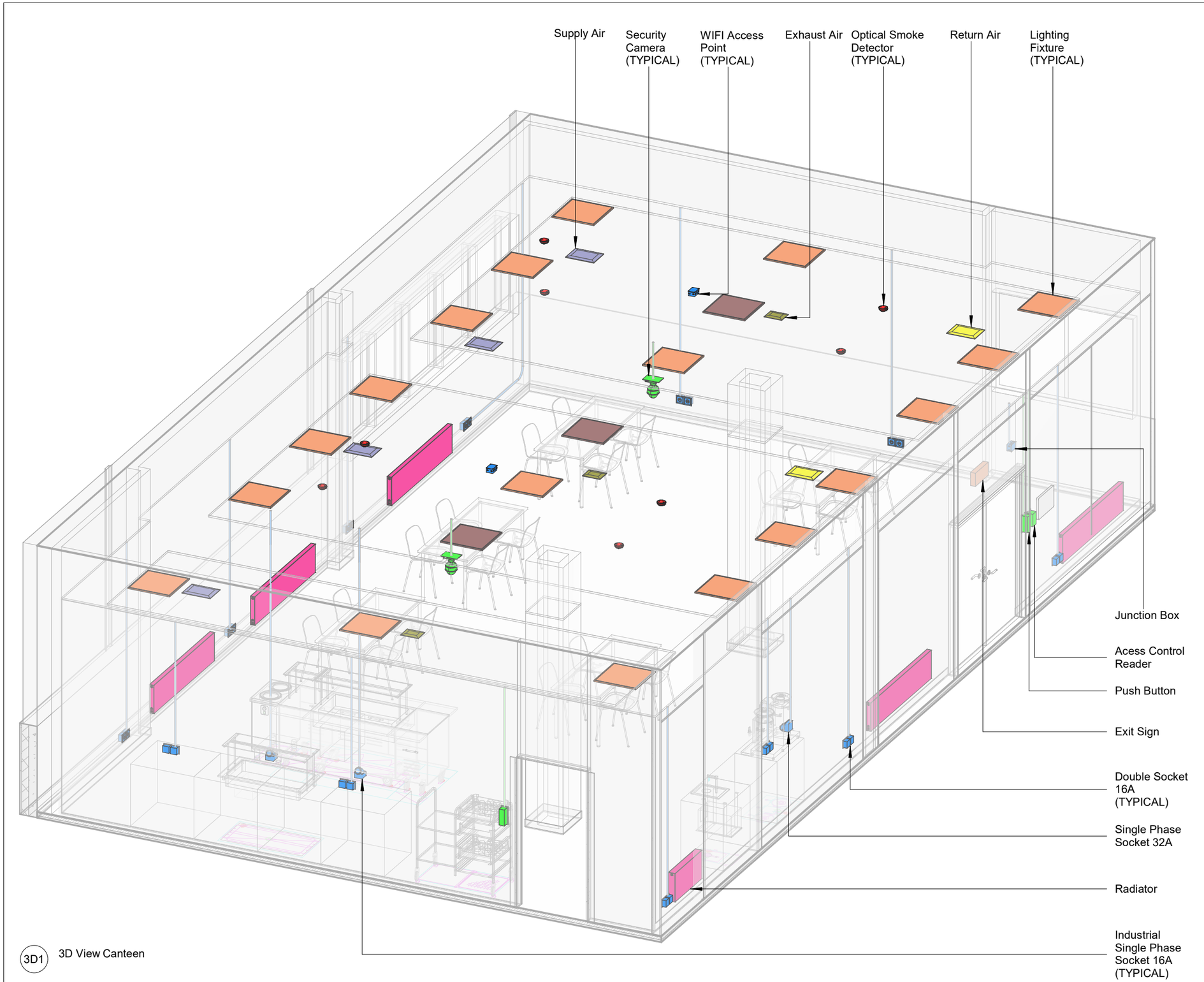

3D1 3D View Canteen

Legend

- Security Devices
- Fire Devices
- Small Power Devices
- Lighting Devices
- Data Devices
- Mechanical Heating
- Emergency Lighting
- Supply Air
- Return Air
- Exhaust Air

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b. Heat and optical smoke detector - One detector at low level and one at high level. To be aligned vertically on site. Displayed separate for better visibility
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P02	04.04.2024	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	LE	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Combined Services - Rooms
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11.11.2024	**04.04.2024**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
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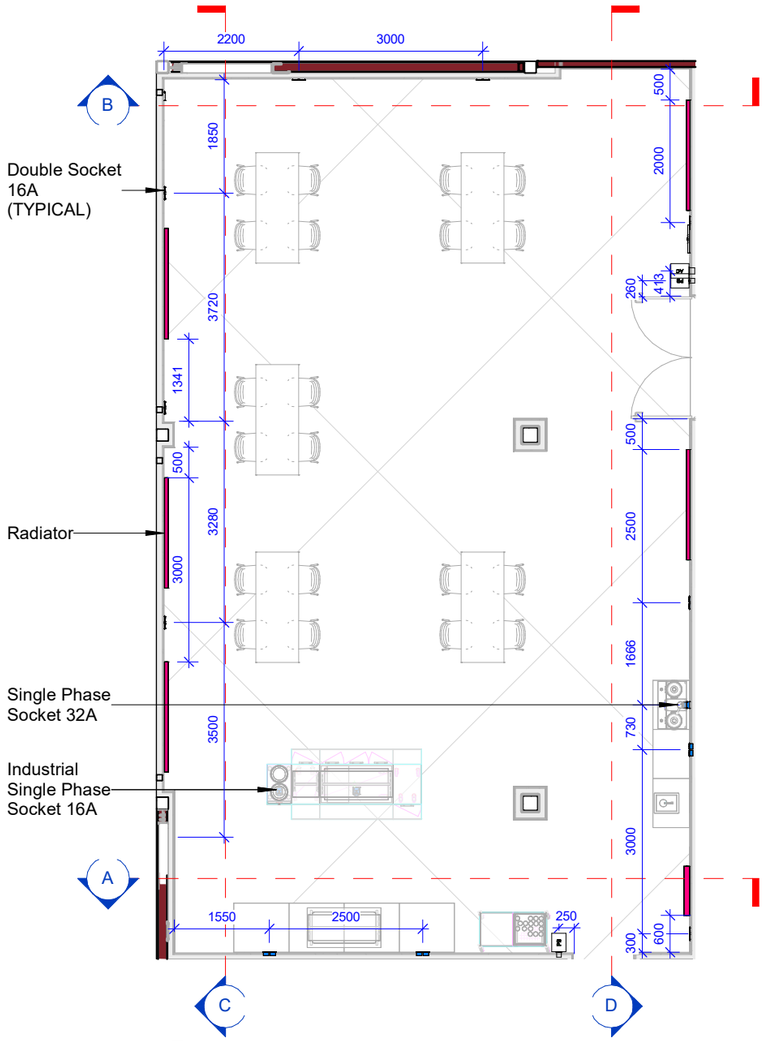
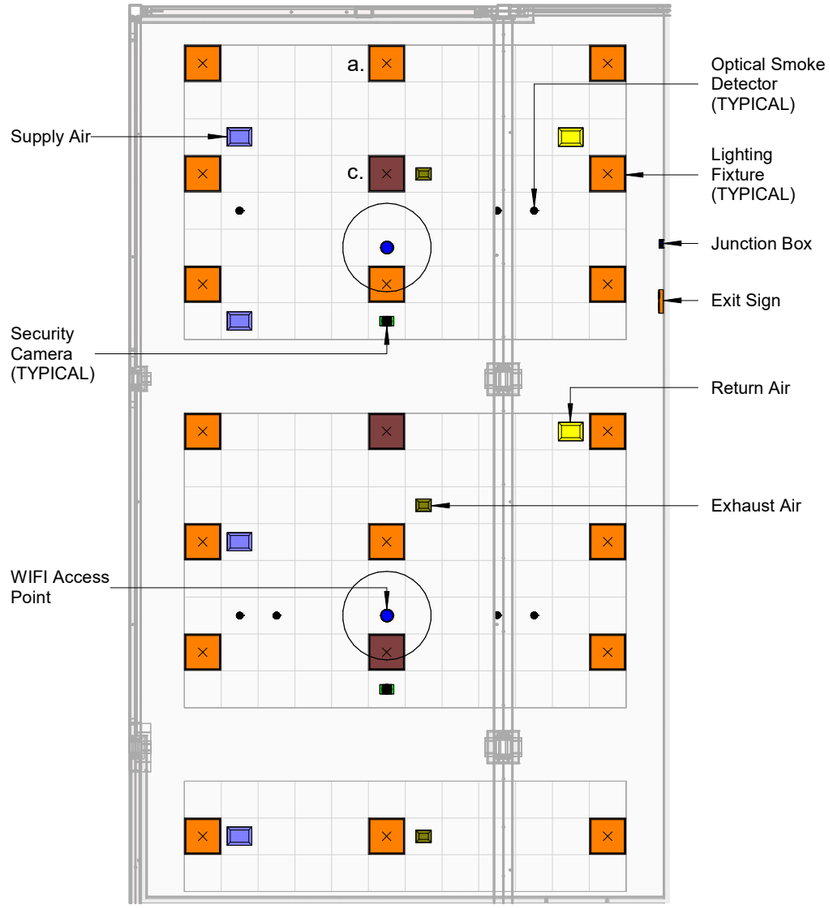


1 Ground Floor Canteen
1 : 100



2 Reflected Ceiling - Canteen
1 : 100

Legend

- Security Devices
- Fire Devices
- Small Power Devices
- Lighting Devices
- Data Devices
- Mechanical Heating
- Emergency Lighting
- Supply Air
- Return Air
- Exhaust Air

Abbreviations

Code	Description
DC	Door Contact
AC	Access Control Card Reader
FAS	Flashing Beacon with Siren
MCP	Manual Alarm Call Point
ACMS	Door-Holding Magnets
JB	Junction Box
PB	Push Button for automatic Doors
AI	As Indicated

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DRAWING NUMBER:		FORMAT:	REVISION:
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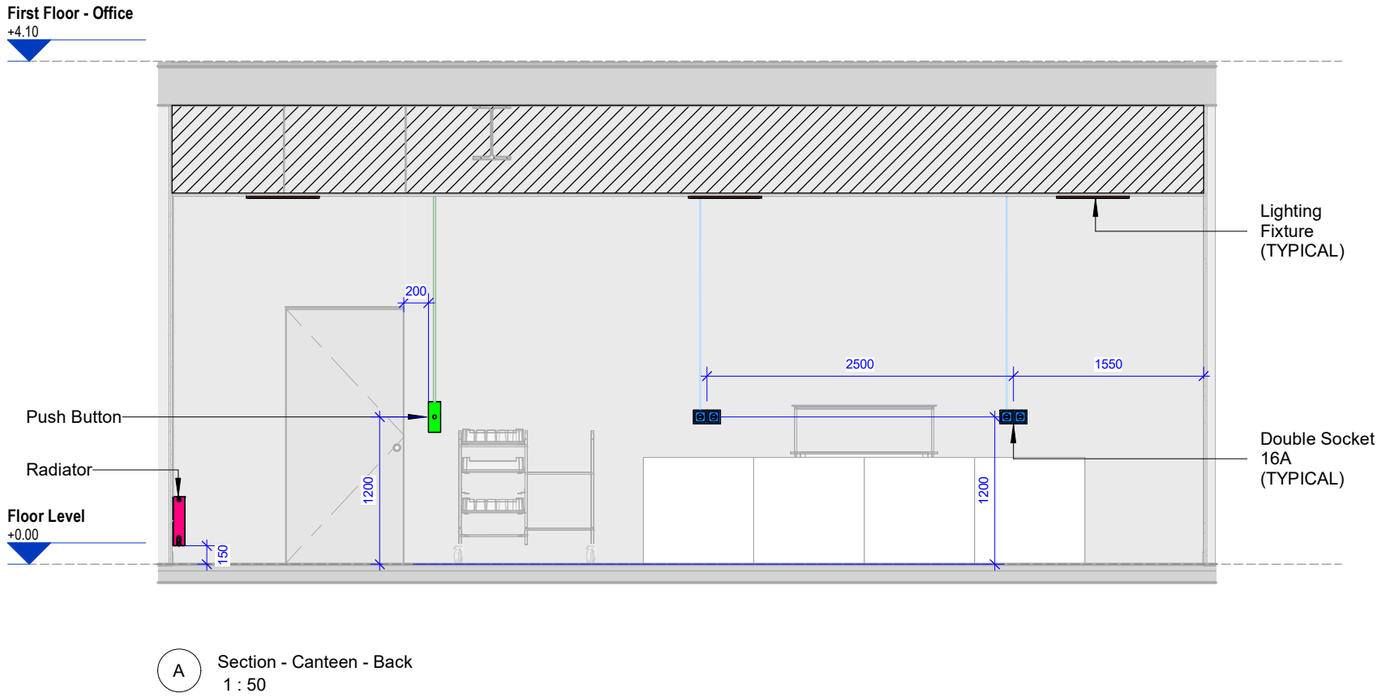
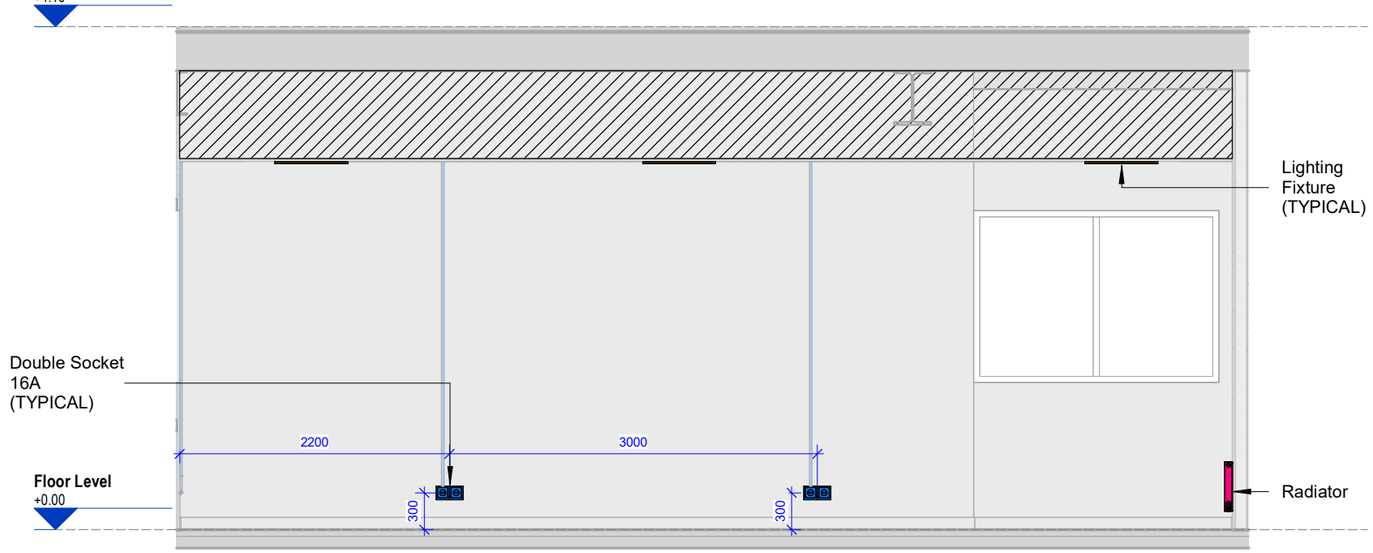


A Section - Canteen - Back
1 : 50



B Section - Canteen - Front
1 : 50

Legend

	Security Devices
	Fire Devices
	Small Power Devices
	Lighting Devices
	Data Devices
	Mechanical Heating
	Emergency Lighting
	Supply Air
	Return Air
	Exhaust Air

Abbreviations

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DRAWING NUMBER:		FORMAT:	REVISION:
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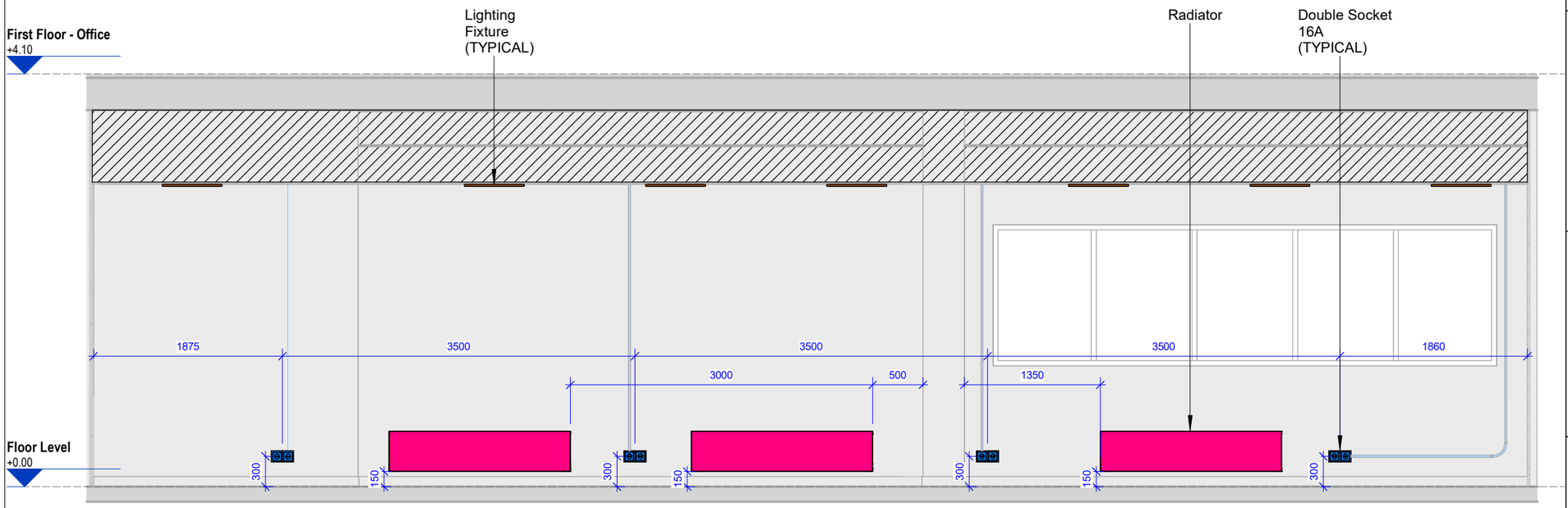
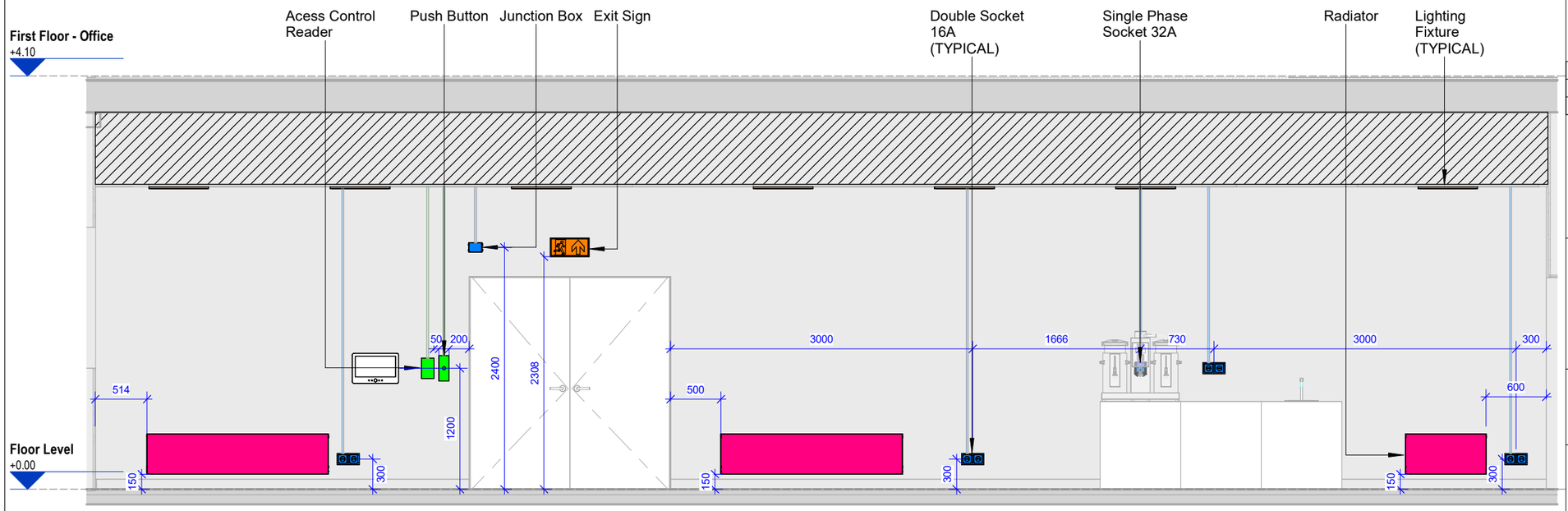


C Section - Canteen - Left
1 : 50



D Section - Canteen - Right
1 : 50

Legend

	Security Devices
	Fire Devices
	Small Power Devices
	Lighting Devices
	Data Devices
	Mechanical Heating
	Emergency Lighting
	Supply Air
	Return Air
	Exhaust Air

Abbreviations

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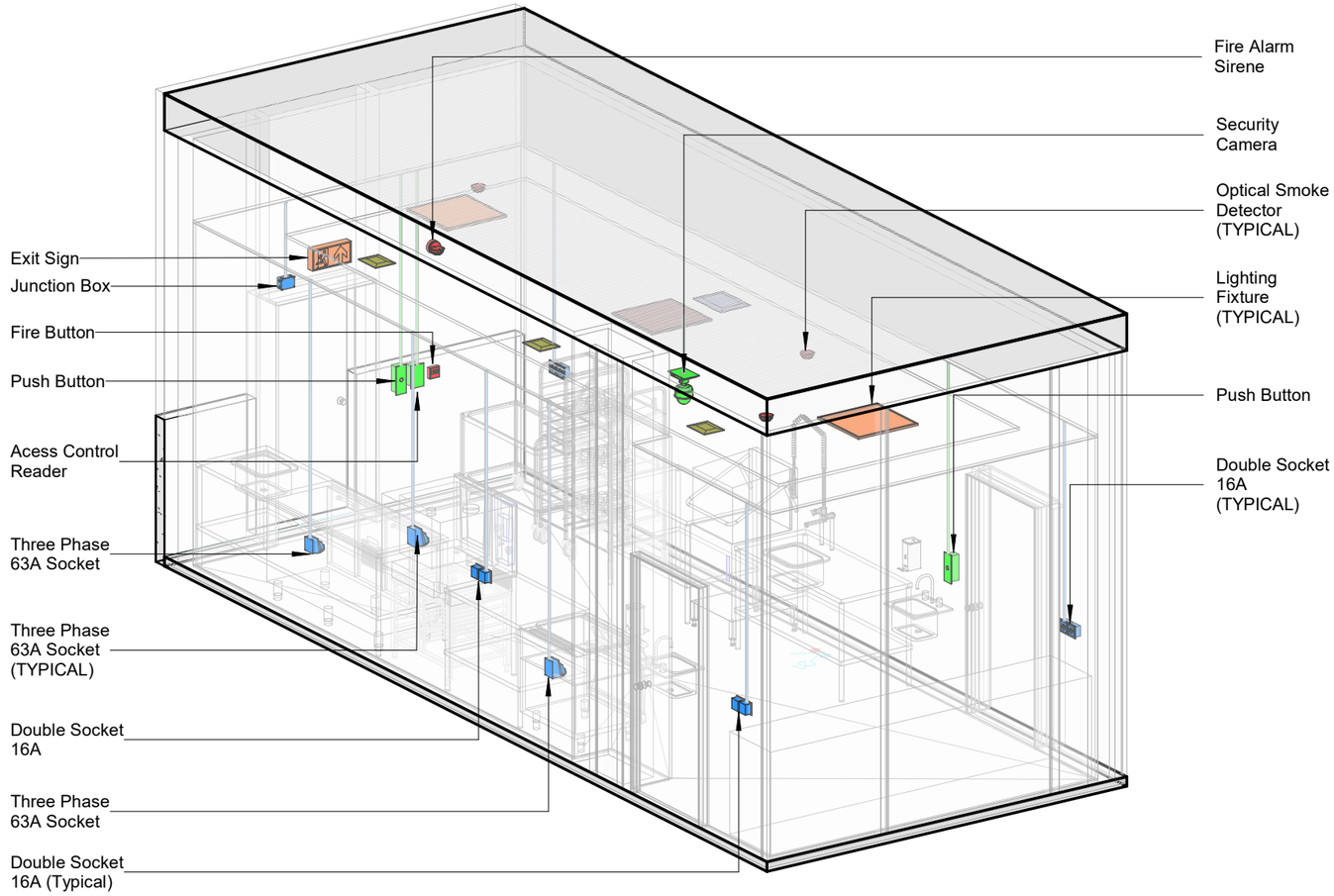
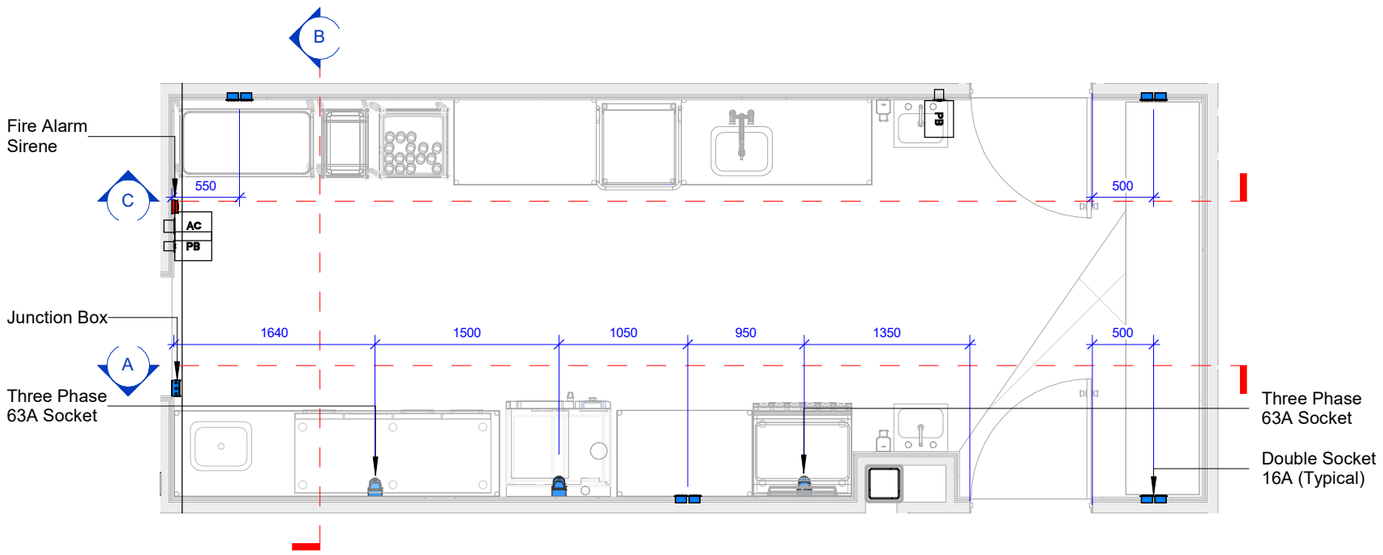


3D1 3D View Catering



1 Ground Floor Catering
1 : 50

Legend

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- Fire Devices
- Small Power Devices
- Lighting Devices
- Data Devices
- Mechanical Heating
- Emergency Lighting
- Supply Air
- Return Air
- Exhaust Air

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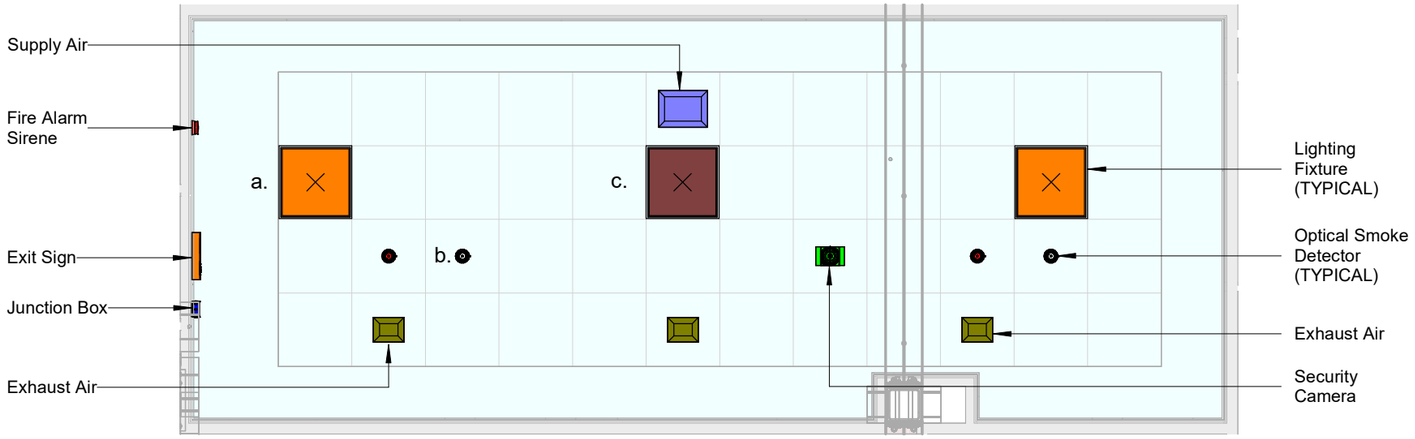
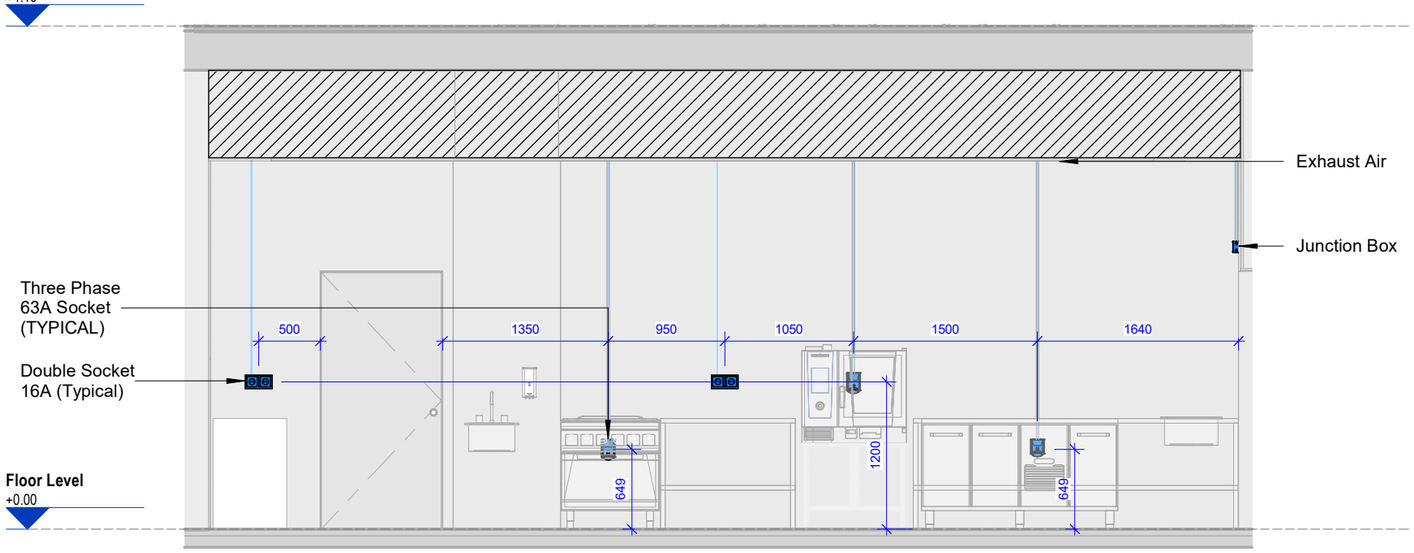


2 Reflected Ceiling - Catering
1 : 50



A Section - Catering - Back
1 : 50

Legend

- Security Devices
- Fire Devices
- Small Power Devices
- Lighting Devices
- Data Devices
- Mechanical Heating
- Emergency Lighting
- Supply Air
- Return Air
- Exhaust Air

Abbreviations

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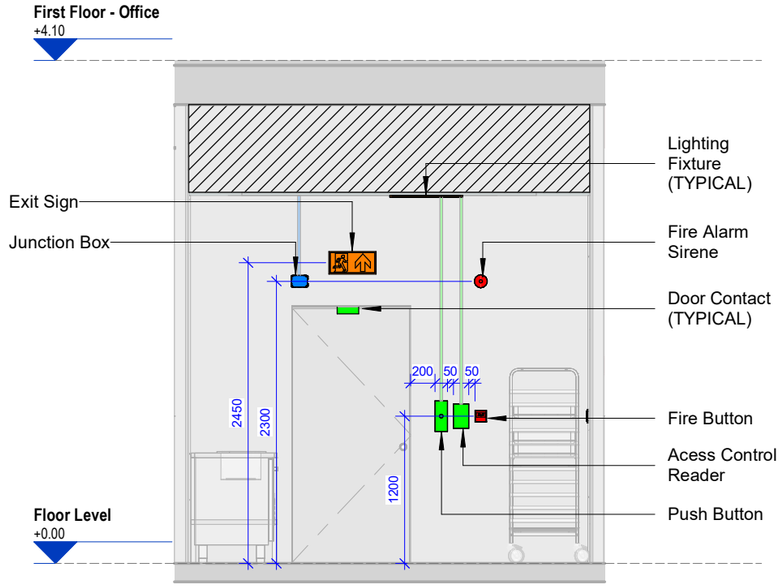
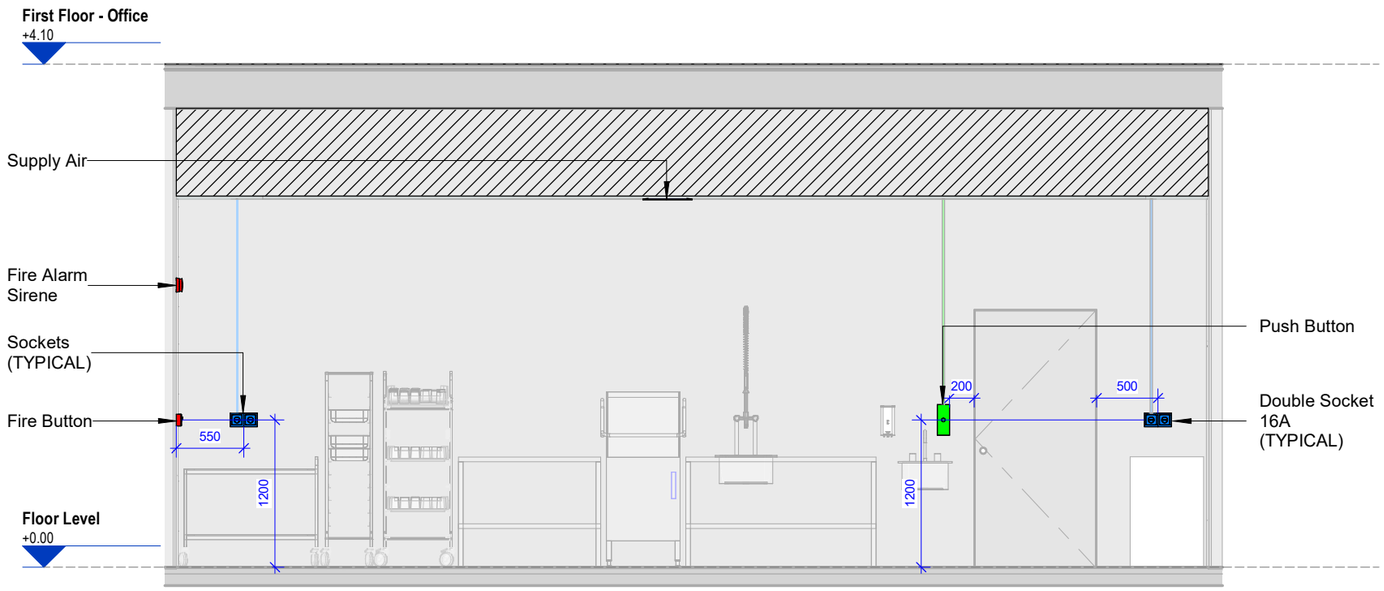


B Section - Catering - Left
1 : 50



C Section - Catering - Right
1 : 50

Legend

- Security Devices
- Fire Devices
- Small Power Devices
- Lighting Devices
- Data Devices
- Mechanical Heating
- Emergency Lighting
- Supply Air
- Return Air
- Exhaust Air

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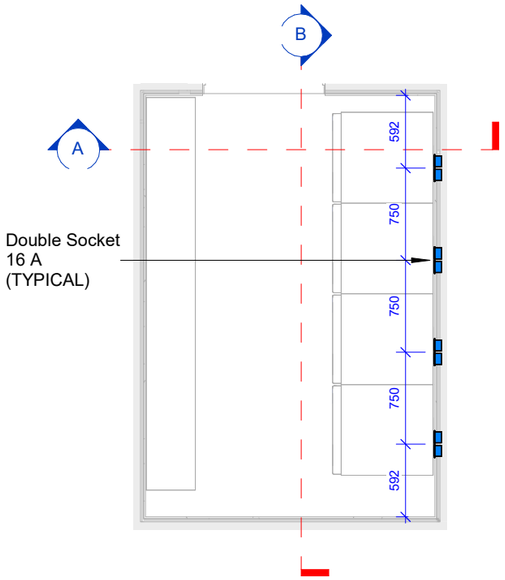
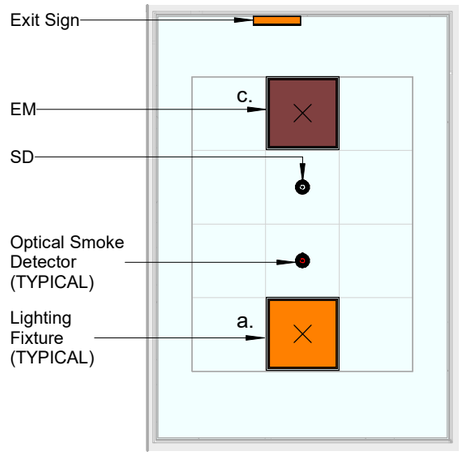
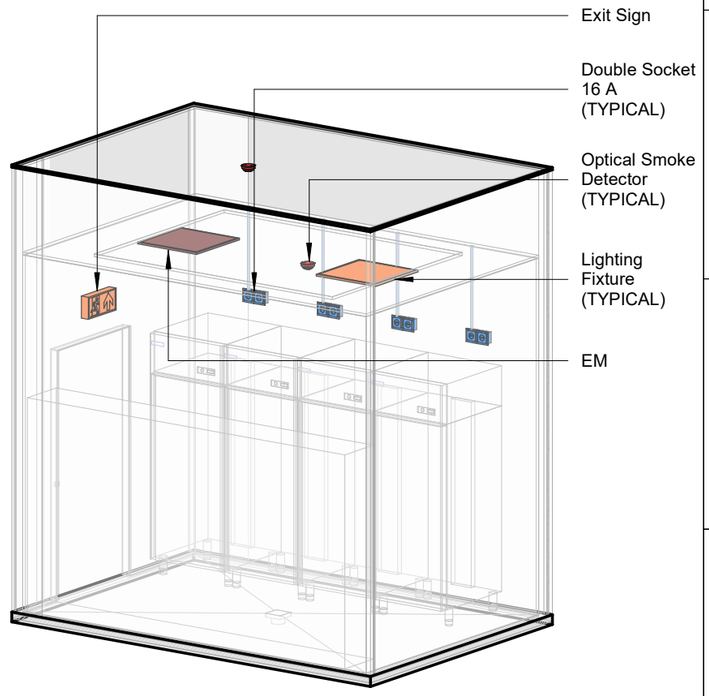


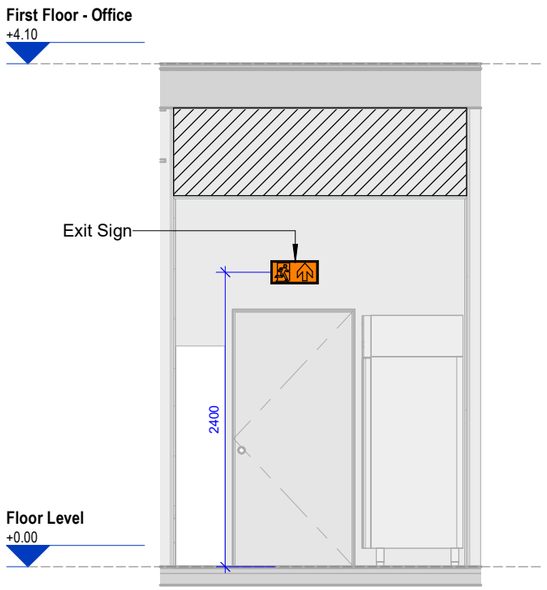
1 Ground Floor Catering Storage
1 : 50



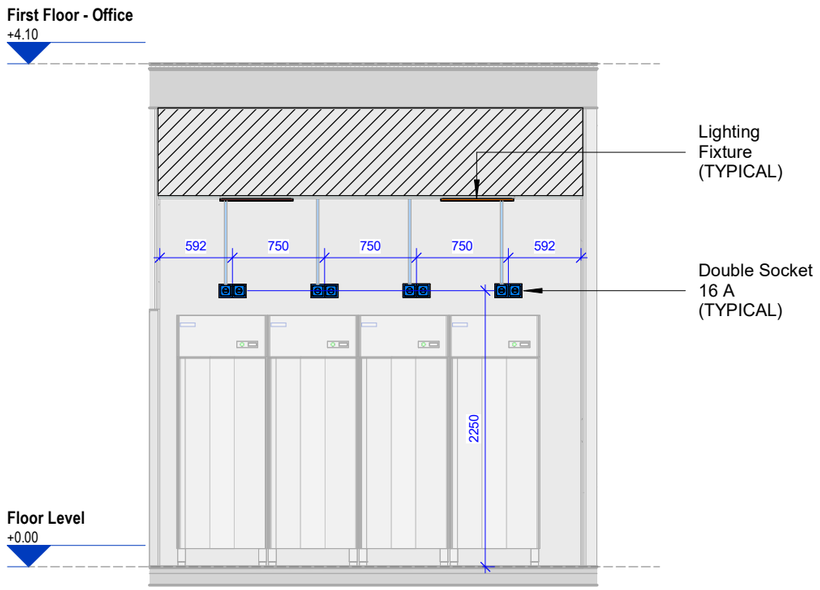
2 Reflected Ceiling - Catering Storage
1 : 50



3D1 3D View Catering Storage



A Section - Catering Storage - Front
1 : 50



B Section - Catering Storage - Right
1 : 50

Legend

	Security Devices
	Fire Devices
	Small Power Devices
	Lighting Devices
	Data Devices
	Mechanical Heating
	Emergency Lighting
	Supply Air
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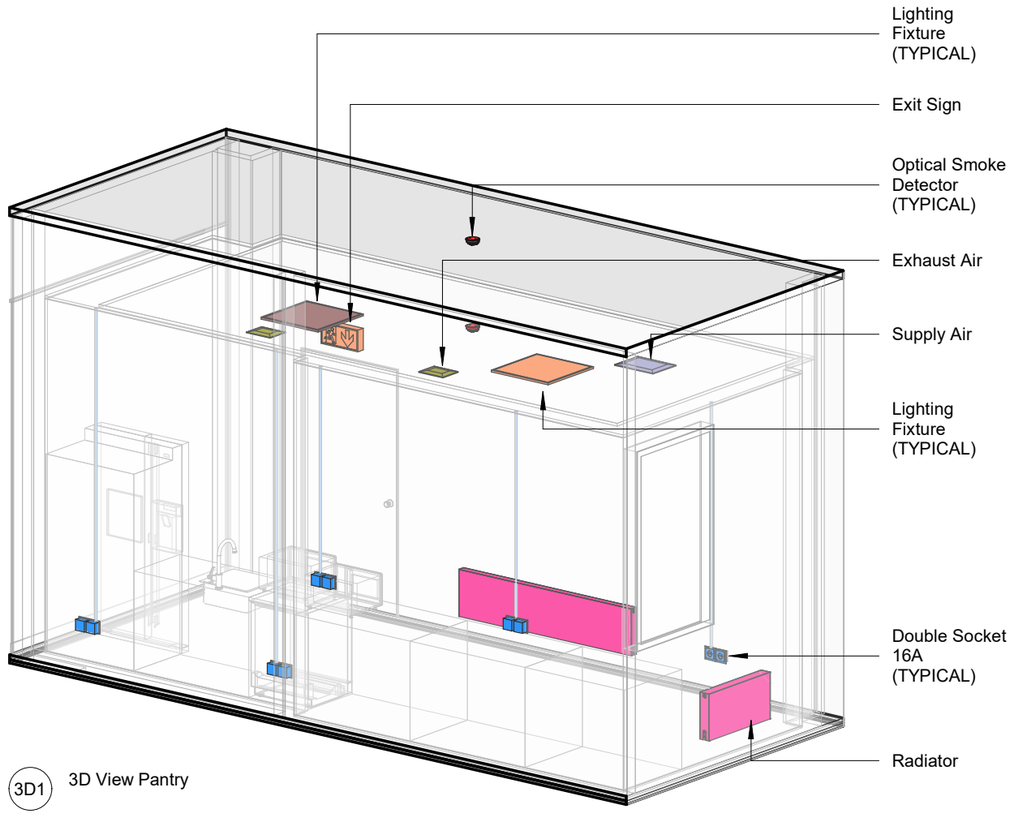
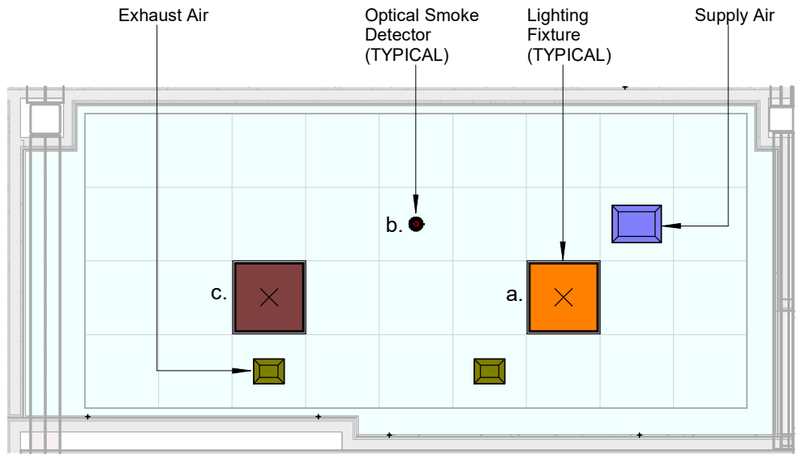
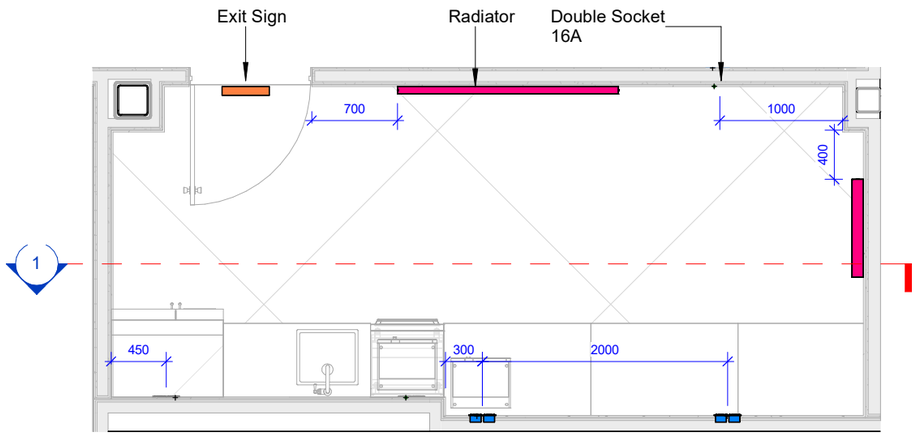


3D1 3D View Pantry



A Reflected Ceiling - Pantry
1 : 50



B Ground Floor Pantry
1 : 50

Legend

- Security Devices
- Fire Devices
- Small Power Devices
- Lighting Devices
- Data Devices
- Mechanical Heating
- Emergency Lighting
- Supply Air
- Return Air
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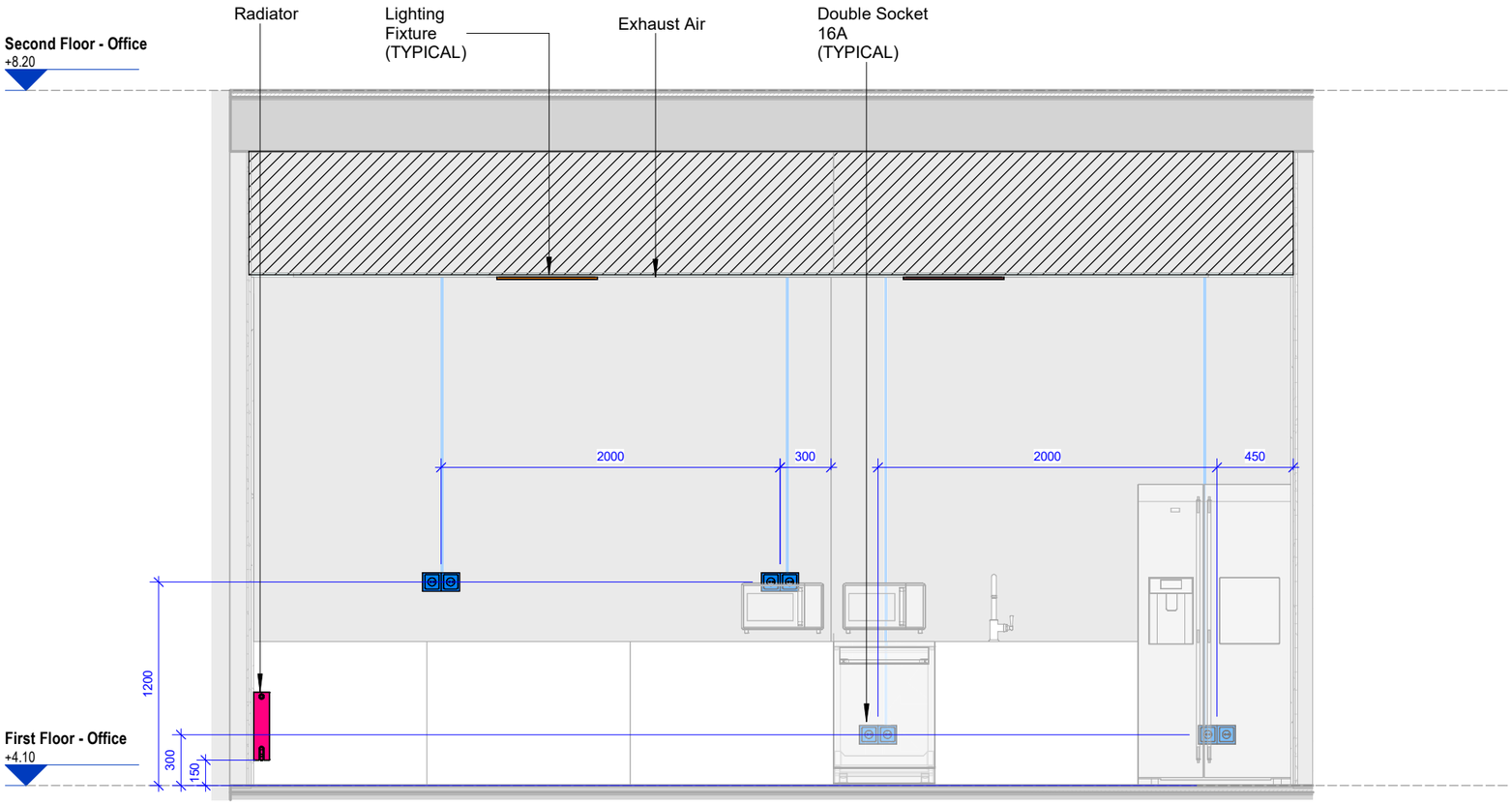

1 Section - Pantry - Back
1 : 35

Legend

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- Fire Devices
- Small Power Devices
- Lighting Devices
- Data Devices
- Mechanical Heating
- Emergency Lighting
- Supply Air
- Return Air
- Exhaust Air

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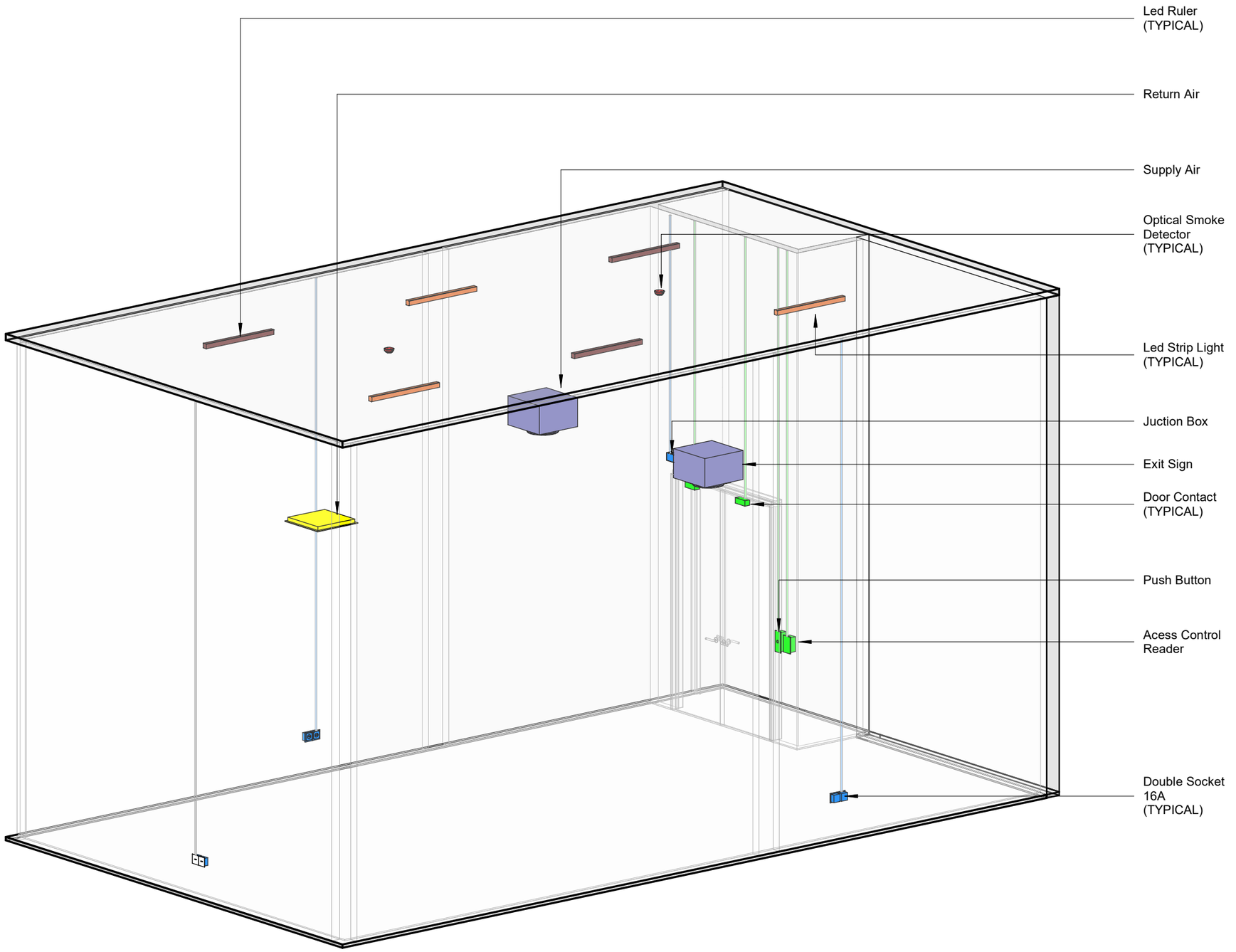

3D1 3D View Storage

Legend

- Security Devices
- Fire Devices
- Small Power Devices
- Lighting Devices
- Data Devices
- Mechanical Heating
- Emergency Lighting
- Supply Air
- Return Air
- Exhaust Air

Abbreviations

Code	Description
DC	Door Contact
AC	Access Control Card Reader
FAS	Flashing Beacon with Siren
MCP	Manual Alarm Call Point
ACMS	Door-Holding Magnets
JB	Junction Box
PB	Push Button for automatic Doors
AI	As Indicated

General Notes

1. All dimensions are in millimeters unless otherwise noted.
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CTS GROUP PARTNER:

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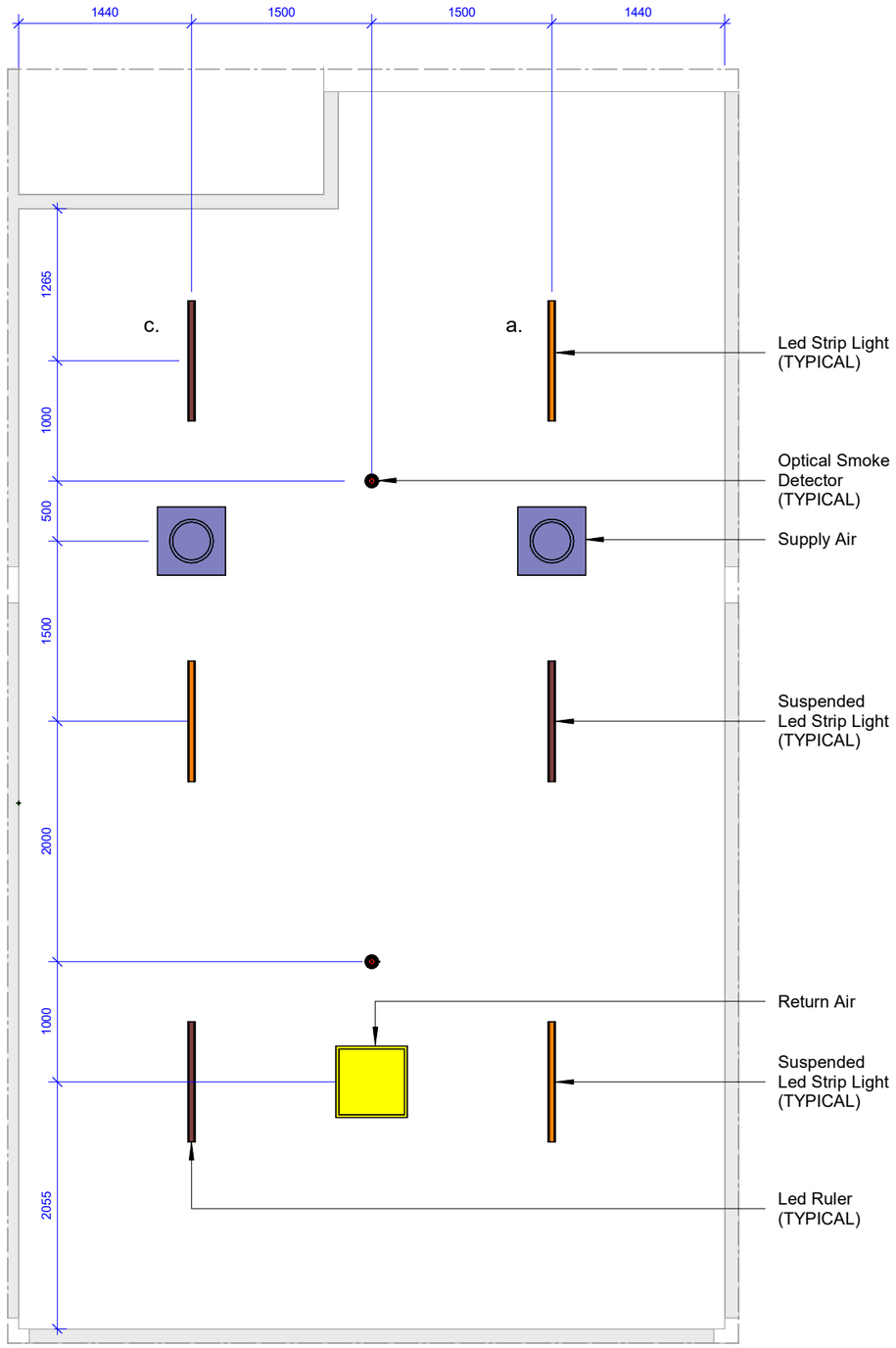
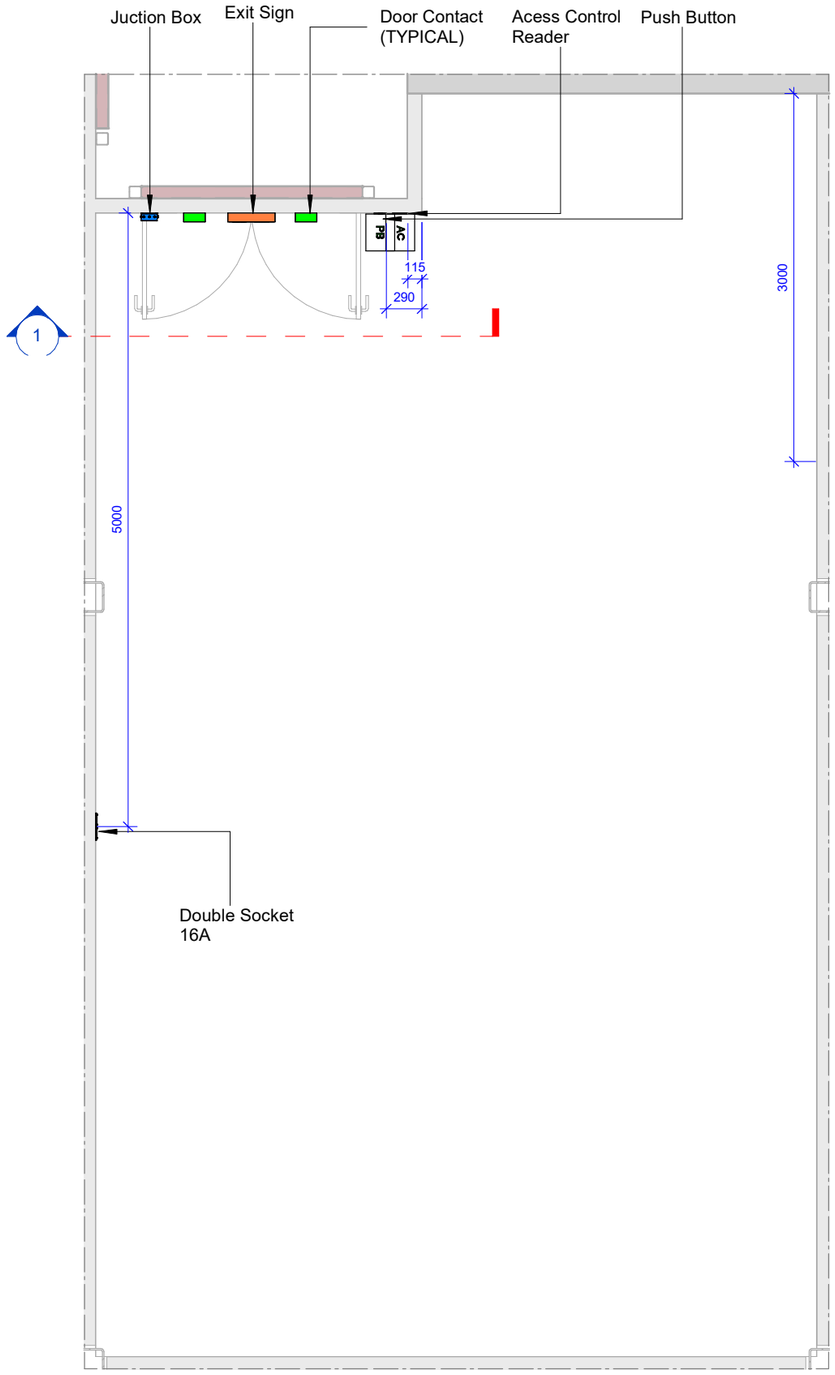


A Reflected Ceiling - Storage
1 : 50



B Ground Floor Storage
1 : 50

Legend

- Security Devices
- Fire Devices
- Small Power Devices
- Lighting Devices
- Data Devices
- Mechanical Heating
- Emergency Lighting
- Supply Air
- Return Air
- Exhaust Air

Abbreviations

Code	Description
DC	Door Contact
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P02	04.04.2024	Revision 1	JR	JM
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DESIGN & BUILD CONTRACTOR:

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PROJECT NAME:

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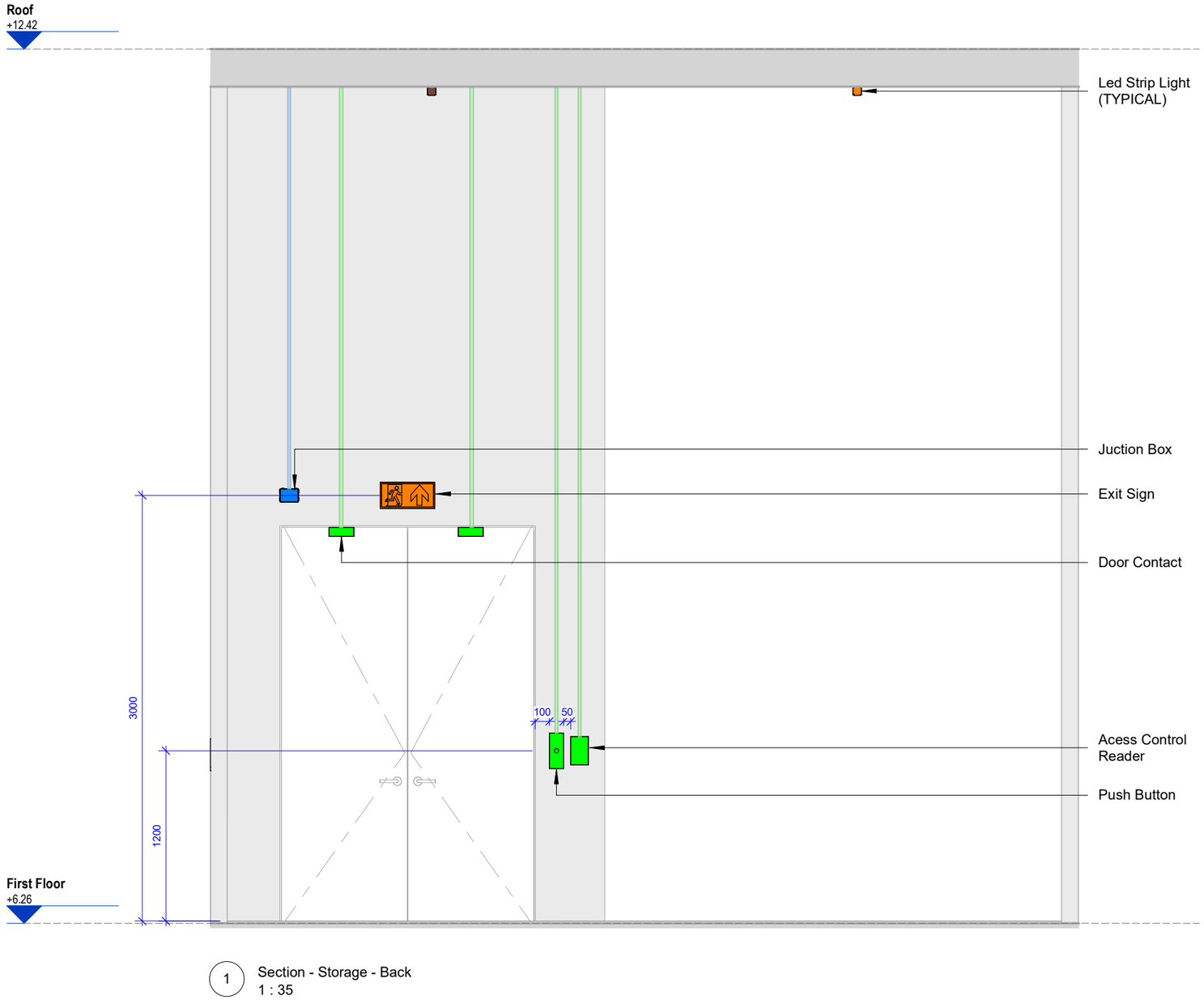

1 Section - Storage - Back
1 : 35

Legend

- Security Devices
- Fire Devices
- Small Power Devices
- Lighting Devices
- Data Devices
- Mechanical Heating
- Emergency Lighting
- Supply Air
- Return Air
- Exhaust Air

Abbreviations

Code	Description
DC	Door Contact
AC	Access Control Card Reader
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P02	04.04.2024	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	LE	JM

DESIGN & BUILD CONTRACTOR:

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PROJECT NAME:

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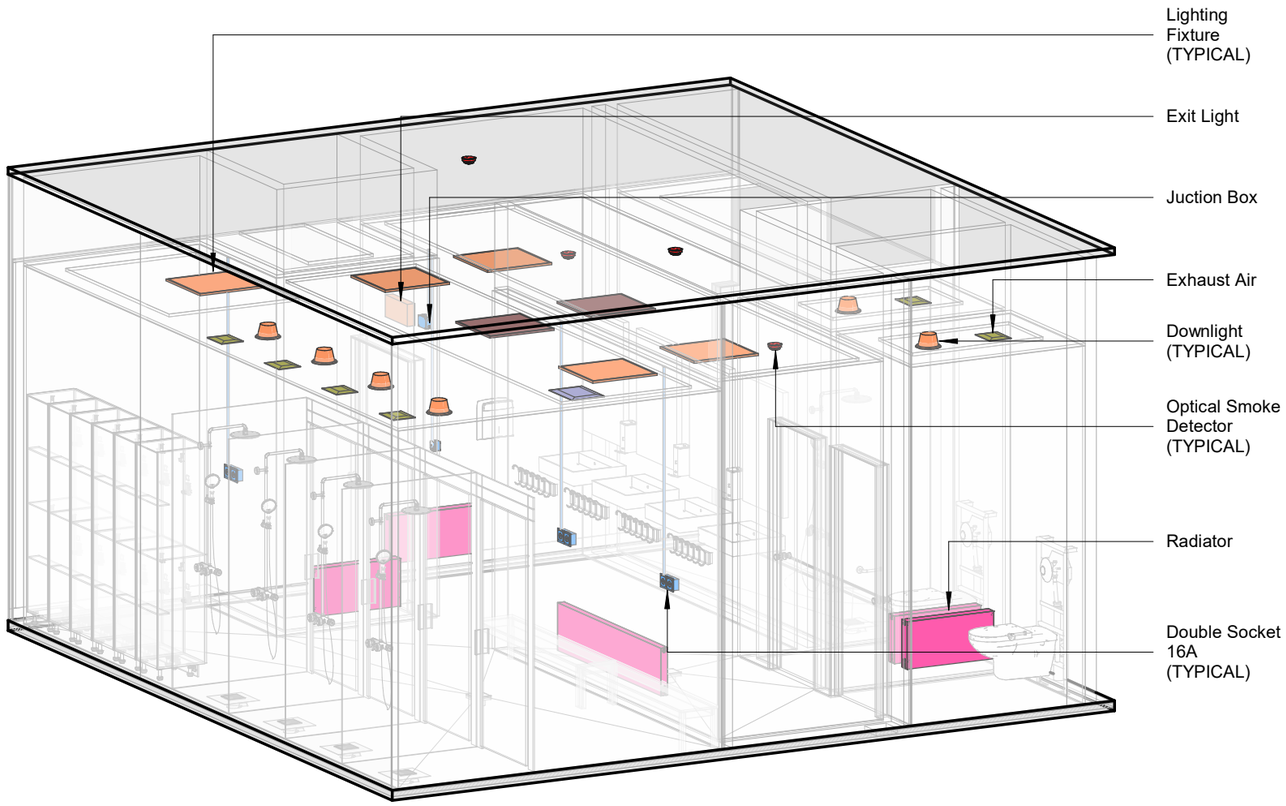

3D1 3D View Wardrobe Men

Legend

- Security Devices
- Fire Devices
- Small Power Devices
- Lighting Devices
- Data Devices
- Mechanical Heating
- Emergency Lighting
- Supply Air
- Return Air
- Exhaust Air

Abbreviations

Code	Description
DC	Door Contact
AC	Access Control Card Reader
FAS	Flashing Beacon with Siren
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Specific Notes

a. LED with motion detector.
b. Heat and optical smoke detector - One detector at low level and one at high level. To be aligned vertically on site. Displayed separate for better visibility
c. Emergency Lighting

Rev	Date	Description	Sign.	Veri.
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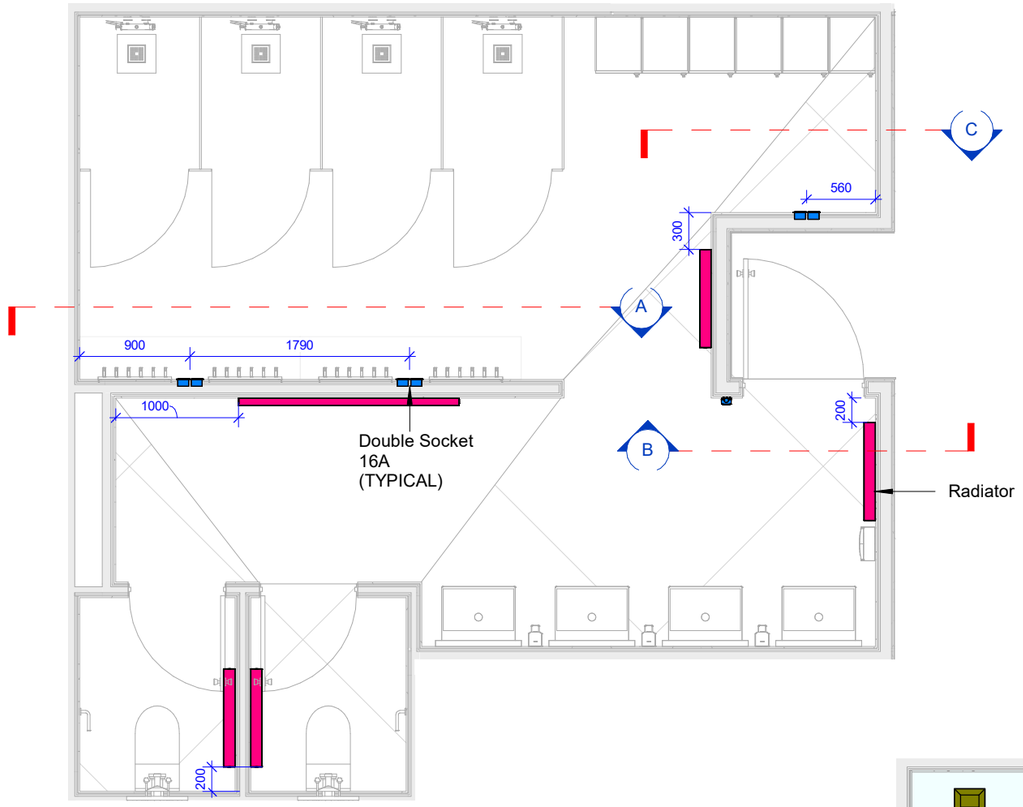
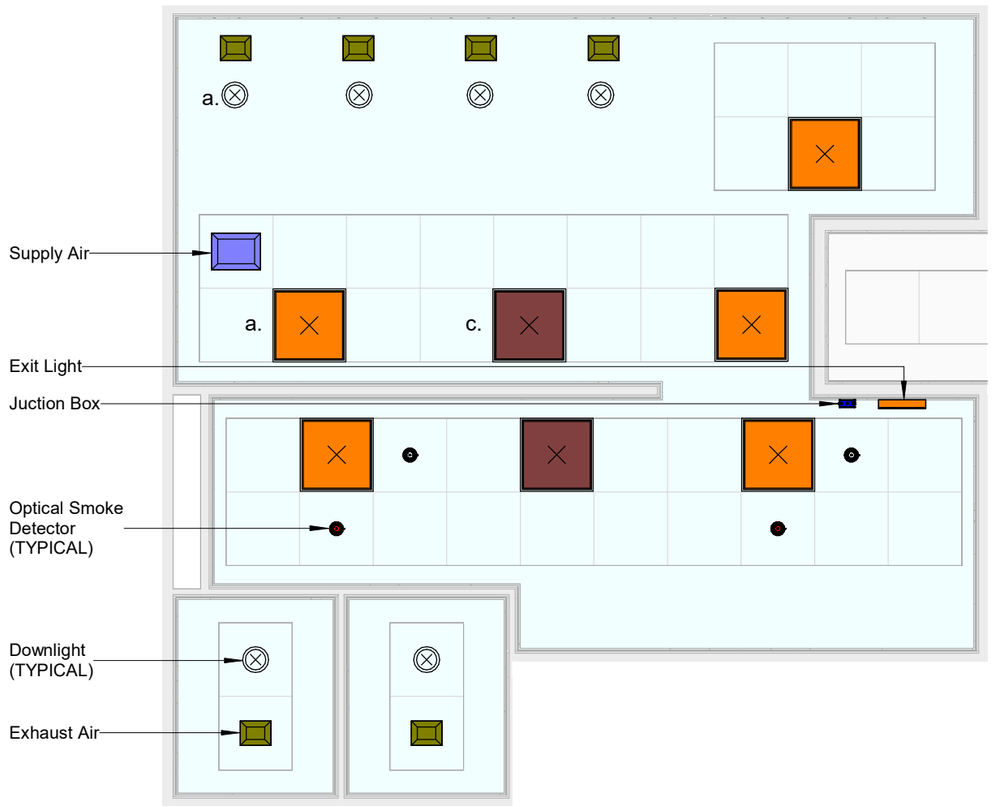


1 Ground Floor Wardrobe Men
1 : 50



2 Reflected Ceiling - Wardrobe Men
1 : 50

Legend

- Security Devices
- Fire Devices
- Small Power Devices
- Lighting Devices
- Data Devices
- Mechanical Heating
- Emergency Lighting
- Supply Air
- Return Air
- Exhaust Air

Abbreviations

Code	Description
DC	Door Contact
AC	Access Control Card Reader
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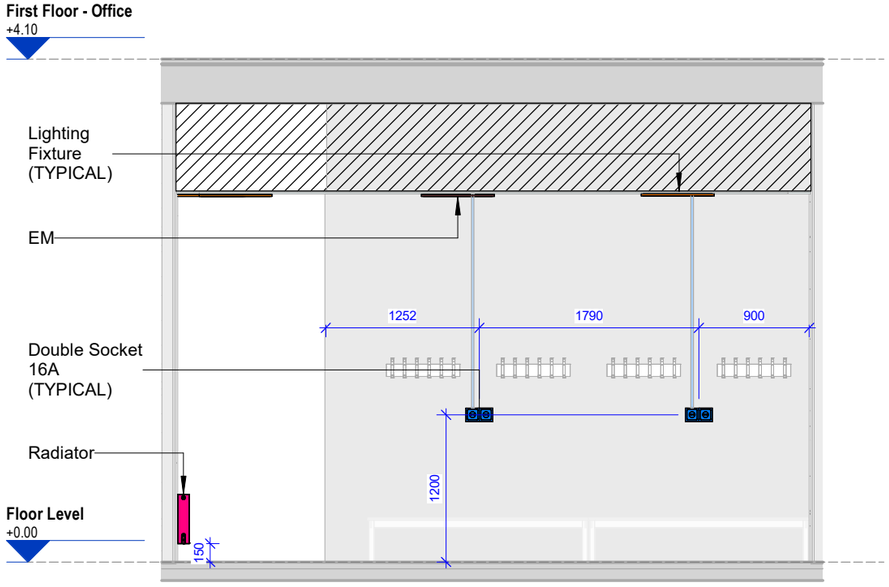
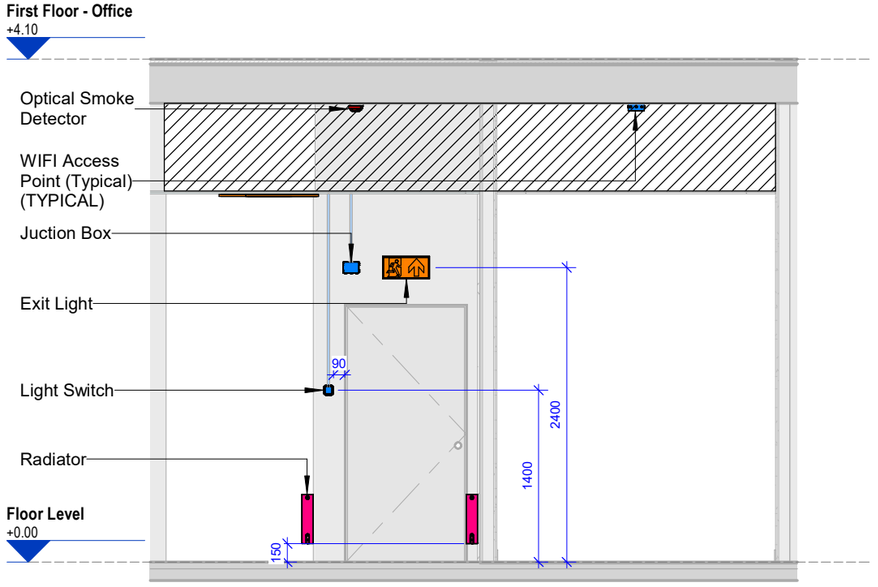
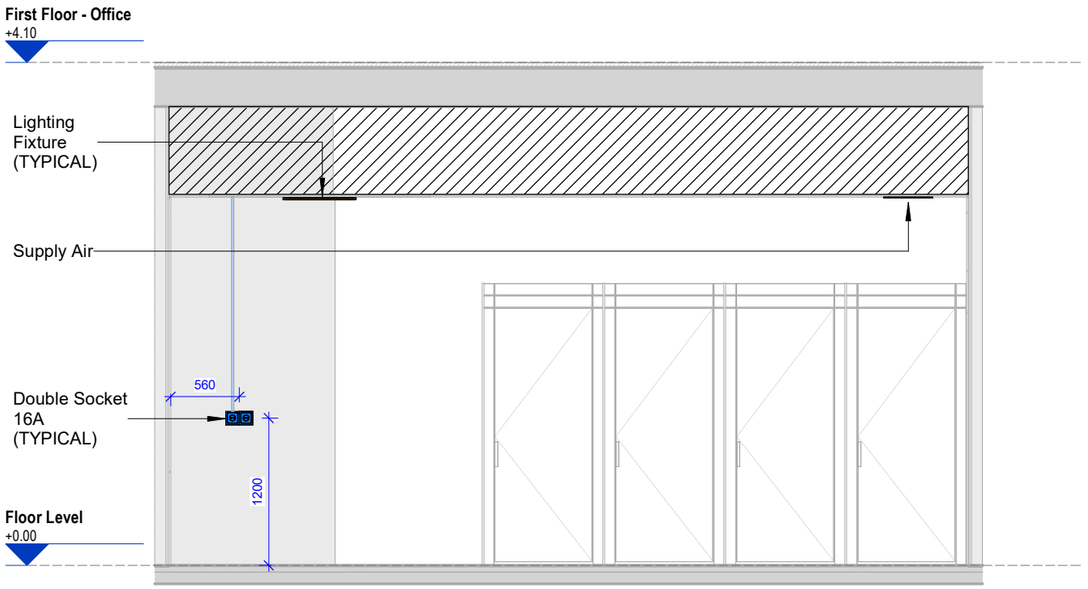


A Section - Wardrobe Men - Middle
1 : 50



B Section - Wardrobe Men - Door
1 : 50



C Section - Wardrobe Men - Back
1 : 50

Legend

	Security Devices
	Fire Devices
	Small Power Devices
	Lighting Devices
	Data Devices
	Mechanical Heating
	Emergency Lighting
	Supply Air
	Return Air
	Exhaust Air

Abbreviations

Code	Description
DC	Door Contact
AC	Access Control Card Reader
FAS	Flashing Beacon with Siren
MCP	Manual Alarm Call Point
ACMS	Door-Holding Magnets
JB	Junction Box
PB	Push Button for automatic Doors
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General Notes

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5. All elevations are in regards to the Finished Floor Level unless otherwise noted.

Specific Notes

a. LED with motion detector.
b. Heat and optical smoke detector - One detector at low level and one at high level. To be aligned vertically on site. Displayed separate for better visibility
c. Emergency Lighting

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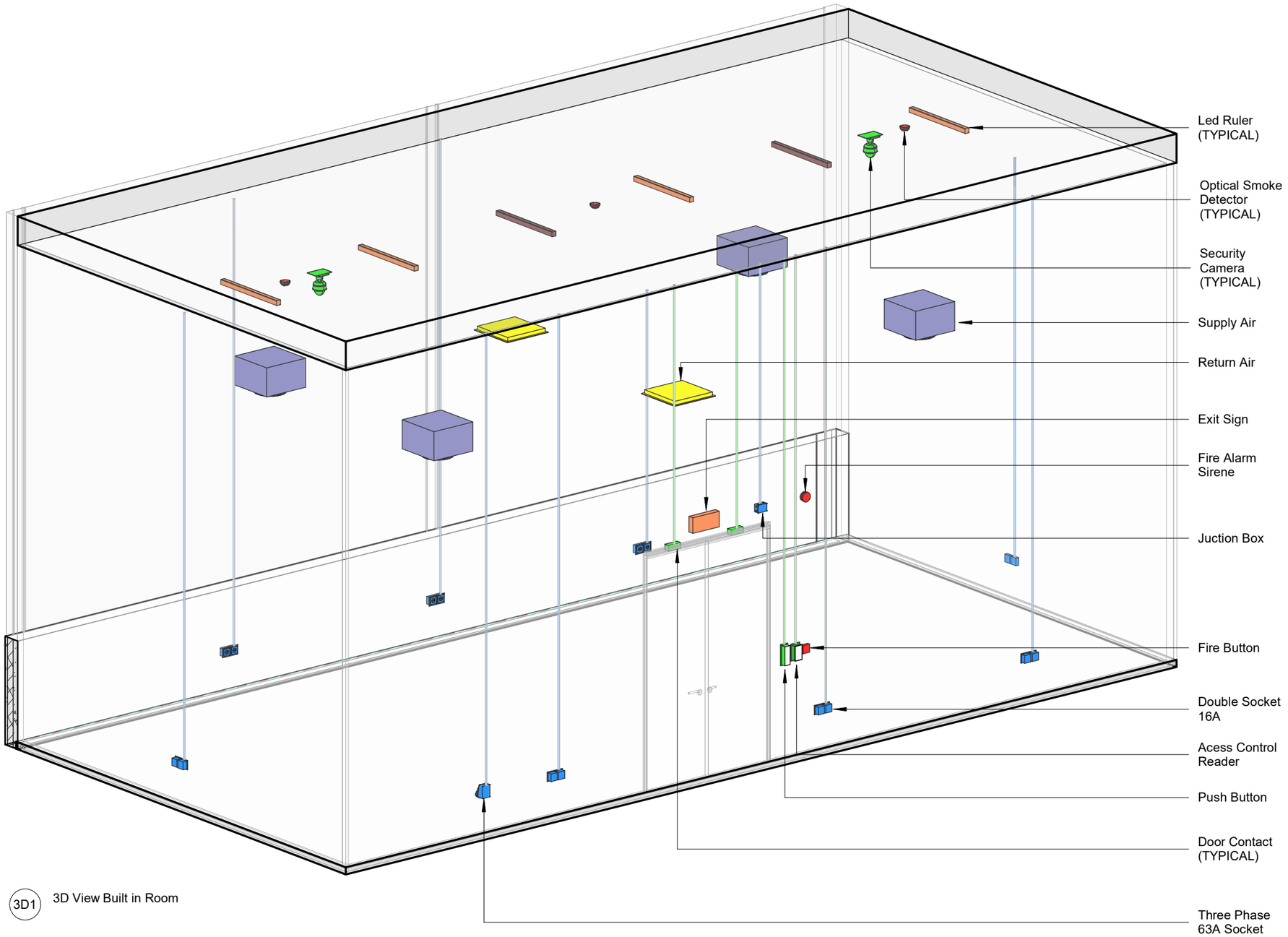

3D1 3D View Built in Room

Legend

- Security Devices
- Fire Devices
- Small Power Devices
- Lighting Devices
- Data Devices
- Mechanical Heating
- Emergency Lighting
- Supply Air
- Return Air
- Exhaust Air

Abbreviations

Code	Description
DC	Door Contact
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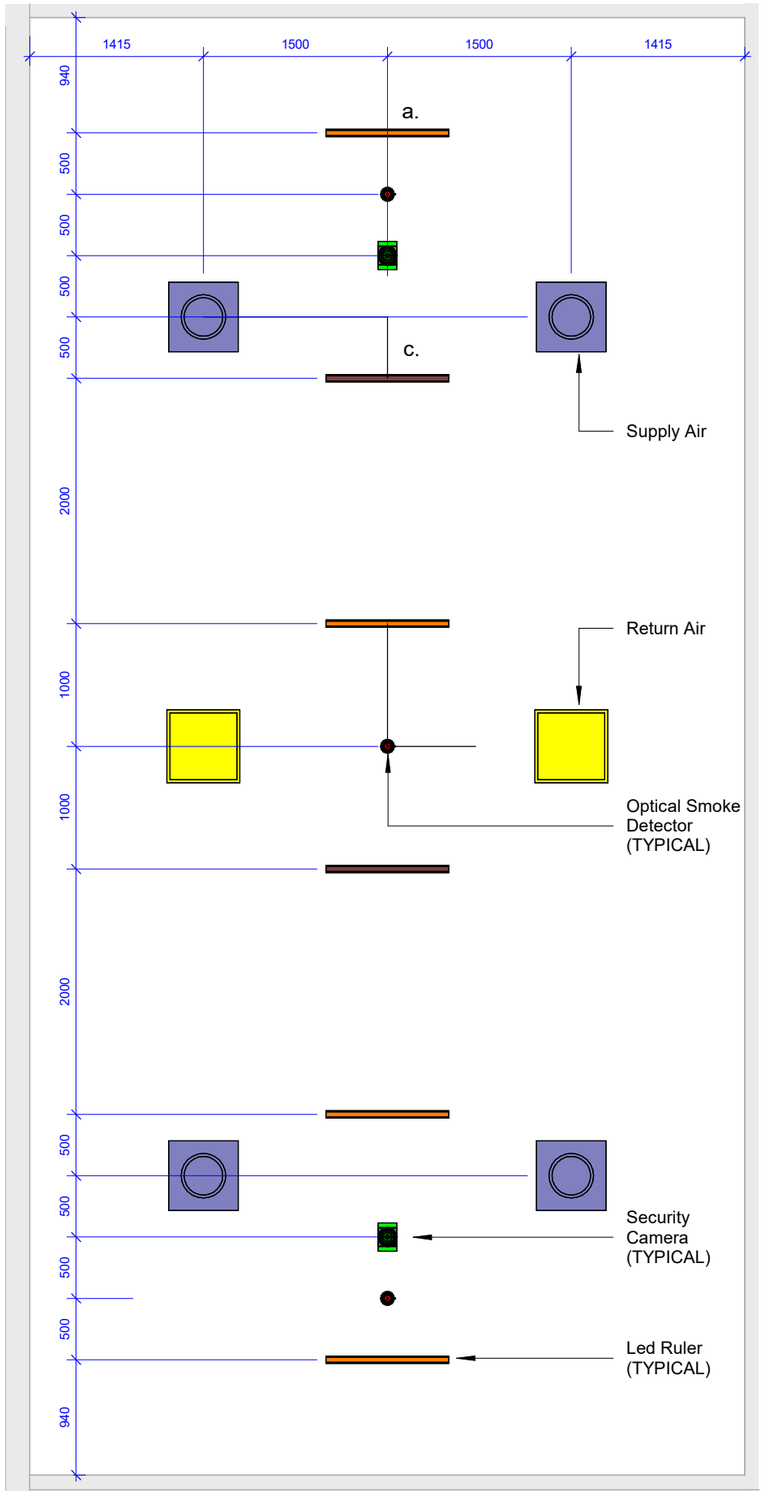
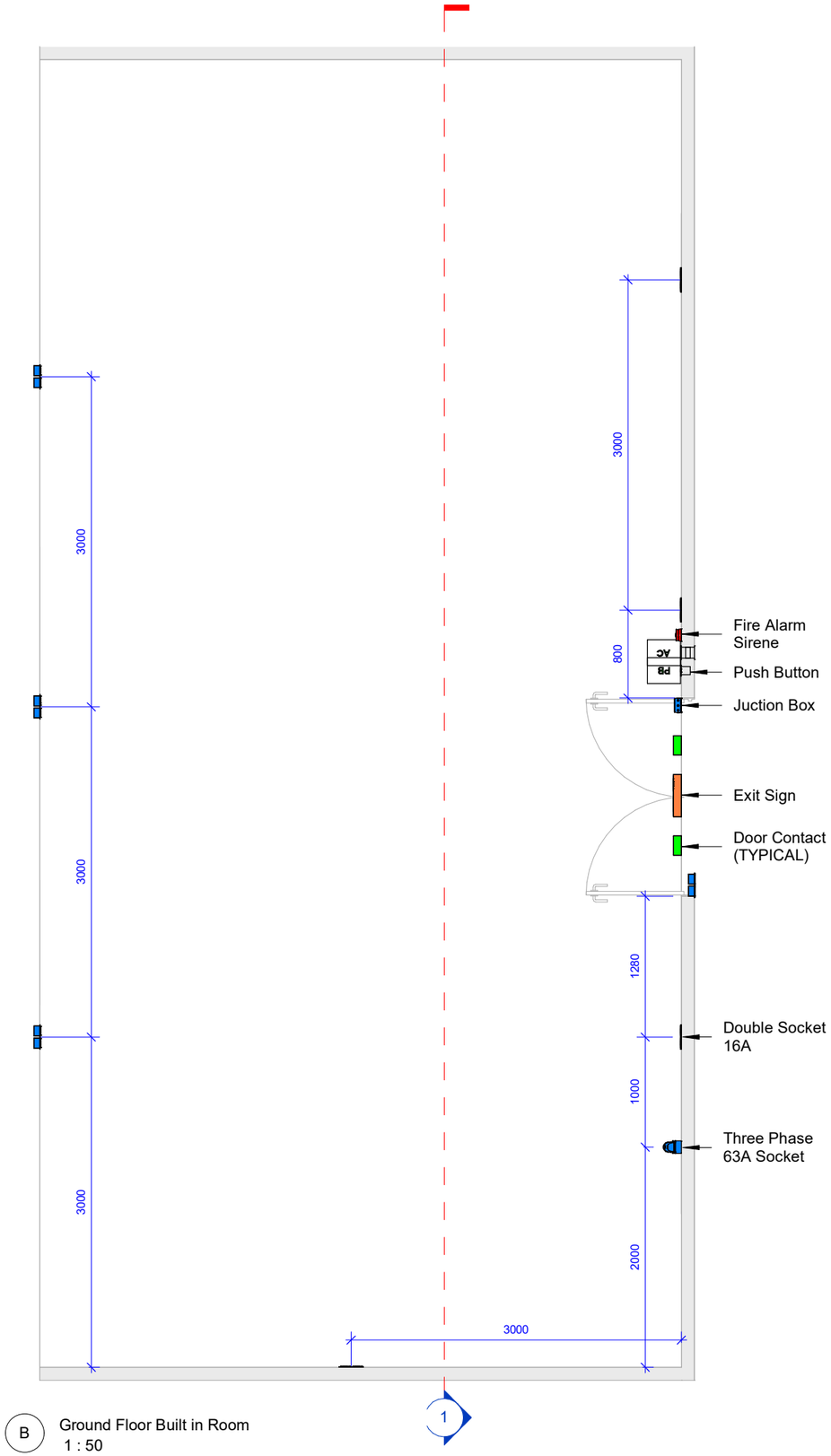


A Reflected Ceiling - Built in Room
1 : 50



B Ground Floor Built in Room
1 : 50

Legend

- Security Devices
- Fire Devices
- Small Power Devices
- Lighting Devices
- Data Devices
- Mechanical Heating
- Emergency Lighting
- Supply Air
- Return Air
- Exhaust Air

Abbreviations

Code	Description
DC	Door Contact
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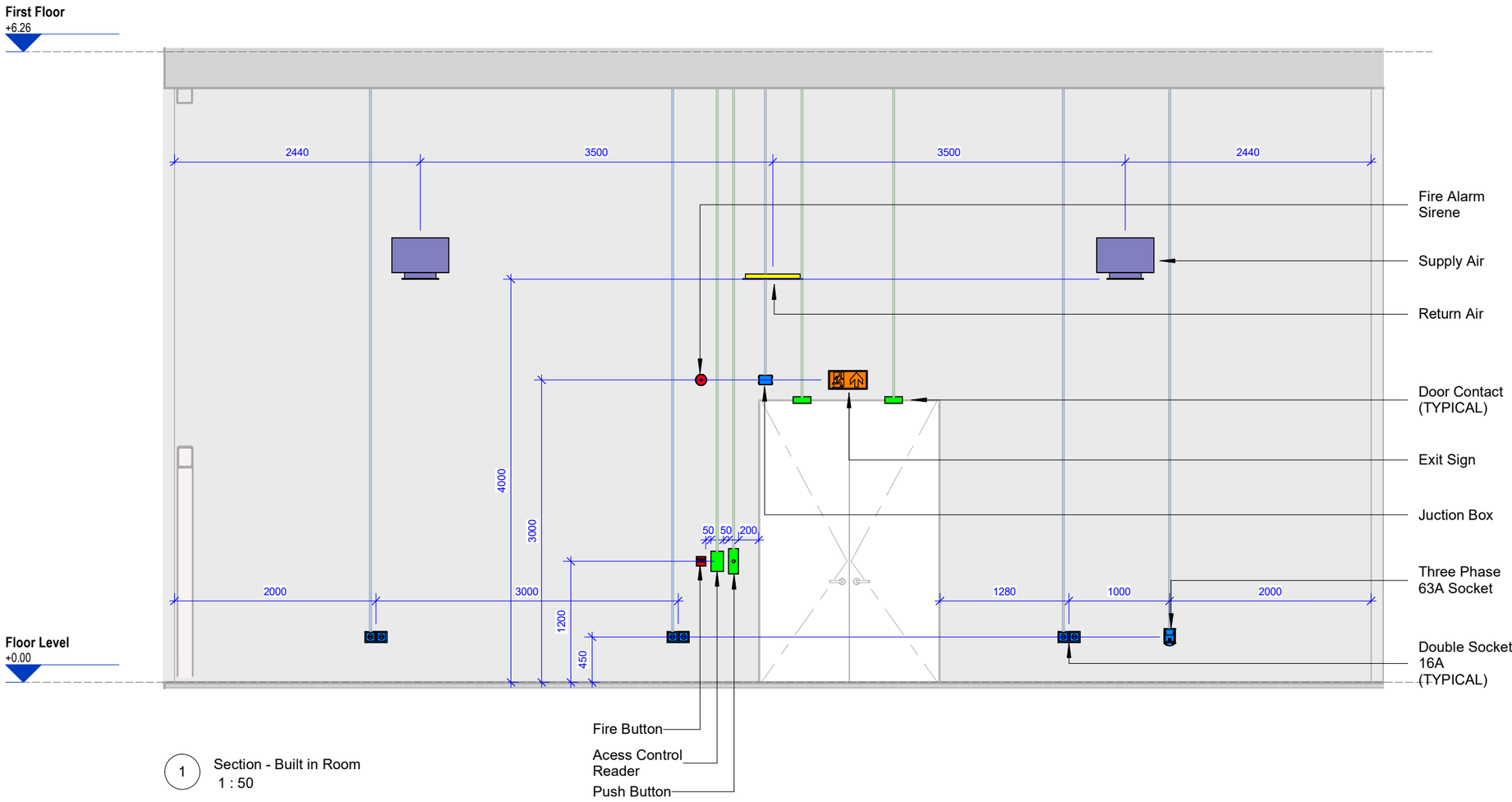

1 Section - Built in Room
1 : 50

Legend

	Security Devices
	Fire Devices
	Small Power Devices
	Lighting Devices
	Data Devices
	Mechanical Heating
	Emergency Lighting
	Supply Air
	Return Air
	Exhaust Air

Abbreviations

Code	Description
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CTS GROUP PARTNER:

BIMMS

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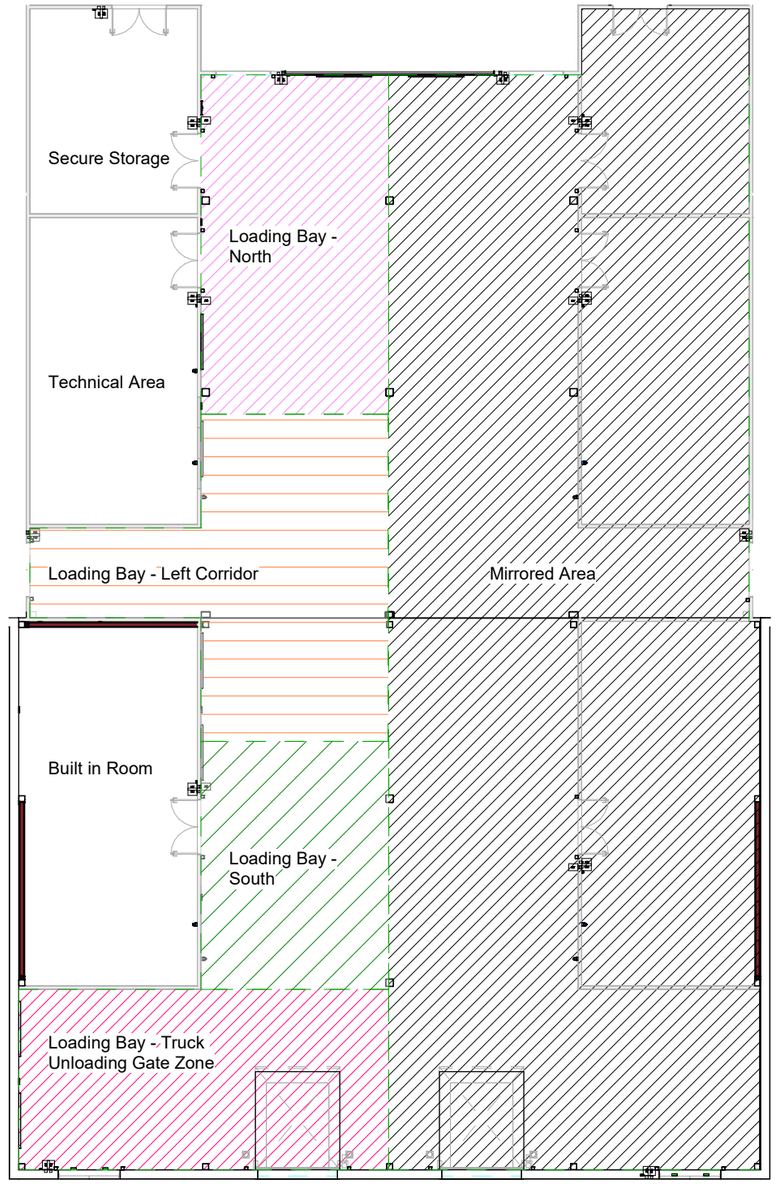

A Loading Bay - Overview
1 : 200

Legend

- Security Devices
- Fire Devices
- Small Power Devices
- Lighting Devices
- Data Devices
- Mechanical Heating
- Emergency Lighting
- Supply Air
- Return Air
- Exhaust Air

Abbreviations

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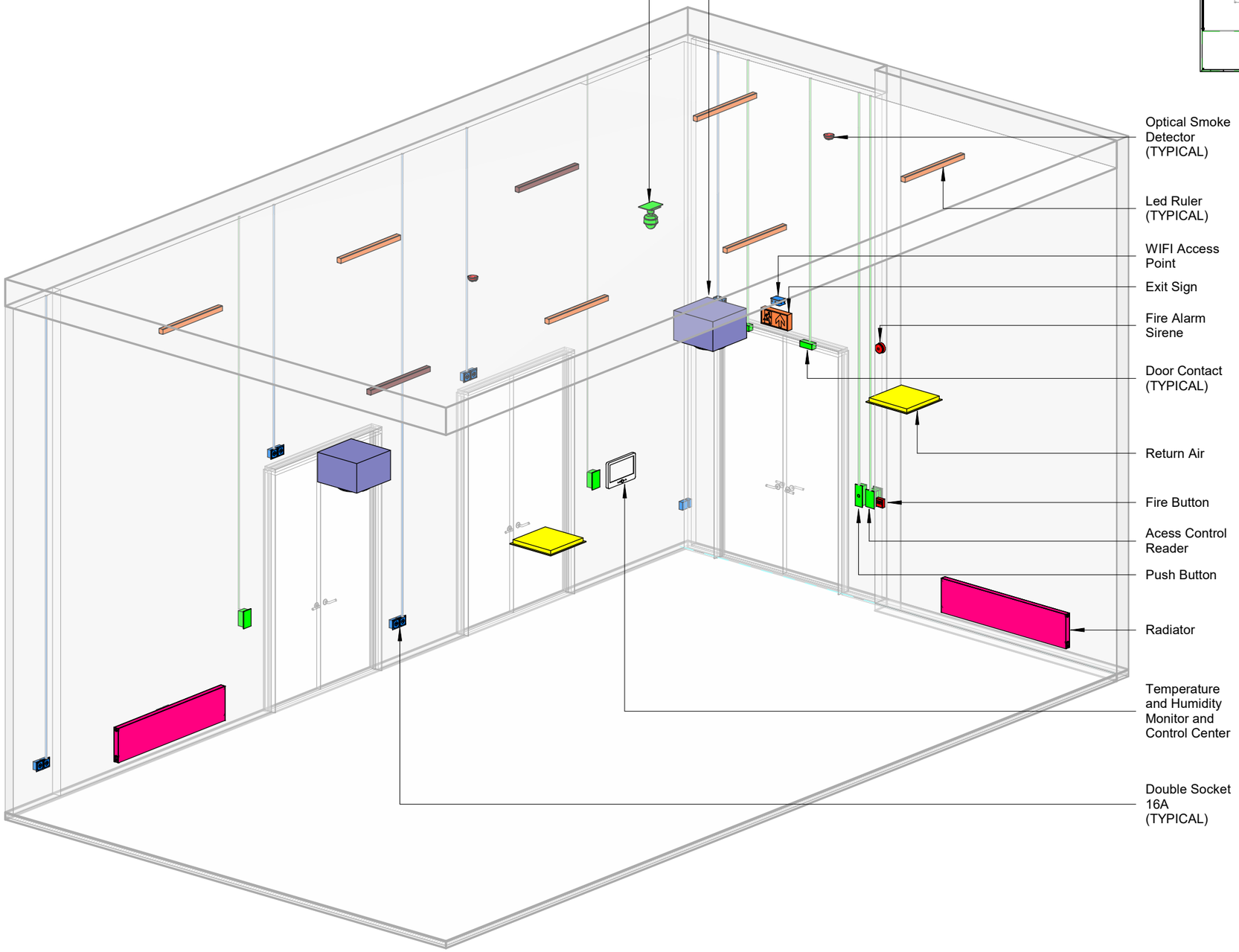

3D1 3D View Loading Bay - North

Legend

- Security Devices
- Fire Devices
- Small Power Devices
- Lighting Devices
- Data Devices
- Mechanical Heating
- Emergency Lighting
- Supply Air
- Return Air
- Exhaust Air

Abbreviations

Code	Description
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AC	Access Control Card Reader
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DESIGN & BUILD CONTRACTOR:

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PROJECT NAME:

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Combined Services - Rooms Loading Bay - North - Page 2 of 17

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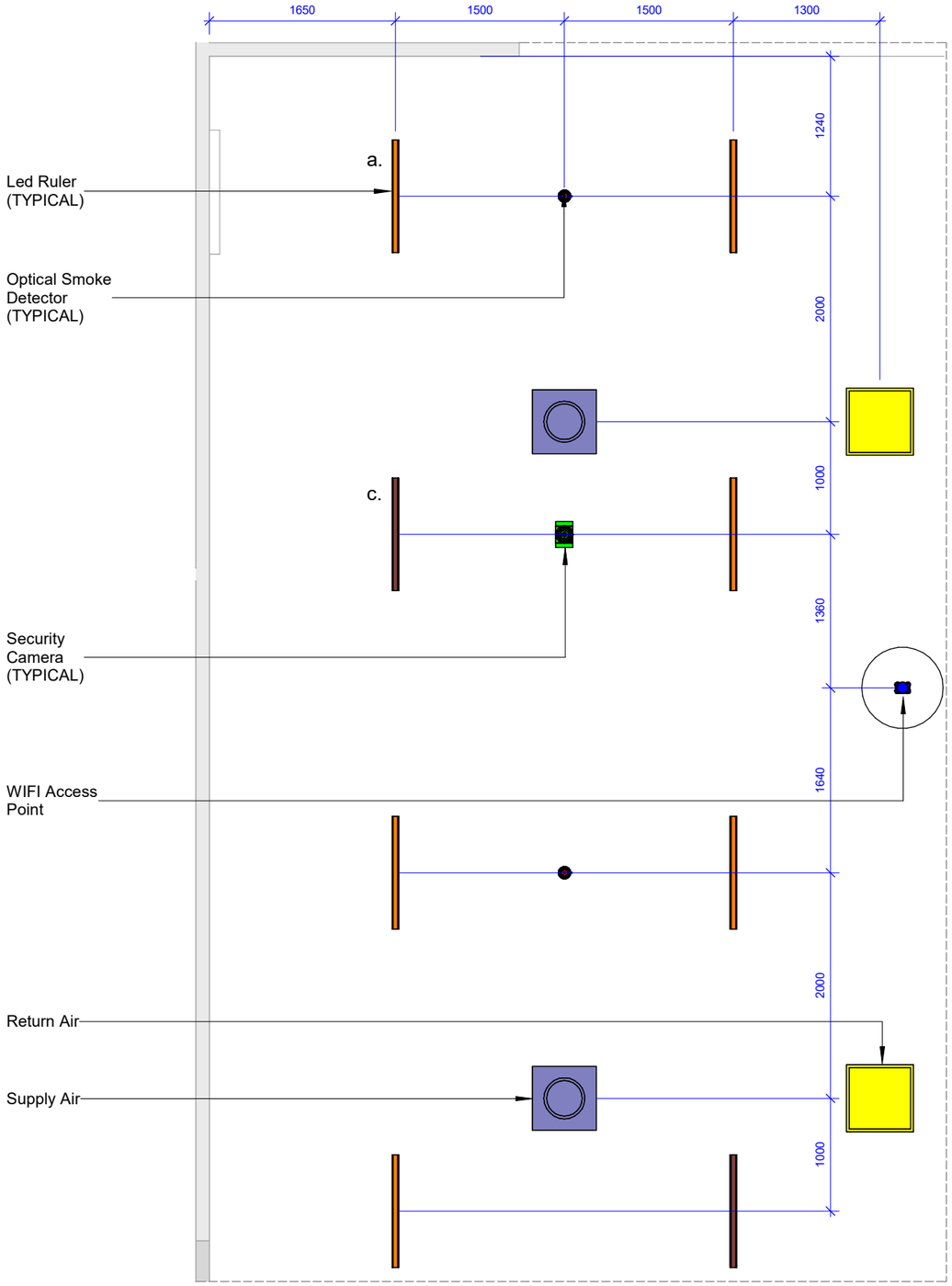
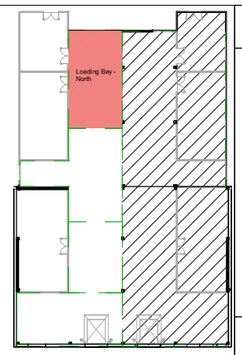


B Reflected Ceiling - Loading Bay - North
1 : 50



Legend

- Security Devices
- Fire Devices
- Small Power Devices
- Lighting Devices
- Data Devices
- Mechanical Heating
- Emergency Lighting
- Supply Air
- Return Air
- Exhaust Air

Abbreviations

Code	Description
DC	Door Contact
AC	Access Control Card Reader
FAS	Flashing Beacon with Siren
MCP	Manual Alarm Call Point
ACMS	Door-Holding Magnets
JB	Junction Box
PB	Push Button for automatic Doors
AI	As Indicated

General Notes

1. All dimensions are in millimeters unless otherwise noted.
2. Align Sockets by Light Switch, whenever it is possible.
3. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.
4. Final Locations of installation accessories to be reviewed with specialist subcontractor.
5. All elevations are in regards to the Finished Floor Level unless otherwise noted.

Specific Notes

a. LED with motion detector.
b. Heat and optical smoke detector - One detector at low level and one at high level. To be aligned vertically on site. Displayed separate for better visibility
c. Emergency Lighting

Rev	Date	Description	Sign.	Veri.
P02	04.04.2024	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	LE	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

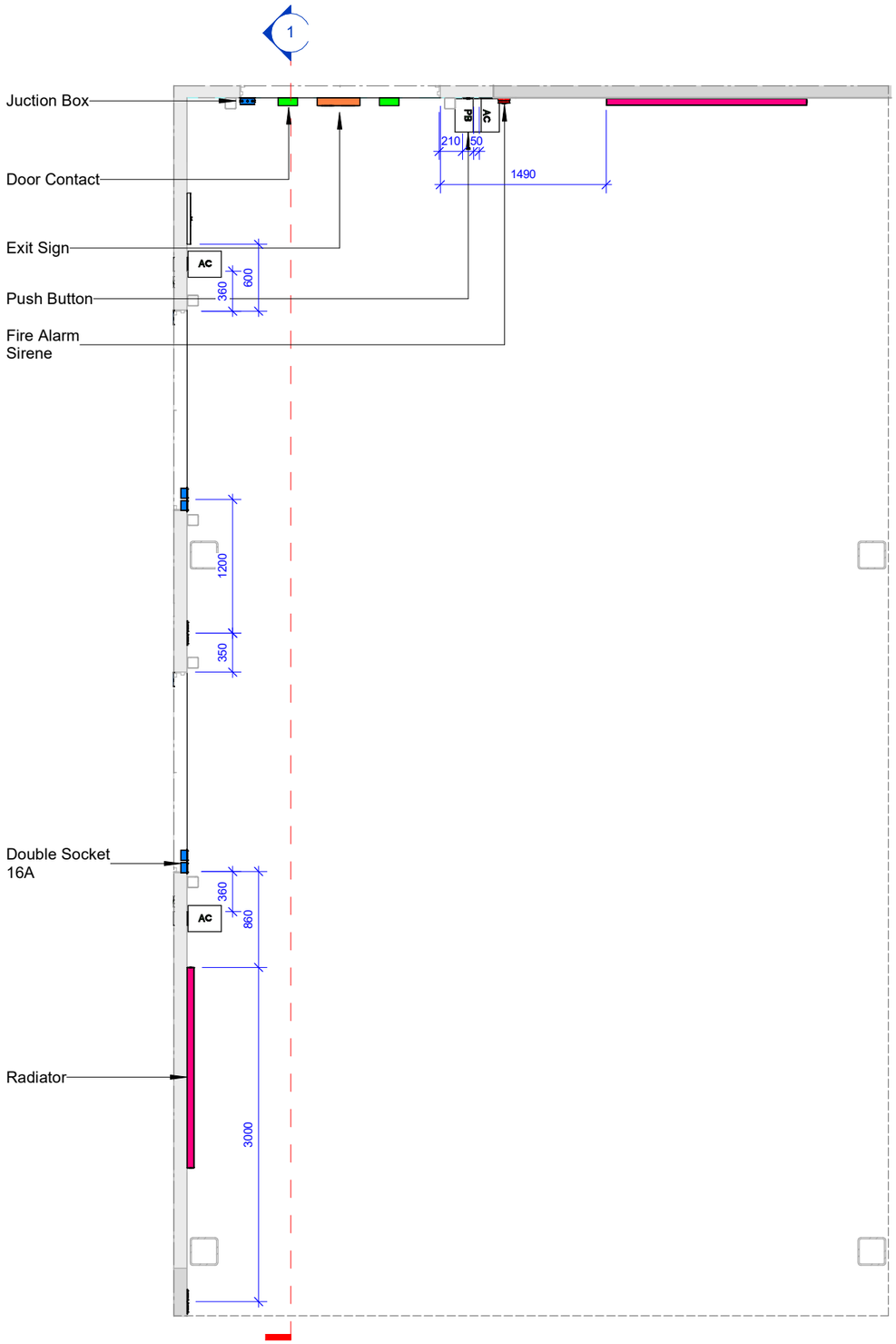
PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Combined Services - Rooms Loading Bay - North - Page 3 of 17

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**AI**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-J-62339		**A3**	**P02**



C Ground Floor Loading Bay - North
1 : 50

Legend

- Security Devices
- Fire Devices
- Small Power Devices
- Lighting Devices
- Data Devices
- Mechanical Heating
- Emergency Lighting
- Supply Air
- Return Air
- Exhaust Air

Abbreviations

Code	Description
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Rev	Date	Description	Sign.	Veri.
P02	04.04.2024	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	LE	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Combined Services - Rooms Loading Bay - North - Page 4 of 17

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**AI**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
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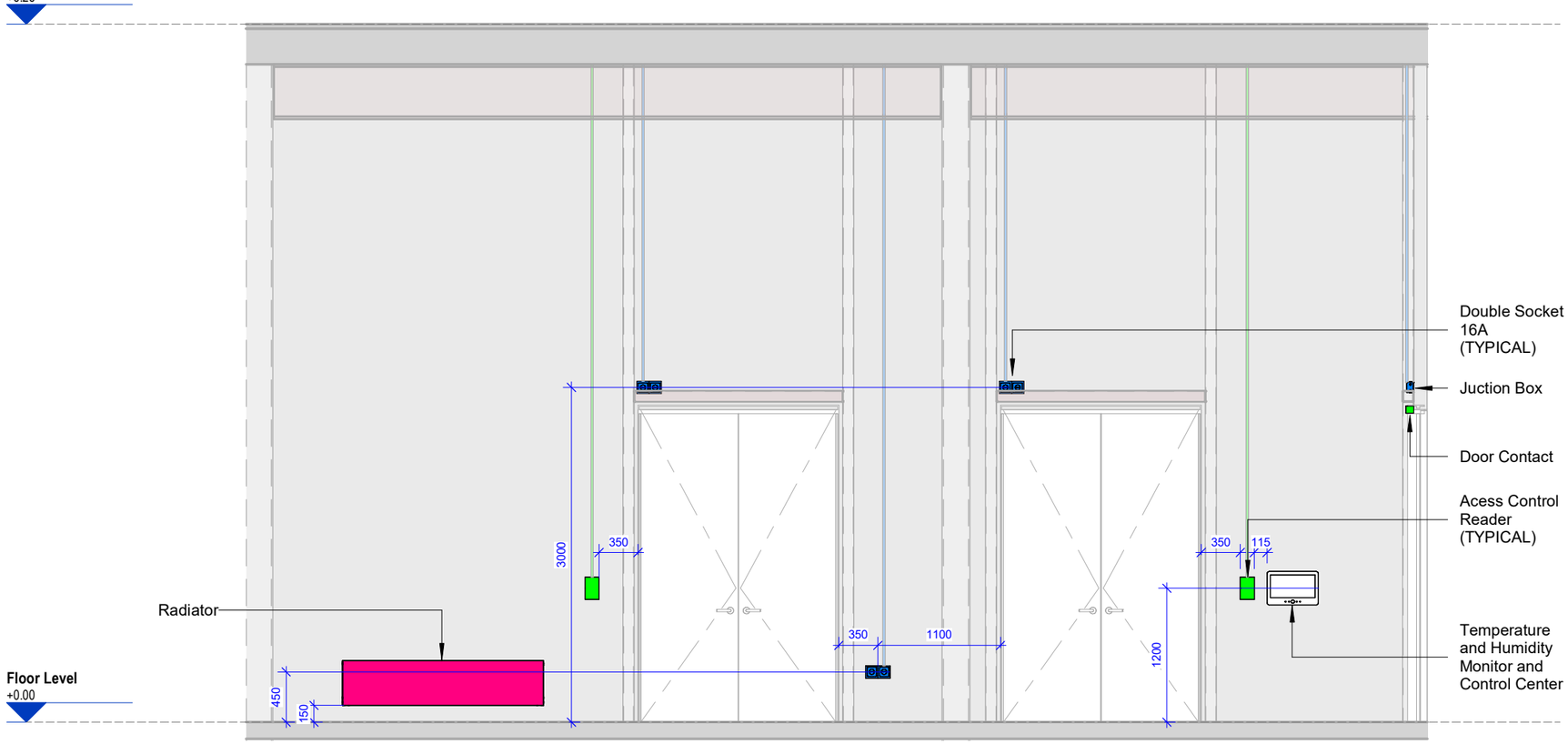

1 Section - Loading Bay North - Left
1 : 50

Legend

- Security Devices
- Fire Devices
- Small Power Devices
- Lighting Devices
- Data Devices
- Mechanical Heating
- Emergency Lighting
- Supply Air
- Return Air
- Exhaust Air

Abbreviations

Code	Description
DC	Door Contact
AC	Access Control Card Reader
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Rev	Date	Description		
P02	04.04.2024	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	LE	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

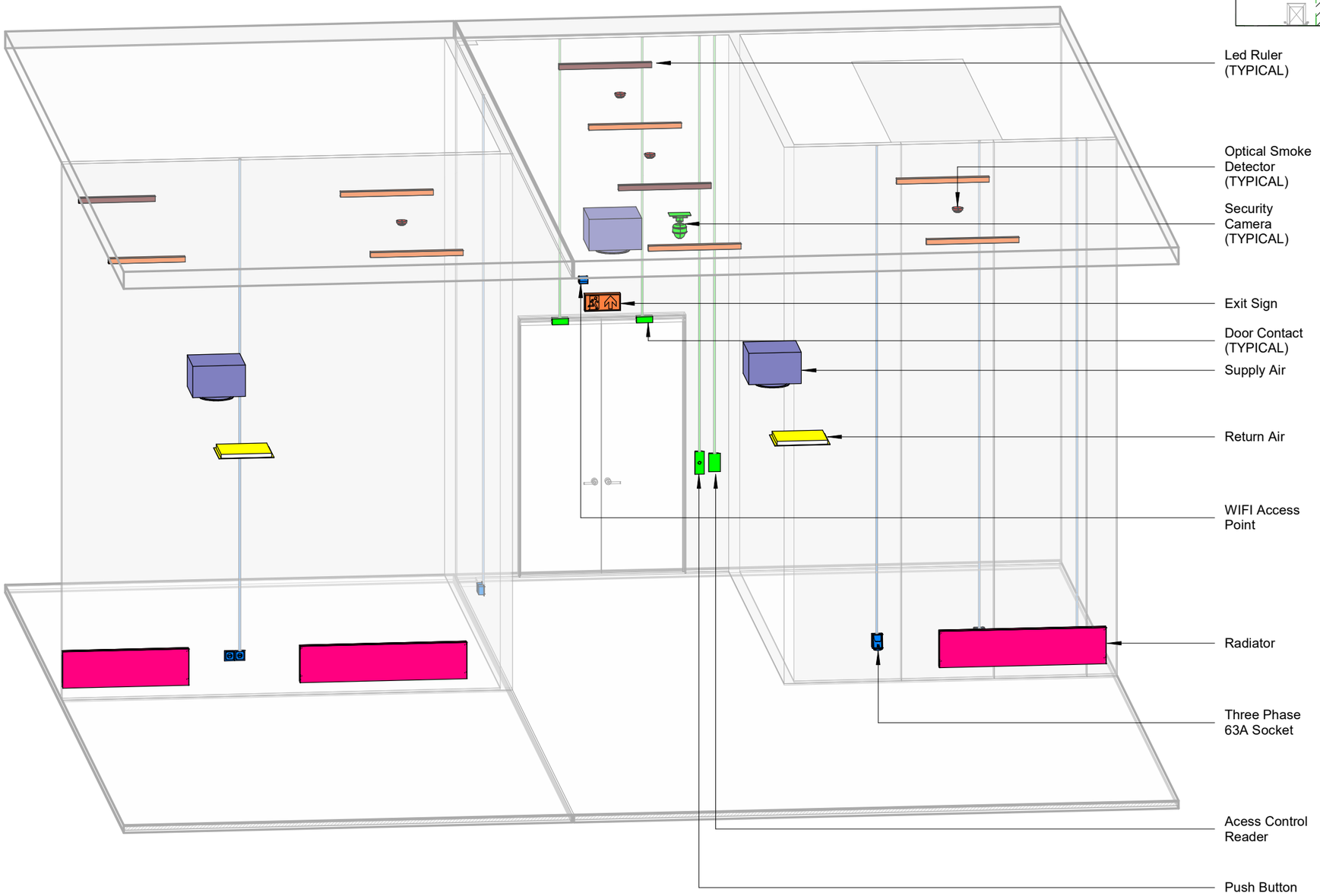
PROJECT NAME:

Execution Design and Engineering Requirements

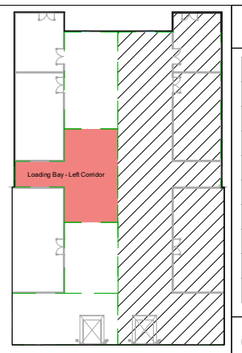
DRAWING NAME:

Combined Services - Rooms Loading Bay - North - Page 5 of 17

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**AI**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-J-62341		**A3**	**P02**



3D2 3D View Loading Bay - Left Corridor



Legend

- Security Devices
- Fire Devices
- Small Power Devices
- Lighting Devices
- Data Devices
- Mechanical Heating
- Emergency Lighting
- Supply Air
- Return Air
- Exhaust Air

Abbreviations

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Rev	Date	Description		
P02	04.04.2024	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	LE	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Combined Services - Rooms Loading Bay - Left Corridor - Page 6 of 17

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**AI**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
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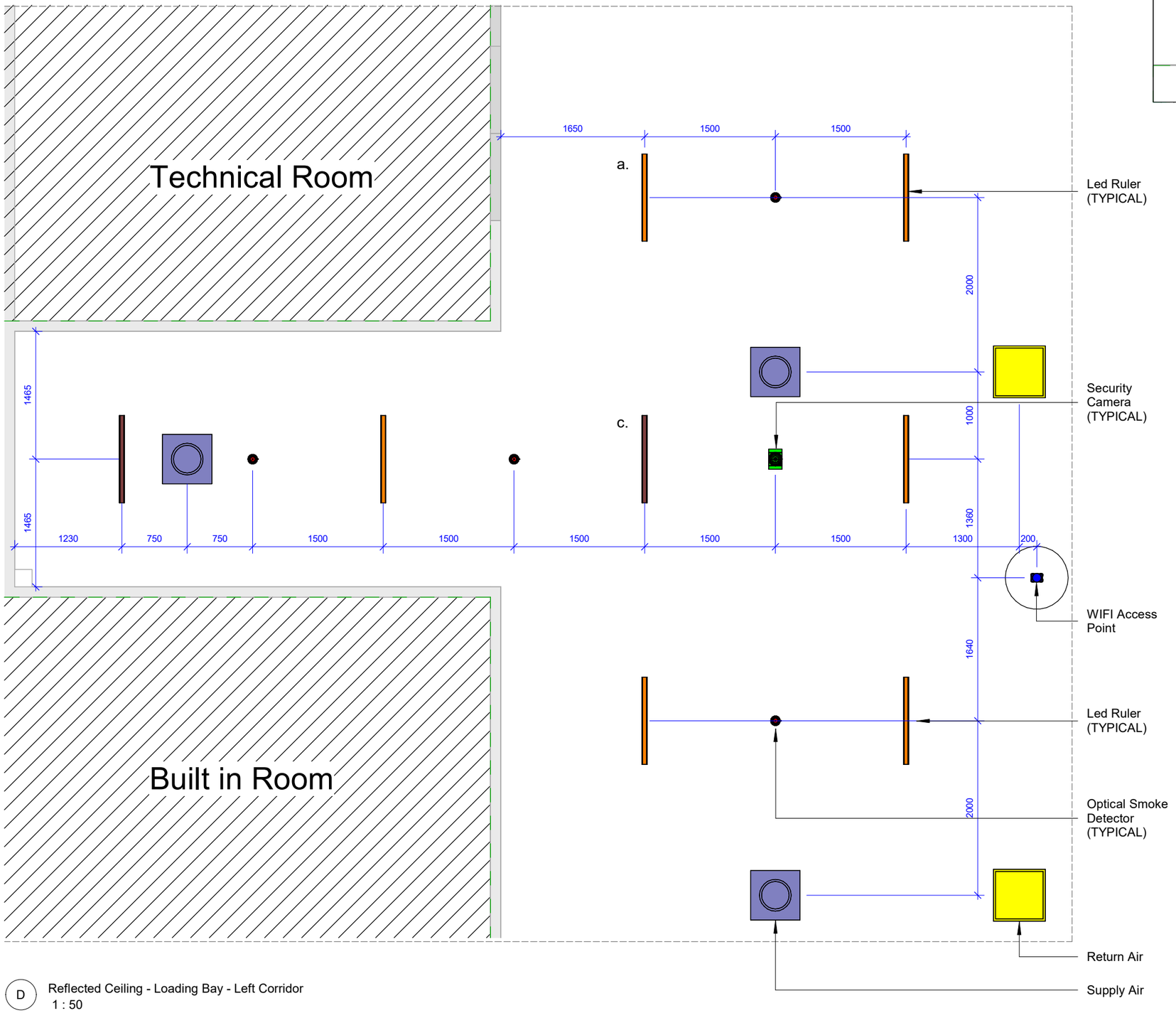
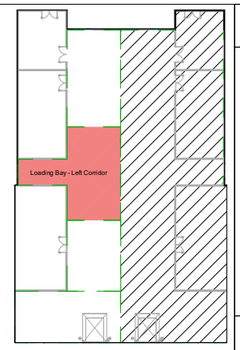


D Reflected Ceiling - Loading Bay - Left Corridor
1 : 50



Legend

- Security Devices
- Fire Devices
- Small Power Devices
- Lighting Devices
- Data Devices
- Mechanical Heating
- Emergency Lighting
- Supply Air
- Return Air
- Exhaust Air

Abbreviations

Code	Description
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Rev	Date	Description	Sign.	Veri.
P02	04.04.2024	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	LE	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

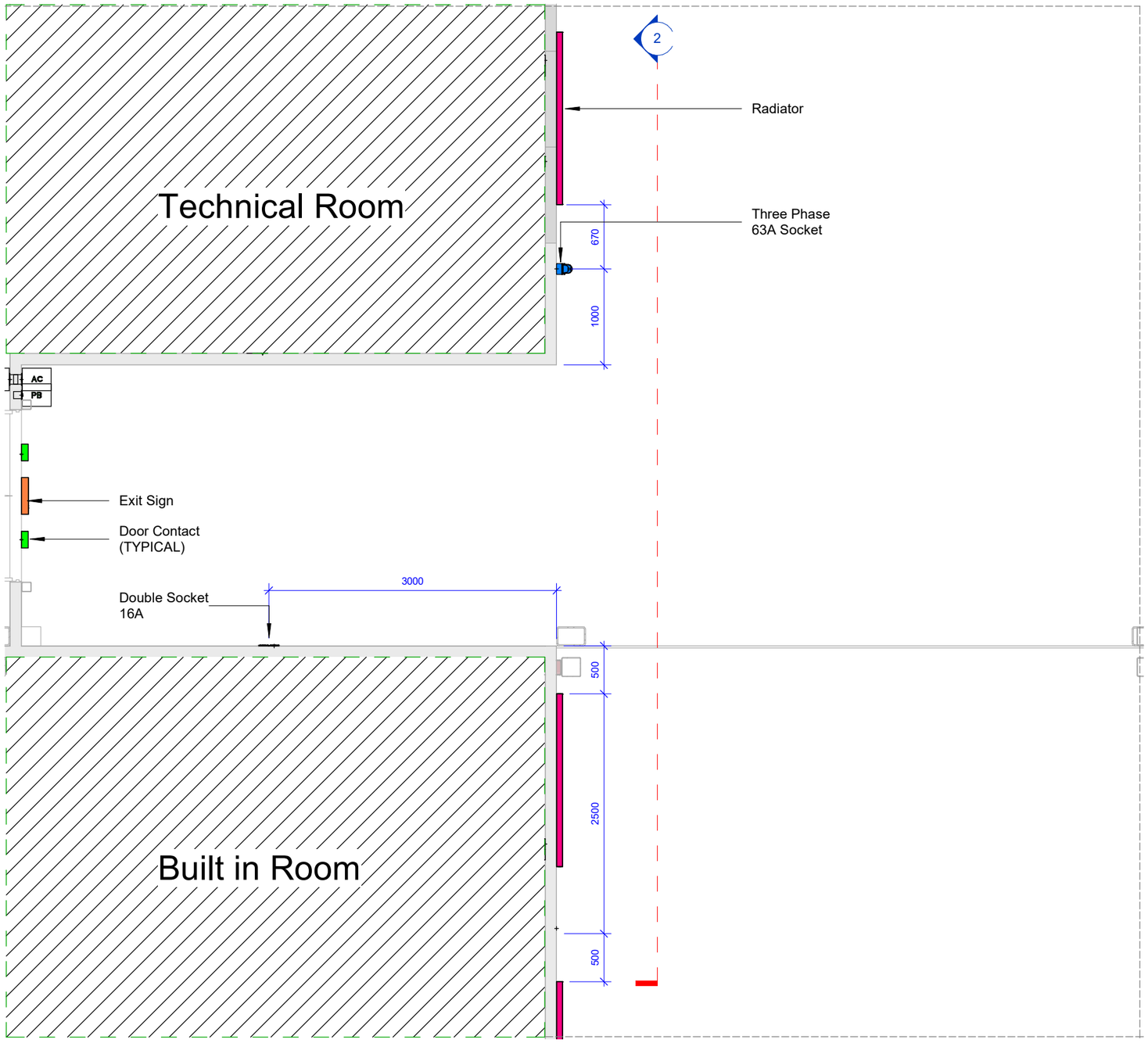
DRAWING NAME:

Combined Services - Rooms Loading Bay - Left Corridor - Page 7 of 17

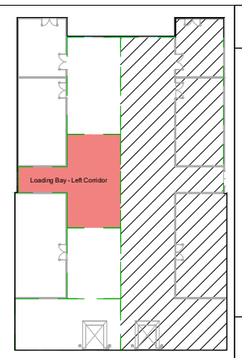
DRAWING STATUS:	SCALE:	STATUS:
Revision 1	**AI**	**S2**

DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**

DRAWING NUMBER:	FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-J-62343	**A3**	**P02**



E Ground Floor Loading Bay - Left Corridor
1 : 50



Legend

- Security Devices
- Fire Devices
- Small Power Devices
- Lighting Devices
- Data Devices
- Mechanical Heating
- Emergency Lighting
- Supply Air
- Return Air
- Exhaust Air

Abbreviations

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Rev	Date	Description	Sign.	Veri.
P02	04.04.2024	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	LE	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Combined Services - Rooms Loading Bay - Left Corridor - Page 8 of 17

DRAWING STATUS:	SCALE:	STATUS:
Revision 1	**AI**	**S2**

DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**

DRAWING NUMBER:	FORMAT:	REVISION:
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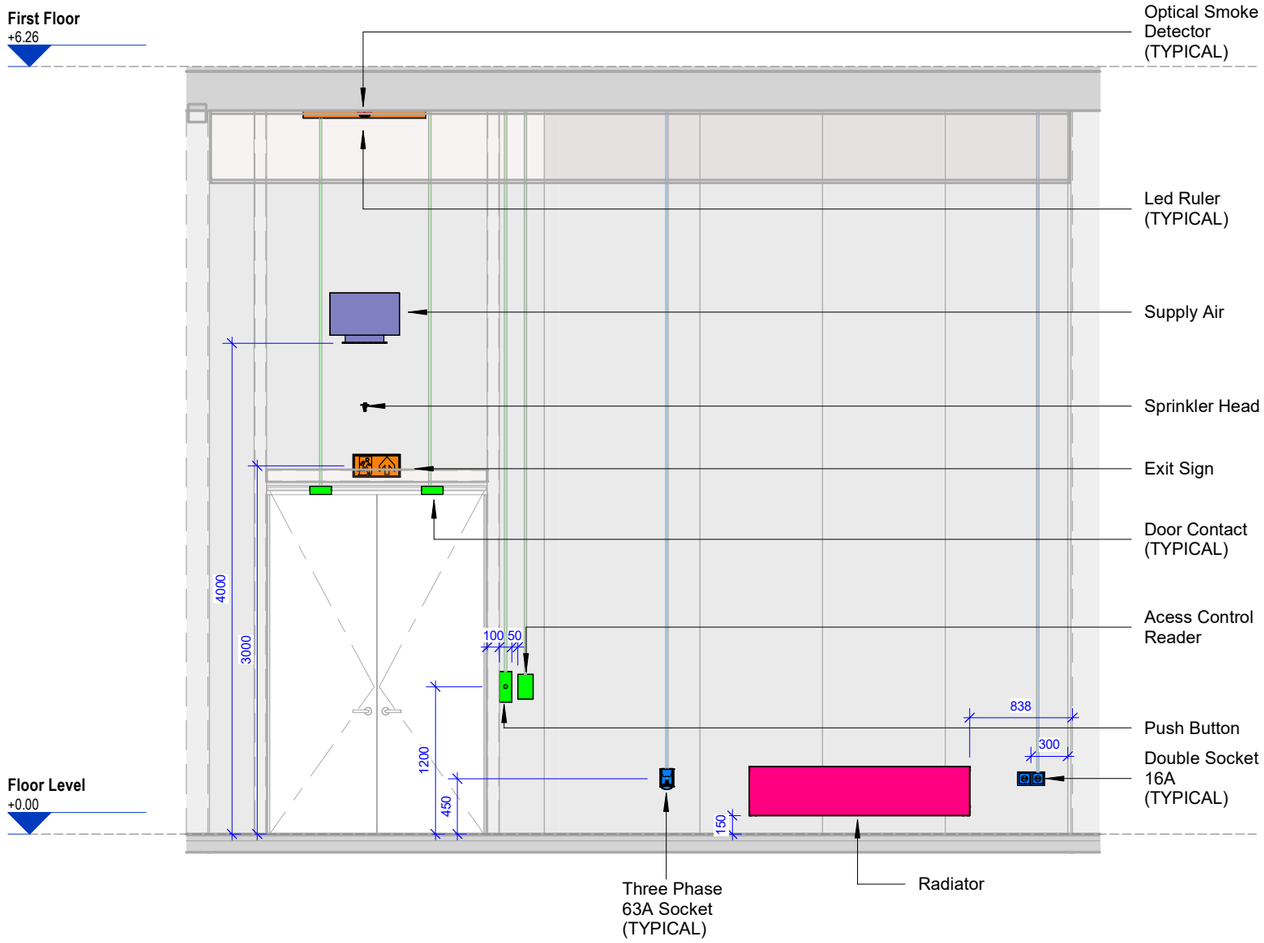
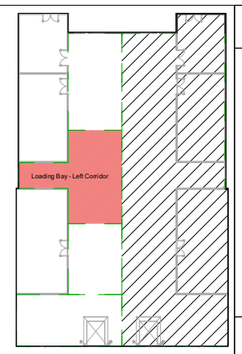


2 Section - Loading Bay - Left Corridor
1 : 50



Legend

- Security Devices
- Fire Devices
- Small Power Devices
- Lighting Devices
- Data Devices
- Mechanical Heating
- Emergency Lighting
- Supply Air
- Return Air
- Exhaust Air

Abbreviations

Code	Description
DC	Door Contact
AC	Access Control Card Reader
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Rev	Date	Description	Sign.	Veri.
P02	04.04.2024	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	LE	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Combined Services - Rooms Loading Bay - Left Corridor - Page 9 of 17

DRAWING STATUS:	SCALE:	STATUS:
Revision 1	**AI**	**S2**

DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**

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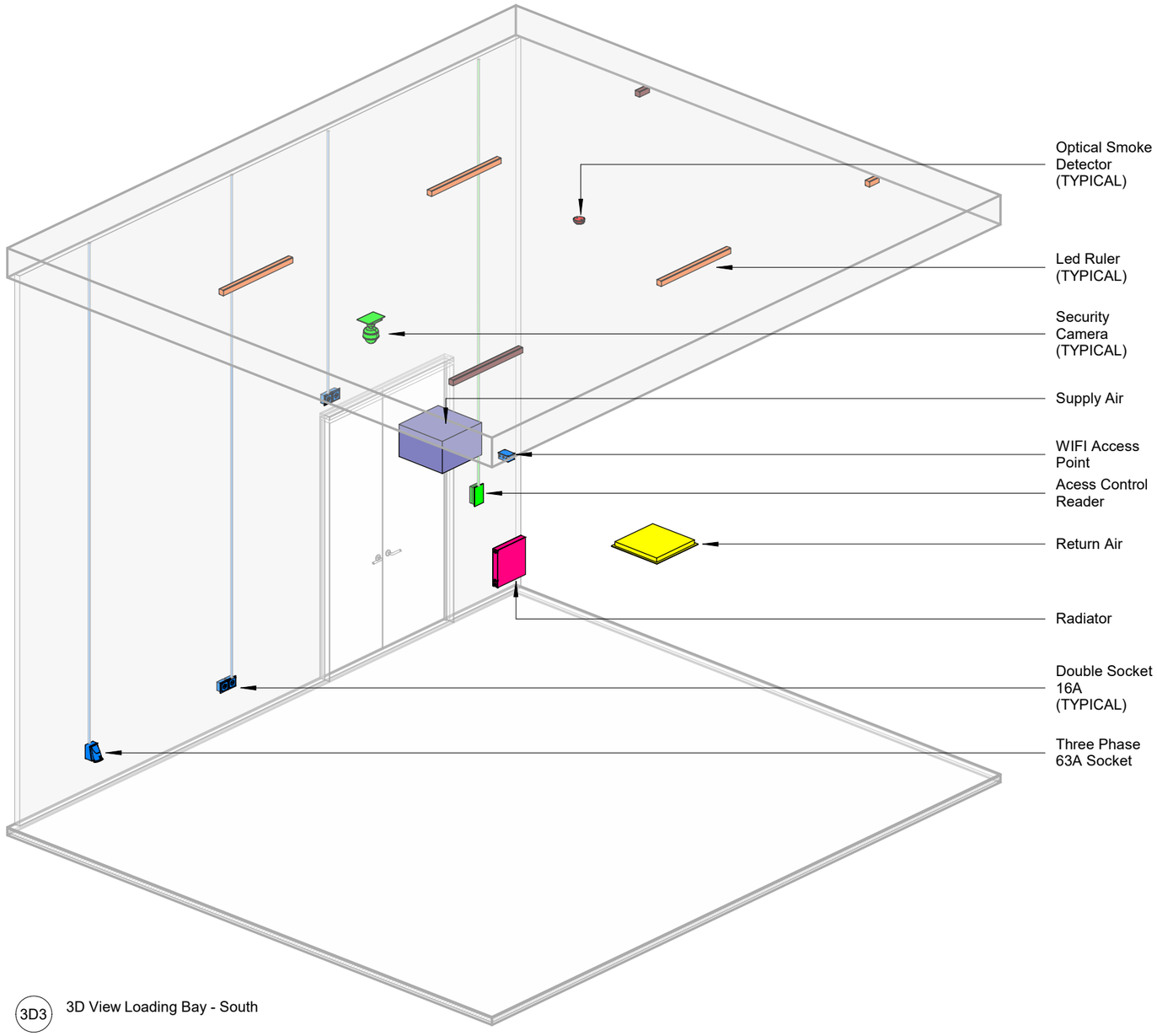
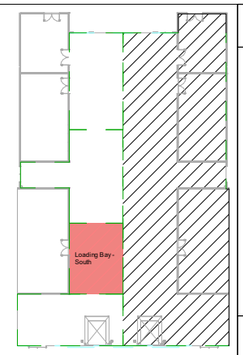


3D3 3D View Loading Bay - South



Legend

- Security Devices
- Fire Devices
- Small Power Devices
- Lighting Devices
- Data Devices
- Mechanical Heating
- Emergency Lighting
- Supply Air
- Return Air
- Exhaust Air

Abbreviations

Code	Description
DC	Door Contact
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Rev	Date	Description	Sign.	Veri.
P02	04.04.2024	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	LE	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Combined Services - Rooms Loading Bay - South - Page 10 of 17

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**AI**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
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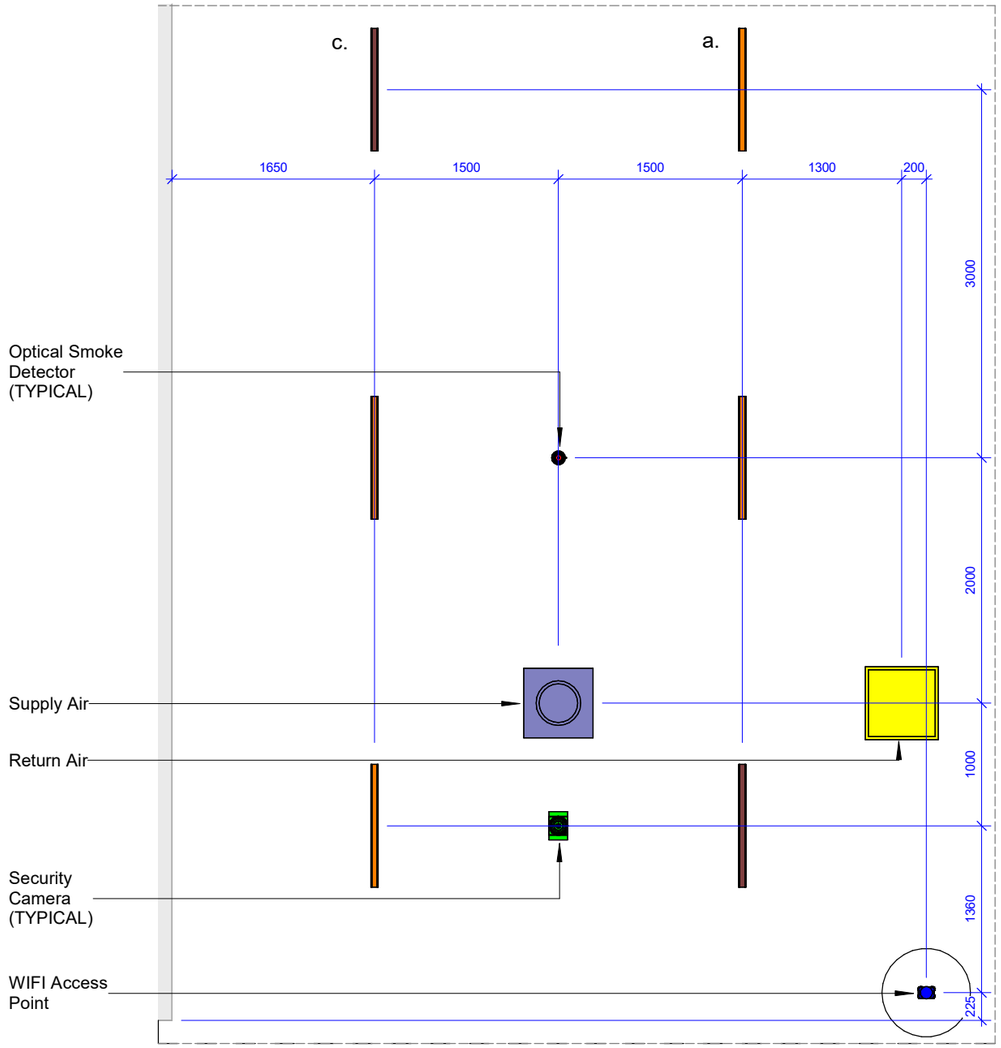
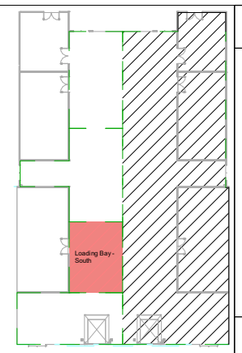


F Reflected Ceiling - Loading Bay - South
1 : 50



Legend

- Security Devices
- Fire Devices
- Small Power Devices
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Rev	Date	Description	Sign.	Veri.
P02	04.04.2024	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	LE	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Combined Services - Rooms Loading Bay - South - Page 11 of 17

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**AI**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**
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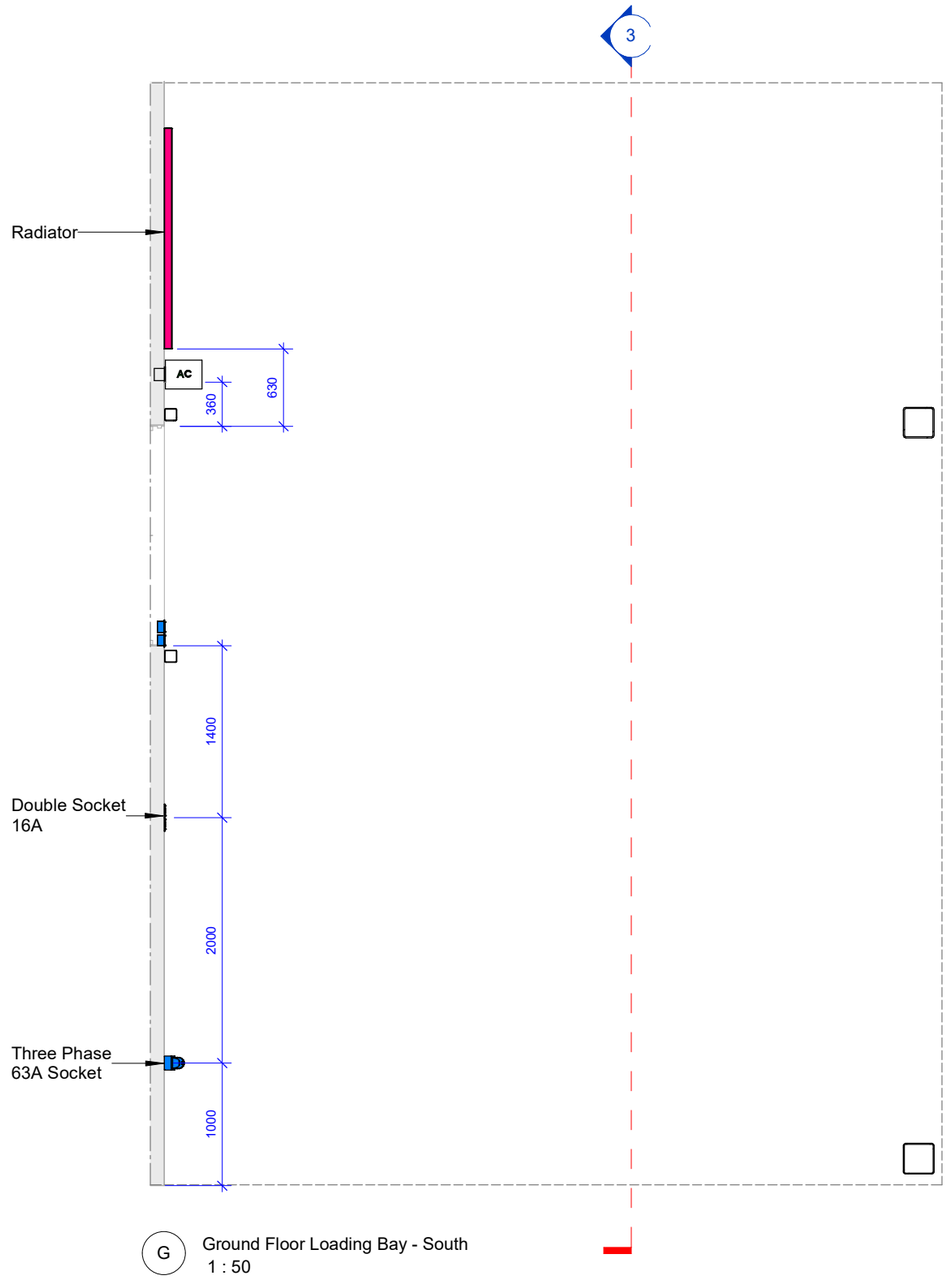
RDC0000-BMS-ZZ-ZZ-DR-J-62347		**A3**	**P02**



G Ground Floor Loading Bay - South
1 : 50

Legend

- Security Devices
- Fire Devices
- Small Power Devices
- Lighting Devices
- Data Devices
- Mechanical Heating
- Emergency Lighting
- Supply Air
- Return Air
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Rev	Date	Description	Sign.	Veri.
P02	04.04.2024	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	LE	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Combined Services - Rooms Loading Bay - South - Page 12 of 17

DRAWING STATUS:	SCALE:	STATUS:
Revision 1	**AI**	**S2**

DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**

DRAWING NUMBER:	FORMAT:	REVISION:
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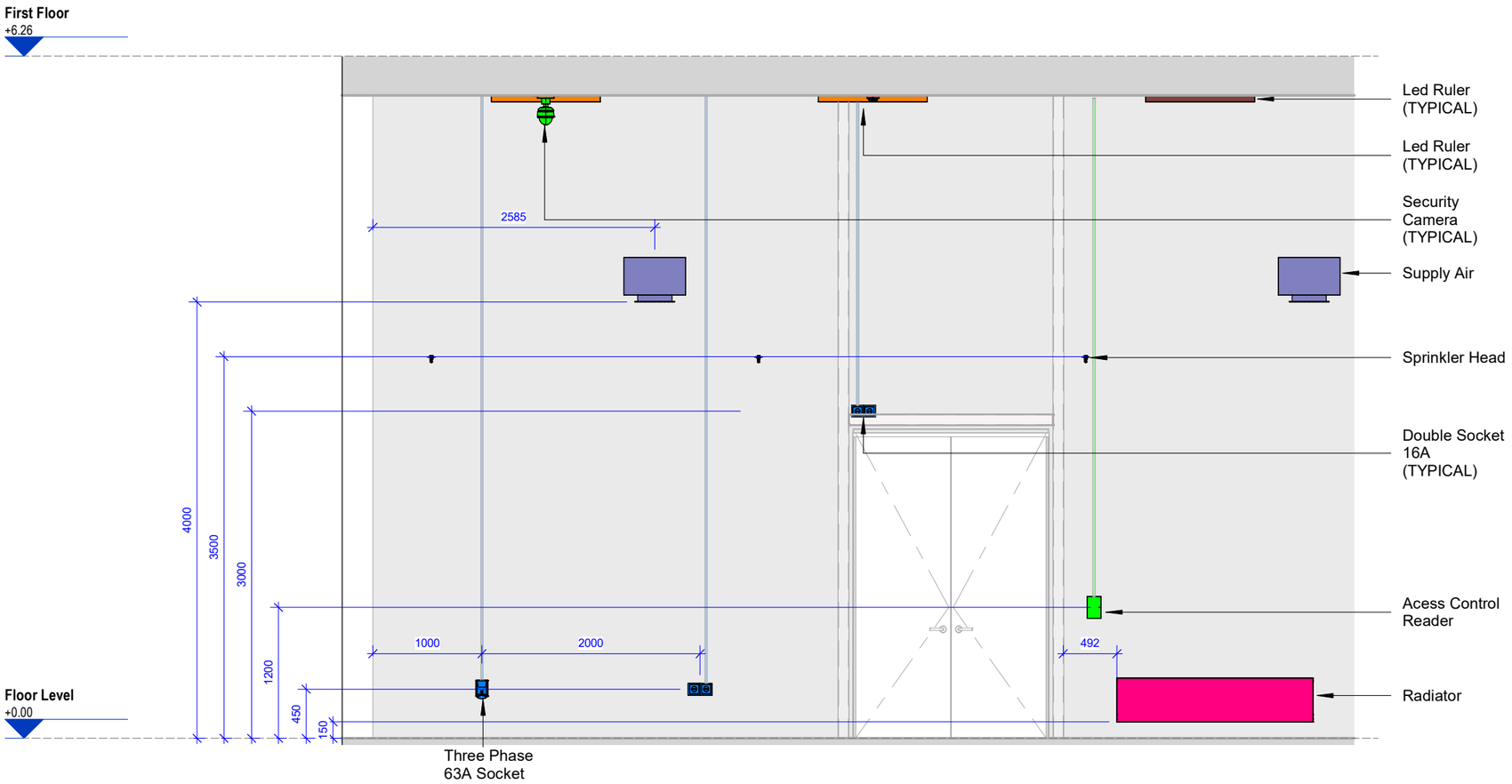

3 Section - Loading Bay - South - Left
1 : 50

Legend

- Security Devices
- Fire Devices
- Small Power Devices
- Lighting Devices
- Data Devices
- Mechanical Heating
- Emergency Lighting
- Supply Air
- Return Air
- Exhaust Air

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Rev	Date	Description	Sign.	Veri.
P02	04.04.2024	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	LE	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

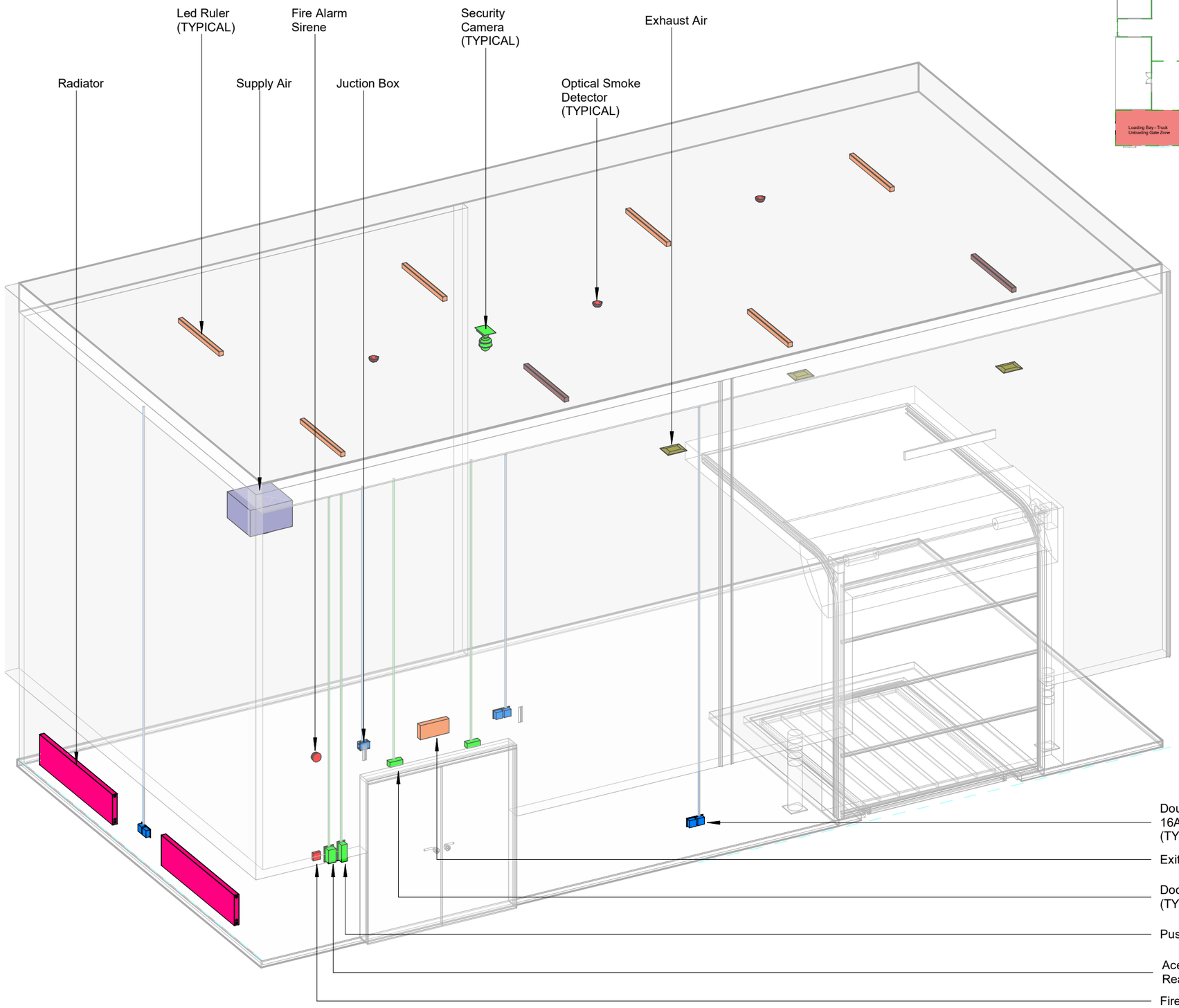
DRAWING NAME:

Combined Services - Rooms Loading Bay - South - Page 13 of 17

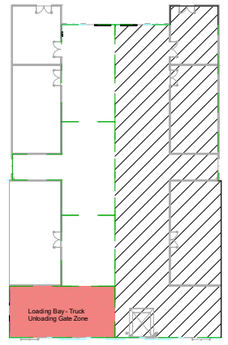
DRAWING STATUS:	SCALE:	STATUS:
Revision 1	**AI**	**S2**

DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**

DRAWING NUMBER:	FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-J-62349	**A3**	**P02**



3D4 3D View Loading Bay - Truck Unloading Gate Zone



Legend

- Security Devices
- Fire Devices
- Small Power Devices
- Lighting Devices
- Data Devices
- Mechanical Heating
- Emergency Lighting
- Supply Air
- Return Air
- Exhaust Air

Abbreviations

Code	Description
DC	Door Contact
AC	Access Control Card Reader
FAS	Flashing Beacon with Siren
MCP	Manual Alarm Call Point
ACMS	Door-Holding Magnets
JB	Junction Box
PB	Push Button for automatic Doors
AI	As Indicated

General Notes

1. All dimensions are in millimeters unless otherwise noted.
2. Align Sockets by Light Switch, whenever it is possible.
3. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.
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5. All elevations are in regards to the Finished Floor Level unless otherwise noted.

Specific Notes

a. LED with motion detector.
b. Heat and optical smoke detector - One detector at low level and one at high level. To be aligned vertically on site. Displayed separate for better visibility
c. Emergency Lighting

Rev	Date	Description	Sign.	Veri.
P02	04.04.2024	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	LE	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Combined Services - Rooms Loading Bay - Truck Unloading Gate Zone - Page 14 of 17

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**AI**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
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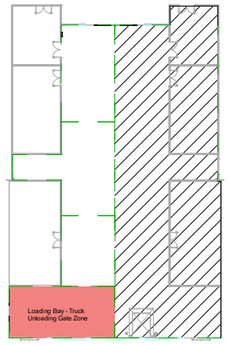

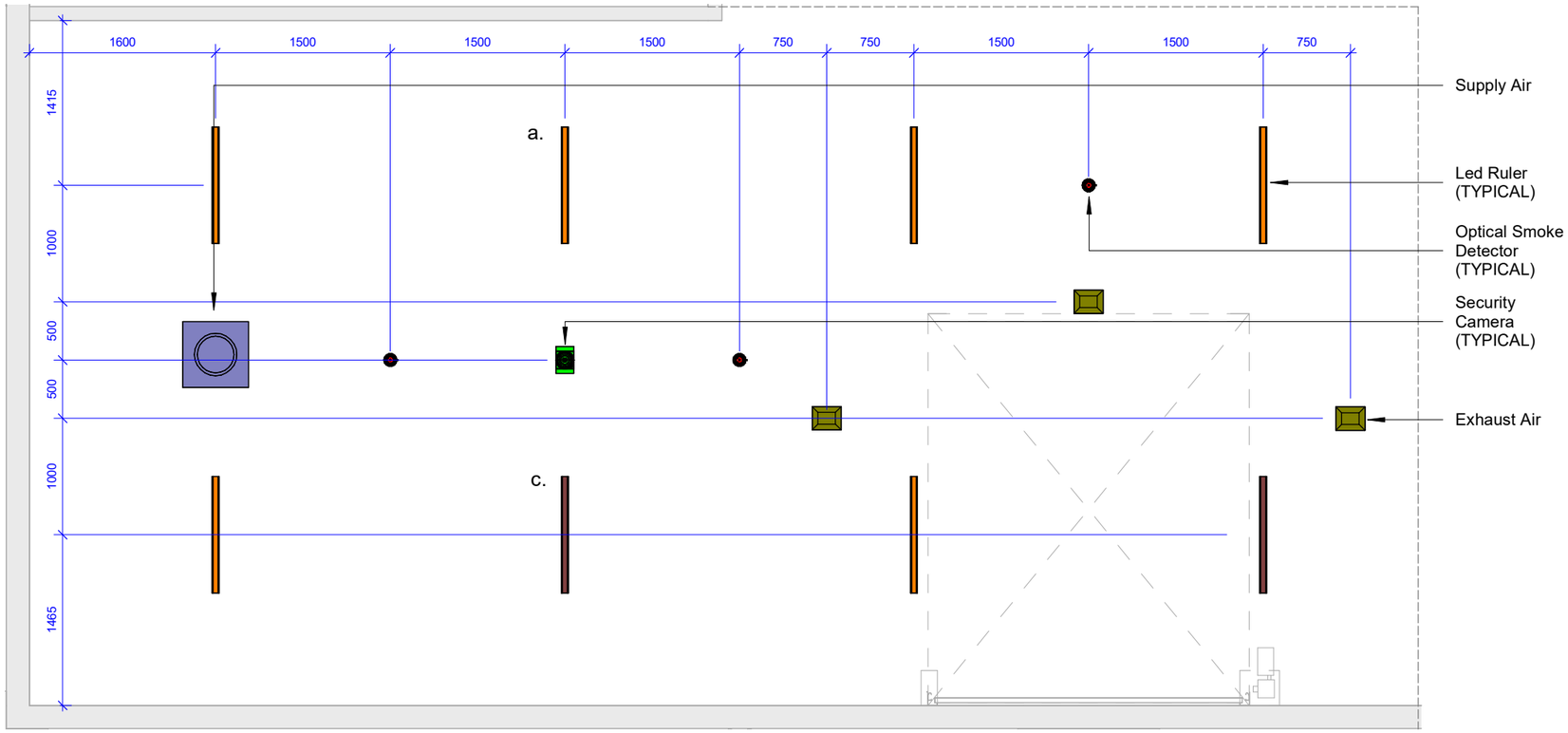

H Reflected Ceiling - Loading Bay - Truck Unloading Gate Zone
1 : 50

Legend

- Security Devices
- Fire Devices
- Small Power Devices
- Lighting Devices
- Data Devices
- Mechanical Heating
- Emergency Lighting
- Supply Air
- Return Air
- Exhaust Air

Abbreviations

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P02	04.04.2024	Revision 1	JR	JM
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DESIGN & BUILD CONTRACTOR:

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CTS GROUP PARTNER:

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PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Combined Services - Rooms Loading Bay - Truck Unloading Gate Zone - Page 15 of 17

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**AI**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**
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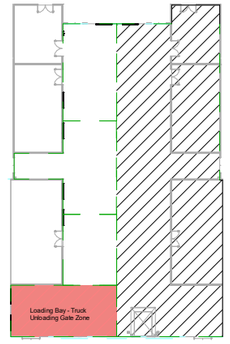

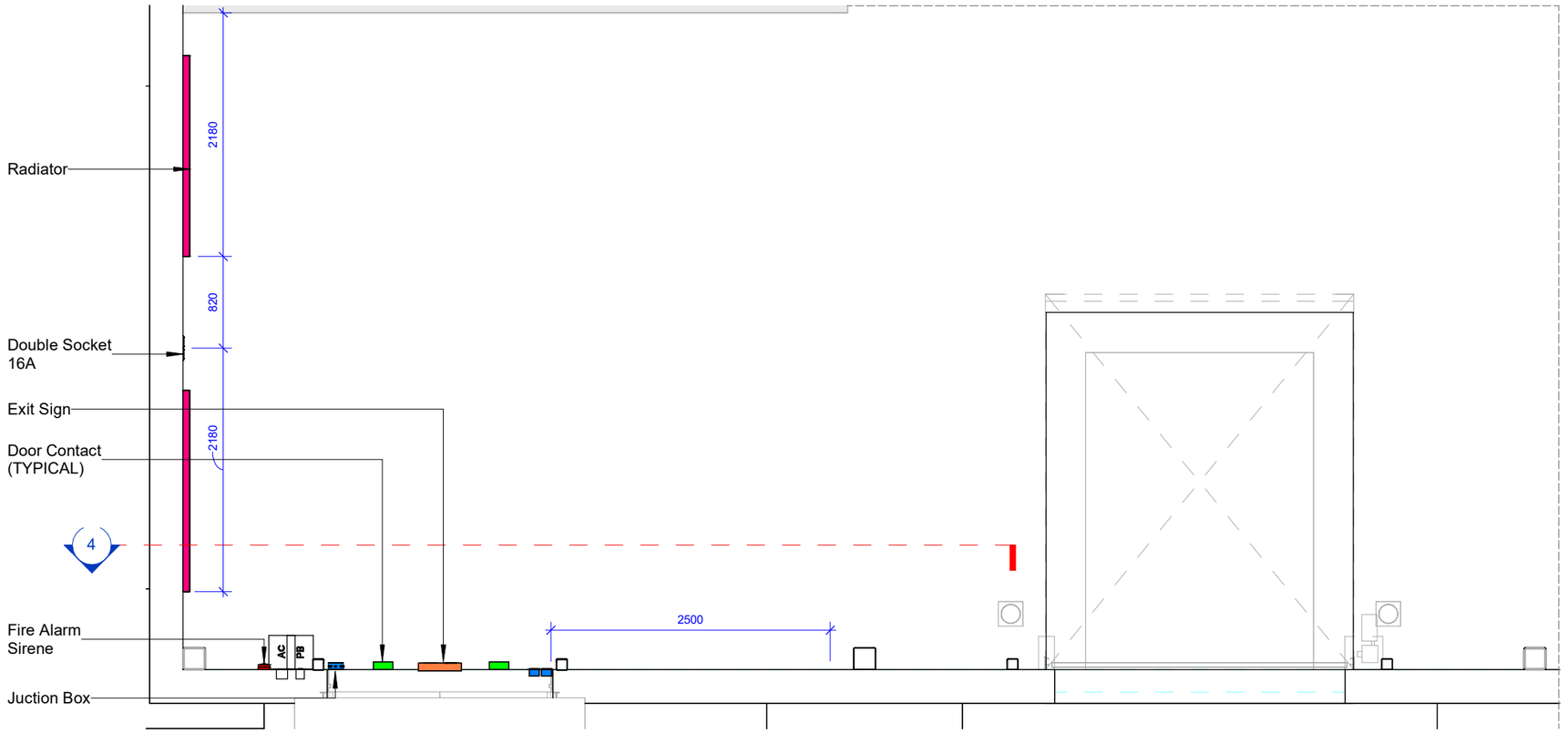

(1) Ground Floor Loading Bay - Truck Unloading Gate Zone
1 : 50

Legend

	Security Devices
	Fire Devices
	Small Power Devices
	Lighting Devices
	Data Devices
	Mechanical Heating
	Emergency Lighting
	Supply Air
	Return Air
	Exhaust Air

Abbreviations

Code	Description
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DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Combined Services - Rooms Loading Bay - Truck Unloading Gate Zone - Page 16 of 17

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Revision 1		**AI**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
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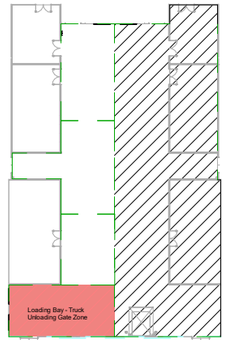

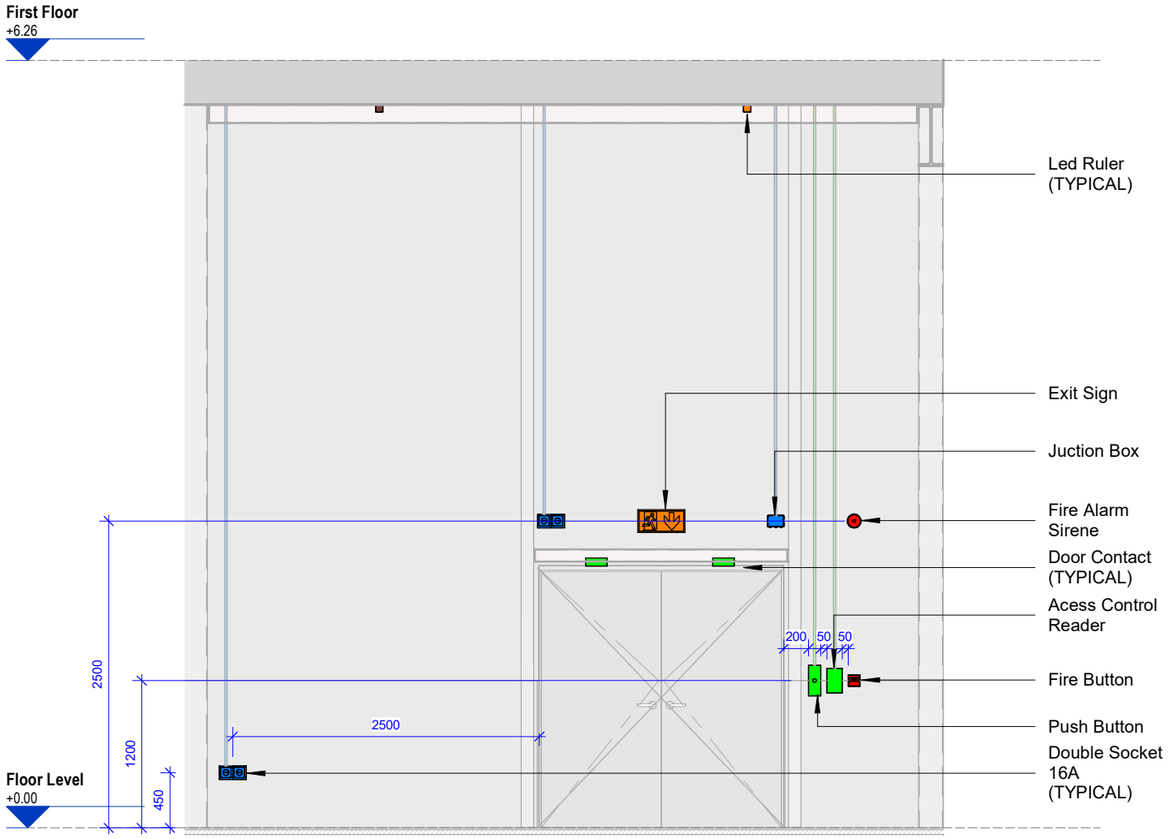

4 Section - Truck Unloading Gate Zone - Back
1 : 50

Legend

- Security Devices
- Fire Devices
- Small Power Devices
- Lighting Devices
- Data Devices
- Mechanical Heating
- Emergency Lighting
- Supply Air
- Return Air
- Exhaust Air

Abbreviations

Code	Description
DC	Door Contact
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Execution Design and Engineering Requirements

DRAWING NAME:

Combined Services - Rooms Loading Bay - Truck Unloading Gate Zone - Page 17 of 17

DRAWING STATUS:	SCALE:	STATUS:
Revision 1	**AI**	**S2**

DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**

DRAWING NUMBER:	FORMAT:	REVISION:
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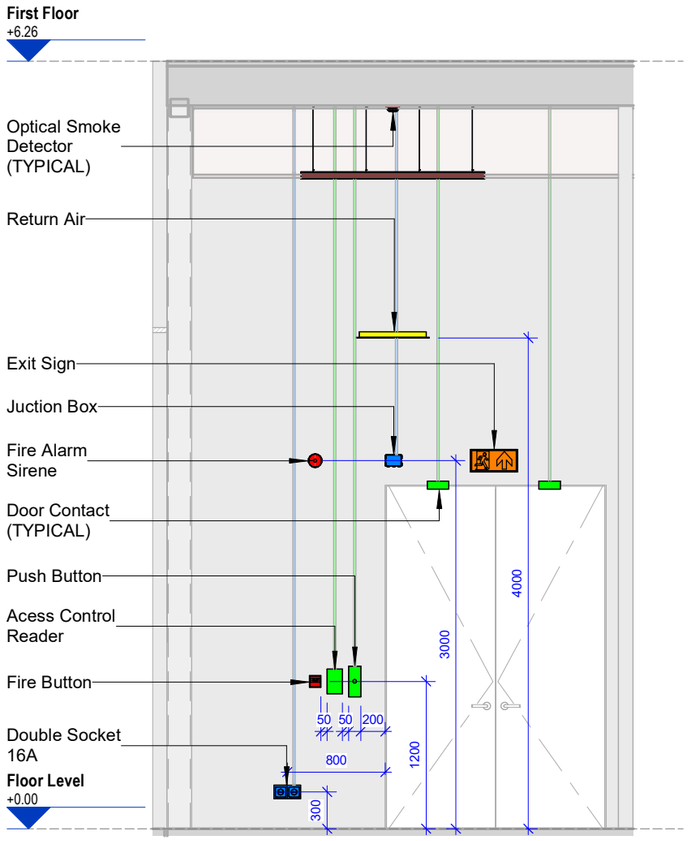
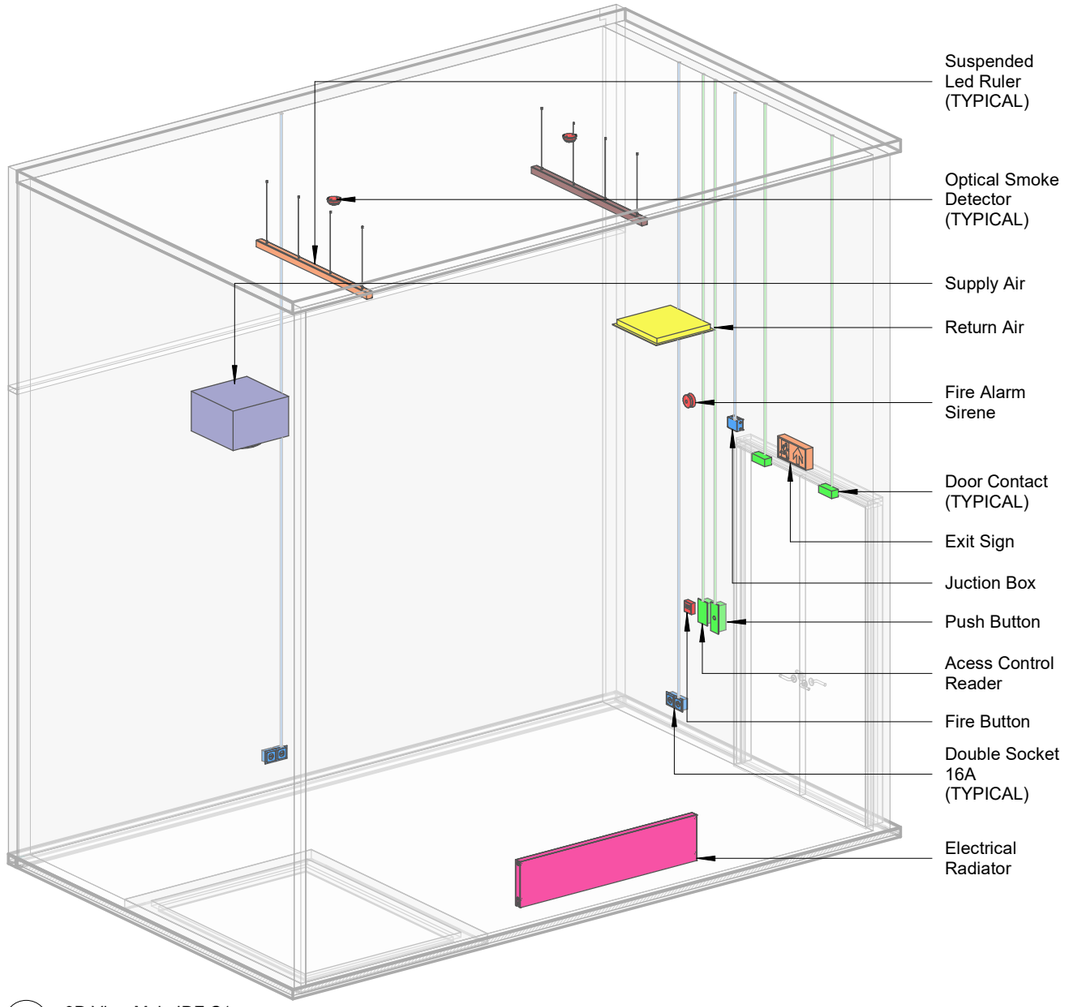
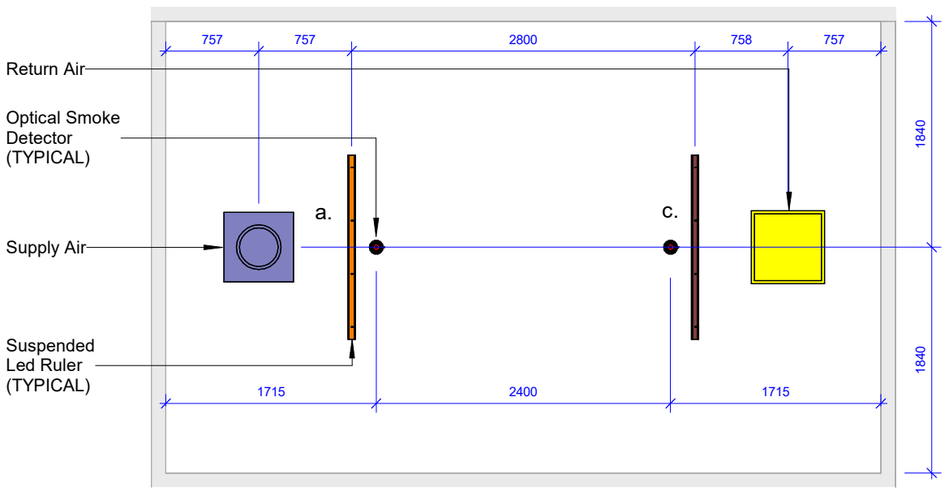


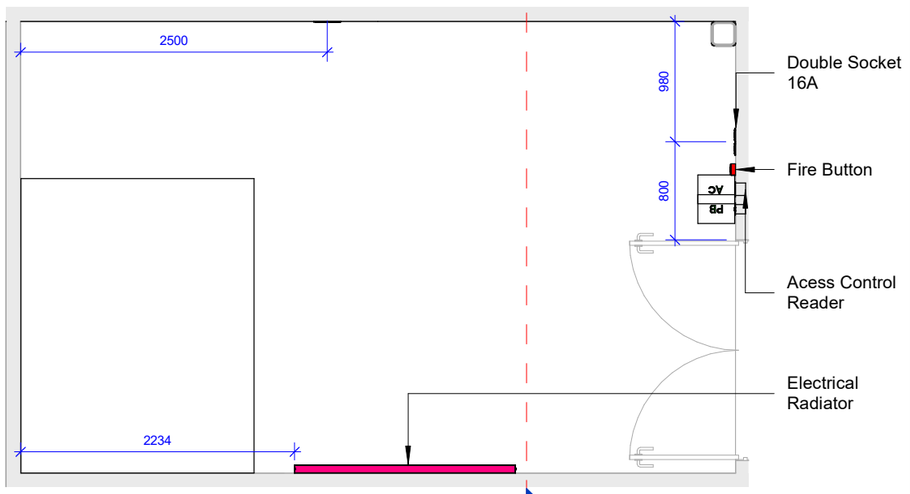
A Section - IDF C1 - Right
1 : 50



3D1 3D View Main IDF C1



1 Reflected Ceiling - IDF C1
1 : 50



2 Ground Floor IDF C1
1 : 50

Legend

- Security Devices
- Fire Devices
- Small Power Devices
- Lighting Devices
- Data Devices
- Mechanical Heating
- Emergency Lighting
- Supply Air
- Return Air
- Exhaust Air

Abbreviations

Code	Description
DC	Door Contact
AC	Access Control Card Reader
FAS	Flashing Beacon with Siren
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General Notes

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Specific Notes

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Rev	Date	Description	Sign.	Veri.
P02	04.04.2024	Revision 1	JR	JM
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DESIGN & BUILD CONTRACTOR:

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CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Combined Services - Rooms
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DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
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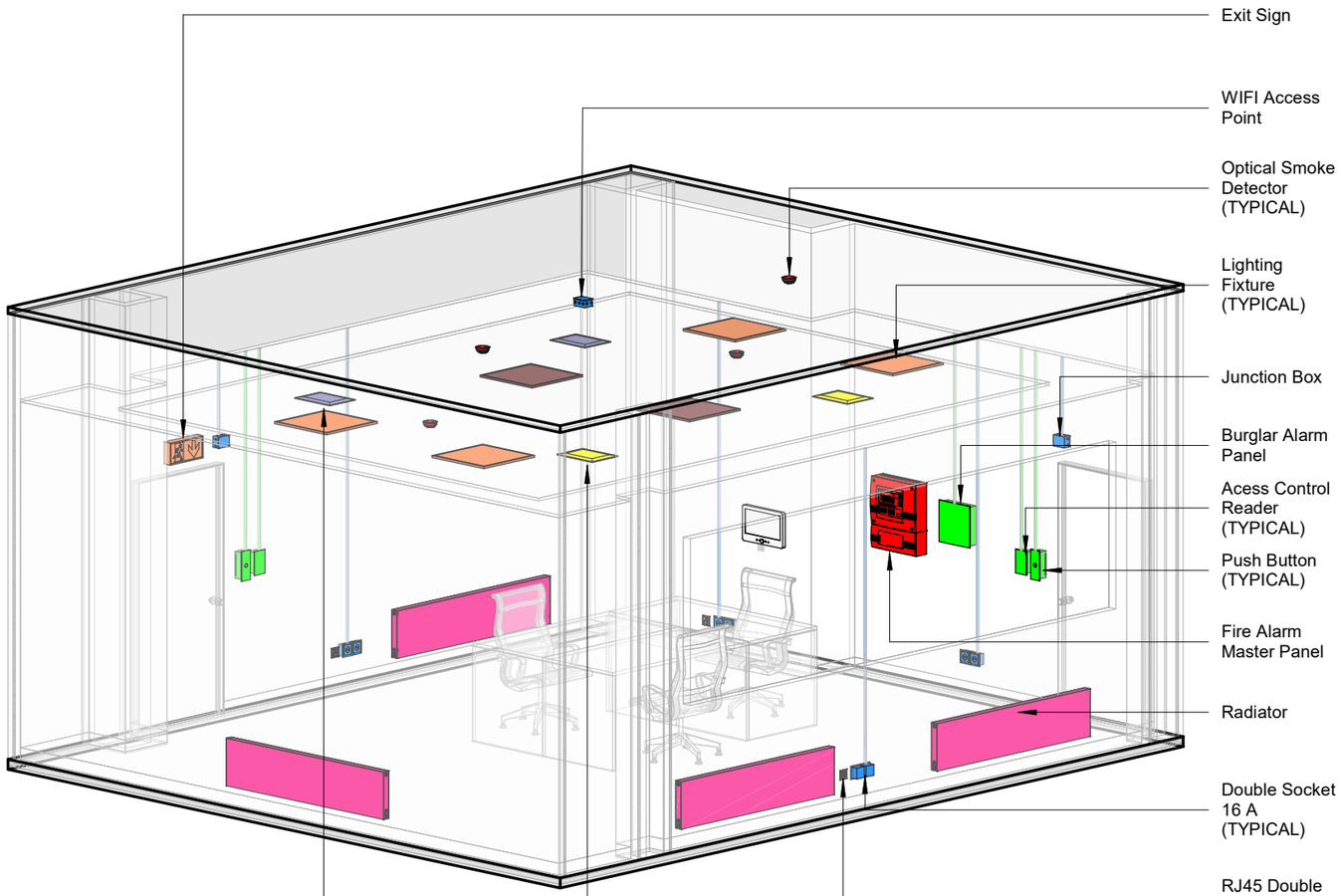

3D1 3D View Security Room

Legend

- Security Devices
- Fire Devices
- Small Power Devices
- Lighting Devices
- Data Devices
- Mechanical Heating
- Emergency Lighting
- Supply Air
- Return Air
- Exhaust Air

Abbreviations

Code	Description
DC	Door Contact
AC	Access Control Card Reader
FAS	Flashing Beacon with Siren
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Rev	Date	Description	Sign.	Veri.
P02	04.04.2024	Revision 1	JR	JM
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DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Combined Services - Rooms
Security Room - Page 1 of 3

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Revision 1		**AI**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
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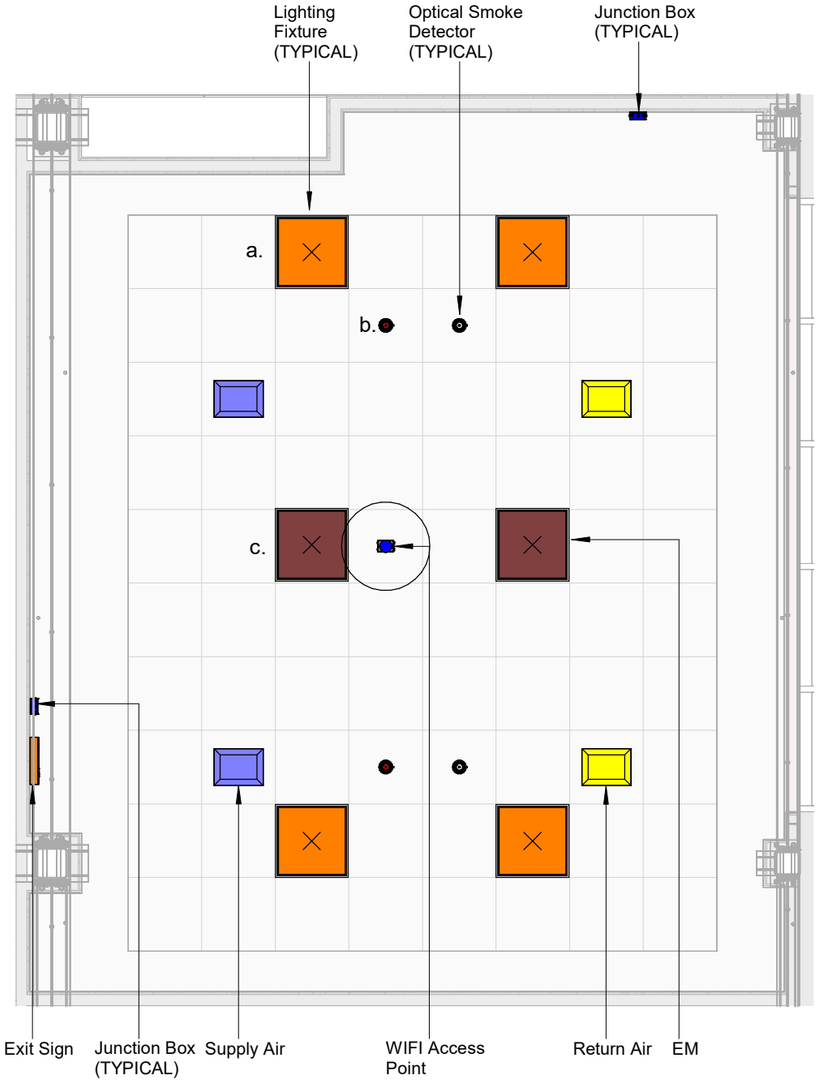
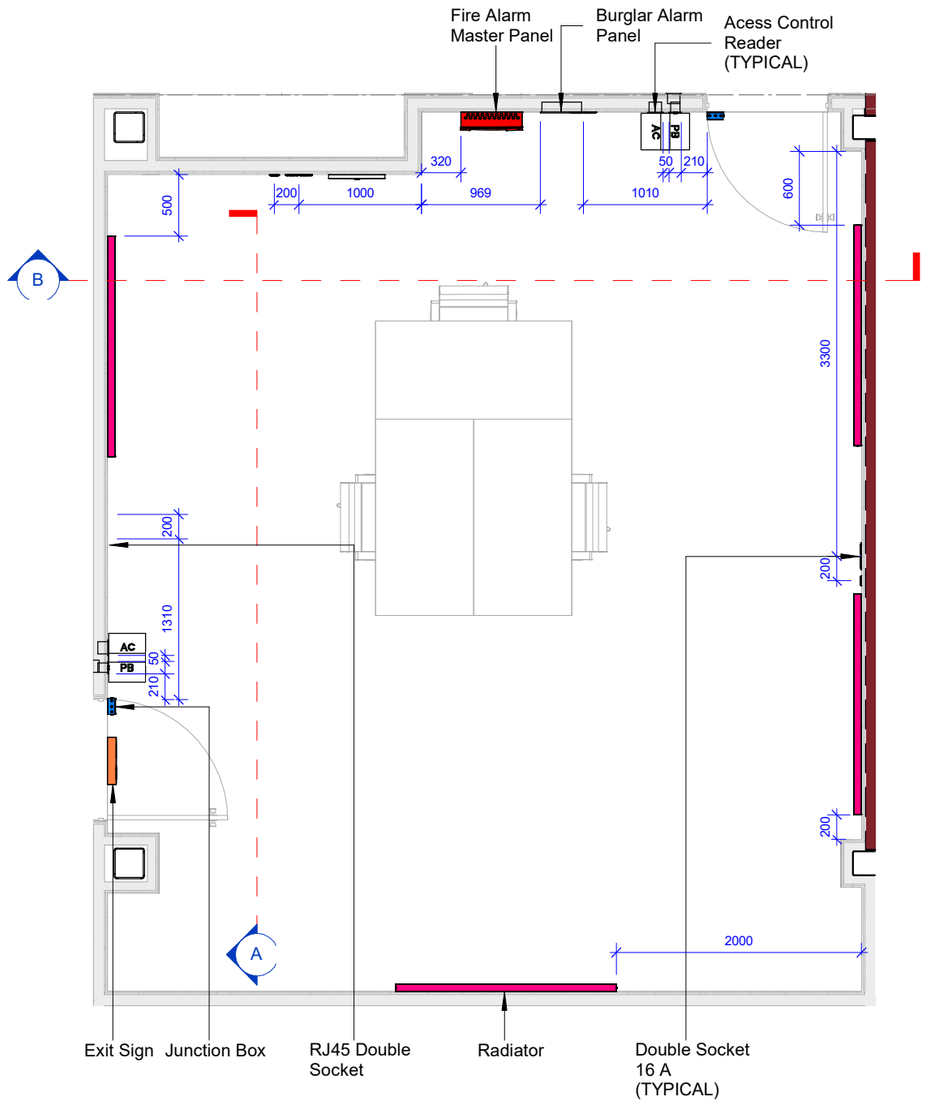


1 Reflected Ceiling - Security Room
1 : 50



2 Ground Floor Security Room
1 : 50

Legend	Abbreviations	
Security Devices	Code	Description
Fire Devices	DC	Door Contact
Small Power Devices	AC	Access Control Card Reader
Lighting Devices	FAS	Flashing Beacon with Siren
Data Devices	MCP	Manual Alarm Call Point
Mechanical Heating	ACMS	Door-Holding Magnets
Emergency Lighting	JB	Junction Box
Supply Air	PB	Push Button for automatic Doors
Return Air	AI	As Indicated
Exhaust Air		

General Notes

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P01	11.11.2024	Issued for Information	LE	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

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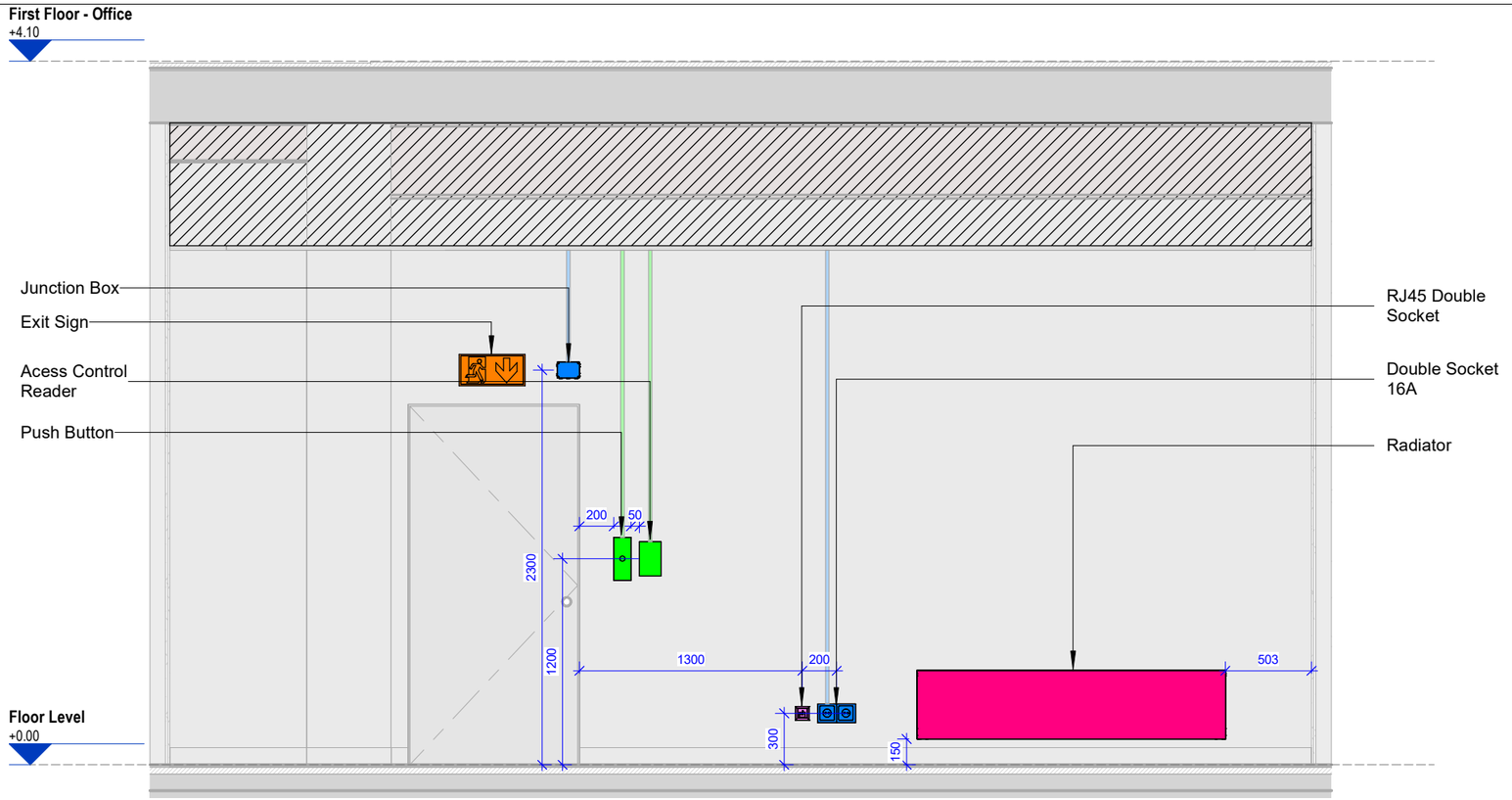
Combined Services - Rooms
Security Room - Page 2 of 3

DRAWING STATUS:	SCALE:	STATUS:
Revision 1	**AI**	**S2**

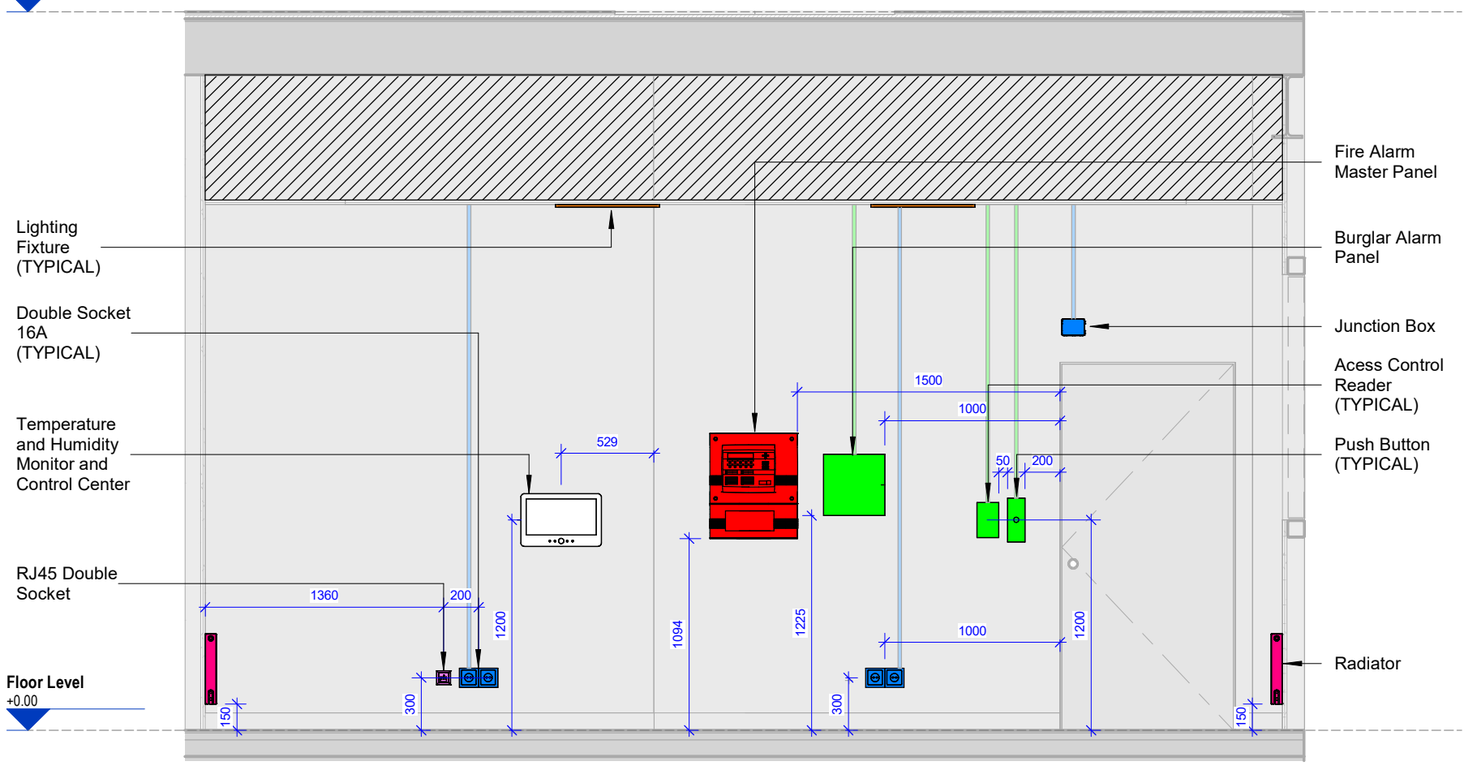
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**

DRAWING NUMBER:	FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-J-62321	**A3**	**P02**



First Floor - Office
+4.10

A Section - Security Room - Left
1 : 35



B Section - Security Room - Front
1 : 35

Legend

	Security Devices
	Fire Devices
	Small Power Devices
	Lighting Devices
	Data Devices
	Mechanical Heating
	Emergency Lighting
	Supply Air
	Return Air
	Exhaust Air

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Rev	Date	Description	Sign.	Veri.
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DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

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PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Combined Services - Rooms
Security Room - Page 3 of 3

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**AI**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**
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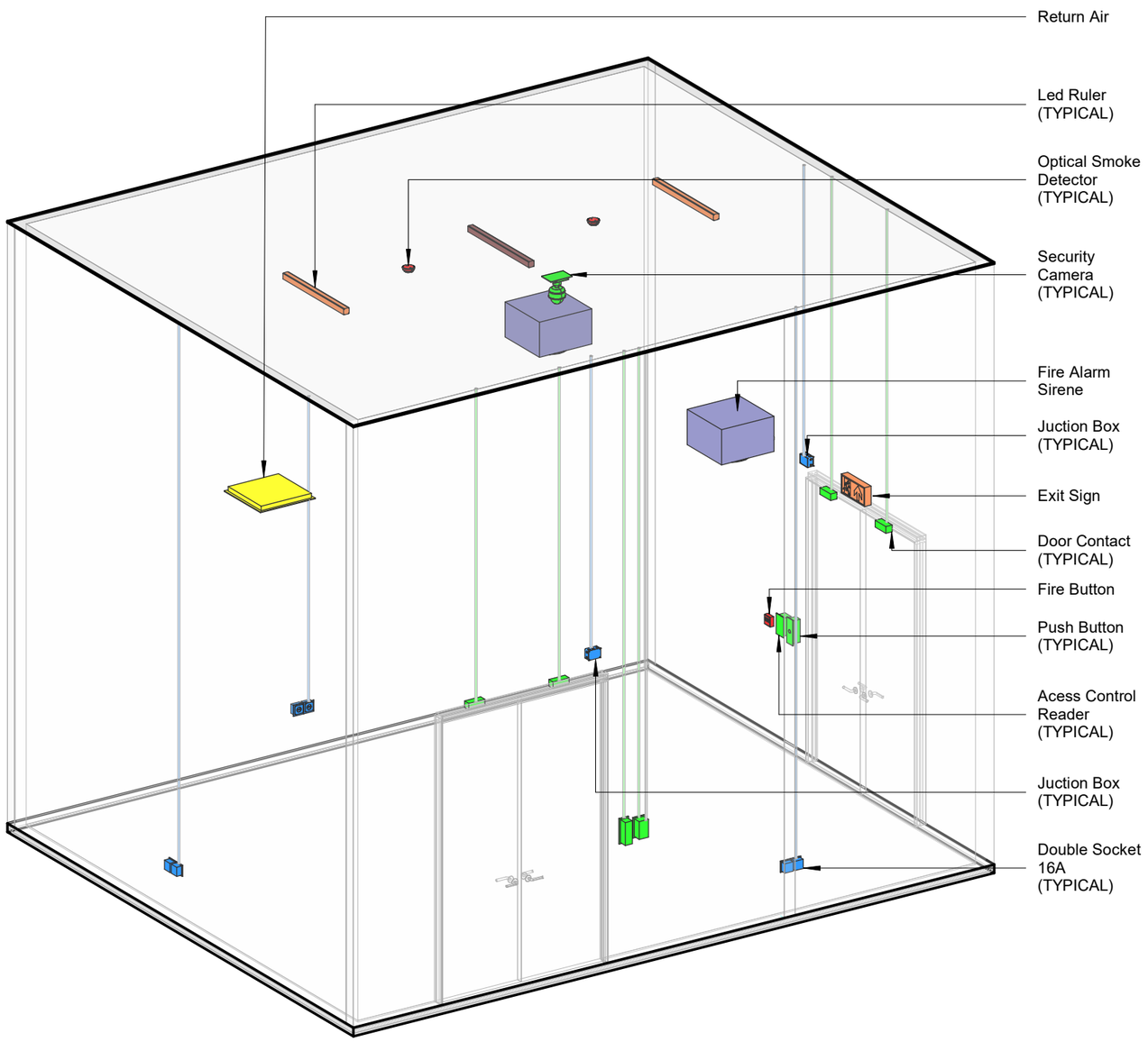

3D1 3D View Secure Storage

Legend

- Security Devices
- Fire Devices
- Small Power Devices
- Lighting Devices
- Data Devices
- Mechanical Heating
- Emergency Lighting
- Supply Air
- Return Air
- Exhaust Air

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DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

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DRAWING NAME:

Combined Services - Rooms Secure Storage - Page 1 of 3

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Revision 1		**AI**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**
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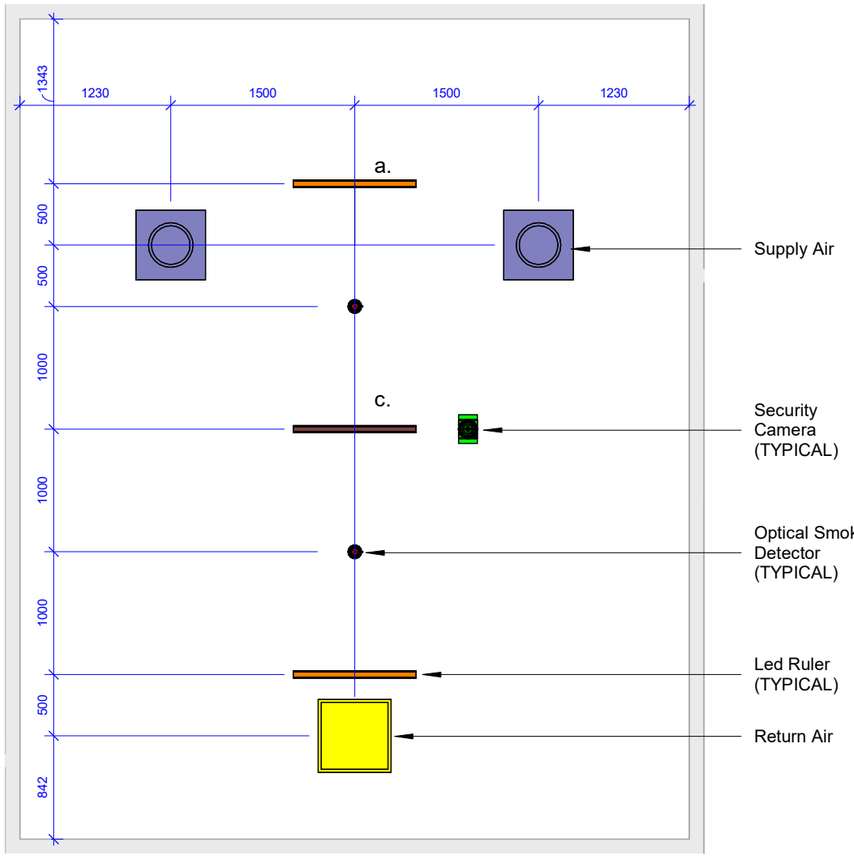
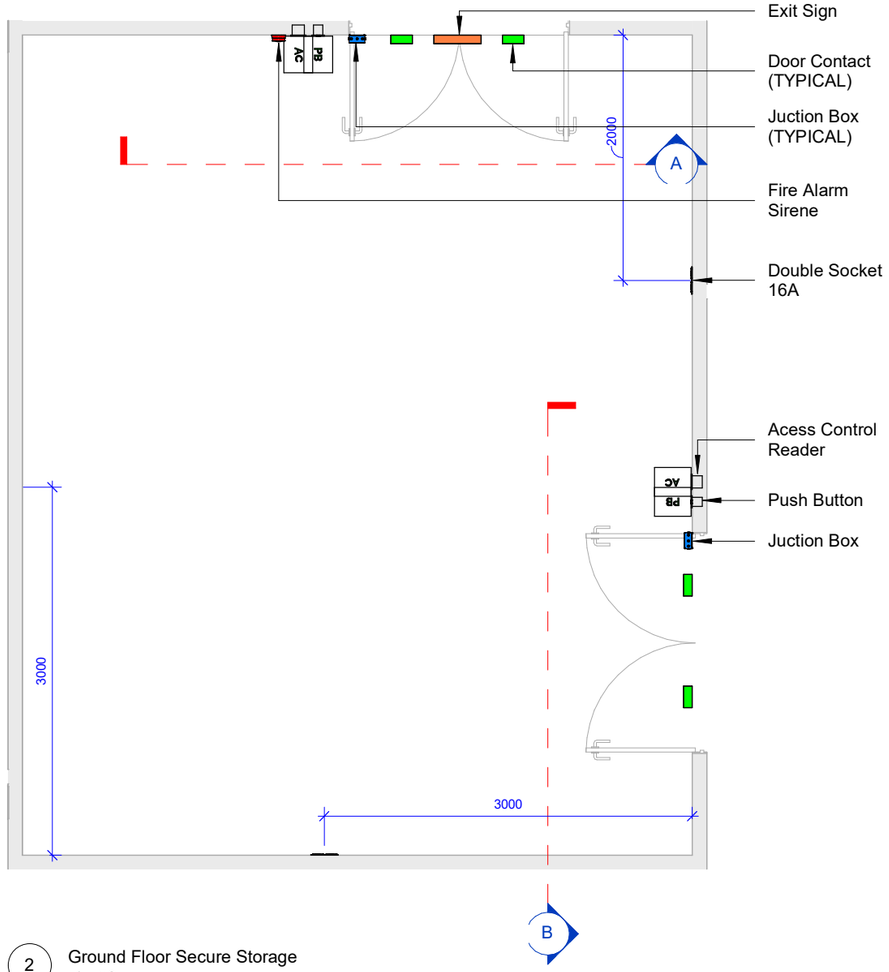


1 Reflected Ceiling - Secure Storage
1 : 50



2 Ground Floor Secure Storage
1 : 50

Legend

- Security Devices
- Fire Devices
- Small Power Devices
- Lighting Devices
- Data Devices
- Mechanical Heating
- Emergency Lighting
- Supply Air
- Return Air
- Exhaust Air

Abbreviations

Code	Description
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BIMMS

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Combined Services - Rooms
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Revision 1		**AI**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
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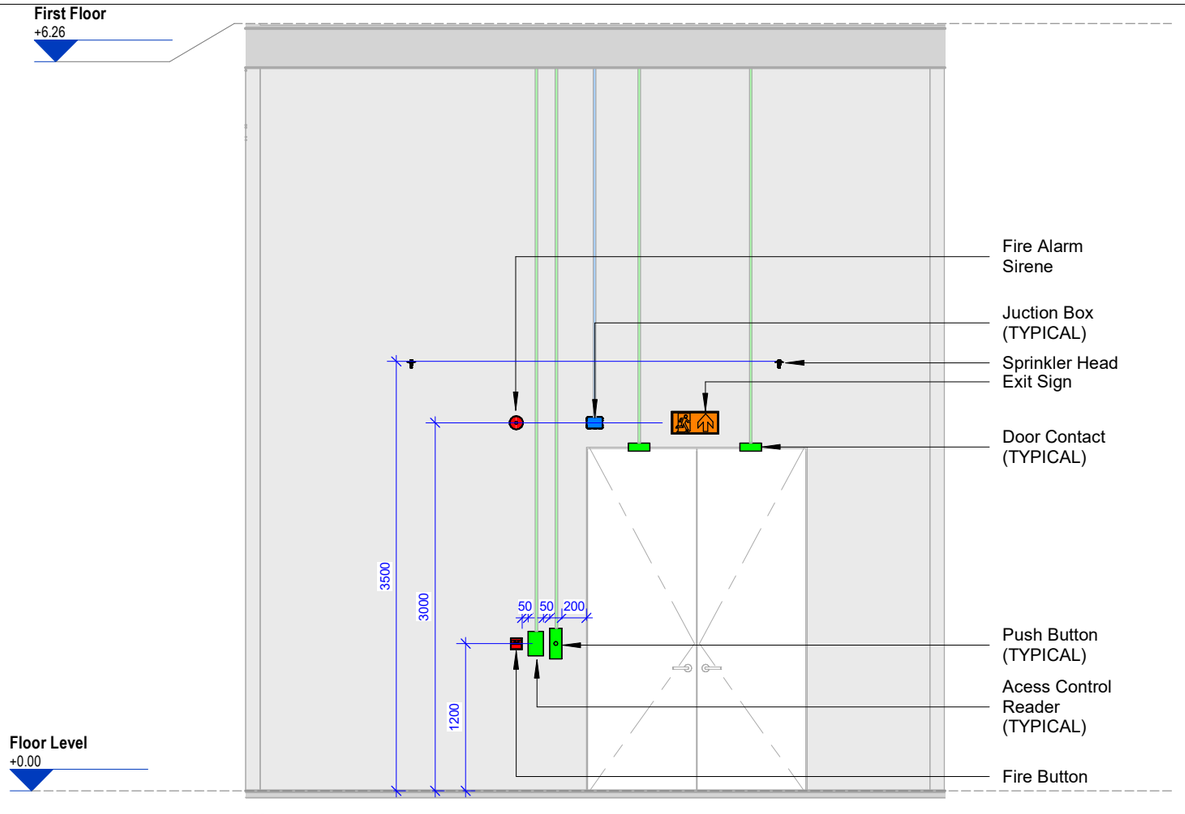
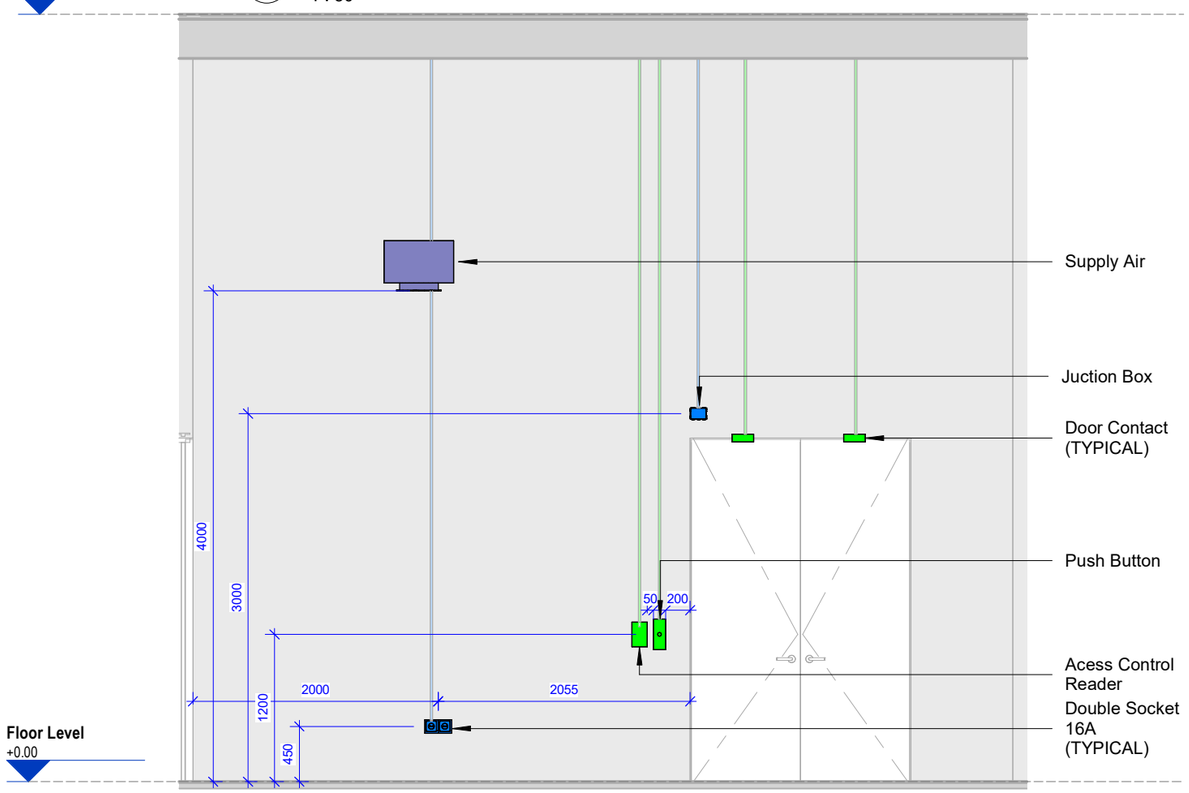


A Section - Secure Storage - Front
1 : 50



B Section - Secure Storage - Right
1 : 50

Legend

- Security Devices
- Fire Devices
- Small Power Devices
- Lighting Devices
- Data Devices
- Mechanical Heating
- Emergency Lighting
- Supply Air
- Return Air
- Exhaust Air

Abbreviations

Code	Description
DC	Door Contact
AC	Access Control Card Reader
FAS	Flashing Beacon with Siren
MCP	Manual Alarm Call Point
ACMS	Door-Holding Magnets
JB	Junction Box
PB	Push Button for automatic Doors
AI	As Indicated

General Notes

1. All dimensions are in millimeters unless otherwise noted.
2. Align Sockets by Light Switch, whenever it is possible.
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Specific Notes

a. LED with motion detector.
b. Heat and optical smoke detector - One detector at low level and one at high level. To be aligned vertically on site. Displayed separate for better visibility
c. Emergency Lighting

Rev	Date	Description	Sign.	Veri.
P02	04.04.2024	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	LE	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

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PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Combined Services - Rooms
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Revision 1		**AI**	**S2**
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11.11.2024	**04.04.2024**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
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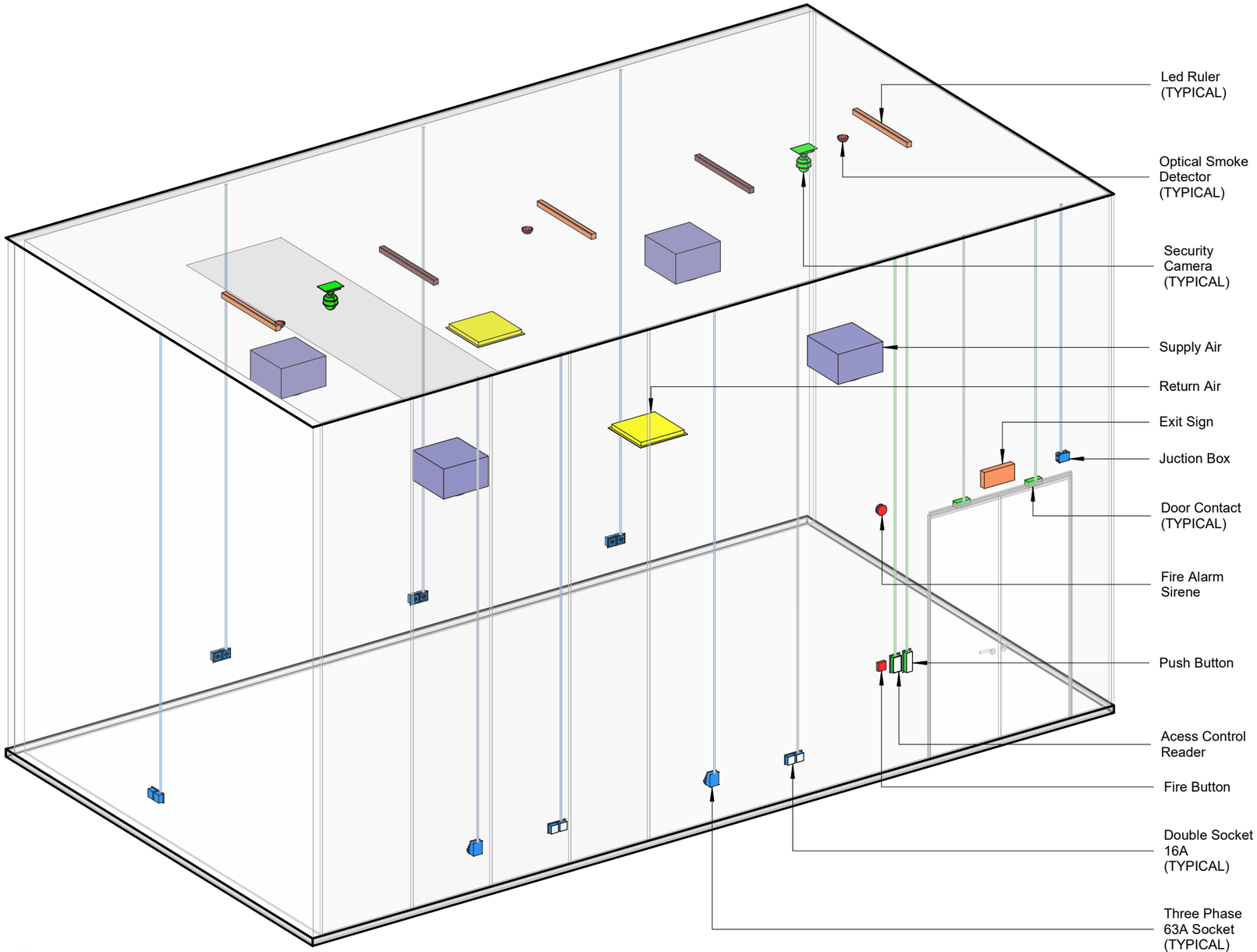

3D1 3D View Tech Area

Legend

- Security Devices
- Fire Devices
- Small Power Devices
- Lighting Devices
- Data Devices
- Mechanical Heating
- Emergency Lighting
- Supply Air
- Return Air
- Exhaust Air

Abbreviations

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DESIGN & BUILD CONTRACTOR:

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CTS GROUP PARTNER:

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PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Combined Services - Rooms Tech Area - Page 1 of 3

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Revision 1		**AI**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**
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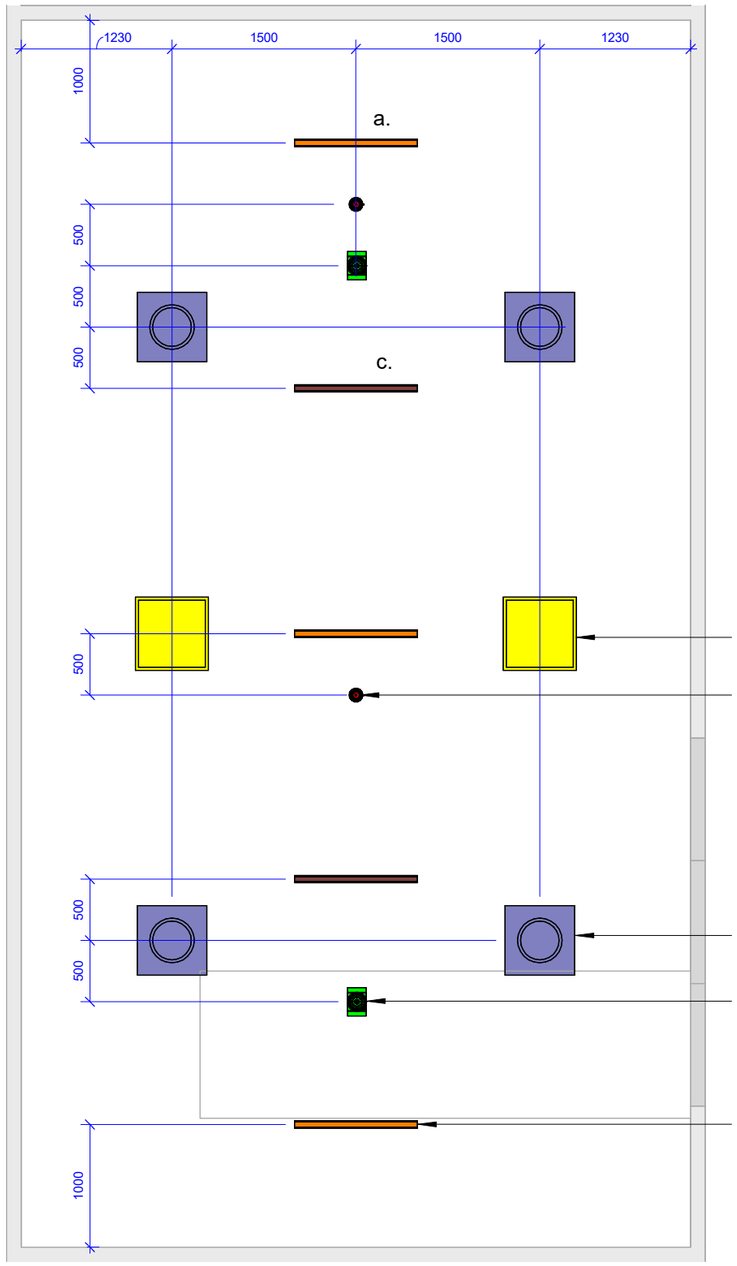
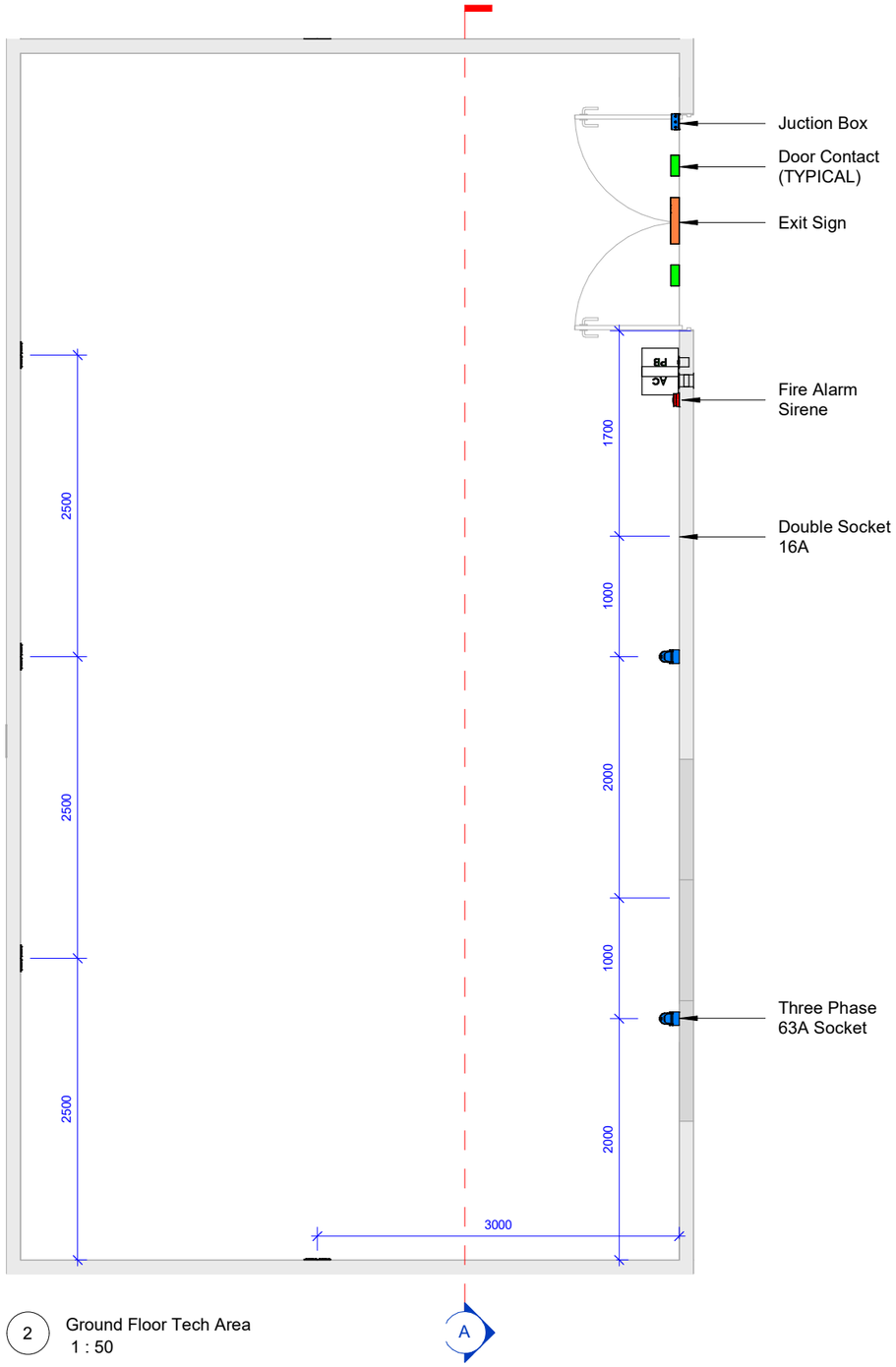


1 Reflected Ceiling - Tech Area
1 : 50



2 Ground Floor Tech Area
1 : 50

A

Legend

- Security Devices
- Fire Devices
- Small Power Devices
- Lighting Devices
- Data Devices
- Mechanical Heating
- Emergency Lighting
- Supply Air
- Return Air
- Exhaust Air

Abbreviations

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P01	11.11.2024	Issued for Information	LE	JM

DESIGN & BUILD CONTRACTOR:

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BIMMS

PROJECT NAME:

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Combined Services - Rooms Tech Area - Page 2 of 3

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DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**

DRAWING NUMBER:	FORMAT:	REVISION:
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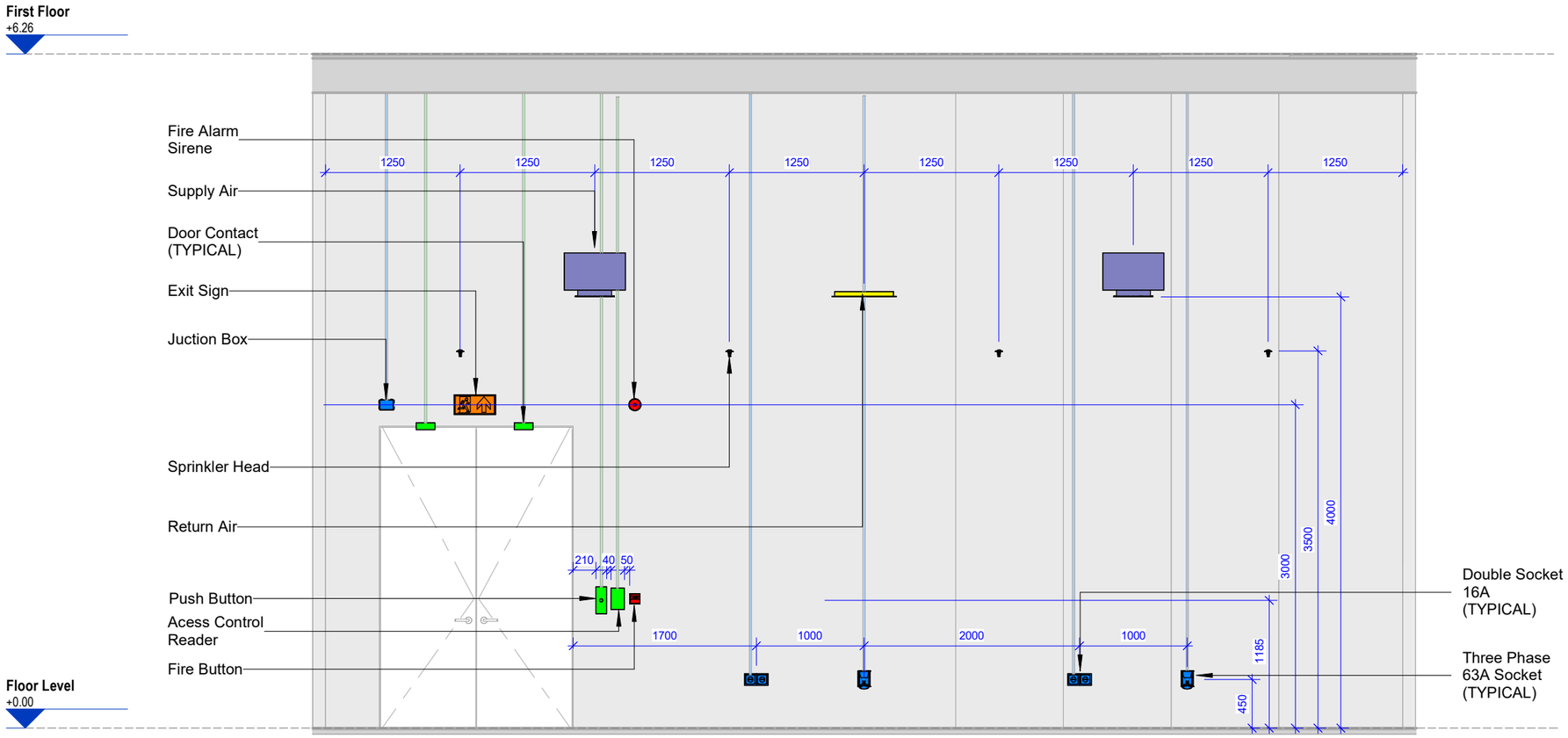

A Section - Tech Area - Right
1 : 50

Legend

	Security Devices
	Fire Devices
	Small Power Devices
	Lighting Devices
	Data Devices
	Mechanical Heating
	Emergency Lighting
	Supply Air
	Return Air
	Exhaust Air

Abbreviations

Code	Description
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DESIGN & BUILD CONTRACTOR:

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CTS GROUP PARTNER:

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DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
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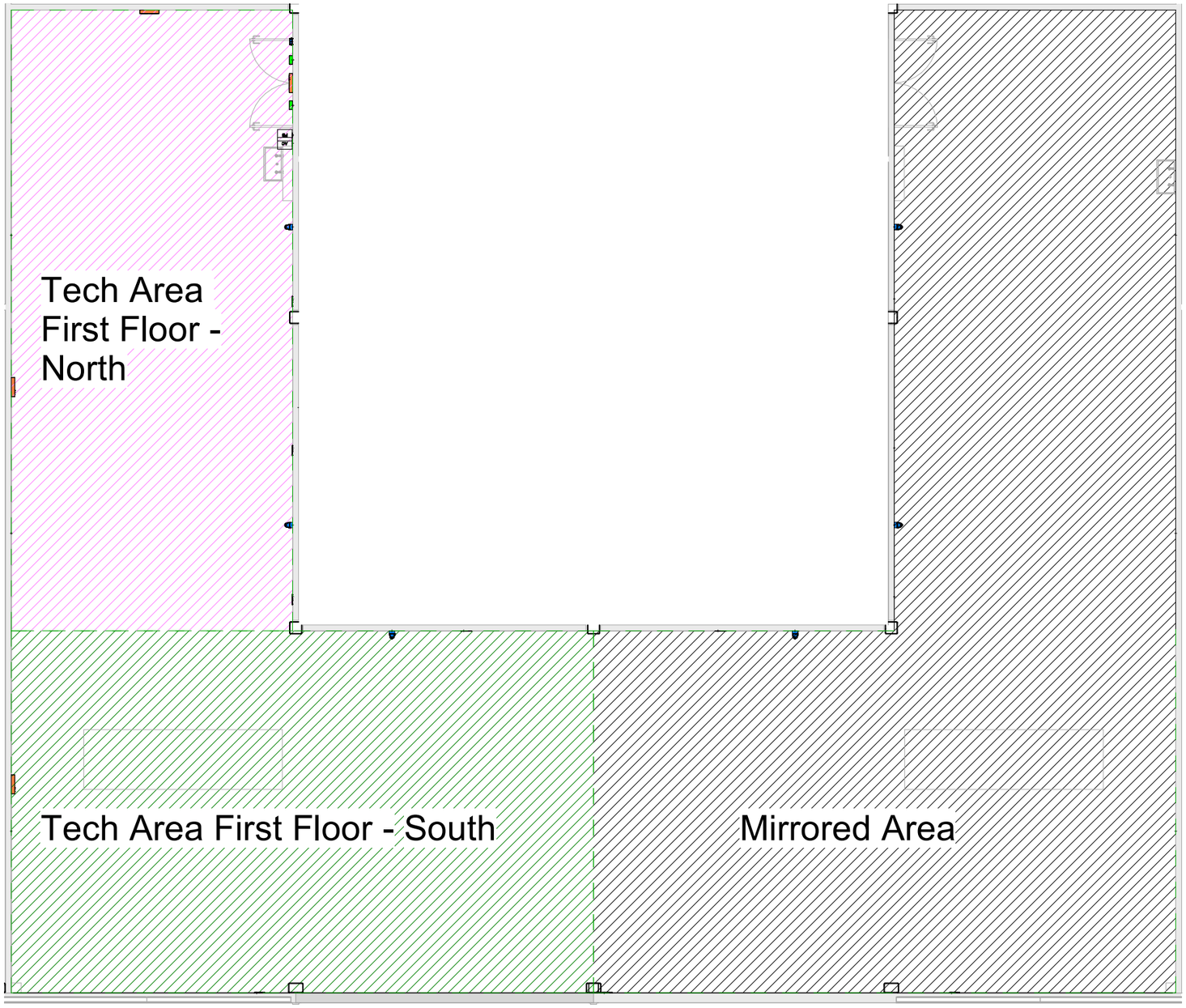

A Ground Floor Tech Area 1st Floor - Overview
1 : 100

Legend

- Security Devices
- Fire Devices
- Small Power Devices
- Lighting Devices
- Data Devices
- Mechanical Heating
- Emergency Lighting
- Supply Air
- Return Air
- Exhaust Air

Abbreviations

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P02	04.04.2024	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	LE	JM

DESIGN & BUILD CONTRACTOR:

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PROJECT NAME:

Execution Design and Engineering Requirements

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Revision 1	**AI**	**S2**

DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**

DRAWING NUMBER:	FORMAT:	REVISION:
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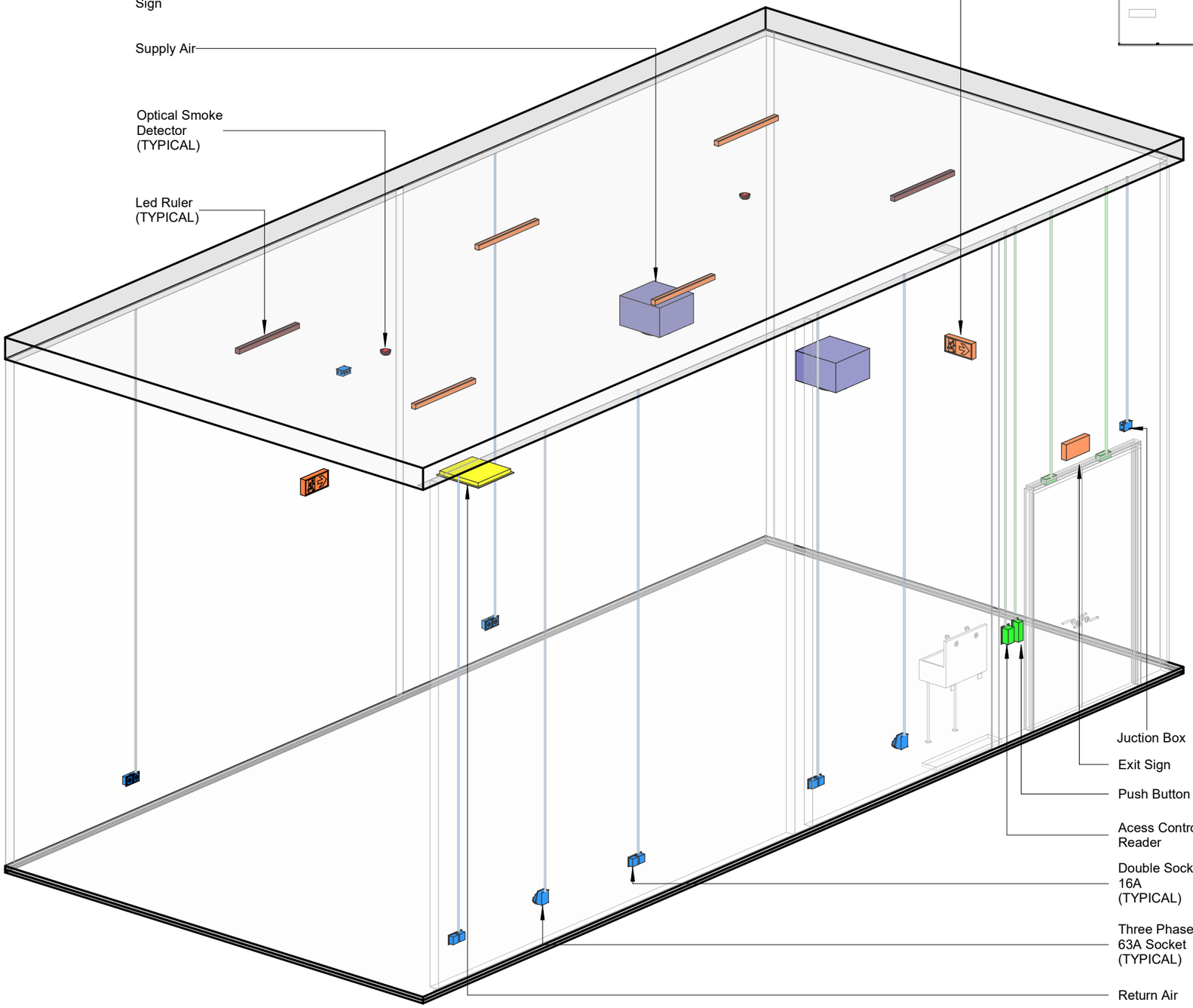
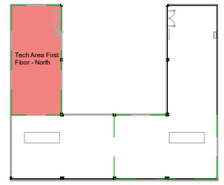


3D1 3D View Tech Area First Floor - North



Legend

- Security Devices
- Fire Devices
- Small Power Devices
- Lighting Devices
- Data Devices
- Mechanical Heating
- Emergency Lighting
- Supply Air
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P02	04.04.2024	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	LE	JM

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PROJECT NAME:

Execution Design and Engineering Requirements

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Combined Services - Rooms Tech Area First Floor - North - Page 2 of 9

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**AI**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**
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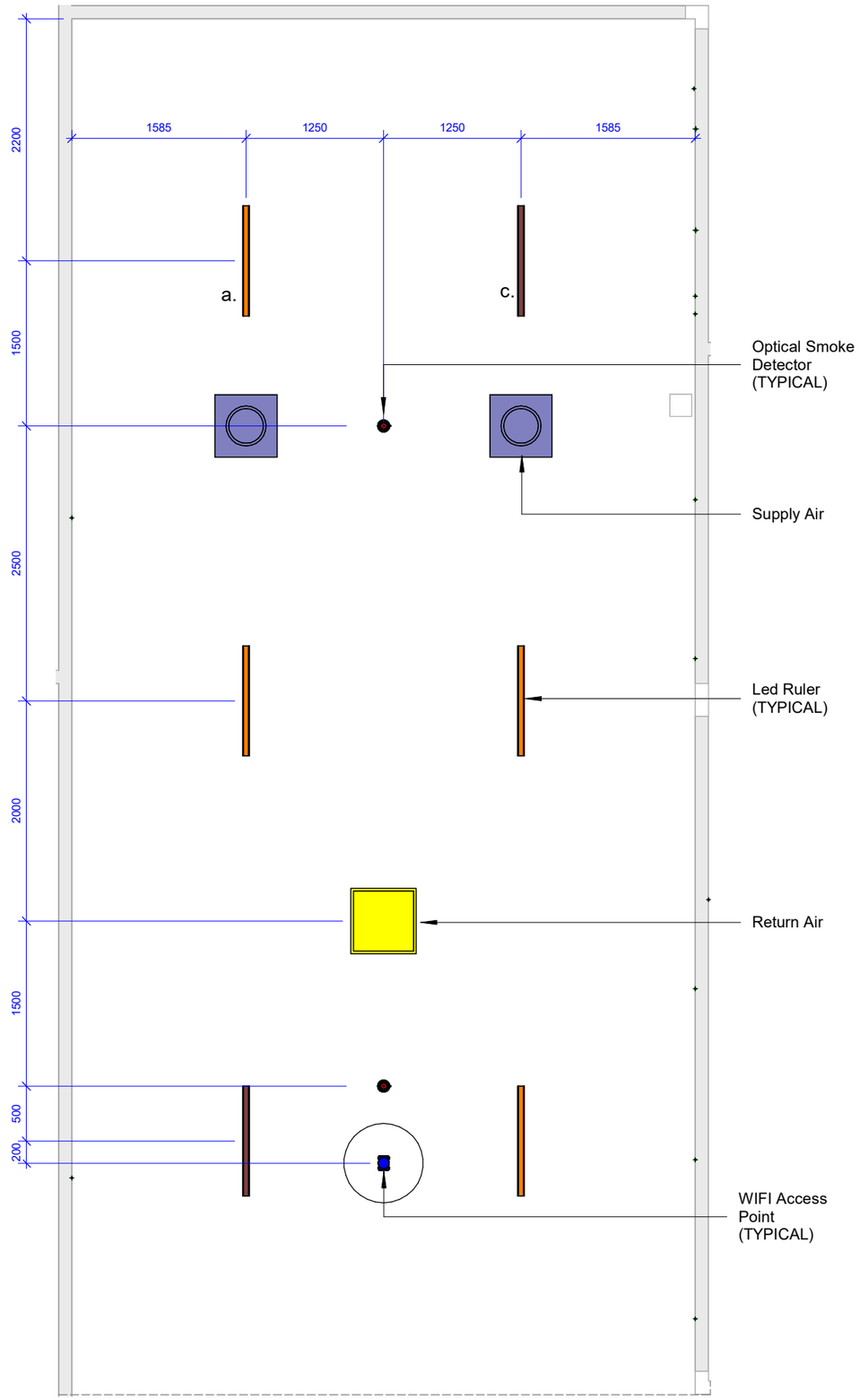
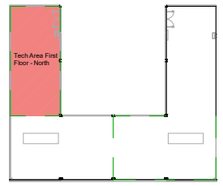


B Reflected Ceiling - Tech Area 1st Floor - North
1 : 50



Legend

- Security Devices
- Fire Devices
- Small Power Devices
- Lighting Devices
- Data Devices
- Mechanical Heating
- Emergency Lighting
- Supply Air
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P02	04.04.2024	Revision 1	JR	JM
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DESIGN & BUILD CONTRACTOR:

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PROJECT NAME:

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11.11.2024	**04.04.2024**	**JR**	**JM**

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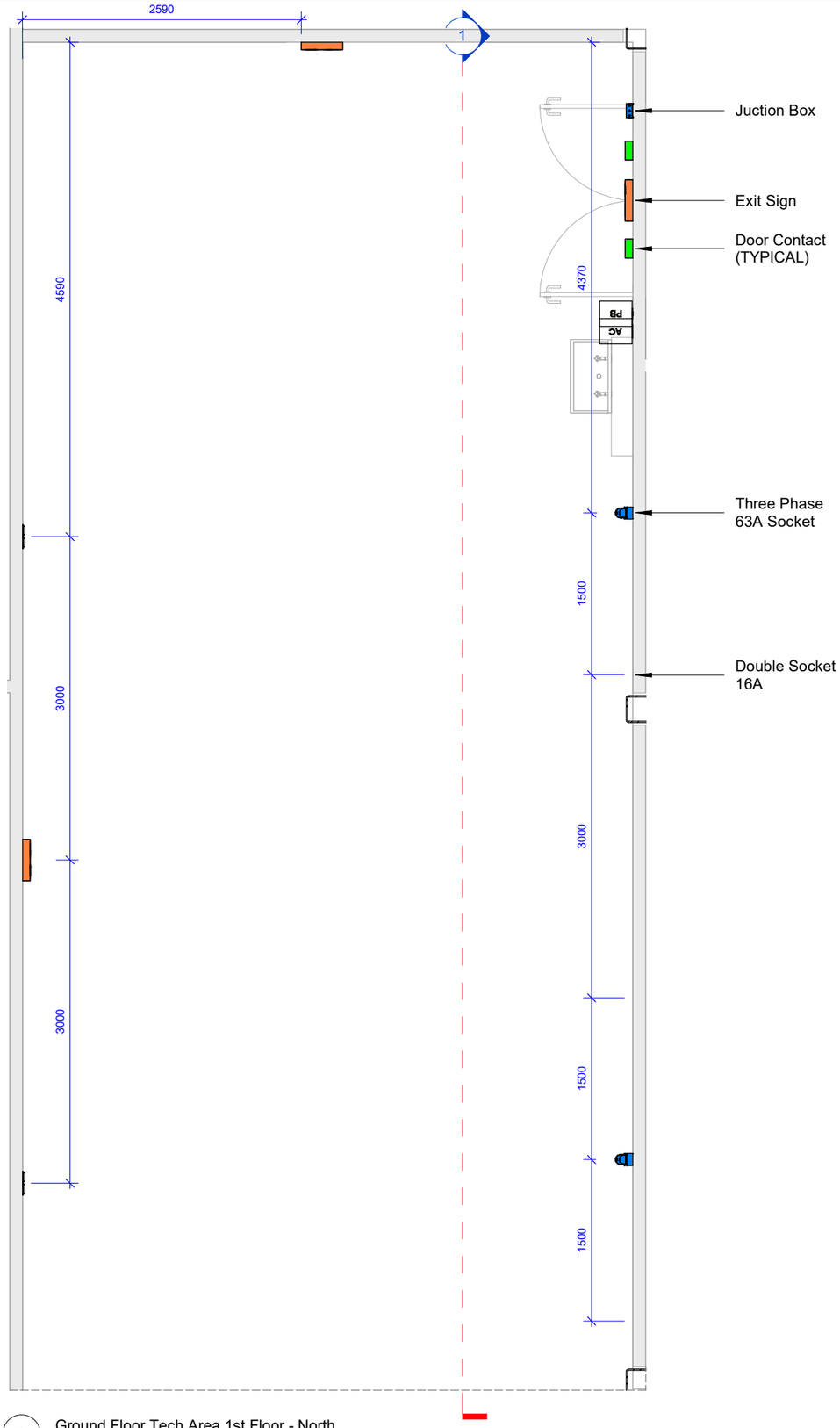
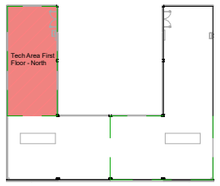


C Ground Floor Tech Area 1st Floor - North
1 : 50



Legend

- Security Devices
- Fire Devices
- Small Power Devices
- Lighting Devices
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P02	04.04.2024	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	LE	JM

DESIGN & BUILD CONTRACTOR:

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PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Combined Services - Rooms Tech Area First Floor - North - Page 4 of 9

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**AI**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**
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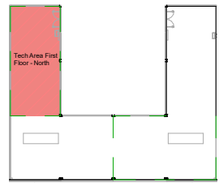

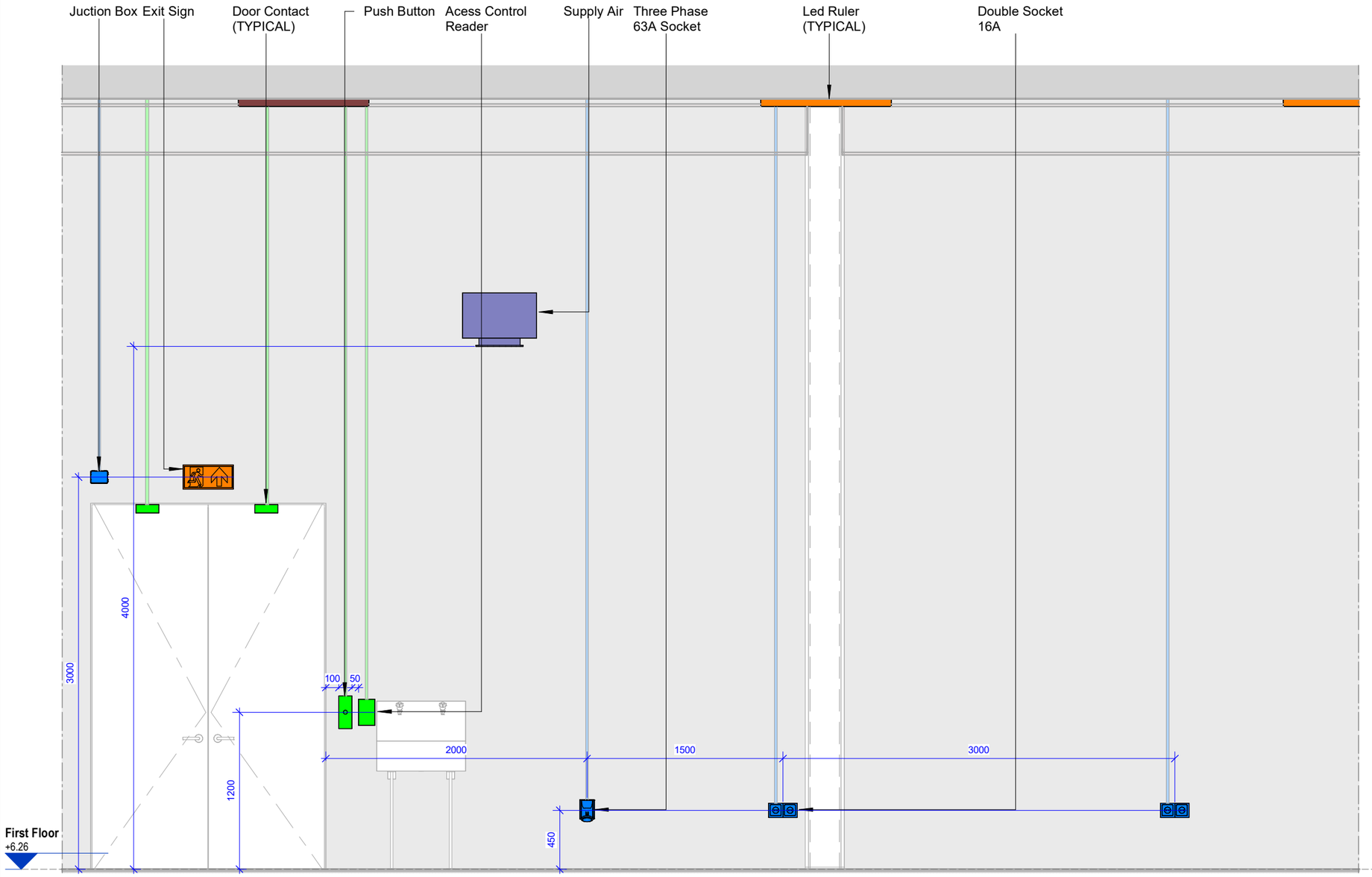

1 Section - Tech Area 1st Floor - North
1 : 35

Legend

- Security Devices
- Fire Devices
- Small Power Devices
- Lighting Devices
- Data Devices
- Mechanical Heating
- Emergency Lighting
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Rev	Date	Description	Sign.	Veri.
P02	04.04.2024	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	LE	JM

DESIGN & BUILD CONTRACTOR:

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PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Combined Services - Rooms Tech Area First Floor - North - Page 5 of 9

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Revision 1		**AI**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**
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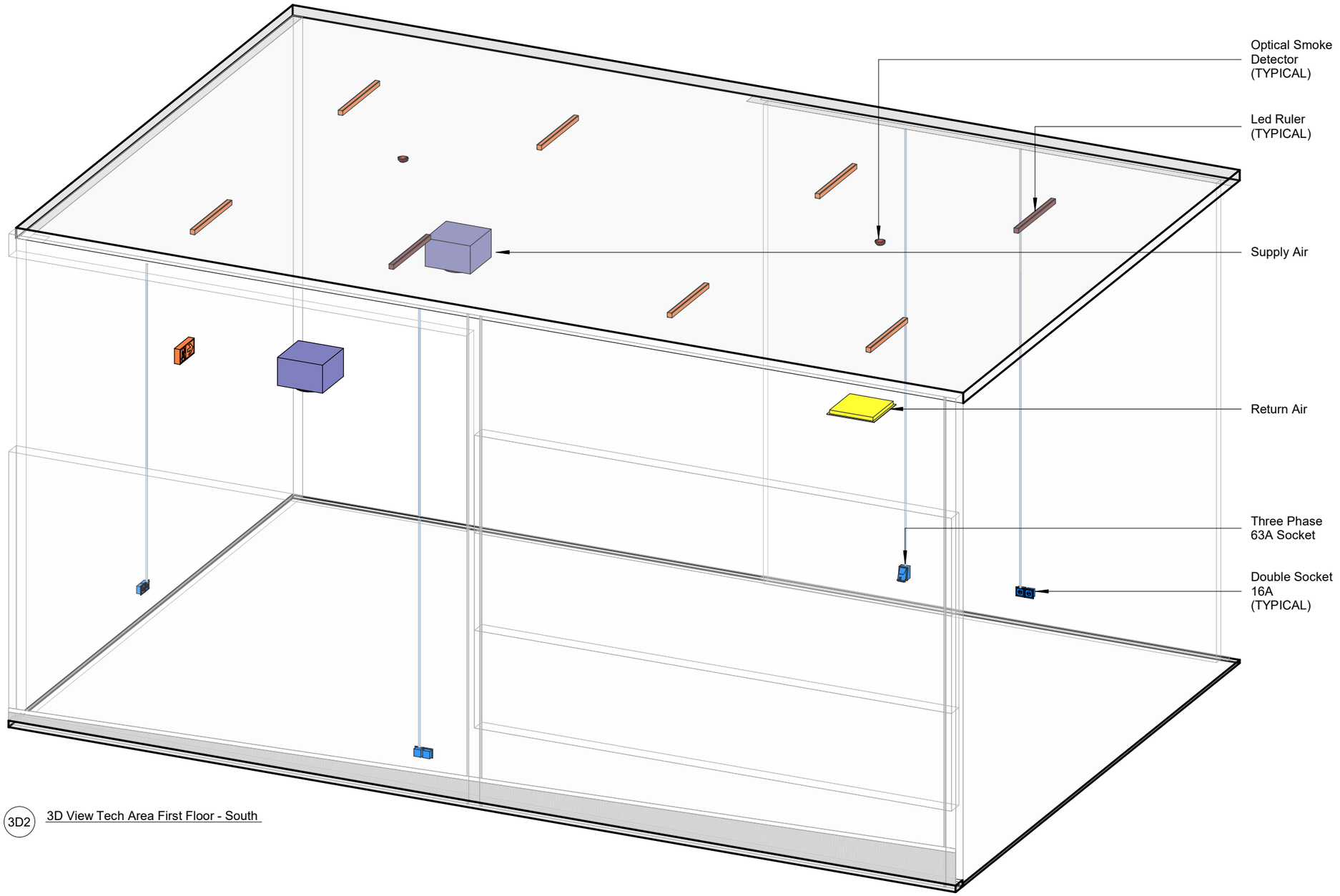
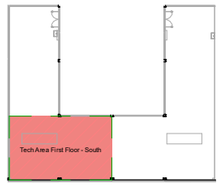


3D2 3D View Tech Area First Floor - South



Legend

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P01	11.11.2024	Issued for Information	LE	JM

DESIGN & BUILD CONTRACTOR:

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CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Combined Services - Rooms Tech Area First Floor - South - Page 6 of 9

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Revision 1	**AI**	**S2**

DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**

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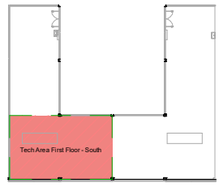

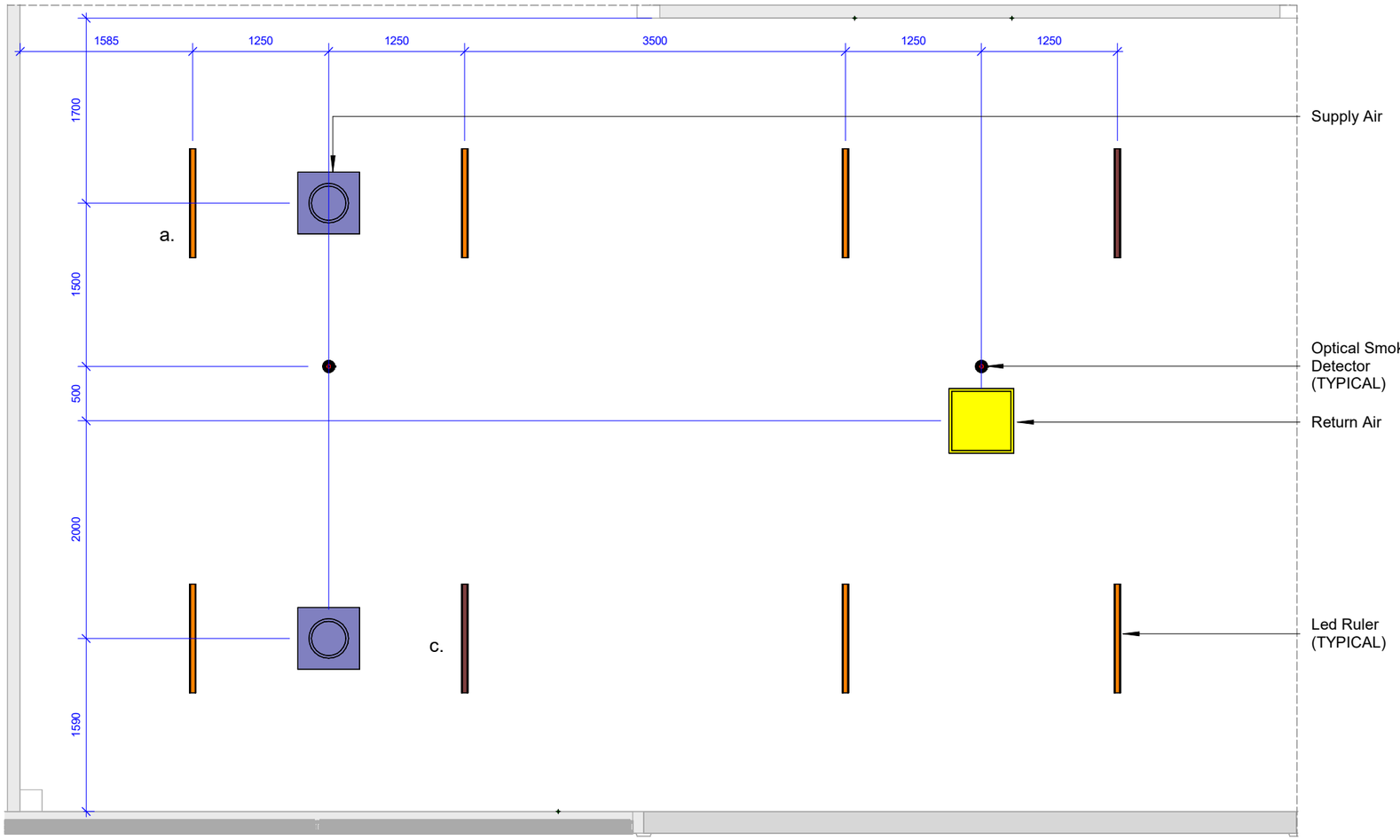

D Reflected Ceiling - Tech Area 1st Floor - South
1 : 50

Legend

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- Fire Devices
- Small Power Devices
- Lighting Devices
- Data Devices
- Mechanical Heating
- Emergency Lighting
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DESIGN & BUILD CONTRACTOR:

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BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Combined Services - Rooms Tech Area First Floor - South - Page 7 of 9

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**AI**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
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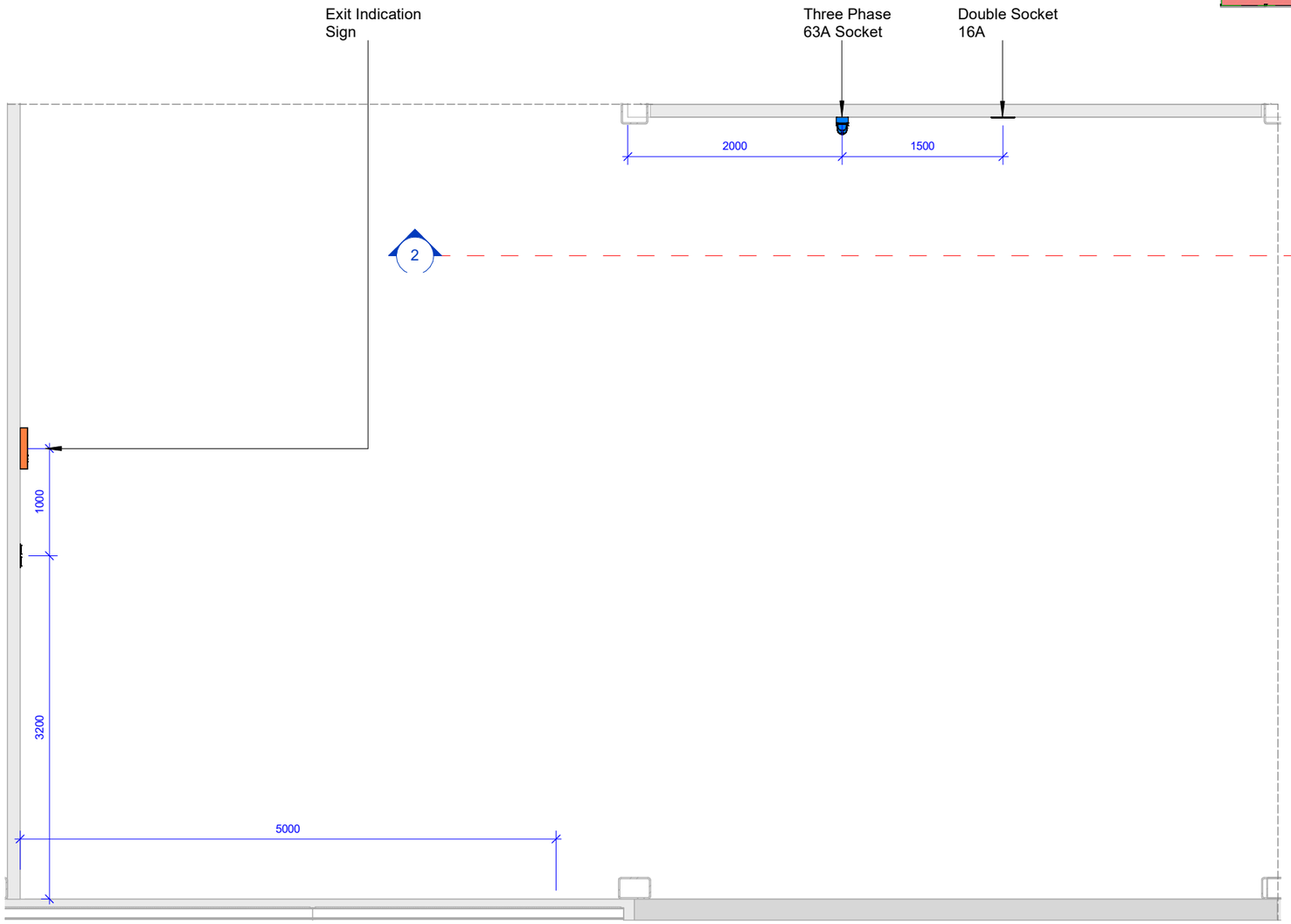
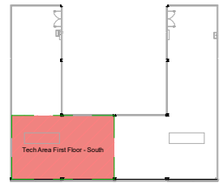
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-J-62380		**A3**	**P02**





E Ground Floor Tech Area 1st Floor - South
1 : 50

Legend

- Security Devices
- Fire Devices
- Small Power Devices
- Lighting Devices
- Data Devices
- Mechanical Heating
- Emergency Lighting
- Supply Air
- Return Air
- Exhaust Air

Abbreviations

Code	Description
DC	Door Contact
AC	Access Control Card Reader
FAS	Flashing Beacon with Siren
MCP	Manual Alarm Call Point
ACMS	Door-Holding Magnets
JB	Junction Box
PB	Push Button for automatic Doors
AI	As Indicated

General Notes

1. All dimensions are in millimeters unless otherwise noted.
2. Align Sockets by Light Switch, whenever it is possible.
3. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.
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5. All elevations are in regards to the Finished Floor Level unless otherwise noted.

Rev	Date	Description	Sign.	Veri.
P02	04.04.2024	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	LE	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Combined Services - Rooms Tech Area First Floor - South - Page 8 of 9

DRAWING STATUS:	SCALE:	STATUS:
Revision 1	**AI**	**S2**

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DRAWING NUMBER:	FORMAT:	REVISION:
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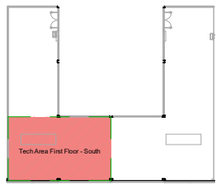

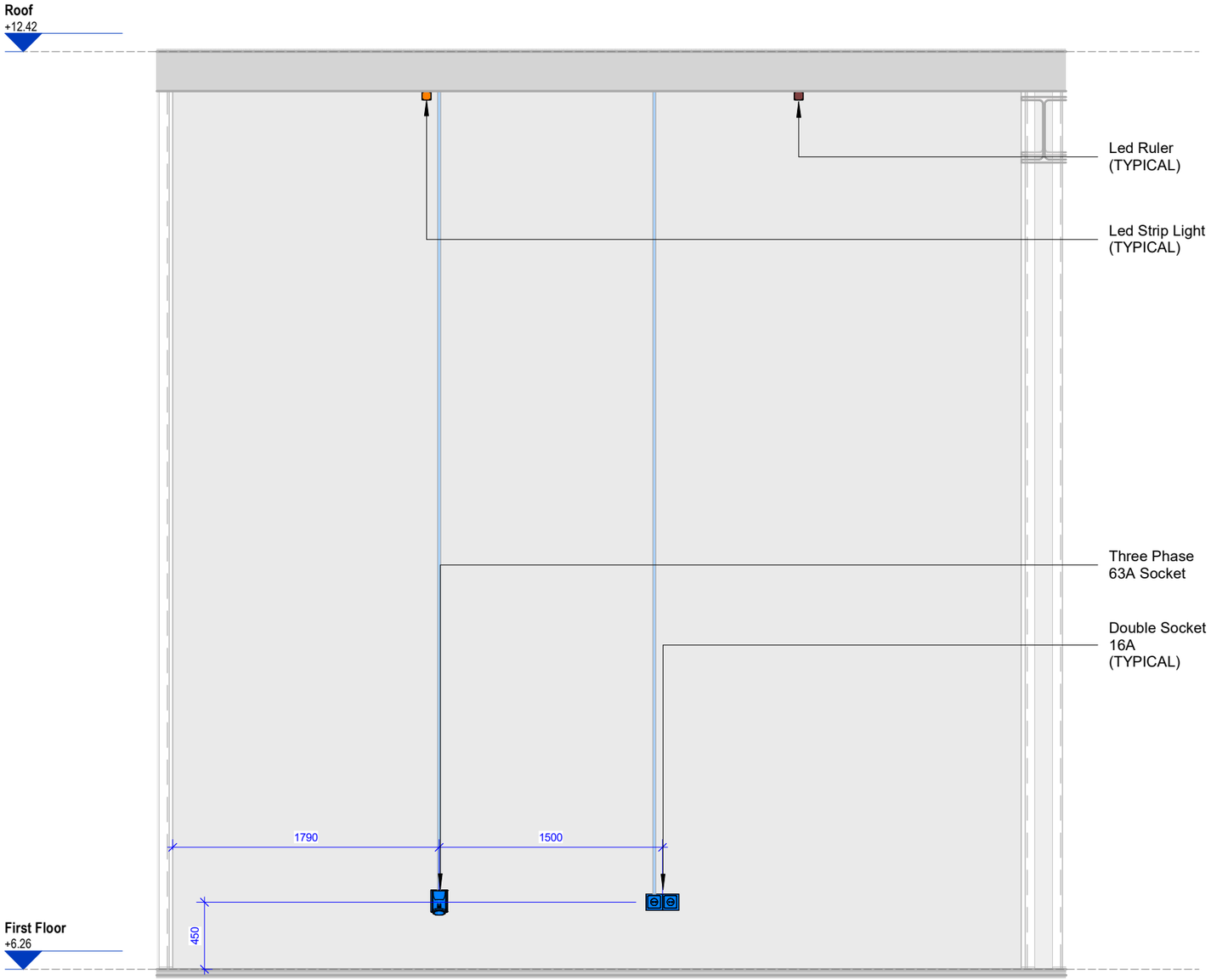

2 Section - Tech Area First Floor - South
1 : 35

Legend

- Security Devices
- Fire Devices
- Small Power Devices
- Lighting Devices
- Data Devices
- Mechanical Heating
- Emergency Lighting
- Supply Air
- Return Air
- Exhaust Air

Abbreviations

Code	Description
DC	Door Contact
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P02	04.04.2024	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	LE	JM

DESIGN & BUILD CONTRACTOR:

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PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Combined Services - Rooms Tech Area First Floor - South - Page 9 of 9

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**AI**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**
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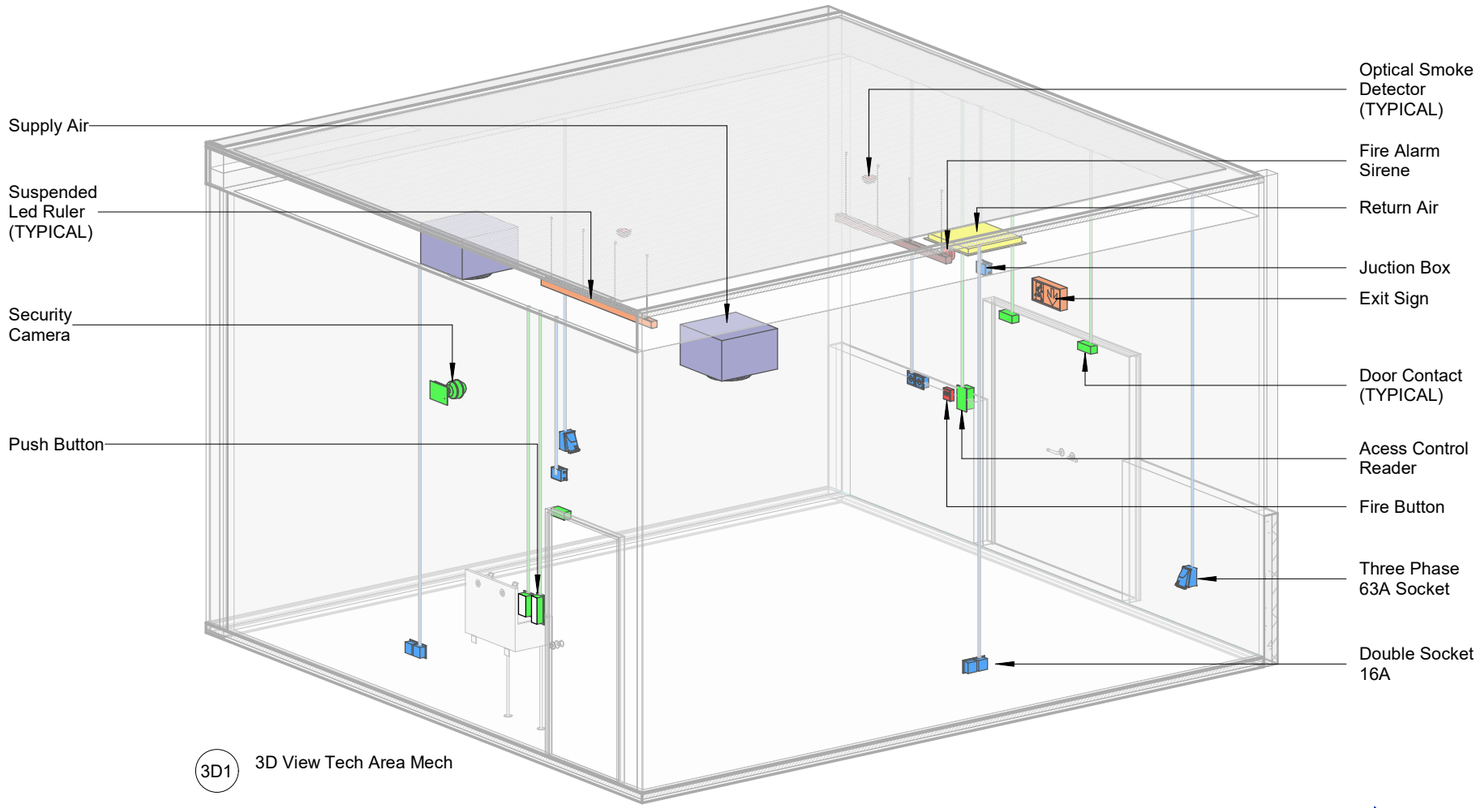
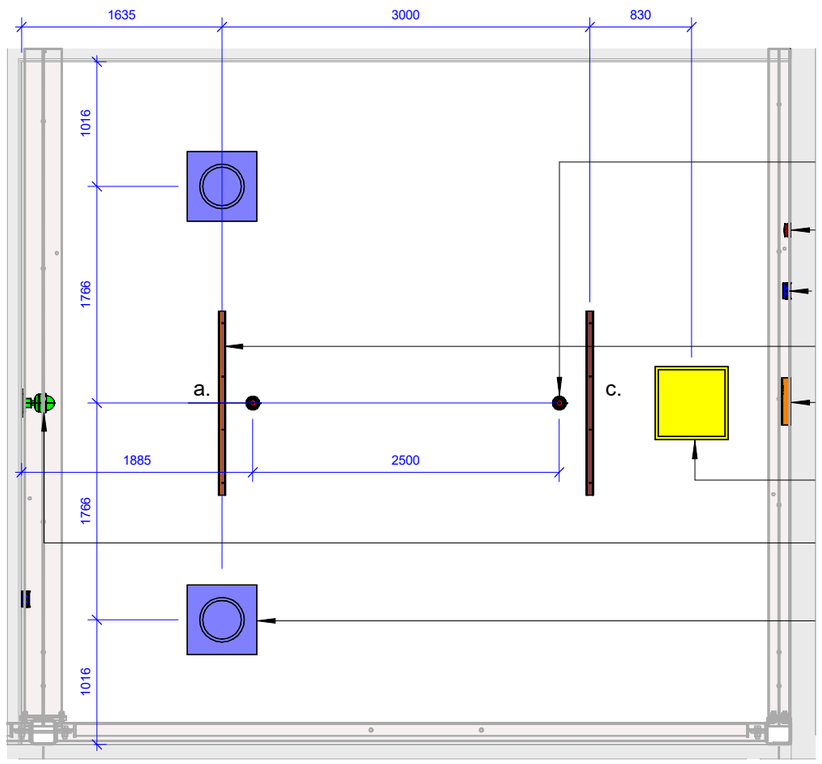
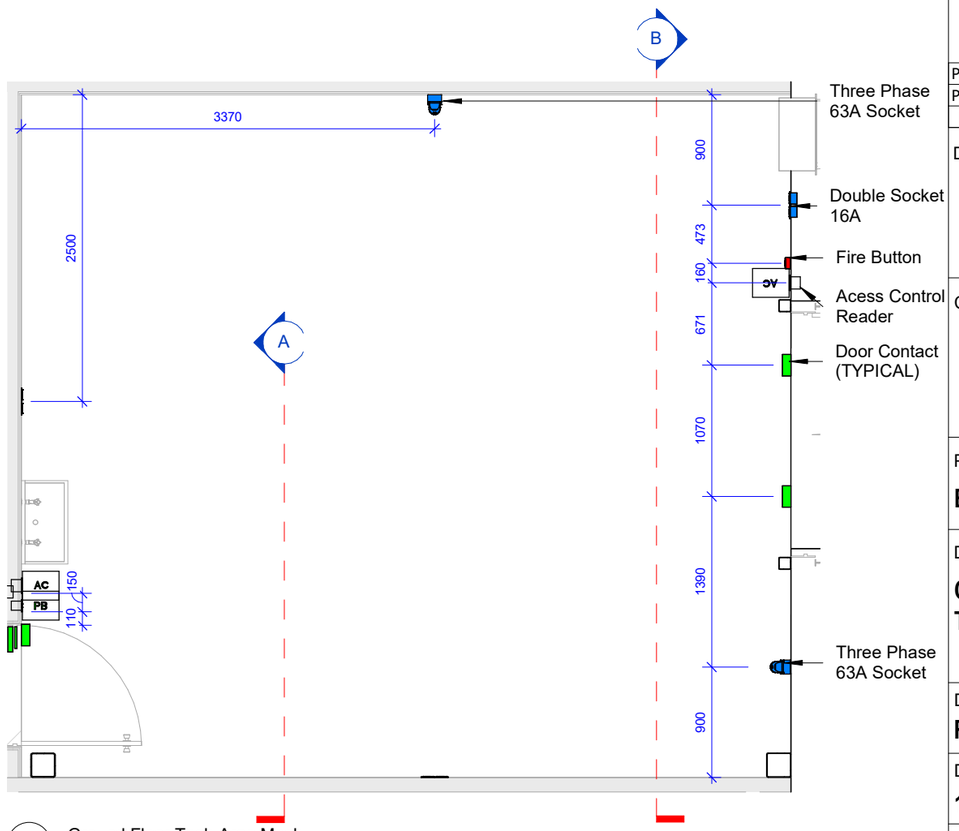


3D1 3D View Tech Area Mech



1 Reflected Ceiling - Tech Area Mech
1 : 50



2 Ground Floor Tech Area Mech
1 : 50

Legend

- Security Devices
- Fire Devices
- Small Power Devices
- Lighting Devices
- Data Devices
- Mechanical Heating
- Emergency Lighting
- Supply Air
- Return Air
- Exhaust Air

Abbreviations

Code	Description
DC	Door Contact
AC	Access Control Card Reader
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5. All elevations are in regards to the Finished Floor Level unless otherwise noted.

Specific Notes

a. LED with motion detector.
b. Heat and optical smoke detector - One detector at low level and one at high level. To be aligned vertically on site. Displayed separate for better visibility
c. Emergency Lighting

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P02	04.04.2024	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	LE	JM

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CTS GROUP PARTNER:

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PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Combined Services - Rooms Tech Area Mech - Page 1 of 2

DRAWING STATUS:	SCALE:	STATUS:
Revision 1	**AI**	**S2**

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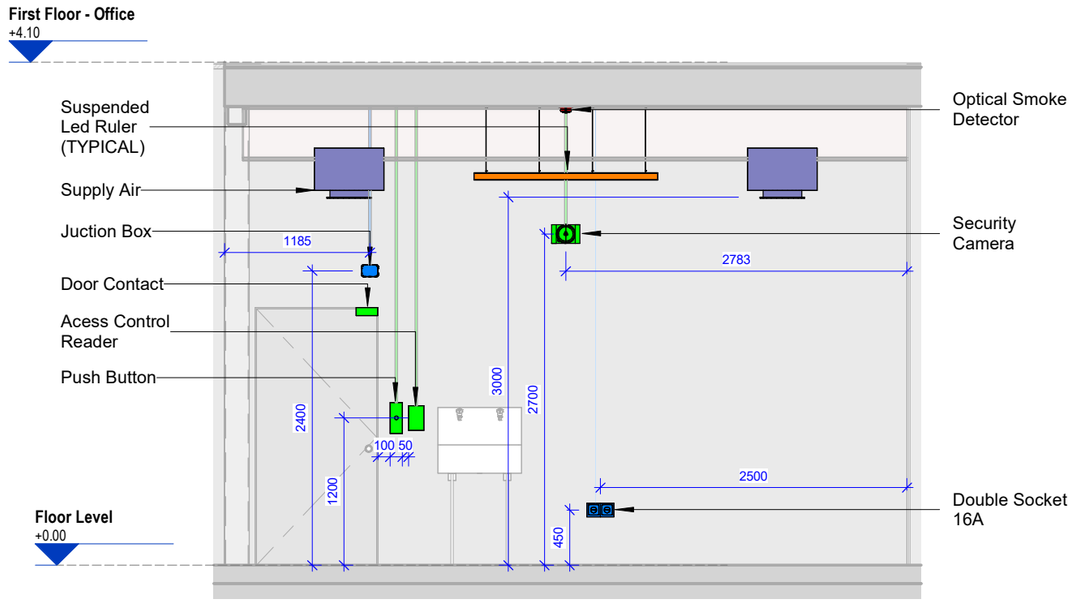
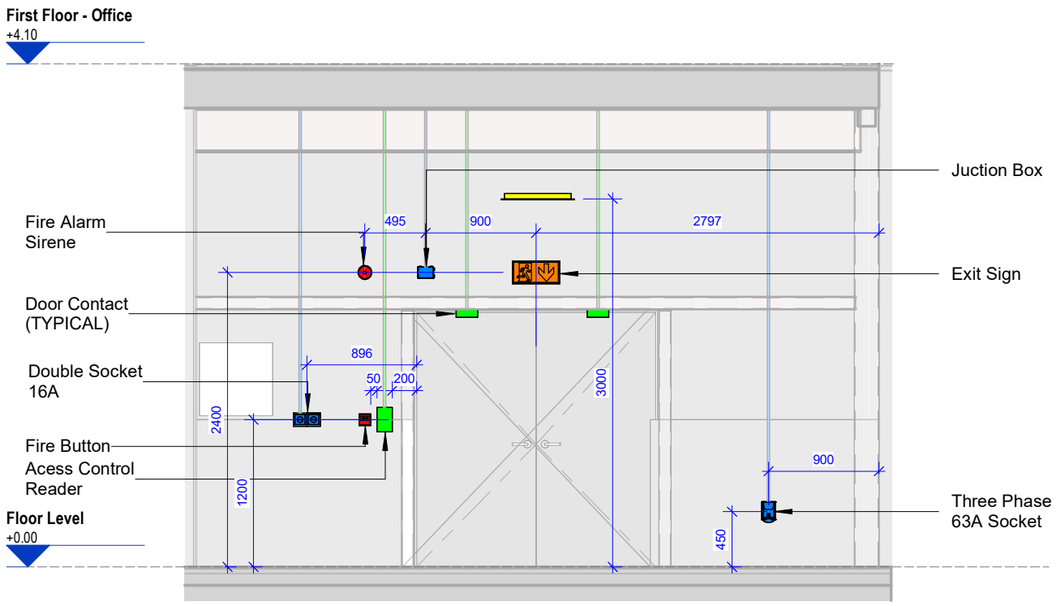
11.11.2024	**04.04.2024**	**JR**	**JM**

DRAWING NUMBER:	FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-J-62326	**A3**	**P02**



A Section -Tech Area Mech - Left
1 : 50



B Section -Tech Area Mech - Right
1 : 50

Legend

- Security Devices
- Fire Devices
- Small Power Devices
- Lighting Devices
- Data Devices
- Mechanical Heating
- Emergency Lighting
- Supply Air
- Return Air
- Exhaust Air

Abbreviations

Code	Description
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DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Combined Services - Rooms
Tech Area Mech - Page 2 of 2

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**AI**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**
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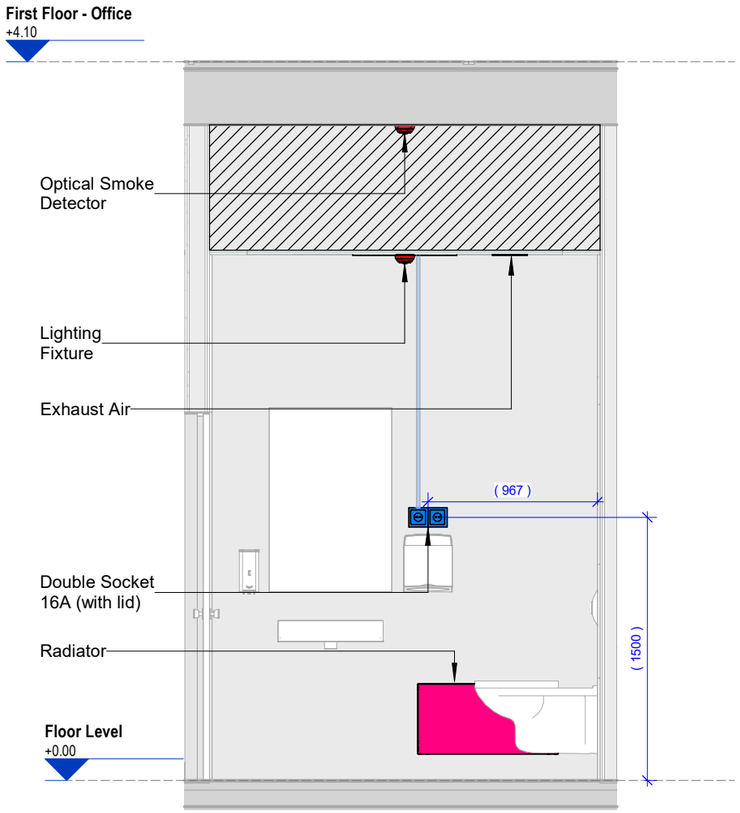
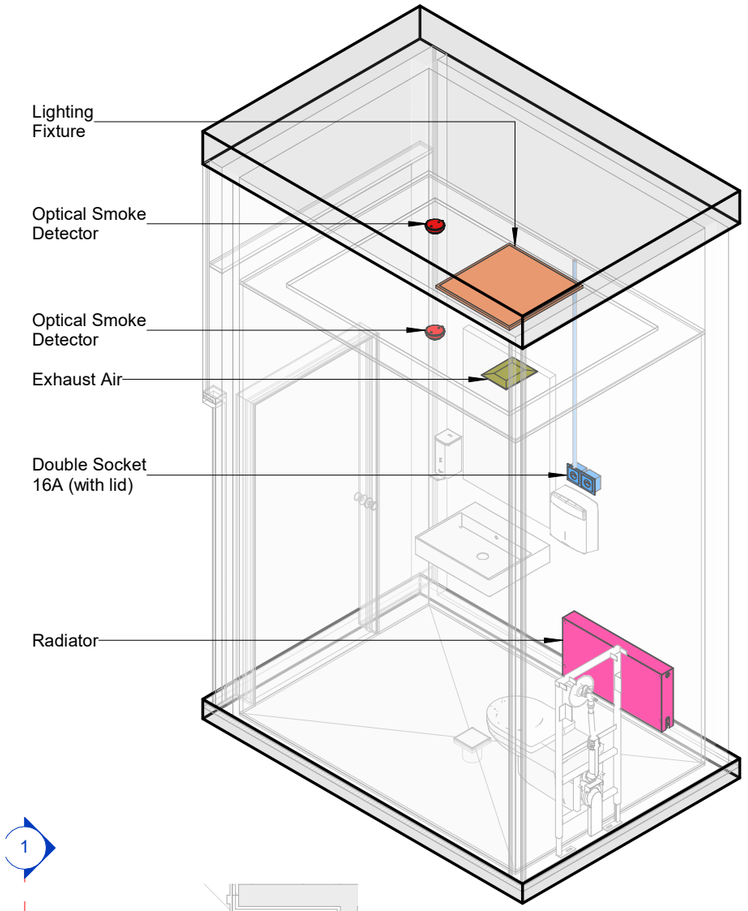
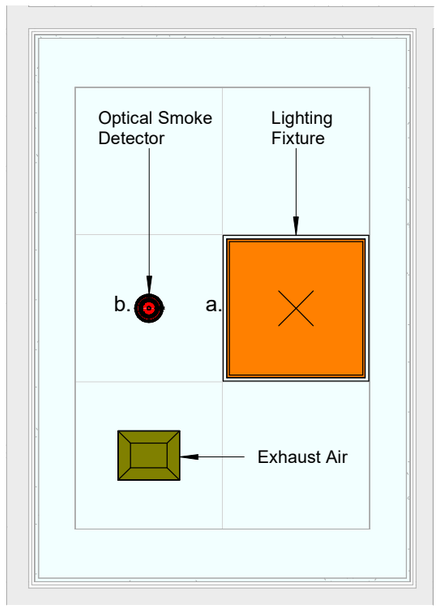


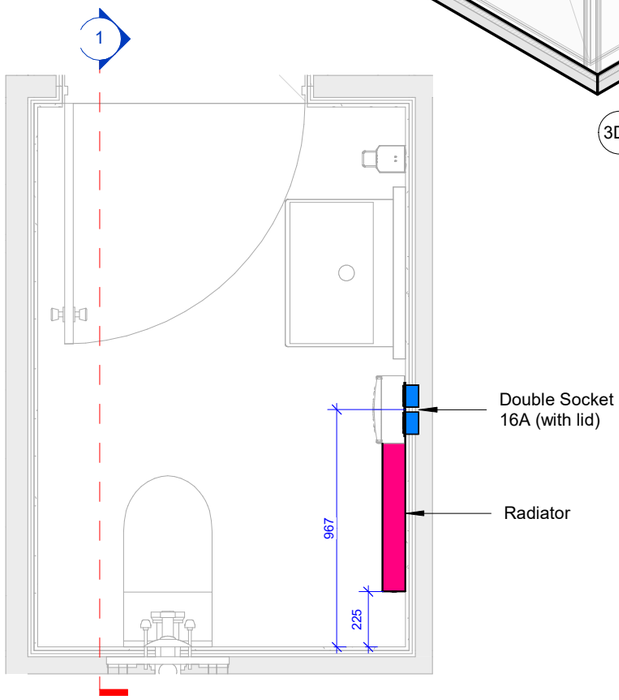
1 Section - WC
1 : 35



3D1 3D View - WC



A Reflected Ceiling GF - WC
1 : 25



B Ground Floor - WC
1 : 25

Legend

- Security Devices
- Fire Devices
- Small Power Devices
- Lighting Devices
- Data Devices
- Mechanical Heating
- Emergency Lighting
- Supply Air
- Return Air
- Exhaust Air

Abbreviations

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DESIGN & BUILD CONTRACTOR:

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CTS GROUP PARTNER:

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PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Combined Services - Rooms
WC - Page 1 of 1

DRAWING STATUS:		SCALE:	STATUS:
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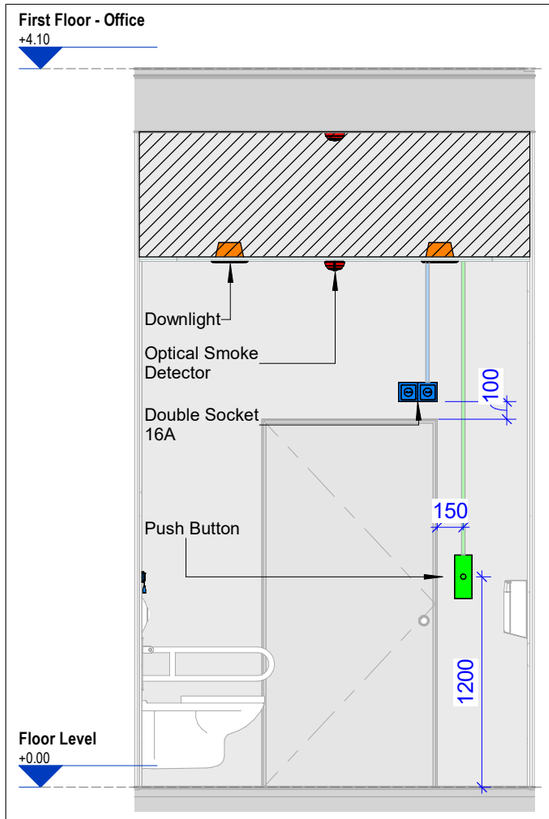
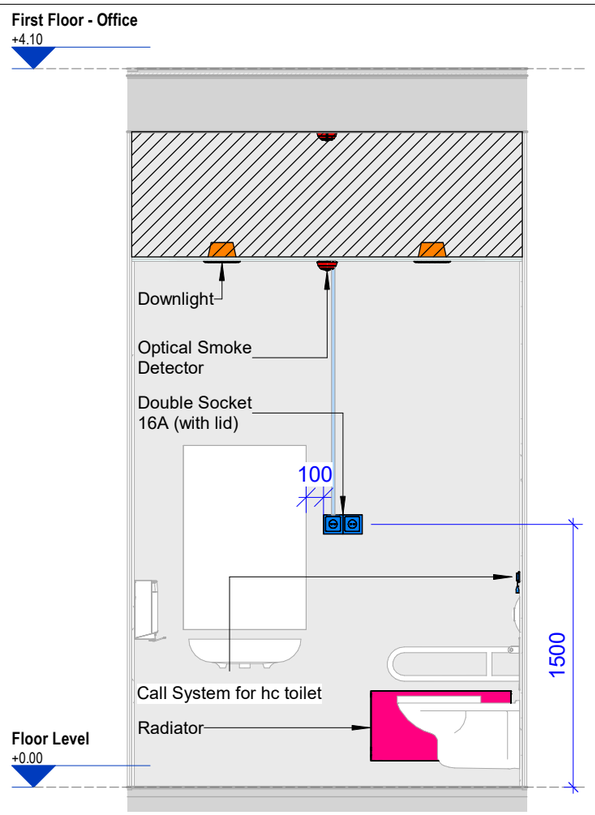
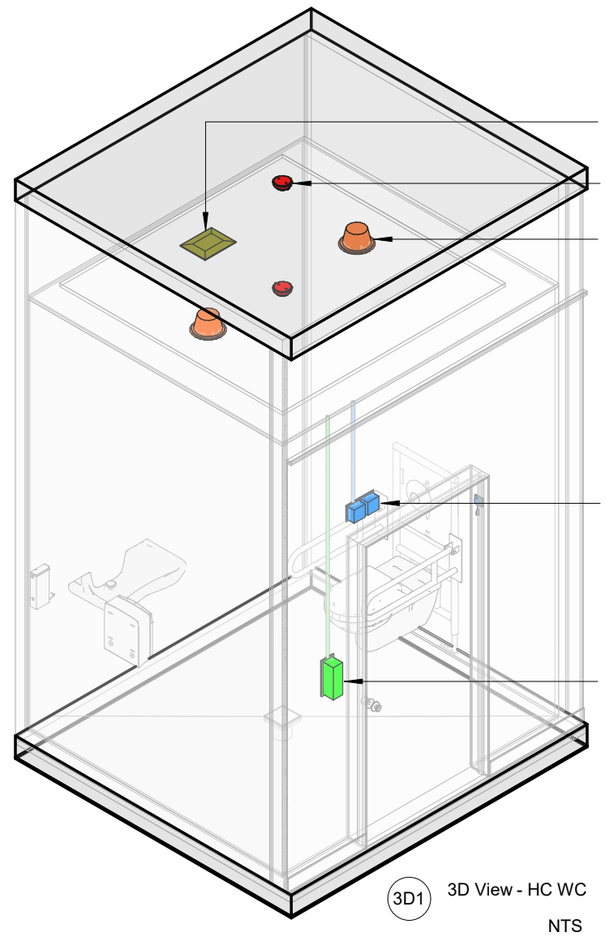


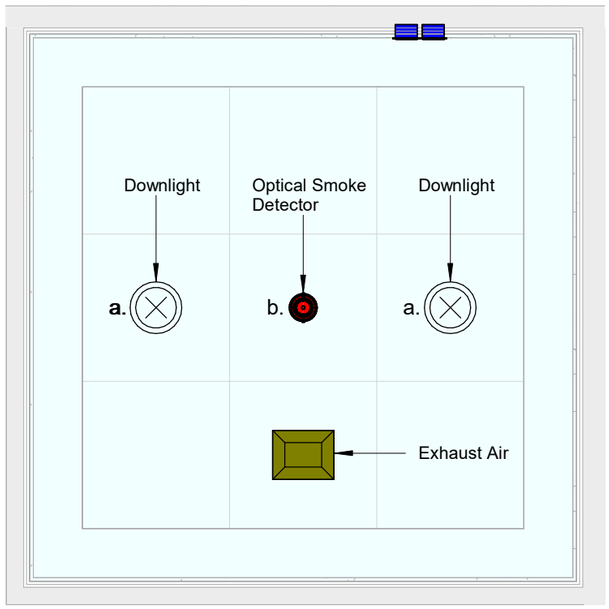
1 Section - HC WC - Front
1 : 35



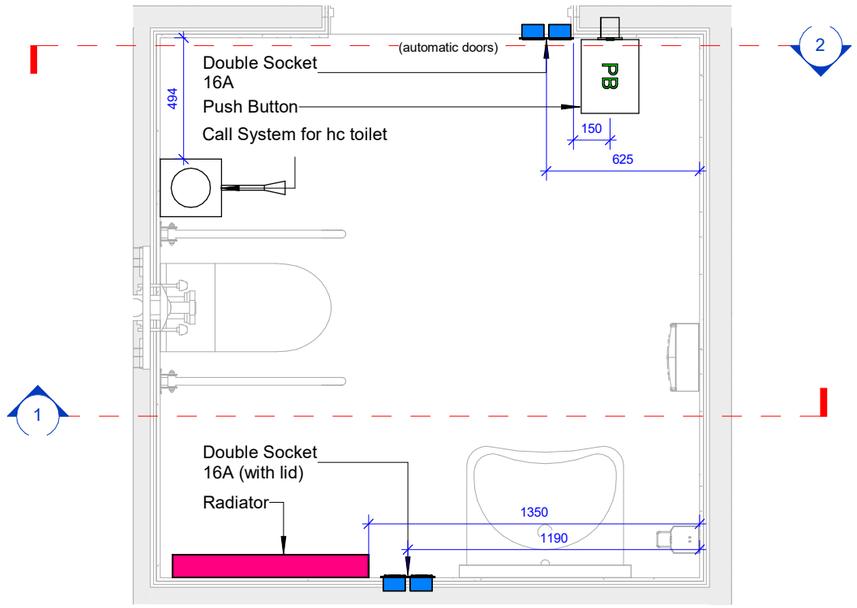
2 Section - HC WC - Back
1 : 35



3D1 3D View - HC WC
NTS



A Reflected Ceiling - Ground Floor
1 : 25



B Ground Floor - HC WC
1 : 25

Legend

	Security Devices
	Fire Devices
	Small Power Devices
	Lighting Devices
	Data Devices
	Mechanical Heating
	Emergency Lighting
	Supply Air
	Return Air
	Exhaust Air

Abbreviations

Code	Description
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DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

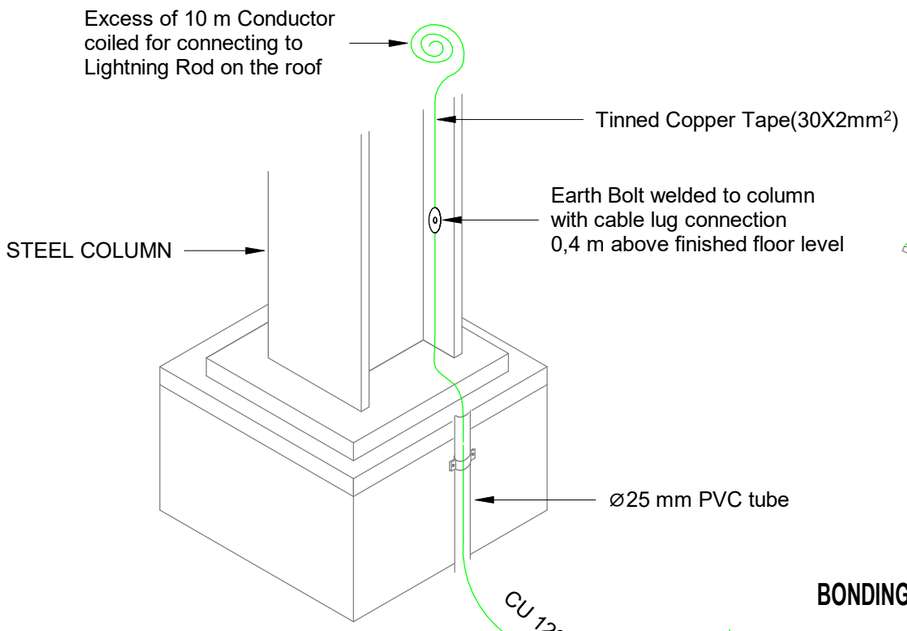
Combined Services - Rooms
HC WC - Page 1 of 1

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**AI**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-J-62303		**A3**	**P02**

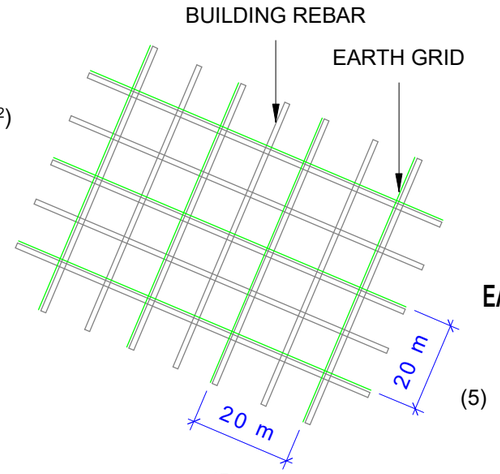
4.1. MEP Installation Detail – Earthing

Purpose: this chapter showcases Underground Earthing Grid Typical Design to ensure that the Datacentre and its' occupants are protected against any touch and step potentials, which might occur due to the MV and LV Electrical Infrastructure, as well as providing effective means for all Earth Fault and Earth Leakage Protection to operate.

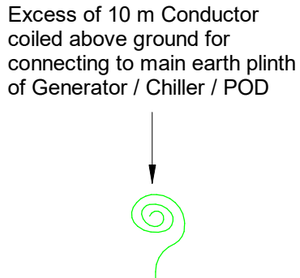
EARTHING CONNECTION TO MAIN METALLIC STRUCTURES (Building / Gantry)



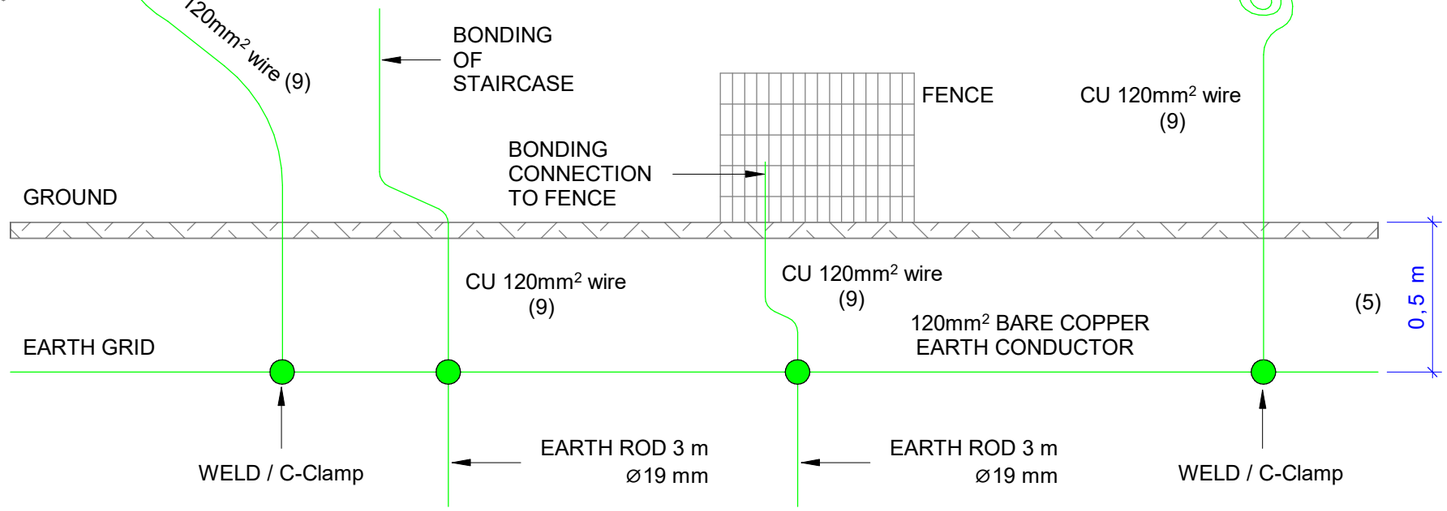
BUILDING REBAR VS EARTH GRID (3)



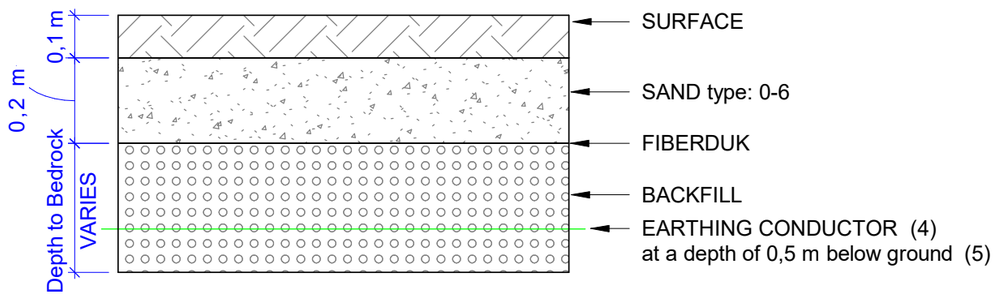
EARTHING CONNECTION TO MAIN EQUIPMENT (Generator / Chiller / POD)



BONDING OF PERIMETER FENCE / STAIRCASE (6)



BACKFILL ARRANGEMENT WITH EARTHING CONDUCTOR



Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.
3. All connections to earth grid must be done using exothermic welds. Unless weather impacts resulting in bad joints, C-clamps can be used. A mesh network of 20 m by 20 m (max) (approximately) is to be implemented to minimise step potential issues on site.
4. In some cases the earth conductor is surrounded by some sand (to prevent the earth conductor being damaged) with a fiberduk under (to keep the sand from falling through the backfill).
5. These dimensions can vary due to specific conditions / project.
6. Earth rods installed every 20 m. Non-conductive fence sections installed every 20 m with each conductive section only bonded to a single earth rod. All conductive fence panels to be connected using 16 mm² insulated green yellow copper bonding conductor.
7. Earth rods are to be driven for each and every down conductor used for the lightning protection. Earth rods are to be a minimum of 3 m in length (> 3.5 m deep).
8. Earthing conductor can be installed above the foundation blocks and underneath the building slab. Connections above the ground floor can be installed on cable trays.
9. The wire section depends on the total power of the Data Center. To be validated according to the earthing study (can be adjustable in function of earth grid).
10. Exothermic welds will be used for all connection between earth grid cable and earth rods unless otherwise agreed with the client.
11. All bonds between the earth grid and the reber building reinforcement will be achieved using exothermic welds unless otherwise agreed with the client.
12. Please refer to IEC 60364.

Rev	Date	Description	Sign.	Veri.
P02	04.04.2024	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	JR	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

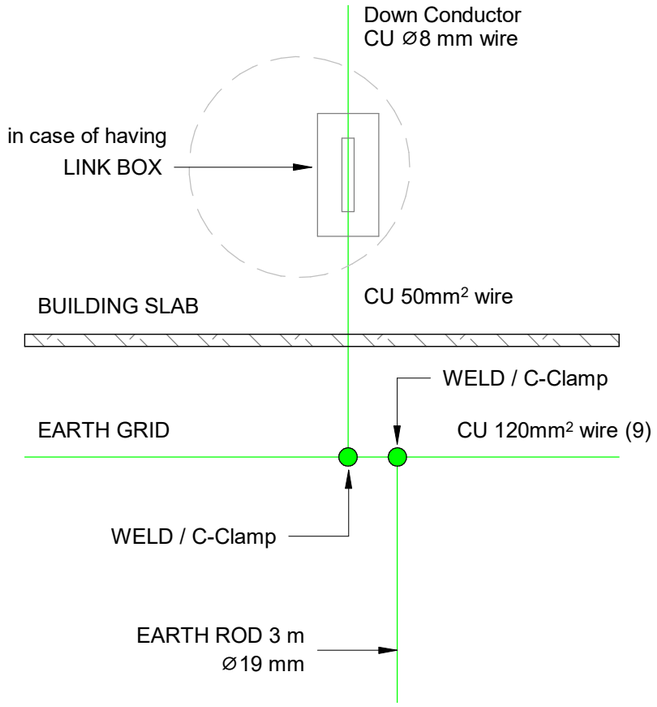
DRAWING NAME:

Earthing
Earthing Connection to Metallic Structures and Equipments

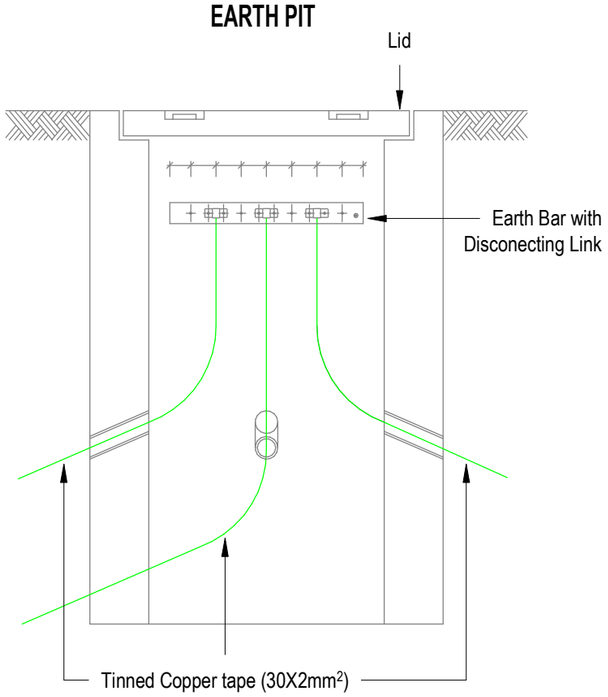
DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-J-63511		**A3**	**P02**

EARTH ELECTRODES FOR LIGHTNING PROTECTION

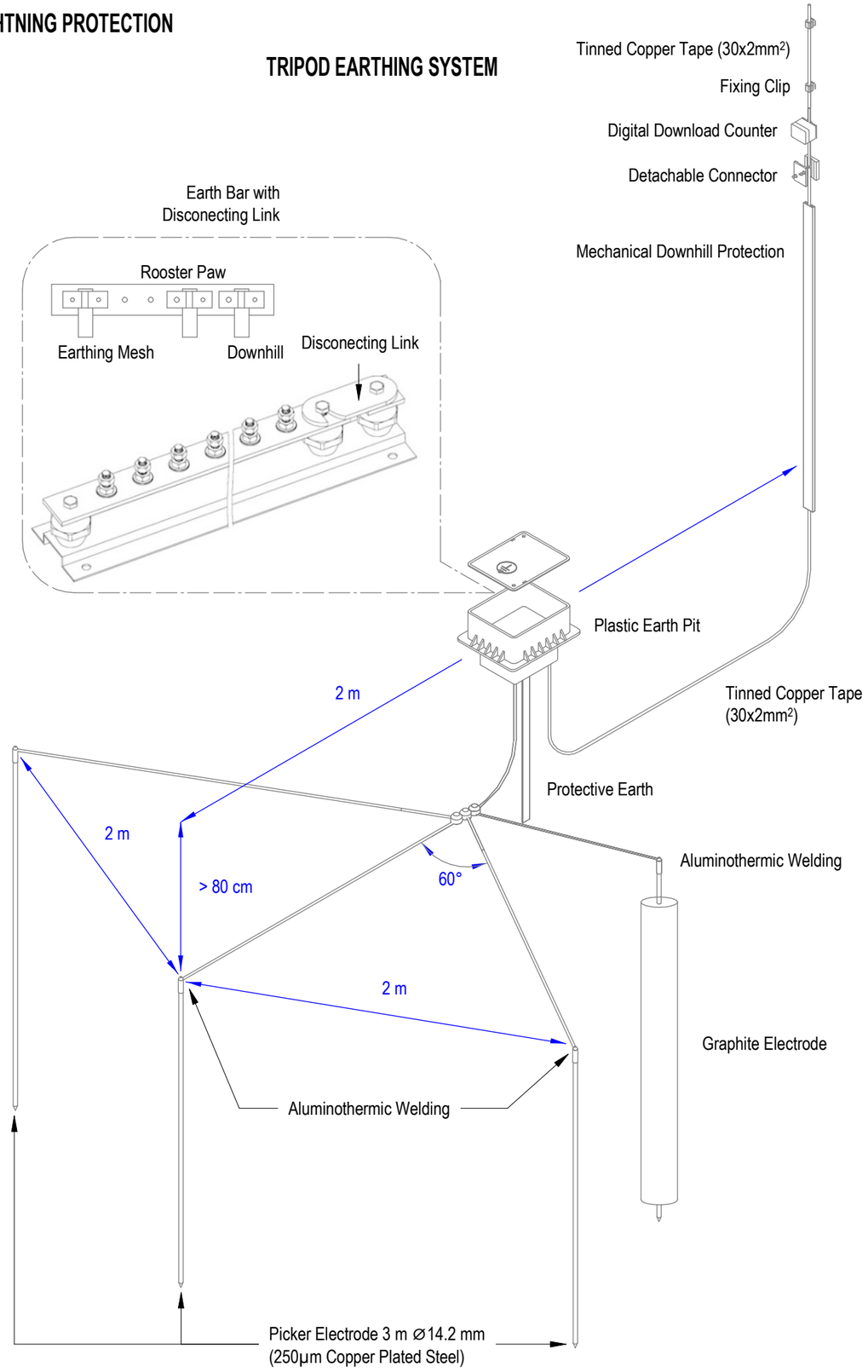
TYPICAL DOWN HILL



EARTH PIT



TRIPOD EARTHING SYSTEM



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DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

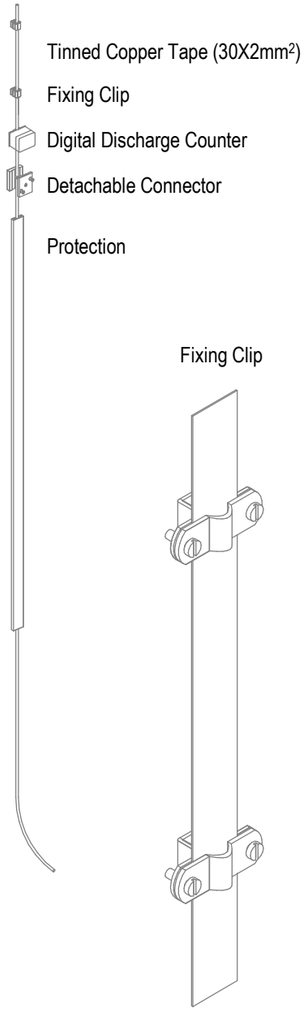
DRAWING NAME:

Earthing
Earth Electrodes for Lightning Protection

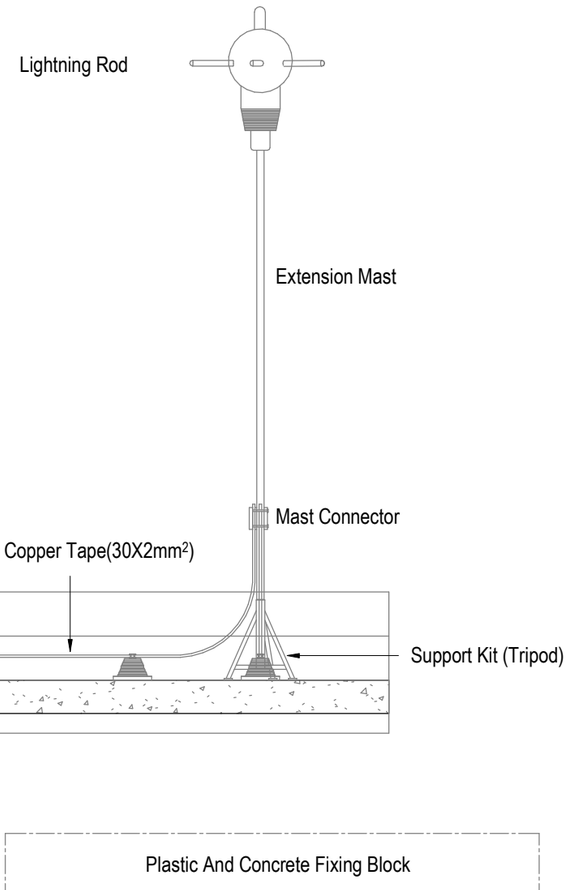
DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-J-63512		**A3**	**P02**

LIGHTNING ROD

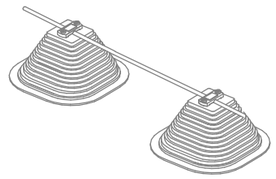
Downhill



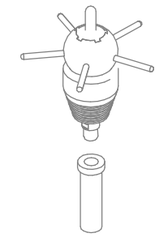
Lightning Rod



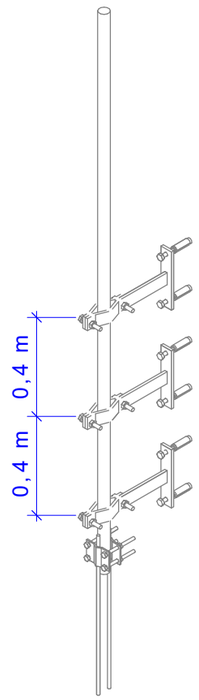
Plastic And Concrete Fixing Block



Lightning Rod Ioniflash Δt=60µs



Extension Mast Fixing



Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.
3. All connections to earth grid must be done using exothermic welds. Unless weather impacts resulting in bad joints, C-clamps can be used. A mesh network of 20 m by 20 m (max) (approximately) is to be implemented to minimise step potential issues on site.
4. In some cases the earth conductor is surrounded by some sand (to prevent the earth conductor being damaged) with a fiberduk under (to keep the sand from falling through the backfill).
5. These dimensions can vary due to specific conditions / project.
6. Earth rods installed every 20 m. Non-conductive fence sections installed every 20 m with each conductive section only bonded to a single earth rod. All conductive fence panels to be connected using 16 mm² insulated green yellow copper bonding conductor.
7. Earth rods are to be driven for each and every down conductor used for the lightning protection. Earth rods are to be a minimum of 3 m in length (> 3.5 m deep).
8. Earthing conductor can be installed above the foundation blocks and underneath the building slab. Connections above the ground floor can be installed on cable trays.
9. The wire section depends on the total power of the Data Center. To be validated according to the earthing study (can be adjustable in function of earth grid).
10. Exothermic welds will be used for all connection between earth grid cable and earth rods unless otherwise agreed with the client.
11. All bonds between the earth grid and the reber building reinforcement will be achieved using exothermic welds unless otherwise agreed with the client.
12. Please refer to IEC 60364.

Rev	Date	Description	Sign.	Veri.
P02	04.04.2024	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	JR	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

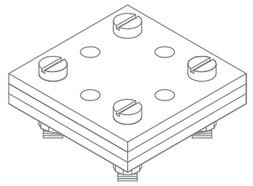
DRAWING NAME:

Earthing
Lightning Rod

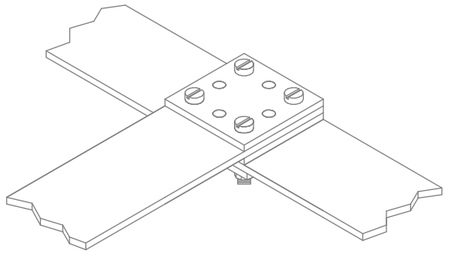
DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-J-63513		**A3**	**P02**

EARTH CONDUCTOR CONNECTIONS

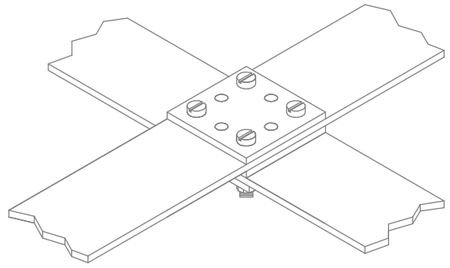
Tape-Tape Connector



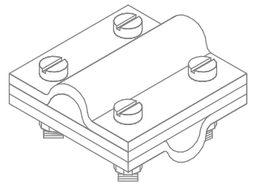
Tape-Tape Connection



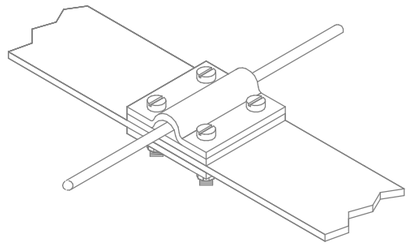
Tape-Tape Connection



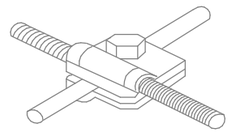
Cable-Cable Connector



Tape-Cable Connection



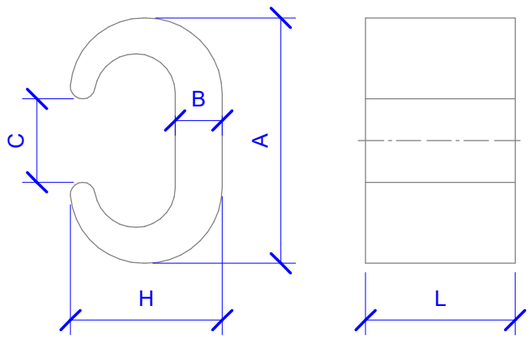
Connection (Bimetallic)
Structural Cable-Armor



C-CLAMP

A C-Clamp is a metallic connector in the shape of a "C" used to secure conductors (such as bare copper cables or grounding rods) safely, usually by crimping with a hydraulic tool or tightening with set screws.

Connector manufacturers (like Burndy, Panduit, Cembre, etc.) often provide technical charts indicating the values of the dimensions (A, B, C, H and L) for a suitable section of conductor.



Number of Crimps:
For crimp-type C-Clamps, the general practice (though always check the manufacturer's recommendations and local codes) is:

Conductor Size	Minimum Number of Crimps
Up to 35 mm²	1 crimp
From 50 mm² to 95 mm²	2 crimps
From 95 mm² to 120 mm²	3 crimps
Above 120 mm²	3 or more crimps

⚠ Important: The crimping tool (hydraulic, manual, etc.) and die mold must be compatible with both the connector and the cable. Incorrect use can compromise both the electrical and mechanical connection.

Connector manufacturers (like Burndy, Panduit, Cembre, etc.) often provide technical charts indicating the exact number of crimps required for each model.

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.
3. All connections to earth grid must be done using exothermic welds. Unless weather impacts resulting in bad joints, C-clamps can be used. A mesh network of 20 m by 20 m (max) (approximately) is to be implemented to minimise step potential issues on site.
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11. All bonds between the earth grid and the reber building reinforcement will be achieved using exothermic welds unless otherwise agreed with the client.
12. Please refer to IEC 60364.

Rev	Date	Description	Sign.	Veri.
P02	04.04.2024	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	JR	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

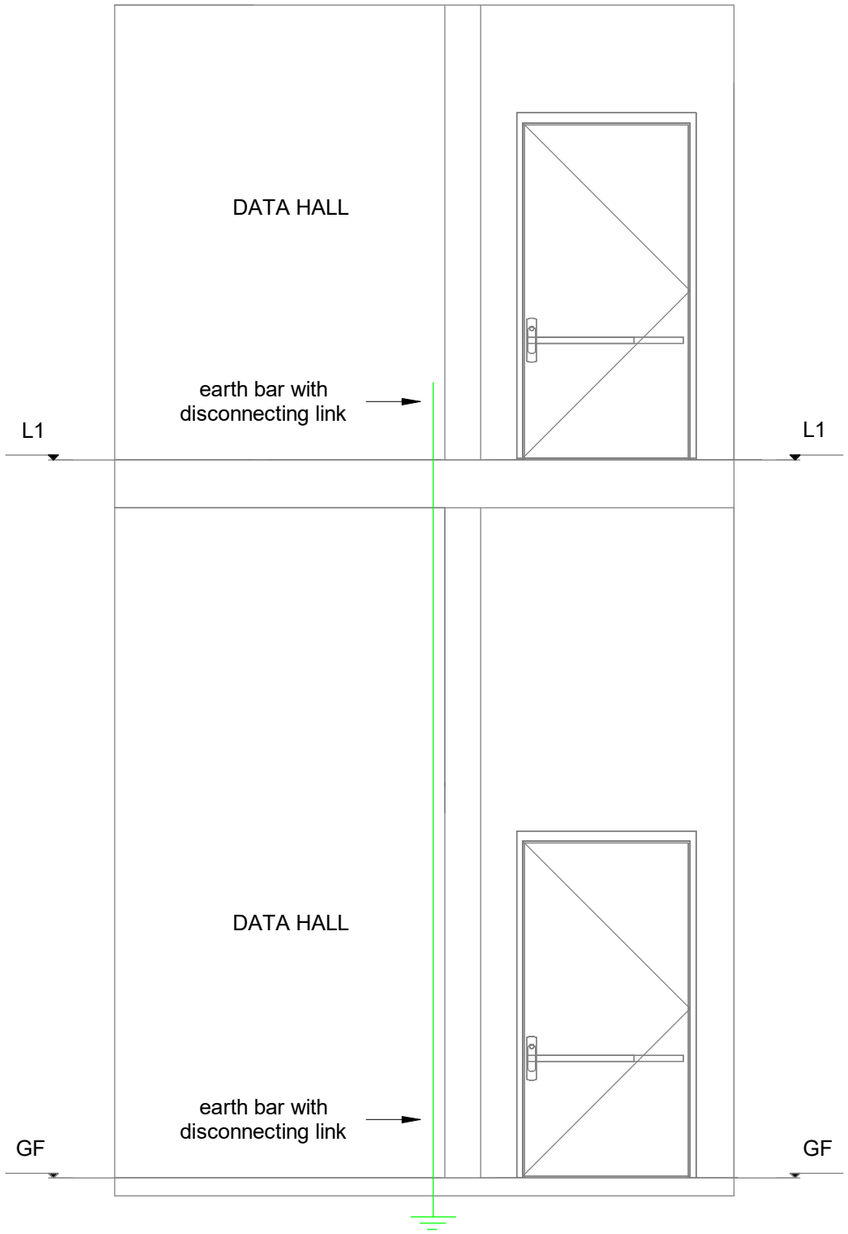
Execution Design and Engineering Requirements

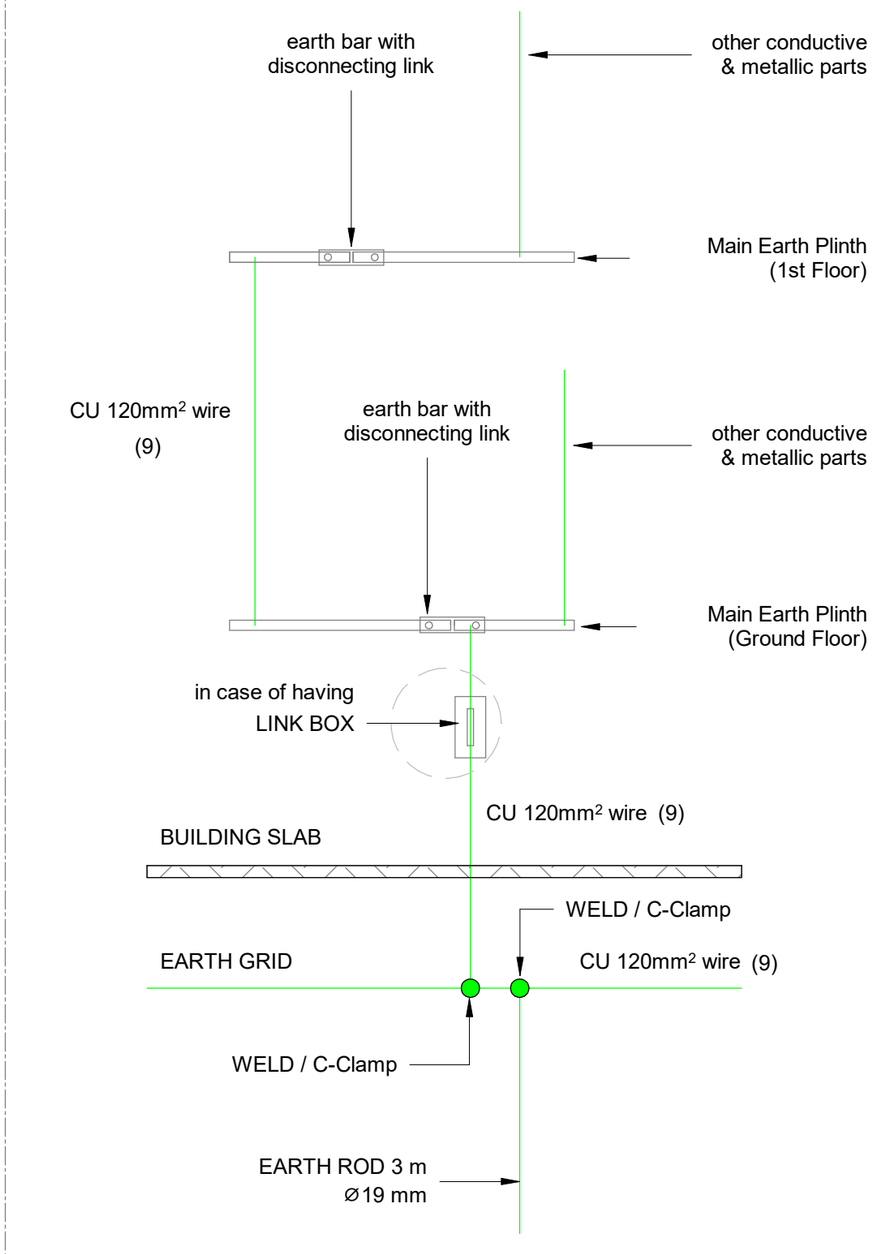
DRAWING NAME:

Earthing
Earth Conductor Connections

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-J-63514		**A3**	**P02**

PRINCIPLE FOR GETTING THE EARTHING UP TO 1F





Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.
3. All connections to earth grid must be done using exothermic welds. Unless weather impacts resulting in bad joints, C-clamps can be used. A mesh network of 20 m by 20 m (max) (approximately) is to be implemented to minimise step potential issues on site.
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12. Please refer to IEC 60364.

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P02	04.04.2024	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	JR	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

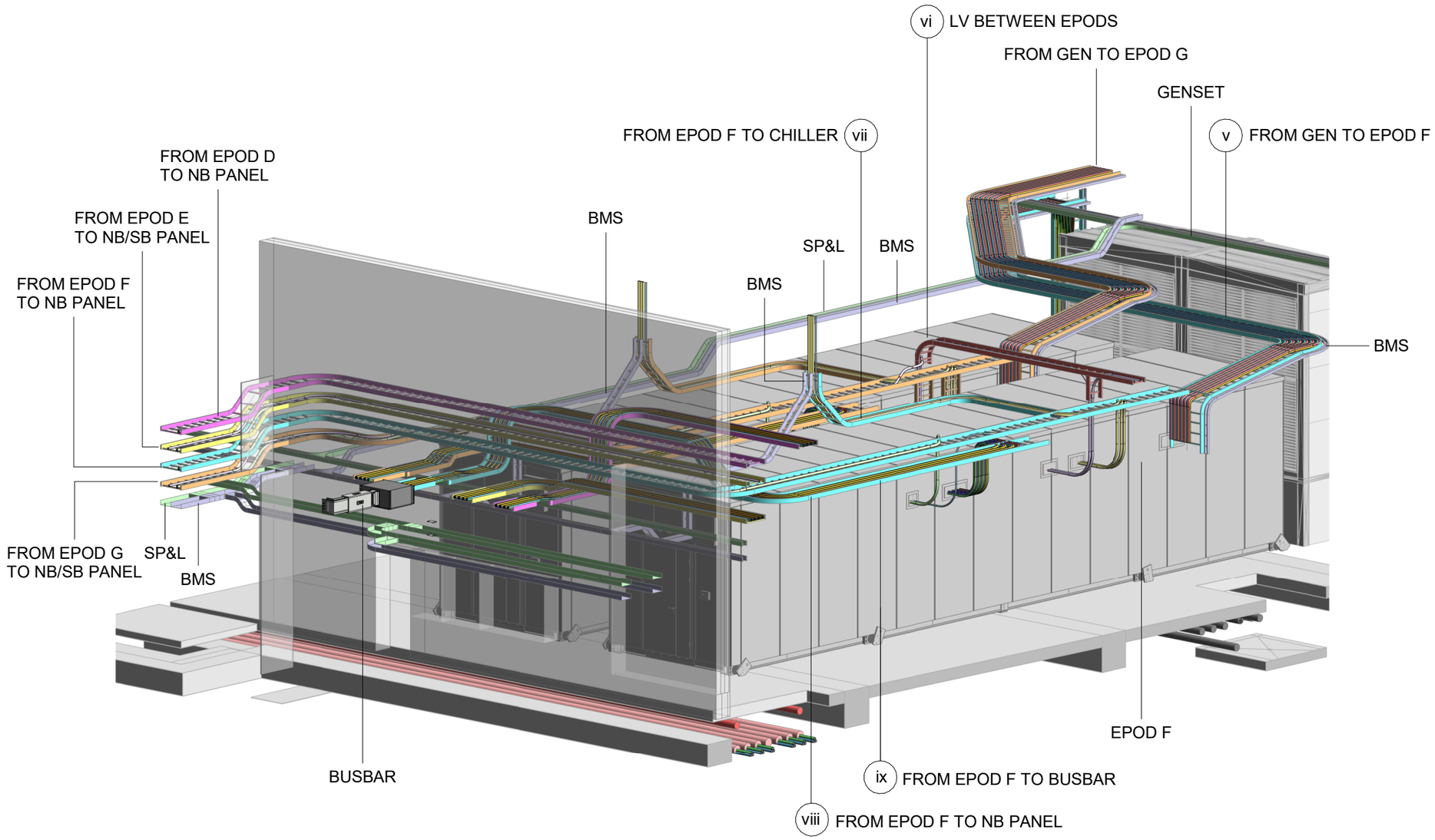
Earthing
Principle for Getting the Earthing Up to 1F

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-J-63515		**A3**	**P02**

4.2. MEP Installation Details – Power Cable Routing

Purpose: in this chapter you can find the best fit for Main Power Cable Routing connections, namely:

- LV Genset – EPOD connection
- LV EPOD – Datacentre connection
- MV Underground cable routing



3D Cable Ways - Technical Yard - 3D

Legend

Color	Description
	Conduits – Phase L1
	Conduits – Phase L2
	Conduits – Phase L3
	Conduits – NEUTRAL
	Conduits – PE
	Power Cable – RZ1-K 4G120
	Power Cable – RZ1-K 5G35
	Power Cable – RZ1-K 5G70
	Power Cable – RZ1-K 5G150

General Notes

1. All dimensions in millimeters unless otherwise noted.
2. This drawing to be read in conjuction with other 5 drawings.
   Please refer the set of drawings that include:
   - RDC0000-BMS-ZZ-ZZ-DR-E-91550
   - RDC0000-BMS-ZZ-ZZ-DR-E-91551
   - RDC0000-BMS-ZZ-ZZ-DR-E-91552
   - RDC0000-BMS-ZZ-ZZ-DR-E-91553
   - RDC0000-BMS-ZZ-ZZ-DR-E-91554
   - RDC0000-BMS-ZZ-ZZ-DR-E-91555.

Cable Routing Tags:
(**Cable Name**) | From (**Source**) to (**Target**) | (**Cable Type**)

Rev	Date	Description	Sign.	Veri.
P02	04.04.2025	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	JR	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

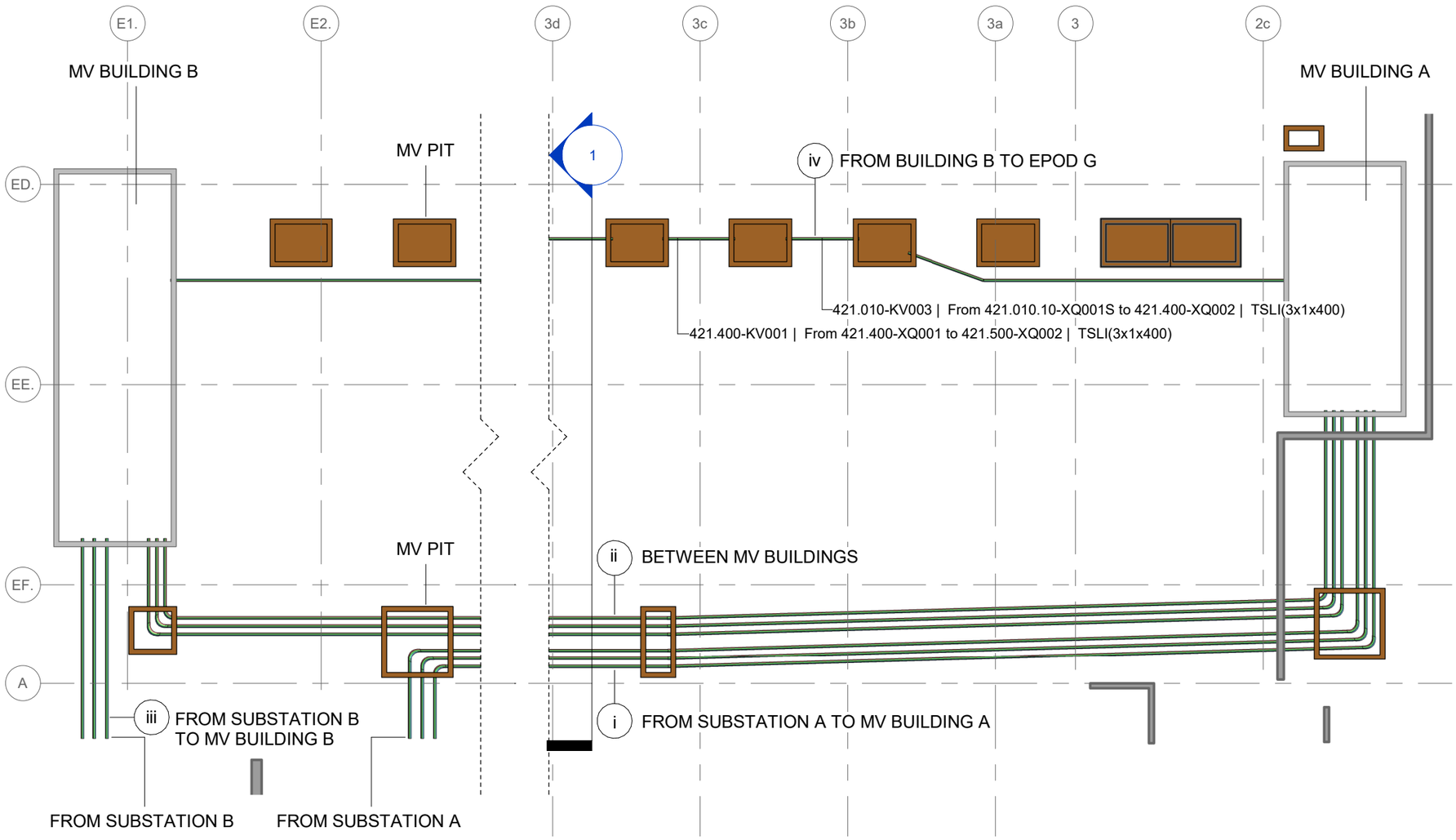
DRAWING NAME:

POWER CABLE ROUTING TECHNICAL YARD - 3D

DRAWING STATUS:	SCALE:	STATUS:
Revision 1	**as indic.**	**S2**

DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2025**	**JR**	**JM**

DRAWING NUMBER:	FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-E-91550	**A3**	**P02**



A Cable Routing - Technical Yard - UnderGround
1 : 200

Legend

Color	Description
	Conduits – Phase L1
	Conduits – Phase L2
	Conduits – Phase L3
	Conduits – NEUTRAL
	Conduits – PE
	Power Cable – RZ1-K 4G120
	Power Cable – RZ1-K 5G35
	Power Cable – RZ1-K 5G70
	Power Cable – RZ1-K 5G150

General Notes

1. All dimensions in millimeters unless otherwise noted.
2. This drawing to be read in conjuction with other 5 drawings.
   Please refer the set of drawings that include:
   - RDC0000-BMS-ZZ-ZZ-DR-E-91550
   - RDC0000-BMS-ZZ-ZZ-DR-E-91551
   - RDC0000-BMS-ZZ-ZZ-DR-E-91552
   - RDC0000-BMS-ZZ-ZZ-DR-E-91553
   - RDC0000-BMS-ZZ-ZZ-DR-E-91554
   - RDC0000-BMS-ZZ-ZZ-DR-E-91555.

Cable Routing Tags:
(**Cable Name**) | From (**Source**) to (**Target**) | (**Cable Type**)

Rev	Date	Description	Sign.	Veri.
P02	04.04.2025	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	JR	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

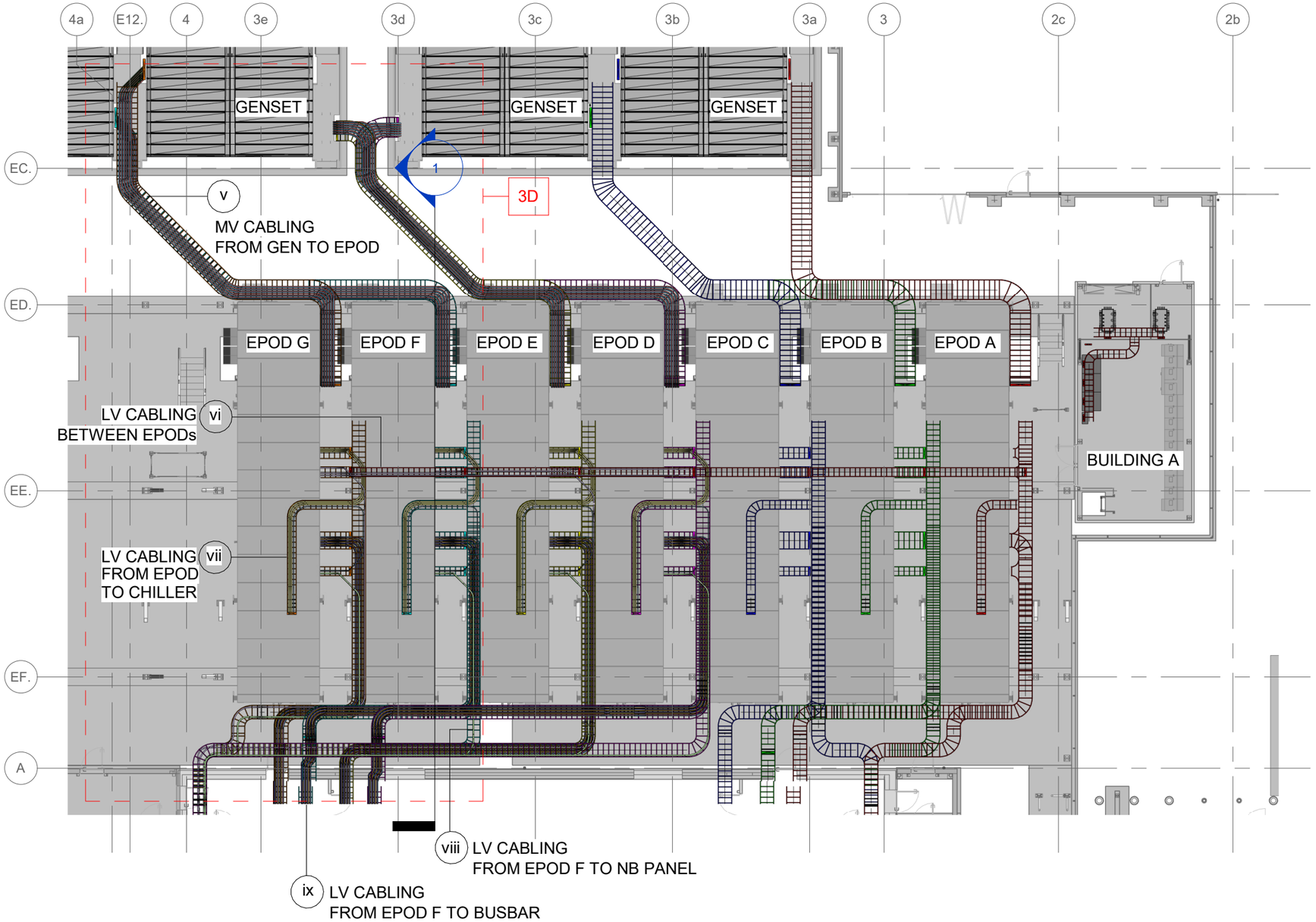
PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

POWER CABLE ROUTING TECHNICAL YARD -UNDERGROUND

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**as indic.**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2025**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-E-91551		**A3**	**P02**



1 Cable Routing - Technical Yard - Ground Floor
1 : 200

Legend

Color	Description
	Conduits – Phase L1
	Conduits – Phase L2
	Conduits – Phase L3
	Conduits – NEUTRAL
	Conduits – PE
	Power Cable – RZ1-K 4G120
	Power Cable – RZ1-K 5G35
	Power Cable – RZ1-K 5G70
	Power Cable – RZ1-K 5G150

General Notes

1. All dimensions in millimeters unless otherwise noted.
2. This drawing to be read in conjuction with other 5 drawings.
   Please refer the set of drawings that include:
   - RDC0000-BMS-ZZ-ZZ-DR-E-91550
   - RDC0000-BMS-ZZ-ZZ-DR-E-91551
   - RDC0000-BMS-ZZ-ZZ-DR-E-91552
   - RDC0000-BMS-ZZ-ZZ-DR-E-91553
   - RDC0000-BMS-ZZ-ZZ-DR-E-91554
   - RDC0000-BMS-ZZ-ZZ-DR-E-91555.

Cable Routing Tags:
(**Cable Name**) | From (**Source**) to (**Target**) | (**Cable Type**)

Rev	Date	Description	Sign.	Veri.
P02	04.04.2025	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	JR	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

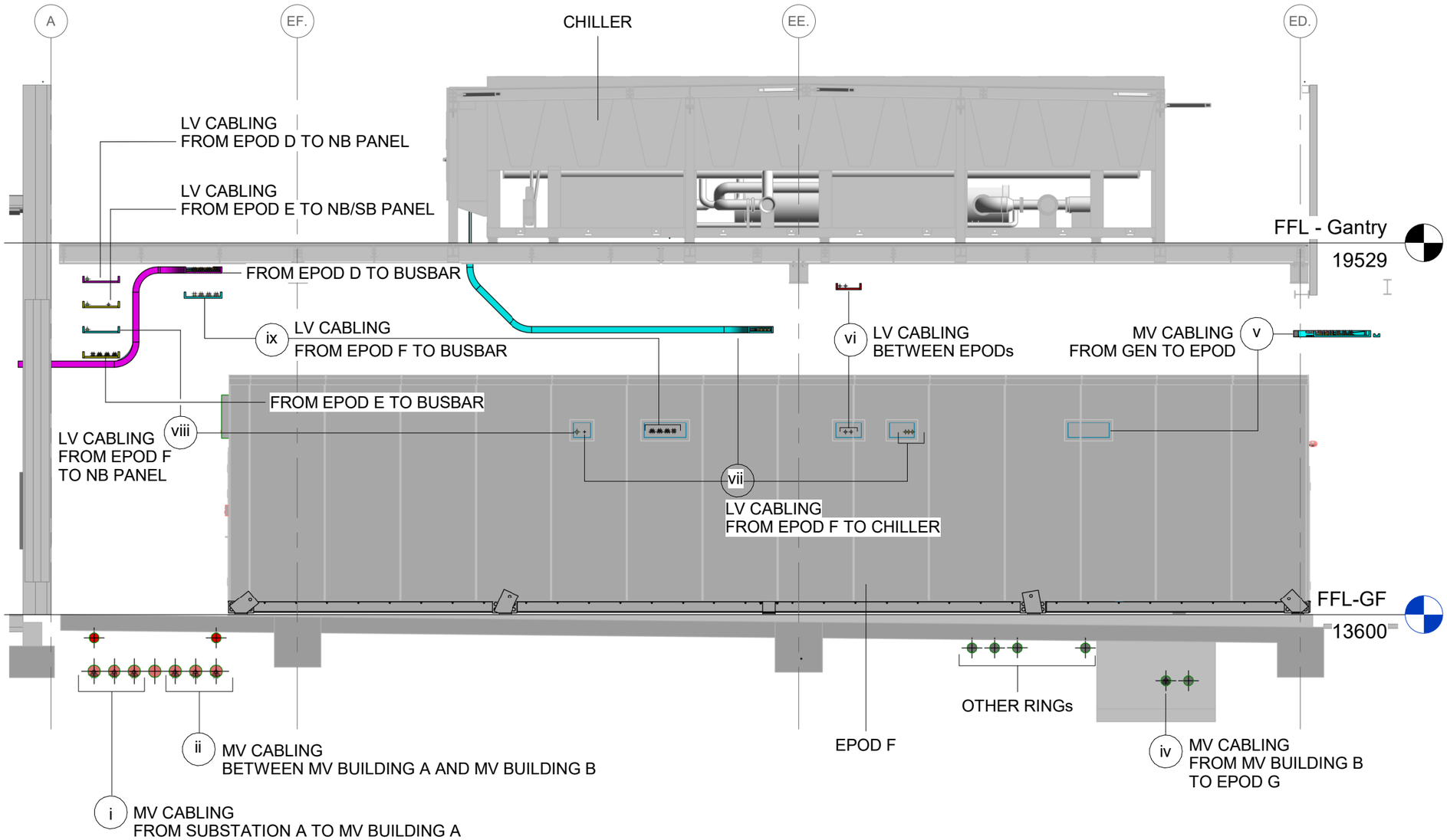
CTS GROUP PARTNER:

BIMMS

PROJECT NAME:
Execution Design and Engineering Requirements

DRAWING NAME:
POWER CABLE ROUTING TECHNICAL YARD -GROUND_FLOOR

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**as indic.**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2025**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-E-91552		**A3**	**P02**



1 Cable Routing - Technical Yard - Section
1 : 75

Legend

Color	Description
	Conduits – Phase L1
	Conduits – Phase L2
	Conduits – Phase L3
	Conduits – NEUTRAL
	Conduits – PE
	Power Cable – RZ1-K 4G120
	Power Cable – RZ1-K 5G35
	Power Cable – RZ1-K 5G70
	Power Cable – RZ1-K 5G150

General Notes

1. All dimensions in millimeters unless otherwise noted.
2. This drawing to be read in conjuction with other 5 drawings.
   Please refer the set of drawings that include:
   - RDC0000-BMS-ZZ-ZZ-DR-E-91550
   - RDC0000-BMS-ZZ-ZZ-DR-E-91551
   - RDC0000-BMS-ZZ-ZZ-DR-E-91552
   - RDC0000-BMS-ZZ-ZZ-DR-E-91553
   - RDC0000-BMS-ZZ-ZZ-DR-E-91554
   - RDC0000-BMS-ZZ-ZZ-DR-E-91555.

Cable Routing Tags:
(**Cable Name**) | From (**Source**) to (**Target**) | (**Cable Type**)

Rev	Date	Description	Sign.	Veri.
P02	04.04.2025	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	JR	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

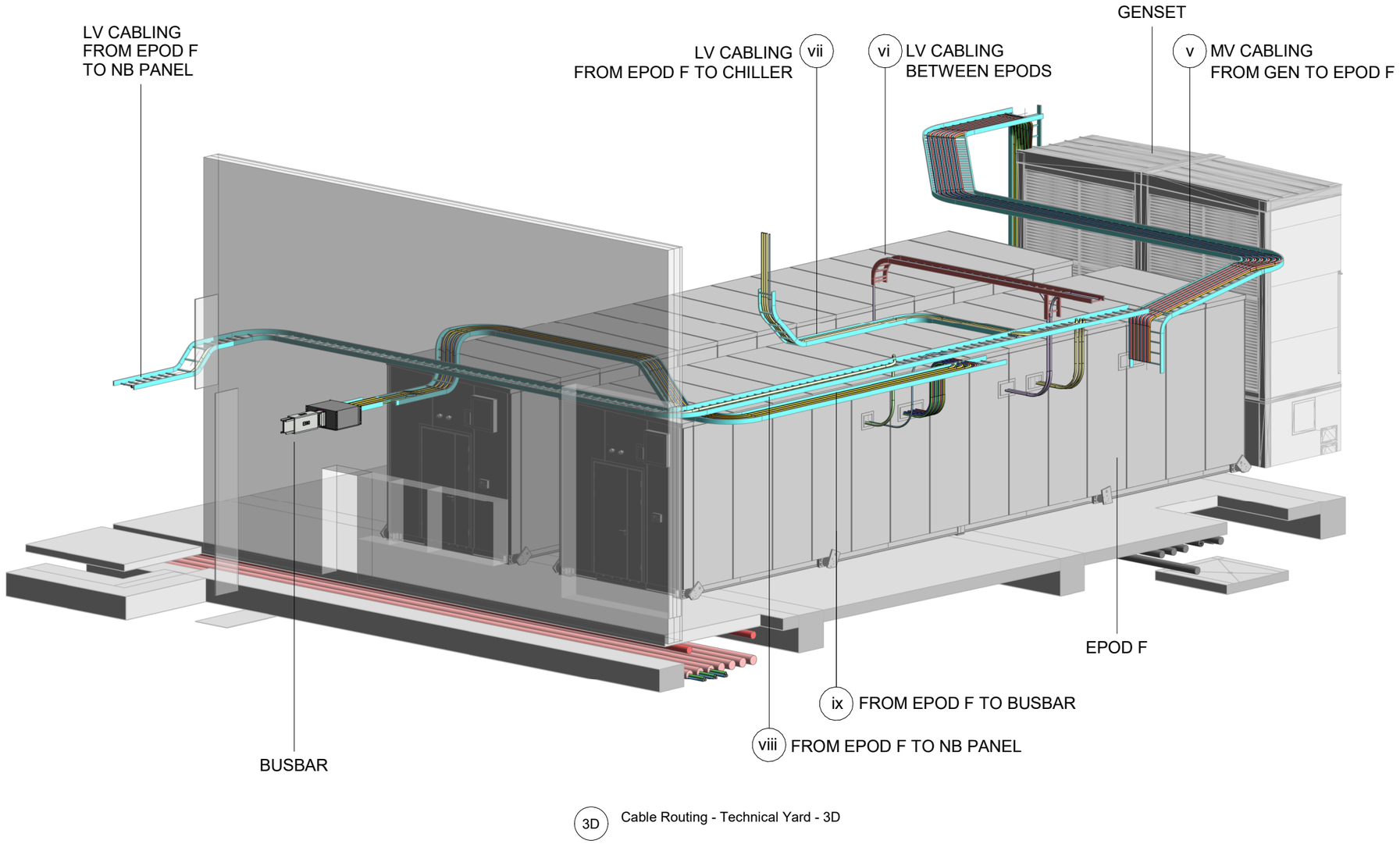
PROJECT NAME:
Execution Design and Engineering Requirements

DRAWING NAME:
POWER CABLE ROUTING TECHNICAL YARD - SECTION

DRAWING STATUS:	SCALE:	STATUS:
Revision 1	**as indic.**	**S2**

DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2025**	**JR**	**JM**

DRAWING NUMBER:	FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-E-91553	**A3**	**P02**



3D Cable Routing - Technical Yard - 3D

Legend

Color	Description
	Conduits – Phase L1
	Conduits – Phase L2
	Conduits – Phase L3
	Conduits – NEUTRAL
	Conduits – PE
	Power Cable – RZ1-K 4G120
	Power Cable – RZ1-K 5G35
	Power Cable – RZ1-K 5G70
	Power Cable – RZ1-K 5G150

General Notes

1. All dimensions in millimeters unless otherwise noted.
2. This drawing to be read in conjuction with other 5 drawings.
   Please refer the set of drawings that include:
   - RDC0000-BMS-ZZ-ZZ-DR-E-91550
   - RDC0000-BMS-ZZ-ZZ-DR-E-91551
   - RDC0000-BMS-ZZ-ZZ-DR-E-91552
   - RDC0000-BMS-ZZ-ZZ-DR-E-91553
   - RDC0000-BMS-ZZ-ZZ-DR-E-91554
   - RDC0000-BMS-ZZ-ZZ-DR-E-91555.

Cable Routing Tags:
(**Cable Name**) | From (**Source**) to (**Target**) | (**Cable Type**)

Rev	Date	Description	Sign.	Veri.
P02	04.04.2025	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	JR	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

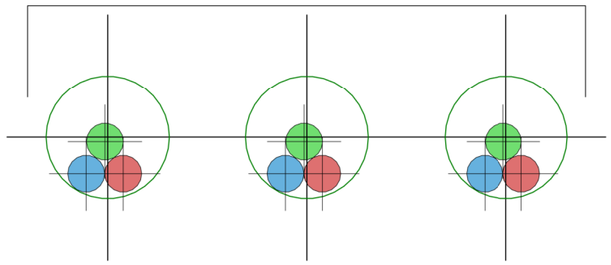
Execution Design and Engineering Requirements

DRAWING NAME:

POWER CABLE ROUTING TECHNICAL YARD - 3D

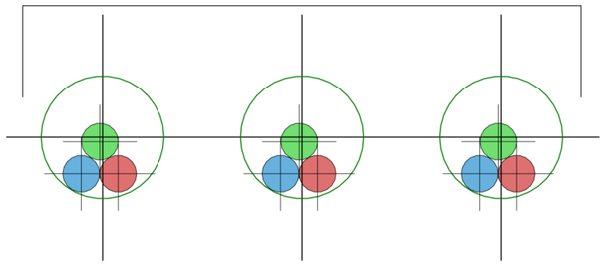
DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**as indic.**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2025**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-E-91554		**A3**	**P02**

421.010-KV001 | From 421.001-XT001 to 421.010.1 | 3xTSLI(3x1x630)



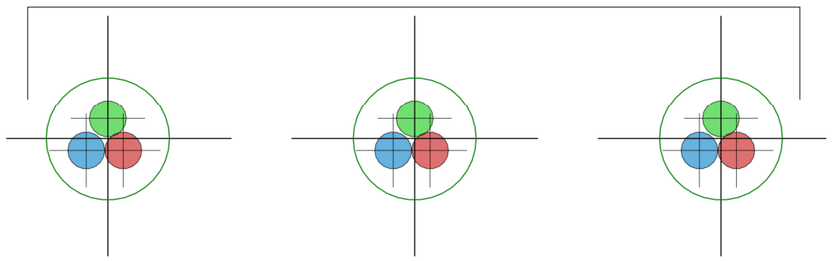
i From Substation A to MV Building A
1 : 10

421.020-KV010 | From 421.020.14-XQ001S to 421.010.14-XQ001S | 3xTSLI(3x1x630)

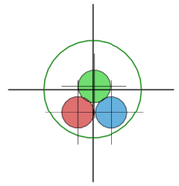


ii Between MV Buildings
1 : 10

421.020-KV001 | From 421.002-XT001 to 421.020.1 | 3xTSLI(3x1x630)



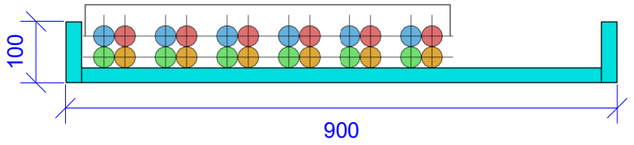
iii From Substation B to MV Building B
1 : 10



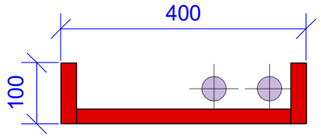
421.020-KV003 | From 421.020.8-XQ001S to 421.700-XQ001 | TSLI(3x1x400)

iv From MV Building B to EPOD G
1 : 10

431.600-KW002 | From GENERATOR FXX to 431.600-XQ002 | N2XH-Flex(6x4x1x400)



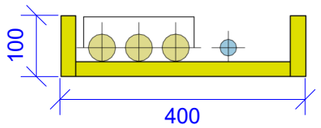
v From GEN to EPOD
1 : 10



432.600-KW107 | From 432.600-XQ107 to 432.700-XS001 | RZ1-K 5G70
432.700-KW107 | From 432.700-XQ107 to 432.400-XS001 | RZ1-K 5G70

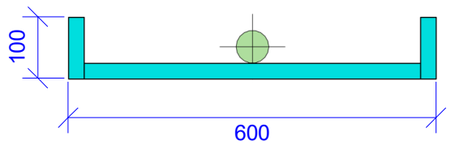
vi Between EPODs
1 : 10

432.500-KW101 | From 432.500-XQ101 to 353.XX1-IK005 | 3x RZ1-K 4G120
462.500-KW204 | From 462.500-XQ204 to 353.XX1-JP005 | RZ1-K 5G35

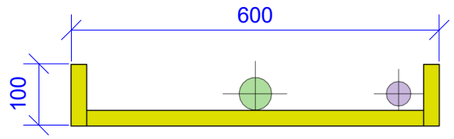


vii From EPOD to Chiller
1 : 10

462.600-KW203 | From 462.600-XQ203 to 433.651-FA001 | RZ1-K 5G150



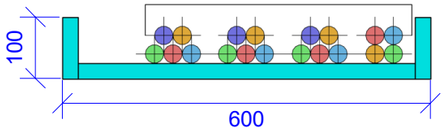
viii-1 From EPOD D/F to NB Panel
1 : 10



462.500-KW203 | From 462.500-XQ203 to 433.551-FS001 | RZ1-K 5G150
432.500-KW103 | From 432.500-XQ103 to 433.501-FS001 | RZ1-K 5G70

viii-2 From EPOD E/G to SB/NB Panels
1 : 10

462.600-KW202 | From 462.600-XQ202 to 435.600-KS202 | N2XH-Flex(4x4x1x300 +3x1x300)



ix From EPOD to Busbar Feed-In Box
1 : 10

Legend

Color	Description
	Conduits – Phase L1
	Conduits – Phase L2
	Conduits – Phase L3
	Conduits – NEUTRAL
	Conduits – PE
	Power Cable – RZ1-K 4G120
	Power Cable – RZ1-K 5G35
	Power Cable – RZ1-K 5G70
	Power Cable – RZ1-K 5G150

General Notes

1. All dimensions in millimeters unless otherwise noted.
2. This drawing to be read in conjuction with other 5 drawings.
   Please refer the set of drawings that include:
   - RDC0000-BMS-ZZ-ZZ-DR-E-91550
   - RDC0000-BMS-ZZ-ZZ-DR-E-91551
   - RDC0000-BMS-ZZ-ZZ-DR-E-91552
   - RDC0000-BMS-ZZ-ZZ-DR-E-91553
   - RDC0000-BMS-ZZ-ZZ-DR-E-91554
   - RDC0000-BMS-ZZ-ZZ-DR-E-91555.

Cable Routing Tags:
(**Cable Name**) | From (**Source**) to (**Target**) | (**Cable Type**)

Rev	Date	Description	Sign.	Veri.
P02	04.04.2025	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	JR	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

POWER CABLE ROUTING TECHNICAL YARD - DETAILS

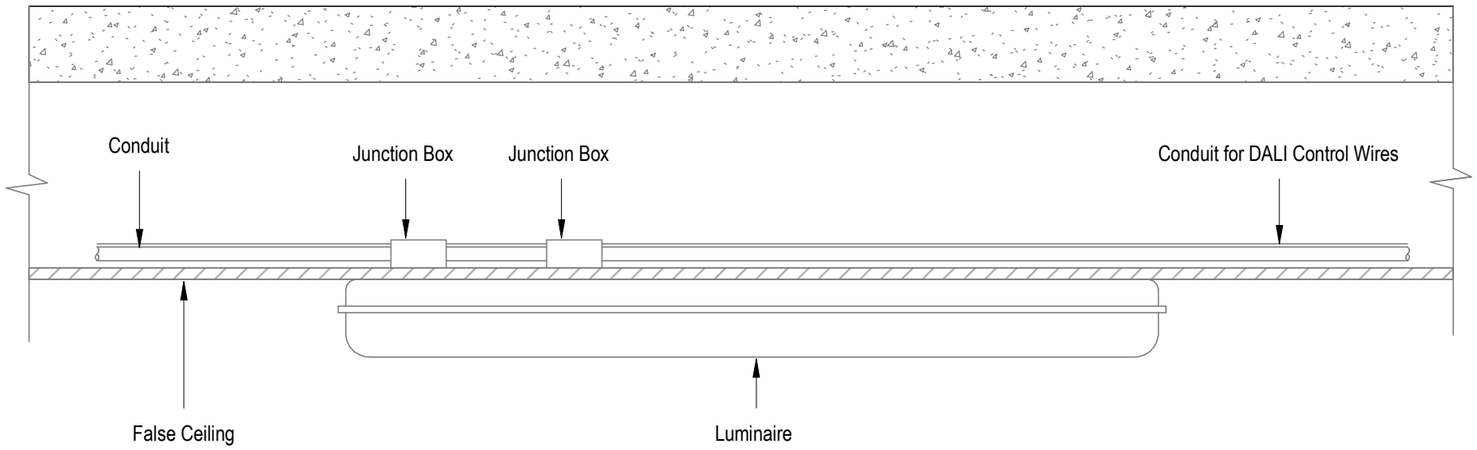
DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**as indic.**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2025**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-E-91555		**A3**	**P02**

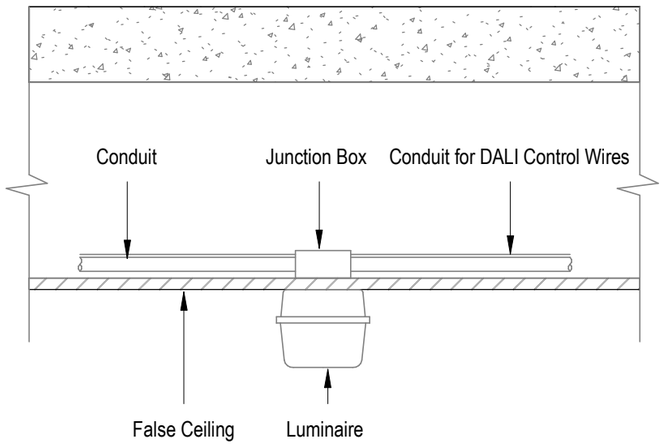
4.3. MEP Installation Details – Lighting

Purpose: this chapter includes typical installation guidelines for surface, wall and recessed mounted luminaires, suspended lighting fixtures (both normal and emergency lighting), floor installed up-lights and support/trunking channel/ busbar lighting solutions.

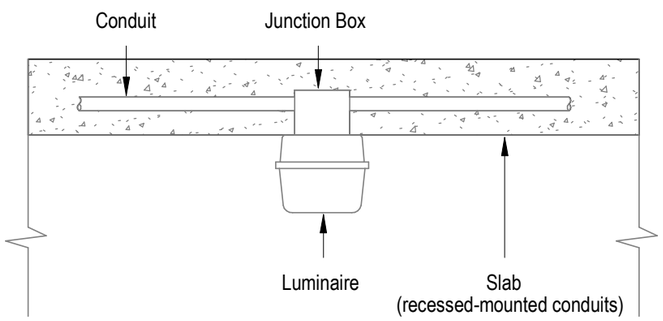
SURFACE-MOUNTED LUMINAIRE

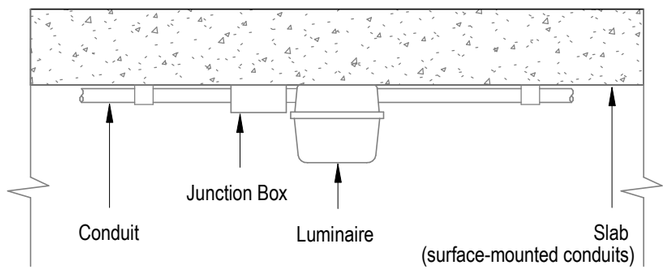
On False Ceiling





On Slab (Real Ceiling)





Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.

Rev	Date	Description	Sign.	Veri.
P02	04.04.2024	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	JR	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

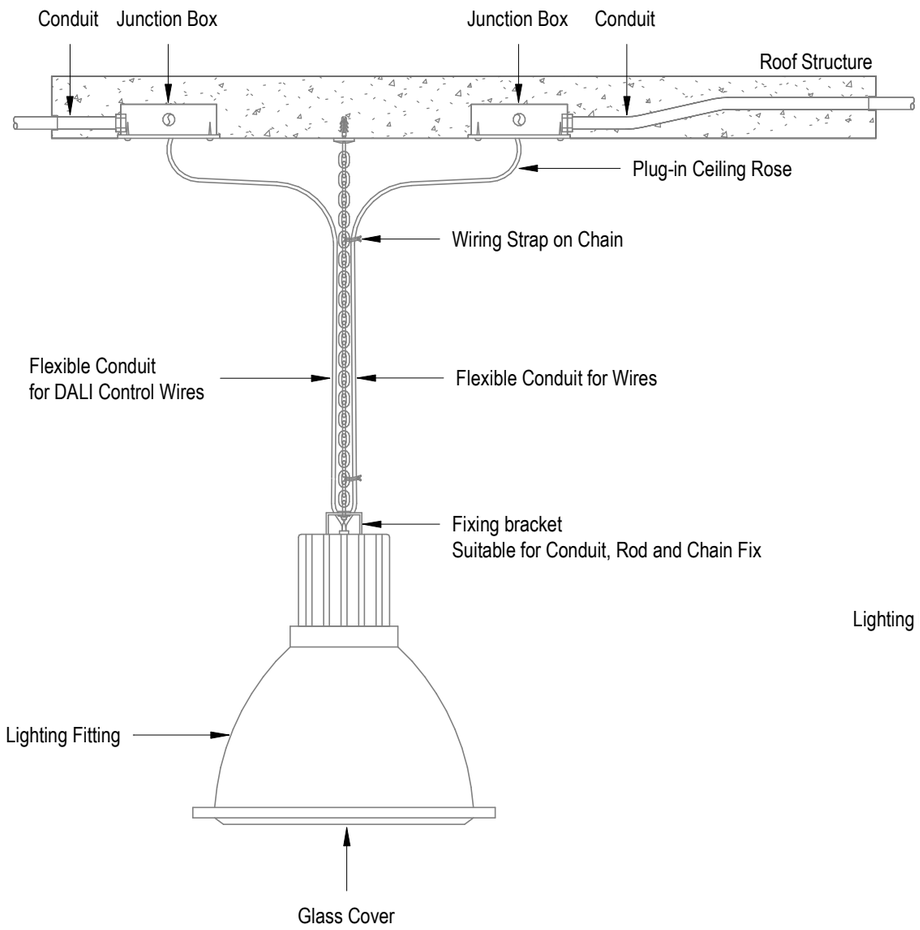
Execution Design and Engineering Requirements

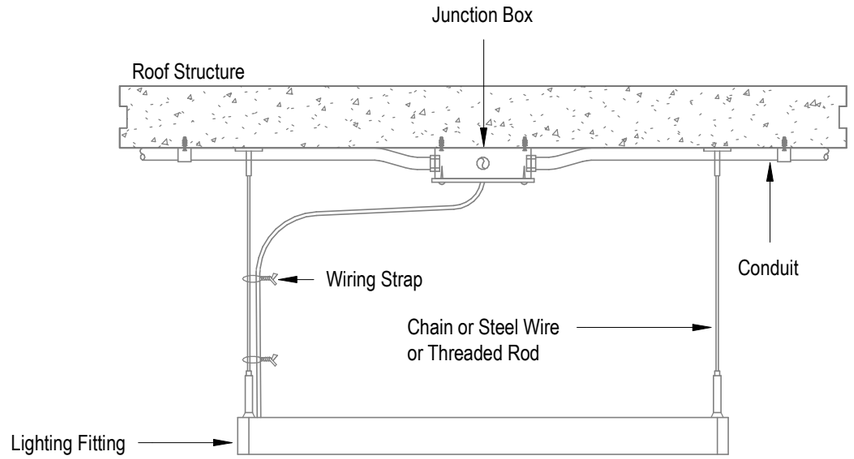
DRAWING NAME:

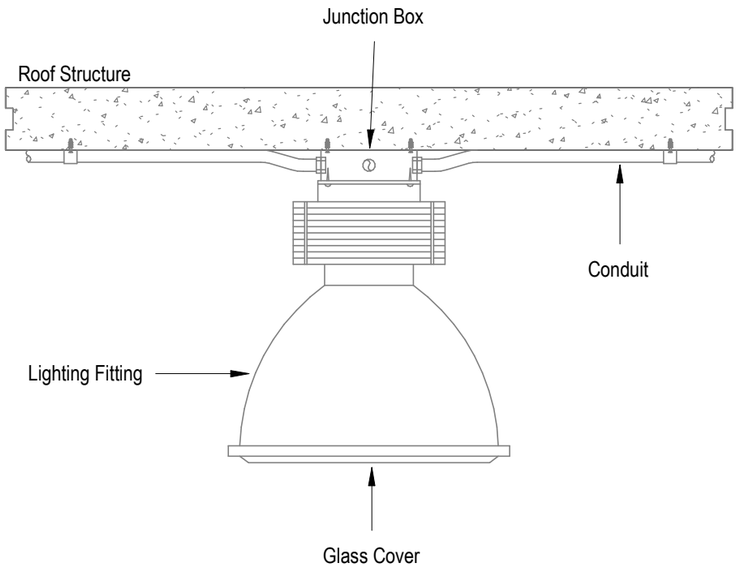
Lighting
Surface-Mounted Luminaire

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-J-63501		**A3**	**P02**

SUSPENDED LUIMINAIRE







Notes

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Rev	Date	Description	Sign.	Veri.
P02	04.04.2024	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	JR	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

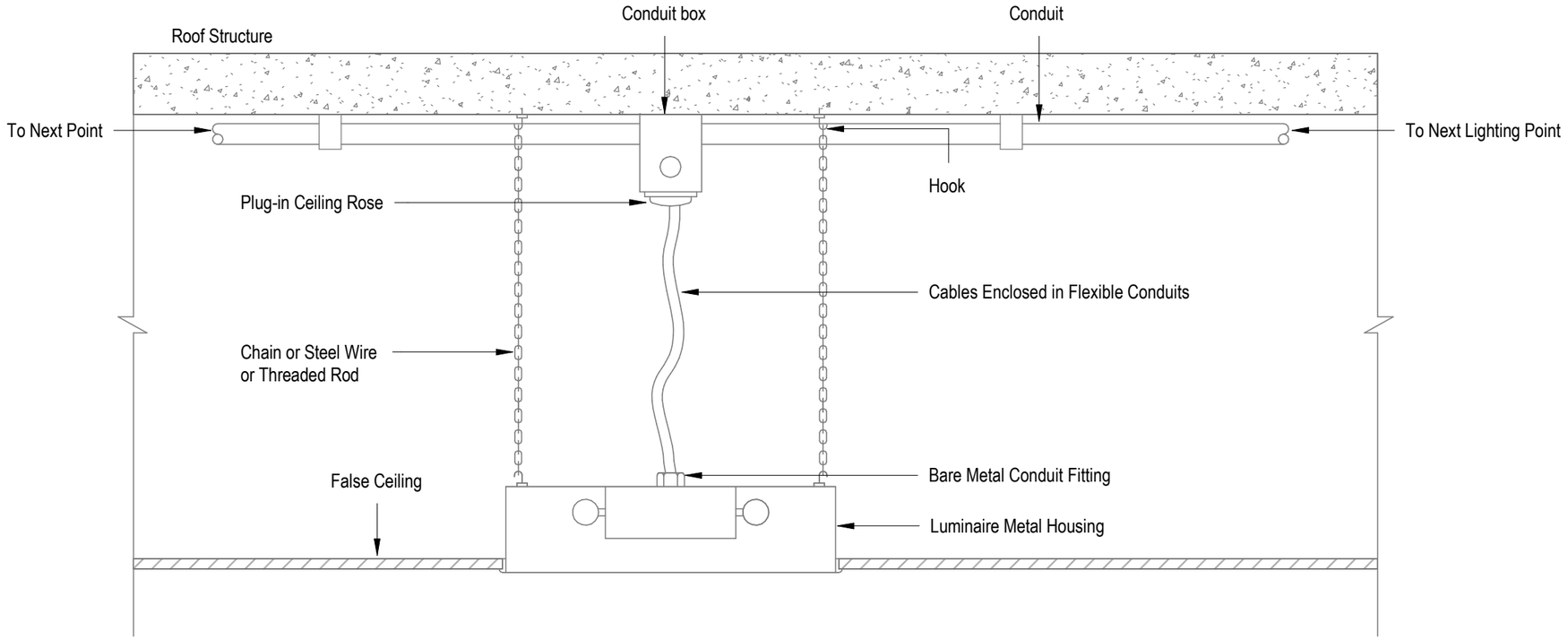
Lighting
Suspended Luminaire

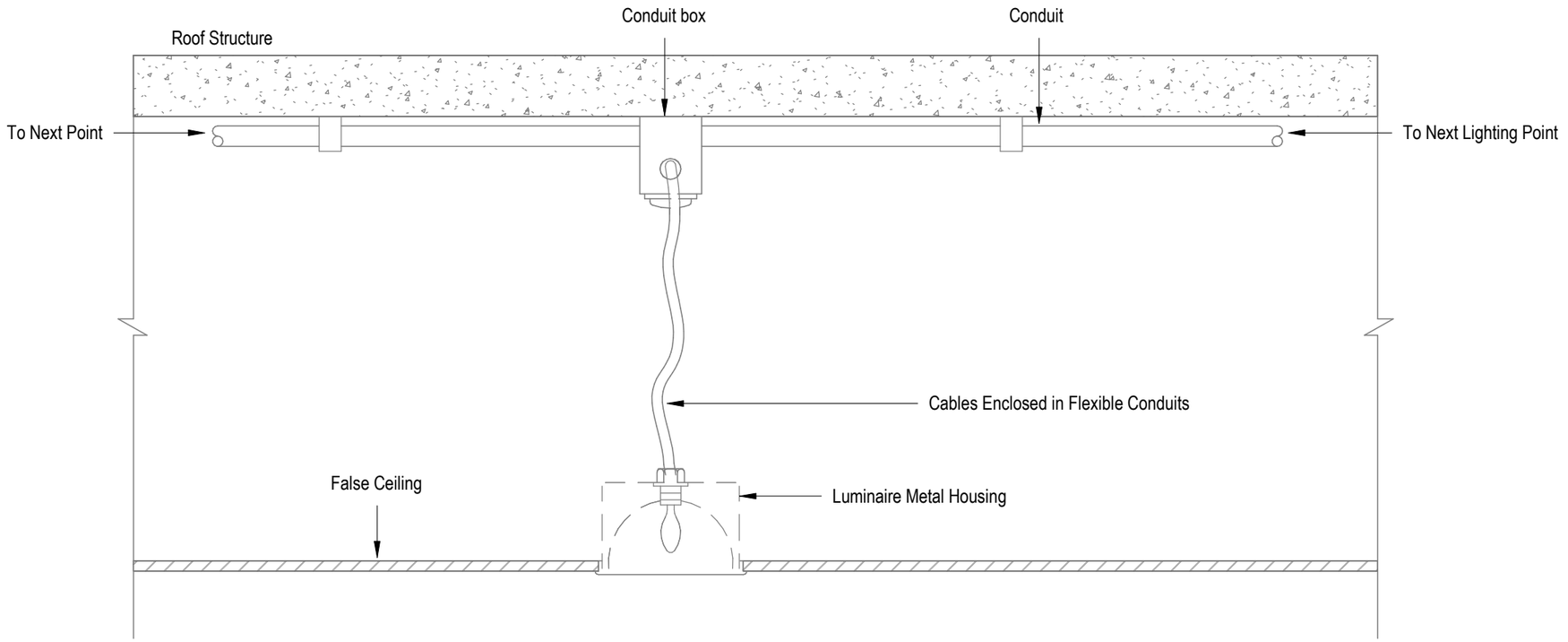
DRAWING STATUS:	SCALE:	STATUS:
Revision 1	**NTS**	**S2**

DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**

DRAWING NUMBER:	FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-J-63502	**A3**	**P02**

RECESSED-MOUNTED LUMINAIRE





Notes

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Rev	Date	Description	Sign.	Veri.
P02	04.04.2024	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	JR	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

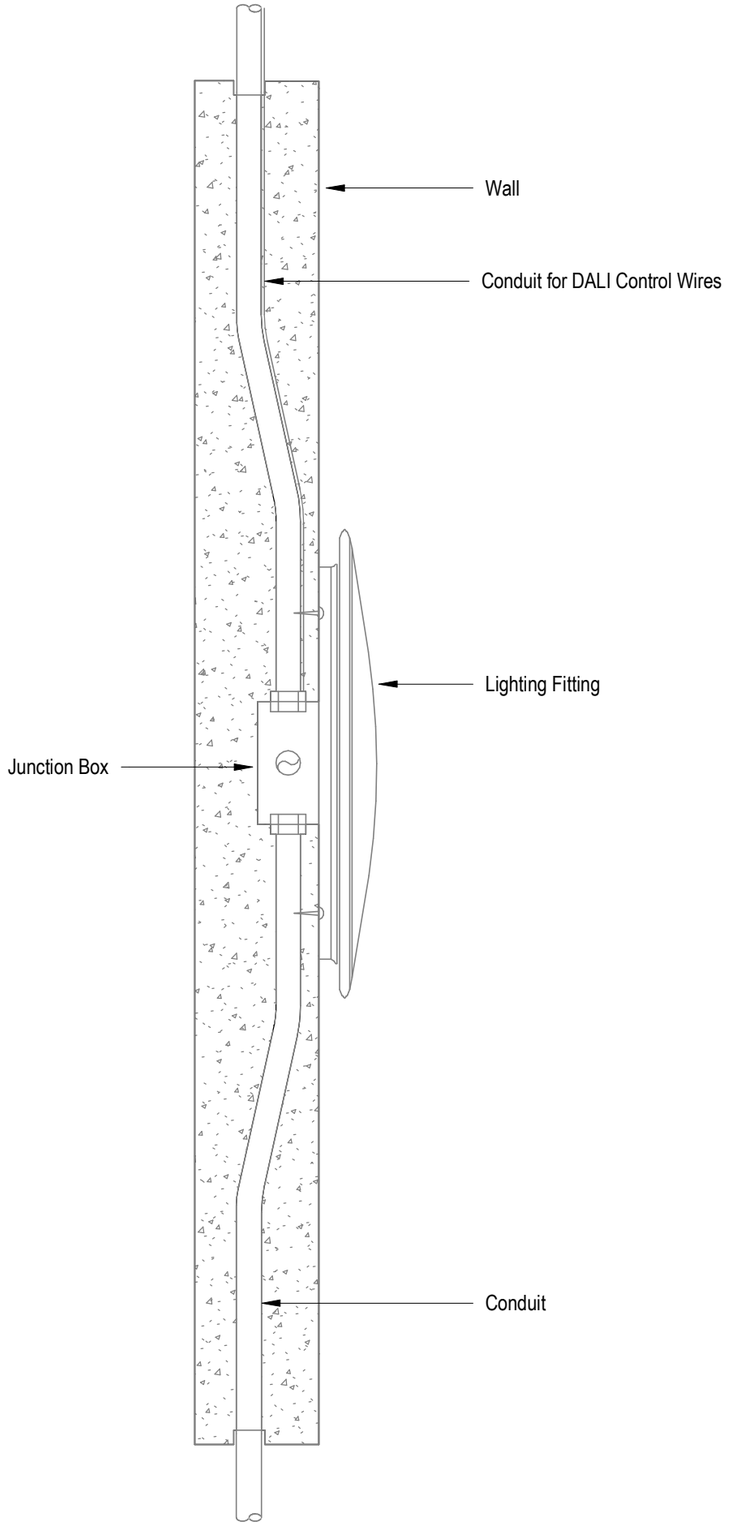
Execution Design and Engineering Requirements

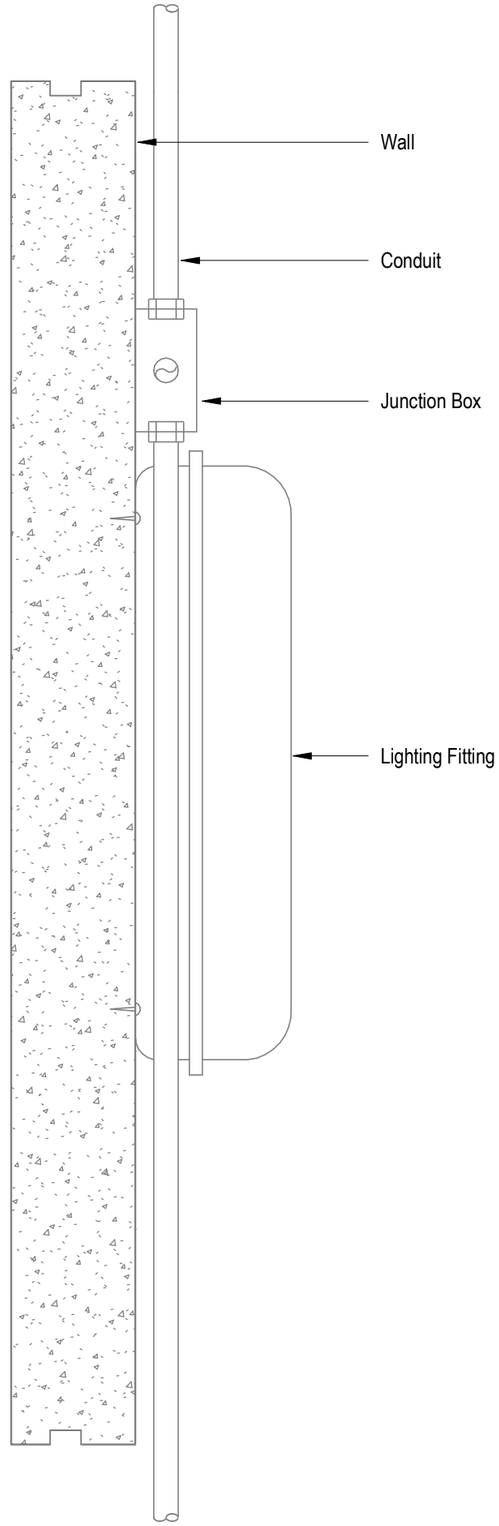
DRAWING NAME:

Lighting
Recessed-Mounted Luminaire

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-J-63503		**A3**	**P02**

WALL-MOUNTED LUMINAIRE





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Rev	Date	Description	Sign.	Veri.
P02	04.04.2024	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	JR	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

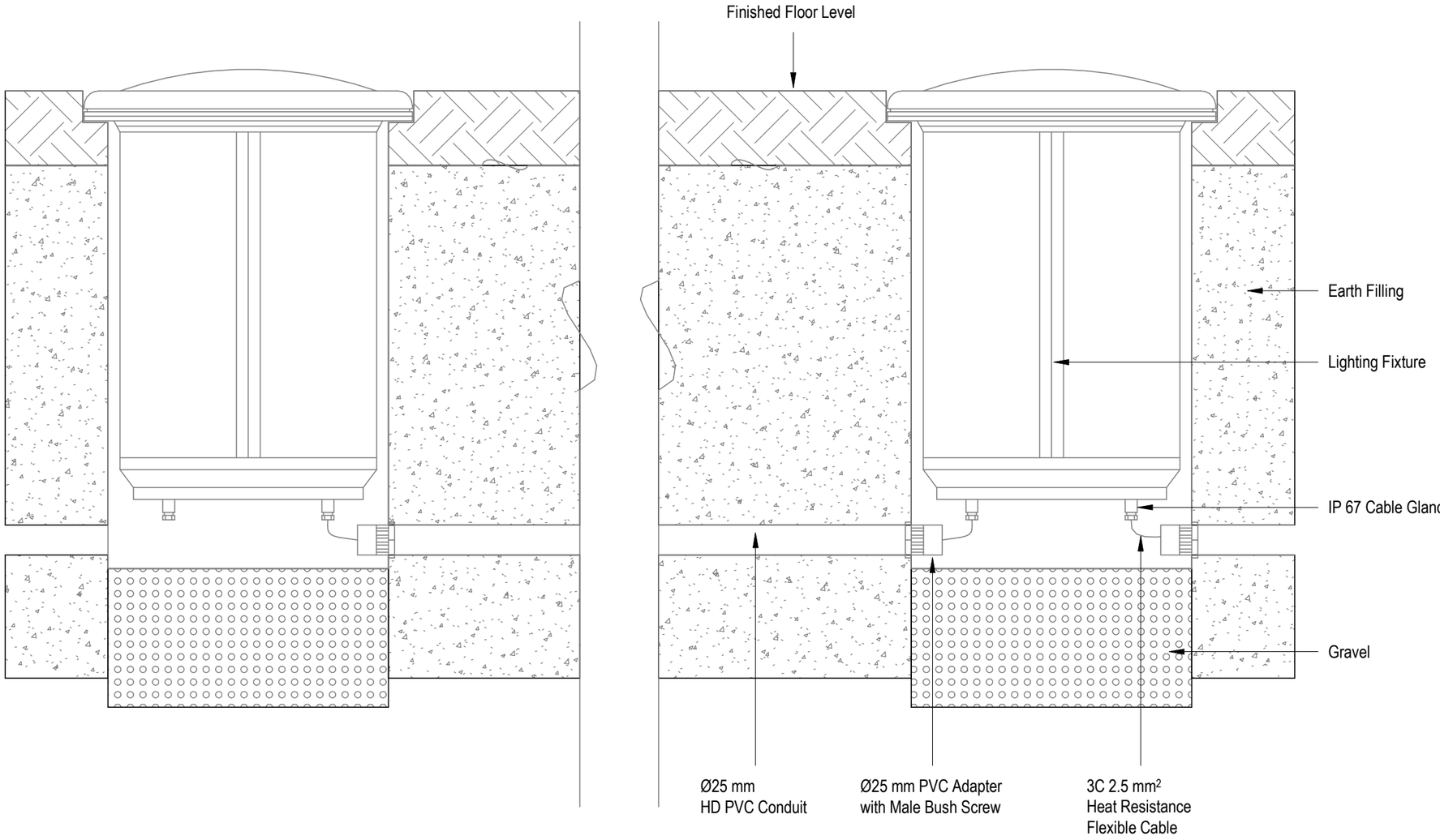
Execution Design and Engineering Requirements

DRAWING NAME:

Lighting
Wall-Mounted Luminaire

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-J-63504		**A3**	**P02**

UP-LIGHT LUMINAIRE



Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
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Rev	Date	Description	Sign.	Veri.
P02	04.04.2024	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	JR	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

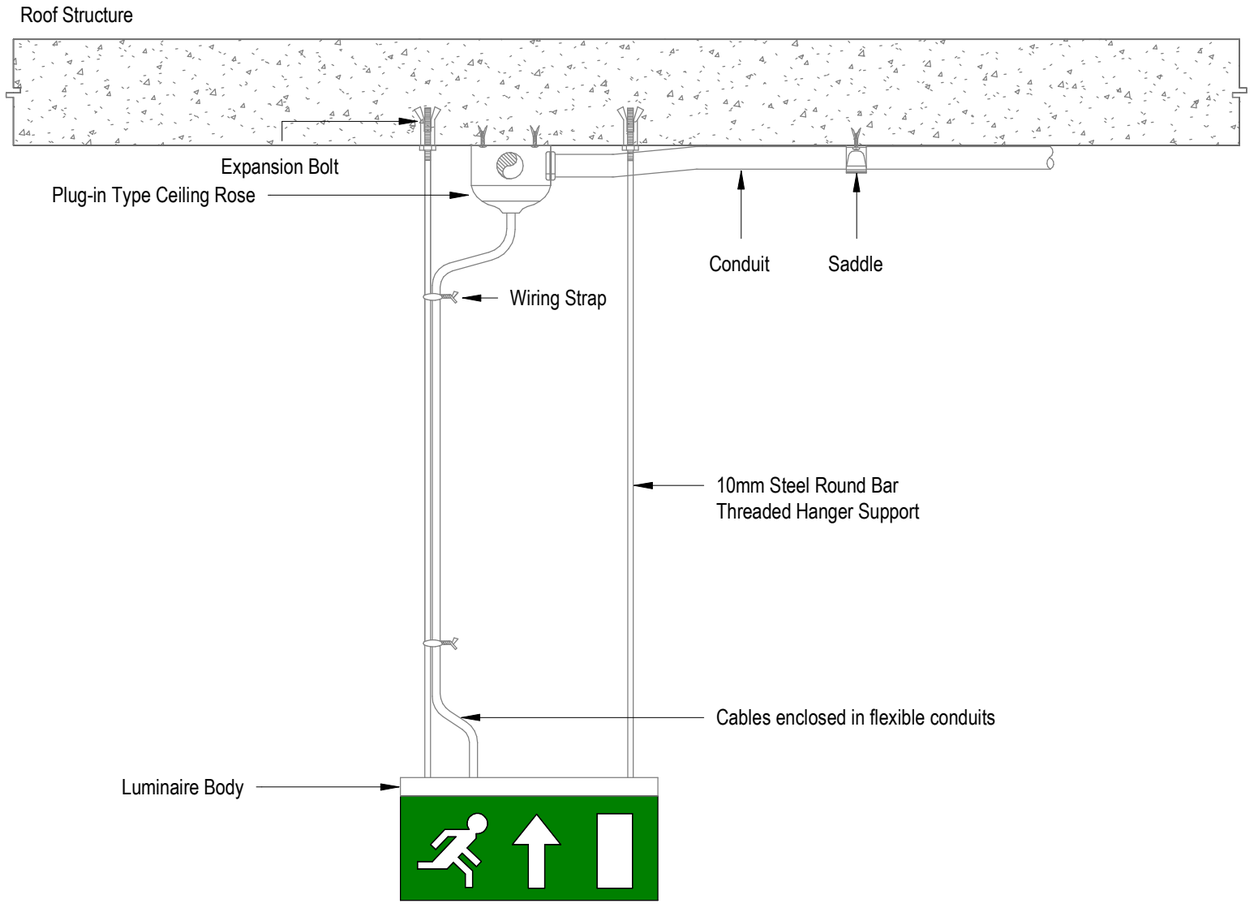
Execution Design and Engineering Requirements

DRAWING NAME:

Lighting
Up-Light Luminaire

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-J-63505		**A3**	**P02**

EXIT-LIGHT LUMINAIRE



Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.

Rev	Date	Description	Sign.	Veri.
P02	04.04.2024	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	JR	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

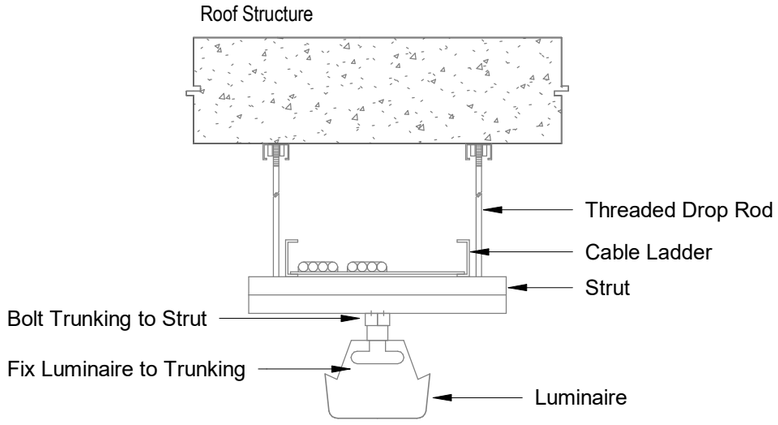
DRAWING NAME:

Lighting
Exit-Light Luminaire

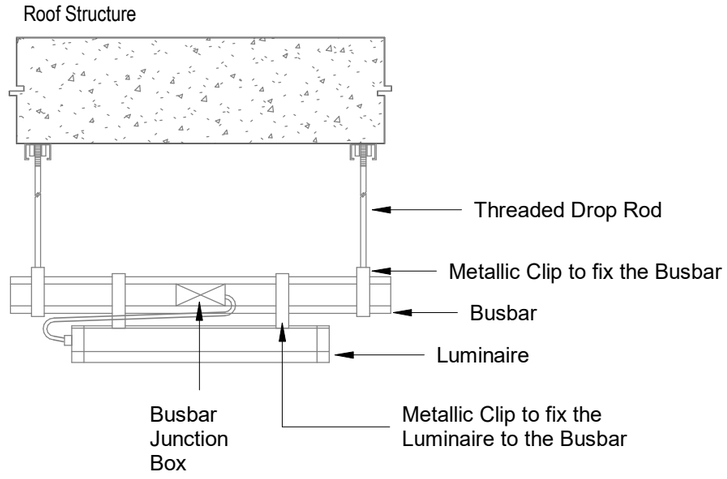
DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-J-63506		**A3**	**P02**

LUMINAIRE MOUNTED ON SUPPORTS / BUSBAR / TRUNKING CHANNEL

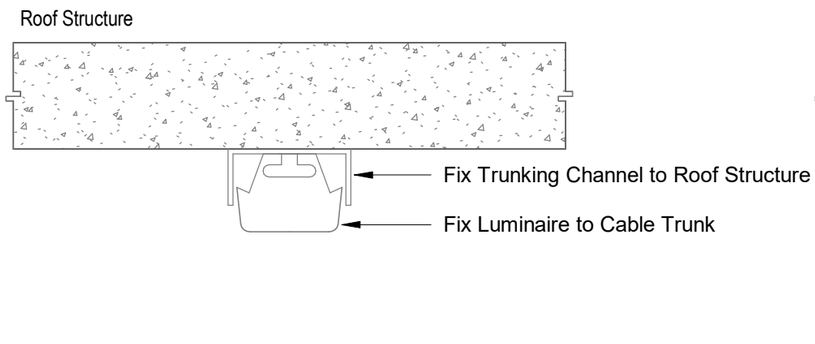
Luminaire Mounted on Supports (Bellow Cable Rack)

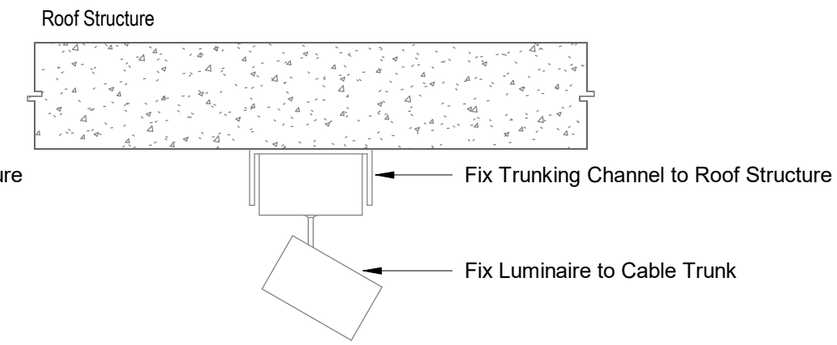


Luminaire Mounted on Busbar



Luminaire Mounted on Trunking Channel





Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.

Rev	Date	Description	Sign.	Veri.
P02	04.04.2024	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	JR	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

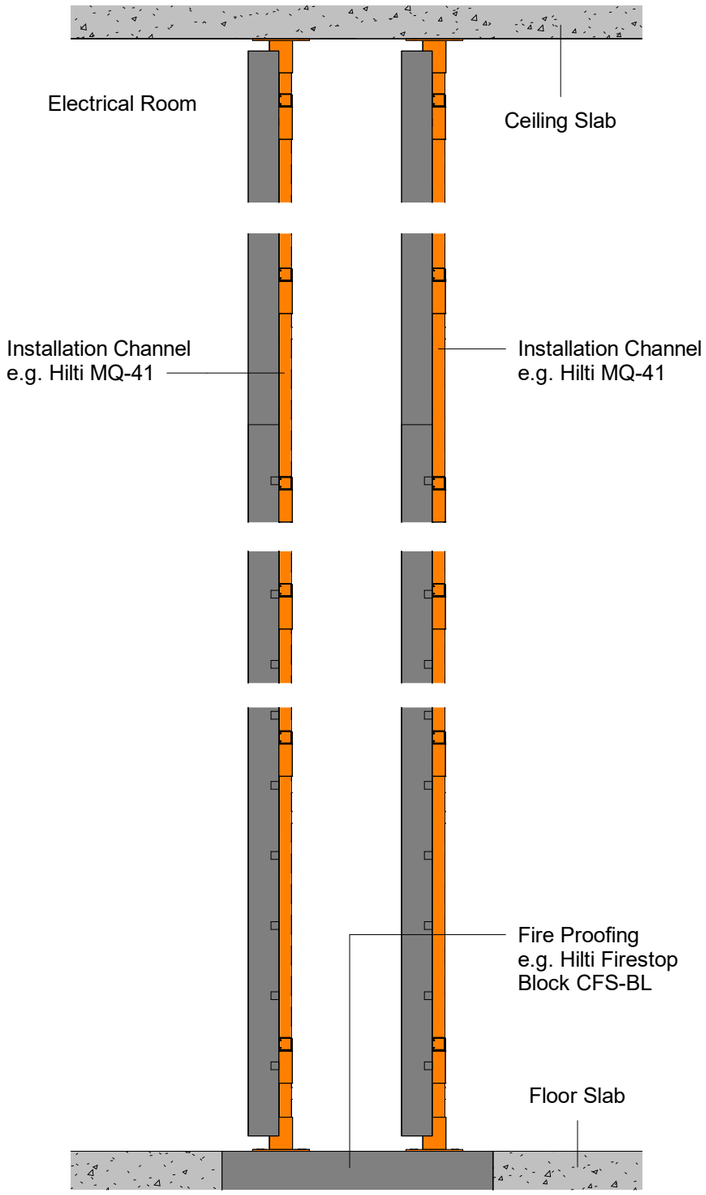
DRAWING NAME:

Lighting
Luminaire Mounted on Supports, Busbar and Trunking Channel

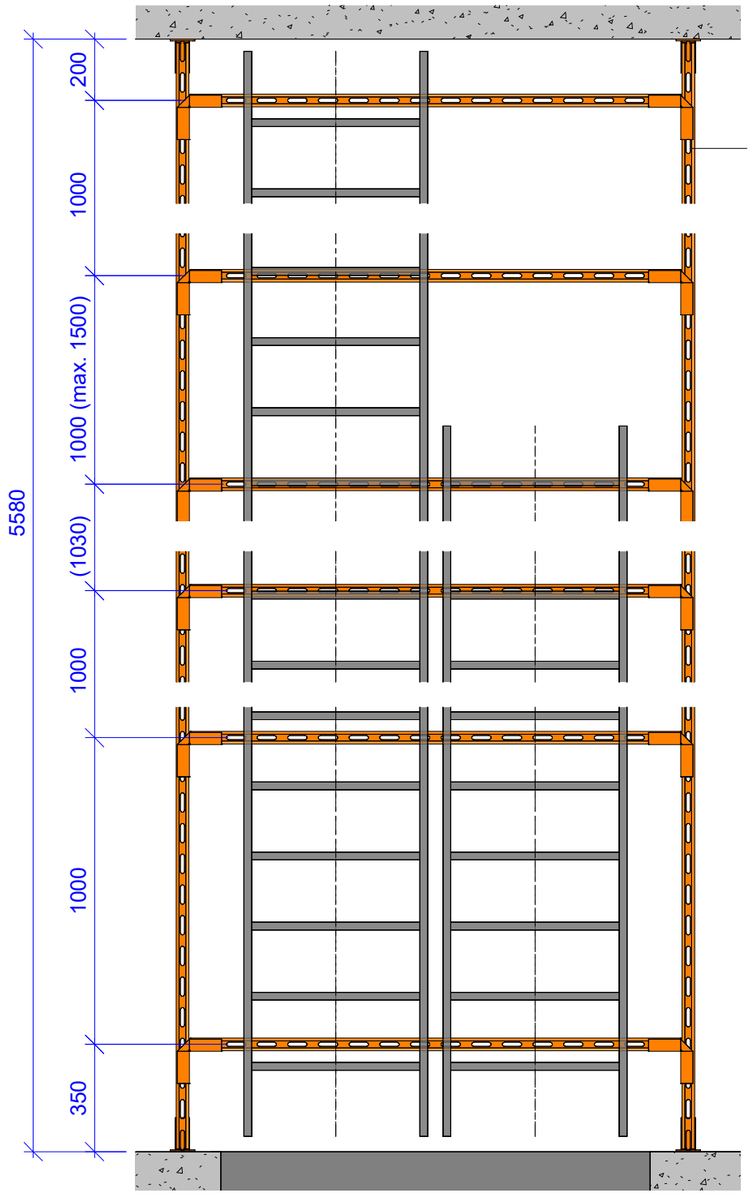
DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-J-63507		**A3**	**P02**

4.4. MEP Installation Details – Containment Support Principles

Purpose: in this chapter you can find best practices and requirements for the installation of electrical cable containment attached to different ceiling or wall layouts or construction solutions, as well as floor layout.



1 Section View - - Vertical Cable Ways - Mounting on Concrete Floor and Ceiling



2 Front View - Vertical Cable Ways - Mounting on Concrete Floor and Ceiling

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.
3. All dimensions are in millimeters unless otherwise noted.

Rev	Date	Description	Sign.	Veri.
P02	04.04.2025	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	JR	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

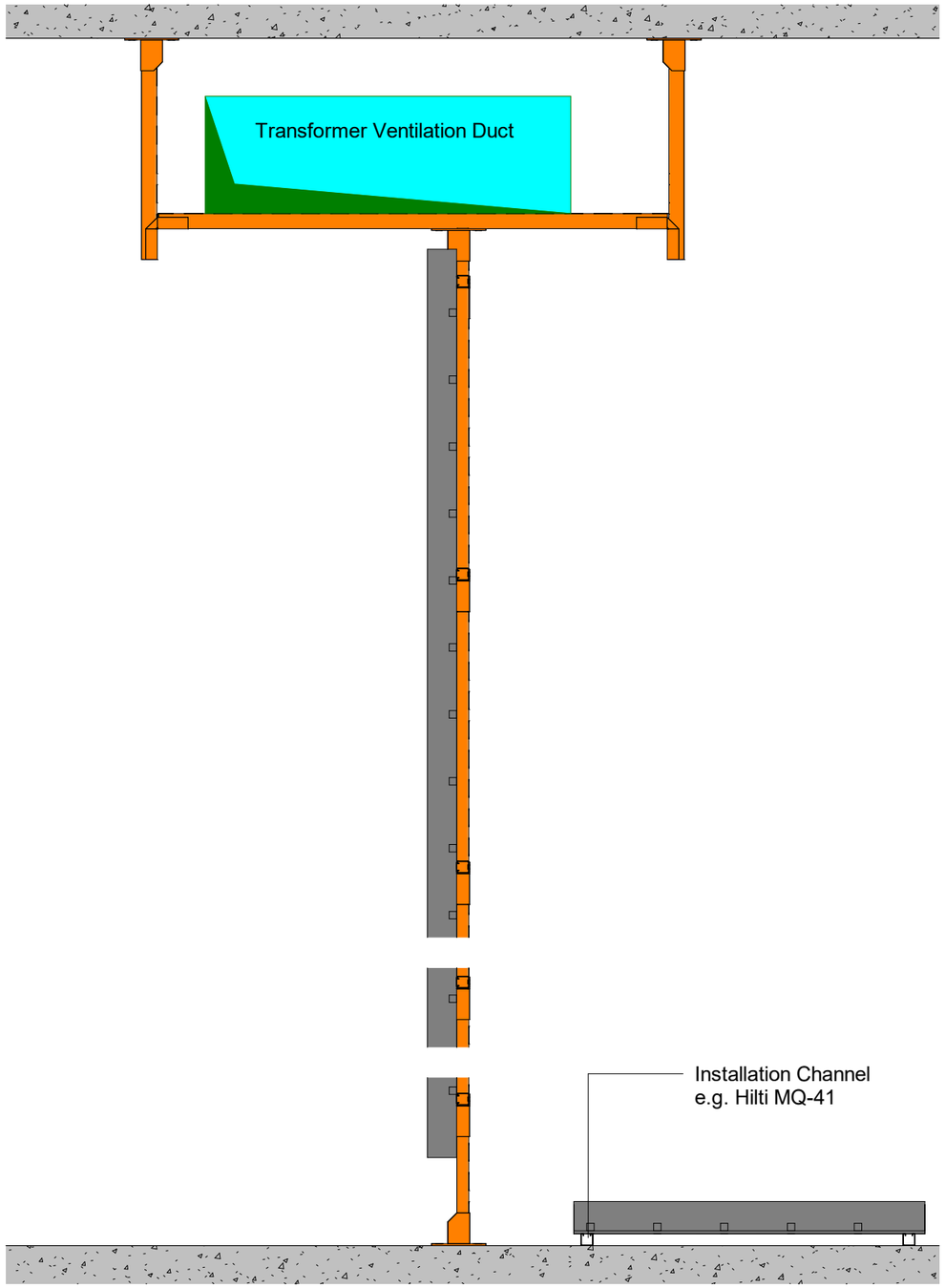
PROJECT NAME:

Execution Design and Engineering Requirements

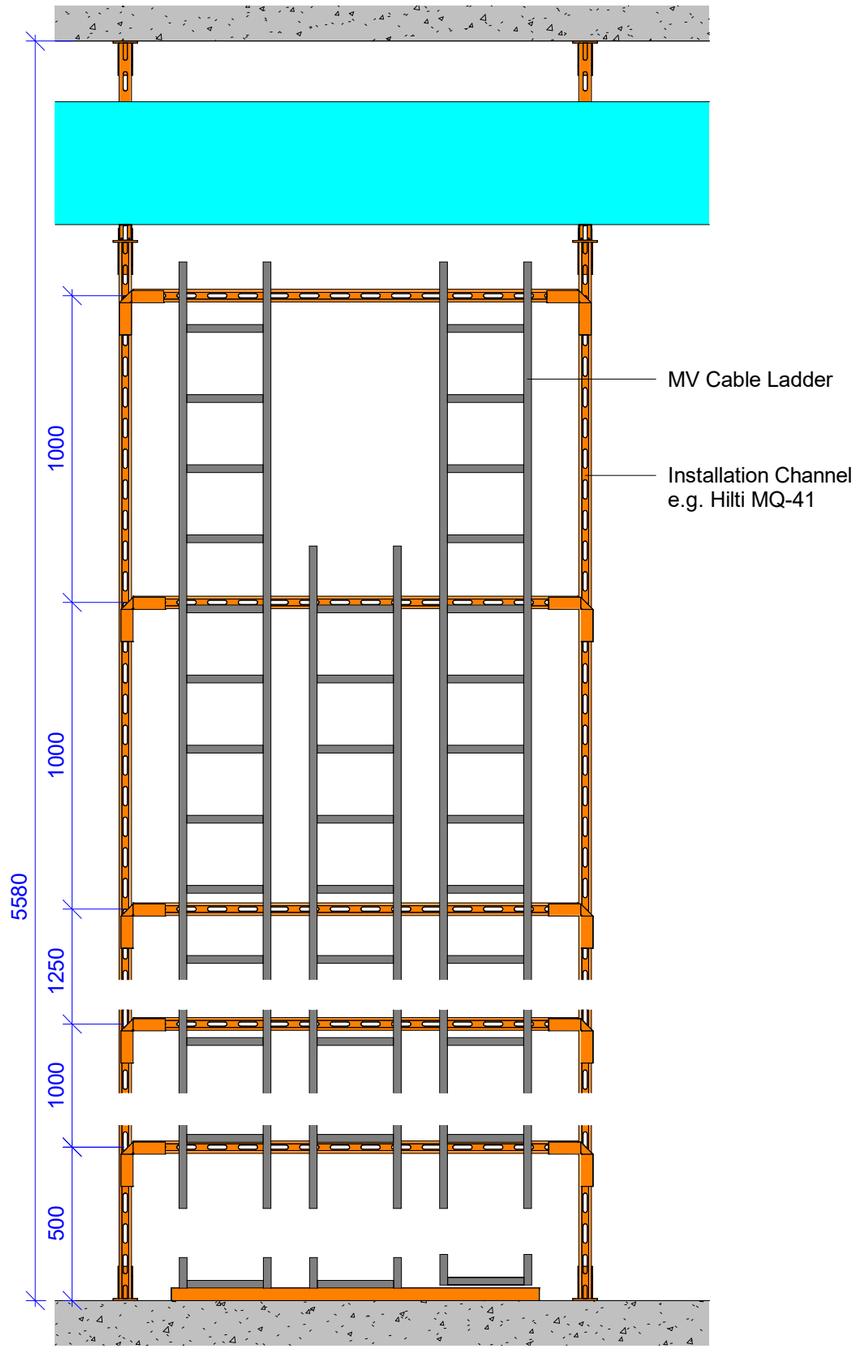
DRAWING NAME:

Containment Supports Principles Vertical Cable Ways - Mounting on Concrete Floor and Ceiling

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2025**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-J-39300		**A3**	**P02**



2 Section View - Cable Ways - Mounting on Concrete Floor and Ceiling



1 Front View - Cable Ways - Mounting on Concrete Floor and Ceiling

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.
3. All dimensions are in millimeters unless otherwise noted.

Rev	Date	Description	Sign.	Veri.
P02	04.04.2025	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	JR	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

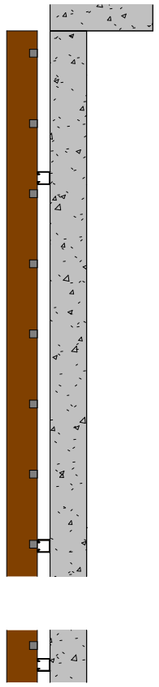
PROJECT NAME:

Execution Design and Engineering Requirements

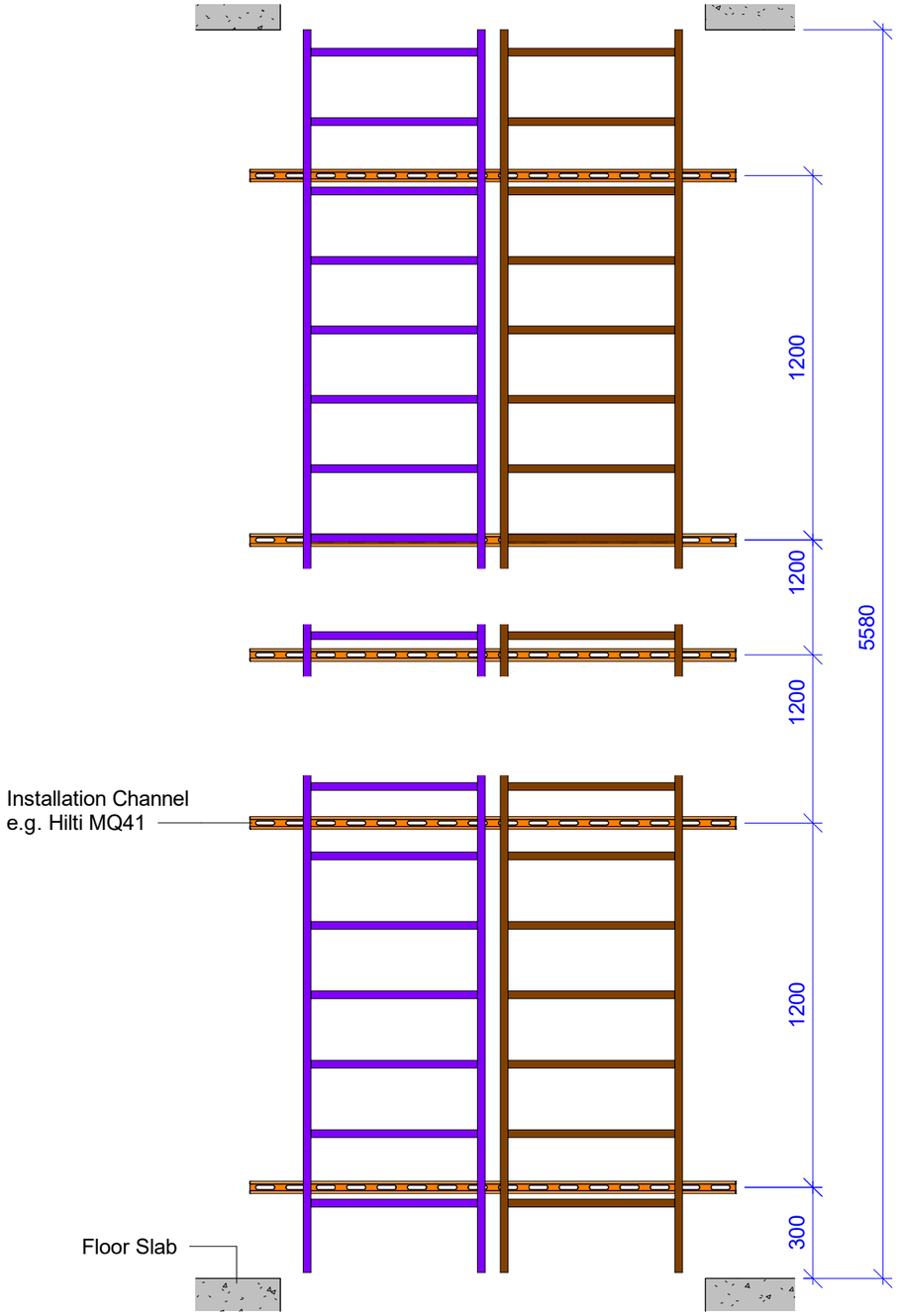
DRAWING NAME:

Containment Supports Principles Cable Ways - Mounting on Concrete Floor and Ceiling

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2025**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-J-39301		**A3**	**P02**



1 Section View - Vertical Cable Ways - Mounting on (Concrete) Walls



A Front View - Vertical Cable Ways - Mounting on (Concrete) Walls

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.
3. All dimensions are in millimeters unless otherwise noted.

Rev	Date	Description	Sign.	Veri.
P02	04.04.2025	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	JR	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

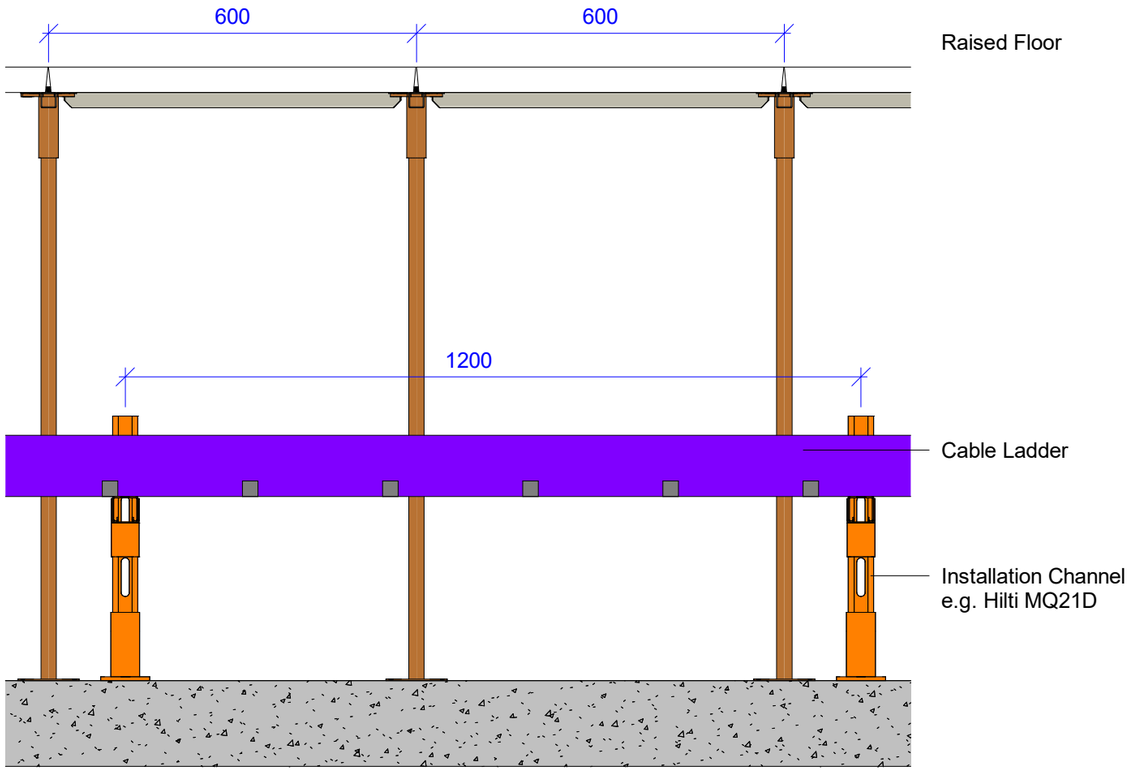
PROJECT NAME:

Execution Design and Engineering Requirements

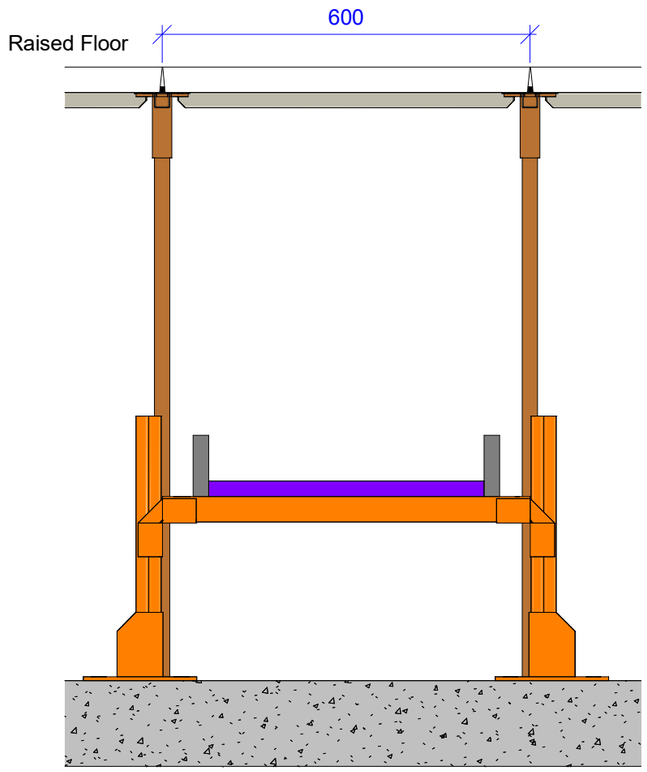
DRAWING NAME:

Containment Supports Principles Vertical Cable Ways - Mounting on Concrete Wall

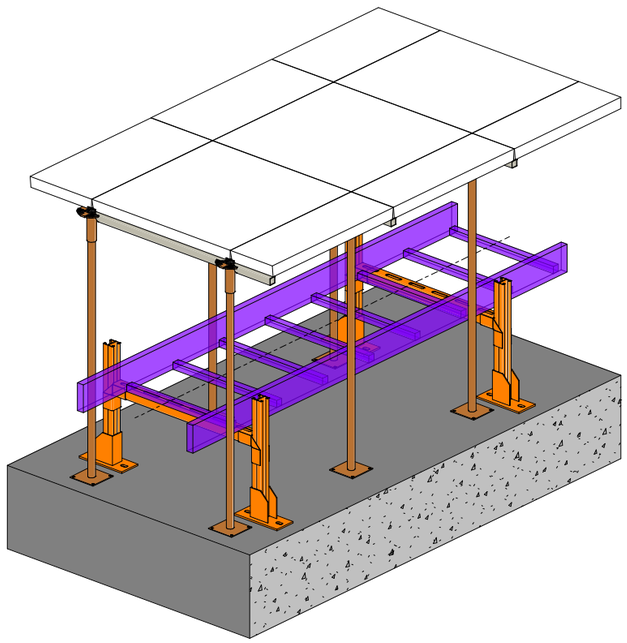
DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2025**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-J-39302		**A3**	**P02**



1 Section View - Cable Ways - Under Raised Floor



A Front View - Cable Way - Under Raised Floor



3D1 3D View - Cable Ways - Under Raised Floor

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.
3. All dimensions are in millimeters unless otherwise noted.

Rev	Date	Description	Sign.	Veri.
P02	04.04.2025	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	JR	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

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PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Containment Supports Principles
Cable Ways - Under Raised Floor

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
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DRAWING NUMBER:		FORMAT:	REVISION:
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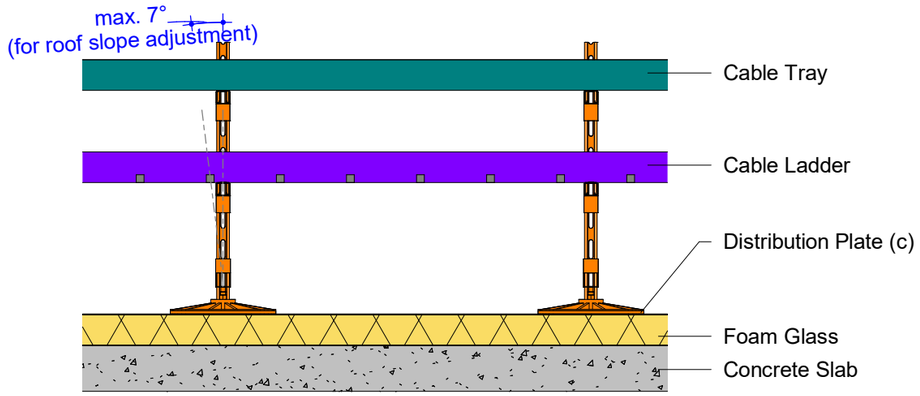
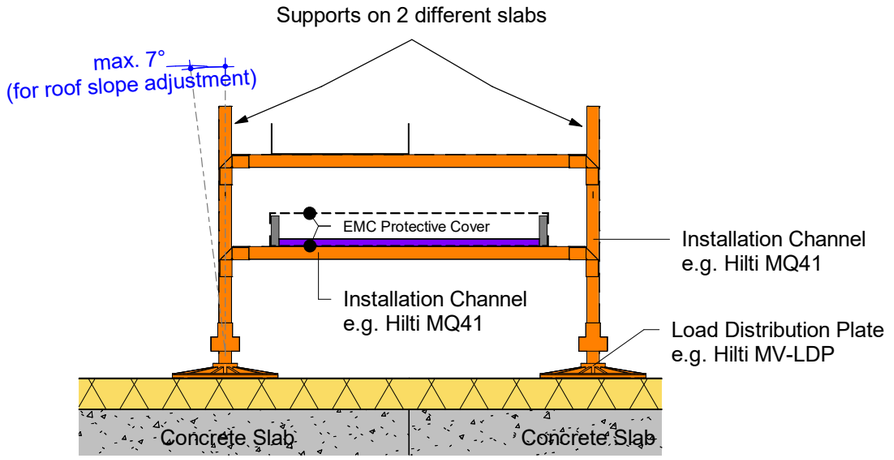
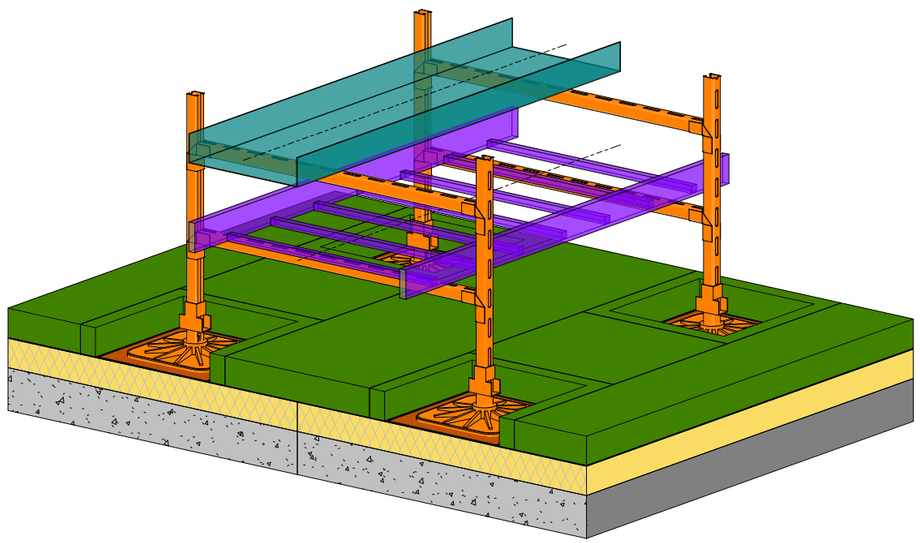


1 Section View - Cable Ways - Roof



A Front View - Cable Ways - Roof



3D1 3D View - Cable Ways - Roof

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.

Specific Notes

a. Bends & T-pieces to be supported seperatly.
b. For stability of the cable and/or busbar route, contractor to determine were longitudinal and/or transverse braces need to be placed.
c. To be place on solid surface (not on gravel and/or green roof elements)

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P01	11.11.2024	Issued for Information	JR	JM

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CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Containment Supports Principles Cable Ways - Installation with Roof Supports

DRAWING STATUS:		SCALE:	STATUS:
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DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
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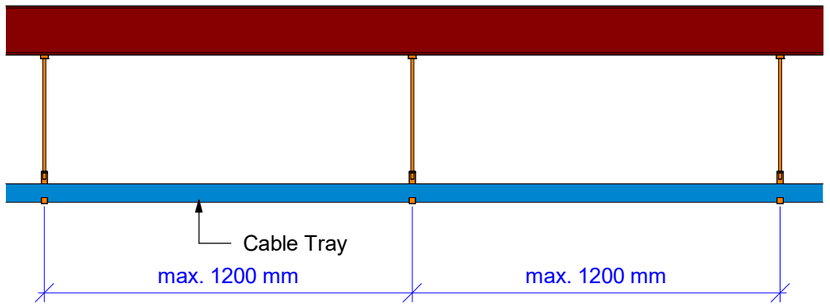
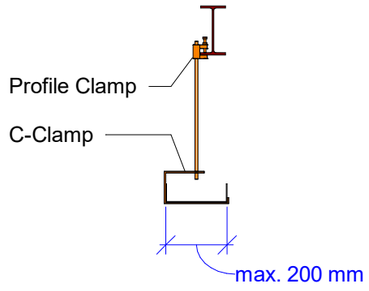
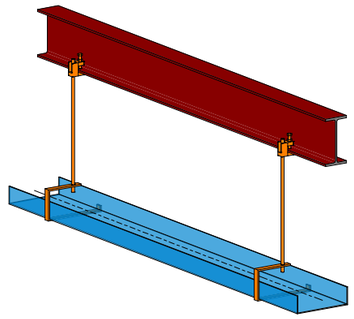
RDC0000-BMS-ZZ-ZZ-DR-J-39304		**A3**	**P02**



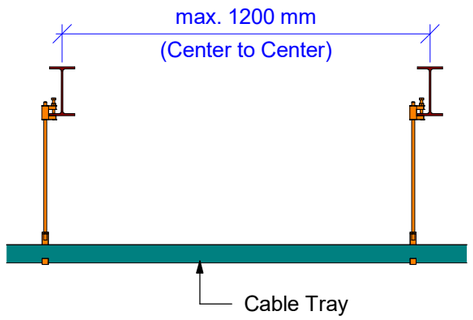
1 Section View - Cable tray Parallel to Beams



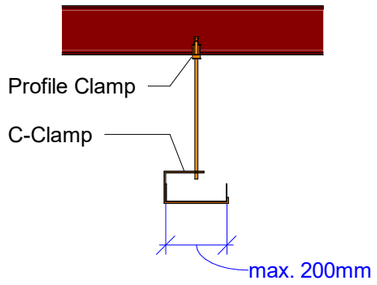
A Front View - Cable tray Parallel to Beams



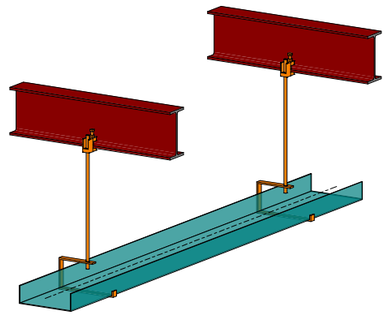
3D1 3D View - Cable tray Parallel to Beams



2 Section View - Cable tray Perpendicular to Beams



B Front View - Cable tray Perpendicular to Beams



3D2 3D View - Cable tray Perpendicular to Beams

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
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DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

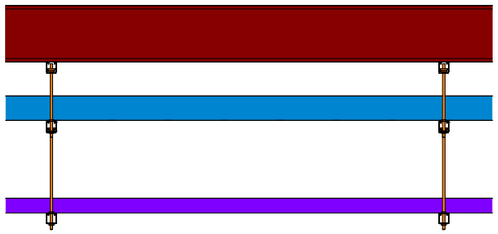
PROJECT NAME:

Execution Design and Engineering Requirements

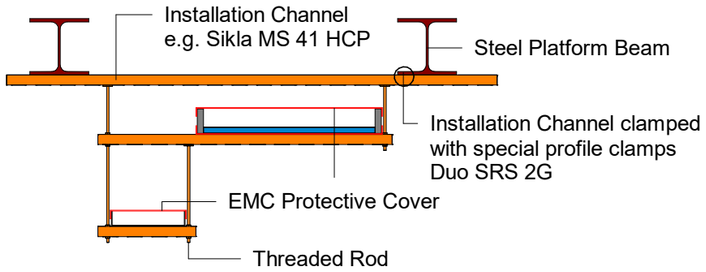
DRAWING NAME:

Containment Supports Principles Cable Ways - Installation with Beam Supports - C-Clamps

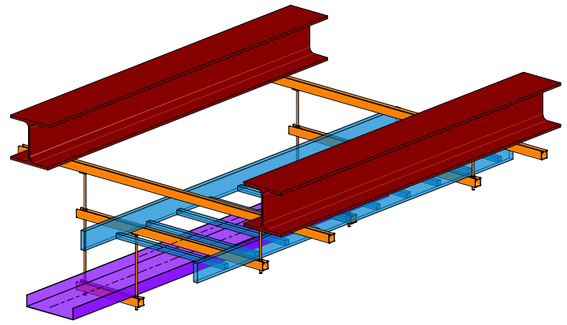
DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2025**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-J-39305		**A3**	**P02**



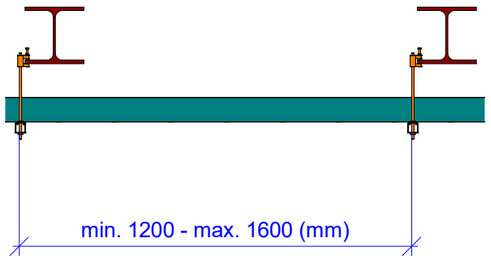
1 Section View - Cable Ways Parallel to Beams



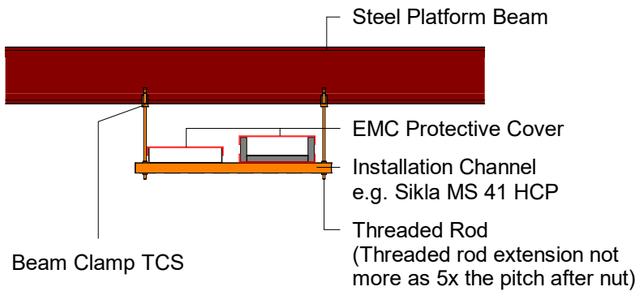
A Front View - Cable Ways Parallel to Beams



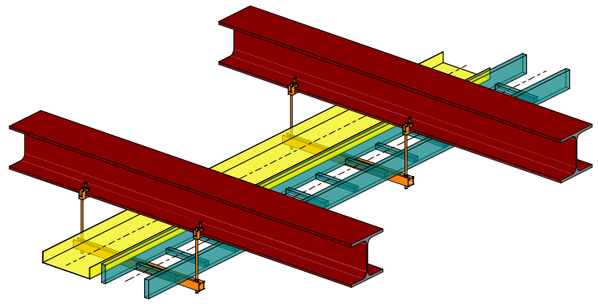
3D1 3D View - Cable Ways Parallel to Beams



2 Section View - Cable Ways Perpendicular to Beams



B Front View - Cable Ways Perpendicular to Beams



3D2 3D View - Cable Ways Perpendicular to Beams

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
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DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Containment Supports Principles Cable Ways - Installation with Beam Supports - Channels

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
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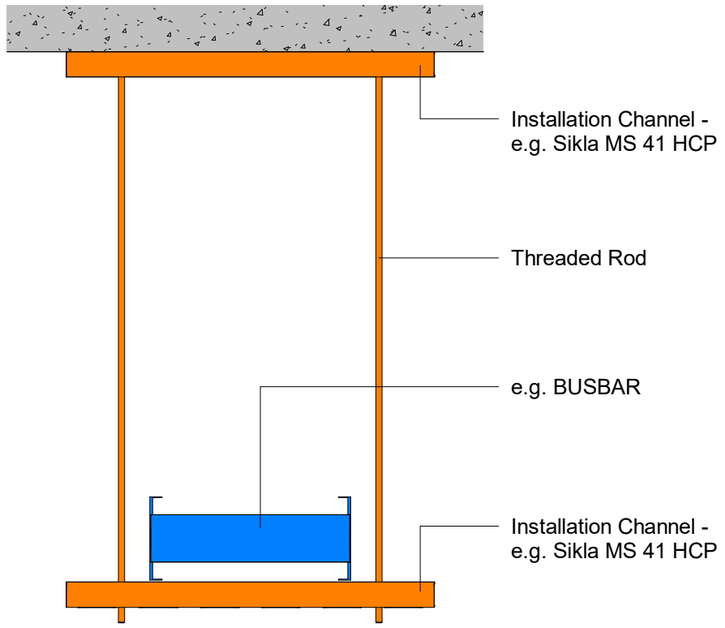
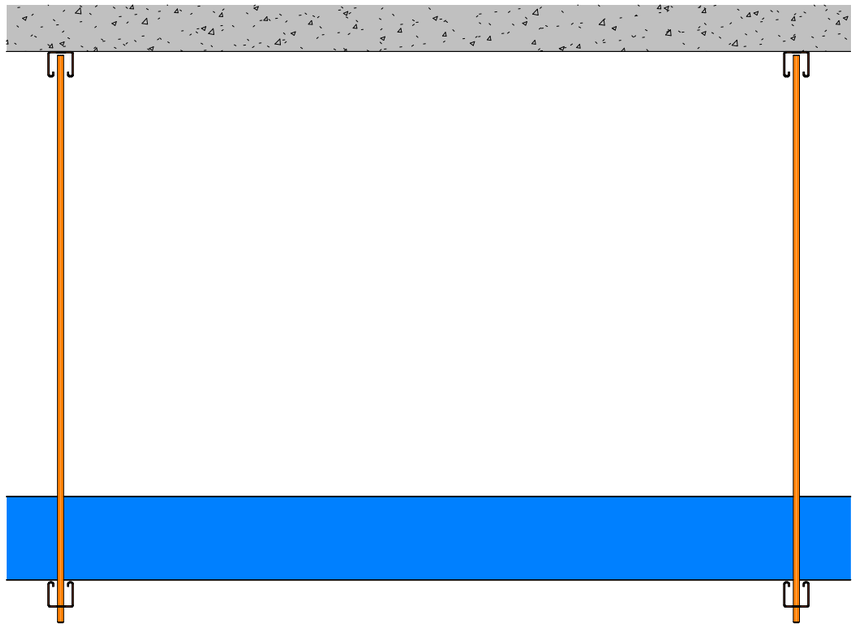
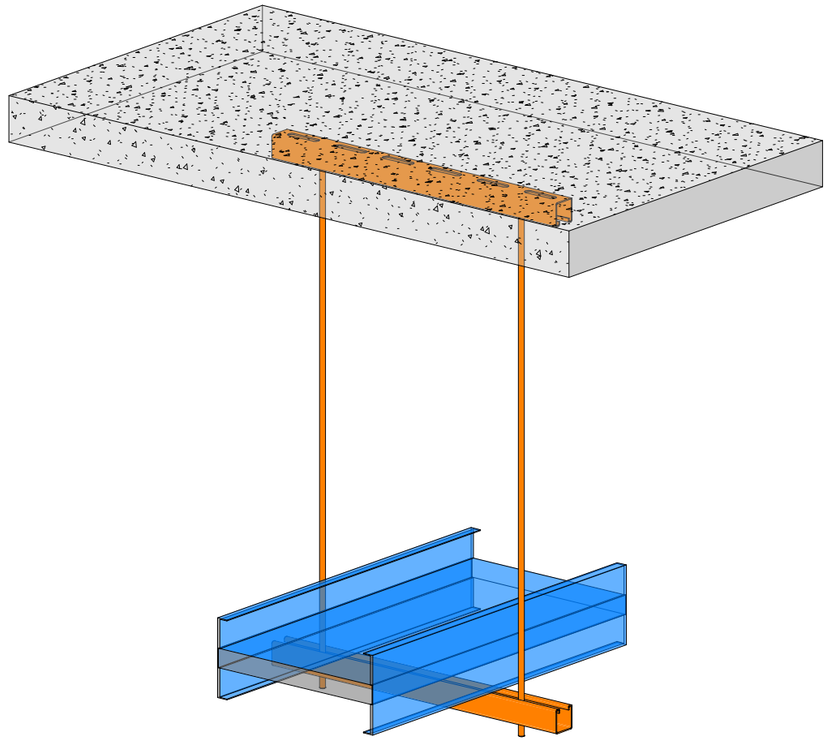
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-J-39306		**A3**	**P02**



A Section Front View - Supports - One Level



1 Section View - Supports - One Level



3D1 3D View - Supports - One Level

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
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Rev	Date	Description	Sign.	Veri.
P02	04.04.2025	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	TP	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

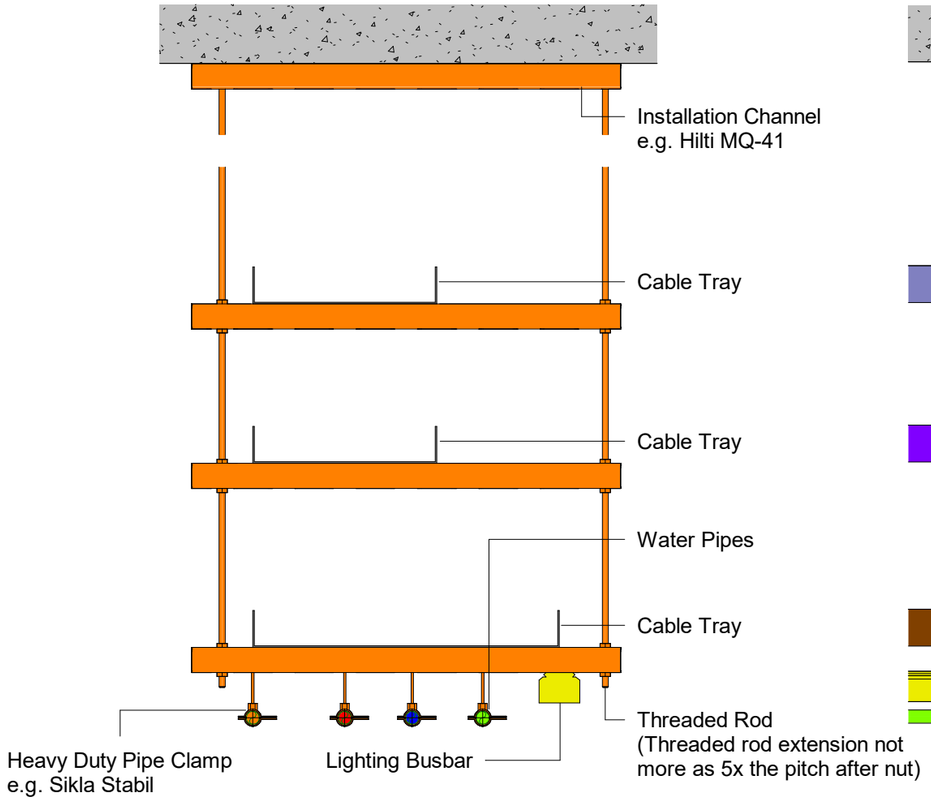
PROJECT NAME:

Execution Design and Engineering Requirements

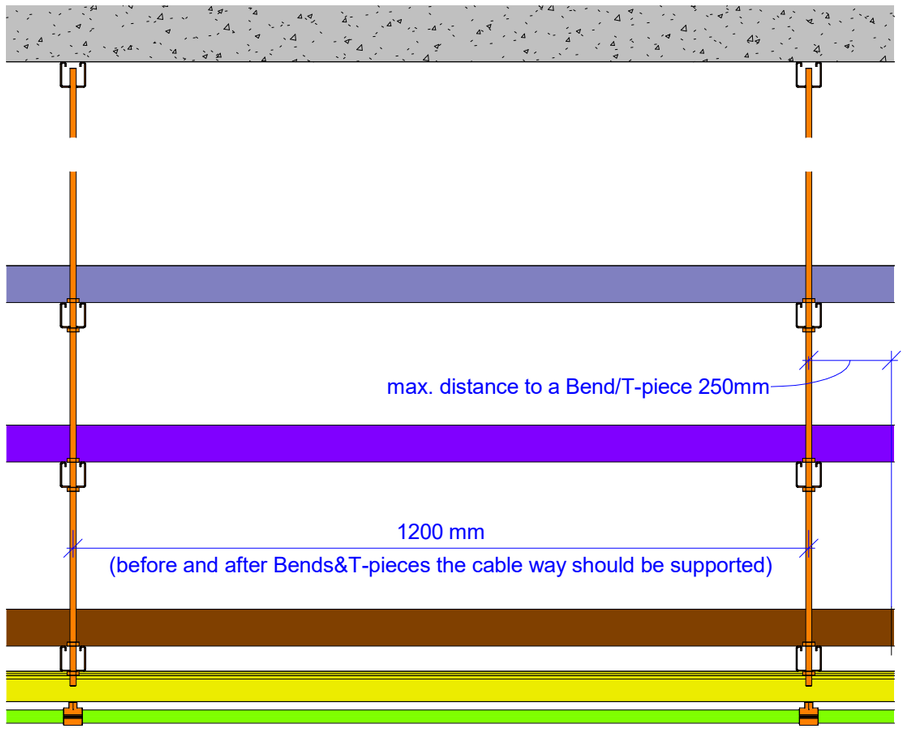
DRAWING NAME:

Containment Supports Principles Cable Ways - One-level

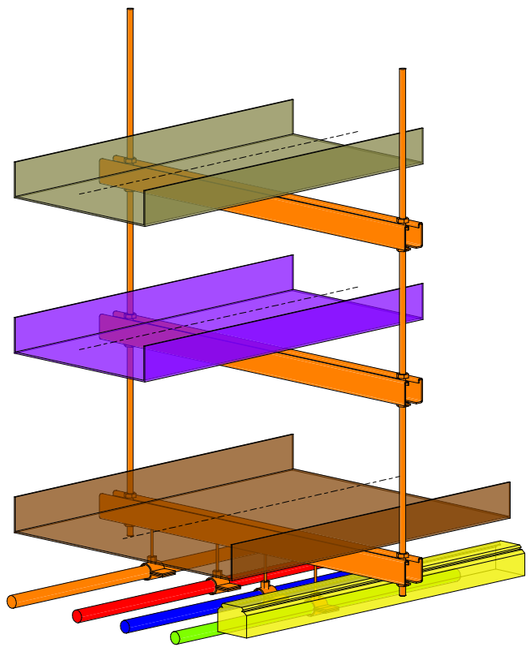
DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2025**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-J-39307		**A3**	**P02**



1 Section View - Cable Ways - Typical Corridor



A Front View - Cable Ways - Typical Corridor



3D1 3D View - Cable Ways - Typical Corridor

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
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P02	04.04.2025	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	TP	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Containment Supports Principles
Cable Ways - Multi-level

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
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DRAWING NUMBER:		FORMAT:	REVISION:
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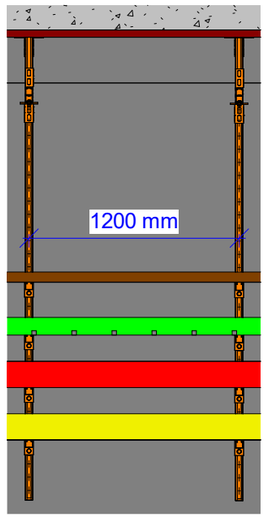
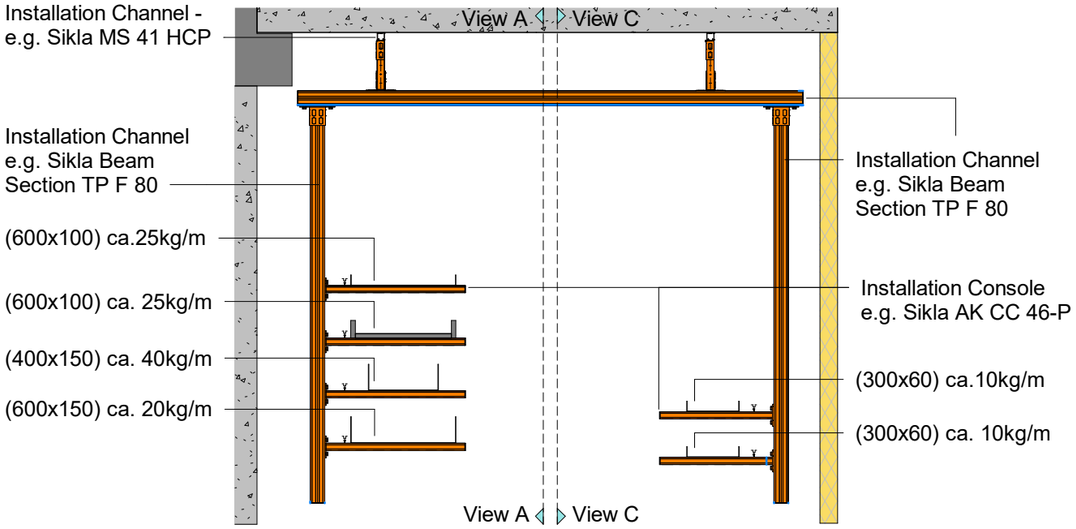
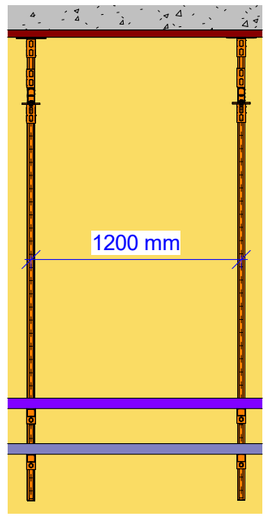


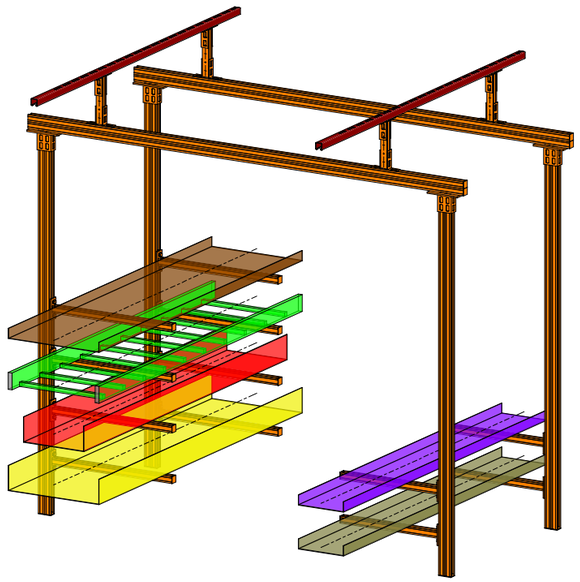
A View A - Installation with Consoles



B Front View - Installation with Consoles



C View C - Installation with Consoles



3D1 3D View - Cable Ways - Installation with Consoles

Notes

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P02	04.04.2025	Revision 1	JR	JM
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CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

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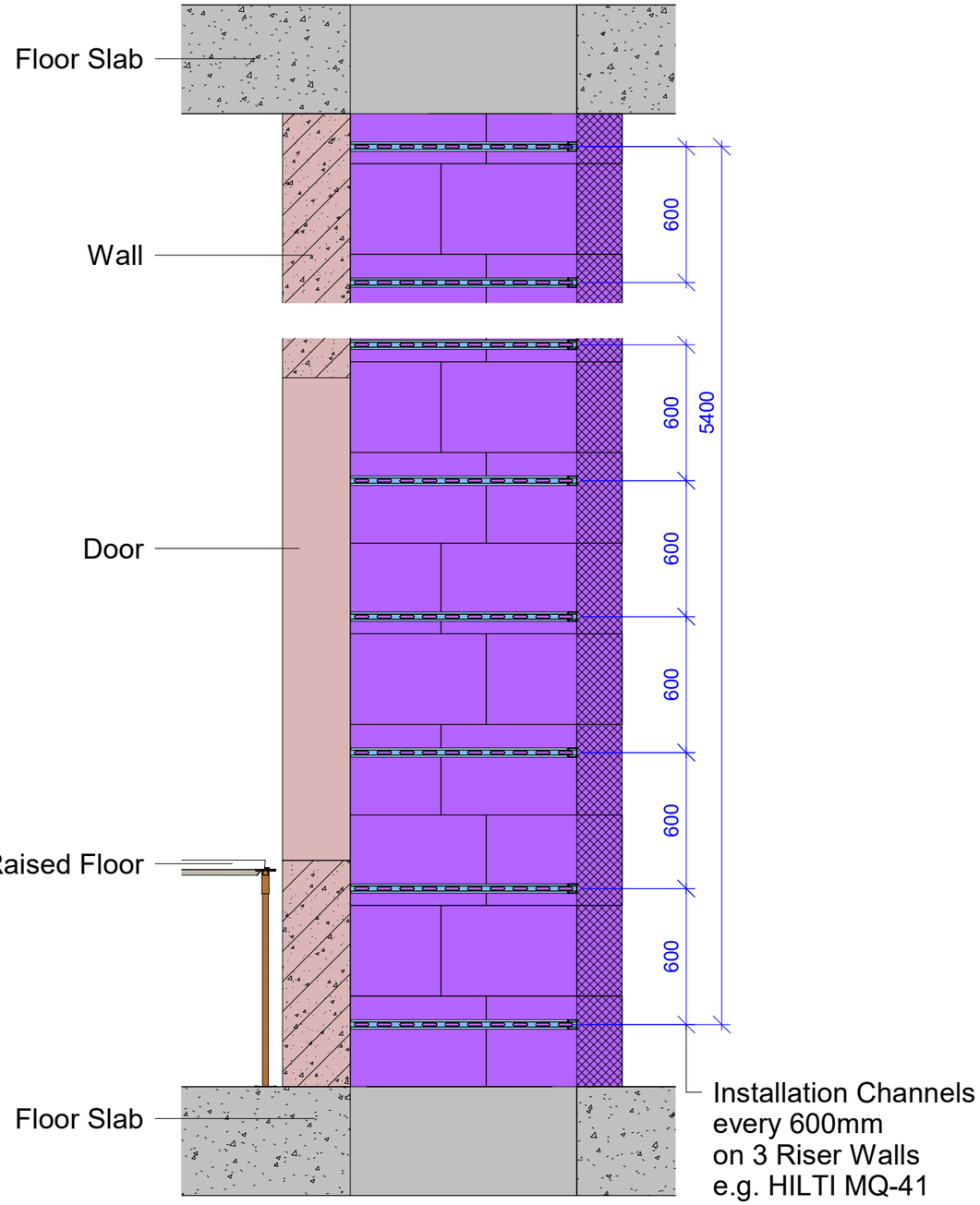
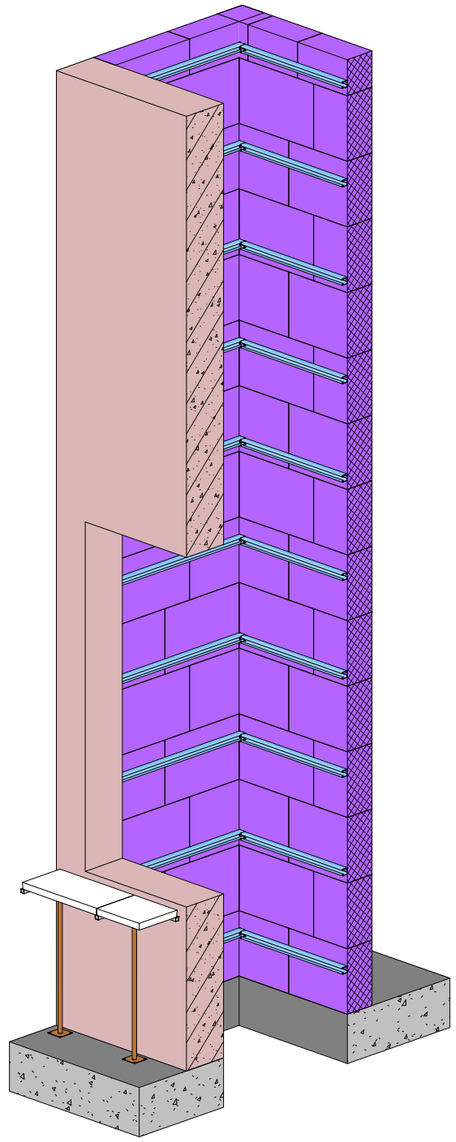
Containment Supports Principles Cable Ways - Installation with Consoles

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2025**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-J-39309		**A3**	**P02**



A Front View - Installation Channels on Riser Walls



3D1 3D View - Installation Channels on Riser Walls

Note:

Sandwich panel walls in a riser are typically not the primary support. The supports usually rely on separate structural framing or anchorage to the main building structure.
The panels are for enclosure, insulation, and fire separation, not bearing loads.
Heavy riser contents are often hung or supported by concrete slabs or steel beams.
Unistrut/Strut Channels are frequently fixed between structural elements (like slabs or steel framing) to support piping and cabling.
Bracket Systems can be bolted to steel columns or interior framing elements, not the panel itself.
Please refer RDC0000-BMS-ZZ-ZZ-DR-J-39300 and RDC0000-BMS-ZZ-ZZ-DR-J-39301.

Notes

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P02	04.04.2025	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	TP	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

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Execution Design and Engineering Requirements

DRAWING NAME:

Containment Supports Principles Cable Ways - Installation Channels on Riser Walls

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
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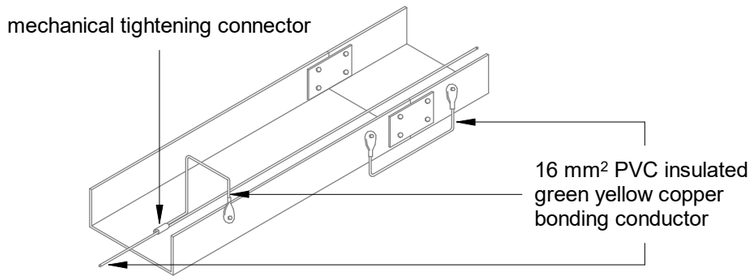
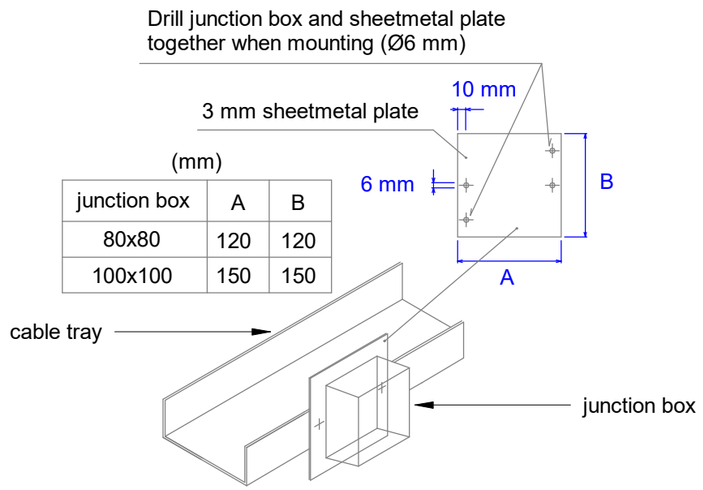
11.11.2024	**04.04.2025**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-J-39310		**A3**	**P02**

CONTAINMENT INSTALATION DETAILS

CABLE TRAY BONDING



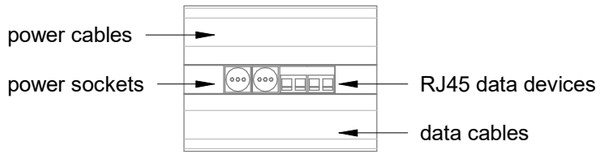
JUNCTION BOX FIXATION TO CABLE TRAY



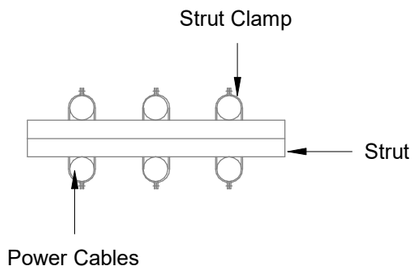
(mm)

junction box	A	B
80x80	120	120
100x100	150	150

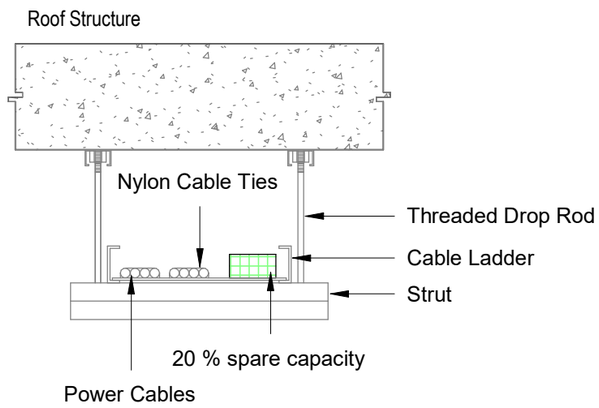
CABLE TRUNKING DETAIL



MV CABLE CLAMPING DETAIL



LV POWER CABLE SPACING DETAIL



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DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

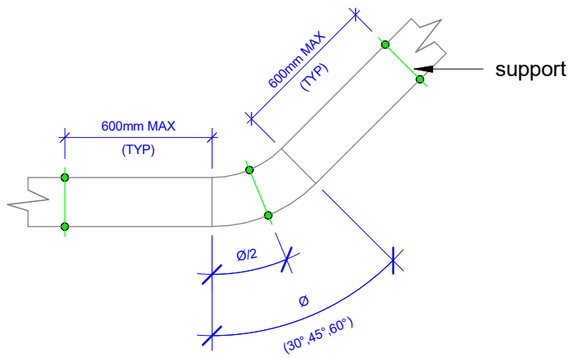
DRAWING NAME:

Containment Support Principles
Containment Instalation Details

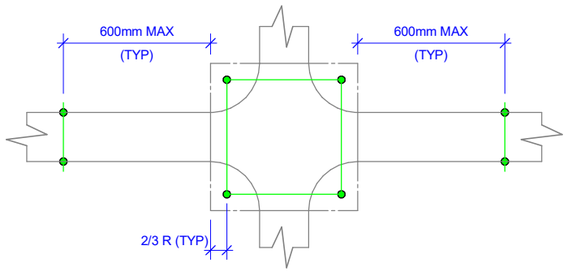
DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-J-63521		**A3**	**P02**

CONTAINMENT FITTING SUPPORT LOCATIONS

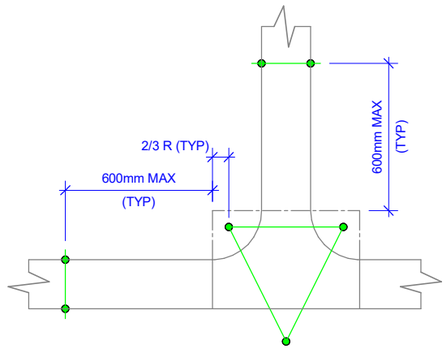
Horizontal Elbows



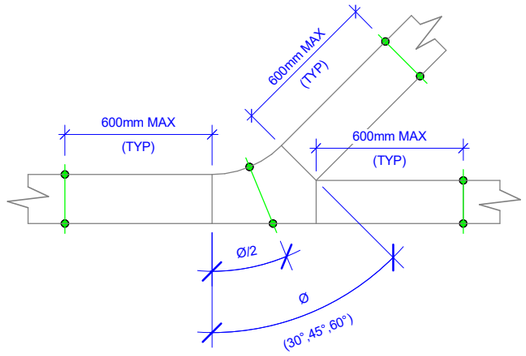
Horizontal Cross



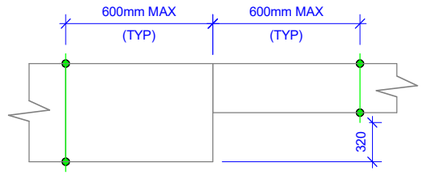
Horizontal Tee



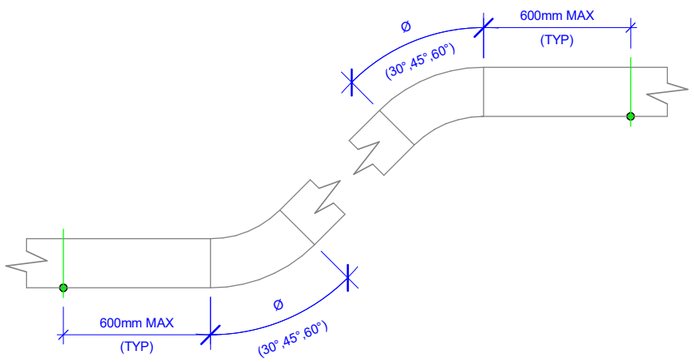
Horizontal Wye



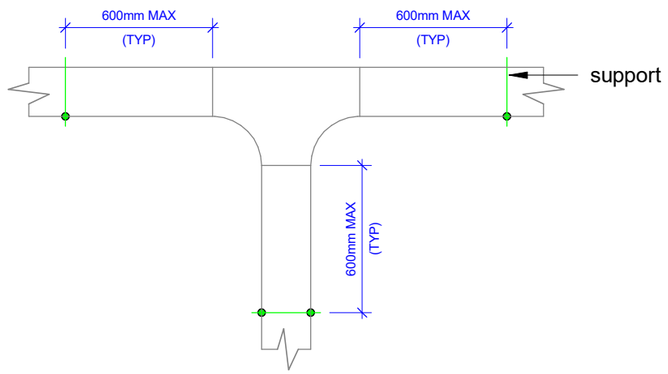
Reducer



Vertical Elbows



Vertical Tee



Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
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Rev	Date	Description	Sign.	Veri.
P02	04.04.2024	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	JR	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

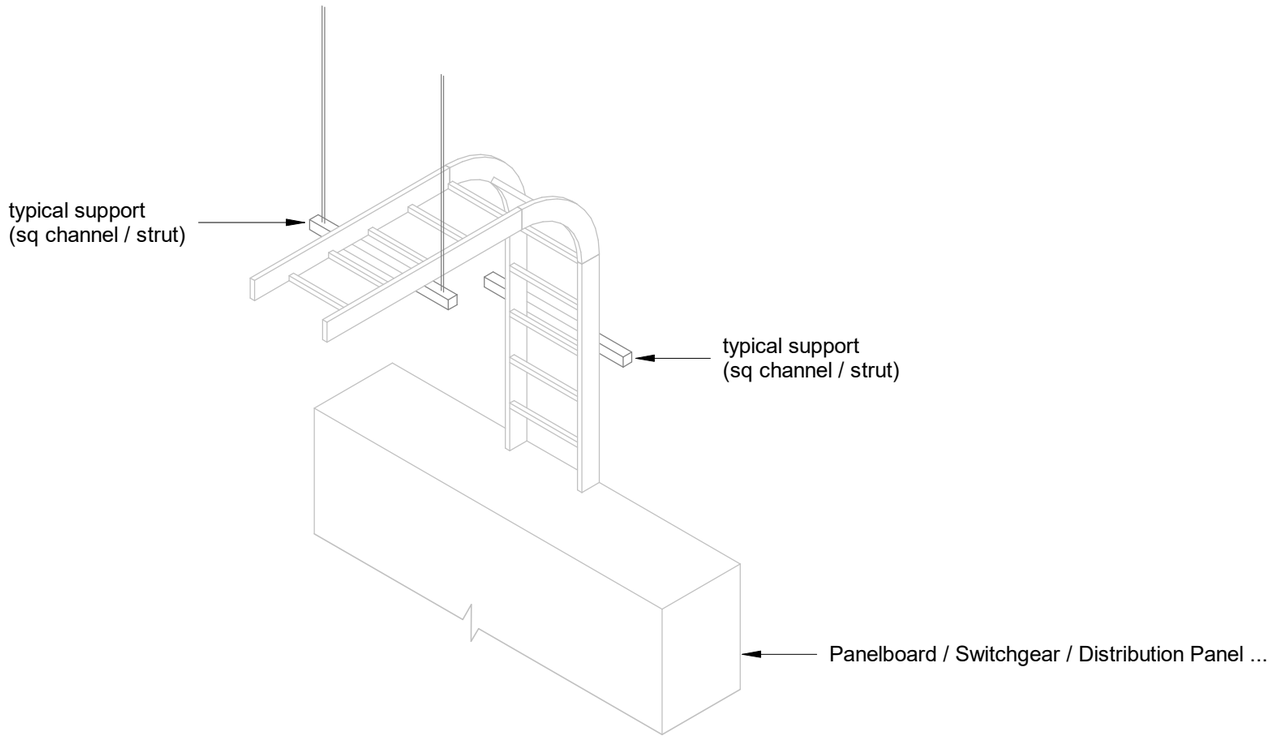
Execution Design and Engineering Requirements

DRAWING NAME:

Containment Support Principles Containment Fitting Support Locations

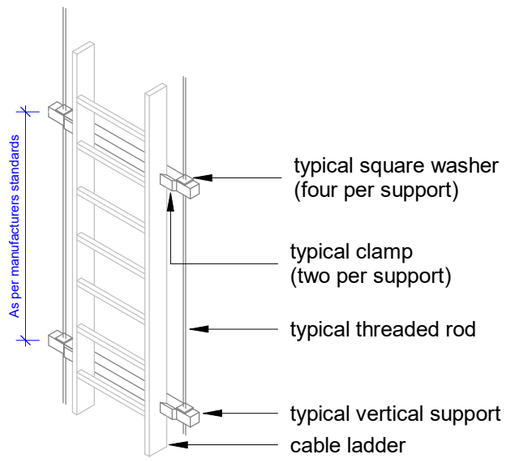
DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-J-63522		**A3**	**P02**

CONTAINMENT TO ELECTRICAL EQUIPMENT SUPPORT MOUNTING



VERTICAL CABLE LADDER SUPPORT MOUNTING

(for ladders suspended from building steel above)



Notes

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Rev	Date	Description	Sign.	Veri.
P02	04.04.2024	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	JR	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

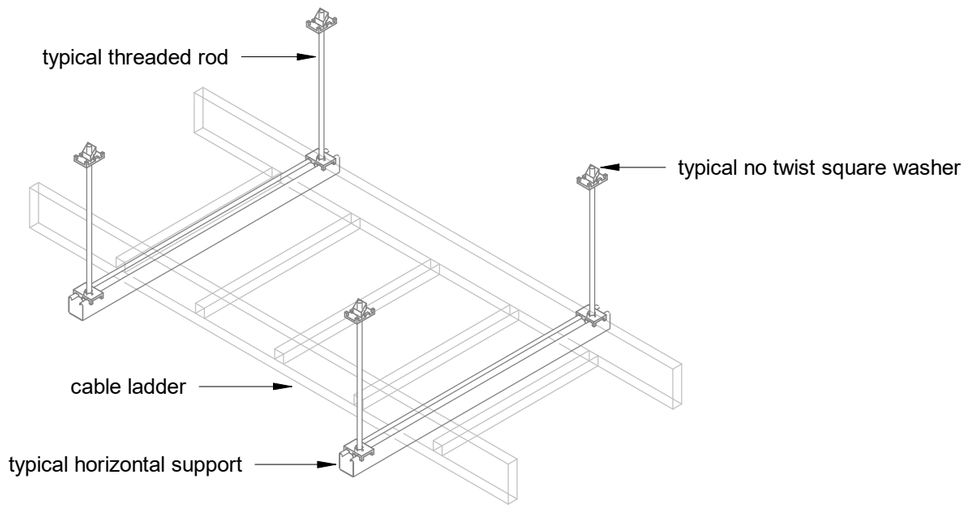
DRAWING NAME:

Containment Support Principles Containment To Electric Equipment Support Mounting

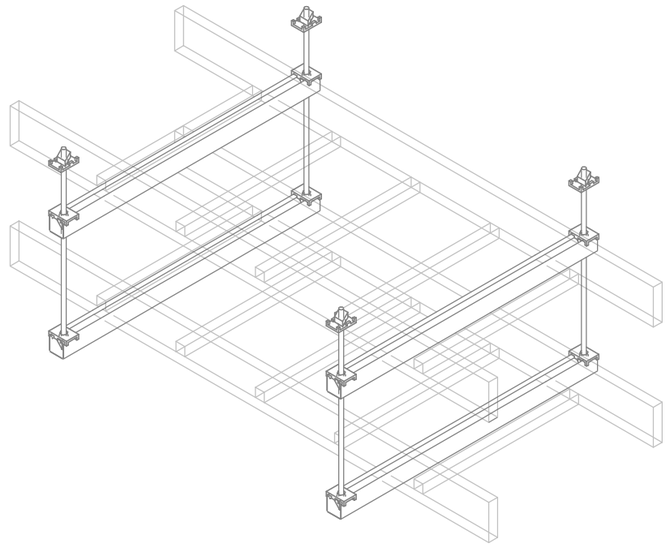
DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-J-63523		**A3**	**P02**

CONTAINMENT SUPPORTS - LAYERS
(for ladders suspended from building steel above)

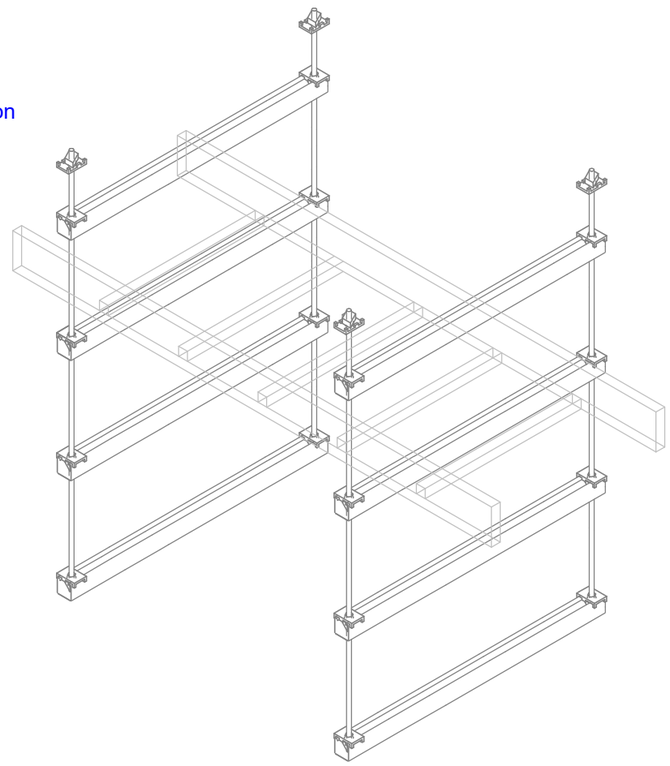
SINGLE LAYER



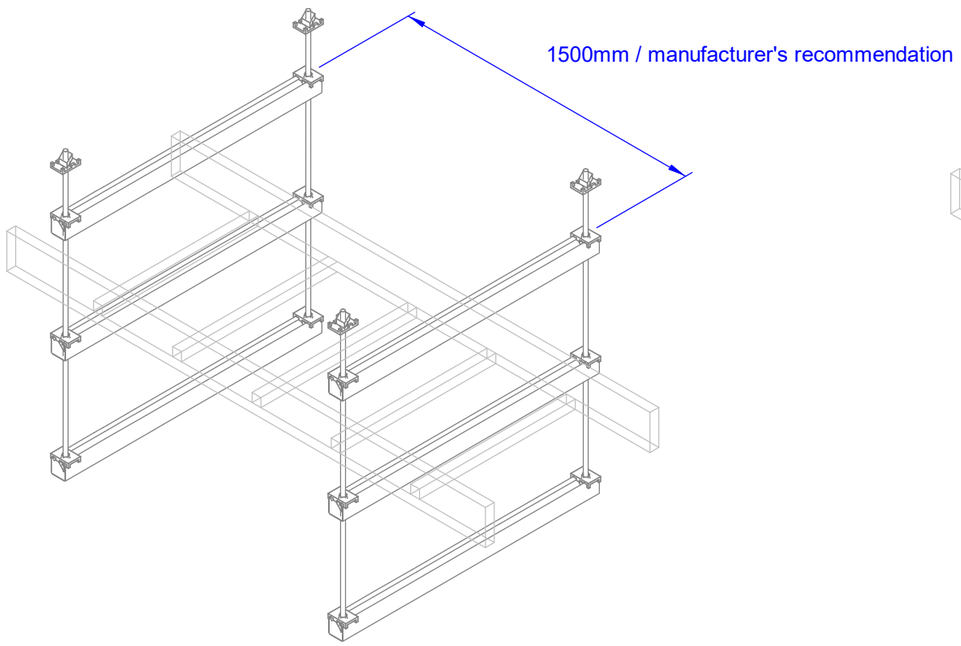
DOUBLE LAYER



QUAD LAYER



TRIPLE LAYER



Notes

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Rev	Date	Description	Sign.	Veri.
P02	04.04.2024	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	JR	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

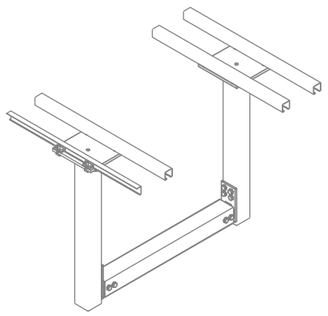
DRAWING NAME:

Containment Support Principles
Containment Supports - Layers

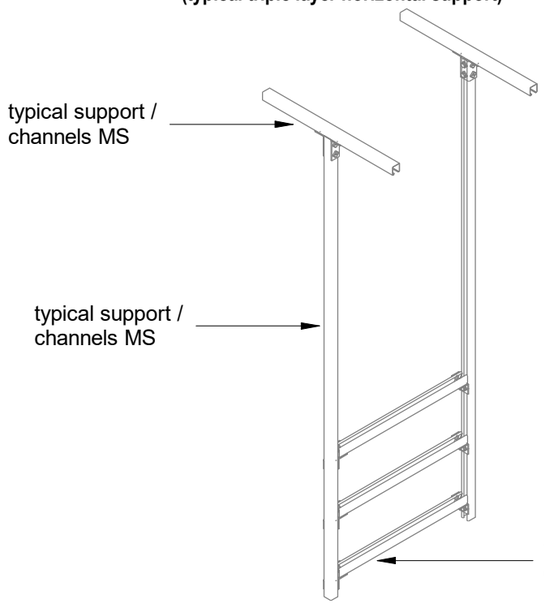
DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-J-63524		**A3**	**P02**

CONTAINMENT SUPPORTS - TYPICAL FIXATION

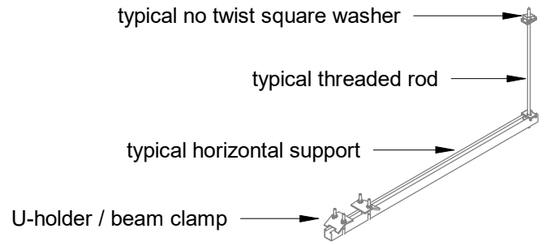
SUSPENDED FROM HOLLOW CORE SLAB
(typical horizontal support)



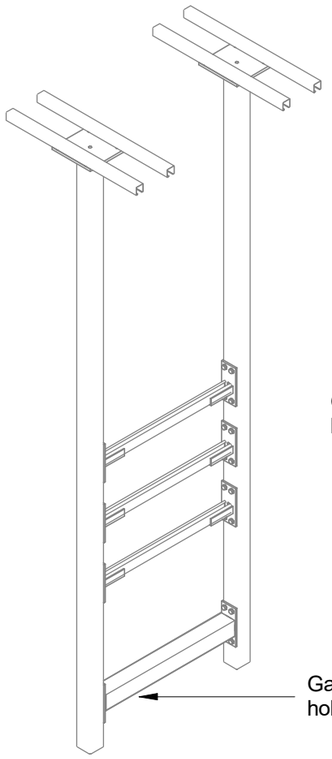
SUSPENDED FROM HOLLOW CORE SLAB
(typical triple layer horizontal support)



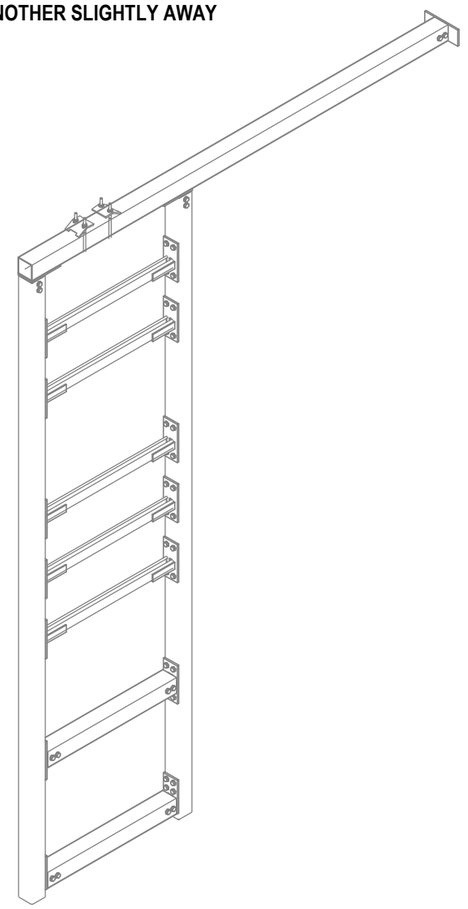
SUSPENDED FROM TATE CEILING ON THE RIGHT AND A FROM BEAM ON THE LEFT



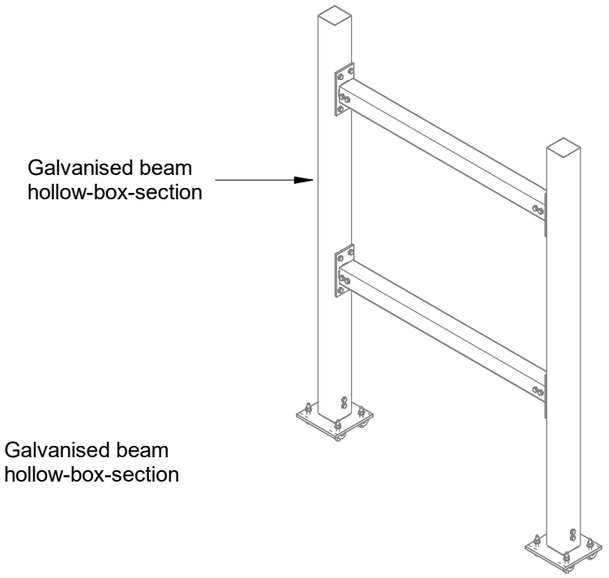
SUSPENDED FROM HOLLOW CORE SLAB
(typical quad layer horizontal support)



SUSPENDED FROM A NEARBY BEAM AND ANOTHER SLIGHTLY AWAY



FIXED TO A BEAM THAT PASSES UNDERNEATH



Notes

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2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.

Rev	Date	Description	Sign.	Veri.
P02	04.04.2024	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	JR	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

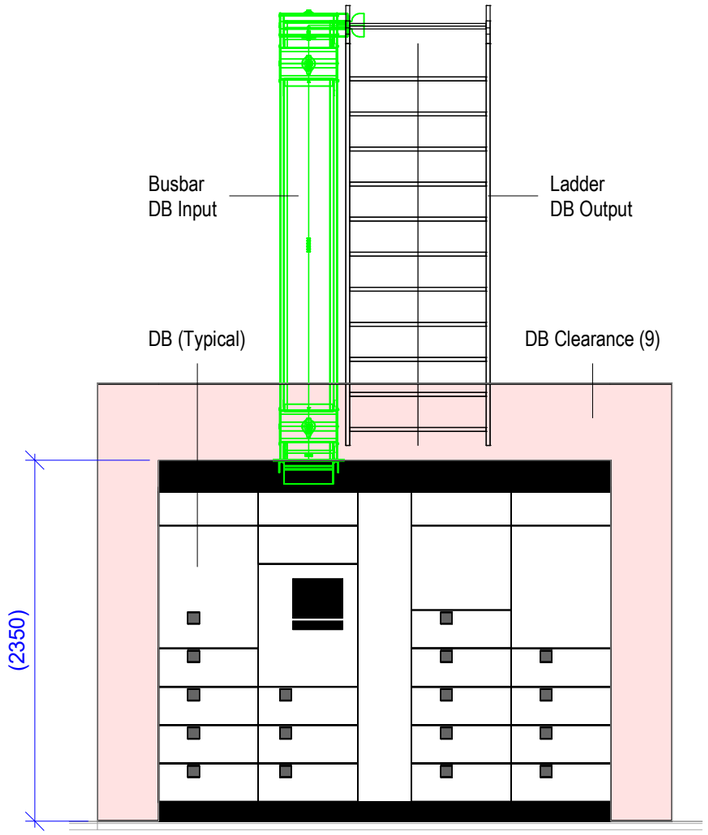
DRAWING NAME:

Containment Support Principles Containment Supports - Typical Fixation

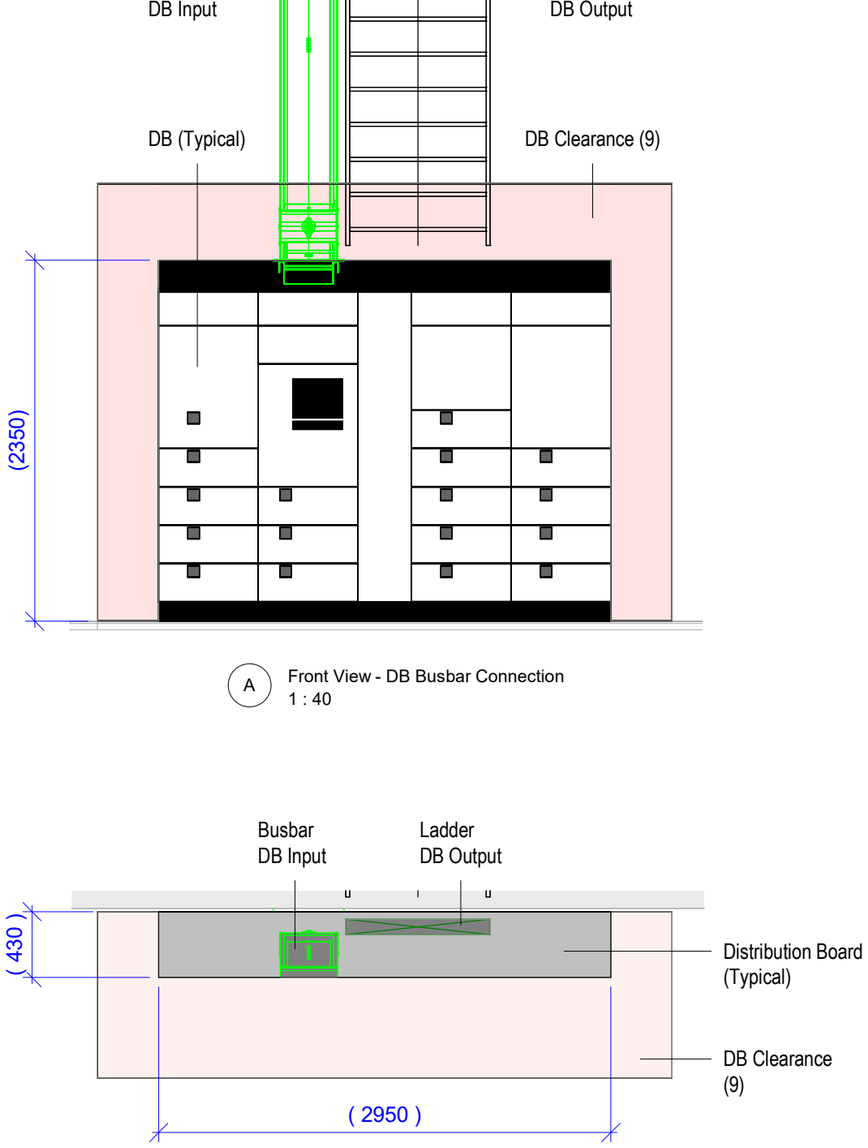
DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2024**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-J-63525		**A3**	**P02**

4.5. MEP Installation Details – Electrical Equipment

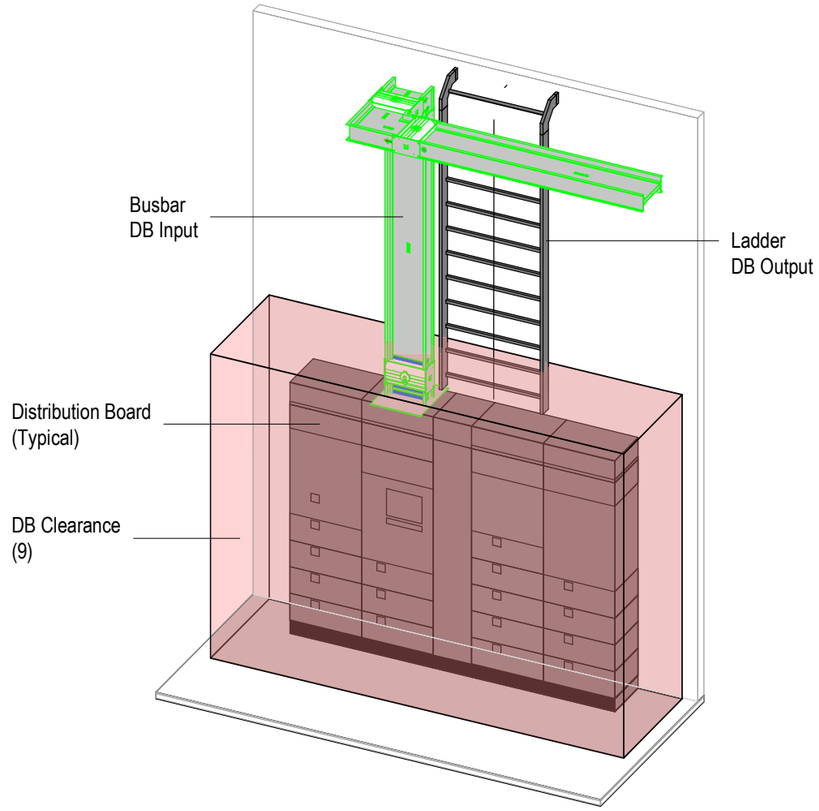
Purpose: in this chapter you can find best practices and requirements for the installation of electrical equipment such as Distribution Boards, Control Cabinets, Fan Wall and Racks.



A Front View - DB Busbar Connection
1 : 40



B Top View - DB Busbar Connection
1 : 40



3D1 3D View - DB Busbar Connection

General Notes:

1. All dimensions are in milimeters unless otherwise noted.

2. This drawing is to be read in conjunction with all other architectural, structural, electrical, piping, mechanical, civils, landscape, specialists, temporary works, and main contractor drawings, specifications, equipment schedules, designers risk assessments and with most updated as built information.

3. For materials and equipment sizes/technical information refer to project specifications, schedules and product data sheets.

4. Final Locations of installation accessories to be reviewed with specialist subcontractor.

5. Do not scale from this drawing.

Specific Notes:

1. Choose distribution boards suitable for the data center's electrical load, with appropriate circuit breakers and fuses for protection against overloads and short circuits.

2. Use proper fasteners and supports to ensure secure installation and correct grounding of devices.

3. Implement an effective grounding system, in accordance with local standards.

4. Install signaling devices and current and voltage meters for remote monitoring.

5. Ensure proper ventilation to prevent overheating, with openings or fans.

6. Include redundant circuits and alternative power sources, such as UPS, to ensure continuous power supply.

7. Plan the distribution board with space for future expansions and easy access for maintenance.

8. Ensure that the distribution boards comply with local and international standards, with appropriate certifications to guarantee safety and efficiency.

9. DB clearance according to the model / manufacturer.

Rev	Date	Description	Sign.	Veri.
P02	04.04.2025	Revision 1	JR	JM
P01	24.01.2025	Issued for Information	TP	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

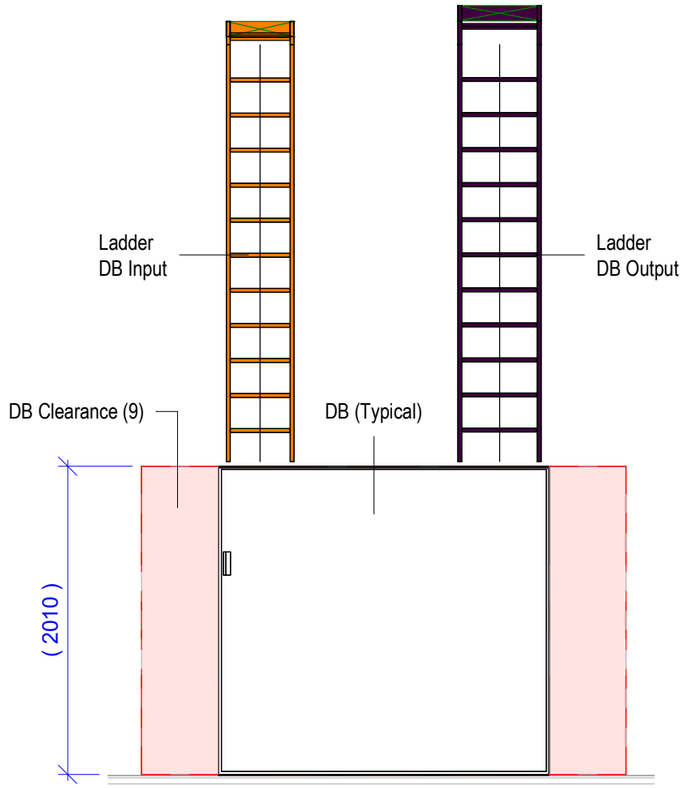
PROJECT NAME:

Execution Design and Engineering Requirements

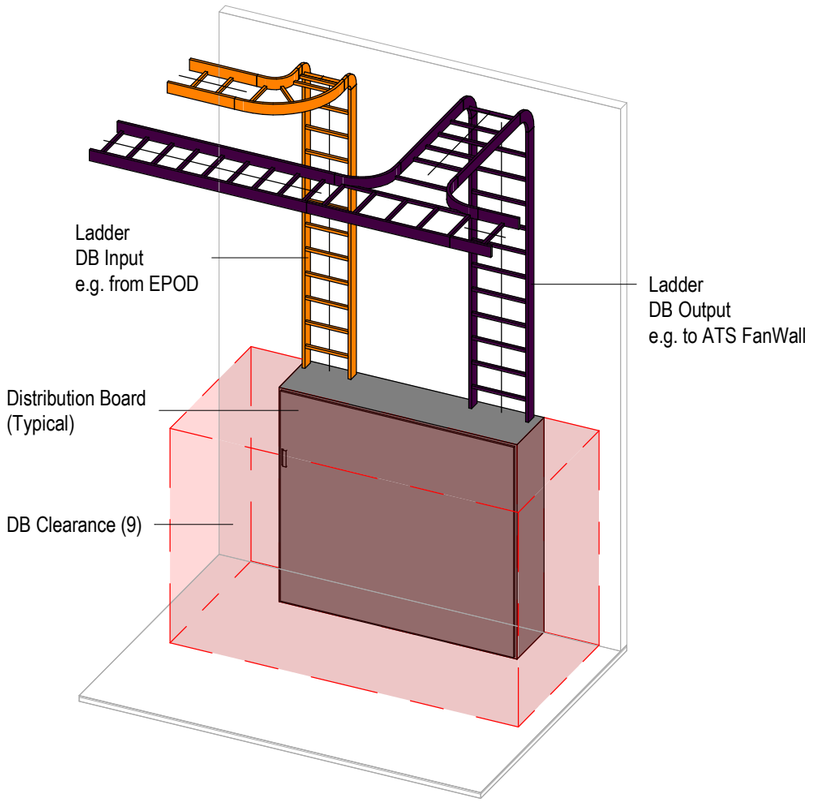
DRAWING NAME:

Electrical Equipment Distribution Board (DB) Busbar Connection

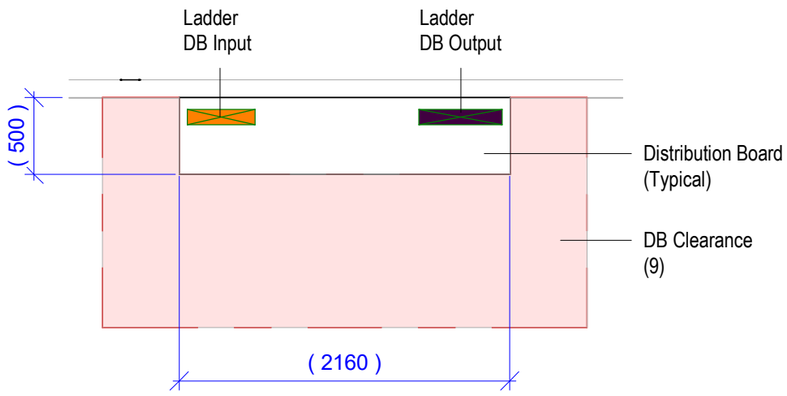
DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**As Indic**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
24.01.2025	**04.04.2025**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-XX-XX-DR-E-70205		**A3**	**P02**



A Front View - DB - Typical
1 : 40



3D1 3D View - DB - Typical



B Top View - DB - Typical
1 : 40

General Notes:

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7. Plan the distribution board with space for future expansions and easy access for maintenance.

8. Ensure that the distribution boards comply with local and international standards, with appropriate certifications to guarantee safety and efficiency.

9. DB clearance according to the model / manufacturer.

Rev	Date	Description	Sign.	Veri.
P02	04.04.2025	Revision 1	JR	JM
P01	24.01.2025	Issued for Information	TP	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

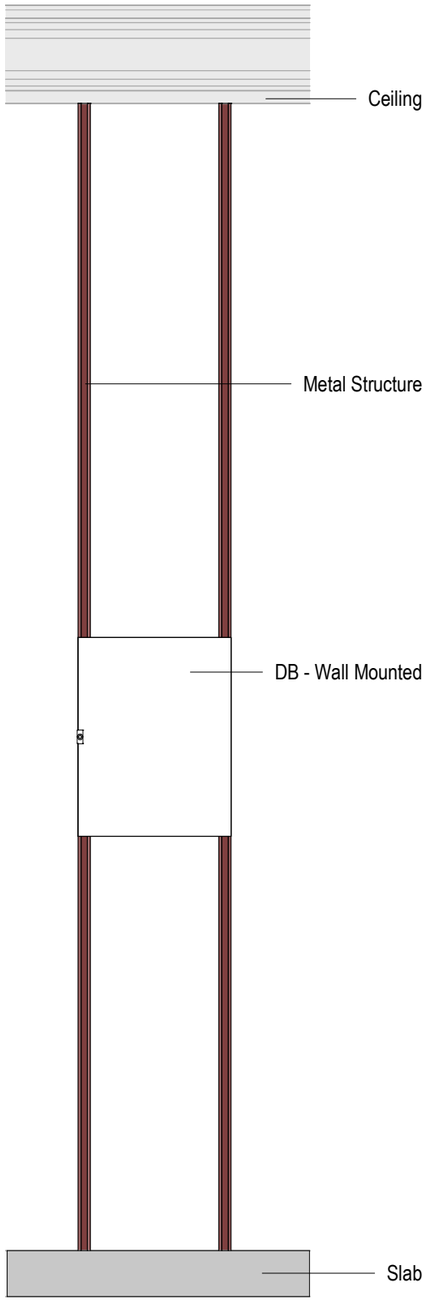
PROJECT NAME:

Execution Design and Engineering Requirements

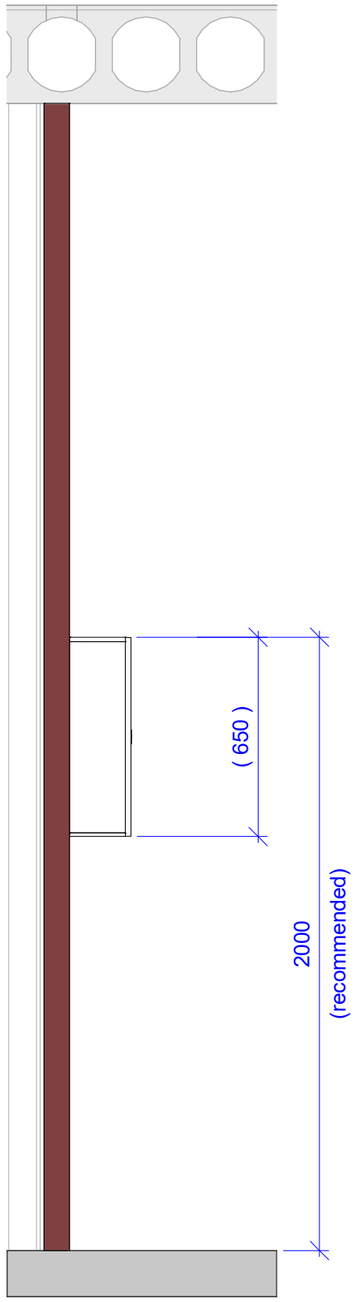
DRAWING NAME:

Electrical Equipment
Distribution Board (DB) - Typical

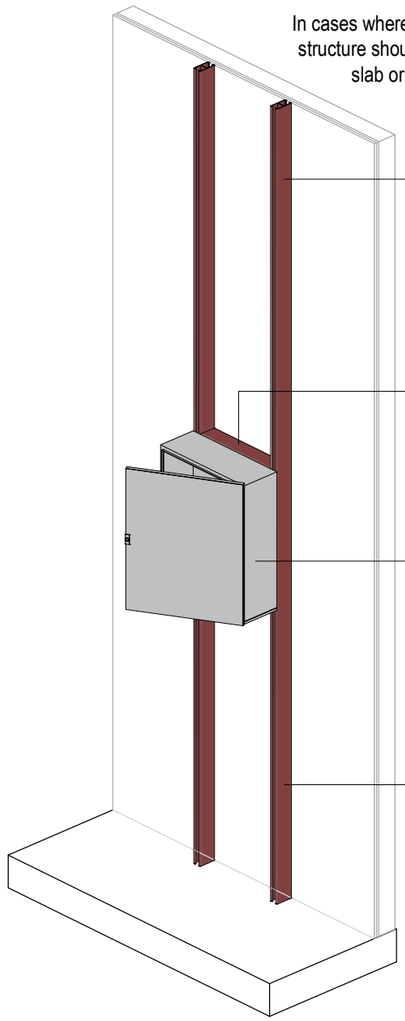
DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**As Indic**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
24.01.2025	**04.04.2025**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-XX-XX-DR-E-70206		**A3**	**P02**



A Front View - DB - Wall Mounted
1 : 20



B Left View - DB - Wall Mounted
1 : 20



In cases where the wall has low resistance, a metal structure should be installed, secured from slab to slab or alternatively only to the floor.

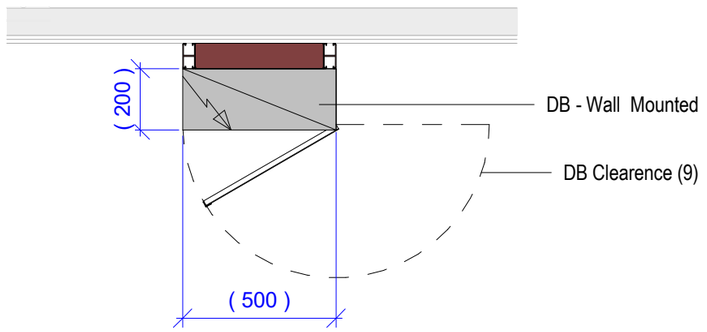
Typical slotted channel, spaced as required by equipment mounting.

Typical horizontal support, minimum of two per rack, spaced as required by equipment mounting holes.

Distribution Board - Wall Mounted

Equally secure vertical supports to wall studs in three places, use twist square washer.

3D1 3D View - DB - Wall Mounted



C Top View - DB - Wall Mounted
1 : 20

General Notes:

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5. Ensure proper ventilation to prevent overheating, with openings or fans.

6. Include redundant circuits and alternative power sources, such as UPS, to ensure continuous power supply.

7. Plan the distribution board with space for future expansions and easy access for maintenance.

8. Ensure that the distribution boards comply with local and international standards, with appropriate certifications to guarantee safety and efficiency.

9. DB clearance according to the model / manufacturer.

Rev	Date	Description	Sign.	Veri.
P02	04.04.2025	Revision 1	JR	JM
P01	24.01.2025	Issued for Information	TP	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

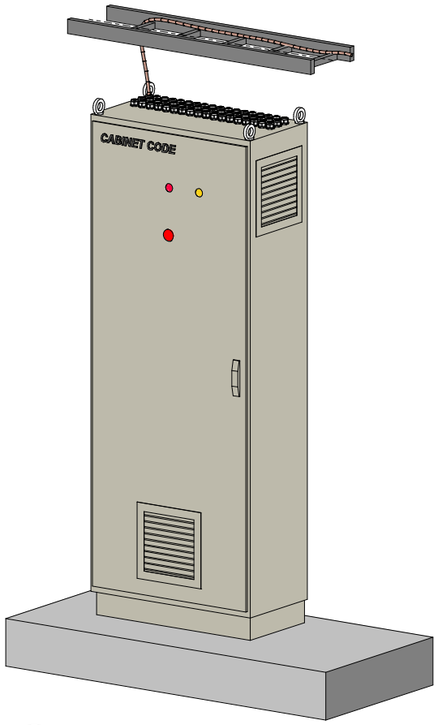
PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Electrical Equipment Distribution Board (DB) - Wall Mounted

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**As Indic**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
24.01.2025	**04.04.2025**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-XX-XX-DR-E-70207		**A3**	**P02**



3D1 3D View - Control Cabinet - Single Door

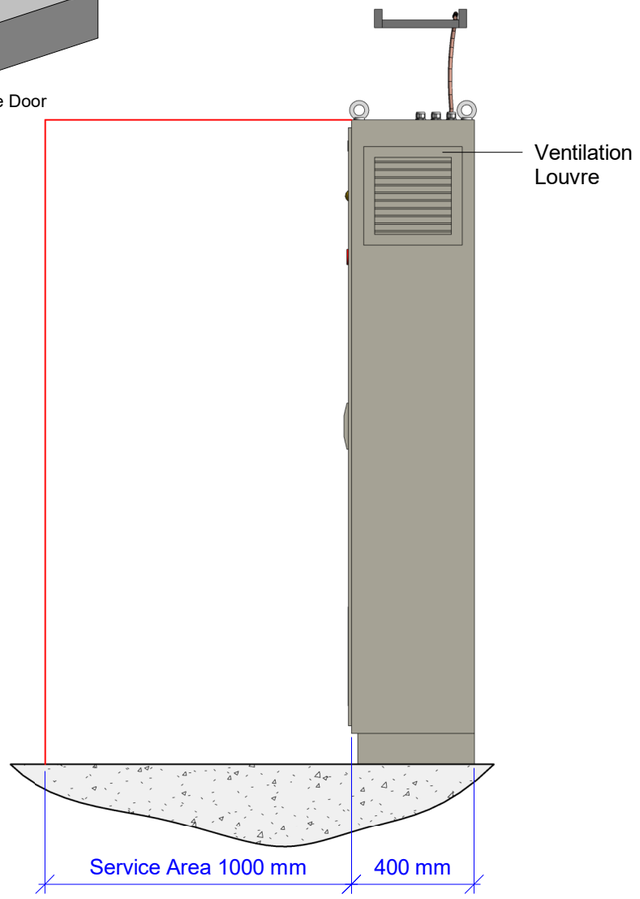
CONTROL CABINET (a)

Cable Entry:
- Cables to be fitted with a cable hook and loop fastener to the cable ladder for strain relief.
- Each single cable to enter the Cabinet with its own cable gland, protection rate IP55.

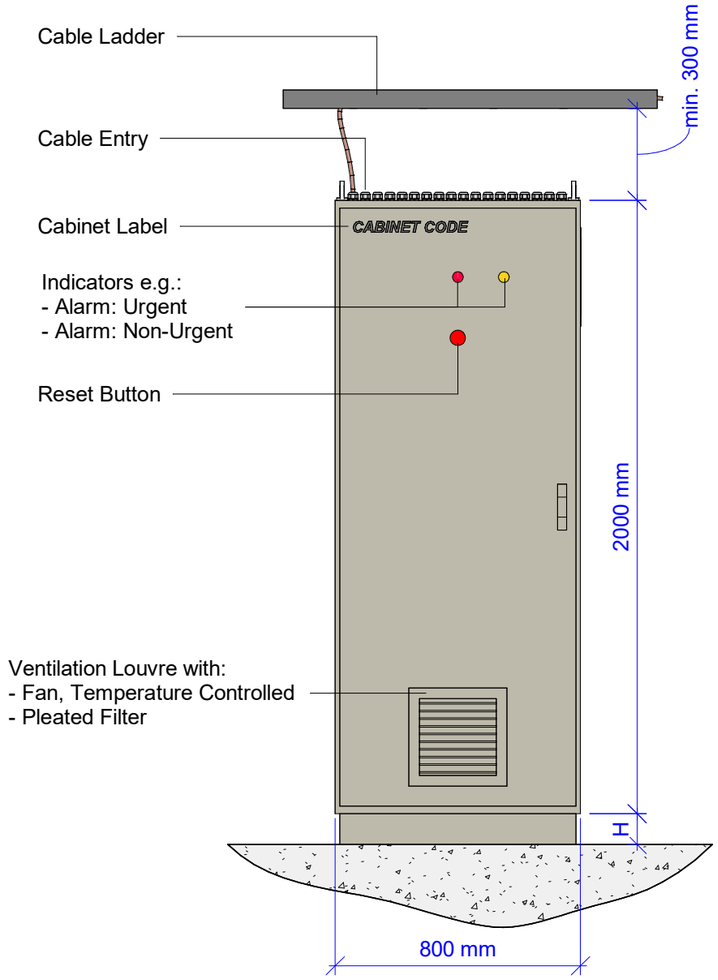
Console:
- Console height H : 100 mm for top cable entry
  200 mm for bottom cable entry

Lighting:
- Cabinet to be equipped with LED Lighting.

Service / Maintenance Connections:
- Cabinet to be equipped with at least 1 service power outlet of 230V.
- Cabinet to be equipped with at least 1 service IT-Connection.



B Right View - Control Cabinet - Single Door



A Front View - Control Cabinet - Single Door

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.

Specific Notes

a. Information to be confirmed.
   Data shown as an example.

Rev	Date	Description	Sign.	Veri.
P02	04.04.2025	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	JR	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Control Cabinets
Single Door-Detail 01

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2025**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-E-91533		**A3**	**P02**

General Requirements (Typical) (a):

Main Switch inside the cabinet		
Standard door key		
Color	RAL7032	
Operation Voltage	230/400	Vac/50 Hz
Control Voltage	230/24	Vac/50 Hz
	24	Vdc
Earthing System	TN-S System	
Grounding	All Devices except the 24V	
Contemporaneous	100%	
Protection Degree	IP55	
	IP20 (with open doors)	
Operating Conditions	Temp: 0 to 35 °C	
	RH: 10 to 90 %	
Short Circuit Rating	6 kA	
Wiring	Halogen Free	
Wiring Conduits	Halogen Free	
Cable Glands	<M40 Plastic	
	≥M40 Brass	
	2 Spare Glands per Terminal Bar, with exeption of X0 and X6	
	Sealing Cap for unused Glands	

Wiring Colors:

Main Current

Phase	Black
Neutral	Blue
PE (Earth)	Yellow/Green

Process Control

Digital In 24Vac	Orange
Digital In xxVdc	Red
Analog In	Grey
Analog Out - Control	Purple
Anolog Out - Minus	White

Control Current

230 Vac - Phase	Brown
230 Vac - Neutral	Blue
230 Vac - Switch Wire	Black
230 Vac - Earth	Yellow/Green
24 Vac - Phase	Orange
24 Vac - Neutral	White
xx Vdc - Plus	Red
xx Vdc - Minus	White
External Voltage	Pink
Temporary	Green

Terminal Bars:

External

X0	Supply	230/400 Vac
X1	Main Current	230/400 Vac
X2	Control Current	230 Vac
X3	Control Current	24 Vac/dc
X4	Measuring Circuits	
X5	External Voltage	
X6	Data Communication	

Internal

X10	Coupling
X11	Panel Utilities
X12	Panel Ventilation

Data Communication:

Terminal	JH(st)H 2x2x0.8
RJ45	UTP Cat-6 Color Blue

Text Labels:

General

35x18

CODING
TEXT LINE 1
TEXT LINE 2
FIELD CODE

Label: White/Self Adhesive
Text: Arial
Letter: 8 Bold

General

20x10

CODING

White/Self Adhesive
Arial
9 Bold

Warning

35x18

TEXT LINE 1
TEXT LINE 2
TEXT LINE 3
TEXT LINE 4

Yellow/Self Adhesive
Arial
8 Bold

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.

Specific Notes

a. Information to be confirmed.
Data shown as an example.

Rev	Date	Description	Sign.	Veri.
P02	04.04.2025	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	JR	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

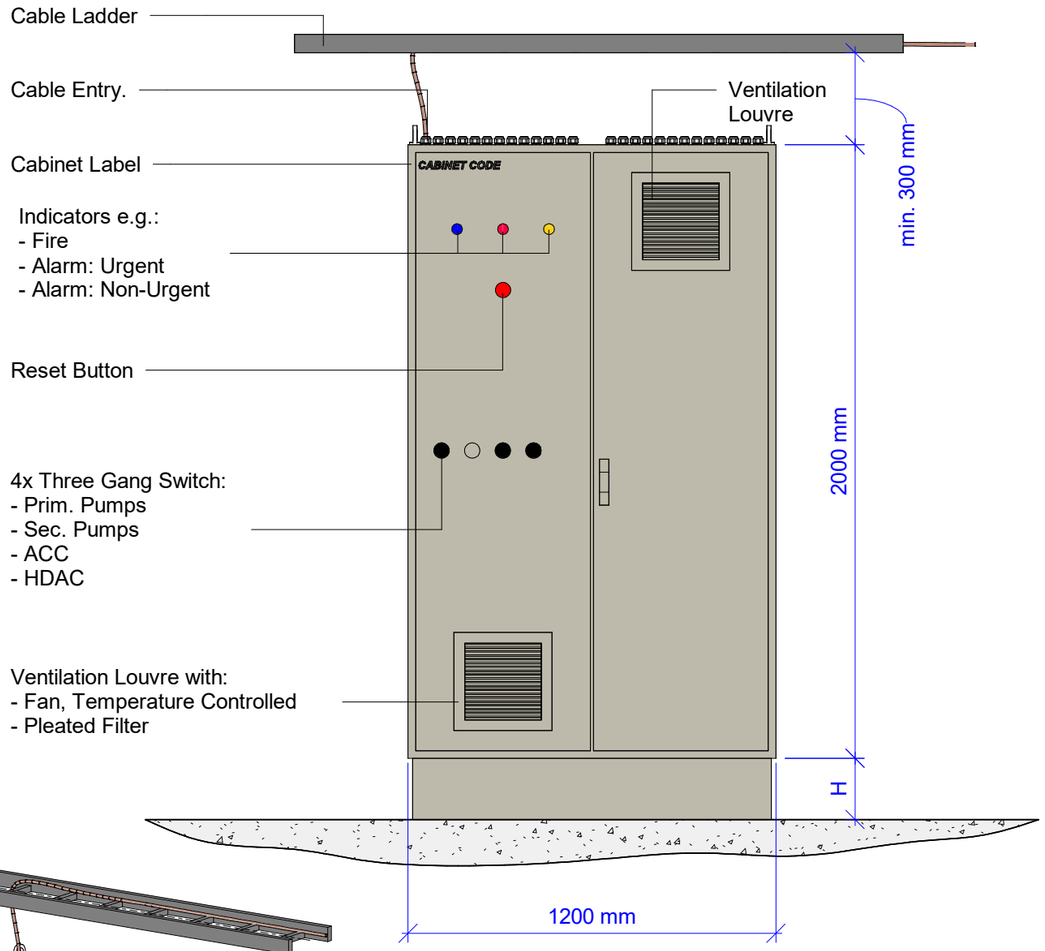
DRAWING NAME:

Control Cabinets
Single Door-Detail 02

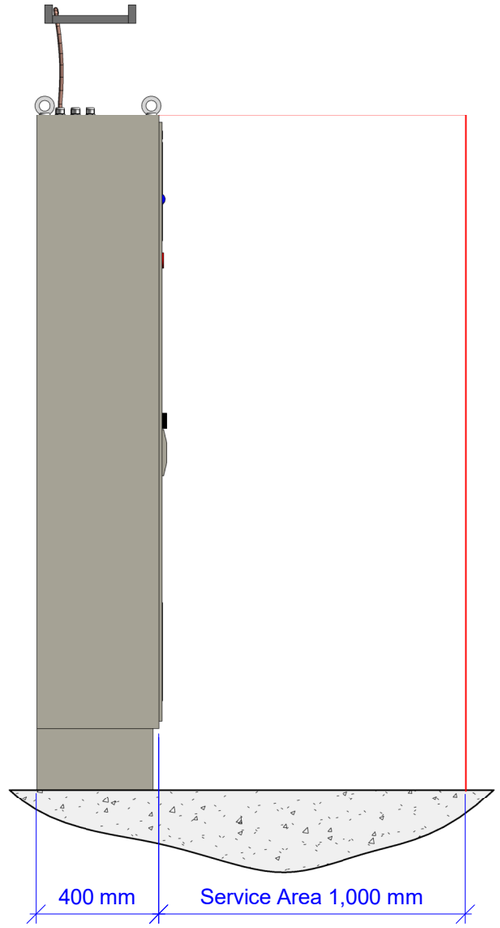
DRAWING STATUS:	SCALE:	STATUS:
Revision 1	**NTS**	**S2**

DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2025**	**JR**	**JM**

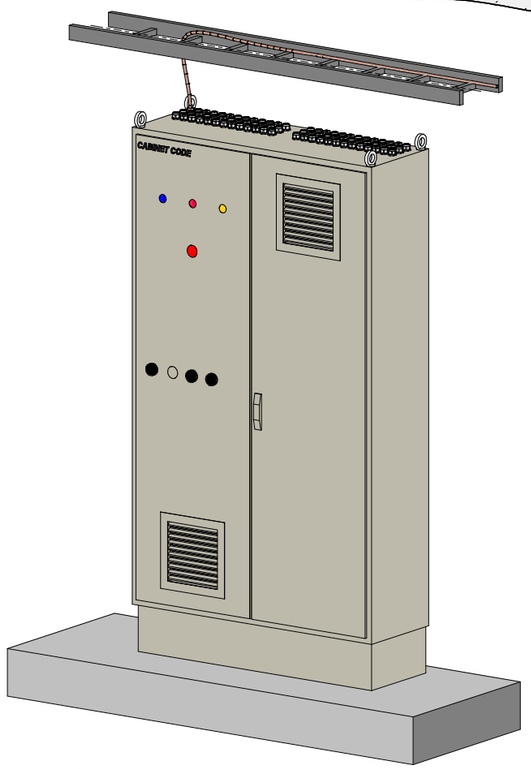
DRAWING NUMBER:	FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-E-91534	**A3**	**P02**



A Front View - Control Cabinet - Double Door



B Left View - Control Cabinet - Double Door



3D1 3D View - Control Cabinet - Double Door

CONTROL CABINET (a)

Cable Entry:
- Cables to be fitted with a cable hook and loop fastener to the cable ladder for strain relief.
- Each single cable to enter the Cabinet with its own cable gland, protection rate IP55.

Console:
- Console height H : 100 mm for top cable entry
  200 mm for bottom cable entry

Lighting:
- Cabinet to be equipped with LED Lighting.

Service / Maintenance Connections:
- Cabinet to be equipped with at least 1 service power outlet of 230V.
- Cabinet to be equipped with at least 1 service IT-Connection.

Notes

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Specific Notes

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   Data shown as an example.

Rev	Date	Description	Sign.	Veri.
P02	04.04.2025	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	JR	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Control Cabinets
Double Door-Detail 01

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2025**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-E-91535		**A3**	**P02**

General Requirements (Typical) (a):

Main Switch inside the cabinet		
Standard door key		
Color	RAL7032	
Operation Voltage	230/400	Vac/50 Hz
Control Voltage	230/24	Vac/50 Hz
	24	Vdc
Earthing System	TN-S System	
Grounding	All Devices except the 24V	
Contemporaneous	100%	
Protection Degree	IP55	
	IP20 (with open doors)	
Operating Conditions	Temp: 0 to 35 °C	
	RH: 10 to 90 %	
Short Circuit Rating	6 kA	
Wiring	Halogen Free	
Wiring Conduits	Halogen Free	
Cable Glands	<M40 Plastic	
	≥M40 Brass	
	2 Spare Glands per Terminal Bar, with exeption of X0 and X6	
	Sealing Cap for unused Glands	

Wiring Colors:

Main Current

Phase	Black
Neutral	Blue
PE (Earth)	Yellow/Green

Process Control

Digital In 24Vac	Orange
Digital In xxVdc	Red
Analog In	Grey
Analog Out - Control	Purple
Anolog Out - Minus	White

Control Current

230 Vac - Phase	Brown
230 Vac - Neutral	Blue
230 Vac - Switch Wire	Black
230 Vac - Earth	Yellow/Green
24 Vac - Phase	Orange
24 Vac - Neutral	White
xx Vdc - Plus	Red
xx Vdc - Minus	White
External Voltage	Pink
Temporary	Green

Data Communication:

Terminal	JH(st)H 2x2x0.8
RJ45	UTP Cat-6 Color Blue

Terminal Bars:

External

X0	Supply	230/400 Vac
X1	Main Current	230/400 Vac
X2	Control Current	230 Vac
X3	Control Current	24 Vac/dc
X4	Measuring Circuits	
X5	External Voltage	
X6	Data Communication	

Internal

X10	Coupling
X11	Panel Utilities
X12	Panel Ventilation

Text Labels:

General

35x18

```
CODING
TEXT LINE 1
TEXT LINE 2
FIELD CODE
```

Label: White/Self Adhesive
Text: Arial
Letter: 8 Bold

General

20x10

```
CODING
```

White/Self Adhesive
Arial
9 Bold

Warning

35x18

```
TEXT LINE 1
TEXT LINE 2
TEXT LINE 3
TEXT LINE 4
```

Yellow/Self Adhesive
Arial
8 Bold

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.

Specific Notes

a. Information to be confirmed.
Data shown as an example.

Rev	Date	Description	Sign.	Veri.
P02	04.04.2025	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	JR	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

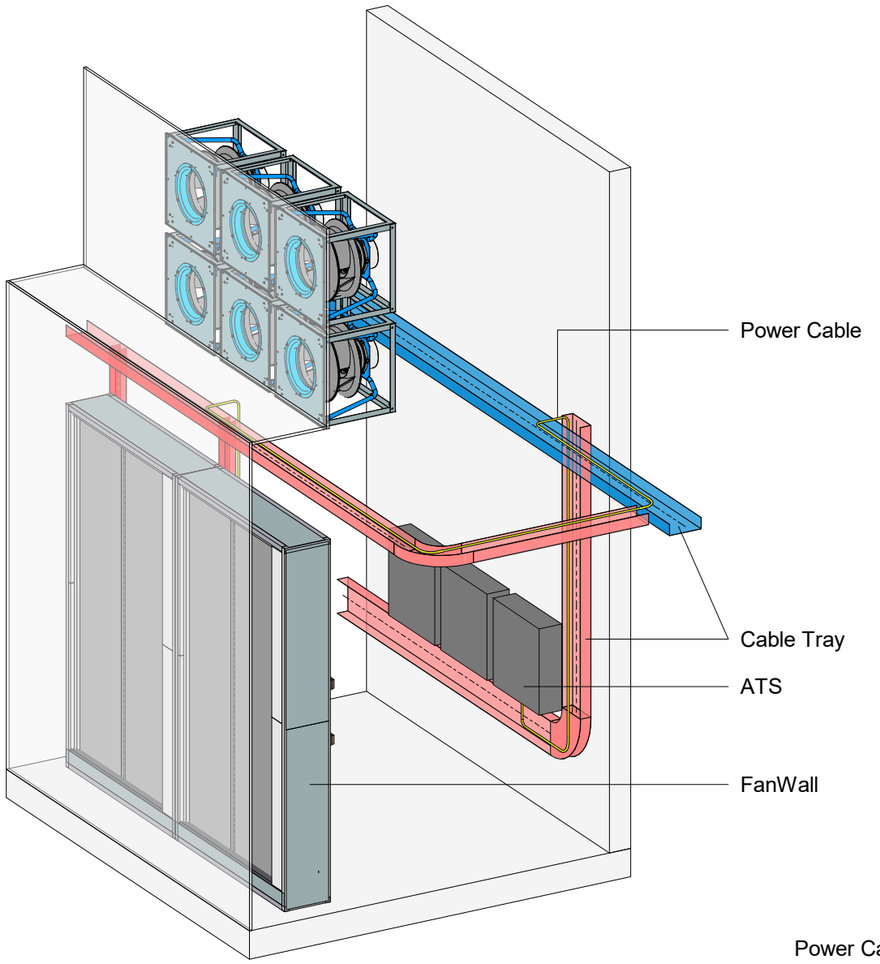
PROJECT NAME:

Execution Design and Engineering Requirements

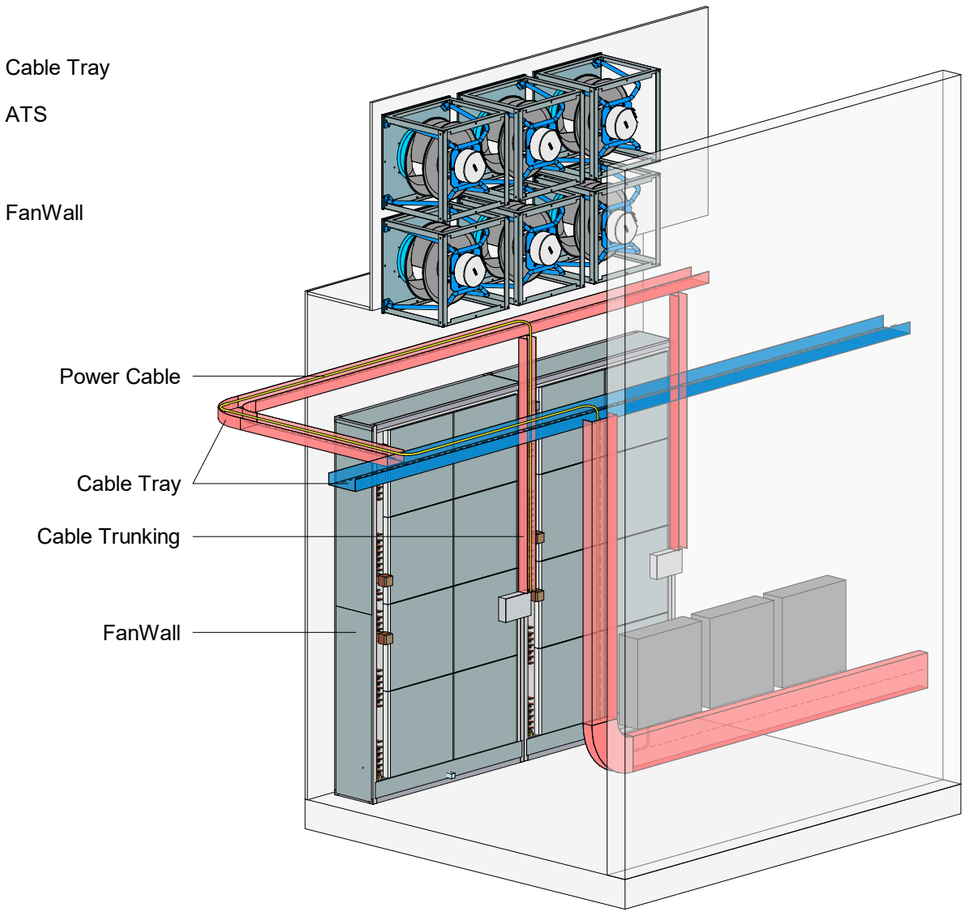
DRAWING NAME:

Control Cabinets
Double Door-Detail 02

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2025**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-E-91536		**A3**	**P02**



3D1 3D View - ATS to Cable Tray

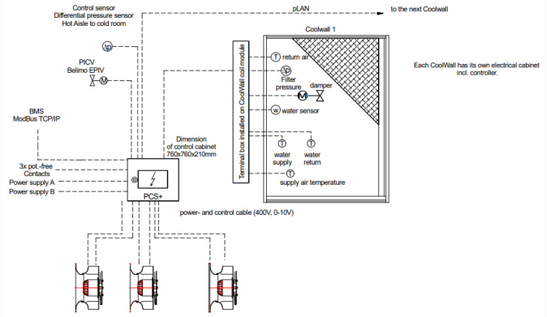


3D2 3D View - Cable Tray To FanWall

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.

Fanwall Field Wiring Diagram



Please refer to:
RDC0000-BMS-ZZ-ZZ-DR-E-91532
Fanwall Power Supply Detail 02

Rev	Date	Description	Sign.	Veri.
P02	04.04.2025	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	JR	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

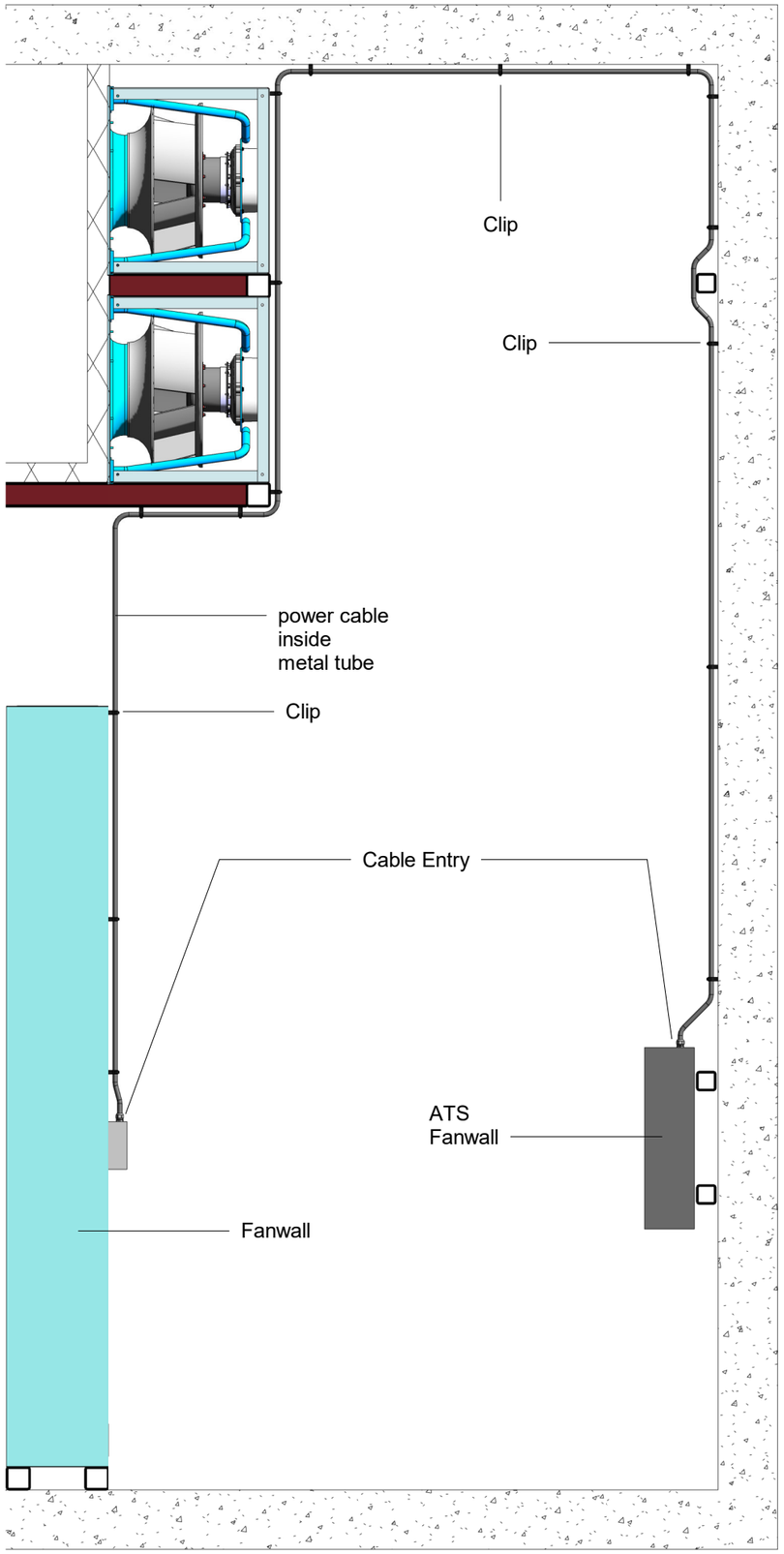
PROJECT NAME:

Execution Design and Engineering Requirements

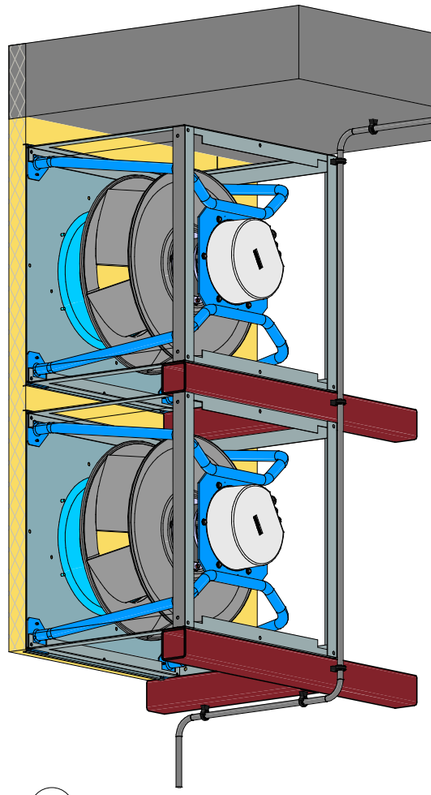
DRAWING NAME:

Electrical Equipment
Fanwall Power Supply case 1
Detail 01

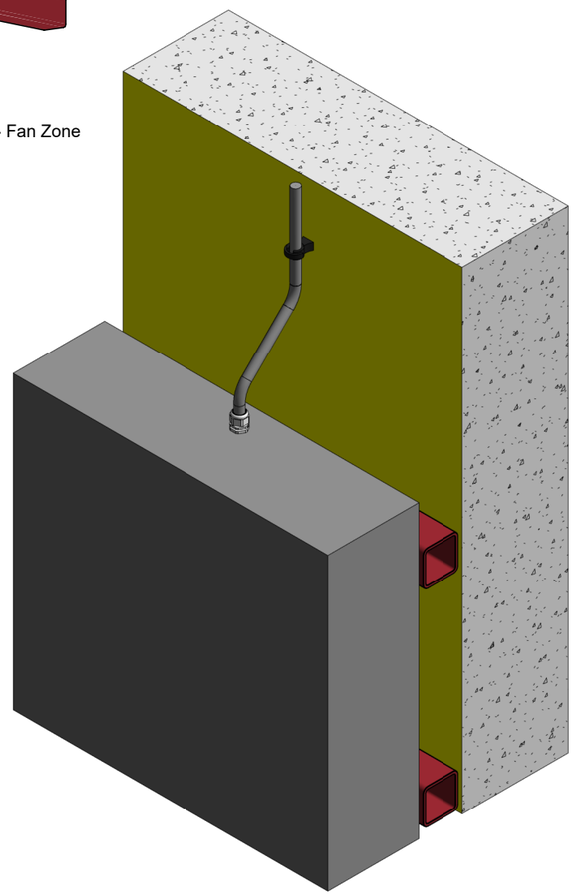
DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2025**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-E-91529		**A3**	**P02**



1 Section View - Fanwall Power Supply



3D1 3D View - Fanwall Power Supply - Fan Zone

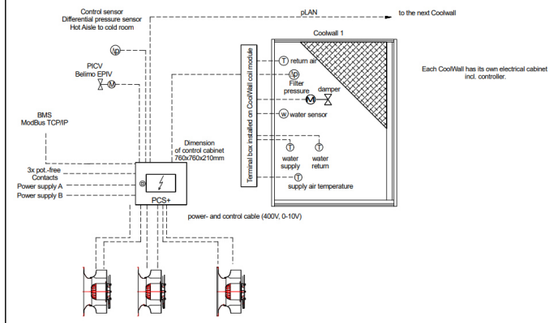


3D2 3D View - Fanwall Power Supply - ATS Zone

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.

Fanwall Field Wiring Diagram



Please refer to:
RDC0000-BMS-ZZ-ZZ-DR-E-91532
Fanwall Power Supply Detail 02

Rev	Date	Description	Sign.	Veri.
P02	04.04.2025	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	JR	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

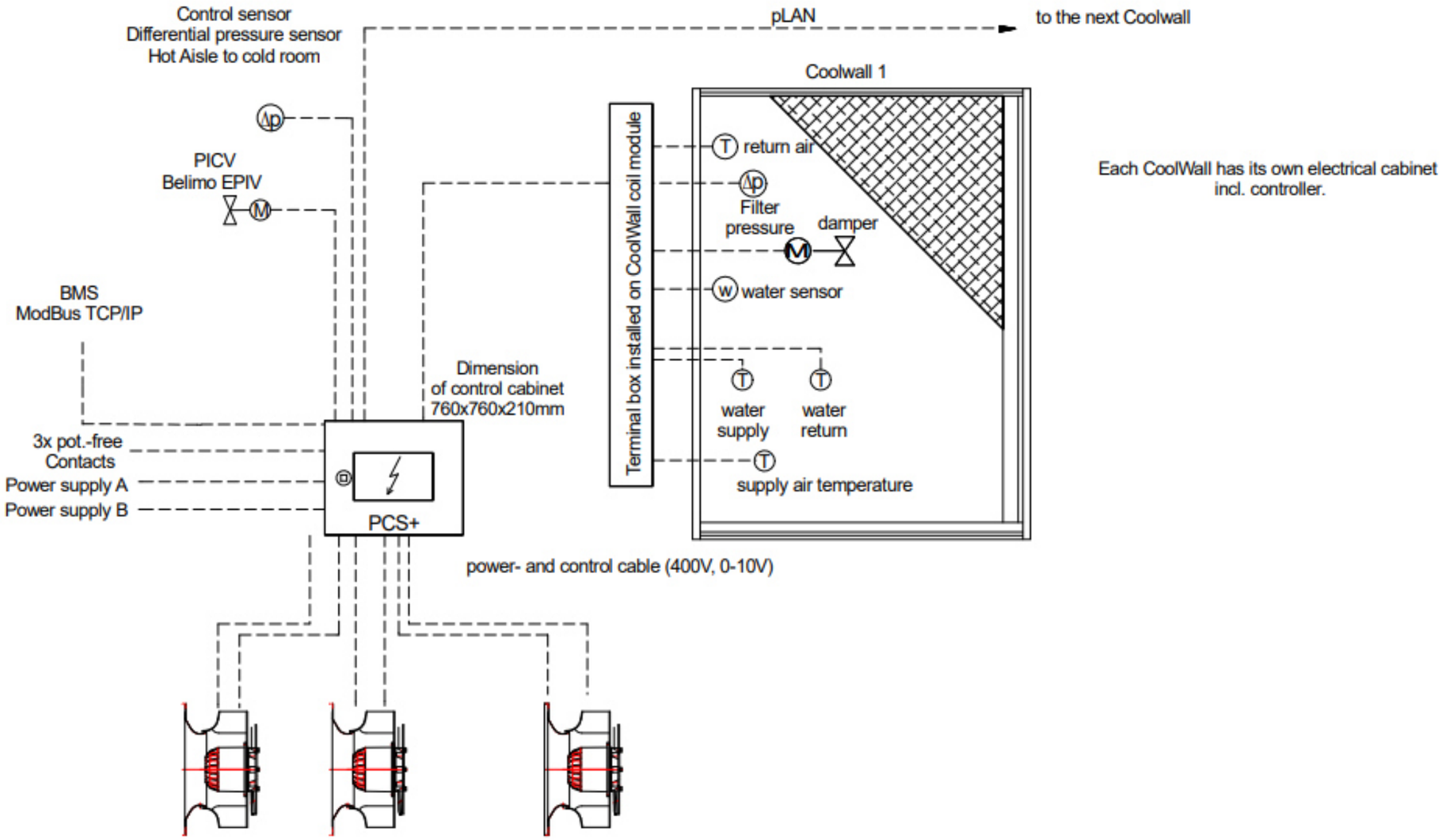
Execution Design and Engineering Requirements

DRAWING NAME:

Electrical Equipment
Fanwall Power Supply case 2
Detail 01

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2025**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-E-91531		**A3**	**P02**

Fanwall Field Wiring Diagram



Notes

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Rev	Date	Description	Sign.	Veri.
P02	04.04.2025	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	JR	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Electrical Equipment
Fanwall Power Supply Detail 02

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2025**	**JR**	**JM**
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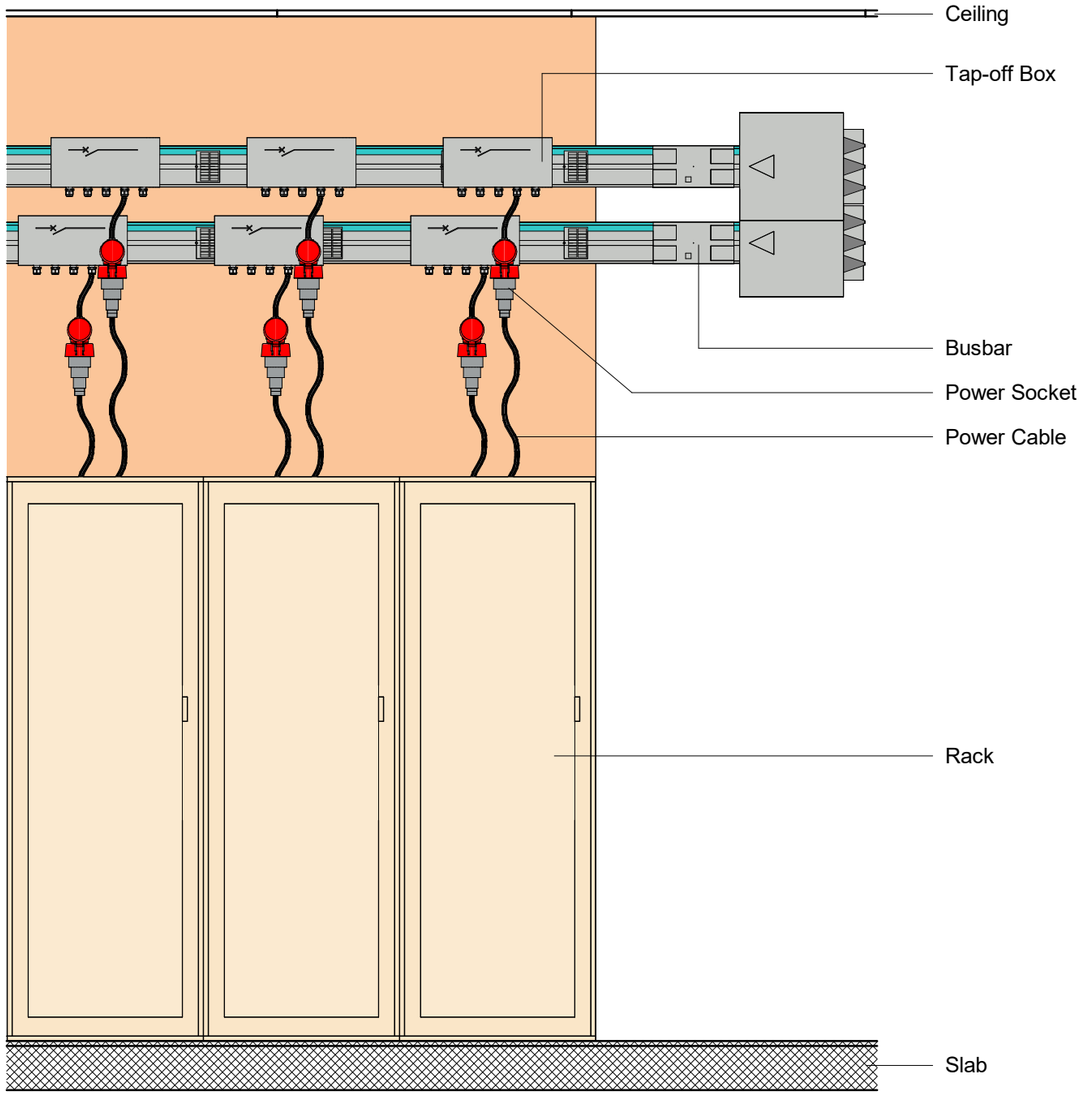
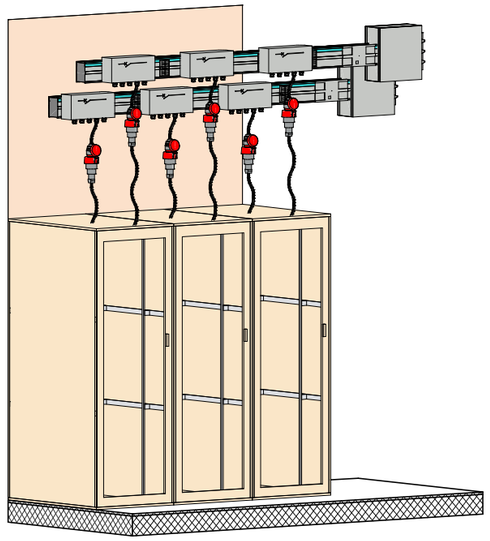
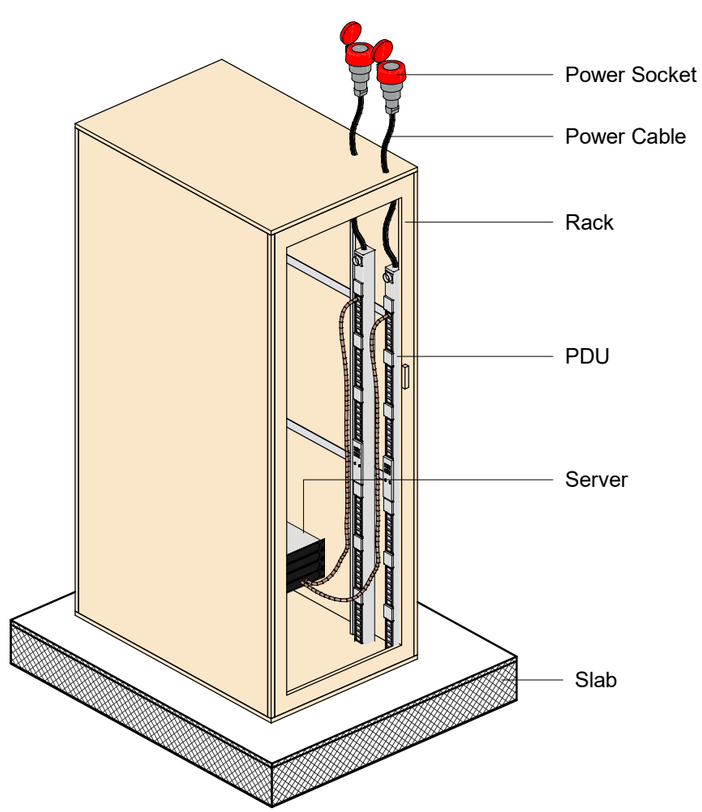


A Front View - Busbar to Rack



3D1 3D View - Busbar to Rack



3D2 3D View - PDU to Server

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.

Specific Notes

a. This is a schematic drawing. Data shown as an example.

Rev	Date	Description	Sign.	Veri.
P02	04.04.2025	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	JR	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Power Supply
Busbar to Rack

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2025**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
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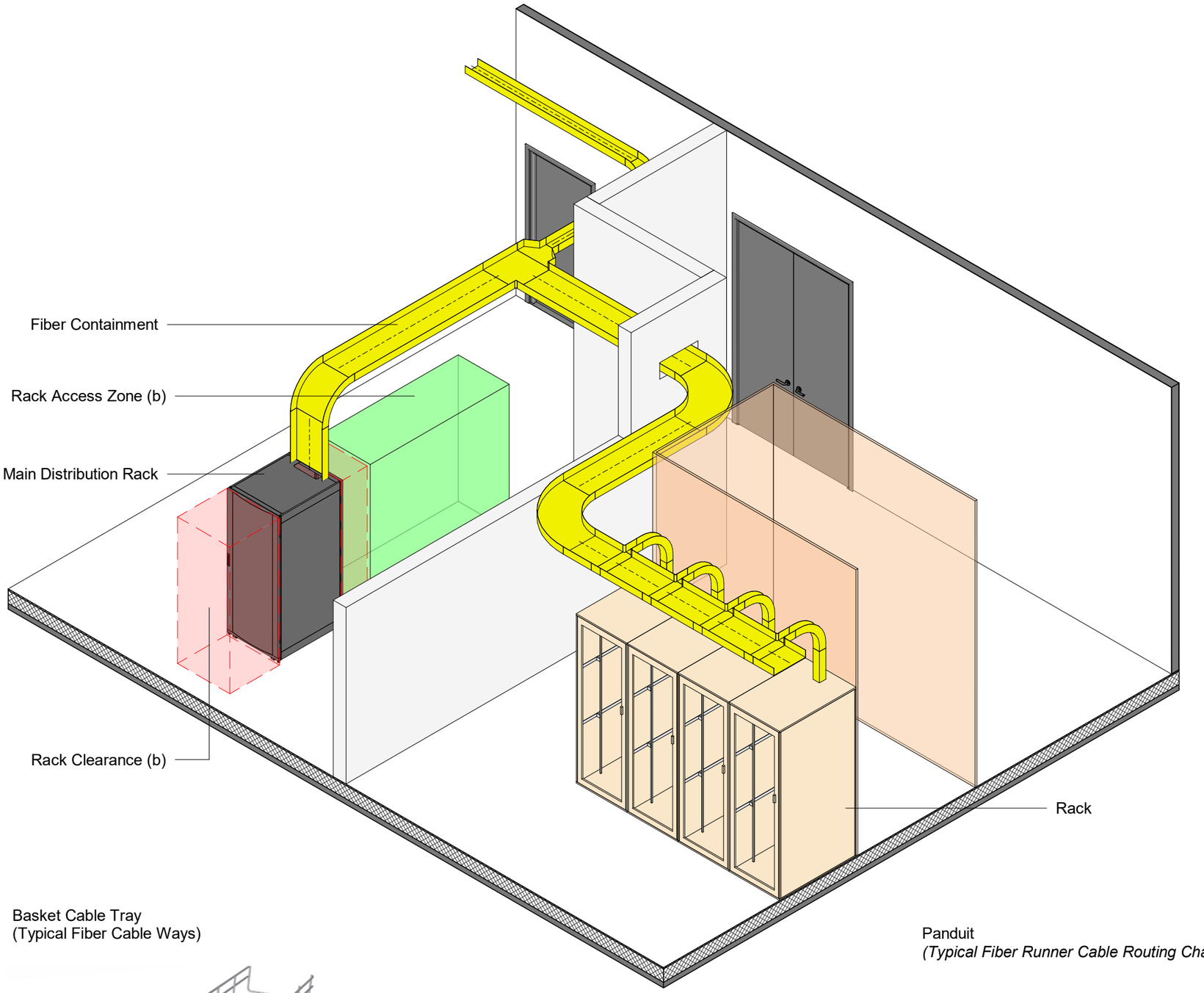
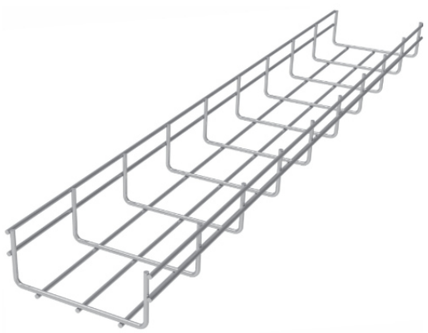


3D1 3D View - Fiber to Rack

Basket Cable Tray
(Typical Fiber Cable Ways)



Panduit
(Typical Fiber Runner Cable Routing Channel)

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.

Specific Notes

a. This is a schematic drawing. Data shown as an example.
b. According to the model / manufacturer.

Rev	Date	Description	Sign.	Veri.
P02	04.04.2025	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	JR	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

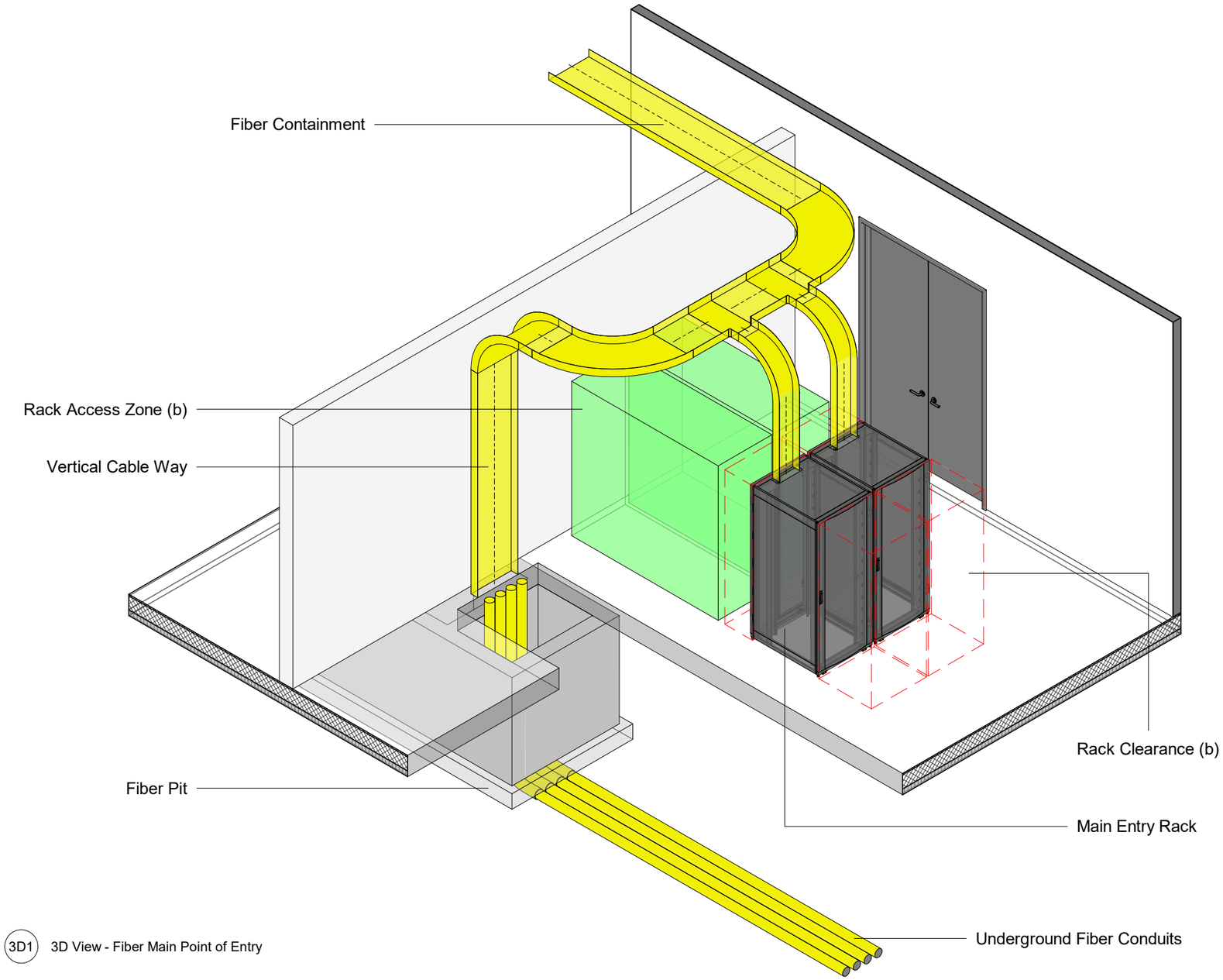
PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

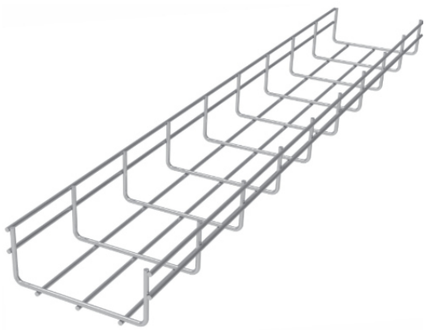
Fiber Routing System
Fiber to Rack

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2025**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-E-91538		**A3**	**P02**



3D1 3D View - Fiber Main Point of Entry

Basket Cable Tray
(Typical Fiber Cable Ways)



Panduit
(Typical Fiber Runner Cable Routing Channel)

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.

Specific Notes

a. This is a schematic drawing. Data shown as an example.
b. According to the model / manufacturer.

Rev	Date	Description	Sign.	Veri.
P02	04.04.2025	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	JR	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

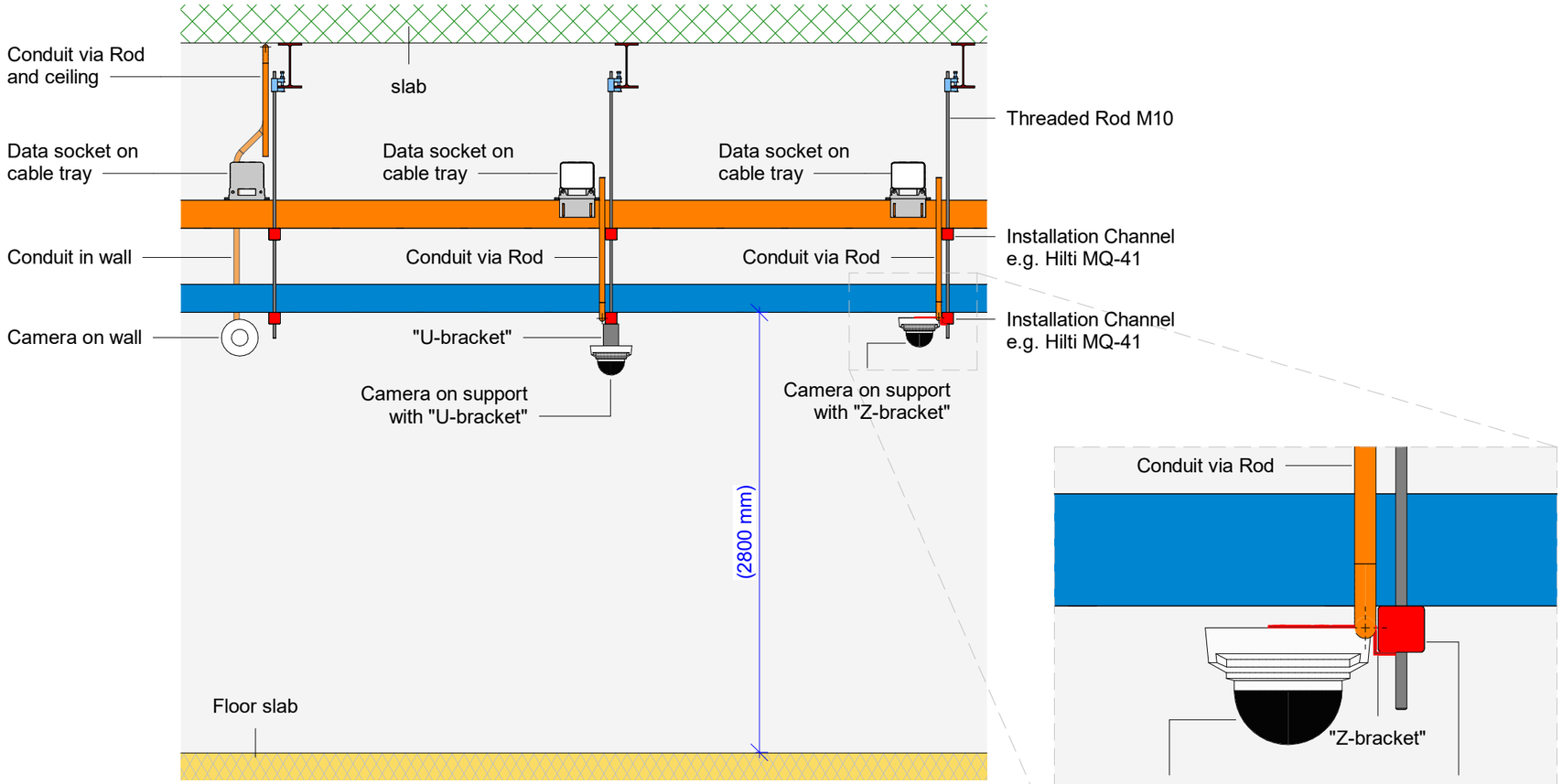
Fiber Routing System
Fiber Main Point of Entry

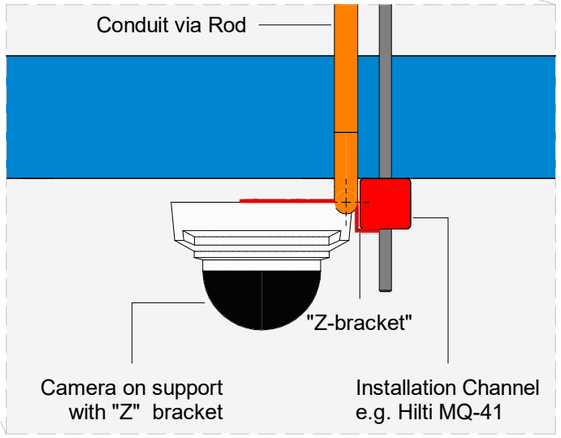
DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2025**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-E-91539		**A3**	**P02**

4.6. MEP Installation Details – Security Camaras

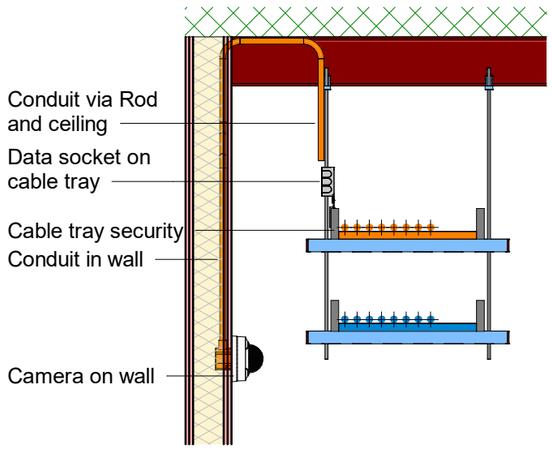
Purpose: this chapter highlights the most common solutions for Security Cameras Installation both inside and outside of the data centre building.

Camera Mounting on Wall and on Support

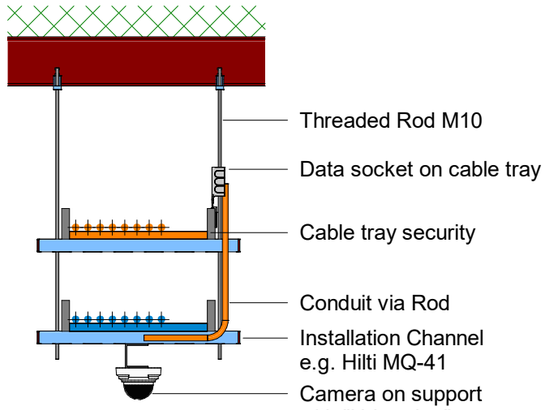




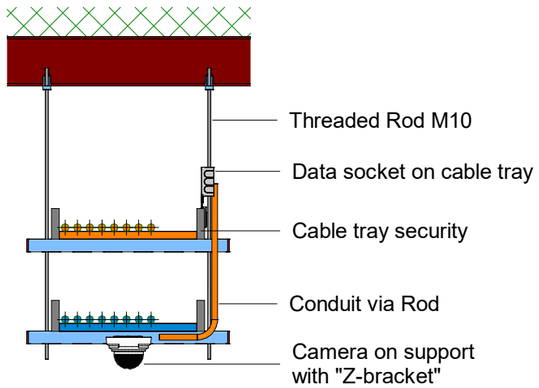
1 Section View - Camera on Wall and on Support



A Front View - Camera on Wall



B Front View - Camera on Support with "U-bracket"



C Front View - Camera on Support with "Z-bracket"

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.

Rev	Date	Description	Sign.	Veri.
P02	04.04.2025	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	JR	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

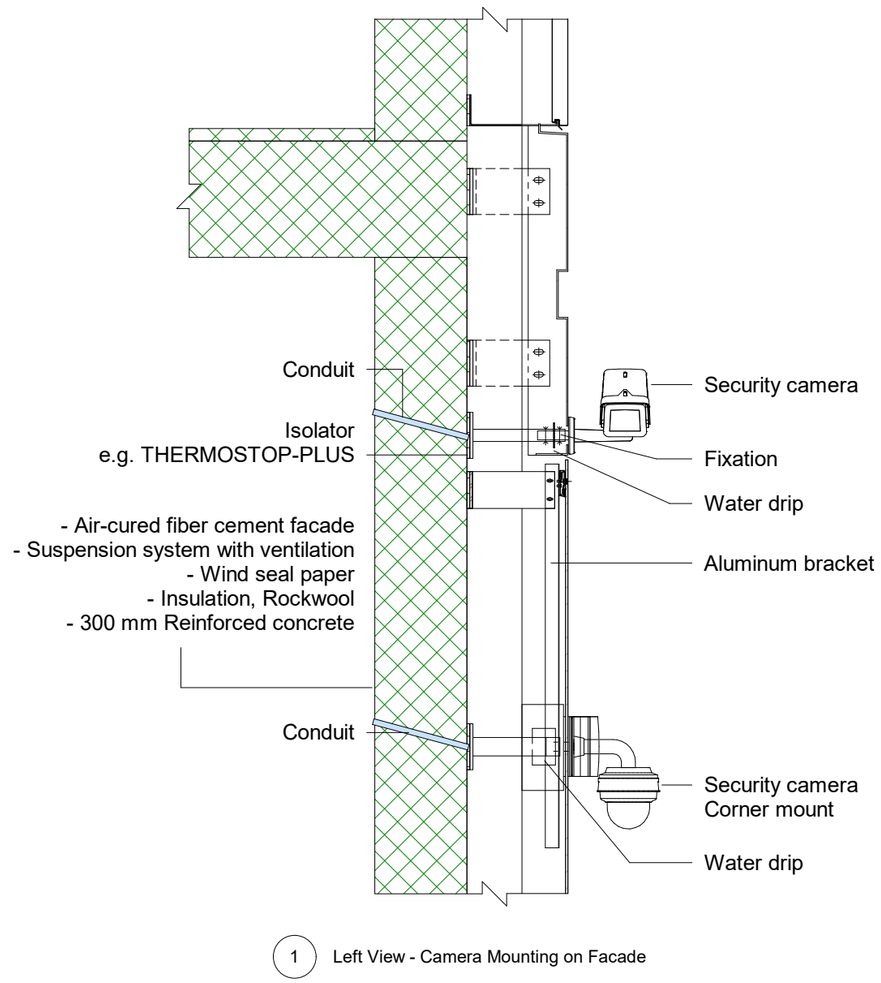
Execution Design and Engineering Requirements

DRAWING NAME:

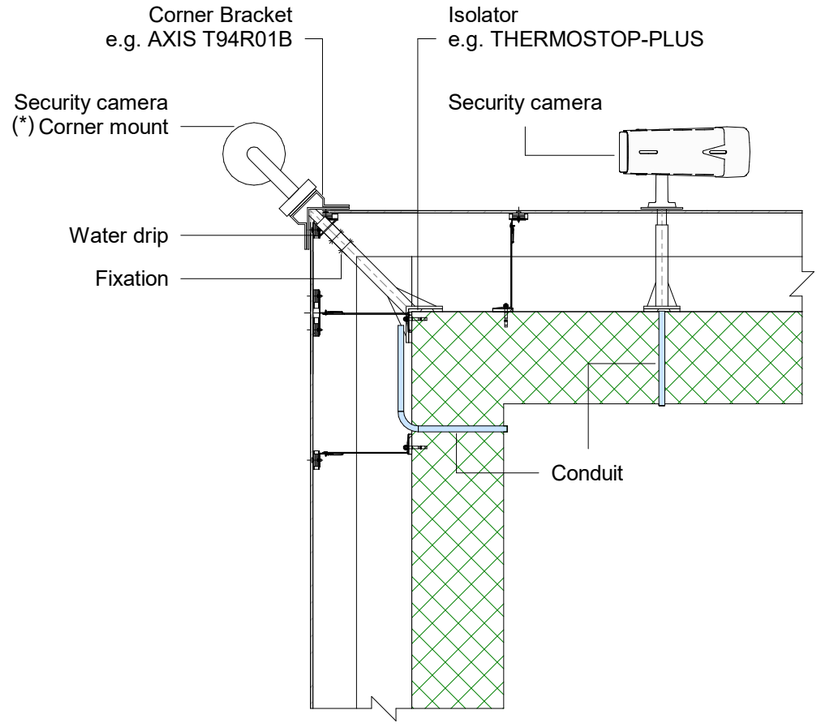
Security Camaras
Camera Mounting on Wall and on Support

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2025**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-E-91552		**A3**	**P02**

Camera Mounting on Facade



1 Left View - Camera Mounting on Facade



A Top View - Camera Mounting on Facade

(*) 360º Cameras for Security – Key Considerations

Stitching Blind Spots: Most 360º security cameras use dual-lens technology, meaning the stitching area could create small distortions or gaps. High-end cameras minimize this issue.
Mounting Position Matters:

- Ceiling-mounted (best option) – Provides full coverage with no blind spot underneath.
- Wall-mounted – May create a blind spot behind the camera.
- Corner-mounted – Good for large areas but can limit part of the view.

IR Night Vision Performance: Some 360º cameras have weak infrared coverage at the stitching points, leading to dark areas at night.
Software & AI Processing: Many advanced cameras use AI motion detection to track objects and compensate for minor blind spots.

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.

Rev	Date	Description	Sign.	Veri.
P02	04.04.2025	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	JR	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Security Camaras
Camera Mounting on Facade

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2025**	**JR**	**JM**
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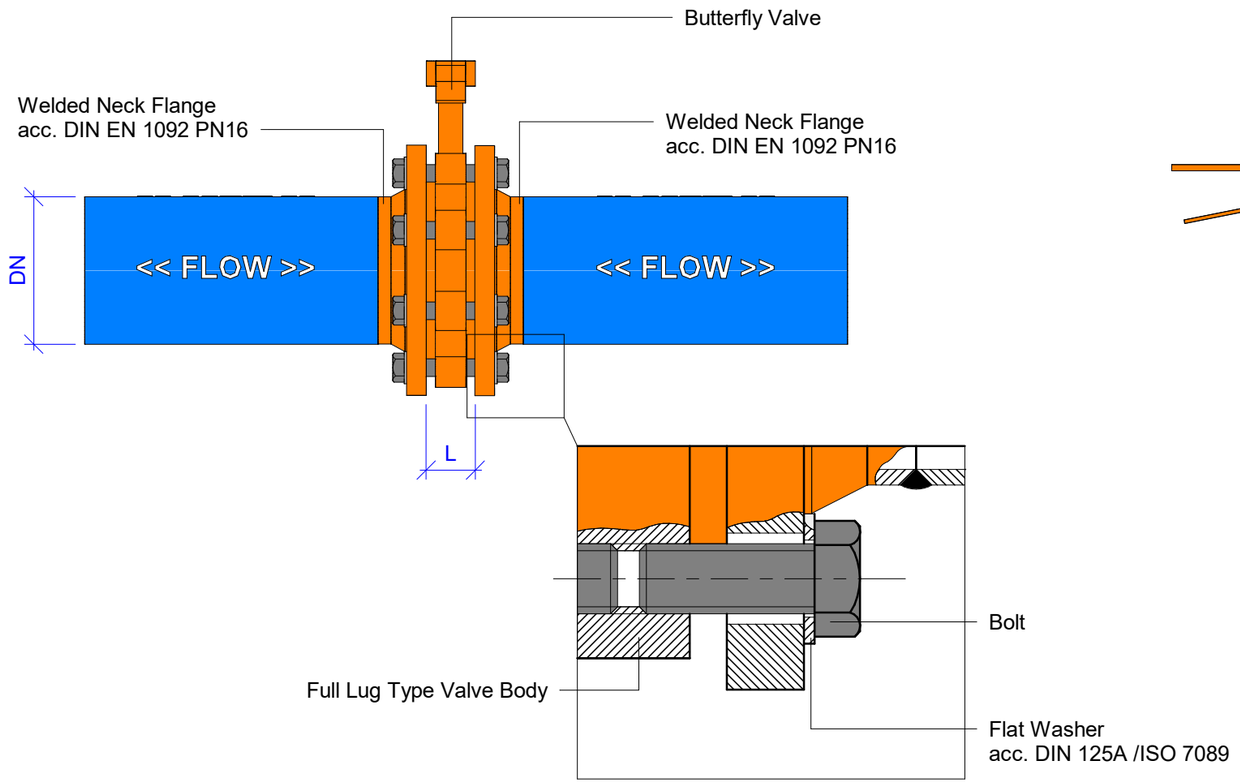
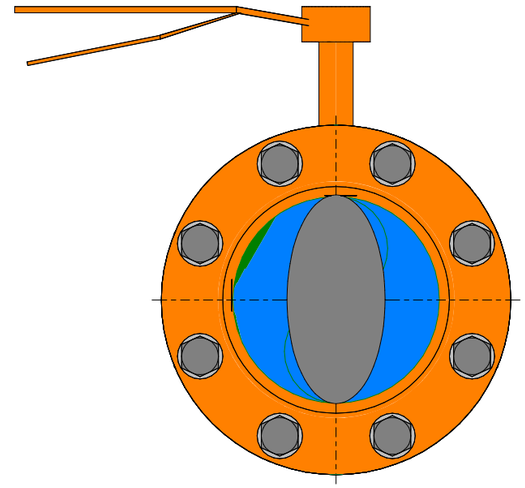
RDC0000-BMS-ZZ-ZZ-DR-E-91553		**A3**	**P02**

4.7. MEP Installation Details – Mechanical Accessories

Purpose: in this chapter you can find installation of mechanical accessories such as valves, thermometers, temperature sensors, pressure transmitters, electromagnetic flow sensors, used in steel and plastic pipe systems, and valves, grills, flow and smoke dampers, temperature, humidity and pressure emitters and transmitters used in duct systems.



A Front View - Butterfly Valve



1 Section View - Butterfly Valve

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.

Installation Notes

1. The valve is designed for using between all types of flat or raised face flanges.
2. Do not use flange gaskets. The butterfly valve design eliminates the need for gaskets.
3. For proper installation, the space between flanges must be sufficient to permit valve insertion without disturbing the rubber liner flange seal. Note that the disc sealing edge is in line with the flat of the shaft.
4. Rotate the stem to position the disc within the body, place the valve between flanges and hand-tighten the bolts.
5. Slowly open the valve counterclockwise to check for adequate disc clearance.
6. Return the disc to 10% open position and cross tighten all bolts, again check for adequate disc clearance.

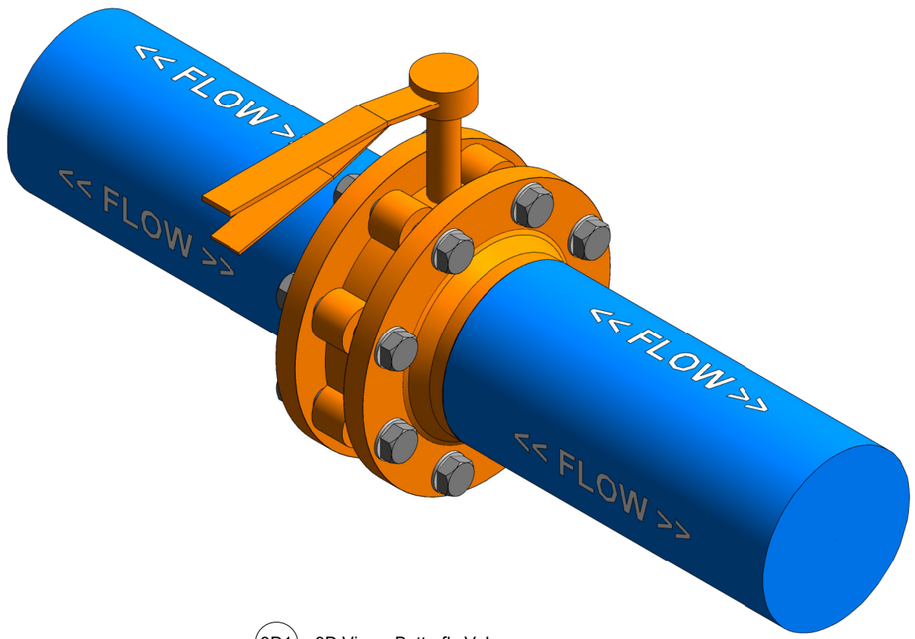
Butterfly Valve Specifications (Typical) (a):

A butterfly valve in a data center is a type of flow control valve that is used to regulate the flow of coolant or other fluid to and from server racks, cooling units, and other critical components in a data center environment.

The valve is typically mounted on the piping that circulates the coolant, and it works by rotating a disc inside the valve body to either block or allow fluid to flow through. The valve is named from the shape of the disc, which resembles the wings of a butterfly. Butterfly valves are favored in data centers because they are compact, durable, and can be operated quickly and easily.

- Type	Butterfly Valve Full Lug Type
- Valve Pressure Rating:	PN16
- Body:	Ductile Cast Iron
- Disc:	Stainless Steel
- Shaft:	
Bottom	Stainless Steel
Top	Stainless Steel
- Seat/Liner:	EPDM
- Actuator Flange:	acc. ISO 5211
Operation:	
- Lever	≤ DN125
- Gearbox	> DN125

DN (mm)	L (mm)
40	33
50	43
65	46
80	46
100	52
125	56
150	56
200	60
250	68
300	78
350	78
400	102
450	114
500	127
600	154



3D1 3D View - Butterfly Valve

Rev	Date	Description	Sign.	Veri.
P02	04.04.2025	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	JR	JM

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CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Cooling Steel Pipe Systems - Butterfly Valve

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
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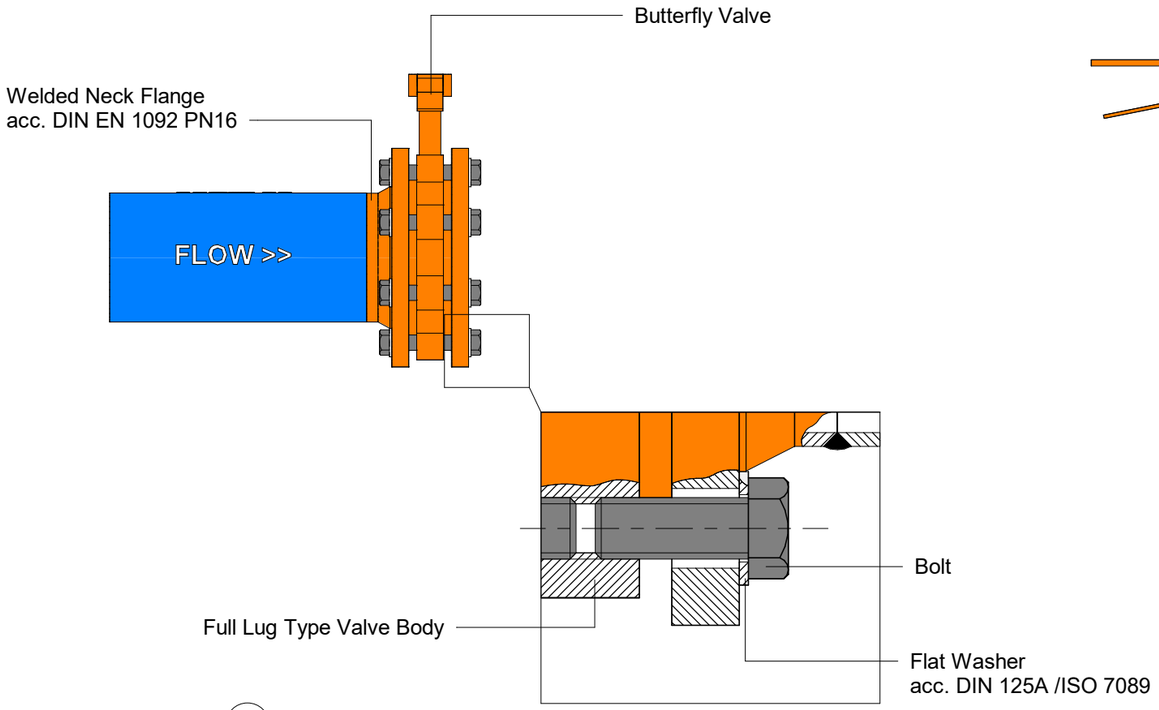
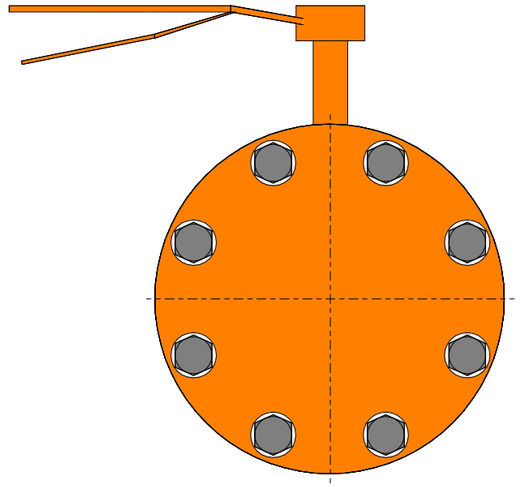
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-M-91458		**A3**	**P02**



A Front View - Butterfly Valve End Valve



1 Section - Butterfly Valve End Valve

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.

Specific Notes

a. Information to be confirmed.
Data shown as an example.

Installation Notes

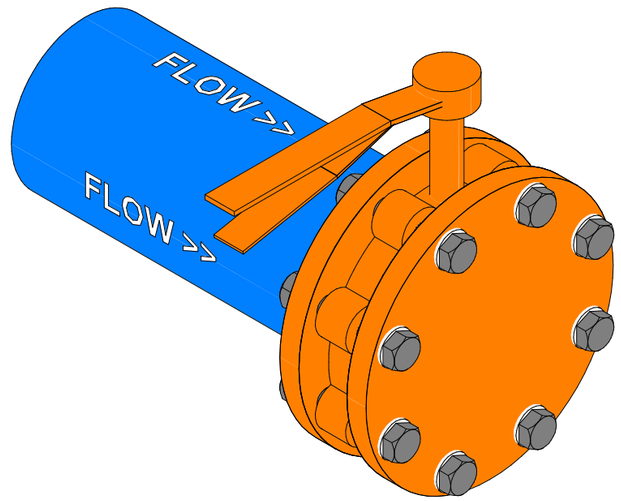
1. The valve is designed for using between all types of flat or raised face flanges.
2. Do not use flange gaskets. The butterfly valve design eliminates the need for gaskets.
3. For proper installation, the space between flanges must be sufficient to permit valve insertion without disturbing the rubber liner flange seal. Note that the disc sealing edge is in line with the flat of the shaft.
4. Rotate the stem to position the disc within the body, place the valve between flanges and hand-tighten the bolts.
5. Slowly open the valve counterclockwise to check for adequate disc clearance.
6. Return the disc to 10% open position and cross tighten all bolts, again check for adequate disc clearance.

Butterfly Valve Specifications (Typical) (a):

The Butterfly Valve End Valve, No Overflow is a flow control valve designed for critical applications in data centers, where precise fluid flow control is essential for the maintenance and safe operation of cooling systems.

The valve is typically mounted on the piping that circulates the coolant, and it works by rotating a disc inside the valve body to either block or allow fluid to flow through. The valve is named from the shape of the disc, which resembles the wings of a butterfly.

- Type	Butterfly Valve Full Lug Type
- Valve Pressure Rating:	PN16
- Body:	Ductile Cast Iron
- Disc:	Stainless Steel
- Shaft:	
Bottom	Stainless Steel
Top	Stainless Steel
- Seat/Liner:	EPDM
- Actuator Flange:	acc. ISO 5211
Operation:	
- Lever	≤ DN125
- Gearbox	> DN125



3D1 3D View - Butterfly Valve End Valve

Rev	Date	Description	Sign.	Veri.
P02	04.04.2025	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	JR	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Cooling Steel Pipe Systems - Butterfly Valve- End Valve, No Overflow

DRAWING STATUS:	SCALE:	STATUS:
Revision 1	**NTS**	**S2**

DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
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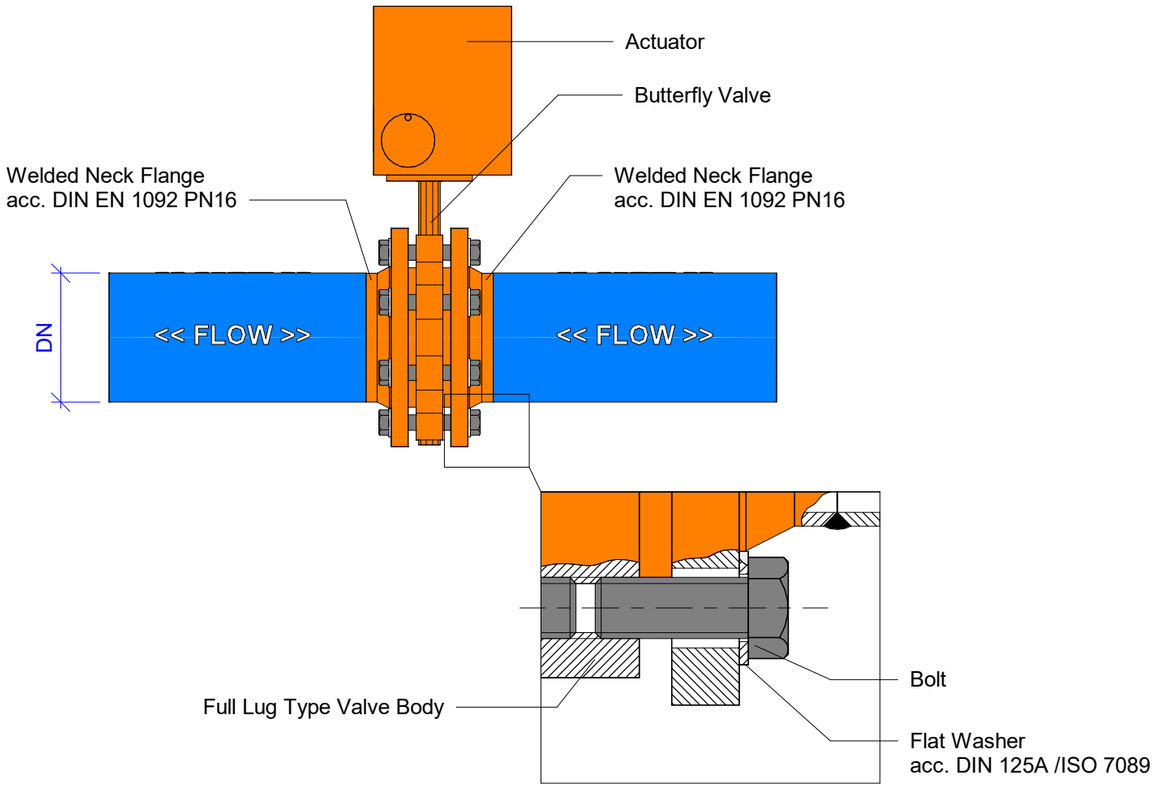
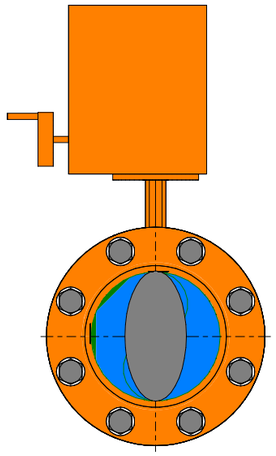
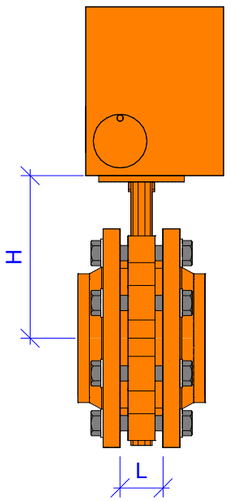
DRAWING NUMBER:	FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-M-91459	**A3**	**P02**



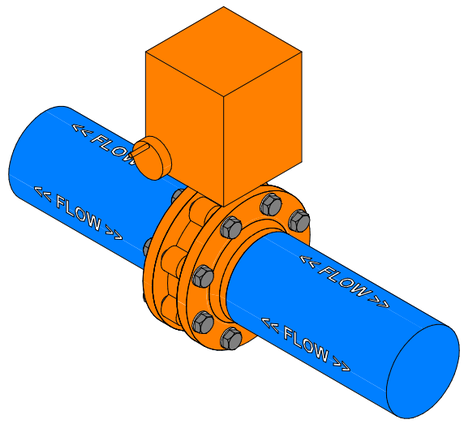
A Front View - Butterfly Valve Motorized



1 Section View - Butterfly Valve Motorized



2 Section View - Butterfly Valve Motorized



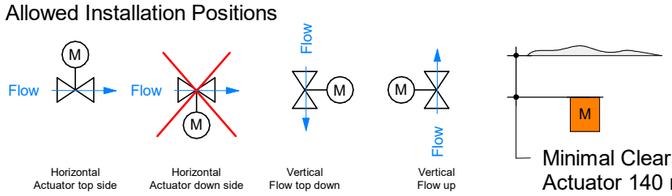
3D1 3D View - Butterfly Valve Motorized

Butterfly Valve Motorized Specifications (Typical):

- Type	Butterfly Valve Full Lug Type, e.g. Econosto ECON Fig.6830
- Valve Pressure Rating:	PN16
- Body:	Ductile Cast Iron
- Disc:	Stainless Steel
- Shaft:	
Bottom	Stainless Steel
Top	Stainless Steel
- Seat/Liner:	EPDM
- Actuator Flange:	acc. ISO 5211
Operation:	Actuator, eg. Econosto Fig.7907 ELA
Power Connection	24VAC
Housing	IP67

DN	H (mm)	L (mm)
40	115	33
50	143	43
65	156	46
80	162	46
100	181	52
125	197	56
150	210	56
200	240	60
250	286	68
300	309	78
350	329	78
400	361	102
450	393	114
500	427	127
600	492	154

Allowed Installation Positions



Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.

Installation Notes

1. When installed in a horizontal pipeline it is recommended that the butterfly valve is to be mounted with the stem in a horizontal position, as such that the bottom of the disc will open in the direction of the flow. This way of mounting increases the lifetime of the valve and prevents sludging of the flow and accumulation of dirt.
2. Valves larger then DN300 may not to be mounted upside down (stem and ISO-top flange facing downwards).
3. The contact surfaces of the flanges must be smooth and clean. Rust, spatter, dirt and paint is to be removed to prevent damage to the lining.
4. Flange gaskets are not allowed to use.
5. The Lug type butterfly valves have to be installed between flanges and can't be used as end of line valve.

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DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

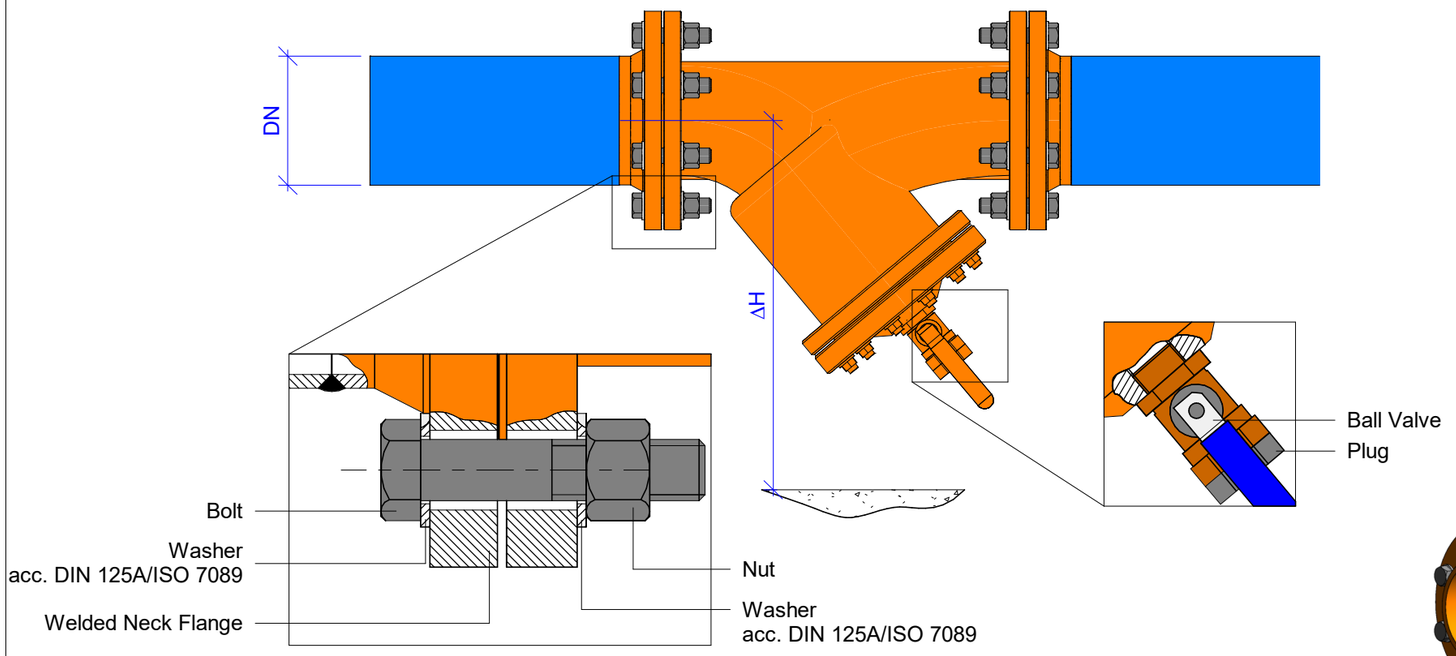
PROJECT NAME:

Execution Design and Engineering Requirements

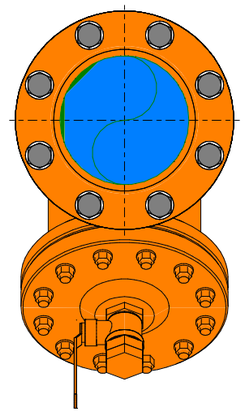
DRAWING NAME:

Cooling
Steel Pipe Systems-Butterfly
Valve Motorized Open Closed

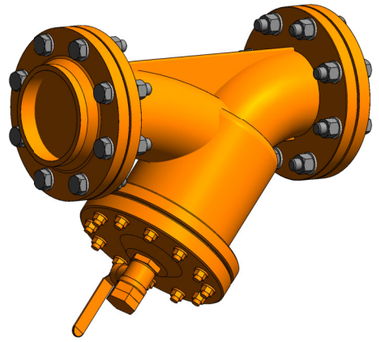
DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2025**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-M-91460		**A3**	**P02**



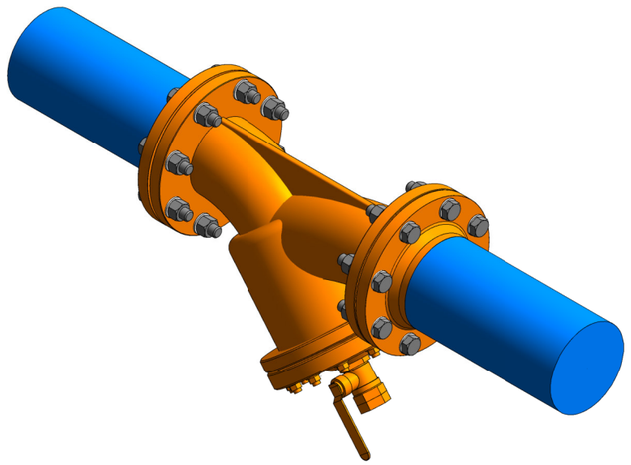
A Front View - Strainer Y - Type



1 Section View - Strainer Y - Type



3D1 3D View - Strainer Y - Type



3D2 3D View - Strainer Y - Type

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.

Installation Notes

1. Ensure all machined surfaces are free of defects and that the inside of the strainer is free of foreign objects.
2. For horizontal pipelines, the strainer should be installed so that the drain connection is pointed downwards.
3. For flanged end strainers, the flange bolting should be tightened gradually in a back and forth clockwise motion. Threaded end strainers should use an appropriate sealant.
4. Once installed, increase line pressure gradually and check for leakage around joints.
5. If the strainer is supplied with a start-up screen, monitor pressure drop carefully.

Y Strainer Type Specifications (Typical):

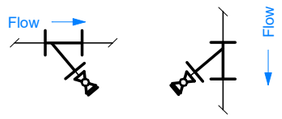
A strainer is a type of pipe accessory used to filter out solid particles or debris from a fluid or gas that is flowing through a pipeline. The strainer is typically installed at the inlet of a pump, valve, or other type of fluid handling equipment to prevent damage to the equipment by removing unwanted particles before they can enter the system. Strainers can be made from various materials, such as wire mesh, perforated metal, or screens, and are typically selected based on the type and size of particles being filtered and the flow rate of the fluid.

- Type:	Y-Type;	
- Valve Pressure Rating:	PN16	
- Body:	Ductile Cast Iron	
- Strainer Mesh:	Stainless Steel	
Strainer Size DN65 - DN150	1.6 mm	
Strainer Size DN200- DN350	1.6 mm	
Complete with:		
- Ball valve male/female	Thread	
Strainer Size DN65 - DN80	G1/2"	
Strainer Size DN100- DN300	G1"	

Clearance needed for changing Filter Element

DN	ΔH [mm]
80	340
100	410
125	516
150	600
200	790

Allowed Installation Positions



Rev	Date	Description	Sign.	Veri.
P02	04.04.2025	Revision 1	JR	JM
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DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

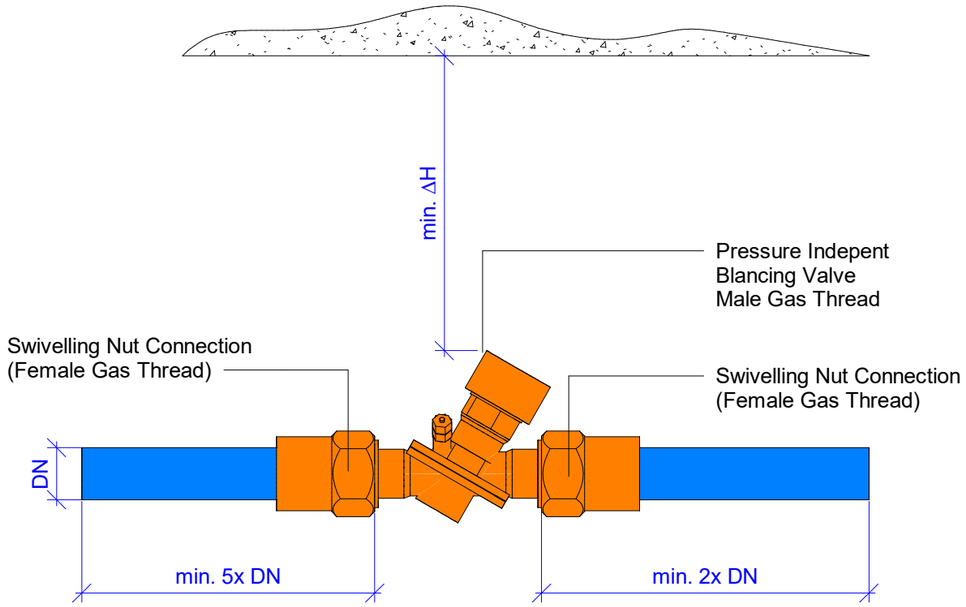
DRAWING NAME:

Cooling
Steel Pipe Systems - Strainer
Y-Type

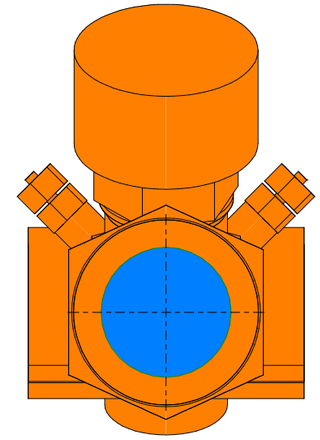
DRAWING STATUS:	SCALE:	STATUS:
Revision 1	**NTS**	**S2**

DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2025**	**JR**	**JM**

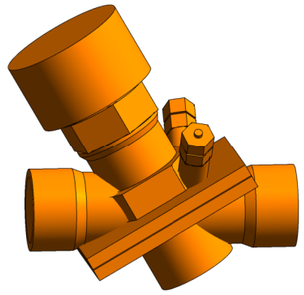
DRAWING NUMBER:	FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-M-91461	**A3**	**P02**



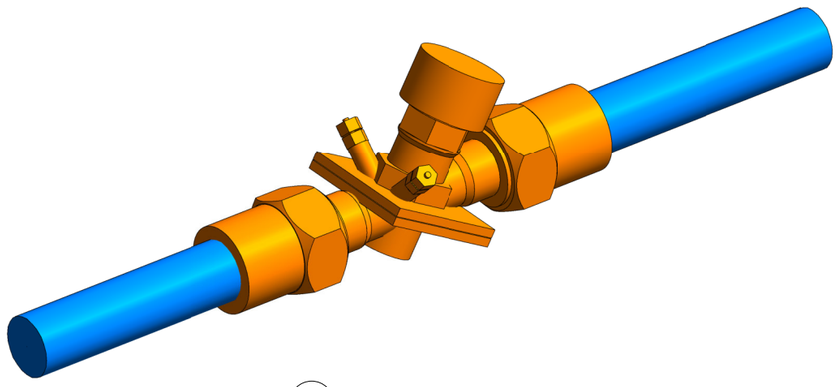
A Front View - PICV Threaded



1 Section View - PICV Threaded



3D1 3D View - PICV Threaded



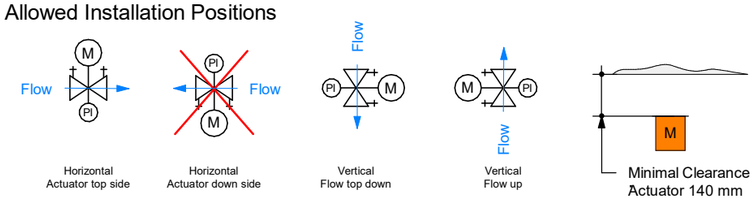
3D2 3D View - PICV Threaded

Pressure Independent Balancing and Control Valve (Typical):

Pressure independent control valves will often be abbreviated to the letters PICV. These valves are basically a number of different valves conveniently combined into one unit.
They have two main functions which are to control the amount of liquid flowing through a pipe and to automatically adjust and compensate for pressure fluctuations in the system to maintain a stable and reliable control.

- Type	Pressure Independent Balancing and Control Valve
- Valve Pressure Rating:	PN16
- Body:	Brass/AMETAL
- Process Connection:	Threaded
- Including Measuring Nipples	L ≈ 45 mm for uninsulated valves L ≈ 100 mm for insulated valves

Allowed Installation Positions



Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.

Installation Notes

1. The valve operates when arrow on the valve body is aligned with flow direction. When this rule is disobeyed the valve acts like variable orifice that cause water hammer at sudden closing when vailable pressure has increased or valve have been set to lower value.
2. In case when system condition allows backflows it is strongly recommended to use backflow preventer in order to avoid possible water hammer that can damage the valve as well as other elements in the system.

Rev	Date	Description	Sign.	Veri.
P02	04.04.2025	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	NS	JM

DESIGN & BUILD CONTRACTOR:

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CTS GROUP PARTNER:

BIMMS

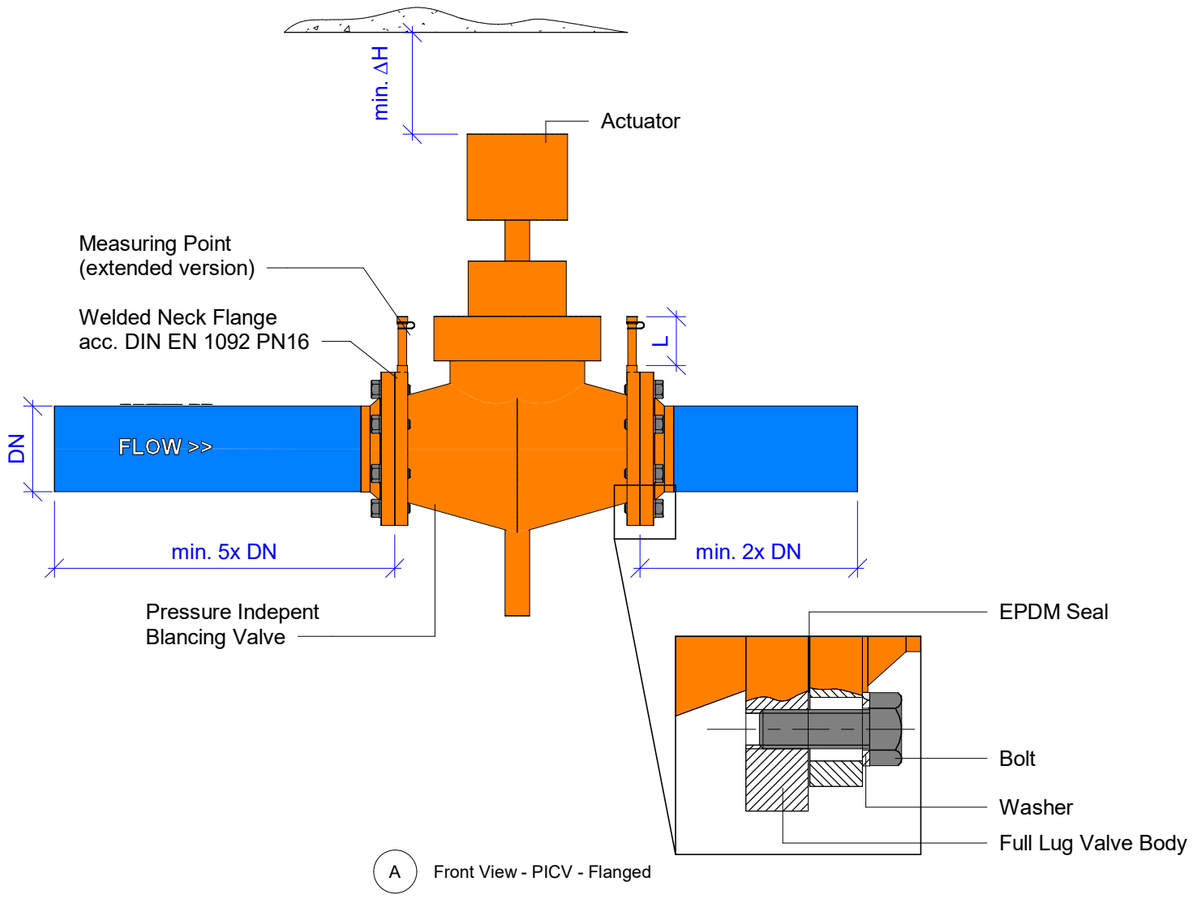
PROJECT NAME:

Execution Design and Engineering Requirements

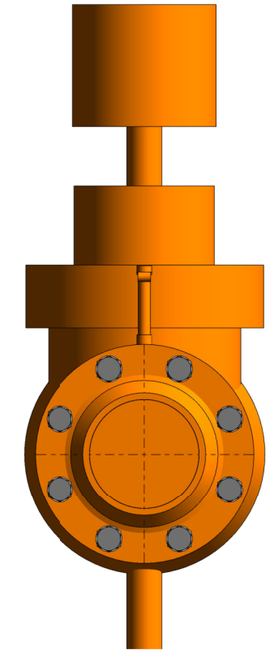
DRAWING NAME:

Cooling
Steel Pipe Systems - PICV Threaded

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2025**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-M-91462		**A3**	**P02**



A Front View - PICV - Flanged



1 Section View - PICV - Flanged

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.

Installation Notes

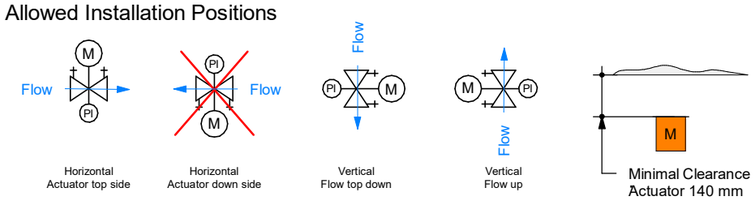
1. The valve operates when arrow on the valve body is aligned with flow direction. When this rule is disobeyed the valve acts like variable orifice that cause water hammer at sudden closing when vailable pressure has increased or valve have been set to lower value.
2. In case when system condition allows backflows it is strongly recommended to use backflow preventer in order to avoid possible water hammer that can damage the valve as well as other elements in the system.

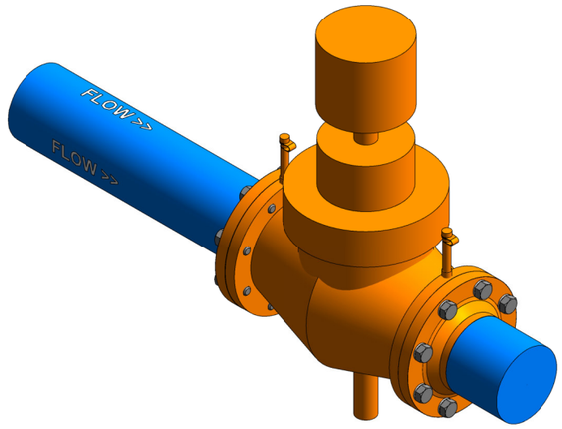
Pressure Independent Balancing and Control Valve (Typical):

Pressure independent control valves will often be abbreviated to the letters PICV. These valves are basically a number of different valves conveniently combined into one unit.
They have two main functions which are to control the amount of liquid flowing through a pipe and to automatically adjust and compensate for pressure fluctuations in the system to maintain a stable and reliable control.

- Type	Pressure Independent Balancing and Control Valve
- Valve Pressure Rating:	PN16
- Body:	Ductile Iron EN-GJS-400
- Process Connection:	Flanged
- Including Measuring Nipples	L ≈ 45 mm for uninsulated valves L ≈ 100 mm for insulated valves

Allowed Installation Positions





3D1 3D View - PICV - Flanged

Rev	Date	Description	Sign.	Veri.
P02	04.04.2025	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	NS	JM

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CTS Group

CTS GROUP PARTNER:

BIMMS

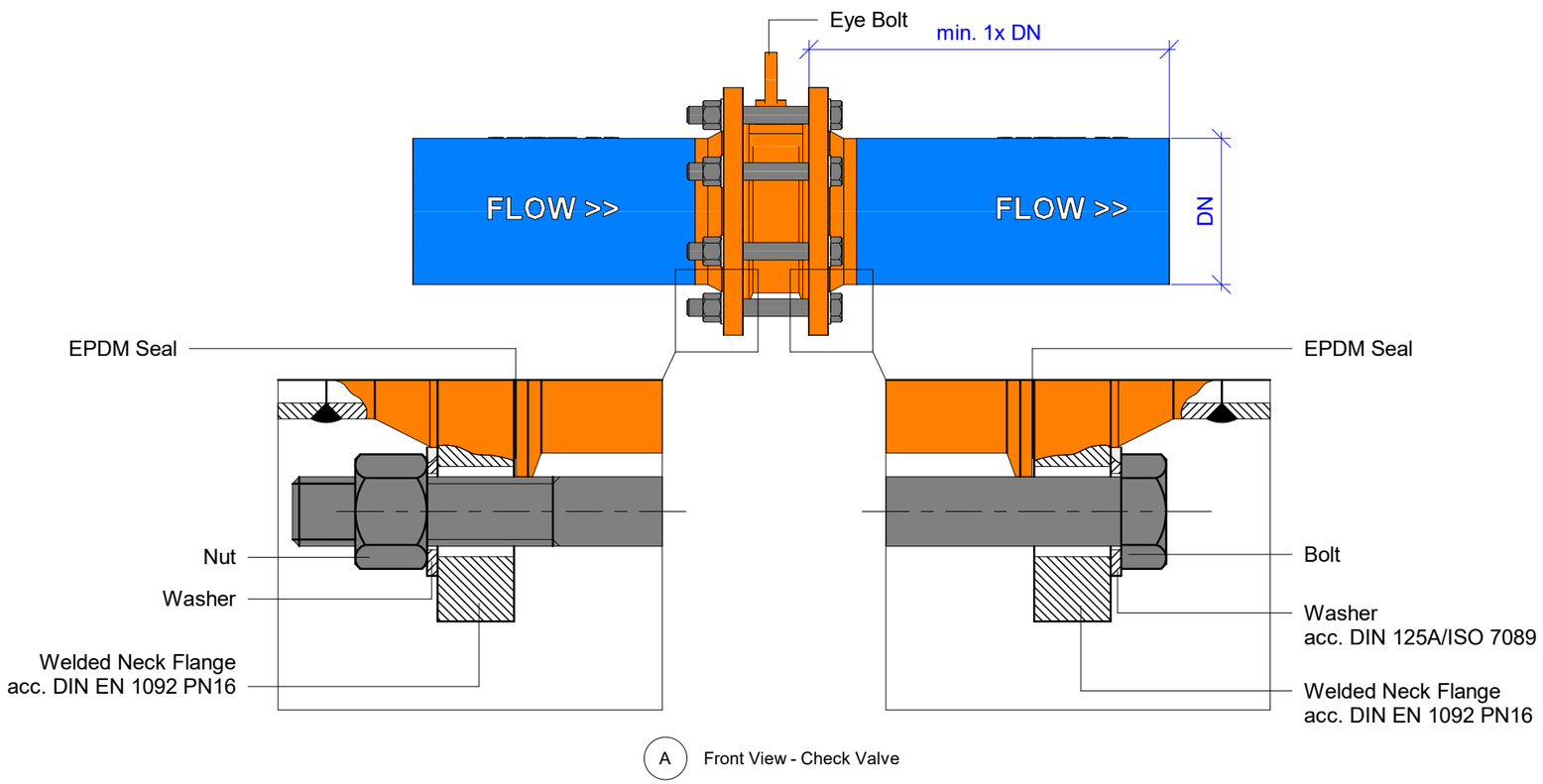
PROJECT NAME:

Execution Design and Engineering Requirements

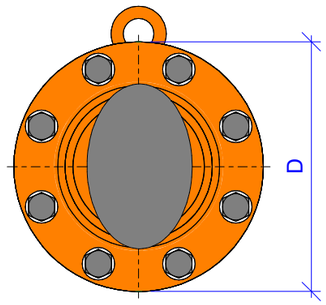
DRAWING NAME:

Cooling
Steel Pipe Systems - PICV
Flanged

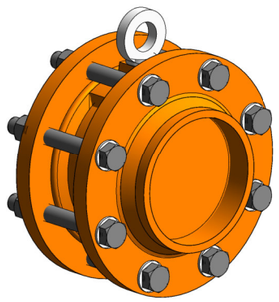
DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2025**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-M-91463		**A3**	**P02**



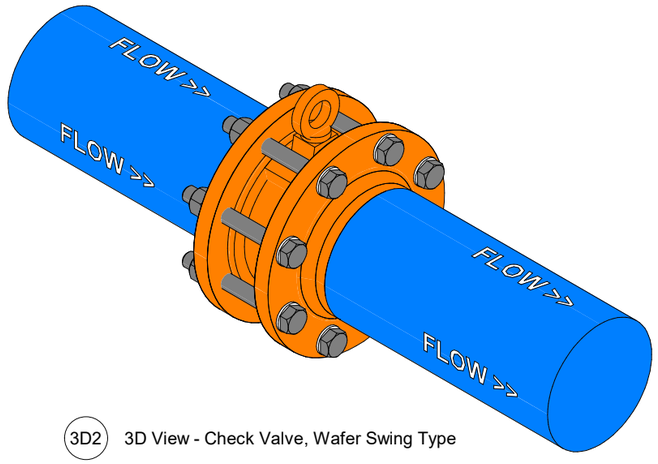
A Front View - Check Valve



1 Section View - Check Valve, Wafer Swing Type



3D1 3D View - Check Valve, Wafer Swing Type



3D2 3D View - Check Valve, Wafer Swing Type

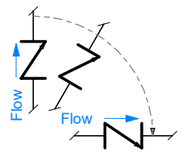
Check Valve Specifications:

Check valves permit flow in one direction only and close automatically if flow reverses. They are entirely automatic in action, depending upon pressure and velocity of flow within the line to perform the functions of the opening and closing

- Type	Wafer Type Check Valve; e.g. Econosto ECON Fig. 2237
- Valve Pressure Rating:	PN16
- Body:	Cast Iron
- Disc:	Brass
- Shaft:	Stainless Steel
- Spring:	Stainless Steel
- Seal:	NBR

Duct Nominal size D [mm]
40
50
65
80
100
125
150
200
250
300
350

Allowed Installation Positions



Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.

Installation Notes

1. Make sure that the applied valves are suitable for the working conditions in the plant, with right system connections, according to pressure and temperature limits.
2. When sizing the check valve, please note, that a particular volume flow is necessary to bring the valve into a stable full-opened position. If a full-opened position is not achieved, the valve is oversized and will give chattering noises. This means a higher abrasion and may cause malfunctioning.
3. Before plant startup, especially after repairs carried out, flash out the pipeline, before installing the wafer type check valves.
4. The installation position for the check valves in a horizontal pipeline, is with the discs in vertical position, or in a vertical pipeline with the discs closed and the flow in upstream direction.
5. Wafer type check valves are designed for installation between two pipeline flanges, including appropriate flange sealing. The outer diameter of the valve centers itself by the flange bolts. For a good stable functioning, the distance between pipe elbows, pumps etc and the valve, should be 5x DN in a straight way.
6. The valve should be assembled in the pipeline in closed position, for a correct functioning, the valve must be stress free mounted between the flanges.

Rev	Date	Description	Sign.	Veri.
P02	04.04.2025	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	NS	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

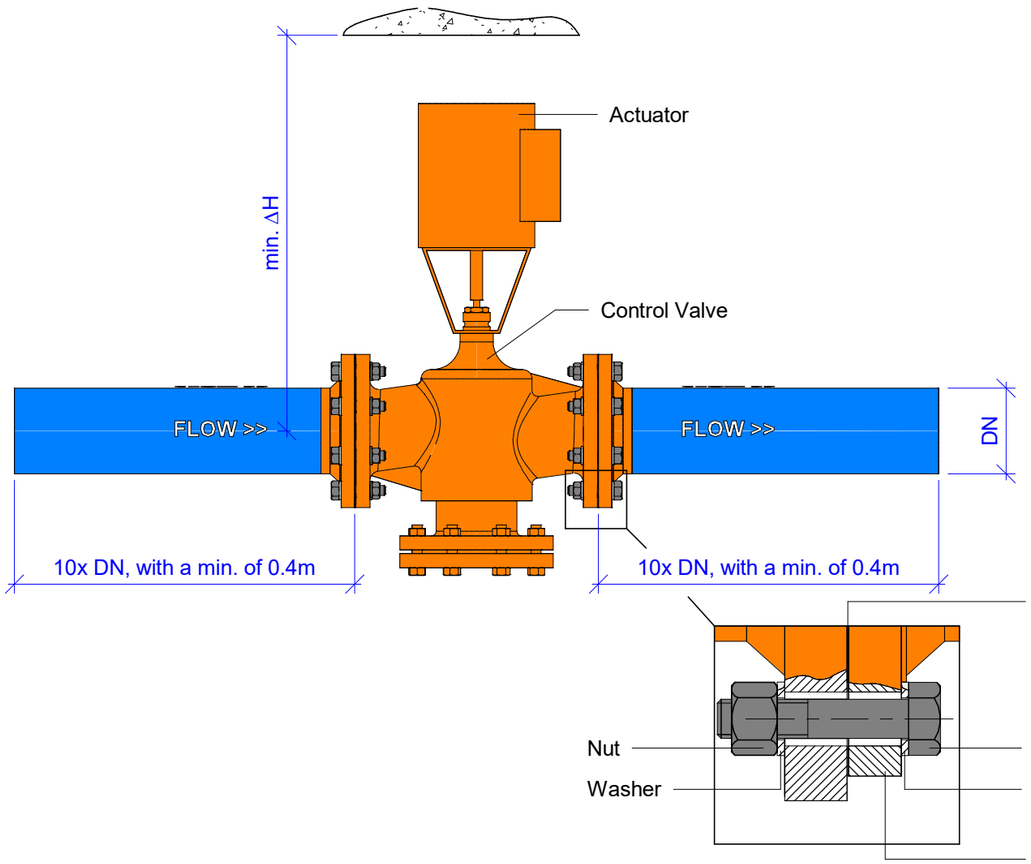
PROJECT NAME:

Execution Design and Engineering Requirements

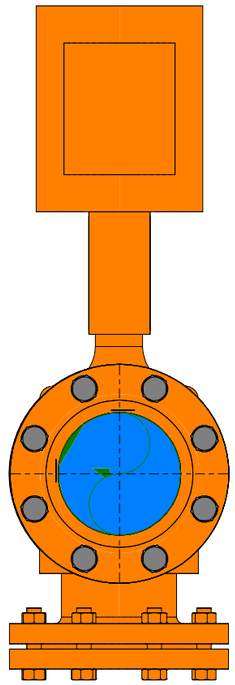
DRAWING NAME:

Cooling Steel Pipe Systems - Check Valve, Wafer Swing Type

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2025**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-M-91464		**A3**	**P02**



A Front View - Control Valve - Flanged



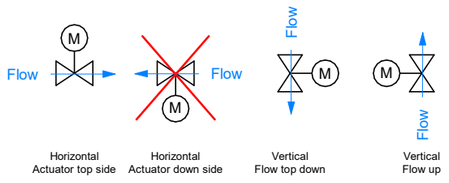
1 Section View - Control Valve - Flanged

Control Valve Specifications:

A control valve is a valve used to control fluid flow by varying the size of the flow passage as directed by a signal from a controller.

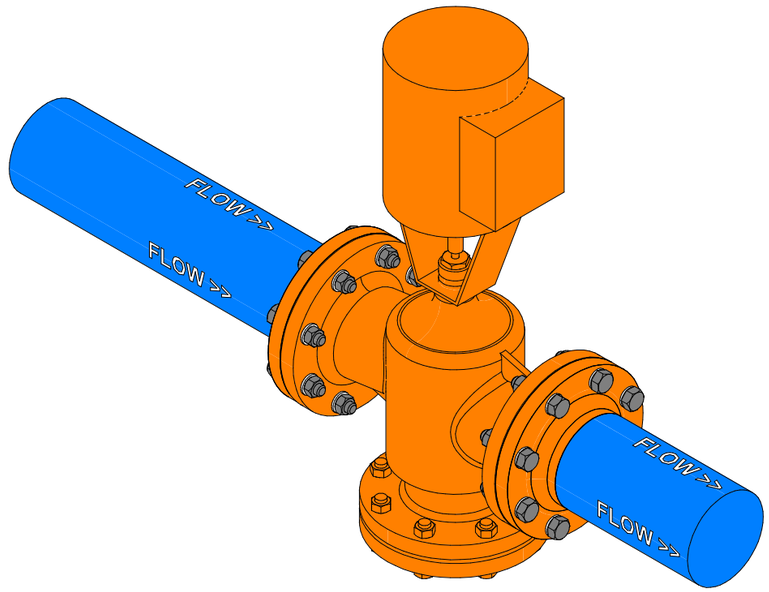
- Valve Pressure Rating:	PN16
- Body:	Ductile Cast Iron
- Valve Body:	Stainless Steel
- Seal:	PTFE
- Shaft:	Stainless Steel

Allowed Installation Positions



Clearance needed for placing/changing Actuator

DN	ΔH [mm]
50	675
64	690
80	690
100	725
125	735
150	765



3D1 3D View - Control Valve-Flanged

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.

Installation Notes

1. Valves that are to be fitted with ADCATrol actuators are generally delivered with the actuator's already mounted. If delivered separately follow the actuator respective Installation and Maintenance Instructions (IMI) when mounting it onto the valve.
2. The recommended installation position of the valve is horizontal with the actuator pointing upwards.
3. The valve has an arrow or inlet/outlet designation, be sure that it is installed in the appropriate direction according to fluid flow.
4. Take care with jointing materials and sealing compounds to ensure that none may be permitted to block or enter the steam trap causing malfunction. In case of flanged connections use appropriate flange gaskets.

Rev	Date	Description	Sign.	Veri.
P02	04.04.2025	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	NS	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

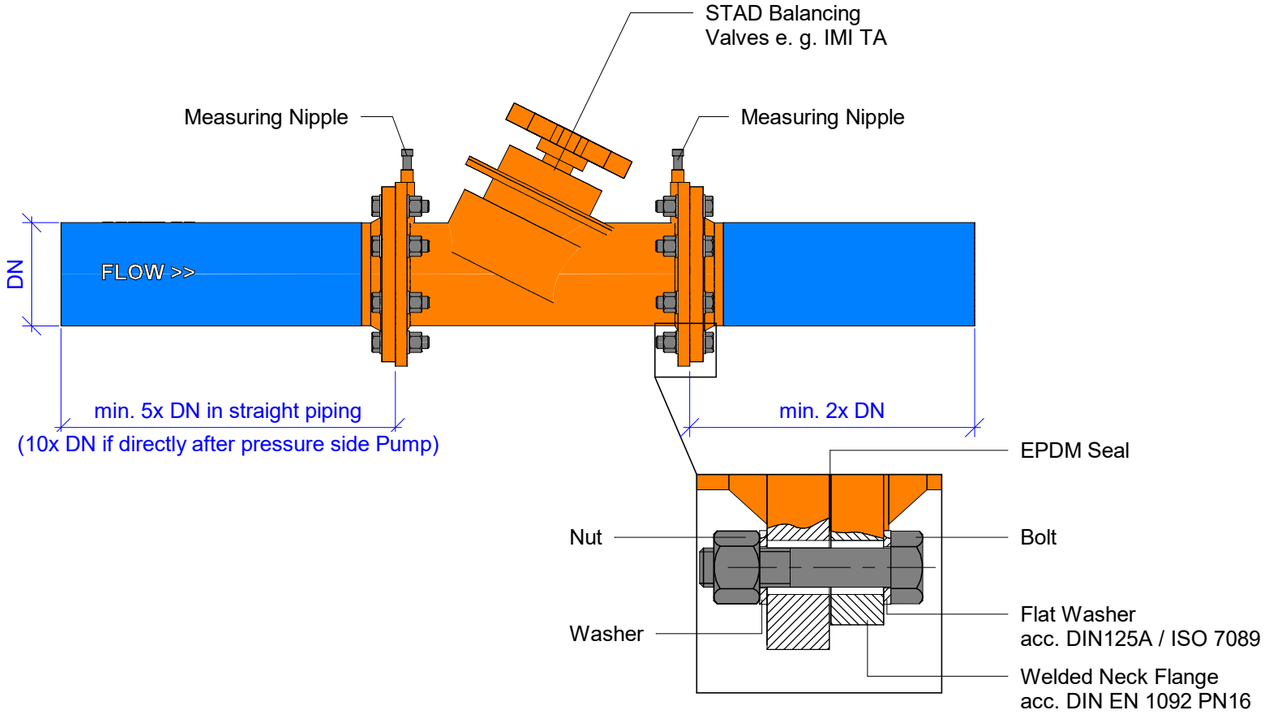
PROJECT NAME:

Execution Design and Engineering Requirements

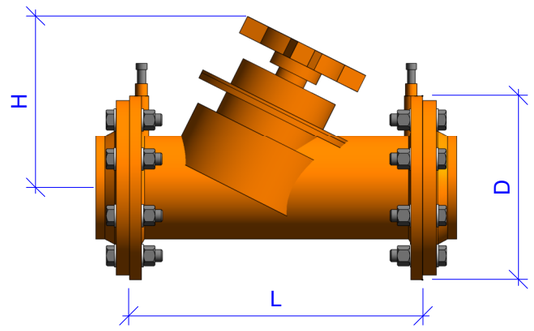
DRAWING NAME:

Cooling
Steel Pipe Systems-Control Valve

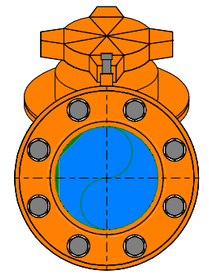
DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2025**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-M-91465		**A3**	**P02**



A Front View - Balancing Valve - Flanged



B Front View - Balancing Valve - Flanged



1 Section View - Balancing Valve - Flanged

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.

Installation Notes

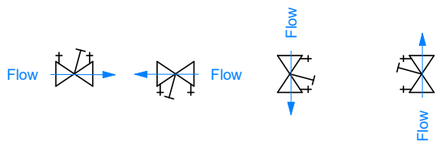
The valve should be kept in a dry, clean location and protected from damage and contamination.
Before you install the valve, check that:

1. The valve is clean and undamaged.
2. The pipe system has been cleaned.
3. Surfaces where the seals are to seal against are clean and undamaged.
4. Demands on straight pipe lengths before the valve, after a bend respective pump, as well as after the valve must be observed.

Balancing Valve Specifications:

- Type	Balancing Valve STAF, STAF - SG
- Process Connection:	Flanged
- Including Measuring Nipples	L ≈ 45 mm for uninsulated valves L ≈ 100 mm for insulated valves
Body, STAF:	Cast iron
Body, STAF-SG:	Ductile iron
DN 20-150:	
Bonnet, cone and spindle	AMETAL.
DN 200-300:	
Bonnet and cone	Ductile iron, and spindle of AMETAL.
DN 350-400:	
Seals	EPDM.
Slip washer	PTFE.
Bonnet bolts	Surface treated steel.
Measuring points	AMETALand EPDM.
Handwheel	
DN 20-50	Polyamide and TPE
DN 65-150	Polyamide
DN 200-400	Aluminium

Allowed Installation Positions



STAF - Cast Iron

DN	D (mm)	L (mm)	H (mm)	Number of bolt holes
65	185	290	163	4
80	200	310	172	8
100	220	350	223	8
125	250	400	259	8
150	285	480	273	8

STAF - SG - Ductile Iron

DN	D (mm)	L (mm)	H (mm)	Number of bolt holes
20	105	150	100	4
25	115	160	109	4
32	140	180	111	4
40	150	200	122	4
50	165	230	122	4
65	185	290	163	8
80	200	310	172	8
100	235	350	223	8
125	270	400	259	8
150	300	480	273	8
200	340	600	430	12
250	400	730	420	12
300	455	850	480	12
350	520	980	585	16
400	580	1100	640	16

Rev	Date	Description	Sign.	Veri.
P02	04.04.2025	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	NS	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

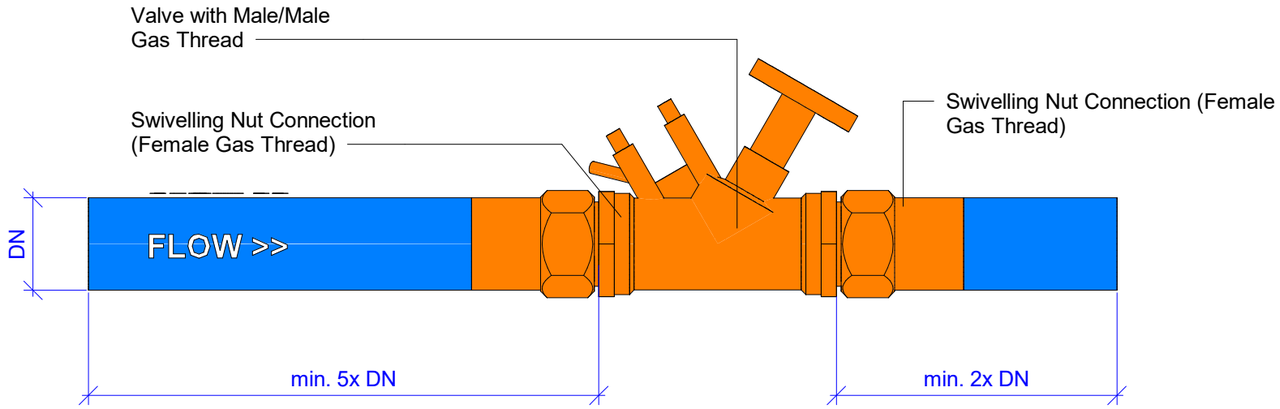
PROJECT NAME:

Execution Design and Engineering Requirements

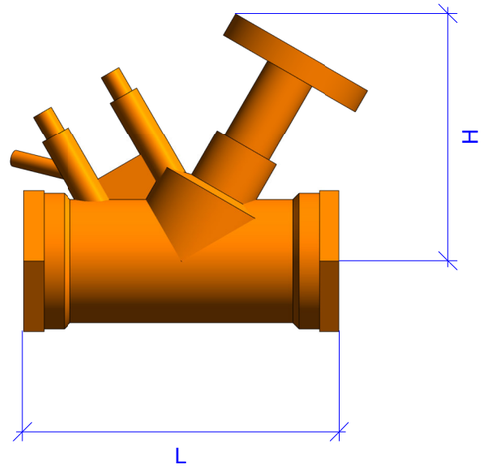
DRAWING NAME:

Cooling
Steel Pipe Systems-Balancing Valve Flanged

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2025**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-M-91466		**A3**	**P02**



A Front View - Balancing Valve - Threaded



B Front View - Balancing Valve - Threaded

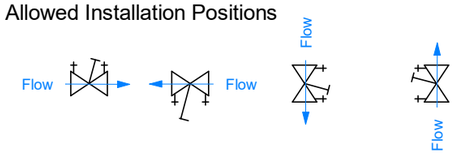
Balancing Valve Specifications:

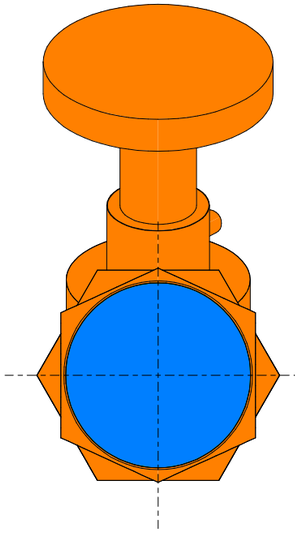
- Type	Balancing Valve e. g. IMI TA
- Valve Pressure Rating:	PN25
- Process Connection:	L ≈ 45 mm for uninsulated valves L ≈ 100 mm for insulated valves
- Including Measuring Nipples	

DN	L (mm)	H (mm)
10	73	100
15	84	100
20	94	100
25	105	105
32	121	110
40	126	120
50	155	120

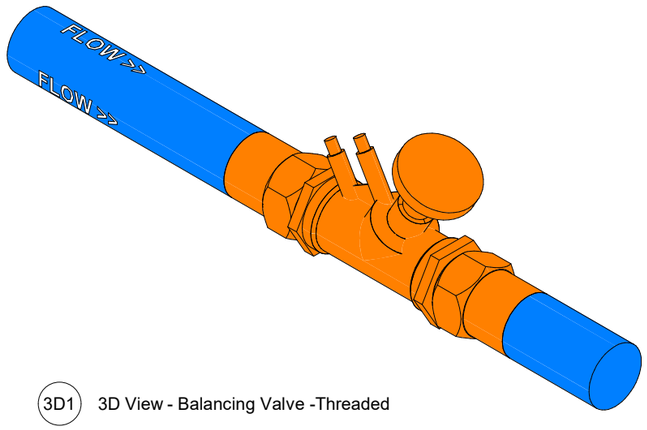
- Valve body and bonnet:	AMETAL
- Sealing (body/bonnet):	EPDM (Ethylene Propylene Diene Monomer) O-ring
- Valve plug:	AMETAL
- Seat seal:	EPDM (Ethylene Propylene Diene Monomer) O-ring
- Spindle:	AMETAL
- Slip washer:	PTFE (Polytetrafluoroethylene)
- Spindle seal:	EPDM (Ethylene Propylene Diene Monomer) O-ring
- Spring:	Stainless steel
- Handwheel:	Polyamide and TPE (Thermoplastic Elastomer)
- Measuring points:	AMETAL
- Caps:	Polyamide and TPE (Thermoplastic Elastomer)
- Draining:	AMETAL
- Sealing:	EPDM (Ethylene Propylene Diene Monomer)
- Gaskets:	Fiber-based aramid

Allowed Installation Positions





1 Section View - Balancing Valve - Threaded



3D1 3D View - Balancing Valve -Threaded

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.

Installation Notes

1. Remove the Cap: Unscrew the protective cap of the valve, allowing access to the drainage or measurement point.
2. Insert the Measurement or Drainage Point: Connect the tool or drainage pipe to the indicated point. This step enables either fluid drainage or flow measurement, depending on the need.
3. Adjust the Valve: Use an Allen wrench (5 mm) to adjust the valve flow. This is critical for balancing the system and ensuring the correct flow of fluid through the valve.
4. Fine Adjustment: Fine-tuning can be done to ensure proper balancing, using a spanner (8-14 mm size) to adjust additional components, ensuring a proper seal or correct adjustment.
5. Leak Check and Final Test: After making adjustments, check for any leaks and perform a final system test to ensure the valve is functioning properly and the system is balanced.

Rev	Date	Description	Sign.	Veri.
P02	04.04.2025	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	NS	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

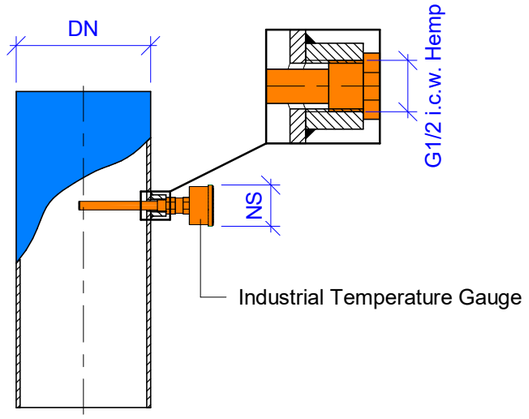
PROJECT NAME:

Execution Design and Engineering Requirements

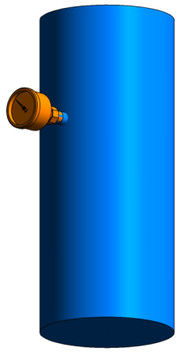
DRAWING NAME:

Cooling
Steel Pipe Systems-Balancing Valve Threaded

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2025**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-M-91467		**A3**	**P02**



1 Section View - Temperature Gauge



3D1 3D View - Temperature Gauge

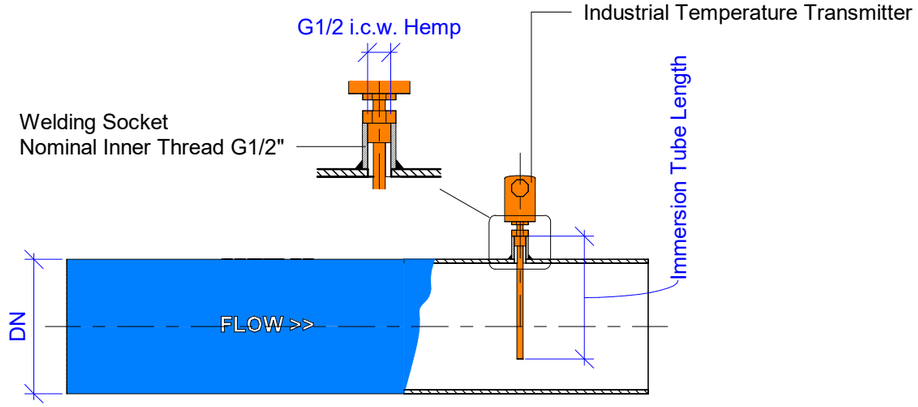
Temperature Gauge (Typical) Specifications:

The temperature gauge measures and displays the temperature of the system, ensuring accurate monitoring for safe and efficient operation.

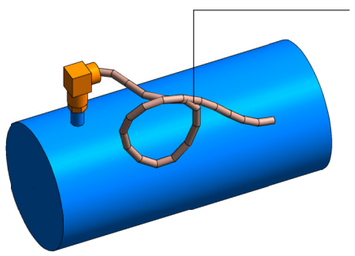
- Type	MRE / MRE-g
- Version	Bayonet ring case or crimpedon ring case
- Nominal Size (NS)	100 mm [4"] e 160 mm [6"].
- Accuracy temperature	Class 1 per EN 13190 at 23 °C ±10 °C ambient
- Process connection	Variable, including standard threaded connections (e.g. G ½ B, ½ NPT) and other adjustable options.
- Measurement system	Measuring element filled with inert, physiologically safe gas.
- Scale ranges from	-200 °C to +700 °C
- Pressure load capacity	Maximum pressure in the immersion tube up to 25 bar static

Materials (non-wetted)

- Case, bayonet bezel	Stainless steel 304
- Pointer	Aluminium, black, micro adjustment
- Articulated joint “adjustable stem and dial”	Stainless steel 304
- Dial	Aluminium (white)



2 Section View - Temperature Transmitter



Connection Type: Angular connector DIN EN 175301-803 form A for cables with 6 ...8mm [0.24 ... 0.31 in] diameter, cross-section max. 1.5mm²

3D2 3D View - Temperature Transmitter

Temperature Transmitter (Typical) Specifications:

The temperature transmitter converts the signal into a standardized output for easy integration with control systems. It ensures accurate temperature measurement over long distances.

- Type:	Dial Thermometer	
- Vertical Piping	Central Back Connection,	for H <1.800 mm
- Horizontal Piping Bottom Connection	135° Back Connection,	for H ≥1.800 mm
- Nominal Size (NS)	Size 63, 80, 100, 160 mm [2.5, 3, 4, 6\"]	
- Immersion Tube:	Stainless Steel AISI316Ti (1.4571)	

- Sensor range -50 ... +250 °C [-58 ... +482 °F]

- Compact design

- Electrical connection via angular connector DIN EN 175301-803 form A

- With direct sensor output (Pt100 in 2-, 3- or 4-wire connection) or integrated transmitter

- Integrated transmitter with 4... 20 mA output signal, individually parameterisable with free-of-charge WIKAsoft-TT PC configuration software

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.

To take into acount during installation

1. Check that the location where the thermometer will be installed meets the specified conditions (e.g. temperature, pressure, etc.).
2. Make sure the area is clean and accessible.
3. Identify the correct connection design for your model (male thread, movable nut, sliding fit, etc.).
4. Confirm the dimensions of the connector and insertion length to ensure compatibility.
5. For threaded connections, apply suitable sealing (such as Teflon tape, if necessary) to prevent leaks.
6. Carefully screw the thermometer into the installation site using the appropriate wrench so as not to damage the thread.
7. Ensure that the thermometer is positioned correctly for a clear and safe reading.
8. Adjust the angle or bracket if necessary, especially for rear or bottom bracket mounts.
9. After installation, start the process and check that the thermometer is working correctly.
10. Monitor the accuracy and stability of the reading within the specified range.
11. Carry out periodic inspections to check the integrity of the thermometer and its accuracy.
12. If necessary, remove the thermometer using a thermowell for maintenance without interrupting the process.

Rev	Date	Description	Sign.	Veri.
P02	04.04.2025	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	TP	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

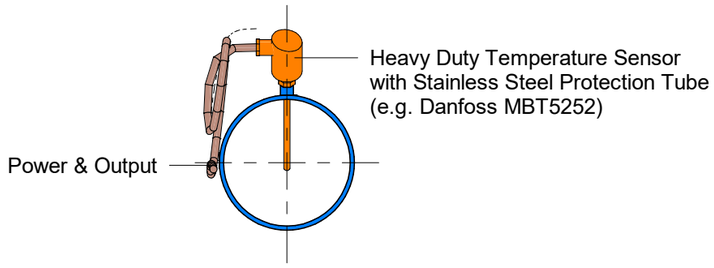
PROJECT NAME:

Execution Design and Engineering Requirements

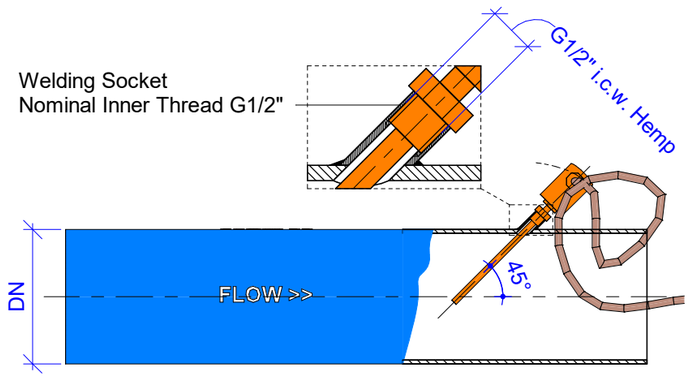
DRAWING NAME:

Cooling
Steel Pipe Systems-Industrial
Thermometer Dial

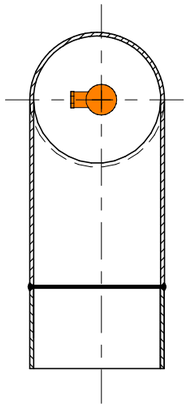
DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2025**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-M-91468		**A3**	**P02**



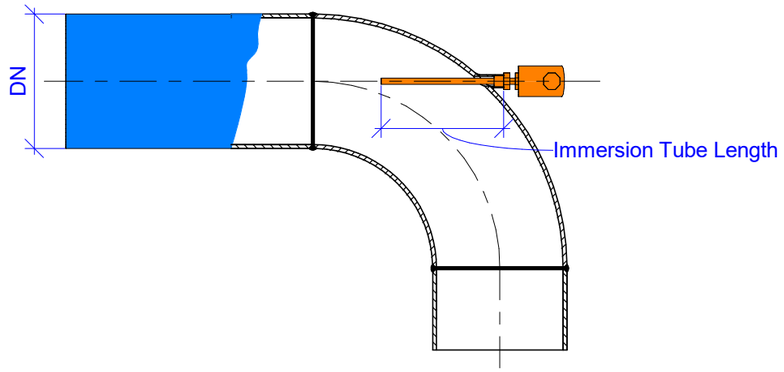
1 Section View - Temperature Sensor - Straight Pipe Lengths Installation



A Front View 2 - Temperature Sensor - Straight Pipe Lengths Installation



2 Section View - Temperature Sensor - Bends Installation



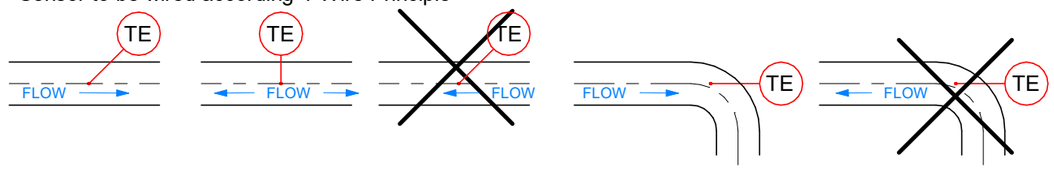
B Front View - Temperature Sensor - Bends Installation

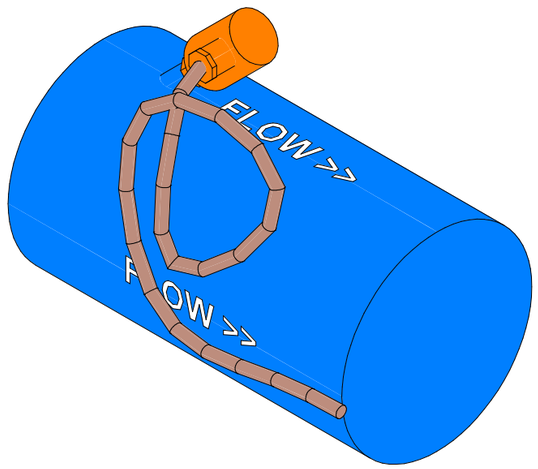
Temperature Sensor Specifications:

- Sensing Element: PT1000
- Tolerance: EN 60751 Class B (± [0.30 + 0.002xT])

- Protection Tube: Stainless Steel AISI316Ti
- Process Connection: G 1/2

- Enclosure: IP65
- Sensor to be wired according 4-Wire Principle





3D1 3D View - Temperature Sensor

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
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Rev	Date	Description	Sign.	Veri.
P02	04.04.2025	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	JR	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Cooling Steel Pipe Systems - Temperature Sensor

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
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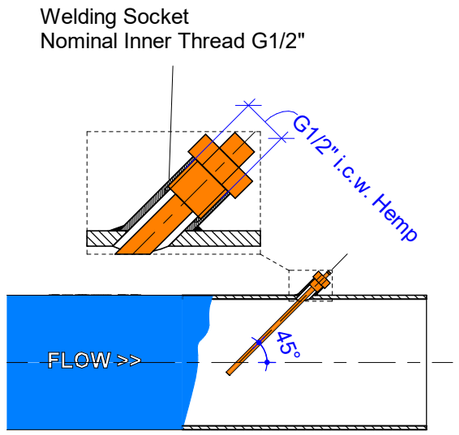
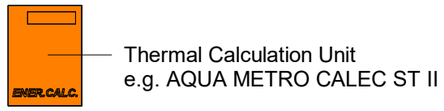
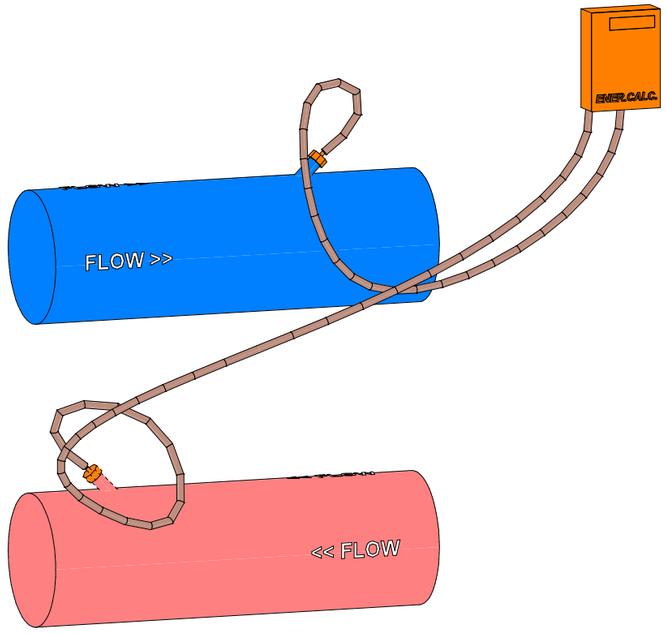
11.11.2024	**04.04.2025**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-M-91469		**A3**	**P02**



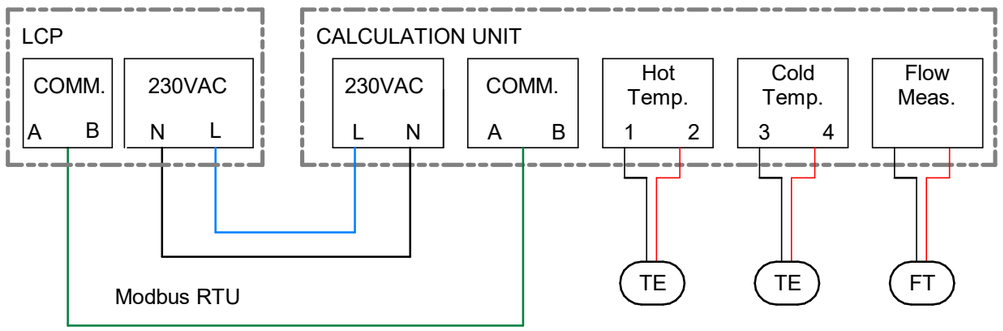
A Front View - Paired Temperature Sensor





3D1 3D View - Paired Temperature Sensor

Wiring:

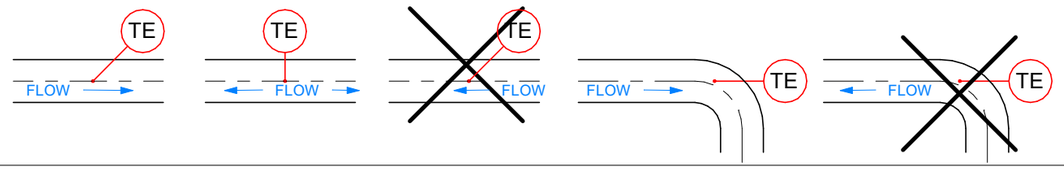


Temperature Sensor Specifications:

- Sensing Element: PT100
- Tolerance: EN 60751 Class B (± [0.30 + 0.005xT])

- Protection Tube: Stainless Steel AISI316Ti
- Process Connection: G 1/2

- Sensor to be wired according 2-Wire Principle



Notes

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CTS Group

CTS GROUP PARTNER:

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PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Cooling
Steel Pipe Systems - Thermal
Energy Calculation Unit

DRAWING STATUS:	SCALE:	STATUS:
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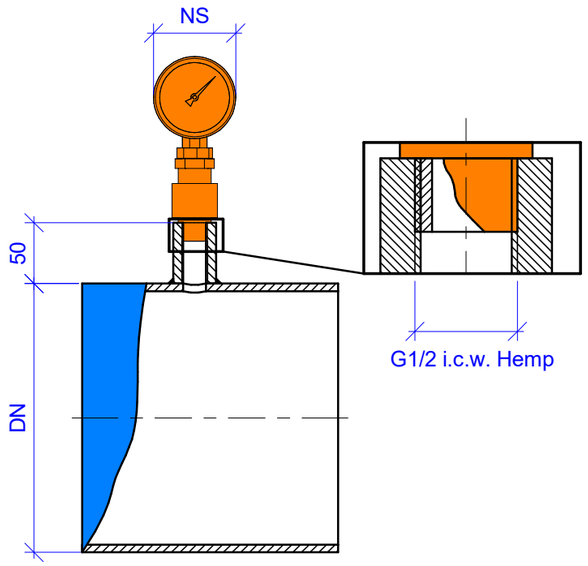
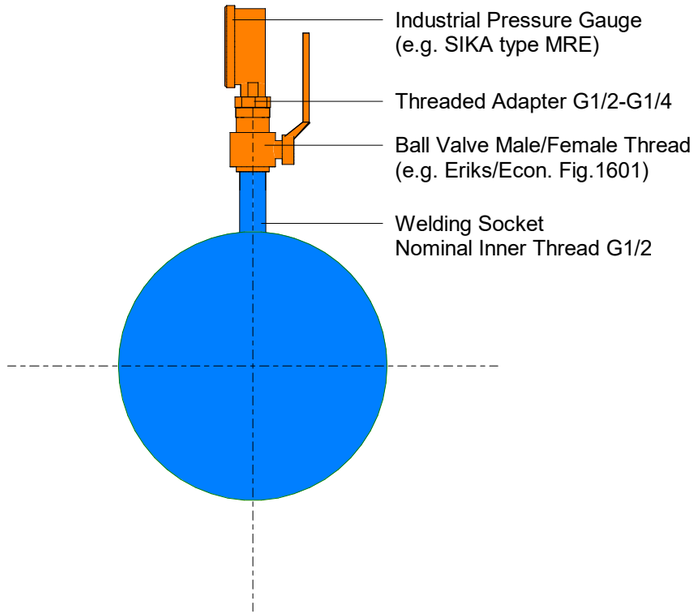


1 Section View - Pressure Gauge



2 Section View - Pressure Gauge

Notes

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To take into acount during installation

1. The installation of pressure gauges should be left to specialized personnel.
2. During installation or removal, never apply any force to the pressure gauge housing, instead, apply the wrench to the wrench fittings provided.
3. It must be ensured that the corresponding process connection has been selected (nominal width, suitable sealing face if required).
4. To position the pressure gauge so that it can be read perfectly, the use of a clamping sleeve or union nut is recommended.
5. In the case of flange joints, the pressure gauge is placed on the corresponding flange and the flanges are joined with suitable bolts. Ensure that the bolts are tightened firmly.
6. Gaskets must be watertight! For this reason, it is mandatory to use suitable gaskets made of a material resistant to the pressure medium in the connections.
7. For sealing connections with a parallel thread, for example, flat gaskets in accordance with EN 837-1 or profile seals must be installed or, on the other hand, the corresponding sealing lens must be supplied in the case of a high-pressure connection.
8. Tapered threads (e.g. NPT threads) are sealed with additional seals, such as PTFE tape, for example (see EN 837-2).
9. For pressure gauges with a Ø 13 mm pressure relief vent at the top of the housing, it is recommended, for pressure ranges < 6 bar, to cut off the nipple on the fill plug so that the pressure gauge can be filled with water.

Pressure Gauge (Typical) Specifications:

SIKA quality pressure gauges in industrial version with 63 mm stainless steel housing suitable for pressure measurement of gaseous and liquid media, but not for highly viscous or crystallizing media. The stainless steel housing is available as a housing with bayonet ring (type MRE) or as a housing with clamping ring (type MRE-G).

Type	MRE / MRE-g
Version	Bayonet ring case or crimped-on ring case
Nominal size	63 mm
Accuracy	EN 837-1, class 1.6 and class 2.5 (for display ranges 0...600 bar and 0...1000 bar)
Medium / Application	Liquid and gaseous media
Process connection	Thread see table , brass, optional stainless steel
Measurement system	Bourdon spring bronze, optional stainless steel
Degree of protection according to EN 60529	IP54 (IP65 for filled cases with closed pressure compensation insert)
Ambient temperature	-40 to 60 °C (-20 to 60 °C with case filling)
Storage temperature	-40 to 70 °C (-20 to 70 °C with case filling)
Medium temperature	Devices with brass connection max. 60 °C Devices with stainless steel connection max. 200 °C (max. 100 °C with case filling)
Nominal use temperature	20 °C*
Pressure load capacity	Of full-scale value
Resting load	75 %
Dynamic load	65 %
Overload	Max.

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CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Cooling
Steel Pipe Systems-Industrial
Pressure Gauge Dial

DRAWING STATUS:	SCALE:	STATUS:
Revision 1	**NTS**	**S2**

DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2025**	**JR**	**JM**

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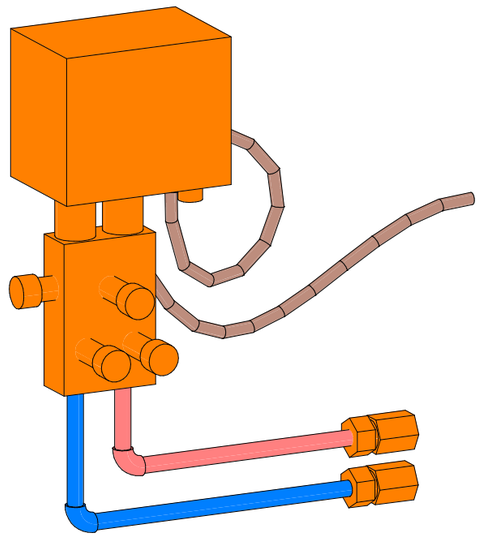
RDC0000-BMS-ZZ-ZZ-DR-M-91489	**A3**	**P02**

1 Front View - Differential Pressure

Pressure Transmitter Specifications:

- Measuring Range	0 to 6 Bar
- Accuracy	±3% of Final Value at 20 °C (with min. of 1Pa)
- Power Supply	24 V DC/AC
- Output	4-20 mA
- Enclosure	IP65
- Cable Gland	Including Strain Relief
- Display	Yes
Connections	
- Electrical 1	5-pin power input and analog signal out
- Electrical 2	4-pin realy contacts/solid state switch outputs
- Process 1	G1/8"female thread
- Process 2	G1/8"female thread



2 3D View - Differential Pressure Transmitter

Notes

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P02	04.04.2025	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	JR	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

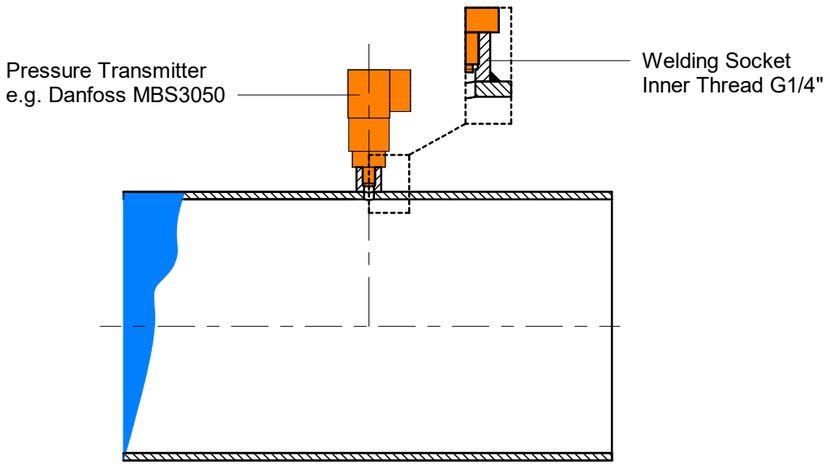
PROJECT NAME:

Execution Design and Engineering Requirements

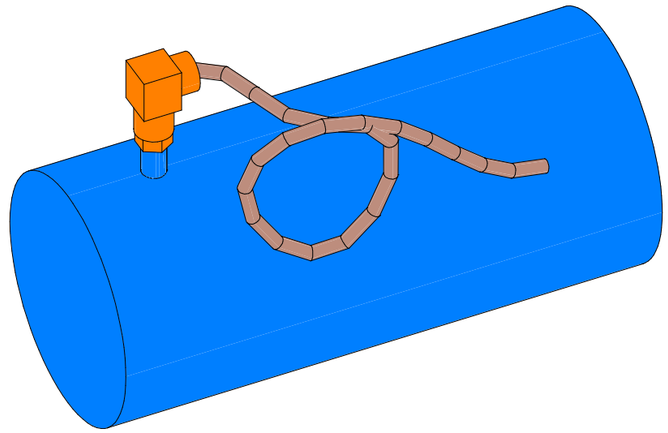
DRAWING NAME:

Cooling
Steel Pipe Systems - Digital
Differential Pressure Transmitter

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2025**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-M-91552		**A3**	**P02**



A Front View - Pressure Transmitter



3D1 3D View - Pressure Transmitter

Pressure Transmitter Specifications:

- Accuracy:	1 % FS (max.); 0.5% FS (typ.)
- Non-linearity BFSL	0.2% FS
- Hysteresis:	0.1% FS
- Nom. Output Signal:	4-20 mA
- Supply Voltage:	9-32 V
- Sensor Temperature Range	-40 to 85 °C
- Pressure Range	0 to 250 kPA
- Responce Time	< 4 ms

Notes

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DESIGN & BUILD CONTRACTOR:

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CTS GROUP PARTNER:

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PROJECT NAME:

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DRAWING NAME:

Cooling
Steel Pipe Systems - Pressure Transmitter

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
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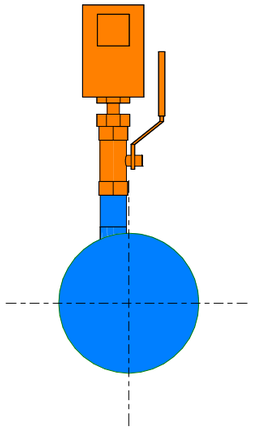
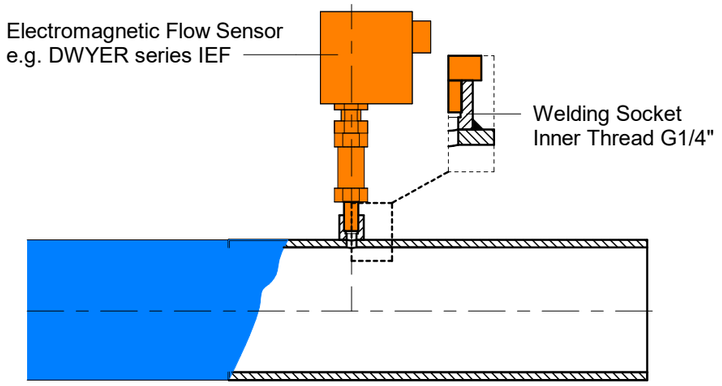
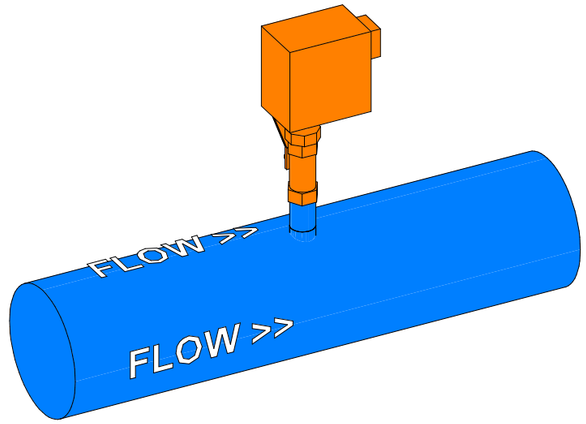
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-M-91553		**A3**	**P02**



1 Section View - Electromagnetic Flow Sensor



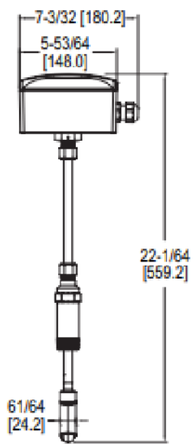
A Front View - Electromagnetic Flow Sensor

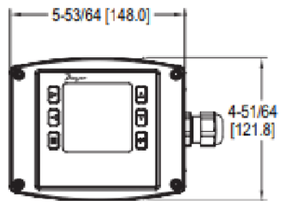


3D1 3D View Eletromagnetic Flow Sensor

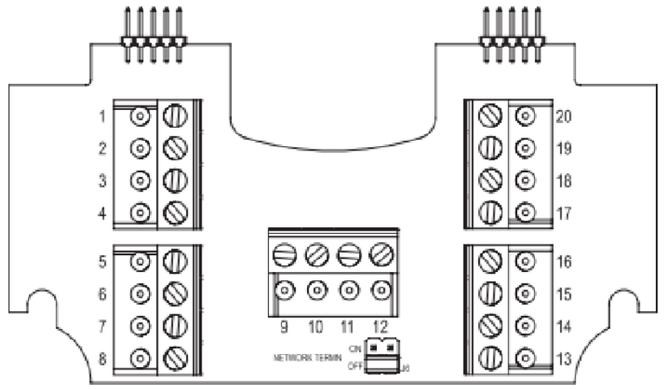
Flow Sensor:

- Type: Electro Magnetic; e.g. DWYER series IEF
- Connection: Threaded
- Converter: In Field Remote; e.g. DWYER series IEF





-LCD option shown



WIRING DIAGRAM				
Cable*	**Terminal #**	**Wire Color**	**Description**	**Note**
A	1	Red	Power Supply Positive	Connect to +24VDC or VAC transformer
A	2	Black	Power Supply Common	Connect to 24VDC/VAC common
A	13	Shield	-	If used - Application Dependant
B	14	Shield	-	If used - Application Dependant
External		-	Earth/Chassis Ground	-
Analog Current Output				
B	3	Brown	(+) Analog current output	4 to 20 mA process output
B	4	Blue	(-) Analog output common	Current output common

Notes

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P02	04.04.2025	Revision 1	JR	JM
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DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

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PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Cooling
Steel Pipe Systems -
Electromagnetic Flow Sensor

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
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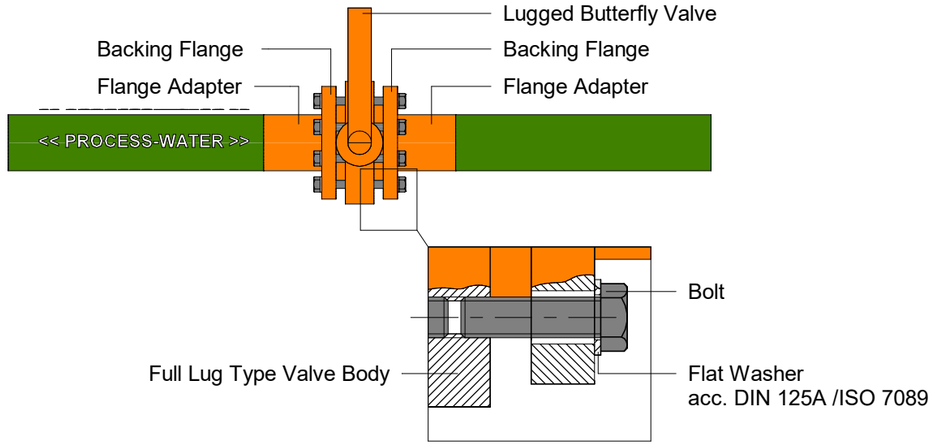
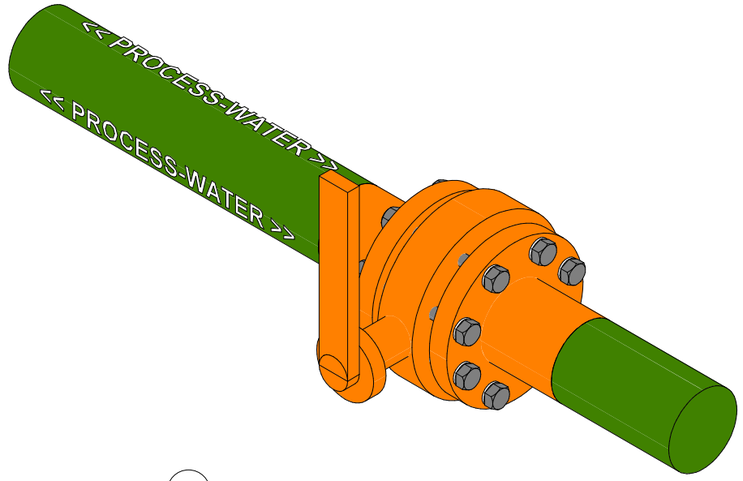
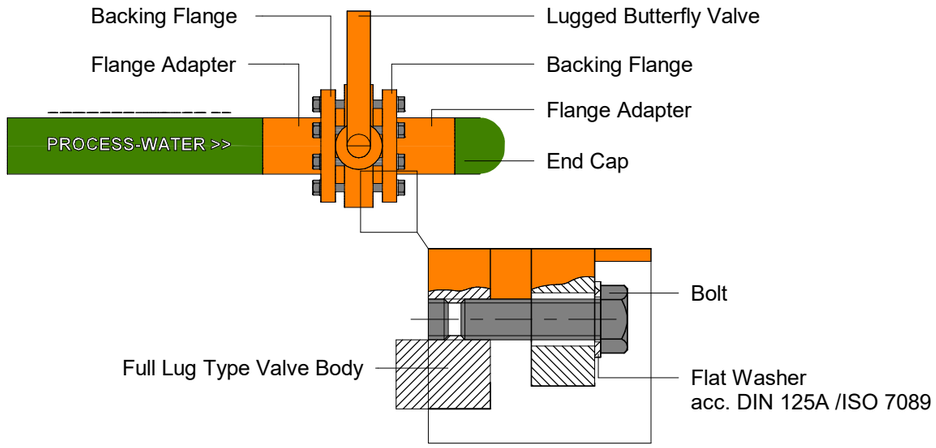
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-M-91554		**A3**	**P02**



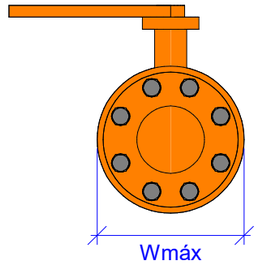
A Front View - Butterfly Valve Plastic Pipe



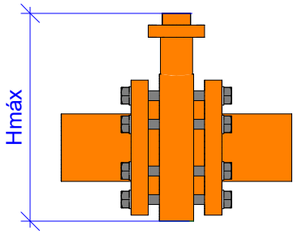
3D1 3D View - Butterfly Valve - Plastic Pipe



B Front View - Butterfly Valve Plastic Pipe End Valve



1 Section View - Butterfly Valve - Plastic Pipe



2 Section View - Butterfly Valve - Plastic Pipe

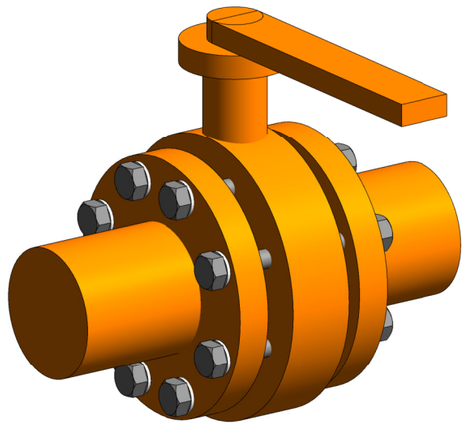
Butterfly Valve - Plastic Pipe Specifications (Typical):

A butterfly valve for plastic pipe is a flow control device used in plastic piping systems. Its function is to regulate or stop the flow of fluids in the system. The valve operates through a rotating disc mounted on a central shaft, which, when turned, controls the fluid passage. When the disc is perpendicular to the flow, the valve is closed, blocking the passage; when it is parallel, the valve is open, allowing full flow.

Use butterfly valves type 578 as intermediate (wafer) or end-of-line butterfly valves

- Type	Butterfly Valve Full Lug Type, e.g. Georg Fischer Type 578
- Valve Pressure Rating:	PN10
- Body:	PP-GF30
- Seal:	FKM
- Disc:	PVC
Operation:	
- Lever	≤ Round 140
- Gearbox	> Round 140

Duct Nominal Size øD [mm]	Wmáx [mm]	Hmáx [mm]
50	159.9	238.3
65	166.1	251.2
80	187.8	263
100	181.4	288.9
125	195.4	318.1
150	207.4	341.9
200	228.9	390.4
250	304.6	511.5
300	325.4	560.9



3D2 3D View - Butterfly Valve - Plastic pipe

Notes

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Installation

1. Allow for sufficient spacing between the flange ends. Note that the BFV opens counterclockwise.
2. Put the valve disc at closed position. Move the butterfly valve with the seals (O-rings or flat gaskets) between both flange ends.
3. Realign the pipeline. Make sure that the disc can be fully opened.
4. Fasten the butterfly valve with flange screws.
5. If you install Type 578 as an end-of-line BFV, mount a counter flange adaptor also on the free connection side.
6. Both sides must be tightened with an equal, increasing torque at operating temperature.

Rev	Date	Description	Sign.	Veri.
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CTS GROUP PARTNER:

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PROJECT NAME:

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DRAWING NAME:

Cooling Plastic Pipe Systems-Butterfly Valve

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
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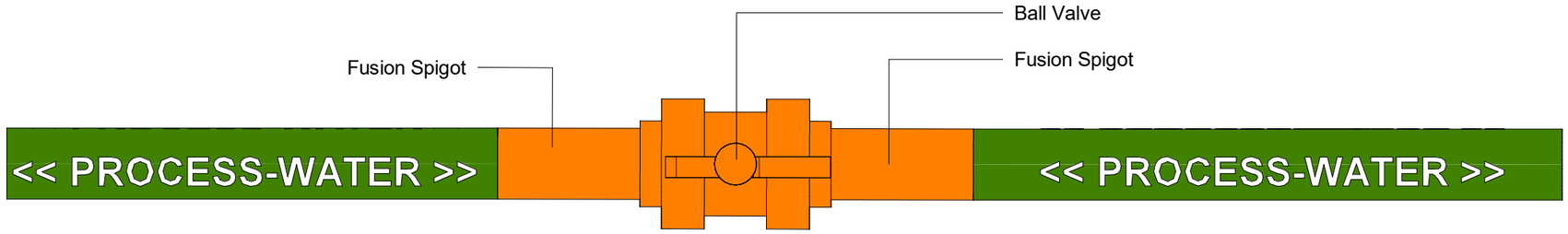
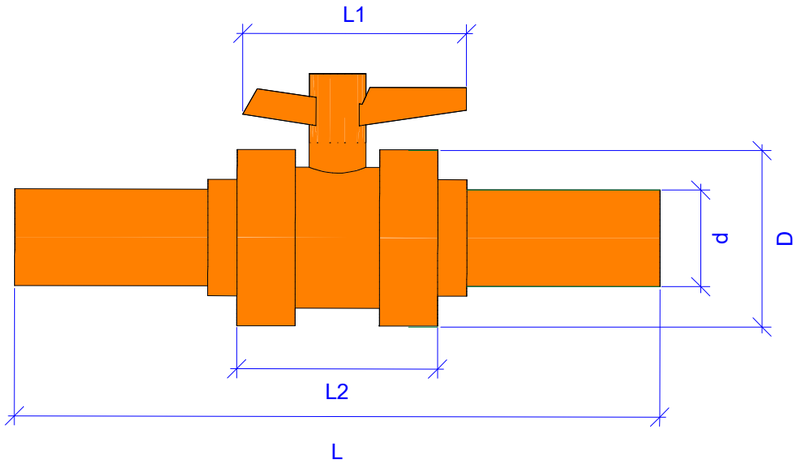
RDC0000-BMS-ZZ-ZZ-DR-M-91570		**A3**	**P02**

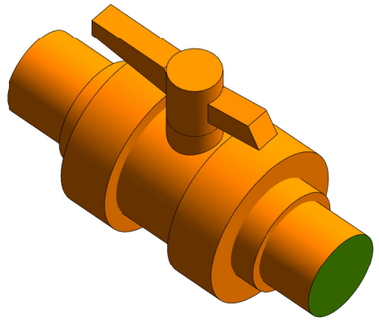


A Front View - Ball Valve



1 Section View - Ball Valve

2 Section View - Ball Valve



3D1 3D View - Ball Valve

Ball Valve Specifications:

A ball valve in a data center is a type of valve that is used to isolate a section of the piping system for maintenance, repair, or replacement purposes, without interrupting the flow of fluid or gas to the rest of the system. This allows for maintenance to be performed on one section of the piping system without affecting the operations of the entire data center.

Ball valves can also be lodged in any direction.

- Type	Ball Valve Type, e.g. Georg Fischer Type 546
- Valve Pressure Rating:	PN10
- Body:	PVDF
- Seat:	PTFE
- Seals:	EPDM, FKM
- End Connection:	Fusion spigot
- Mounting:	Stainless steel threaded inserts

DN	L [mm]	L1 [mm]	L2 [mm]	H [mm]	D [mm]	d [mm]
15	193	72	56	54	50	20
20	218	93	65	66	58	25
25	224	93	71	71	68	32
32	250	110	85	85	84	40
40	271	110	89	92	97	50
50	321	128	101	108	124	63

Notes

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Installation

1. Verify that the valve body, seat, and ball are free from any damage caused by transportation or storage.
2. Confirm that the pressure rating of the valve is equal to the application condition.
3. Confirm that the temperature rating of the valve matches the application conditions.
4. Confirm that the valve thread (BSP or NPT, socket welding ANSI), flange(ANSI 150, ANSI 300, etc.), and solvent weld (BLP Schedule 40) are in line with the application needs.
5. Before installing the ball valve, complete all welding tasks. Also, ensure that the flange is at the ambient temperature.
6. Before installing the pipe, ensure it is free of welding remnants, rust, or other trash. If necessary, wash the pipe with mild detergent or water.
7. Check that the ball valve is not in conflict with the flange.To reduce the load on the piping, support the valve wherever necessary (significant for larger valves and actuator assemblies).
8. After the installation is completed, it is recommended to operate the valve multiple times to ensure it is not invaded and rotates through its entire 90-degree operation.

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PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Cooling
Plastic Pipe Systems-Ball Valve

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
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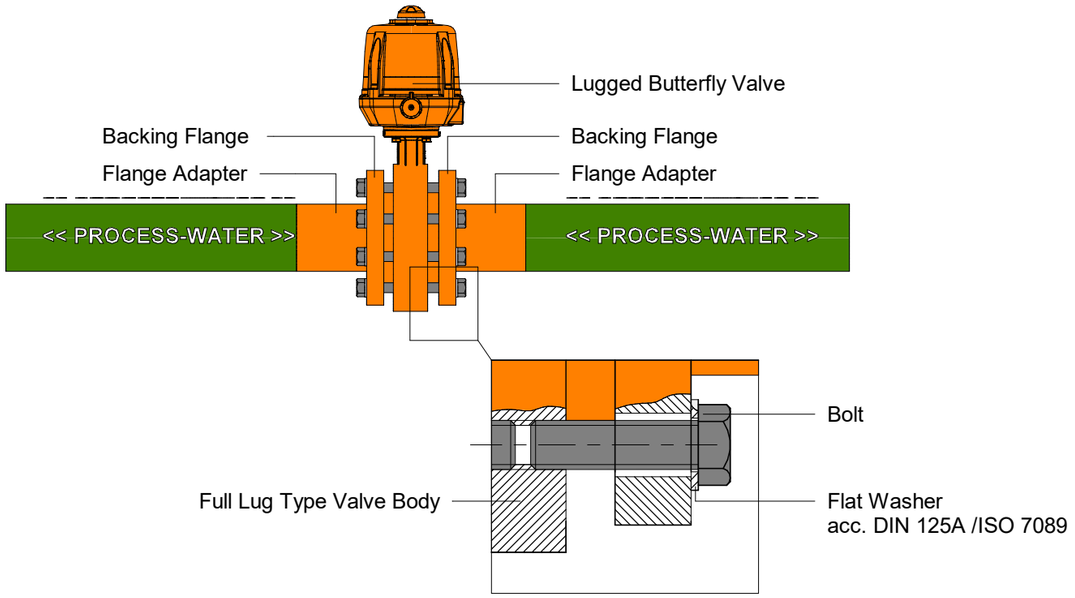
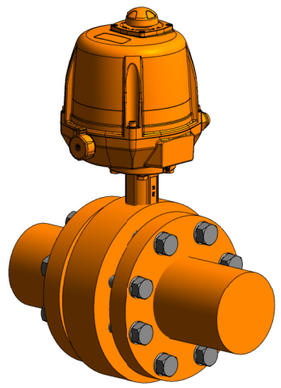
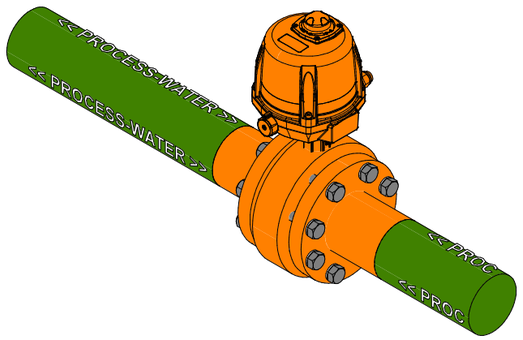
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-M-91571		**A3**	**P02**



A Front View - Butterfly Valve Motorized - Plastic Pipe



3D1 3D View - Butterfly Valve Motorized - Plastic Pipe



3D2 3D View - Butterfly Valve Motorized - Plastic Pipe

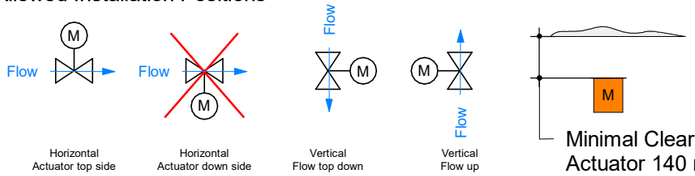
Butterfly Valve Motorized - Plastic Pipe Specifications (Typical):

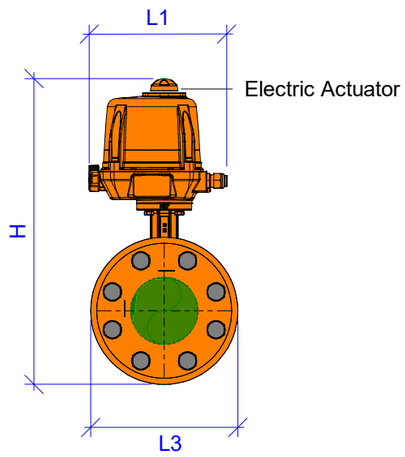
The motorized butterfly valve is a device used to control the flow of liquids or gases in a piping system. Its basic construction consists of a rotating disc mounted on a shaft, positioned at the center of the valve. The motorized actuation allows for remote or automated control of the disc's opening and closing, precisely regulating the flow.

- Type: Butterfly Valve Full Lug Type, e.g. Georg Fischer Type 147
- Valve Pressure Rating: PN10
- Body: PP-H

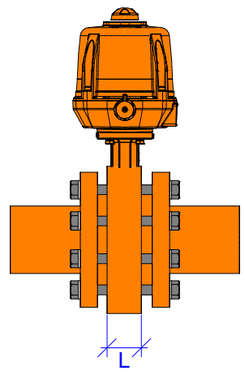
Duct Nominal Size øD [mm]	L [mm]	L1 [mm]	L3 [mm]	H [mm]
63	45	122	165	415
75	46	122	182	428
90	49	122	210	428
110	56	122	240	460
140	64	122	272	487
160	72	122	300	508
225	73	122	360	575
280	113	122	440	677
315	113	122	510	721

Allowed Installation Positions





1 Section View - Butterfly Valve Motorized - Plastic Pipe



2 Section View - Butterfly Valve Motorized - Plastic Pipe

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.

Installation Notes

1. When installed in a horizontal pipeline it is recommended that the butterfly valve is to be mounted with the stem in a horizontal position, as such that the bottom of the disc will open in the direction of the flow. This way of mounting increases the lifetime of the valve and prevents sludging of the flow and accumulation of dirt.
2. Valves larger then DN300 may not to be mounted upside down (stem and ISO-top flange facing downwards).
3. The contact surfaces of the flanges must be smooth and clean. Rust, spatter, dirt and paint is to be removed to prevent damage to the lining.
4. Flange gaskets are not allowed to use.
5. The Lug type butterfly valves have to be installed between flanges and can't be used as end of line valve.

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P02	04.04.2025	Revision 1	JR	JM
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DESIGN & BUILD CONTRACTOR:

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CTS GROUP PARTNER:

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PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Cooling
Plastic Pipe Systems-Butterfly Valve Motorized Open Closed

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2025**	**JR**	**JM**
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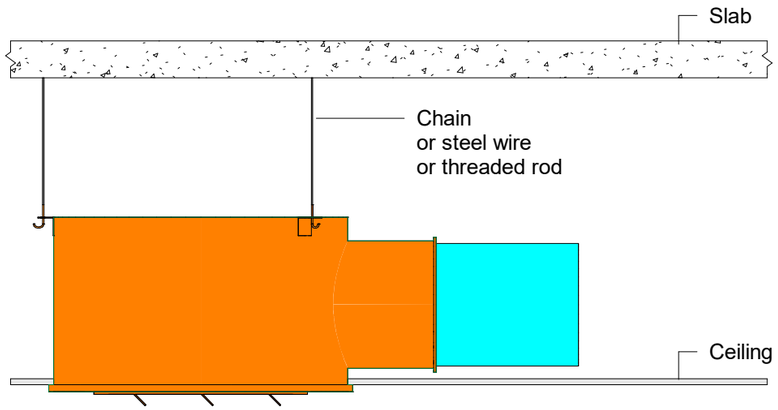
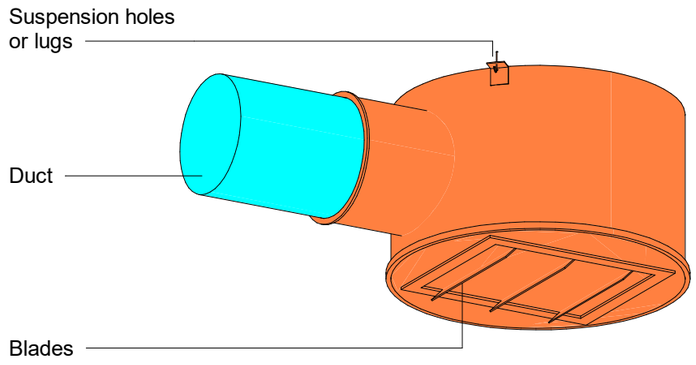
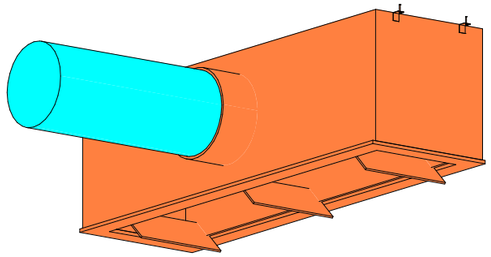
RDC0000-BMS-ZZ-ZZ-DR-M-91572		**A3**	**P02**



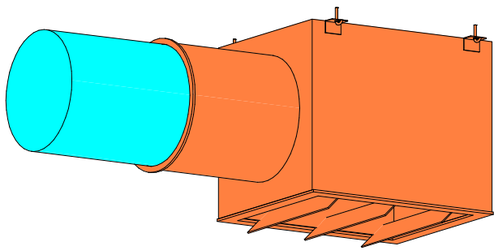
1 Section View - Suspended Flush Ceiling Installation



3D1 3D View - Circular Plenum Box



3D2 3D View - Rectangular Plenum Box



3D3 3D View - Square Plenum Box

Supply / Extract Grilles:

Supply and exhaust grilles play a key role in HVAC systems, ensuring the supply of fresh air and the removal of polluted air to efficiently ventilate specific areas.

In most cases, the supply grille is installed in the ceiling of server rooms, allowing air to be blown into the space through the grille, optimizing airflow distribution.

A wide selection of rectangular, square and circular top-entry grille boxes is available in standard sizes, with various depths and diameters to meet various installation requirements.

- Frame: Made of galvanized steel for durability.

- Blades: The adjustable blades are made usually of aluminum.

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.

Installation Notes

1. Fix the device only to load-bearing structural elements.
2. Load suspension systems only with the weight of the device.
3. Adjacent components and connecting ducts must be supported separately.
4. Refer to the technical leaflets for product weights and dimensions.
5. The diffusers must remain accessible for cleaning even after installation.

Rev	Date	Description	Sign.	Veri.
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DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

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PROJECT NAME:

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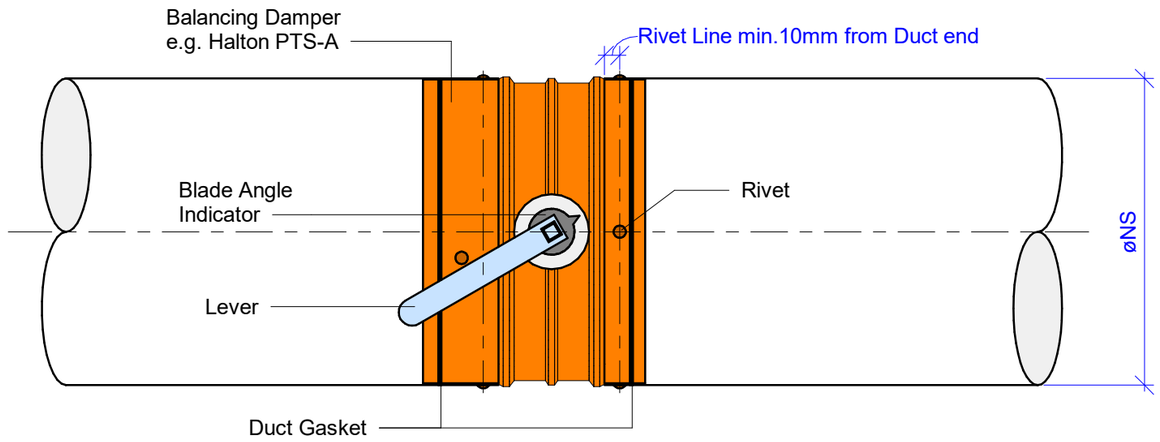
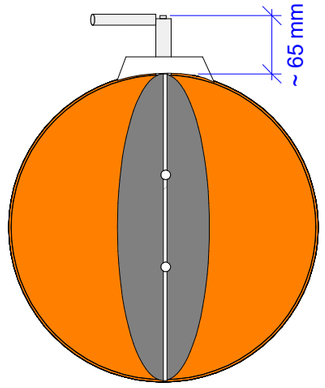
DRAWING NAME:

Ventilation
Duct Systems - Supply or Extract Grills

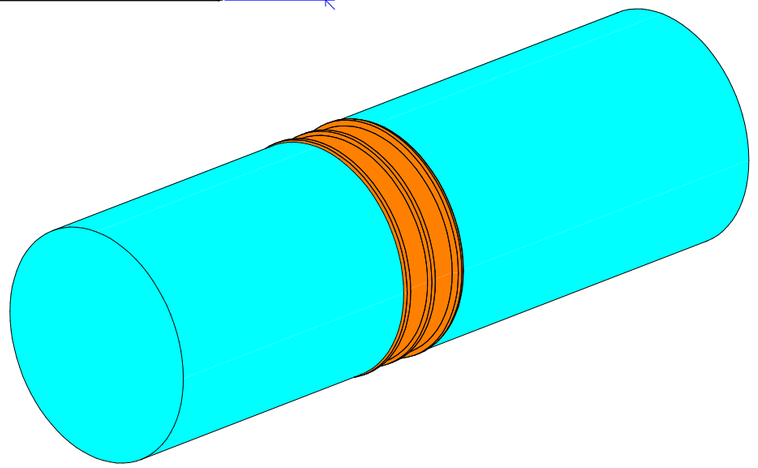
DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2025**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-M-91577		**A3**	**P02**



A Front View - Balancing Flow Damper



1 Section View - Balancing Flow Damper



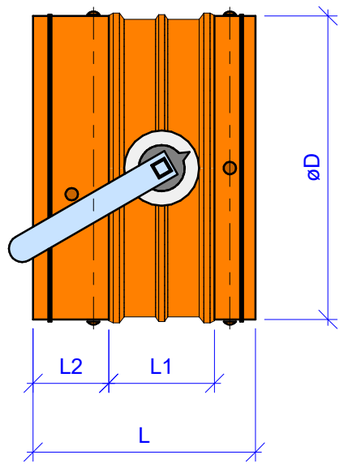
3D1 3D View - Balancing Flow Damper

Balancing Flow Damper:

Balancing dampers are installed to regulate air pressure in rooms connected to the duct work. Air pressure imbalances can cause minor annoyances for occupants, like slamming doors or random gusts of air, but they can cause larger problems for the entire system.

- Casing	Galvanised Steel
- Blade and Shaft	Galvanised Steel
- Duct Gasket	Polyurethane
- Blade Gasket	EPDM rubber
- Actuator Platform	Galvanised Steel
- Operation mechanism	Galvanised Steel

Duct Nominal Size øD [mm]	Max. Air Volume [m3/h]	L [mm]	L1 [mm]	L2 [mm]
100	162	145	70	36
125	252	145	70	36
160	414	145	70	36
200	684	145	70	36
250	1,080	145	70	36
315	1,692	145	70	36
400	2,700	245	175	35
500	4,068	245	175	35



B Front View - BFD Detail

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.

Installation Procedure

1. Fasten the damper to the ductwork with, e.g., rivets.
2. Ensure that the rivets do not prevent the operation of the damper. The position of each rivet must be at least 10 mm from the duct end.
3. External duct gaskets ensure an airtight joint when the damper has been mechanically fastened to the duct with rivets or screws.

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DESIGN & BUILD CONTRACTOR:

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CTS GROUP PARTNER:

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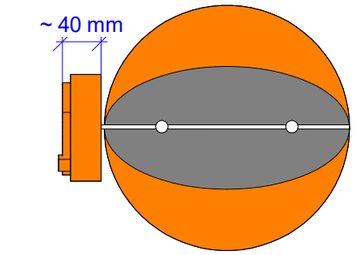
PROJECT NAME:

Execution Design and Engineering Requirements

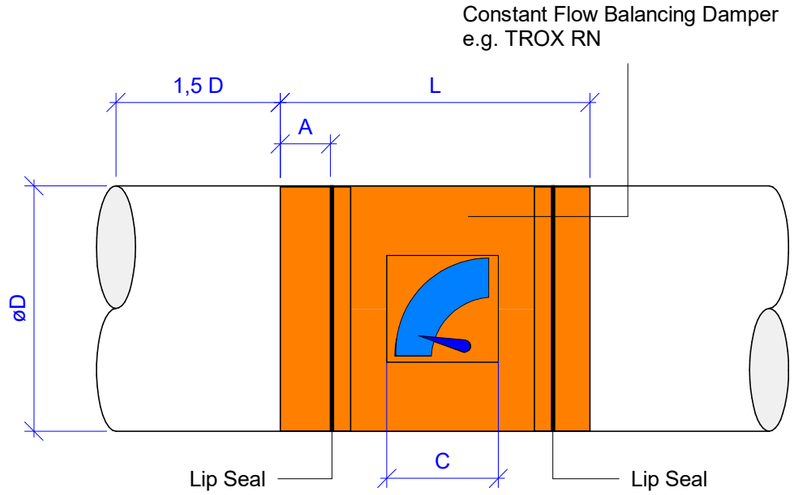
DRAWING NAME:

Ventilation
Duct Systems - Balancing Flow Damper

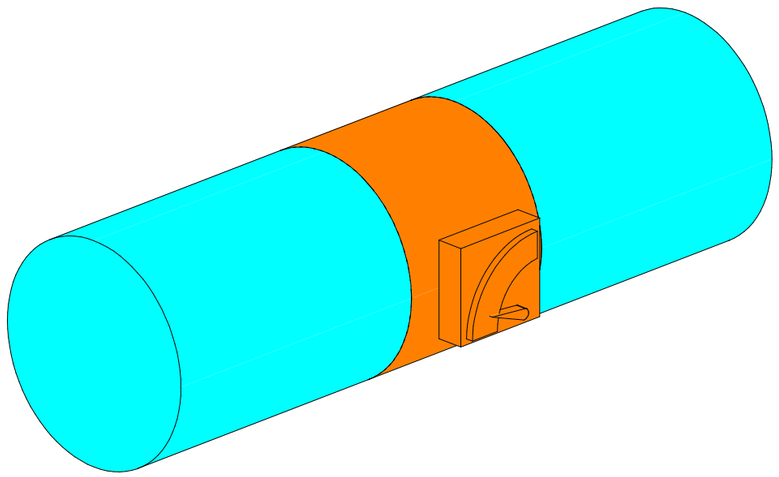
DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2025**	**JR**	**JM**
DRAWING NUMBER:		FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-M-91578		**A3**	**P02**



1 Section View - Constant Flow Damper



A Front View - Constant Flow Damper



3D1 3D View - Constant Flow Damper

Constant Flow Damper:

The constant flow damper is an automatic damper, which at varying pressures wholly mechanical and independent of external energy sources maintains a set flow constant.

- Casing	Galvanised Steel
- Interior Parts	Stainless Steel Nominal Sizes up to 125 Galvanised Steel for Nominal Sizes 160-400 mm
- Bellows	Polyurethane
- Spring	Stainless Steel
- Plain Bearings	Polytetrafluoroethylene

Duct Nominal Size øD [mm]	Max. Air Volume [m3/h]	L [mm]	A [mm]	C [mm]
80	162	310	50	182
100	252	310	50	182
125	414	310	50	182
160	684	310	50	182
200	1,080	310	50	182
250	1,692	400	50	182
315	2,700	400	50	182
400	4,068	400	50	182

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.

Installation Procedure

1. Pre-assemble suspensions at the installation location, at a distance of approx. L+100 mm.
2. Assemble the duct and lead it up to the installation location of the controller.
3. Push the spigot of the CAV controller into the duct; note the airflow direction marked by the arrow.
4. Push the duct onto the other spigot.
5. Fix the ducts and the controller to the suspension system.
6. Fix the controller to the duct using screws or rivets .

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P02	04.04.2025	Revision 1	JR	JM
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CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Ventilation
Duct Systems - Constant Flow Damper

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2025**	**JR**	**JM**
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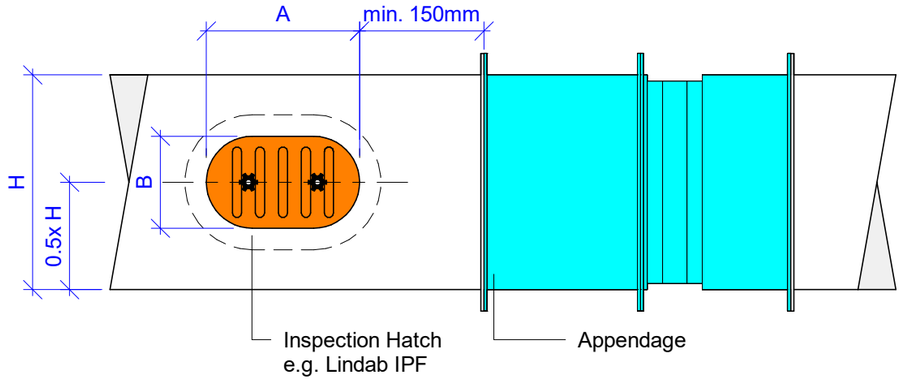
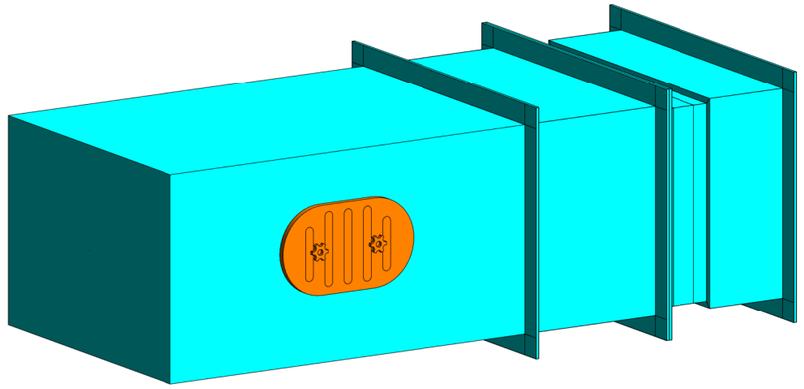
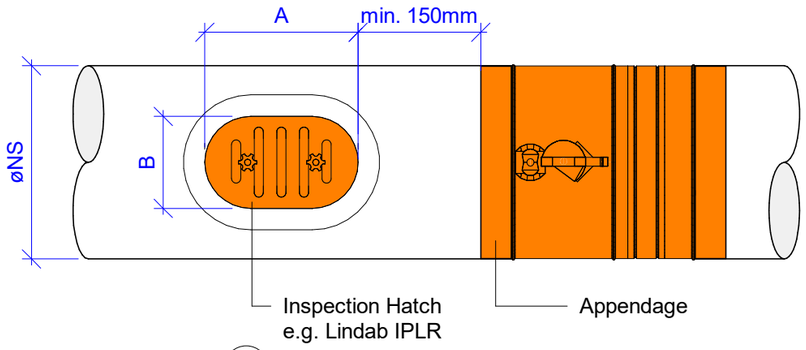


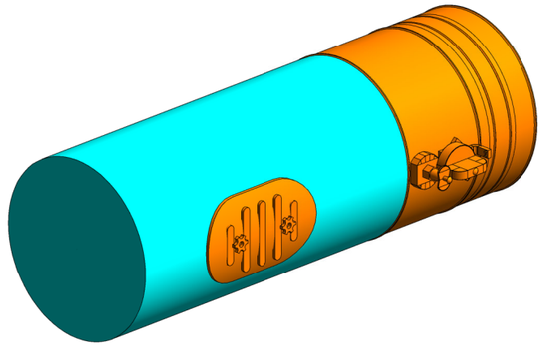
A Front View - Inspection Hatch - Rectangular Duct



3D1 3D View - Inspection Hatch - Retangular Duct



B Front View - Inspection Hatch - Round Duct



3D2 3D View - Inspection Hatch - Round Duct

<u>Inspection Hatches (Typical)</u>:

Inspection Hatches to be placed for inspection and maintenace/cleaning purpuses in the duct work.
Hatches to be placed:
- After Fire Dampers and Control Dampers;
- In main ductwork every 25 meters.

Material of the hatches is the same material as the ductwork.

Round Ductwork

Duct Nominal Size øNS [mm]	Opening Dimensions A [mm]	B [mm]
100-125	180	80
150-160	250	150
180	250	150
200	250	150
250	250	150
300-315	250	150
355	400	150
400	400	300
450	400	300
500	400	300
560	400	300
630	400	300

Rectangular Ductwork

Duct Height H [mm]	Opening Dimensions A [mm]	B [mm]
150	180	80
200	200	100
250	250	150
300	300	200
400	400	300
500	500	400
600	600	450

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.

Installation Procedure

1. Cut a hole in the duct wall for the access door, 15 mm narrower and 15 mm shorter than the access door being used.
2. Unscrew the hand knobs until the end of the hand knob screws.
3. Slip inner plate through duct opening at an angle.
4. Align the access door into position.
5. Tighten the hand knobs.

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P02	04.04.2025	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	NS	JM

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CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

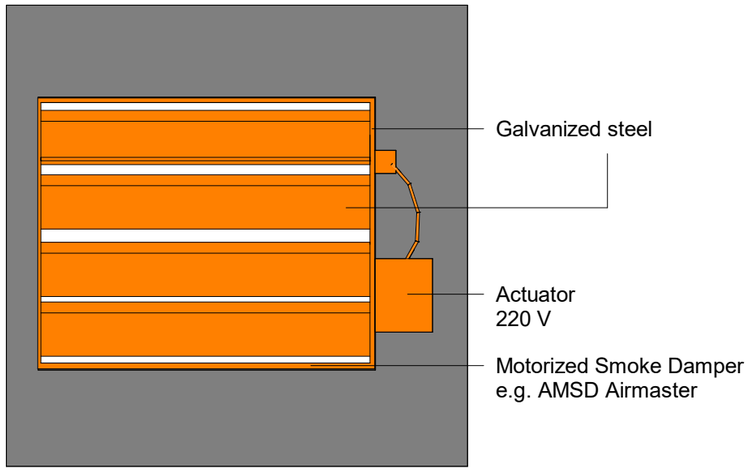
DRAWING NAME:

Ventilation
Duct Systems - Inspection Hatches

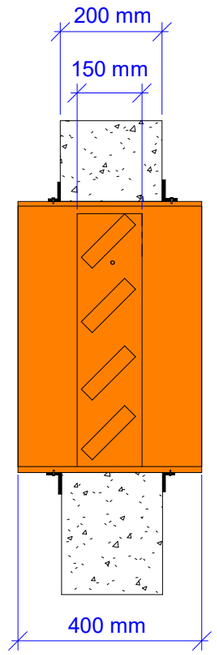
DRAWING STATUS:	SCALE:	STATUS:
Revision 1	**NTS**	**S2**

DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2025**	**JR**	**JM**

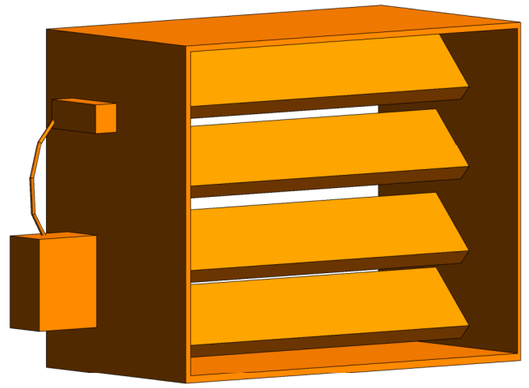
DRAWING NUMBER:	FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-M-91580	**A3**	**P02**



A Front View - Motorized Smoke Damper



1 Section View - Motorized Smoke Damper



3D1 3D View - Motorized Smoke Damper

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.

To take into account during installation:

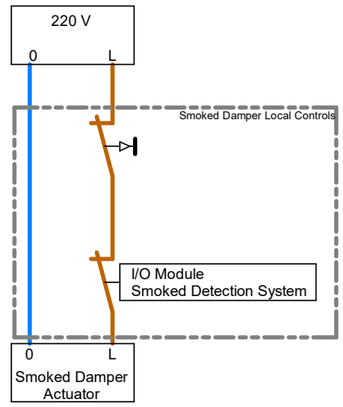
1. Damper Access – Access to the dampers shall be provided. Access shall be large enough to allow inspection and maintenance of the damper and its operating parts.
2. Damper Flow and Pressure Ratings – It shall be verified that the system airflow and pressure are within the dampers ratings.
3. Operation of the Damper – After the damper is installed it shall be cycled to ensure proper operation.

Motorized Smoke Damper (Typical):

Smoke damper's primary function is to control the movement of smoke in dynamic air distribution systems, and they reduce the possibility of smoke transfer within ductwork or through wall openings.

- Frame: Galvanized Steel sheet of thickness 1 mm
- Blades: Single skin roll stell sheet of thickness 1 mm
- Jamb Seal: Stainless Steel
- Actuator: Honeywell, 9NM torque

Wiring (Motorized Smoked Damper):



Rev	Date	Description	Sign.	Veri.
P02	04.04.2025	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	NS	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

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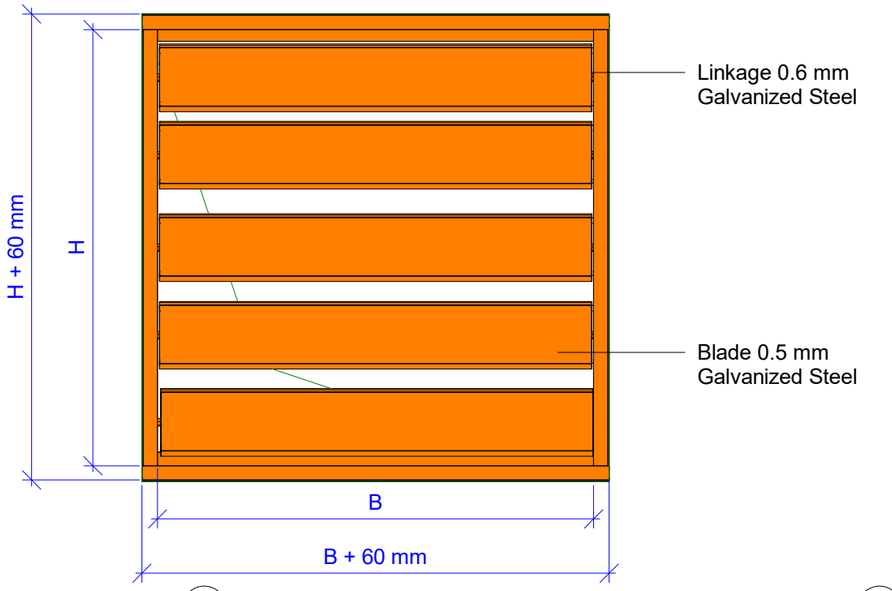
DRAWING NAME:

Ventilation
Duct Systems - Motorized Smoke Damper

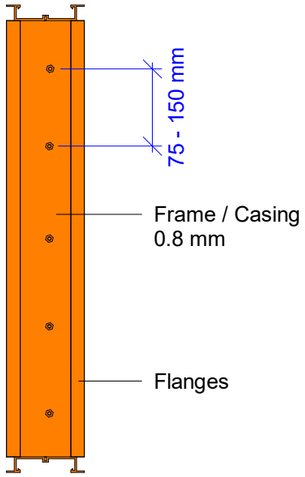
DRAWING STATUS:	SCALE:	STATUS:
Revision 1	**NTS**	**S2**

DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2025**	**JR**	**JM**

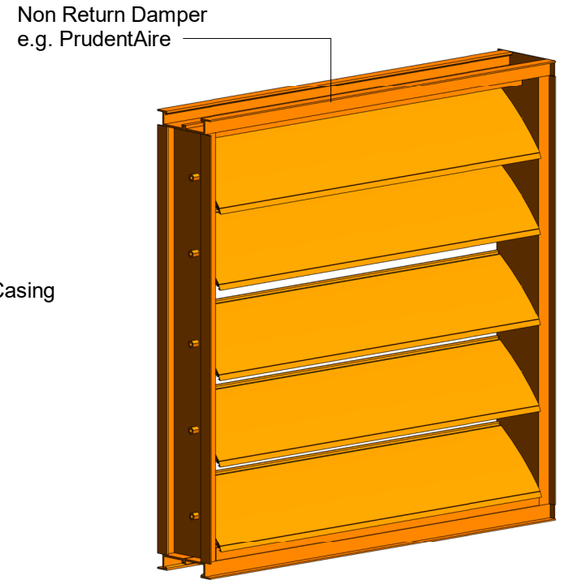
DRAWING NUMBER:	FORMAT:	REVISION:
RDC0000-BMS-ZZ-ZZ-DR-M-91581	**A3**	**P02**



A Front View - Non return Damper



1 Left View - Non Return Damper



3D1 3D View - Non Return Damper

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.

Installation Notes

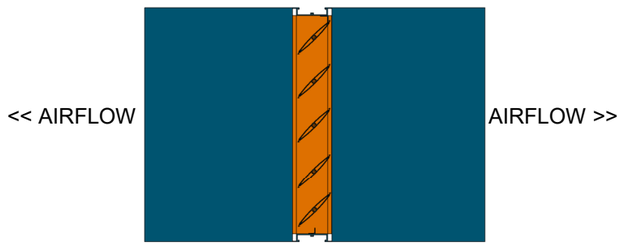
1. Installation with the blades horizontal only in horizontal ducts.
2. Installation in vertical ducts only with the damper opening against gravity (extract air ducts).
3. Duct connection on one side (air inlet / outlet) or on both sides.
4. Dampers that are not screw-fixed to the wall or ceiling slab require suspensions.
5. The function of the damper must be checked before installation, then and after note the airflow direction. Blade movement area must be kept clear.
6. Turbulence on the discharge side of a fan may damage the blades of the non-return damper. A straight upstream section >B+H is hence required on the discharge side of a fan.
7. Typical opening for wall installation with installation subframe is H+20 and B+20.

Non Return Damper (Typical):

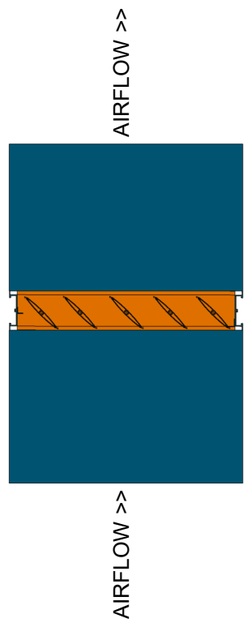
A non-return damper is used to maintain positive pressure within the room. This helps to prevent the infiltration of dust and other contaminants. Additionally, improve the efficiency of the cooling system by preventing conditioned air from escaping the room and allowing hot, unconditioned air to enter. Damper size sould be fabricated as exact neck size.

Available in vertical and horizontal configuration.

- Frame:	Galvanized Steel
- Blades:	Aluminium and Galvanized Steel
- Construction Available	Stainless Steel
- Minimum size:	150 x 150 mm
- Maximum size:	1000 x 1200 mm



2 Non Return Damper - Horizontal



3 Non return Damper - Vertical

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CTS GROUP PARTNER:

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PROJECT NAME:

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DRAWING NAME:

Ventilation Duct Systems - Non Return Damper

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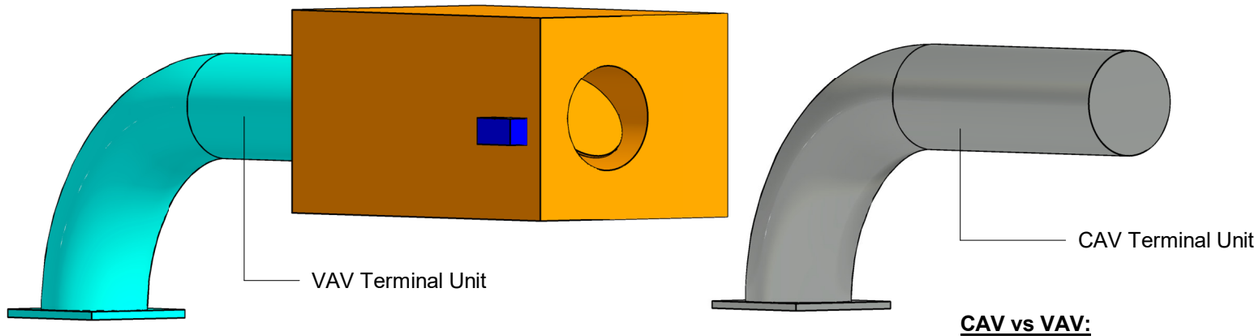
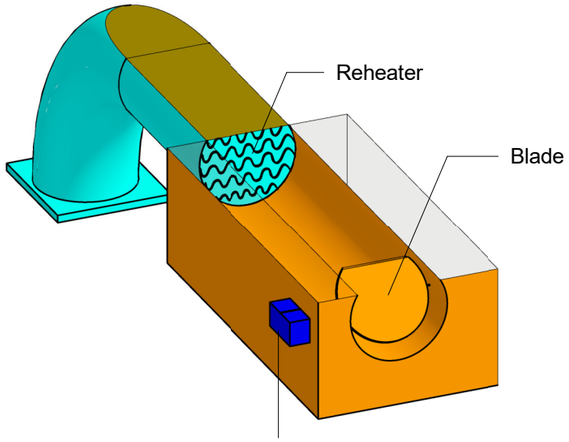
RDC0000-BMS-ZZ-ZZ-DR-M-91582		**A3**	**P02**



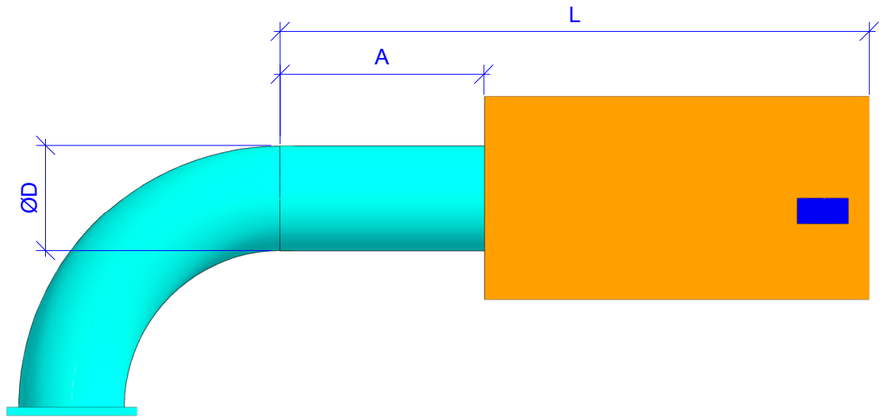
3D1 3D View - VAV and CAV Terminal Unit

CAV vs VAV:

In CAV systems, terminal units are primarily used for local heating or thermal supplementation in distant zones, maintaining constant airflow but allowing temperature adjustment at the terminal point.
In VAV systems, terminal units use motorized dampers to modulate variable airflow in each zone and may include supplemental heating (electric or hydraulic).



3D2 3D View - VAV Terminal Unit



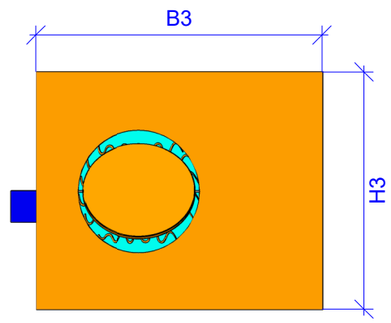
A Front View - VAV Terminal Unit

VAV Terminal Unit Specifications (Typical) :

The VAV terminal unit is fitted with a differential pressure sensor for measuring the volume flow rate. The control components (attachments) include a differential pressure transducer that transforms the differential pressure (effective pressure) into an electric signal, a controller, and an actuator. For most applications, the setpoint value comes from a room temperature controller which is installed outside of the potentially explosive atmosphere. The controller compares the actual value with the setpoint value and alters the control signal of the damper actuator if there is a difference between the two values. The connections for the supply voltage and for the voltage signals are made in a terminal box that is suitable for use in potentially explosive atmospheres.

- Casing and inner duct :	Galvanised steel
- Damper Blade:	Stainless steel
- Blade Seal	TPE plastic
- Shaft	Stainless Steel
- Differential pressure sensor:	Aluminium

NS [mm]	ØD [mm]	A [mm]	B3 [mm]	H3 [mm]
125	124	150	300	236
160	159	200	410	236
200	199	200	560	281
250	249	250	700	311
315	314	250	900	361
400	399	250	1000	446



1 Section View - VAV Terminal Unit

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.

Installation

1. Respect the ductwork inlet and outlet configurations required for stable airflow conditions.
2. Ensure the ductwork is sealed as specified to reduce conditioned air leakage.
3. No flexible ductwork ever on high pressure side of the VAV box. Flexible ductwork 1 m max on VAV box low pressure ductwork. Install flexible ductwork as straight as possible to reduce airflow resistance and noise generation.
4. Ensure access zone is made available for commissioning and facilities maintenance.

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PROJECT NAME:

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DRAWING NAME:

Ventilation Duct Systems - VAV Terminal Unit

DRAWING STATUS:		SCALE:	STATUS:
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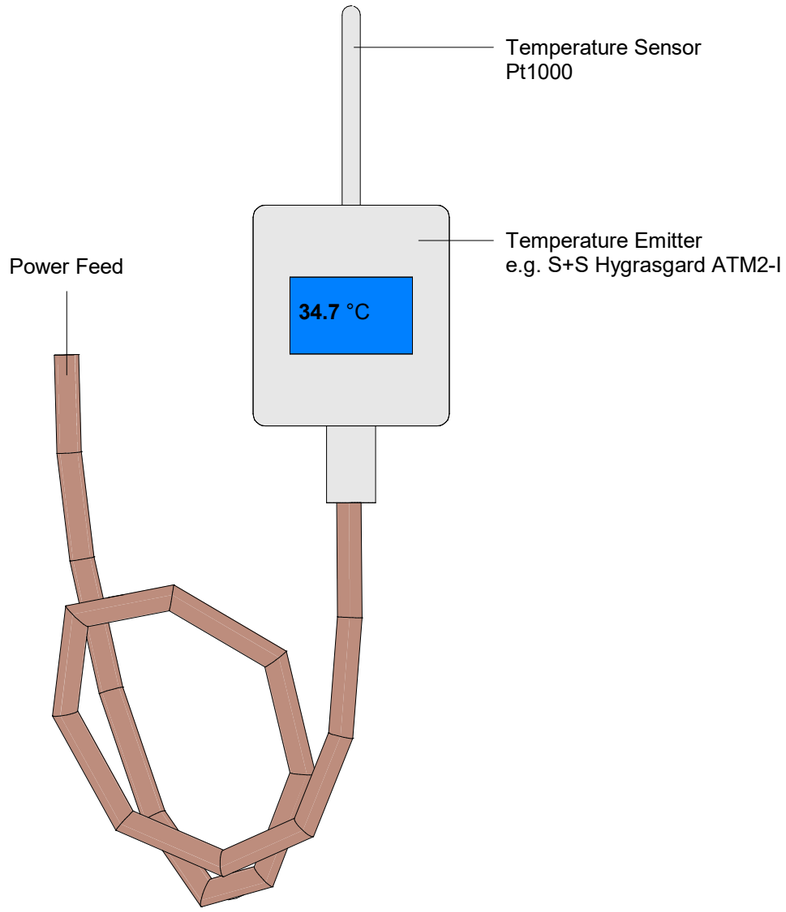
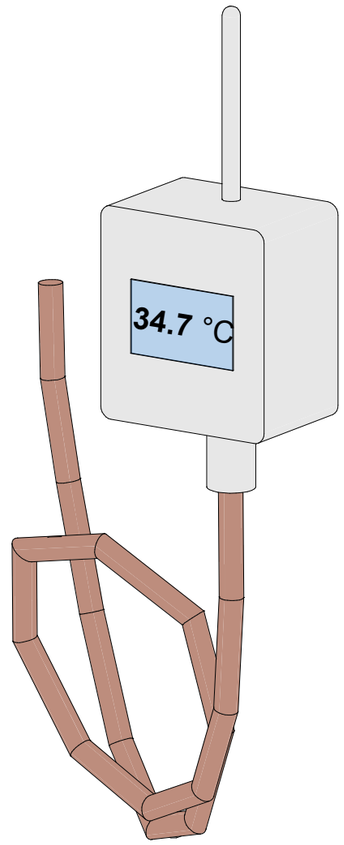
RDC0000-BMS-ZZ-ZZ-DR-M-91583		**A3**	**P02**



A Front View - Temperature Emitter



3D1 3D View - Temperature Emitter

Temperature Emitter Specifications:

- Sensing Element	PT1000
- Tolerance:	EN 60751 Class B (± [0.30 + 0.005xT])
- Power Supply	15-36 V DC
- Measuring Range	0-50 [°C]
- Measuring Transducer	-30-+70[°C]
- Output:	4-20 [mA]
- Enclosure	IP65
- Cable Gland	Including Strain Relief
- Display	Yes
- Wiring Principle	3-Wire Connection

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.

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DESIGN & BUILD CONTRACTOR:

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CTS GROUP PARTNER:

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PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Ventilation
Duct Systems - Digital
Temperature Emitter

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
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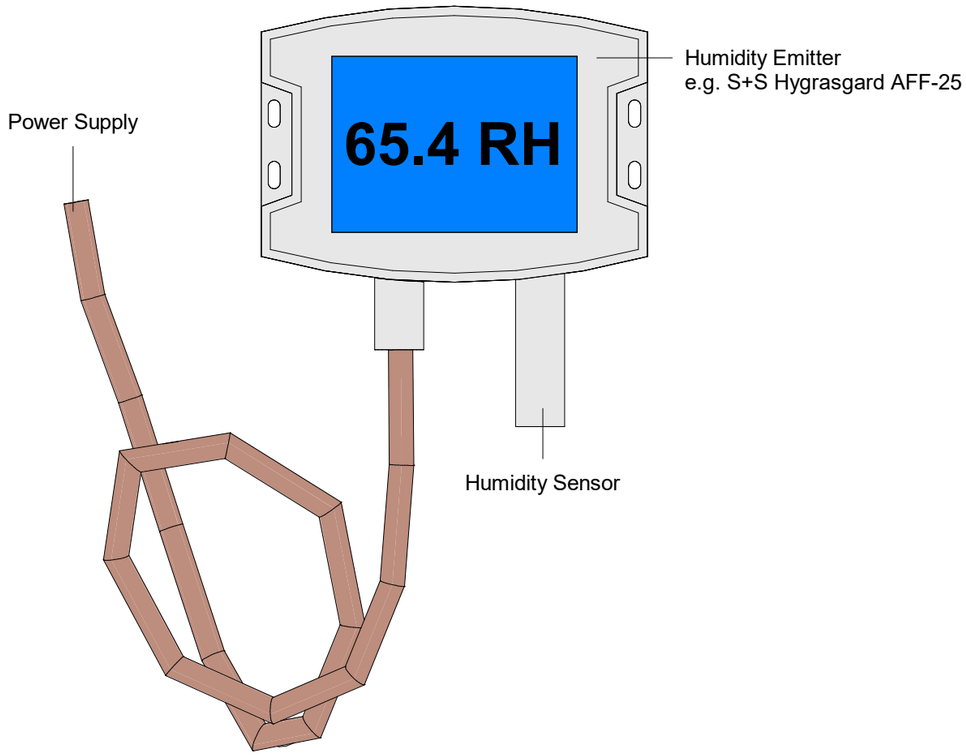
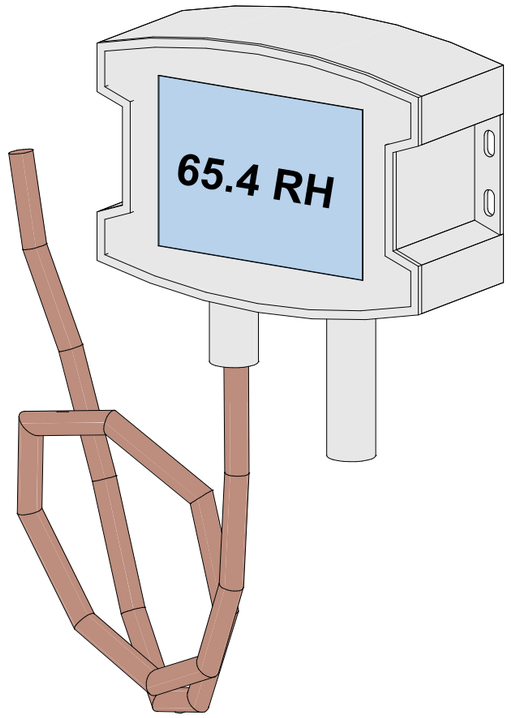


A Front View - Humidity & Temperature Emitter



3D1 3D View - Humidity Emitter

Humidity Emitter Specifications:

- Sensing Element	Digital Humidity Sensor	
- Power Supply	15-36 V DC	
- Measuring Range Humidity	0 to 100	[% R.H]
- Deviation Humidity	±3 at 20°C	[% R.H]
- Output Humidity	4-20	[mA]
- Enclosure	IP65	
- Cable Gland	Including Strain Relief	
- Screen	Yes	
- Wiring	3-Wire Connection	

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.

Rev	Date	Description	Sign.	Veri.
P02	04.04.2025	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	NS	JM

DESIGN & BUILD CONTRACTOR:

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CTS GROUP PARTNER:

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PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Ventilation Duct Systems - Digital Humidty Emitter

DRAWING STATUS:	SCALE:	STATUS:
Revision 1	**NTS**	**S4**

DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
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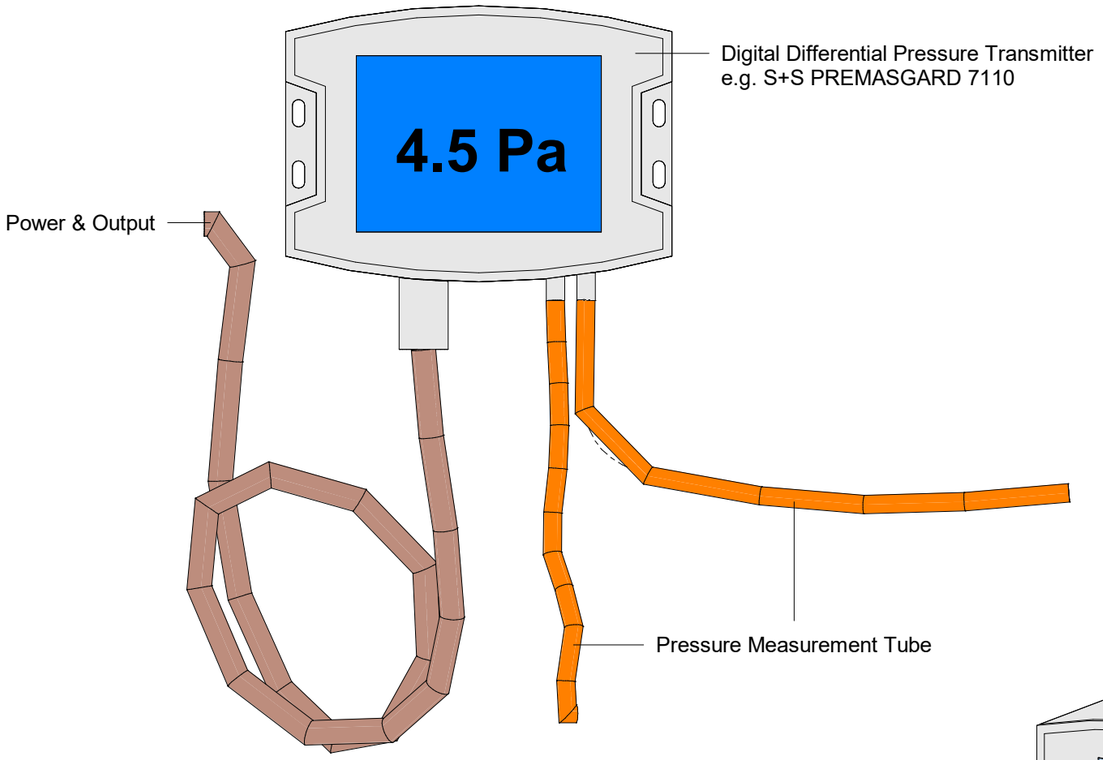
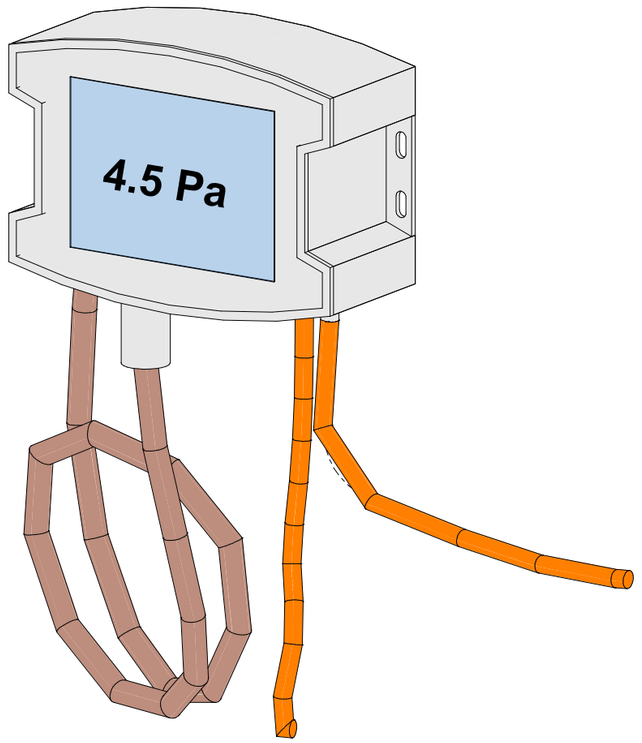


1 Front View - Differential Pressure Transmitter

Pressure Transmitter Specifications:

- Measuring Range	-25 to +25 Pa
- Accuracy	±3% of Final Value at 20 °C (with min. of 1Pa)
- Power Supply	15-36 V DC
- Output	4-20 mA
- Enclosure	IP65
- Cable Gland	Including Strain Relief
- Display	Yes
- Wiring Principle	3-Wire Connection



2 3D View - Digital Pressure Difference Transmitter

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.

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P02	04.04.2025	Revision 1	JR	JM
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CTS GROUP PARTNER:

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PROJECT NAME:

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DRAWING NAME:

Ventilation
Duct Systems - Digital Differential Pressure Transmitter

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
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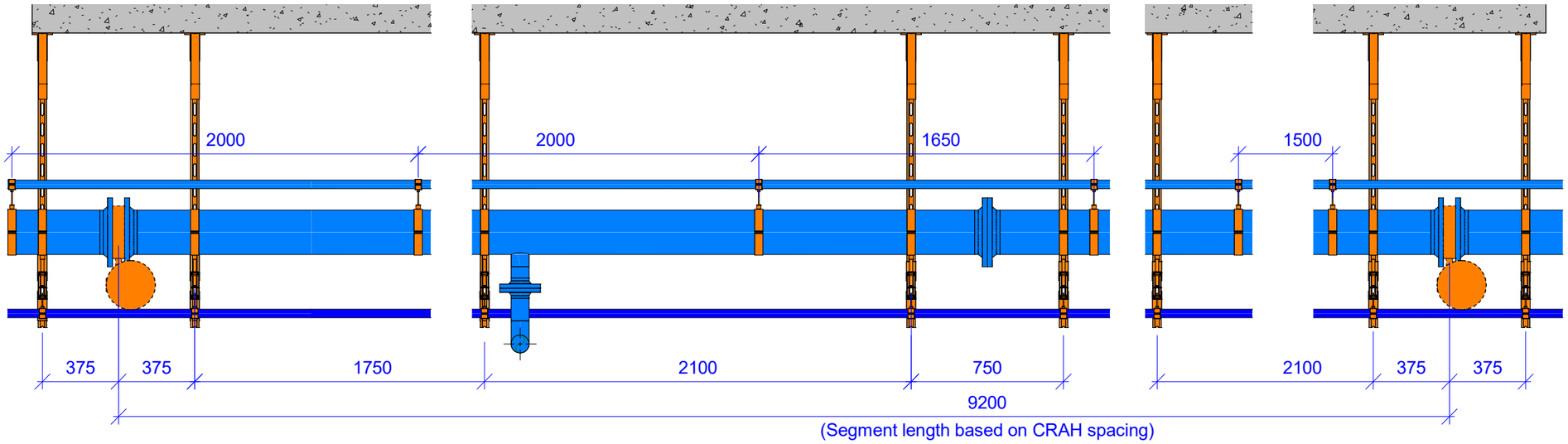
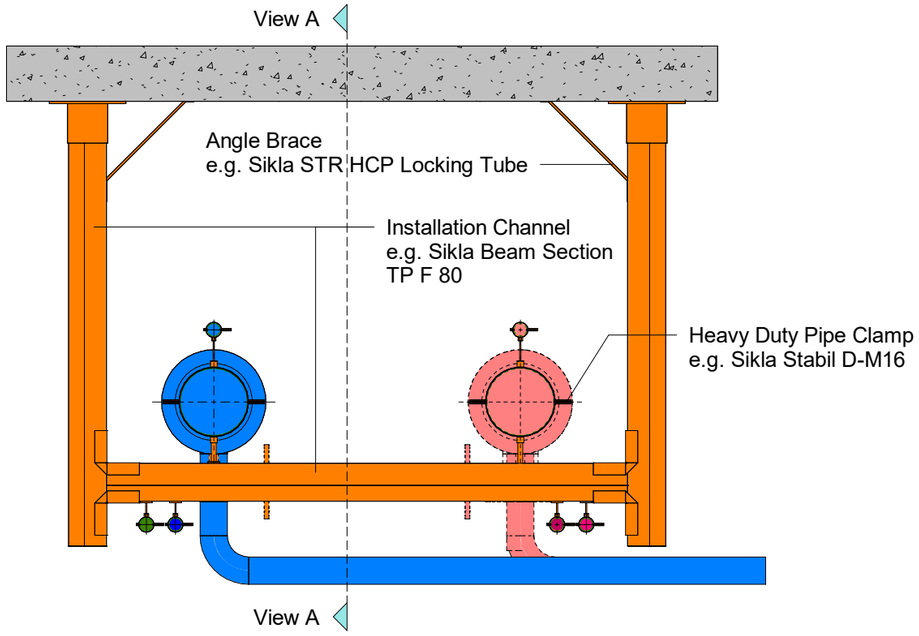
RDC0000-BMS-ZZ-ZZ-DR-M-91586		**A3**	**P02**

4.8. MEP Installation Details – Mechanical Support Principles

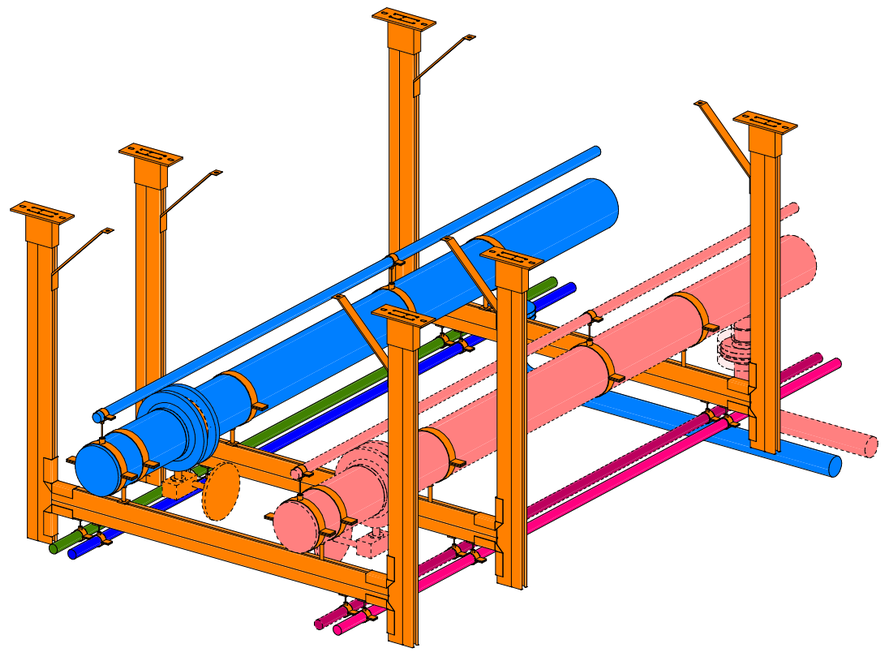
Purpose: this chapter highlights best practices and requirements for the installation of ducts and pipes attached to different ceiling or wall layouts or construction solutions, as well as floor layout.



A View A - Mounting on Concrete Ceiling



1 Section View - Mounting on Concrete Ceiling



3D1 3D View - Mounting on Concrete Ceiling

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.
3. All dimensions are in millimeters unless otherwise noted.

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Mechanical Supports Principles Steel Pipe Systems - Mounting on Concrete Floor/Ceiling

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DRAWING NUMBER:		FORMAT:	REVISION:
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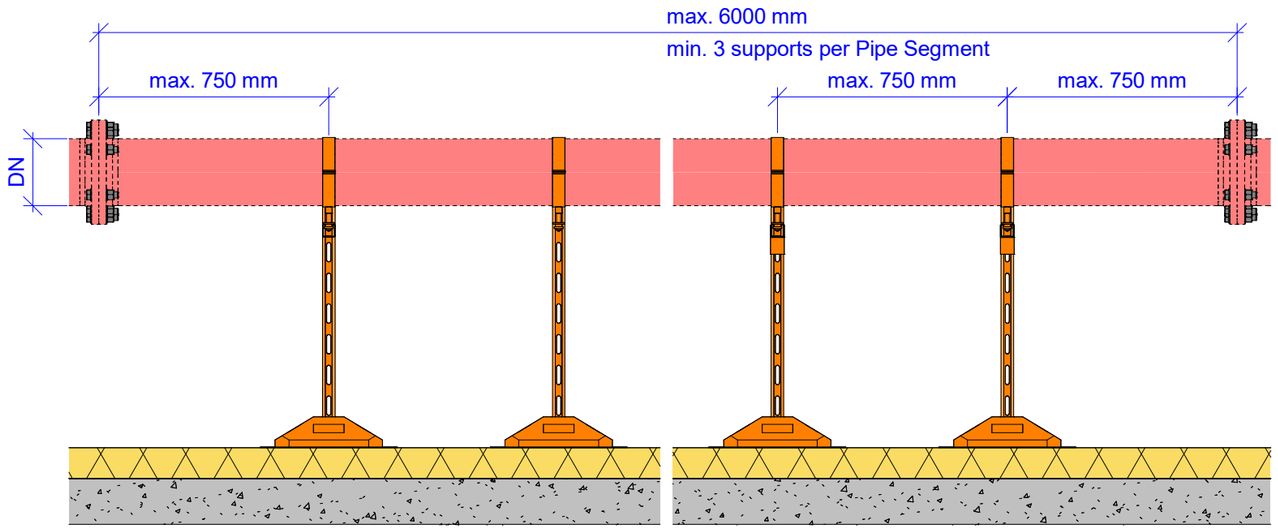
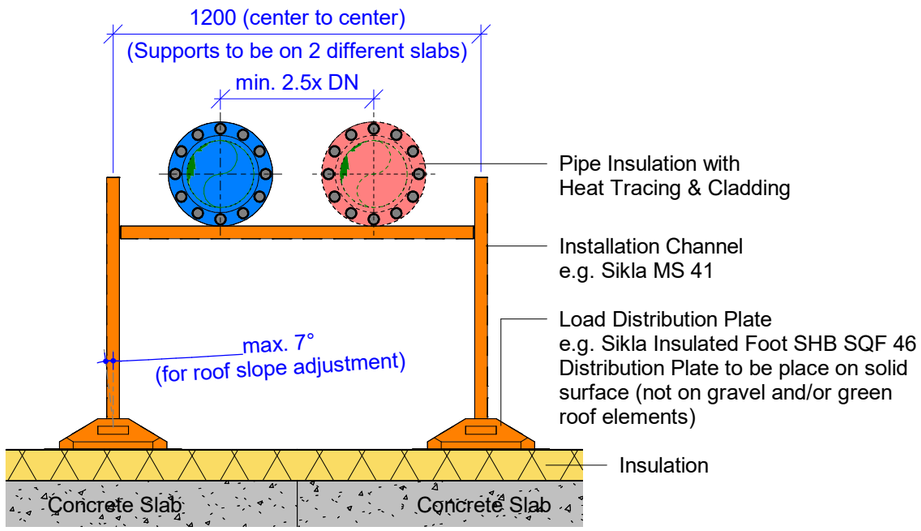
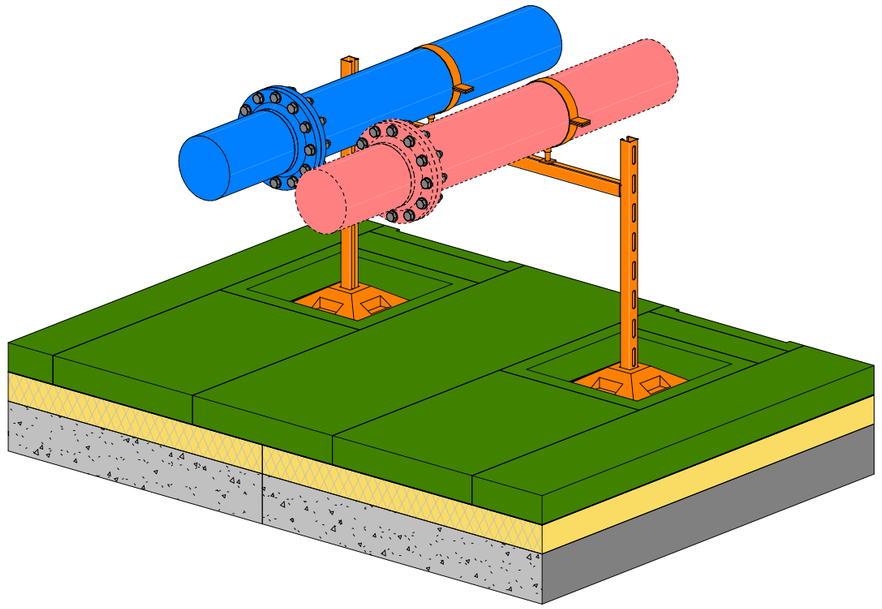


A Front View - Steel Pipes - Roof



1 Section View - Steel Pipes - Roof



3D1 3D View - Steel Pipes - Roof

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.
3. All dimensions are in millimeters unless otherwise noted.

Specific Notes

1. Heat Tracing Ribbon not be be clamped between pipe clamp and pipes.
2. Remove additional Tracing Ribbon of approx. 1m length around flanges, valves and strainers.

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Mechanical Supports Principles Steel Pipe Systems - Installation with Roof Supports

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DRAWING NUMBER:		FORMAT:	REVISION:
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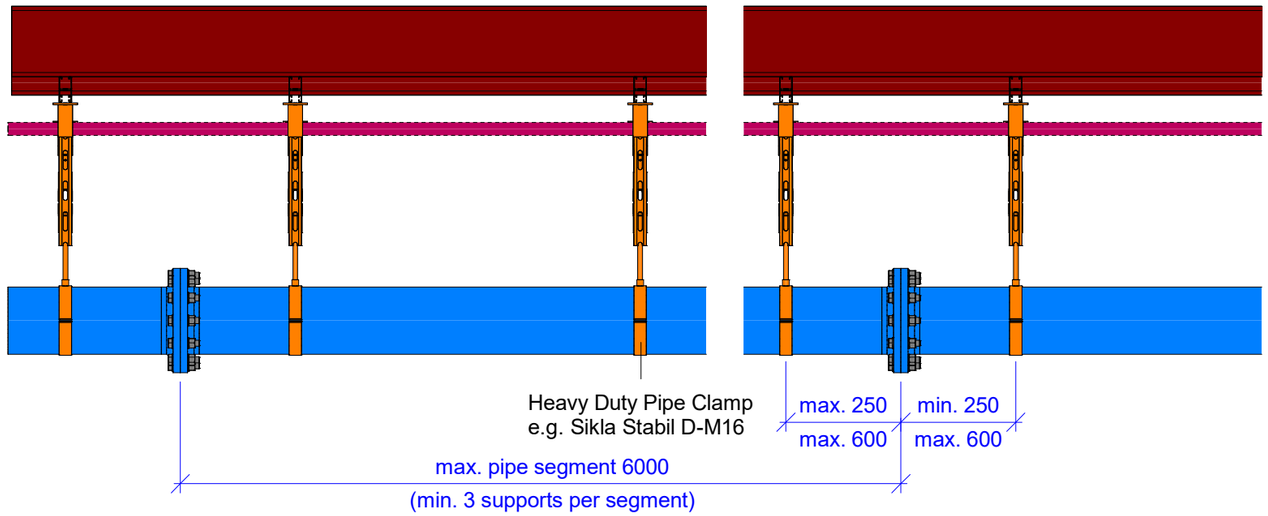
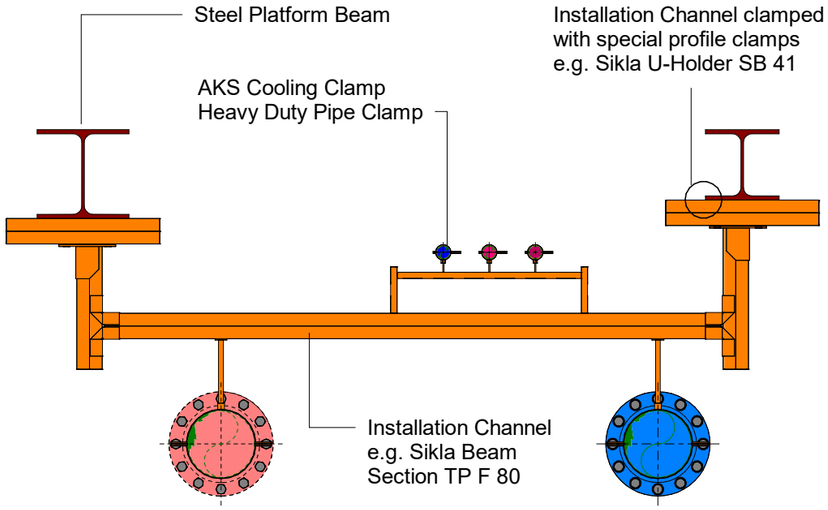
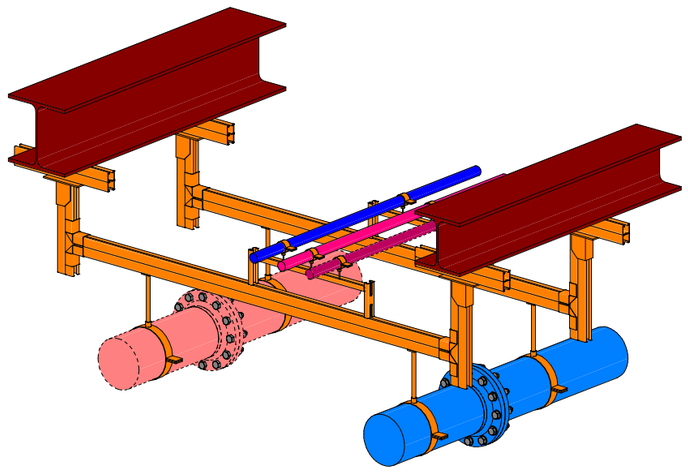


A Front View - Mounting on Steel Platform Beams Type 1



1 Section View - Mounting on Steel Platform Beams Type 1



3D1 3D View - Mounting on Steel Platform Beams Type 1

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
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Specific Notes

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Mechanical Supports Principles Steel Pipe Systems - Mounting on Steel Platform Beams 1

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Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
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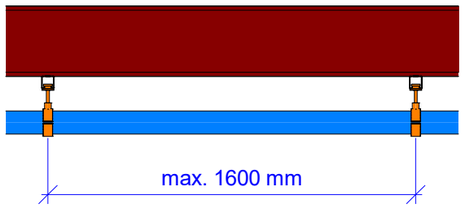
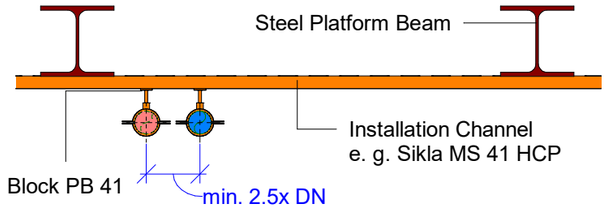
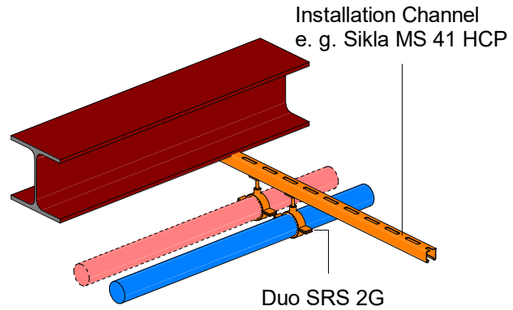


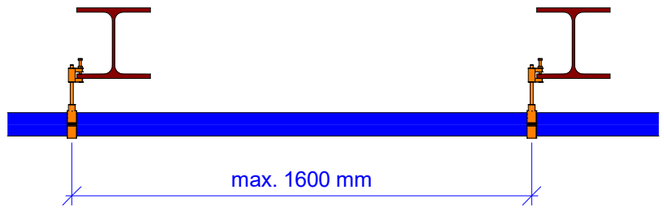
1 Section View - Pipes Parallel to Beams



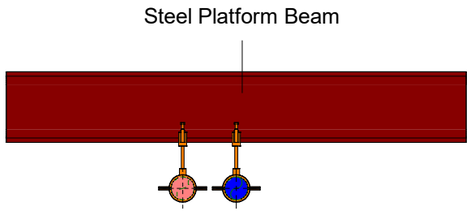
A Front View - Pipes Parallel to Beams



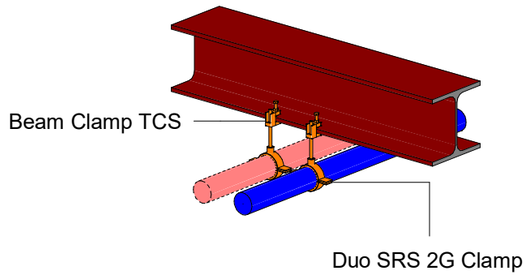
3D1 3D View - Pipes Parallel to Beams



2 Section View - Pipes Perpendicular to Beams



B Front View - Pipes Perpendicular to Beams



3D2 3D View - Pipes Perpendicular to Beams

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.
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Specific Notes

1. Heat Tracing Ribbon not be be clamped between pipe clamp and pipes.
2. Remove additional Tracing Ribbon of approx. 1m length around flanges, valves and strainers.

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PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Mechanical Supports Principles Steel Pipe Systems -Mounting on Steel Platform Beams 2

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2025**	**JR**	**JM**
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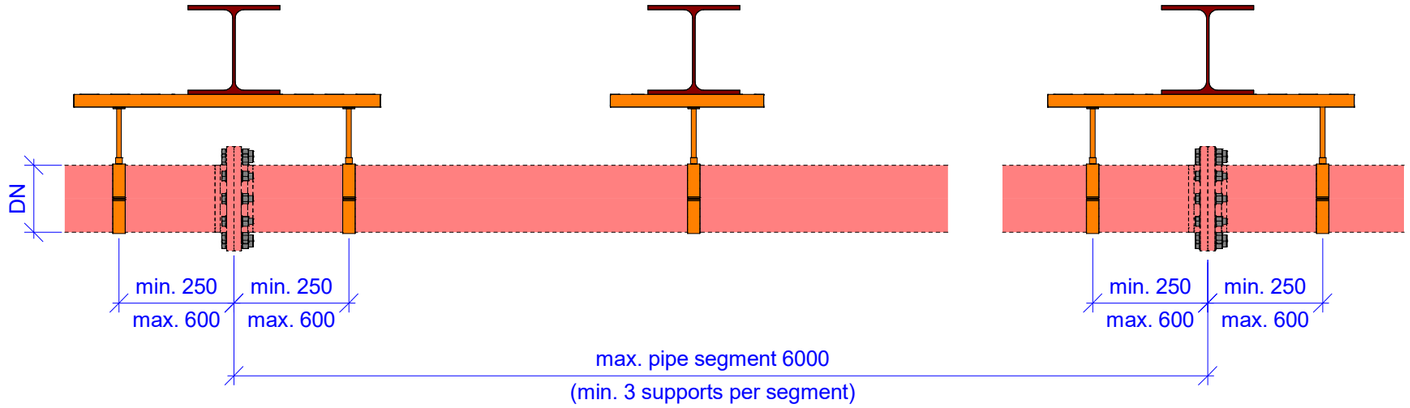
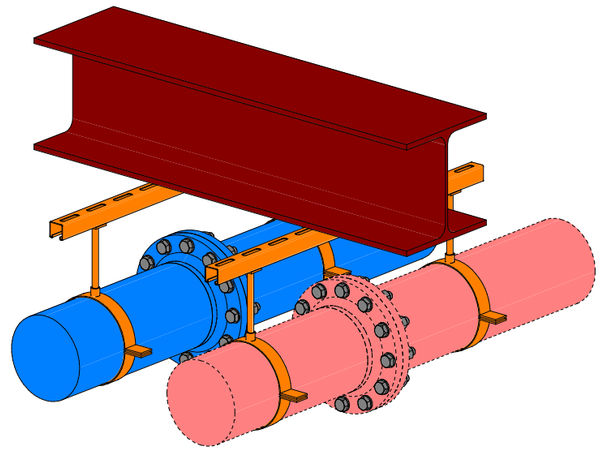
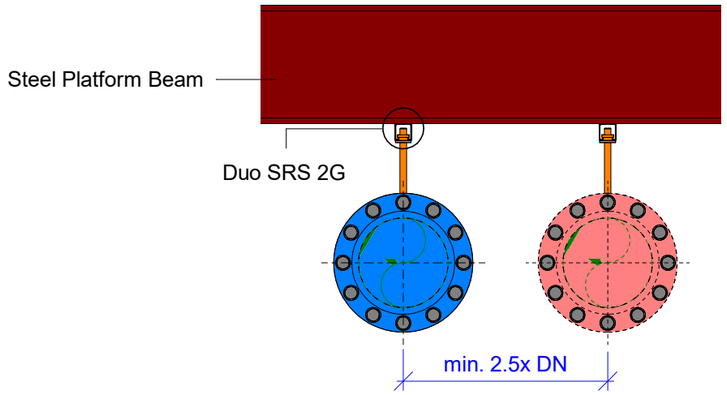


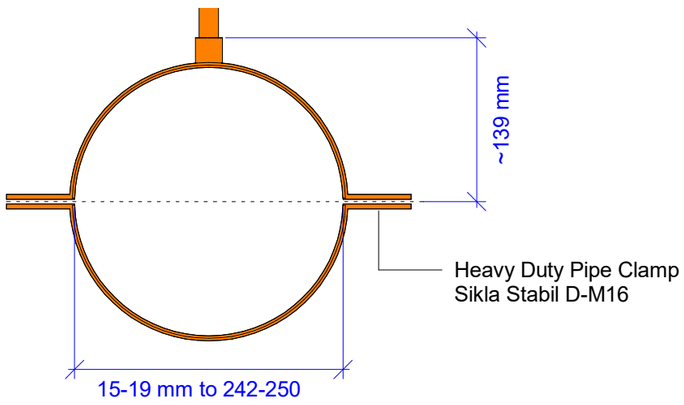
A Front View - Steel Pipes - Mounting on Platform Beams Type 3



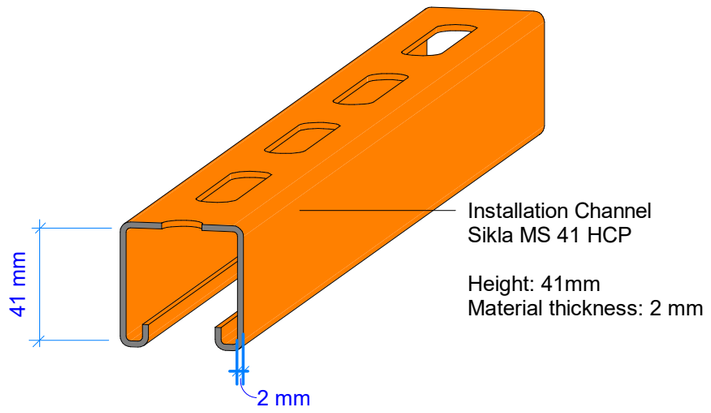
3D1 3D View - Steel Pipes - Mounting on Platform Beams Type 3



1 Section View - Steel Pipes - Mounting on Platform Beams Type 3



2 Section View - Heavy Duty Pipe Champ Sikla Stabil D-M16



3D2 3D View - Installation Channel Sikla MS 41 HCP

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.
3. All dimensions are in millimeters unless otherwise noted.

Specific Notes

1. Heat Tracing Ribbon not be be clamped between pipe clamp and pipes.
2. Remove additional Tracing Ribbon of approx. 1m length around flanges, valves and strainers.

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Mechanical Supports Principles Steel Pipe Systems - Mounting on Platform Beams 3

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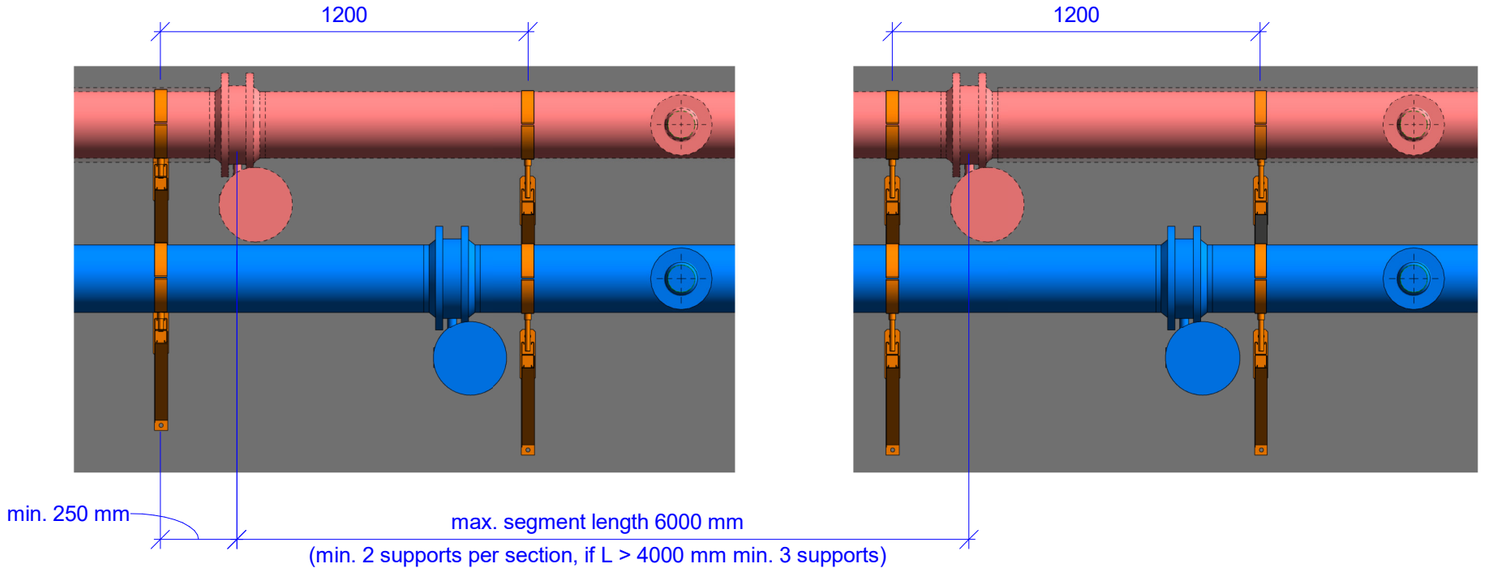
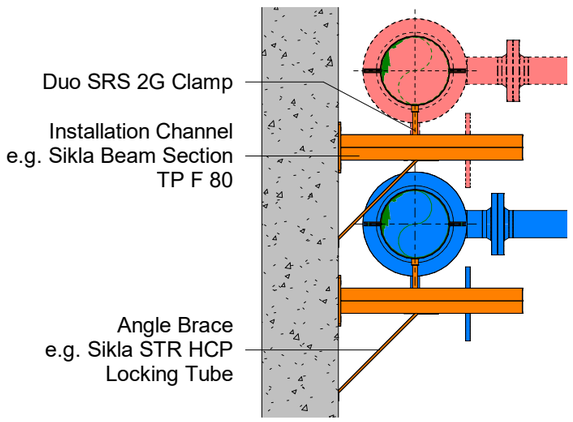
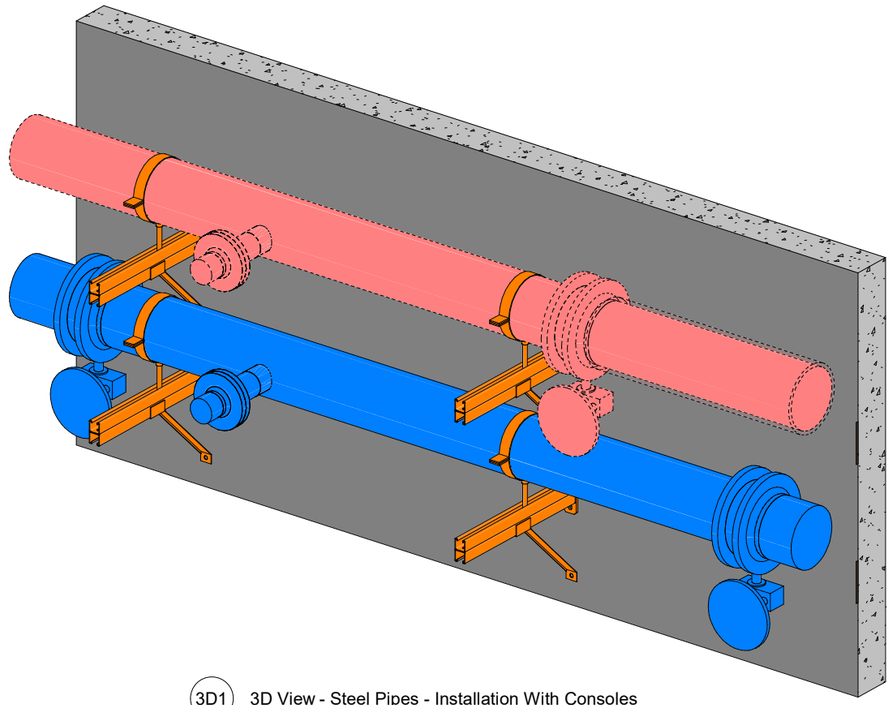


A Front View - Steel Pipes - Installation With Consoles



2 Section View - Steel Pipes - Installation With Consoles



3D1 3D View - Steel Pipes - Installation With Consoles

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.
3. All dimensions are in millimeters unless otherwise noted.

Applications

1. Heavy-duty pipe installations with diameters up to 168 mm
2. Installation of industrial pipework
3. Mounting process and control lines
4. Heavy-duty plumbing and heating applications
5. Recommended for use in dry, interior environments

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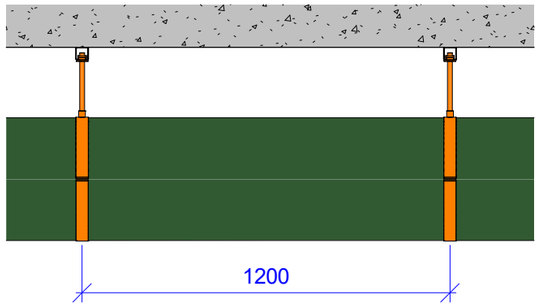
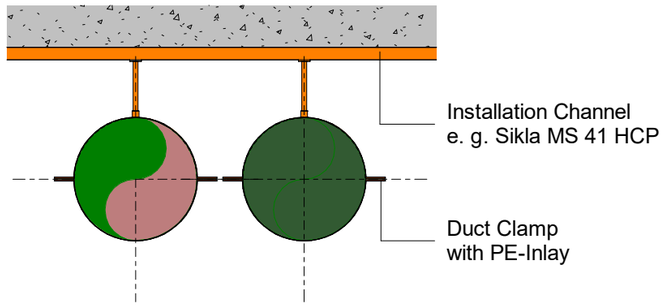
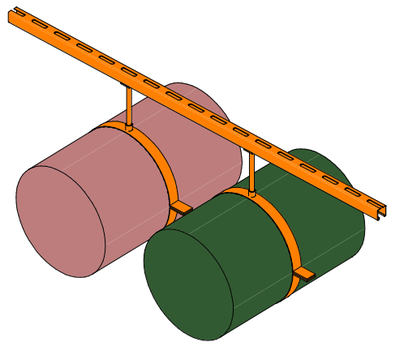


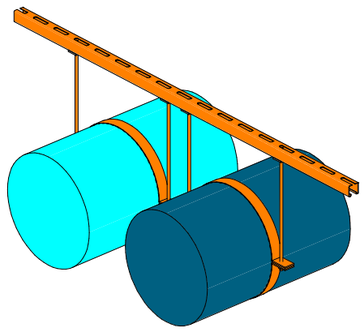
A Front View - Duct on Ceiling



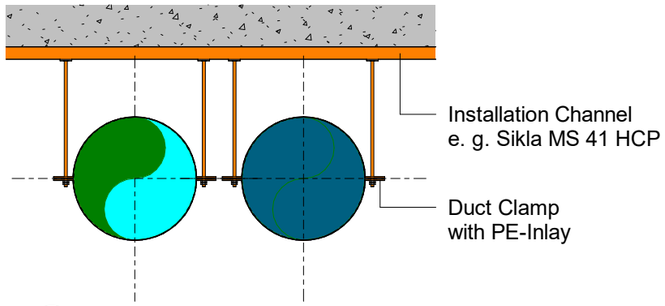
1 Section View - Duct on Ceiling



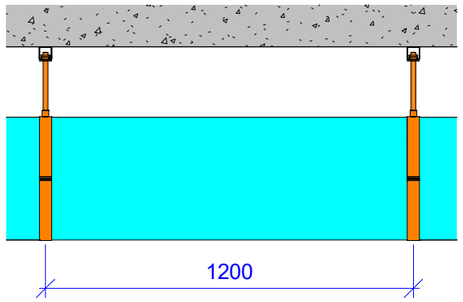
3D1 3D View - Duct on Ceiling



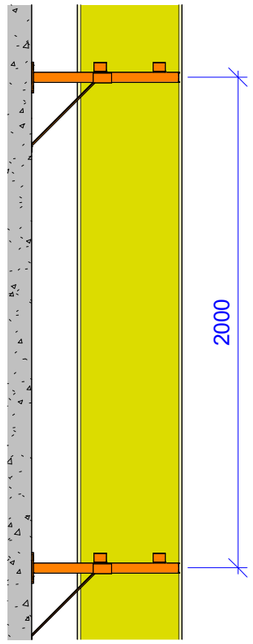
3D2 3D View - Duct on Ceiling With Dual Rod



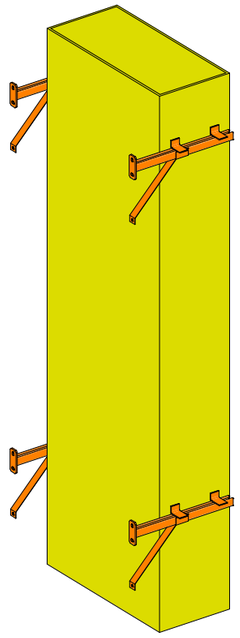
2 Section View - Duct on Ceiling With Dual Rod



B Front View - Duct on Ceiling With Dual Rod



3 Section View - Duct on Wall



3D3 3D View - Duct on Wall

Notes

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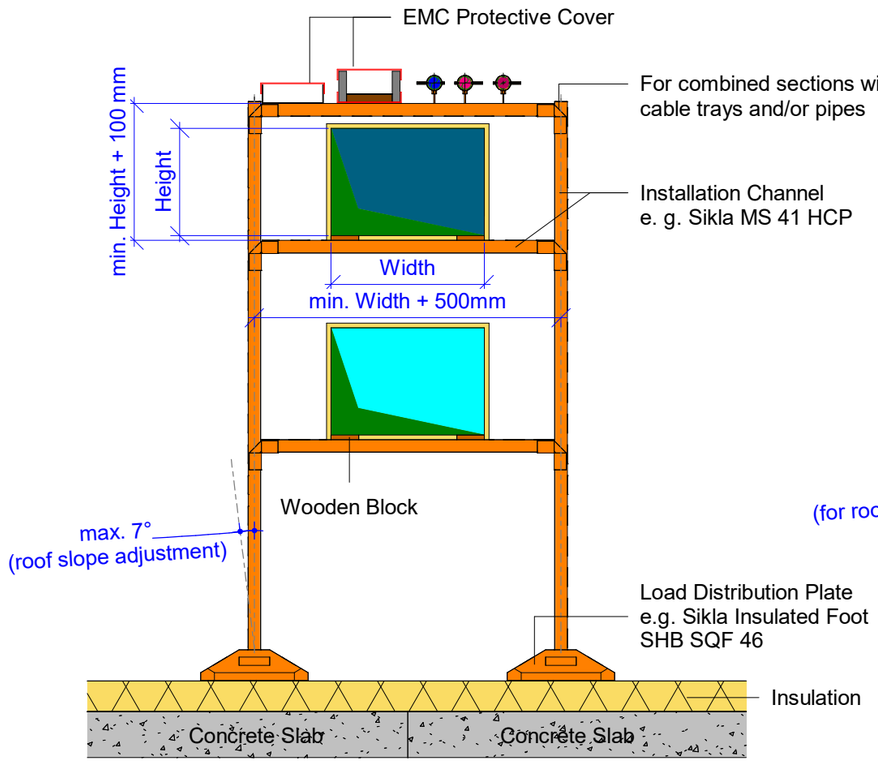
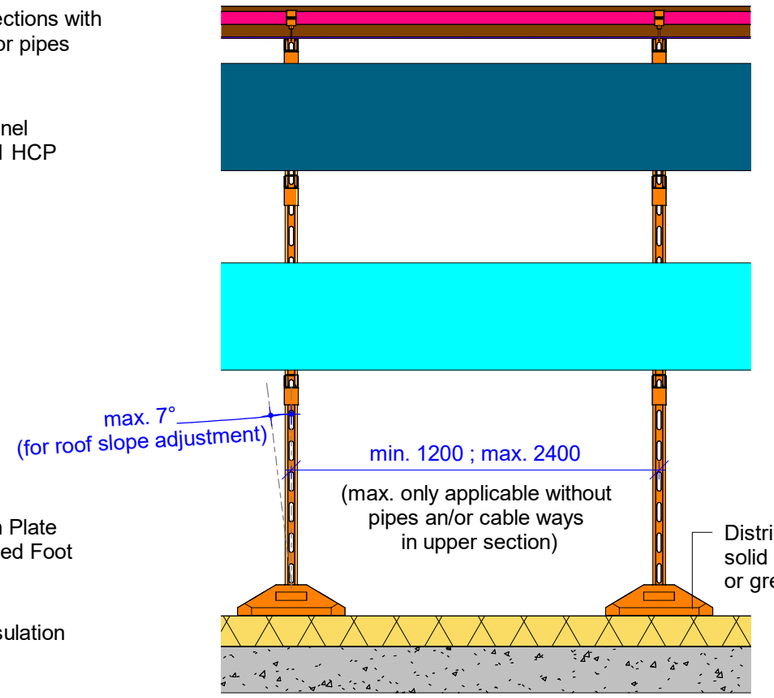
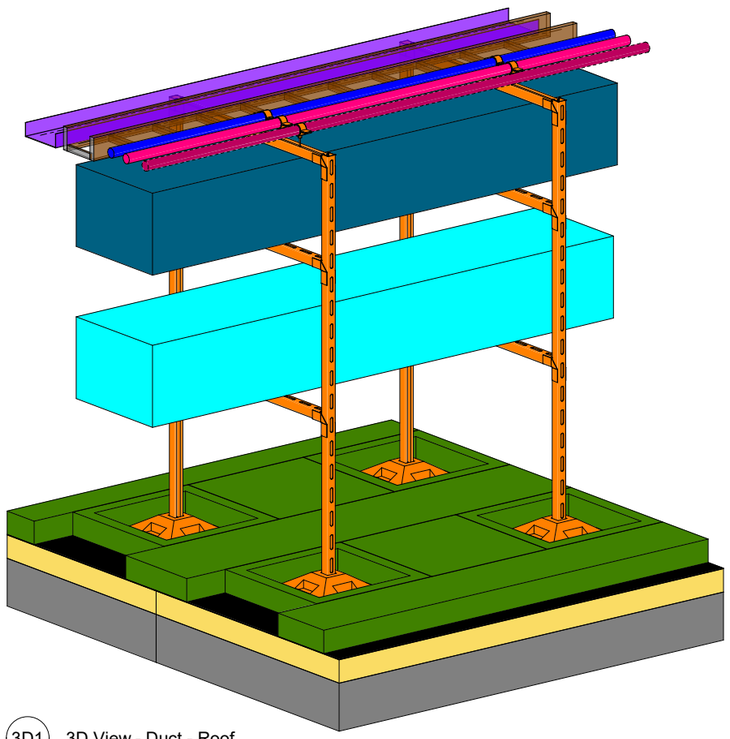


1 Section View - Duct - Roof



A Front View - Duct - Roof



3D1 3D View - Duct - Roof

Notes

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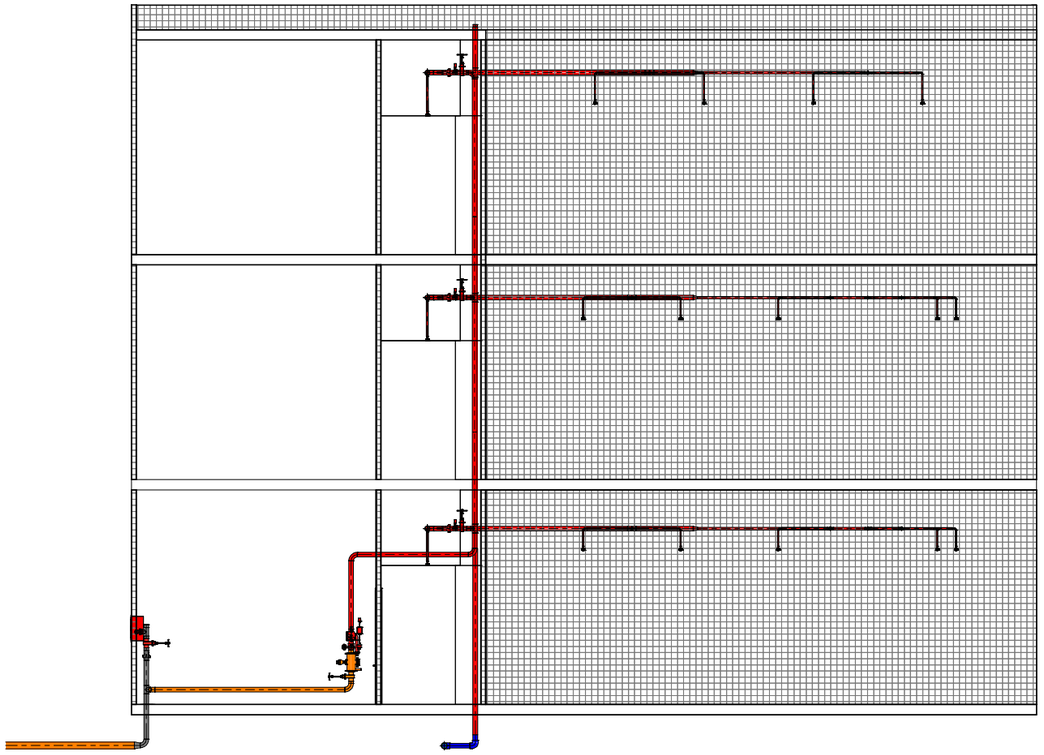
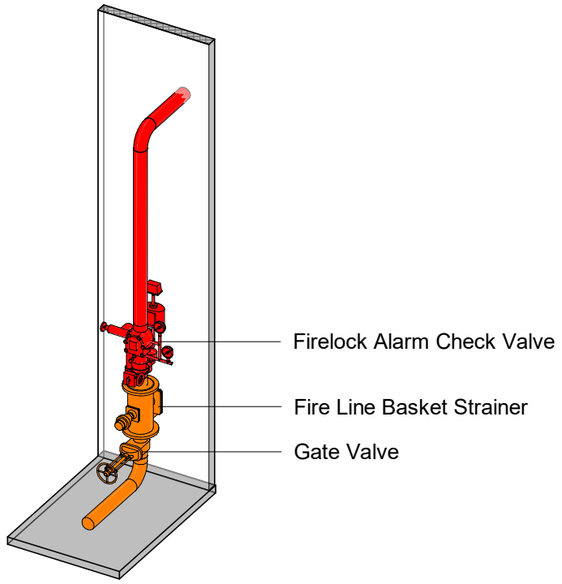
4.9. MEP Installation Details – Fire Protection

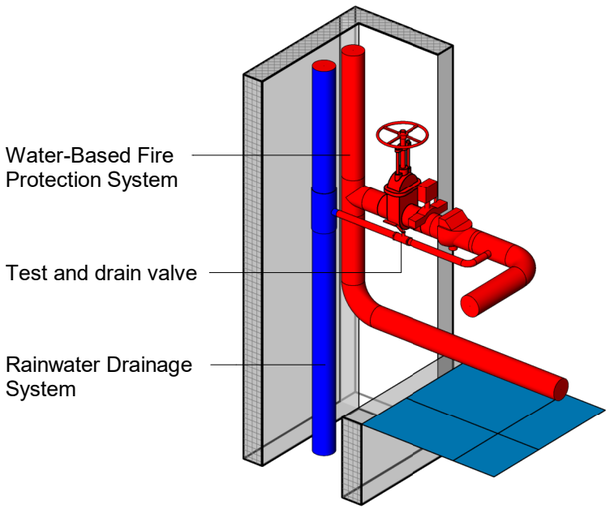
Purpose: in this chapter you can find best practices and requirements for the installation of wet and dry systems, gas suppression systems. Also, information about types of insulation vs type of gas suppression systems and pressure relief devices.



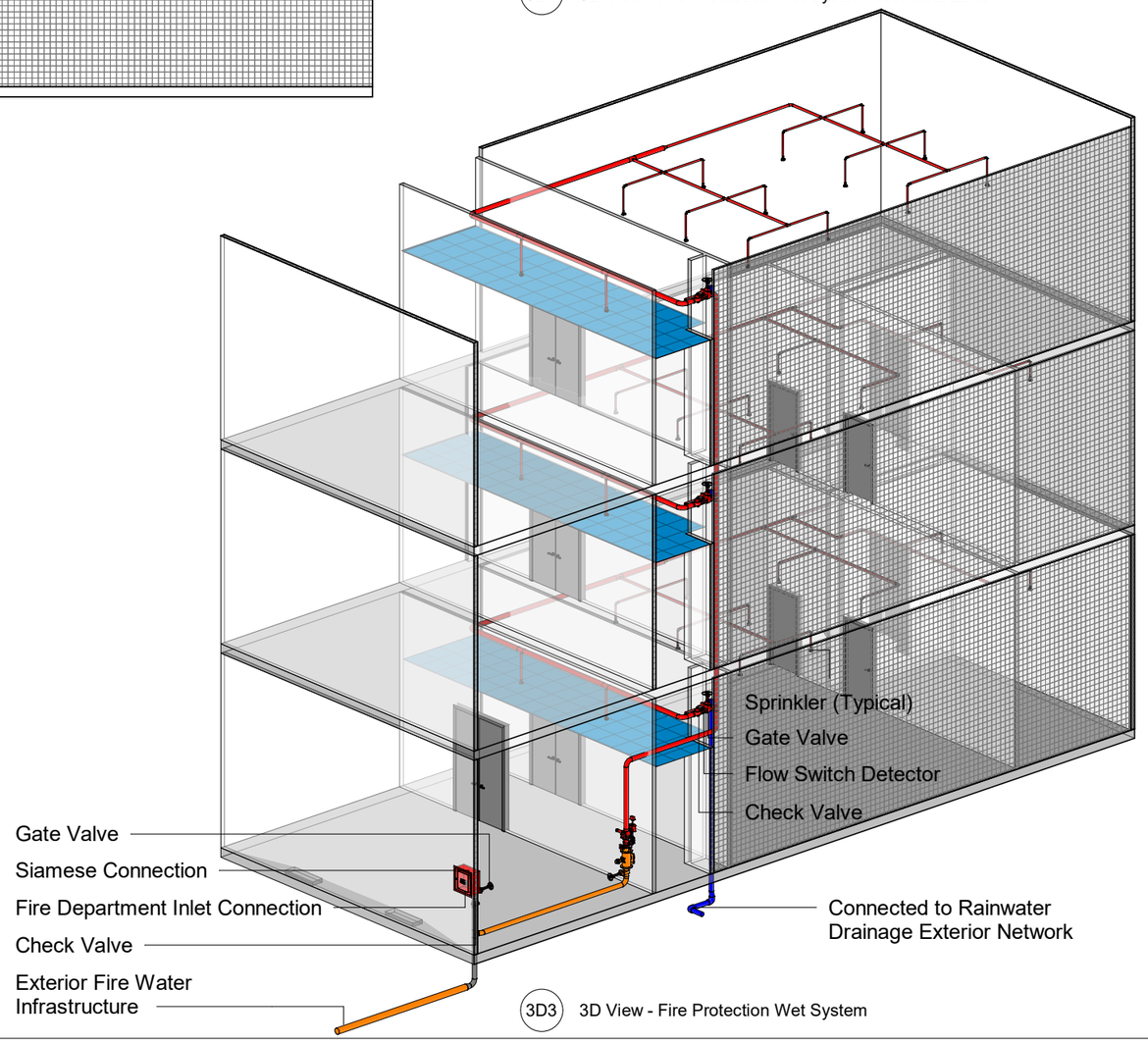
1 Section - Fire Protection Wet System



3D1 3D View - Fire Protection Wet System Technical Zone



3D2 3D View - Fire Protection Wet System Shaft



3D3 3D View - Fire Protection Wet System

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.

Water-Based Fire Protection Systems-General Notes:

1. The pipes are always full of water and the sprinklers discharge immediately when activated.
2. All spaces identified in the fire protection project as being to be protected by sprinklers, shall be fully sprinklered, in accordance with the local codes and all relevant standards.
3. These documents depict the performance level engineering design criteria to be utilized as a guidance for the planning of the water-based fire sprinkler systems by the contractor.
4. Shall be included, in the shop drawings and calculations, any additional equipment necessary to complete the installation and comply with applicable standards and ahj requirements.
5. All sprinkler piping shall be installed so that the system can be drained. auxiliary drains shall be provided at the low points of the sprinkler system, in accordance with local and applicable standards.
6. All sprinkler heads must be fitted 90 degrees (I.E., perpendicular) to the roof or in the pendant or upright position as specified on the drawings.
7. The water-based fire protection systems shall be protected from freezing temperatures and mechanical damage.
8. Fire alarm and electrical panels that are controlled by an alarm flow switch on the fire sprinklers risers shall not be interrupted.
9. All equipment to be approved per specifications & AHJ.
10. Sprinkler systems are typically triggered by heat, and are designed to activate at a certain temperature, which is typically around 135-165°F (57-74°C).

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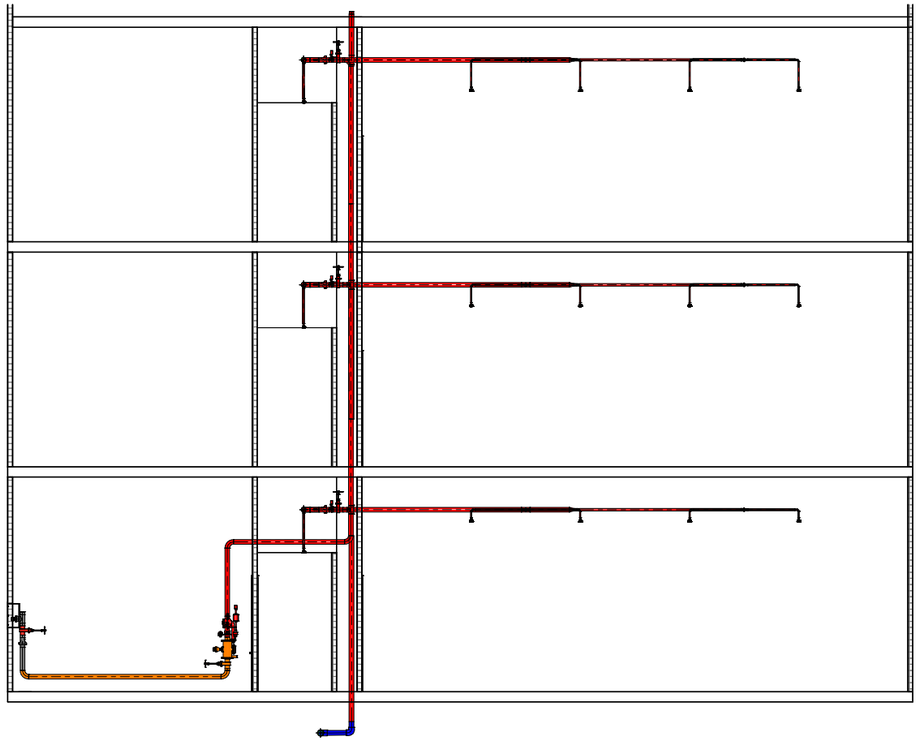
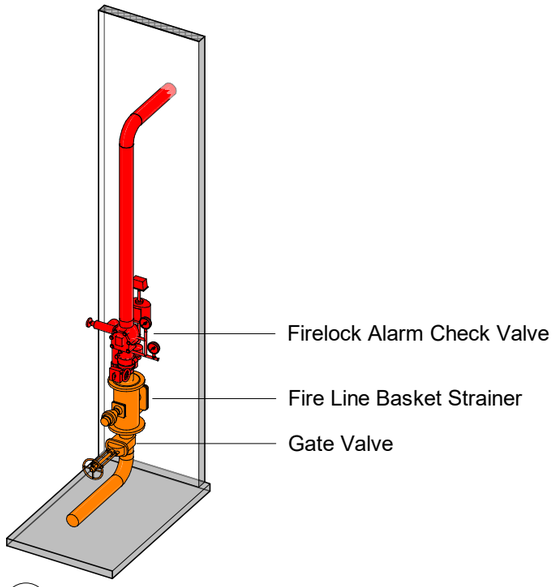
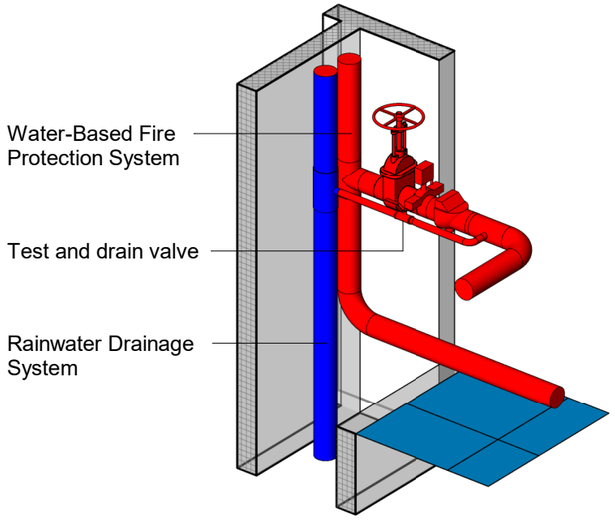


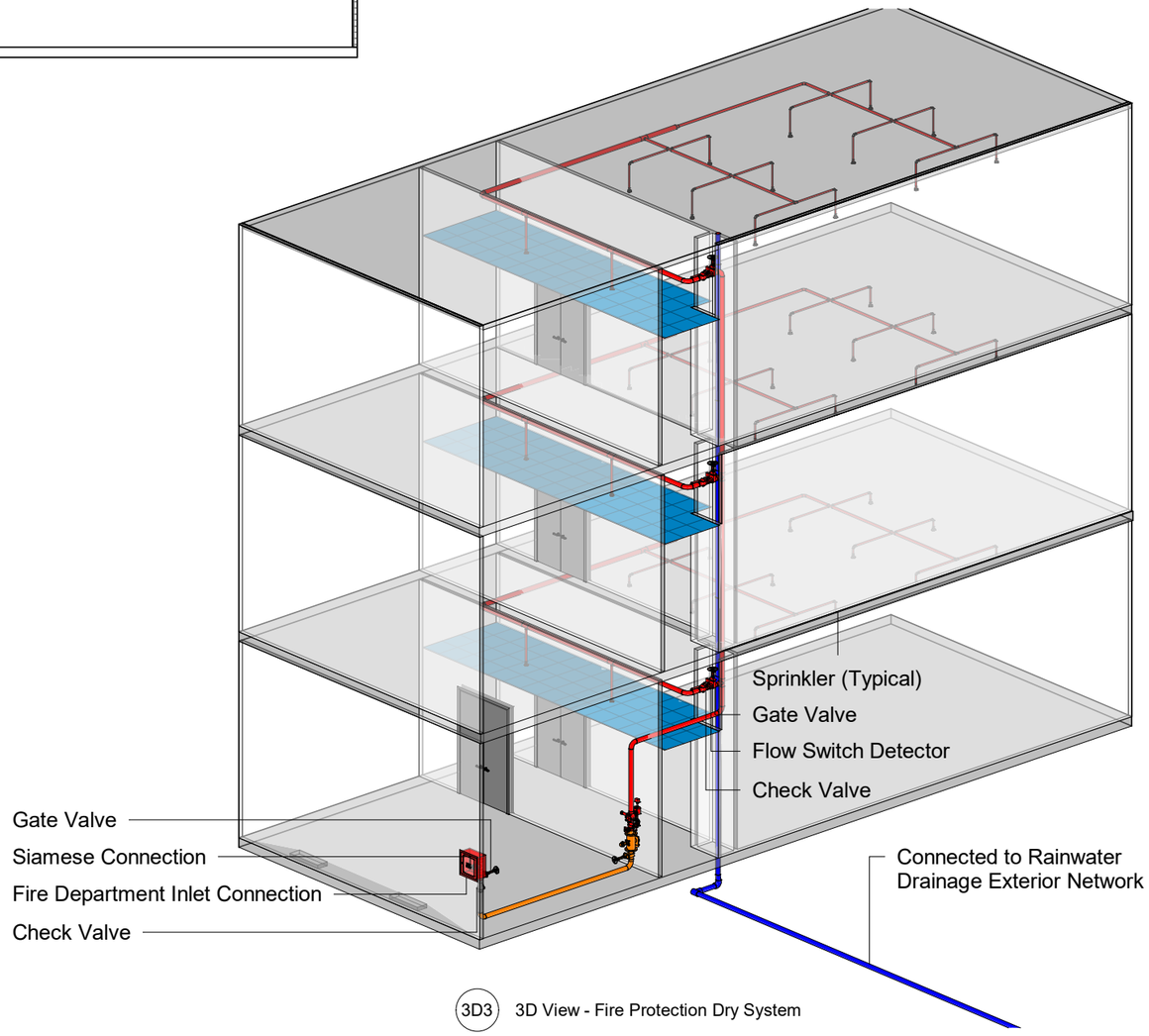
1 Section - Fire Protection Dry System



3D1 3D View - Fire Protection Dry System Technical Zone



3D2 3D View - Fire Protection Dry System Shaft



3D3 3D View - Fire Protection Dry System

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.

Dry Sprinkler System General Notes:

1. The pipes contain pressurized air or nitrogen, avoiding the risk of leaks.
2. Water only enters the system once a sprinkler has been activated.
3. Suitable for critical areas where direct contact with water can cause damage.
4. Requires a control panel and dry valves, which release the water when necessary.
5. Must be installed with auxiliary drains to avoid condensation build-up.
6. Sprinkler systems are typically triggered by heat, and are designed to activate at a certain temperature, which is typically around 135-165°F (57-74°C).

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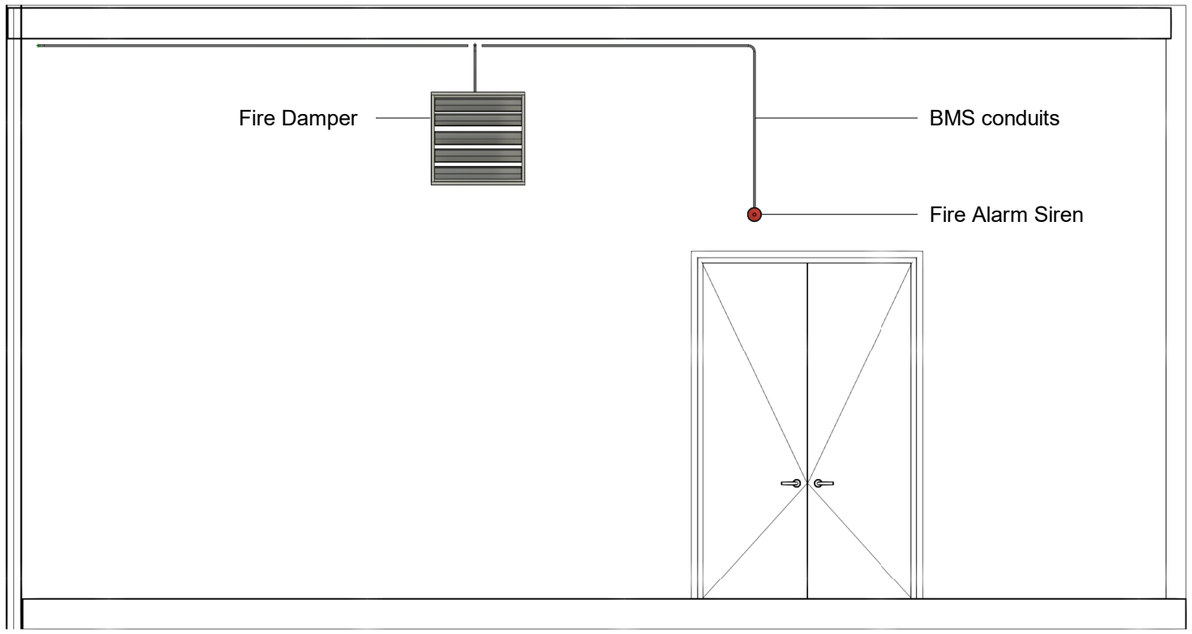
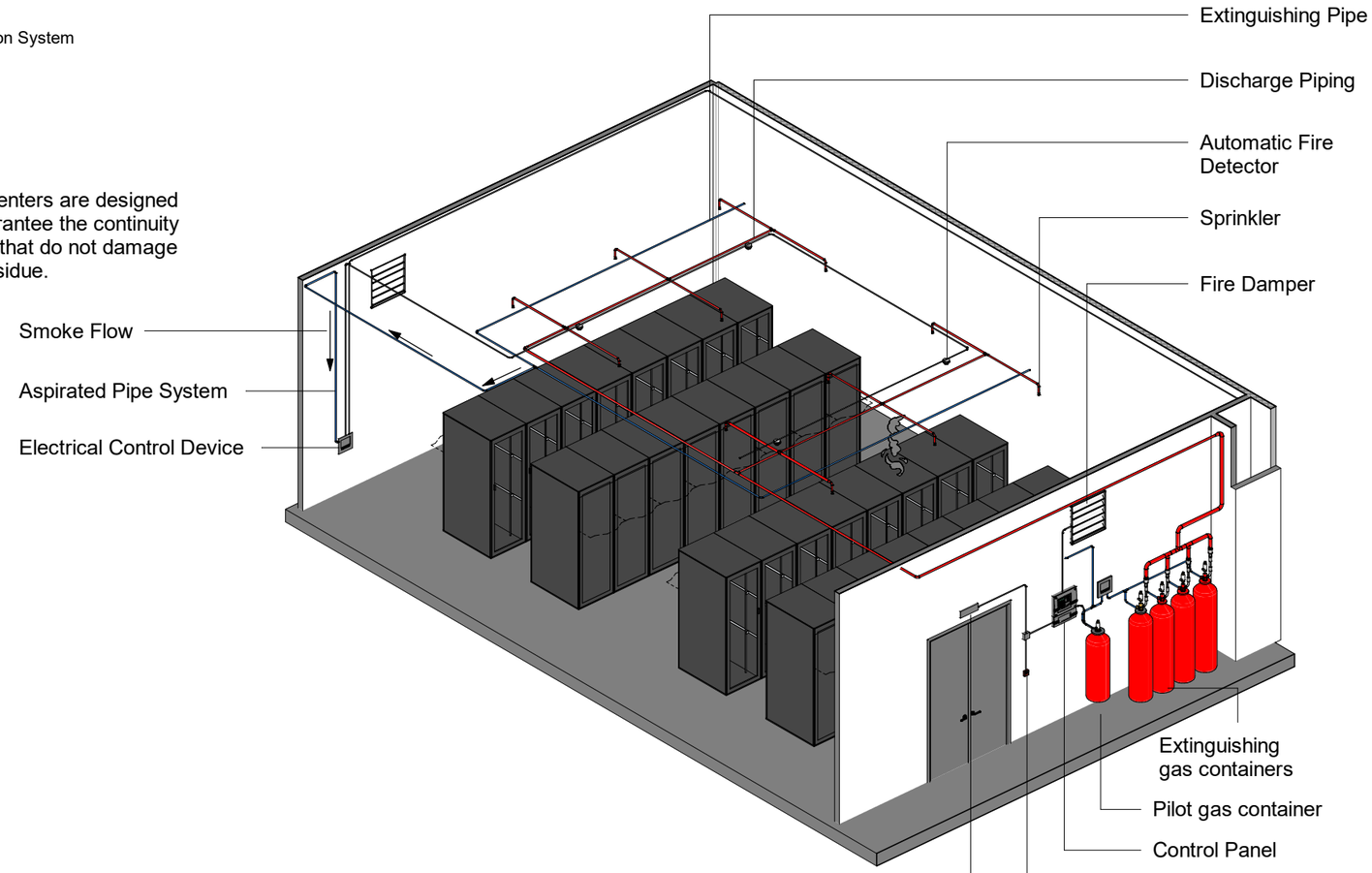


A Front View - Fire Protection - Gas Suppression System

Gas Suppression System:

Gas fire suppression systems in data centers are designed to protect sensitive equipment and guarantee the continuity of services, using extinguishing agents that do not damage electronic components and leave no residue.



3D 3D View - Fire Protection Gás Suppression System

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.

Gas Suppression System General Notes:

1. For early smoke detection, use highly sensitive smoke detection systems that identify combustion particles even before visible flames form.
2. When it detects signs of fire, the system triggers audible and visual alarms, allowing for the safe evacuation of personnel and preparation for automatic suppression.
3. After the alarms, the system releases the gaseous extinguishing agent, which suppresses the fire without causing damage to equipment or leaving residue.
4. Ensure that detection, alarm and suppression systems are integrated and work in a coordinated manner for a quick and efficient response.
5. Mandatory Door Fan Test to ensure minimum gas retention time after discharge: minimum 10 minutes.
6. Maximum time for fault indication on the panel: ≤ 100 seconds after occurrence.
7. Response time for activation of detectors: maximum 60 seconds after reaching established threshold.
8. Minimum sensitivity required: detect smoke with a density of less than 0.03% obscuration/m.
9. Mandatory minimum retention period of the gaseous extinguishing agent inside the protected space: ≥ 10 minutes after discharge.
10. The regulation defines criteria for classifying different areas of a building according to the level of fire risk, guiding the appropriate protection measures for each zone.
11. Carry out periodic inspections and tests of the detection and suppression systems to ensure they function properly.

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Fire Protection
Gas Susppression System

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Types of insullations vs type of gas suppression systems

1. Types of Insulation

Insulation Type	Composition & Key Properties	Fire Performance	Common Uses
Polyurethane (PU)	Foam plastic	Flammable (unless treated)	Cold storage, panels
Polyisocyanurate (PIR)	Modified PU, better fire resistance	Improved over PU	Facades, roofs
Expanded Polystyrene (EPS)	Lightweight foam beads	Flammable (melts quickly)	Sandwich panels (low-cost)
Mineral Wool (Rockwool)	Basalt rock fibers	Non-combustible (A1 rated)	Fire-rated walls, ceilings
Glass Wool	Glass fibers	Non-combustible	HVAC, partitions
Phenolic Foam	Rigid, closed-cell foam	Good fire resistance, low smoke	High-spec panels, ductwork
Cellulose	Recycled paper, treated	Fire-retardant if treated	Walls, ceilings (eco-friendly)

2. Types of Gas Suppression Systems

System Type	Gas Used	Key Characteristics	Applications
Inert Gas	Argon, Nitrogen, CO_2 (e.g., IG-541, IG-55)	Safe for equipment, displaces oxygen	Data centers, archives
Chemical Clean Agents	FM-200, Novec 1230	Quick action, low residue, safe for electronics	Server rooms, museums
CO_2	Pure carbon dioxide	Displaces oxygen, not safe for occupied spaces	Industrial rooms, machinery spaces
Water Mist	Fine water droplets	Cools and suppresses fire, safe for people	Hospitals, marine, heritage sites
Aerosol	Potassium-based compounds	Creates fire-inhibiting cloud	Electrical panels, remote enclosures

3. Compatibility Matrix

Insulation →	Inert Gas	FM-200 / Novec	CO_2	Water Mist	Aerosol
PU / PIR	✓ Safe	✓ Safe	✓ (w/ care)	⚠ Not ideal (wetting)	✓ Caution for hot discharge
EPS	✓	✓	⚠ Melts	✗ Risk of collapse	✗ Can damage
Mineral Wool	✓ Best	✓ Best	✓ Best	✓ Best	✓ Best
Glass Wool	✓	✓	✓	✓	✓
Phenolic Foam	✓ Good	✓ Good	✓	⚠ Absorbent	⚠ Sensitive
Cellulose	✓ (if dry)	✓ (if treated)	✗ Fire risk	✗ Can absorb	✗ Not recommended

4. Key Notes:

Non-combustible insulations (like mineral wool) are ideal for fire suppression environments.
Chemical systems (FM-200, Novec) are compatible with most insulations due to their clean, residue-free nature.
CO_2 systems require caution in insulated spaces, especially if insulation is flammable.
Water mist is not ideal for absorptive or moisture-sensitive insulation.
Always consider fire rating, toxicity of combustion gases, and smoke production.

Notes

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Gas Susppression Systems vs Insullations

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Pressure Relief Devices

PRDs (Pressure Relief Devices) are used in connection with certain extinguishing gas systems—especially where pressurized containers or rooms are involved. They play a critical safety role by allowing controlled pressure release to prevent damage or hazards.

1. What is a PRD?

A Pressure Relief Device is a safety component designed to open at a preset pressure to prevent over-pressurization in a system.
They can be:
Burst discs (rupture discs)
Spring-loaded relief valves
Vents or flaps

2. Where PRDs are used in Gas Extinguishing Systems:

2.1. Gas Cylinder PRDs

Application: Found on storage cylinders of gases like FM-200, Novec 1230, CO_2, and Inert gases (IG-55, IG-541).
Purpose: Protect the cylinder from over-pressurization (e.g., due to temperature rise).

2.2. Protected Room Pressure Relief Vents (PRVs)

Application: Rooms where total flooding systems are used (e.g., data centers, archives).
Purpose: Gas discharge causes rapid pressure changes (positive or negative). A PRV ensures room integrity is maintained and structural damage is avoided.
Especially needed with:
Inert gas systems – high volume of gas rapidly displaces air → positive pressure
Chemical agents (FM-200, Novec) – expansion may cause negative pressure as gas cools

2.3. Discharge Pipe PRDs (less common)

Application: If the piping system gets blocked or gas flow is interrupted.
Purpose: Acts as a backup safety release.

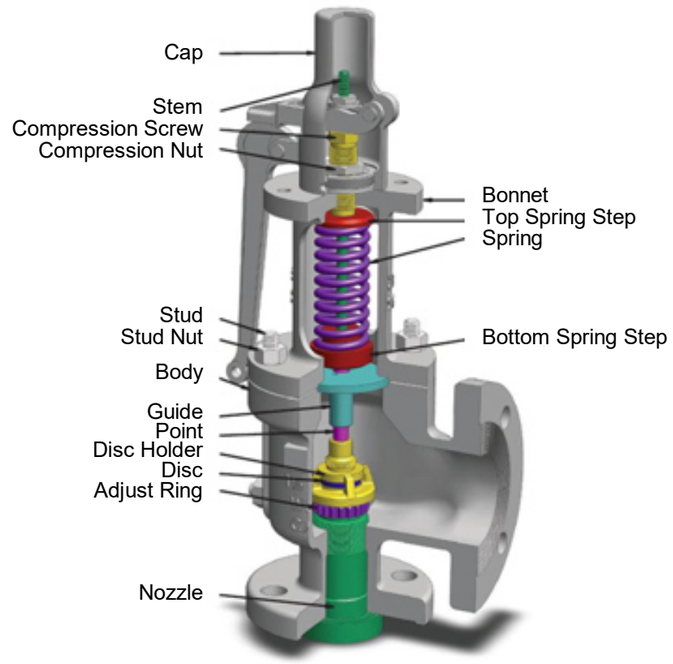
3. Why it Matters

If a PRD is not installed where needed:
- Walls, ceilings, or doors could blow out during a discharge
- Gas suppression may fail due to unintended leaks or pressure imbalance
- Personnel safety could be at risk

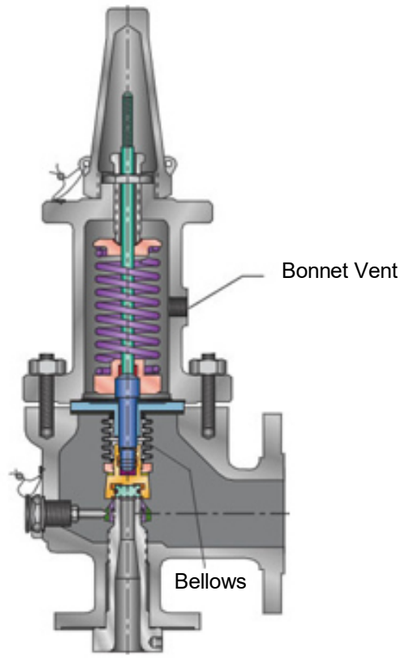
4. Design Considerations

PRDs must be sized and located based on:
- Room volume
- Type of suppression agent
- Discharge time
- Maximum allowable overpressure/underpressure

EN 15004, NFPA 2001, and other standards specify PRD requirements.



Convencional Pressure Relief Valve



Balanced Bellows Pressure Relief Valve

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.

Gas Suppression System General Notes:

1. For early smoke detection, use highly sensitive smoke detection systems that identify combustion particles even before visible flames form.
2. When it detects signs of fire, the system triggers audible and visual alarms, allowing for the safe evacuation of personnel and preparation for automatic suppression.
3. After the alarms, the system releases the gaseous extinguishing agent, which suppresses the fire without causing damage to equipment or leaving residue.
4. Ensure that detection, alarm and suppression systems are integrated and work in a coordinated manner for a quick and efficient response.
5. Mandatory Door Fan Test to ensure minimum gas retention time after discharge: minimum 10 minutes.
6. Maximum time for fault indication on the panel: ≤ 100 seconds after occurrence.
7. Response time for activation of detectors: maximum 60 seconds after reaching established threshold.
8. Minimum sensitivity required: detect smoke with a density of less than 0.03% obscuration/m.
9. Mandatory minimum retention period of the gaseous extinguishing agent inside the protected space: ≥ 10 minutes after discharge.
10. The regulation defines criteria for classifying different areas of a building according to the level of fire risk, guiding the appropriate protection measures for each zone.
11. Carry out periodic inspections and tests of the detection and suppression systems to ensure they function properly.

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Fire Protection
Pressure Relief Devices

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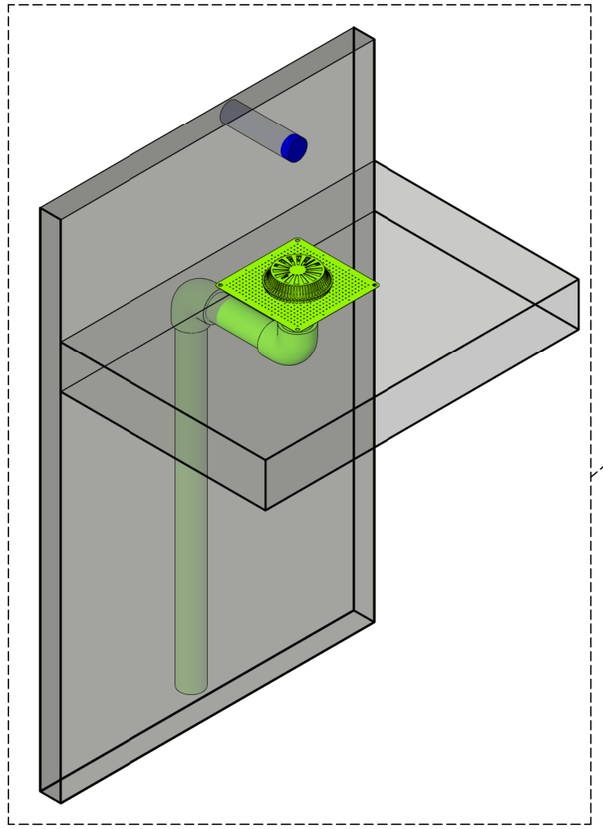
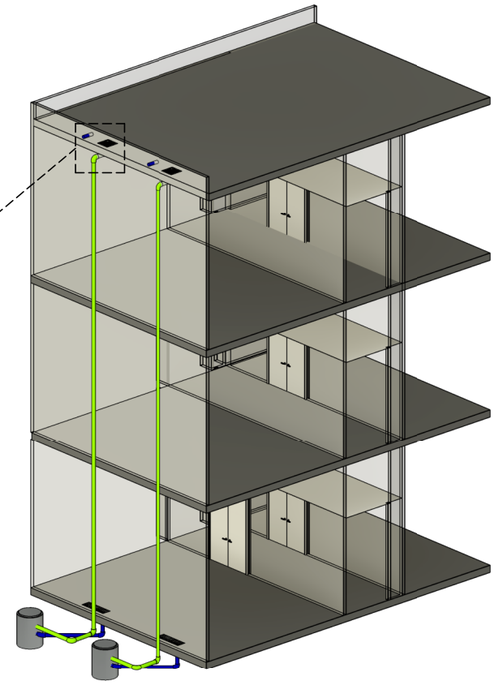
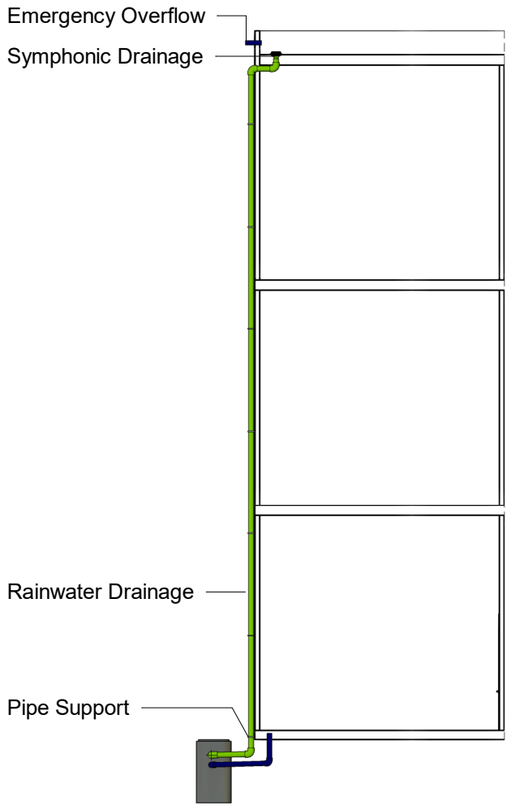
4.10. MEP Installation Details – Plumbing

Purpose: in this chapter you can find best practices and requirements for the installation of plumbing, rainwater systems, hot and cold-water systems, sewage, leak detection and heating system.

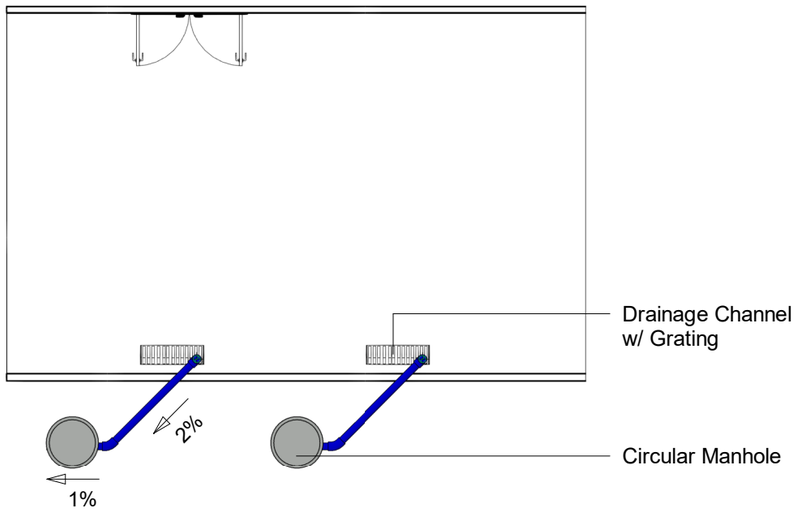






3D1 3D View - Rain Water - Symphonic Drainage Systems

1 Section - Rain Water - Symphonic Drainage Systems



A Floor Plan - Rain Water - Symphonic Drainage Systems

Symphonic Drainage System Specification:

The symphonic drainage system works by draining without the presence of air, creating a negative pressure that accelerates the flow of water in the pipe. Unlike conventional gravity systems, it keeps the pipes completely filled during operation, allowing for more efficient drainage.

Note: The rainwater network must not be connected to the sanitary sewage network.

Maximum distances between supports for PVC vertical pipes:

- Pipes up to 50 mm → support every 1,00 m;
- Pipes from 63 to 75 mm → support every 1,50 m;
- Pipes over 90 mm → support every 2,50 m.

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.

Symphonic Drainage Notes

1. Flow occurs without the presence of air, creating negative pressure to increase flow velocity. Unlike gravity systems, it keeps the pipe completely full during operation.
2. No inclination required in horizontal pipes.The height of the building impacts the internal pressure, making the system more efficient in tall buildings.
3. It may be necessary to use speed control devices to avoid overloading.
4. The height difference between pickups should not exceed 3 meters to avoid instability in the flow.
5. May be less efficient in regions with low rainfall, as it requires a minimum volume of water for activation.
6. Requires planning for periodic inspections, as obstructions can compromise the system's operation.
7. It can drain up to 12 times more water than a conventional system using the same pipe diameter. Reduces the number of vertical drops, freeing up space in basements and technical areas. It uses siphonic drains with an anti-vortex device, preventing air from entering the pipe.
8. The pipes and fittings are made from HDPE (High Density Polyethylene), guaranteeing resistance to negative pressure.
9. Reductions in diameter are permitted in the direction of flow.
10. Diameter increases are not permitted in vertical stretches so as not to compromise the siphonic effect.
11. The use of two 45° bends is preferable to one 90° bend.
12. Pipe intersections → Must be made with 45° forks.

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Plumbing
Rain Water - Symphonic Drainage Systems

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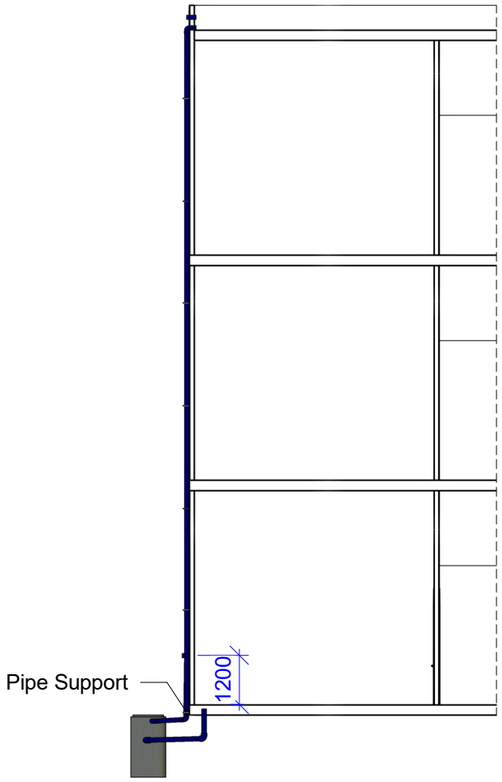


1 Section - Rain Water

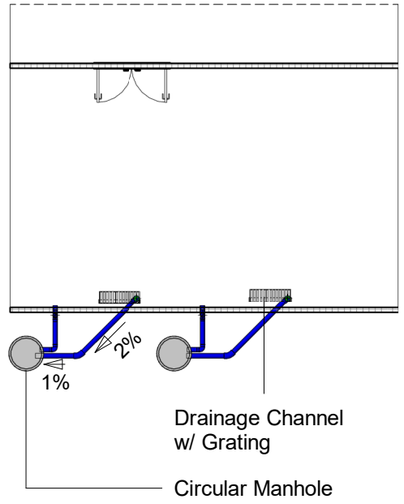
Note: The rainwater network must not be connected to the sanitary sewage network.

Minimum and maximum slope for efficient flow:

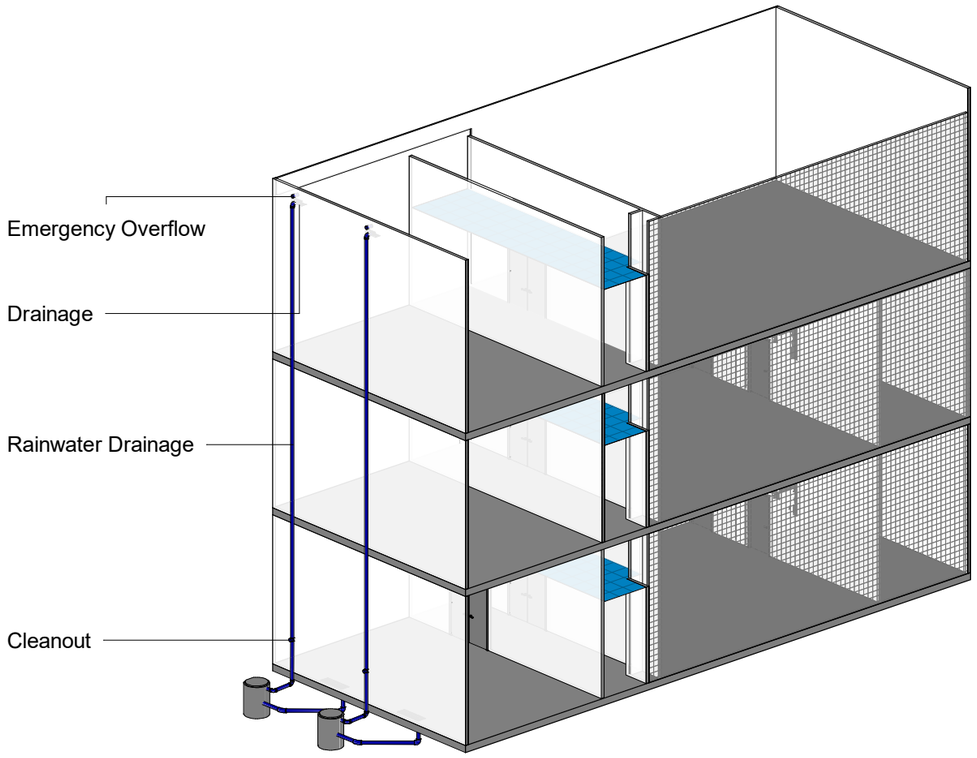
- 0.5% ≤ i ≤ 4% (depending on the type of pipe and flow rate);

Maximum distances between supports for PVC vertical pipes:

- Pipes up to 50 mm → support every 1,00 m;
- Pipes from 63 to 75 mm → support every 1,50 m;
- Pipes over 90 mm → support every 2,50 m.



A Floor Plan - Rain Water



3D1 3D View - Rain Water

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.

Drainage General Notes:

1. Dimensions and elevations must have standard units in meters, and diameters must be indicated in millimeters, except where another unit is specified.
2. All elevations must be confirmed "in situ".
3. Inspection chambers must have corrosion protection.
4. Rain gutters must include a flow-reducing system, consisting of emergency overload discharges, positioned close to the downpipes.
5. All fittings must be fully supplied to ensure a functional installation.
6. All appliances connected to the drainage system must be installed with a siphon to prevent air escaping from the system into the building.
7. Inspections are mandatory on drainage pipes and must be installed on all downpipes on each floor, at 1200 mm above finished floor level, and at all changes of direction, or as indicated on the drawings.
8. The connection between the rain gutter and the manhole must be made at an angle of 90°.
9. Supports and fixings must be supplied in accordance with the manufacturer's instructions.
10. Expansion joints must be provided in the pipes in accordance with the manufacturer's instructions.
11. Exposed pipes must be protected against mechanical damage.
12. External pipes must be protected against freezing when exposed, using suitable thermal insulation.
13. All buried pipes must be laid in accordance with the structural details and manufacturer's recommendations, ensuring compatibility with the architectural and structural design.

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Plumbing
Rain Water

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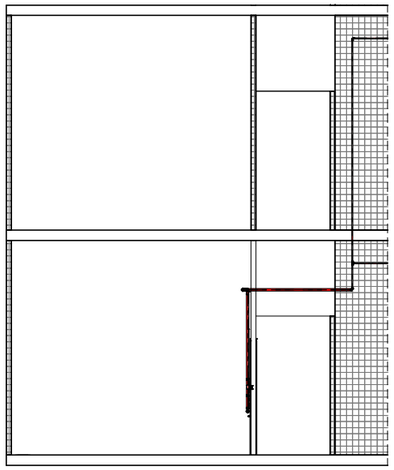
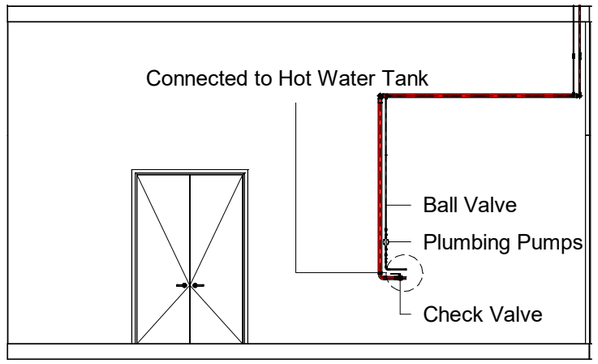
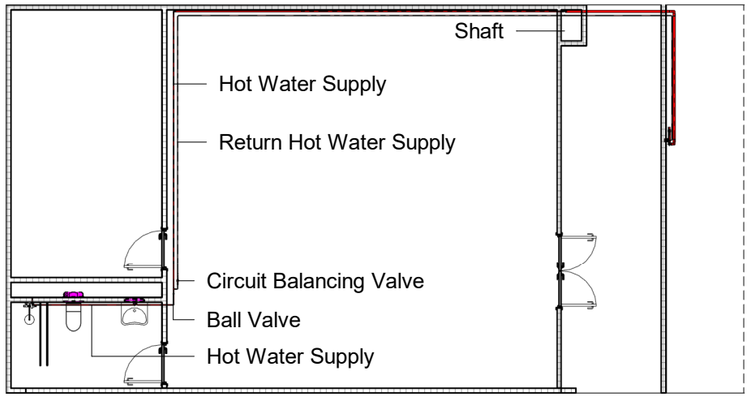


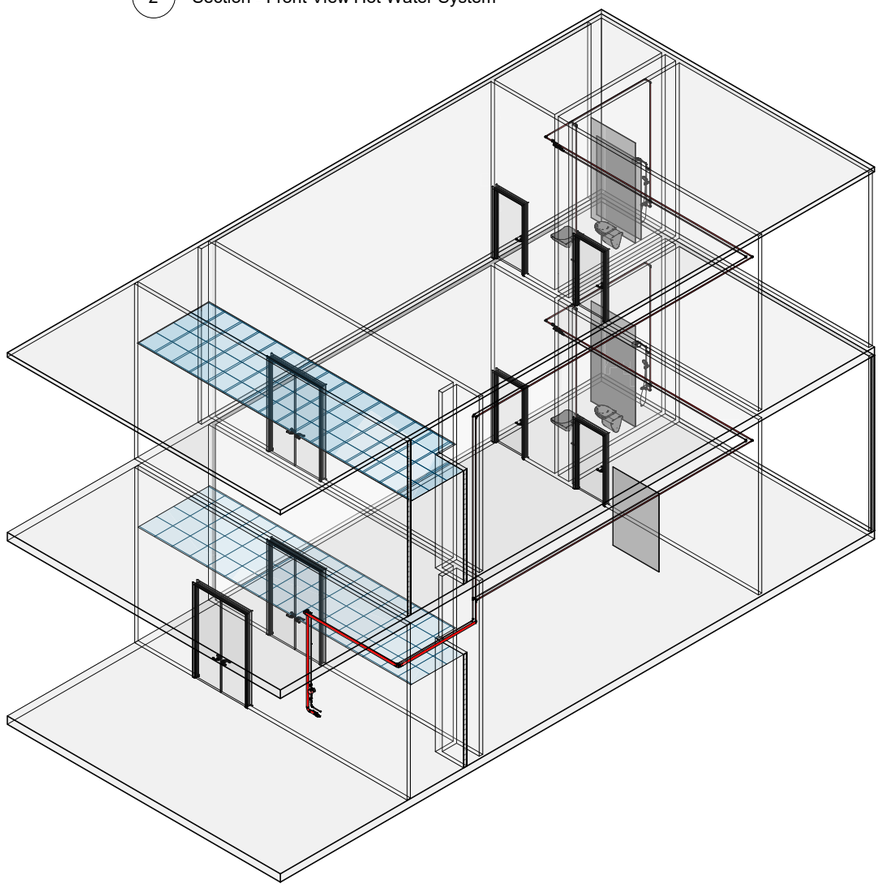
1 Section - Hot Water System



2 Section - Front View Hot Water System



A Floor Plan - Hot Water System



3D1 3D View - Hot Water System

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.

Hot Water Supply-General Notes:

1. Backflow preventers must be installed whenever the system is interconnected to other networks.
2. All penetrations must be sealed with materials tested for fire resistance.
3. The project must be compatible with local and international standards applicable to hot water installation.
4. Temperature and flow sensors must be integrated into the BMS (Building Management System).
5. Carry out hydraulic tests before operation to detect leaks.
6. The hot water must be kept between 50°C and 60°C to prevent bacterial growth.
7. Maintain pressures between 150 kPa and 600 kPa to avoid overpressure in the pipes.
8. Water velocity should be between 0.5 m/s and 2.0 m/s to avoid erosion and thermal loss.
9. The design should consider a temperature differential (ΔT) between 5°C and 10°C for thermal optimization.
   All pipes and tanks must be insulated to reduce thermal losses.
10. Implement a return circuit to avoid waste and keep the temperature homogeneous.
11. Use expansion joints to accommodate thermal variations without compromising the pipes.
12. Provision should be made for maintenance, including valves and inspection chambers in strategic locations.
13. Installation of automatic valves at the highest point of the pipes to prevent the formation of air pockets.
14. Contingency plan - Implement redundancy in critical systems to avoid operational downtime of the data center.

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Plumbing
Hot Water System

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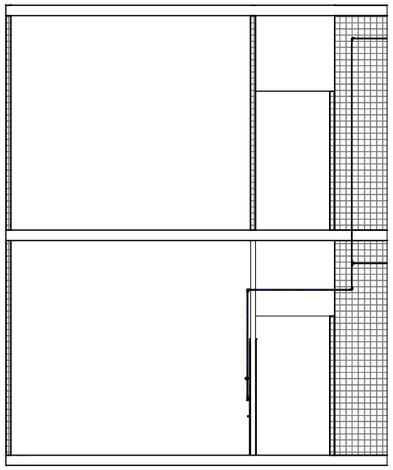
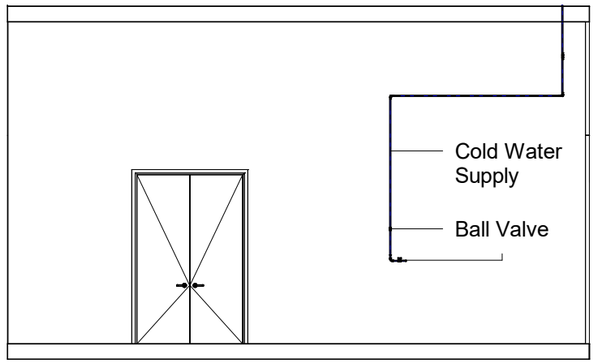
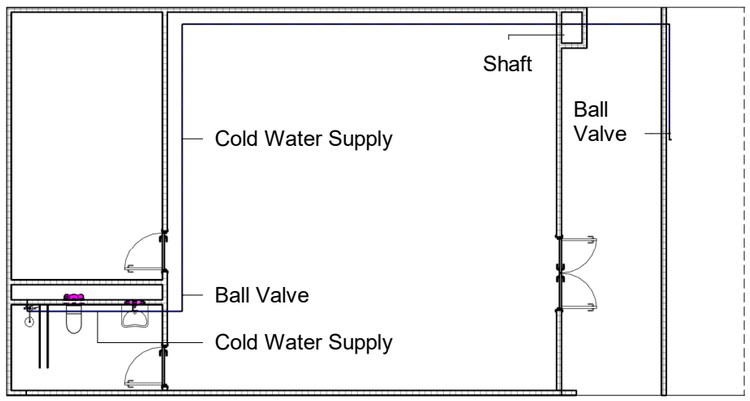


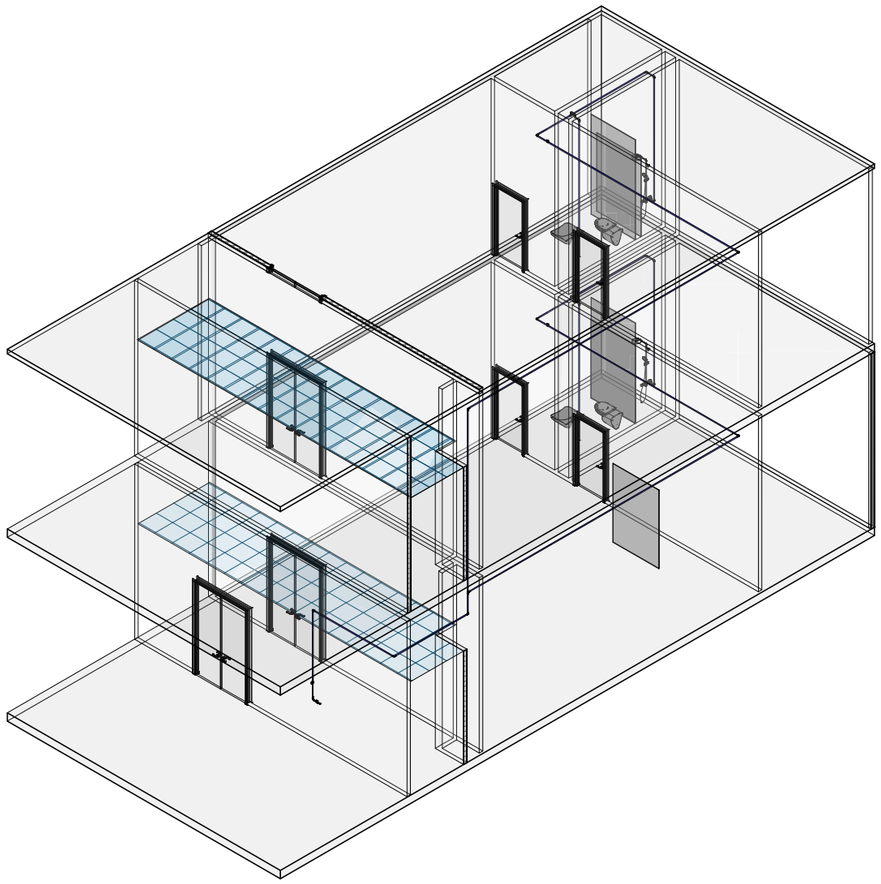
1 Section - Cold Water System



2 Section - Front View Cold Water System



A Floor Plan - Cold Water System



3D1 3D View - Cold Water System

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.

Cold Water Supply-General Notes:

1. The project must be compatible with the public supply network, checking available pressures and sections, as well as the need for reservoirs and pumping systems.
2. Backflow preventers must be installed whenever the system is connected to other networks, to avoid cross-contamination.
3. All pipe entry points into the building must be sealed with materials tested for fire resistance, guaranteeing structural safety.
4. The service pressures in the devices must be between 50 kPa and 600 kPa, with 150 kPa and 300 kPa being recommended to optimize performance and comfort.
5. The velocity of the water in the pipes must be between 0.5 m/s and 2.0 m/s to prevent erosion of the pipes and maintain hydraulic efficiency.
6. The design must provide for adequate simultaneity coefficients, guaranteeing correct pipe sizing in accordance with technical standards.
7. The system must be designed to minimize load losses, adopting optimized routes and avoiding sudden changes in direction.
8. The installation must be designed to minimize noise and vibrations, ensuring acoustic comfort for users.
9. The installation must provide an adequate drainage system for all water supply points, especially in technical areas.
10. The use of automatic air valves should be provided at the highest point of the pipes to avoid air pockets and ensure continuous flow.
11. The system must be compatible with the concept of rational water use, including the possibility of reusing rainwater where applicable.

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Plumbing
Cold Water System

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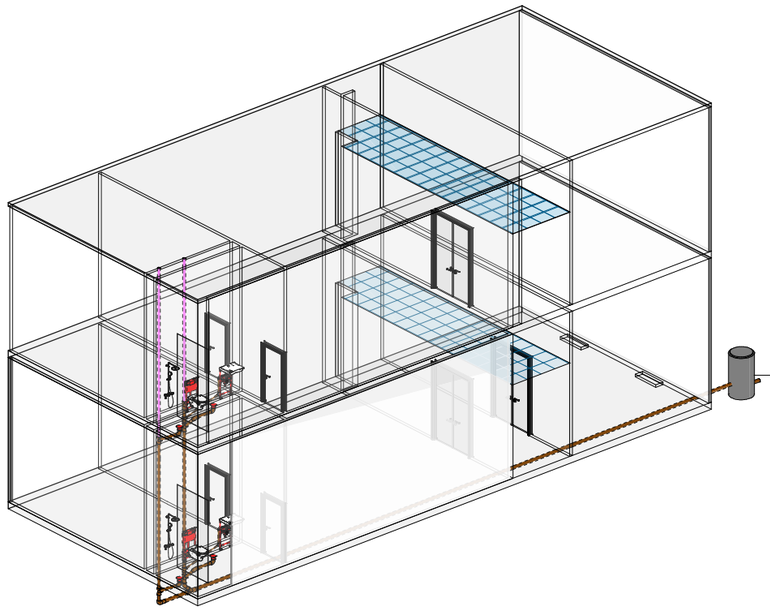
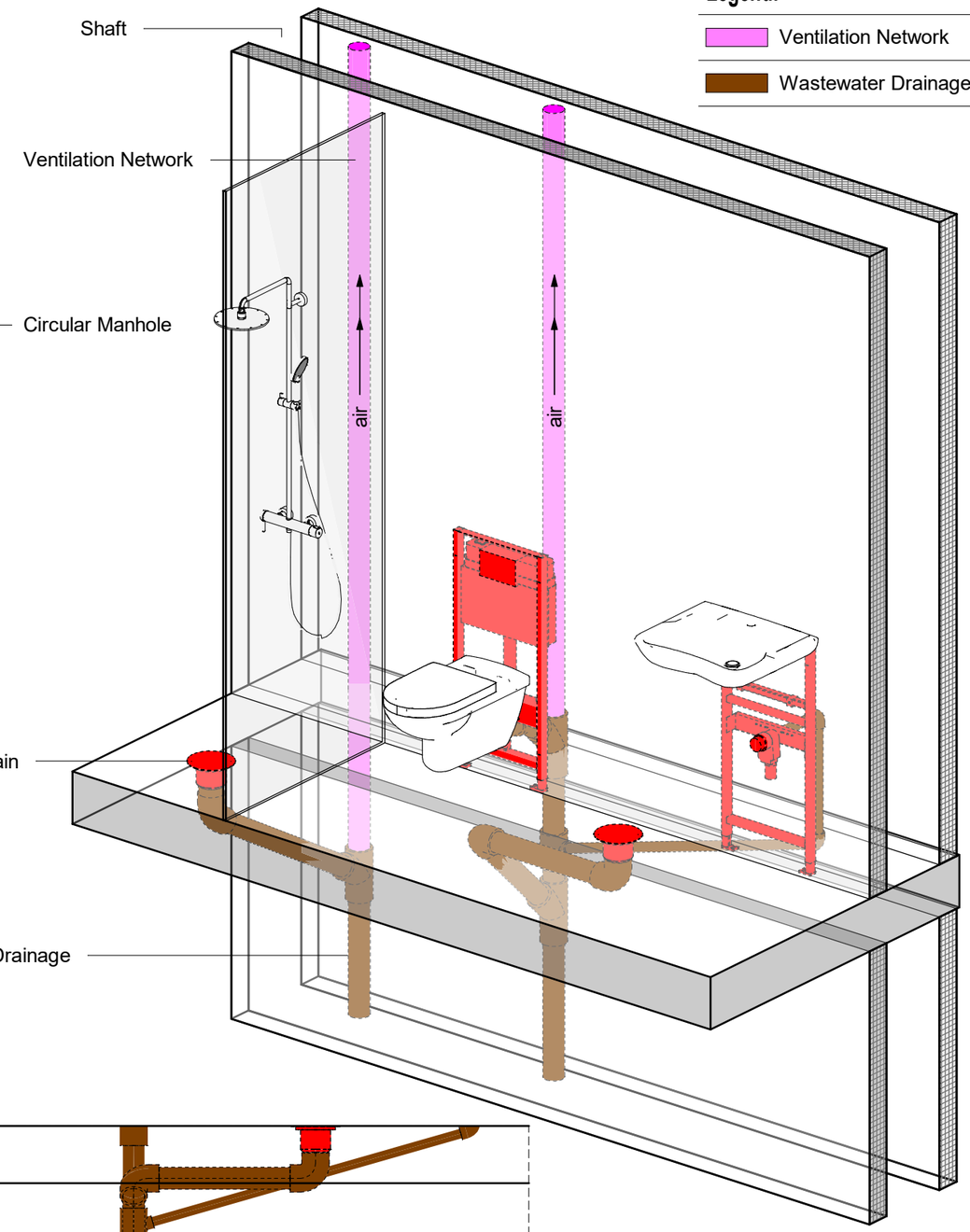
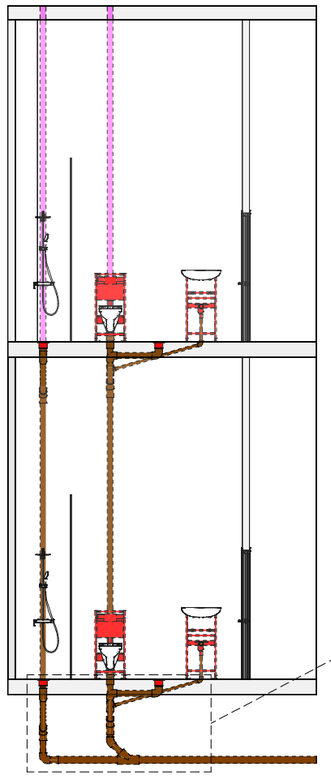
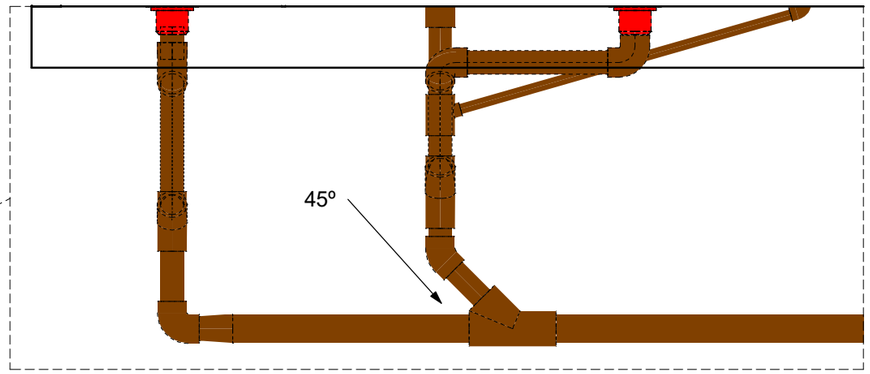


3D1 3D View - Sewage



3D2 3D View - Sewage WC





Legend:

- Ventilation Network
- Wastewater Drainage

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.

Sewage Notes

1. The sewage system must be not connected to the rainwater drainage system.
2. The sanitary sewage system must have primary ventilation and, where necessary, secondary ventilation, to avoid the effects of suction and negative pressure in the system.
3. When unavoidable, adopt adequate acoustic insulation to avoid noise transmission.
4. The minimum slopes for gravity flow are 2% for pipes ≤ 75 mm and 1% for pipes ≥ 100 mm, ensuring efficient flow.
5. Changes of direction must have angles ≤ 45° horizontally to avoid accumulation of solids and ≤ 90° when transitioning to vertical.
6. Inspection boxes must be installed every 25 m in horizontal pipes, no more than 15 m from the public network and at changes of direction, slope / strategic points.
7. Backflow prevention - All sanitary appliances must be protected by backflow preventers or siphons to prevent the return of odors and harmful gases.
8. Waterproofing of complementary devices - Inspection boxes, grease traps and manholes must be waterproofed and sealed hermetically.
9. Provision for pumping effluent below street level - When the sanitary sewer is at a lower level than the public network, a collection box with a pump must be provided to pump the effluent.
10. Before being released for use, the system must undergo leak-tightness and operational tests, in accordance with current regulations.
11. It is essential to check the applicable national codes and ensure that pipe slopes, materials and system configurations comply with local regulations and best practices for wastewater management.

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CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Plumbing
Sewage

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Revision 1		**NTS**	**S2**
DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
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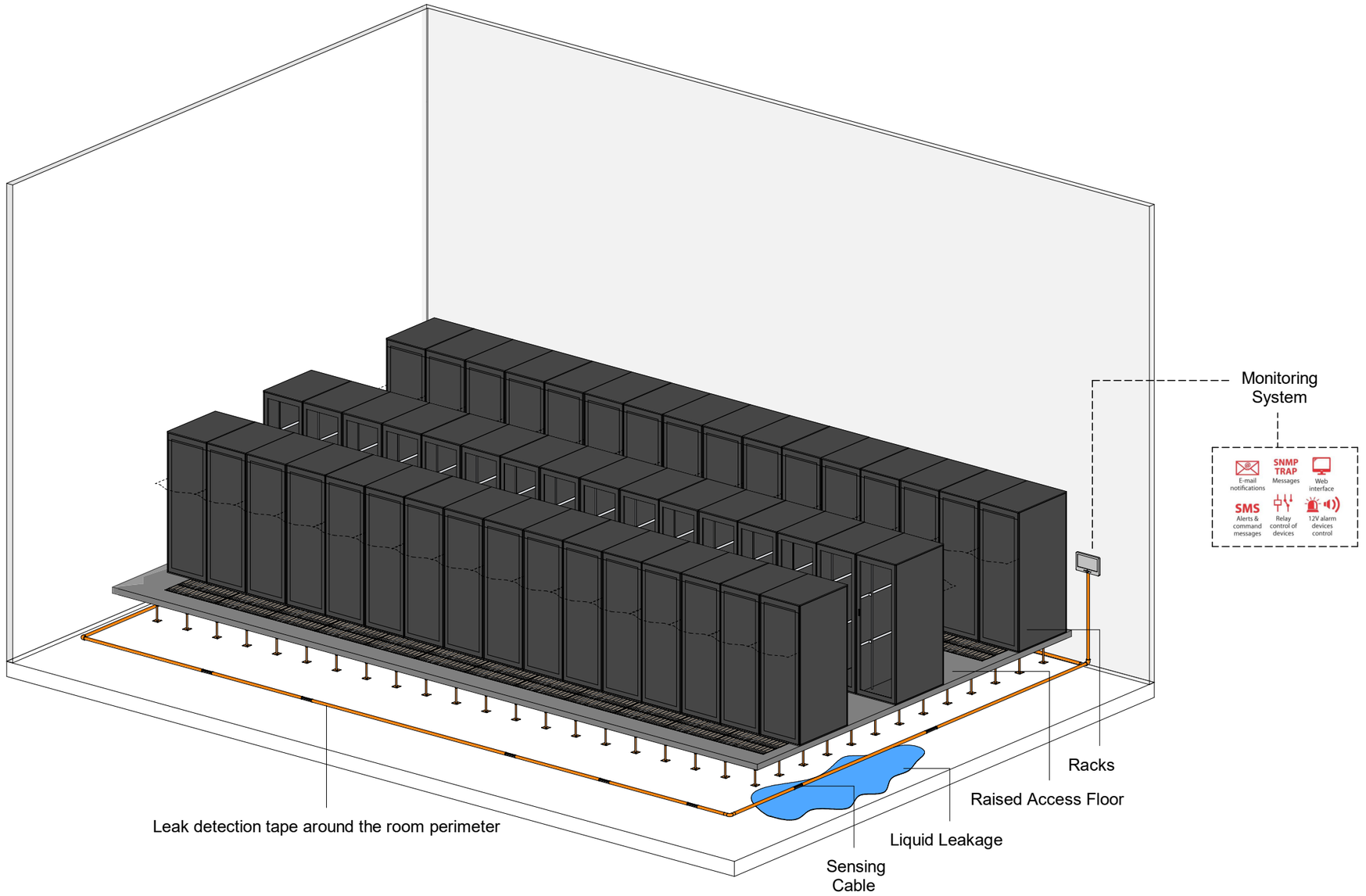


3D Leak Detection_ Floor Sensor

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.

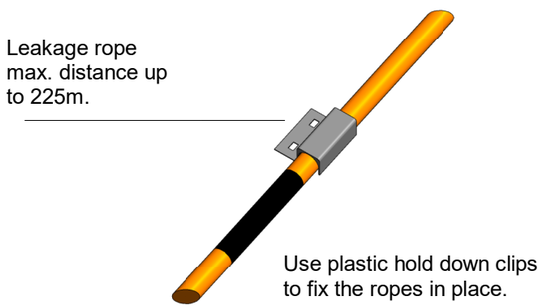
Specific Note

1. Water Leak Detection: Monitors for water leaks in critical environments such as data centers, server rooms, and building facilities. It detects water by sensing a drop in resistance along the connected Water Leak Cable.
2. Early Warning Systems: Provides real-time alerts when a leak is detected, helping to prevent water damage to equipment, infrastructure, or sensitive areas by enabling rapid response.
3. Flexible Installation: Can be installed along pipelines, around sensitive equipment, or in areas prone to flooding. The connected Water Leak Cable can be ordered in different lengths, allowing the sensor to monitor large or hard-to-reach areas.
4. Integration with Monitoring Systems: It connects easily to any monitoring unit, and the number of sensors can be expanded using the Sensor Extension Unit, making it suitable for large-scale installations.

Leak Detection Specifications (Typical):

Data centers require cooling systems to maintain optimal conditions, but water leaks and condensation can damage IT equipment and promote mold growth. Sensing cables and floor leak detectors detect water, trigger alarms, and pinpoint leak locations. They cover large areas, support MODBUS RTU, relays, and event recording, ensuring efficient monitoring.

Detectable liquids: Clean, polluted & distilled water; acids; alkalis; alcohols, and other electrically conductive liquid
Cable lengths: Order options include 3m, 6m, 10m, 15m, 25m, 50m.
Diameter: 6.5 mm cable
Storage temperature: Max +75° C
Operating humidity: 0 to 95 % (Non-Condensing)
Outputs: 2 wires
Maximum cable length: 100 meters



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DRAWING NAME:
Plumbing
Leak Detection

DRAWING STATUS:		SCALE:	STATUS:
Revision 1		**NTS**	**S2**
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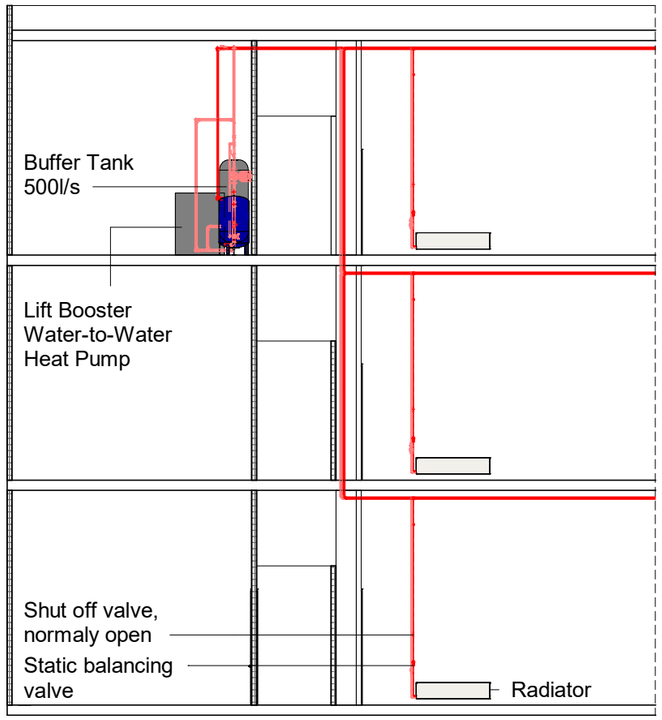
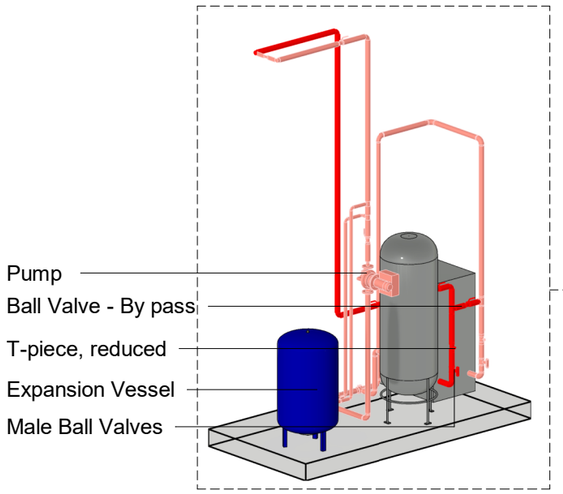
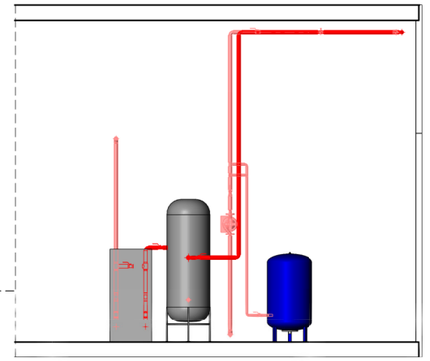
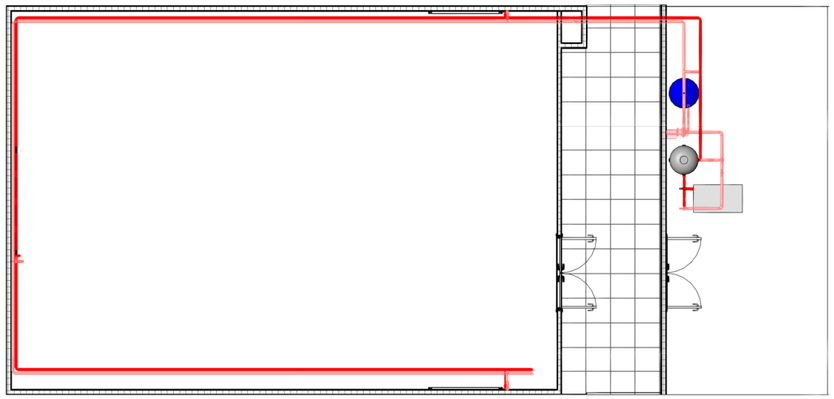


1 Section - Heating System

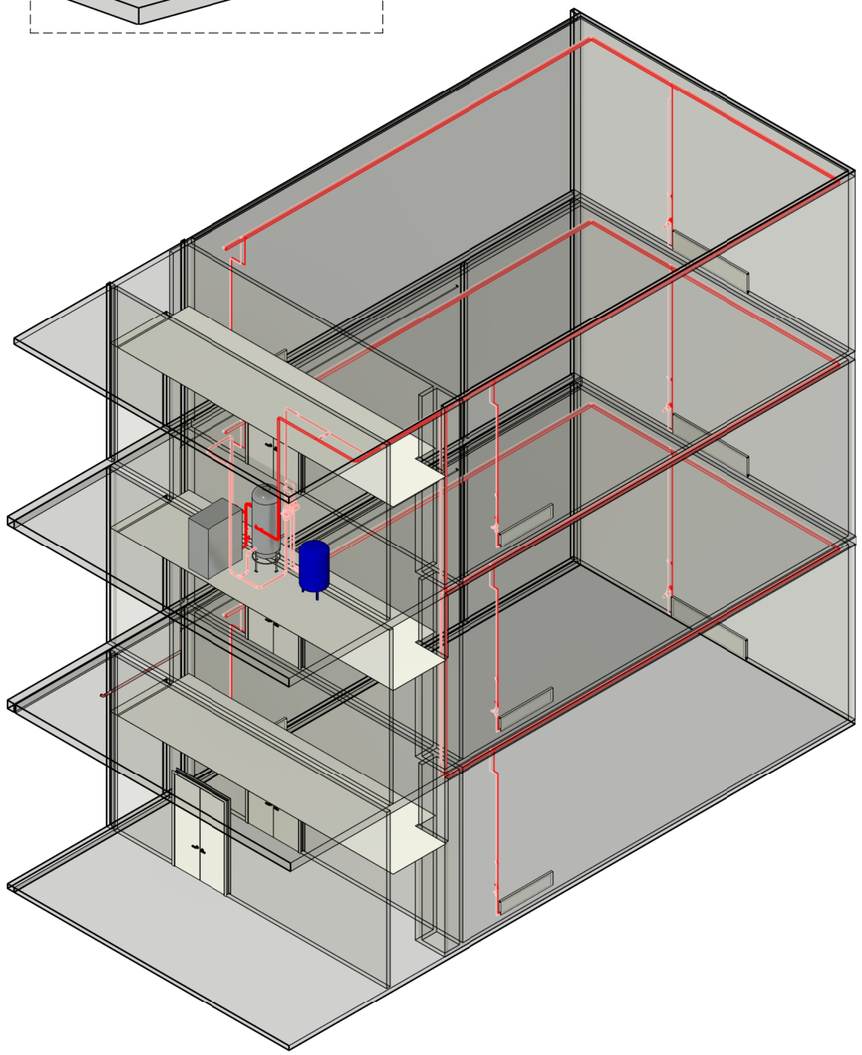




2 Section - Front View Heating System



A Floor Plan - Heating System



3D 3D View - Heating System

Notes

1. Final locations of installation accessories to be reviewed with specialist subcontractor.
2. All work shall be carried out according to prevailing project specification, to material/equipment technical specifications, schedules, data sheets and details.

Heating General Notes:

1. Assess the capacity of the walls to support the weight of the radiators and thermal fluid, ensuring that they are securely fixed.
2. Avoid heat recirculation zones that could compromise the cooling of the servers.
3. Thermal sizing (EN 442-1:2014) - Calculate the thermal power required according to the room's thermal load, ensuring that the radiators meet the room's demand.
4. Use EN 12831-1 to determine the thermal load of the space and EN 15316-1 to optimize the thermal fluid flow.
5. Use copper or PEX-AL-PEX, ensuring low heat loss and corrosion resistance.
6. Install TRV (Thermostatic Radiator Valve) thermostatic valves for precise temperature adjustment on each radiator.
7. Apply PTFE tape to hydraulic connections for efficient sealing and to prevent infiltration.
8. Implement pressure relief valves (PRV) and correctly sized expansion tanks to compensate for thermal variations.
9. Equip radiators with automatic air bleed valves to eliminate bubbles and ensure efficient circulation of the thermal fluid.
10. Electrical radiators must be properly grounded and the circuits protected by circuit breakers sized to prevent overloading.
11. The system must be connected to a Building Management System (BMS) for remote control and dynamic temperature adjustments.
12. The thermal insulation of the pipes must follow the criteria: 20 mm for DN15 to DN35 and 30 mm for DN35 to DN65, using high-efficiency materials (DIN 4753), such as elastomeric foam or mineral wool, to minimize thermal losses.
13. Radiators should be installed in accessible locations, allowing for inspections and repairs without complex dismantling.

Rev	Date	Description	Sign.	Veri.
P02	04.04.2025	Revision 1	JR	JM
P01	11.11.2024	Issued for Information	TP	JM

DESIGN & BUILD CONTRACTOR:

CTS Group

CTS GROUP PARTNER:

BIMMS

PROJECT NAME:

Execution Design and Engineering Requirements

DRAWING NAME:

Plumbing
Heating System

DRAWING STATUS:	SCALE:	STATUS:
Revision 1	**NTS**	**S2**

DATE CREATED:	LAST REV. DATE:	SIGNED:	CONTROL:
11.11.2024	**04.04.2025**	**JR**	**JM**

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RDC0000-BMS-ZZ-ZZ-DR-H-91586	**A3**	**P02**

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