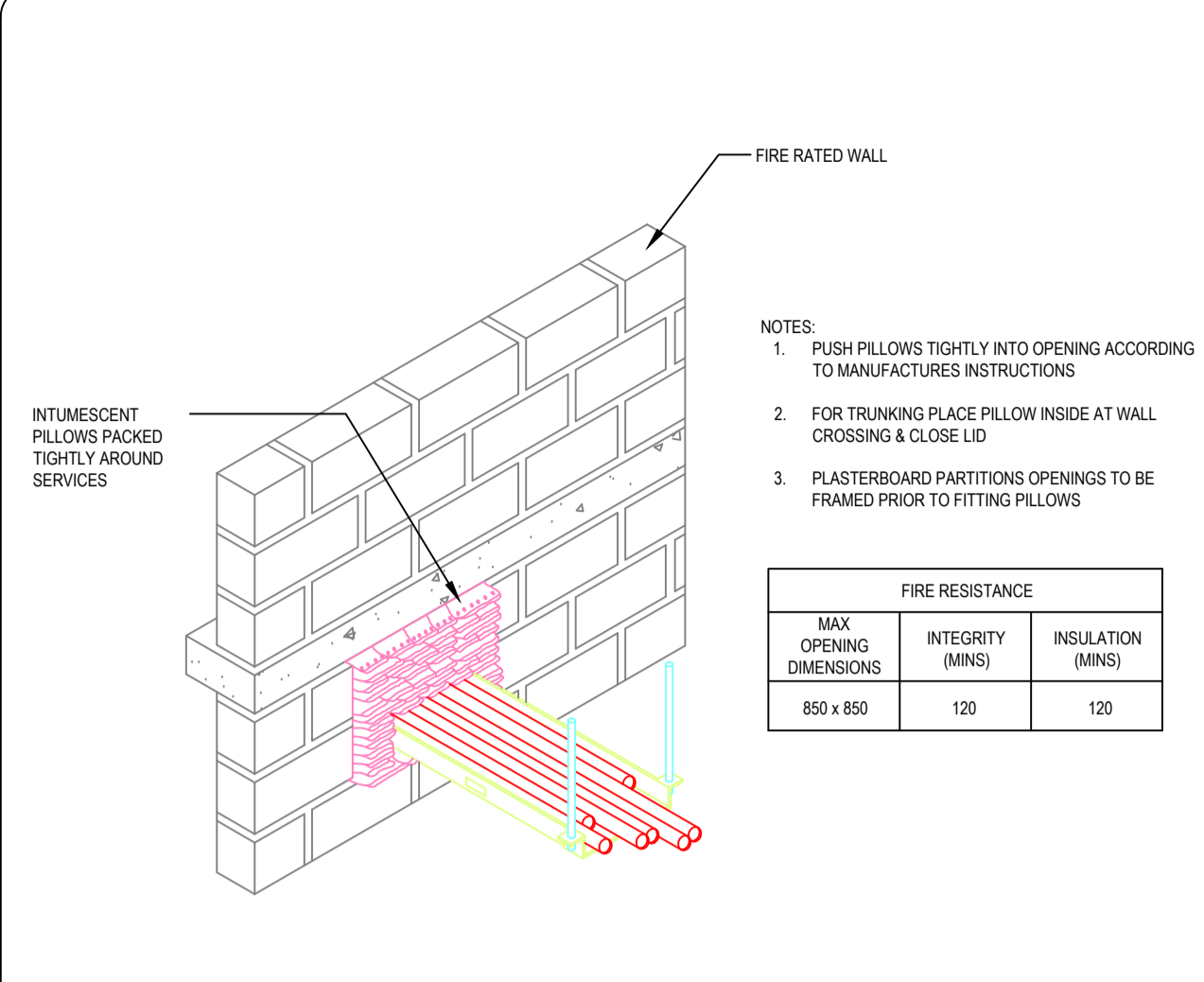
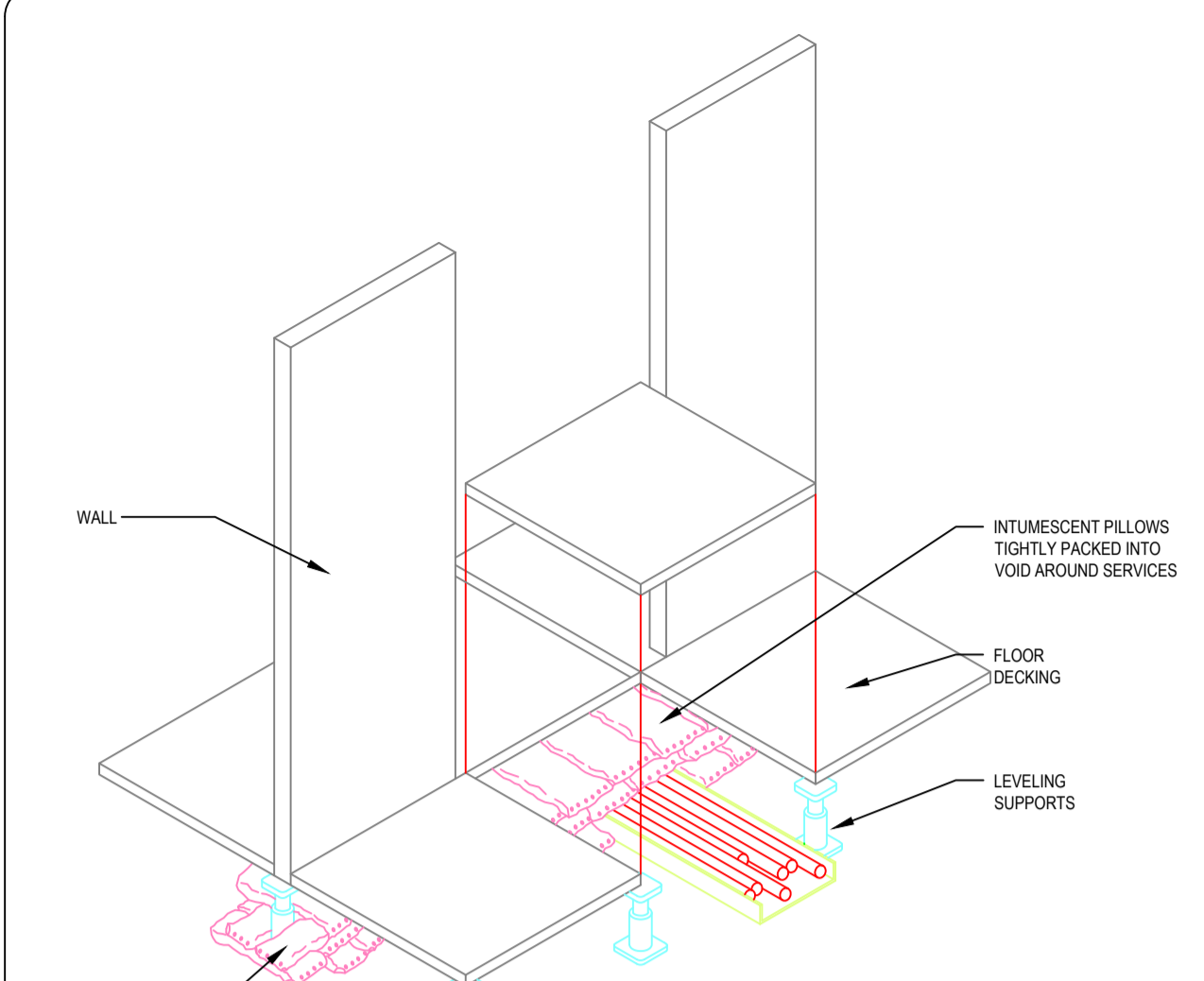


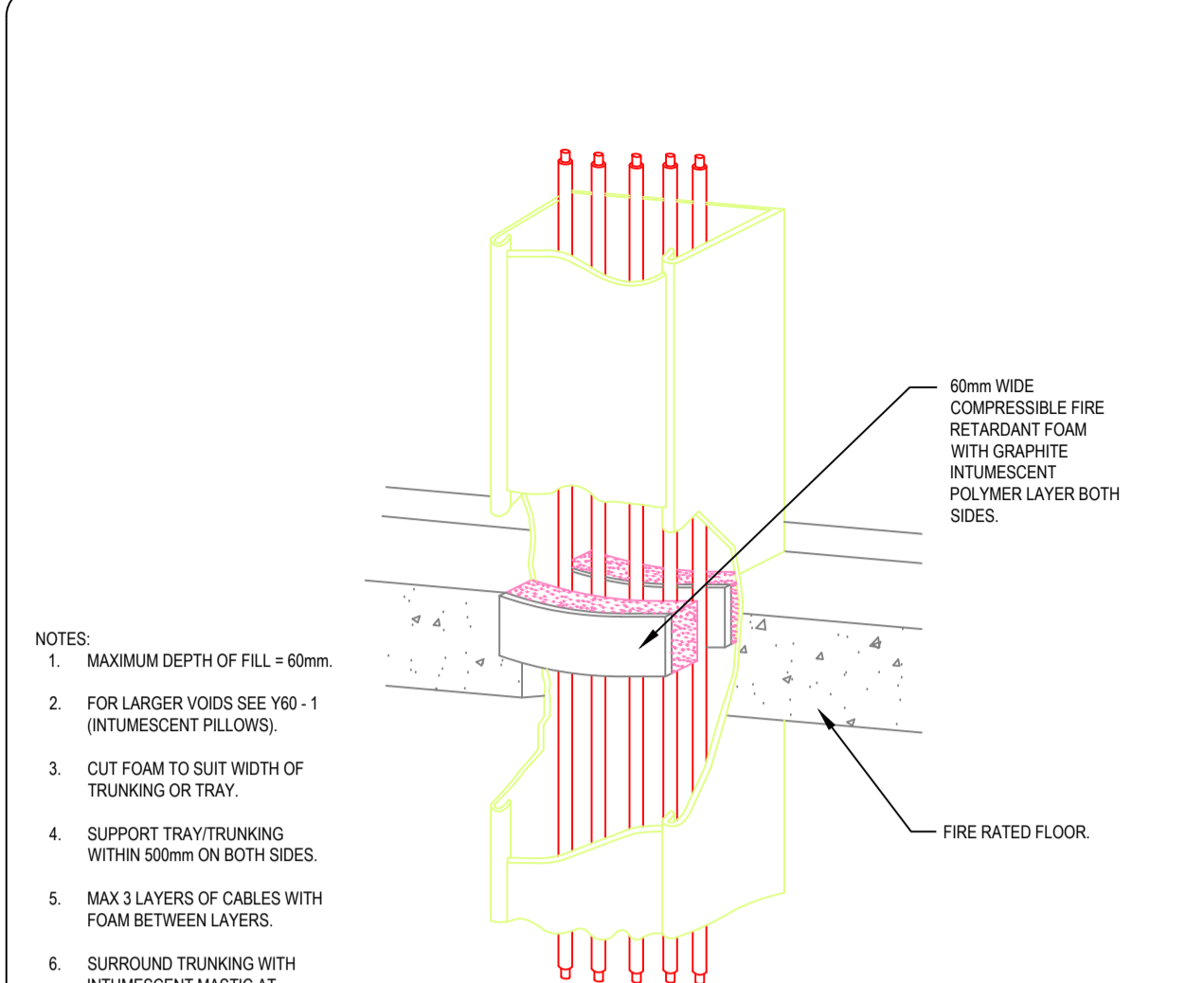
Y60-01 VERTICAL CABLE TRAY/BASKET THROUGH FIRE RATED FLOORS



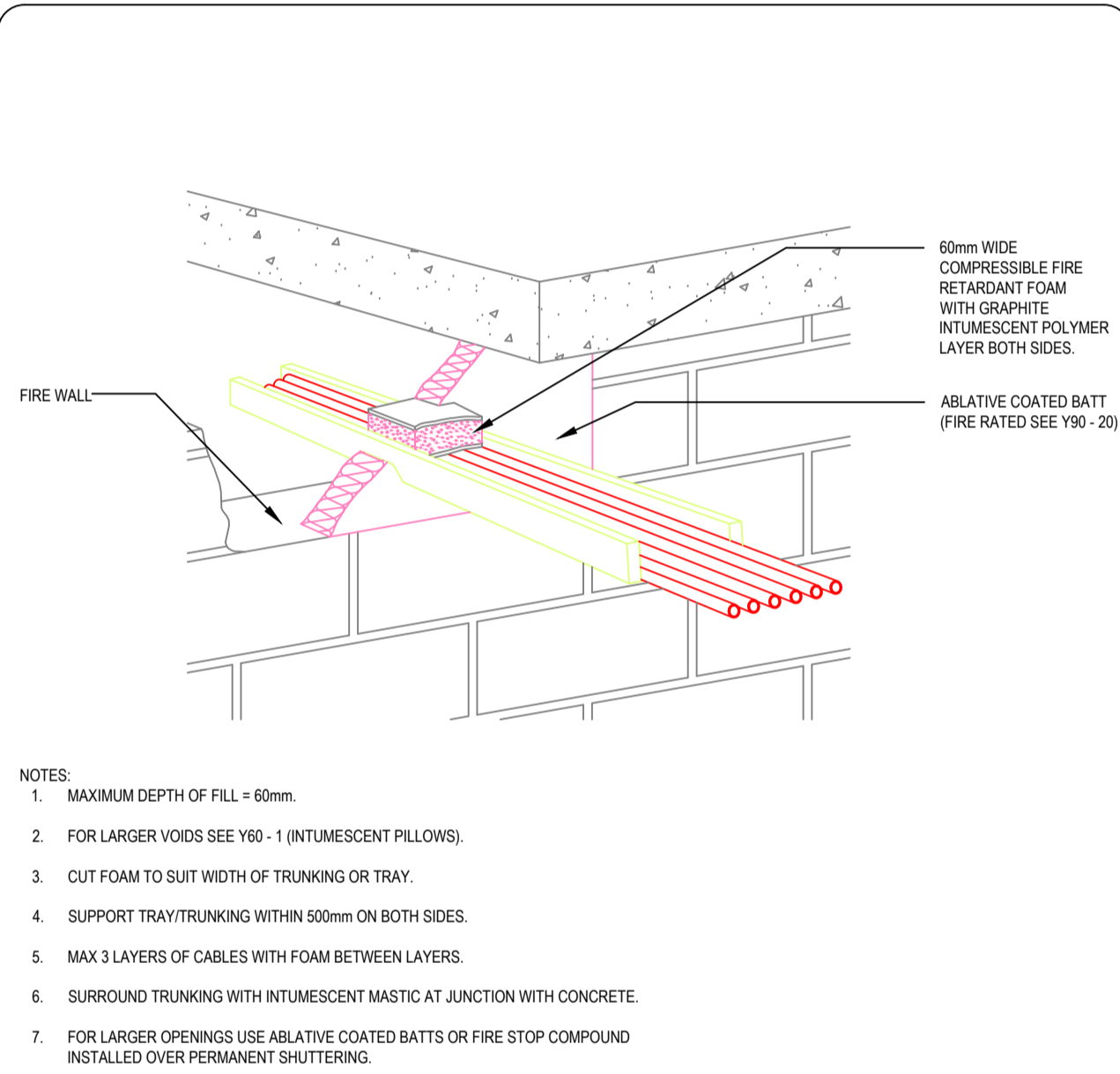
Y60-02 HORIZONTAL CABLE TRAY/BASKET THROUGH FIRE RATED WALLS



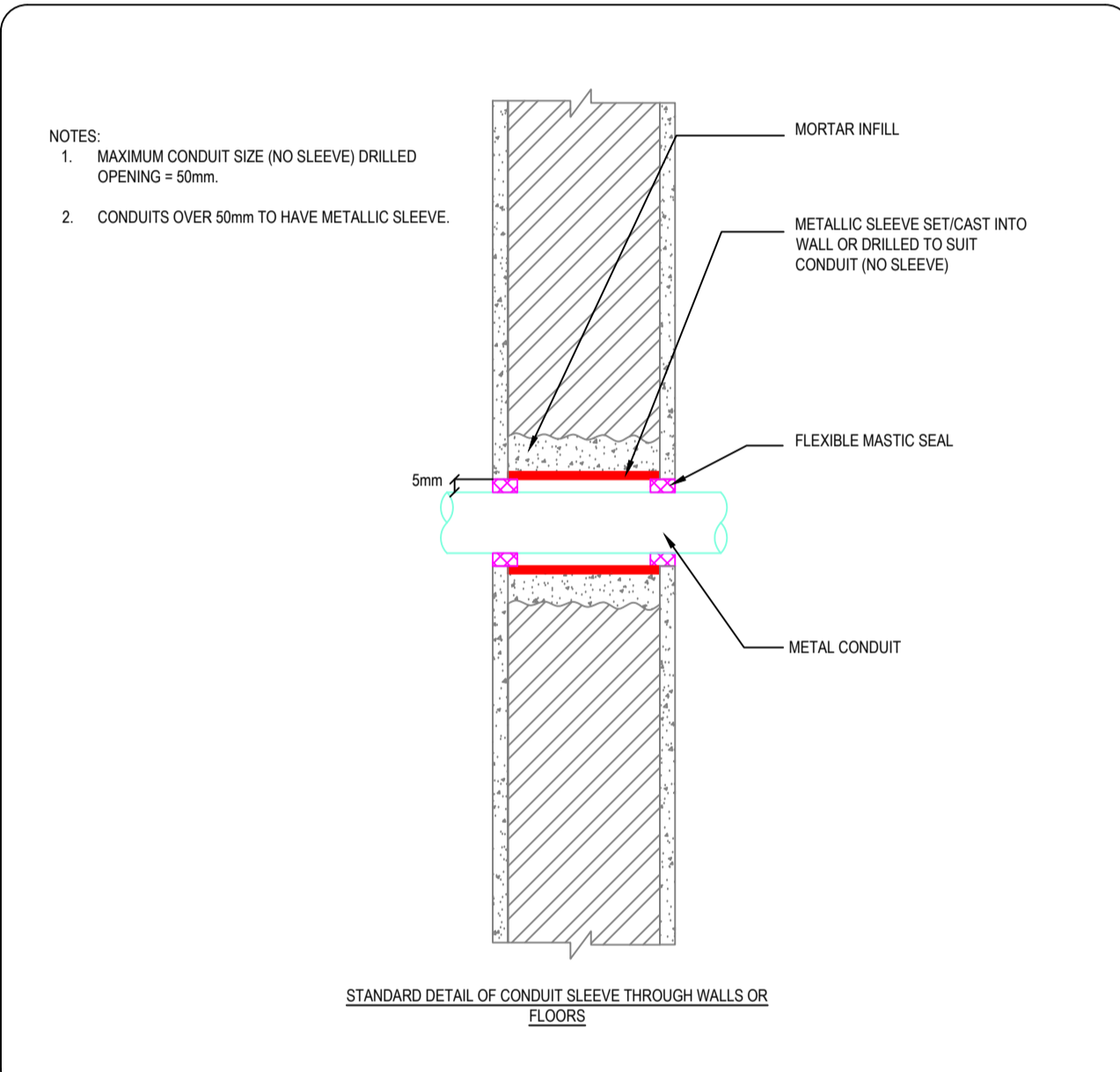
Y60-03 CAVITY BARRIER UNDER RAISED FLOORS



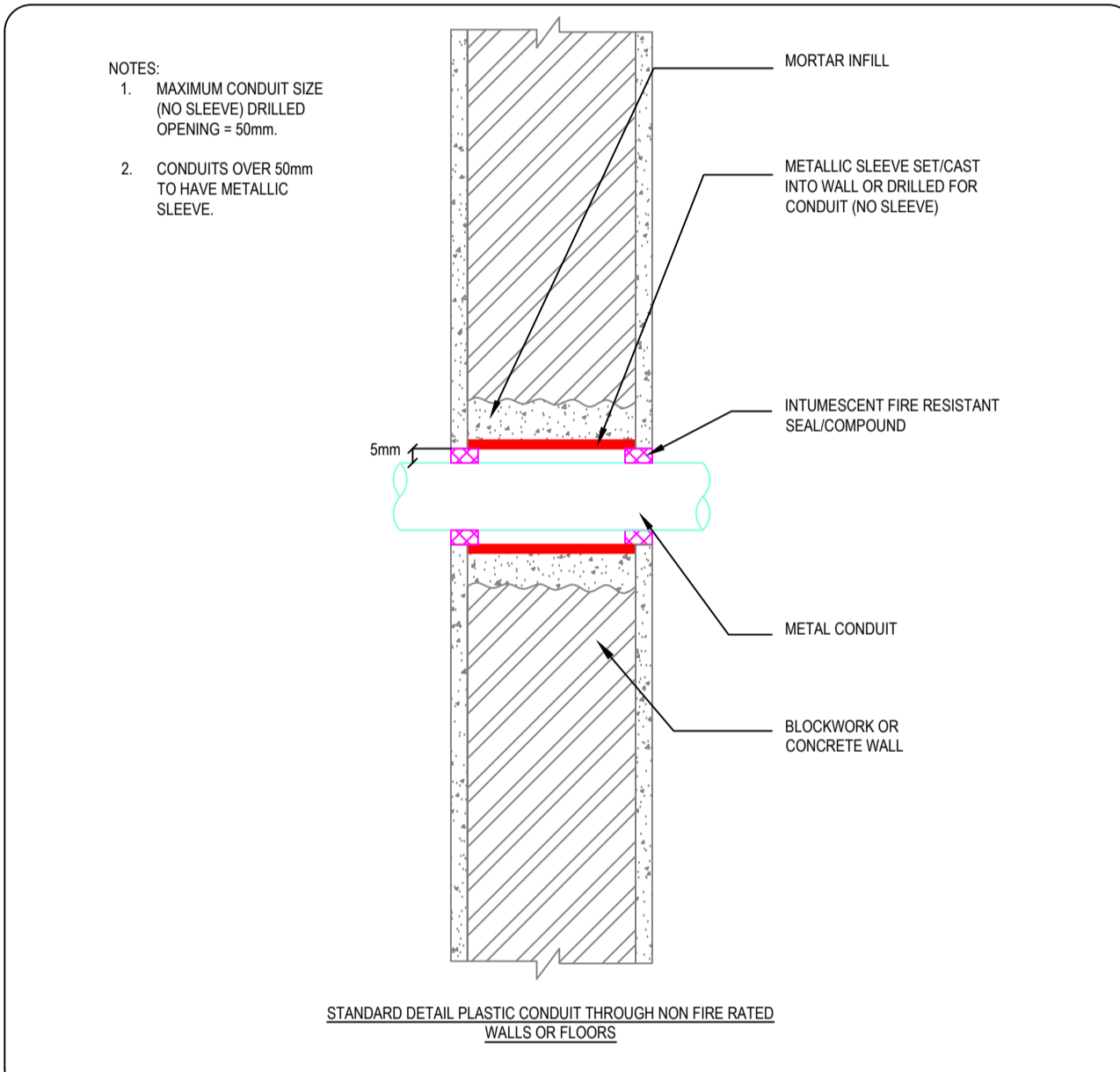
Y60-04 VERTICAL TRUNKING/TRAY - FIRE STOP



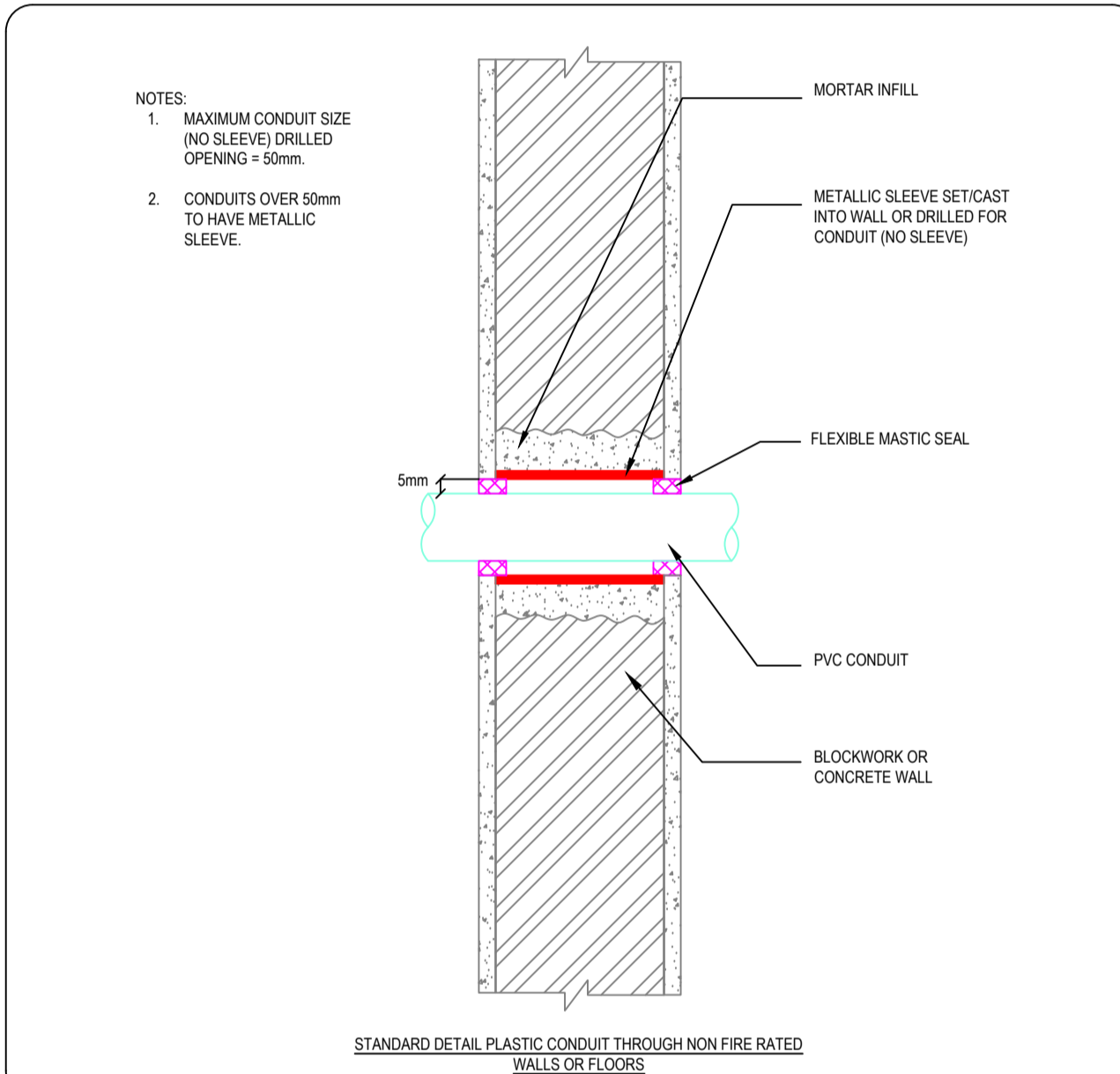
Y60-6 HORIZONTAL TRUNKING/TRAY - FIRE STOP



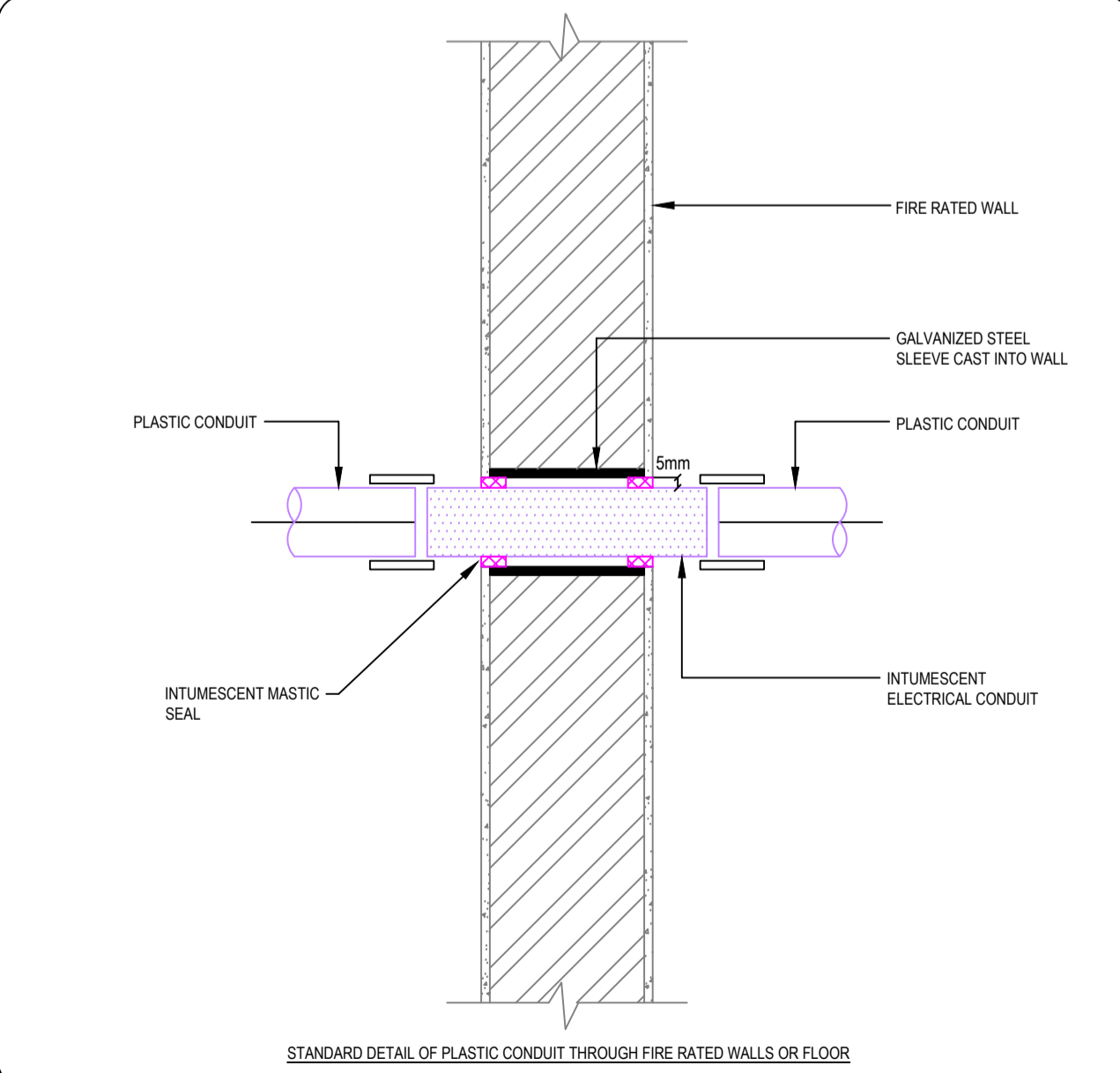
Y60-6 METAL CONDUIT THROUGH NON-FIRE RATED WALLS OR FLOORS



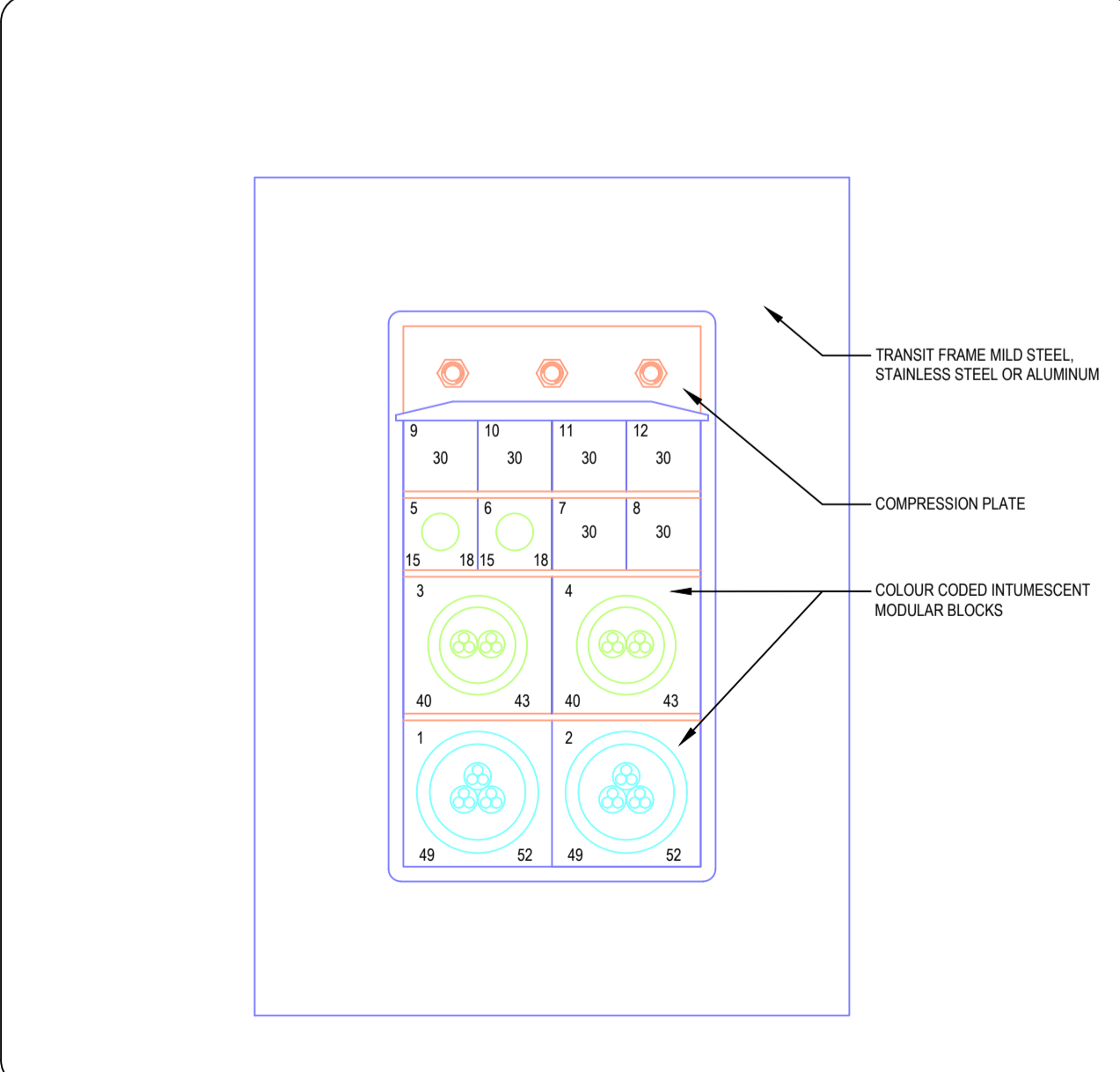
Y60-07 METAL CONDUIT THROUGH FIRE RATED WALLS OR FLOORS



Y60-08 PLASTIC CONDUIT THROUGH NON - FIRE RATED WALLS OR FLOORS



Y60-09 PLASTIC CONDUIT THROUGH FIRE RATED WALLS OR FLOORS



Y60-10 MULTI CABLE TRANSIT THROUGH FIRE RATED WALLS OR FLOORS

DO NOT SCALE THIS DRAWING.
HEALTH AND SAFETY INFORMATION

IN ADDITION TO THE HAZARDS/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING CONSTRUCTION:

1. WORKING AT HEIGHT
2. LIFTING HEAVY EQUIPMENT
3. WORKING ADJACENT TO POTENTIALLY LIVE SERVICES
4. HANDLING CHEMICAL PRODUCTS
5. WORKING IN CONFINED SPACES
6. PRESENCE OF ASBESTOS

MAINTENANCE/CLEANING/OPERATION:

1. HANDLING CHEMICAL PRODUCTS
2. WORKING AT HEIGHT
3. WORKING ADJACENT TO POTENTIALLY LIVE SERVICES

DECOMMISSIONING/DEMOLITION:

1. PRESENCE OF LIVE SERVICES
2. PRESENCE OF ASBESTOS
3. WORKING AT HEIGHT
4. LIFTING HEAVY EQUIPMENT
5. ALWAYS SAFELY ISOLATE BEFORE COMMENCING ANY WORKS

Notes
ADD NOTES

P01 TENDER	11/04/2017	AW	LH
Rev	Description	Date	Dm Chd

TENDER

Status of drawing

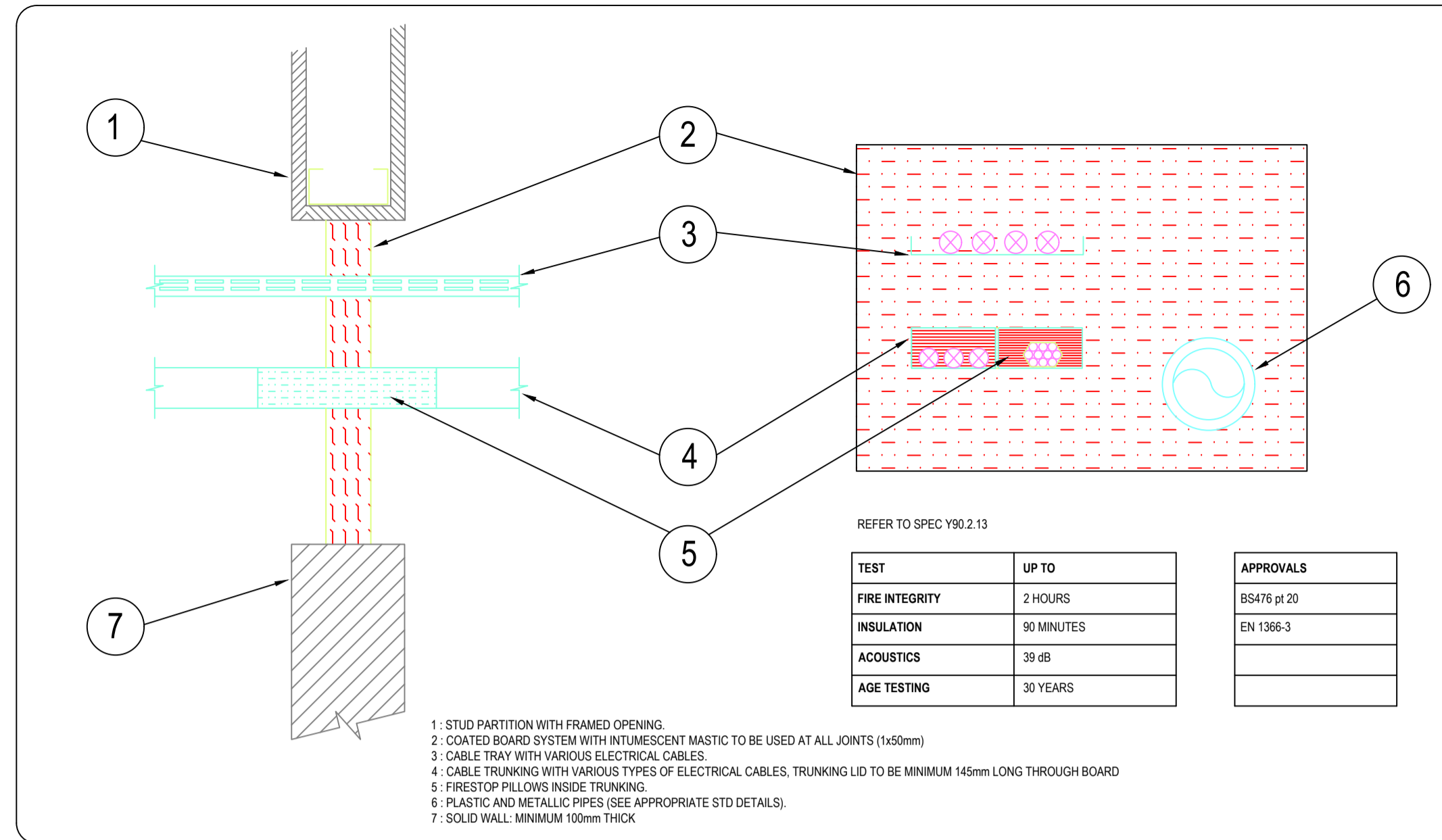
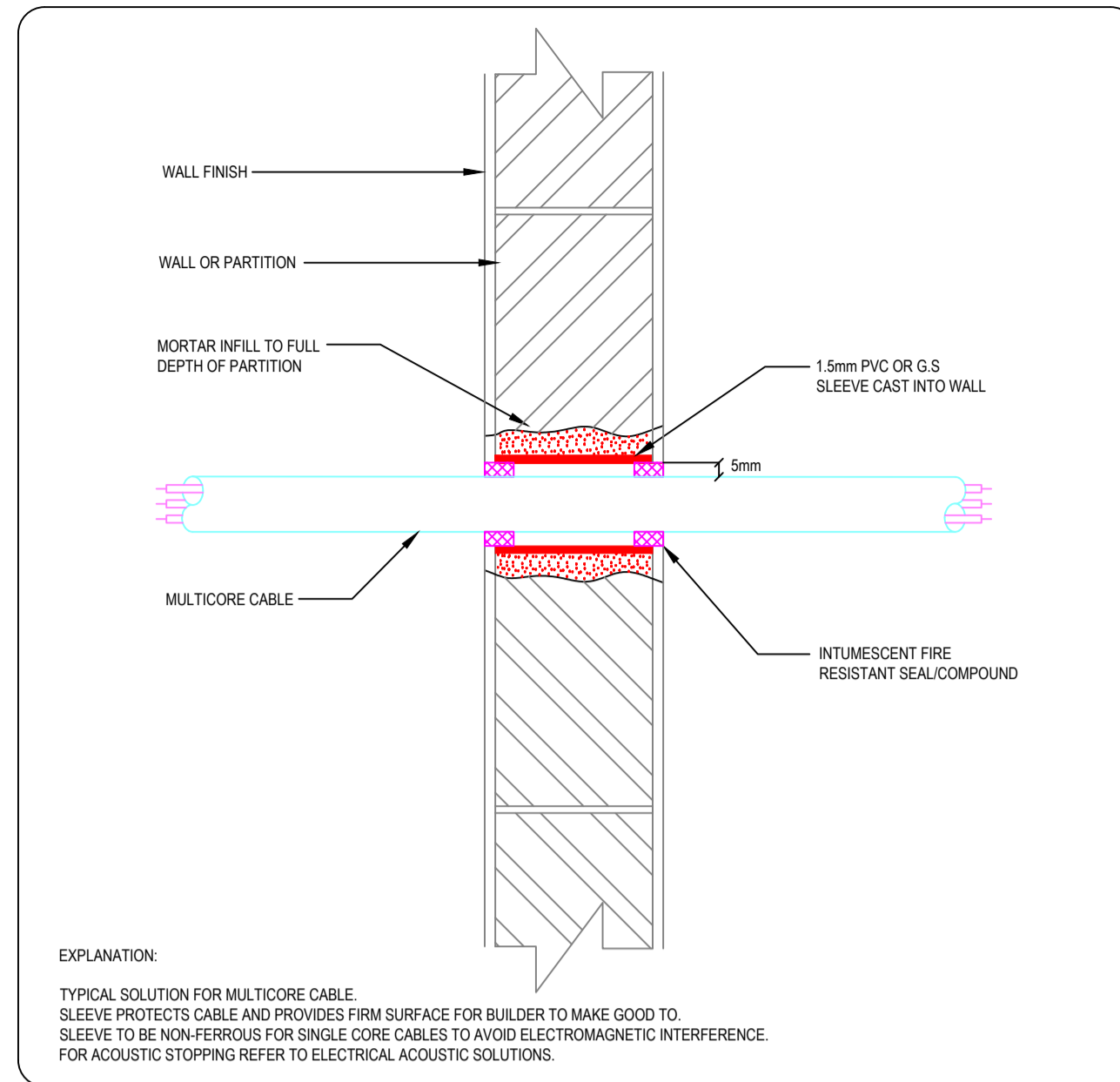
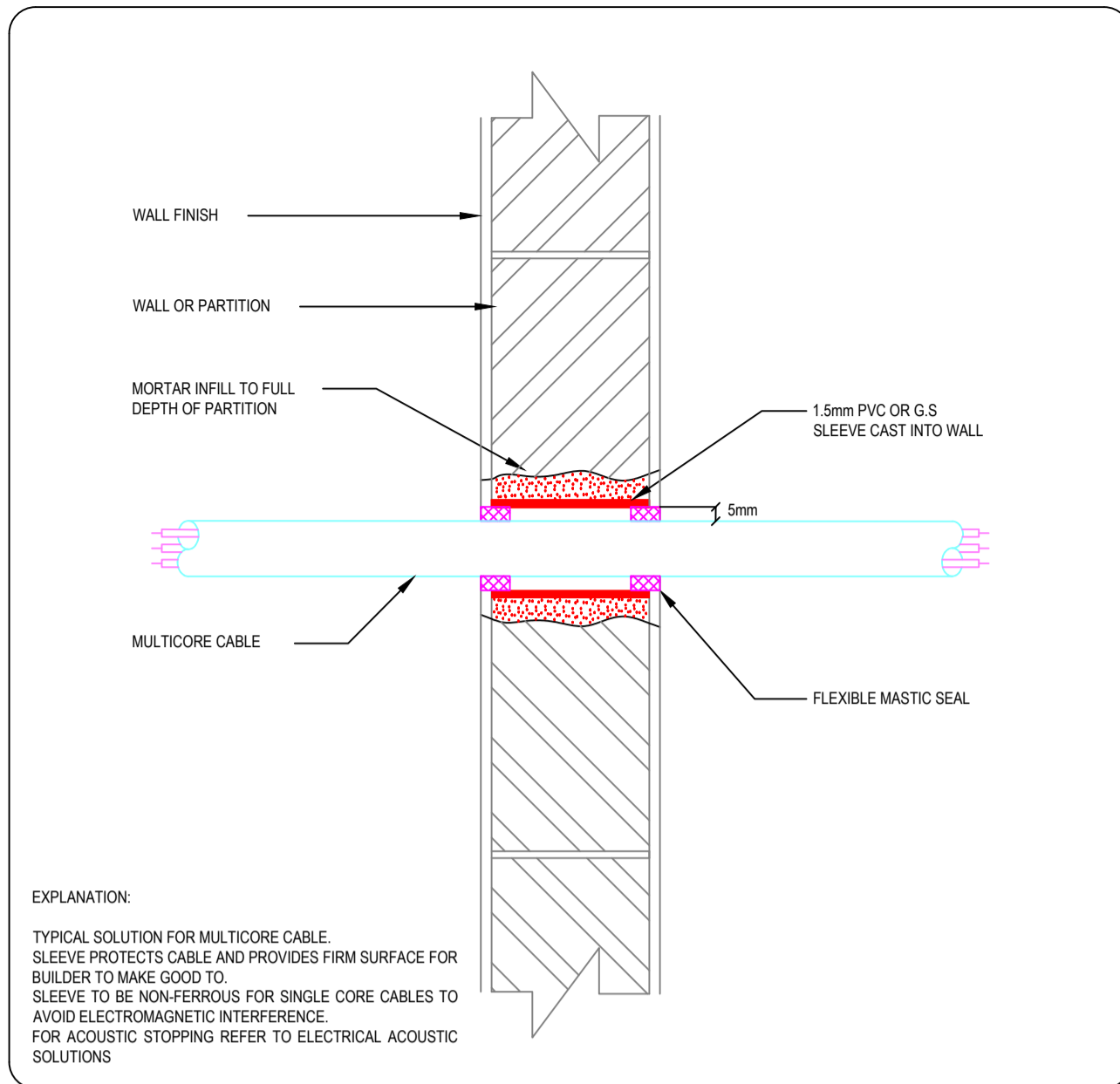
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Project **BURO HAPPOLD STANDARD DETAILS**
Drg Title **Electrical Services Penetration Details**
Sheet 1

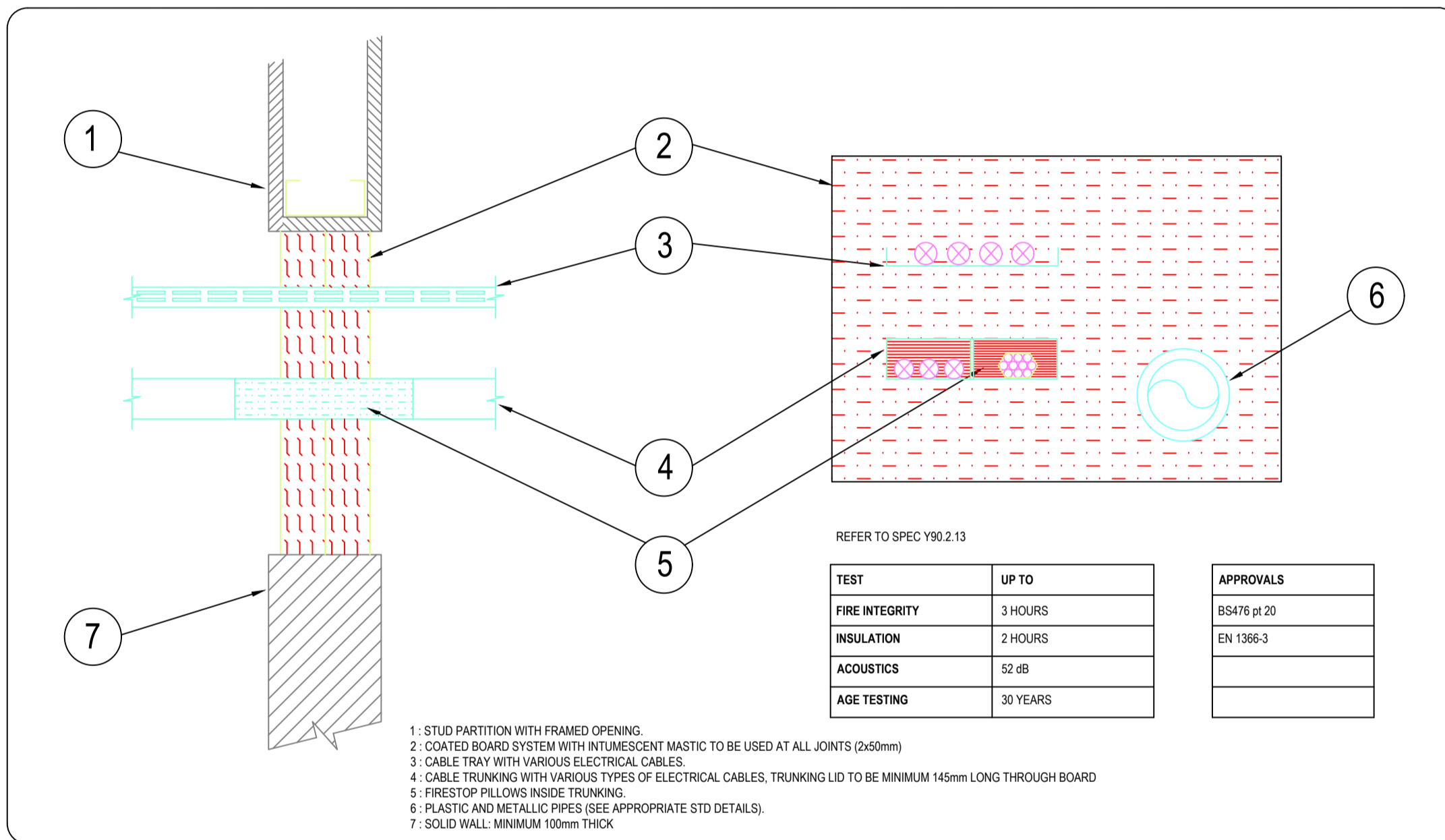
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Drawn by AW	Drawing No. 208W-BHM-SW-XX-DR-E-XX-5001
Checked by LH	Rev P01
Date April 2017	



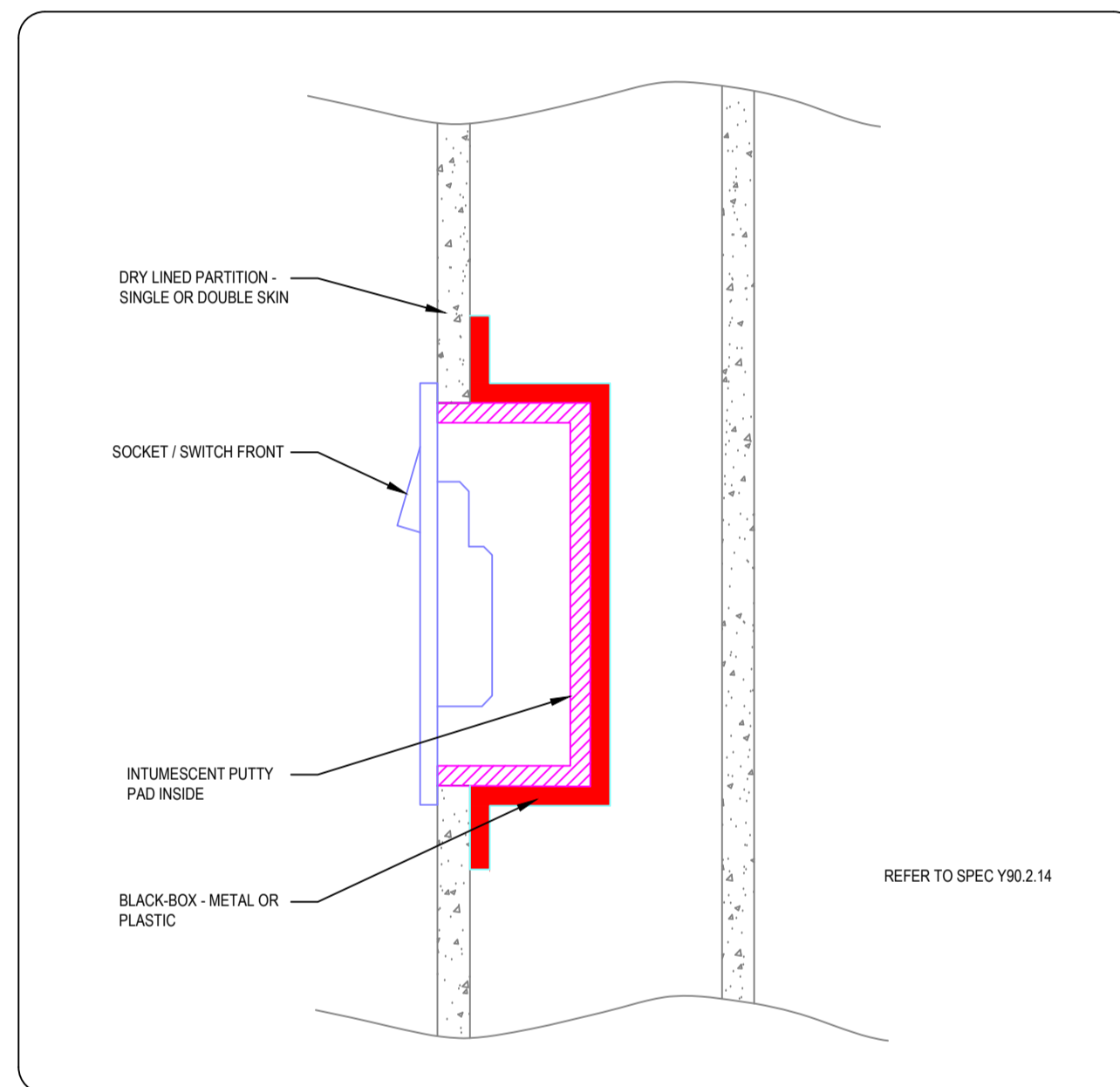
Y61-01 CABLE PENETRATION THROUGH NON-FIRE RATED WALLS & FLOORS

Y61-02 CABLE PENETRATION THROUGH FIRE RATED WALLS & FLOORS

Y90-20 MIXED SERVICES PENETRATION THROUGH FIRE WALL USING FIRE STOP & ACOUSTIC BOARD (SINGLE BOARD)



Y90-21 MIXED SERVICES PENETRATION THROUGH FIRE WALL USING FIRE STOP & ACOUSTIC BOARD (DOUBLE BOARD)



Y90-22 STUD PARTITIONS - FIRE RATING OF SOCKETS & SWITCHES

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 - LIFTING HEAVY EQUIPMENT
 - WORKING ADJACENT TO POTENTIALLY LIVE SERVICES
 - HANDLING CHEMICAL PRODUCTS
 - WORKING IN CONFINED SPACES
 - PRESENCE OF ASBESTOS

MAINTENANCE/CLEANING/OPERATION:

- HANDLING CHEMICAL PRODUCTS
- WORKING AT HEIGHT
- WORKING ADJACENT TO POTENTIALLY LIVE SERVICES

DECOMMISSIONING/DEMOLITION:

- PRESENCE OF LIVE SERVICES
- PRESENCE OF ASBESTOS
- WORKING AT HEIGHT
- LIFTING HEAVY EQUIPMENT
- ALWAYS SAFELY ISOLATE BEFORE COMMENCING ANY WORKS

Notes

ADD NOTES

P01 TENDER	11/04/2017	AW	LH
Rev	Description	Date	Dm Ch'd

TENDER

Status of drawing

BURO HAPPOLD
ENGINEERING

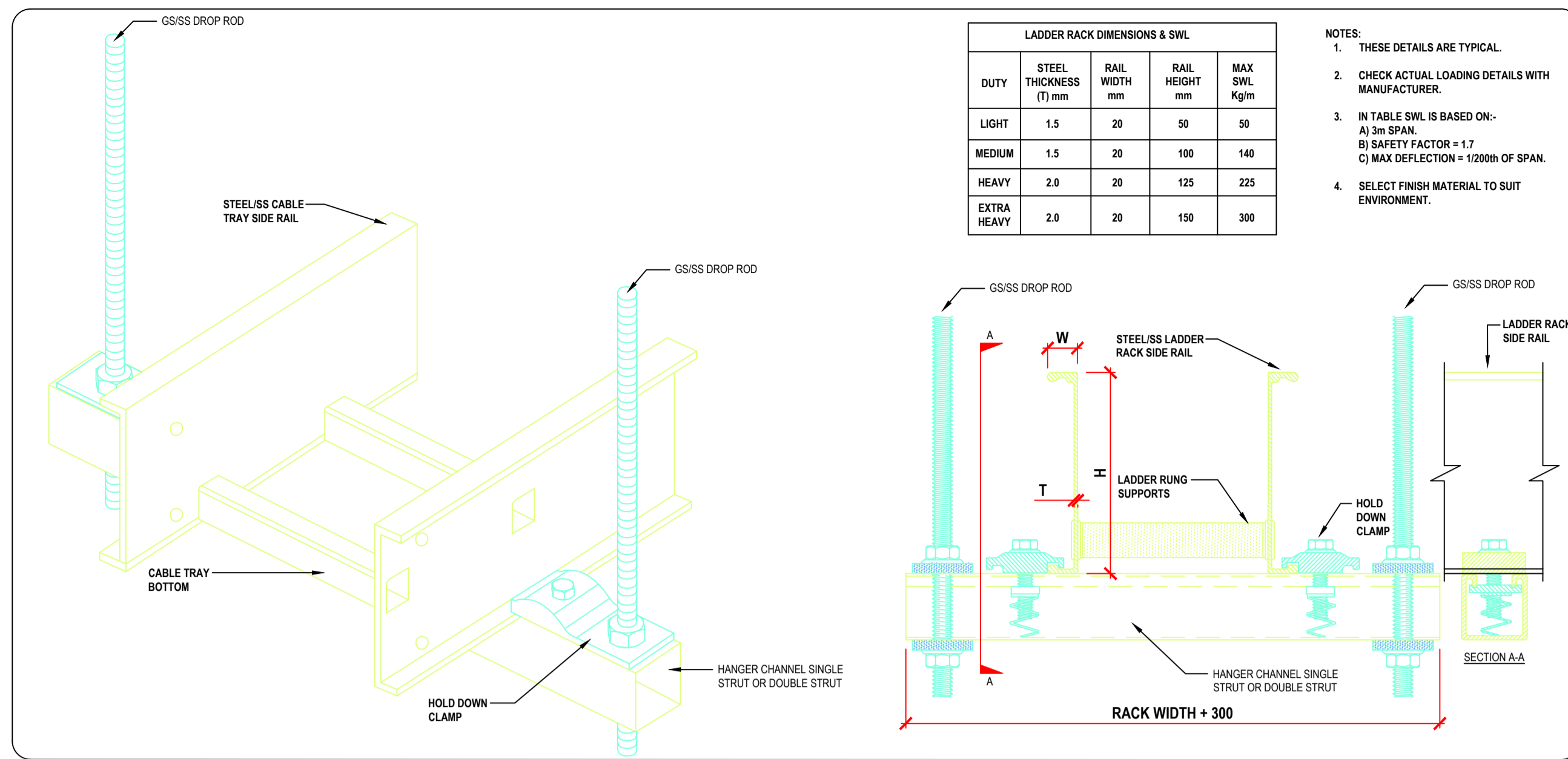
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Architect
Project **BURO HAPPOLD STANDARD DETAILS**
Drg Title **Electrical Services Penetration Details Sheet 2**

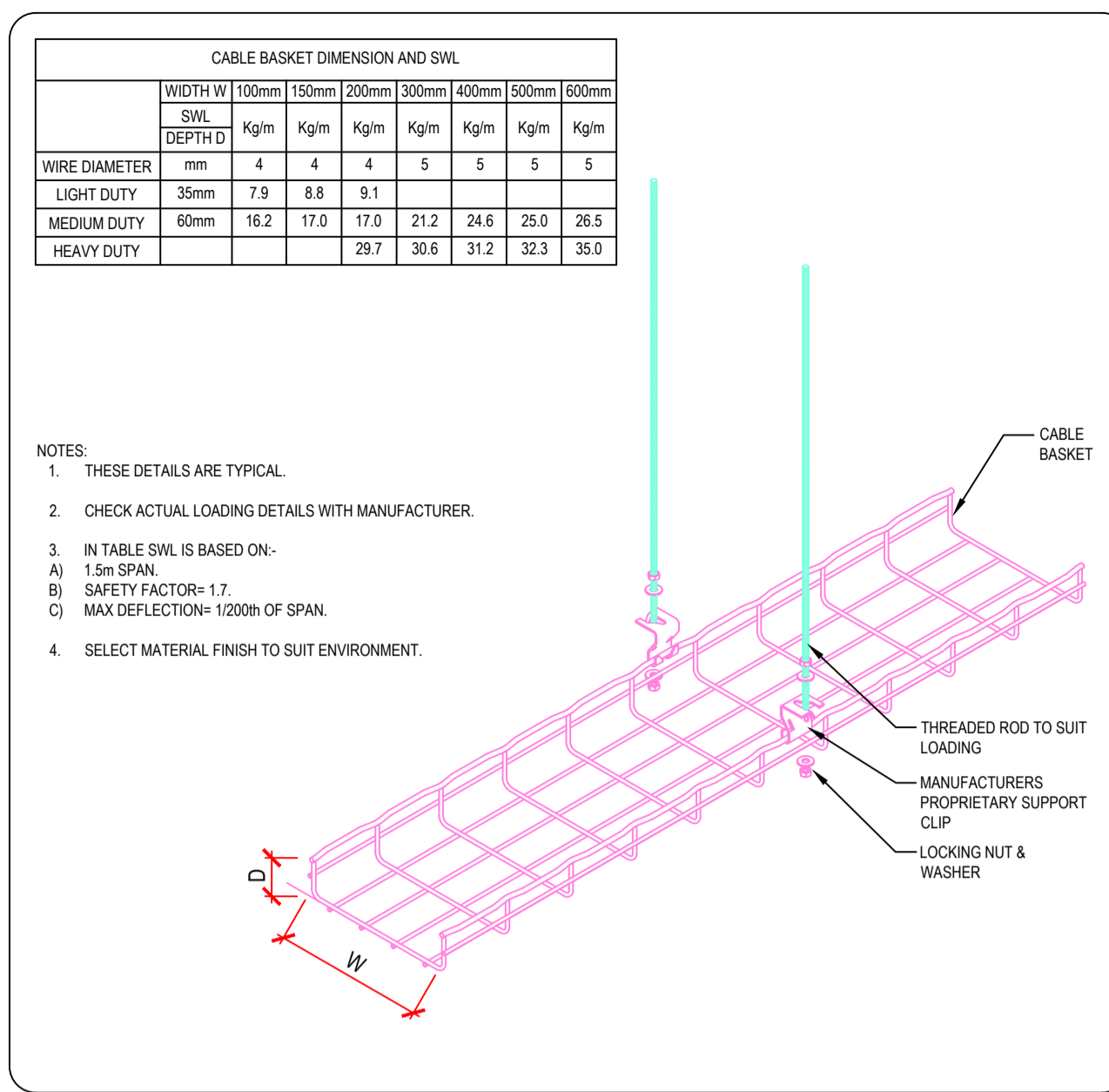
Scales: A1 N.T.S.	Job No. 035833
Drawn by AW	Drawing No. 208W-EM-SW-XX-DR-E-XX-5002
Checked by LH	Rev P01
Date April 2017	

D:\CS\BuroHappold\StandardDetails\Electrical\BMS\SW\XX-DR-E-XX-5002 - Electrical Services Penetration Details - Sheet 2.dwg



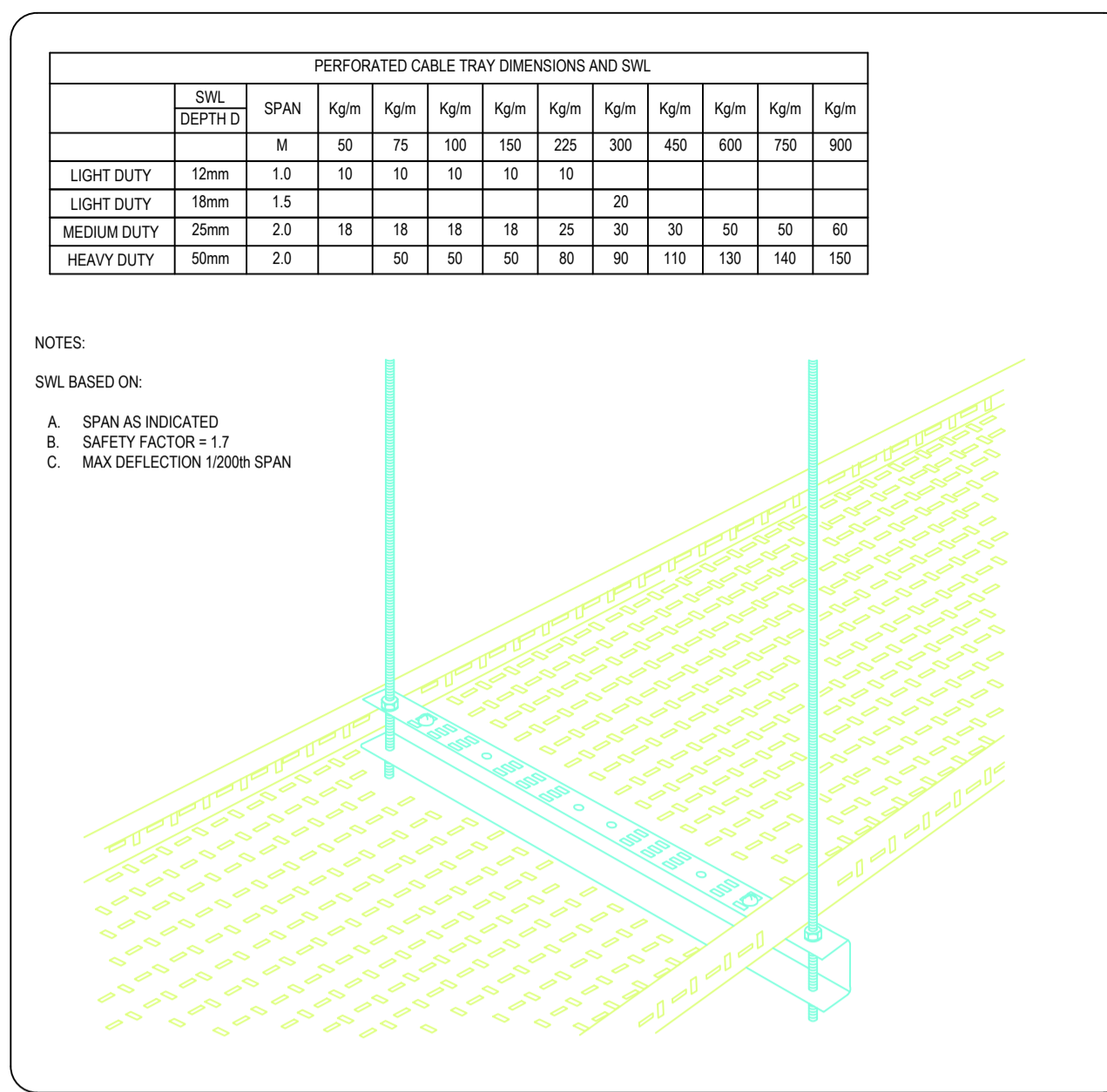
DUTY	STEEL THICKNESS (T) mm	RAIL WIDTH mm	RAIL HEIGHT mm	MAX SWL Kg/m
LIGHT	1.5	20	50	50
MEDIUM	1.5	20	100	140
HEAVY	2.0	20	125	225
EXTRA HEAVY	2.0	20	150	300

- NOTES:
1. THESE DETAILS ARE TYPICAL.
 2. CHECK ACTUAL LOADING DETAILS WITH MANUFACTURER.
 3. IN TABLE SWL IS BASED ON-
A) 3m SPAN.
B) SAFETY FACTOR = 1.7.
C) MAX DEFLECTION = 1/200th OF SPAN.
 4. SELECT FINISH MATERIAL TO SUIT ENVIRONMENT.



WIRE DIAMETER	WIDTH W								
	100mm	150mm	200mm	300mm	400mm	500mm	600mm	800mm	
LIGHT DUTY	35mm	7.9	8.8	9.1	17.0	21.2	24.6	25.0	26.5
MEDIUM DUTY	60mm	16.2	17.0	17.0	21.2	24.6	25.0	26.5	
HEAVY DUTY					29.7	30.6	31.2	32.3	35.0

- NOTES:
1. THESE DETAILS ARE TYPICAL.
 2. CHECK ACTUAL LOADING DETAILS WITH MANUFACTURER.
 3. IN TABLE SWL IS BASED ON-
A) 1.5m SPAN.
B) SAFETY FACTOR = 1.7.
C) MAX DEFLECTION = 1/200th OF SPAN.
 4. SELECT MATERIAL FINISH TO SUIT ENVIRONMENT.



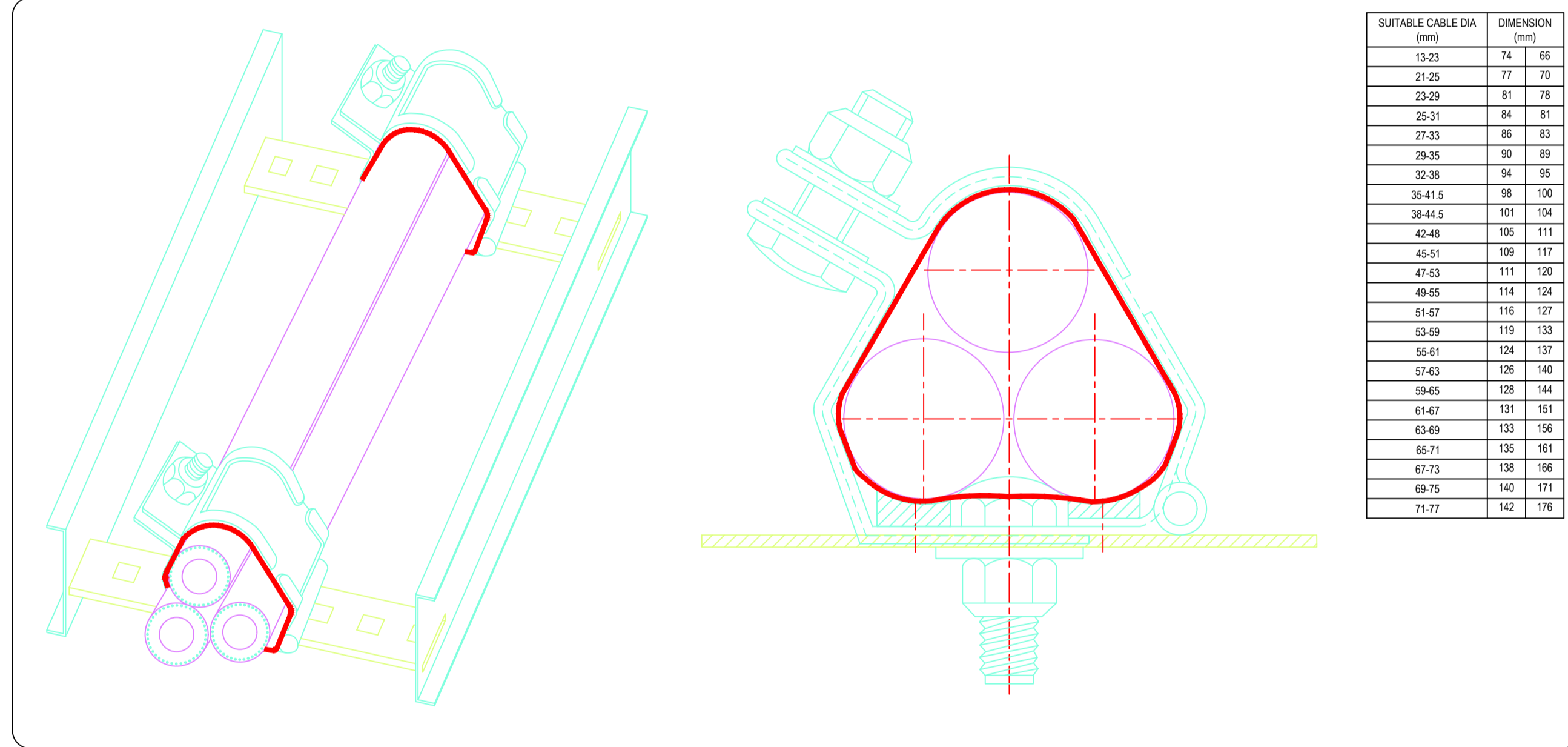
WIRE DIAMETER	SPAN												
	50	75	100	150	225	300	450	600	750	900	1200	1500	
LIGHT DUTY	12mm	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
MEDIUM DUTY	18mm	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
HEAVY DUTY	25mm	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0

- NOTES:
- SWL BASED ON:
- A. SPAN AS INDICATED
 - B. SAFETY FACTOR = 1.7
 - C. MAX DEFLECTION 1/200th SPAN

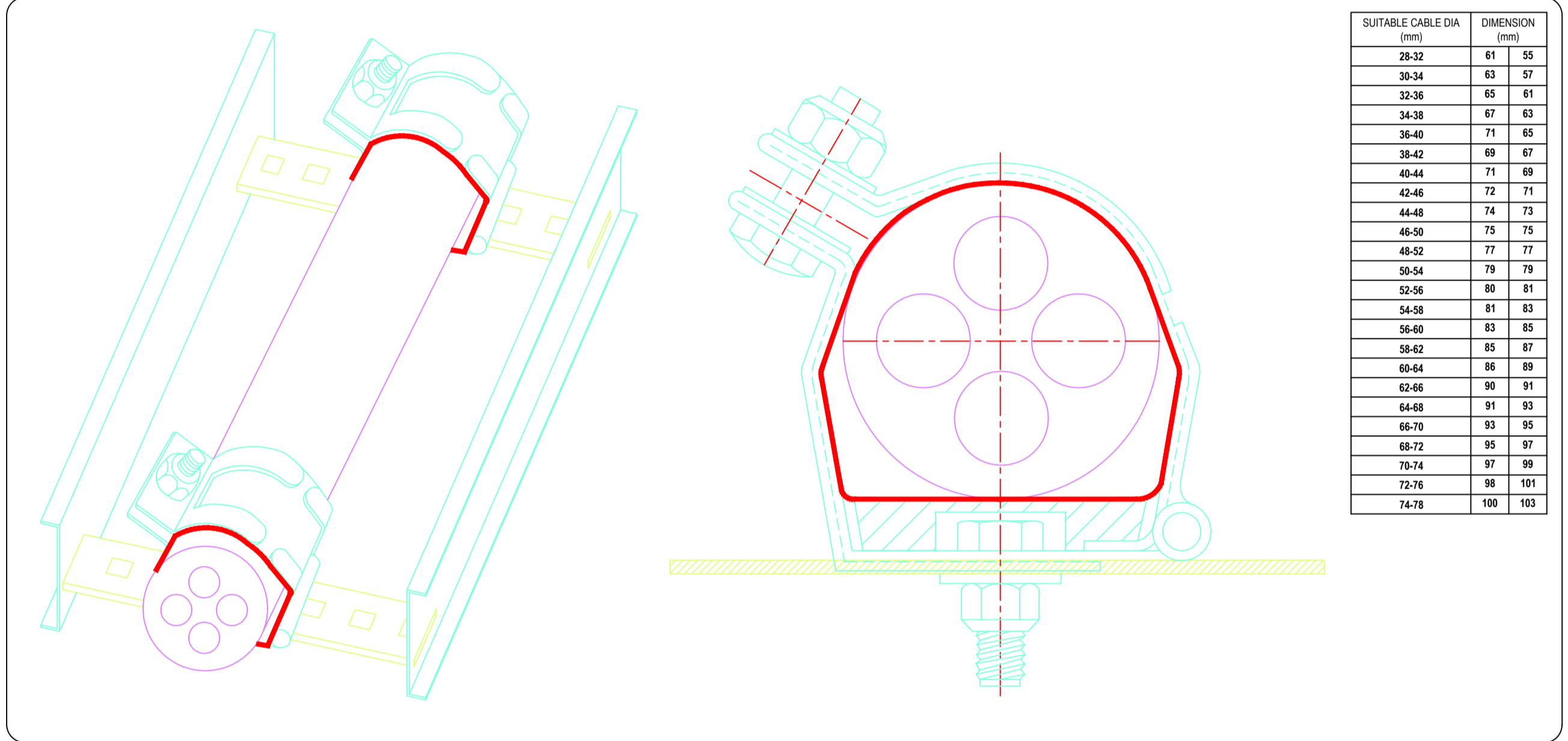
Y63-1 LADDER RACK SUPPORT SECTION & 3D VIEW

Y63-2 CABLE BASKET SUPPORT

Y63-3 PERFORATED CABLE TRAY SUPPORT



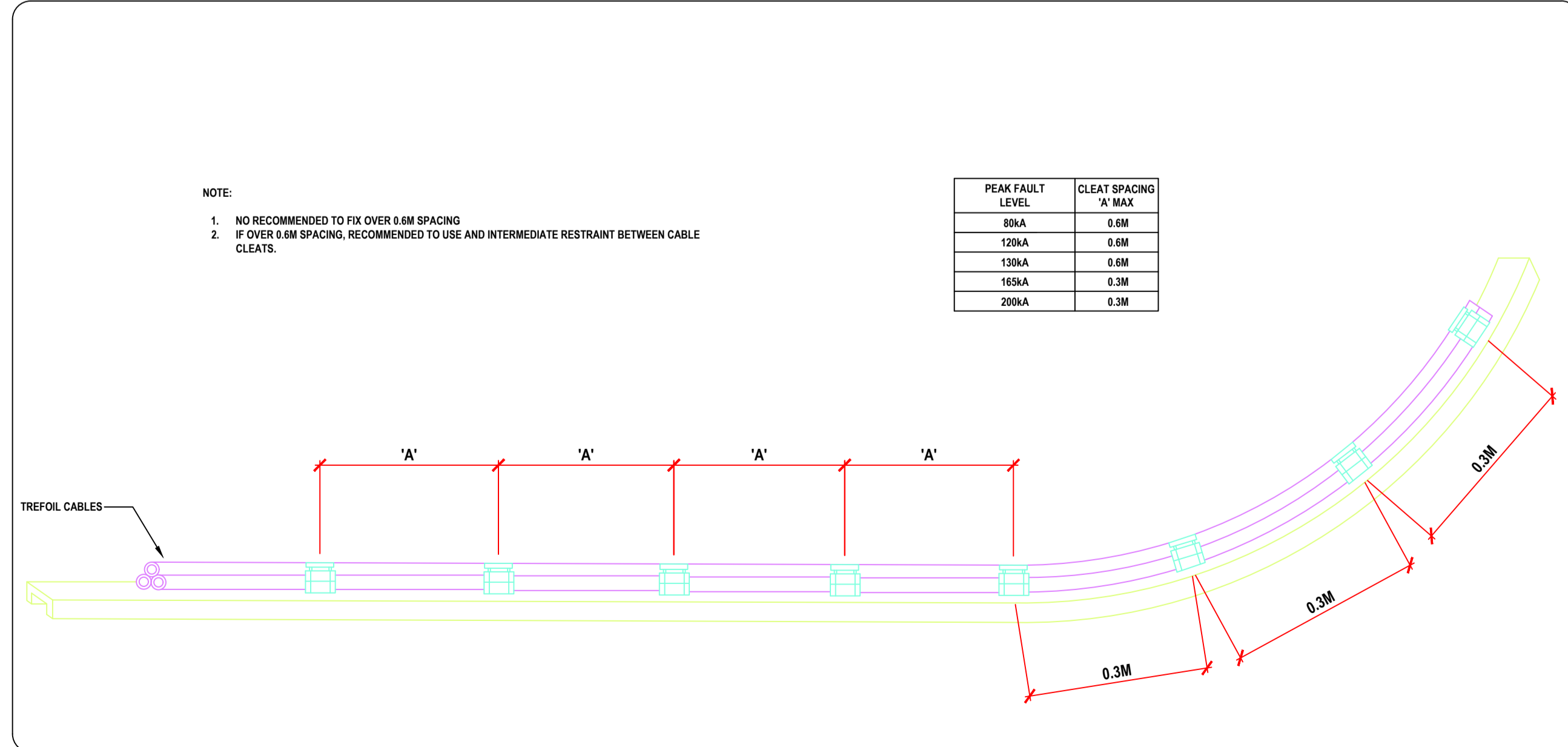
SUITABLE CABLE DIA (mm)	DIMENSION (mm)	
13.23	74	66
21.25	77	70
23.29	81	78
25.31	84	81
27.33	86	83
29.35	90	89
32.38	94	95
35.41.5	98	100
38.44.5	101	104
42.48	105	111
45.51	109	117
47.53	111	120
49.55	114	124
51.57	116	127
53.59	119	133
55.61	124	137
57.63	126	140
59.65	128	144
61.67	131	151
63.69	133	156
65.71	135	161
67.73	138	166
69.75	140	171
71.77	142	176



SUITABLE CABLE DIA (mm)	DIMENSION (mm)	
28.32	61	55
30.34	63	57
32.36	65	61
34.38	67	63
36.40	71	65
38.42	69	67
40.44	71	69
42.46	72	71
44.48	74	73
46.50	75	75
48.52	77	77
50.54	79	79
52.56	80	81
54.58	81	83
56.60	83	85
58.62	85	87
60.64	86	88
62.66	90	91
64.68	91	93
66.70	93	95
68.72	95	97
70.74	97	99
72.76	98	101
74.78	100	103

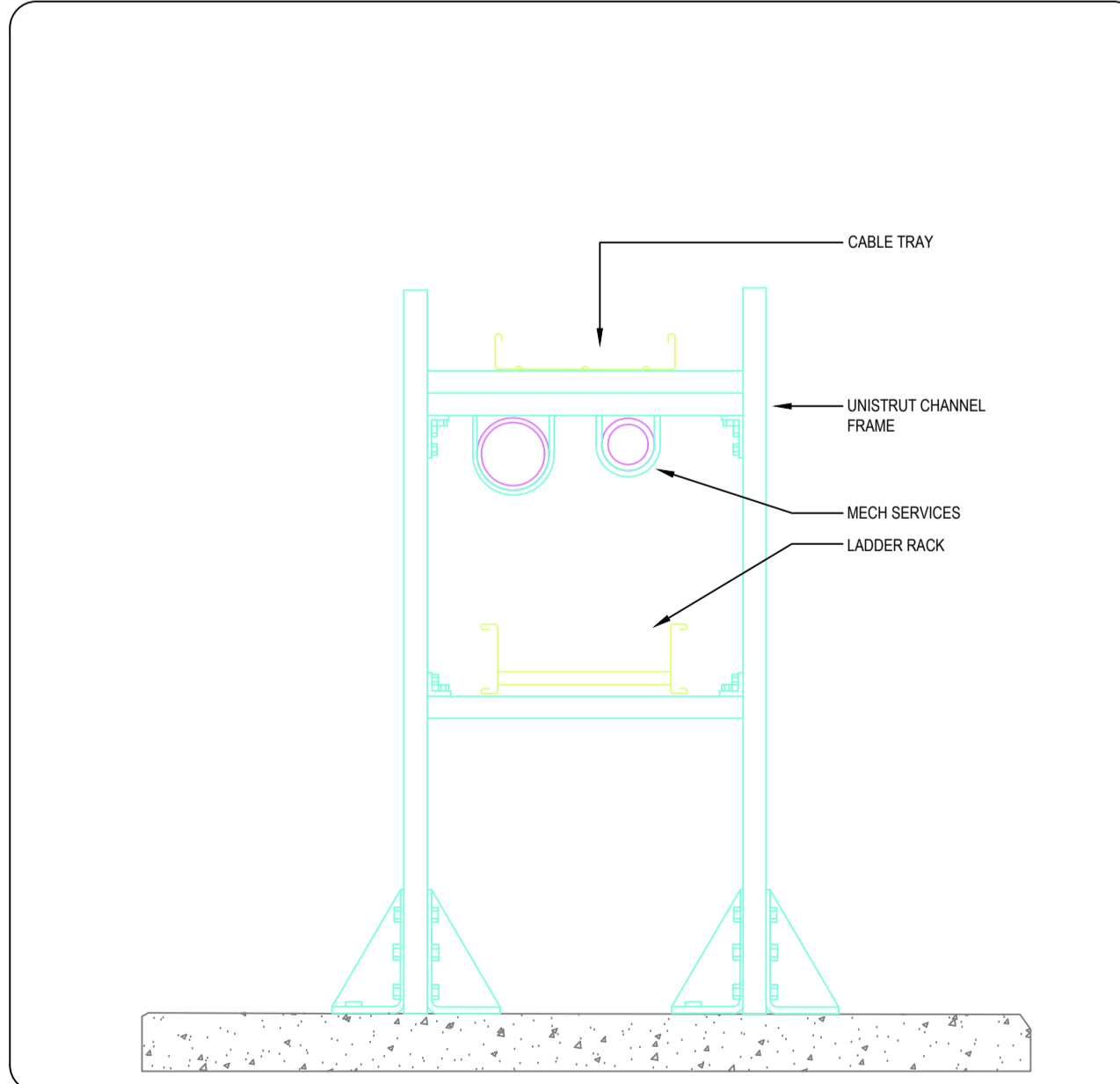
Y63-4 TREFOIL CABLE CLEAT FORMATION SECTION & 3D VIEW

Y63-5 SINGLE CABLE CLEAT FORMATION SECTION & 3D VIEW



PEAK FAULT LEVEL	CLEAT SPACING 'A' MAX
80kA	0.6M
120kA	0.6M
130kA	0.6M
165kA	0.3M
200kA	0.3M

Y63-6 TREFOIL CABLE RECOMMENDED INSTALLATION SPACING



Y63-7 TYPICAL FLOOR MOUNTED SUPPORTS

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3. WORKING ADJACENT TO POTENTIALLY LIVE SERVICES
4. HANDLING CHEMICAL PRODUCTS
5. WORKING IN CONFINED SPACES
6. PRESENCE OF ASBESTOS

MAINTENANCE/CLEANING/OPERATION:

1. HANDLING CHEMICAL PRODUCTS
2. WORKING AT HEIGHT
3. WORKING ADJACENT TO POTENTIALLY LIVE SERVICES

DECOMMISSIONING/DEMOLITION:

1. PRESENCE OF LIVE SERVICES
2. PRESENCE OF ASBESTOS
3. WORKING AT HEIGHT
4. LIFTING HEAVY EQUIPMENT
5. ALWAYS SAFELY ISOLATE BEFORE COMMENCING ANY WORKS

Notes

1. SELECT MATERIALS IN ACCORDANCE WITH Y-63 AND CORROSION RESISTANCE.
2. CHECK WITH SAFE WORKING LOADS (SWL) WITH PARTICULAR MANUFACTURER.
3. SWL IN TABLES ARE ALL UNIFORMLY DISTRIBUTED. CHECK POINT LOADS WITH TRAY/LADDER MANUFACTURER.
4. ALLOW FOR ALL POSSIBLE LOADS AS Y-63.
5. INCORPORATE EXPANSION JOINTS AT BUILDING MOVEMENT JOINTS OR TO ACCOMMODATE THERMAL MOVEMENTS.

P01 TENDER	11/04/2017	AW	LH
Rev	Description	Date	Dm Chd

TENDER

Status of drawing

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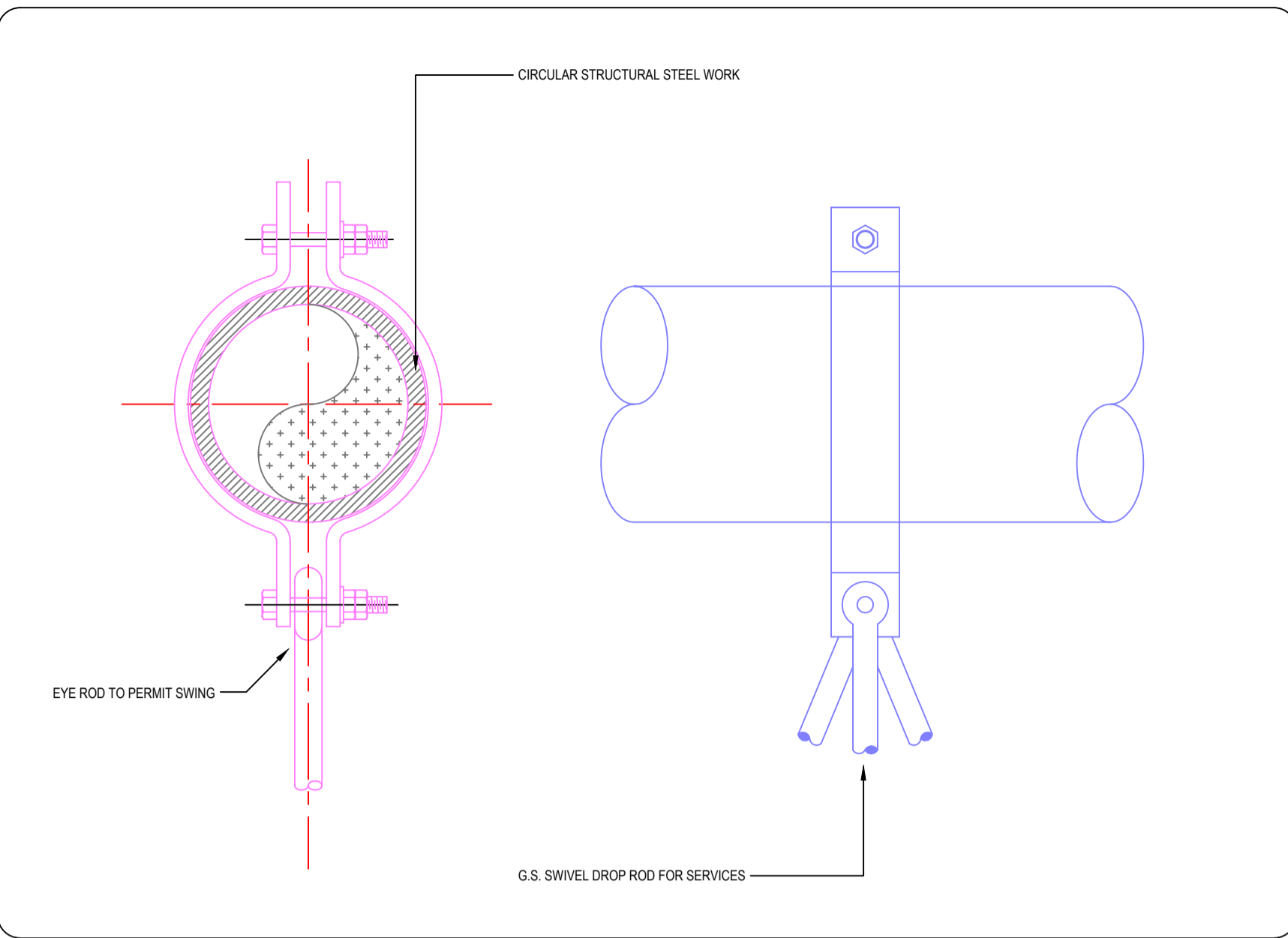
Project: **BURO HAPPOLD STANDARD DETAILS**

Drg Title: **Electrical Services
Cable Tray & Basket
Support Details**

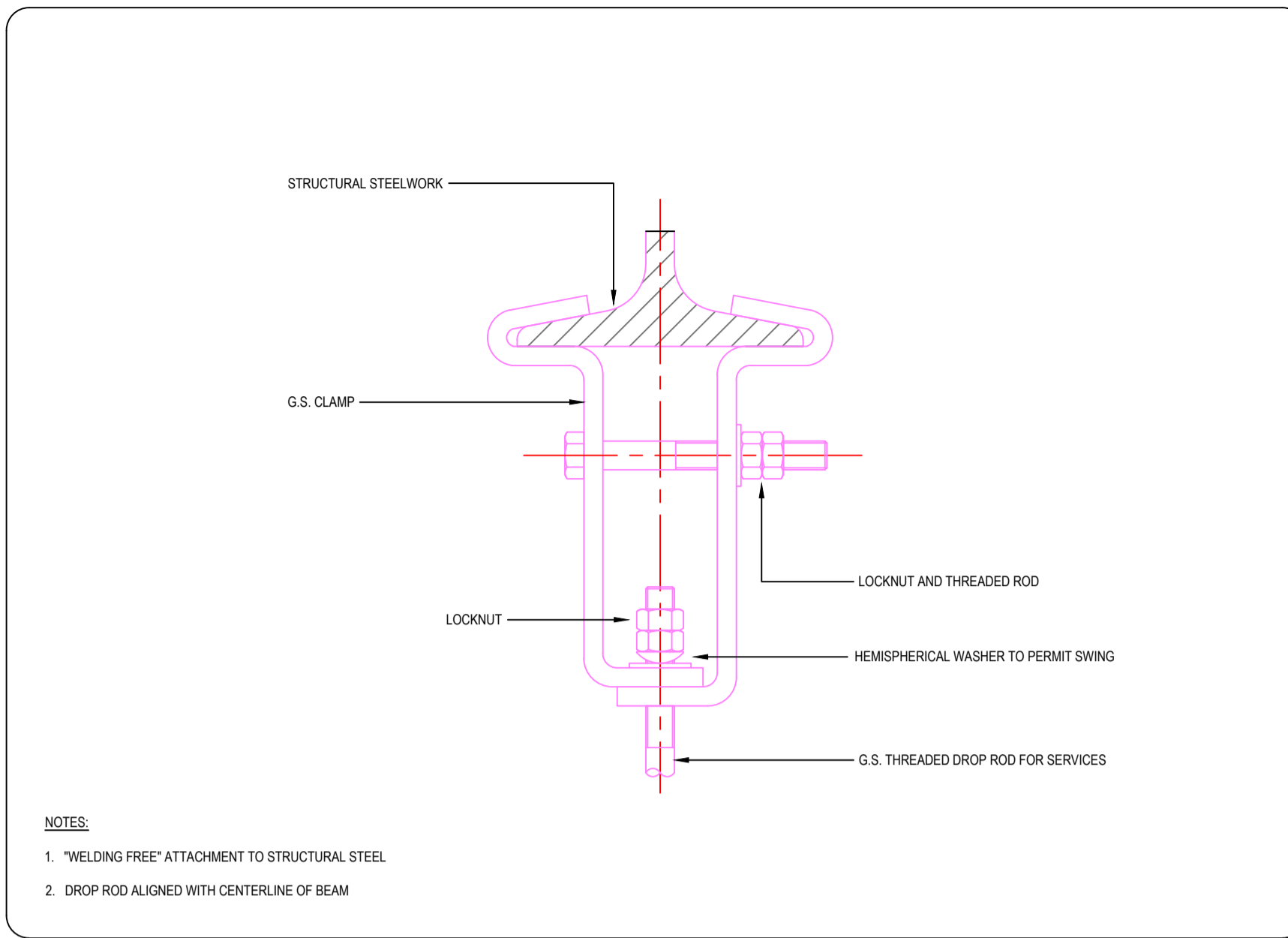
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Job No: **035833**

Drawn by: AW
Checked by: LH
Date: April 2017

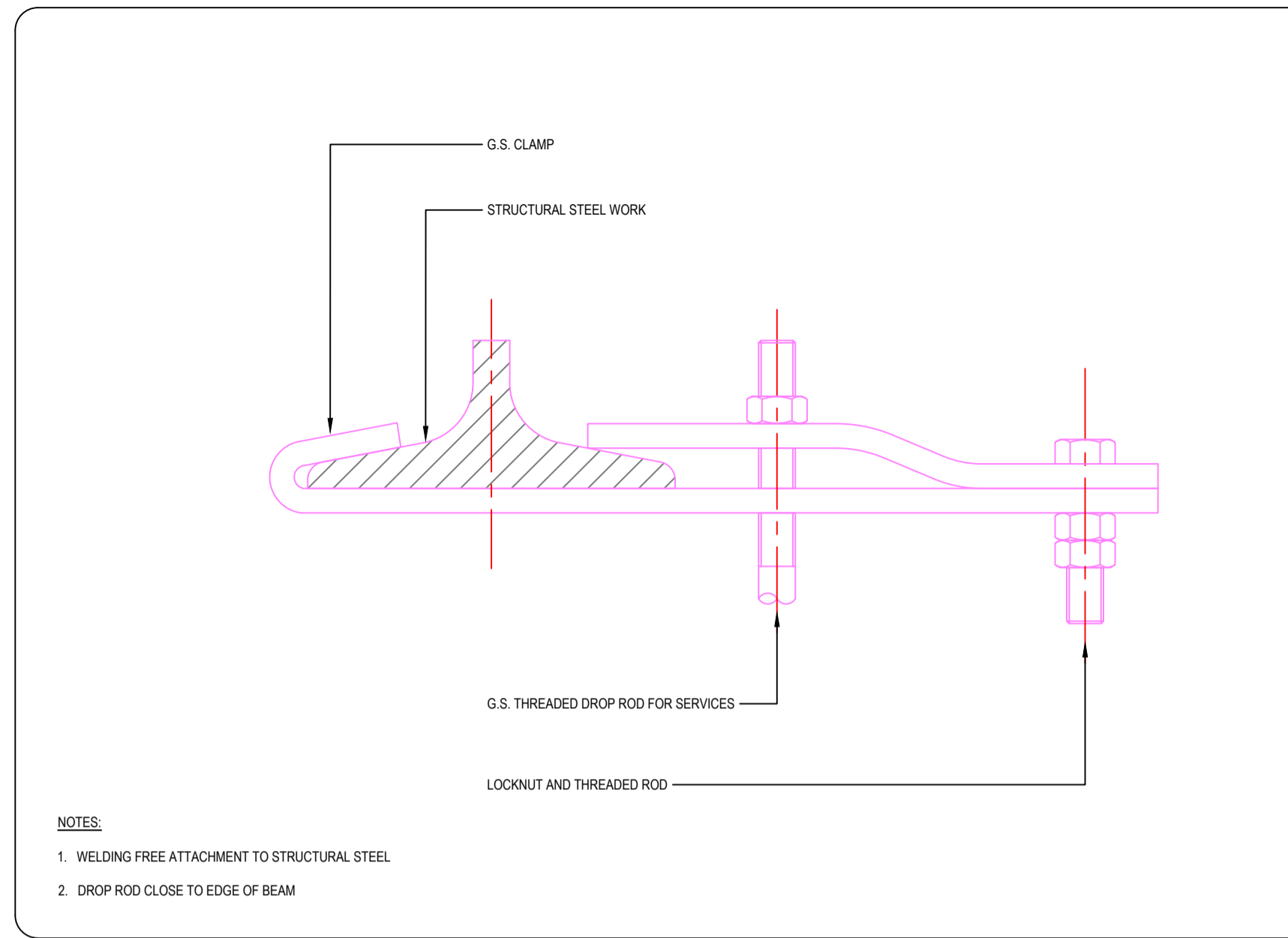
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Rev: **P01**



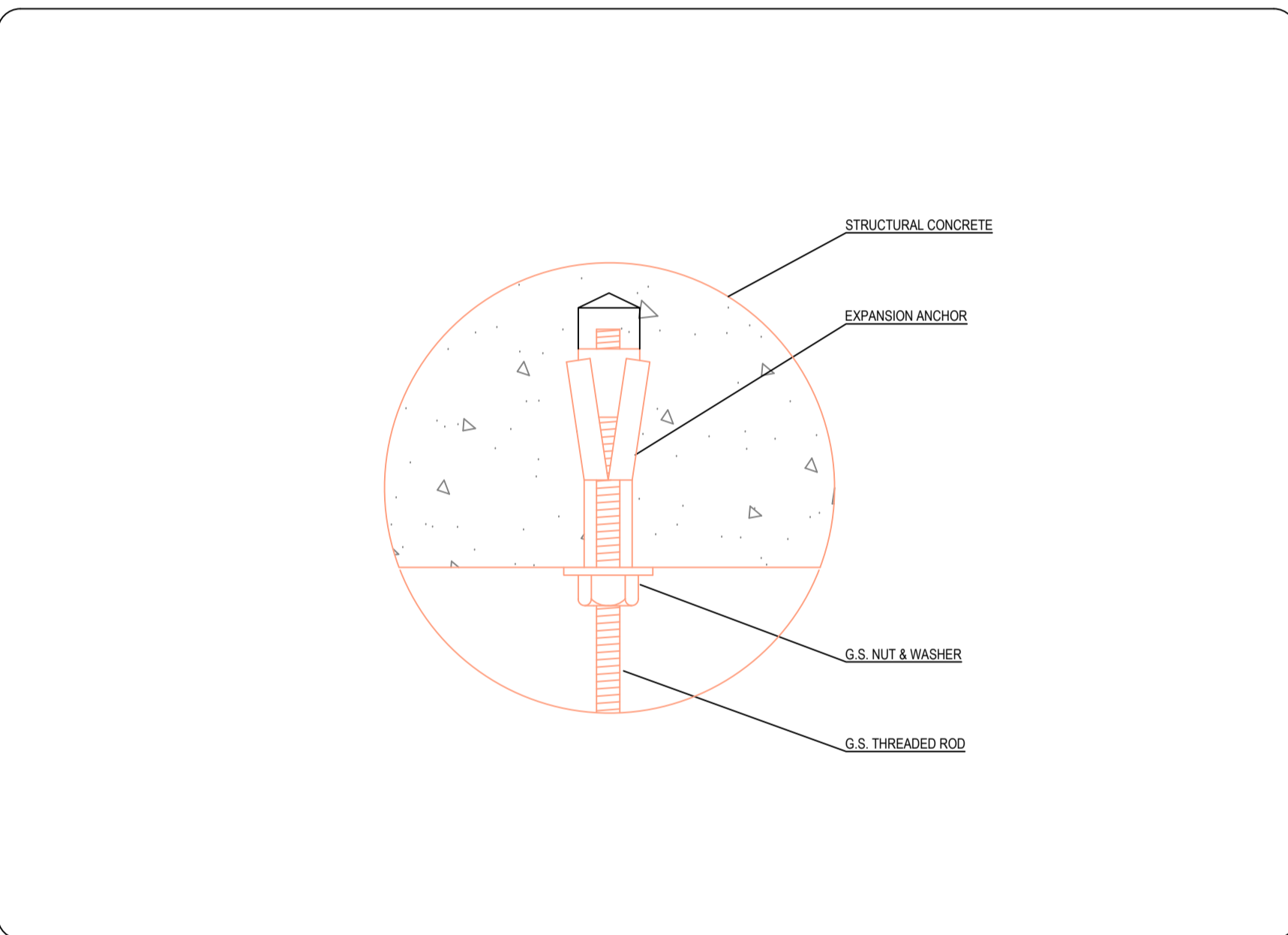
Y90-01 CIRCULAR STRUCTURAL STEEL FIXING



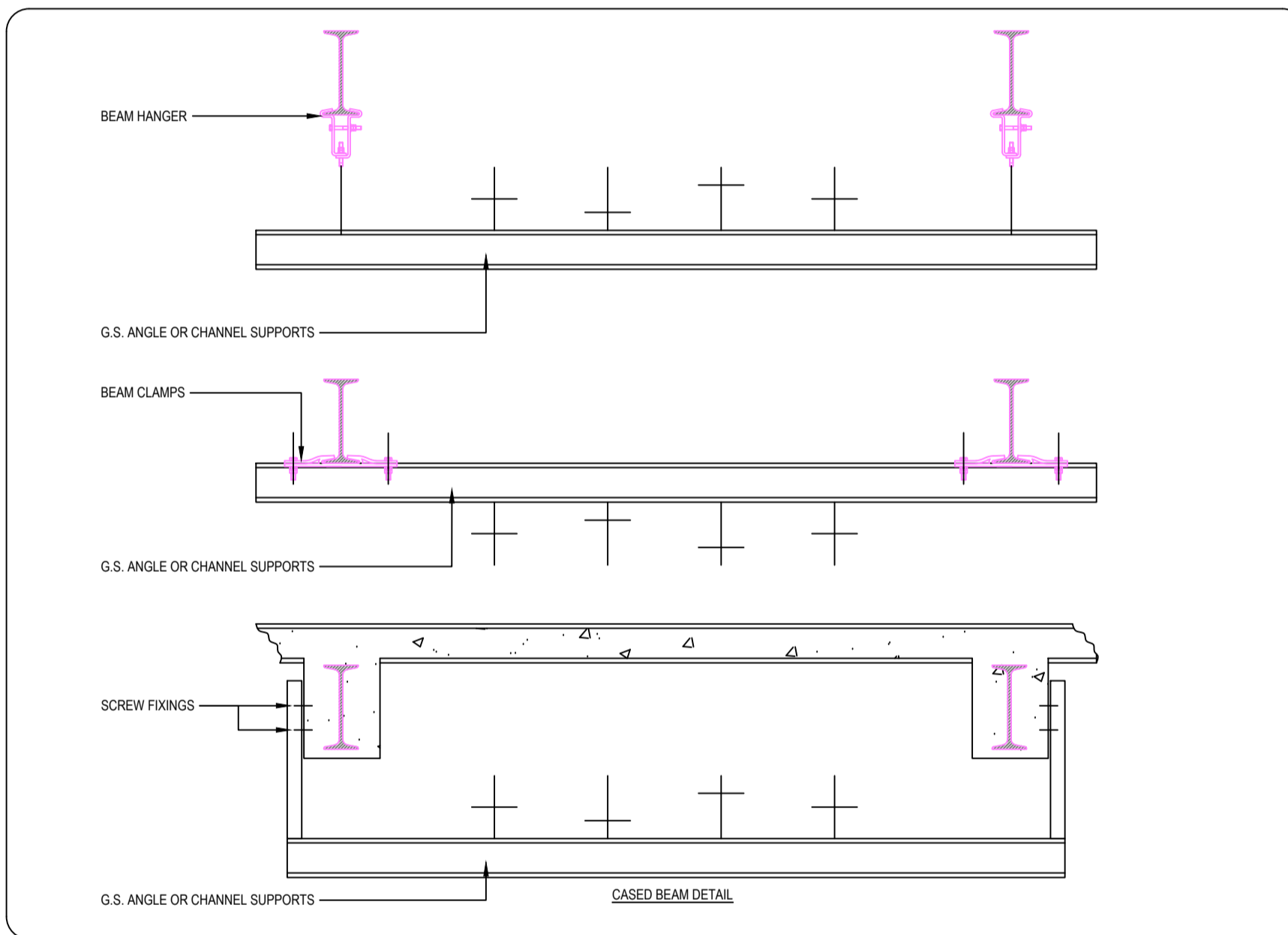
Y90-02 STEELWORK BEAM CLAMP HANGER FIXING TYPE 1



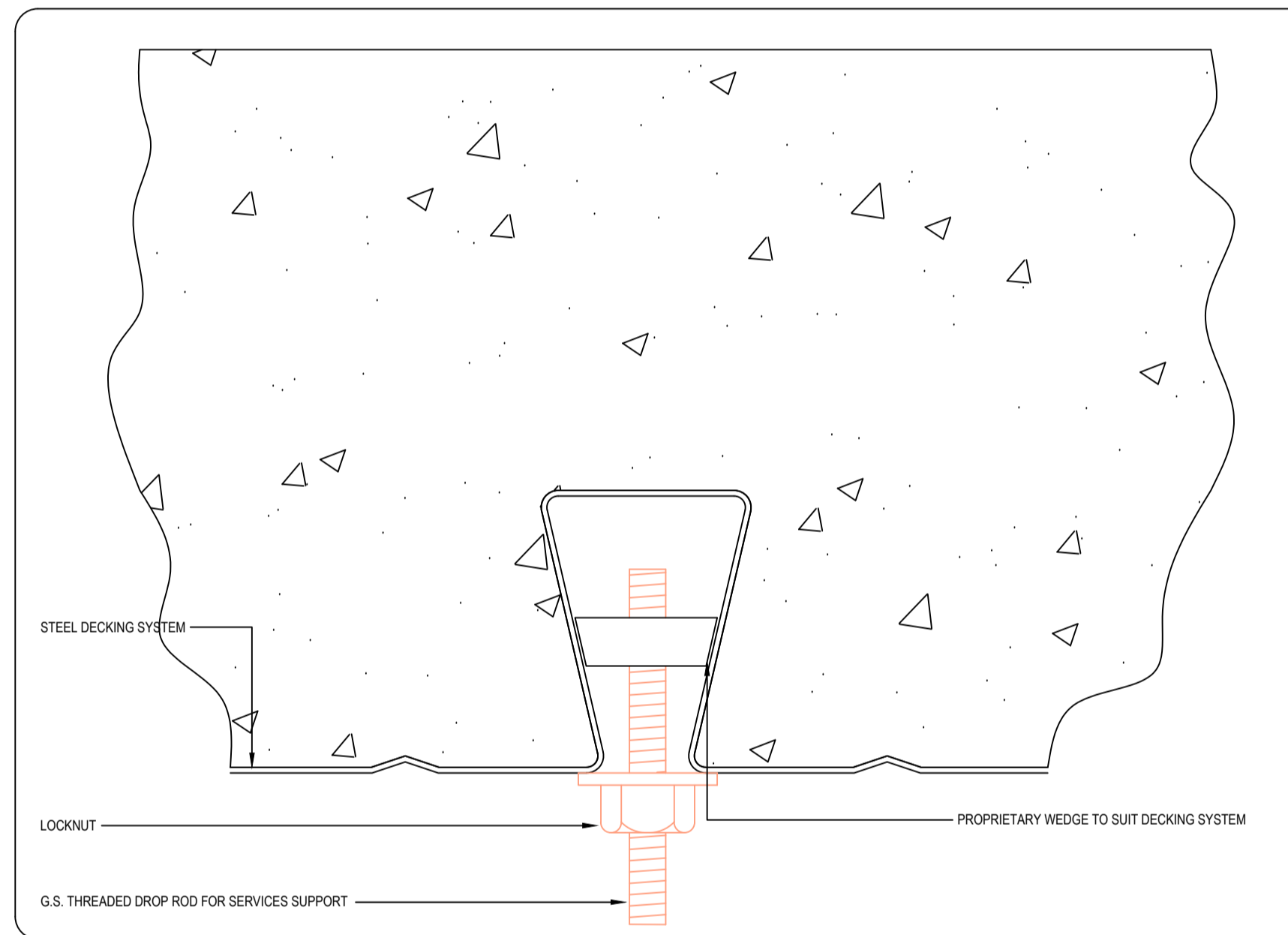
Y90-03 STEELWORK BEAM CLAMP FIXING TYPE 2



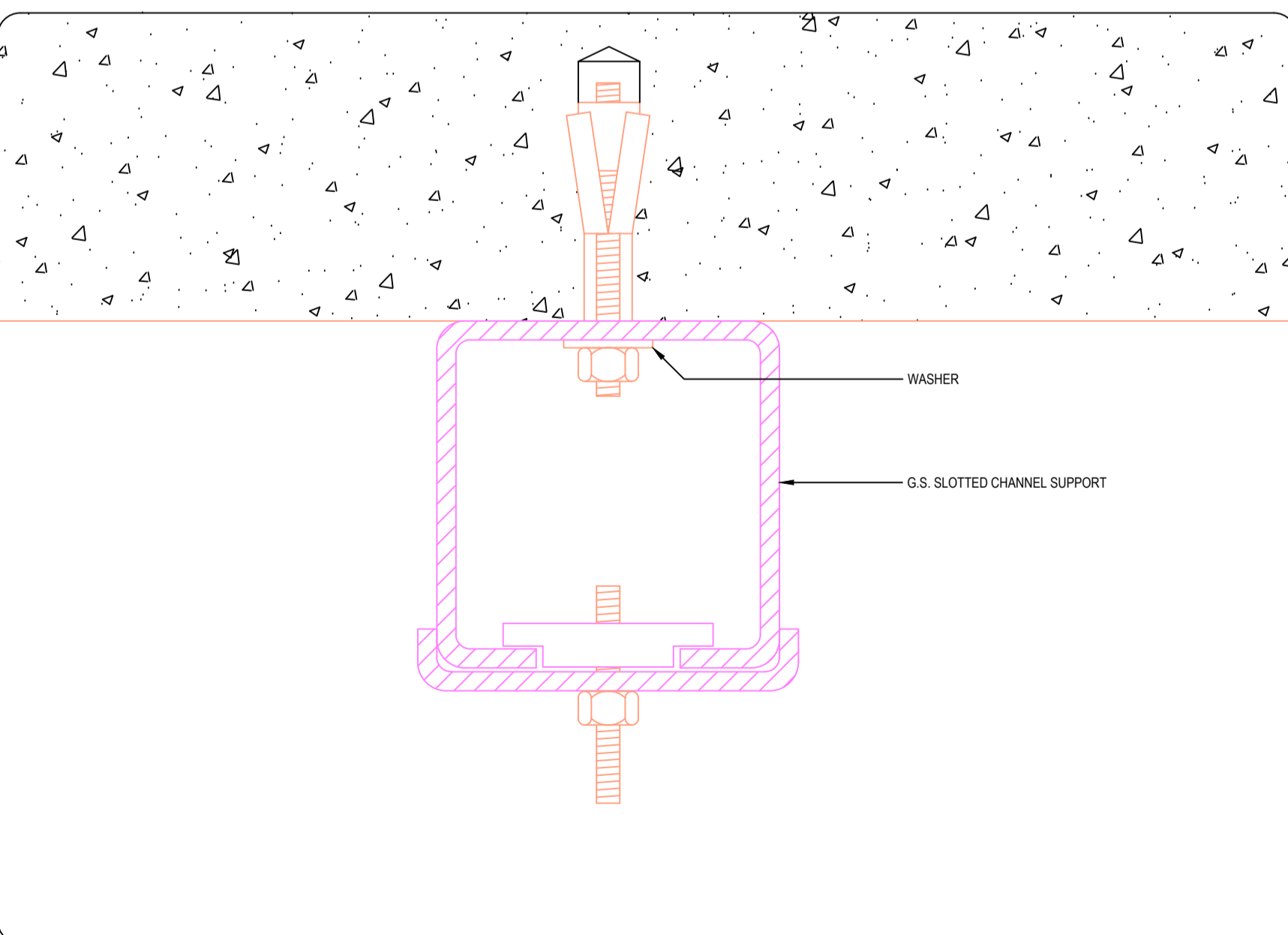
Y90-04 EXPANSION ANCHOR FIXING INTO STRUCTURAL CONCRETE



Y90-05 TYPICAL SUPPORT FIXINGS TO OVERHEAD STEELWORK



Y90-06 METAL COMPOSITE DECK FIXING - HOLORIB TYPE



Y90-07 CHANNEL & DROP ROD SUPPORT

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 5. WORKING IN CONFINED SPACES
 6. PRESENCE OF ASBESTOS

- MAINTENANCE/CLEANING/OPERATION:**
1. HANDLING CHEMICAL PRODUCTS
 2. WORKING AT HEIGHT
 3. WORKING ADJACENT TO POTENTIALLY LIVE SERVICES

- DECOMMISSIONING/DEMOLITION:**
1. PRESENCE OF LIVE SERVICES
 2. PRESENCE OF ASBESTOS
 3. WORKING AT HEIGHT
 4. LIFTING HEAVY EQUIPMENT
 5. ALWAYS SAFELY ISOLATE BEFORE COMMENCING ANY WORKS

Notes

1. SEEK APPROVAL FROM STRUCTURAL ENGINEER AND PROVIDE LOADING DETAILS FOR ALL FIXINGS.
2. INSTALL SERVICES FIXINGS TO STEELWORK SO THAT ANY FIRE COATING OR CLADDING TO STEELWORK IS NOT COMPROMISED.
3. COMPLY WITH MANUFACTURERS INSTRUCTIONS FOR PROPRIETARY STEEL COMPOSITE DECK FIXINGS.
4. WALL MOUNTED CANTILEVER BRACKETS NOT PERMITTED.

P01 TENDER	11/04/2017	AW	LH
Rev	Description	Date	Dm Chd

Status of drawing

TENDER

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Project **BURO HAPPOLD STANDARD DETAILS**
Drg Title **Electrical Services
Standard Details
Structural Fixings**

Scales@A1 N.T.S.	Job No. 035833
Drawn by AW	Drawing No. 208W-BH-SW-XX-DR-E-XX-5004
Checked by LH	Rev P01
Date April 2017	

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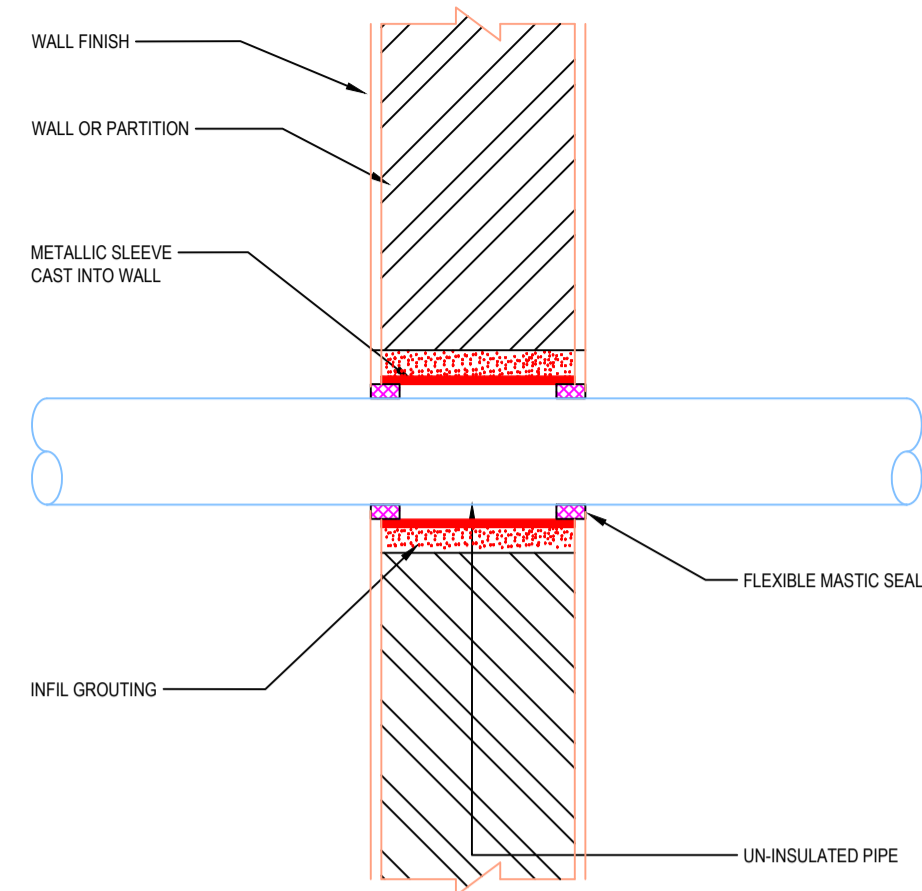
- CONSTRUCTION:**
- WORKING AT HEIGHT
 - LIFTING HEAVY EQUIPMENT
 - WORKING ADJACENT TO POTENTIALLY LIVE SERVICES
 - HANDLING CHEMICAL PRODUCTS
 - WORKING IN CONFINED SPACES
 - PRESENCE OF ASBESTOS

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- HANDLING CHEMICAL PRODUCTS
 - WORKING AT HEIGHT
 - WORKING ADJACENT TO POTENTIALLY LIVE SERVICES

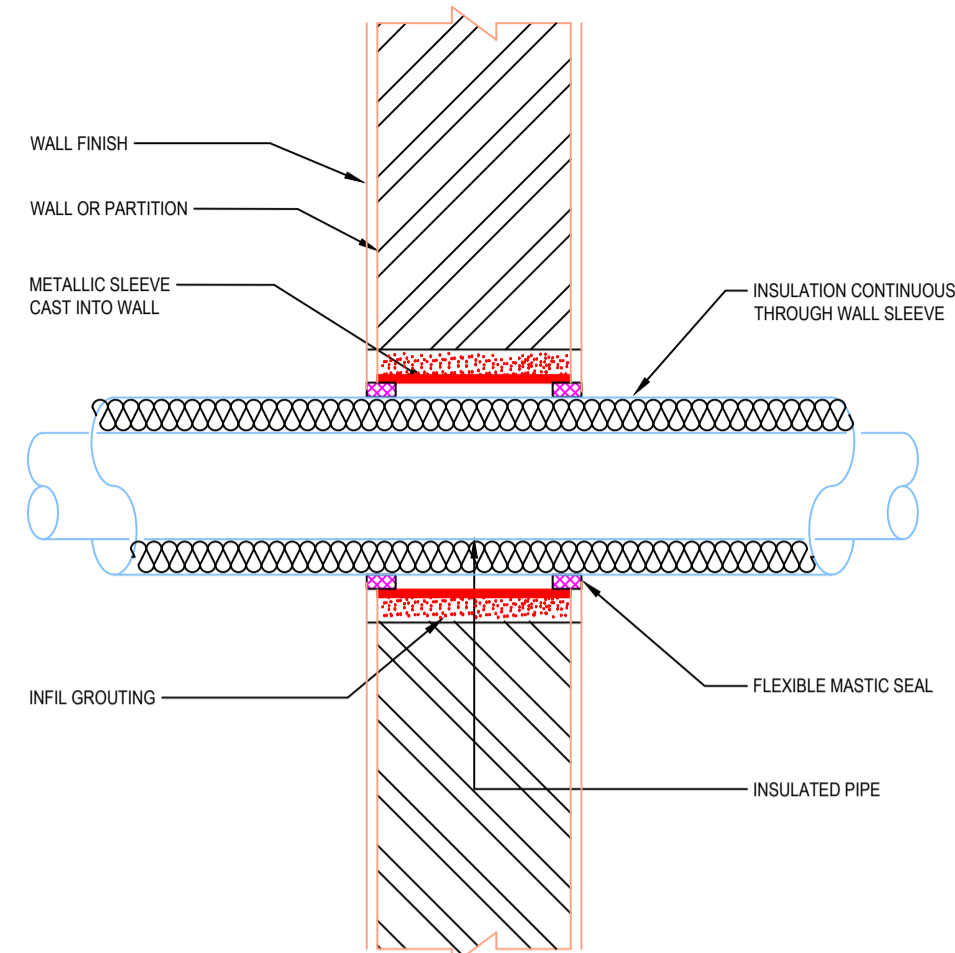
- DECOMMISSIONING/DEMOLITION:**
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 - PRESENCE OF ASBESTOS
 - WORKING AT HEIGHT
 - LIFTING HEAVY EQUIPMENT
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Notes

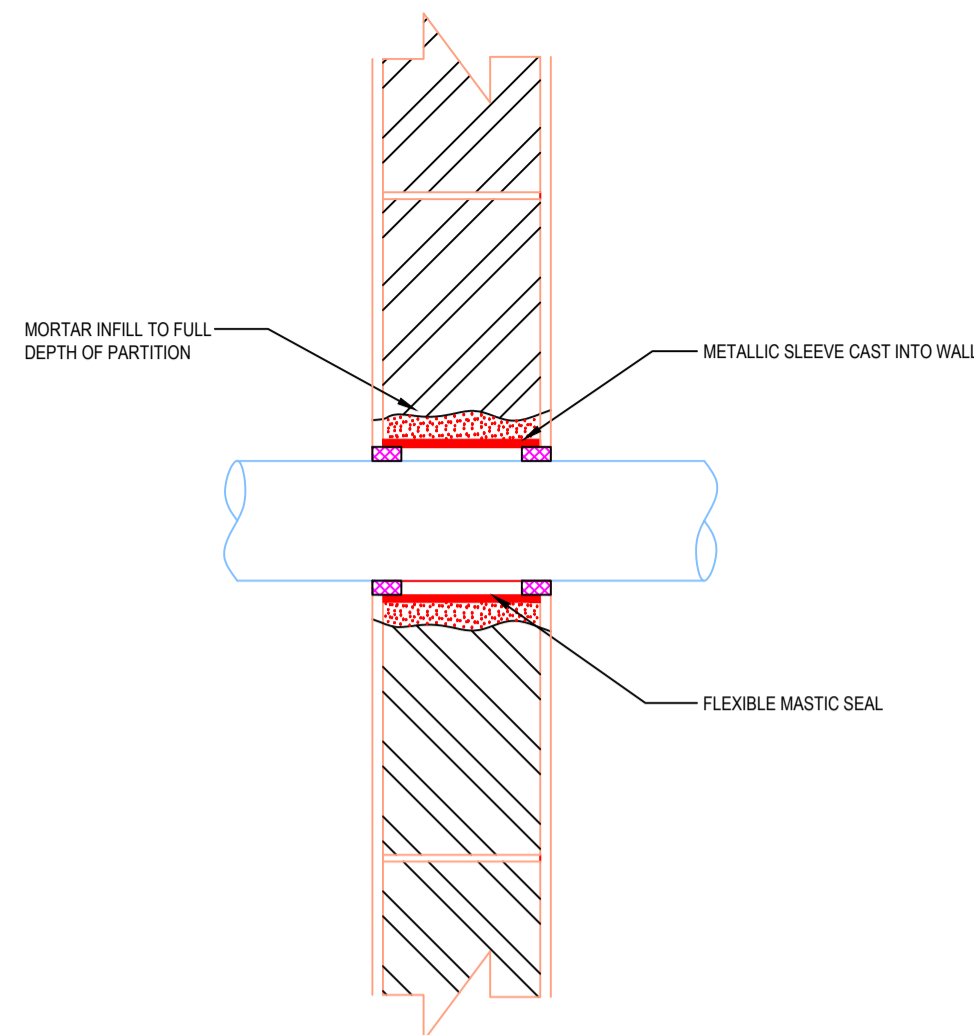
- REFER TO SPEC. CLAUSES : Y10.2.44 - 47
- ENSURE INSULATION WITH VAPOUR SEAL IS CONTINUOUS THROUGH PENETRATIONS.
- PROVIDE 15mm - 20mm MAXIMUM SPACING BETWEEN PIPEWORK / INSULATION AND SLEEVE.



Y10-20 UN-INSULATED METALLIC PIPE CROSSING NON FIRE RATED WALL

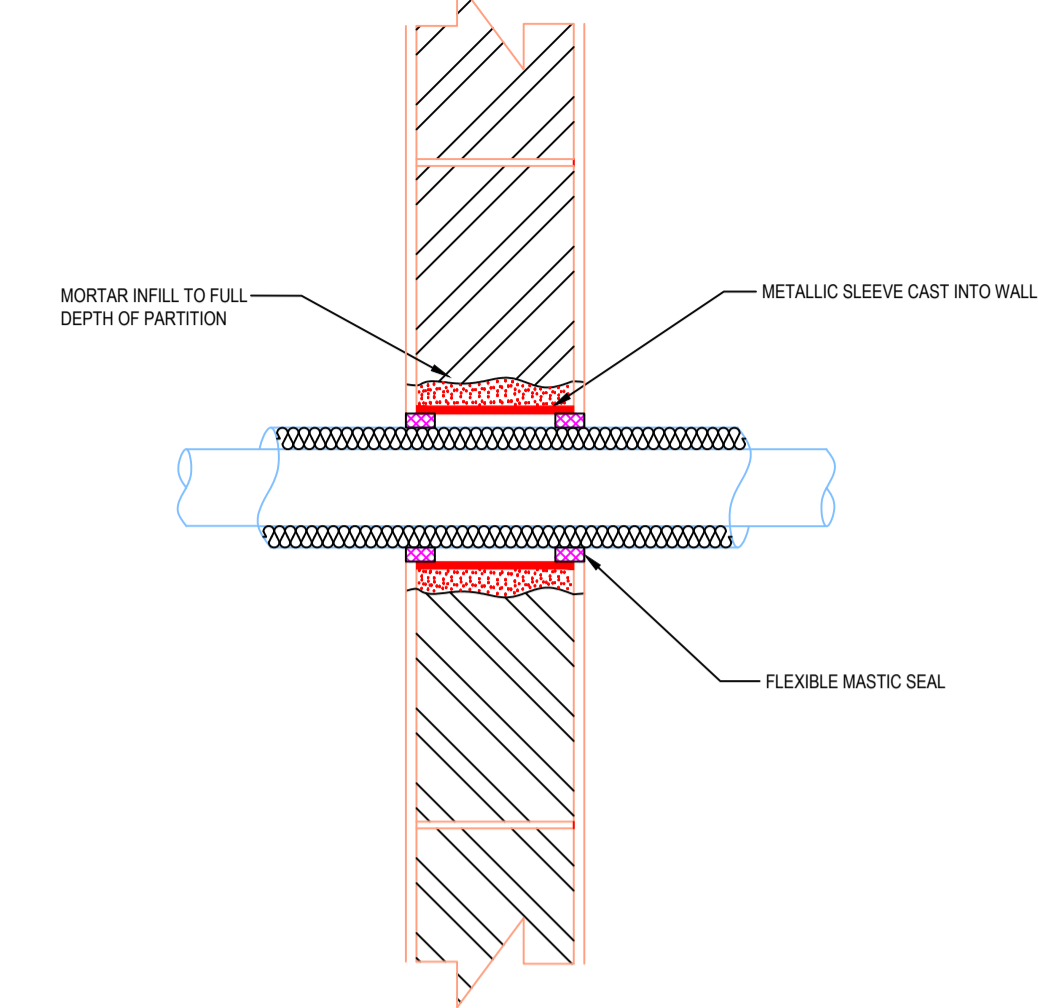


Y10-21 INSULATED METALLIC PIPE CROSSING NON FIRE RATED WALL

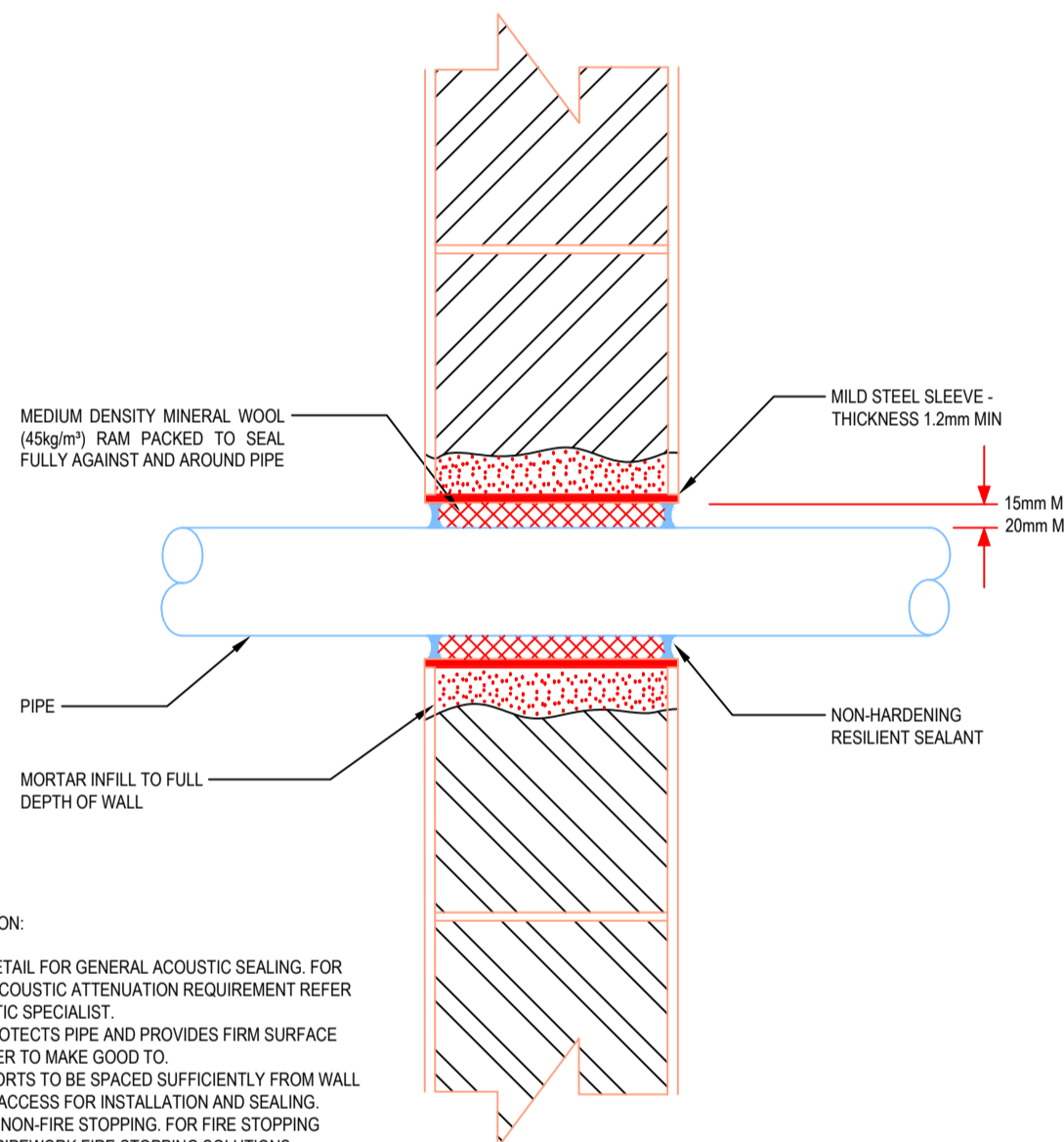


EXPLANATION:
TYPICAL SOLUTION FOR PLASTIC PIPES (PVC, PE, ABS). SLEEVE PROTECTS PIPE AND PROVIDES FIRM SURFACE FOR BUILDER TO MAKE GOOD TO. PIPE SUPPORTS TO BE SPACED SUFFICIENTLY FROM WALL TO ALLOW ACCESS FOR INSTALLATION AND SEALING.

Y10-22 UN-INSULATED PLASTIC PIPE CROSSING NON FIRE RATED WALL

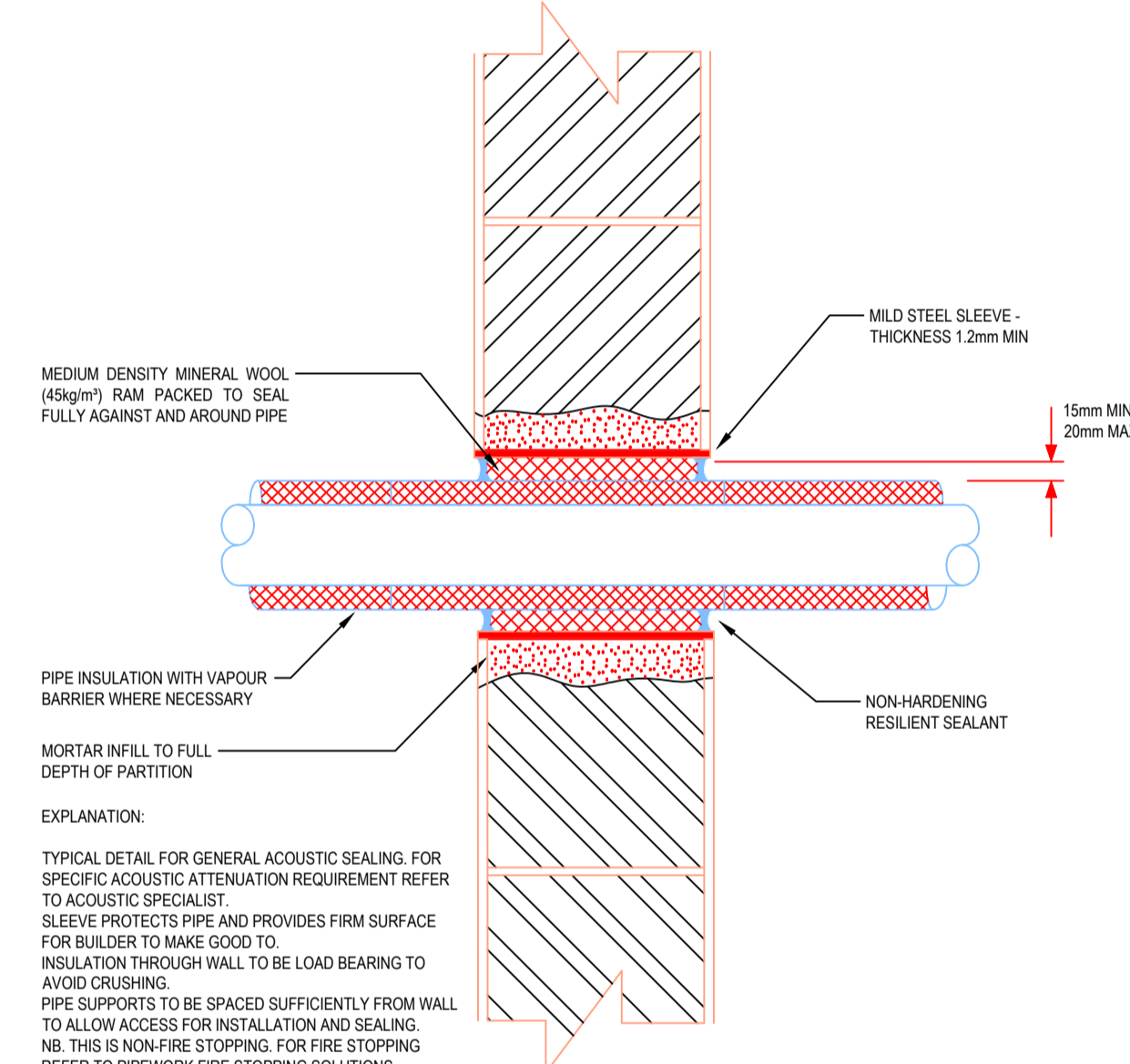


Y10-23 INSULATED PLASTIC PIPE CROSSING NON FIRE RATED WALL & FLOOR



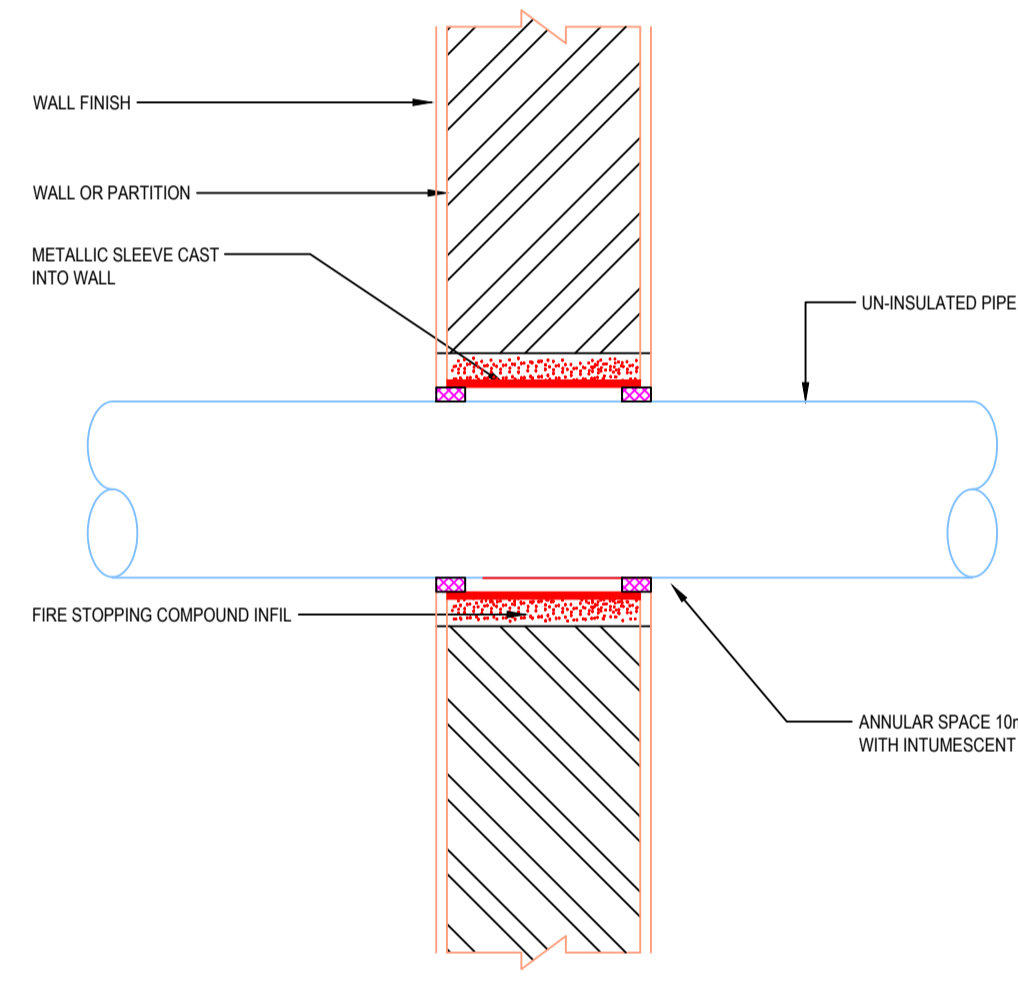
EXPLANATION:
TYPICAL DETAIL FOR GENERAL ACOUSTIC SEALING. FOR SPECIFIC ACOUSTIC ATTENUATION REQUIREMENT REFER TO ACOUSTIC SPECIALIST. SLEEVE PROTECTS PIPE AND PROVIDES FIRM SURFACE FOR BUILDER TO MAKE GOOD TO. PIPE SUPPORTS TO BE SPACED SUFFICIENTLY FROM WALL TO ALLOW ACCESS FOR INSTALLATION AND SEALING. NB. THIS IS NON-FIRE STOPPING. FOR FIRE STOPPING REFER TO PIPEWORK FIRE STOPPING SOLUTIONS.

Y10-24 UN-INSULATED PIPE CROSSING ACOUSTICALLY RATED WALL (NON FIRE RATED)

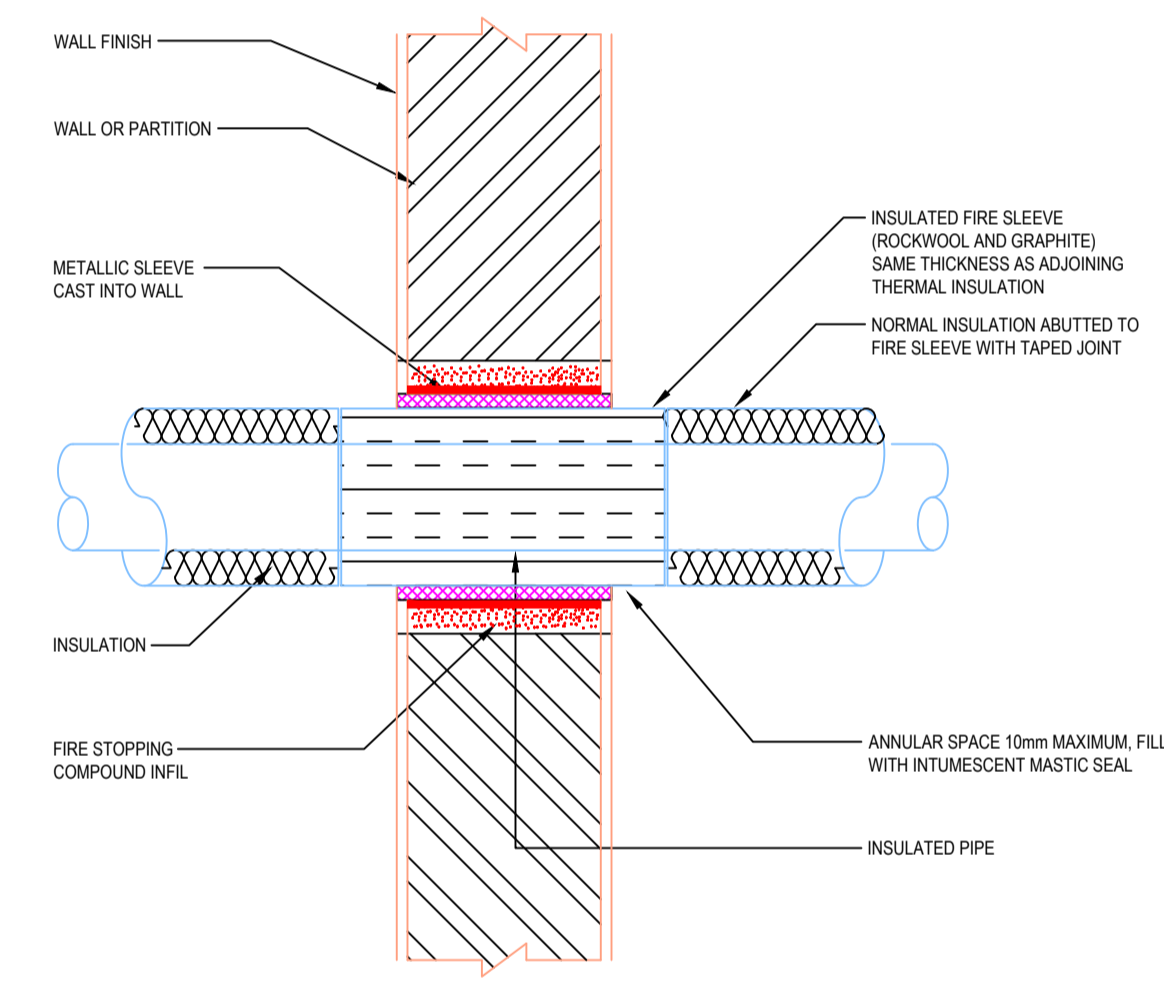


EXPLANATION:
TYPICAL DETAIL FOR GENERAL ACOUSTIC SEALING. FOR SPECIFIC ACOUSTIC ATTENUATION REQUIREMENT REFER TO ACOUSTIC SPECIALIST. SLEEVE PROTECTS PIPE AND PROVIDES FIRM SURFACE FOR BUILDER TO MAKE GOOD TO. INSULATION THROUGH WALL TO BE LOAD BEARING TO AVOID CRUSHING. PIPE SUPPORTS TO BE SPACED SUFFICIENTLY FROM WALL TO ALLOW ACCESS FOR INSTALLATION AND SEALING. NB. THIS IS NON-FIRE STOPPING. FOR FIRE STOPPING REFER TO PIPEWORK FIRE STOPPING SOLUTIONS.

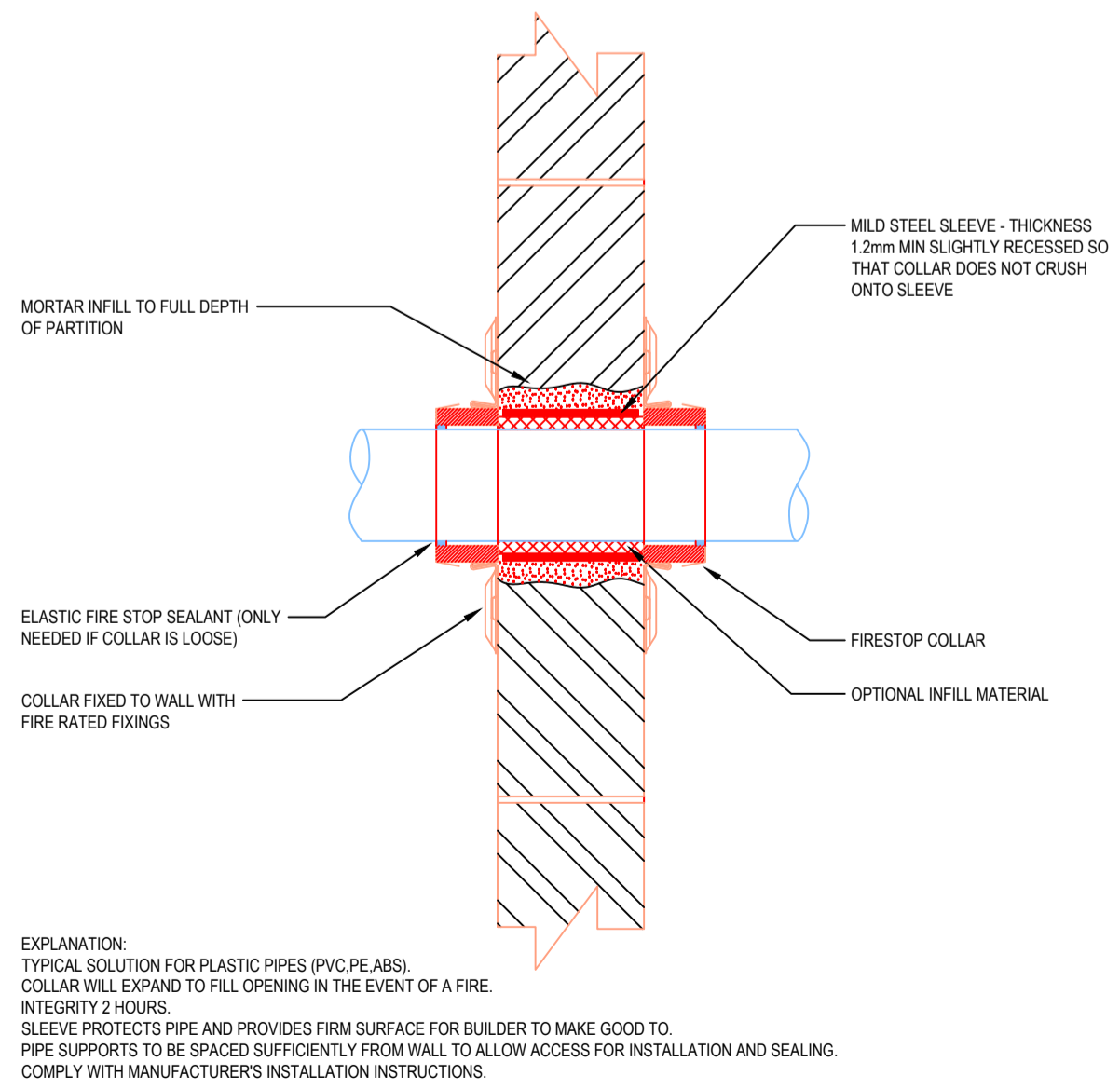
Y10-25 INSULATED PIPE CROSSING ACOUSTICALLY RATED WALL (NON FIRE RATED)



Y10-26 UN-INSULATED METALLIC PIPE CROSSING FIRE RATED WALL

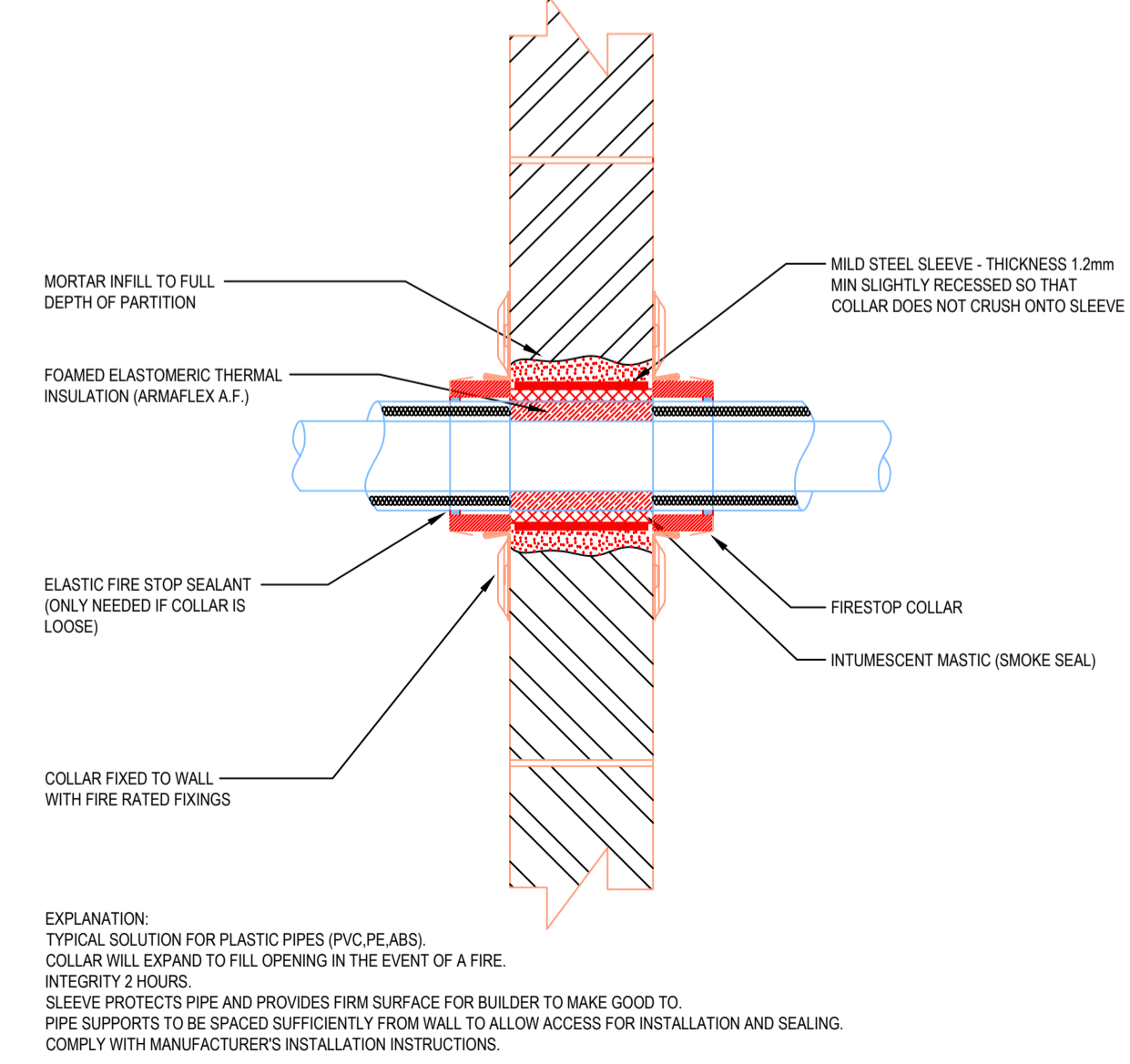


Y10-27 INSULATED METALLIC PIPE CROSSING FIRE RATED WALL



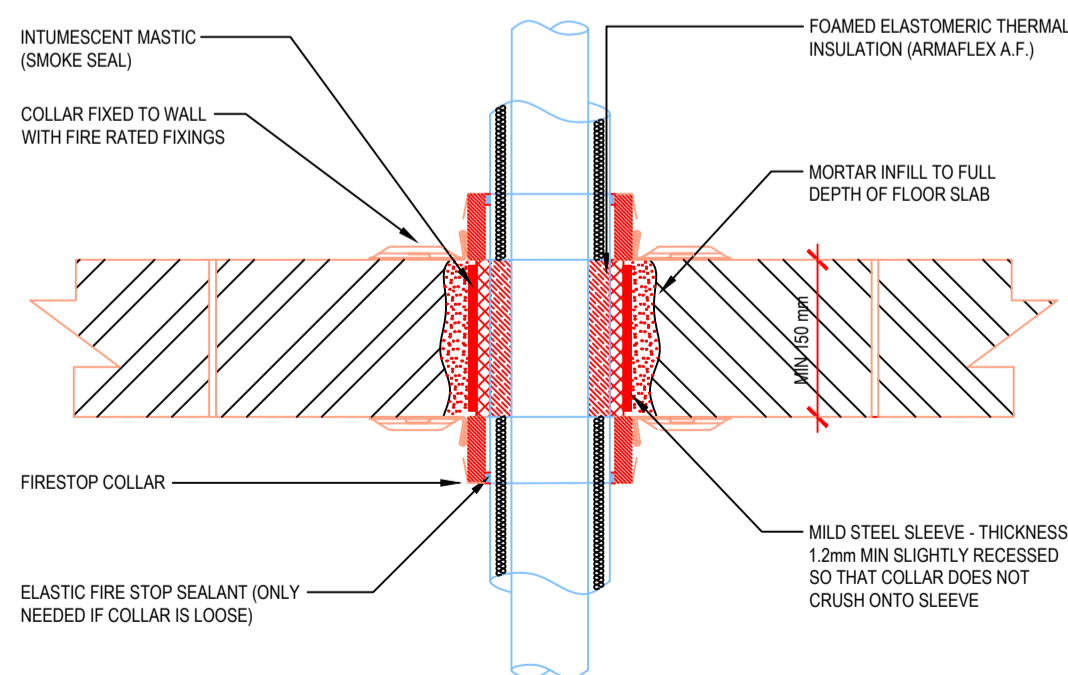
EXPLANATION:
TYPICAL SOLUTION FOR PLASTIC PIPES (PVC, PE, ABS). COLLAR WILL EXPAND TO FILL OPENING IN THE EVENT OF A FIRE. INTEGRITY 2 HOURS. SLEEVE PROTECTS PIPE AND PROVIDES FIRM SURFACE FOR BUILDER TO MAKE GOOD TO. PIPE SUPPORTS TO BE SPACED SUFFICIENTLY FROM WALL TO ALLOW ACCESS FOR INSTALLATION AND SEALING. COMPLY WITH MANUFACTURER'S INSTALLATION INSTRUCTIONS.

Y10-28 UN-INSULATED PLASTIC PIPE CROSSING FIRE RATED WALL



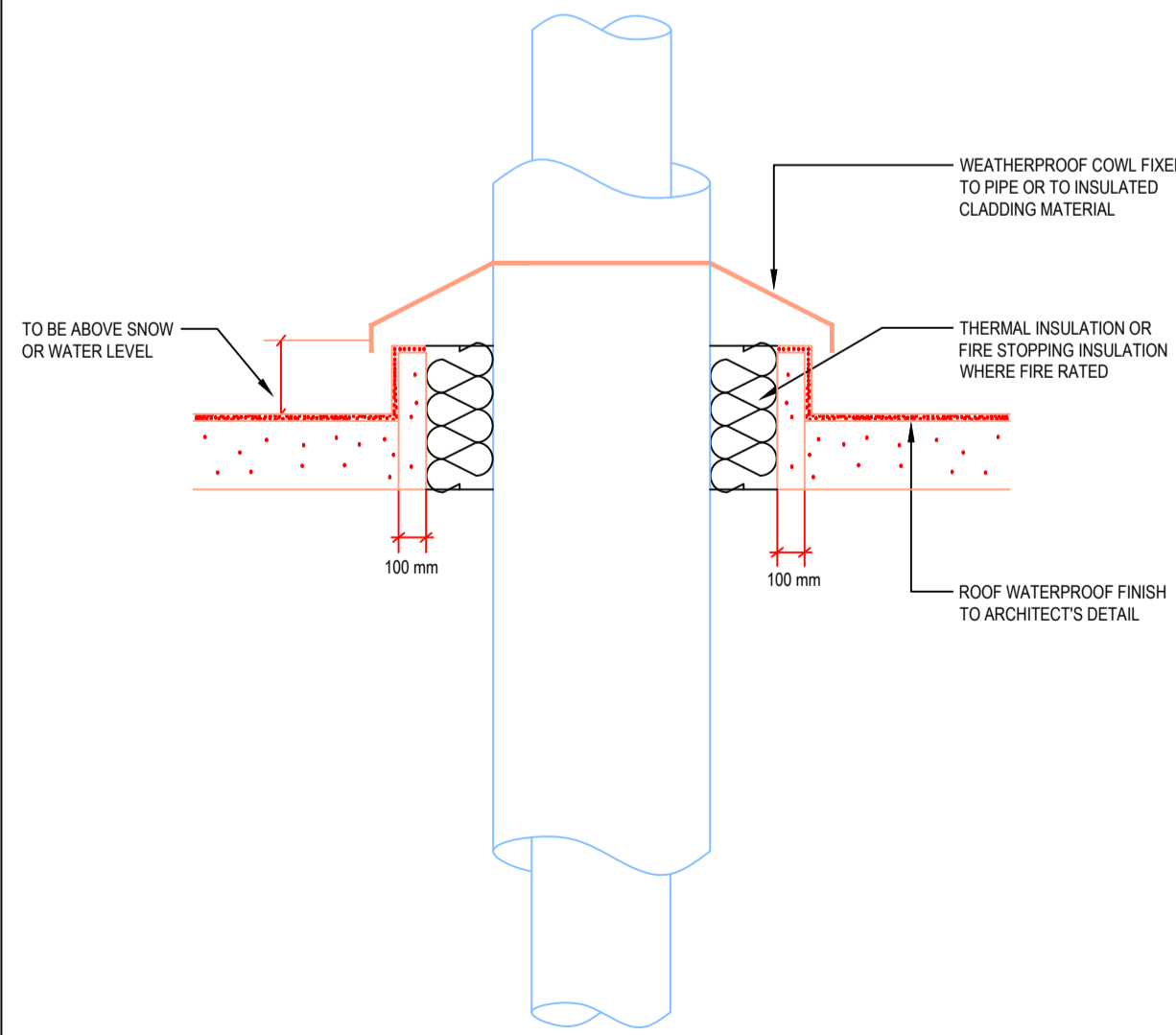
EXPLANATION:
TYPICAL SOLUTION FOR PLASTIC PIPES (PVC, PE, ABS). COLLAR WILL EXPAND TO FILL OPENING IN THE EVENT OF A FIRE. INTEGRITY 2 HOURS. SLEEVE PROTECTS PIPE AND PROVIDES FIRM SURFACE FOR BUILDER TO MAKE GOOD TO. PIPE SUPPORTS TO BE SPACED SUFFICIENTLY FROM WALL TO ALLOW ACCESS FOR INSTALLATION AND SEALING. COMPLY WITH MANUFACTURER'S INSTALLATION INSTRUCTIONS.

Y10-29 INSULATED PLASTIC PIPE CROSSING FIRE RATED WALL



EXPLANATION:
TYPICAL SOLUTION FOR PLASTIC PIPES (PVC, PE, ABS). COLLAR WILL EXPAND TO FILL OPENING IN THE EVENT OF A FIRE. INTEGRITY 2 HOURS. SLEEVE PROTECTS PIPE AND PROVIDES FIRM SURFACE FOR BUILDER TO MAKE GOOD TO. PIPE SUPPORTS TO BE SPACED SUFFICIENTLY FROM WALL TO ALLOW ACCESS FOR INSTALLATION AND SEALING. COMPLY WITH MANUFACTURER'S INSTALLATION INSTRUCTIONS.

Y10-30 VERTICAL INSULATED PLASTIC PIPEWORK THROUGH FIRE RATED FLOOR SLAB



Y10-31 PIPE PENETRATION THROUGH ROOF SLAB

P01 TENDER	11/04/2017	AH	LH
Rev	Description	Date	Dm Chd

TENDER

Status of drawing

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Project: **BURO HAPPOLD STANDARD DETAILS**
Drg Title: **Mechanical Services Standard Details - Sheet 1 Pipework Penetration Details**

Scale: A1 N.T.S.	Job No: 035833
Drawn by: AH	Drawing No: 208W-8HM-SW-XX-DR-MX-XX-0001
Checked by: LH	Rev: P01
Date: April 2017	

DO NOT SCALE THIS DRAWING.

HEALTH AND SAFETY INFORMATION

IN ADDITION TO THE HAZARDS/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING:

CONSTRUCTION:

- WORKING AT HEIGHT
- LIFTING HEAVY EQUIPMENT
- WORKING ADJACENT TO POTENTIALLY LIVE SERVICES
- HANDLING CHEMICAL PRODUCTS
- WORKING IN CONFINED SPACES
- PRESENCE OF ASBESTOS

MAINTENANCE/CLEANING/OPERATION:

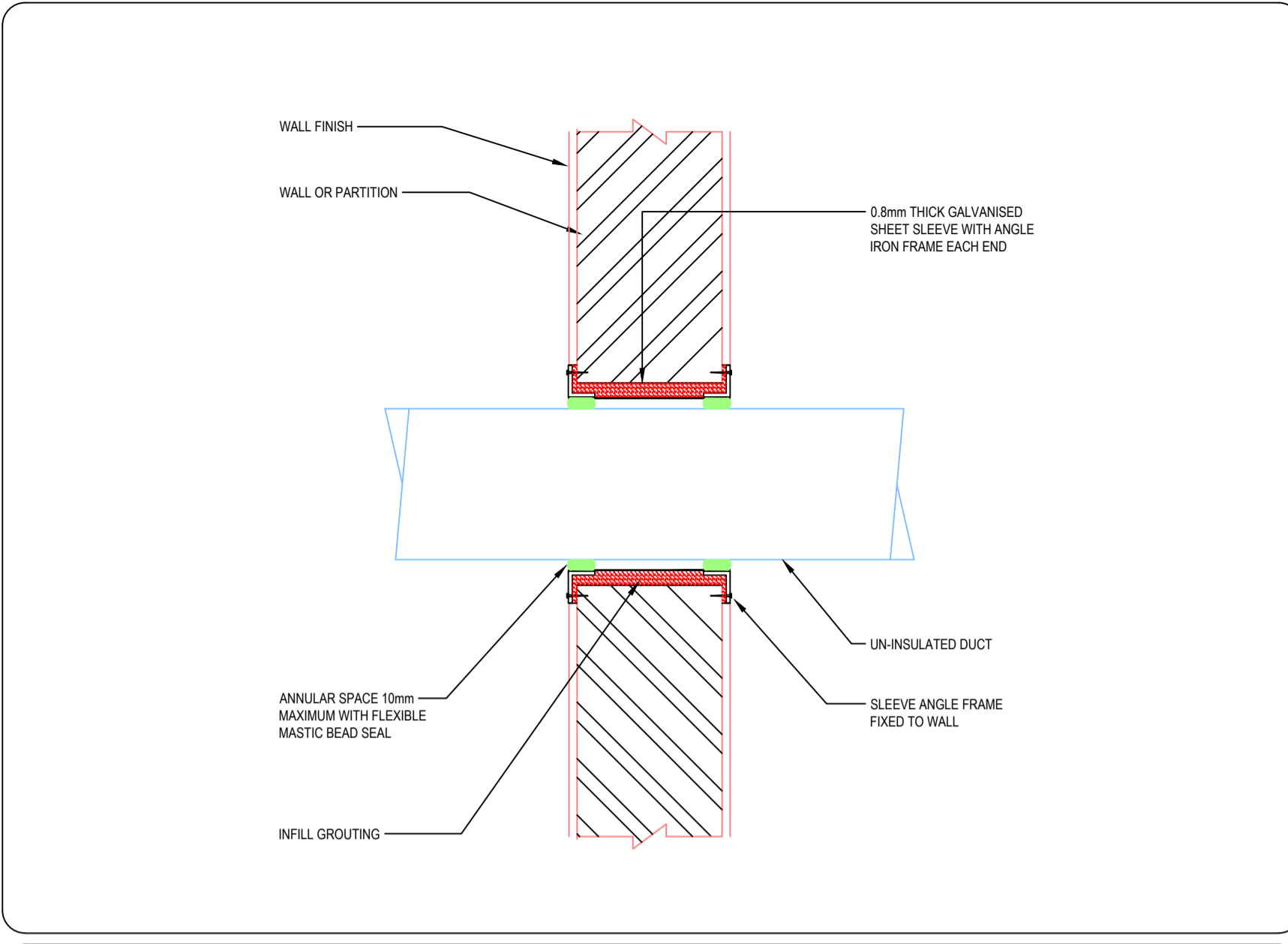
- HANDLING CHEMICAL PRODUCTS
- WORKING AT HEIGHT
- WORKING ADJACENT TO POTENTIALLY LIVE SERVICES

DECOMMISSIONING/DEMOLITION:

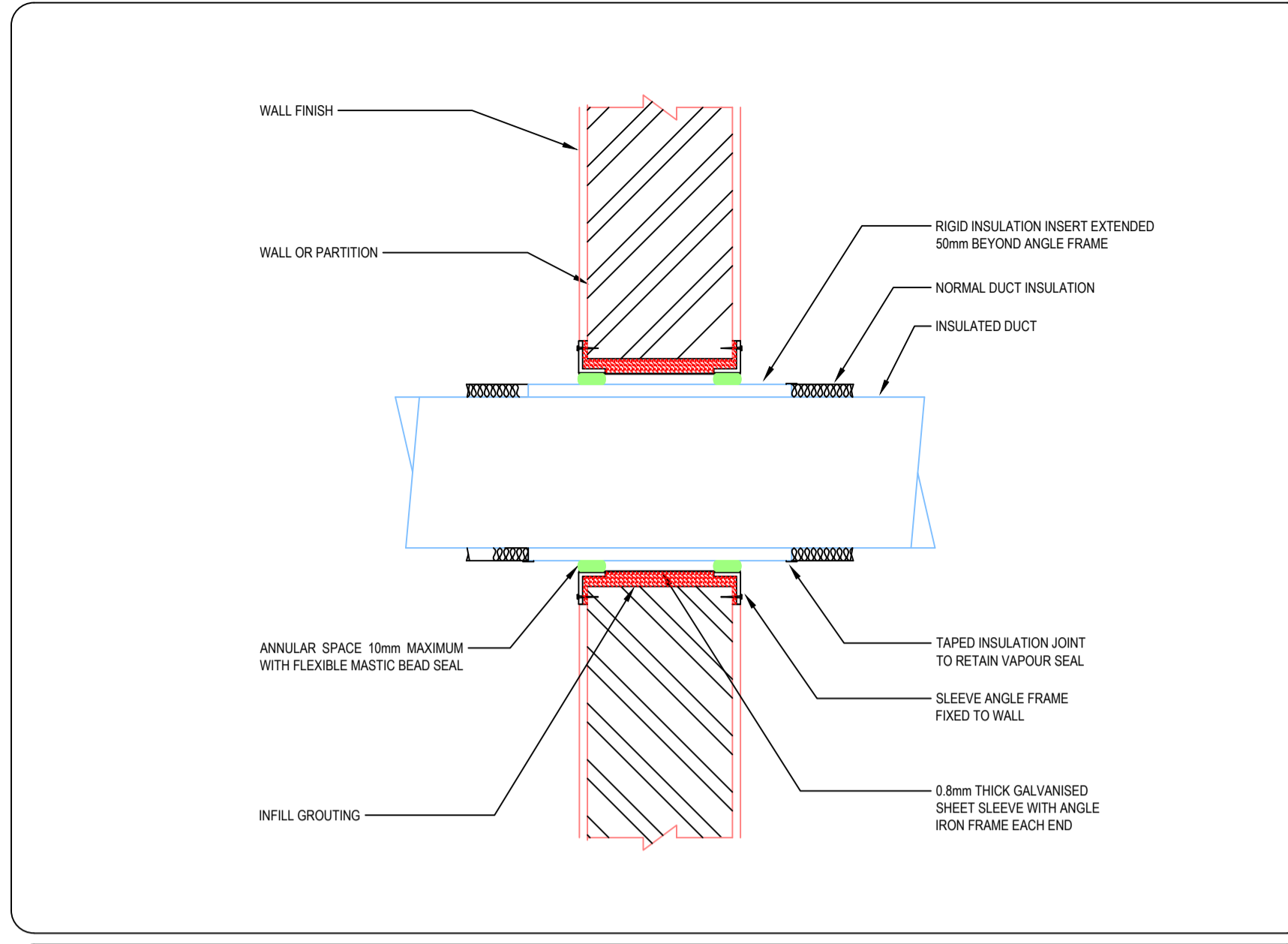
- PRESENCE OF LIVE SERVICES
- PRESENCE OF ASBESTOS
- WORKING AT HEIGHT
- LIFTING HEAVY EQUIPMENT
- ALWAYS SAFELY ISOLATE BEFORE COMMENCING ANY WORKS

Notes

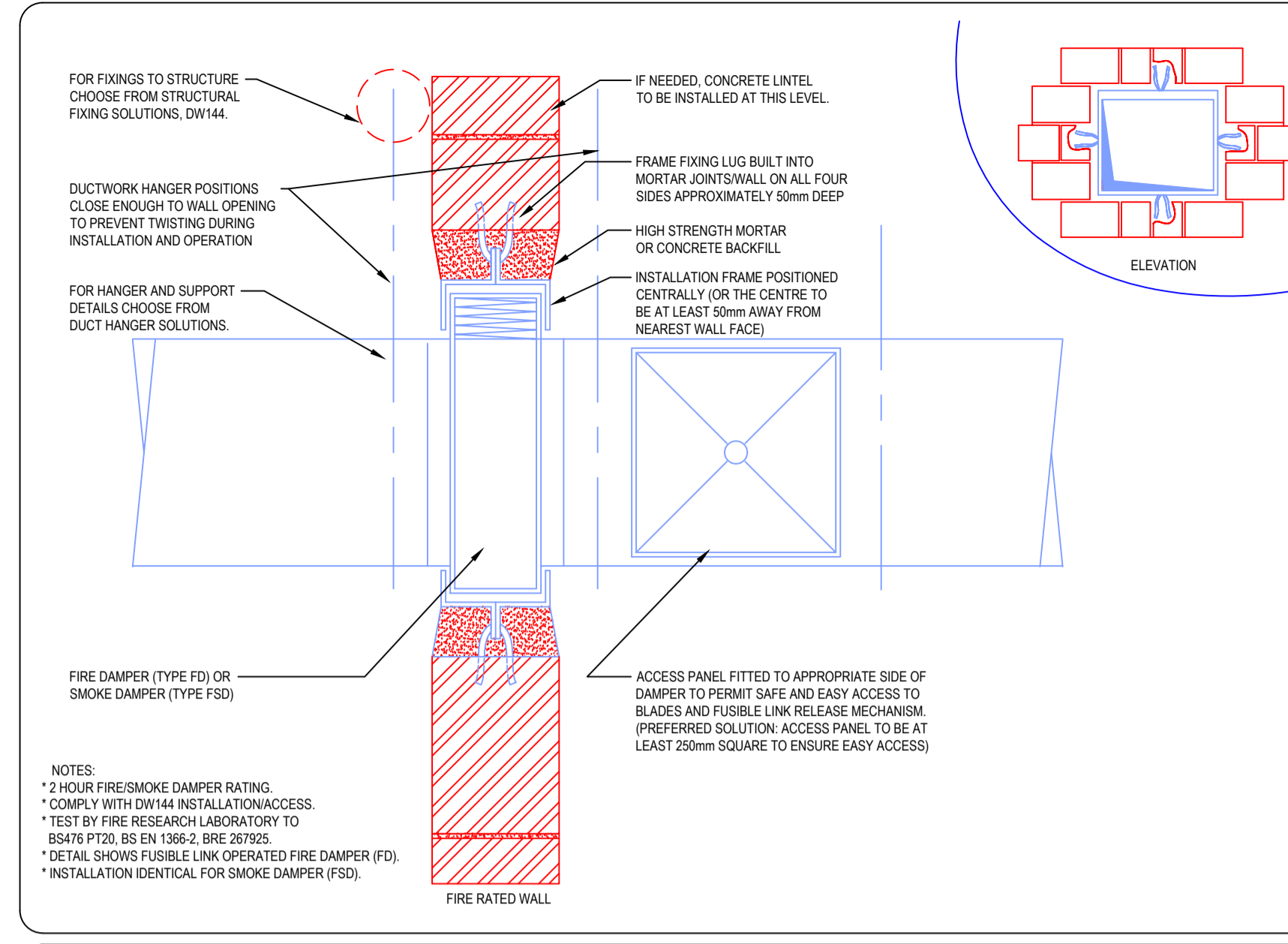
- FIRE DAMPERS HAVE FOLDED STEEL CURTAIN SHUTTER. (SPEC. REF U80.2.23)
- SMOKE DAMPERS HAVE AERODYNAMIC DOUBLE SKIN BLADES WITH SMOKE SEALS. (SPEC. REF U80.2.24 - 26)



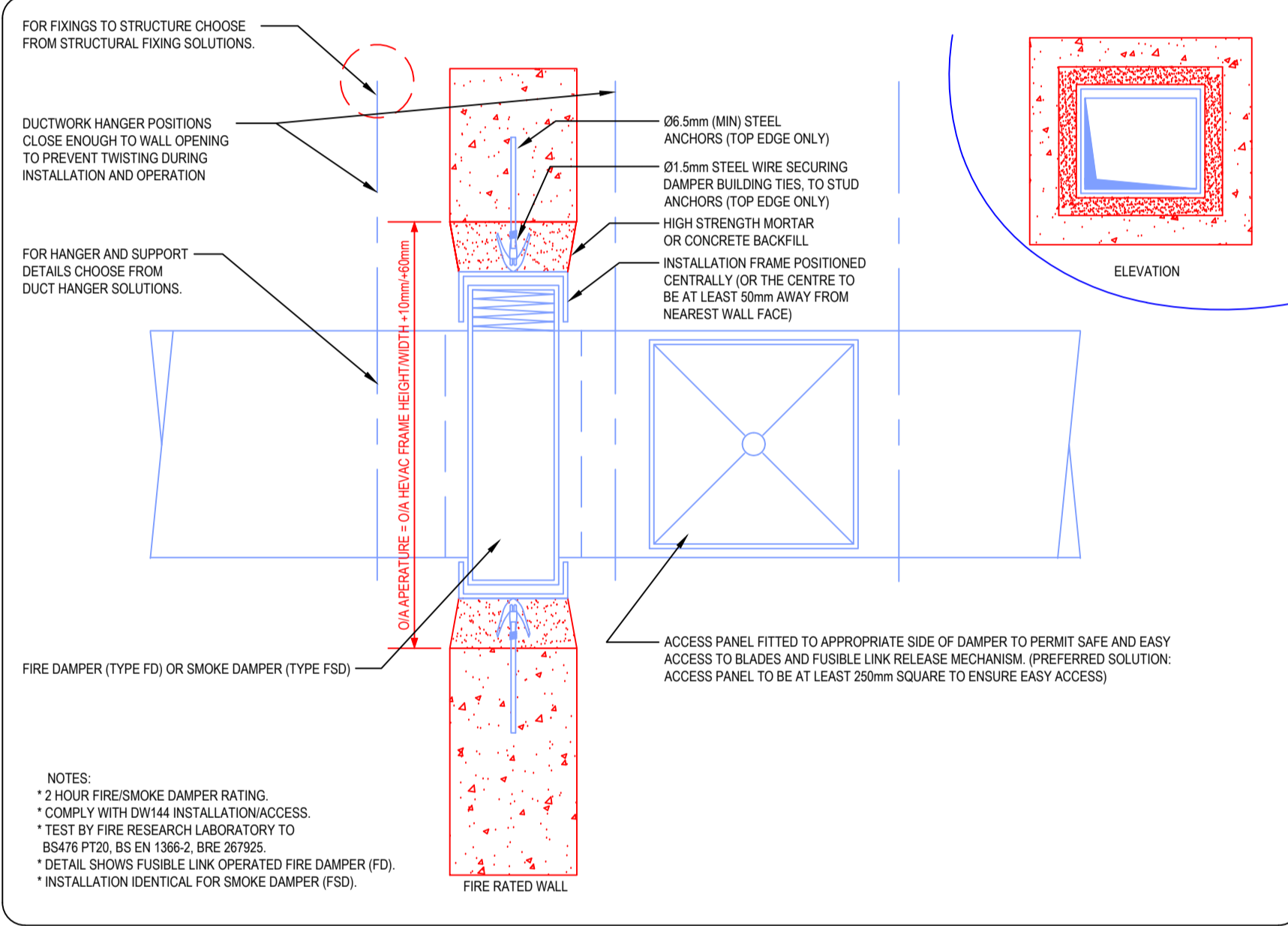
U80-01 UN-INSULATED DUCT CROSSING NON FIRERATED WALL



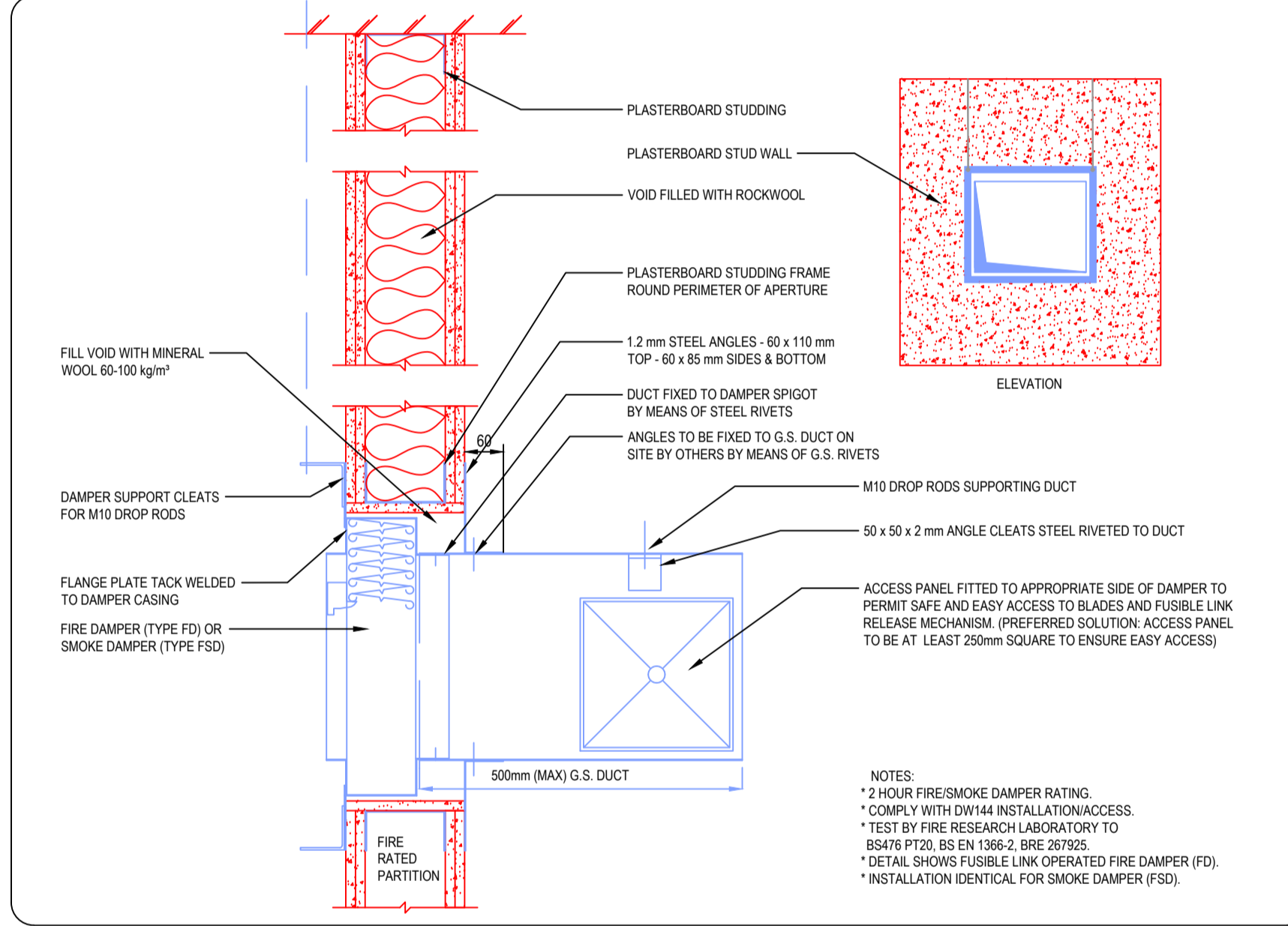
U80-02 INSULATED DUCT CROSSING NON FIRE RATED WALL



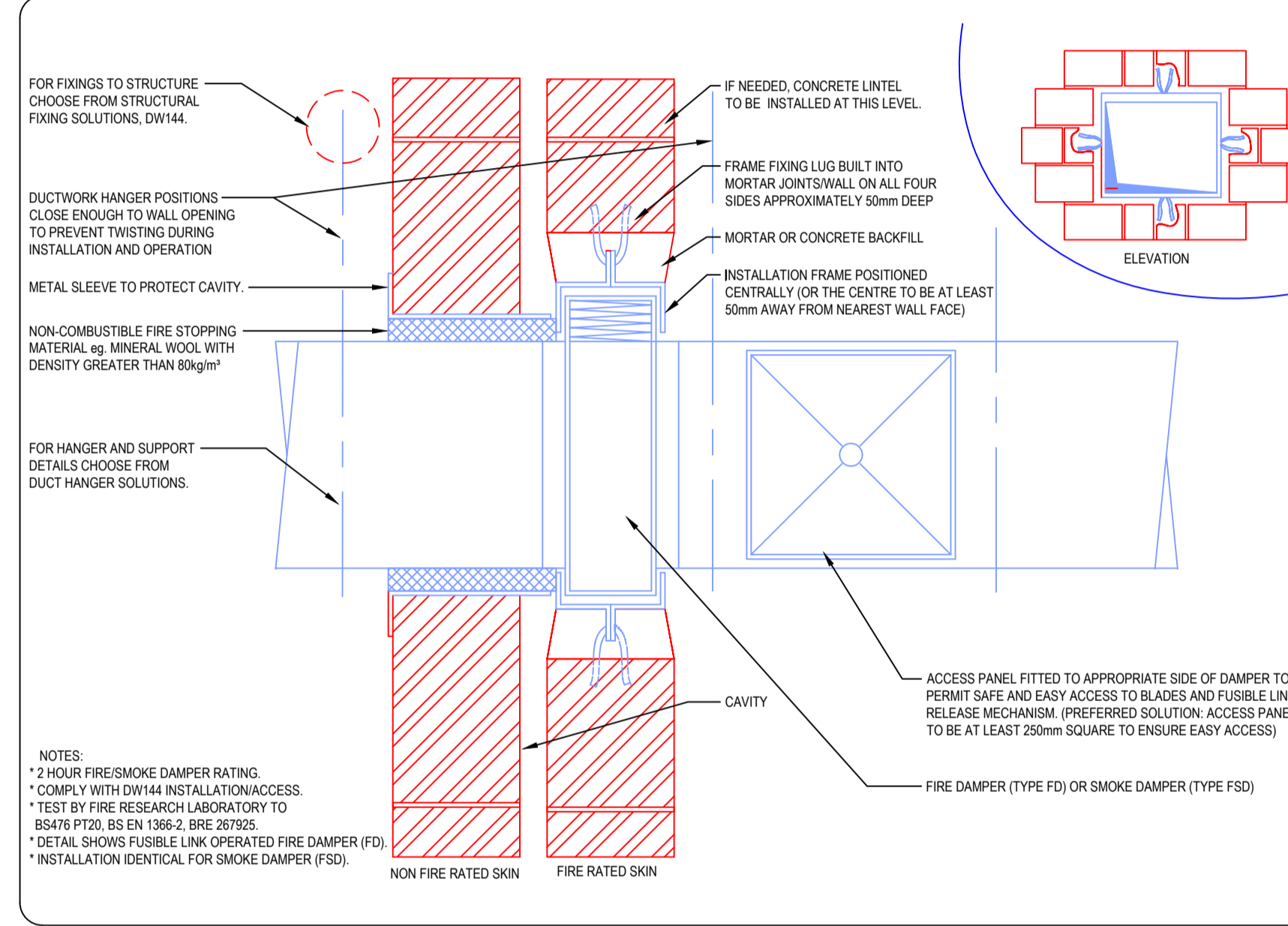
U80-03 VERTICAL FIRE/SMOKE DAMPER IN BRICK/BLOCKWORK WALL



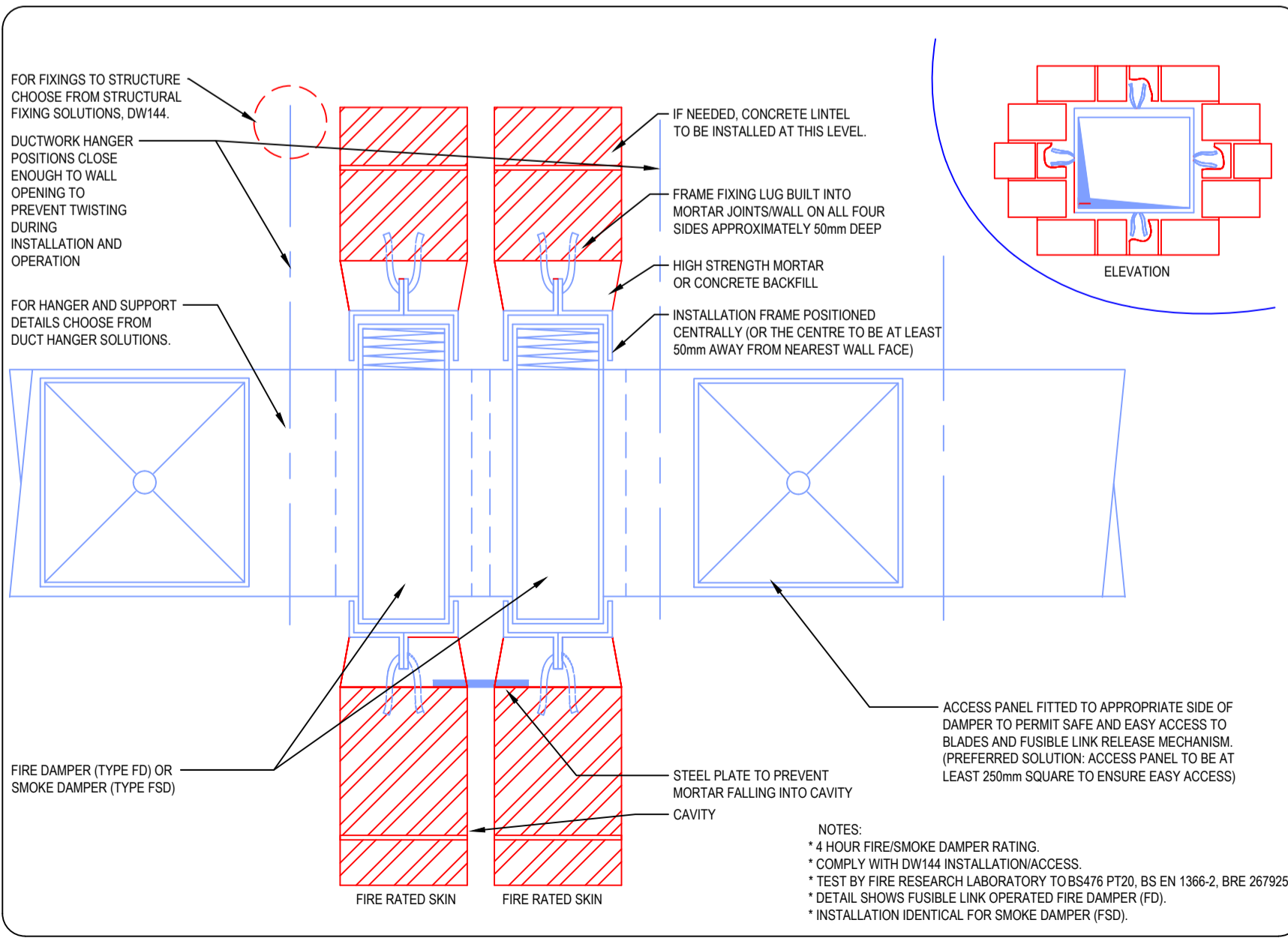
U80-04 VERTICAL FIRE/SMOKE DAMPER IN CONCRETE WALL



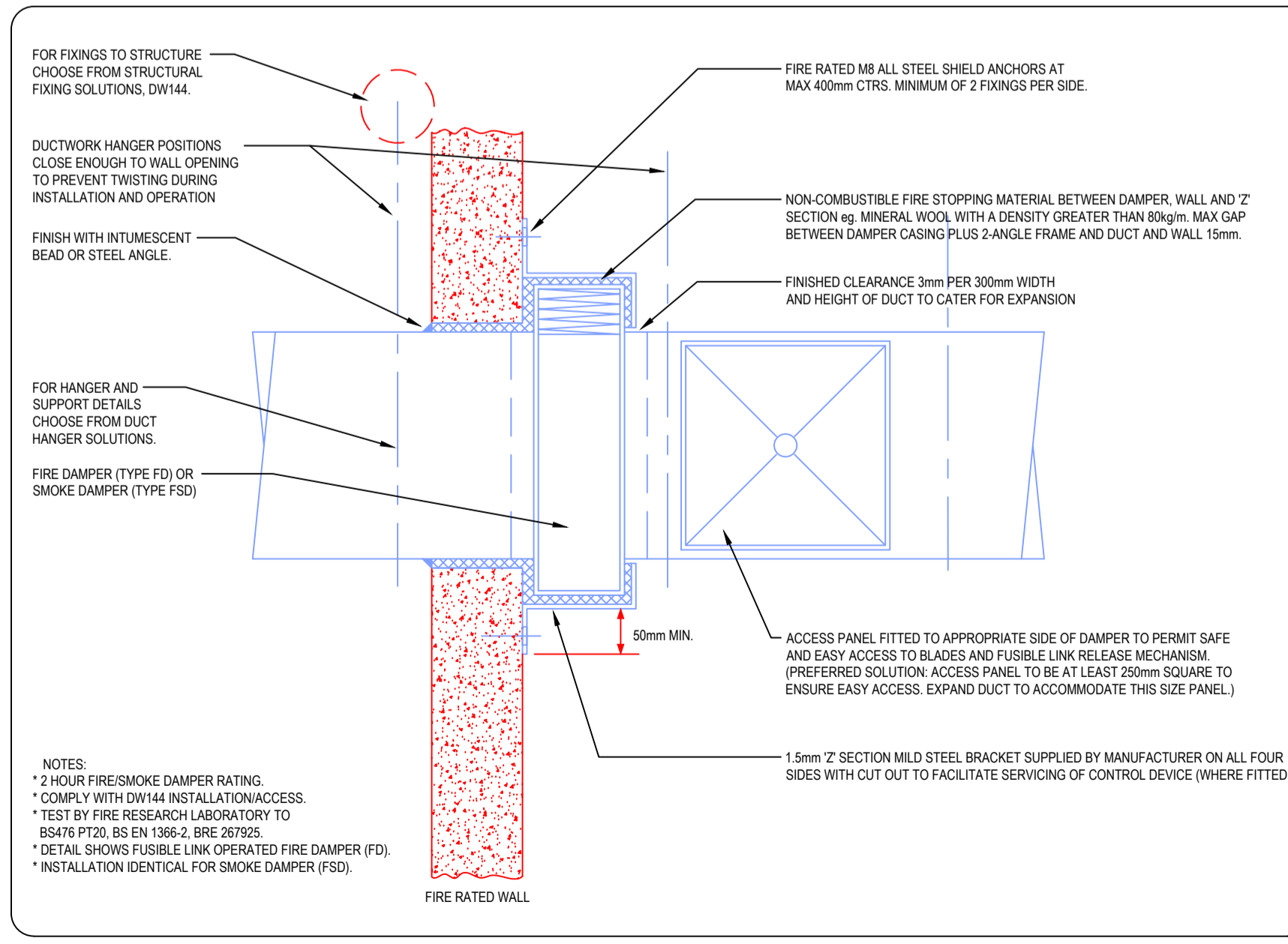
U80-05 VERTICAL FIRE/SMOKE DAMPER-PLASTERBOARD STUD WALL



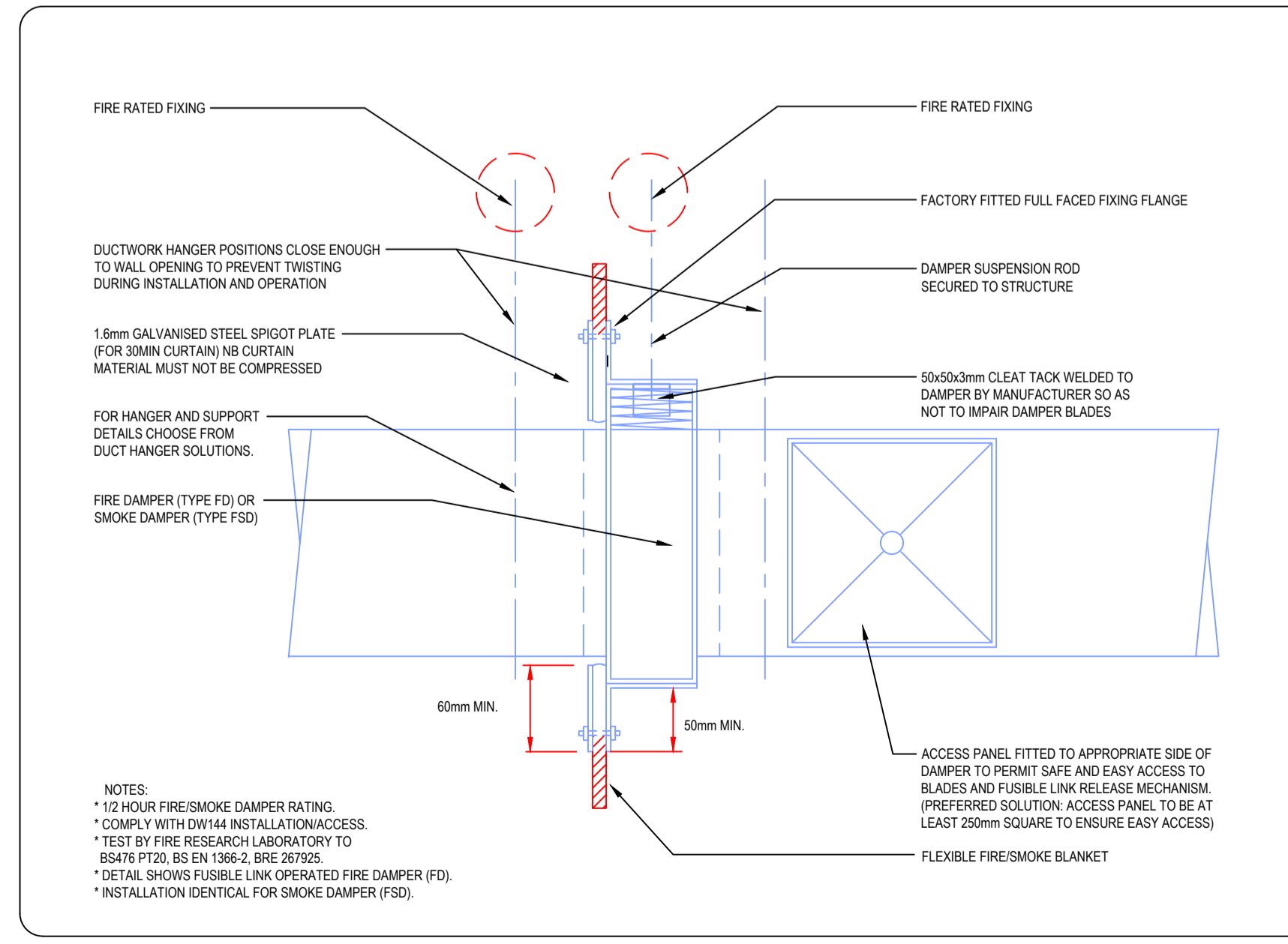
U80-06 VERTICAL FIRE/SMOKE DAMPER IN CAVITY WALL (2 HOUR)



U80-07 VERTICAL FIRE/SMOKE DAMPER IN CAVITY WALL (4 HOUR)



U80-08 VERTICAL FIRE/SMOKE DAMPER - SURFACE FIXED



U80-09 VERTICAL FIRE/SMOKE DAMPER IN FIRE/SMOKE CURTAIN

P01 TENDER	11/04/2017	AW	LH
Rev	Description	Date	Dm Chd

TENDER

Status of drawing

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Architect	Project	Job No.	035833
Project	BURO HAPPOLD STANDARD DETAILS	Drawing No.	208W-6H-SW-XX-DR-M-XX-0002
Dwg Title	Mechanical Services Standard Details - Sheet 2 Ductwork Penetration Details - 1	Rev	P01
Scales@A1	N.T.S.	Drawn by	AW
Checked by	LH	Date	April 2017

U80-01: Mechanical Services - Standard Details - Sheet 2 - Ductwork Penetration Details - 1.dwg
 U80-02: Mechanical Services - Standard Details - Sheet 2 - Ductwork Penetration Details - 1.dwg
 U80-03: Mechanical Services - Standard Details - Sheet 2 - Ductwork Penetration Details - 1.dwg
 U80-04: Mechanical Services - Standard Details - Sheet 2 - Ductwork Penetration Details - 1.dwg
 U80-05: Mechanical Services - Standard Details - Sheet 2 - Ductwork Penetration Details - 1.dwg
 U80-06: Mechanical Services - Standard Details - Sheet 2 - Ductwork Penetration Details - 1.dwg
 U80-07: Mechanical Services - Standard Details - Sheet 2 - Ductwork Penetration Details - 1.dwg
 U80-08: Mechanical Services - Standard Details - Sheet 2 - Ductwork Penetration Details - 1.dwg
 U80-09: Mechanical Services - Standard Details - Sheet 2 - Ductwork Penetration Details - 1.dwg

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1. WORKING AT HEIGHT
 2. LIFTING HEAVY EQUIPMENT
 3. WORKING ADJACENT TO POTENTIALLY LIVE SERVICES
 4. HANDLING CHEMICAL PRODUCTS
 5. WORKING IN CONFINED SPACES
 6. PRESENCE OF ASBESTOS

MAINTENANCE/CLEANING/OPERATION:

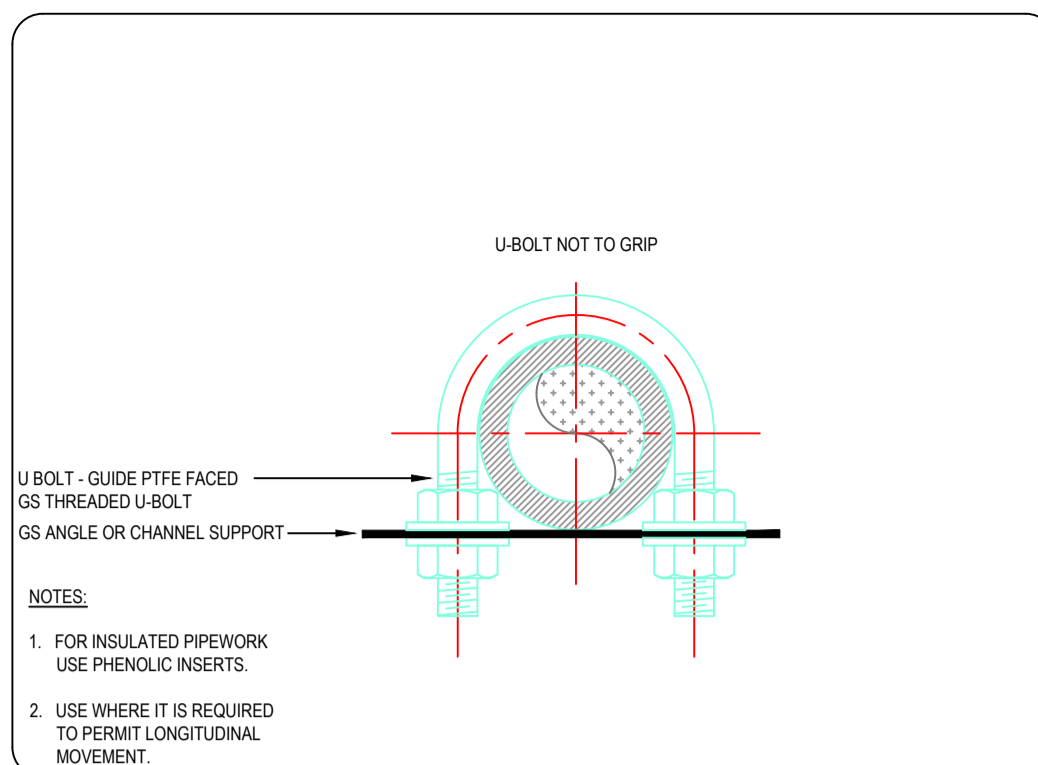
1. HANDLING CHEMICAL PRODUCTS
2. WORKING AT HEIGHT
3. WORKING ADJACENT TO POTENTIALLY LIVE SERVICES

DECOMMISSIONING/DEMOLITION:

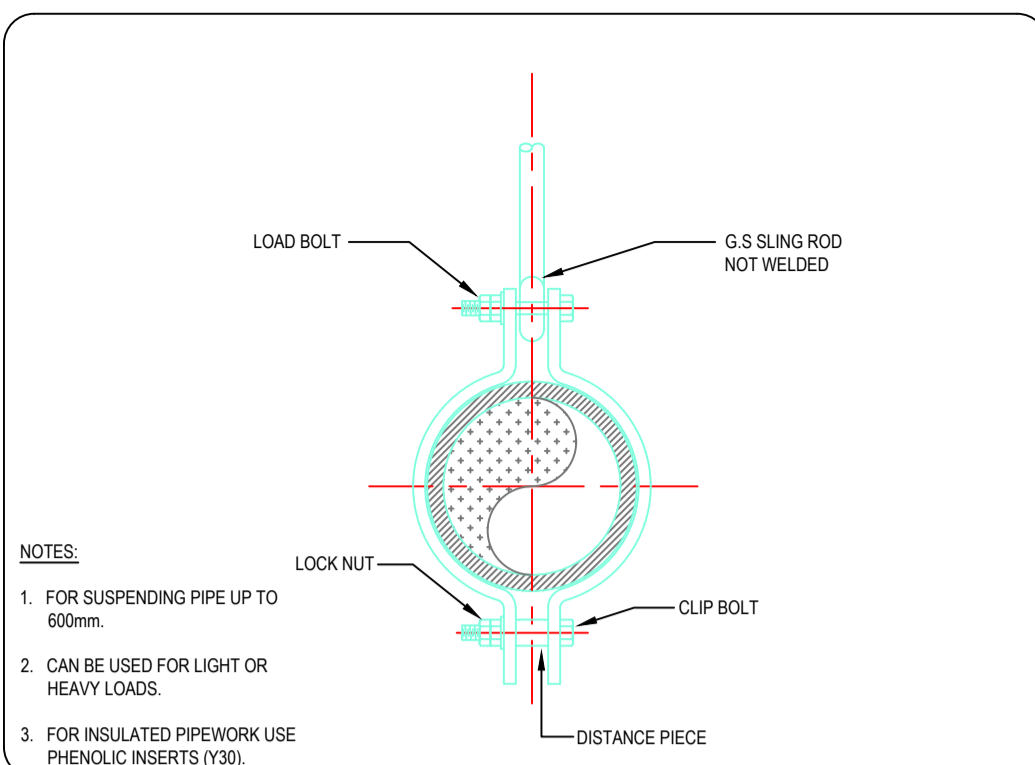
1. PRESENCE OF LIVE SERVICES
2. PRESENCE OF ASBESTOS
3. WORKING AT HEIGHT
4. LIFTING HEAVY EQUIPMENT
5. ALWAYS SAFELY ISOLATE BEFORE COMMENCING ANY WORKS

Notes

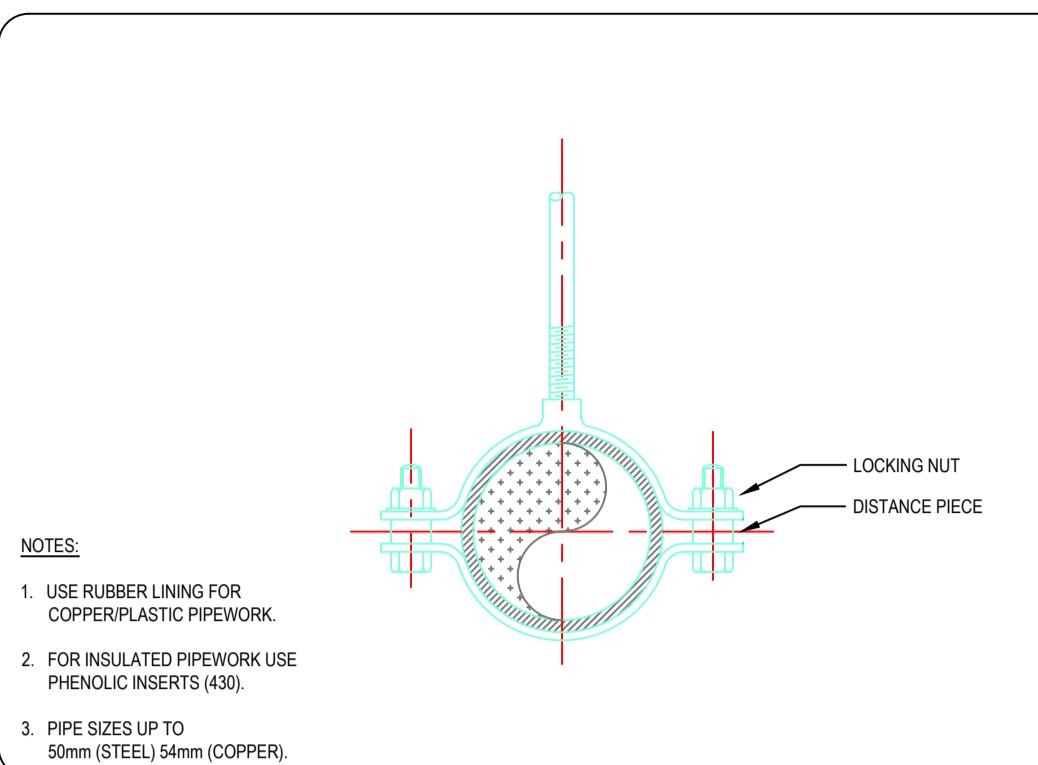
1. FOR FIXINGS TO STRUCTURE REFER TO "STANDARD DETAIL - SHEET 5 STRUCTURAL FIXINGS".
2. DO NOT OVER TIGHTEN SERVICES THAT NEED TO EXPAND.
3. FOR SWINGING PIPE HANGERS SUPPORT RODS MUST BE AT LEAST 300mm.
4. USE HEMISPHERICAL WASHERS ON SWINGING PIPE SUPPORTS.
5. SLIDING SUPPORTS TO ACCOMMODATE LINEAR MOVEMENTS TO BE FACED WITH PTFE.
6. ANCHOR VERTICAL PIPEWORK AT THE BASE WITH GUIDES AT INTERVALS IN THE RISER.
7. PROVIDE ROLLERS FOR ALL HEATING & HOT WATER SERVICES.
8. PROVIDE PLASTIC COATING FOR COPPER OR PLASTIC PIPEWORK WHERE NECESSARY TO GIVE SEPARATION BETWEEN SUPPORT AND PIPE TUBE.



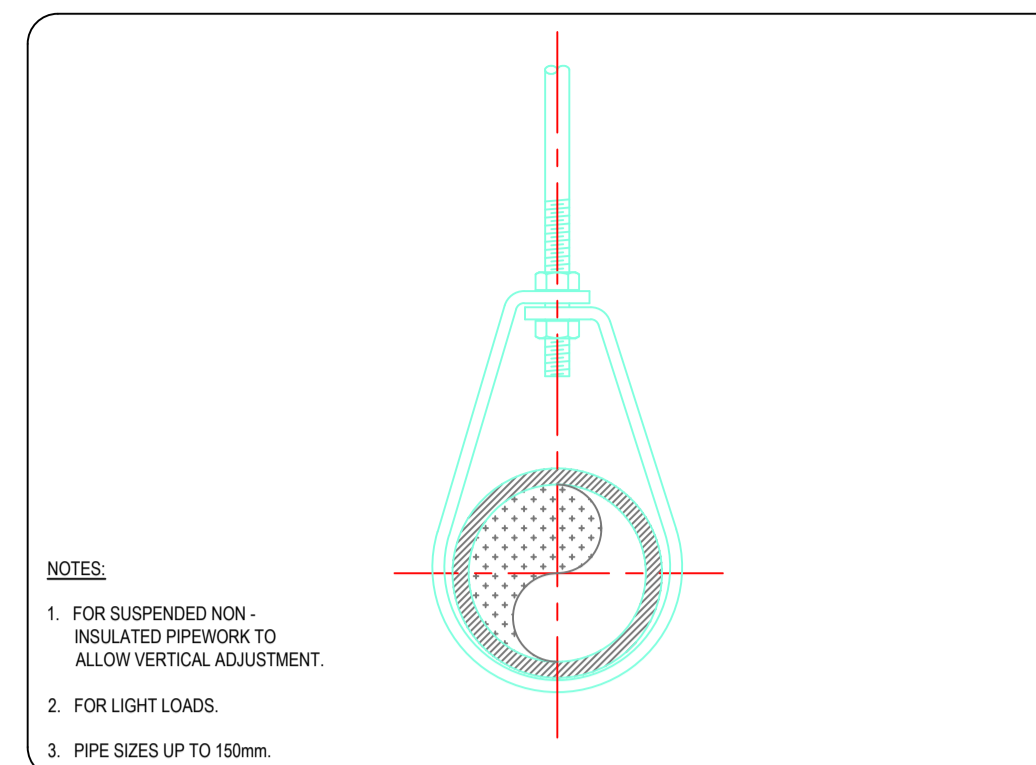
Y10-01 "U" BOLT



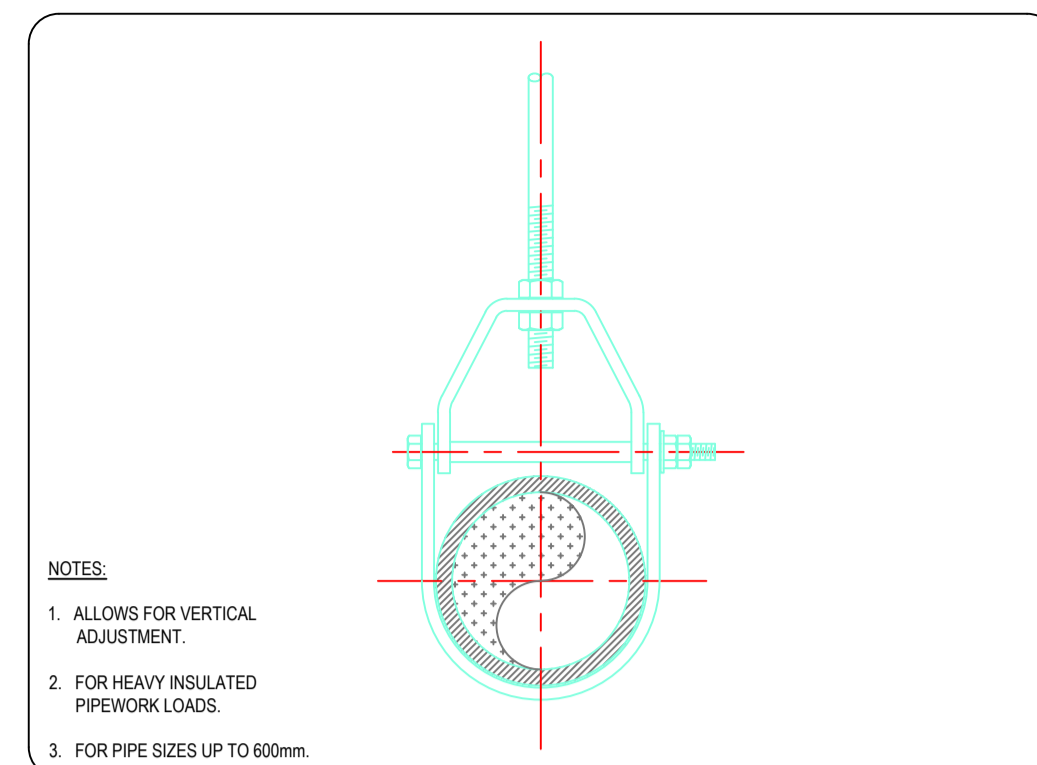
Y10-02 SUSPENDED PIPE CLAMP HANGER



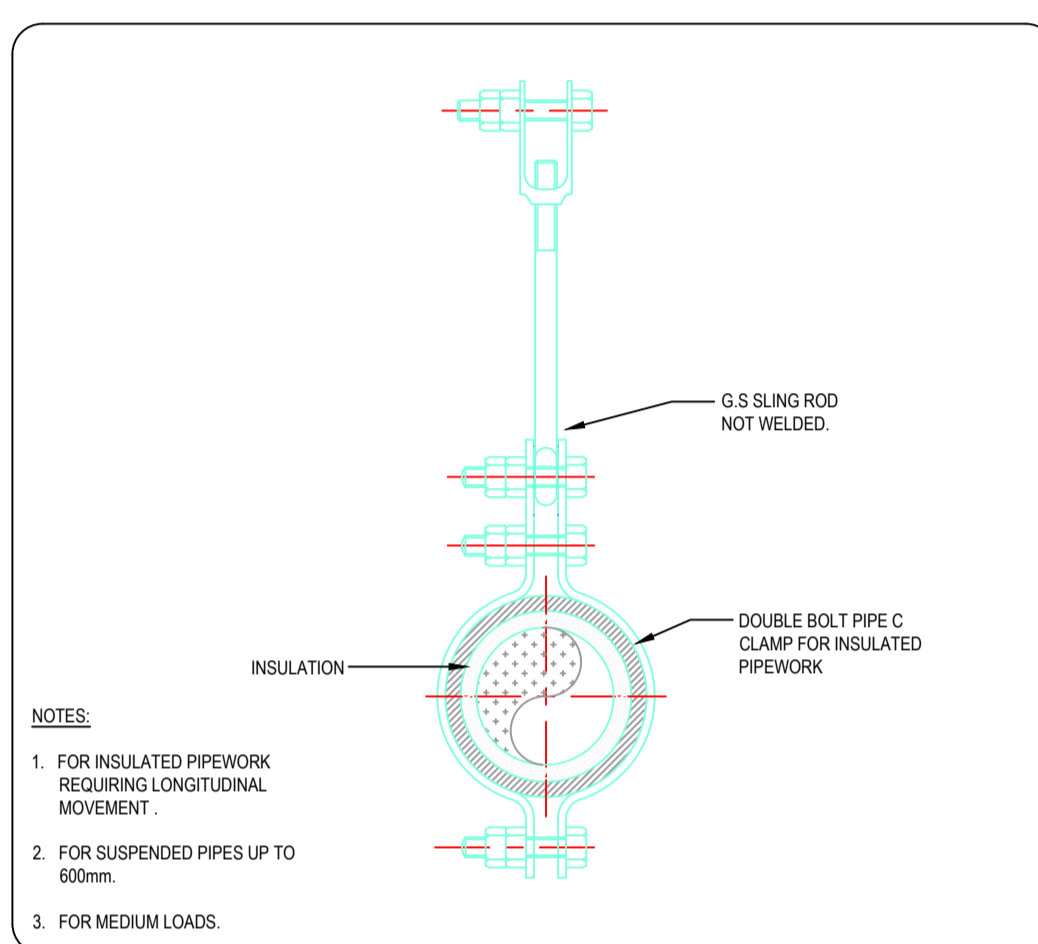
Y10-03 HORIZONTAL OR VERTICAL PIPE CLAMP HANGER



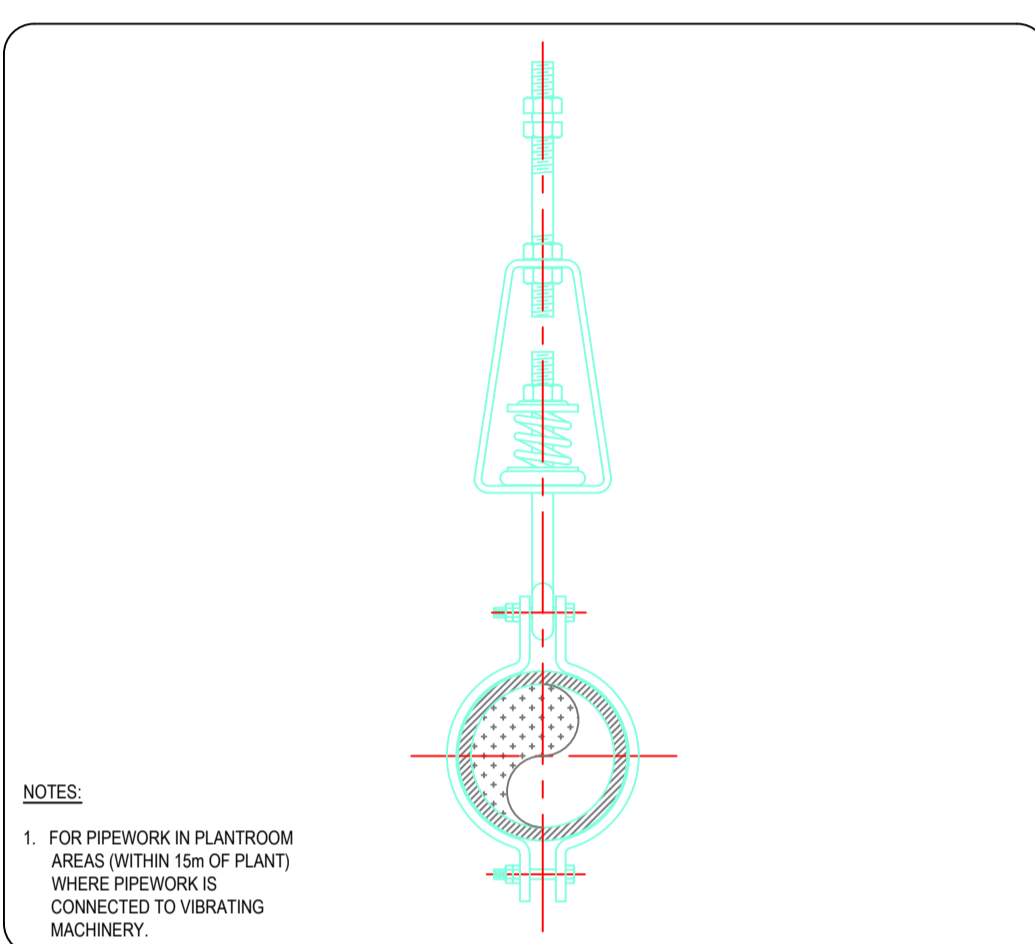
Y10-04 STRAP CLAMP HANGER



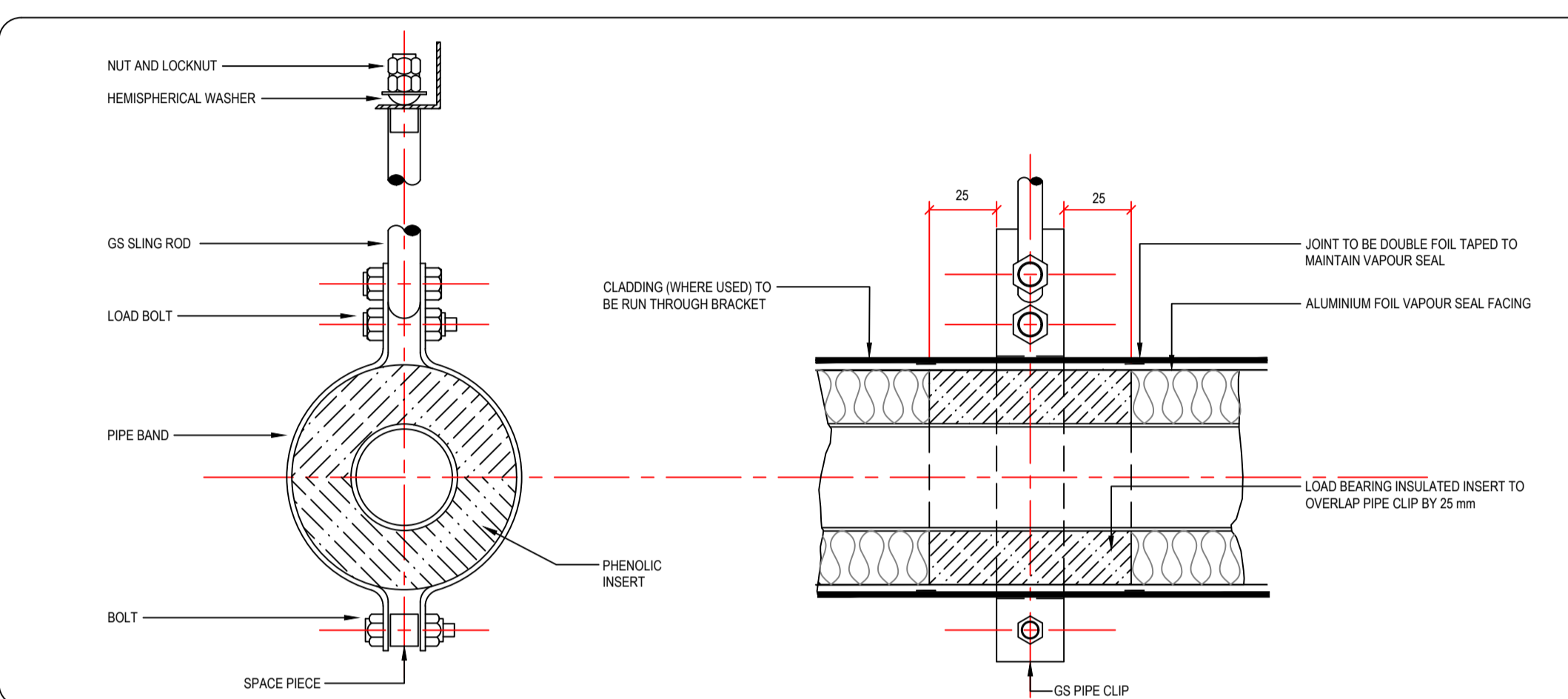
Y10-05 CLEVIS HANGER



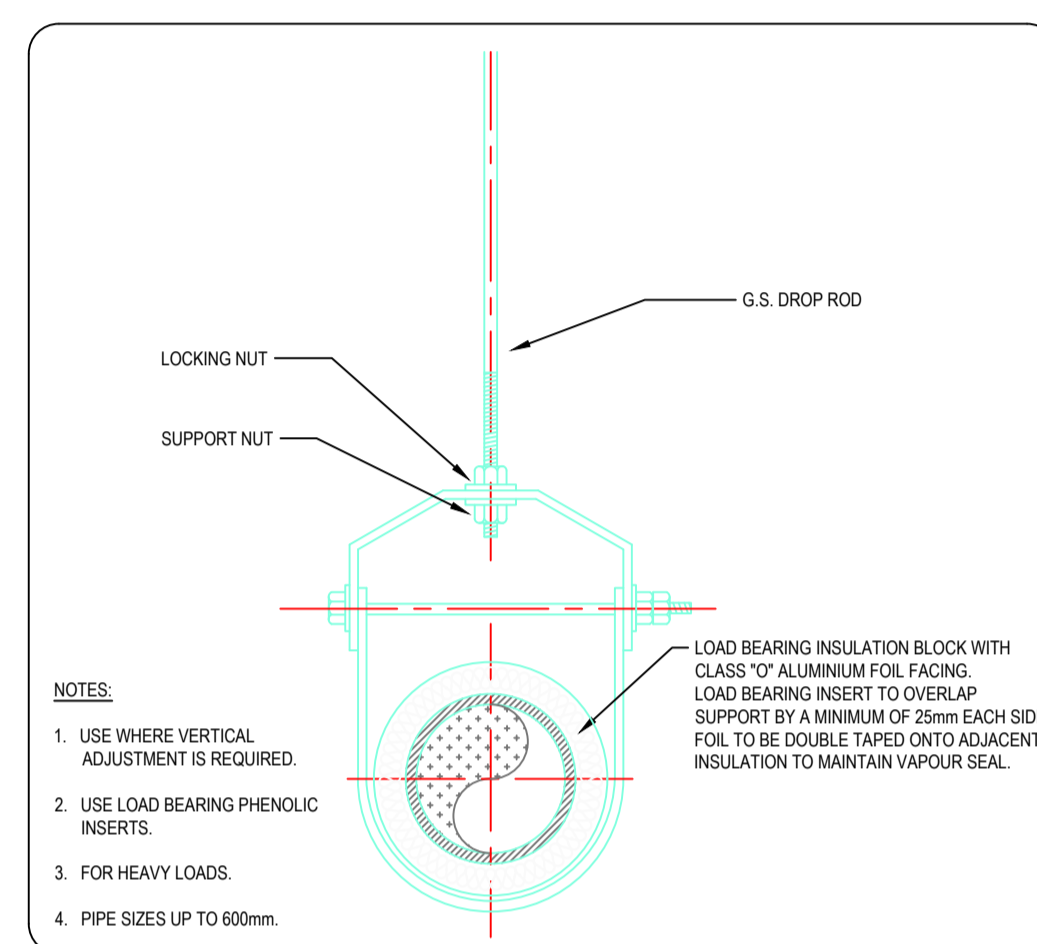
Y10-06 SWIVEL HANGER FOR INSULATED PIPE



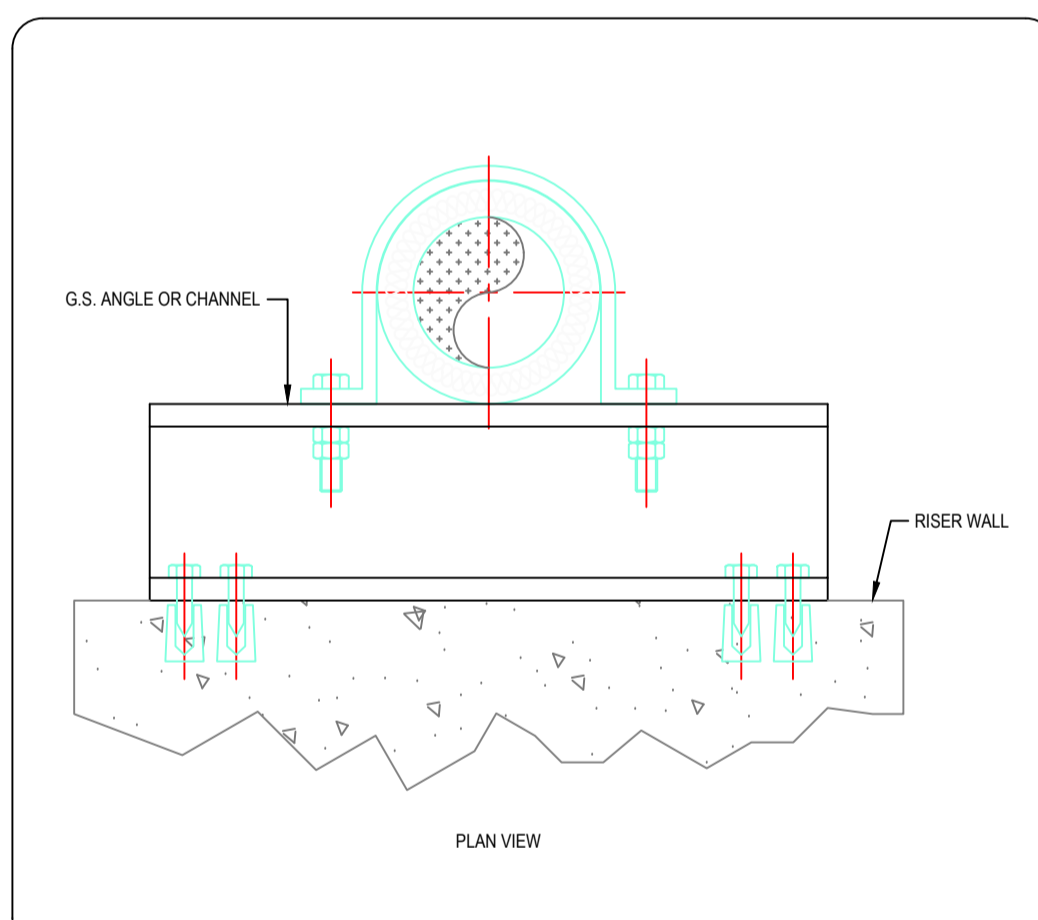
Y10-07 SPRING HANGER



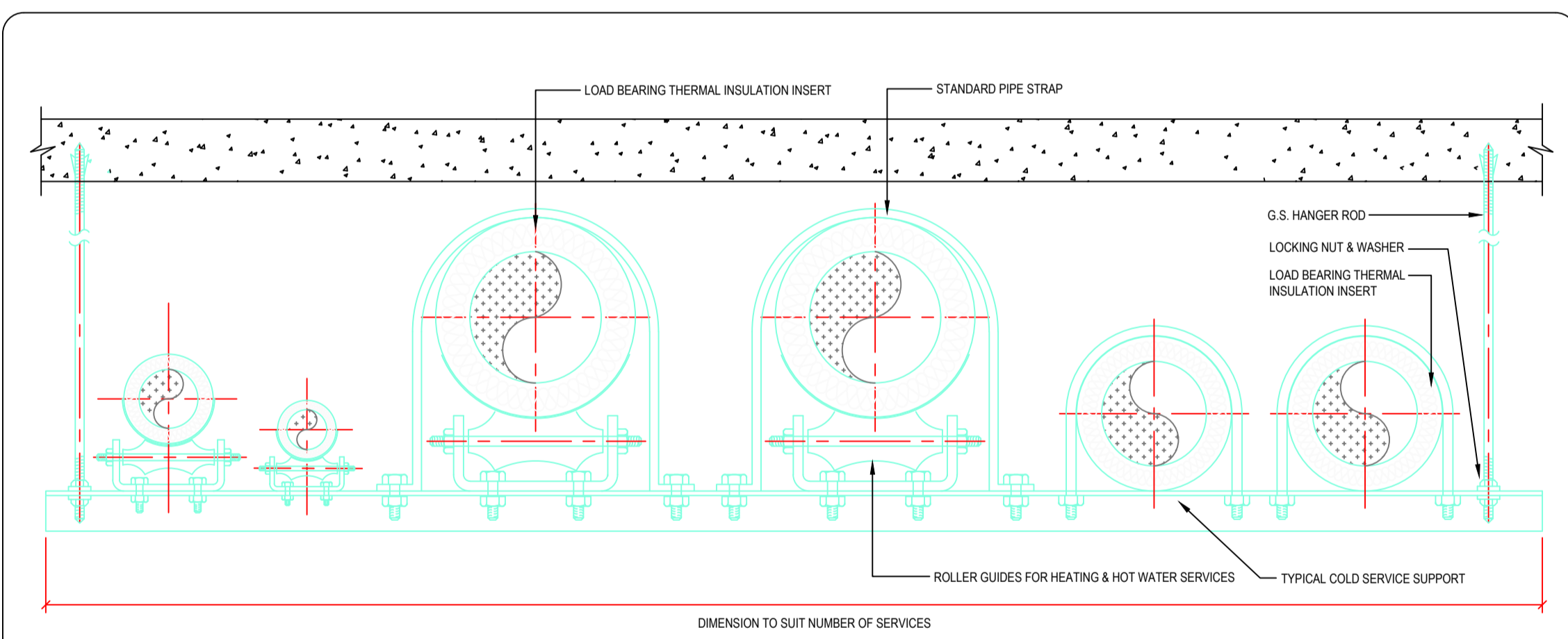
Y10-08 INSULATED PIPE SUPPORT



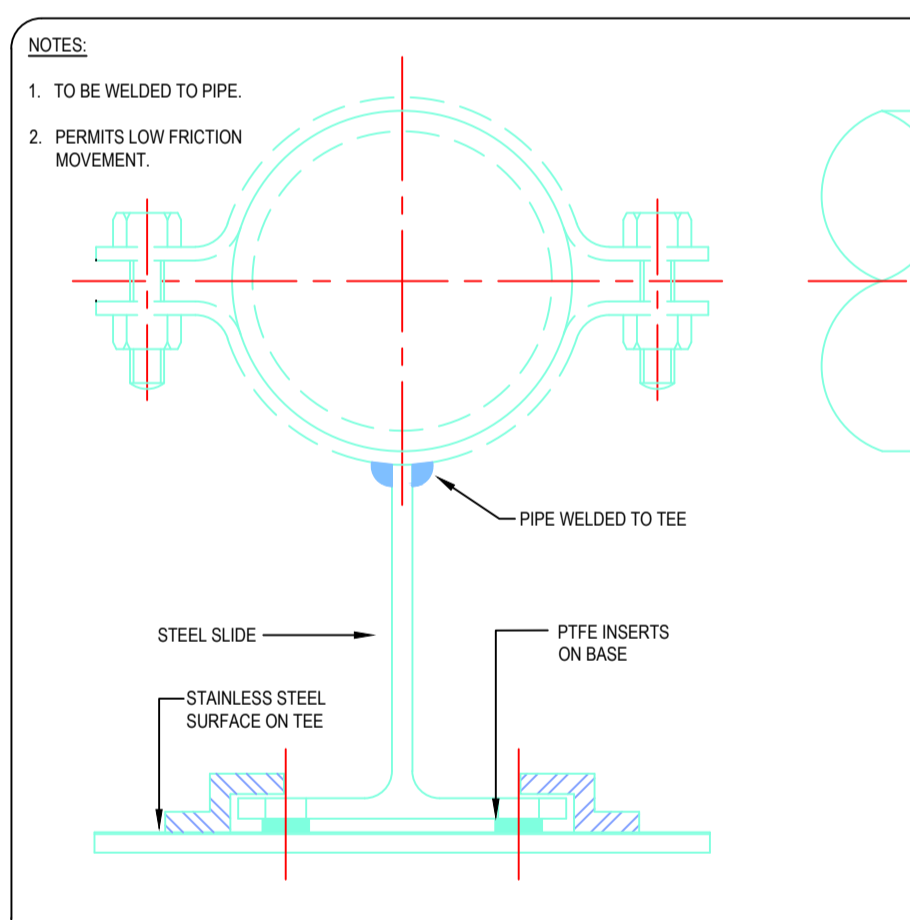
Y10-09 CLEVIS HANGER - INSULATED



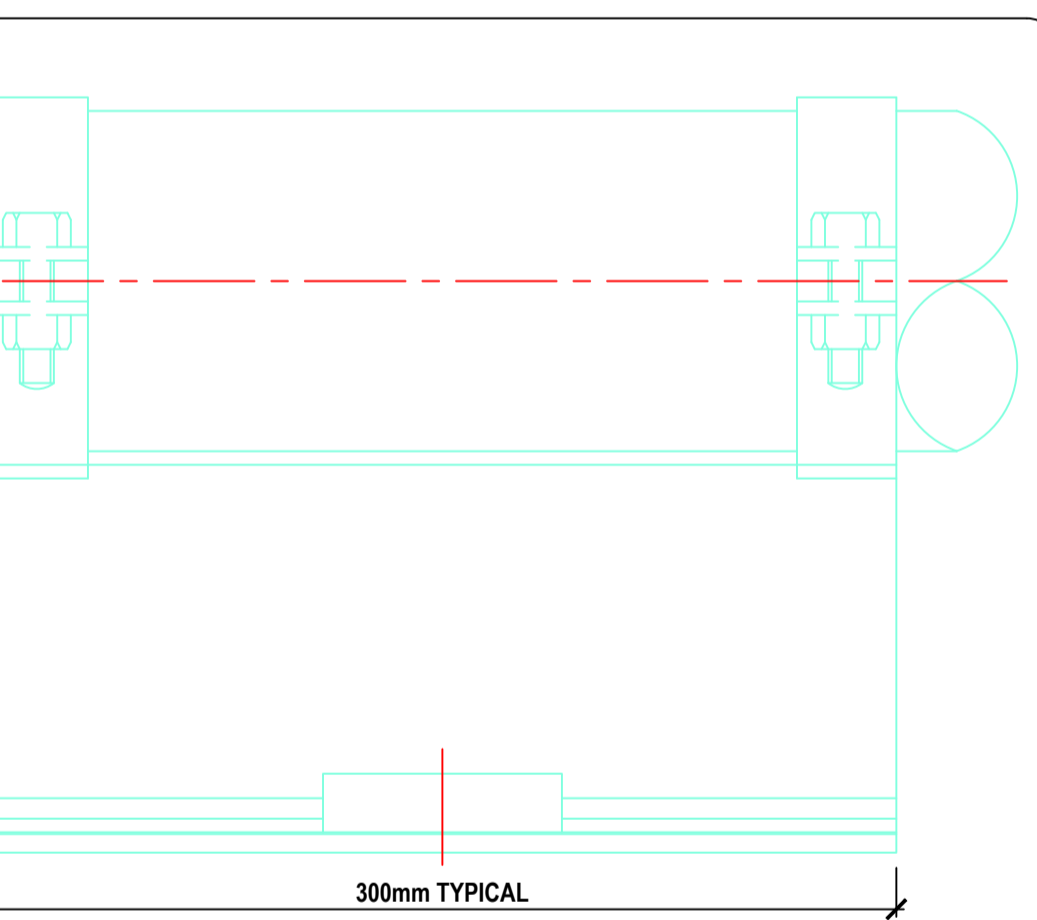
Y10-10 VERTICAL PIPE RISER SUPPORT



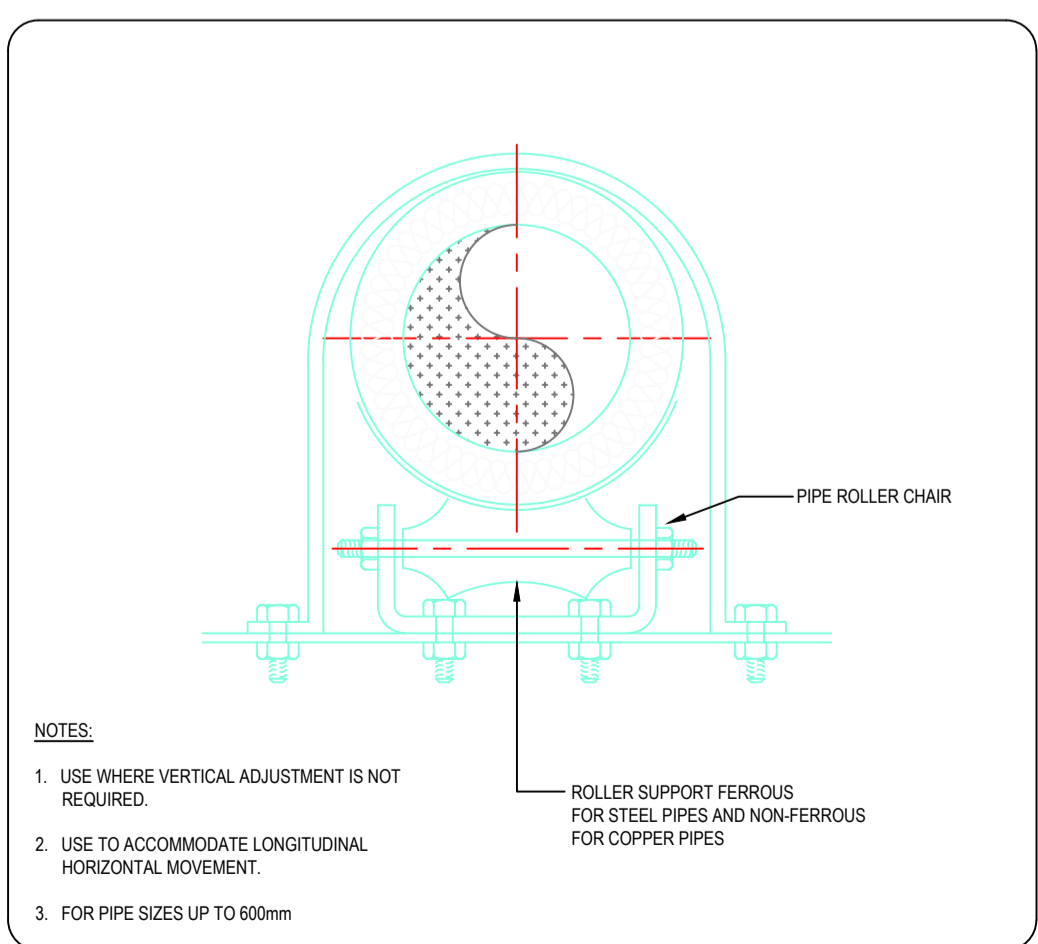
Y10-11 HORIZONTAL MULTIPipe SUPPORT



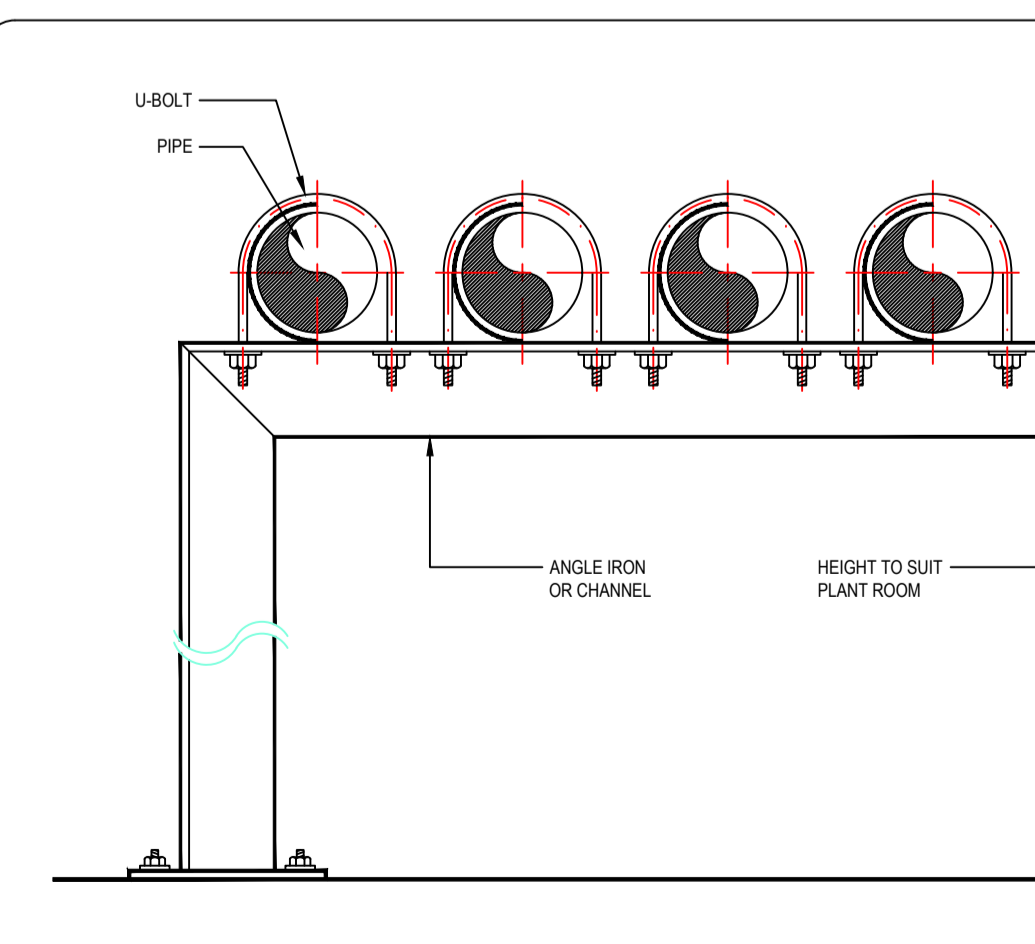
Y10-12 LIGHT DUTY PIPE GUIDE SUPPORT



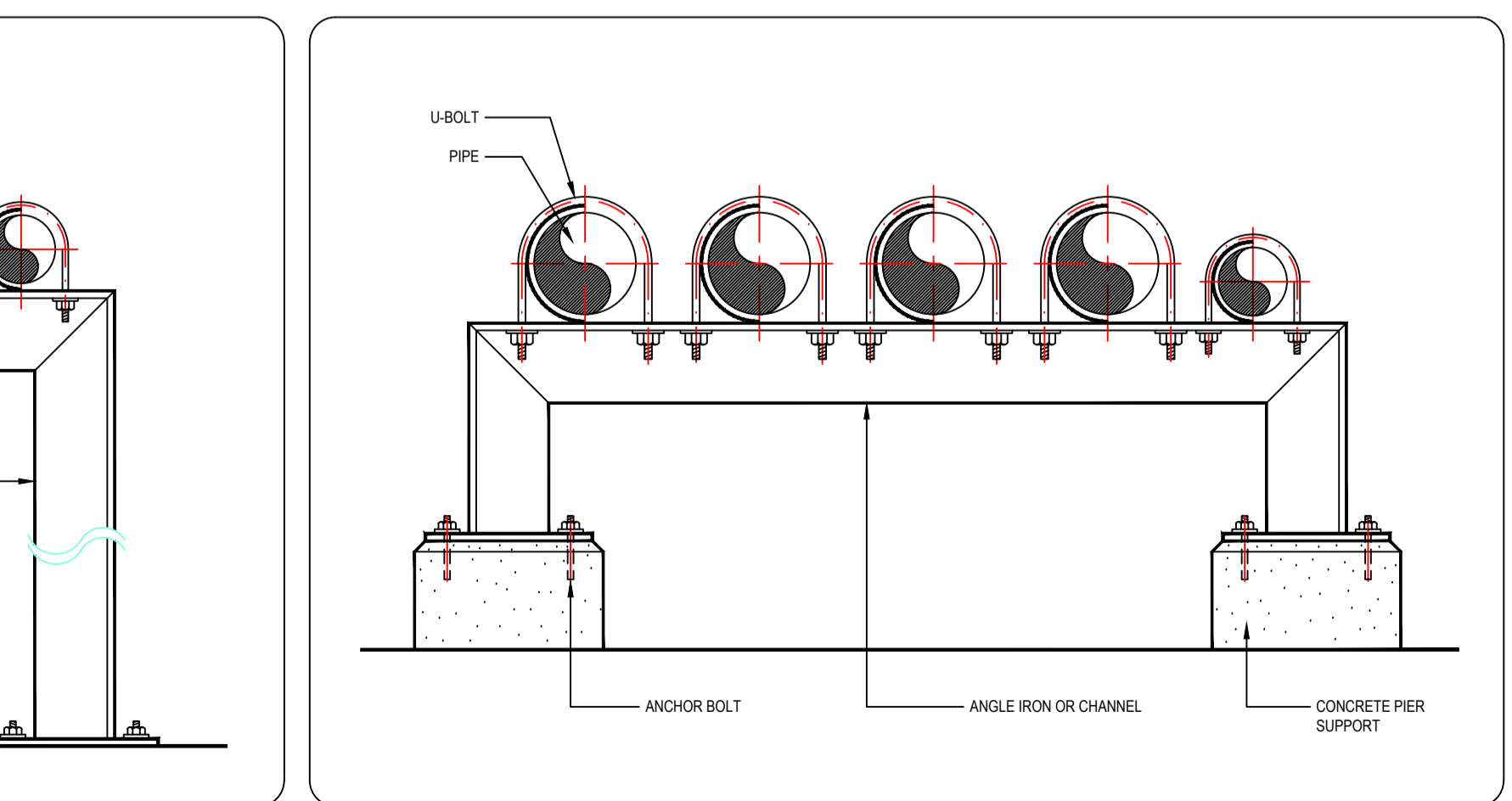
Y10-16 PIPEWORK SERVICES IN FLOOR SCREED



Y10-13 HEAVY DUTY PIPE GUIDE FOR HEATING & HOT WATER SERVICES



Y10-14 PIPEWORK FLOOR SUPPORT



Y10-15 PIPEWORK ROOF SUPPORT

P01 TENDER	11/04/2017 AW LH
Rev Description	Date Dm Chd

TENDER

Status of drawing

BUROHAPPOLD ENGINEERING

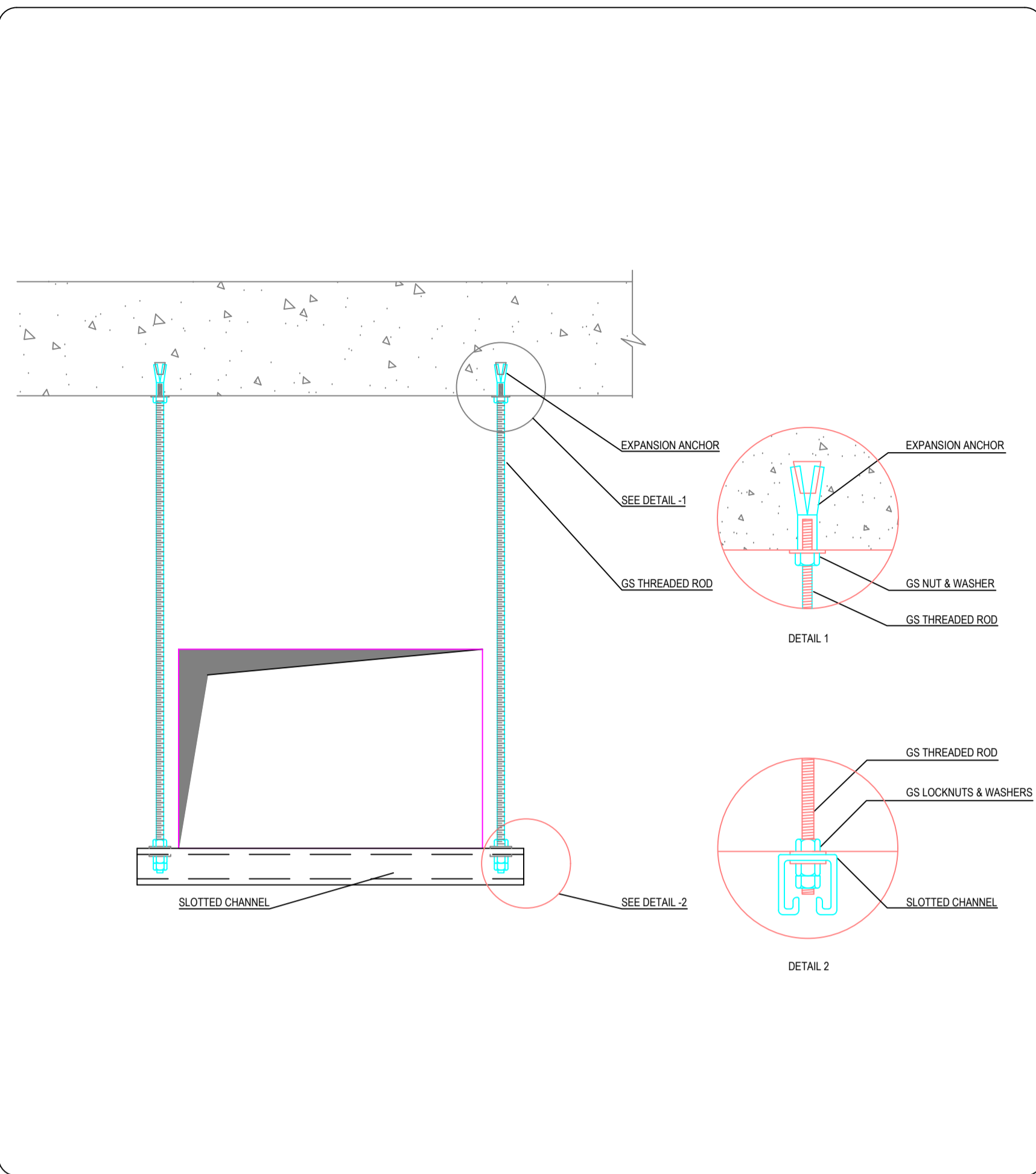
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Fax: +44 (0)870 787 4148
Email: 035833@burohappold.com
Web: www.burohappold.com

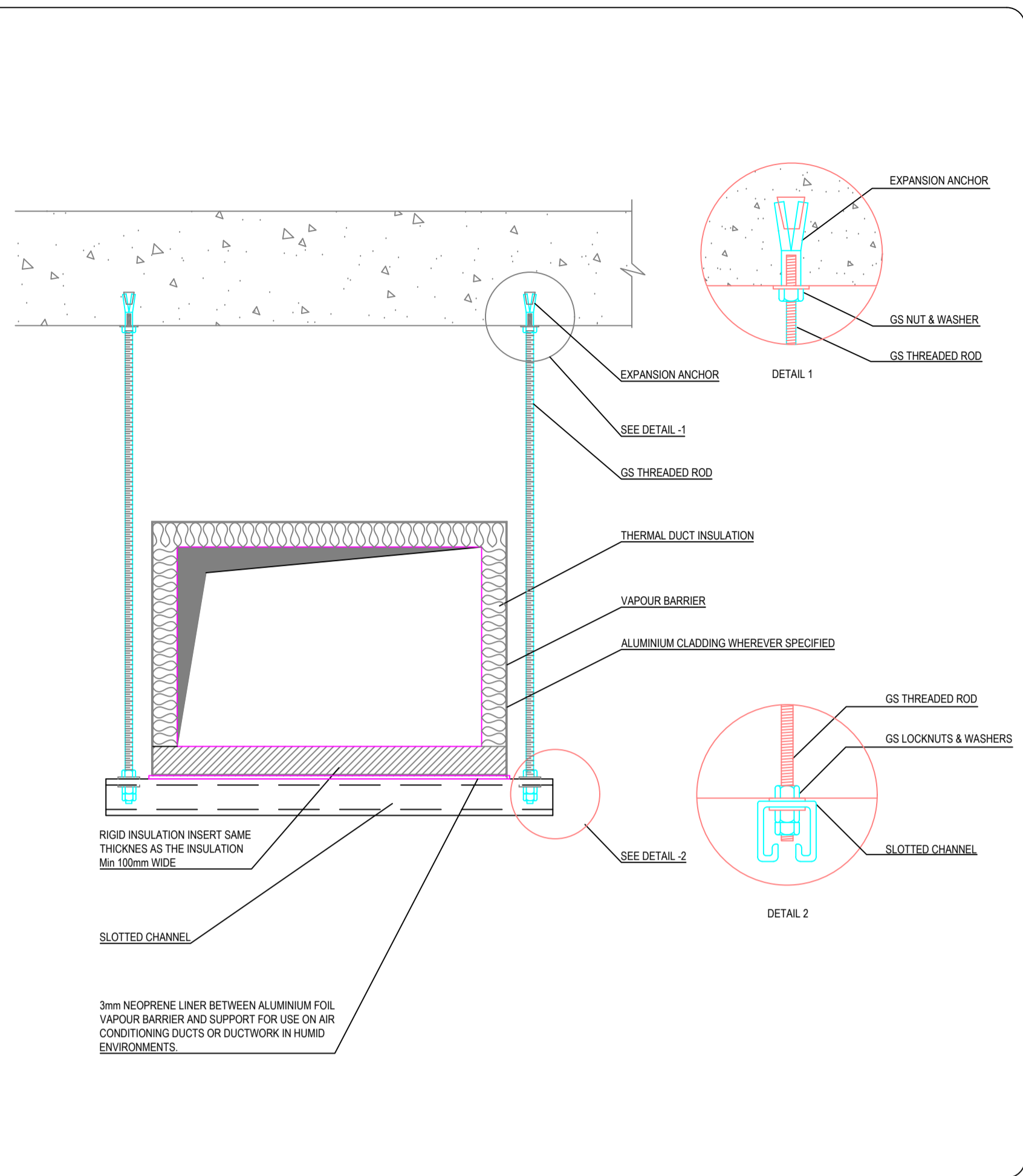
Project: **BURO HAPPOLD STANDARD DETAILS**
Drg Title: **Mechanical Services Standard Details - Sheet 3 Pipework Support Details**

Scale: A1 N.T.S.	Job No: 035833
Drawn by: AW	Drawing No: 208W-6HM-SW-XX-DR-M-XX-6003
Checked by: LH	Rev: P01
Date: April 2017	

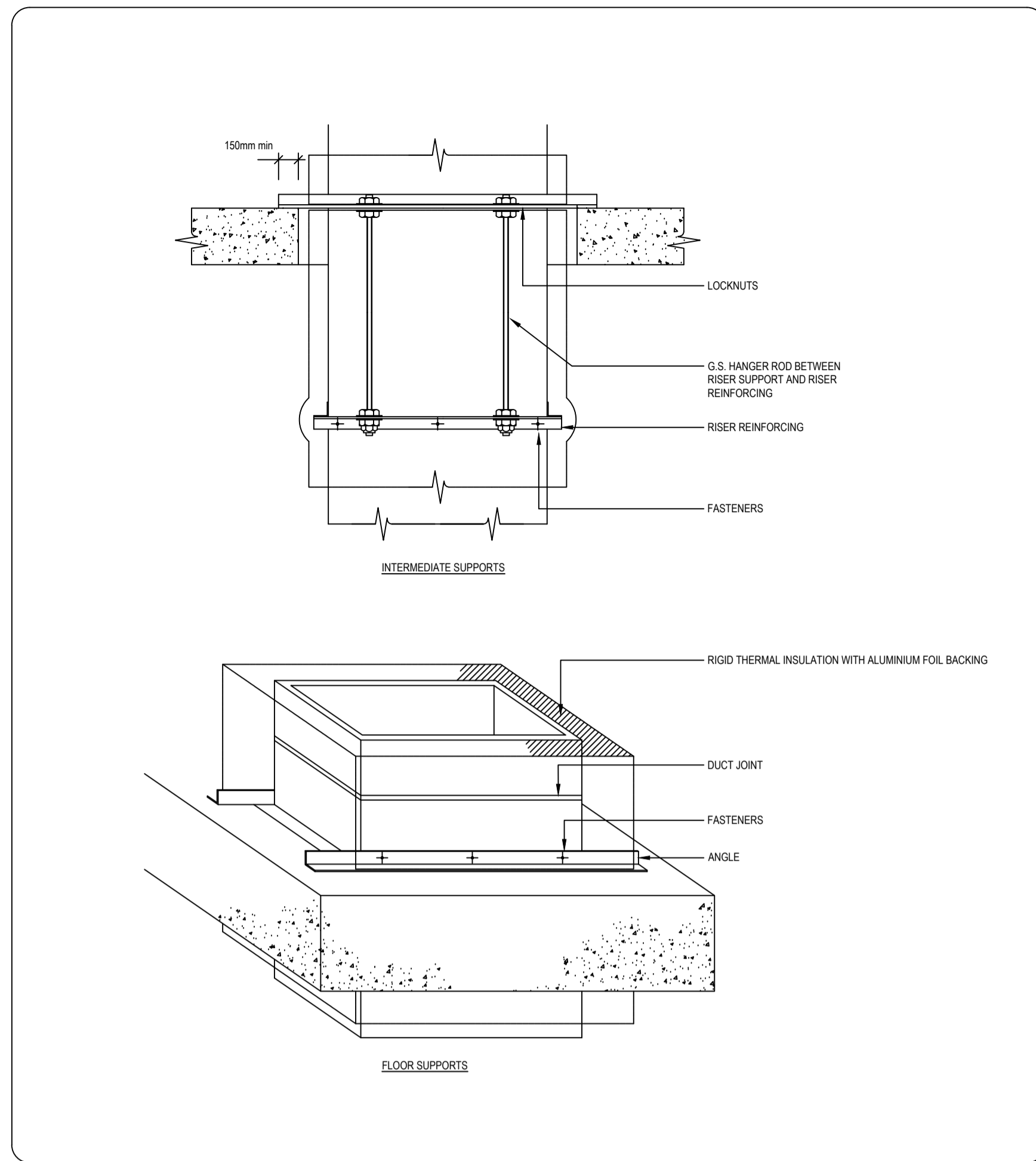
File: C:\Users\happold\OneDrive\Documents\BuroHappold\Projects\2017\035833\Mechanical Services - Standard Details - Sheet 3 - Pipework Support Details.dwg



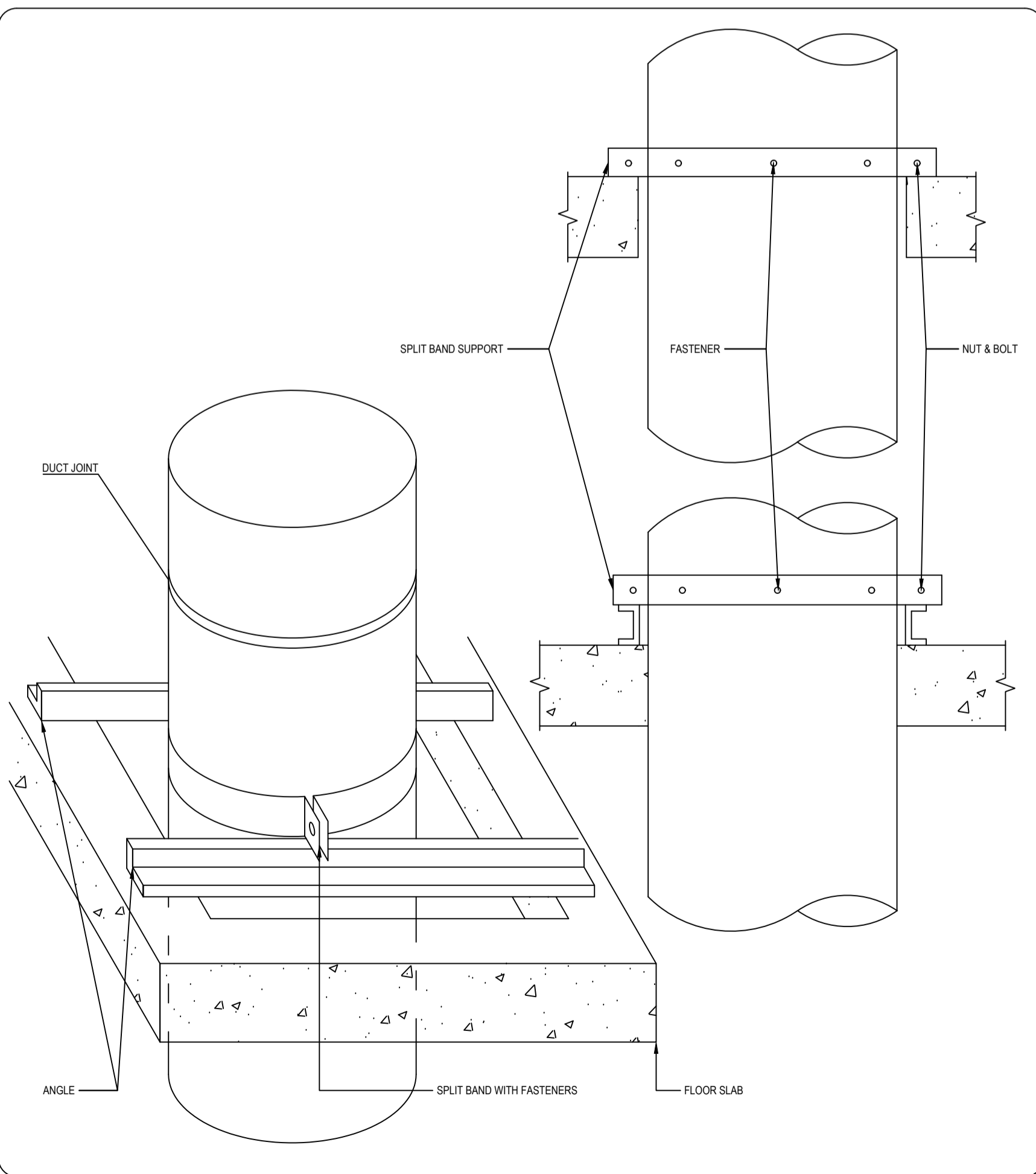
U80-01 HORIZONTAL UNINSULATED RECTANGULAR DUCT SUPPORT



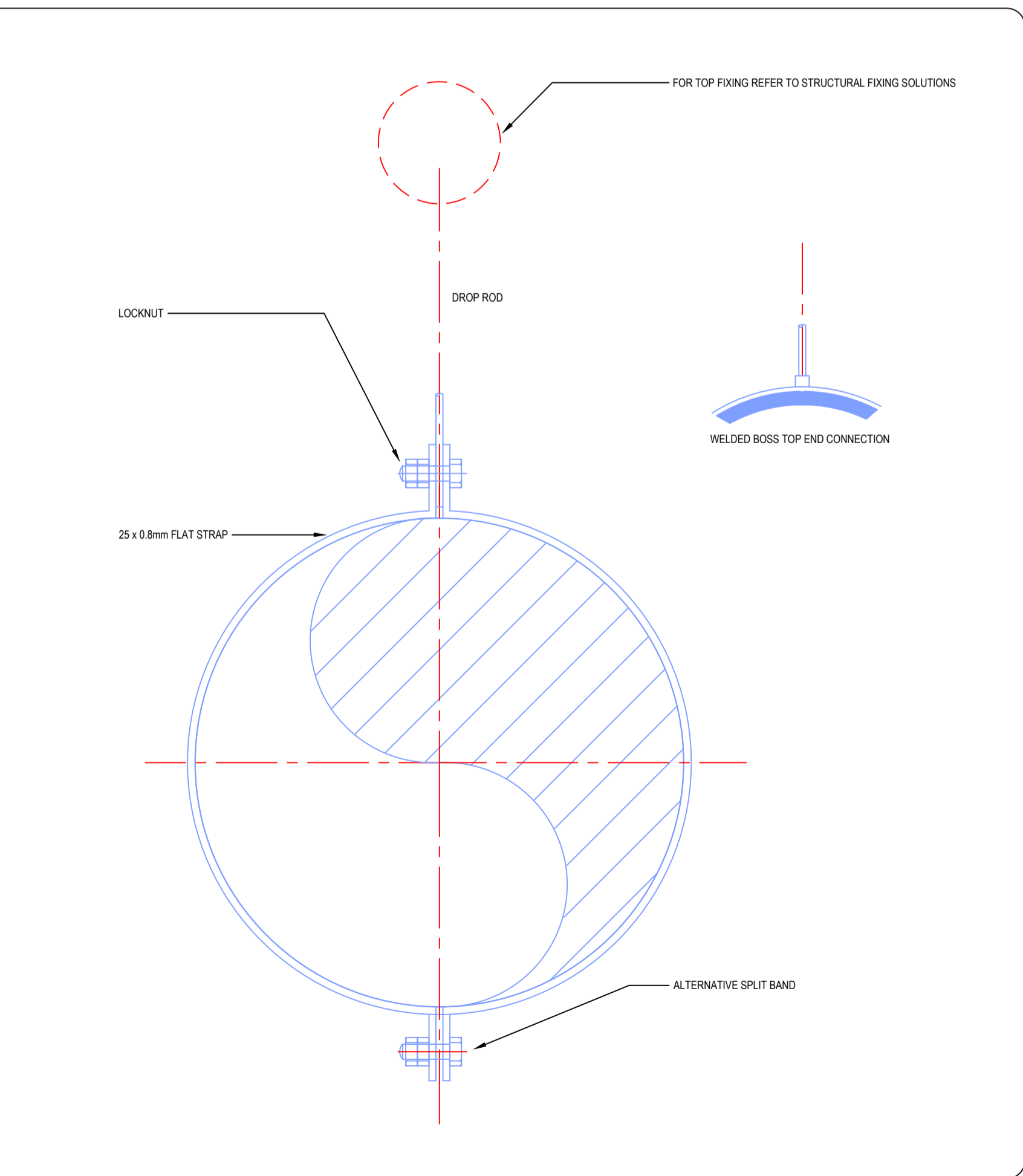
U80-02 HORIZONTAL INSULATED RECTANGULAR DUCT SUPPORT



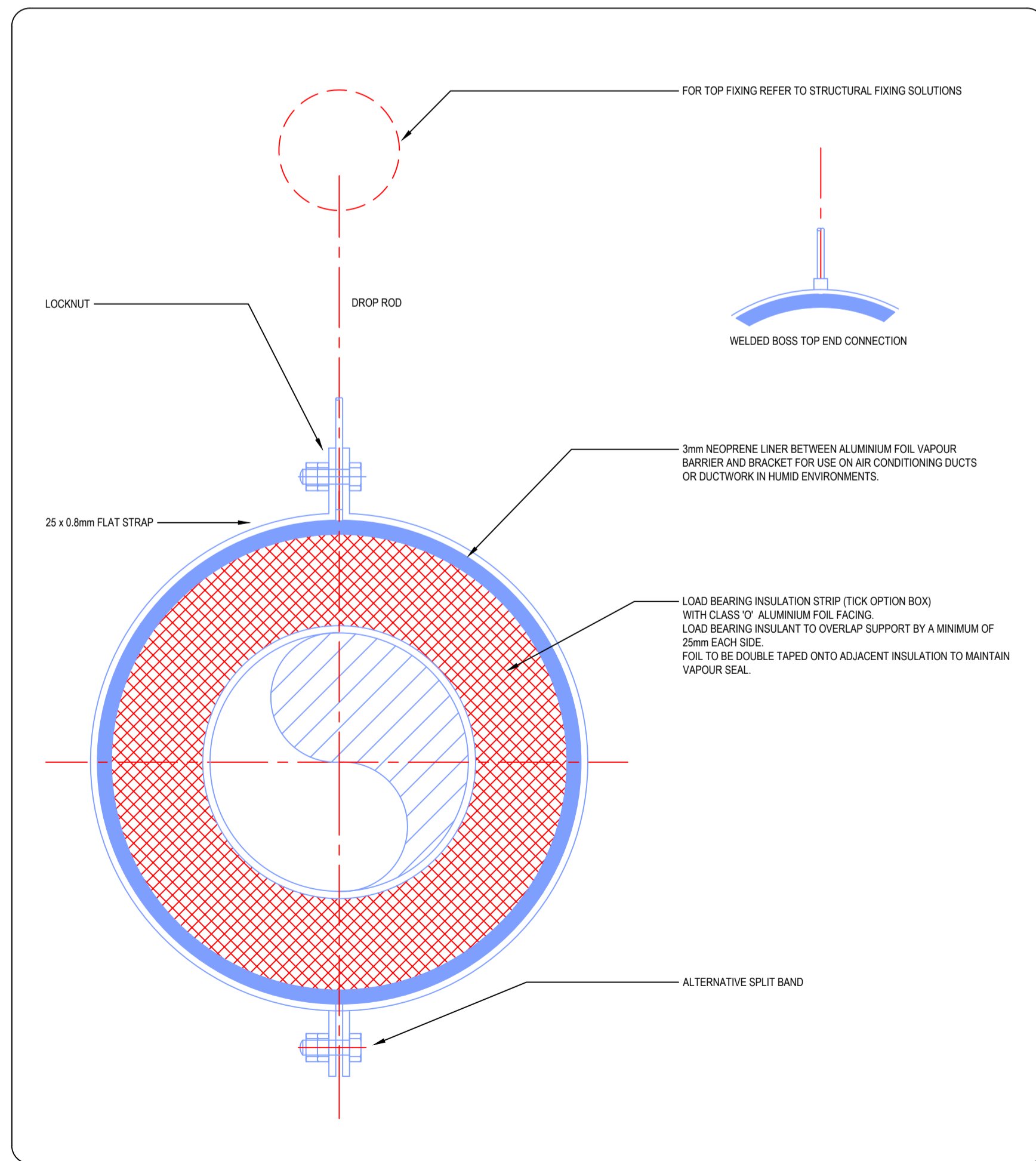
U80-03 VERTICAL RECTANGULAR DUCT SUPPORT



U80-04 VERTICAL CIRCULAR DUCT SUPPORT



U80-05 HORIZONTAL UNINSULATED CIRCULAR DUCT SUPPORT



U80-06 HORIZONTAL INSULATED CIRCULAR DUCT SUPPORT

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 3. WORKING ADJACENT TO POTENTIALLY LIVE SERVICES
 4. HANDLING CHEMICAL PRODUCTS
 5. WORKING IN CONFINED SPACES
 6. PRESENCE OF ASBESTOS

MAINTENANCE/CLEANING/OPERATION:

1. HANDLING CHEMICAL PRODUCTS
2. WORKING AT HEIGHT
3. WORKING ADJACENT TO POTENTIALLY LIVE SERVICES

DECOMMISSIONING/DEMOLITION:

1. PRESENCE OF LIVE SERVICES
2. PRESENCE OF ASBESTOS
3. WORKING AT HEIGHT
4. LIFTING HEAVY EQUIPMENT
5. ALWAYS SAFELY ISOLATE BEFORE COMMENCING ANY WORKS

Notes

1. FIRE DAMPERS ARE REQUIRED IN FIRE RATED WALLS AND FLOORS, SEE STANDARD DETAIL SHEETS 1 & 2.
2. CUT ENDS OF UNISTRUT TO BE GALVANISED PAINTED AND COMPLETE WITH END CAPS.
3. DROP RODS TO BE TRIMMED CLOSE TO LOCK NUTS.

P01 TENDER	11/04/2017	AW	LH
Rev	Description	Date	Dm

TENDER

Status of drawing

BUROHAPPOLD ENGINEERING

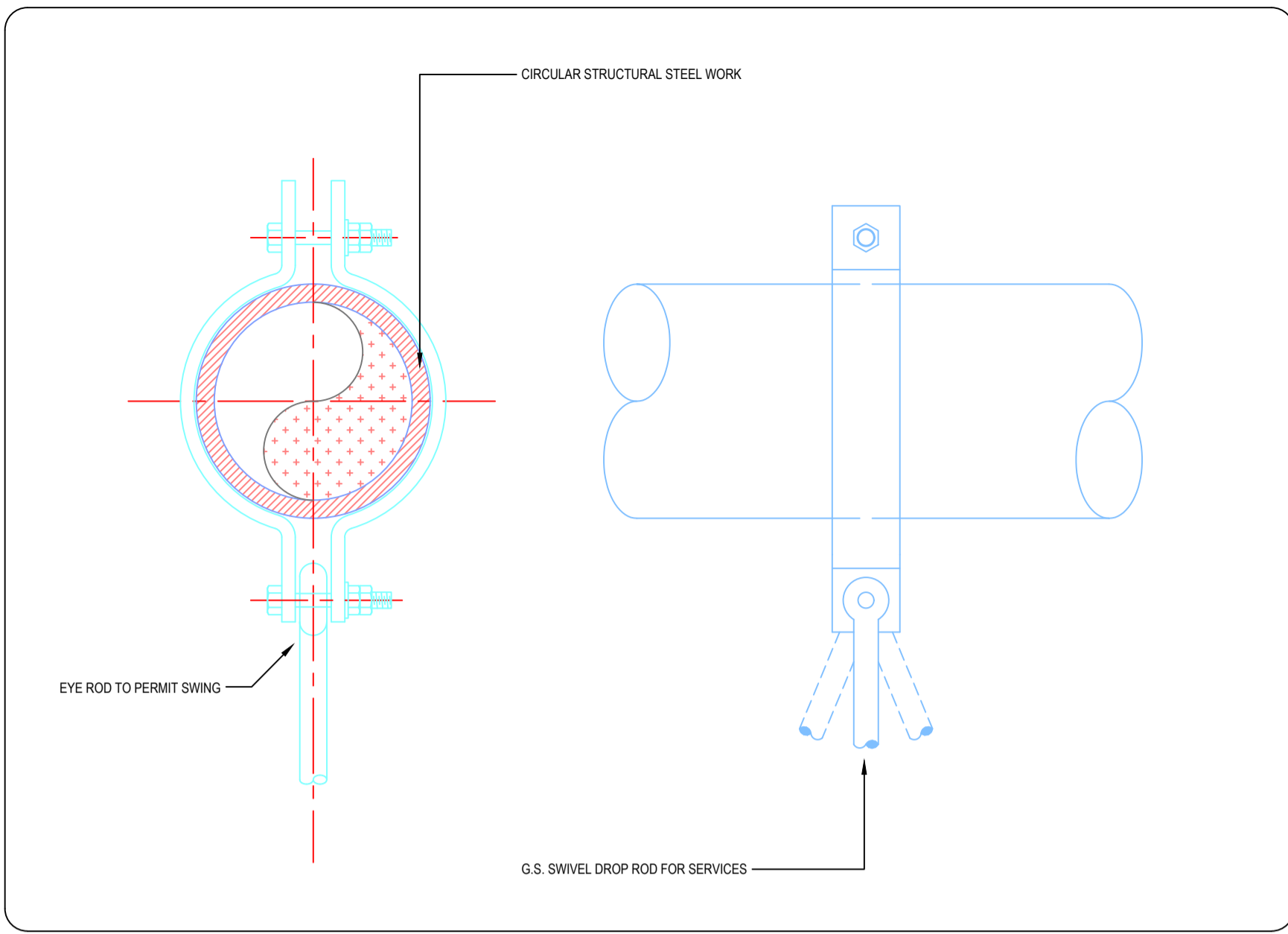
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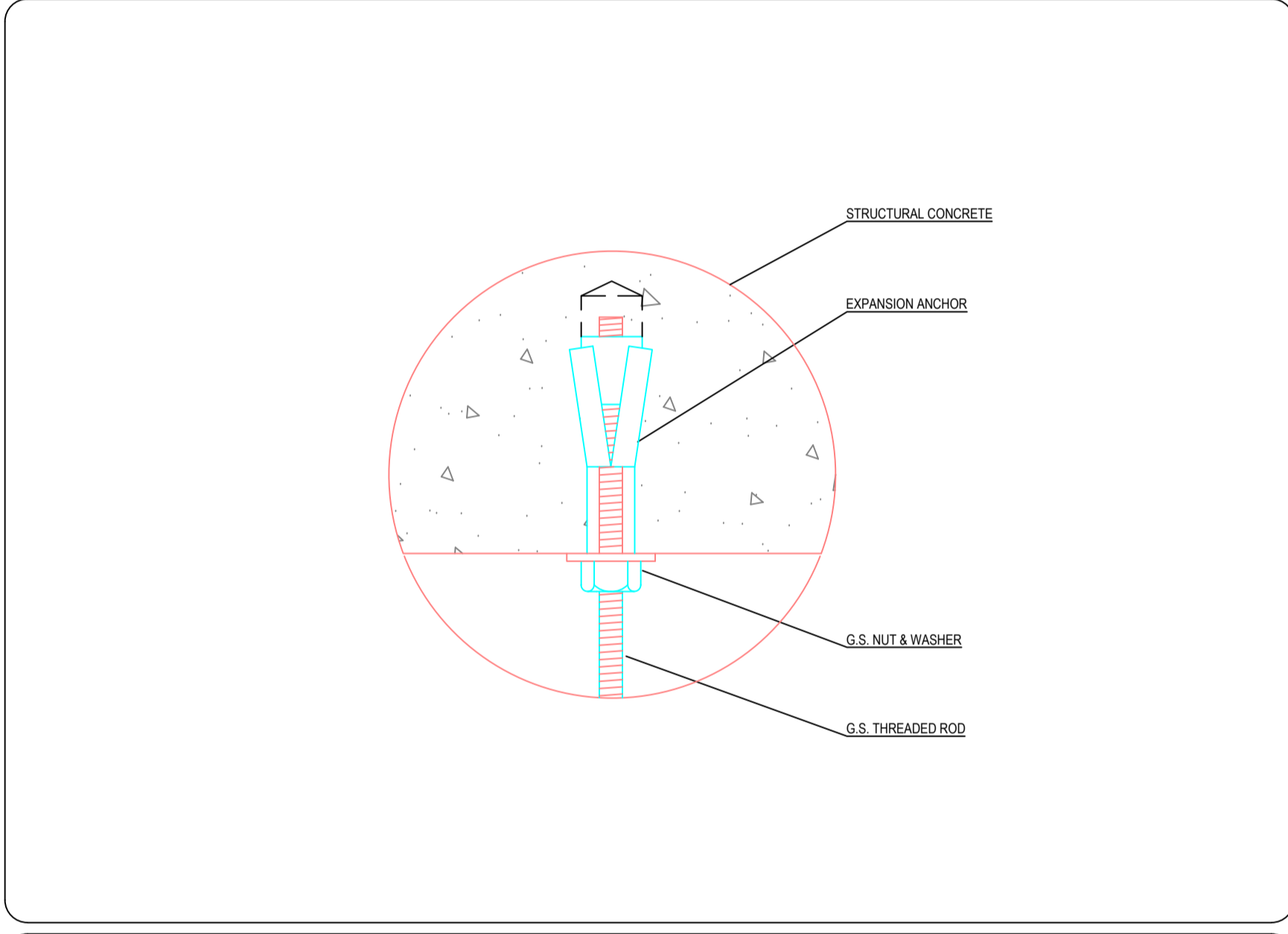
Project **BURO HAPPOLD STANDARD DETAILS**
Drg Title **Mechanical Services Standard Details - Sheet 4 Ductwork Support Details - 1**

Scales @ A1	N.T.S.	Job No.	035833
Drawn by	AW	Drawing No.	208W-6H-M-SW-XX-DR-M-XX-5004
Checked by	LH	Rev	P01
Date	April 2017		

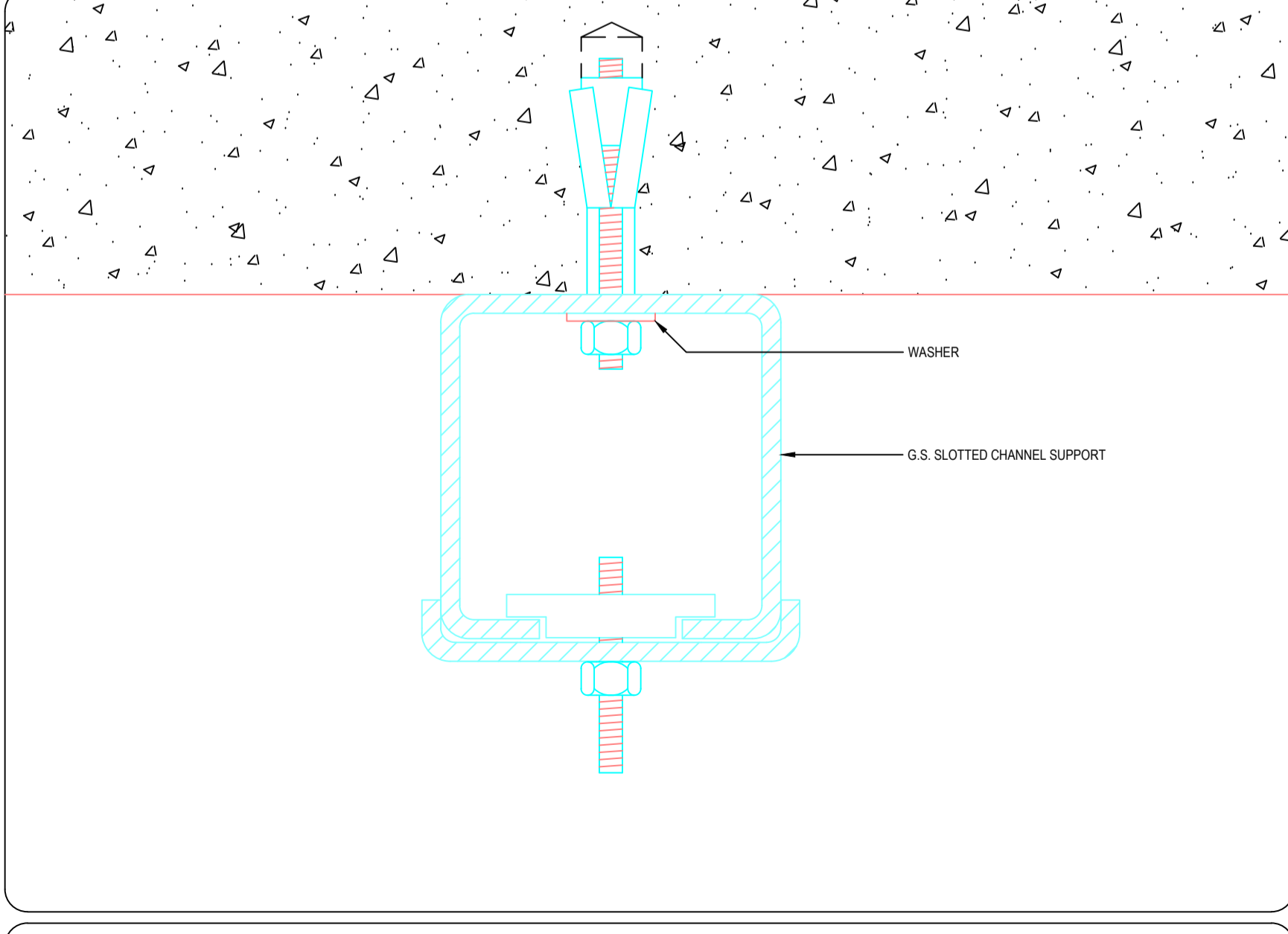
P:\Cheese\happold\std\035833.dwg, Title: BUROHAPPOLD STANDARD DETAILS - SHEET 4 - DUCTWORK SUPPORT DETAILS - 1.dwg, Mechanical Services - Standard Details - Sheet 4 - Ductwork Support Details - 1.dwg



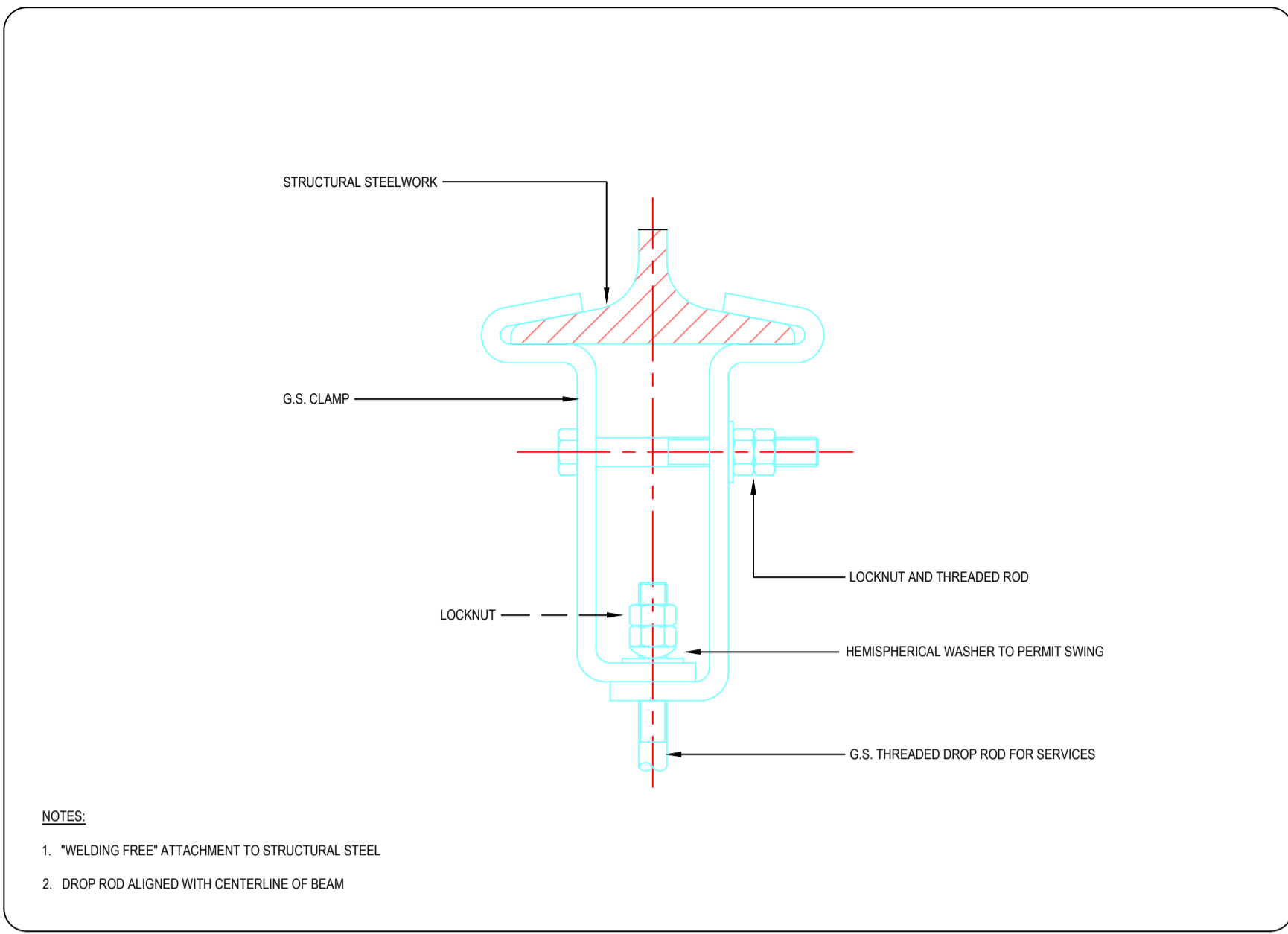
Y90-01 CIRCULAR STRUCTURAL STEEL FIXING



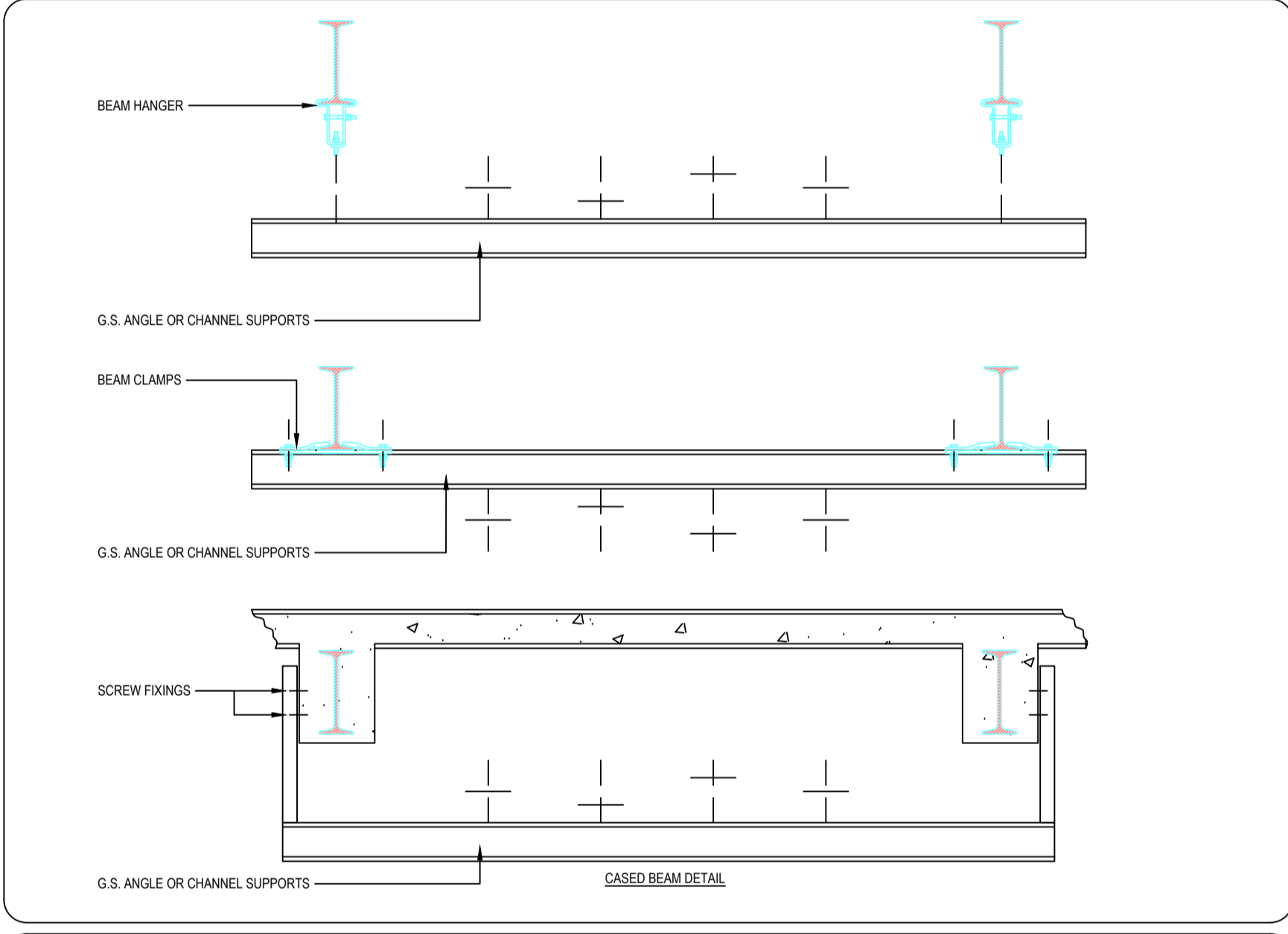
Y90-04 EXPANSION ANCHOR FIXING INTO STRUCTURAL CONCRETE



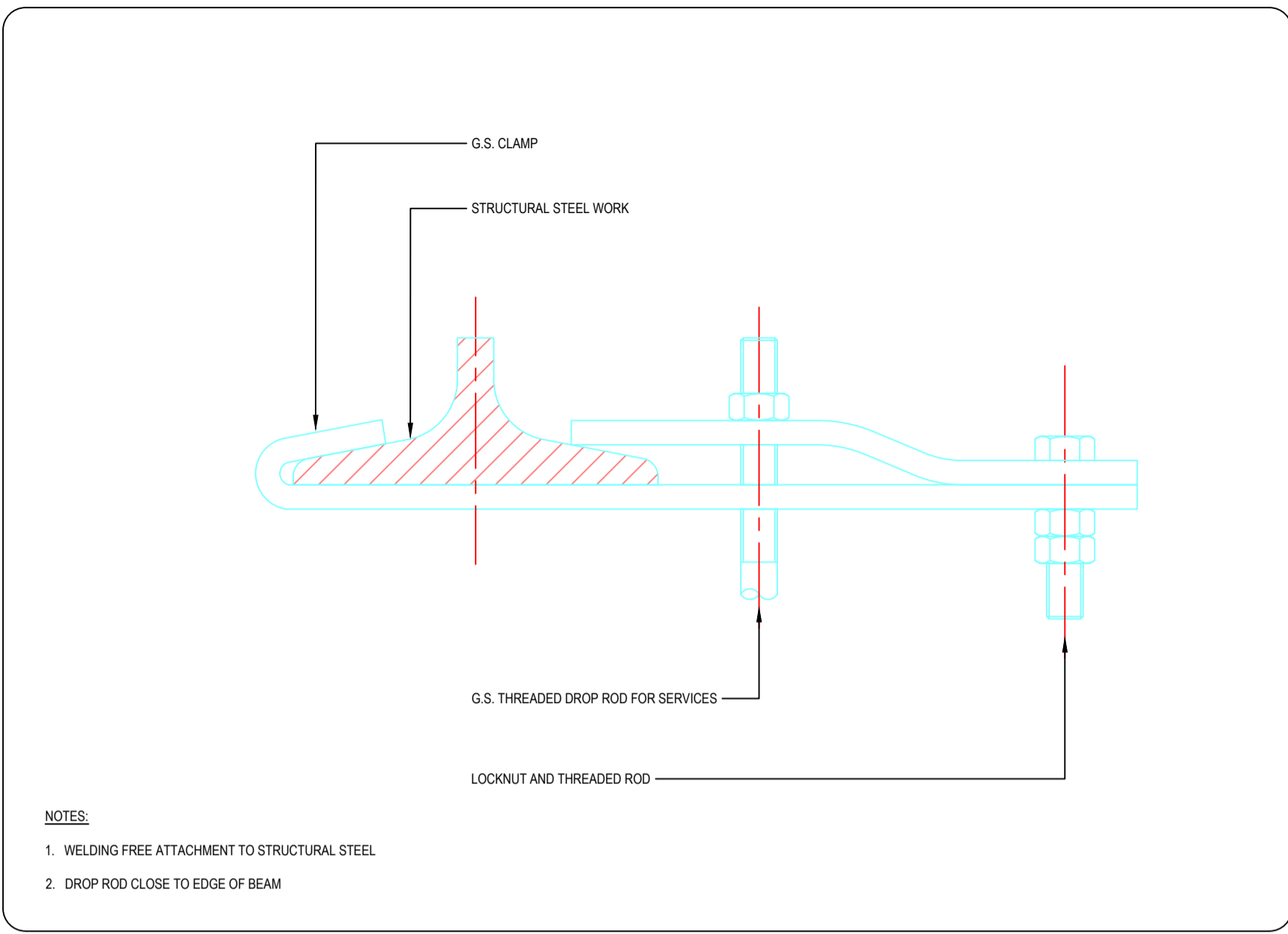
Y90-07 CHANNEL & DROP ROD SUPPORT



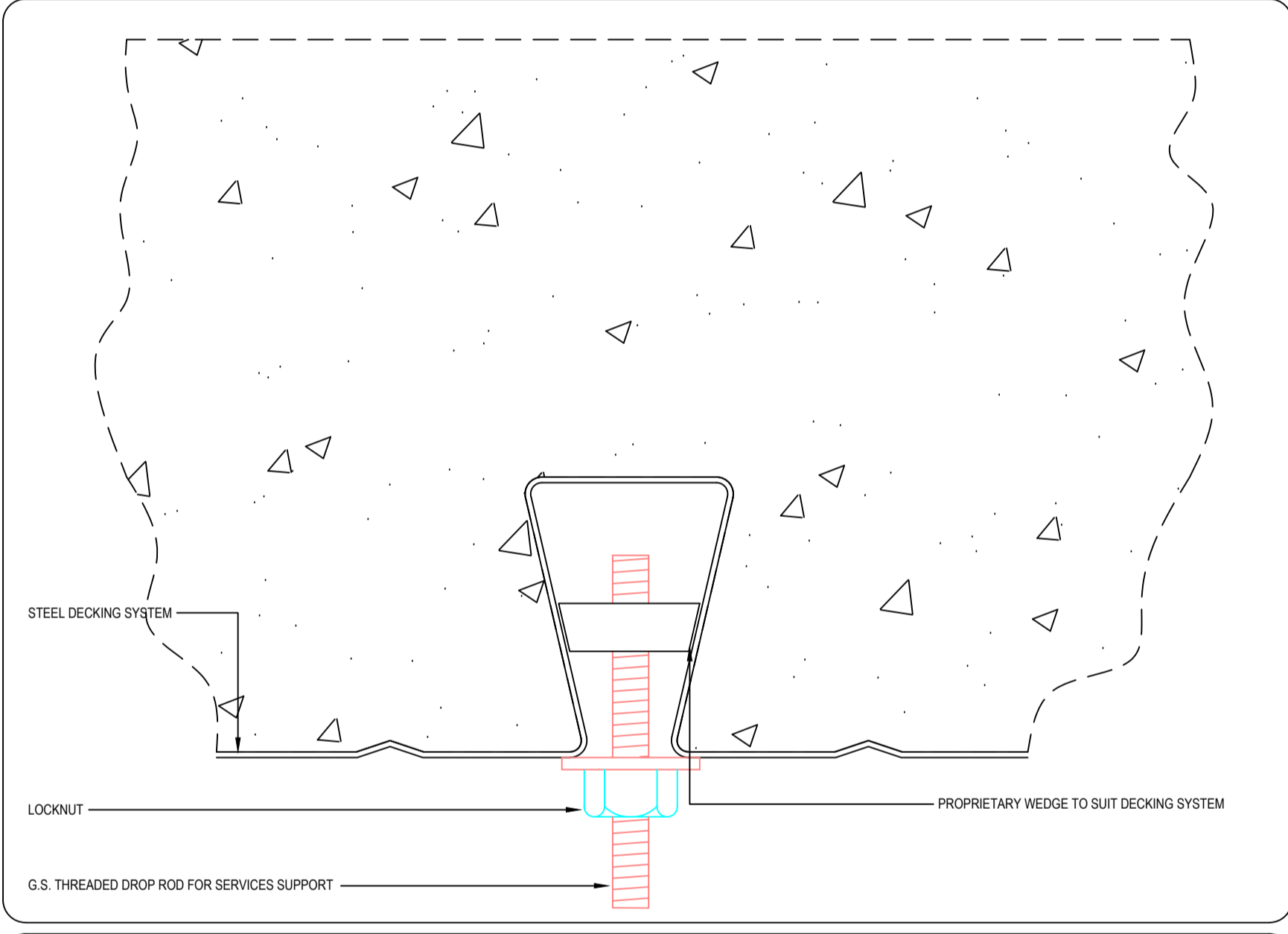
Y90-02 STEELWORK BEAM CLAMP HANGER FIXING TYPE 1



Y90-05 TYPICAL SUPPORT FIXINGS TO OVERHEAD STEELWORK



Y90-03 STEELWORK BEAM CLAMP FIXING TYPE 2



Y90-06 METAL COMPOSITE DECK FIXING - HOLORIB TYPE

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- MAINTENANCE/CLEANING/OPERATION:**
1. HANDLING CHEMICAL PRODUCTS
 2. WORKING AT HEIGHT
 3. WORKING ADJACENT TO POTENTIALLY LIVE SERVICES

- DECOMMISSIONING/DEMOLITION:**
1. PRESENCE OF LIVE SERVICES
 2. PRESENCE OF ASBESTOS
 3. WORKING AT HEIGHT
 4. LIFTING HEAVY EQUIPMENT
 5. ALWAYS SAFELY ISOLATE BEFORE COMMENCING ANY WORKS

- Notes**
1. SEEK APPROVAL FROM STRUCTURAL ENGINEER AND PROVIDE LOADING DETAILS FOR ALL FIXINGS.
 2. INSTALL SERVICES FIXINGS TO STEELWORK SO THAT ANY FIRE COATING OR CLADDING TO STEELWORK IS NOT COMPROMISED.
 3. COMPLY WITH MANUFACTURERS INSTRUCTIONS FOR PROPRIETARY STEEL COMPOSITE DECK FIXINGS.
 4. WALL MOUNTED CANTILEVER BRACKETS NOT PERMITTED.

P01 TENDER	11/04/2017	AW	LH
Rev	Description	Date	Dm Ch'd

Status of drawing

TENDER

BURO HAPPOLD ENGINEERING

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London
W1T 1PD
UK

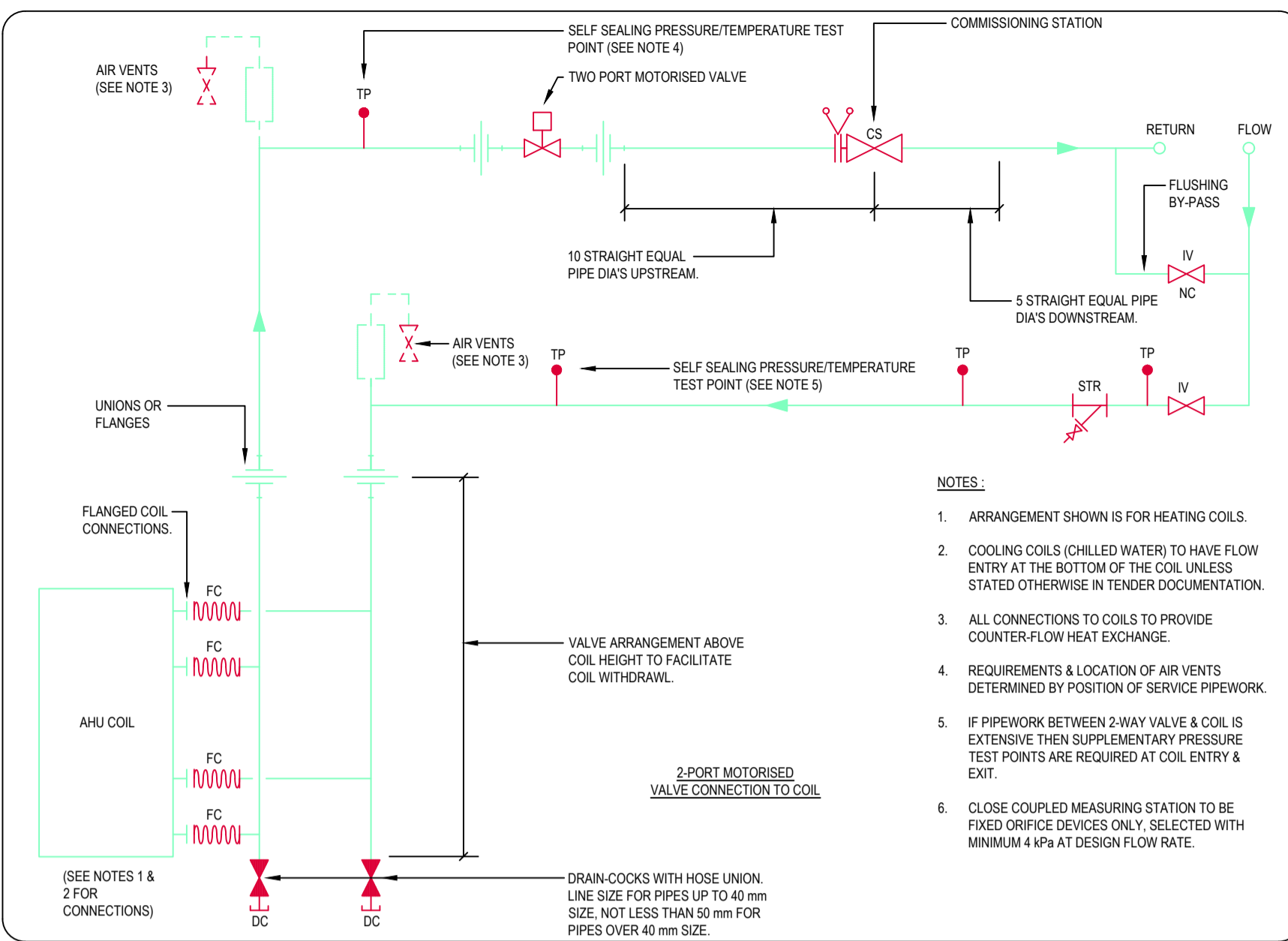
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Architect
Project **BURO HAPPOLD STANDARD DETAILS**
Drg Title **Mechanical Services
Standard Details - Sheet 5
Structural Fixings**

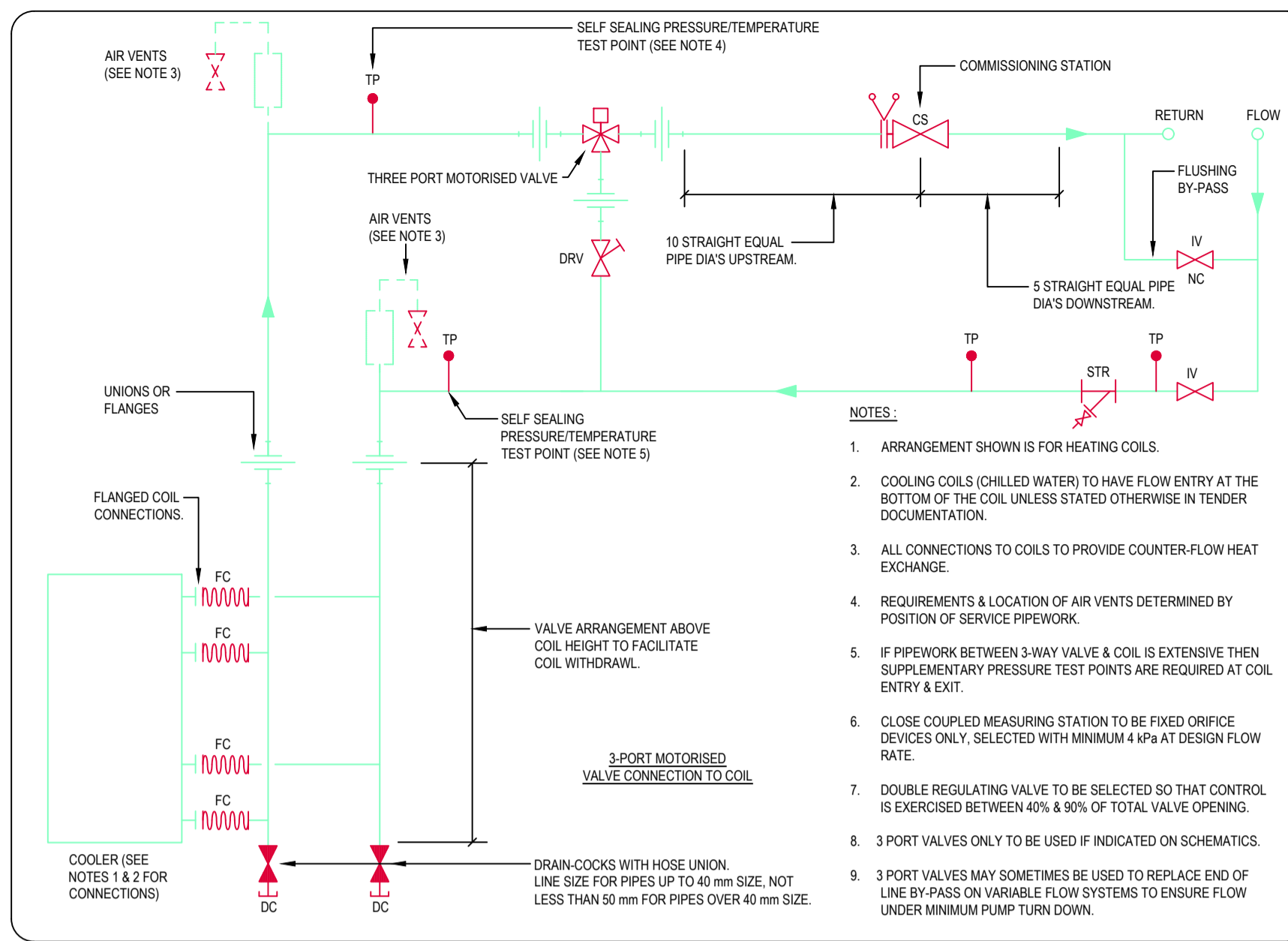
Scales@A1 N.T.S.
Drawn by AW
Checked by LH
Date April 2017

Job No. **035833**
Drawing No. 208W-BHM-SW-XX-DR-M-XX-0005
Rev **P01**

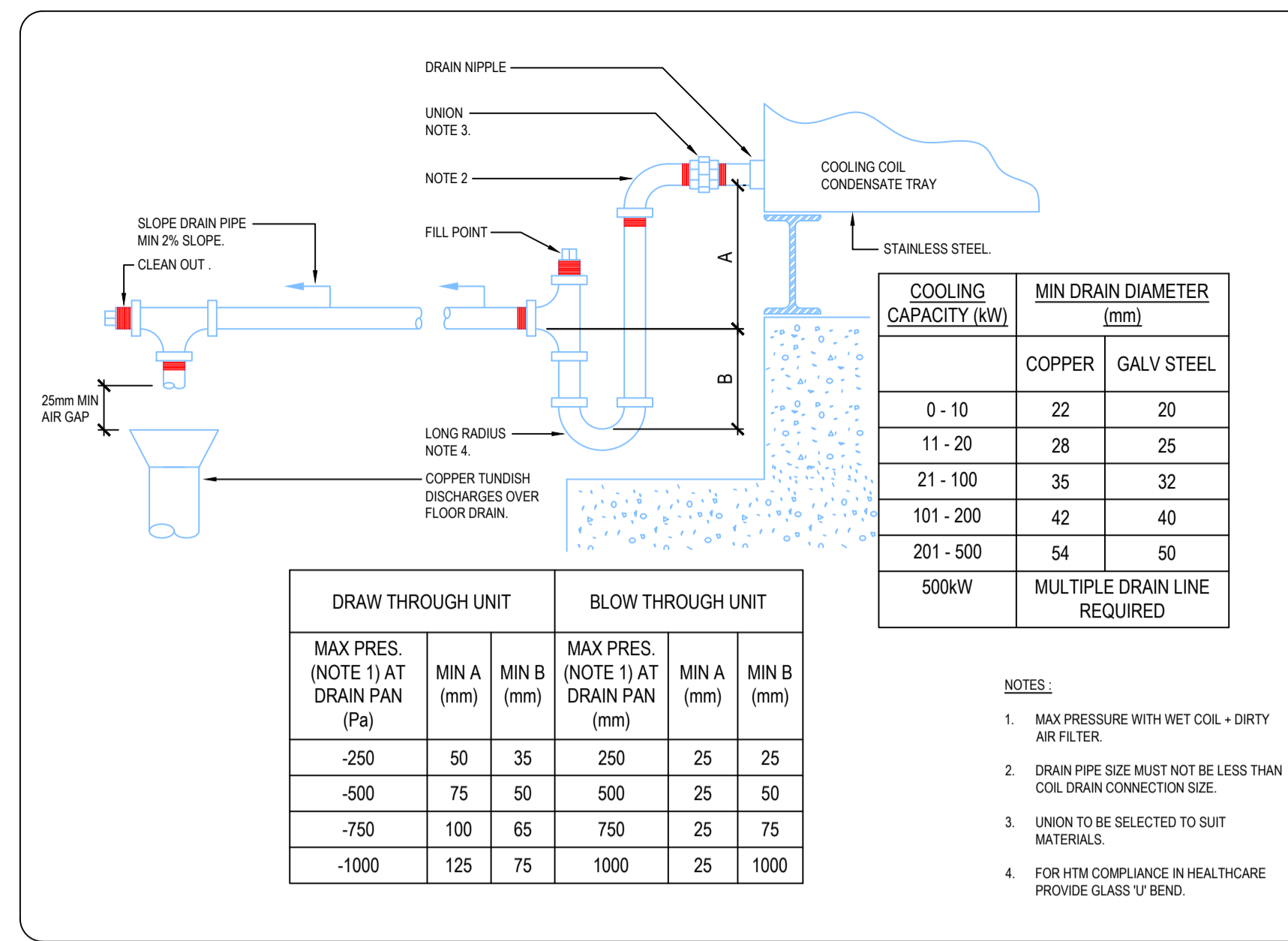
Dwg. Checked: harrisc@burohappold.com 035833 DCL, Titleblock of Extension of Education Facility at St Paul's Cathedral, London, UK, 2005 - Mechanical Services - Structural Details - Sheet 5 - Structural Fixings.dwg



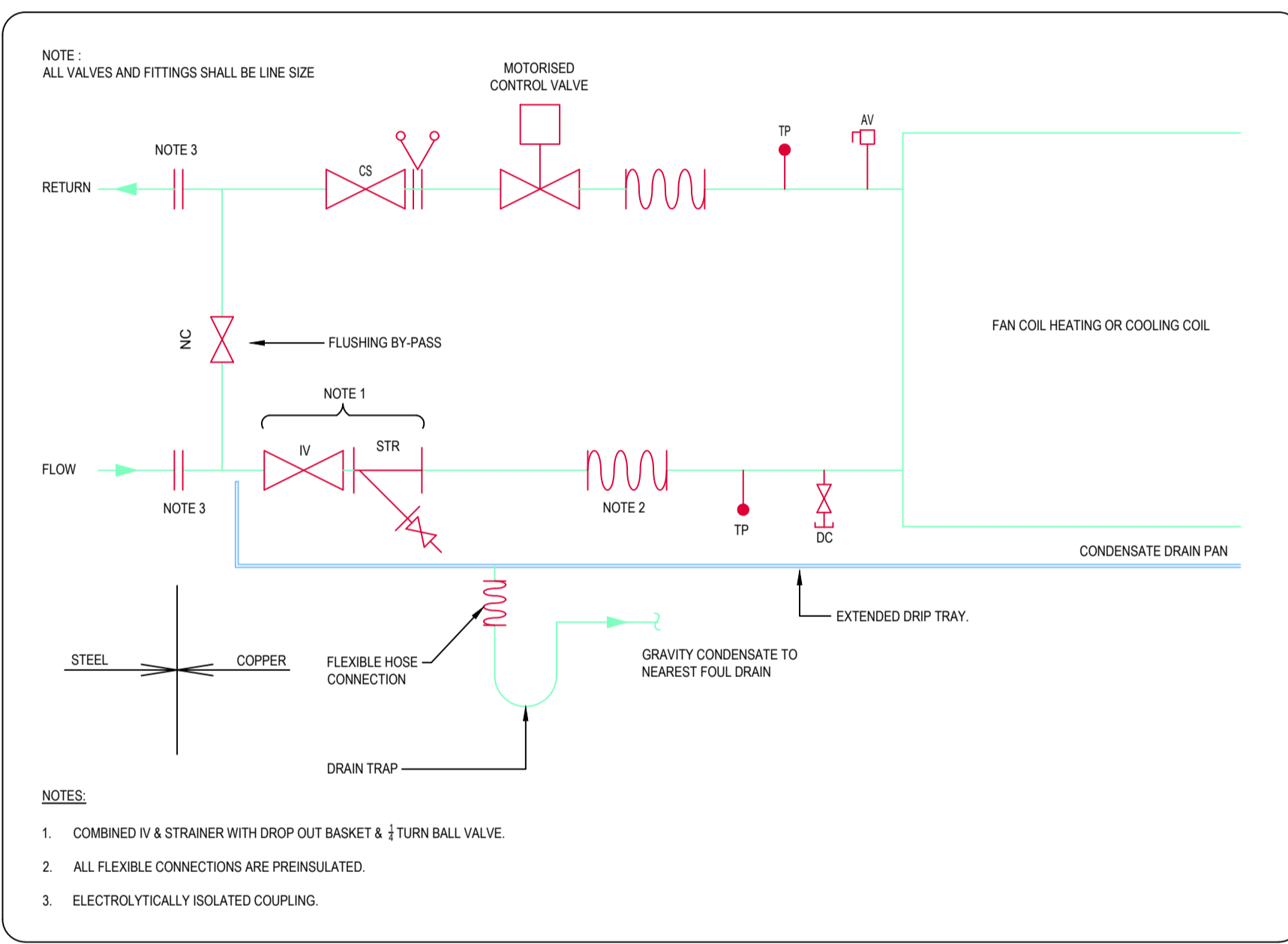
U81-1 TYPICAL AHU UNIT COIL PIPING DETAIL - 2 PORT VALVE ARRANGEMENT



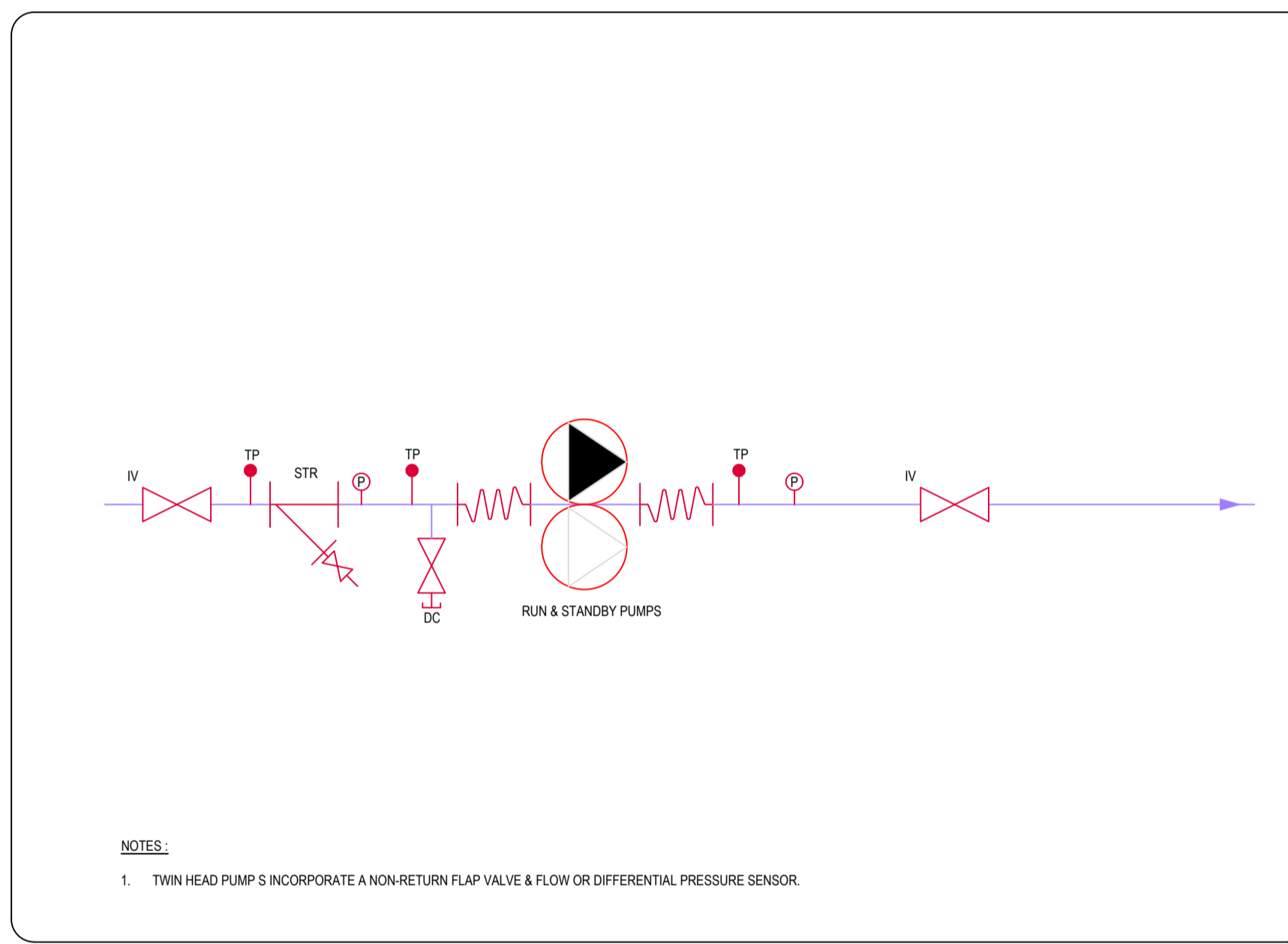
U81-2 TYPICAL AHU UNIT COIL PIPING DETAIL - 3 PORT VALVE ARRANGEMENT



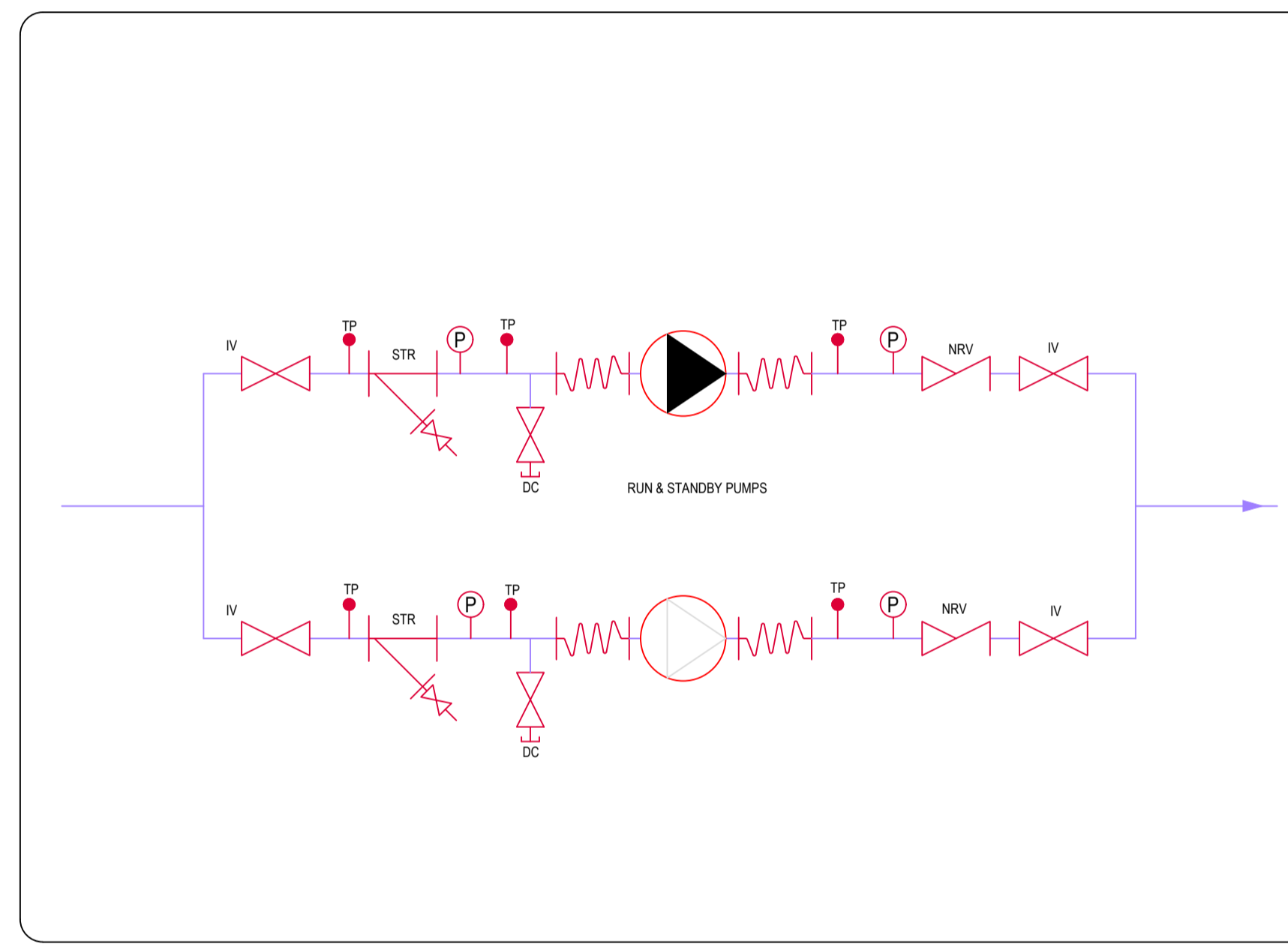
U81-3 CONDENSATE TRAY DRAIN (AHU)



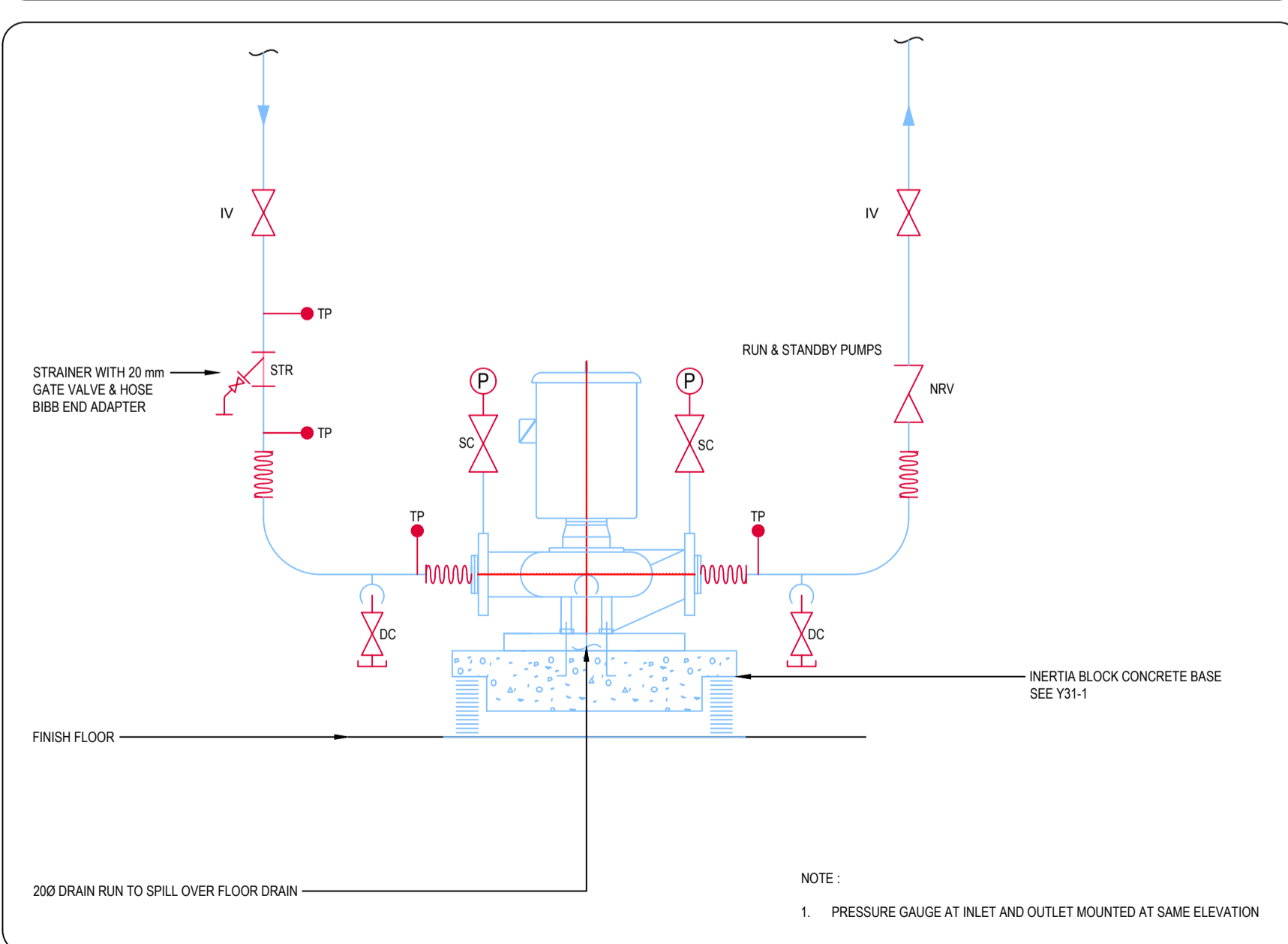
U41-1 CHILLED WATER AND LTHW FCU CONNECTION DETAIL



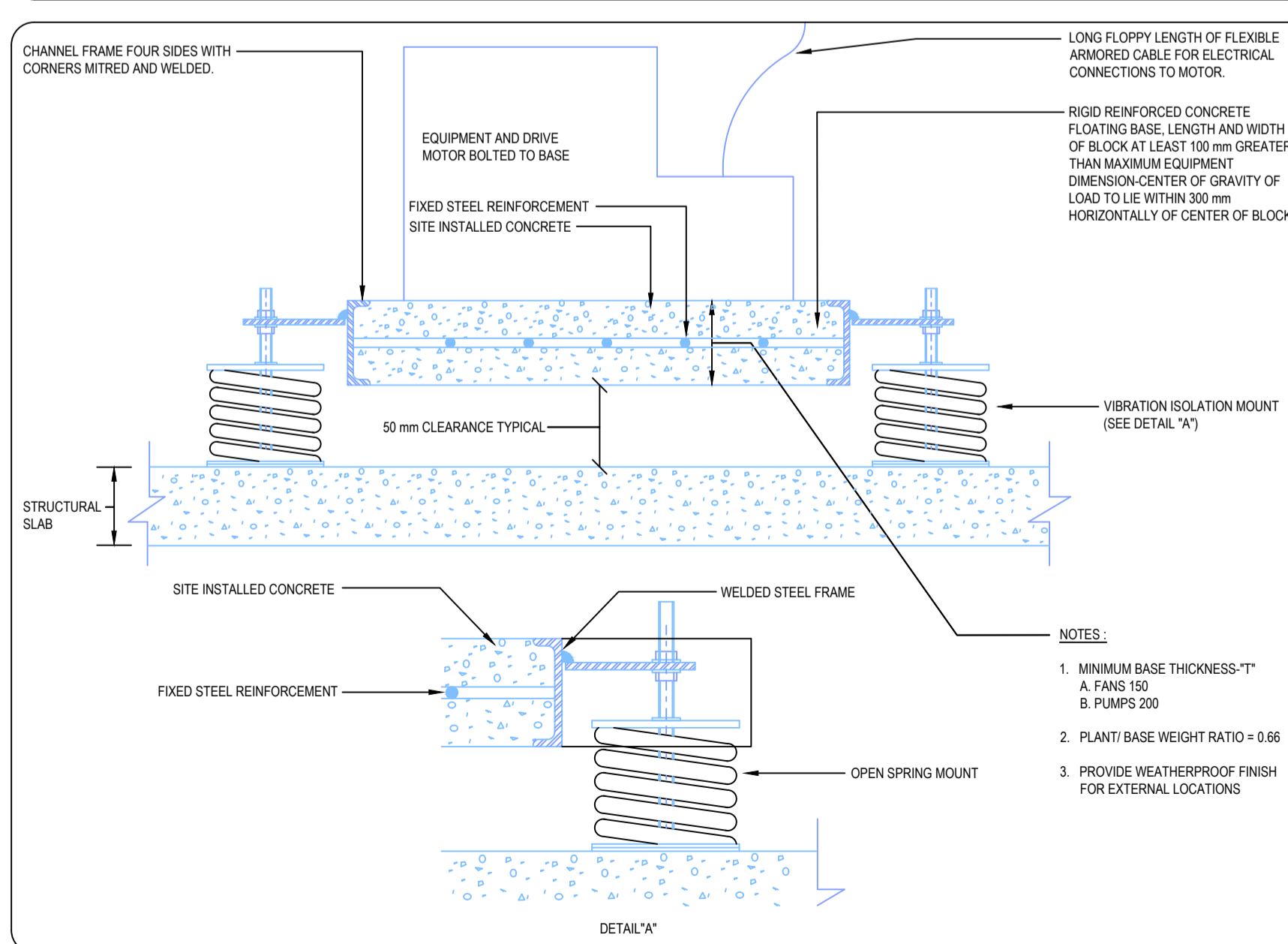
Y20-1 TWIN HEAD PUMP SCHEMATIC DETAIL



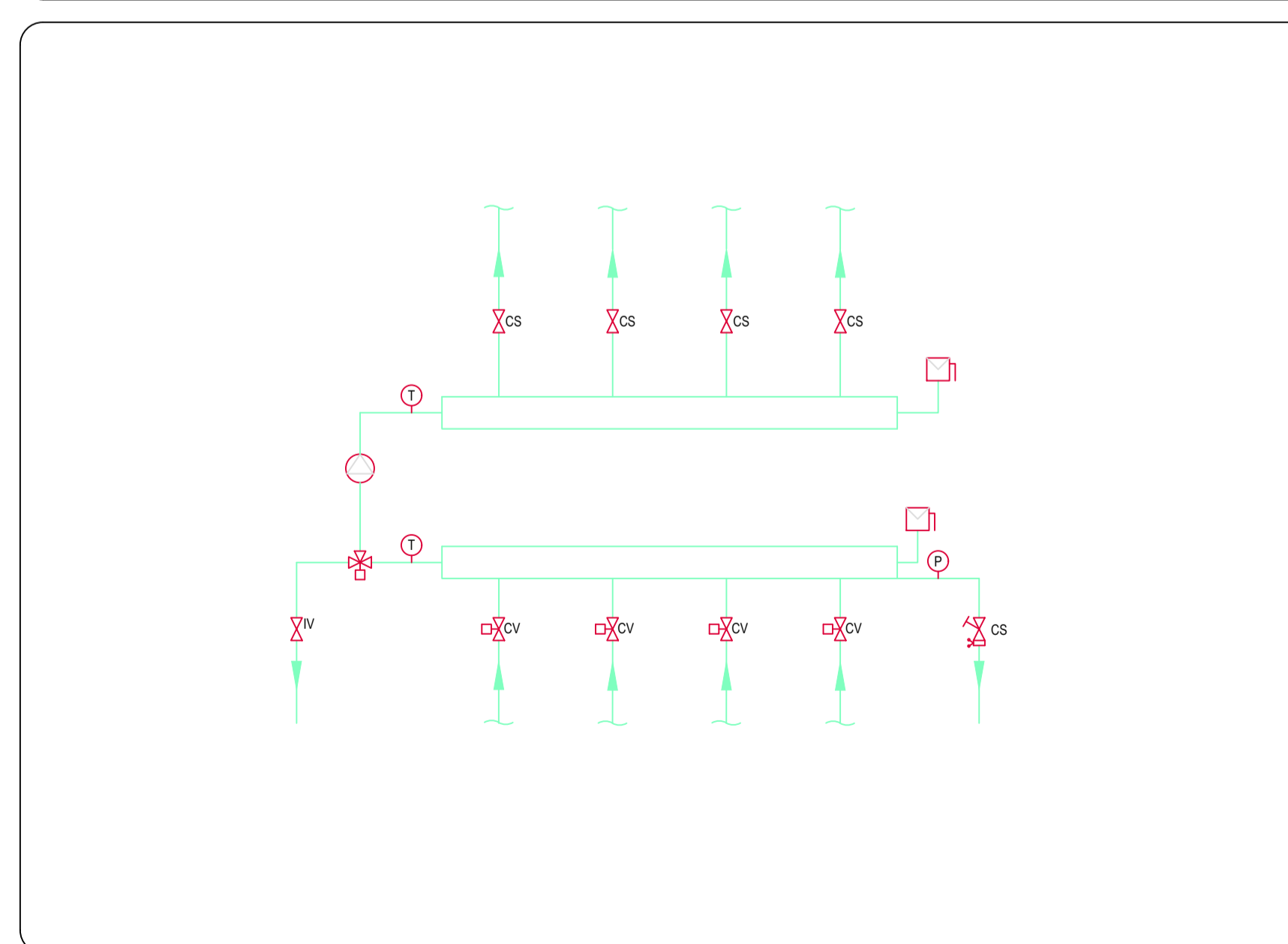
Y20-2 TWIN PUMP SET SCHEMATIC DETAIL



Y20-3 TYPICAL PUMP INSTALLATION



Y31-1 INERTIA BASE FOR VIBRATING EQUIPMENT



T42-1 UNDERFLOOR HEATING / COOLING MANIFOLD

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CONSTRUCTION:

- WORKING AT HEIGHT
- LIFTING HEAVY EQUIPMENT
- WORKING ADJACENT TO POTENTIALLY LIVE SERVICES
- HANDLING CHEMICAL PRODUCTS
- WORKING IN CONFINED SPACES
- PRESENCE OF ASBESTOS

MAINTENANCE/CLEANING/OPERATION:

- HANDLING CHEMICAL PRODUCTS
- WORKING AT HEIGHT
- WORKING ADJACENT TO POTENTIALLY LIVE SERVICES

DECOMMISSIONING/DEMOLITION:

- PRESENCE OF LIVE SERVICES
- PRESENCE OF ASBESTOS
- WORKING AT HEIGHT
- LIFTING HEAVY EQUIPMENT
- ALWAYS SAFELY ISOLATE BEFORE COMMENCING ANY WORKS

Notes

- FOR LEGEND REFER TO STANDARD MECHANICAL SERVICES DETAILS.
- FOR DETAILS OF FLEXIBLE CONNECTIONS REFER TO SHEET 5.
- PUMPS INDICATED MAY BE CONSTANT OR VARIABLE SPEED. REFER TO PUMP SCHEDULES & SCHEMATICS FOR PUMP TYPE / SPEED CONTROL.
- 3 PORT VALVE (U81-2) USE ONLY IF INDICATED ON SCHEMATICS FOR CONSTANT FLOW RATE SYSTEMS OR INSTEAD OF END OF LINE BY-PASS ON VARIABLE FLOW CIRCUITS

POTTENDER 11/04/2017 LH

Rev	Description	Date	Dm	Ch'd

TENDER

Status of drawing

BUROHAPPOLD ENGINEERING

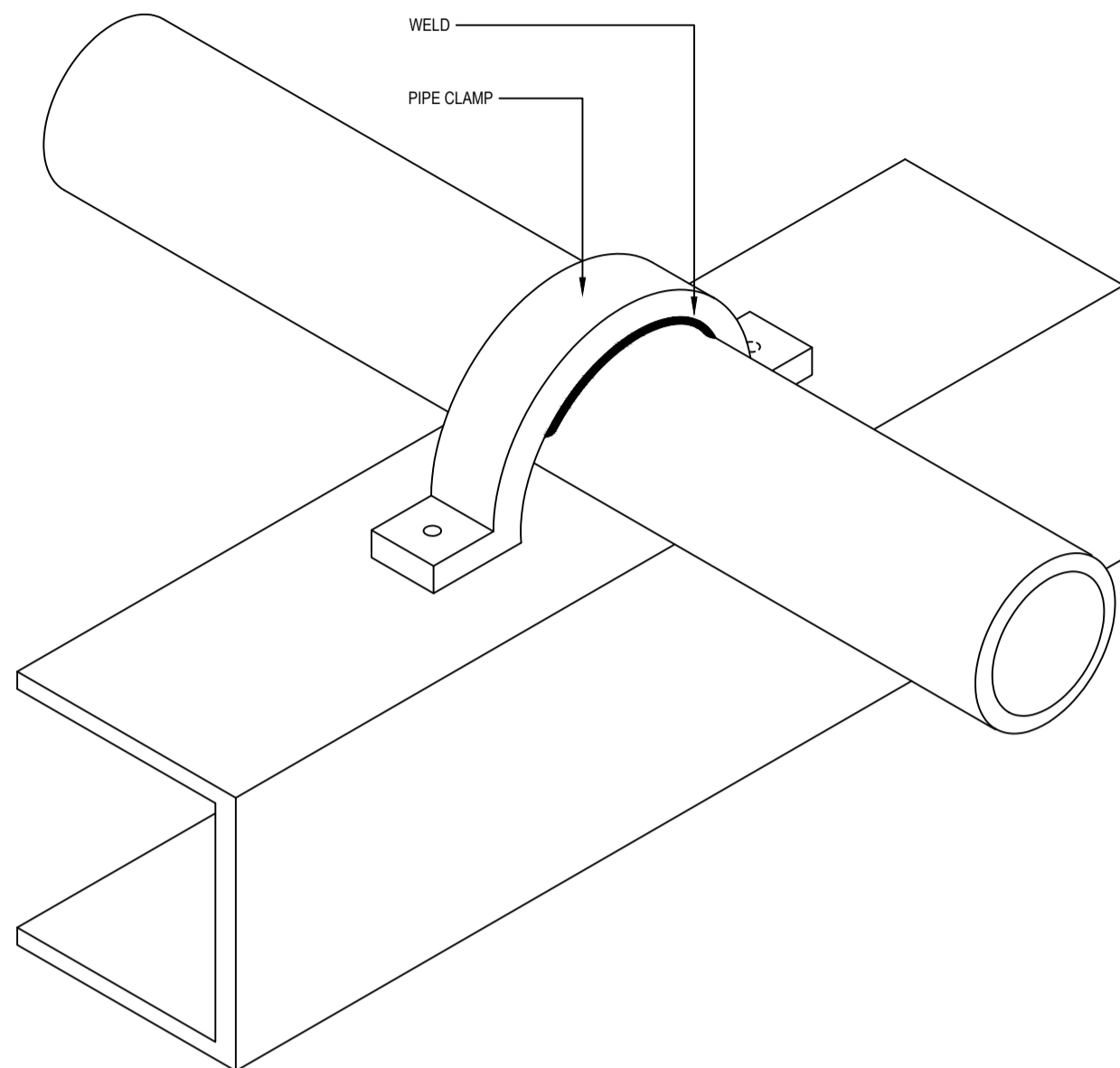
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Web: www.burohappold.com

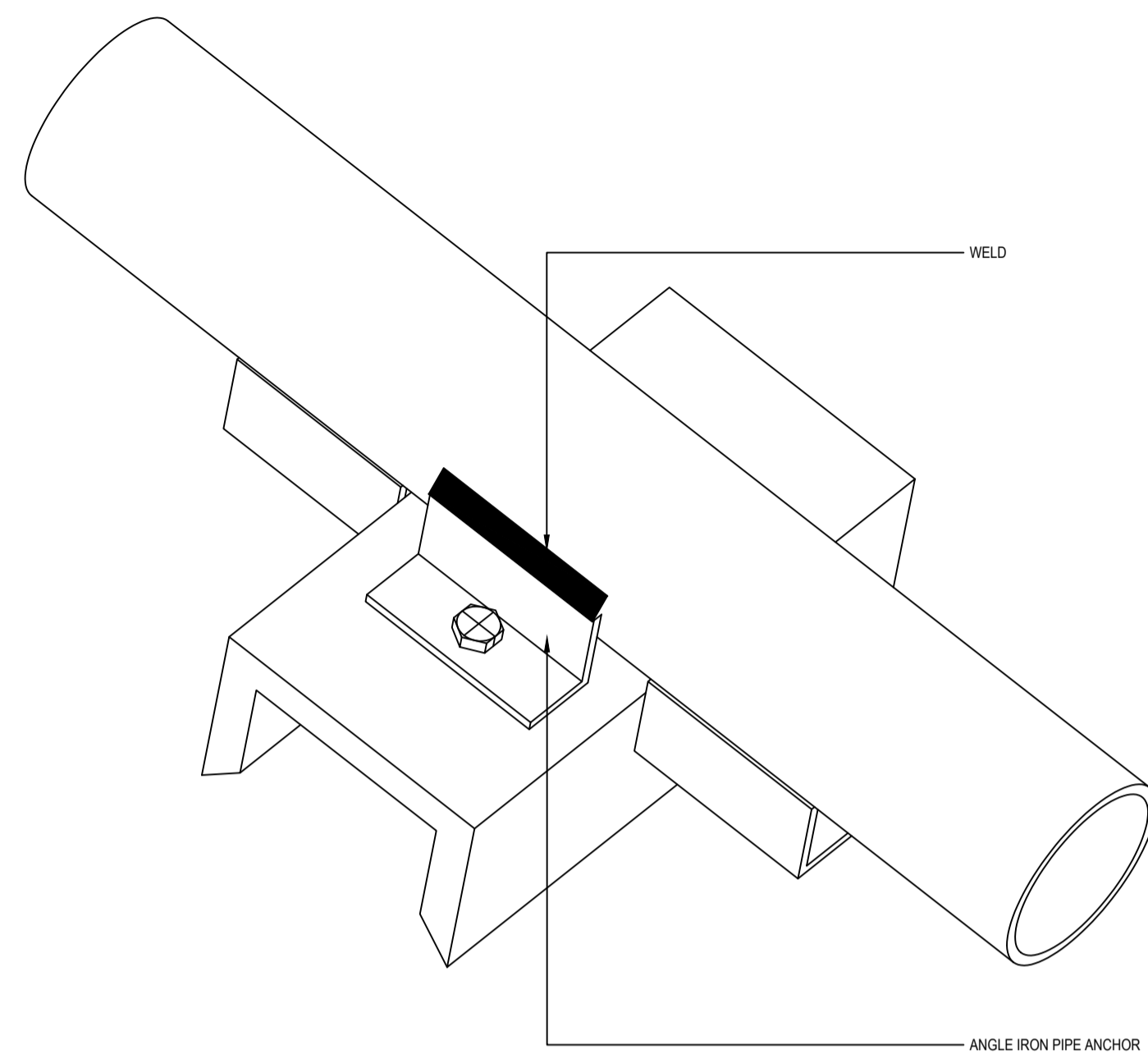
Project **BURO HAPPOLD STANDARD DETAILS**
Mechanical Services
Standard Details - Sheet 6
Mechanical Details

Scale: A1 N.T.S.	Job No. 035833
Drawn by AW	Drawing No. 208W-BHM-SW-XX-DR-MX-0008
Checked by LH	Rev P01
Date April 2017	

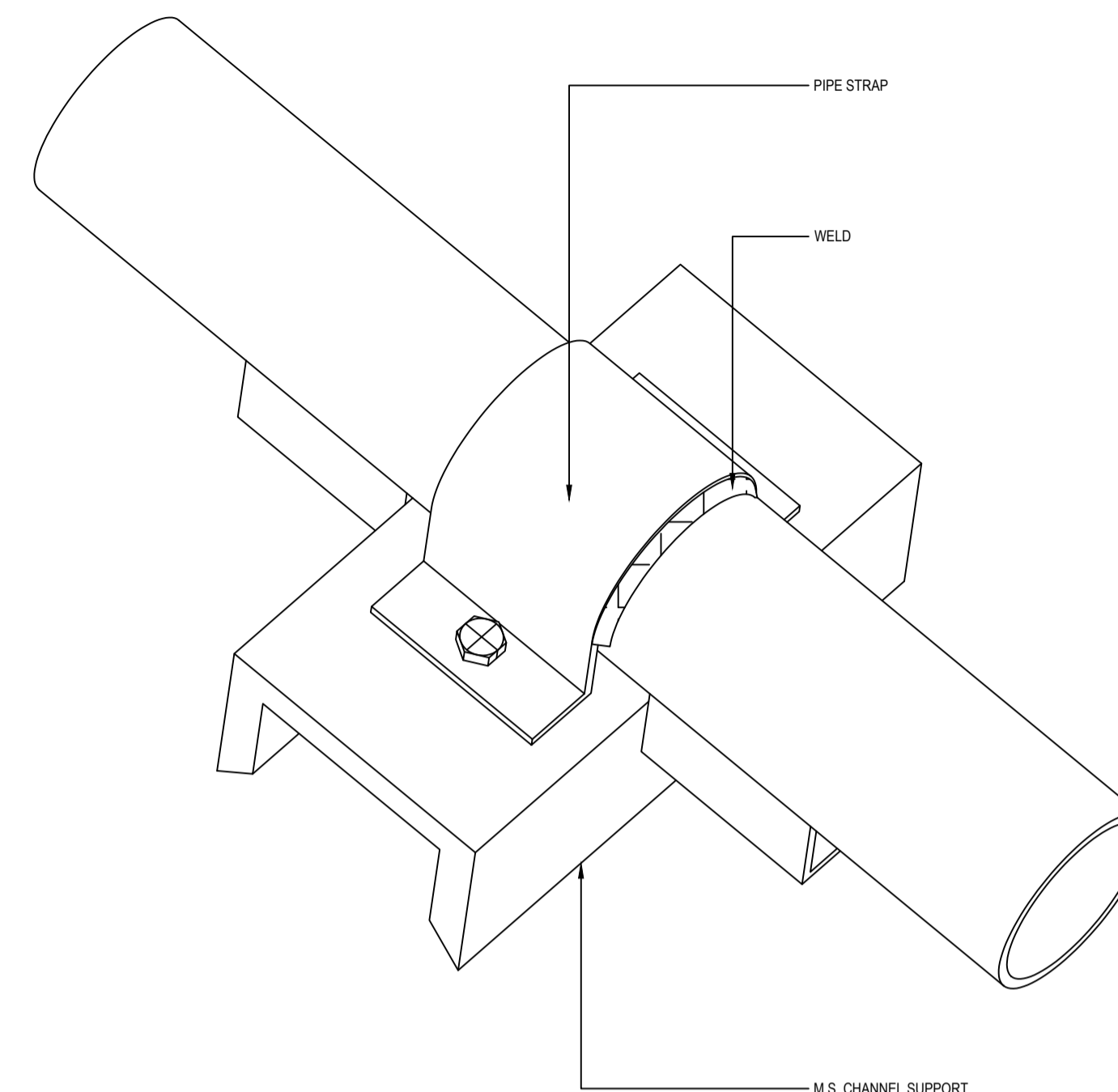
Y20-3: Mechanical Services - Standard Details - Sheet 6 - Mechanical Details - Drawing No. 208W-BHM-SW-XX-DR-MX-0008



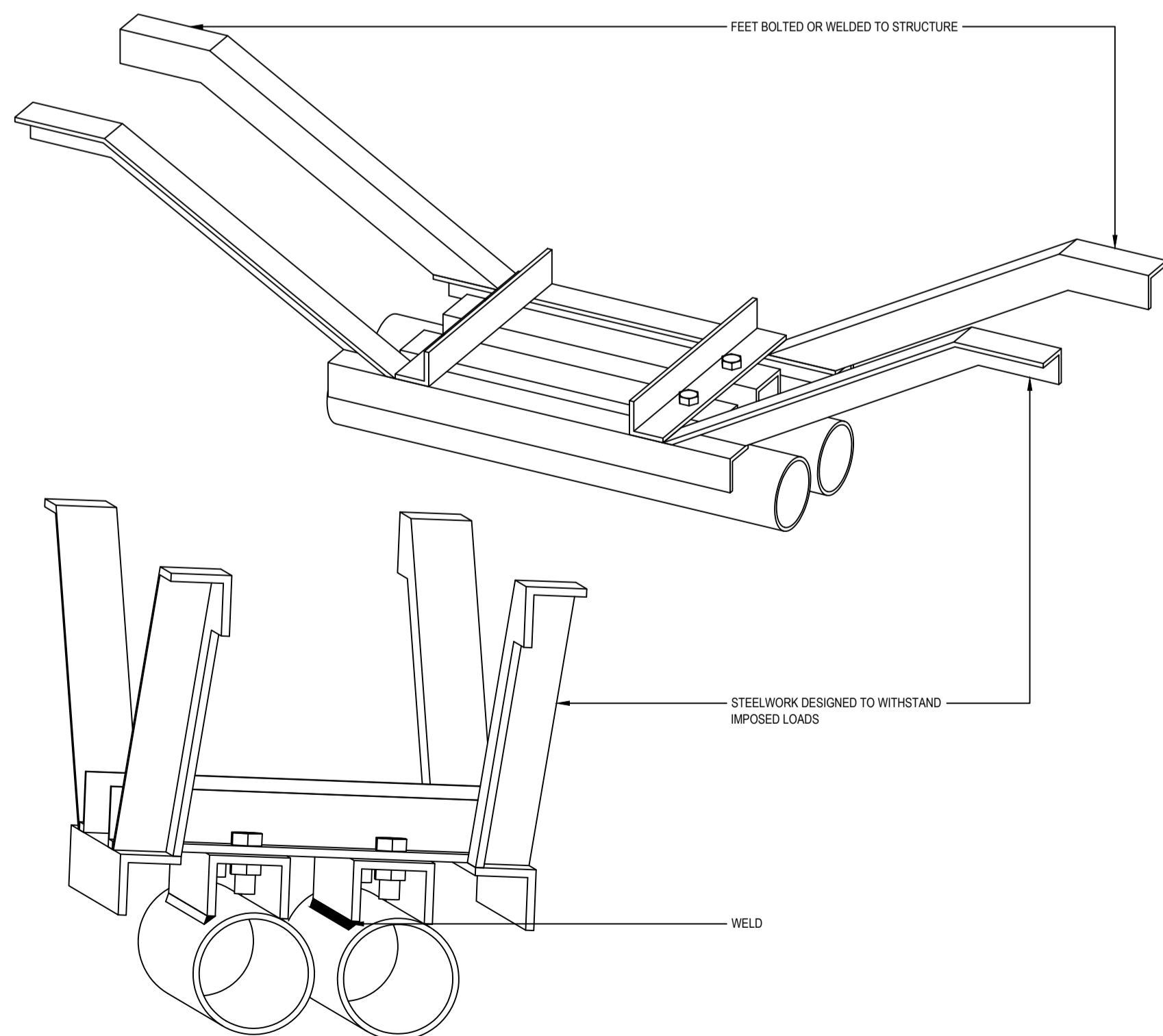
Y10-40 VERY LIGHT LOAD ANCHOR



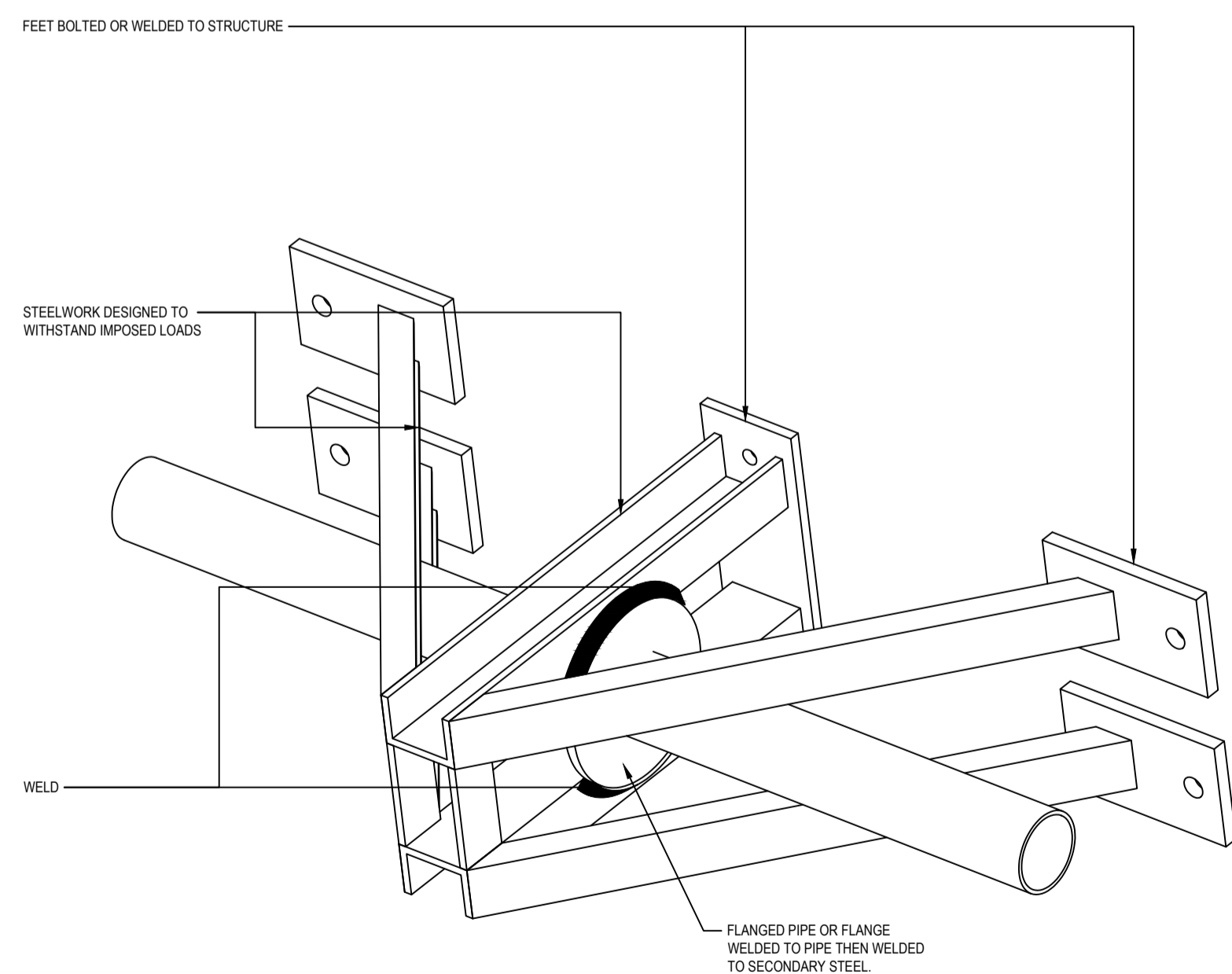
Y10-41 LIGHT LOAD ANCHOR (1)



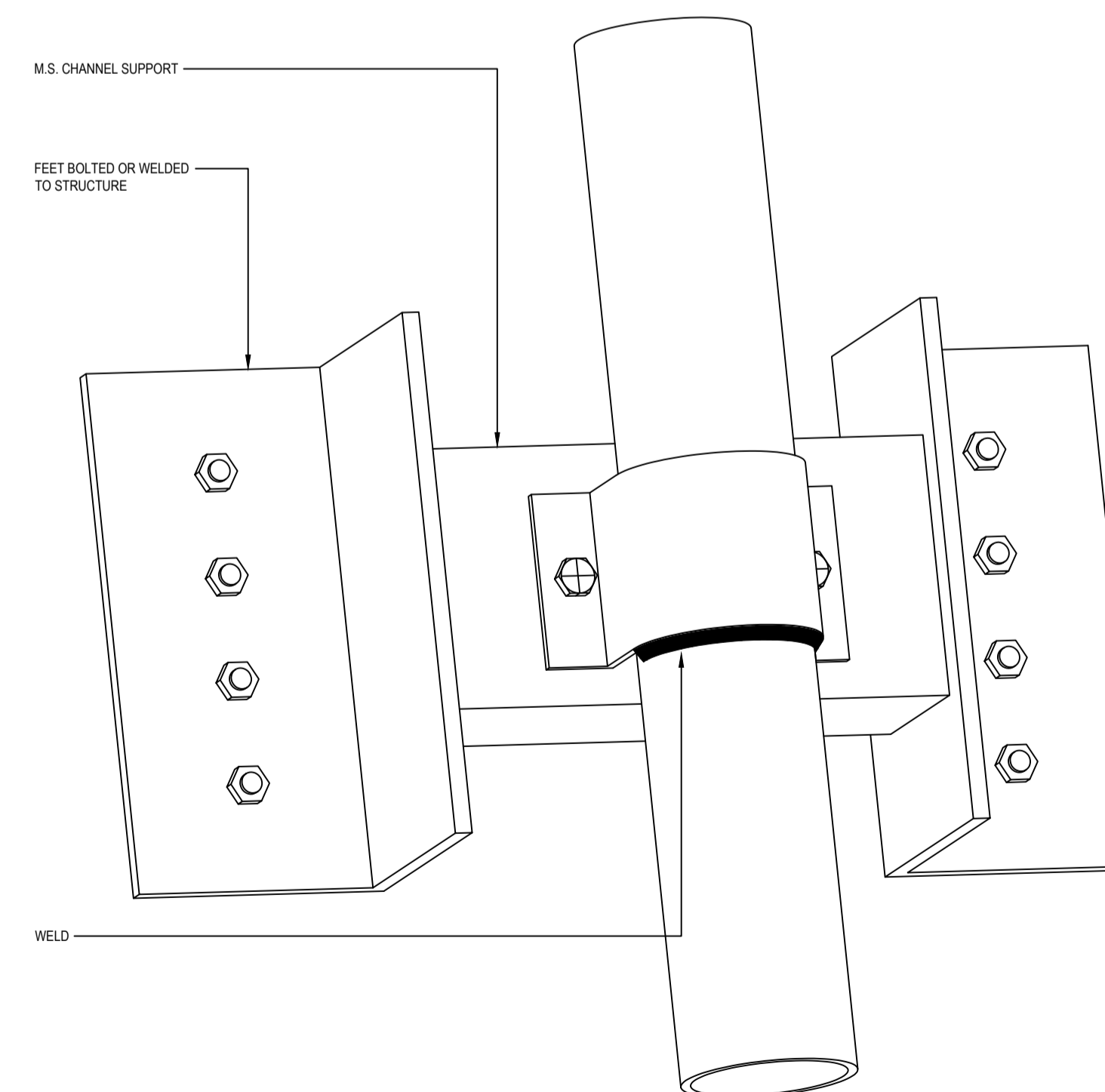
Y10-42 LIGHT LOAD ANCHOR (2)



Y10-43 MEDIUM LOAD ANCHOR



Y10-44 HEAVY LOAD ANCHOR



Y10-45 VERTICAL PIPE ANCHOR

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4. LIFTING HEAVY EQUIPMENT
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Notes

1. SEEK APPROVAL FROM STRUCTURAL ENGINEER FOR ALL FIXINGS TO STRUCTURE.
2. ALL EXPANSION JOINTS TO BE INSTALLED STRICTLY IN ACCORDANCE WITH MANUFACTURERS INSTRUCTIONS.
3. INSTALLER TO PROVIDE ALL LOADING & EXPANSION CALCULATIONS.
4. ANCHORS FOR THERMALLY INSULATED PIPEWORK ENSURE THAT ANY POTENTIAL COLD BRIDGING IS MINIMIZED BY ENCAPSULATING THE ANCHOR & THE STEEL TO WHICH IT IS FIXED. ENSURE THAT VAPOUR BARRIER IS MAINTAINED.
5. ENSURE SUPPORT/FIXING MATERIALS ARE COMPATIBLE WITH PIPELINE MATERIAL.
6. USE SYSTEM FLEXIBILITY WHEREVER POSSIBLE. USE EXPANSION DEVICES WHERE NOT PRACTICAL.
7. WHERE PRACTICAL USE HINGED OR ARTICULATED BELLOWS IN PREFERENCE TO AXIAL.
8. APPLY COLD DRAW OF PIPING OR COLD STRETCH OF BELLOWS DURING ERECTION.

P01 TENDER	11/04/2017	AW	LH
Rev	Description	Date	Dm

TENDER

Status of drawing

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ENGINEERING**

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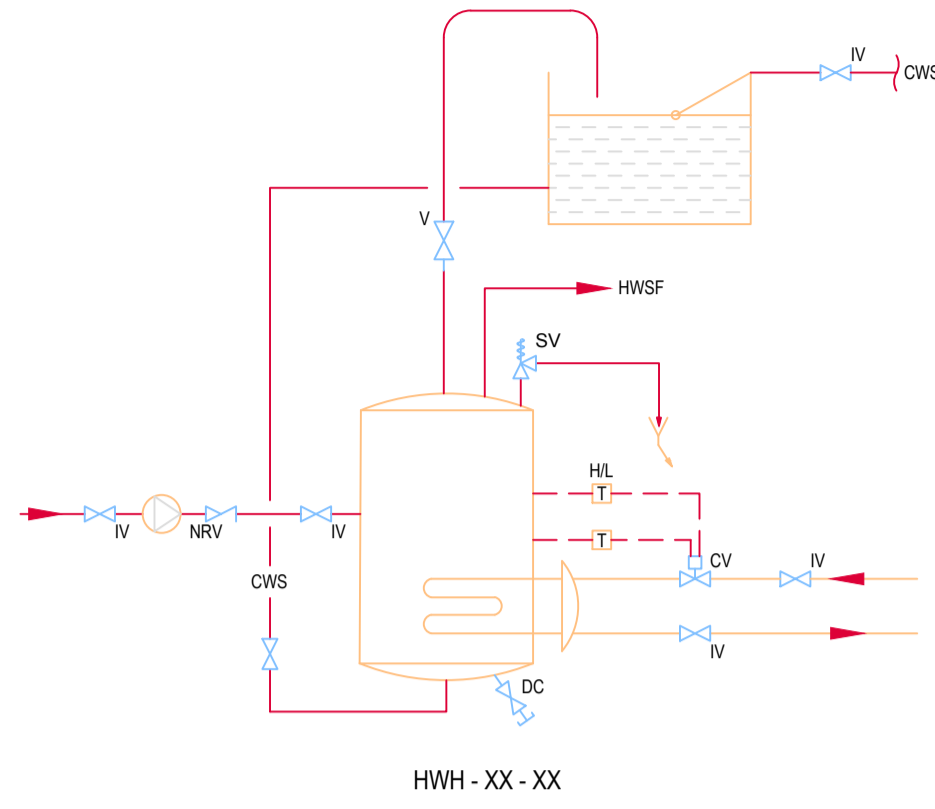
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Web: www.burohappold.com

Project: Landmark House
Drg Title: Mechanical Services
Standard Details - Sheet 7
Pipework Anchor & Expansion Details - 1

Scale: A1 N.T.S.	Job No.
Drawn by: AW	Drawing No.
Checked by: LH	208W-BH-M-SW-XX-DR-M-XX-5007
Date: April 2017	Rev: P01

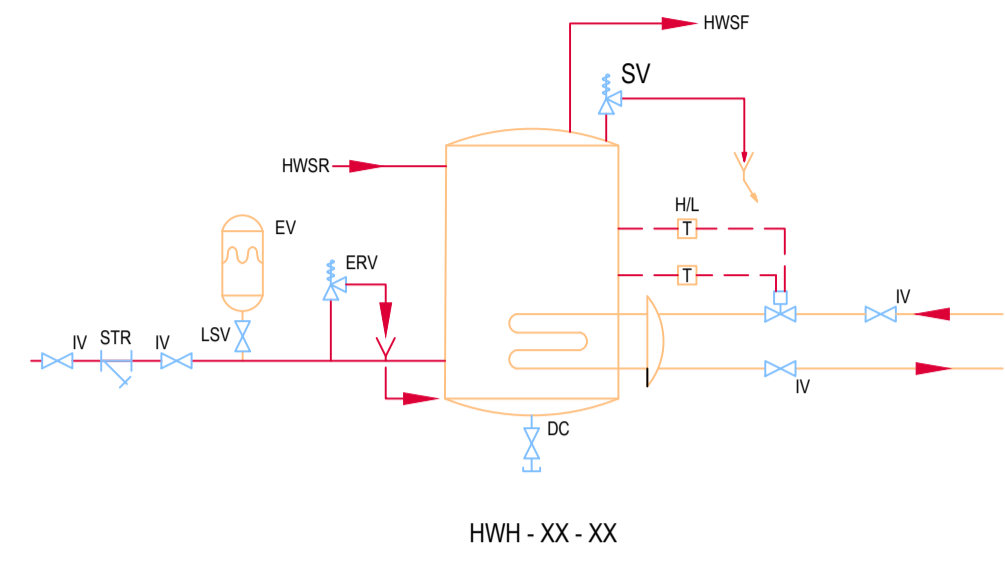
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TYPE HWH1 - SEMISTORAGE - S10.2.1
 TYPE HWH3 - HIGH CAPACITY CALORIFIER - S10.2.3



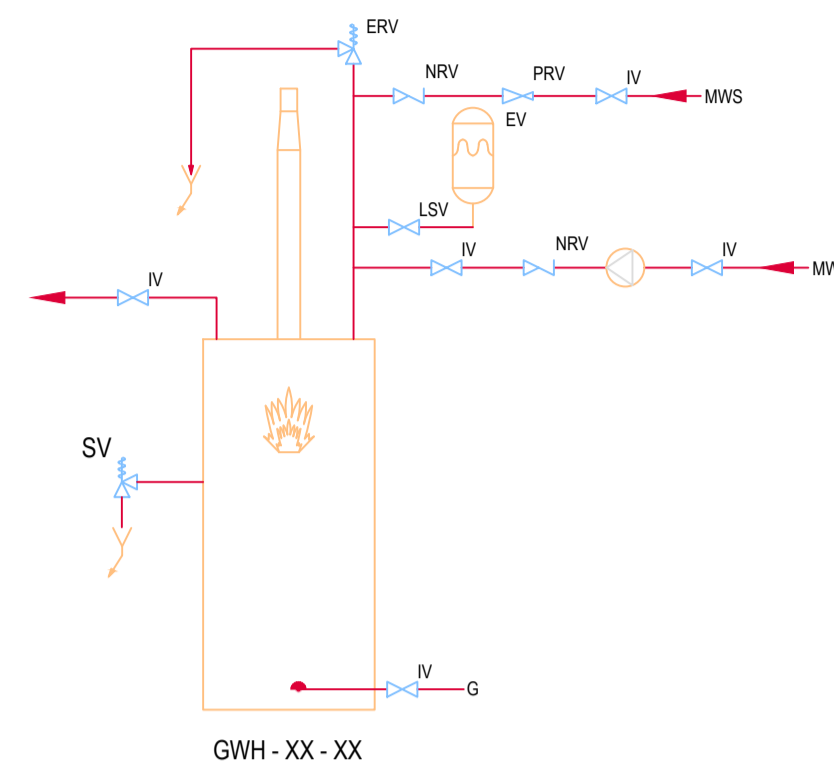
S10-1 OPEN VENTED HOT WATER STORAGE CALORIFIER

TYPE HWH2 - SEMISTORAGE - S10.2.2
 TYPE HWH4 - HIGH CAPACITY CALORIFIER - S10.2.4



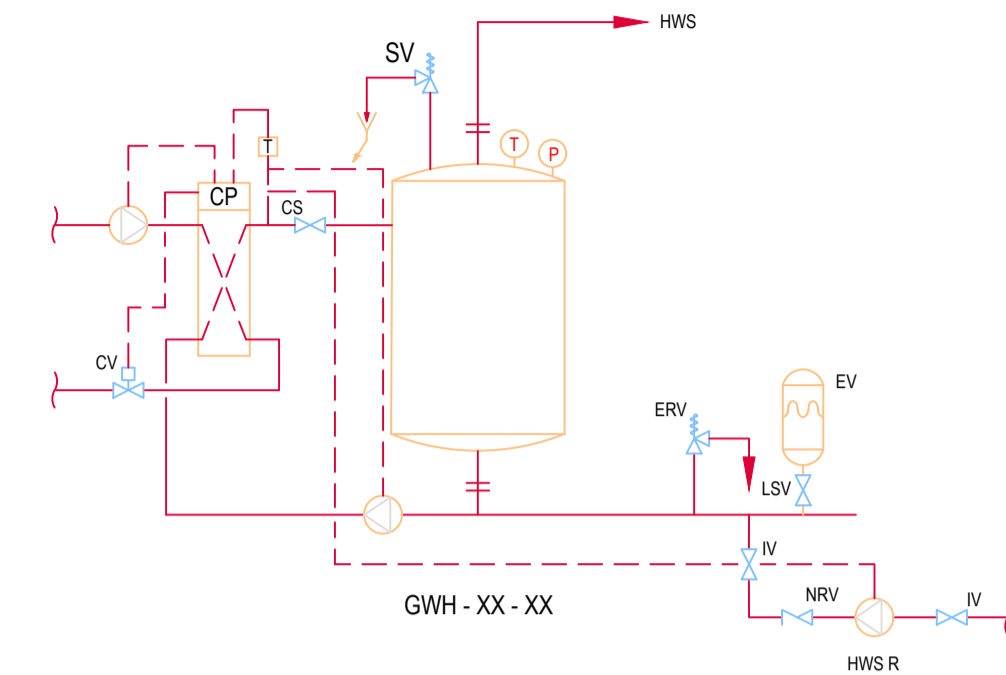
S10-2 UN-VENTED HOT WATER STORAGE CALORIFIER

TYPE HWH7 - HIGH EFFICIENCY CONDENSING DIRECT GAS FIRED WATER HEATER
 TYPE HWH7 - STAINLESS STEEL - S10.2.7
 TYPE HWH8 - VITREOUS LINED - S10.2.8
 TYPE HWH9 - COPPER - S10.2.9



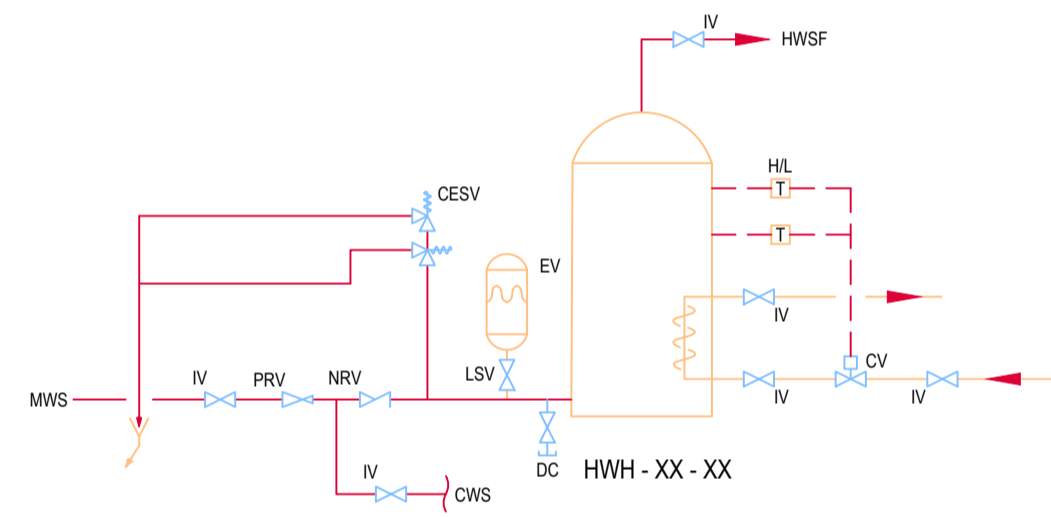
S10-3 DIRECT GAS FIRED WATER HEATER

TYPE HWH5 - S10.2.5



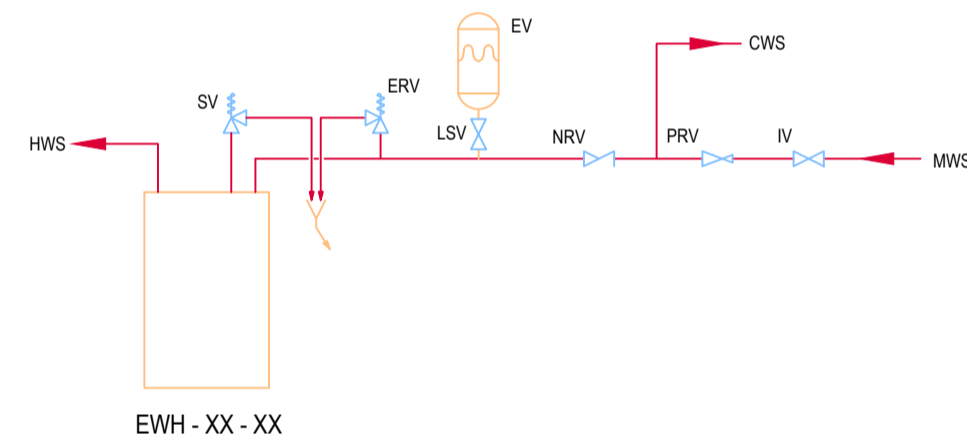
S10-4 PACKAGED HOT WATER SERVICE PLATE HEAT EXCHANGER & BUFFER VESSEL

TYPE HWH10 - S10.2.10

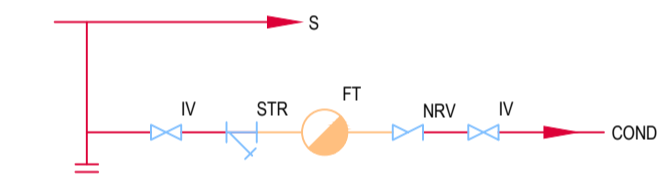


S10-5 RESIDENTIAL HOT WATER CYLINDER UN-VENTED

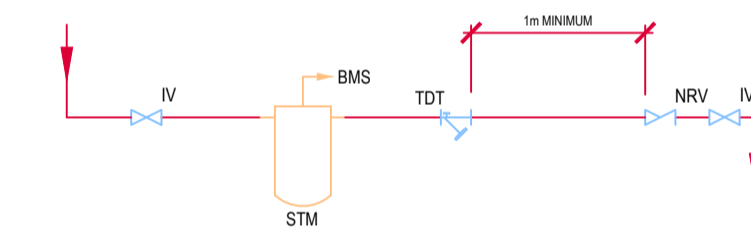
TYPE HWH6 - S10.2.6



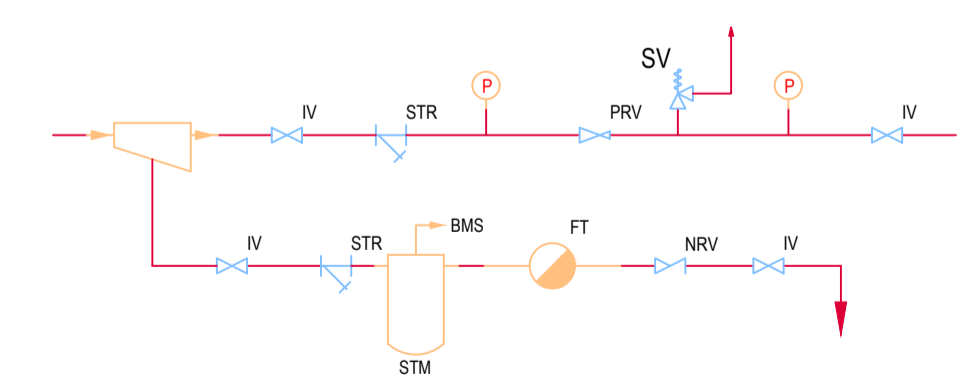
S10-6 ELECTRIC SMALL CAPACITY UN-VENTED POINT OF USE HOT WATER HEATER



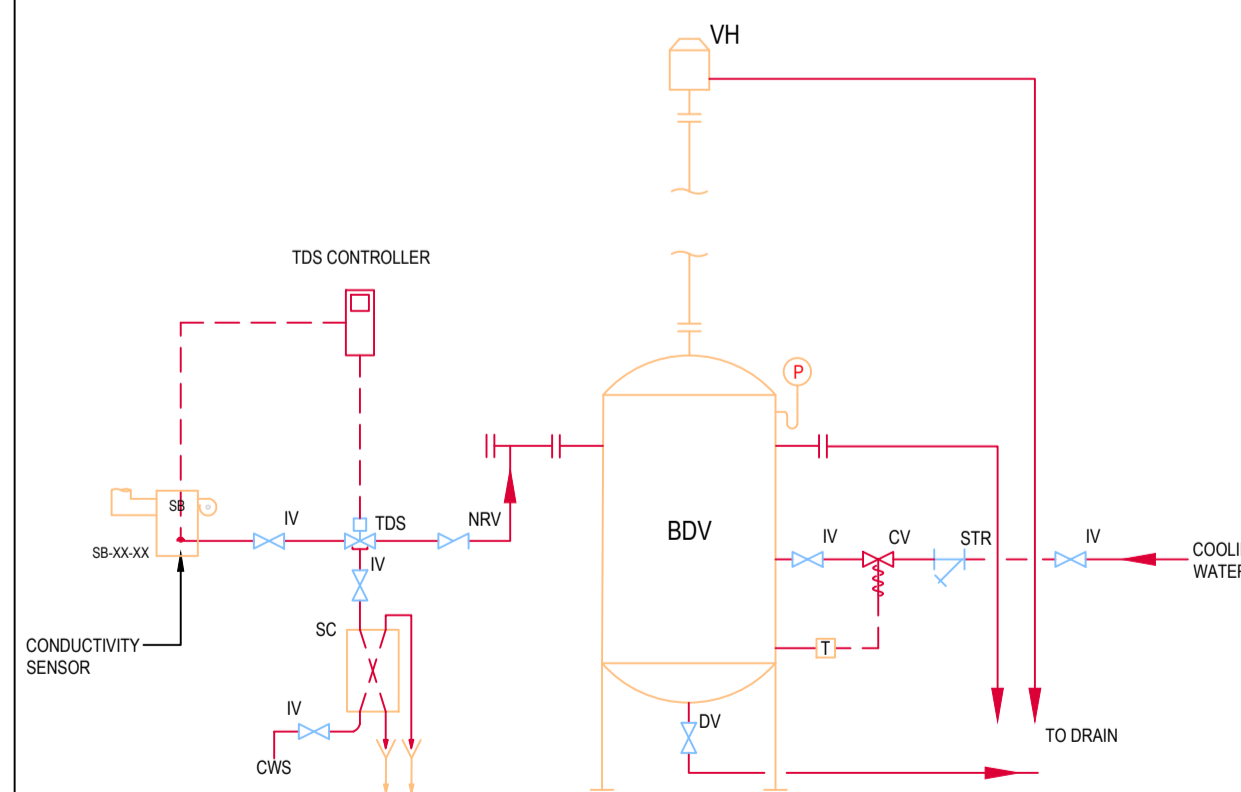
S51-1 CONDENSATE TRAP DETAIL BALL FLOAT TYPE



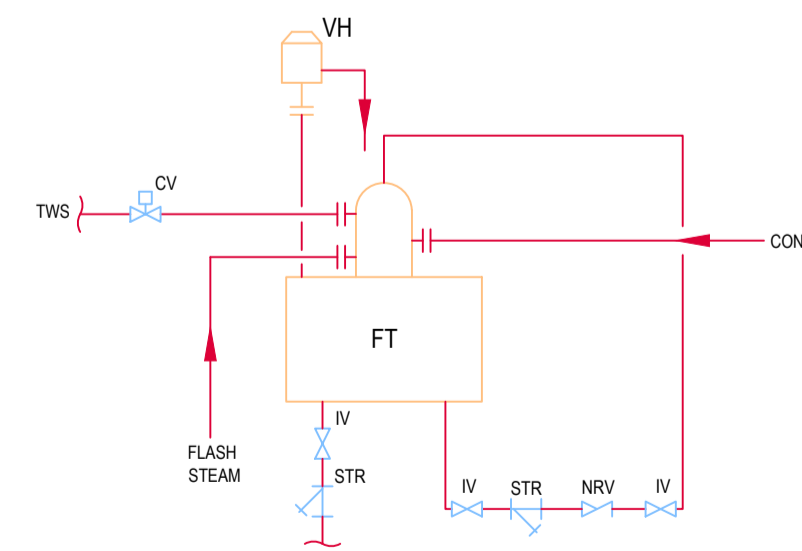
S51-2 THERMODYNAMIC STEAM TRAP DETAIL



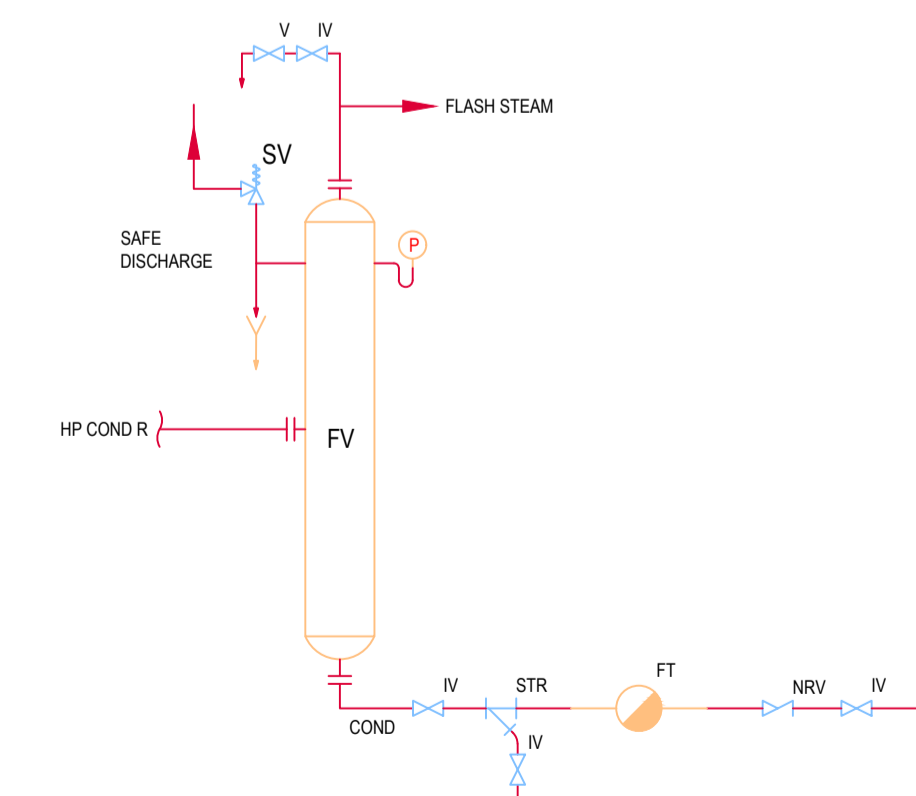
S51-3 PRESSURE REDUCING SET DETAIL



S51-4 BLOW DOWN



S51-5 BOILER HOT-WELL/FEED TANK



S51-6 FLASH STEAM RECOVERY

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Notes

P01 TENDER	11/04/2017	AW	LH
Rev	Description	Date	Dm Chd

TENDER

Status of drawing

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 Web: www.burohappold.com

Architect	BURO HAPPOLD STANDARD DETAILS
Project	Mechanical Services
Drg Title	Standard Details - Sheet 8
	Water & Steam Services Details
Scales@A1 N.T.S.	Job No. 035833
Drawn by AW	Drawing No. 208W-8H-SW-XX-DR-MX-XX-5008
Checked by LH	Rev P01
Date April 2017	

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