

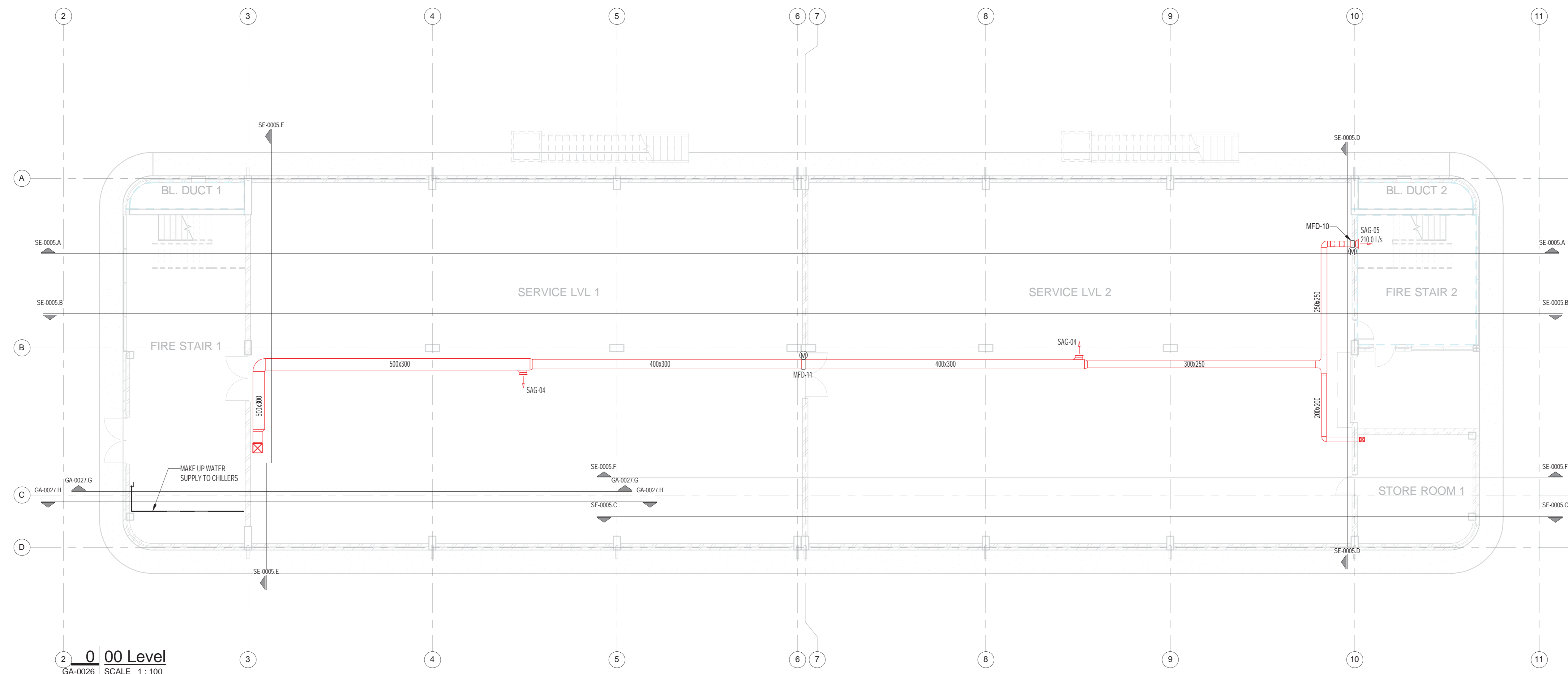
REF. NO.	DESCRIPTION	LOCATION / QUANTITY	AREA SERVED	POWER FROM	DESIGN DATA SCHEDULE										Return Air OBD (L/s)	Fresh Air OBD (L/s)	Floor Area (m2)		
					Electric Motors each		Mass each (kg)	Total for AHU or Fans (L/s)	TP (Pa) Est. to AHU or Fans	COOLING									
					Others	Load				Phase	Water Flow (L/s)	Cooling Coil (kW)	Air On °C					Air Off °C	
System 1 - Electrical Equipment Cooling																			
AHU 01	EAST WING SUPPLY (Initial Installation)	1	RELAY ROOM METERING ROOM SCADA ROOM LV ROOM	ACP-L1-01	SITE ELECTRICIAN	2.00 kW	3	250	1745	T.B.C.	1.0	21.7	30.2	19.3	13.7	13.2	505	1240	38
AHU 02	WEST WING SUPPLY A (Initial Installation)	1	MV SWITCHGEAR ROOM - SOUTH	ACP-L1-01	SITE ELECTRICIAN	4.00 kW	3	600	3180	T.B.C.	3.0	68.2	30.2	19.3	13.7	13.2	2890	490	172
AHU 03	WEST WING SUPPLY B (Initial Installation)	1	MV SWITCHGEAR ROOM - NORTH	ACP-L1-01	SITE ELECTRICIAN	4.00 kW	3	600	3180	T.B.C.	3.0	68.2	30.5	19.7	13.6	13.1	2890	490	172
FCU 01	WEST WING SUPPLY C (Future Capacity Expansion)	T.B.C	MV SWITCHGEAR ROOM - SOUTH	ACP-L1-01	SITE ELECTRICIAN	1.00 kW	3	T.B.C.	890	N/A	0.8	17.5	30.2	19.3	13.7	13.2	890	0	172
FCU 02		T.B.C	MV SWITCHGEAR ROOM - NORTH	ACP-L1-01	SITE ELECTRICIAN	1.00 kW	3	T.B.C.	890	N/A	0.8	17.5	30.2	19.3	13.7	13.2	890	0	172
System 2 - Fresh Air Supply																			
FAF 01	SPIN FILTER FAN	1	AHU 1 AHU 2 AHU 3 AC PLANTROOM INTERNAL CORRIDOR SOUTH STAIRWELL NORTH STAIRWELL LEVEL 00 SERVICE FLOOR NORTH EAST CORNER ROOM	ACP-L1-01	SITE ELECTRICIAN	7.00 kW	3	1000	3985	T.B.C.	0	0.0	—	—	—	—	—	1240	N/A
Chiller Units																			
ACC 01	AIR COOLED CHILLER	1	ALL AHU's	ACP-L2-01	SITE ELECTRICIAN	62.2 kW	3	2000	—	—	8.6	194	—	—	—	—	—	—	—
ACC 02	AIR COOLED CHILLER	1	ALL AHU's	ACP-L2-01	SITE ELECTRICIAN	33.8 kW	3	1050	—	—	4.6	105	—	—	—	—	—	—	—

SUPPLY FROM	AREA SERVED	REFERENCE NO.	SUPPLY GRILLE QTY.	FLOW PER GRILLE (L/s)	GRILLE DIMENSIONS (L x W)	GRILLE - MAKE		REFERENCE NO.	RETURN GRILLE QTY.	FLOW PER GRILLE (L/s)	GRILLE DIMENSIONS (L x W)	GRILLE - MAKE	
						GRILLE - MAKE	GRILLE - MODEL					GRILLE - MAKE	GRILLE - MODEL
AHU 01	RELAY ROOM	SAG 03	2	140	250 x 150	Europa	DD + OBD	N/A	—	0	—	—	—
	METERING ROOM	SAG 03	2	140	250 x 150	Europa	DD + OBD	N/A	—	0	—	—	—
	SCADA ROOM	SAG 04	2	195	300 x 250	Europa	DD + OBD	RAG 01	1	110	250 x 200	Europa	RA
	LV ROOM	SAG 08	3	260	300 x 250	Europa	DD + OBD	RAG 02	2	395	300 x 250	Europa	RA
AHU 02	MV SWITCHGEAR ROOM - SOUTH	SAG 09	6	530	525 x 300	Europa	DD + OBD	RAG 03	5	540	400 x 350	Europa	RA
AHU 03	MV SWITCHGEAR ROOM - NORTH	SAG 09	6	530	525 x 300	Europa	DD + OBD	RAG 03	5	540	400 x 350	Europa	RA
FAF 01	AHU 1	OBD	1	1240	—	N/A	N/A	—	—	—	—	—	—
	AHU 2	OBD	1	490	—	N/A	N/A	—	—	—	—	—	—
	AHU 3	OBD	1	490	—	N/A	N/A	—	—	—	—	—	—
	INTERNAL CORRIDOR	SAG 07	2	245	375 x 200	Europa	DD + OBD	—	—	—	—	—	—
	LEVEL 00 - A/C ROOM 1	SAG 06	2	220	375 x 200	Europa	DD + OBD	—	—	—	—	—	—
	SOUTH STAIRWELL	SAG 02	1	130	250 x 150	Europa	DD + OBD	—	—	—	—	—	—
	NORTH STAIRWELL	SAG 05	1	210	300 x 250	Europa	DD + OBD	—	—	—	—	—	—
	LEVEL 00 SERVICE FLOOR	SAG 04	2	195	300 x 250	Europa	DD + OBD	—	—	—	—	—	—
	NORTH-EAST CORNER ROOM	SAG 01	1	105	300 x 300	Europa	FG 15' + OBD	—	—	—	—	—	—

WEATHER LOUVER SCHEDULE		
REF. NO.	SIZE	QTY
WL 01	1500x1500	1

SMOKE VENT SCHEDULE		
REF. NO.	SIZE	QTY
SMOKE VENTILATOR	3600x1000	2

MOTORIZED FIRE DAMPER SCHEDULE		
REF. NO.	SIZE	QTY
MFD-01	300x300-300x300	1
MFD-02	350x350-350x350	3
MFD-03	400x400-400x400	2
MFD-04	500x450-500x450	1
MFD-05	500x500-500x500	1
MFD-06	550x550-550x550	1
MFD-07	650x650-650x650	4
MFD-08	700x650-700x650	4
MFD-09	200x200-200x200	3
MFD-10	250x250-250x250	1
MFD-11	400x300-400x300	1
Grand total: 22		



HVAC DUCT LEGEND	
[Red line]	FRESH AIR
[Blue line]	RETURN AIR
[Green line]	SUPPLY AIR
[Grey box]	MECHANICAL EQUIPMENT/ AIR TERMINALS/ DUCT ACCESSORIES

LEGEND	
FAF	FRESH AIR SUPPLY FAN
EAF	EXHAUST AIR FAN
[Symbol]	1-PHASE ISOLATOR LOCAL WEATHER PROOF ISOLATOR BY SITE ELECTRICIAN HVAC CONTRACTOR TO PROVIDE FAN STARTER AND OVERLOAD PROTECTION FOR FAN
[Symbol]	3-PHASE ISOLATOR: SITE ELECTRICIAN TO CONNECT ONTO 3-PHASE ISOLATOR IN ACP
[Symbol]	Ø50 TRAPPED DRAIN POINT BY PLUMBER
SAT	SOUND ATTENUATOR
[Symbol]	DOOR UNDERCUT 25mm BY OTHERS
[Symbol]	MOTORIZED FIRE DAMPER WITH A 16 GAUGE GALVANIZED SLEEVE TO BE BUILT IN BY BUILDER
[Symbol]	FIRE DAMPER
[Symbol]	Wired Remote Temperature Controller
ACU	AIR CONDITIONING UNIT INCLUDING LOCAL ISOLATOR BY HVAC CONTRACTOR
[Symbol]	BUTTERFLY DAMPER
[Symbol]	NON-RETURN DAMPER
[Symbol]	ON/OFF CANOPY SWITCH
[Symbol]	ELECTRICAL DISTRIBUTION PANEL

MASTER
10 FEB 2017
AECOM

- NOTES**
- DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED
 - THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.

DRAWING NO.	REFERENCE
1924701-2-510-M-GA-0027-01	HVAC GENERAL ARRANGEMENT - LEVEL 01
1924701-2-510-M-GA-0028-01	HVAC GENERAL ARRANGEMENT - LEVEL 02
1924701-2-510-M-SD-0005-01	CHILLED WATER SCHEMATIC
1924701-2-510-M-SE-0004-01	HVAC SECTION LAYOUT



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REG. NO. 1966/006628/07

CONTRACTOR/CONSULTANT		TRANSNET CAPITAL PROJECTS	
TITLE	NAME	NAME	DATE
		K.C.	27 01 17
		J.J.	27 01 17
		J.J.	27 01 17
		A.D.	27 01 17

OPERATING DIVISIONS	
TITLE	NAME

Transnet Capital Projects
TRANSNET LTD (TRANSNET AS TRANSNET CAPITAL PROJECTS) REG. NO. 1966000009
TABLE WY BUILDING, TYGERSBERG PARK TEL: 021 940 1999
163 LYN KRIGE DRIVE, PLATTENKLOOF, 8001 FAX: 021 940 2455

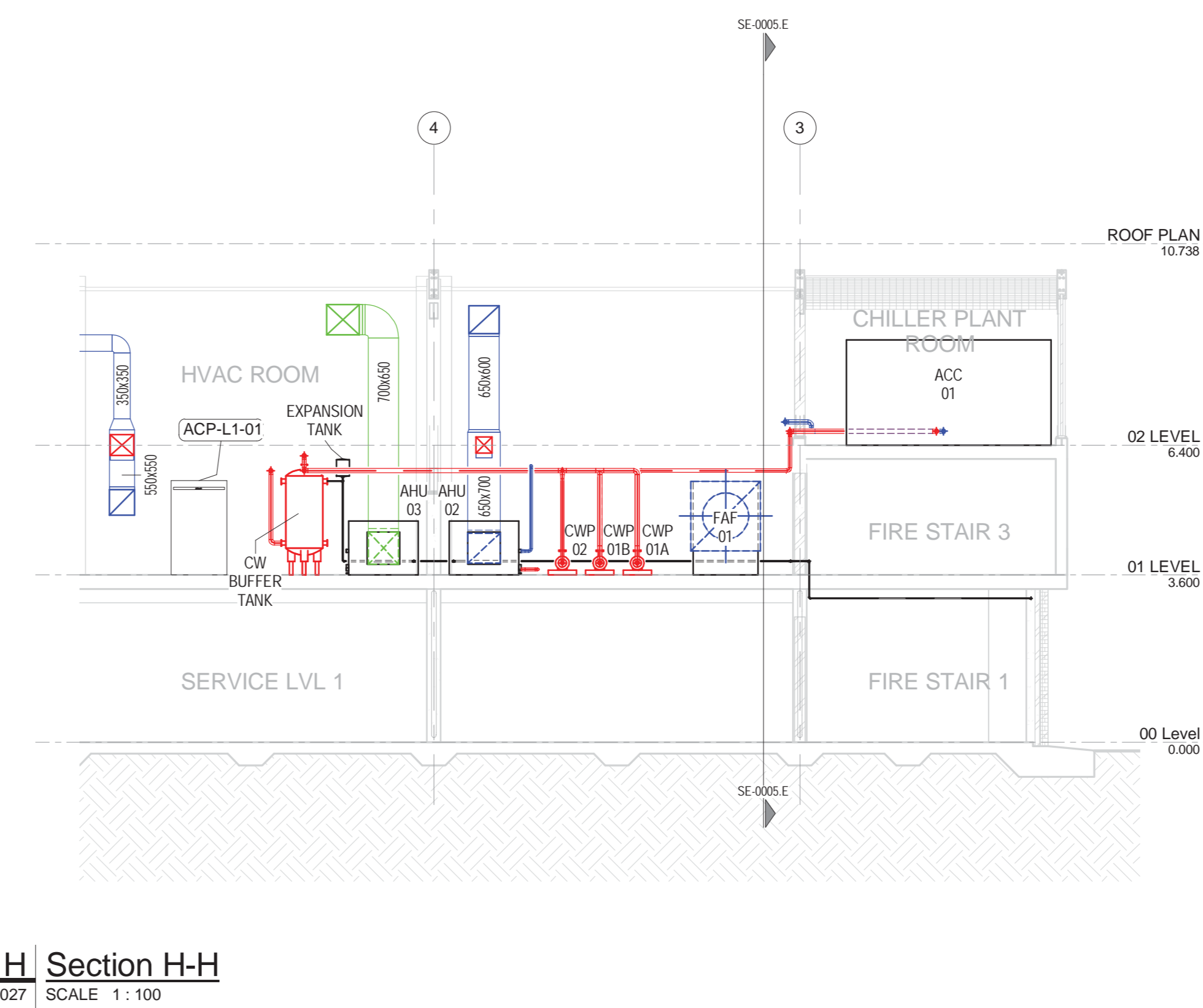
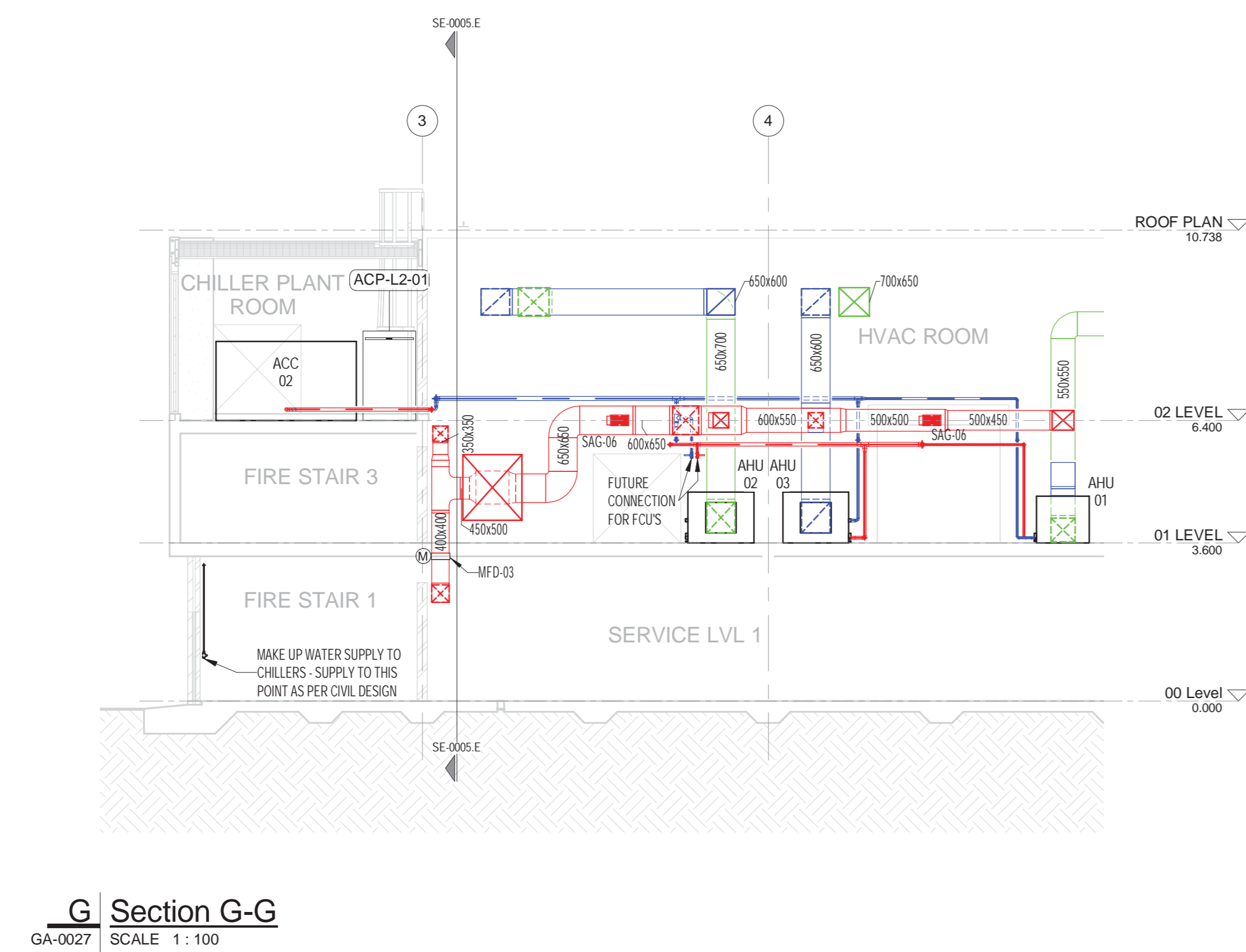
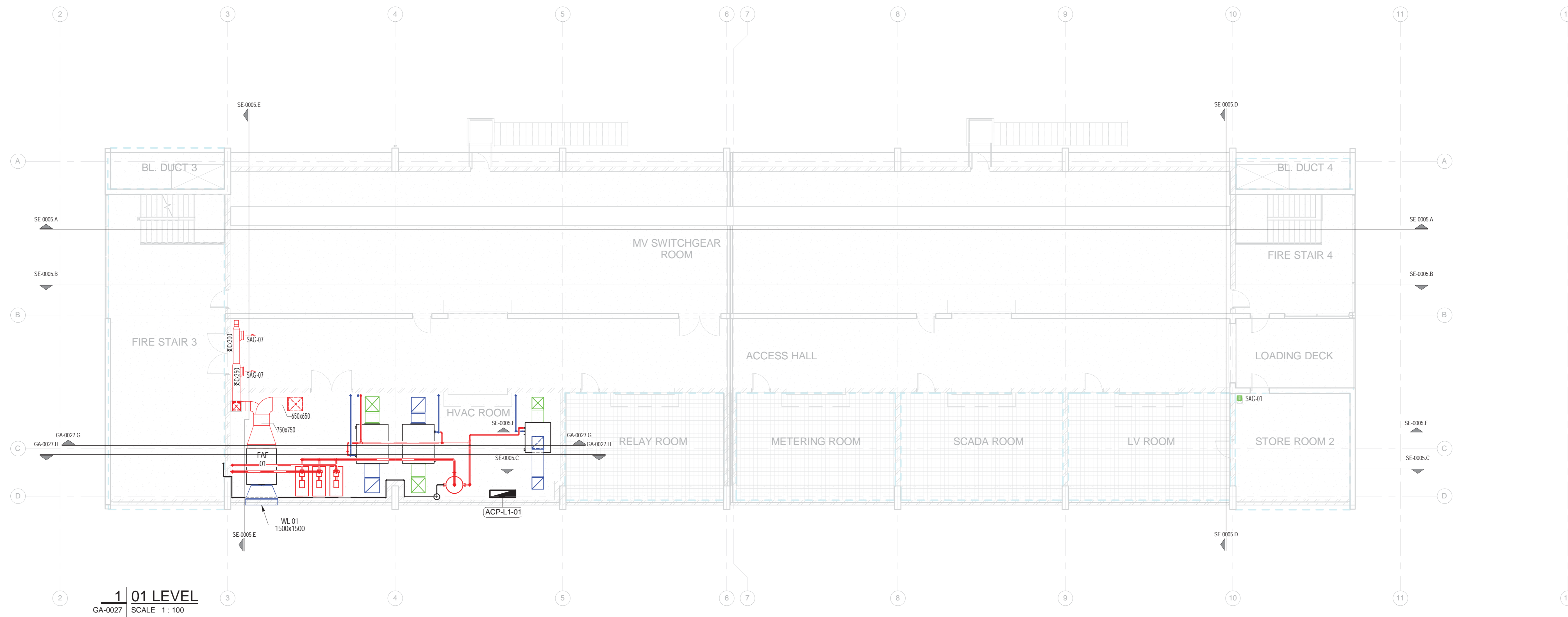
PORT OF SALDANHA

**IRON ORE TIPLER 3 PROJECT
BULK POWER UPGRADE:
MAIN INTAKE SUBSTATION
HVAC GENERAL ARRANGEMENT - LEVEL 00**

PROJECT NUMBER: 00 FBS DIS TYPE DRAWING NO. SHEET REV ID
19 2 4 7 0 1 2 5 1 0 M G A 0 0 2 6 0 1 00 AE

REVISIONS	
NO.	DESCRIPTION
02	ISSUED FOR CONSTRUCTION

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HVAC DUCT LEGEND

- FRESH AIR
- RETURN AIR
- SUPPLY AIR
- MECHANICAL EQUIPMENT/ AIR TERMINALS/ DUCT ACCESSORIES

LEGEND

FAN	FRESH AIR SUPPLY FAN
EAF	EXHAUST AIR FAN
⊗	1-PHASE ISOLATOR LOCAL WEATHER PROOF ISOLATOR BY SITE ELECTRICIAN
⊗	HVAC CONTRACTOR TO PROVIDE FAN STARTER AND OVERLOAD PROTECTION FOR FAN
⊗	3-PHASE ISOLATOR: SITE ELECTRICIAN TO CONNECT ONTO 3-PHASE ISOLATOR IN ACP
⊗	250 TRAPPED DRAIN POINT BY PLUMBER
SAT	SOUND ATTENUATOR
⊗	DOOR UNDERCUT 25mm BY OTHERS
⊗	MOTORIZED FIRE DAMPER WITH A 16 GAUGE GALVANIZED SLEEVE TO BE BUILT IN BY BUILDER
⊗	FIRE DAMPER
⊗	WIRED REMOTE TEMPERATURE CONTROLLER
⊗	ACU AIR CONDITIONING UNIT, INCLUDING LOCAL ISOLATOR BY HVAC CONTRACTOR
⊗	BUTTERFLY DAMPER
⊗	NON-RETURN DAMPER
⊗	ON/OFF GANGPY SWITCH
⊗	ELECTRICAL DISTRIBUTION PANEL

MASTER
 10 FEB 2017
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DRAWING NO.	REFERENCE
1924701-2-510-M-GA-0026-01	HVAC GENERAL ARRANGEMENT - LEVEL 00
1924701-2-510-M-SD-0005-01	CHILLED WATER SCHEMATIC
1924701-2-510-M-SE-0004-01	HVAC SECTION LAYOUT

REFERENCE DRAWINGS



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 TYGER WATERFRONT
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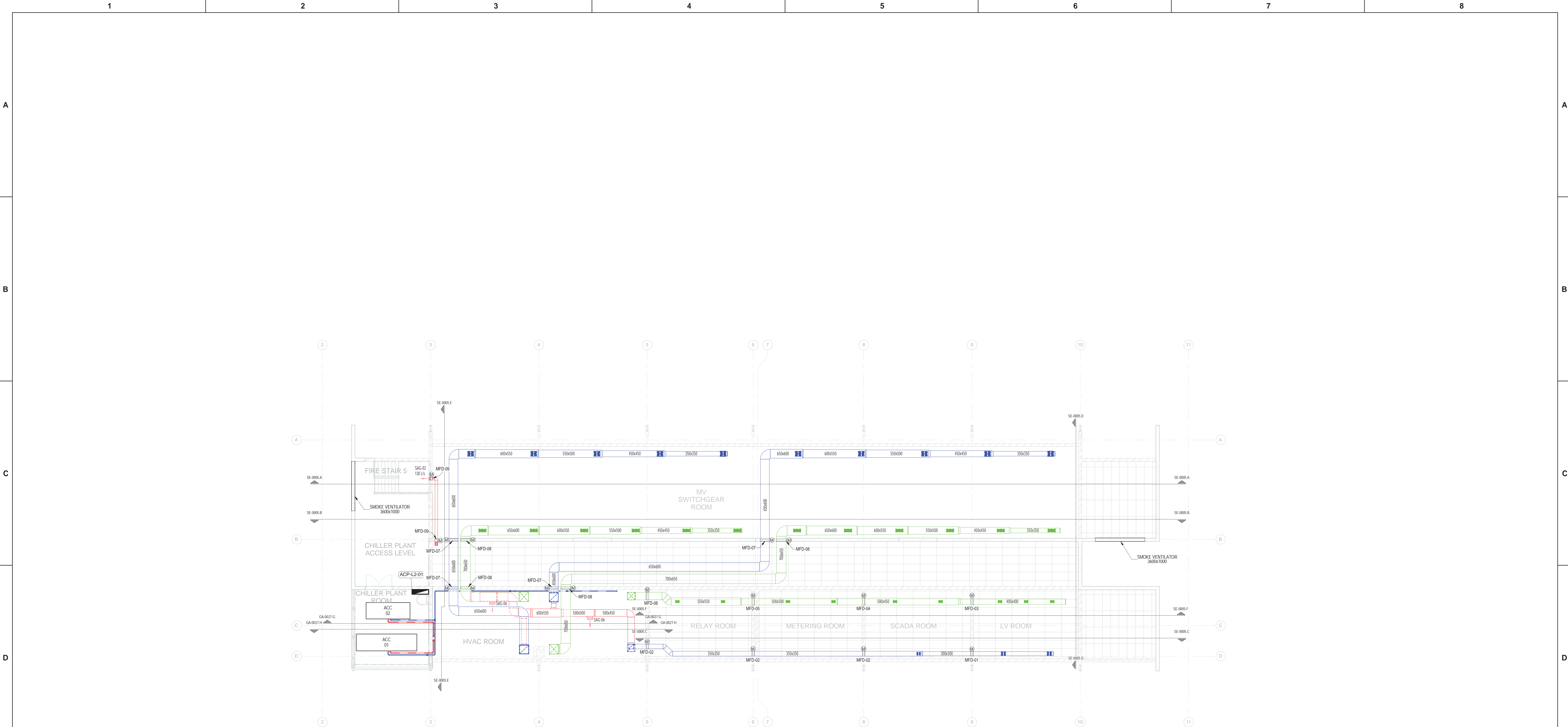
NO	DESCRIPTION	BY	CHKD	APPD	DATE
02	ISSUED FOR CONSTRUCTION	K.C.	J.J.	A.D.	2017/01/27

REVISIONS

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CONTRACTOR/CONSULTANT				TRANSNET CAPITAL PROJECTS			
TITLE	NAME	SIGN	DATE	TITLE	NAME	SIGN	DATE
				DRAWN	K.C.		27/01/17
				CHECKED	J.J.		27/01/17
				DESIGNED	J.J.		27/01/17
				CHECKED	A.D.		27/01/17

Transnet Capital Projects		TRANSNET	
PORT OF SALDANHA			
IRON ORE TIPLER 3 PROJECT			
BULK POWER UPGRADE:			
MAIN INTAKE SUBSTATION			
HVAC GENERAL ARRANGEMENT - LEVEL 01			
PROJECT NUMBER	00	FBS	DIS
2	510	M	GA
DRAWING NO.	0027	SHEET	01
REV	00	AE	



2 02 LEVEL
GA-0028 SCALE 1:100

HVAC DUCT LEGEND	
[Red Line]	FRESH AIR
[Blue Line]	RETURN AIR
[Green Line]	SUPPLY AIR
[Grey Box]	MECHANICAL EQUIPMENT/ AIR TERMINALS/ DUCT ACCESSORIES

LEGEND	
[Symbol]	FRESH AIR SUPPLY FAN
[Symbol]	EXHAUST AIR FAN
[Symbol]	1-PHASE ISOLATOR LOCAL WEATHER PROOF ISOLATOR BY SITE ELECTRICAL HVAC CONTRACTOR TO PROVIDE FAN STARTER AND OVERLOAD PROTECTION FOR FAN.
[Symbol]	3-PHASE ISOLATOR: SITE ELECTRICAL TO CONNECT ONTO 3-PHASE ISOLATOR IN ACP.
[Symbol]	800 TRAPPED DRAIN POINT BY PLUMBER
[Symbol]	SAT SOUND ATTENUATOR
[Symbol]	DOOR UNDERCUT 25mm BY OTHERS
[Symbol]	MOTORIZED FIRE DAMPER WITH A 16 GAUGE GALVANIZED SLEEVE TO BE BUILT IN BY BUILDER
[Symbol]	FIRE DAMPER
[Symbol]	WIRED REMOTE TEMPERATURE CONTROLLER
[Symbol]	ACU AIR CONDITIONING UNIT INCLUDING LOCAL ISOLATOR BY HVAC CONTRACTOR
[Symbol]	BUTTERFLY DAMPER
[Symbol]	NON-RETURN DAMPER
[Symbol]	ON/OFF CANOPY SWITCH
[Symbol]	ELECTRICAL DISTRIBUTION PANEL

MASTER
10 FEB 2017
AECOM

NOTES
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DRAWING NO.	REFERENCE
1924701-2-510-M-GA-0026-01	HVAC GENERAL ARRANGEMENT - LEVEL 00
1924701-2-510-M-SD-0005-01	CHILLED WATER SCHEMATIC
1924701-2-510-M-SE-0004-01	HVAC SECTION LAYOUT



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CONTRACTOR/CONSULTANT		TRANSNET CAPITAL PROJECTS	
TITLE	NAME	SIGN	DATE
OPERATING DIVISIONS			
TITLE	NAME	SIGN	DATE
PR.ENG./PR.TECH./PR.ARCH			
NAME	DATE	DATE	DATE
REVISIONS			
NO	DESCRIPTION	BY	CHKD/APPD DATE
02	ISSUED FOR CONSTRUCTION	K.C. J.J. A.D.	2017/01/27

CONTRACTOR/CONSULTANT		TRANSNET CAPITAL PROJECTS	
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OPERATING DIVISIONS			
TITLE	NAME	SIGN	DATE
PR.ENG./PR.TECH./PR.ARCH			
NAME	DATE	DATE	DATE
REVISIONS			
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02	ISSUED FOR CONSTRUCTION	K.C. J.J. A.D.	2017/01/27

Transnet Capital Projects

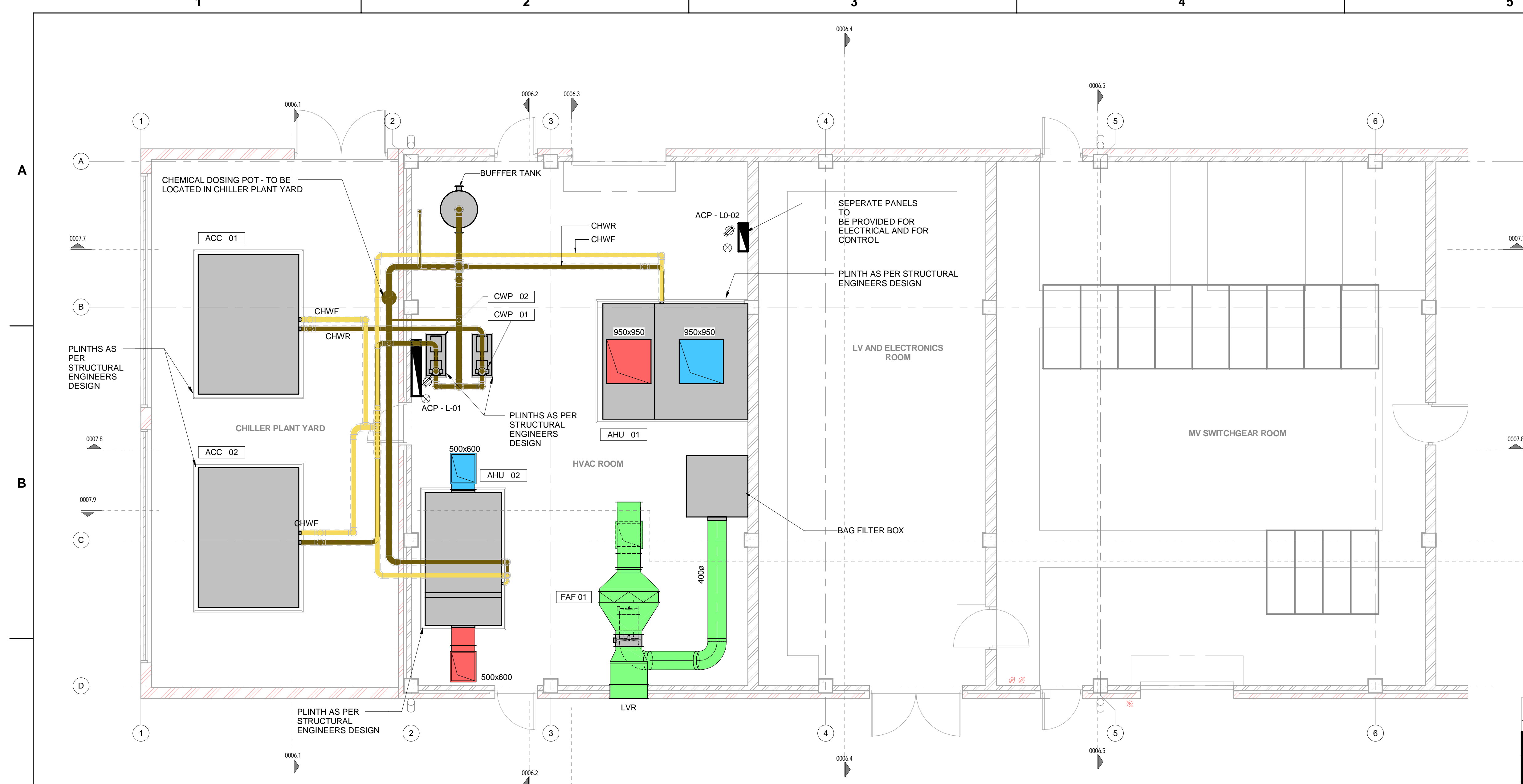
TRANSNET
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PORT OF SALDANHA

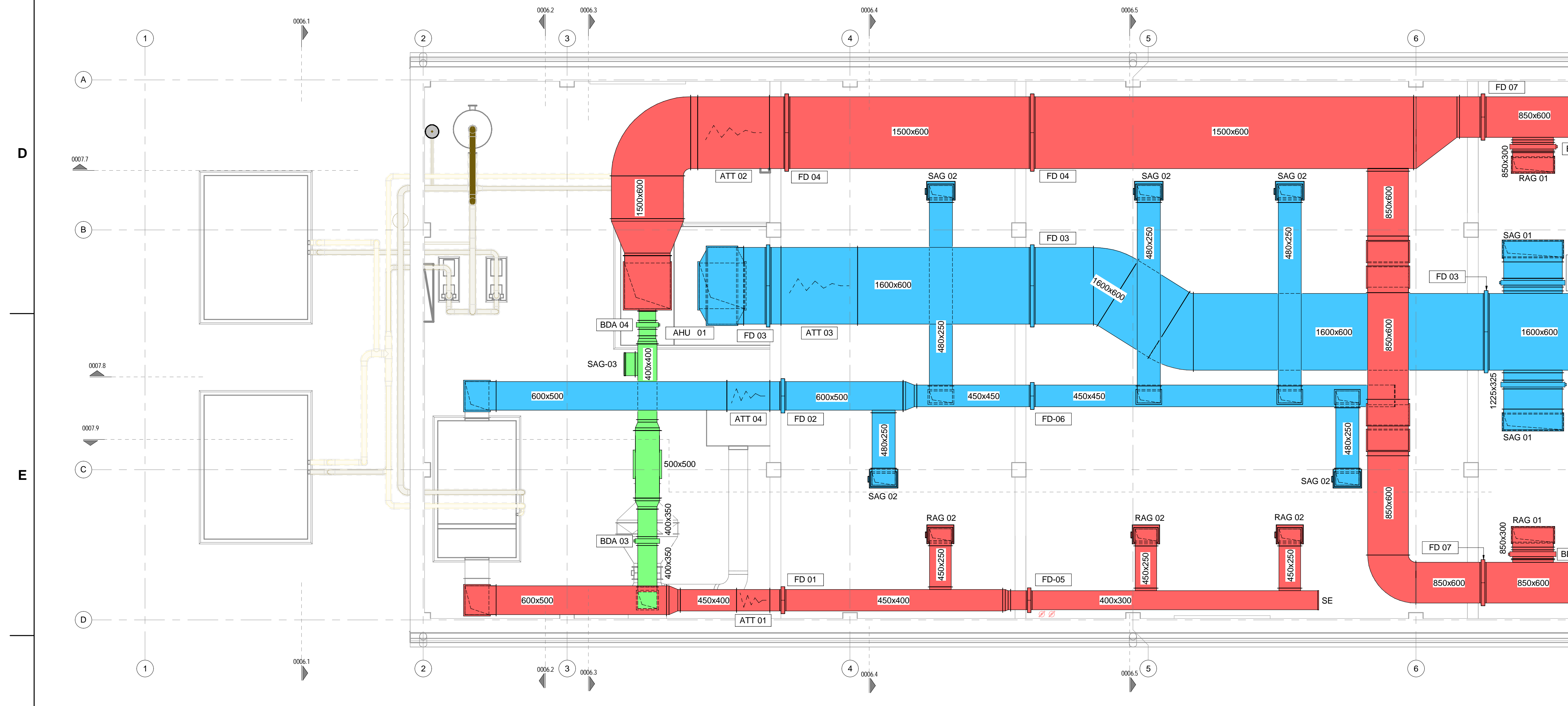
**IRON ORE TIPLER 3 PROJECT
BULK POWER UPGRADE:
MAIN INTAKE SUBSTATION
HVAC GENERAL ARRANGEMENT - LEVEL 02**

PROJECT NUMBER	DO	FBS	DIS	TYPE	DRAWING NO.	SHEET	REV	ID
1924701	2	510	M	GA	0028	01	00	AE

SCALE: 1:100



1 LEVEL 00 - HVAC LAYOUT
SCALE 1:50



2 TO BEAM - HVAC LAYOUT
SCALE 1:50

MECH - SA GRILLE SCHEDULE

Supply From	Area Served	Reference Number	Total Airflow (L/s)	Grille Qty	Flow (L/s) used for selection	Grille Dimensions (L x W)	Grille Make	Grille Model
AHU 01	VSD AND TRANSFORMER ROOM	SAG 01	8400	10	840	1125 x 325	Trox	DD-08D
AHU 02	MV SWITCHGEAR ROOM	SAG 02	1050	3	350	480 x 250	Europa	DD-08D
LV AND ELECTRONICS ROOM		SAG 02	650	2	325	480 x 250	Europa	DD-08D
FAF 01	AHU 1		560	1	560			
AHU 2			870	1	870			
HVAC PLANT ROOM		SAG 03	380	1	380	480 x 250	Europa	DD-08D

MECH - RA GRILLE SCHEDULE

REFERENCE NUMBER	RETURN AIRFLOW (L/s)	GRILLE QTY	DIMENSIONS		SELECTION AIRFLOW	MANUFACTURER	MODEL
			HEIGHT	WIDTH			
RAG 01	7850 L/s	10	300	850	785 L/s	TROX	TYPE TR
RAG 02	490 L/s	2	250	450	245 L/s	EUROPAIR	RA+08D
RAG 02	340 L/s	1	250	450	340 L/s	EUROPAIR	RA+08D

MECH - FIRE DAMPER SCHEDULE

COMPONENT MARK	TYPE	DIMENSIONS		TOTAL
		HEIGHT	WIDTH	
FD 01	FIRE DAMPER - MOTORIZED - RECTANGULAR	400	450	1
FD 02	FIRE DAMPER - MOTORIZED - RECTANGULAR	500	600	1
FD 03	FIRE DAMPER - MOTORIZED - RECTANGULAR	600	1600	3
FD 04	FIRE DAMPER - MOTORIZED - RECTANGULAR	600	1500	2
FD 07	FIRE DAMPER - MOTORIZED - RECTANGULAR	600	850	2
FD-05	FIRE DAMPER - MOTORIZED - RECTANGULAR	300	400	1
FD-06	FIRE DAMPER - MOTORIZED - RECTANGULAR	450	450	1

MECH - BALANCING DAMPER SCHEDULE

COMPONENT MARK	TYPE	DIMENSIONS		TOTAL
		HEIGHT	WIDTH	
BDA 01	BALANCING DAMPER	300	850	10
BDA 02	BALANCING DAMPER	325	1225	10
BDA 03	BALANCING DAMPER	350	400	1
BDA 04	BALANCING DAMPER	300	350	1

MECH - SOUND ATTENUATOR SCHEDULE

REFERENCE NUMBER	HEIGHT	WIDTH	TOTAL
ATT 01 400	450	1	
ATT 02 600	1500	1	
ATT 03 600	1600	1	
ATT 04 500	600	1	

LEGEND

- FAF FRESH AIR SUPPLY FAN
- EAF EXHAUST AIR FAN
- 230V / 1 Phase / 50 Hz POWER SUPPLY AND ISOLATOR BY ELECTRICAL CONTRACTOR. TERMINATION AT EQUIPMENT BY HVAC CONTRACTOR. MOTOR STARTERS AND OVERLOAD PROTECTION TO BE BY HVAC CONTRACTOR, WHERE APPLICABLE.
- 400V / 3 Phase / 50 Hz POWER SUPPLY AND ISOLATOR BY ELECTRICAL CONTRACTOR. TERMINATION AT EQUIPMENT BY HVAC CONTRACTOR. MOTOR STARTERS AND OVERLOAD PROTECTION TO BE BY HVAC CONTRACTOR, WHERE APPLICABLE.
- 90° TRAPPED DRAIN POINT BY PLUMBER
- SAT SOUND ATTENUATOR
- DOOR UNDERCUT 25mm BY OTHERS
- MOTORIZED FIRE DAMPER WITH A 16 GAUGE GALVANIZED SLEEVE TO BE BUILT IN BY BUILDER
- FIRE DAMPER
- WIRING REMOTE TEMPERATURE CONTROLLER
- ACU AIR CONDITIONING UNIT INCLUDING LOCAL ISOLATOR BY HVAC CONTRACTOR
- BUTTERFLY DAMPER
- NON-RETURN DAMPER
- ON/OFF CANOPY SWITCH
- ELECTRICAL DISTRIBUTION PANEL
- FIRE INTERLOCK RELAY AND WIRING UP TO INDICATED POINT BY FIRE DETECTION CONTRACTOR. TERMINATION AT EQUIPMENT BY HVAC CONTRACTOR

HVAC PIPE LEGEND

- CHILLED WATER
- CHILLED WATER

HVAC LEGEND

- EXHAUST
- FRESH AIR/NATURAL
- RETURN
- SUPPLY
- FOUL
- MECHANICAL EQUIP/ AIR TERMINALS/ DUCT ACCESSORIES

DESIGN DATA SCHEDULE

REF. NO.	DESCRIPTION	QTY.	AREA SERVED	EQUIPMENT POWER FROM	Electric Motors / Rated Electric Duty (Total)		Mass each (kg)	Total Airflow (L/s)	Total Pressure (Pa) Ext. to AHU	COOLING				HEATING		MIXING BOX		Floor Area (m ²)			
					Load	Phase				Total Water Flow (L/s)	Total Cooling (kW)	Air On °C DB	Air Off °C WB	Air Off °C DB	Air Off °C WB	Heating (kW)	Return Air (L/s)		Fresh Air (L/s)		
Airside Units																					
AHU 01	VERTICAL DISCHARGE AIR HANDLING UNIT	1	VSD AND TRANSFORMER ROOM	ACP-L0-02	SITE ELECTRICIAN	7.50 kW	3	t.b.c.	8400	425	7.5	170.9	29.9	19.2	13.7	13.2	0.0	7840	560	126	
AHU 02	HORIZONTAL DISCHARGE AIR HANDLING UNIT	1	MV SWITCHGEAR ROOM LV AND ELECTRONICS ROOM	ACP-L0-02	SITE ELECTRICIAN	1.50 kW	3	t.b.c.	1700	425	1.8	40.8	29.4	20.1	13.6	13.1	0.0	490	560	103	
																		340	310	55	
FAF 01	SPIN FILTER FAN	1	AHU 1 HVAC PLANT ROOM	ACP-L0-02	SITE ELECTRICIAN	2.20 kW	3	t.b.c.	1810	190	0	0.0						0	560	N/A	
																		0	870	N/A	
																		0	380	82	
Chiller Units																					
ACC 01	AIR COOLED CHILLER	1	ALL AHU's	ACP-L0-01	SITE ELECTRICIAN	47.0 kW	3	t.b.c.			6.2	142								0.0	
ACC 02	AIR COOLED CHILLER	1	ALL AHU's	ACP-L0-01	SITE ELECTRICIAN	47.0 kW	3	t.b.c.			6.2	142									0.0

REFERENCE DRAWINGS

1924701-2-510-M-ST-0005	SUBSTATION M - STANDARD PIPING DETAILS
1924701-2-510-M-ST-0004	SUBSTATION M - STANDARD DUCTING DETAILS
1924701-2-510-M-SE-0007	SUBSTATION M - HVAC SECTION LAYOUT (SHEET 2)
1924701-2-510-M-SE-0006	SUBSTATION M - HVAC SECTION LAYOUT (SHEET 1)
1924701-2-510-M-SD-0005	SUBSTATION M - CHILLED WATER SCHEMATIC

GENERAL NOTES

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AECOM

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REVISIONS

NO	DESCRIPTION	BY	CHK	APPD	DATE
00	ISSUED FOR CONSTRUCTION	AJ	JI	AD	30-05-2018

CONTRACTOR/CONSULTANT

TITLE	NAME	SIGN	DATE

TRANSNET CAPITAL PROJECTS

TITLE	NAME	SIGN	DATE

OPERATING DIVISIONS

TITLE	NAME	SIGN	DATE

PRENG/PR.TECH/PR.ARCH

NAME	DATE

TRANSNET CAPITAL

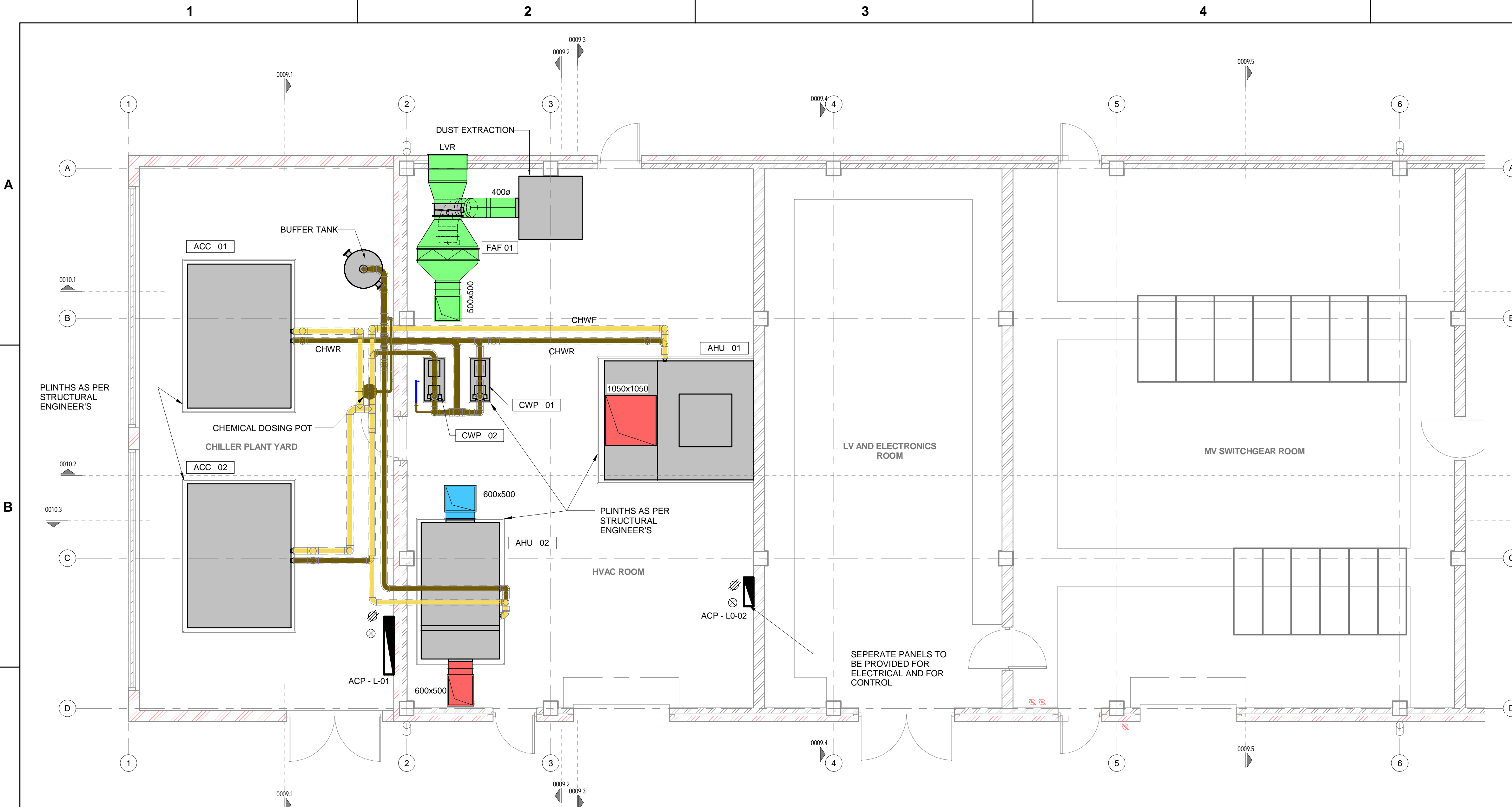
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TABLE BAY BUILDING, TYGERSBERG PARK, 183 LUYERS KRIGE DRIVE, 8001
TEL: 021 940 9999
FAX: 086 877 2465

PORT OF SALDANHA

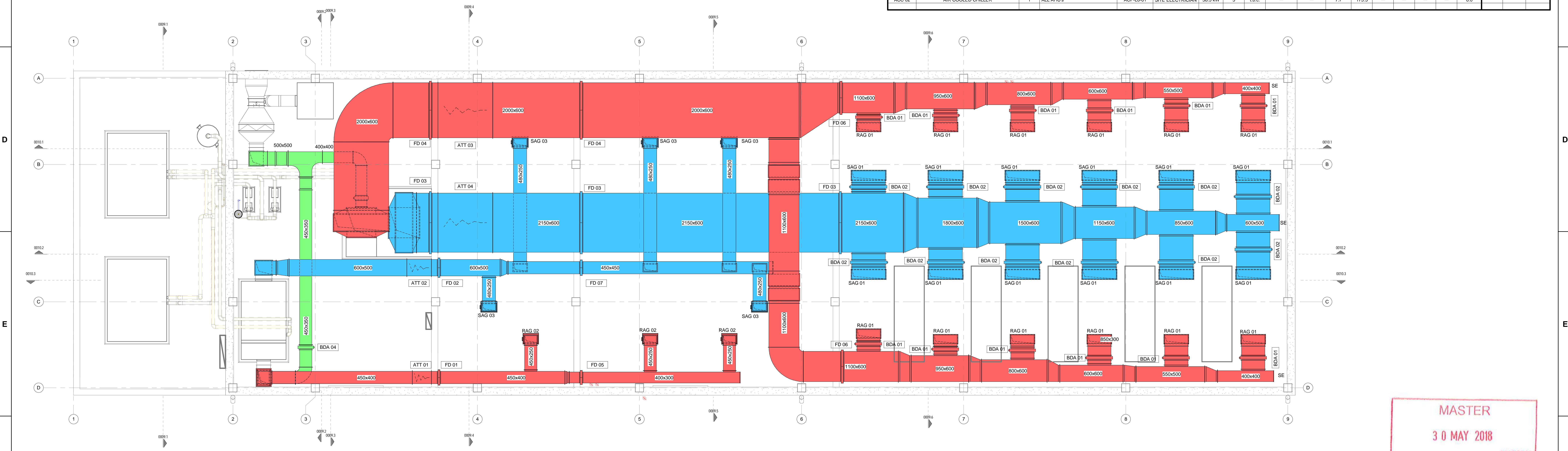
IRON ORE TIPPLER 3 PROJECT
BULK POWER UPGRADE:
SUBSTATION M
HVAC GENERAL ARRANGEMENT LAYOUT

PROJECT NUMBER: 00 FBS DNS TYPE: DRAWING NO. SHEET: REV. ID
192470101 2 510 M G A 0029 01 00 AE

MASTER
30 MAY 2018
AECOM TRANSNET



1 LEVEL 00 - HVAC LAYOUT
0031 SCALE 1:50



2 TOC BEAM - HVAC LAYOUT
0031 SCALE 1:50

Supply From	Area Served	Reference Number	Total Airflow (L/s)	Grille Qty.	Flow (L/s) used for selection	Grille Dimensions (L x W)	Grille - Make	Grille - Model
AHU 01	VSD AND TRANSFORMER ROOM	SAG 01	11000	12	915	1125 x 325	Trox	Type TR
AHU 02	MV SWITCHGEAR ROOM	SAG 02	1050	3	350	480 x 250	Europair	DD-08D
	LV AND ELECTRONICS ROOM	SAG 03	550	2	325	480 x 250	Europair	DD-08D
FAF 01			590	1	590			
AHU 2			870	1	870			
	HVAC PLANTROOM	SAG 04	380	1	380	250 x 200	Europair	DD-08D

REFERENCE NUMBER	RETURN AIRFLOW (L/s)	GRILLE QTY	HEIGHT	WIDTH	SELECTION AIRFLOW	MANUFACTURER	MODEL
RAG 01	10380 L/s	12	300	850	865 L/s	TROX	TYPE TR
RAG 02	490 L/s	2	250	450	245 L/s	EUROPAIR	RA-08D
RAG 02	340 L/s	1	250	450	340 L/s	EUROPAIR	RA-08D

COMPONENT MARK	TYPE	HEIGHT	WIDTH	TOTAL
FD 01	FIRE DAMPER - MOTORIZED - RECTANGULAR	400	450	1
FD 02	FIRE DAMPER - MOTORIZED - RECTANGULAR	500	600	1
FD 03	FIRE DAMPER - MOTORIZED - RECTANGULAR	600	2150	3
FD 04	FIRE DAMPER - MOTORIZED - RECTANGULAR	600	2000	2
FD 05	FIRE DAMPER - MOTORIZED - RECTANGULAR	300	400	1
FD 06	FIRE DAMPER - MOTORIZED - RECTANGULAR	600	1100	2
FD 07	FIRE DAMPER - MOTORIZED - RECTANGULAR	450	450	1

COMPONENT MARK	TYPE	HEIGHT	WIDTH	TOTAL
BDA 01	BALANCING DAMPER	300	850	12
BDA 02	BALANCING DAMPER	325	1225	12
BDA 03	BALANCING DAMPER	400	400	1
BDA 04	BALANCING DAMPER	350	450	1

REFERENCE NUMBER	HEIGHT	WIDTH	TOTAL
ATT 01	400	450	1
ATT 02	500	600	1
ATT 03	600	2000	1
ATT 04	600	2150	1

REF. NO.	DESCRIPTION	QTY.	AREA SERVED	EQUIPMENT POWER FROM	Electric Motors / Rated Electric Duty (Total)	Mass each (kg)	Total Airflow (L/s)	Total Pressure (Pa) Ext. to AHU	Total Water Flow (L/s)	Total Cooling (kW)	COOLING				HEATING		MIXING BOX		Floor Area (m ²)	
											DB	WB	Air On °C	Air Off °C	DB	WB	Return Air (L/s)	Fresh Air (L/s)		
Outside Units																				
AHU 01	VERTICAL DISCHARGE AIR HANDLING UNIT	1	VSD AND TRANSFORMER ROOM	ACP-L0-02	SITE ELECTRICIAN	9.80 kW	3	l.b.c.	11000	415	9.7	221.2	29.9	19.1	13.7	13.2	0.0	10410	590	192
AHU 02	HORIZONTAL DISCHARGE AIR HANDLING UNIT	1	MV SWITCHGEAR ROOM LV AND ELECTRONICS ROOM	ACP-L0-02	SITE ELECTRICIAN	1.50 kW	3	l.b.c.	1700	415	1.9	41.7	29.4	20.1	13.6	13.1	0.0	490	560	103
FAF 01	SPIN FILTER FAN	1		ACP-L0-02	SITE ELECTRICIAN	2.3 kW	3	l.b.c.	1640	315	0	0.0						0	590	N/A
																		0	870	N/A
																		0	380	82
Chiller Units																				
ACC 01	AIR COOLED CHILLER	1	ALL AHU's	ACP-L0-01	SITE ELECTRICIAN	58.5 kW	3	l.b.c.			7.7	175.3								0.0
ACC 02	AIR COOLED CHILLER	1	ALL AHU's	ACP-L0-01	SITE ELECTRICIAN	58.5 kW	3	l.b.c.			7.7	175.3								0.0

LEGEND

FAF FRESH AIR SUPPLY FAN
EAF EXHAUST AIR FAN

230V / 1 Phase / 50 Hz POWER SUPPLY AND ISOLATOR BY ELECTRICIAN. TERMINATION AT EQUIPMENT BY HVAC CONTRACTOR. MOTOR STARTERS AND OVERLOAD PROTECTION TO BE BY HVAC CONTRACTOR. WHERE APPLICABLE.

400V / 3 Phase / 50 Hz POWER SUPPLY AND ISOLATOR BY ELECTRICIAN. TERMINATION AT EQUIPMENT BY HVAC CONTRACTOR. MOTOR STARTERS AND OVERLOAD PROTECTION TO BE BY HVAC CONTRACTOR. WHERE APPLICABLE.

Ø50 TRAPPED DRAIN POINT BY PLUMBER

SAT SOUND ATTENUATOR

DOOR UNDERCUT 25mm BY OTHERS

MOTORIZED FIRE DAMPER WITH A 16 GAUGE GALVANIZED SLEEVE TO BE BUILT IN BY BUILDER

FIRE DAMPER

WIRED REMOTE TEMPERATURE CONTROLLER

AIR CONDITIONING UNIT INCLUDING LOCAL ISOLATOR BY HVAC CONTRACTOR

BUTTERFLY DAMPER

NON-RETURN DAMPER

CHWFF CANOPY SWITCH

ELECTRICAL DISTRIBUTION PANEL

FIRE INTERLOCK RELAY AND WIRING UP TO INDICATED POINT BY FIRE DETECTION CONTRACTOR. TERMINATION AT EQUIPMENT BY HVAC CONTRACTOR

HVAC PIPE LEGEND

CHILLED WATER

CHILLED WATER

HVAC LEGEND

EXHAUST

FRESH AIR/NATURAL

RETURN

SUPPLY

FOUL

MECHANICAL EQUIP/ AIR TERMINALS/ DUCT ACCESSORIES

DRAWING	REFERENCE
1924701-2-510-M-ST-0007	SUBSTATION N - STANDARD PIPING DETAILS
1924701-2-510-M-ST-0006	SUBSTATION N - STANDARD DUCTING DETAILS
1924701-2-510-M-SE-0010	SUBSTATION N - HVAC SECTION LAYOUT (SHEET 2)
1924701-2-510-M-SE-0009	SUBSTATION N - HVAC SECTION LAYOUT (SHEET 1)
1924701-2-510-M-SD-0007	SUBSTATION N - CHILLED WATER SCHEMATIC

GENERAL NOTES

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AECOM

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TYGER WATERFRONT
CARL CRONE DRIVE

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ISSUED FOR CONSTRUCTION

NO DESCRIPTION BY CHK APPD DATE

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TITLE	NAME	SIGN	DATE

TITLE	NAME	SIGN	DATE

TITLE	NAME	SIGN	DATE

NAME	DATE

MASTER
30 MAY 2018

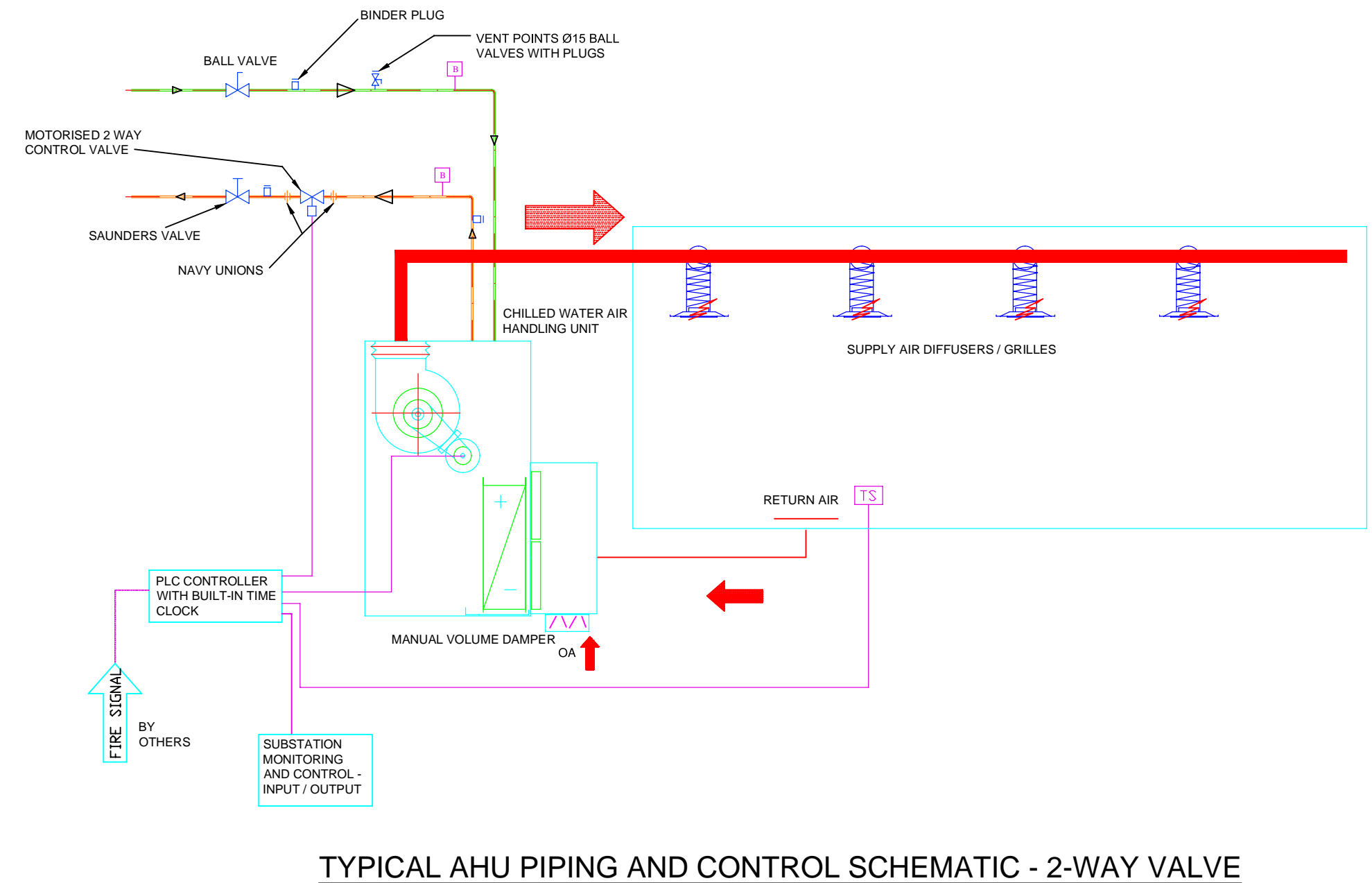
AECOM **TRANSNET**

TRANSNET CAPITAL PROJECTS
TRANSNET LTD (TRADING AS TRANSNET CAPITAL PROJECTS) REG NO: 2010/0000000
TABLE BAY BUILDING, TYGERSBERG PARK, 183 LIVES KRIGE DRIVE, 8001 TEL: 021 940 1999 FAX: 086 677 2465

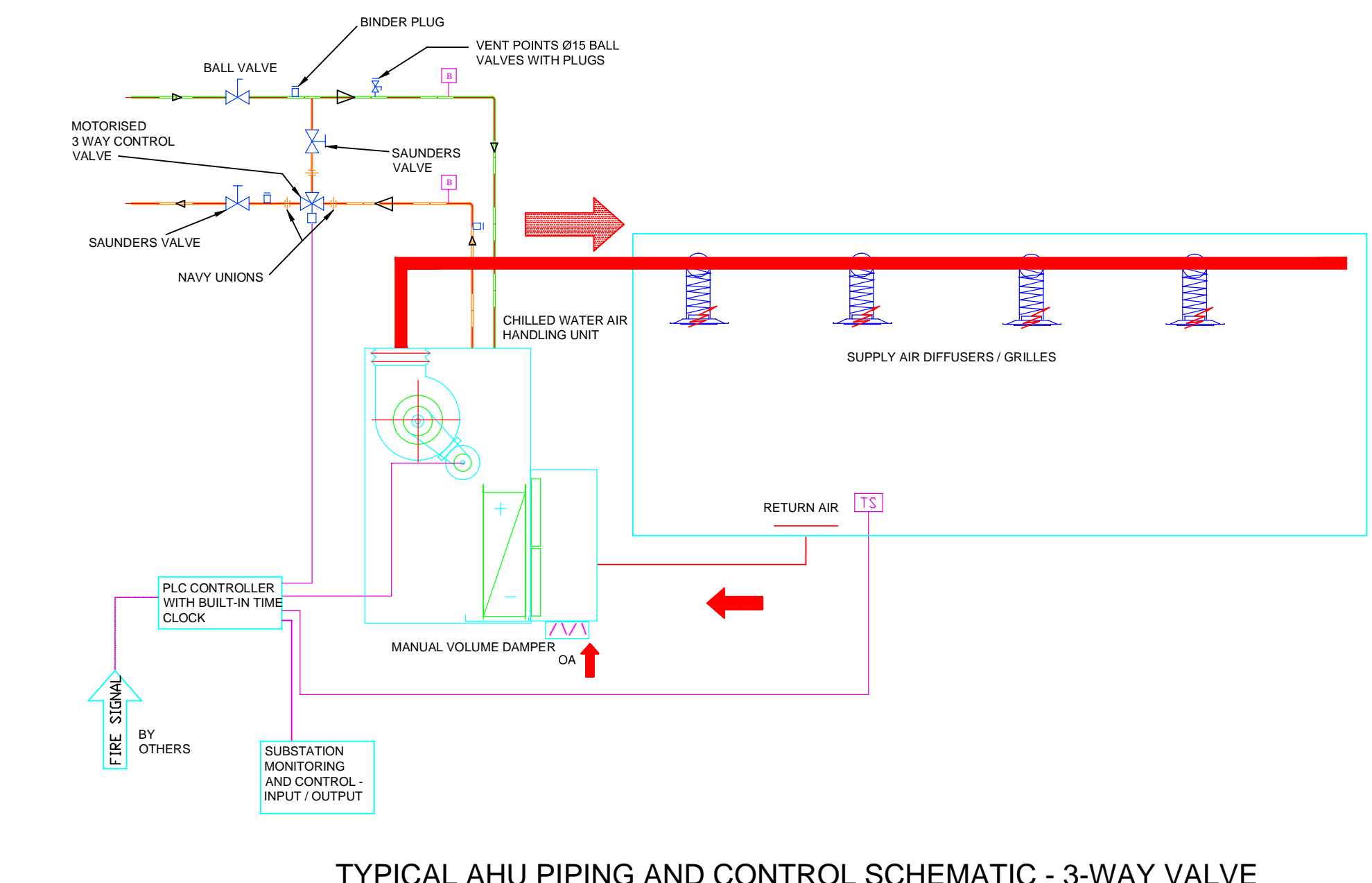
PORT OF SALDANHA

IRON ORE TIPPLER 3 PROJECT
BULK POWER UPGRADE:
SUBSTATION N
HVAC GENERAL ARRANGEMENT LAYOUT

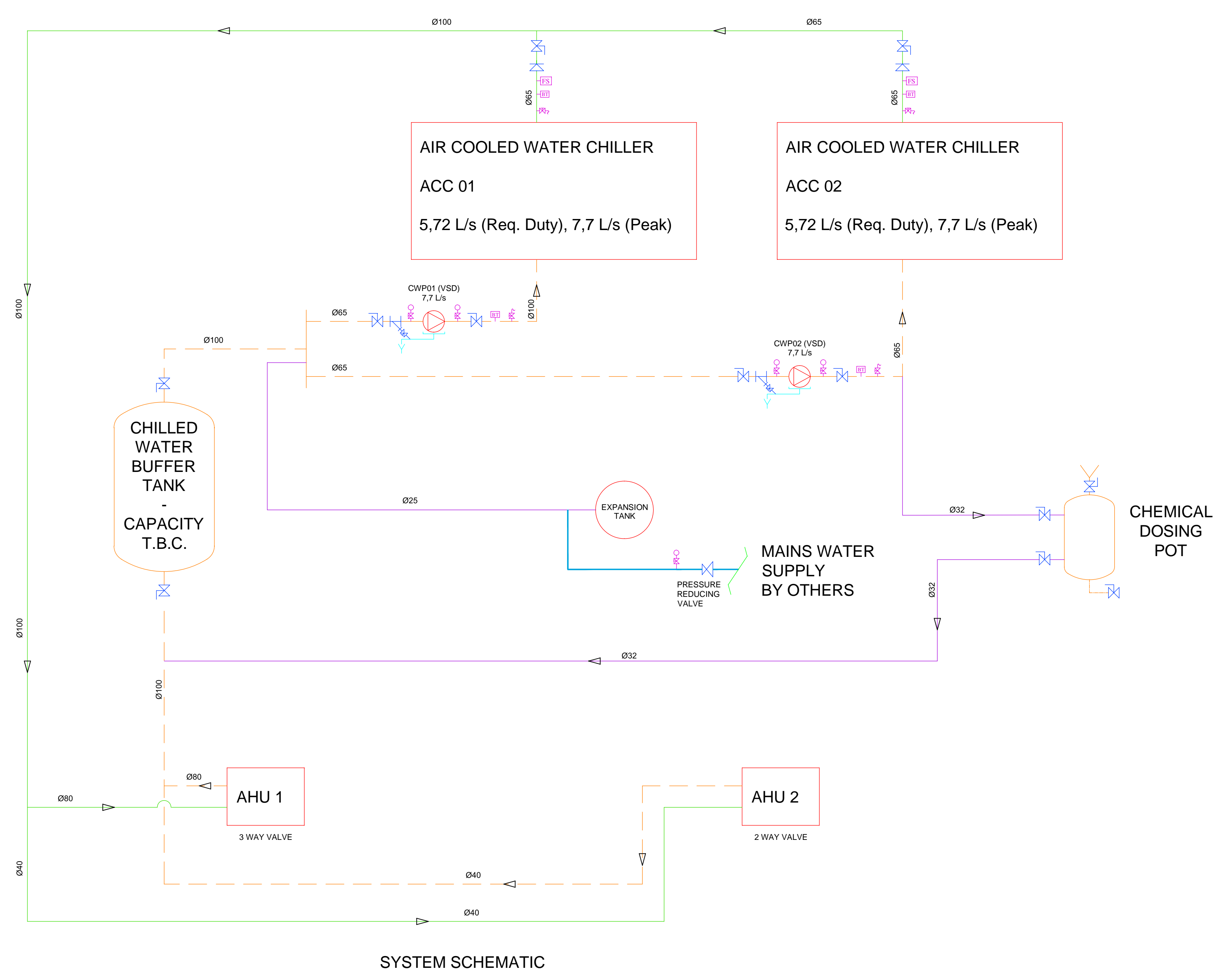
PROJECT NUMBER: 00 510 M G A 0031 01 00 AE



TYPICAL AHU PIPING AND CONTROL SCHEMATIC - 2-WAY VALVE



TYPICAL AHU PIPING AND CONTROL SCHEMATIC - 3-WAY VALVE



SYSTEM SCHEMATIC

	BUTTERFLY SHUT OFF VALVE		CHECK VALVE		THERMOMETER WELL 0.1/2 250a		SUBMIT POINT 250a
	MOTORISED TWO WAY VALVE		GOVERNOR PRESSURE GAUGE		FLOW CONTROL METER		SIGNAL FLOW METER 500a
	THREE WAY VALVE		BALL VALVE AND S TUBE 150a		BINDER TEST POINT 100a		WATER TREATMENT SOCKET 200a BALL VALVE
	BALANCING VALVE		DRAIN POINT - CHILLER 250a/AU 200a		BMS TEMP POINT 150a		FLOW SWITCH 250a
	STRAINER WITH 200a BALL VALVE		SHUT OFF VALVE		WATER TREATMENT DOSING POT 200a BALL VALVE		MAKE UP SYSTEM 250a
	ENERGY METER				TEMPERATURE SENSOR		

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1924701-2-510-01-01-001	SUBSTATION N - HVAC GENERAL ARRANGEMENT LAYOUT
DRAWING NO.	REFERENCE
REFERENCE DRAWINGS	

AECOM

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WATERSIDE PLACE, SOUTH GATE
TYGER WATERFRONT
CARL CRONJE DRIVE

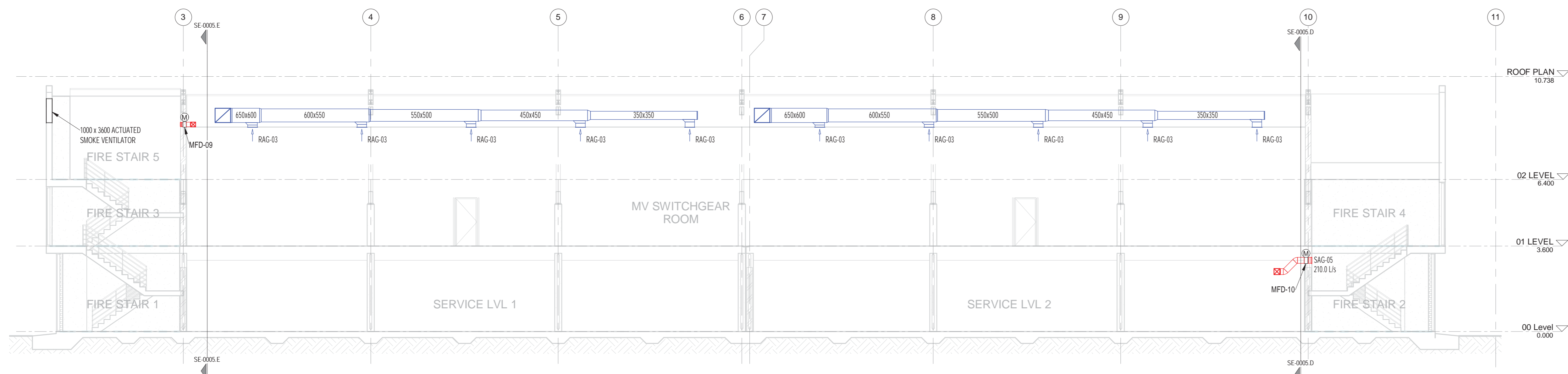
TEL: +27 (0)21 950 7500
FAX: +27 (0)21 950 7502
REG. NO. 1966/006628/07

REVISIONS		NO	DESCRIPTION	BY	CHKD	APPD	DATE
00	ISSUED FOR CONSTRUCTION			KC	JJ	AD	30-05-2018

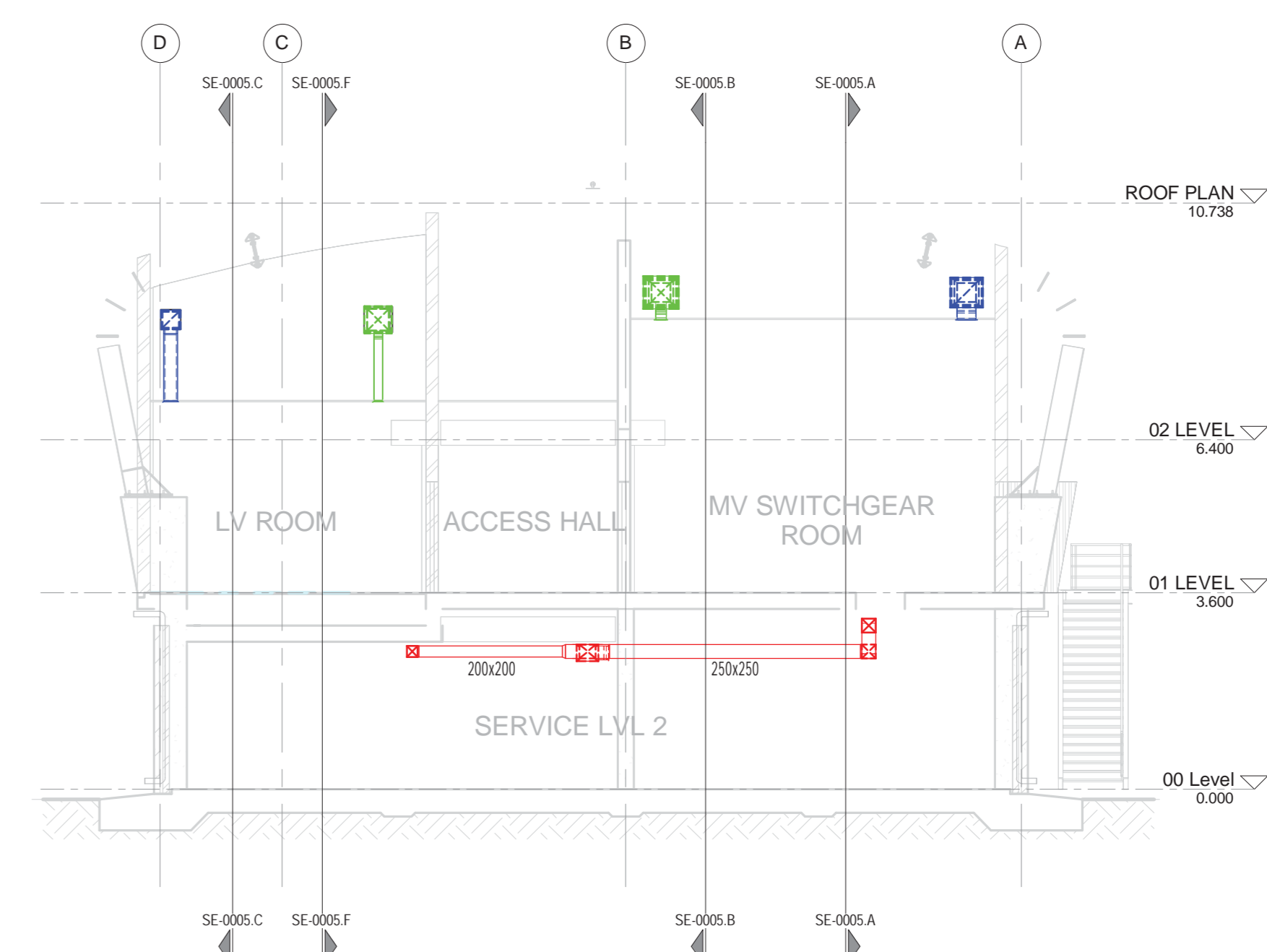
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TITLE	NAME	SIGN	DATE
OPERATING DIVISIONS		PR. ENG./PR. TECH./PR. ARCH	
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NAME	ANDREW DALLY	DATE	30/05/18
SIGNATURE		REG. NUMBER	977004
SCALE	N.T.S.		

MASTER
30 MAY 2018
AECOM TRANSNET

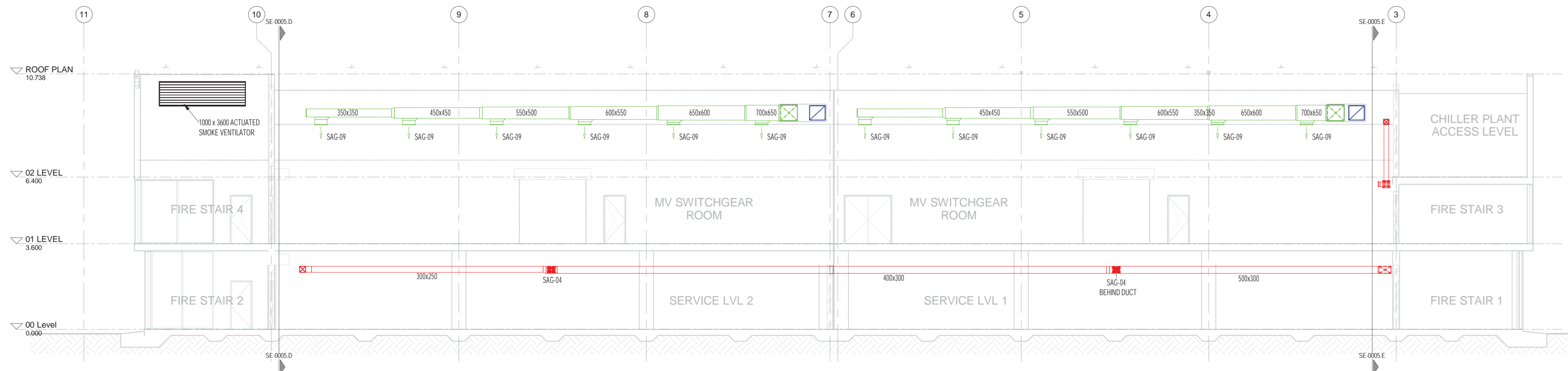
Transnet Capital Projects		TRANSNET	
IRON ORE TIPPLER 3 PROJECT BULK POWER UPGRADE: SUBSTATION N CHILLED WATER SCHEMATIC			
PROJECT NUMBER	1924701	ISS	2510
DATE	30/05/18	TYPE	M.S.D.
DRAWING NO.	01007	SHEET	01
REV	00	ID	AE



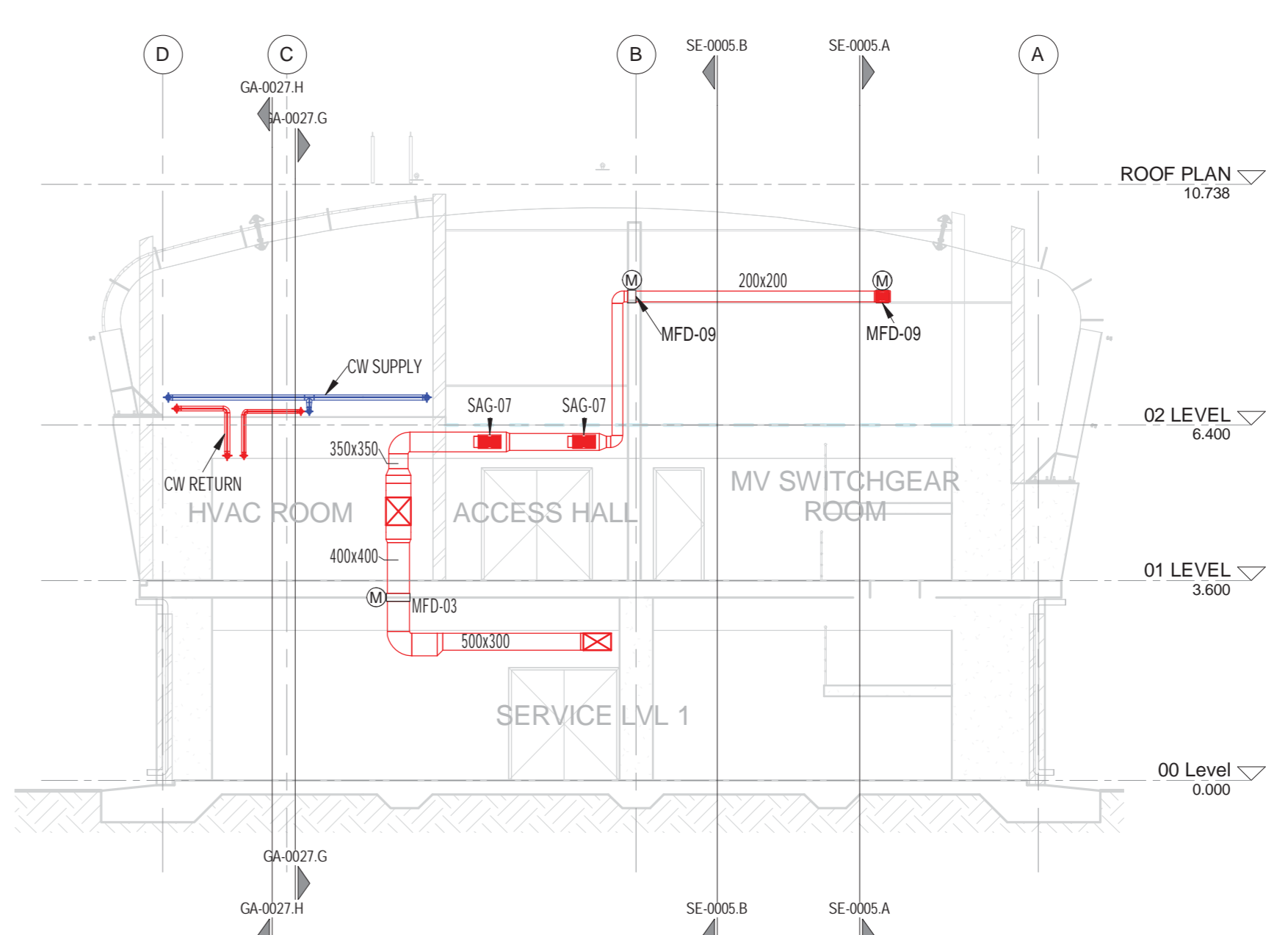
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SE-0005 SCALE 1:100



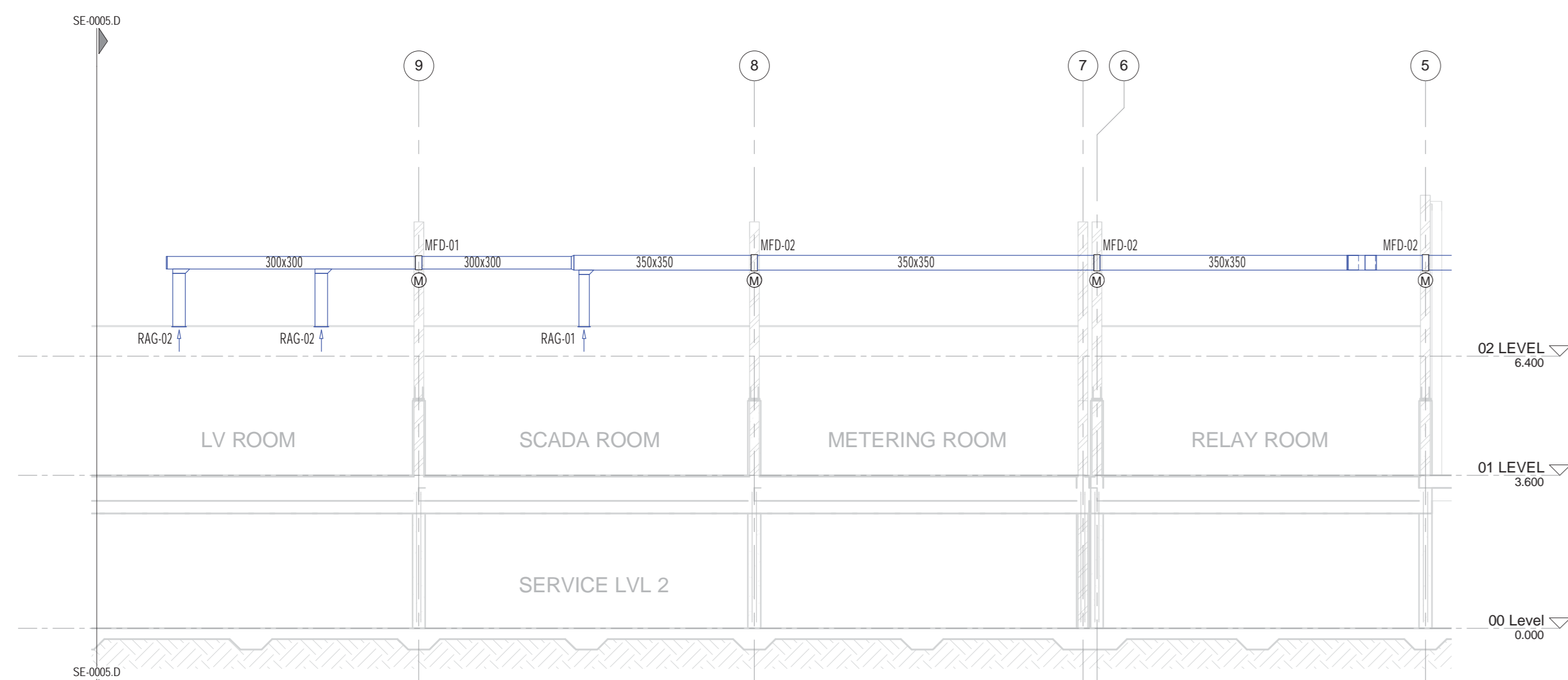
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B Section B-B
SE-0005 SCALE 1:100



E Section E-E
SE-0005 SCALE 1:100



C Section C-C
SE-0005 SCALE 1:100



F Section F-F
SE-0005 SCALE 1:100

HVAC DUCT LEGEND	
[Red Box]	FRESH AIR
[Blue Box]	RETURN AIR
[Green Box]	SUPPLY AIR
[Grey Box]	MECHANICAL EQUIPMENT/AIR TERMINALS/DUCT ACCESSORIES

LEGEND	
[Symbol]	FRESH AIR SUPPLY FAN
[Symbol]	EXHAUST AIR FAN
[Symbol]	1-PHASE ISOLATOR LOCAL WEATHER PROOF ISOLATOR BY SITE ELECTRICAL HVAC CONTRACTOR TO PROVIDE FAN STARTER AND OVERLOAD PROTECTION FOR FAN
[Symbol]	3-PHASE ISOLATOR: SITE ELECTRICIAN TO CONNECT ONTO 3-PHASE ISOLATOR IN ACP
[Symbol]	350 TRAPPED DRAIN POINT BY PLUMBER
[Symbol]	SOUND ATTENUATOR
[Symbol]	DOOR UNDERCUT 25mm BY OTHERS
[Symbol]	MOTORIZED FIRE DAMPER WITH A 16 GAUGE GALVANIZED SLEEVE TO BE BUILT IN BY BUILDER
[Symbol]	FIRE DAMPER
[Symbol]	WIRED REMOTE TEMPERATURE CONTROLLER
[Symbol]	AIR CONDITIONING UNIT INCLUDING LOCAL ISOLATOR BY HVAC CONTRACTOR
[Symbol]	BUTTERFLY DAMPER
[Symbol]	NON-RETURN DAMPER
[Symbol]	ON/OFF CANOPY SWITCH
[Symbol]	ELECTRICAL DISTRIBUTION PANEL

MASTER
10 FEB 2017
AECOM

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DRAWING NO.	REFERENCE
1924701-2-510-M-GA-0026-01	HVAC GENERAL ARRANGEMENT - LEVEL 00
1924701-2-510-M-GA-0027-01	HVAC GENERAL ARRANGEMENT - LEVEL 01
1924701-2-510-M-GA-0028-01	HVAC GENERAL ARRANGEMENT - LEVEL 02
1924701-2-510-M-SD-0005-01	CHILLED WATER SCHEMATIC



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REG. No. 1966/006628/07

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TITLE	NAME	SHGN	DATE
OPERATING DIVISIONS		PR.ENG./PR.TECH./PR.ARCH	
TITLE	NAME	SHGN	DATE
SIGNATURE		DATE	
REG. NUMBER		SCALE: 1:100	

REVISIONS	
NO.	DESCRIPTION
02	ISSUED FOR CONSTRUCTION

PROJECT INFORMATION								
PROJECT NUMBER	DO	FBS	DIS	TYPE	DRAWING NO.	SHEET	REV	ID
1924701	2	510	M	SE	0005	01	00	AE



TRANSNET LTD (17684) 43 TRANSNET CAPITAL PROJECTS REG. NO. 1966/006628/07
TABLE BAY BUILDING, TYGERSBERG PARK
163 LYN RIVER DRIVE, PLATTENKLOOF, 8001
TEL: 021 940 1999
FAX: 021 940 2455

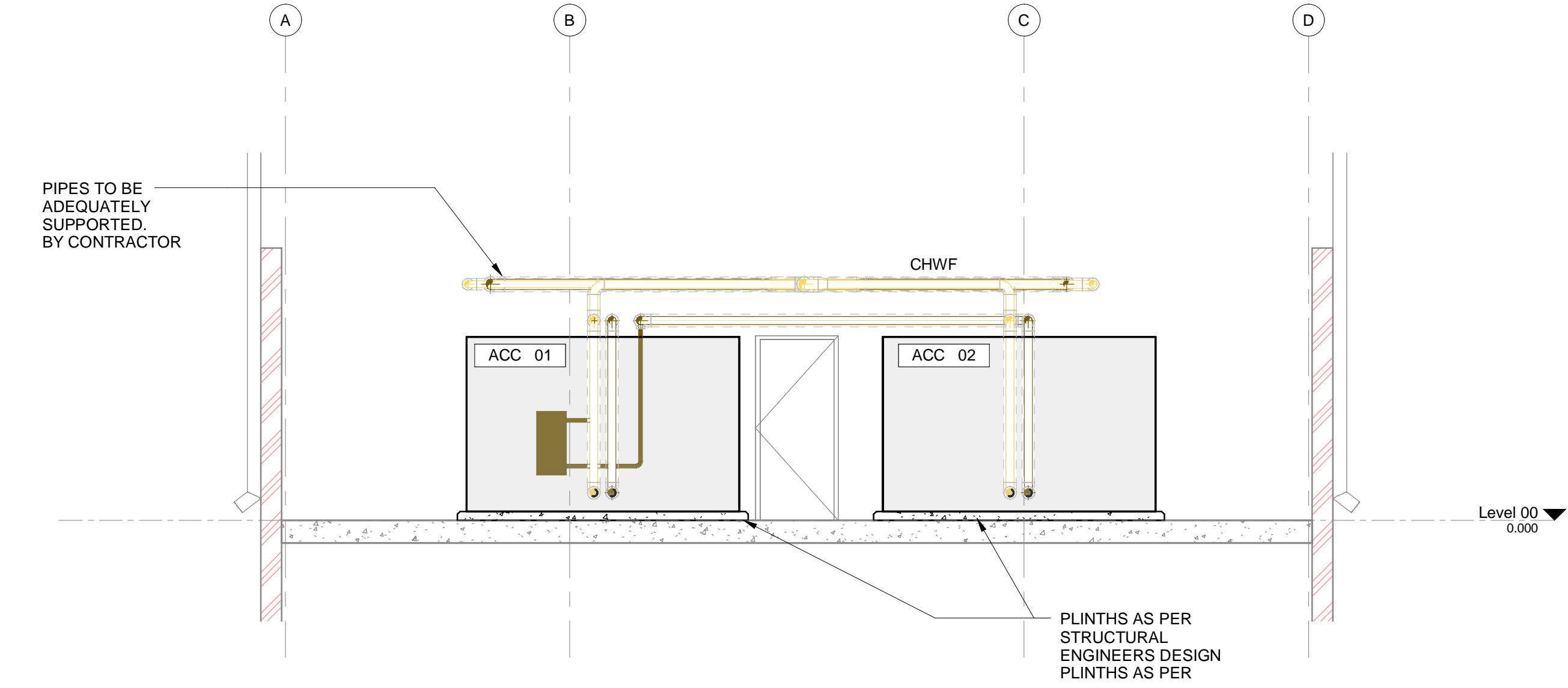
PORT OF SALDANHA
IRON ORE TIPPLER 3 PROJECT
BULK POWER UPGRADE:
MAIN INTAKE SUBSTATION
HVAC - SECTION LAYOUT

HVAC PIPE LEGEND

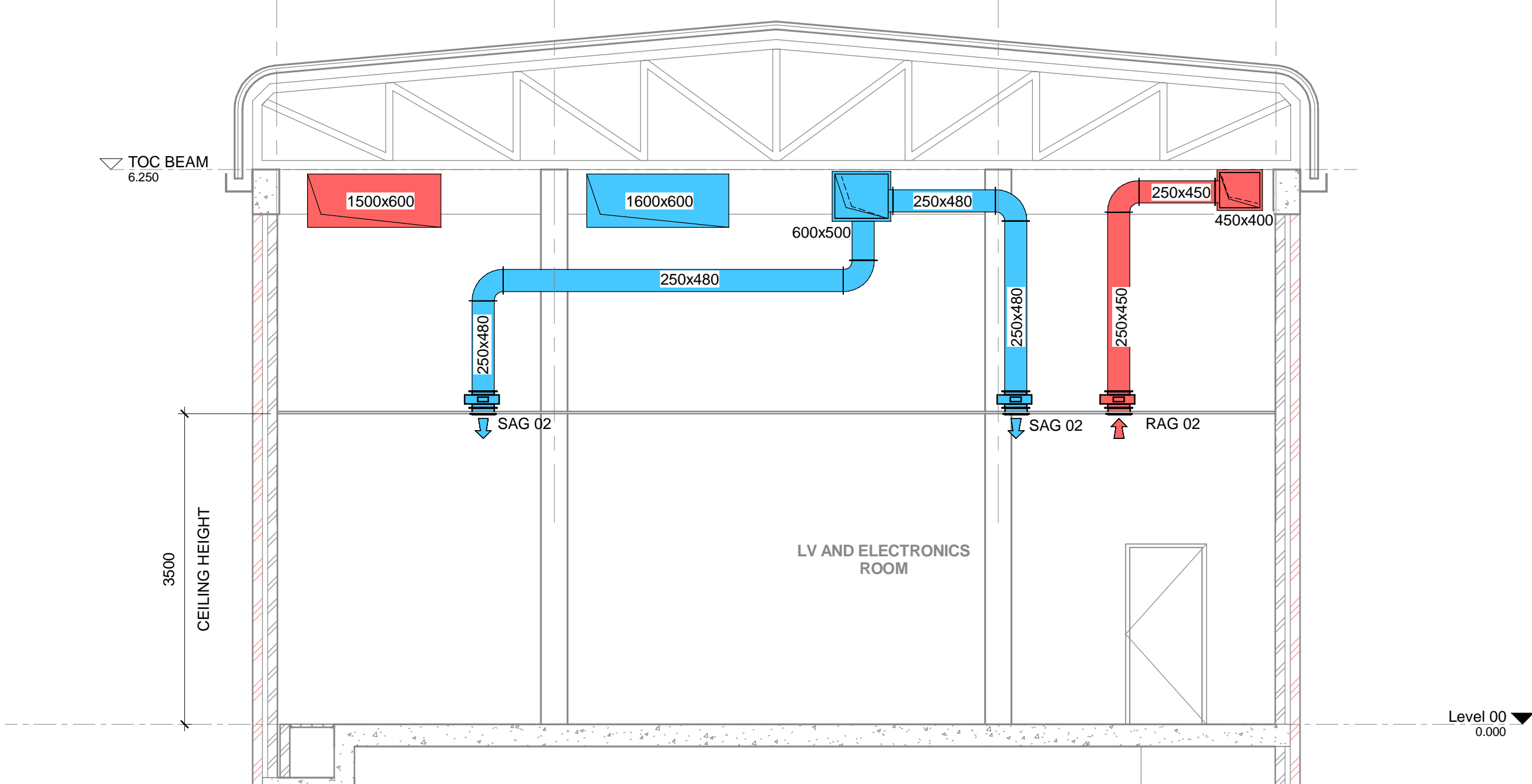
- CHILLED WATER
- CHILLED WATER

HVAC LEGEND

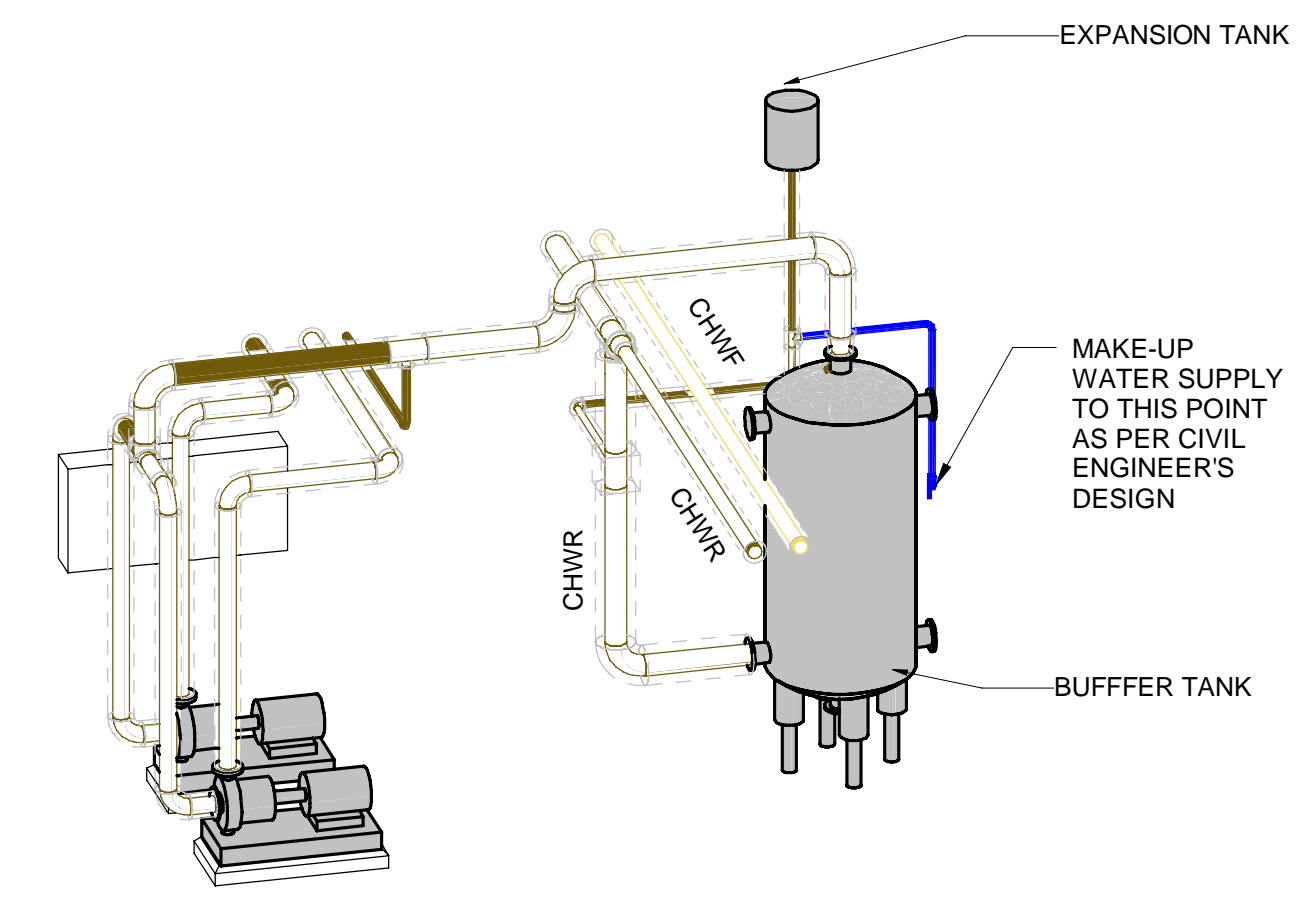
- EXHAUST
- FRESH AIR/NATURAL
- RETURN
- SUPPLY
- FOUL
- MECHANICAL EQUIP/ AIR TERMINALS/ DUCT ACCESSORIES



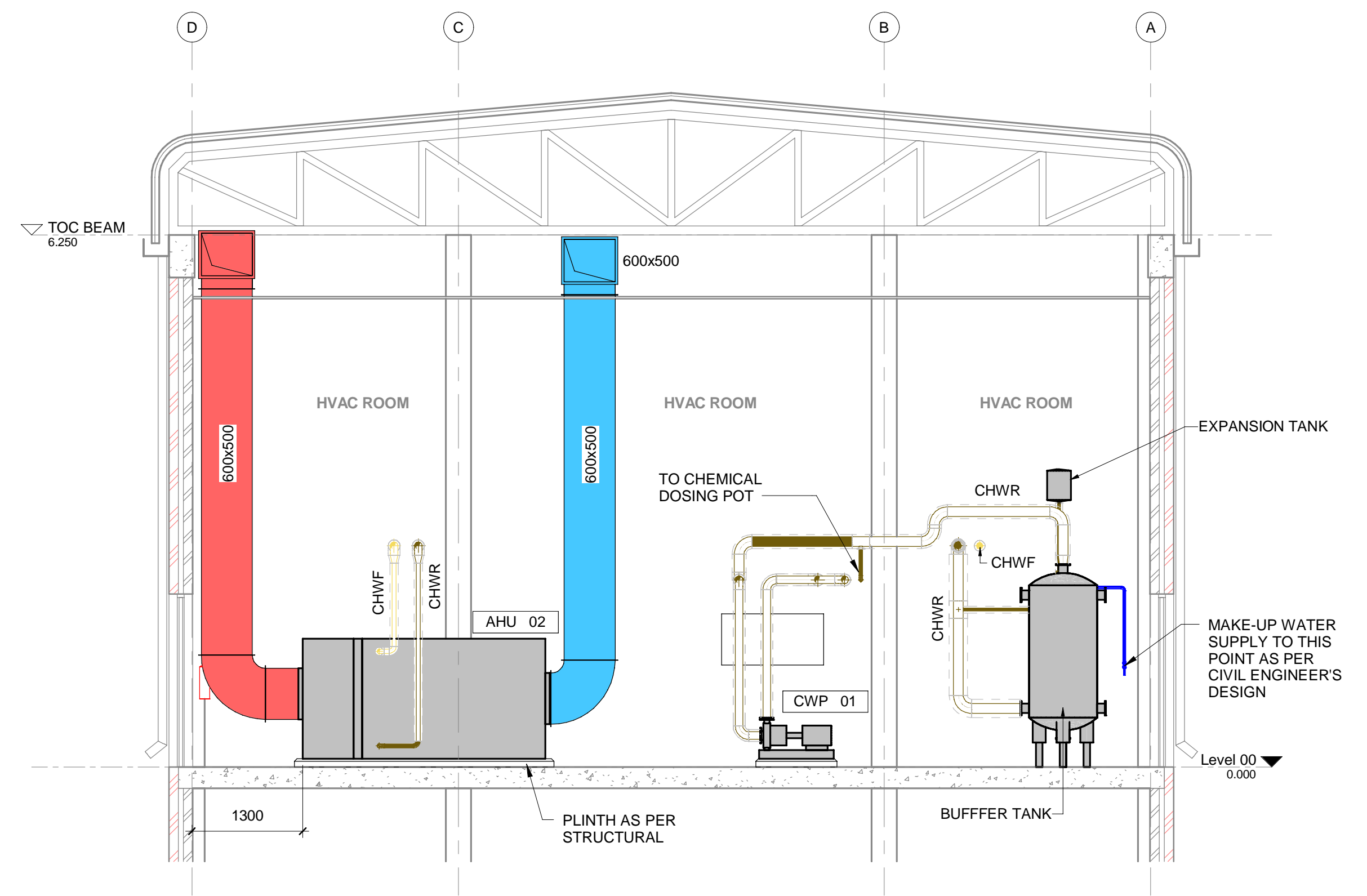
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SCALE 1:50



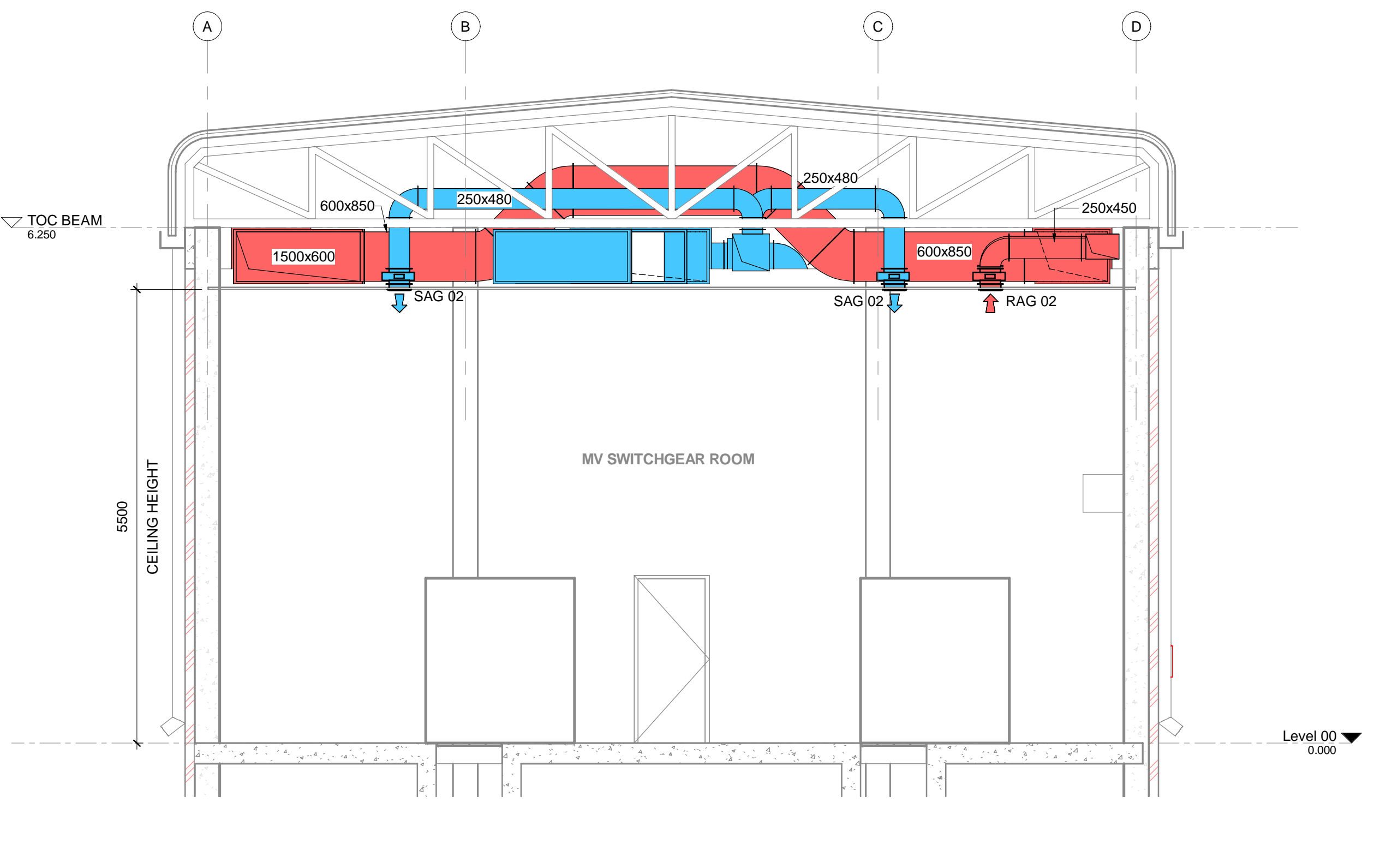
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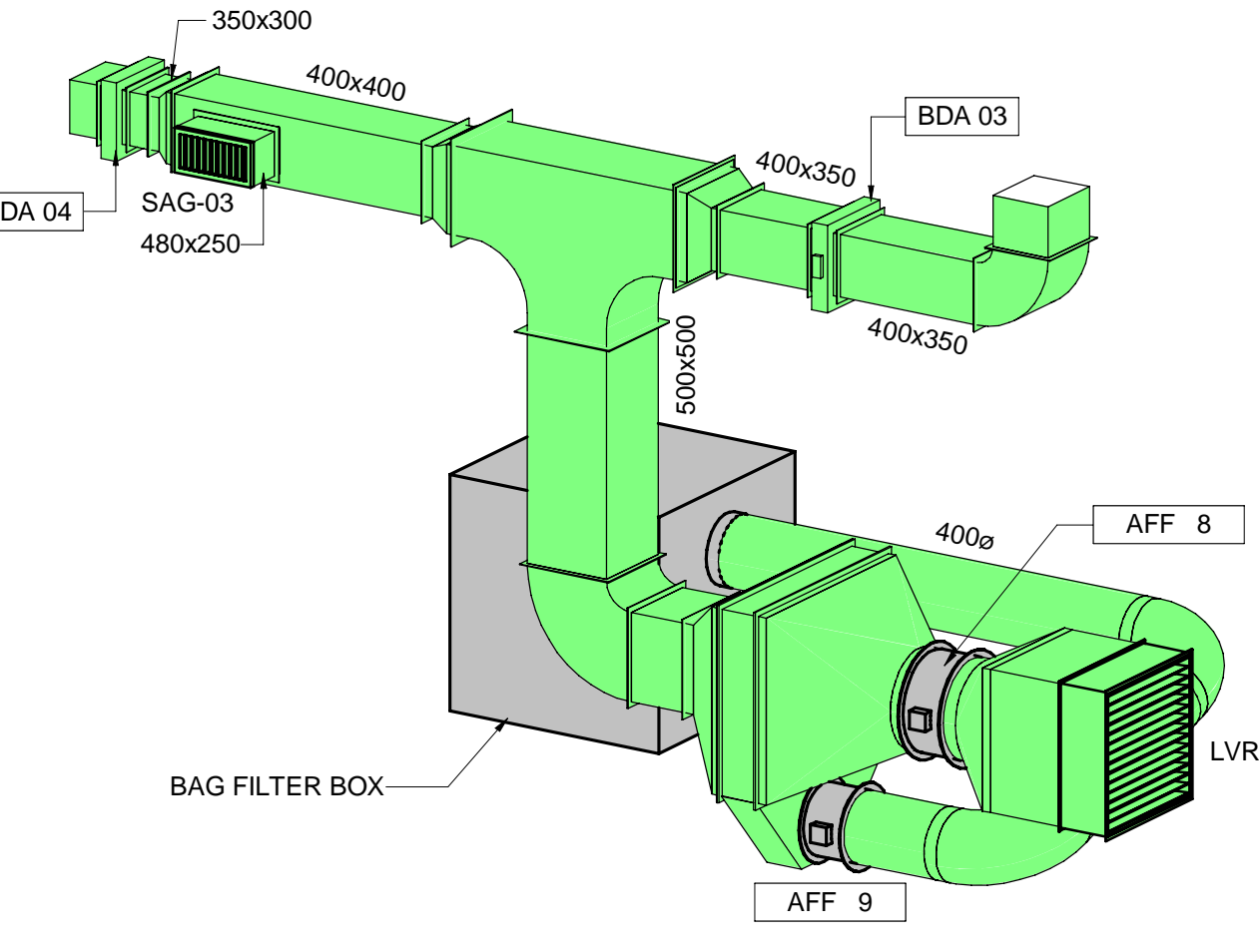
3D VIEW - BUFFER TANK SYSTEM
SCALE



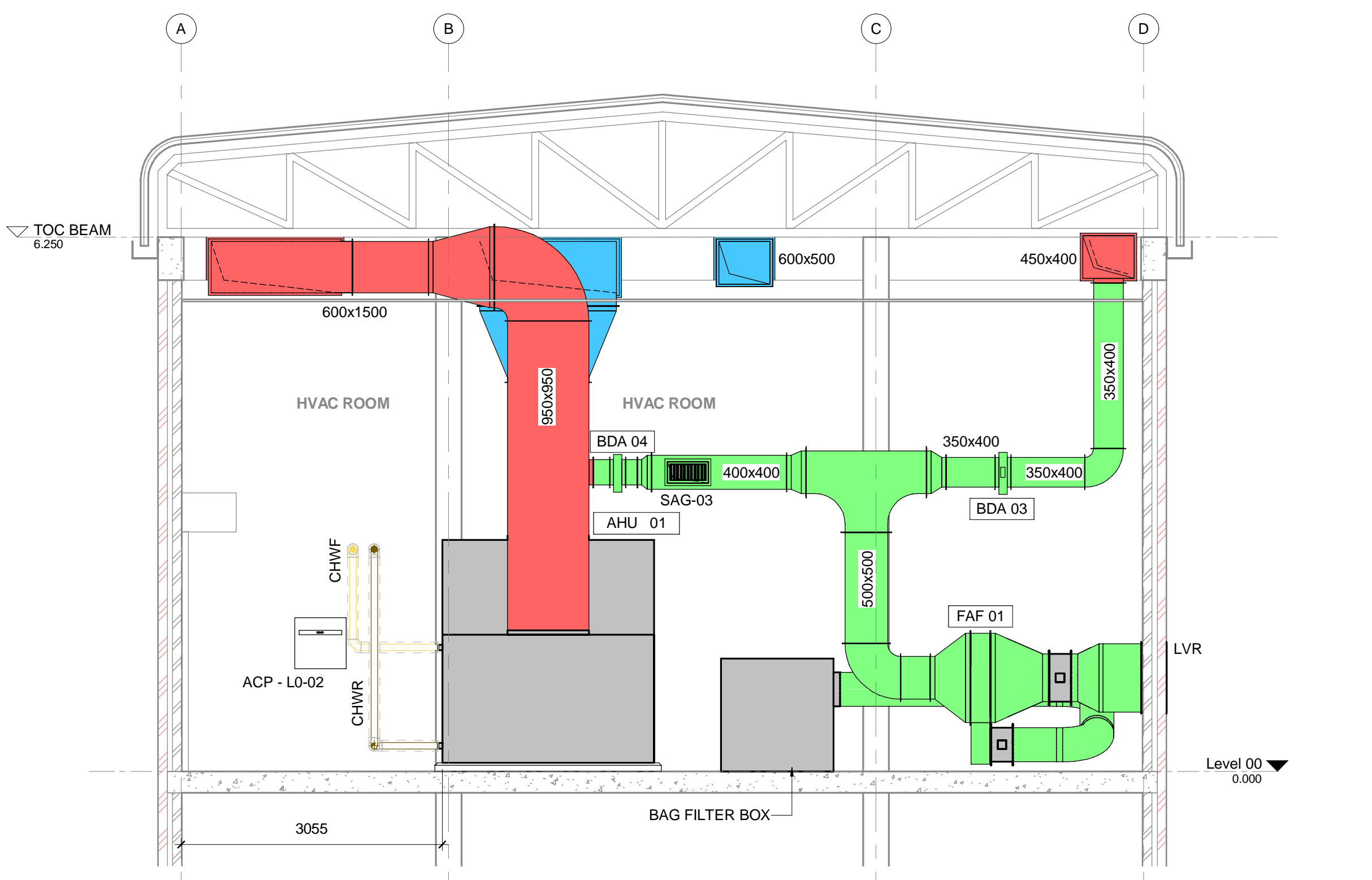
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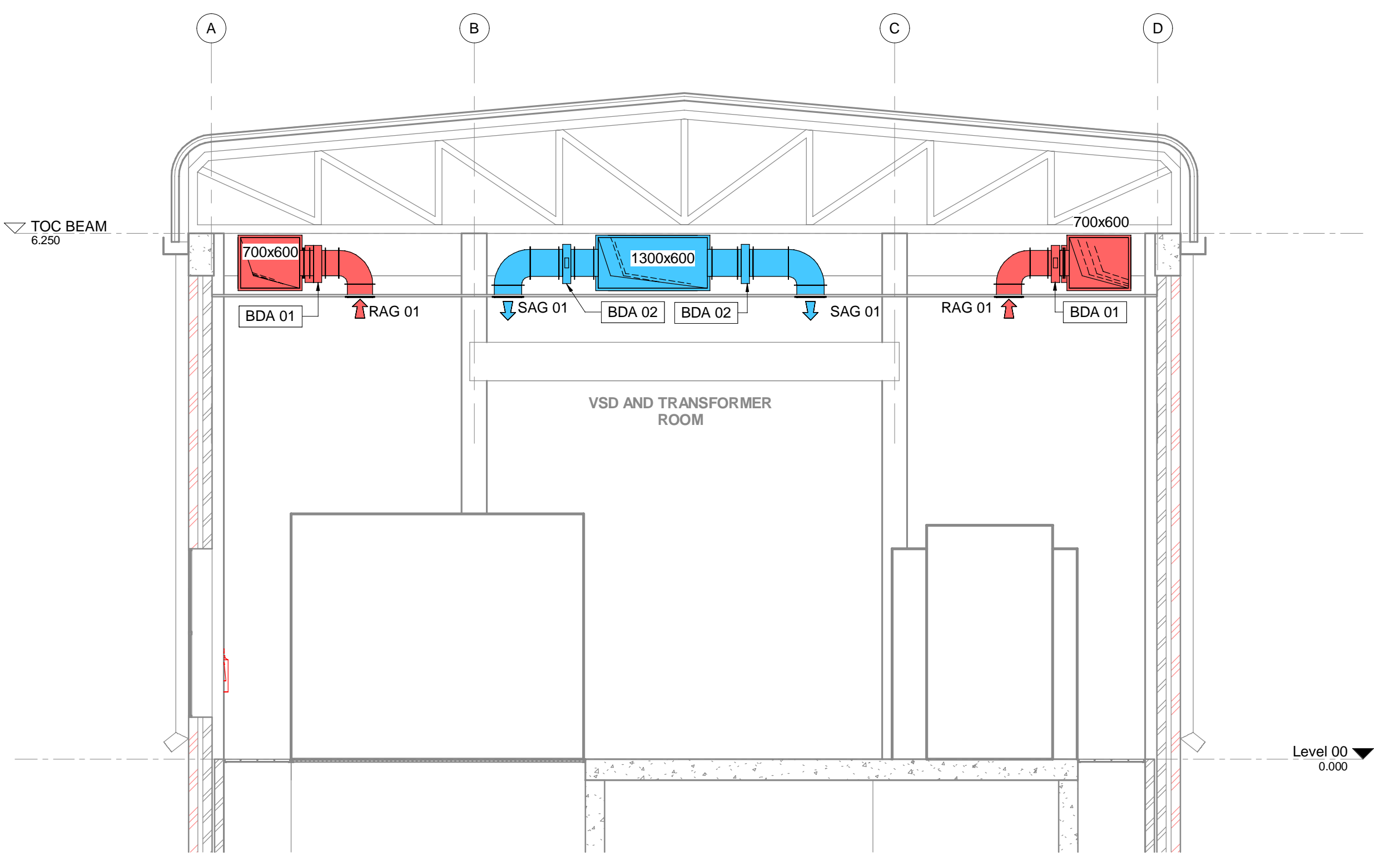
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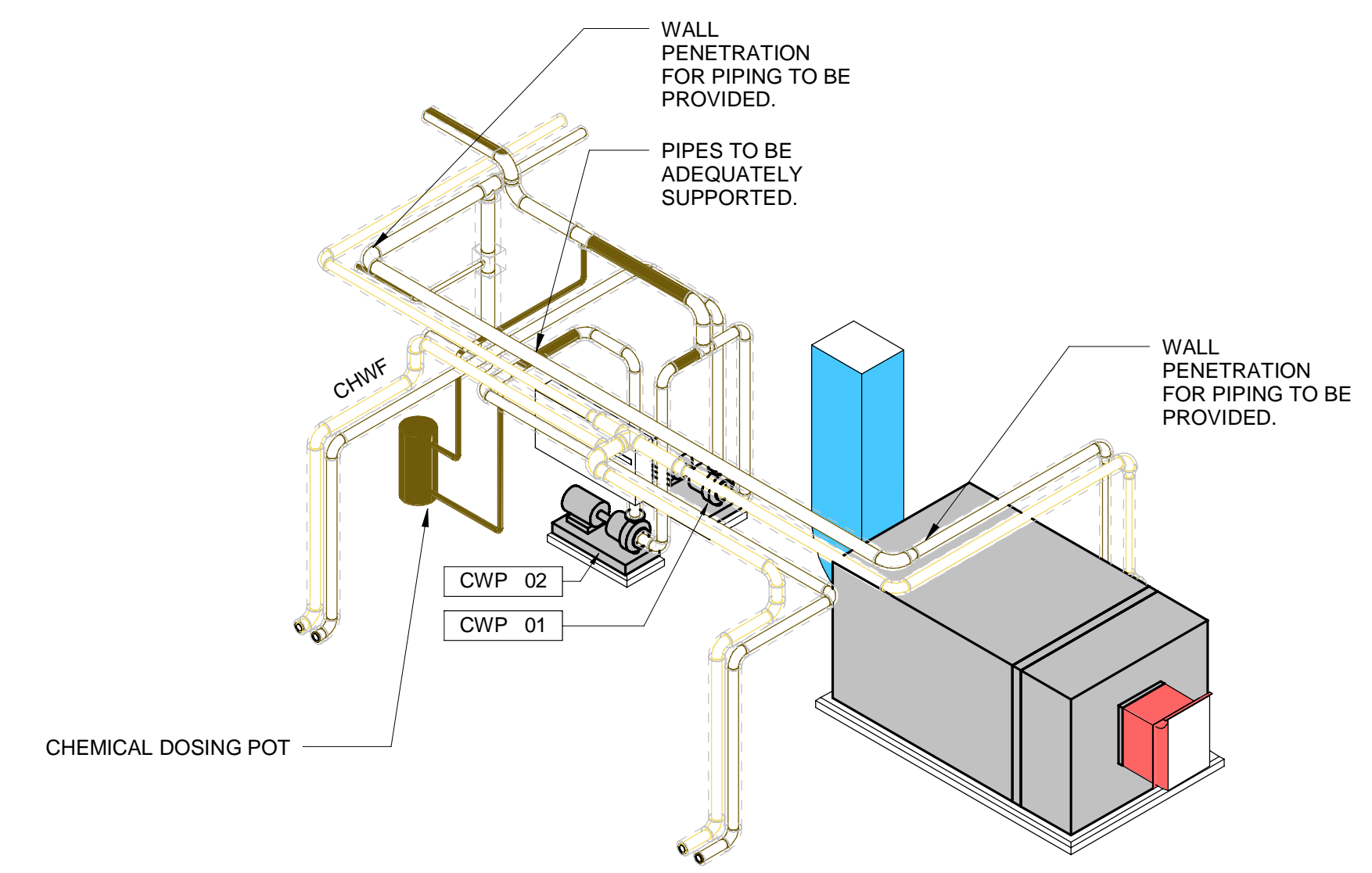
3D VIEW - DUST EXTRACTION
SCALE



3 SECTION 3-3
SCALE 1:50



6 SECTION 6-6
SCALE 1:50



3D VIEW - CHILLED WATER PUMP SYSTEM
SCALE

DRAWING	REFERENCE DRAWINGS
1924701-2-510-M-ST-0005	SUBSTATION M - STANDARD PIPING DETAILS
1924701-2-510-M-ST-0004	SUBSTATION M - STANDARD DUCTING DETAILS
1924701-2-510-M-GA-0029	SUBSTATION M - HVAC GENERAL ARRANGEMENT LAYOUT

GENERAL NOTES

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NO	ISSUED FOR CONSTRUCTION	DESCRIPTION	BY	CHK	APPD	DATE
01	ISSUED FOR CONSTRUCTION		AJ	JJ	AD	30-05-2018

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TITLE	NAME	SIGN	DATE	TITLE	NAME	SIGN	DATE

OPERATING DIVISIONS			
TITLE	NAME	SIGN	DATE

PRENG/PR.TECH/PR.ARCH			
NAME	DATE	DATE	DATE

MASTER

30 MAY 2018

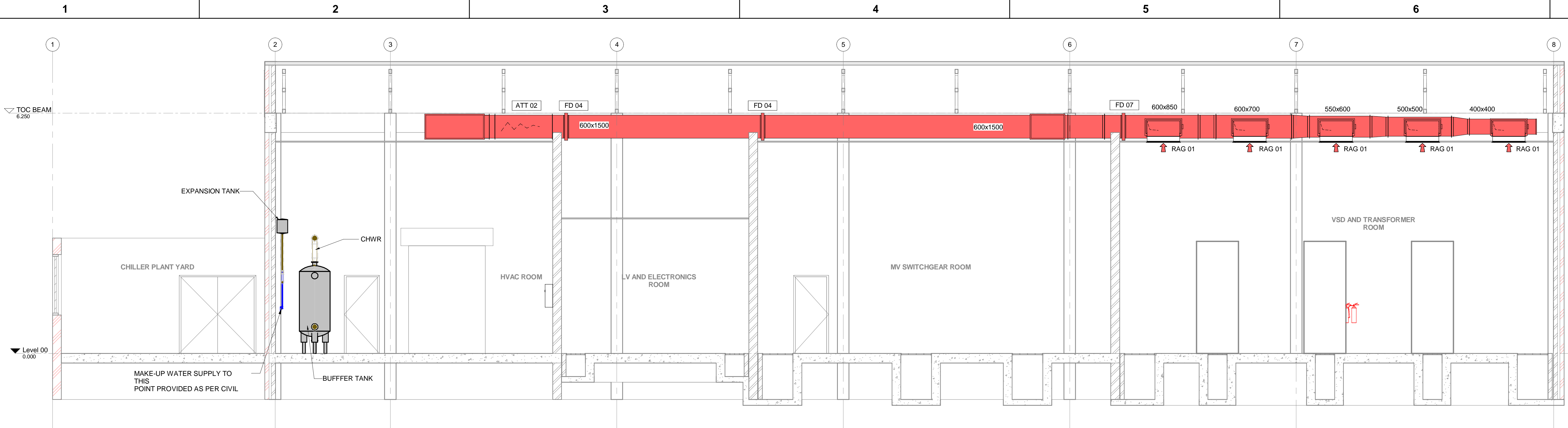
AECOM **TRANSNET**

Transnet Capital
TRANSNET CAPITAL PROJECTS: REG NO. 2015/000000000
TABLE BAY BUILDING, TYGERSBERG PARK, 183 LUYA KRIGER DRIVE, 8001
TEL: 021 940 5999
FAX: 086 877 2465

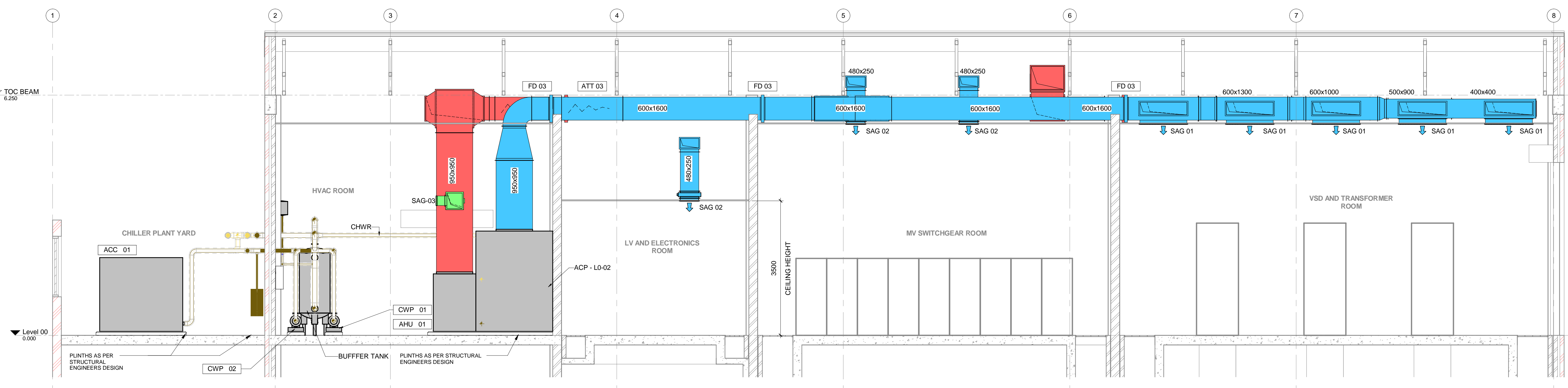
PORT OF SALDANHA

IRON ORE TIPPLER 3 PROJECT
BULK POWER UPGRADE:
SUBSTATION M
HVAC SECTION LAYOUT

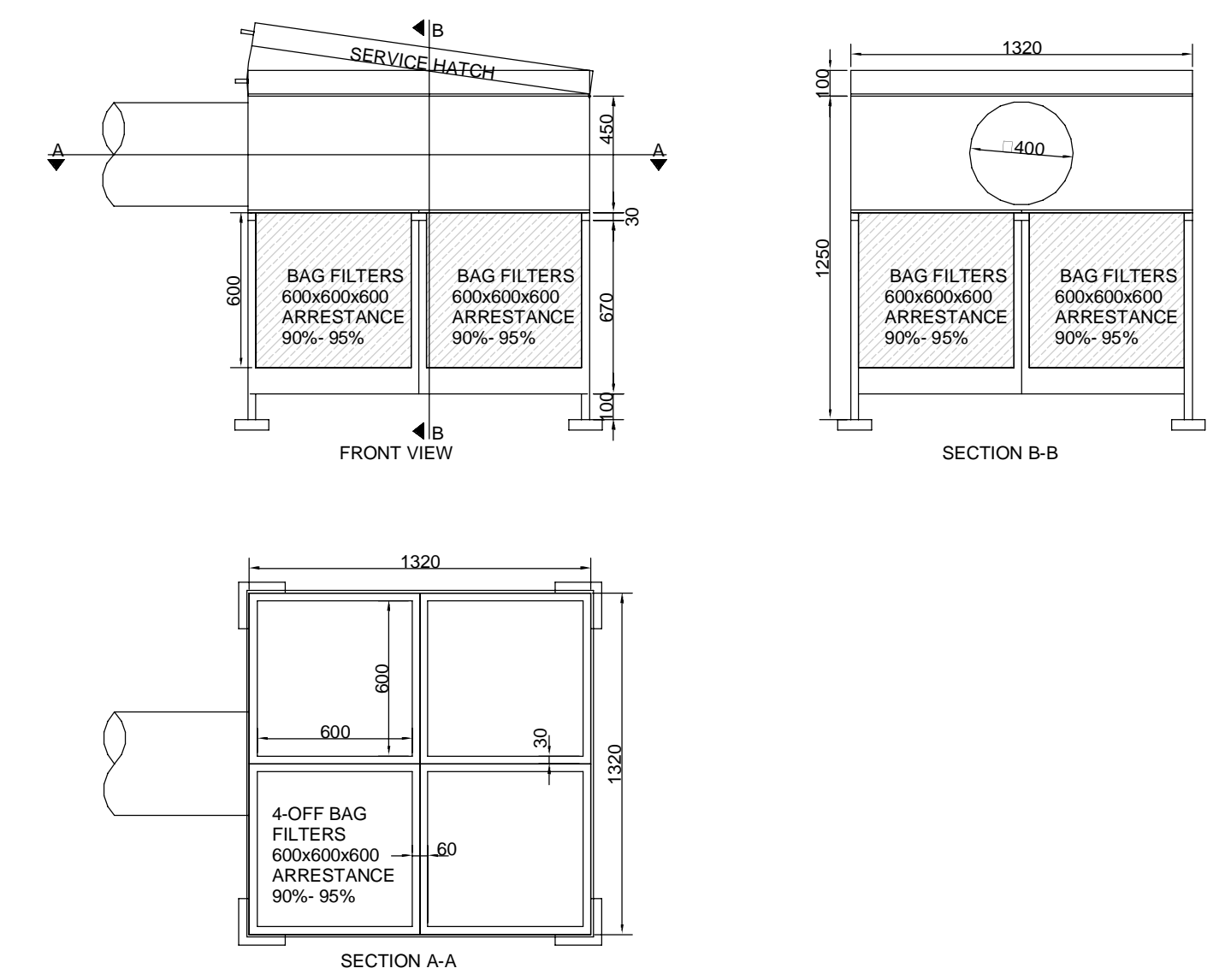
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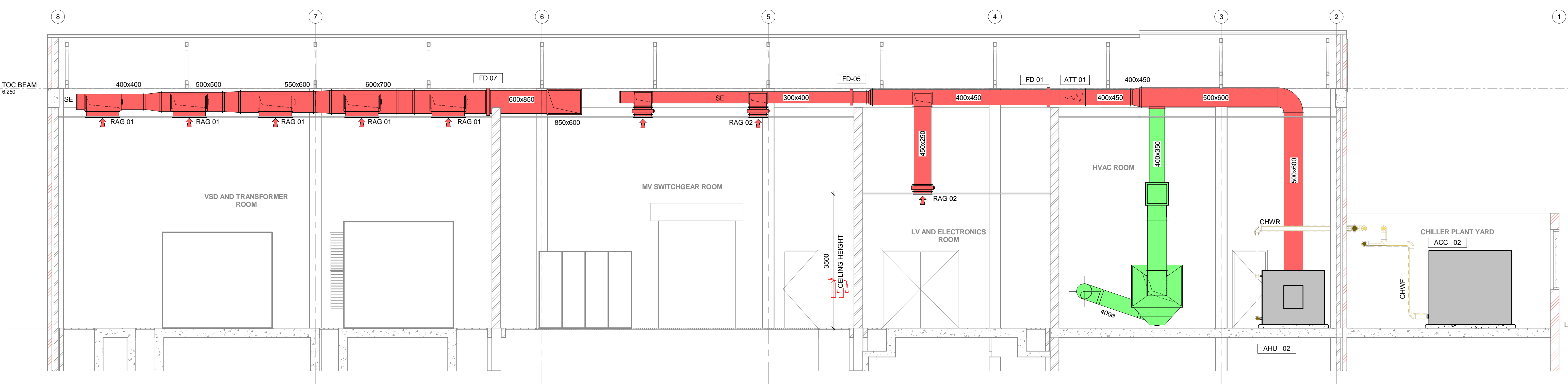
7 SECTION 7-7
0007 SCALE: 1:50



8 SECTION 8-8
0007 SCALE: 1:50



BAG FILTER BOX DETAIL
SCALE



9 SECTION 9-9
0007 SCALE: 1:50

HVAC PIPE LEGEND	
	- CHILLED WATER
	- CHILLED WATER

HVAC LEGEND	
	- EXHAUST
	- FRESH AIR/NATURAL
	- RETURN
	- SUPPLY
	- FOUL
	- MECHANICAL EQUIP/ AIR TERMINALS/ DUCT ACCESSORIES

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30 MAY 2018
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DRAWING	REFERENCE DRAWINGS
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1924701-2-510-M-ST-0004	SUBSTATION M - STANDARD DUCTING DETAILS
1924701-2-510-M-GA-0029	SUBSTATION M - HVAC GENERAL ARRANGEMENT LAYOUT

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NO	DESCRIPTION	BY	CHK	APPD	DATE
01	ISSUED FOR CONSTRUCTION	AJ	JJ	AD	30-05-2018

CONTRACTOR/CONSULTANT			
TITLE	NAME	SIGN	DATE
OPERATING DIVISIONS			
TITLE	NAME	SIGN	DATE

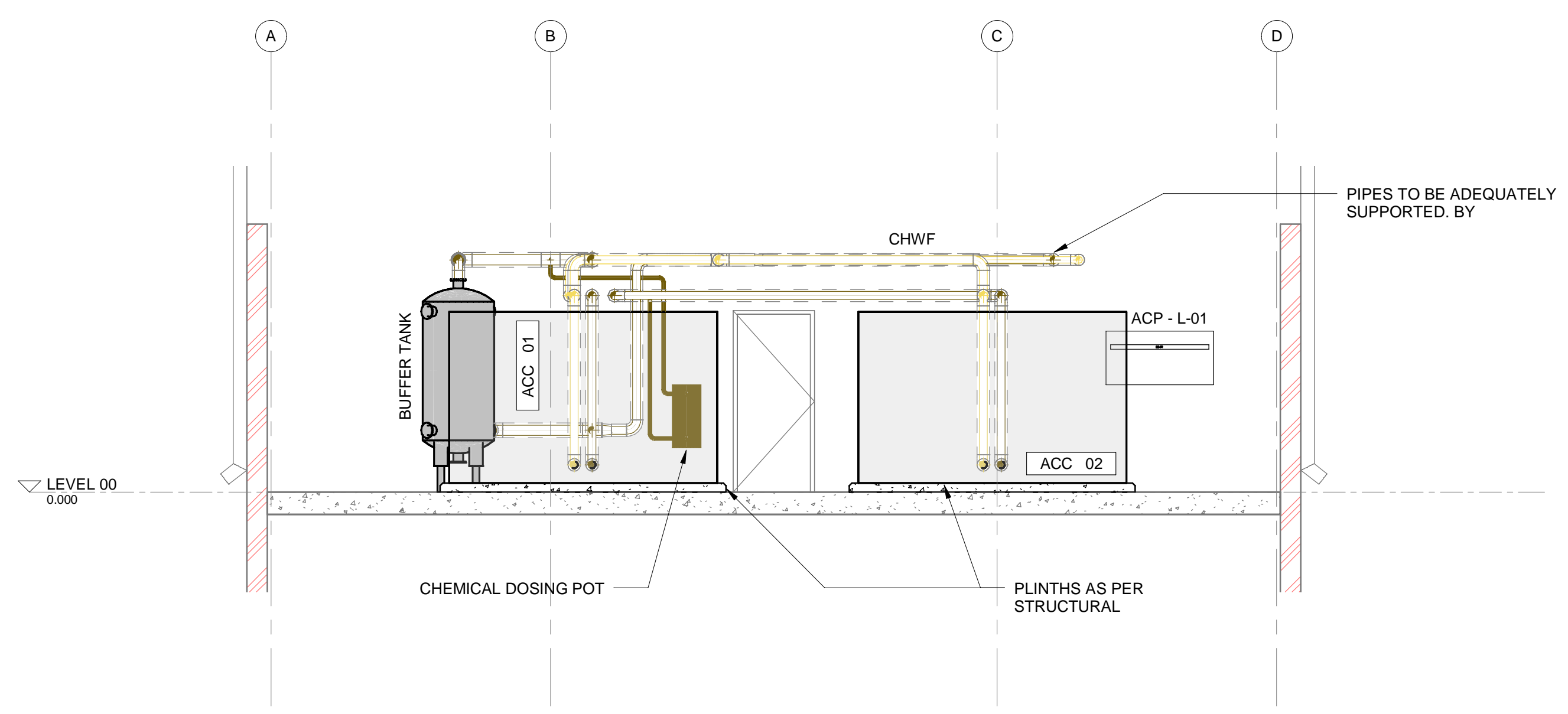
TRANSNET CAPITAL PROJECTS			
TITLE	NAME	SIGN	DATE
DRAWN	A. JULLUS	[Signature]	30/05/18
CHECKED	J. JOOSTE	[Signature]	30/05/18
DESIGNED	J. JOOSTE	[Signature]	30/05/18
CHECKED	A. DALLY	[Signature]	30/05/18

PR. ENG./PR. TECH./PR. ARCH	
NAME	DATE
A. N. GALLY	30/05/18

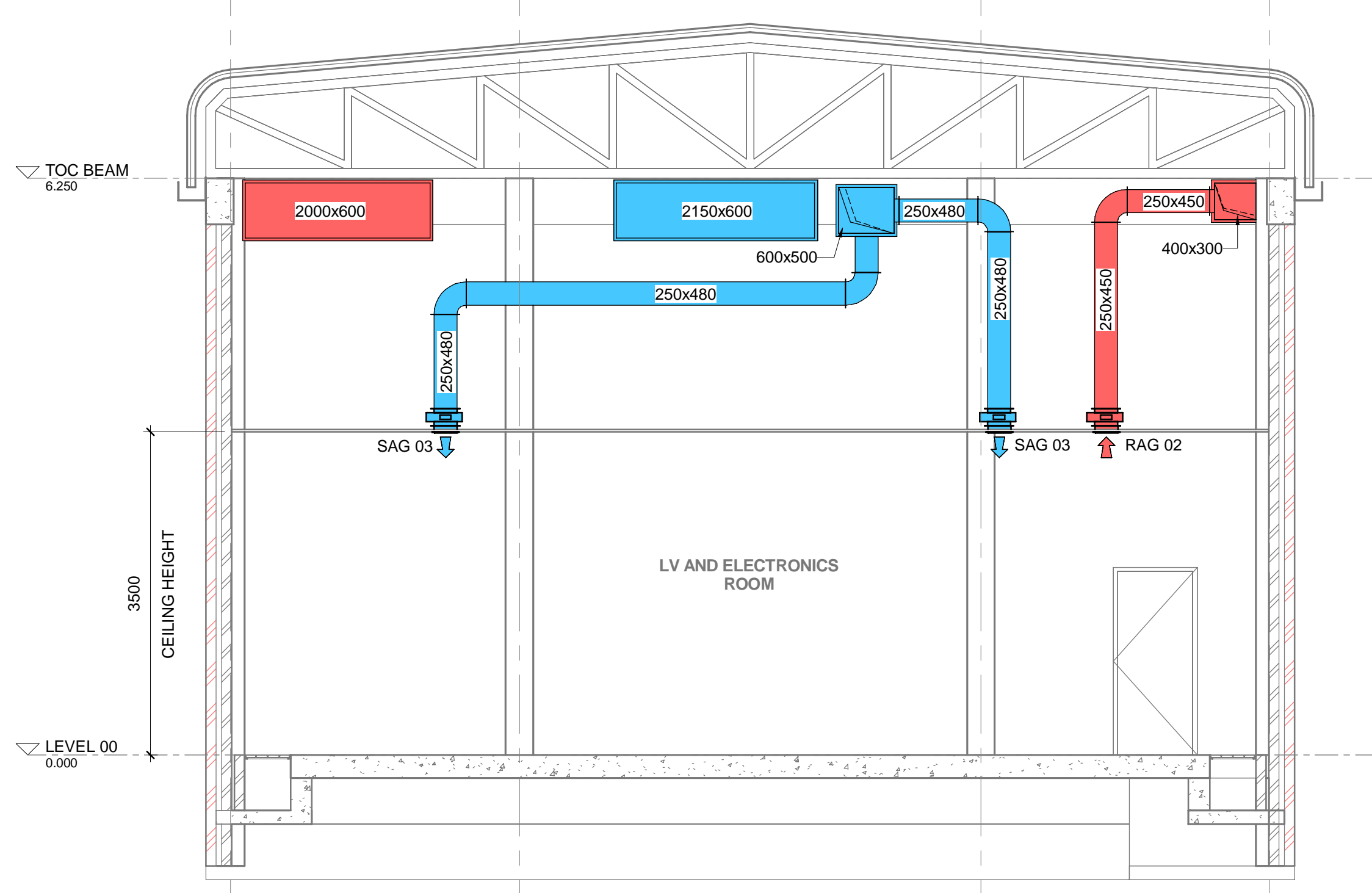
PROJECT NUMBER: 1924701 | 2 | 510 | M | S | E | 0007 | 01 | 00 | AE

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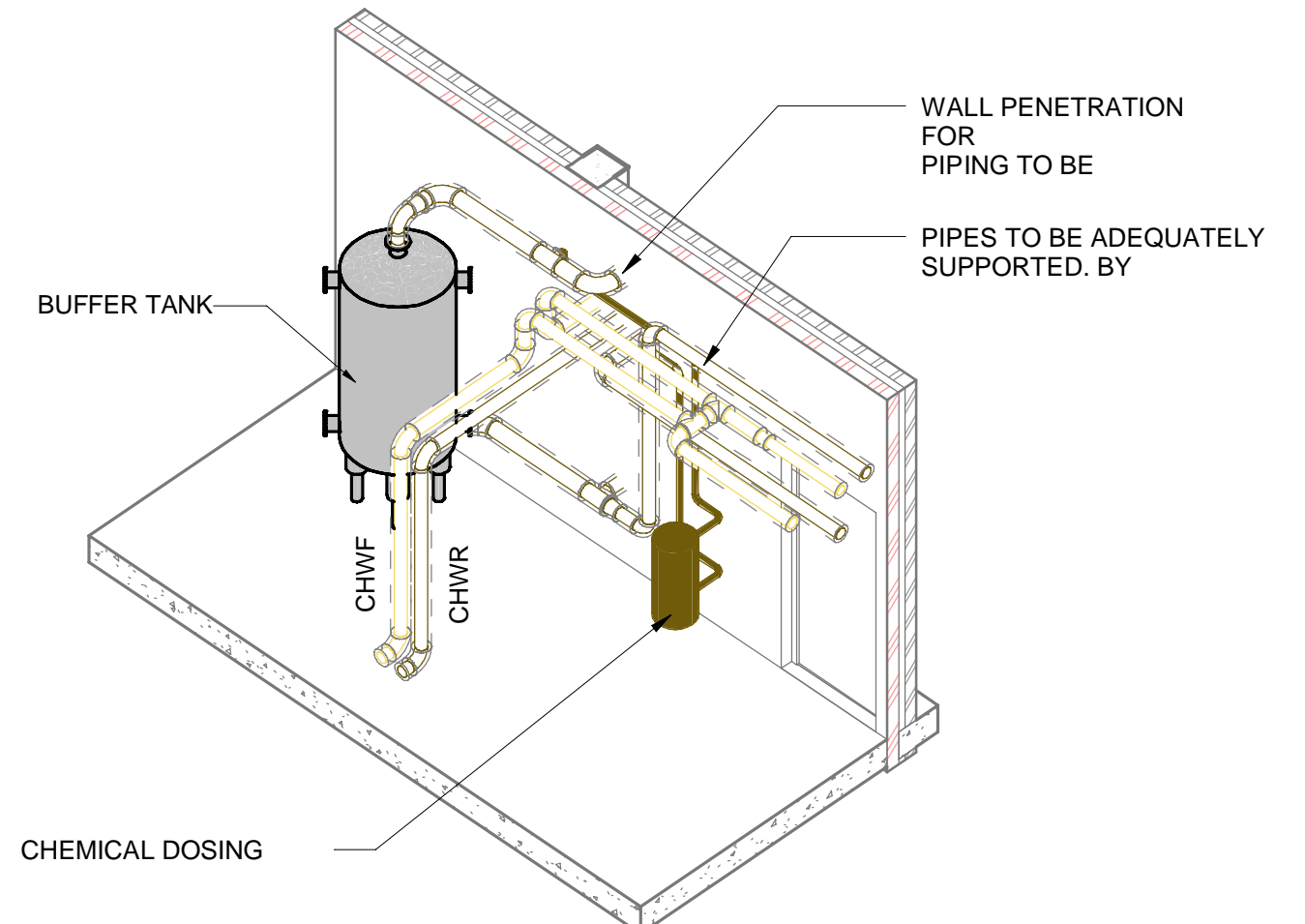
PORT OF SALDANHA
IRON ORE TIPPLER 3 PROJECT
BULK POWER UPGRADE:
SUBSTATION M
HVAC SECTION LAYOUT



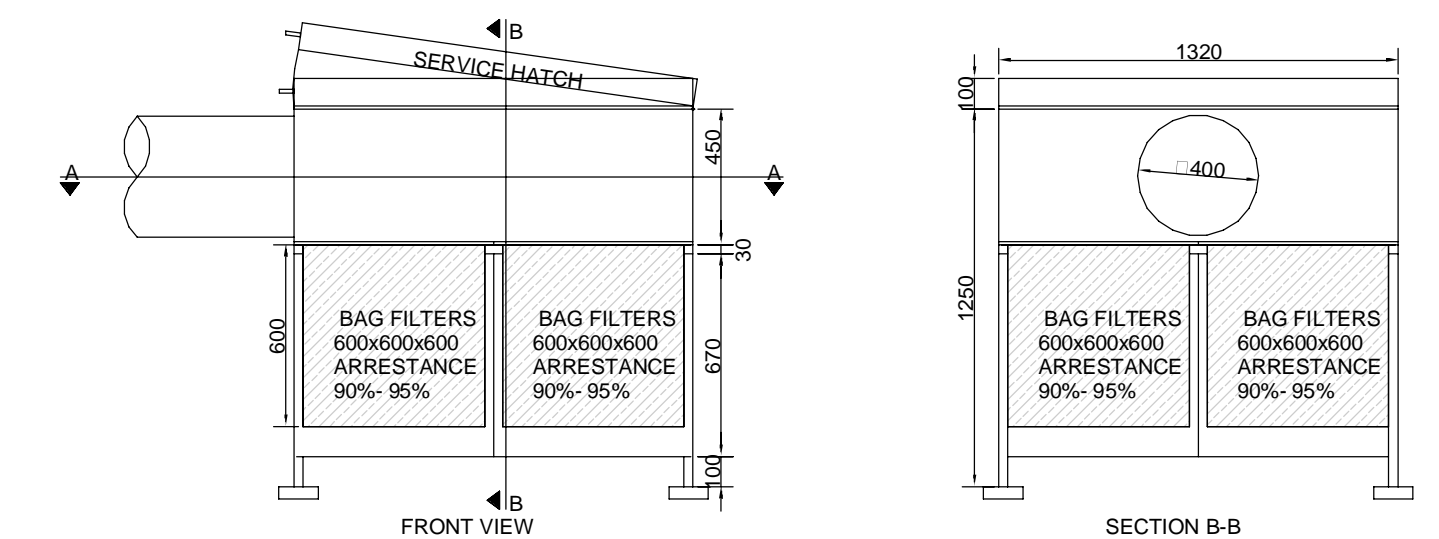
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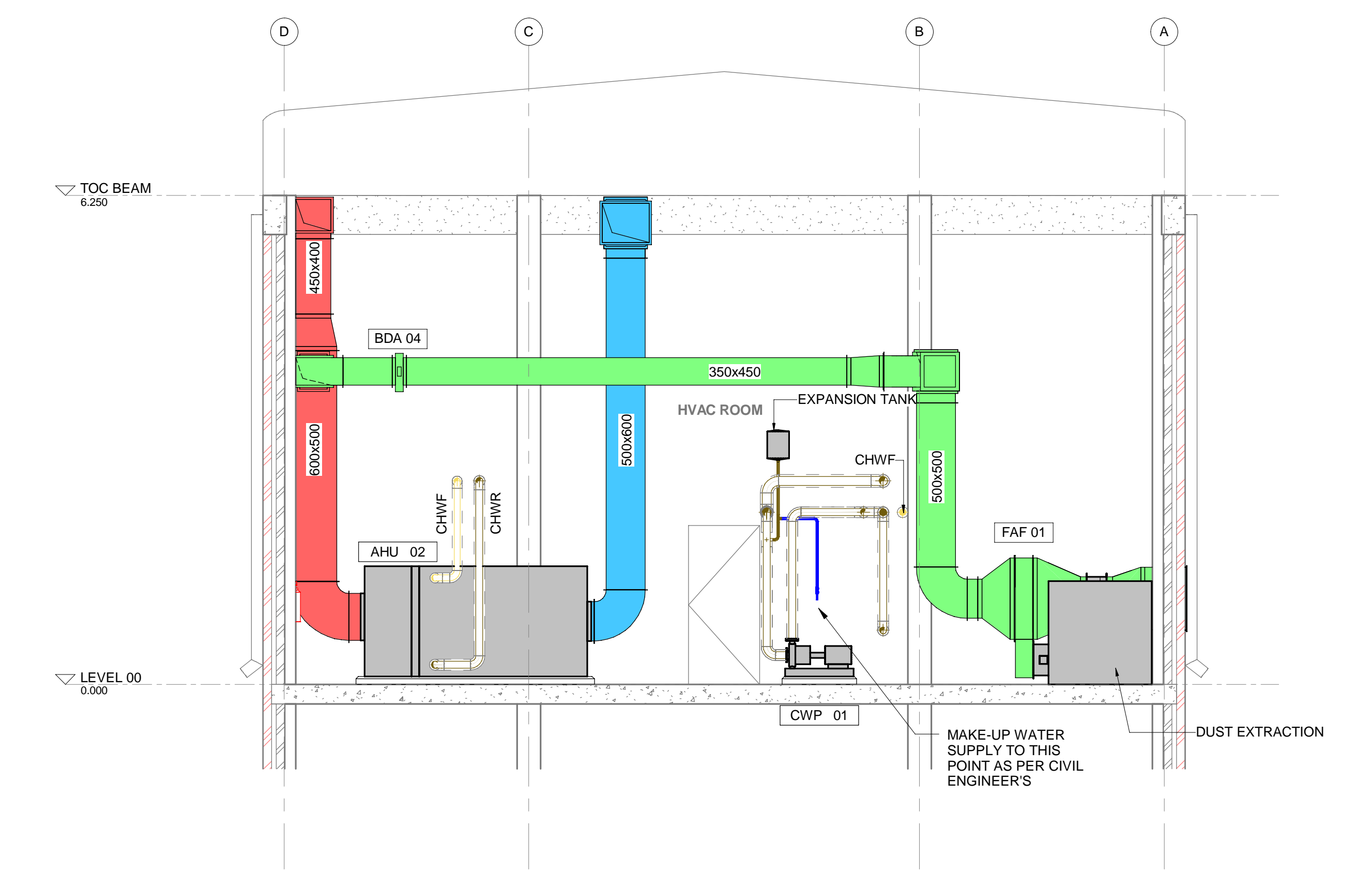
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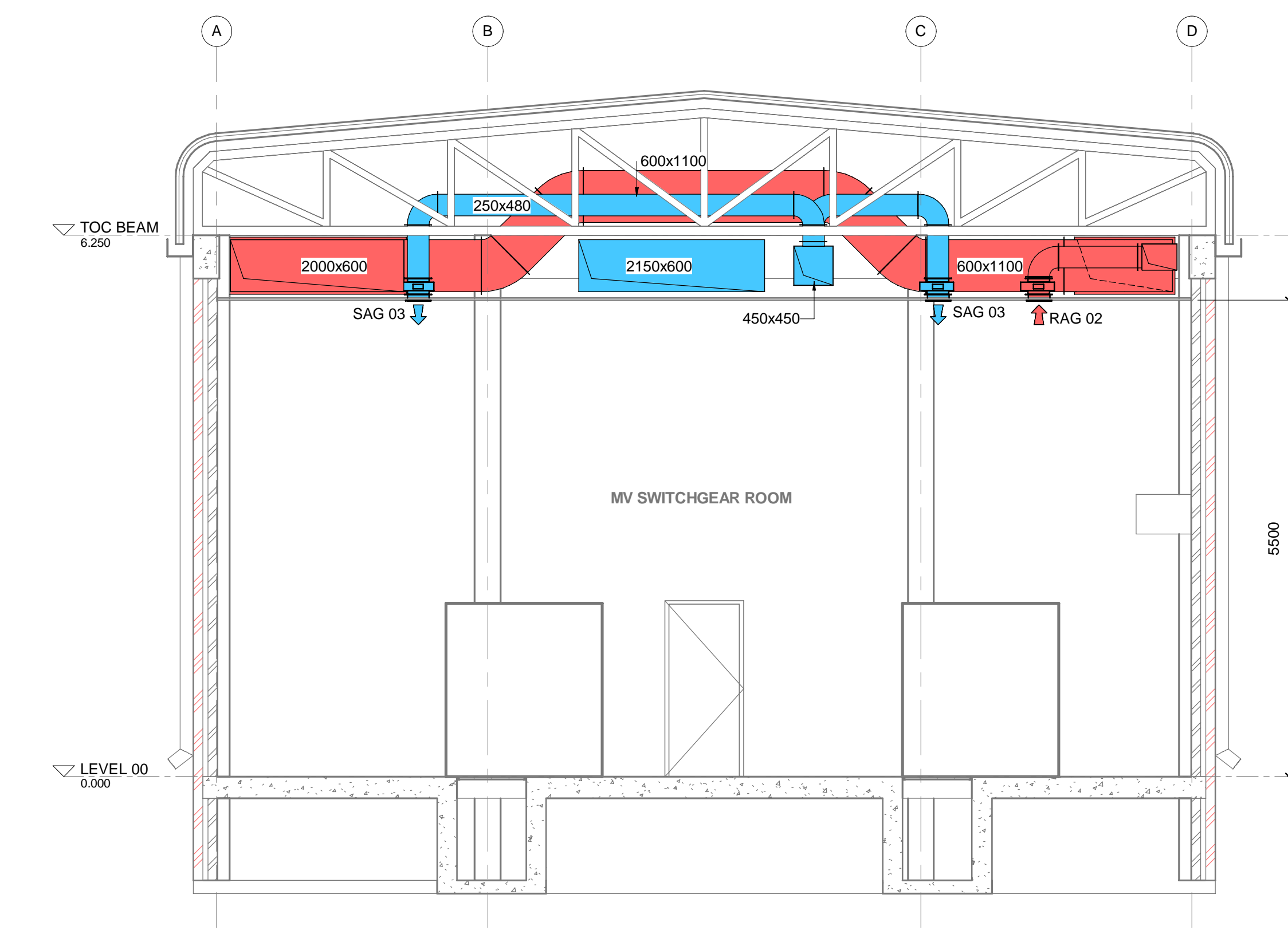
3D VIEW - BUFFER TANK SYSTEM
SCALE



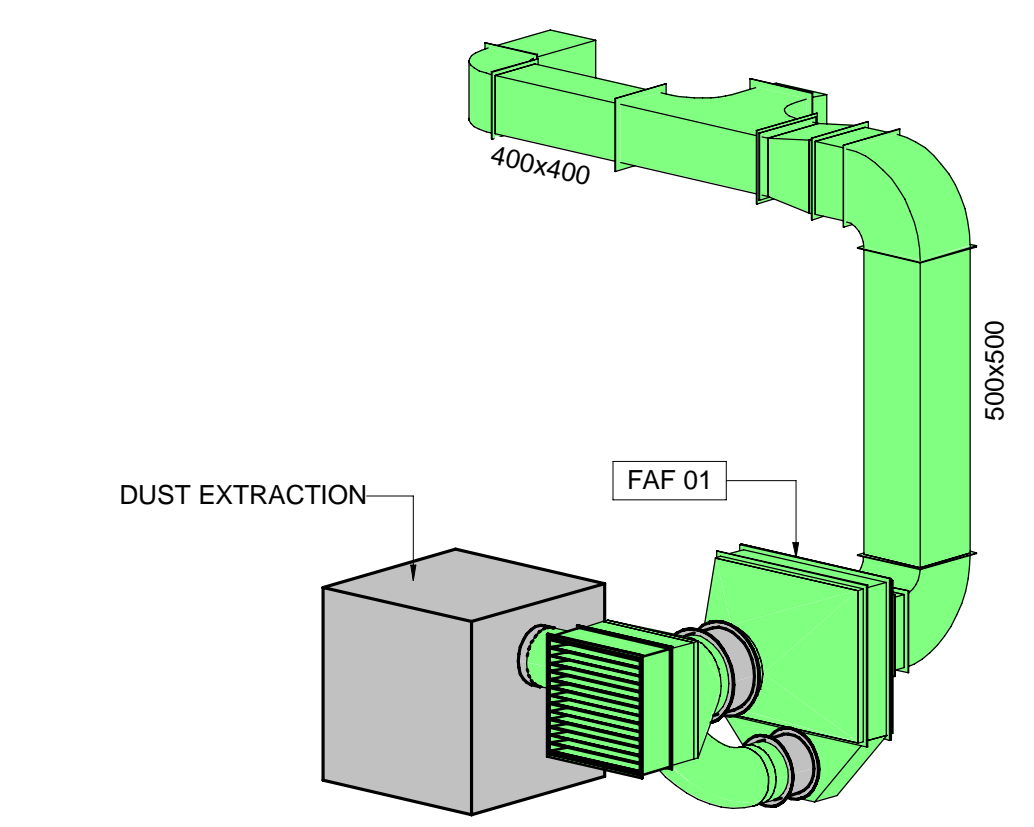
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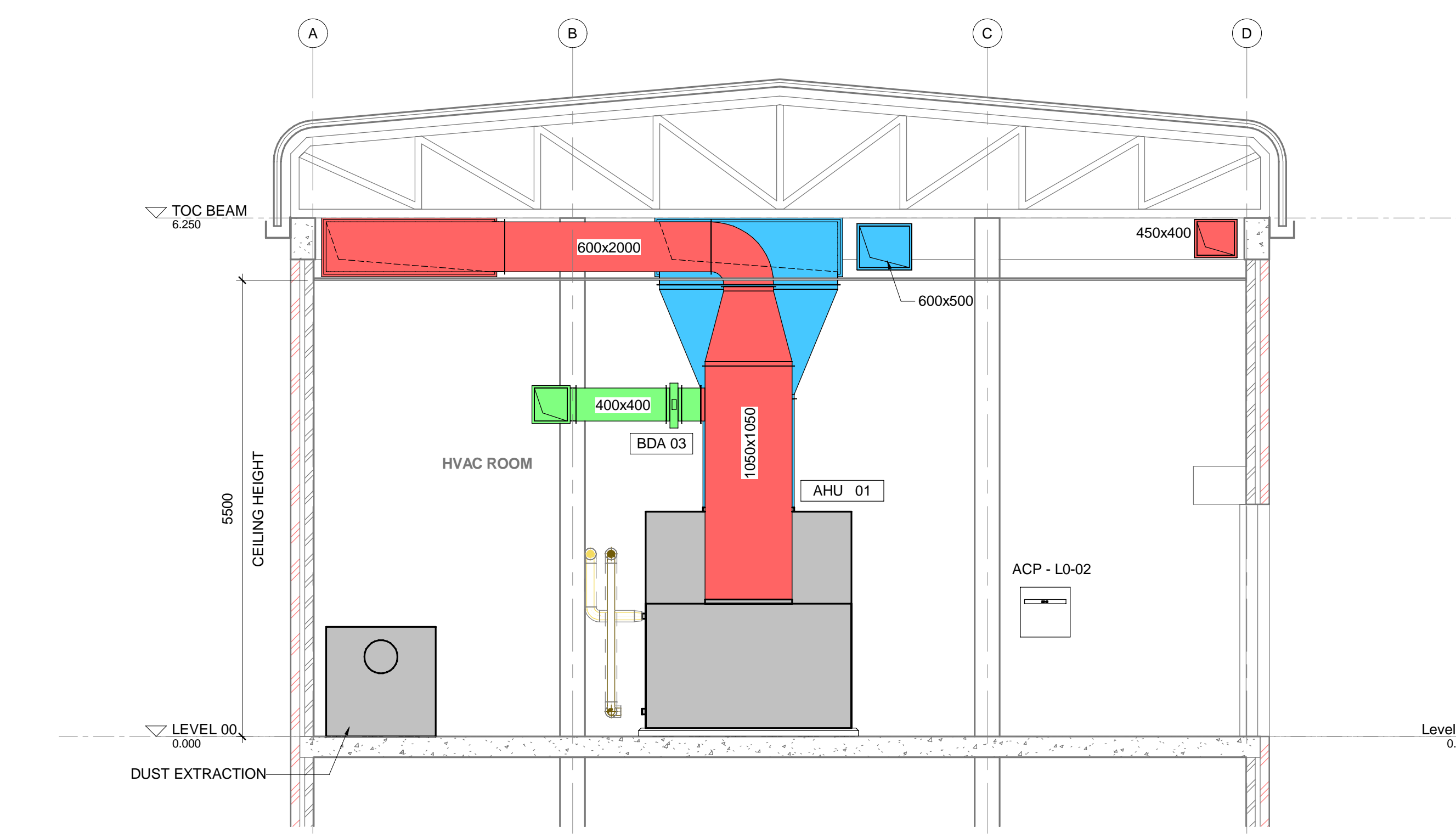
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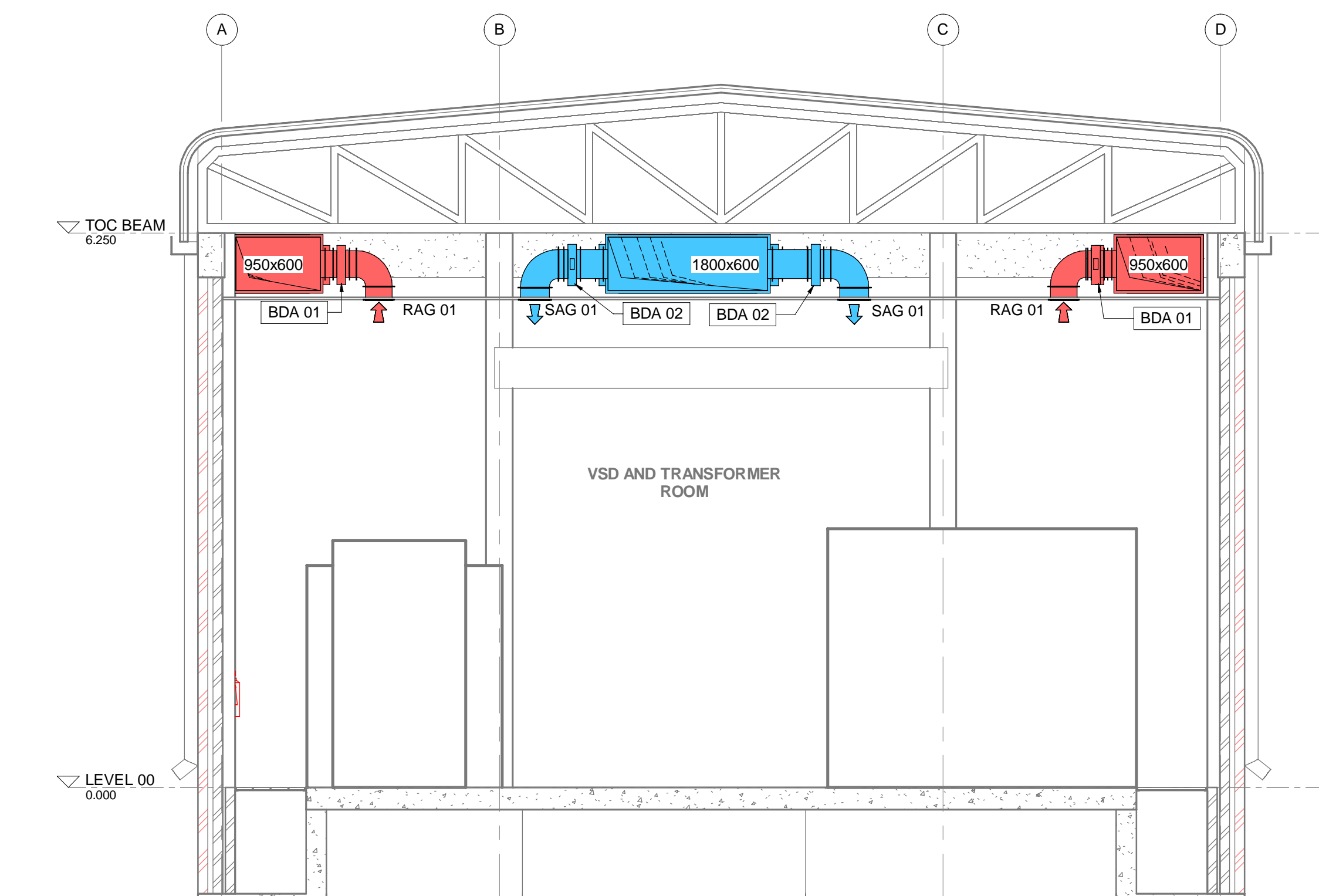
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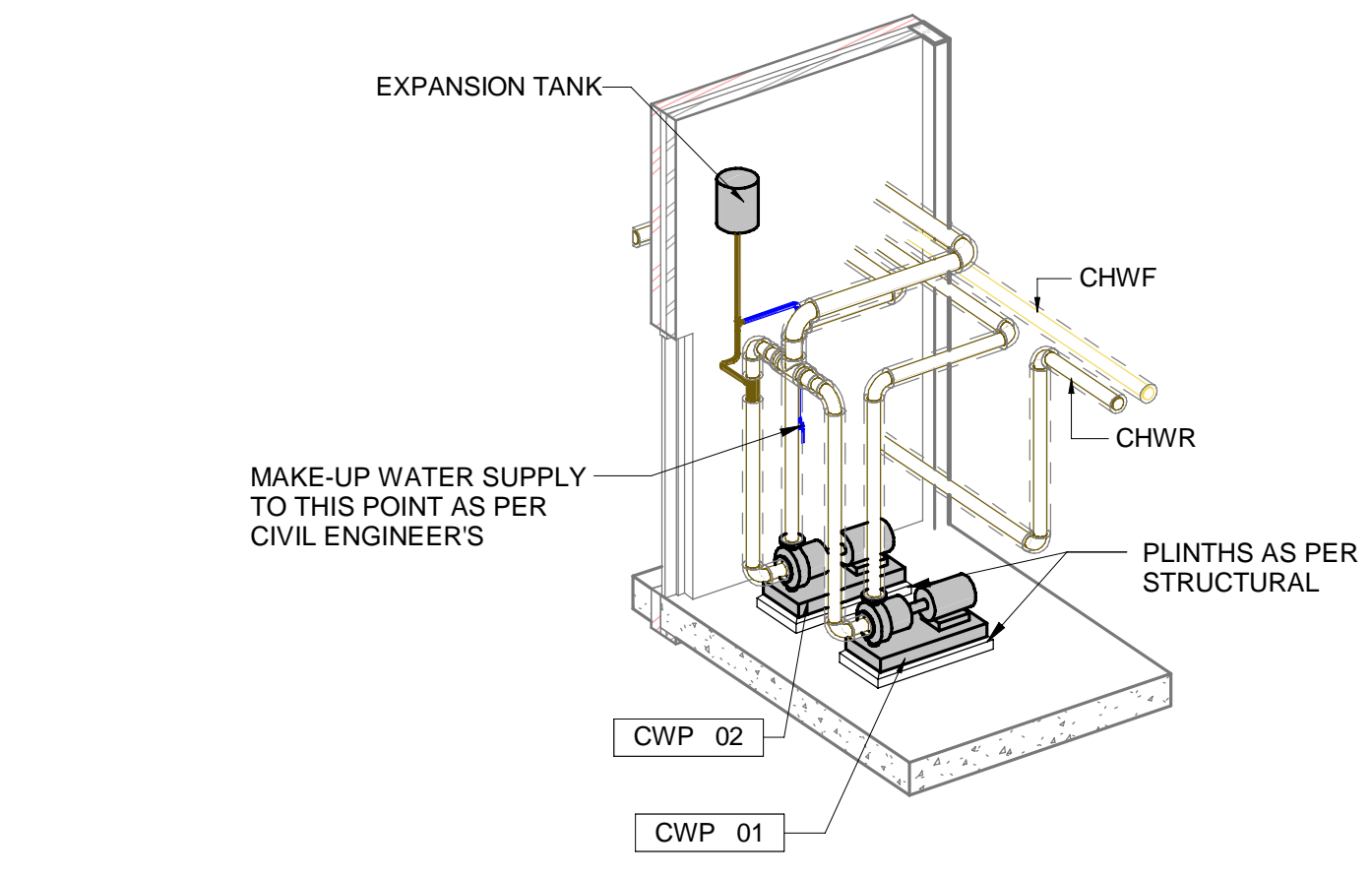
3D VIEW - DUST EXTRACTION
SCALE



3 SECTION 3-3
0009 SCALE 1:50



6 SECTION 6-6
0009 SCALE 1:50



3D VIEW - CHILLED WATER PUMP SYSTEM
SCALE

HVAC LEGEND

- EXHAUST
- FRESH AIR/NATURAL
- RETURN
- SUPPLY
- FOUL
- MECHANICAL EQUIP/ AIR TERMINALS/ DUCT ACCESSORIES

HVAC PIPE LEGEND

- CHILLED WATER
- CHILLED WATER

- GENERAL NOTES**
- DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED
 - THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.
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REFERENCE DRAWINGS

1924701-2-510-M-ST-0007	SUBSTATION N - STANDARD PIPING DETAILS
1924701-2-510-M-ST-0006	SUBSTATION N - STANDARD DUCTING DETAILS
1924701-2-510-M-SD-0007	SUBSTATION N - CHILLED WATER SCHEMATIC

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REVISIONS

NO	DESCRIPTION	BY	CHK	APPD	DATE
00	ISSUED FOR CONSTRUCTION	AJ	JJ	AD	30-05-2018

CONTRACTOR/CONSULTANT

TITLE	NAME	SIGN	DATE
OPERATING DIVISIONS			
TITLE	NAME	SIGN	DATE

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TITLE	NAME	SIGN	DATE
PRE-ENG/PR.TECH/PR.ARCH			
NAME	DATE	DATE	DATE
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REG. NUMBER	917004		
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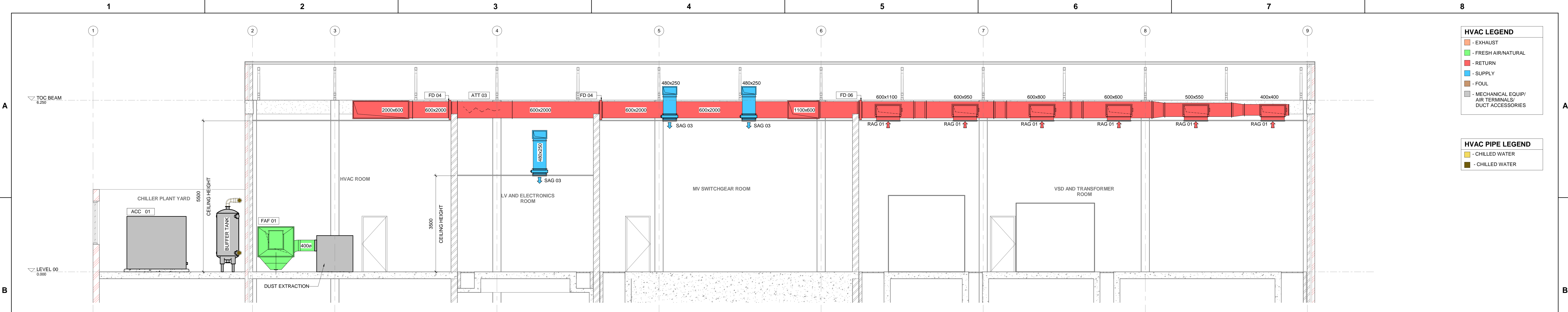
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TRANSNET LTD TRADING AS TRANSNET CAPITAL PROJECTS REG NO: 2015/0000000
TABLE BAY BUILDING, TYGERSBERG PARK, 183 LUYA KRIGER DRIVE, 8001
TEL: 021 940 1999
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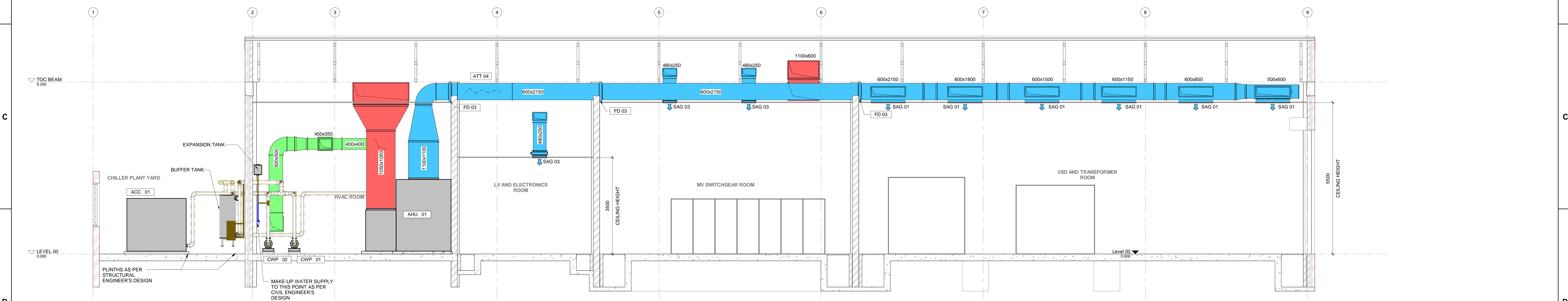
IRON ORE TIPPLER 3 PROJECT
BULK POWER UPGRADE:
SUBSTATION N
HVAC GENERAL ARRANGEMENT SECTION
LAYOUT

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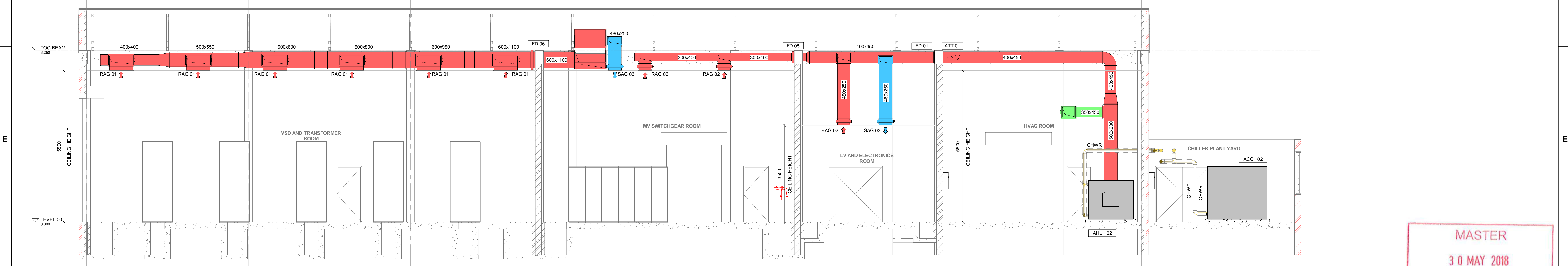
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30 MAY 2018
AECOM TRANSNET



1 SECTION 7-7
0010 SCALE 1:50



2 SECTION 8-8
0010 SCALE 1:50



3 SECTION 9-9
0010 SCALE 1:50

HVAC LEGEND

- EXHAUST
- FRESH AIR/NATURAL
- RETURN
- SUPPLY
- FOUL
- MECHANICAL EQUIP/ AIR TERMINALS/ DUCT ACCESSORIES

HVAC PIPE LEGEND

- CHILLED WATER
- CHILLED WATER

MASTER
30 MAY 2018

AECOM

REFERENCE DRAWINGS

1924701-2-510-M-ST-0007	SUBSTATION N - STANDARD PIPING DETAILS
1924701-2-510-M-ST-0006	SUBSTATION N - STANDARD DUCTING DETAILS
1924701-2-510-M-SD-0007	SUBSTATION N - CHILLED WATER SCHEMATIC REFERENCE

GENERAL NOTES

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REVISIONS

NO	DESCRIPTION	BY	CHK	APPD	DATE
00	ISSUED FOR CONSTRUCTION	AJ	JJ	AD	30-05-2018

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CONTRACTOR/CONSULTANT				TRANSNET CAPITAL PROJECTS			
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OPERATING DIVISIONS				PRE-ENG/PR.TECH/PR.ARCH			
TITLE	NAME	SIGN	DATE	NAME	DATE		
SIGNATURE				SIGNATURE			
REG. NUMBER				REG. NUMBER			
SCALE				SCALE			

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PORT OF SALDANHA

IRON ORE TIPPLER 3 PROJECT
BULK POWER UPGRADE:
SUBSTATION N
HVAC GENERAL ARRANGEMENT SECTION
LAYOUT

PROJECT NUMBER	00	FBS	0510	M	S.E	0010	01	00	AE
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1 2 3 4 5 6 7 8

STANDARD DUCTING NOTES

THIS IS A GENERAL LEGEND AND NOT ALL ITEMS MAY BE APPLICABLE TO THIS SPECIFIC HVAC CONTRACT.

- THE ENTIRE HVAC SYSTEM TO COMPLY WITH THE PROJECT TECHNICAL SPECIFICATION, WHICH THIS DRAWING FORMS PART OF.
- ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED. SIZES SHOWN FOR THE DUCTS ARE CLEAR INTERNAL DIMENSIONS.
- CHECK AND VERIFY ALL DIMENSIONS ON SITE PRIOR TO COMMENCEMENT OF ANY WORKS. ANY DISCREPANCY TO BE REPORTED TO THE EMPLOYER.
- ALL HEATING, VENTILATION AND AIR CONDITIONING DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL PROJECT NOTES AND SPECIFICATIONS AS ISSUED BY ACCORD, AND RELEVANT ARCHITECTURAL, ELECTRICAL AND STRUCTURAL DRAWINGS.
- CAPACITIES, DIMENSIONS AND LOCATIONS OF HEATING, VENTILATION AND AIR CONDITIONING EQUIPMENT ARE BASED ON EQUIPMENT MODELS INDICATED IN HVAC EQUIPMENT CATALOGUES, SCHEDULES AND DRAWINGS.
- ACCESS TO ALL HVAC EQUIPMENT AND ACCESSORIES SHALL BE AS PER DRAWINGS AND MANUFACTURERS' REQUIREMENTS.
- ALL WATER PROOFING OF PENETRATIONS AND COUNTER FLASHINGS TO BE DONE BY SPECIALIST SUB-CONTRACTOR, TO BE APPOINTED BY CONTRACTOR.
- STATIC PRESSURES FOR ALL THE FANS MUST BE VERIFIED PRIOR TO ORDERING THE FANS. MUST BE HANDED REFER TO SHEET BELOW.
- ALL TOILET DOORS TO BE UNDERCUT 25mm, OR PROVIDED WITH DOOR GRILLES.
- ALL MATERIALS EXPOSED TO THE AIRFLOW WITHIN THE CEILING CAVITY SHALL BE NON-COMBUSTIBLE OR LIMITED COMBUSTIBLE, WITH A MAXIMUM SMOKE DEVELOPMENT INDEX OF 50.
- FINAL LOCATIONS & DIMENSIONS OF CONCRETE UPSTANDS FOR THE HVAC EQUIPMENT AND HVAC PIPING SHALL BE CHECKED ON SITE TO SUIT HVAC EQUIPMENT SPECIFIED.
- ALL THE EXTERNAL SUPPORT BRACKETS SHALL BE HOT DIP GALVANIZED BEFORE INSTALLATION.
- WHERE DUCTS AND PIPES PASS THROUGH WALLS, SLICES SHALL BE PROVIDED, AND SEALED WITH AN APPROPRIATE FIRE RATED SEALANT TO PROVIDE AN AIR-TIGHT JOINT.
- ALL EQUIPMENT DUTIES ARE GIVEN AS RATED DESIGN DUTIES WITH AIR VOLUMES CORRECTED FOR SITE ELEVATION ABOVE SEA LEVEL.
- DIRECTION ARROWS AND IDENTIFICATION BANDS ARE TO BE PLACED EVERY TWO METER INTERVALS OVER THE INSULATION FOR ALL SERVICES.
- ALL BENDS & ELBOWS WHICH HAVE A THROAT RADIUS LESS THAN 1/3 OF THE HEEL RADIUS MUST BE HANDED REFER TO SHEET BELOW.
- ALL AIR DIFFUSION EQUIPMENT SHALL BE SELECTED AND INSTALLED AS PER THE SUPPLIER'S DETAILS SPECIFICATIONS. AND ALL BRANCH DUCTS CONNECTING TO AIR DIFFUSERS TO BE FITTED WITH DUCT BALANCING DAMPERS, AS SHOWN ON DRAWINGS.
- ALL AIR CONDITIONING DUCTWORK TO BE LAGGED WITH RIGID FIBERGLASS SLAB COVERED WITH REINFORCED ALUMINUM FOIL, AND FINISHED WITH A VAPOUR SEAL BARRIER.
 - 25mm THICK FIBERGLASS EXTERNAL DUCTWORK @ 2 kg/m³
 - 50mm THICK FIBERGLASS FOR EXTERNAL DUCTWORK @ 2 kg/m³, AND FINISHED WITH A WATER PROOF BARRIER.
 - MADE INSULATION UNDER SUPPORTS. (REFER DETAIL-10)
- ALL SUPPLY & RETURN AIR DIFFUSERS & RETURN SLOT DIFFUSERS SHALL BE SIMILAR TO TROX TYPE - ALS OR APPROVED EQUIVALENT.
- FINAL LOCATION OF ALL AIR DIFFUSION EQUIPMENT SHALL BE CO-ORDINATED WITH THE CEILING TILES, LIGHTING FIXTURES AND OTHER CEILING CLADDING ON SITE.
- FLEXIBLE DUCT TO ANY AIR OUTLET SHALL NOT EXCEED A LENGTH OF 1000mm, AND SHOULD BE STRAIGHT TO ACHIEVE MINIMUM AIR RESISTANCE AND NOISE.
- ALL OUTSIDE AIR INTAKE OPENINGS SHALL BE PROVIDED WITH FILTERS UNDER APPROVED NOTES ON THE HVAC DRAWINGS. OPENINGS TO BE MINIMUM 500mm ABOVE ROOF / GROUND LEVEL.
- ALL DUCTWORK WORK RUNNING THROUGH HIGH HUMIDITY AREAS SHALL BE WRAPPED WITH 25mm THICK 3kg/m³ DENSITY FIBERGLASS INSULATION.
- ALL THE OUTLETS FOR SUPPLY, RETURN, TRANSFER & EXHAUST AIR SHALL BE PROVIDED WITH VOLUME CONTROL DAMPERS. ALL DUCT CONNECTIONS FROM MAIN DUCTS TO BE PROVIDED WITH SPLITTER TYPE DAMPERS, OR AS OTHERWISE NOTED ON THE DRAWINGS.
- ALL TRANSFER DUCTS SHALL BE PROVIDED WITH BACK DRAFT DAMPERS, IN ORDER TO PREVENT AIR FLOW IN THE OPPOSITE DIRECTION.
- ALL AIR DIFFUSION EQUIPMENT SHALL BE EPOXY PAINT WHITE, UNLESS SPECIFIED OTHERWISE.
- FINAL SIZE OF ALL THE WEATHER LOUVRES DEPEND ON THE FAN SPECIFIED.
- BACKDRAFT DAMPERS SHALL BE SIMILAR TO TROX TYPE - ARK OR APPROVED EQUIVALENT.
- DUCTWORK AS NOTED IN MATERIAL SCHEDULE SHALL BE FABRICATED, CONSTRUCTED AND INSTALLED IN ACCORDANCE WITH THE BRACKETS STANDARD. THIS WILL INCLUDE PROVISION FOR ALL TEST POINTS TO ENABLE AIR BALANCING AND COMMISSIONING ACTIVITIES TO BE PERFORMED. (REFER TO DETAIL BELOW).
- SHIELD ACCESS DOORS SHALL BE PROVIDED ON THE USE OF ALL FIRE DAMPERS AND CONTROL DAMPERS, AND GENERALLY AS RECOMMENDED BY THE BRACKETS STANDARD.
- FILTER SPECIFICATION**
PRIMARY AIR FILTER MATERIAL SHALL BE CAPABLE OF BEING WASHED AT LEAST 12 TIMES, AND HAVE AVERAGE ARRESTANCE OF 80% ACCORDING TO THE ASHRAE 52 / F1 STANDARD. SPARE FILTERS SHALL BE PROVIDED.
FILTERS TO BE COVERED IN FIRE RESISTANT FILTER HOUSINGS WITH AIRTIGHT ACCESS DOORS.
- KITCHEN HOOD AND DUCT DETAILS**
 - THE HOOD SHALL BE CONSTRUCTED FROM AND BE SUPPORTED BY STAINLESS STEEL TYPE 304 NOT LESS THAN 1.2mm (DR) OR OTHER APPROVED MATERIAL OF EQUIVALENT STRENGTH, FIRE AND CORROSION RESISTANCE.
 - DUCTS SHALL BE CONSTRUCTED OF AND SUPPORTED BY CARBON STEEL, NOT LESS THAN 1.37mm (18G) (DR) STAINLESS STEEL, NOT LESS THAN 1.2mm (18G).
 - ALL BEAMS AND JOINTS SHALL HAVE LIQUID-TIGHT CONTINUOUS EXTERNAL WELDS.
 - FIRE SUPPRESSION SYSTEM TO BE DONE BY SPECIALIST SUB-CONTRACTOR, TO BE APPOINTED BY CONTRACTOR.
 - FIRE WALL SHALL BE SHOWN RATED TO ENCLOSE EXHAUST DUCT.
 - FILTERS MUST BE 'UL' CLASSIFIED, STAINLESS STEEL, NON-CLOSING BAFLE-TYPE, AND SHOULD BE EASILY REMOVABLE.
 - A RESERVE TRAP SHALL BE PROVIDED AT THE BASE OF EACH VERTICAL RISER, WITH PROVISIONS FOR CLEANOUT.
 - AN OPENING, LARGE ENOUGH TO PERMIT CLEANING, SHALL BE PROVIDED AT EACH CHANGE IN DIRECTION OF THE DUCT, FOR THE PURPOSES OF INSPECTION AND CLEANING. SUCH OPENING SHALL BE AT THE SIDES OF THE DUCT AND AT EVERY TWO METERS IN HORIZONTAL DUCTWORK.
 - AFTER INSTALLATION OF FILTERS, THE REMAINING AREA OF THE HOOD TO BE CLOSED OFF.
 - KITCHEN EXHAUST DUCTS SHALL BE CONSTRUCTED IN COMPLIANCE WITH NFPA STANDARDS.
- MAIN HVAC ELECTRICAL POWER SUPPLY CABLE TO BE COPPER.
- ALL HEATER BANKS TO BE HOUSED IN FLANGED STEEL CASINGS FOR EASY REMOVAL AND COMPLY WITH THE FOLLOWING SAFETY REQUIREMENTS:
 - AIR PRESSURE SWITCH / FUSE SWITCH
 - OVERHEAT THERMOSTAT WITH MANUAL RESET
 - BACK OF TERMINAL BOX TO BE INSULATED
 - ACCESS DOOR INTERLOCKED WITH HEATER BANK
 - HEATER ELEMENTS TO BE SIZED TO SUIT NUMBER OF STEPS AND BALANCE POWER OVER THE THREE PHASES
 - PROPORTIONAL OUTPUT CONTROL TO BE PROVIDED
 - HEATER ELEMENTS TO BE INCOLO TYPE OR APPROVED EQUIVALENT & CHOSEN FOR "BLACK HEAT" OPERATION, HEATING INTENSITY NOT MORE THAN 3 WATTS
 - INSULATION SHALL BE 6mm THICK NON ASBESTOS WML BOARD, LOCATED 300mm UPSTREAM AND 50mm DOWNSTREAM
- ALL MACHINES AND MOTORS (ABOVE 0.75 kW) SHALL INCORPORATE THE FOLLOWING:
 - HIGH EFFICIENCY MOTORS (LOW COPPER AND IRON LOSSES)
 - POWER FACTOR CORRECTION TO 0.95
 - SPEED CONTROLLERS WITH VARIABLE / AUTOMATIC CONTROL VIA BMS WITH 4 - 20 mA CONTROL (IF REQUESTED)
 - ALL CONTROL TRANSFORMERS SHALL BE HIGH EFFICIENCY (LOW COPPER AND IRON LOSSES)
- MOTOR POWER FOR ALL THE HVAC EQUIPMENT SHALL BE VERIFIED ONCE ORDERED.
- SOUND ATTENUATION**
 - ALL FACTORY MADE SOUND ATTENUATORS TO BE SELECTED AND LOCATED AS PER THE "HORDEN DONKIN" COMPANY REQUIREMENTS.
 - ALL SOUND ATTENUATORS TO BE LINED WITH MELINEX FILM, OR APPROVED EQUIVALENT.
 - TRANSITION DUCTWORK BETWEEN ATTENUATORS AND AIR-CON UNITS TO BE PROVIDED WITH ACOUSTIC INSULATION AS PER DETAIL 11 ON THE DRAWING.
 - ALL DUCT LINING MATERIAL SHALL COMPLY WITH SABS STANDARDS.
 - OCCUPIED ROOMS SHALL ATTAIN THE SOUND LEVELS AS NOTED IN THE ASHRAE APPLICATIONS HANDBOOK, CHAPTER "SOUND AND VIBRATION CONTROL".
- VIBRATION ISOLATION OF EQUIPMENT**
ALL ROTATIONAL EQUIPMENT WHICH HAS A POWER CONSUMPTION IN EXCESS OF 1kW SHALL BE FITTED WITH VIBRATION ISOLATORS TO ENSURE NO EQUIPMENT VIBRATION IS TRANSMITTED INTO THE STRUCTURE. VIBRATION ISOLATORS SHALL BE SELECTED IN ACCORDANCE WITH THE MASON INDUSTRIES SELECTION DATA CONSIDERING A MINIMUM 90% TRANSMISSION OF VIBRATION.
- FOR ALL THE HVAC EQUIPMENT, A CONDENSATE DRAIN SHOULD BE PROVIDED WITHIN TWO METERS OF THE UNIT, BY OTHERS, UNLESS STATED OTHERWISE.

LEGEND

T THERMOSTAT
C DEGREE CENTIGRADE
L LITRES PER SECOND
Dc DOOR AIR CURTAIN
db DRY BULB
EA EXHAUST AIR DUCT
EAD EXHAUST AIR
Eg ELECTRIC DUCT HEATER
EG EXHAUST AIR GRILLE
ESP EXTERNAL STATIC PRESSURE
EF EXHAUST FAN
FAU FRESH AIR DUCT
FCU FAN COIL UNIT
Pa PASCAL
Pw KILO WATT
QTY QUANTITY
RA RETURN AIR
RAG RETURN AIR GRILLE
RLG RETURN LINEAR GRILLE
RWG RETURN WALL GRILLE
SA SUPPLY AIR
SAF SUPPLY FAN
SCD SUPPLY CEILING GRILLE
SCO SUPPLY CEILING DIFFUSER
S.S STAINLESS STEEL
SWG SUPPLY WALL GRILLE
TA TRANSFER AIR
TAG TRANSFER AIR GRILLE
TAD TRANSFER AIR DUCT
TEMP TEMPERATURE
UL OR UNDER CUT (25mm) MIN.
Wd WALL BUILD
Wd WALL OPENING
F.D FIRE DAMPER (1 HOUR RATING)
F.S.D FIRE SMOKE DAMPER (1 HOUR RATING)

4-WAY BLOW DIFFUSER
3-WAY BLOW DIFFUSER

INSULATED FLEXIBLE DUCT
COMMISSIONING POINT
LOCAL ISOLATOR

28G GALV. SM CLADDING WRAPPED AROUND DUCTING ON 3 SIDES

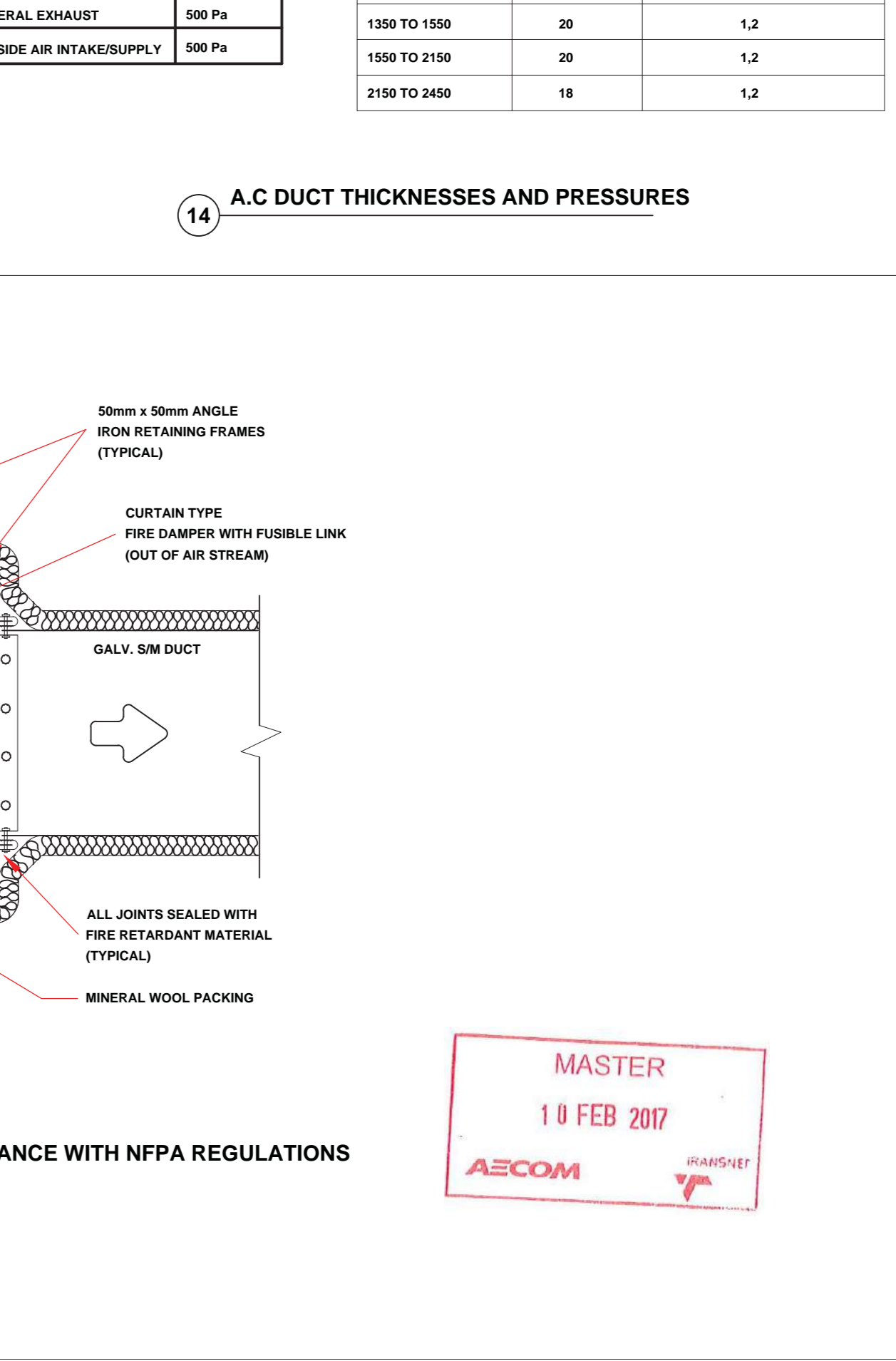
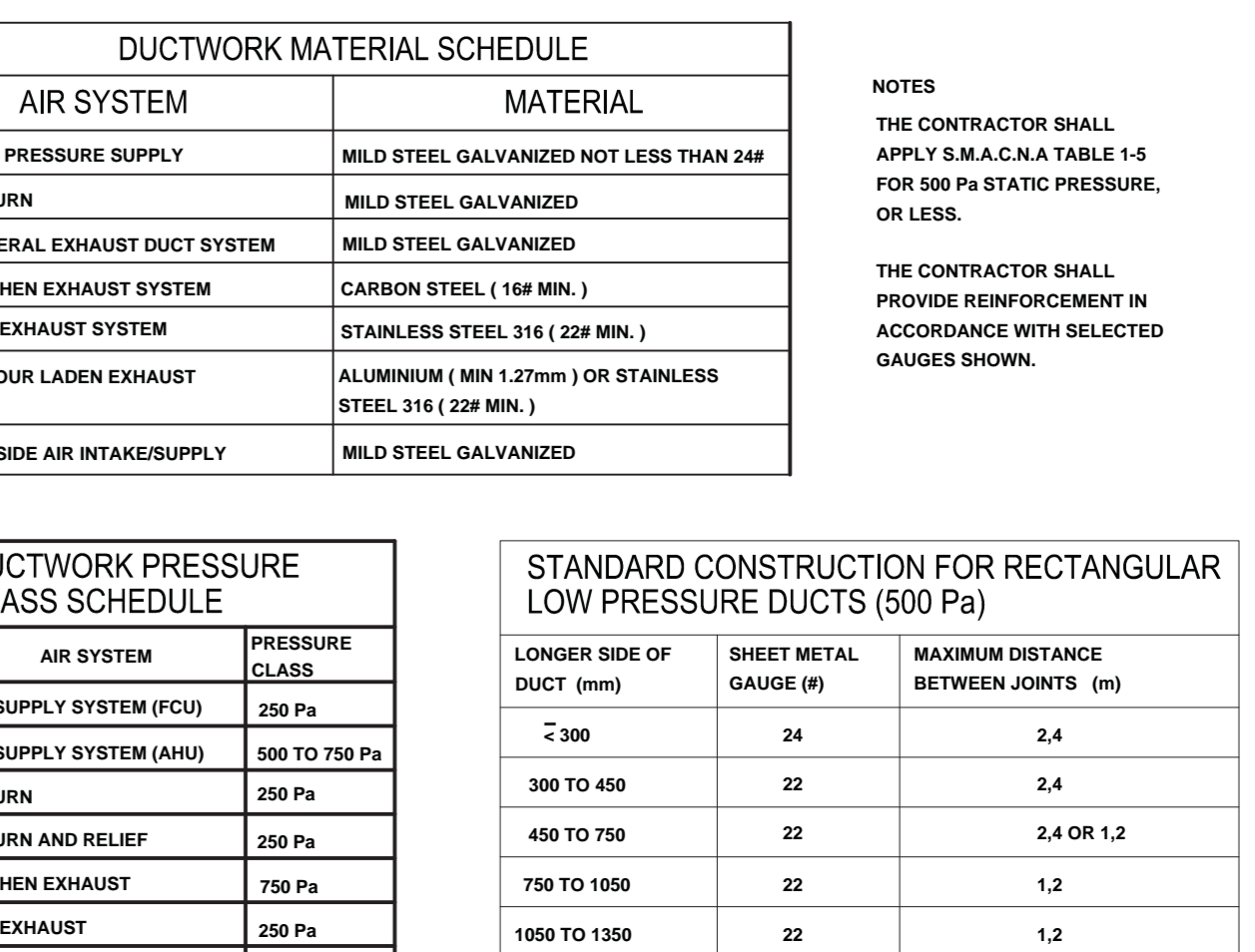
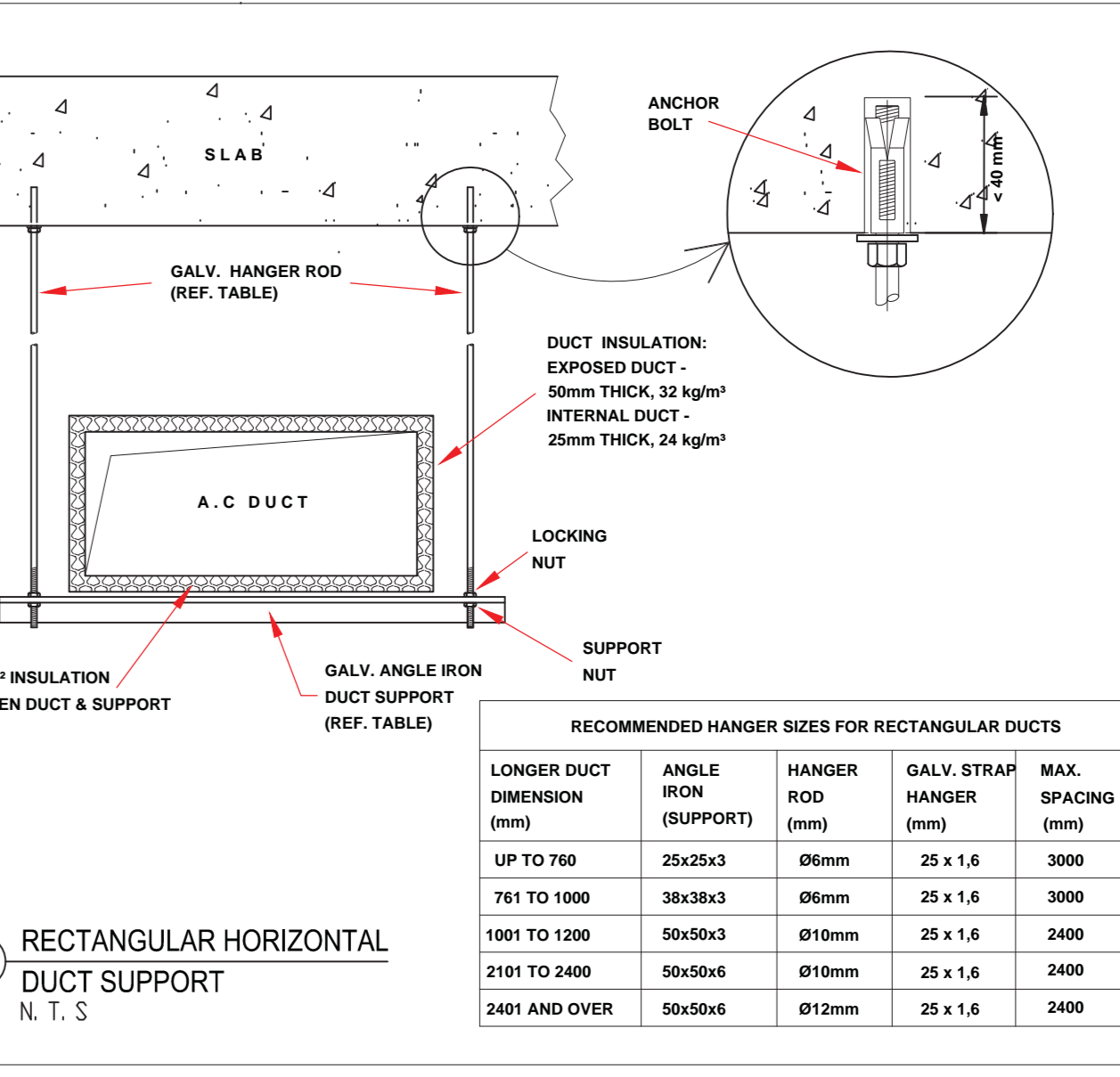
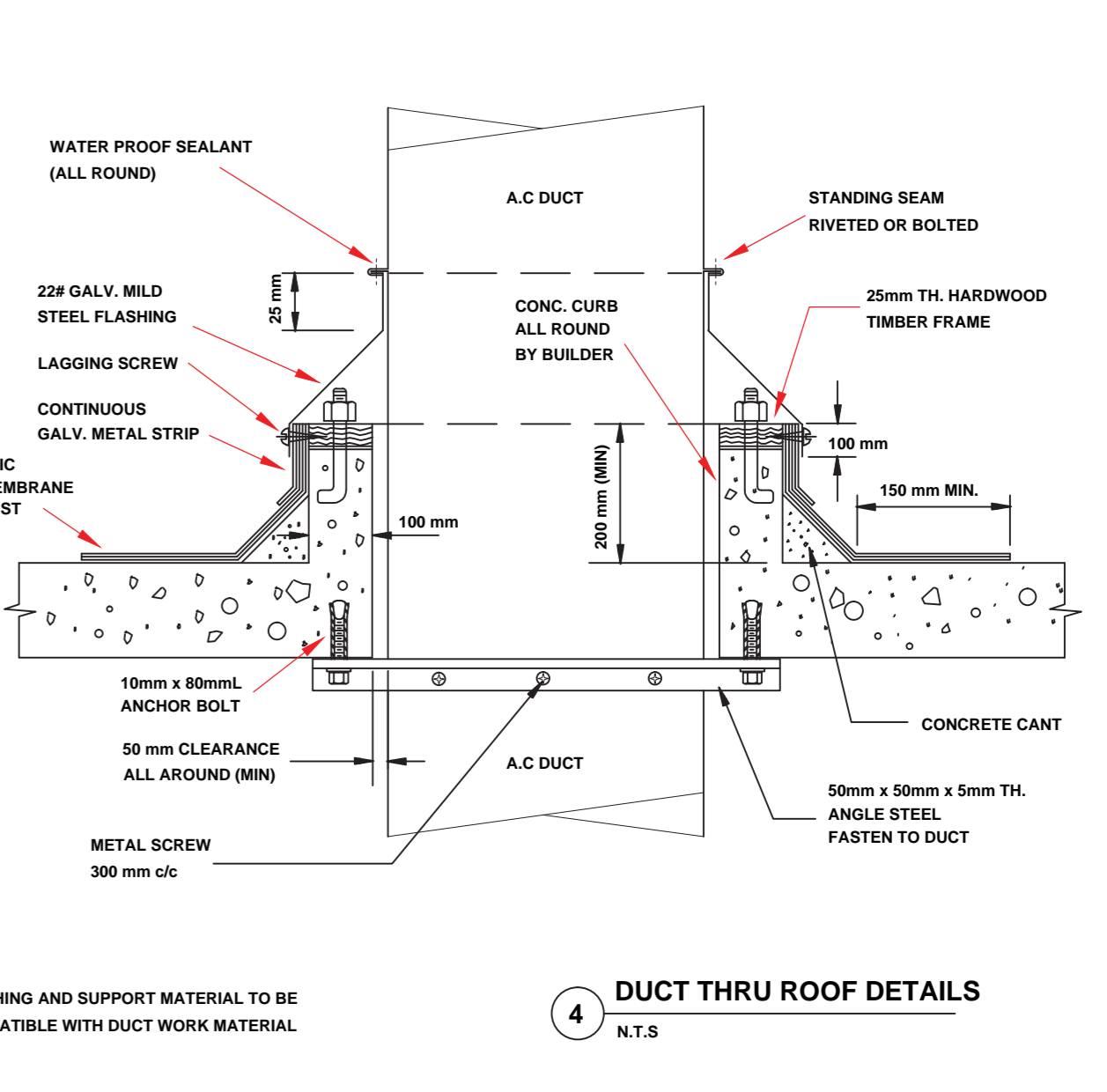
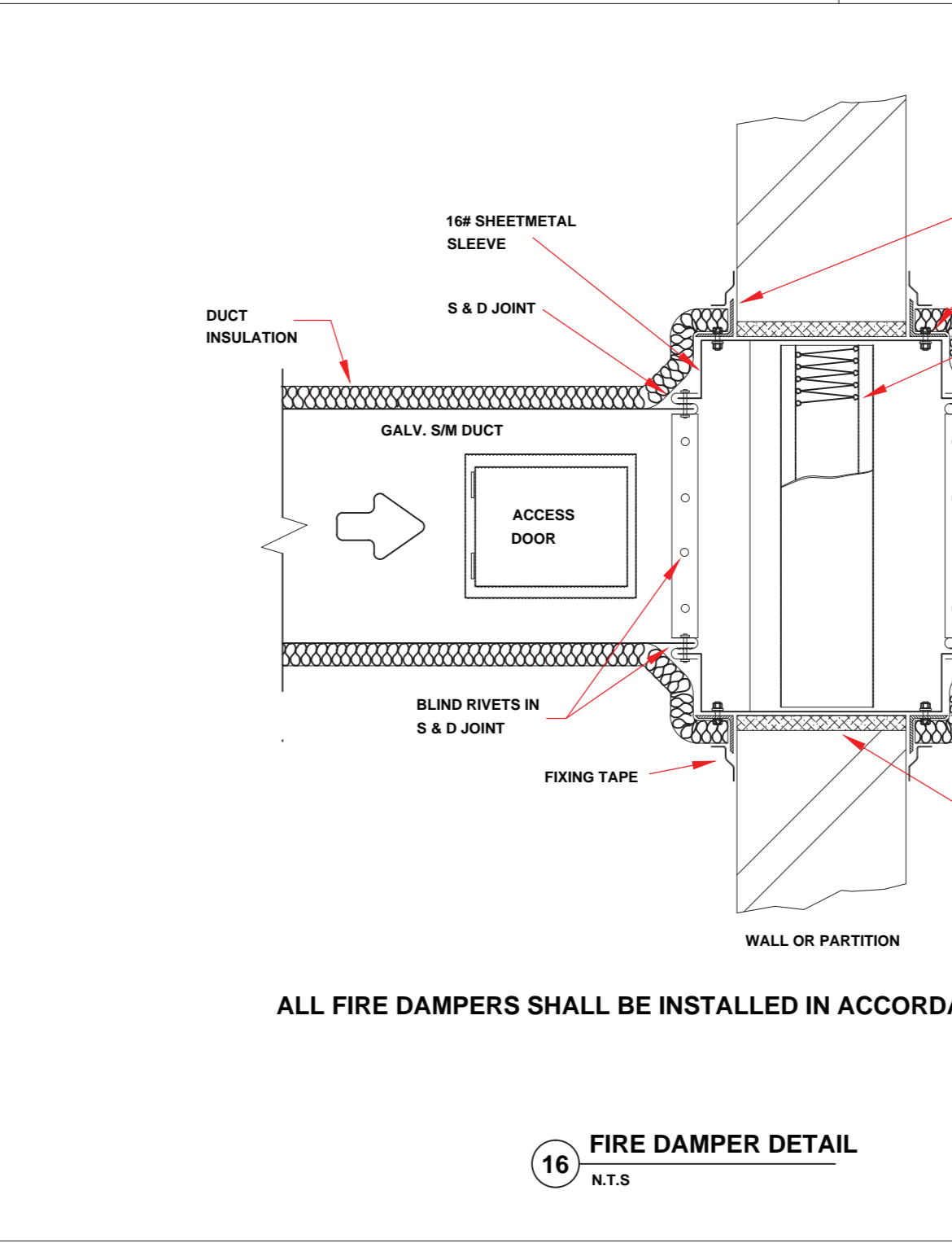
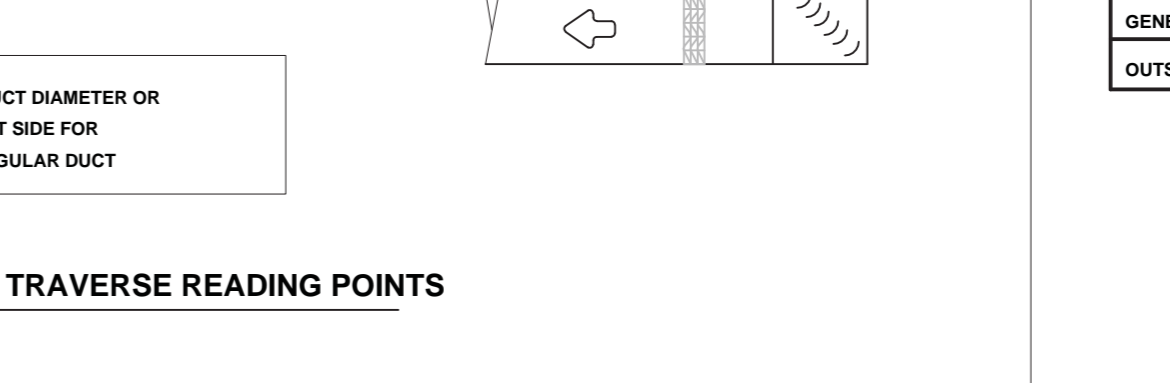
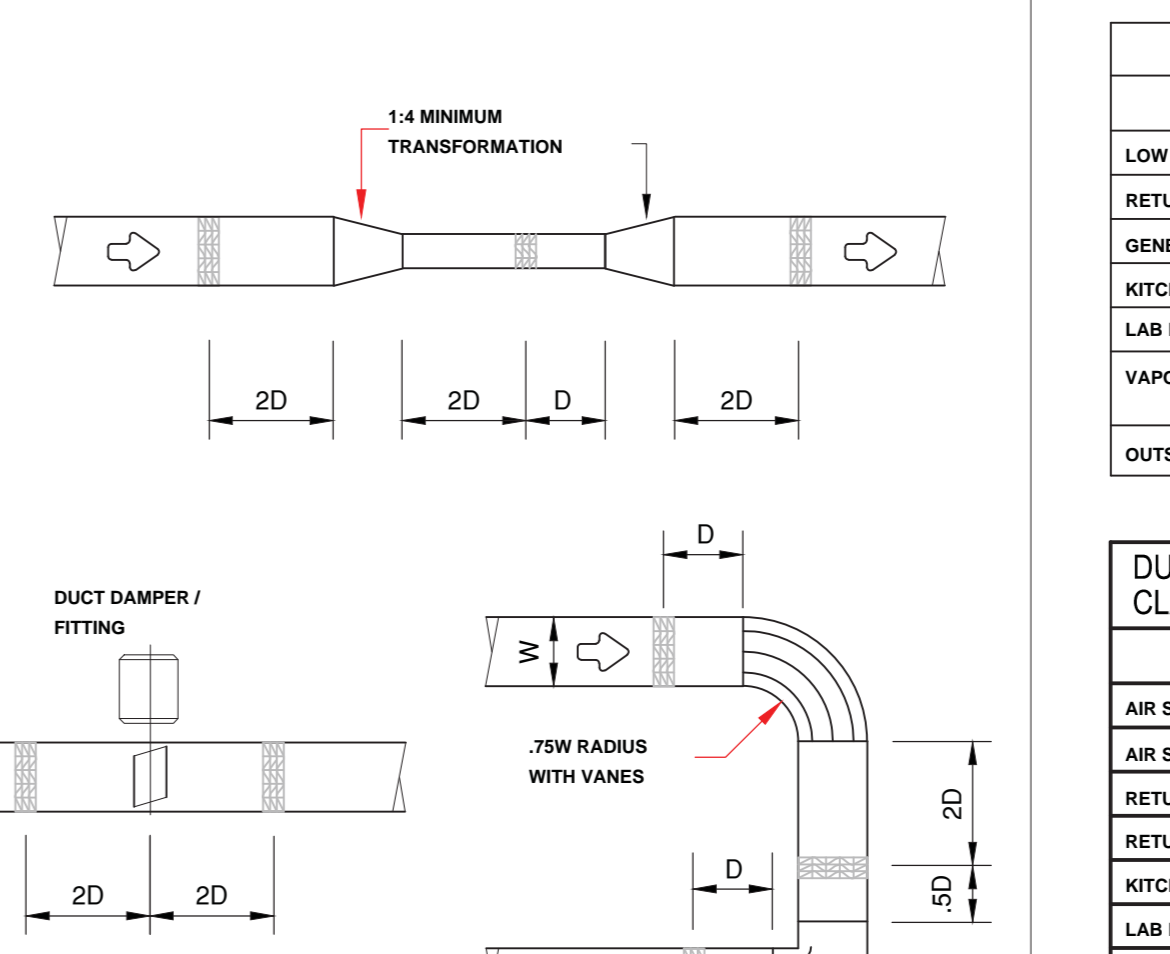
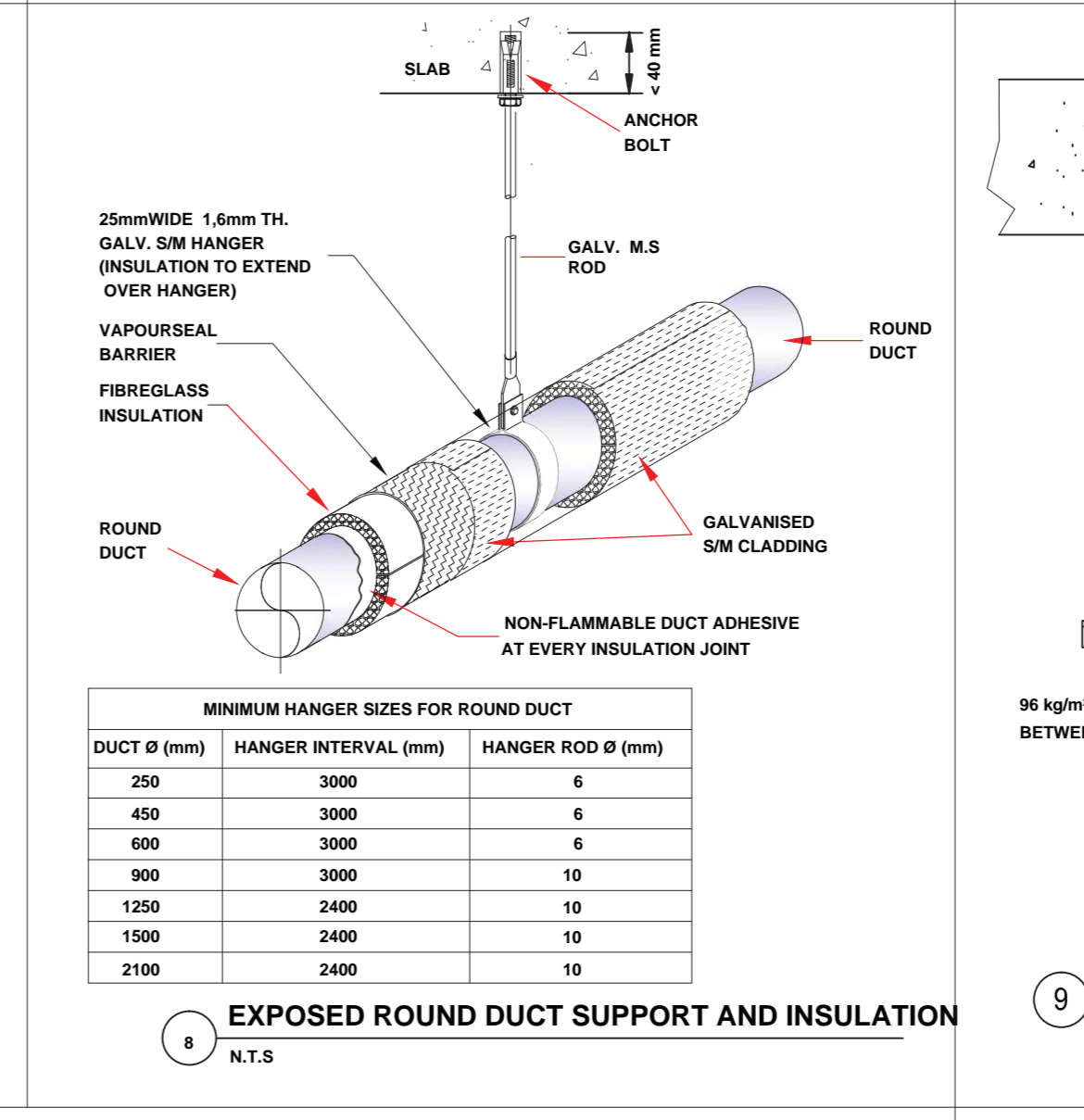
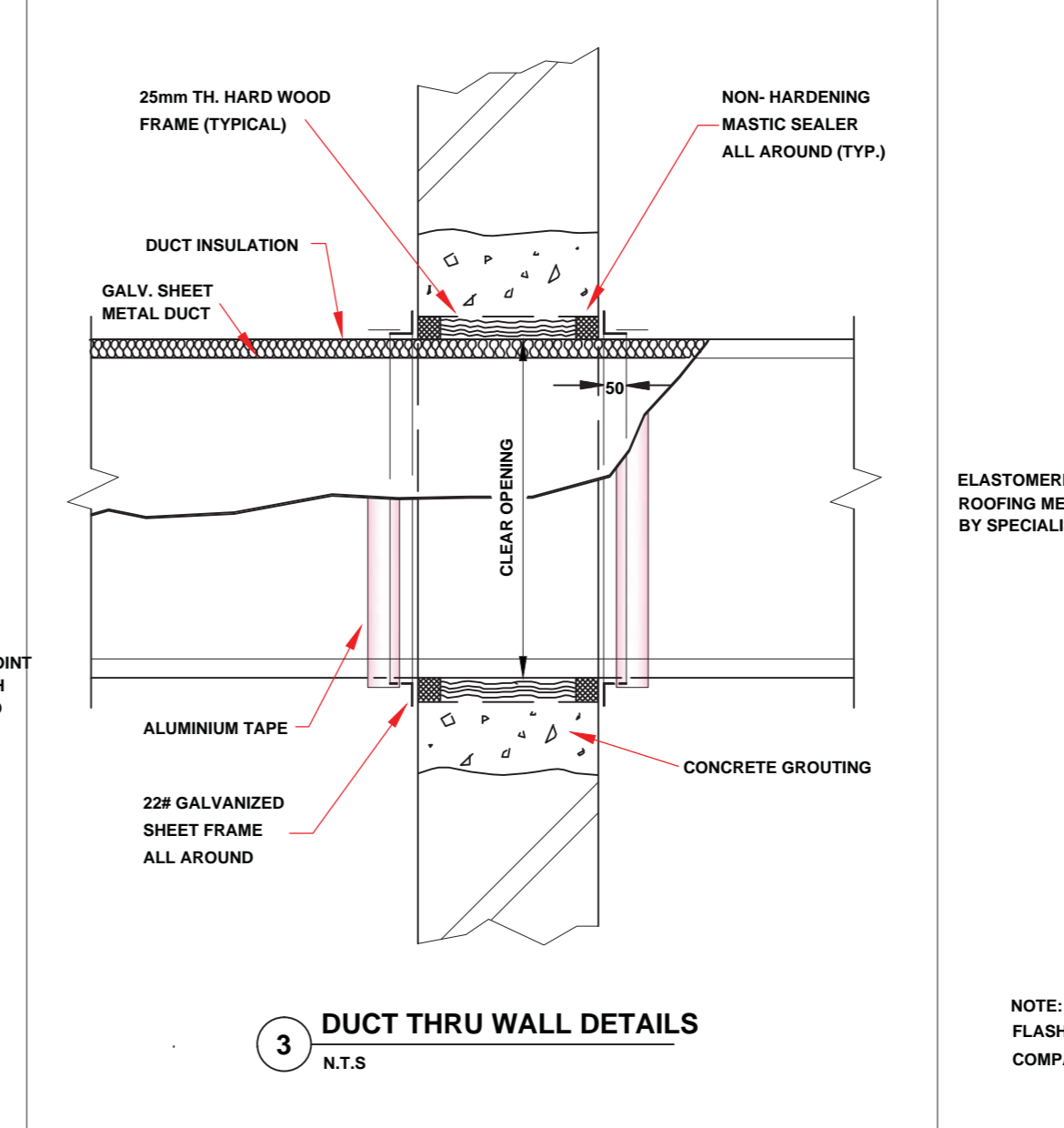
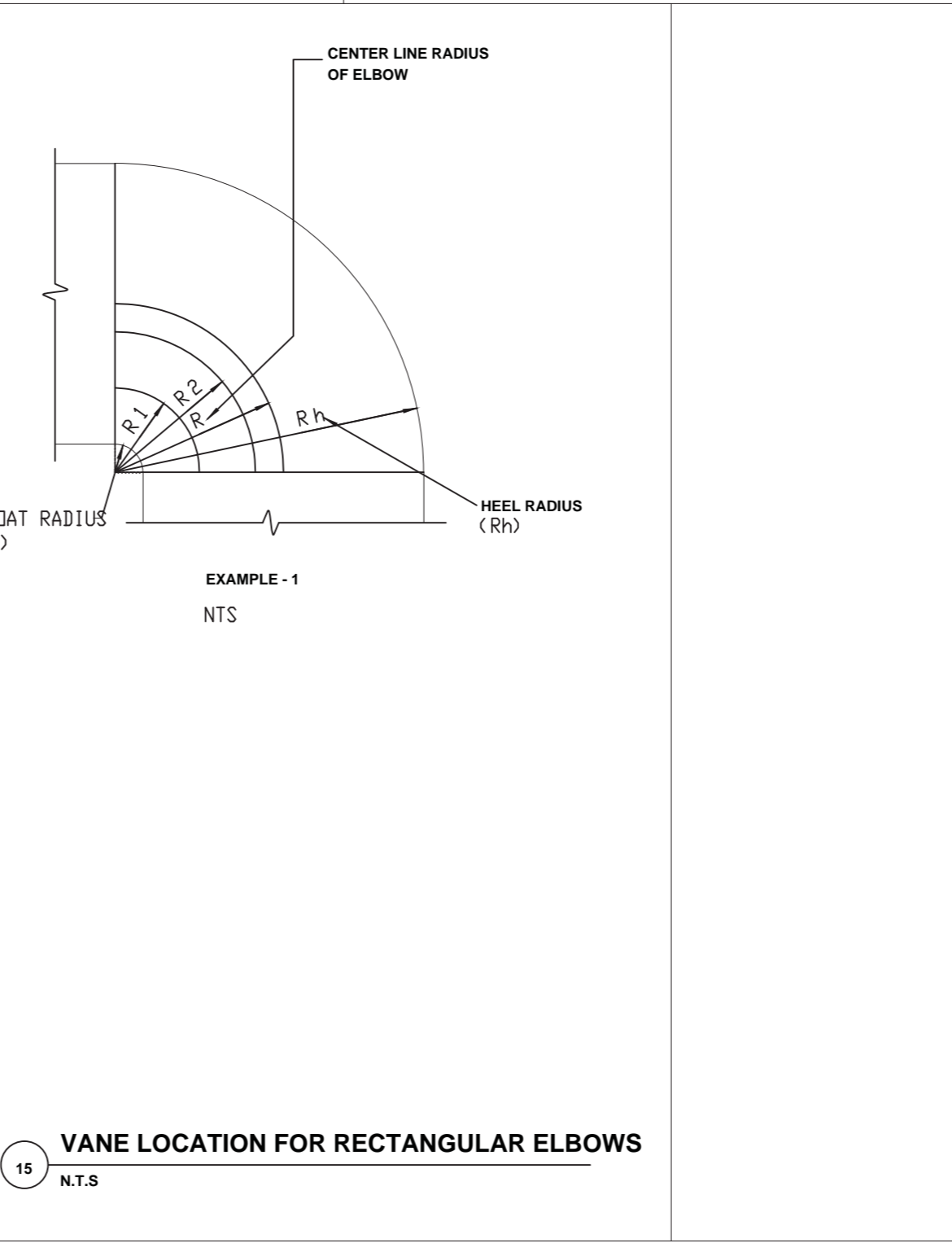
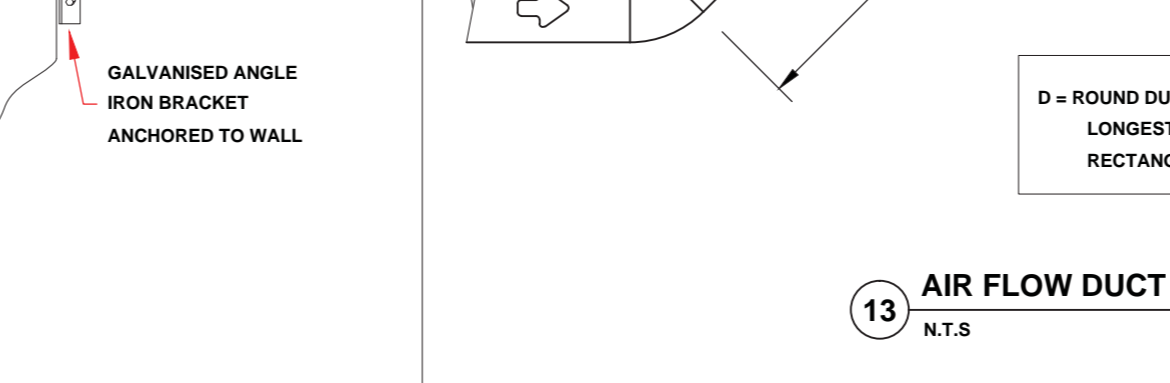
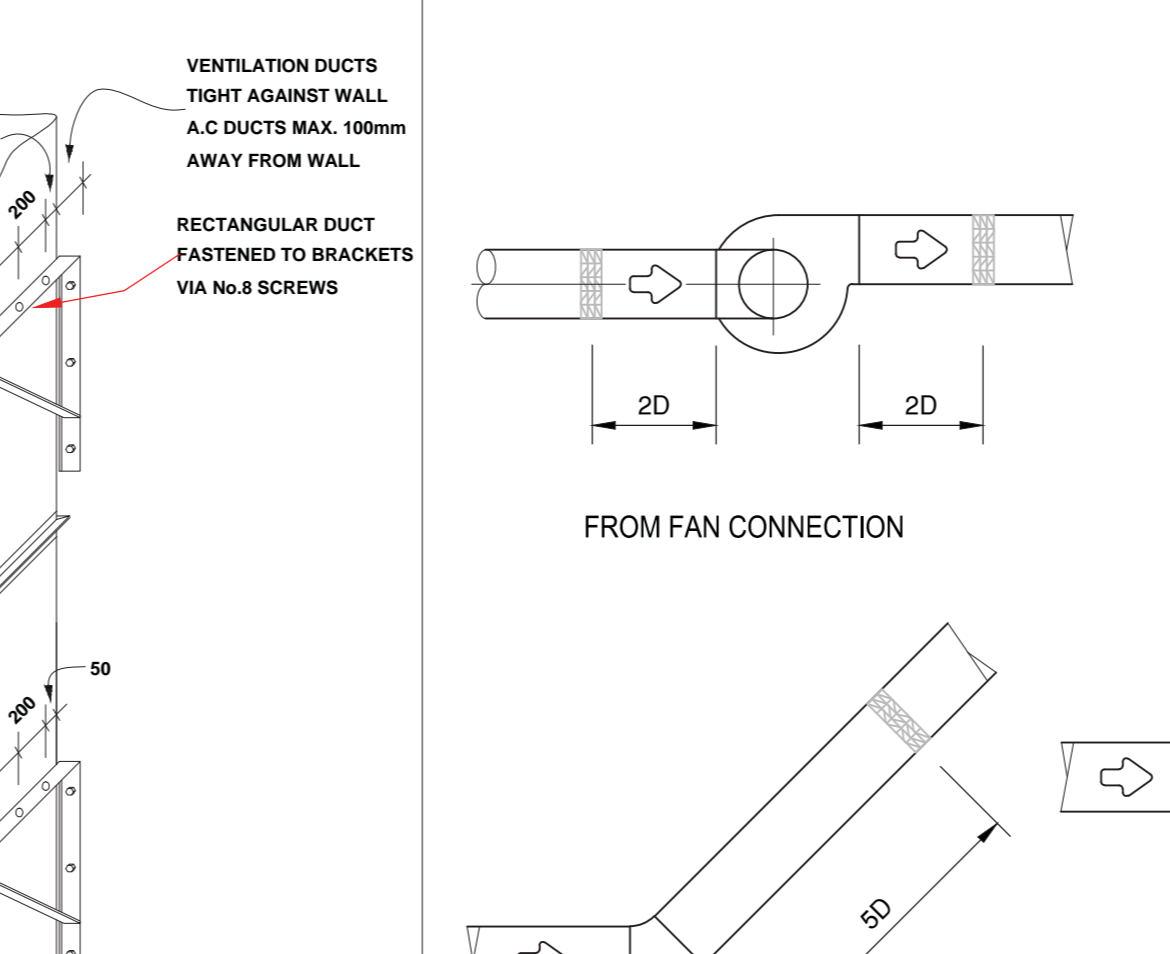
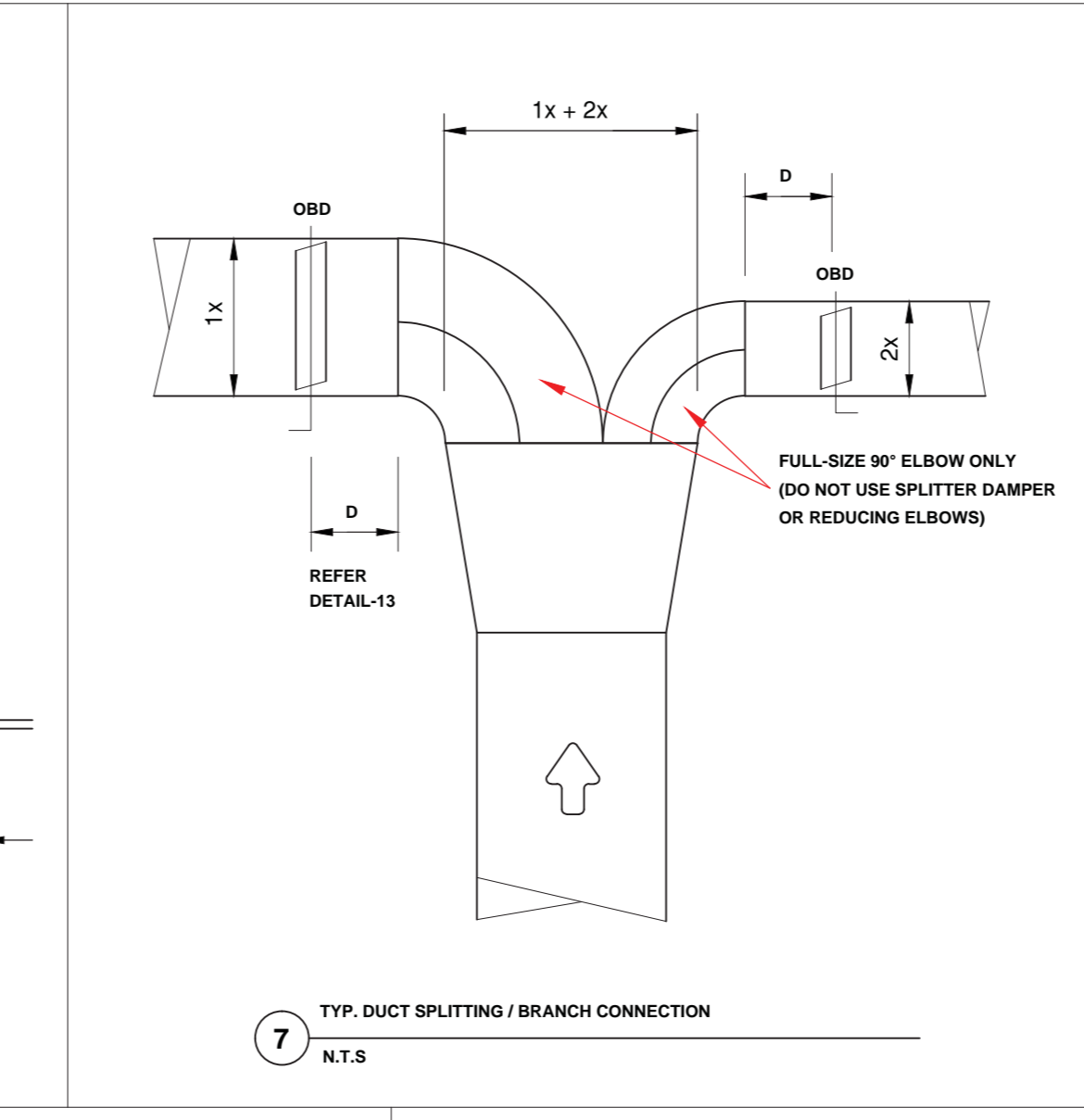
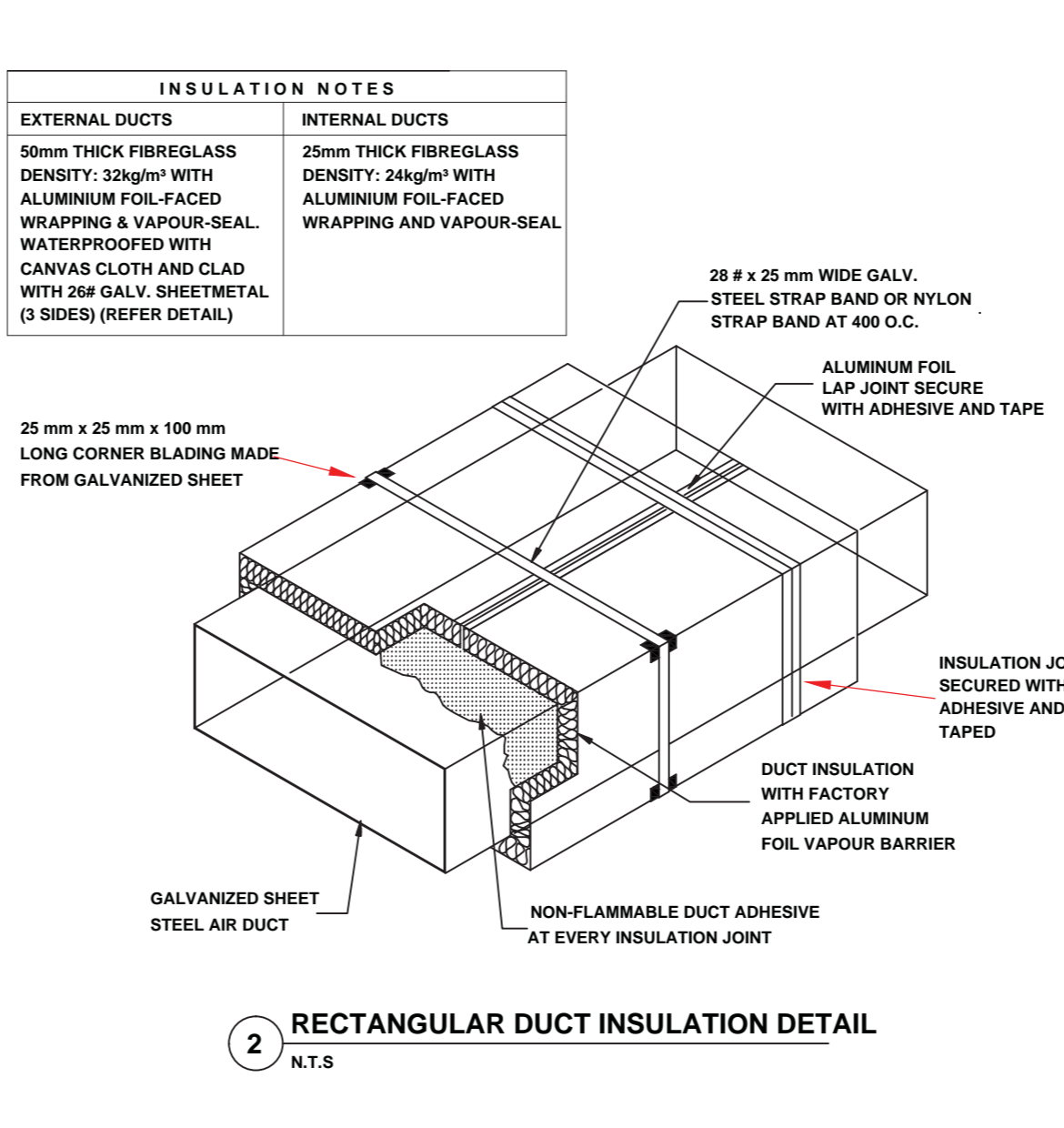
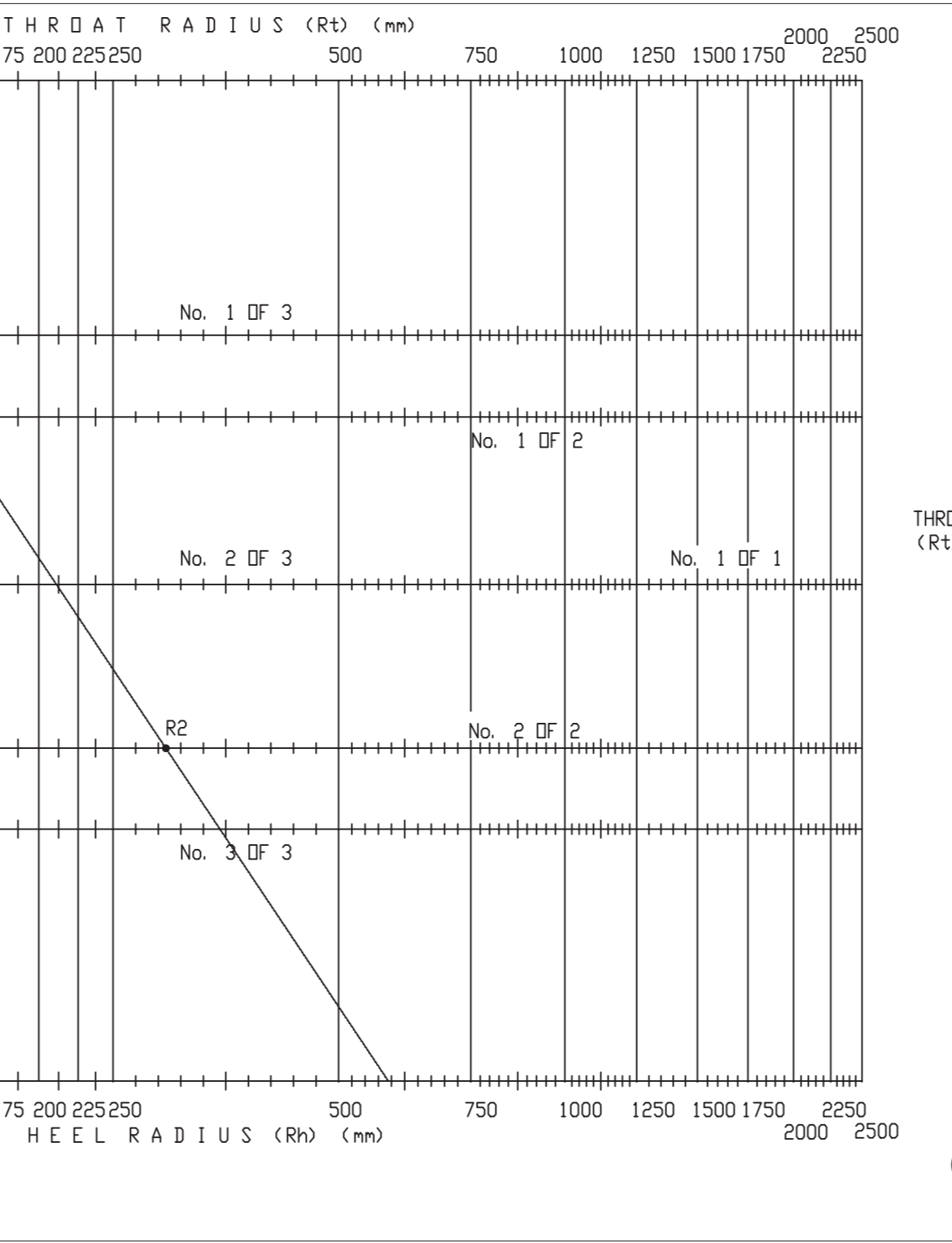
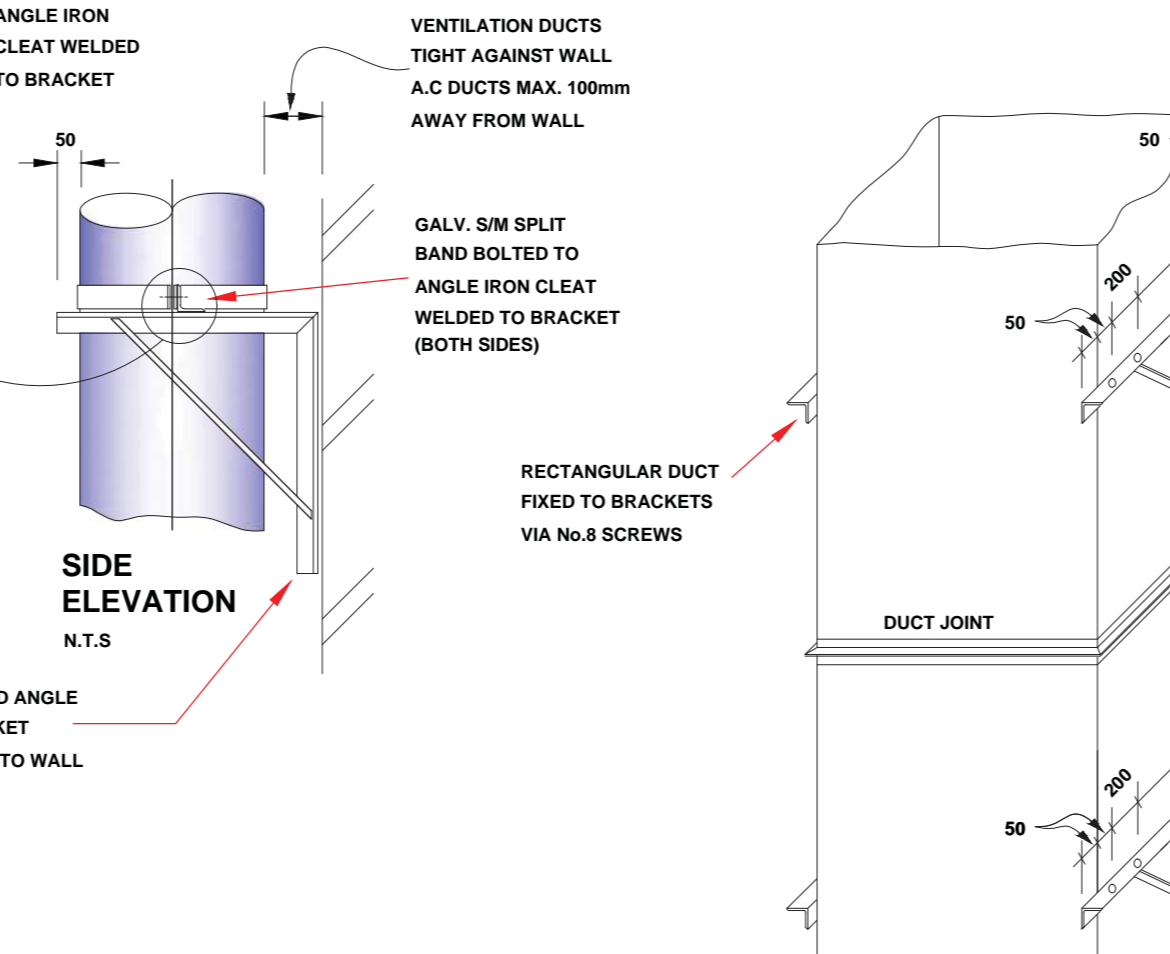
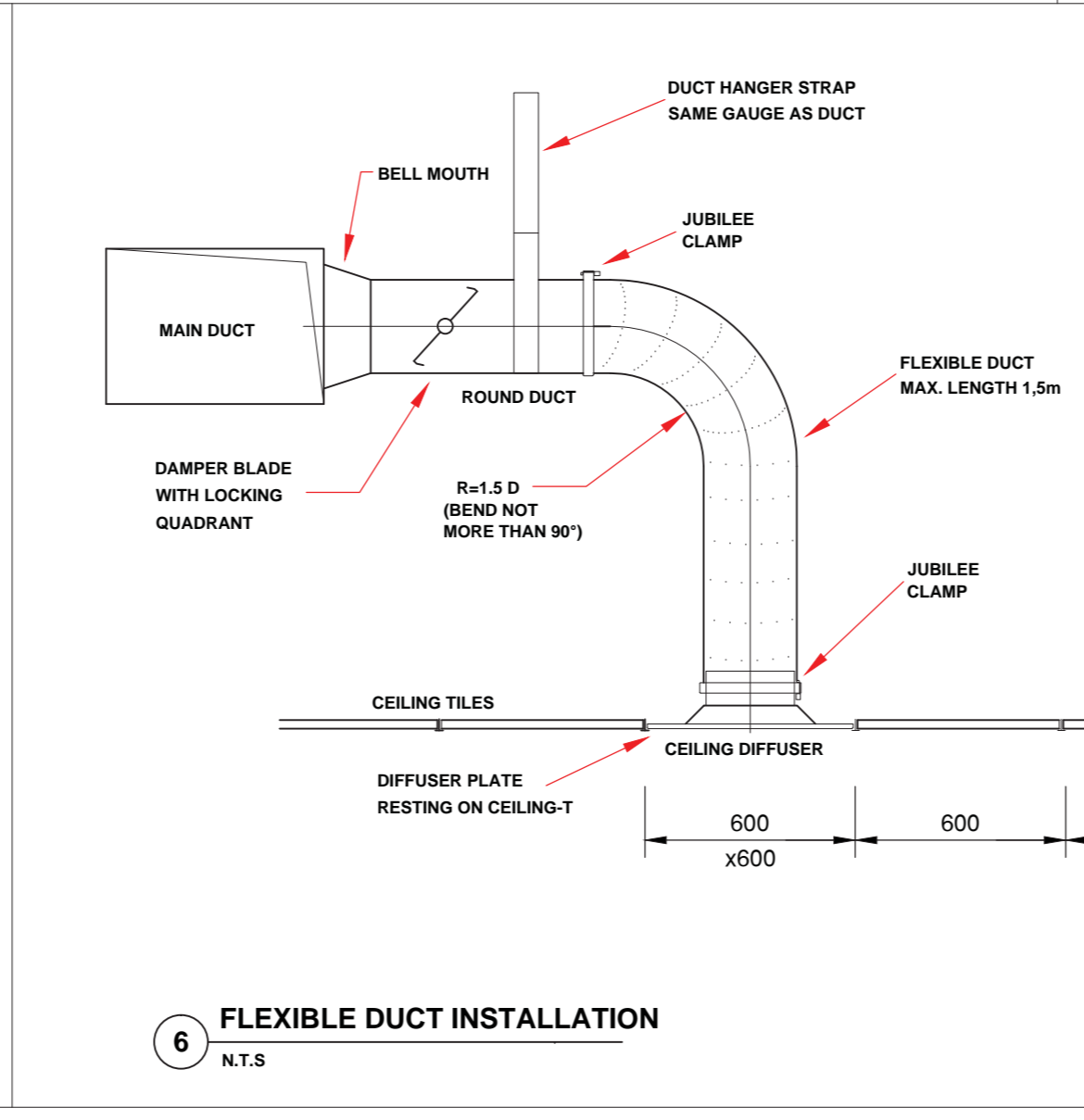
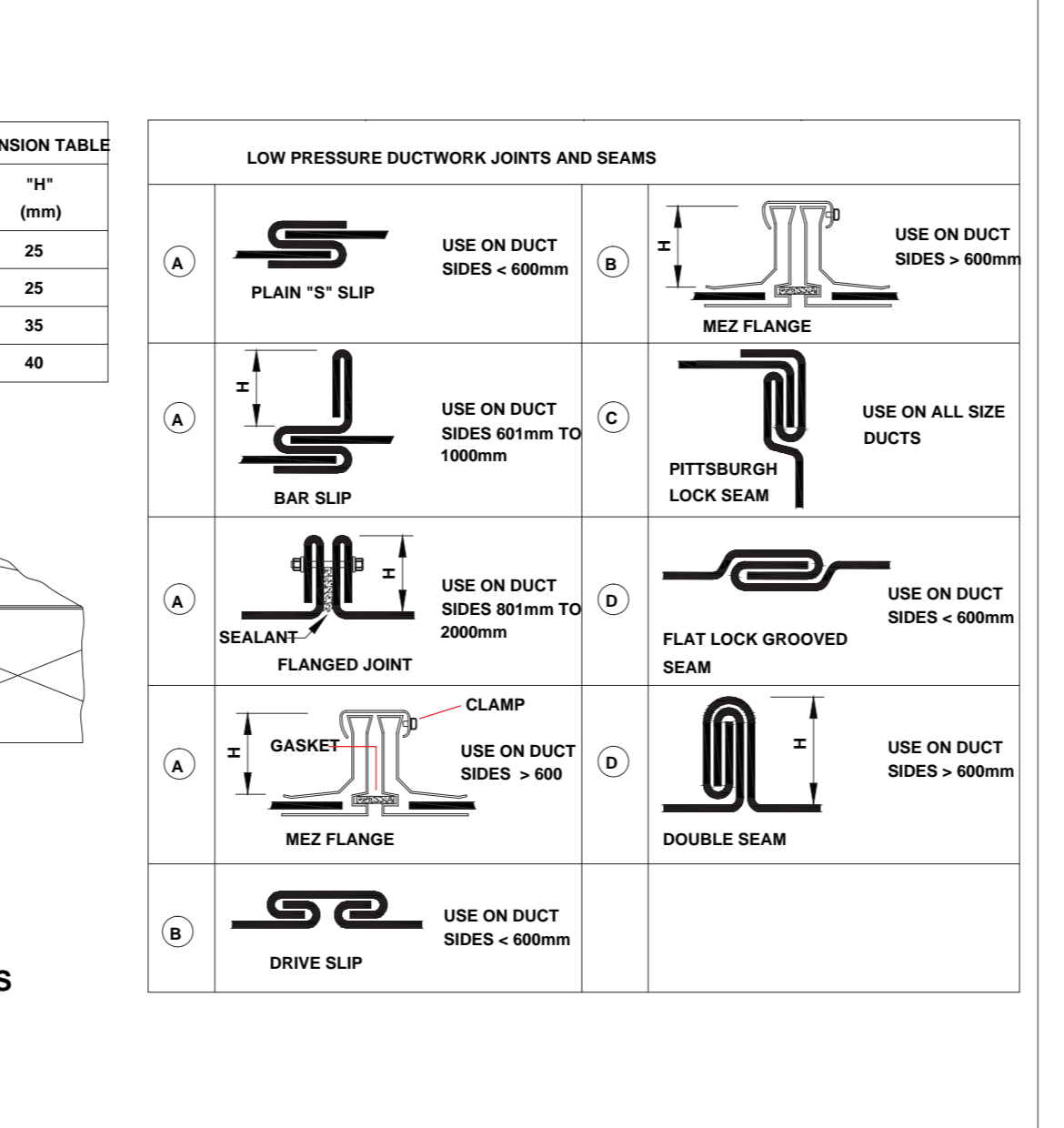
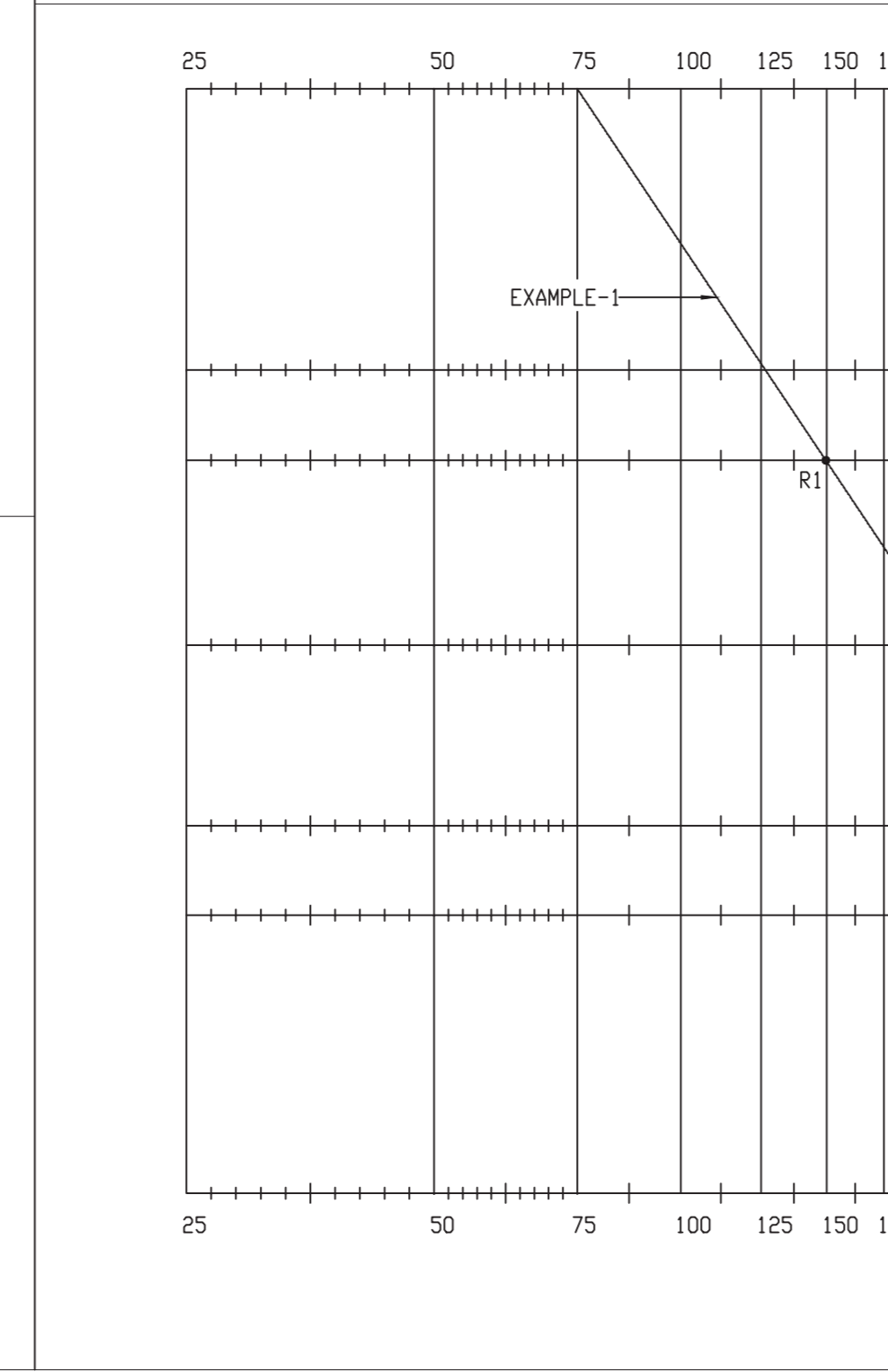
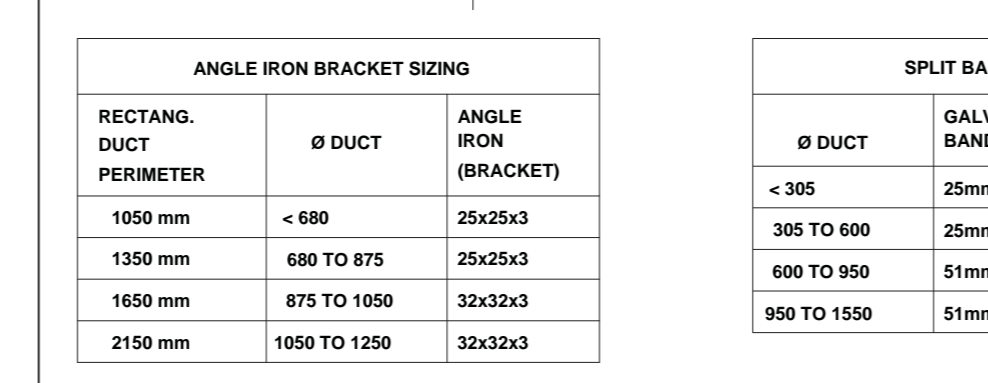
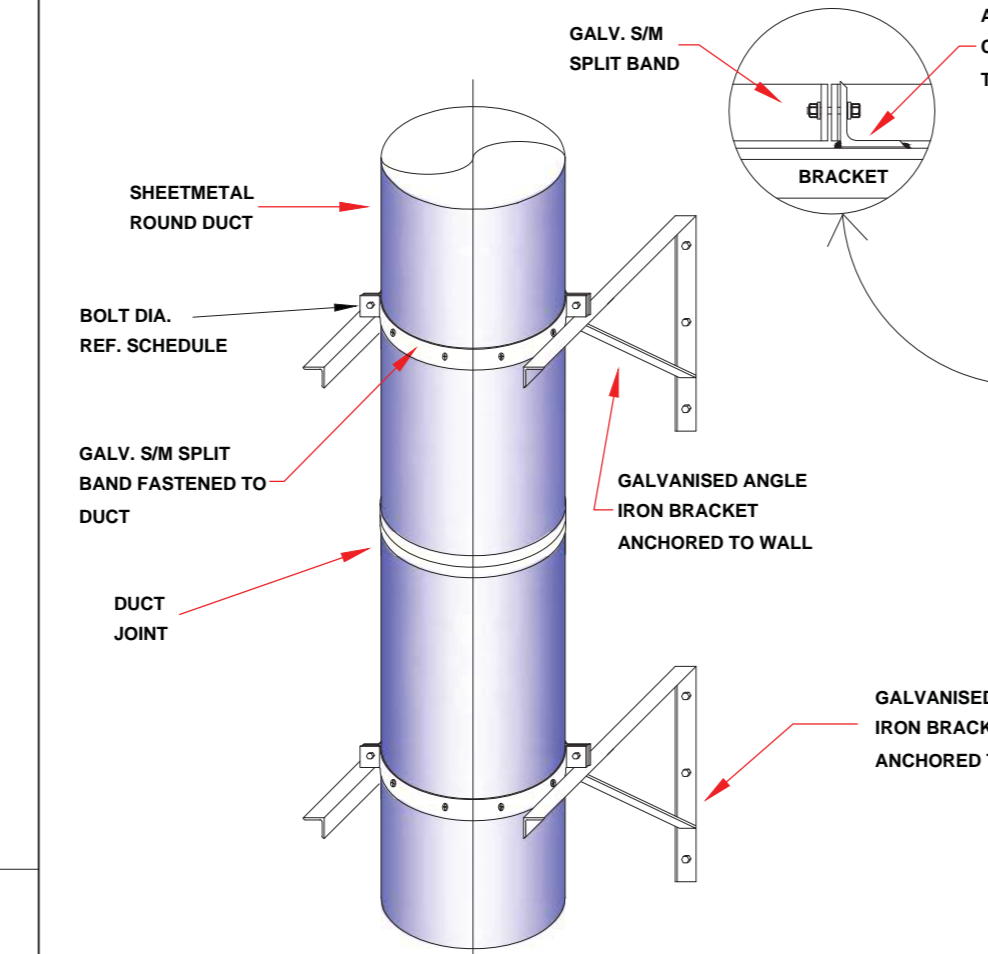
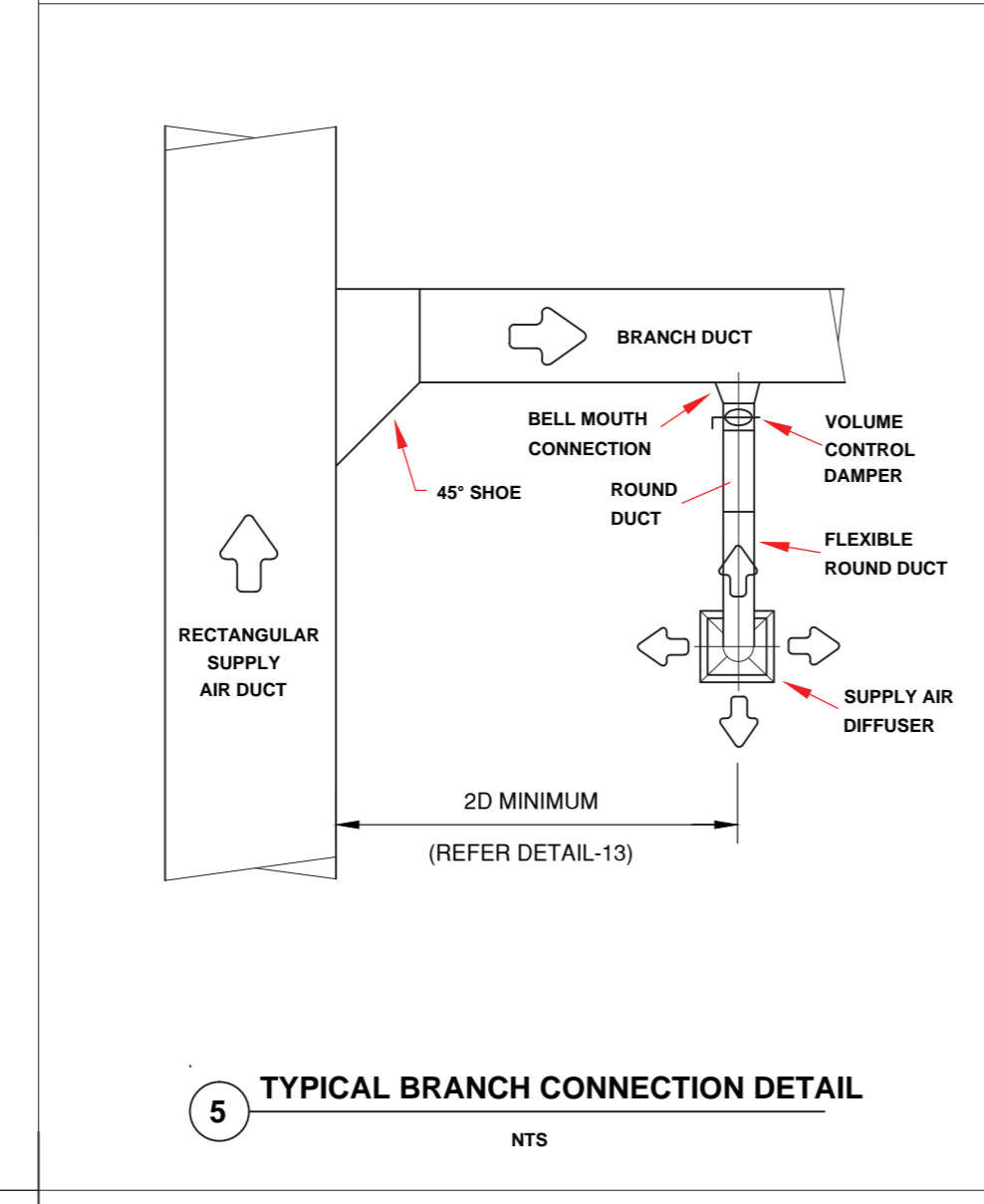
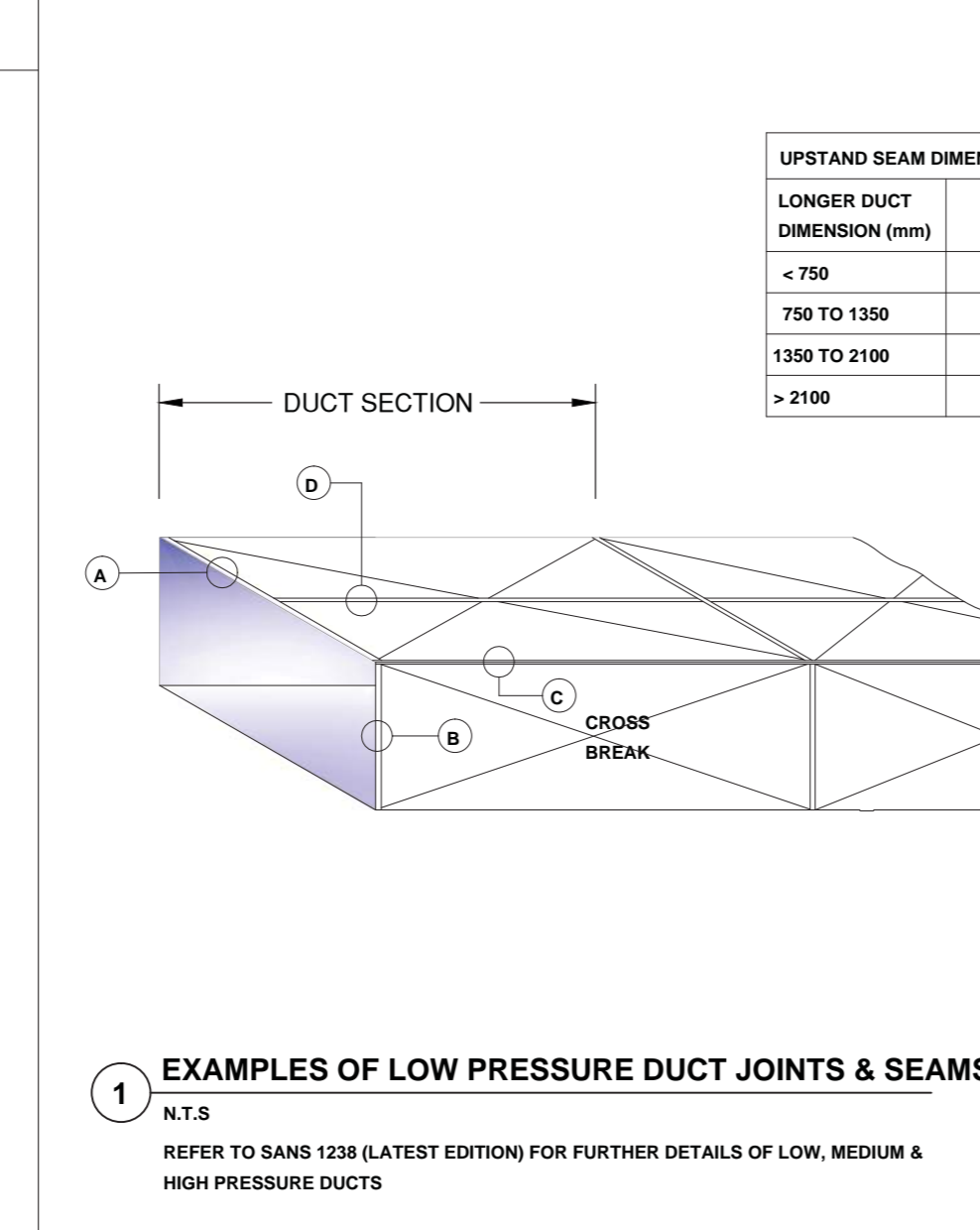
EXPOSED DUCT CLADDING DETAIL
N.T.S.

50mm TH. FIBERGLASS INSULATION WITH 2 kg/m³ DENSITY & WRAPPED WITH MELINEX FILM OR EQUIVALENT

ACOUSTIC INSULATION OF DUCTWORK
N.T.S.

NOTES

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- THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NECC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.



CONTRACTOR/CONSULTANT

TITLE	NAME	SIGN	DATE
DRAWN	JJ		21 01 17
CHECKED	JJ		21 01 17
DESIGNED	JJ		21 01 17
CHECKED	AD		21 01 17

OPERATING DIVISIONS

TITLE	NAME	SIGN	DATE
PR. ENG./PR. TECH./PR. ARCH	ANDREW DALRY		21 01 17

REVISIONS

NO	DESCRIPTION	BY	CHKD	APPD	DATE
00	ISSUED FOR CONSTRUCTION	KC	JJ	AD	27-01-17

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PROJECT NUMBER	AO		19 2 4 7 0 1
DO			2 5 1 0
DH			M S T
DR			0 0 0 4
SH			0 1
REV			0 0
ID			AE

AECOM

CAPE TOWN OFFICE
WATERSIDE PLACE, SOUTH GATE
TYGER WATERFRONT
CARL CRONJE DRIVE

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TRANSNET CAPITAL PROJECTS

TRANSNET LTD (TRADING AS TRANSNET CAPITAL PROJECTS) REG. NO. 1998/000006
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163 LUYKSRIG DRIVE, PLATTEKLOOF, 8001
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PORT OF SALDANHA

IRON ORE TIPLER 3 PROJECT
BULK POWER UPGRADE:
SUBSTATION M
STANDARD DUCTING DETAILS

MASTER
10 FEB 2017
AECOM

STANDARD DUCTING NOTES

THIS IS A GENERAL LEGEND AND NOT ALL ITEMS MAY BE APPLICABLE TO THIS SPECIFIC HVAC CONTRACT.

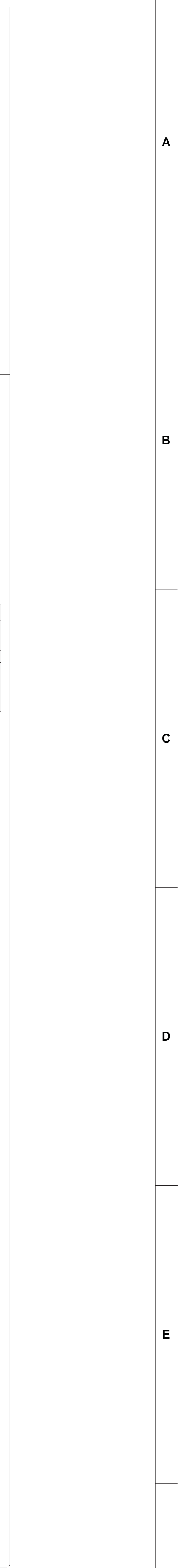
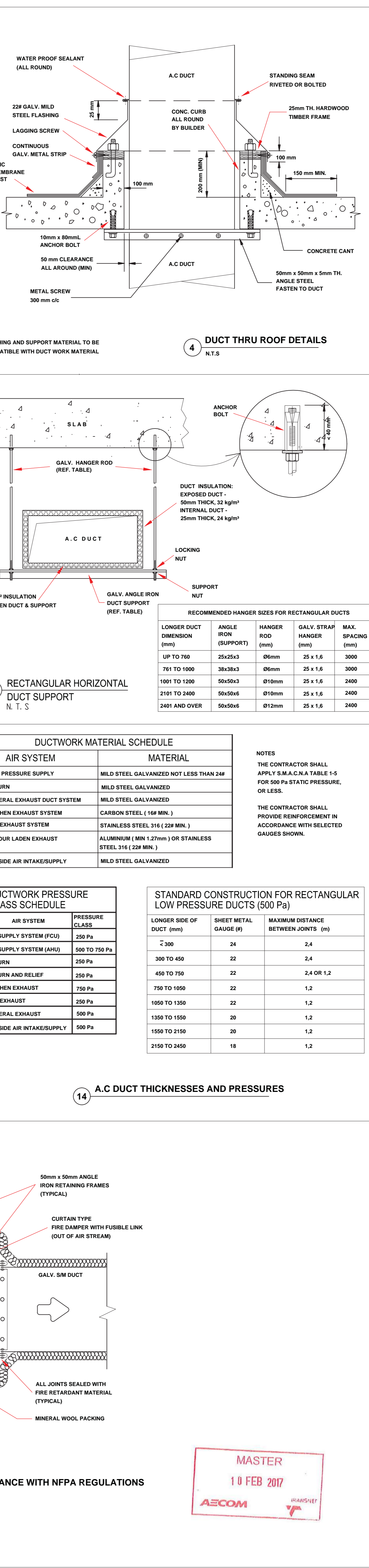
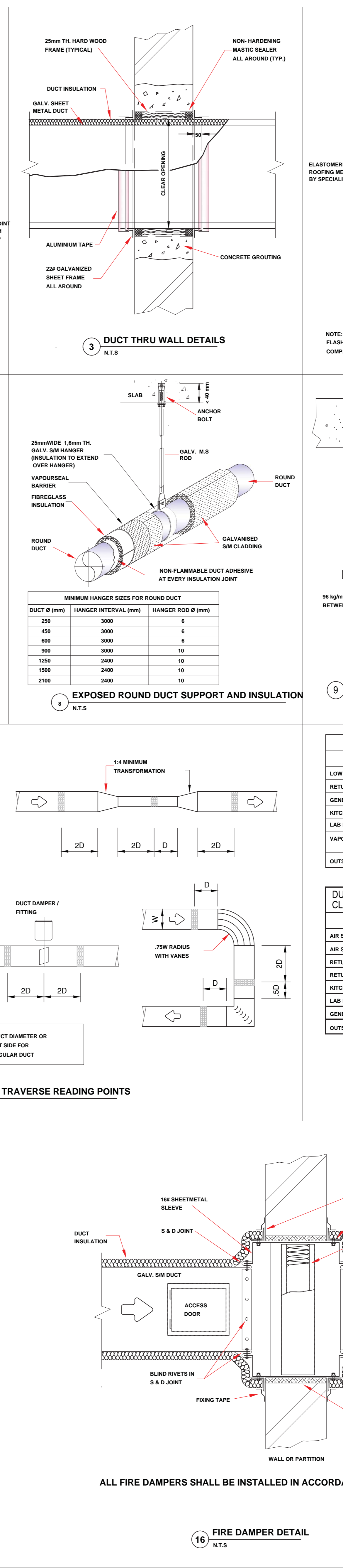
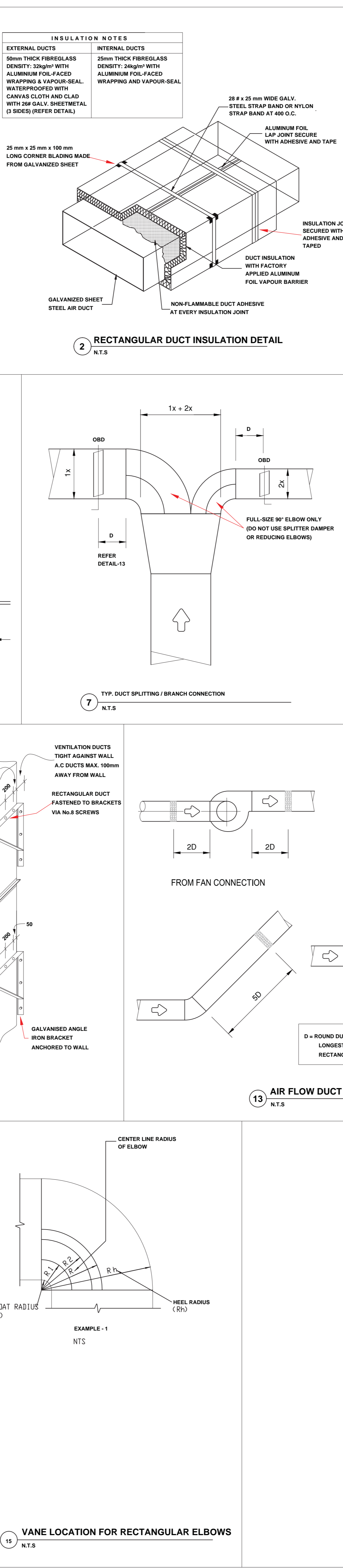
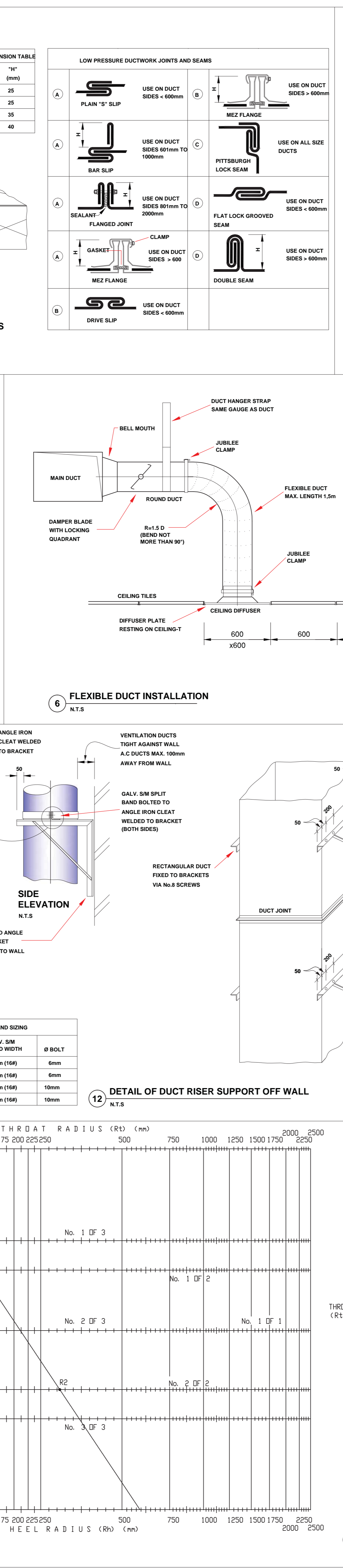
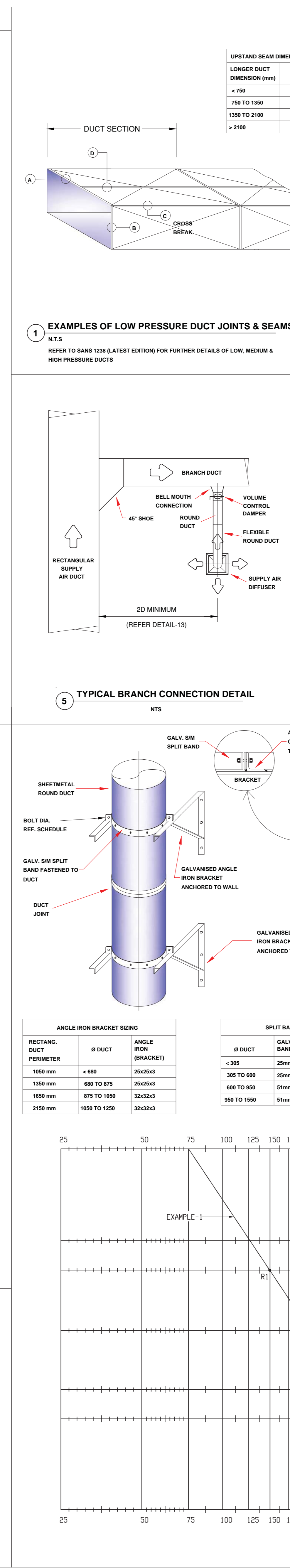
- THE ENTIRE HVAC SYSTEM TO COMPLY WITH THE PROJECT TECHNICAL SPECIFICATION WHICH THIS DRAWING FORMS PART OF.
- ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED. SIZES SHOWN FOR THE DUCTS ARE CLEAR INTERNAL DIMENSIONS.
- CHECK AND VERIFY ALL DIMENSIONS ON SITE PRIOR TO COMMENCEMENT OF ANY WORKS. ANY DISCREPANCY TO BE REPORTED TO THE EMPLOYER.
- ALL HEATING, VENTILATION AND AIR CONDITIONING DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL PROJECT NOTES AND SPECIFICATIONS AS ISSUED BY AECOM, AND RELEVANT ARCHITECTURAL, ELECTRICAL AND STRUCTURAL DRAWINGS.
- CAPACITIES, DIMENSIONS AND LOCATIONS OF HEATING, VENTILATION AND AIR CONDITIONING EQUIPMENT ARE BASED ON EQUIPMENT MODELS INDICATED IN HVAC EQUIPMENT CATALOGUES, SCHEDULES AND DRAWINGS.
- ACCESS TO ALL HVAC EQUIPMENT AND ACCESSORIES SHALL BE AS PER DRAWINGS AND MANUFACTURERS' REQUIREMENTS.
- ALL WATER PROOFING OF PENETRATIONS AND COUNTER FLASHINGS TO BE DONE BY SPECIALIST SUB-CONTRACTOR, TO BE APPOINTED BY CONTRACTOR.
- STATIC PRESSURES FOR ALL THE FANS MUST BE VERIFIED PRIOR TO ORDERING THE FANS.
- ALL TOILET DOORS TO BE UNDERCUT 25mm, OR PROVIDED WITH DOOR GRILLES.
- ALL MATERIALS EXPOSED TO THE AIRFLOW WITHIN THE CEILING CAVITY PLUMB SHALL BE NON-COMBUSTIBLE OR LIMITED COMBUSTIBLE, WITH A MAXIMUM SMOKE DEVELOPMENT INDEX OF 50.
- FINAL LOCATIONS & DIMENSIONS OF CONCRETE UPSTANDS FOR THE HVAC EQUIPMENT AND HVAC PIPING SHALL BE CHECKED ON SITE TO SUIT HVAC EQUIPMENT SPECIFIED.
- ALL EXTERNAL SUPPORT BRACKETS SHALL BE HOT DIP GALVANIZED BEFORE INSTALLATION.
- WHERE DUCTS AND PIPES PASS THROUGH WALLS, SLICES SHALL BE PROVIDED, AND SEALED WITH AN APPROPRIATE FIRE RATED SEALANT TO PROVIDE AN AIR-TIGHT CONNECTION.
- ALL EQUIPMENT DUTIES ARE GIVEN AS RATED DESIGN DUTIES WITH AIR VOLUMES CORRECTED FOR SITE ELEVATION ABOVE SEA LEVEL.
- DIRECTION ARROWS AND IDENTIFICATION BANDS ARE TO BE PLACED EVERY TWO METER INTERVALS OVER THE INSULATION FOR ALL SERVICES.
- ALL BENDS & ELBOWS WHICH HAVE A THROAT RADIUS LESS THAN 5% OF THE HEEL RADIUS MUST BE SIZED. REFER TO TABLE 15.
- ALL AIR DIFFUSION EQUIPMENT SHALL BE SELECTED AND INSTALLED AS PER THE SUPPLIER'S DETAILS SPECIFICATIONS. AND ALL BRANCH DUCTS CONNECTING TO AIR DIFFUSERS TO BE FITTED WITH DUCT BALANCING DAMPERS, AS SHOWN ON DRAWINGS.
- ALL AIR CONDITIONING DUCTWORK TO BE LAGGED WITH RIGID FIBERGLASS SLAB COVERED WITH REINFORCED ALUMINUM FOIL, AND FINISHED WITH A VAPOUR SEAL BARRIER.
 - 25mm THICK FIBERGLASS INTERNAL DUCTWORK @ 2 kg/m³
 - 50mm THICK FIBERGLASS FOR EXTERNAL DUCTWORK @ 2 kg/m³, AND FINISHED WITH A WATER PROOF BARRIER.
 - MADE INSULATION UNDER SUPPORTS. (REFER DETAIL-10)
- ALL SUPPLY & RETURN AIR DIFFUSERS & RETURN SLOT DIFFUSERS SHALL BE SIMILAR TO TROX TYPE - ALS OR APPROVED EQUIVALENT.
- FINAL LOCATION OF ALL AIR DIFFUSION EQUIPMENT SHALL BE CO-ORDINATED WITH THE CEILING TILES, LIGHTING FIXTURES AND OTHER CEILING CLADDING ON SITE.
- FLEXIBLE DUCT TO ANY AIR OUTLET SHALL NOT EXCEED A LENGTH OF 1000mm, AND SHOULD BE STRAIGHT TO ACHIEVE MINIMUM AIR RESISTANCE AND NOISE.
- ALL OUTSIDE AIR INTAKE OPENINGS SHALL BE PROVIDED WITH FILTERS UNDER APPROVED NOTES ON THE HVAC DRAWINGS. OPENINGS TO BE MINIMUM 500mm ABOVE ROOF / GROUND LEVEL.
- ALL DUCTWORK WORK RUNNING THROUGH HIGH HUMIDITY AREAS SHALL BE WRAPPED WITH 25mm THICK 3kg/m³ FIBERGLASS INSULATION.
- ALL THE OUTLETS FOR SUPPLY, RETURN, TRANSFER & EXHAUST AIR SHALL BE PROVIDED WITH VOLUME CONTROL DAMPERS. ALL DUCT CONNECTIONS FROM MAIN DUCTS TO BE PROVIDED WITH SPLITTER TYPE DAMPERS, OR AS OTHERWISE NOTED ON THE DRAWINGS.
- ALL TRANSFER DUCTS SHALL BE PROVIDED WITH BACK DRAFT DAMPERS, IN ORDER TO PREVENT AIR FLOW IN THE OPPOSITE DIRECTION.
- ALL AIR DIFFUSION EQUIPMENT SHALL BE EPOXY WHITE, UNLESS SPECIFIED OTHERWISE.
- FINAL SIZE OF ALL THE WEATHER LOUVRES DEPEND ON THE FAN SPECIFIED.
- BACKDRAFT DAMPERS SHALL BE SIMILAR TO TROX TYPE - ARK OR APPROVED EQUIVALENT.
- DUCTWORK AS NOTED IN MATERIAL SCHEDULE SHALL BE FABRICATED, CONSTRUCTED AND INSTALLED IN ACCORDANCE WITH THE BRANCA STANDARD.
- THIS WILL INCLUDE PROVISION FOR ALL TEST POINTS TO ENABLE AIR BALANCING AND COMMISSIONING ACTIVITIES TO BE PERFORMED. (REFER TO DETAIL 10).
- WHERE ACCESS DOORS SHALL BE PROVIDED ON THE LINE USE OF ALL FIRE DAMPERS AND CONTROL DAMPERS, AND GENERALLY AS RECOMMENDED BY THE BRANCA STANDARD.
- FILTER SPECIFICATION**
PRIMARY AIR FILTER MATERIAL SHALL BE CAPABLE OF BEING WASHED AT LEAST 12 TIMES, AND HAVE AVERAGE ARRESTANCE OF 80% ACCORDING TO THE ASHRAE 52 / F1 STANDARD.
SPARE FILTERS SHALL BE PROVIDED.
FILTERS TO BE COVERED IN FIRE RESISTANT HOUSINGS WITH AIRTIGHT ACCESS DOORS.
- KITCHEN HOOD AND DUCT DETAILS**
 - THE HOOD SHALL BE CONSTRUCTED FROM AND BE SUPPORTED BY STAINLESS STEEL TYPE 304 NOT LESS THAN 1.2mm (DR) OR OTHER APPROVED MATERIAL OF EQUIVALENT STRENGTH, FIRE AND CORROSION RESISTANCE.
 - DUCTS SHALL BE CONSTRUCTED OF AND SUPPORTED BY CARBON STEEL, NOT LESS THAN 1.37mm (18G) (DR) STAINLESS STEEL, NOT LESS THAN 1.2mm (18G).
 - ALL BEAMS AND JOINTS SHALL HAVE LIQUID-TIGHT CONTINUOUS EXTERNAL WELDS.
 - FIRE SUPPRESSION SYSTEM TO BE DONE BY SPECIALIST SUB-CONTRACTOR, TO BE APPOINTED BY CONTRACTOR.
 - FIRE WALL SHALL BE SIZED RATED TO ENCLOSE EXHAUST DUCT.
 - FILTERS MUST BE 'UL' CLASSIFIED, STAINLESS STEEL, NON-CLOSING BAFLE-TYPE, AND SHOULD BE EASILY REMOVABLE.
 - A RESISTE TRAP SHALL BE PROVIDED AT THE BASE OF EACH VERTICAL RISER, WITH PROVISIONS FOR CLEANOUT.
 - AN OPENING, LARGE ENOUGH TO PERMIT CLEANING, SHALL BE PROVIDED AT EACH CHANGE IN DIRECTION OF THE DUCT, FOR THE PURPOSES OF INSPECTION AND CLEANING. SUCH OPENING SHALL BE AT THE SIDES OF THE DUCT AND AT EVERY TWO METERS IN HORIZONTAL DUCTWORK.
 - AFTER INSTALLATION OF FILTERS, THE REMAINING AREA OF THE HOOD TO BE CLOSED OFF.
 - KITCHEN EXHAUST DUCTS SHALL BE CONSTRUCTED IN COMPLIANCE WITH NFPA STANDARDS.
 - MAIN HVAC ELECTRICAL POWER SUPPLY CABLE TO BE COPPER.
- ALL HEATER BANKS TO BE HOUSED IN FLANGED STEEL CASINGS FOR EASY REMOVAL AND COMPLY WITH THE FOLLOWING SAFETY REQUIREMENTS:
 - AIR PRESSURE SWITCH / FUSE SWITCH
 - OVERHEAT THERMOSTAT WITH MANUAL RESET
 - BACK OF TERMINAL BOX TO BE INSULATED
 - ACCESS DOOR INTERLOCKED WITH HEATER BANK
 - HEATER ELEMENTS TO BE SIZED TO SUIT NUMBER OF STEPS AND BALANCE POWER OVER THE THREE PHASES
 - PROPORTIONAL OUTPUT CONTROL TO BE PROVIDED
 - HEATER ELEMENTS TO BE INCOLO TYPE OR APPROVED EQUIVALENT & CHOSEN FOR "BLACK HEAT" OPERATION, HEATING INTENSITY NOT MORE THAN 3 WATTS
 - INSULATION SHALL BE 6mm THICK NON ASBESTOS WML BOARD, LOCATED 300mm UPSTREAM AND 50mm DOWNSTREAM
- ALL MACHINES AND MOTORS (ABOVE 0.75 KW) SHALL INCORPORATE THE FOLLOWING:
 - HIGH EFFICIENCY MOTORS (LOW COPPER AND IRON LOSSES)
 - POWER FACTOR CORRECTION TO 0.95
 - SPEED CONTROLLERS WITH VARIABLE / AUTOMATIC CONTROL VIA BMS WITH 4 - 20 mA CONTROL (IF REQUESTED)
 - ALL CONTROL TRANSFORMERS SHALL BE HIGH EFFICIENCY (LOW COPPER AND IRON LOSSES)
- MOTOR POWER FOR ALL THE HVAC EQUIPMENT SHALL BE VERIFIED ONCE ORDERED.
- SOUND ATTENUATION**
 - ALL FACTORY MADE SOUND ATTENUATORS TO BE SELECTED AND LOCATED AS PER THE "MORNINGSON" COMPANY REQUIREMENTS
 - ALL SOUND ATTENUATORS TO BE LINED WITH MELINEX FILM, OR APPROVED EQUIVALENT.
 - TRANSITION DUCTWORK BETWEEN ATTENUATORS AND AIR-CORN UNITS TO BE PROVIDED WITH ACOUSTIC INSULATION AS PER DETAIL 11 ON THE DRAWINGS.
 - ALL DUCT LINING MATERIAL SHALL COMPLY WITH SABS STANDARDS.
 - OCCUPIED ROOMS SHALL ATTAIN THE SOUND LEVELS AS NOTED IN THE ASHRAE APPLICATIONS HANDBOOK, CHAPTER - "SOUND AND VIBRATION CONTROL".
- VIBRATION ISOLATION OF EQUIPMENT**
ALL ROTATIONAL EQUIPMENT WHICH HAS A POWER CONSUMPTION IN EXCESS OF 1KW SHALL BE FITTED WITH VIBRATION ISOLATORS TO ENSURE NO EQUIPMENT VIBRATION IS TRANSMITTED INTO THE STRUCTURE. VIBRATION ISOLATORS SHALL BE SELECTED IN ACCORDANCE WITH THE MASON INDUSTRIES SELECTION DATA CONSIDERING A MINIMUM OF 5% TRANSMISSION OF VIBRATION.
- FOR ALL THE HVAC EQUIPMENT, A CONSERVATIVE DRAIN SHOULD BE PROVIDED WITH TWO METERS OF THE UNIT, BY OTHERS, UNLESS STATED OTHERWISE.

LEGEND

T THERMOSTAT
C DEGREE CENTIGRADE
L LITRES PER SECOND
Pa DOOR AIR CURTAIN
dB DRY BULB
EA EXHAUST AIR CURTAIN
EA EXHAUST AIR
EAD EXHAUST AIR
EHE EXHAUST AIR HEATER
EGH EXHAUST AIR GRILLE
ESP EXHAUST AIR STATIC PRESSURE
EAF EXHAUST FAN
FAO FRESH AIR FLOW
FCU FAN COIL UNIT
Pa PASCAL
kW KILO WATT
QTY QUANTITY
RA RETURN AIR
RAG RETURN AIR GRILLE
RLG RETURN LINEAR GRILLE
RWG RETURN WALL GRILLE
SA SUPPLY AIR
SFA SUPPLY FAN
SCD SUPPLY CEILING DIFFUSER
SCO SUPPLY CEILING ORIFICE
SS STAINLESS STEEL
SWG SUPPLY WALL GRILLE
TA TRANSFER AIR
TAG TRANSFER AIR GRILLE
TAD TRANSFER AIR DUCT
TEMP TEMPERATURE
UL UNDER CUT (25mm) MIN.
WB WALL BULB
WO WALL OPENING
FD FIRE DAMPER (1 HOUR RATING)
FSD FIRE SMOKE DAMPER (1 HOUR RATING)

4-WAY BLOW DIFFUSER
3-WAY BLOW DIFFUSER

WALL GRILLE DOUBLE DEFLECTION
INSULATED FLEXIBLE DUCT
COMMISSIONING POINT
LOCAL ISOLATOR



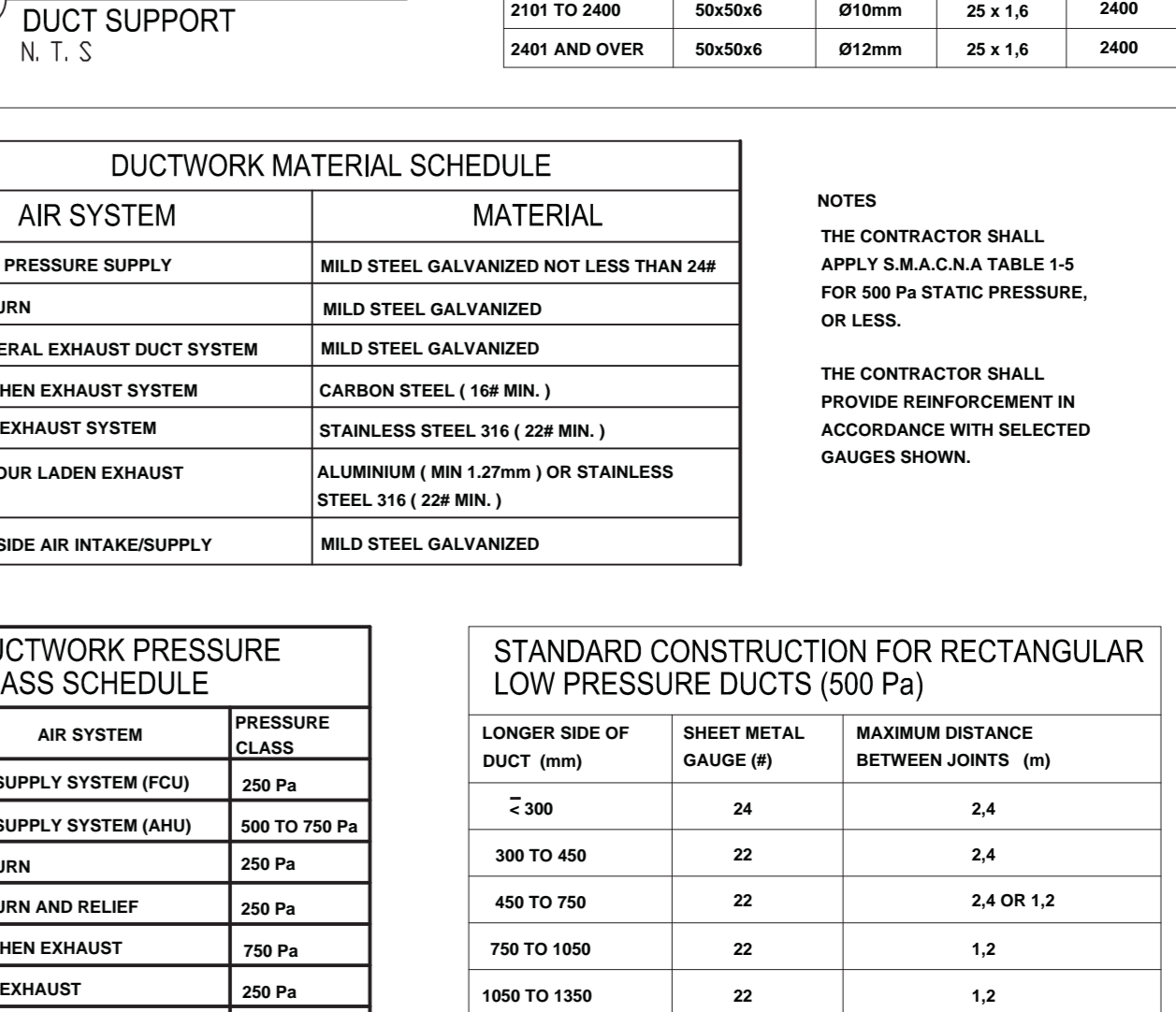
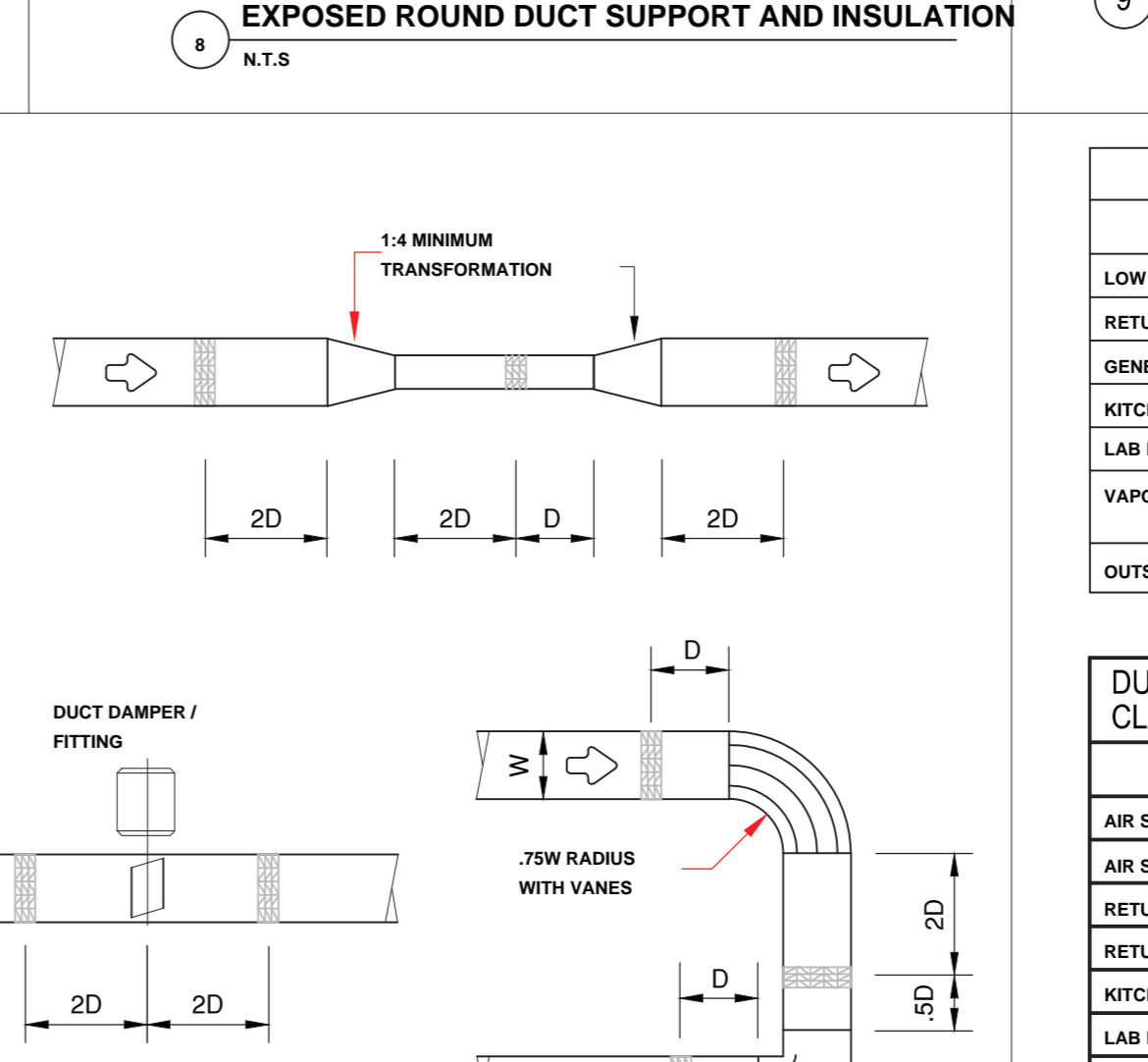
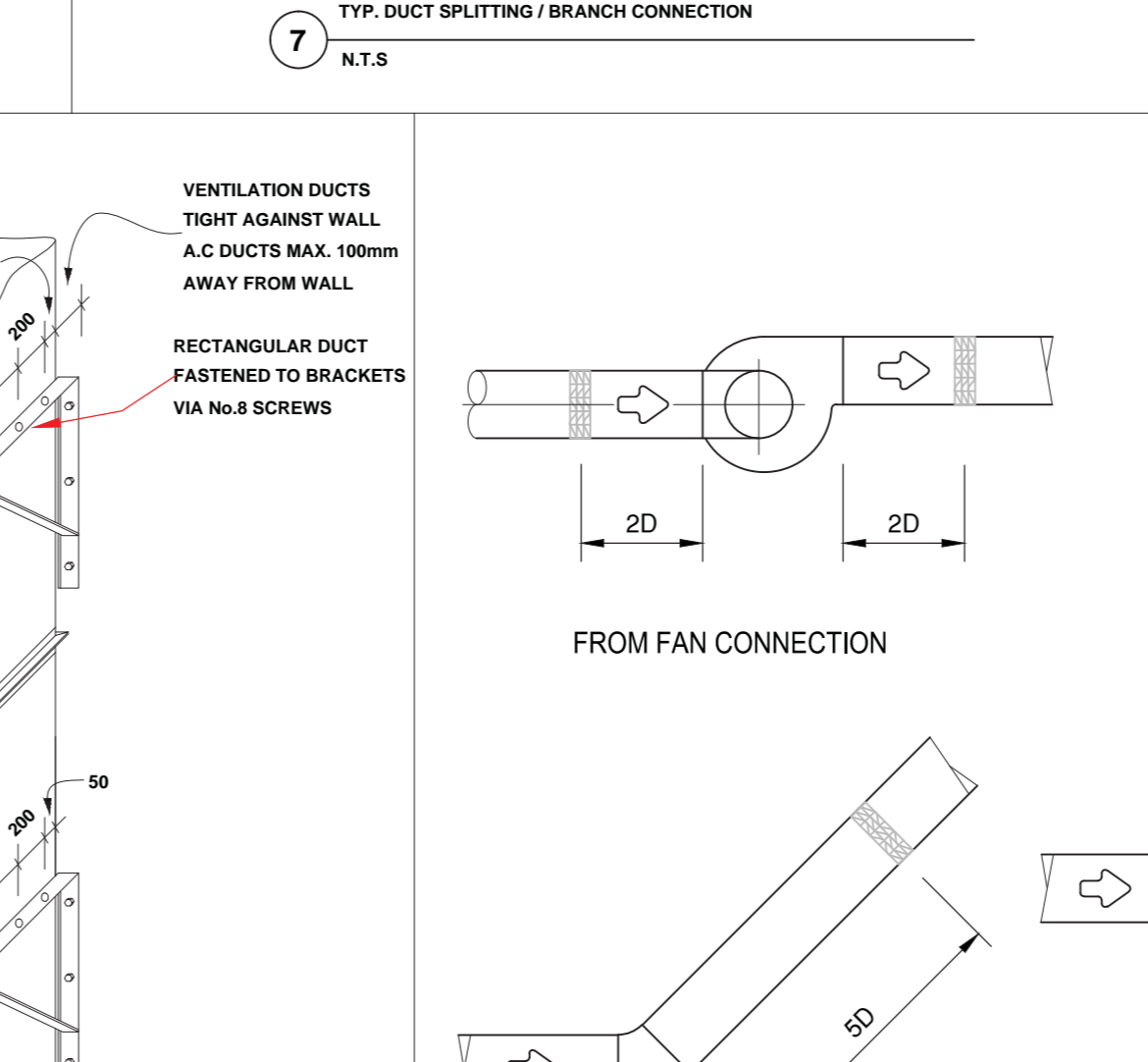
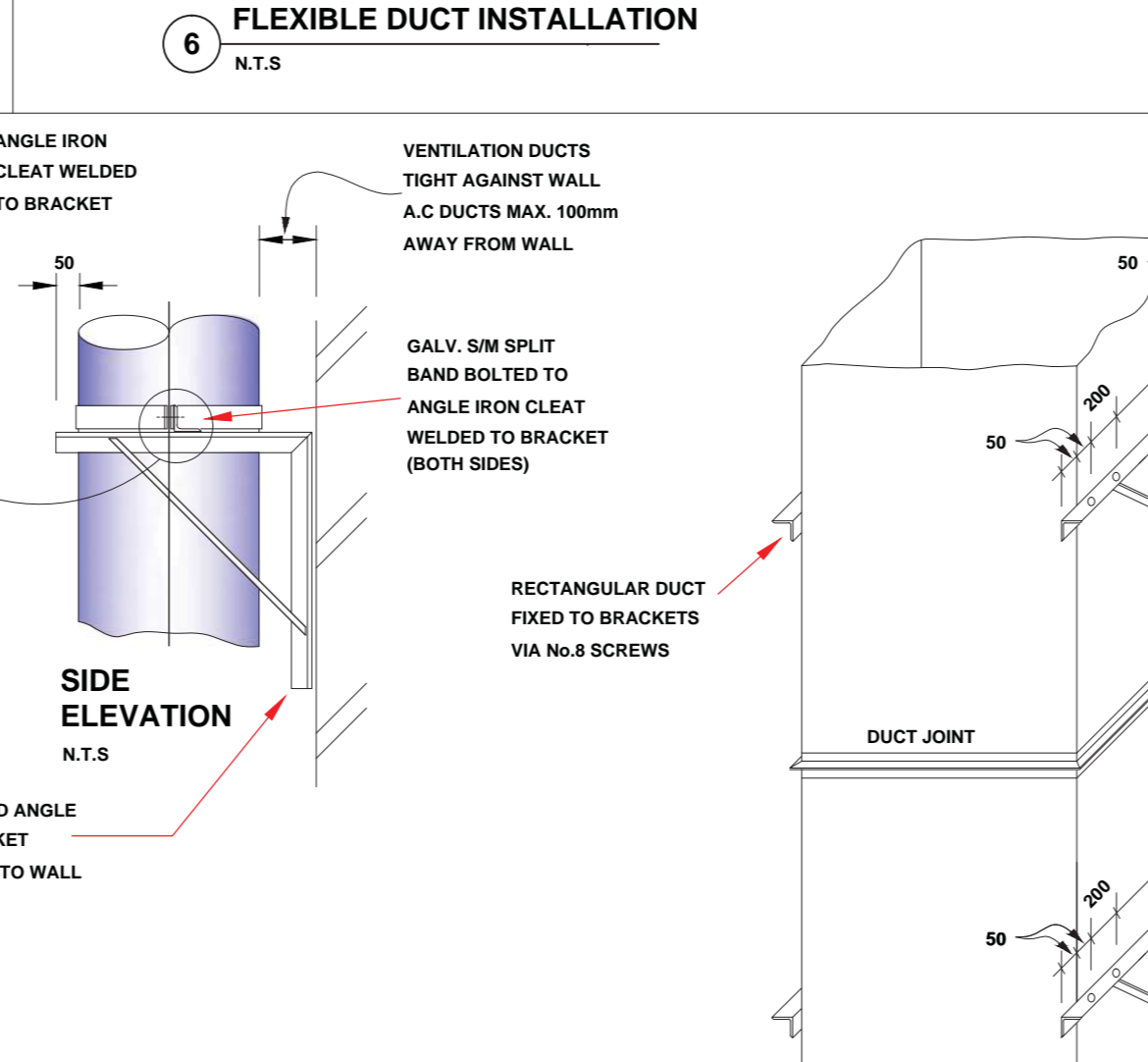
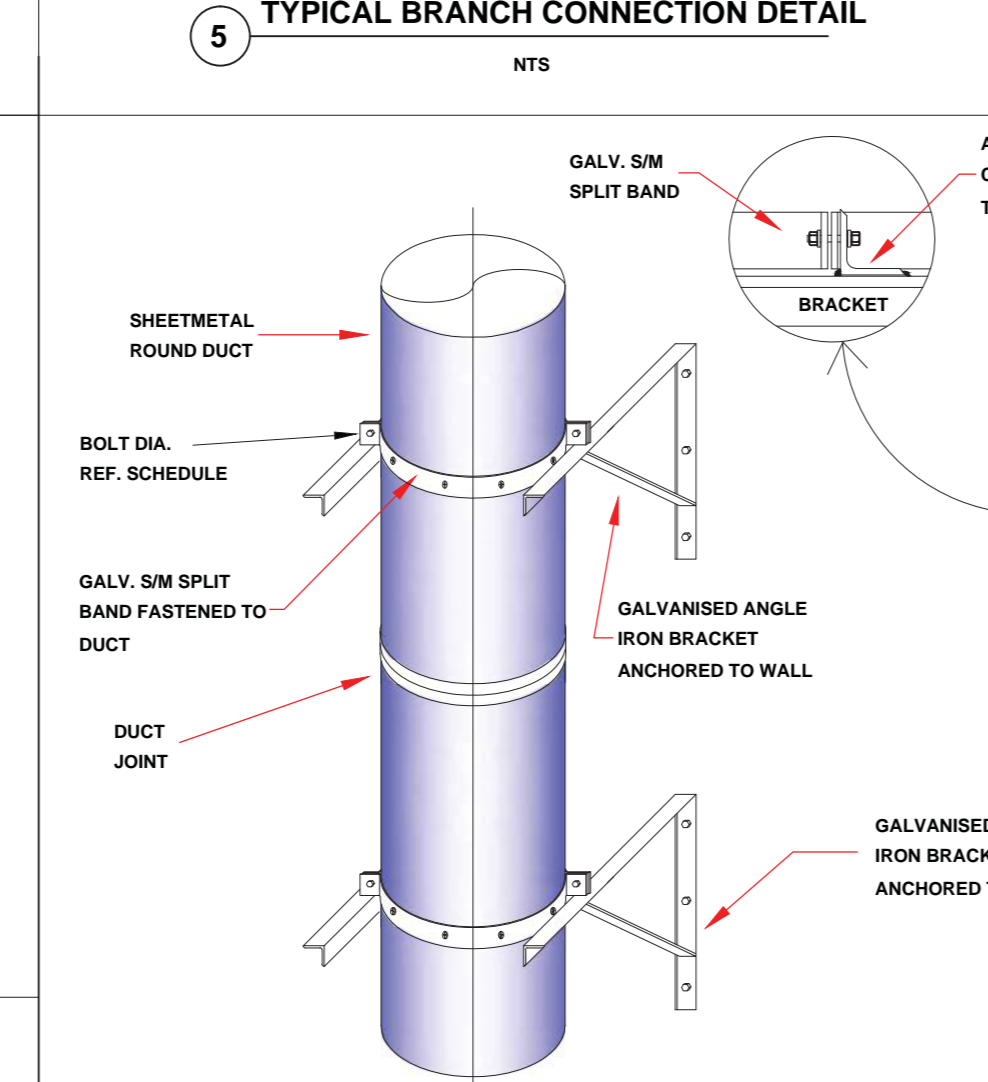
DUCT Ø (mm)	HANGER INTERVAL (mm)	HANGER ROD Ø (mm)
250	3000	6
400	3000	6
600	3000	6
800	3000	10
1200	3000	10
1500	2400	10
2100	2400	10

LONGER DUCT DIMENSION (mm)	ROD HANGER (SUPPORT) (mm)	GALV. STRAP HANGER (mm)	MAX. SPACING (mm)
UP TO 760	25x25x3	Ø6mm	25 x 1.6
761 TO 1000	38x38x3	Ø6mm	25 x 1.6
1001 TO 1300	50x50x3	Ø10mm	25 x 1.6
1301 TO 2400	50x50x6	Ø10mm	25 x 1.6
2401 AND OVER	50x50x6	Ø12mm	25 x 1.6

AIR SYSTEM	MATERIAL
LOW PRESSURE SUPPLY	MILD STEEL GALVANIZED NOT LESS THAN 2MM
RETURN	MILD STEEL GALVANIZED
GENERAL EXHAUST DUCT SYSTEM	MILD STEEL GALVANIZED
KITCHEN EXHAUST SYSTEM	CARBON STEEL (16G MIN.)
LAB EXHAUST SYSTEM	STAINLESS STEEL 316 (22 MIN.)
VAPOUR LADEN EXHAUST	ALUMINUM (MIN 1.27mm) OR STAINLESS STEEL 316 (22 MIN.)
OUTSIDE AIR INTAKE/SUPPLY	MILD STEEL GALVANIZED

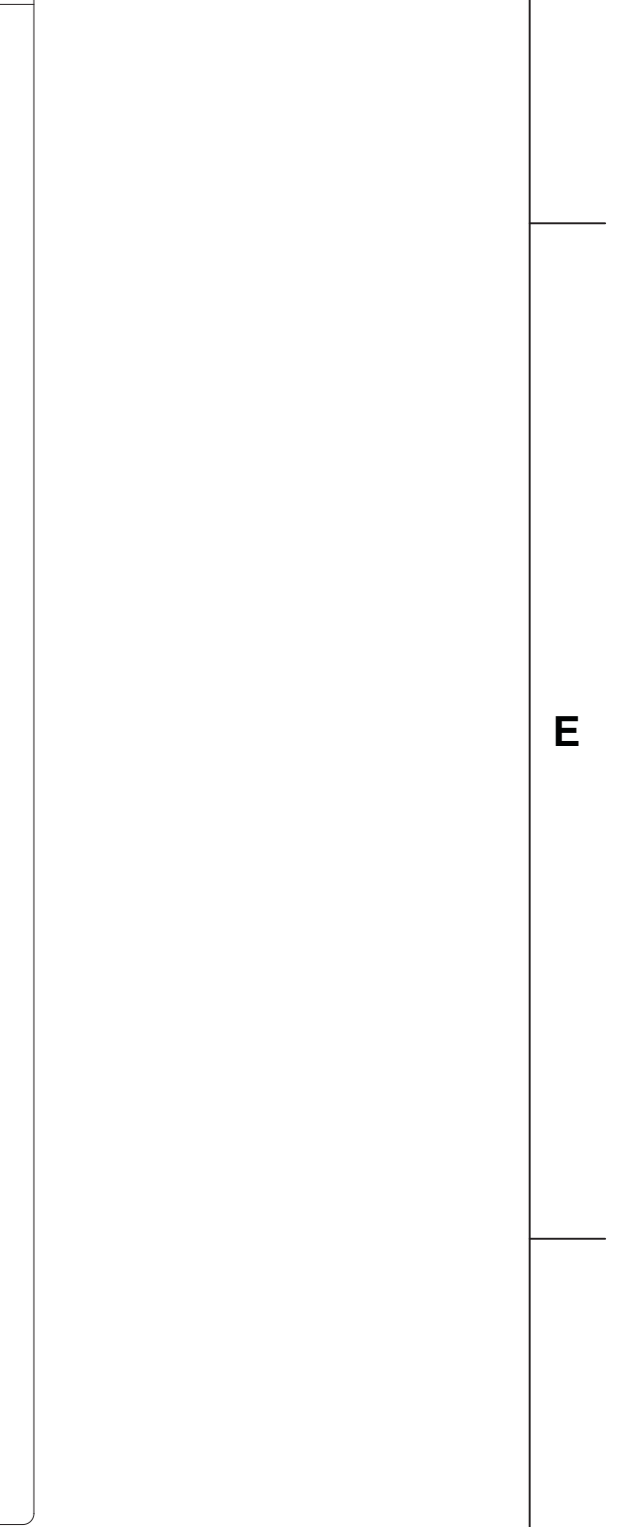
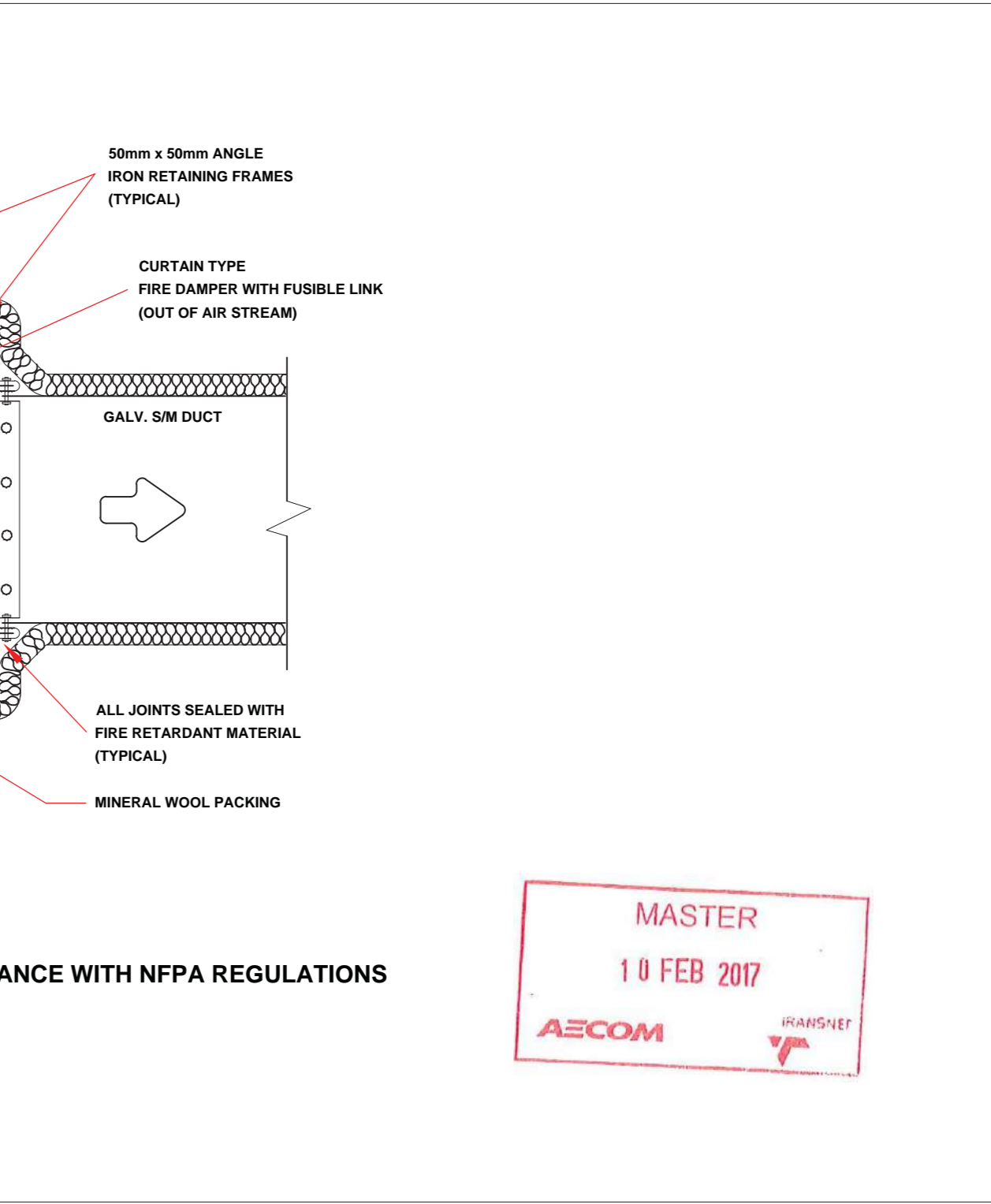
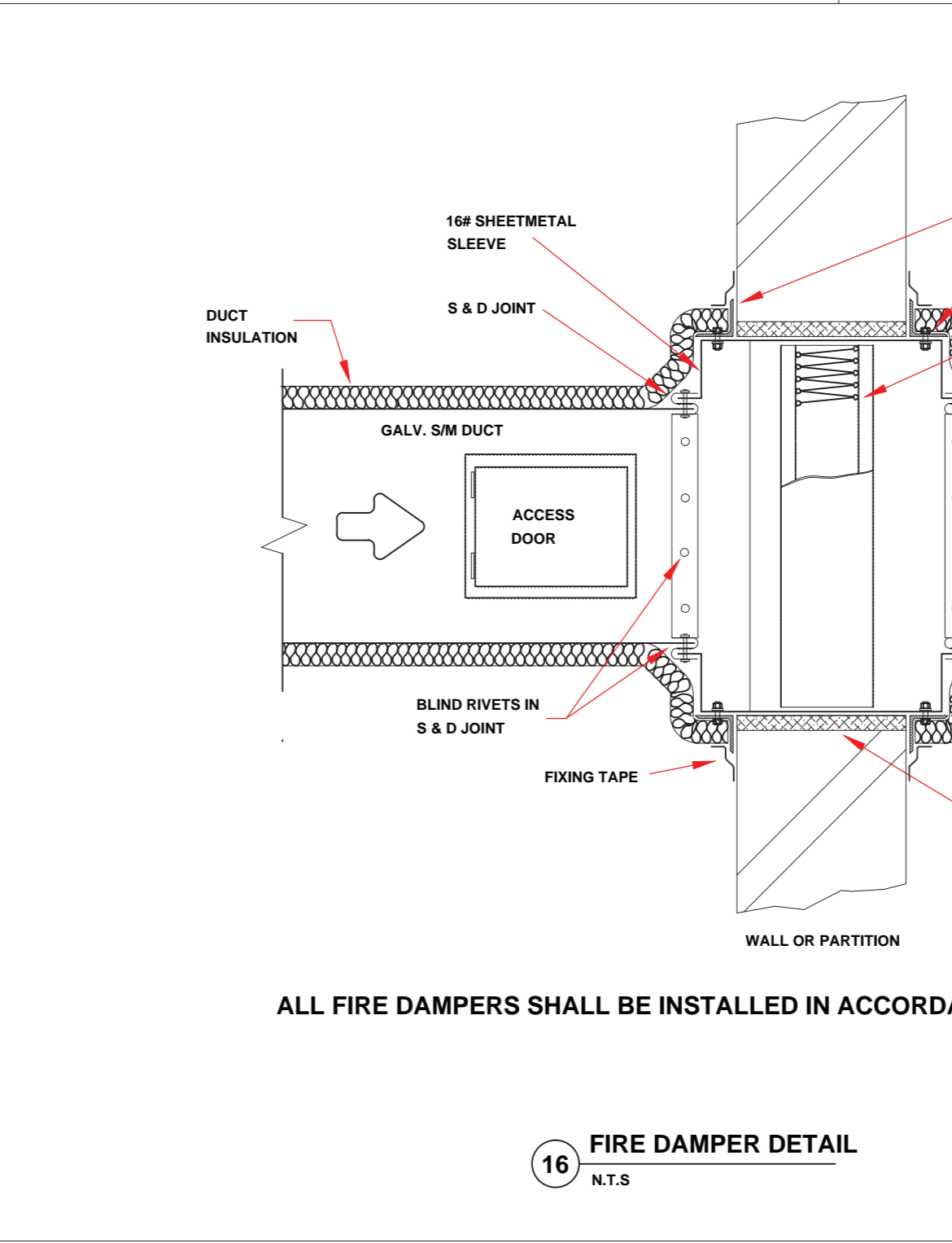
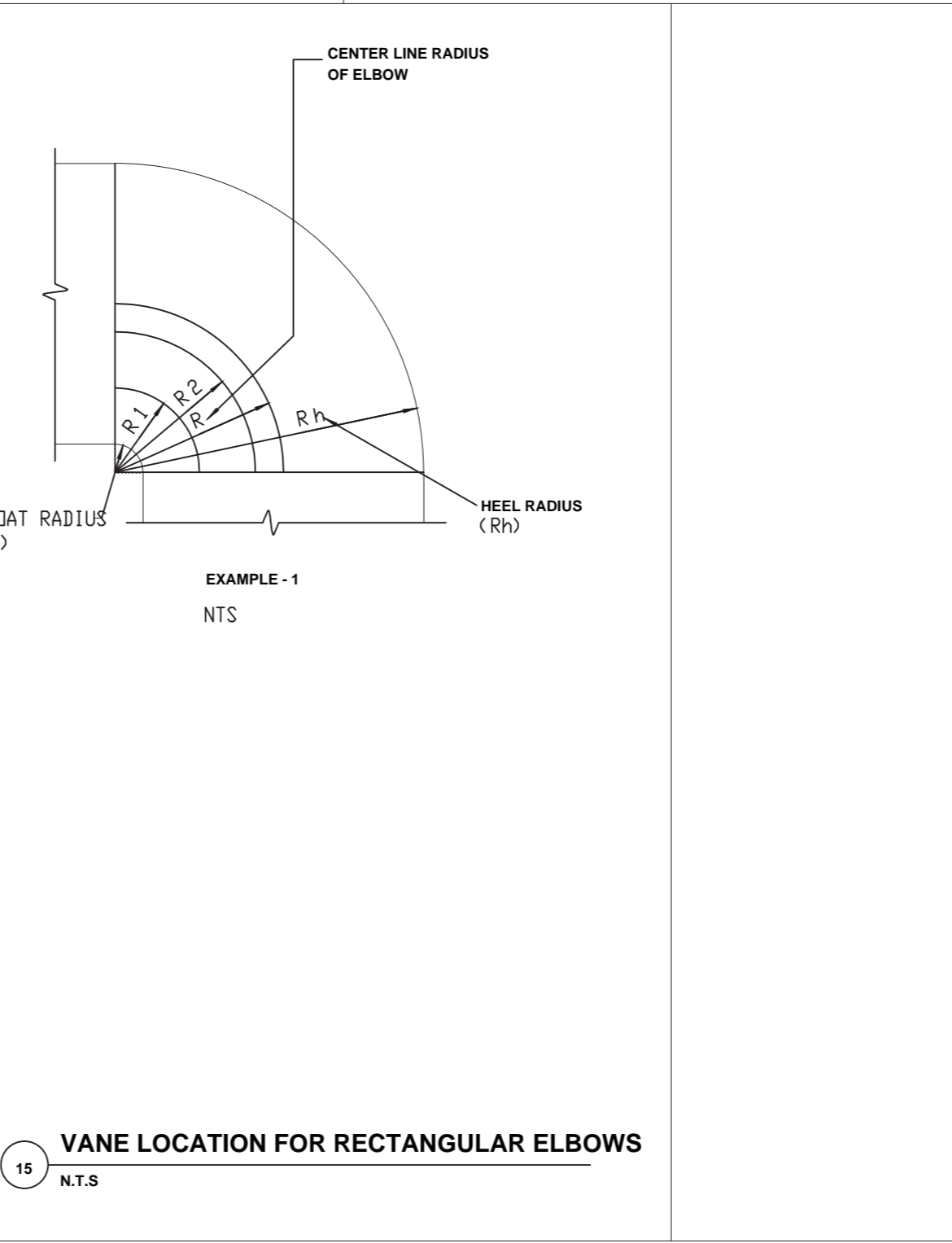
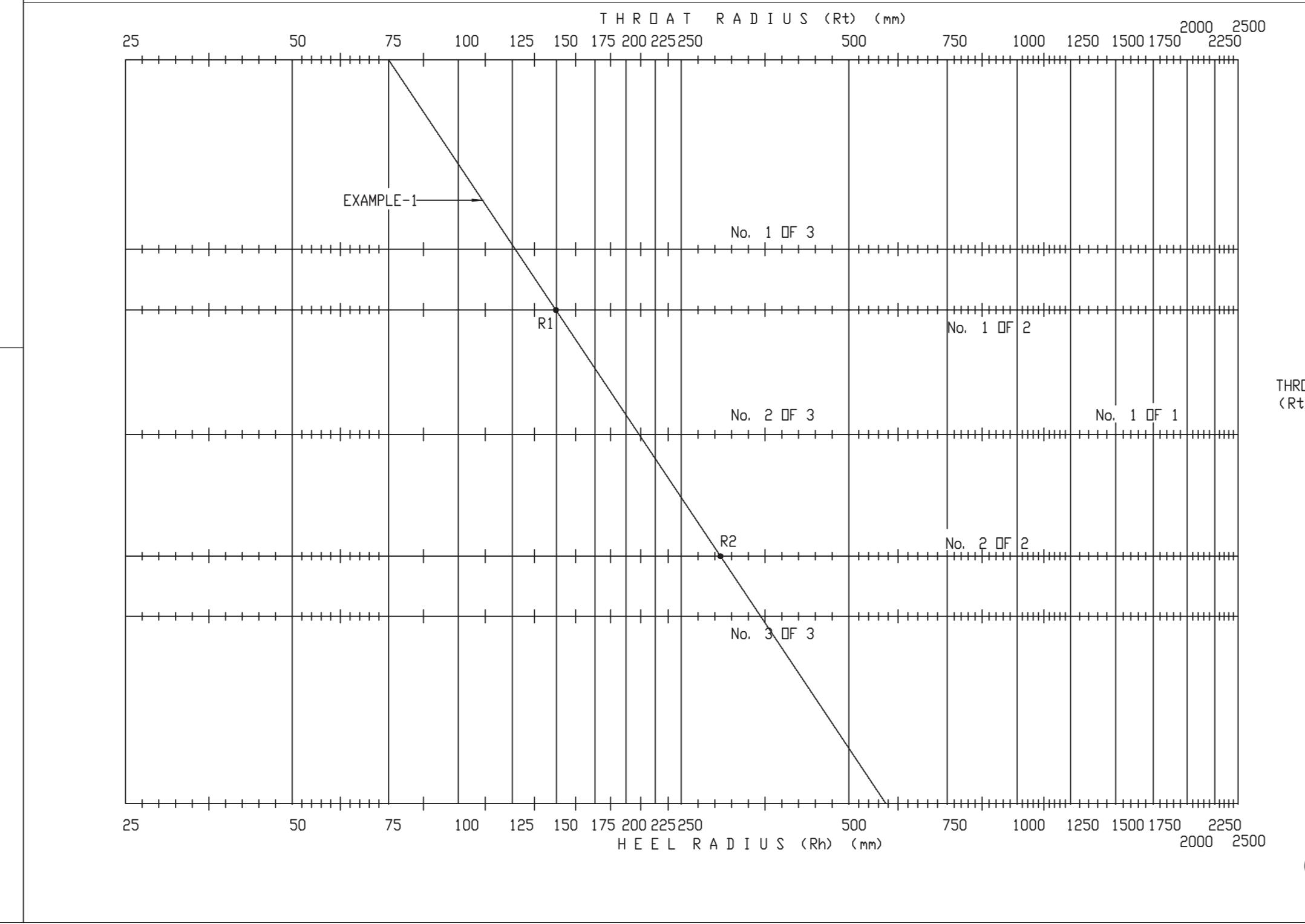
AIR SYSTEM	PRESSURE CLASS
AIR SUPPLY SYSTEM (FCU)	250 Pa
AIR SUPPLY SYSTEM (AHU)	500 TO 750 Pa
RETURN	250 Pa
RETURN AND RELIEF	250 Pa
KITCHEN EXHAUST	750 Pa
LAB EXHAUST	250 Pa
GENERAL EXHAUST	250 Pa
OUTSIDE AIR INTAKE/SUPPLY	500 Pa

LONGER SIDE OF DUCT (mm)	SHEET METAL GUAGE (G)	MAXIMUM DISTANCE BETWEEN JOINTS (m)
< 250	24	2.4
250 TO 450	22	2.4
450 TO 750	22	2.4 OR 1.2
750 TO 1050	22	1.2
1050 TO 1350	20	1.2
1350 TO 1550	20	1.2
1550 TO 2150	20	1.2
2150 TO 2450	18	1.2



RECTANG. DUCT PERIMETER	Ø DUCT	ANGLE IRON (BRACKET)
1600 mm	< 400	25x25x3
1250 mm	400 TO 875	25x25x3
1050 mm	875 TO 1050	32x32x3
2150 mm	1050 TO 1250	32x32x3

Ø DUCT	GALV. S.M. BAND WIDTH	Ø BOLT
< 305	25mm (18G)	6mm
305 TO 600	25mm (18G)	6mm
600 TO 950	51mm (18G)	10mm
950 TO 1550	51mm (18G)	10mm



NOTES

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REFERENCE DRAWINGS

DRAWING NO.	REFERENCE
1	
2	
3	
4	
5	
6	
7	
8	

AECOM

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TYGER WATERFRONT
CARL CRONJE DRIVE

TEL: +27 (0)21 950 7500
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REG. NO. 1996/006628/07

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DESIGNED	JJ		27 01 17
CHECKED	AD		27 01 17

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TABLE BAY BUILDING, TYGERSBERG PARK,
163 LUYKSGRIVE DRIVE, PLATTEKLOOF,
8001

TEL: 021 940 1999
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PORT OF SALDANHA

IRON ORE TIPLER 3 PROJECT
BULK POWER UPGRADE
SUBSTATION N
STANDARD DUCTING DETAILS

PROJECT NUMBER: AO 1924701
DO: 2
FBS: 510
DHS: M
SHT: S
T: 0
0: 0
6: 6
1: 1
0: 0
0: 0
1: 1
0: 0
0: 0
A: E

STANDARD PIPING NOTES

1. GENERAL
Refer to Project Technical Specification for specific details of piping installation. Pipes, strainers and other fittings up to 50mm may be screwed or flanged. Valves, strainers and other fittings larger than 50mm must be flanged. Thread must be in accordance with BS 21 and flanges to ASA standard or BS 4504 unless otherwise specified. Galvanised piping must be screwed when smaller than 50 mm and flanged above 50 mm. Clean all piping before connecting. Welding to galvanised piping or fittings is not permitted. Where welding for whatever purpose is unavoidable the complete section must be hot dip galvanised after manufacture. Cold galvanising is not acceptable. Use full radius bends and sweep fittings wherever possible. Use elbows only under exceptional conditions. Where it is necessary to reduce pipe size, use only reducing sockets and not bushes. Provide all pipelines with 15mm drain cocks at all low points in the system so that the pipe work can be drained of liquid without dismantling. Install horizontal pipes with a slope of at least 1 in 500 to allow venting of air to the expansion tank wherever possible. Fit all pipes in such a manner as to prevent the formation of air locks and air pockets. Provide high points with automatic air vent valves or air bottles. Air vents or bottles must be designed for at least 1.5 times the working pressure of the system. Arrange piping in plant rooms so that normal inspection and servicing of equipment is not obstructed. Size pipes which are not dimensioned on drawings using the following criteria:
* The velocity must not exceed 2.5 m/s.
* The friction rate must not exceed 60 kPa per 100m length. Pipe expansion joints, where required, shall be of the bellows type manufactured from stainless steel or may be of the V-ring Johnson pipe coupling or equal where moderate expansion movements are to be accommodated. Chilled water piping shall be black medium tubing, conforming to SANS 62-1. Screwed joints may be used for piping of diameter up to and including 50mm diameter whereas all piping in excess of this diameter shall be joined by the welded process, using flanges where stated below. Pipes of diameter in excess of 150mm shall be constructed of seamless black steel in accordance with SABS 62-1971 with welded joints only. All black pipe fittings shall conform with SABS 509-1955. Welding of pipework shall be carried out only by qualified welders and the Employer reserves the right to have cut for examination. Connections to air handling units, pumps, chillers and other major equipment shall be flanged in the case of piping of diameter less than 65mm, to enable sections of the air conditioning system to be removed and replaced. In all piping installations due allowance shall be made for the thermal expansion and contraction of the piping material. The chilled water system and the hot water system shall each be supplied with expansion tanks of the asbestos or minimum water volume of 150 litres, complete with ball valve, quick-drain and drain connections. Automatic air release valves shall be fitted at the top of the riser pipe stacks, and in any other positions in the hot water, chilled water and condenser water systems where necessary to prevent airlocks and to facilitate commissioning of the pumping systems. Condenser water pipes shall be of medium or heavy black steel piping to BS 1387 or SANS 719 specifications but shall be hot dip galvanised after manufacture with a minimum coating of 300 g/m². Fittings shall be of heavy galvanised malleable steel or malleable iron with galvanising as above, and shall be manufactured to BS 1740 or SABS 509 specifications. Flanges shall be of cast iron or steel to BS 4504 or ASA standards and shall be galvanised. Drain pipes must fall with a gradient of 1:50. Provide all drain pipes with cleaning eyes at each change in pipe direction. Domestic grade copper piping could be used for drain piping with elbows and fittings of the compression or solder type.

2. HANGERS AND SUPPORTS
Spring hanger mountings for vibration damping shall be used in all plant rooms. Pipe hangers shall be adjustable in height to set the pipe gradient. The maximum horizontal support spacing for condensate (from AC units) pipes shall be as follows:

Nominal Pipe size (mm)	Hanger Rod ø (mm)	Span (m)
12-32	6	2.5
40-65	10	3.0
80-100	12	3.5
125-150	16	4.0
200-300	22	5.0
350-500	25	6.0

The maximum horizontal support spacing for condensate (from AC units) pipes shall be as follows:

Nominal Pipe Size (mm)	Span (m)
12-20	1.0
25-40	2.0
50 and over	2.5

Hangers shall be provided at a maximum spacing of 1 metre from each elbow or pipe fitting.

3. VALVES
Valve materials shall be selected for the particular application. For detailed valve specification refer to Project Technical Specification. Strainers type valves or approved equivalent will be accepted. Gate valves shall only be used as isolating or shut off valves. Globe valves shall be used for throttling or balancing purposes. Butterfly valves shall be used for isolating and shut off purposes. Diaphragm valves shall only be used as shut-off purpose. Check valves shall be of the non-stem type for horizontal or vertical installation. Plug cocks shall be used for balancing purposes. Calibrated balancing valves shall be of the plug cock or globe type with bronze or cast iron valve bodies, bronze disc, internal seals, screwed ends, up to 50 mm and flanged ends for 65 mm ø and over. Valves shall be TOUR AGENTUR or approved equivalent.

4. STRAINERS
Strainers shall be of the angle or Y-type. Strainers up to 50 mm shall have screwed ends and strainers of 65 mm ø and above, shall have flanged ends. Bronze or stainless steel screens will be acceptable. Screens shall be perforated as follows:

Strainer Size (mm)	Perforation Size (mm)
10-50	1.0
65-150	1.5
200 and over	2.0

Strainers shall be provided with a 50mm blowdown pipe and cock on the cap piped to the nearest drainpoint. Flexible piping shall be used. Strainers shall be installed on the inlet side of all hot water, chilled water and condenser water pumps.

5. GAUGES
Pressure gauges for water shall be of the Bourdon type and glycerine filled. Pressure gauge dials shall have a diameter of at least 100 mm. A gauge cock and sight glass shall be provided with each gauge.

6. CONNECTIONS TO VIBRATING EQUIPMENT
Flexible connections shall be Mason Industries SAFEFLEX SFDEJ (double sphere type) or approved equivalent, which shall be provided to the suction and discharge pipes for chilled, condenser and hot water pumps.

7. TESTING OF PIPE INSTALLATIONS
All pipe fittings shall be tested hydrostatically up to a pressure of 1000 kPa or 1.5 times the maximum system pressure, whichever is the higher value. Tests shall be carried out before the application of insulation. Water systems shall be filled with water and air vented at least 24 hours before the test. The test pressure shall be maintained for a period of at least 2 hours after the pressure testing pump has been disconnected.

8. FLUSHING/DRAINING
Upon the completion of all pressure tests throughout the building complex, and prior to the commencement of commissioning of pumping systems, the entire system shall be drained and flushed to ensure the removal of waste jointing material, accumulated dirt, and sundry construction materials. Refer to Water Treatment section for method of cleaning and flushing a piping reticulation.

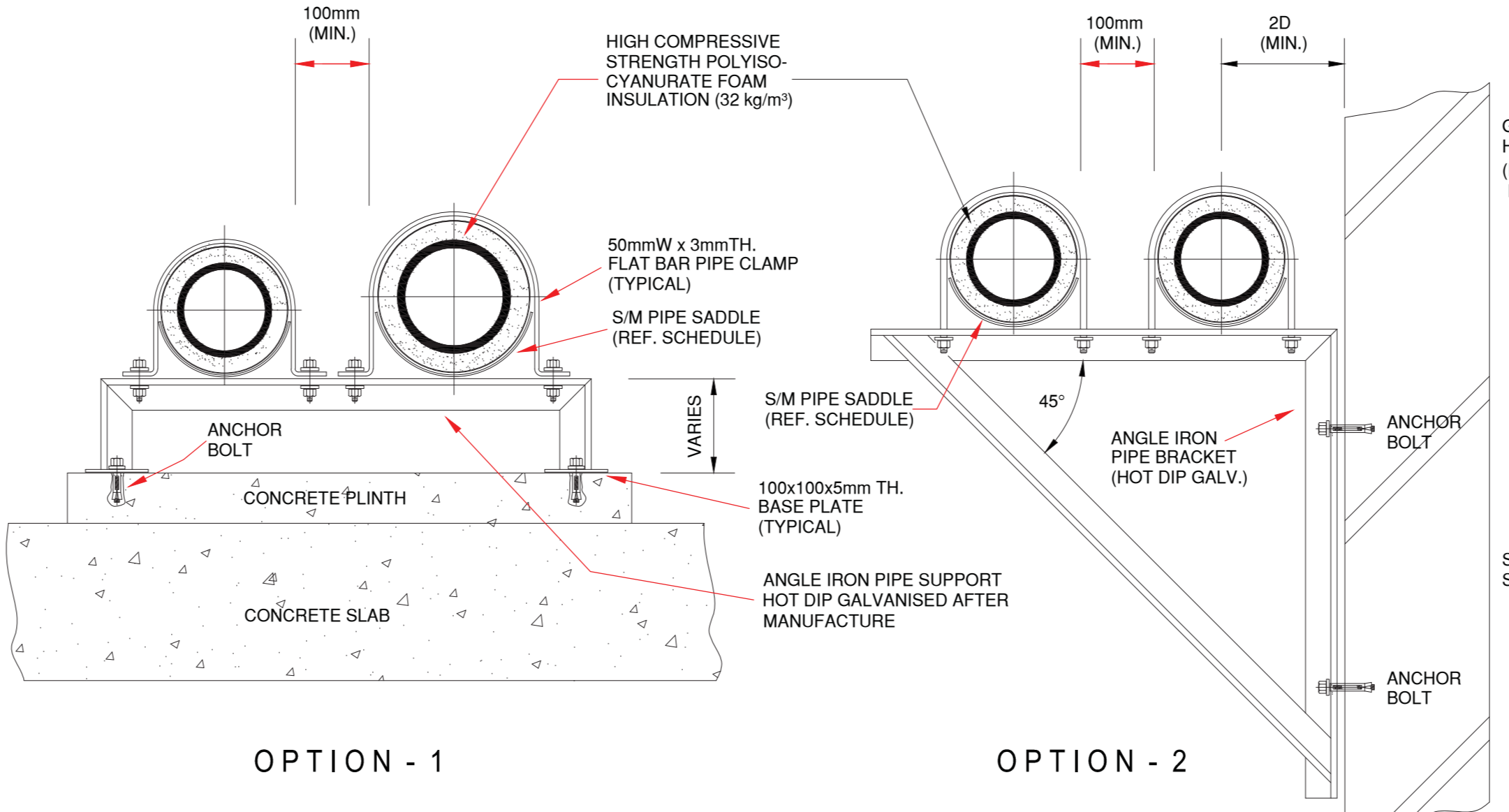
9. WATER TREATMENT
Refer to Project Technical Specification for specific details of "Water Treatment".

10. CHILLED WATER PIPEWORK INSULATION
All chilled water pipework, including pipe fittings and connections, shall be insulated with Polyisocyanurate (PIC) foam, with the necessary vapour barrier. The insulation shall be applied as noted on the Detail Drawing.

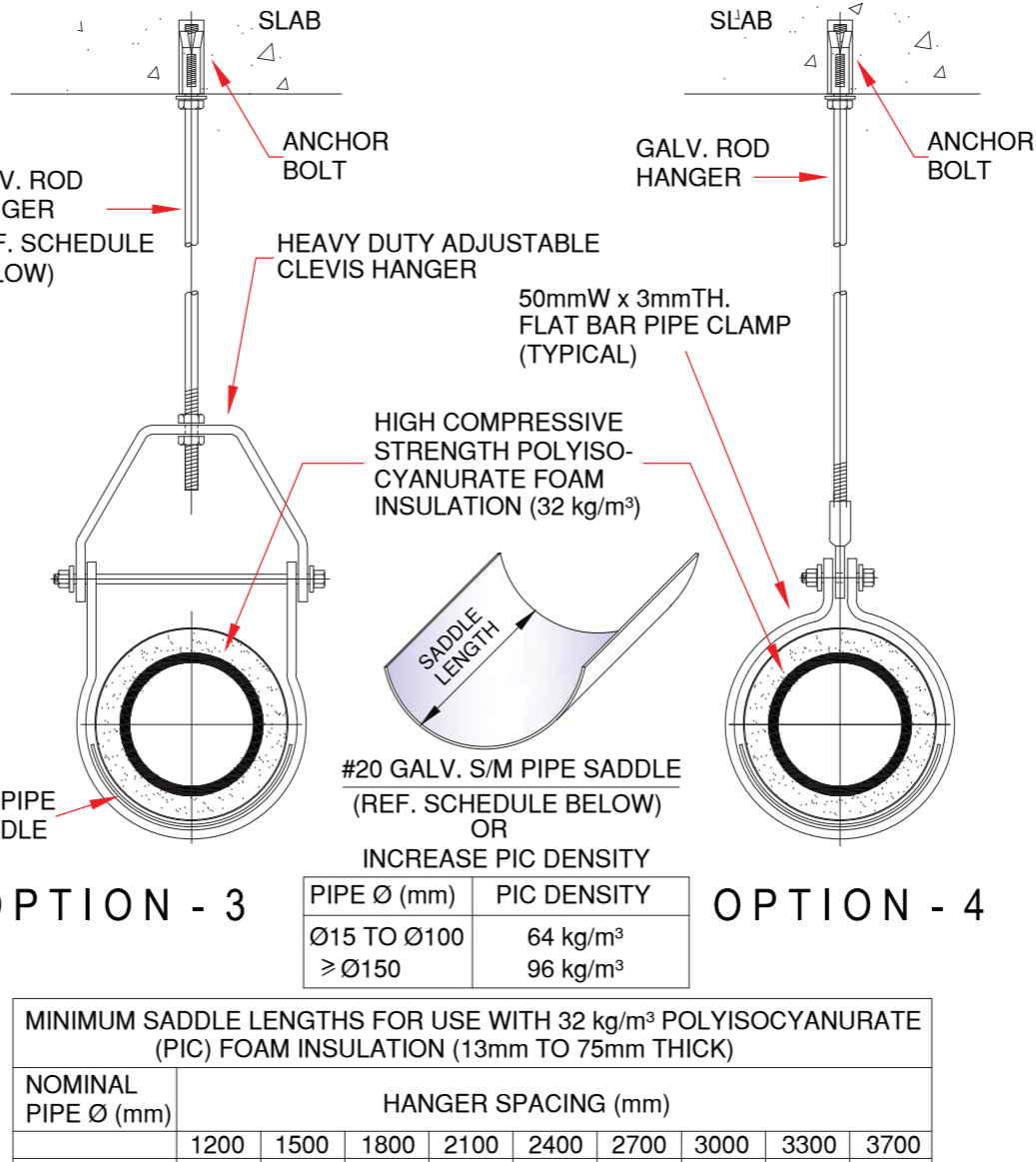
Rigid preformed piping sections shall be used where applicable. Where not possible, blocks/batts shall be shaped to suit the pipe fitting, and securely wired/banded in position. All joints and voids shall be filled with mineral wool. The thickness of the insulation shall be maintained over the pipe fitting. All piping shall be supported from the outside of the insulation as per Details shown. The compressive strength of the insulation shall be determined to ensure no flattening of the insulation (i.e. the insulation must maintain its thickness). Should the weight of the pipe, plus contents, cause the insulation to flatten, then either provide "saddles", or increase the density of the insulation over the bracket width.

REFRIGERANT PIPEWORK AND INSULATION

Refrigerant pipe work shall be installed on site in accordance with Project Technical Specification, and generally as shown on the Equipment layout drawings. All indoor and outdoor Refrigerant pipework shall be insulated and protected by sturdy covers against accidental damage, as needed.
(i) Pipe Runs
(a) Type-L copper to be used.
(b) Horizontal pipes carrying vapour are to be sloped in the direction of the vapour flow.
(c) Piping to be sized to ensure the correct Refrigerant velocities and pressure drops.
(d) Liquid lines running over exposed roofs to be insulated.
(e) All internal Refrigerant pipework shall be insulated with Armaflex, or approved equal.
(f) All external Refrigerant pipework shall be insulated with 25mm thick rigid, pre-formed fibreglass sections of 45 kg/m³ density.
(g) All external Refrigerant pipework shall be vapour-sealed and clad with Aluminium sections, or approved equal.
(h) Refer to "Typical Refrigerant Piping Diagram" detail below.
(i) All Refrigerant pipe runs / lengths to be in accordance with Supplier Requirements.
(j) All Refrigerant pipes to run in cable trays. When external to the Building, a protective cover must be fitted.
(k) Oil Traps
(a) To be fitted at the bottom of all risers.
(b) To be fitted every 7 metres up a riser.
(c) No traps near the suction inlet of a compressor.
(ii) Before starting a system ensure that the Pipework is clean, and free of Contaminants.
(a) Contaminants: Air, Moisture, Copper Oxide, Metal chips and dirt.
(b) Purge system with dry Nitrogen.
(c) Draw a vacuum.
(iii) Oil return to Compressor
(a) Oil travels with the Refrigerant around the system.
(b) Excessive lengths of pipework is detrimental to oil return to the Compressor.
(c) After start-up of the system, check Compressor oil level, and top up if necessary.
(d) Should the pipe lengths be run beyond the Manufacturer's recommendations, then topping up of Compressor oil is necessary.
(iv) Suction line Accumulator
(a) Required to prevent Liquid flooding back to the Compressor, after the system is shut down.
(b) Systems which have excessive lengths of pipe, and fitted with "Capillary tube metering devices" must be fitted with an Accumulator.
(c) Suction Accumulator to either be part of the Condensing unit, or fitted within the Suction line.
(d) Suction Accumulator must be correctly sized.



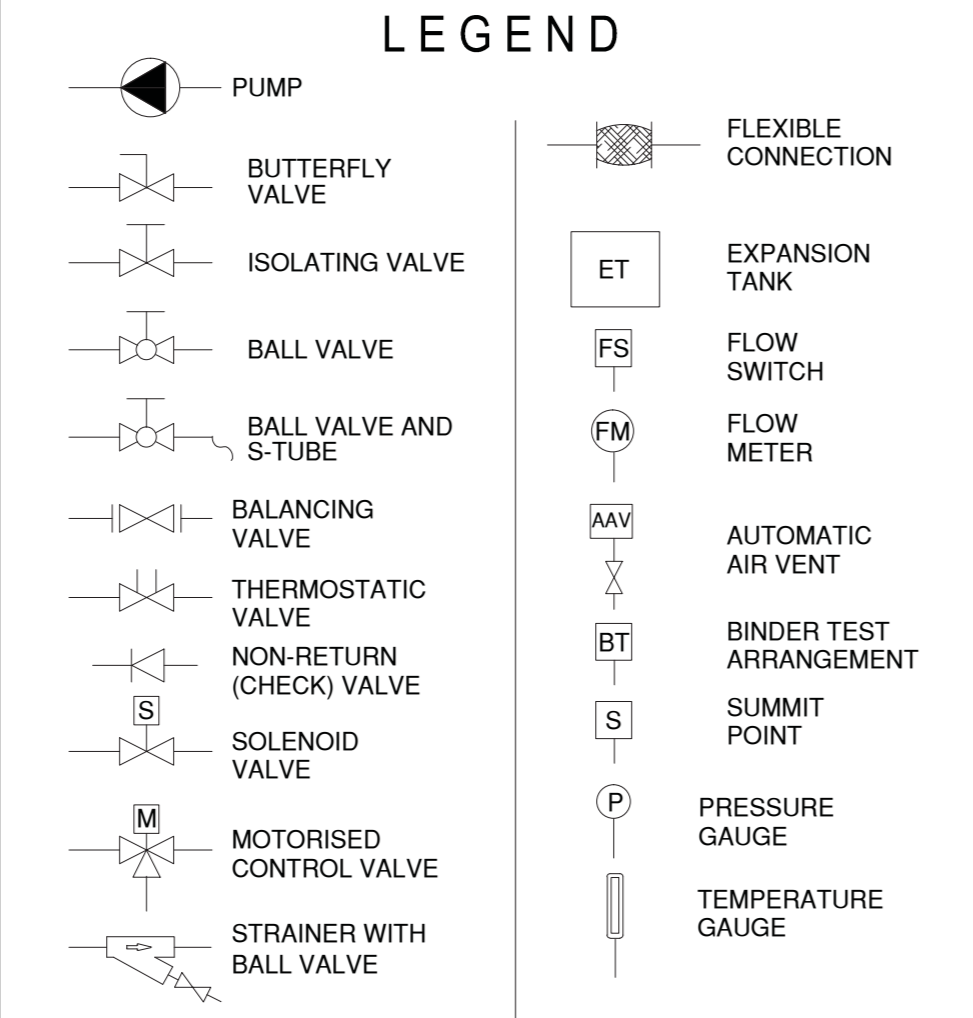
1. HORIZONTAL CHILLED / HOT WATER PIPE SUPPORTS
N.T.S.



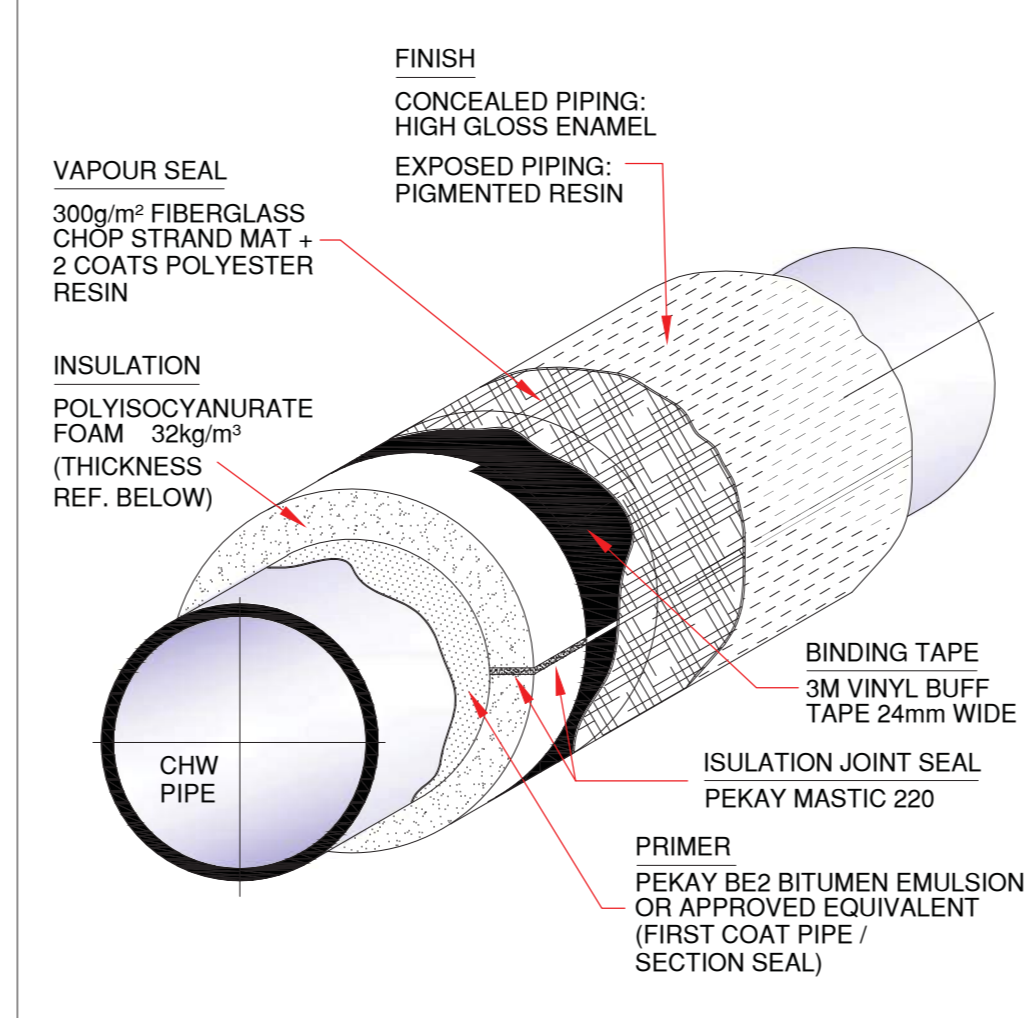
2. VERTICAL CHILLED / HOT WATER PIPE SUPPORTS
N.T.S.

MINIMUM SADDLE LENGTHS FOR USE WITH 32 kg/m³ POLYISOCYANURATE (PIC) FOAM INSULATION (13mm TO 75mm THICK)

NOMINAL PIPE Ø (mm)	HANGER SPACING (mm)	Ø PIPE (mm)	PIC DENSITY
80	1200	100	95 kg/m ³
100	1500	100	95 kg/m ³
125	1800	100	95 kg/m ³
150	2100	100	95 kg/m ³
200	2700	100	95 kg/m ³
250	3300	100	95 kg/m ³
300	3900	100	95 kg/m ³
350	4500	100	95 kg/m ³
400	5100	100	95 kg/m ³
80	1200	150	64 kg/m ³
100	1500	150	64 kg/m ³
125	1800	150	64 kg/m ³
150	2100	150	64 kg/m ³
200	2700	150	64 kg/m ³
250	3300	150	64 kg/m ³
300	3900	150	64 kg/m ³
350	4500	150	64 kg/m ³
400	5100	150	64 kg/m ³



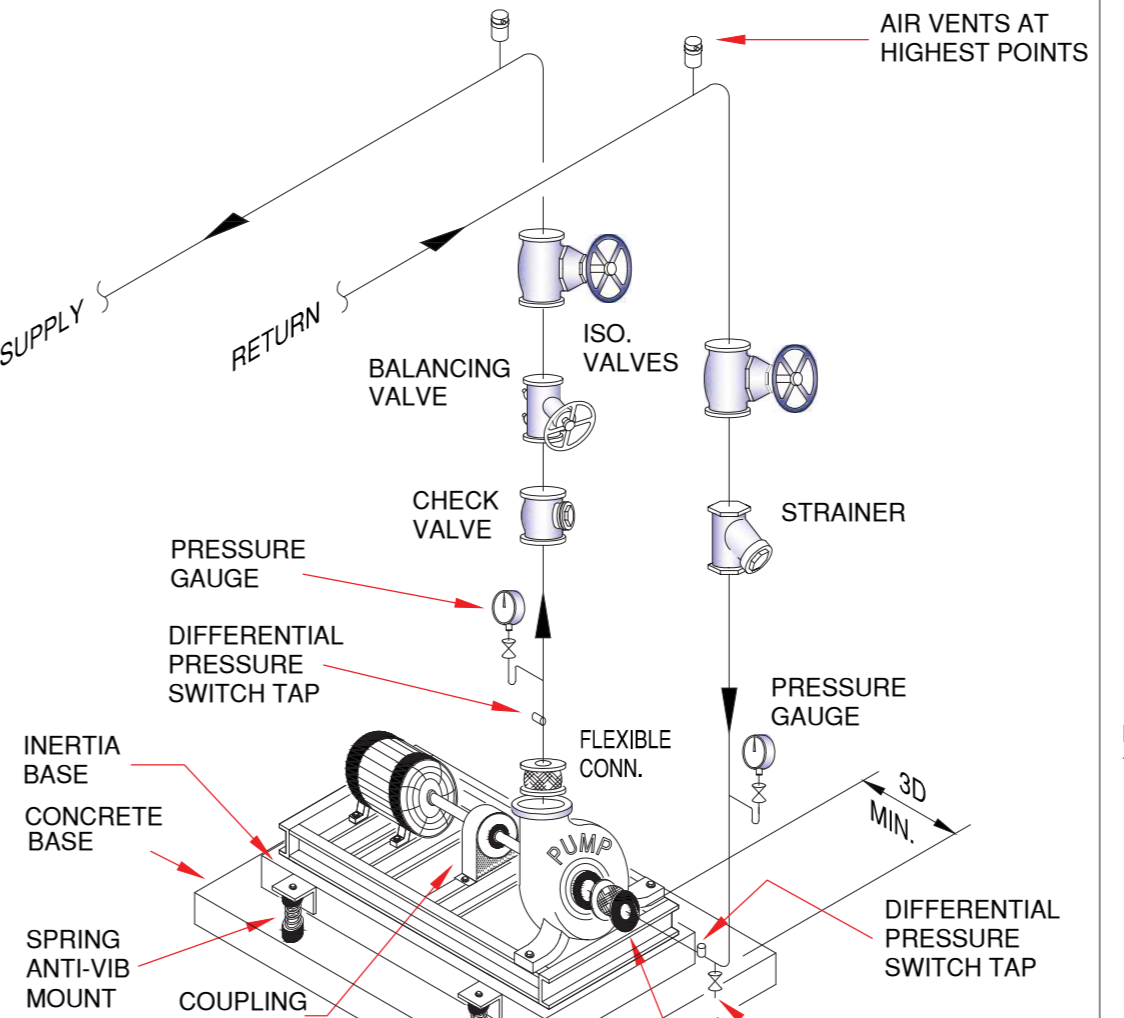
3. RISER SUPPORT AT BOTTOM
N.T.S.



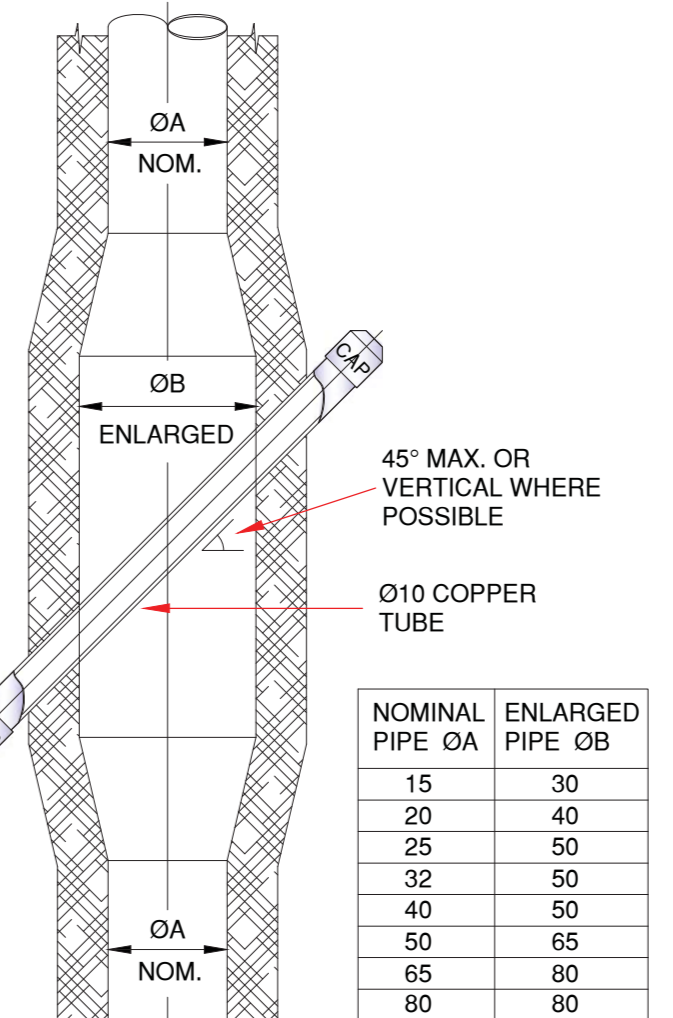
4. CH. WATER PIPE INSULATION DETAIL
N.T.S.

INSULATION THICKNESS

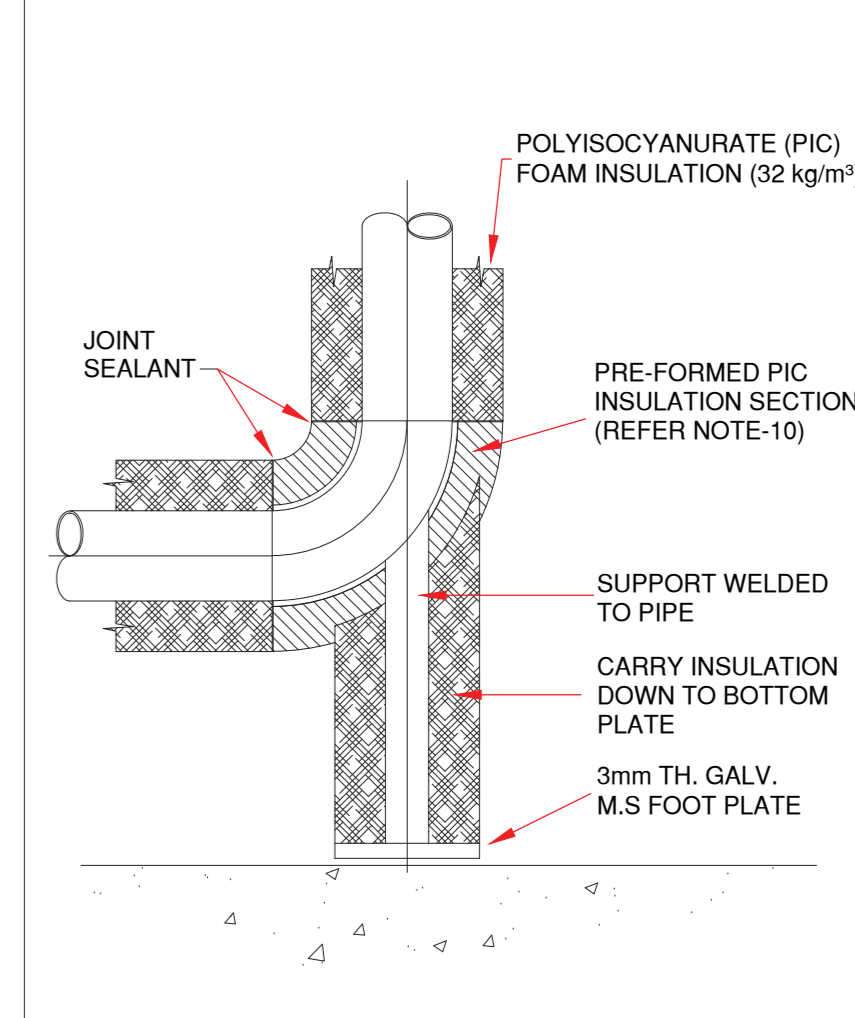
PIPE WITHIN BUILDINGS	EXPOSED PIPING		
Ø PIPE (mm)	INSULATION THICKNESS (mm)	Ø PIPE (mm)	INSULATION THICKNESS (mm)
15 TO 80	25	15 TO 65	25
> Ø100	50	> Ø80	50



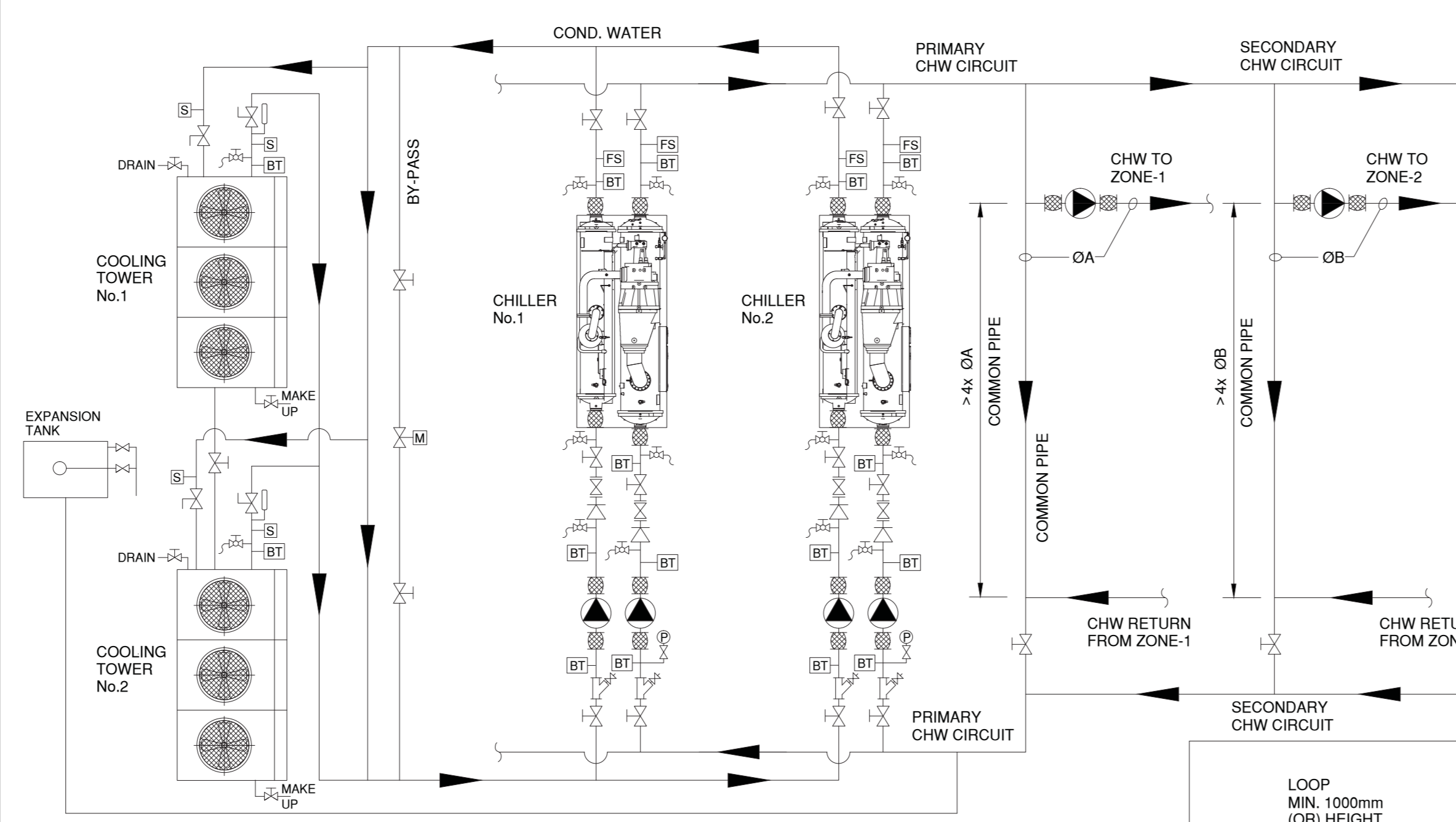
5. PUMP CONNECTION DETAILS
N.T.S.



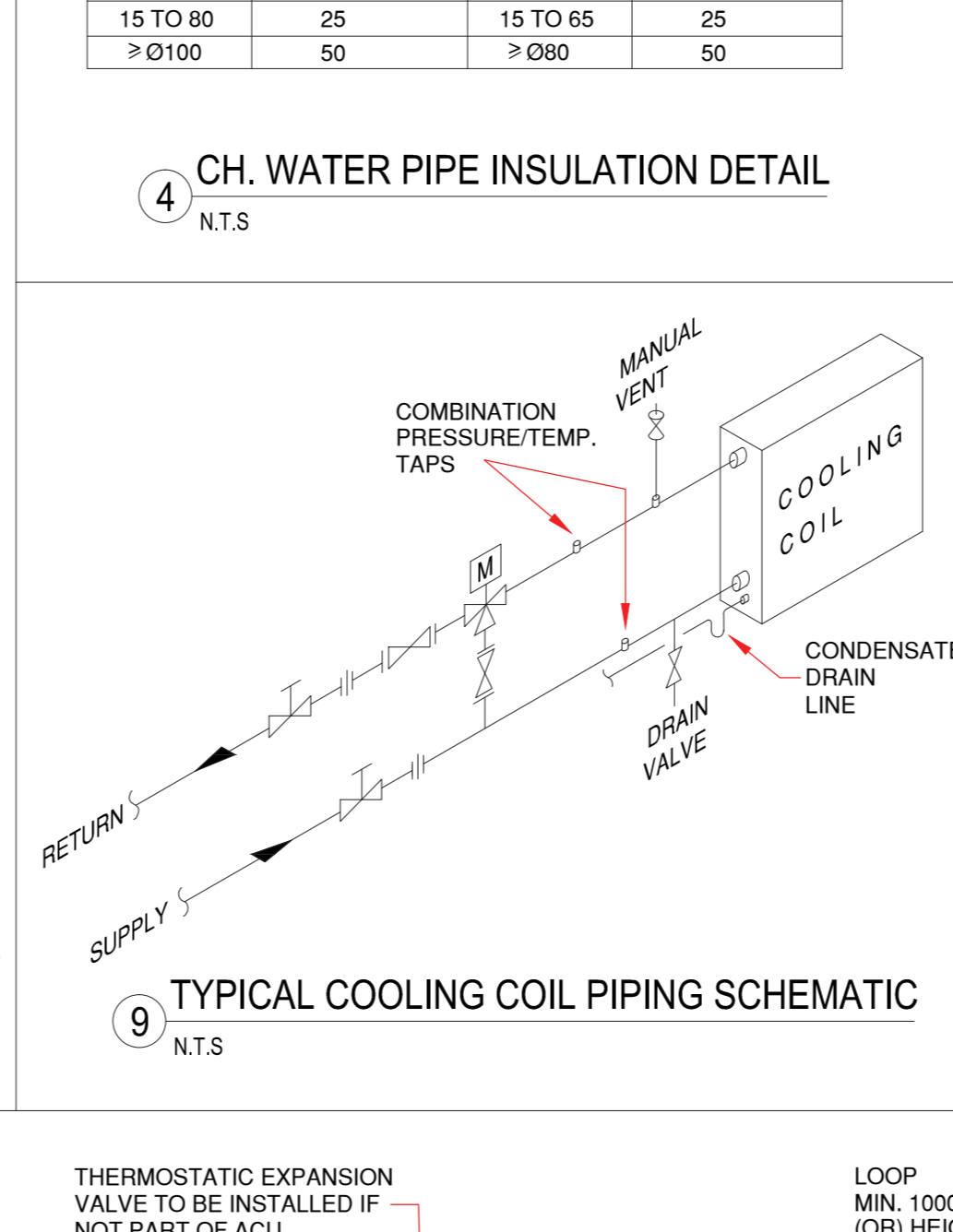
6. TEST THERMOMETER POCKET
N.T.S.



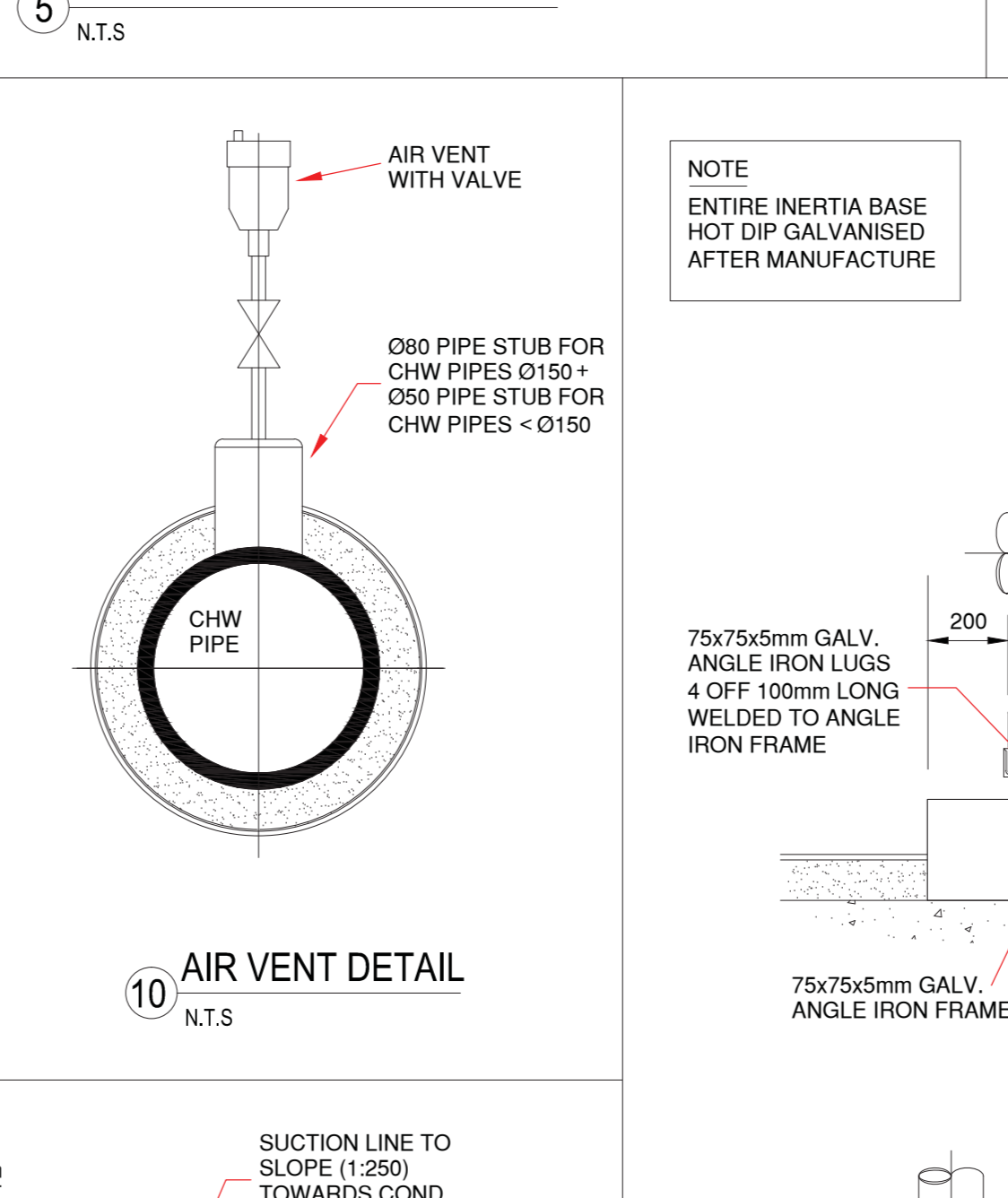
7. PEDESTAL SUPPORT AT ELBOW
N.T.S.



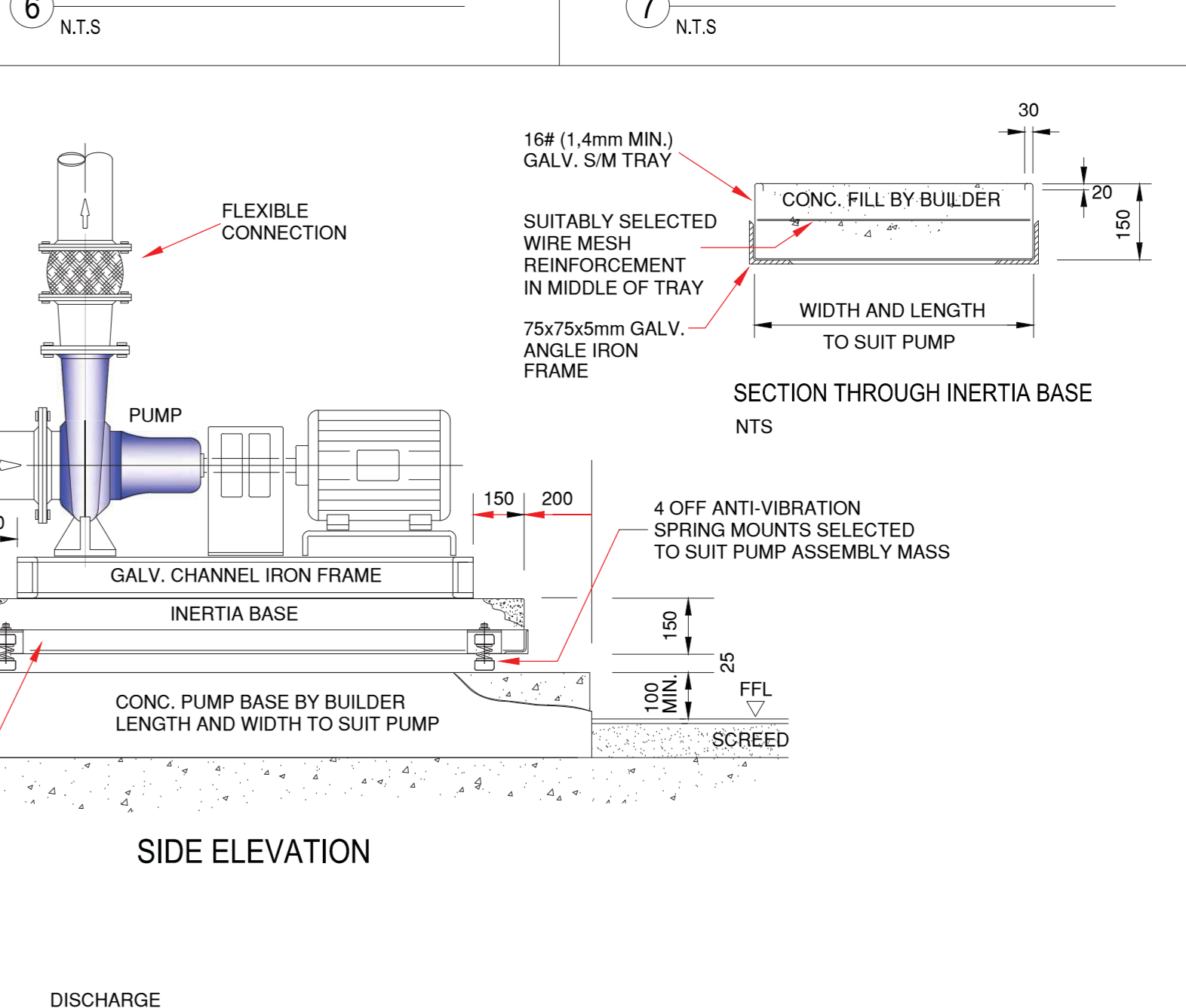
8. TYPICAL CHW AND COND. WATER PIPING SCHEMATIC
N.T.S.



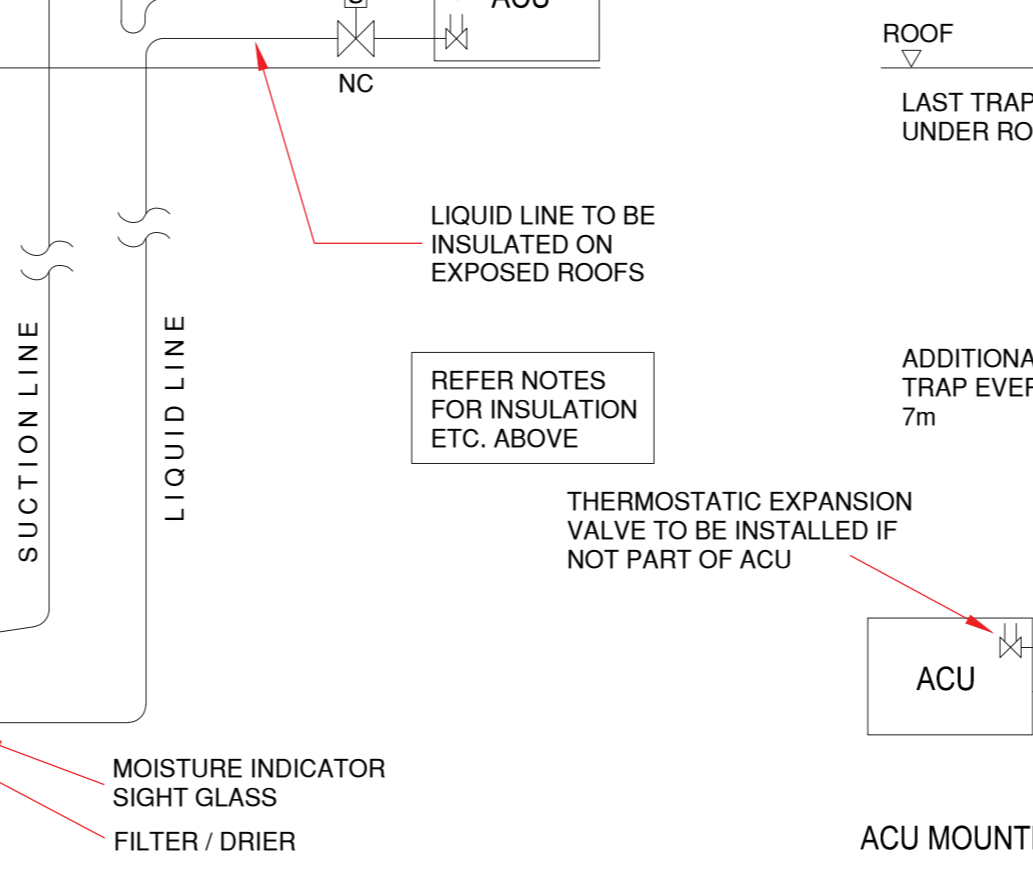
9. TYPICAL COOLING COIL PIPING SCHEMATIC
N.T.S.



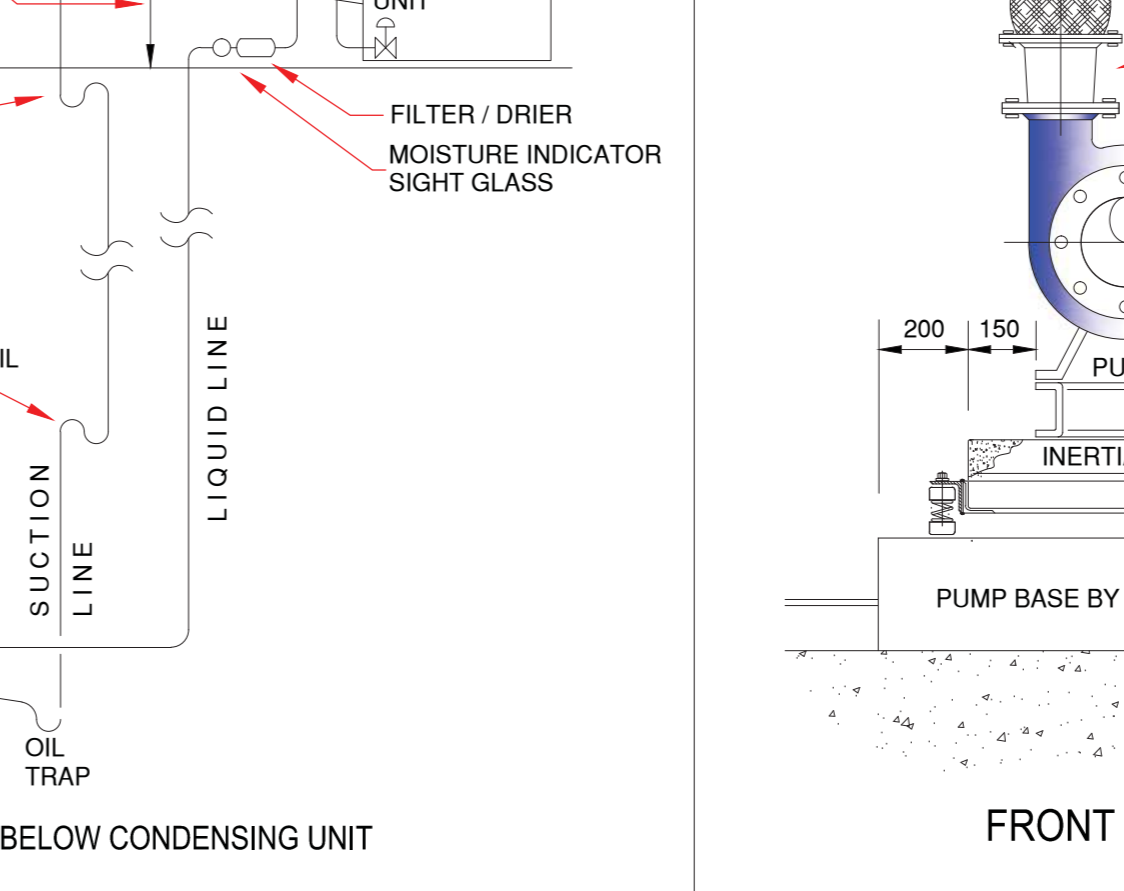
10. AIR VENT DETAIL
N.T.S.



11. DETAIL OF CHW PIPE THROUGH FIRE-RATED WALL
N.T.S.



12. TYPICAL REFRIGERANT PIPING DIAGRAM
N.T.S.



13. PUMP INERTIA BASE DETAIL
N.T.S.

REFERENCE DRAWINGS

DRAWING NO.	REFERENCE
1	
2	
3	
4	
5	
6	
7	
8	

NOTES

- DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED
- THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.

CONTRACTOR/CONSULTANT

TITLE	NAME	SIGN	DATE
DRAWN	J.C.		27 01 17
CHECKED	J.J.		27 01 17
DESIGNED	J.J.		27 01 17
CHECKED	A.D.		27 01 17

OPERATING DIVISIONS

TITLE	NAME	SIGN	DATE
PR. ENG./PR. TECH./PR. ARCH	ANDREW DALRY		27 01 17

REVISIONS

NO	DESCRIPTION	BY	CHKD	APPD	DATE
00	ISSUED FOR CONSTRUCTION	KC	JJ	AD	27-01-17

CONTRACTOR/CONSULTANT

TITLE	NAME	SIGN	DATE
DRAWN	J.C.		27 01 17
CHECKED	J.J.		27 01 17
DESIGNED	J.J.		27 01 17
CHECKED	A.D.		27 01 17

TRANSNET CAPITAL PROJECTS

PROJECT NUMBER	DD	FBS	DHS	DD	DD	DD	DD	DD	DD	DD	DD
10	9	2	4	7	0	1	2	5	1	0	0



CAPE TOWN OFFICE
WATERSIDE PLACE, SOUTH GATE
TYGER WATERFRONT
CARL CRONJE DRIVE
TEL: +27 (0)21 950 7500
FAX: +27 (0)21 950 7502
REG. No. 1966/00628/07



TRANSNET CAPITAL PROJECTS
TRANSNET LTD, (TRANSNET CAPITAL PROJECTS) REG. NO. 198000000
163 LYS KRIGE DRIVE, PLATTELOOF, 8001
TEL: 021 940 1999
FAX: 086 877 2465
PORT OF SALDANHA
IRON ORE TIPLER 3 PROJECT
BULK POWER UPGRADE
SUBSTATION
STANDARD PIPING DETAILS

STANDARD PIPING NOTES

1. GENERAL
Refer to Project Technical Specification for specific details of piping installation.
Pipes, strainers and other fittings up to 50mm may be screwed or flanged.
Valves, strainers and other fittings larger than 50mm must be flanged.
Thread must be in accordance with BS 21 and flanges to ASA standard or BS 4504 unless otherwise specified.
Galvanised piping must be screwed when smaller than 50 mm and flanged above 50 mm. Clean all piping before connecting.
Welding to galvanised piping or fittings is not permitted.
Where welding for whatever purpose is unavoidable the complete section must be hot dip galvanised after manufacture.
Cold galvanising is not acceptable.
Use full radius bends and sweep fittings wherever possible. Use elbows only under exceptional conditions.
Where it is necessary to reduce pipe size, use only reducing sockets and not bushes. Provide all pipelines with 15mm drain cocks at all low points in the system so that the pipe work can be drained of liquid without dismantling.
Install horizontal pipes with a slope of at least 1 in 500 to allow venting of air to the expansion tank wherever possible. Fit all pipes in such a manner as to prevent the formation of air locks and air pockets. Provide high points with automatic air vents or air bottles. Air vents or bottles must be designed for at least 1.5 times the working pressure of the system.
Arrange piping in plant rooms so that normal inspection and servicing of equipment is not obstructed.
Size pipes which are not dimensioned on drawings using the following criteria:
* The velocity must not exceed 2.5 m/s.
* The friction rate must not exceed 60 kPa per 100m length.
Pipe expansion joints, where required, shall be of the bellows type manufactured from stainless steel or may be of the Viking Johnson pipe coupling or equal where moderate expansion movements are to be accommodated.
Chilled water piping shall be black medium tubing, conforming to SANS 62-1. Screwed joints may be used for piping of diameter up to and including 50mm diameter whereas all piping in excess of this diameter shall be joined by the brazing process, using flanges where stated below.
Pipes of diameter in excess of 150mm shall be constructed of seamless black steel in accordance with SABS 62-1971 with welded joints only.
All black pipe fittings shall conform with SABS 509-1955.
Welding of pipework shall be carried out only by qualified welders and the Employer reserves the right to have cut for examination.
Connections to air handling units, pumps, chillers and other major equipment shall be flanged in the case of piping of diameter less than 65mm, to enable sections of the air conditioning system to be removed and replaced.
In all piping installations due allowance shall be made for the thermal expansion and contraction of the piping material.
The chilled water system and the hot water system shall each be supplied with expansion tanks of the asbestos or minimum water volume of 150 litres, complete with ball valve, quick-drain and drain connections.
Automatic air release valves shall be fitted at the top of the riser pipe stacks, and in any other positions in the hot water, chilled water and condenser water systems where necessary to prevent airlocks and to facilitate commissioning of the pumping systems.
Condenser water pipes shall be of medium or heavy black steel piping to BS 1387 or SANS 719 specifications but shall be hot dip galvanised after manufacture with a minimum coating of 300 g/m².
Fittings shall be of heavy galvanised malleable steel or malleable iron with galvanising as above, and shall be manufactured to BS 1740 or SABS 509 specifications. Flanges shall be of cast iron or steel to BS 4504 or ASA standards and shall be galvanised.
Drain pipes must all have a gradient of 1:50.
Provide all drain pipes with cleaning eyes at each change in pipe direction.
Domestic grade copper piping could be used for drain piping with elbows and fittings of the compression or solder type.

2. HANGERS AND SUPPORTS
Spring hanger mountings for vibration damping shall be used in all plant rooms. Pipe hangers shall be adjustable in height to set the pipe gradient.
The maximum horizontal support spacing and hanger rod diameters shall be as follows for steel chilled water, condenser water, hot water

Nominal Pipe size (mm)	Hanger Rod ø (mm)	Span (m)
12-32	6	2.5
40-65	10	3.0
80-100	12	3.5
125-150	16	4.0
200-300	22	5.0
350-500	25	6.0

The maximum horizontal support spacing for condensate (from AC units) pipes shall be as follows:

Nominal Pipe Size (mm)	Span (m)
12-20	1.0
25-40	2.0
50 and over	2.5

Hangers shall be provided at a maximum spacing of 1 metre from each elbow or pipe fitting.

3. VALVES
Valve materials shall be selected for the particular application.
For detailed valve specification refer to Project Technical Specification.
Strainers type valves or approved equivalent will be accepted.
Gate valves shall only be used as isolating or shut off valves.
Globe valves shall be used for throttling or balancing purposes.
Butterfly valves shall be used for isolating and shut off purposes.
Diaphragm valves shall only be used as shut-off purpose.
Check valves shall be of the non-stem type for horizontal or vertical installation.
Plug cocks shall be used for balancing purposes.
Calibrated balancing valves shall be of the plug cock or globe type with bronze or cast iron valve bodies, bronze disc, internal seals, screwed ends, up to 50 mm and flanged ends for 65 mm ø and over. Valves shall be TOUR AGENTUR or approved equivalent.

4. STRAINERS
Strainers shall be of the angle or Y-type. Strainers up to 50 mm shall have screwed ends and strainers of 65 mm ø and above, shall have flanged ends.
Screens shall be perforated as follows:

Strainer Size (mm)	Perforation Size (mm)
10-50	1.0
65-150	1.5
200 and over	2.0

Strainers shall be provided with a 50mm blowdown pipe and cock on the cap piped to the nearest drainpoint. Flexible piping shall be used.
Strainers shall be installed on the inlet side of all hot water, chilled water and condenser water pumps.

5. GAUGES
Pressure gauges for water shall be of the Bourdon type and glycerine filled. Pressure gauge dials shall have a diameter of at least 100 mm.
A gauge cock and sight glass shall be provided with each gauge.

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Flexible connections shall be Mason Industries SAFEFLEX SFDEJ (double sphere type) or approved equivalent, which shall be provided to the suction and discharge pipes for chilled, condenser and hot water pumps.

7. TESTING OF PIPE INSTALLATIONS
All pipe fittings shall be tested hydrostatically up to a pressure of 1000 kPa or 1.5 times the maximum system pressure, whichever is the higher value.
Tests shall be carried out before the application of insulation.
Water systems shall be filled with water and air vented at least 24 hours before the test. The test pressure shall be maintained for a period of at least 2 hours after the pressure testing pump has been disconnected.

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Upon the completion of all pressure tests throughout the building complex, and prior to the commencement of commissioning of pumping systems, the entire system shall be drained and flushed to ensure the removal of waste jointing material, accumulated dirt, and sundry construction materials.
Refer to Water Treatment section for method of cleaning and flushing a piping reticulation.

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Refer to Project Technical Specification for specific details of "Water Treatment".

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All chilled water pipework, including pipe fittings and connections, shall be insulated with Polyisocyanurate (PIC) foam, with the necessary vapour barrier.
The insulation shall be applied as noted on the Detail Drawing.
Rigid preformed piping sections shall be used where applicable. Where not possible, Blocks/Batts shall be shaped to suit the pipe fitting, and securely wired/banded in position. All joints and voids shall be filled with mineral wool. The thickness of the insulation shall be maintained over the pipe fitting.
All piping shall be supported from the outside of the insulation as per Details shown. The compressive strength of the insulation shall be determined to ensure no flattening of the insulation (i.e. the insulation must maintain its thickness). Should the weight of the pipe, plus contents, cause the insulation to flatten, then either provide "saddles", or increase the density of the insulation over the bracket width.

REFRIGERANT PIPEWORK AND INSULATION
Refrigerant pipe work shall be installed on site in accordance with Project Technical Specification, and generally as shown on the Equipment layout drawings. All indoor and outdoor Refrigerant pipework shall be insulated and protected by sturdy covers against accidental damage, as needed.

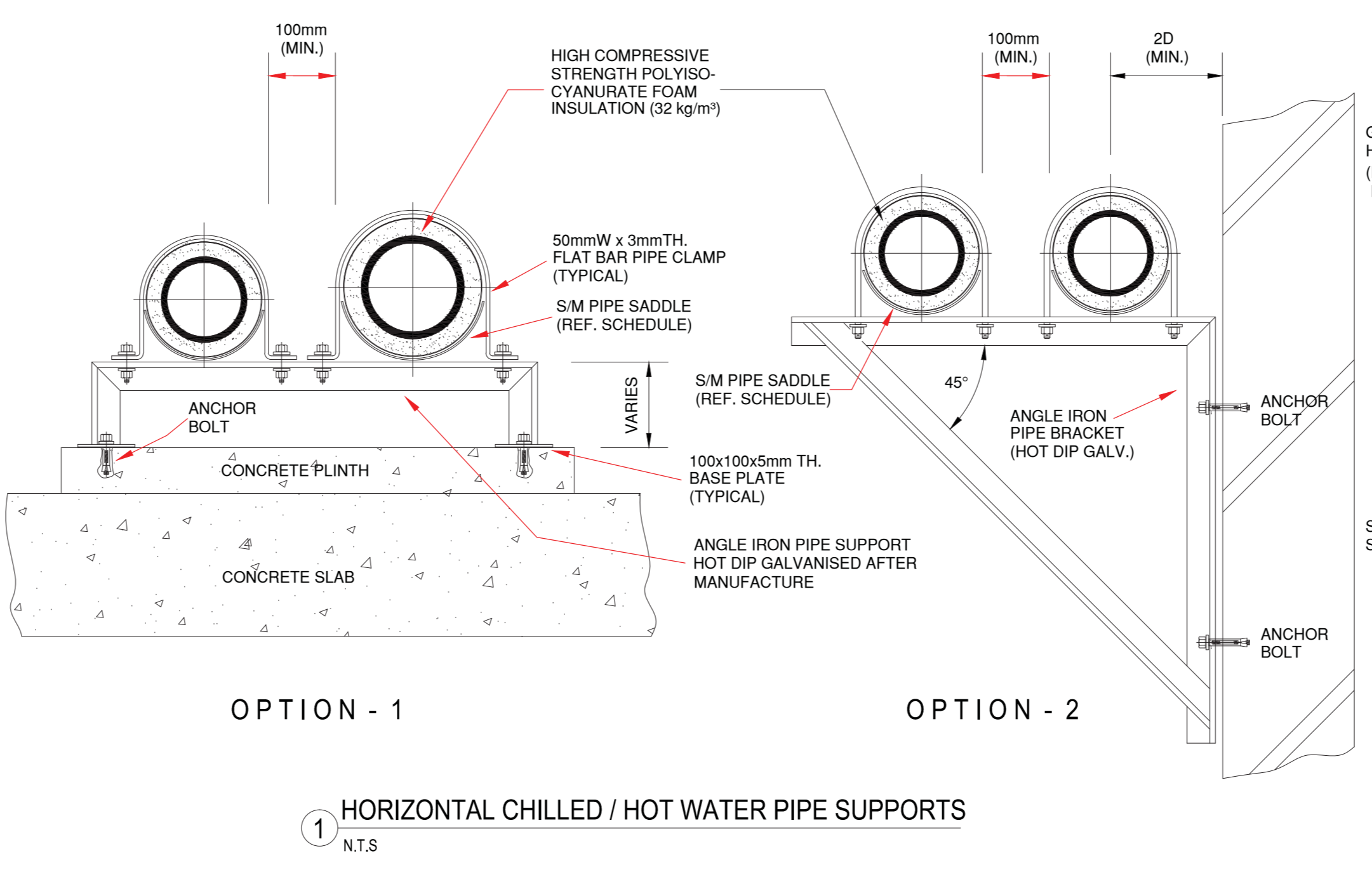
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(c) Piping to be sized to ensure the correct Refrigerant velocities and pressure drops.
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(e) All internal Refrigerant pipework shall be insulated with Armaflex, or approved equal.
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(h) Refer to "Typical Refrigerant Piping Diagram" detail below.
(i) All Refrigerant pipes run / lengths to be in accordance with Supplier Requirements.
(j) All Refrigerant pipes to run in cable trays. When external to the Building, a protective cover must be fitted.

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(a) To be fitted at the bottom of all risers.
(b) To be fitted every 7 metres up a riser.
(c) No traps near the suction inlet of a compressor.

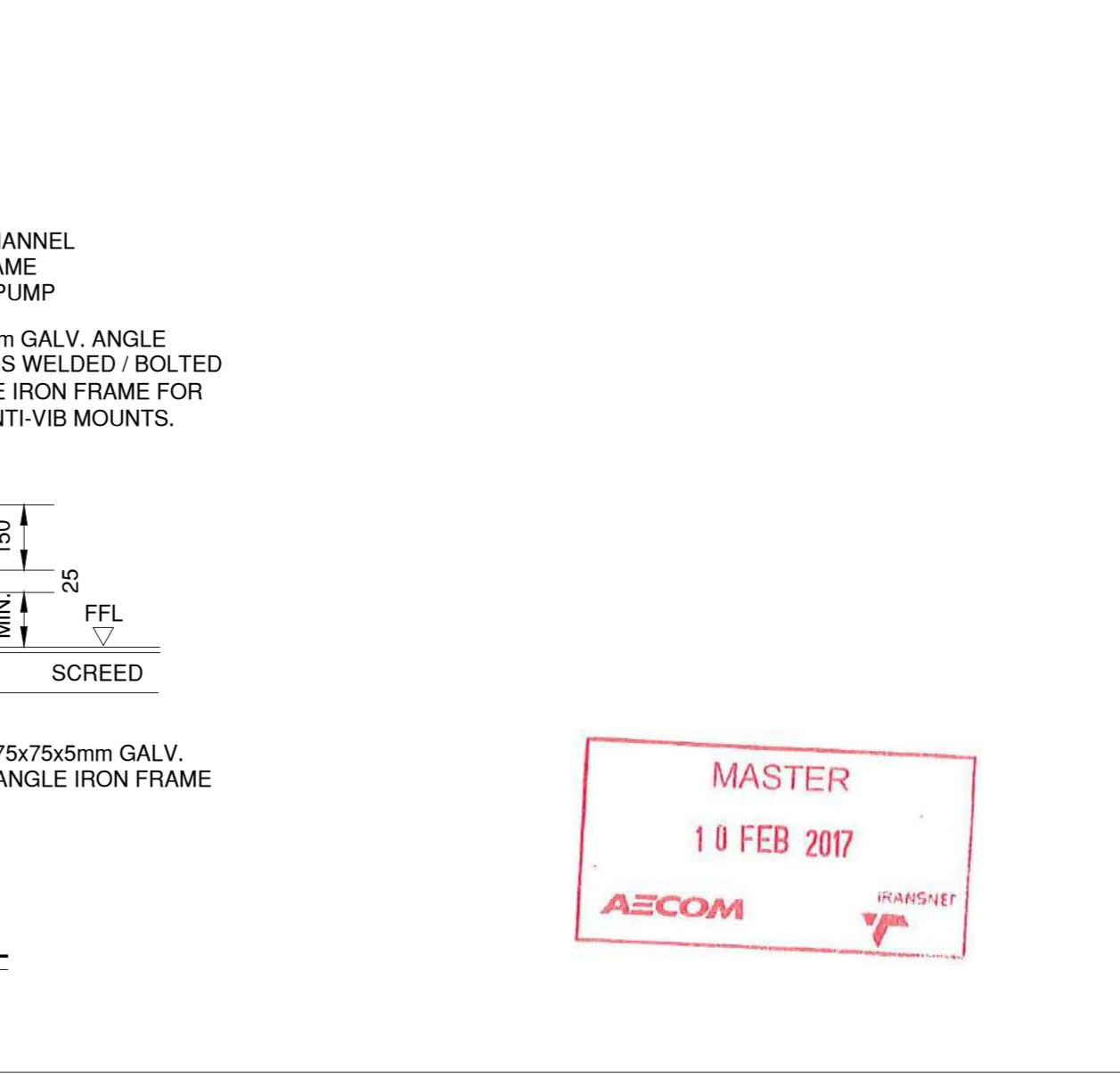
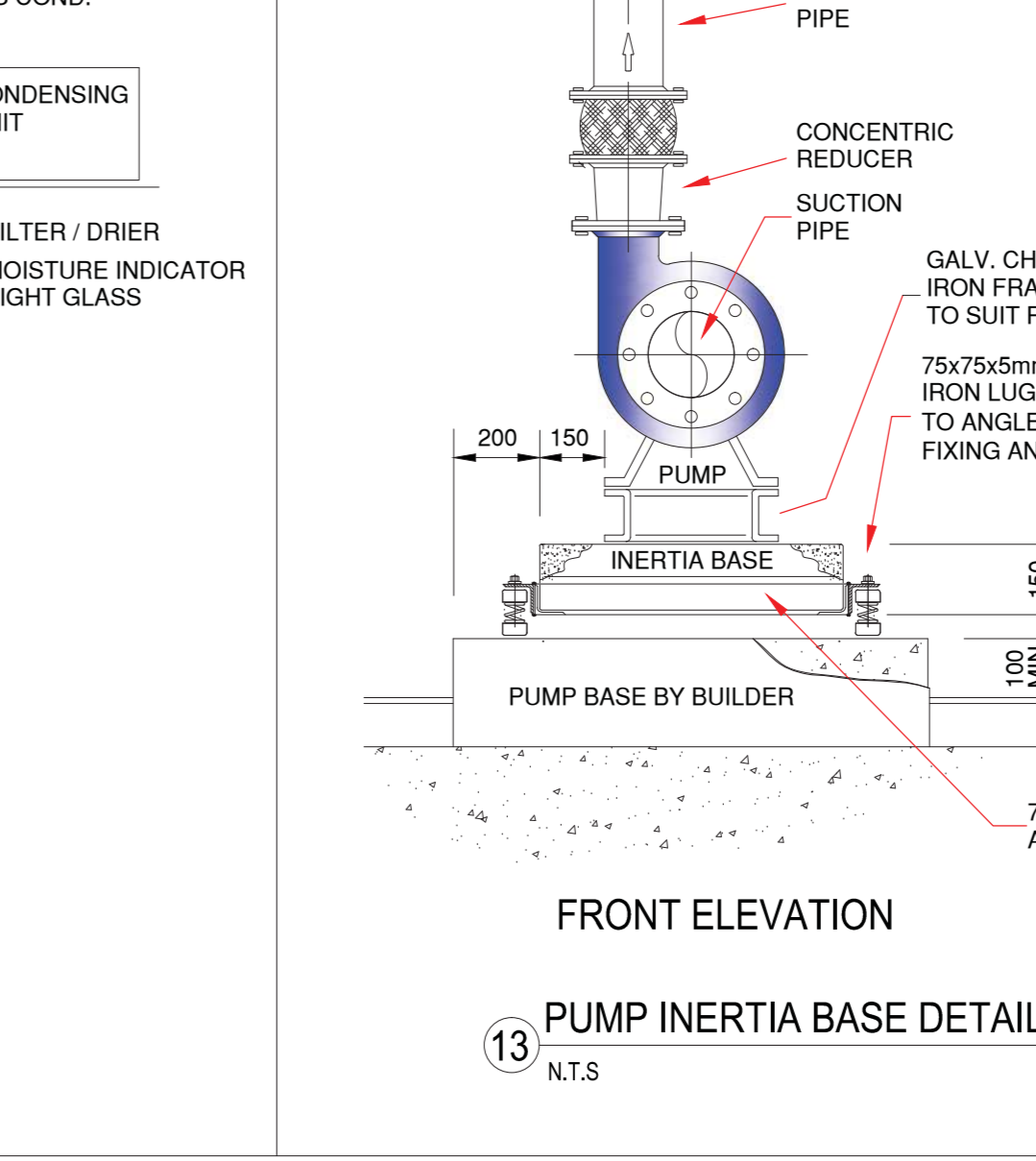
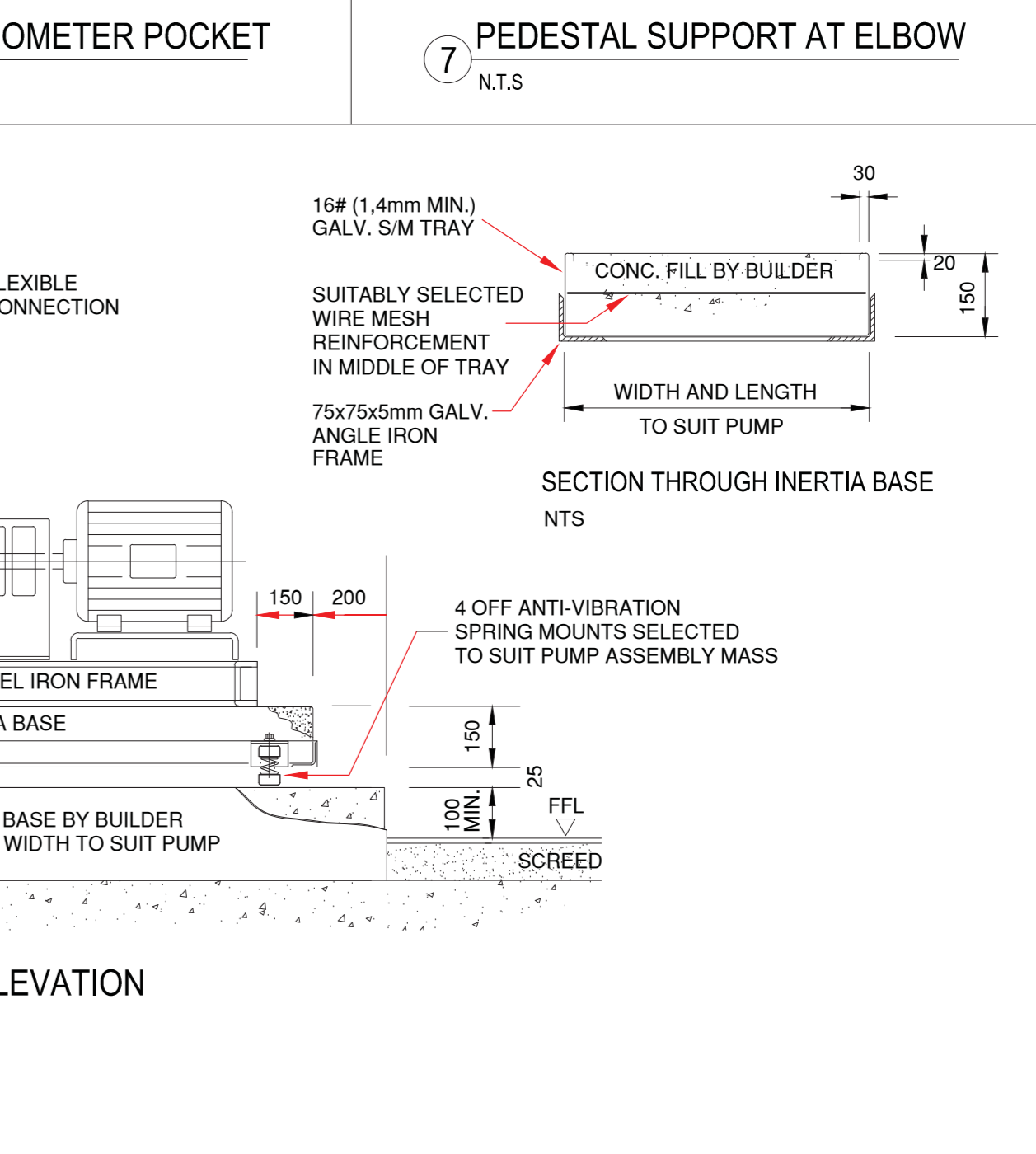
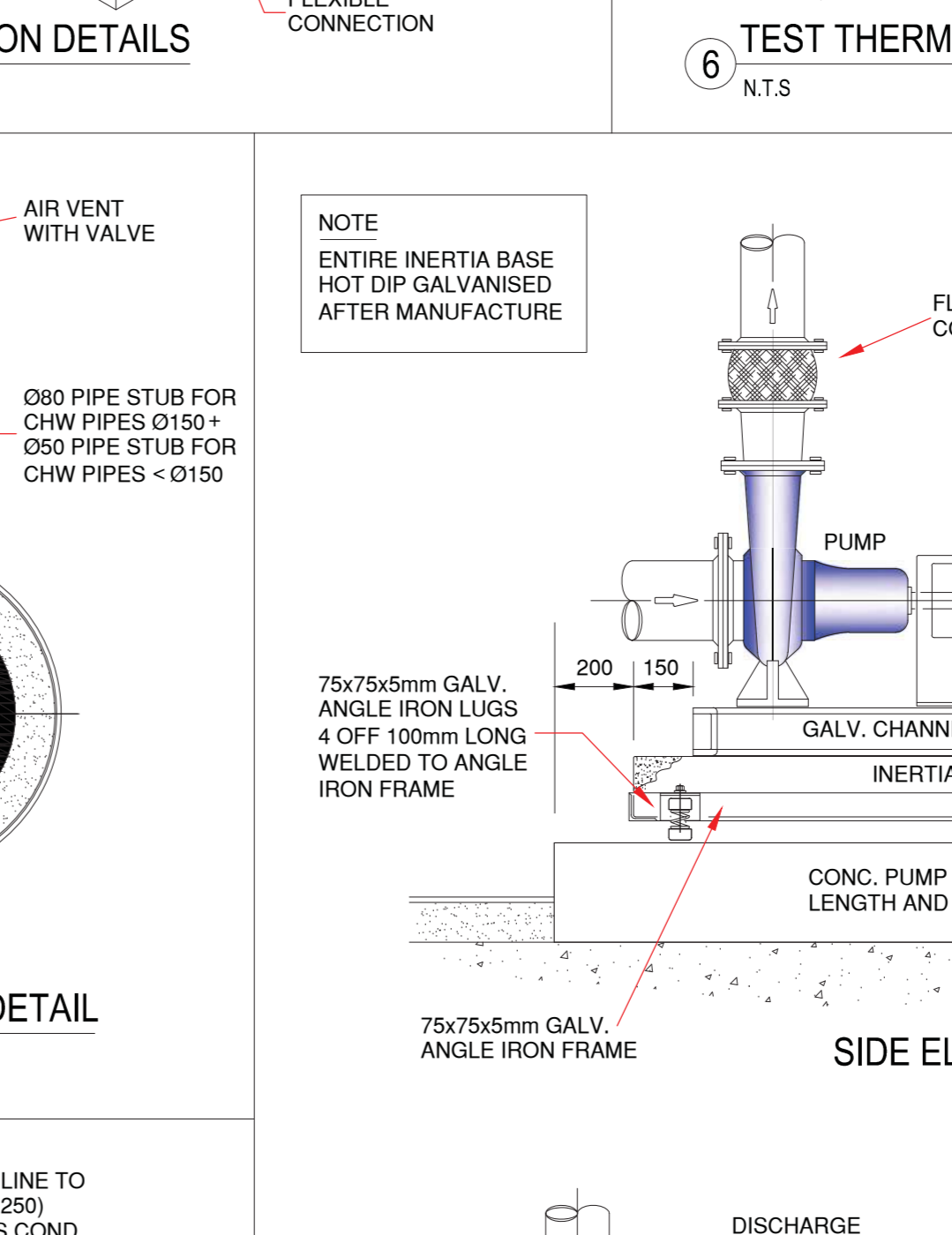
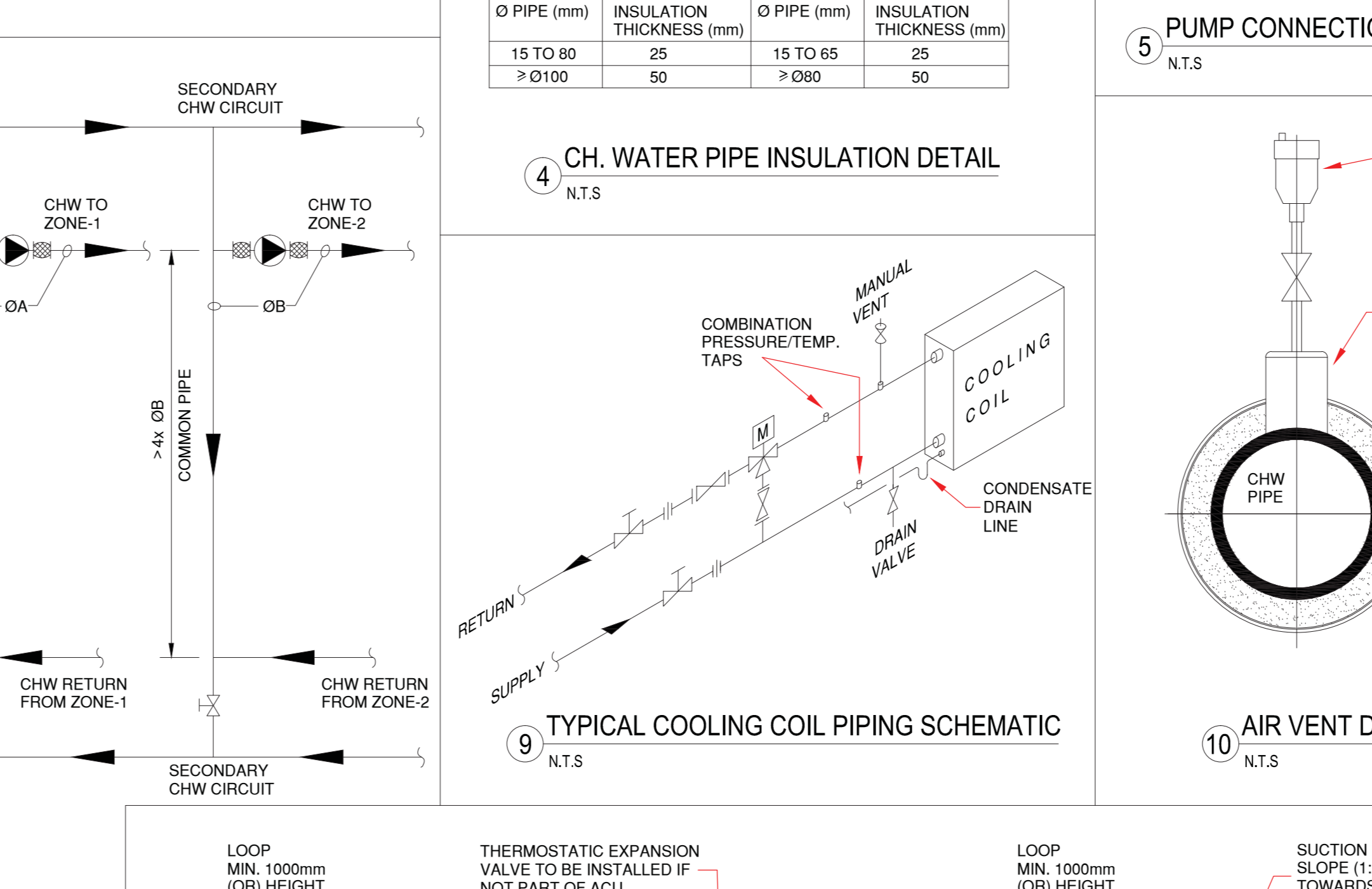
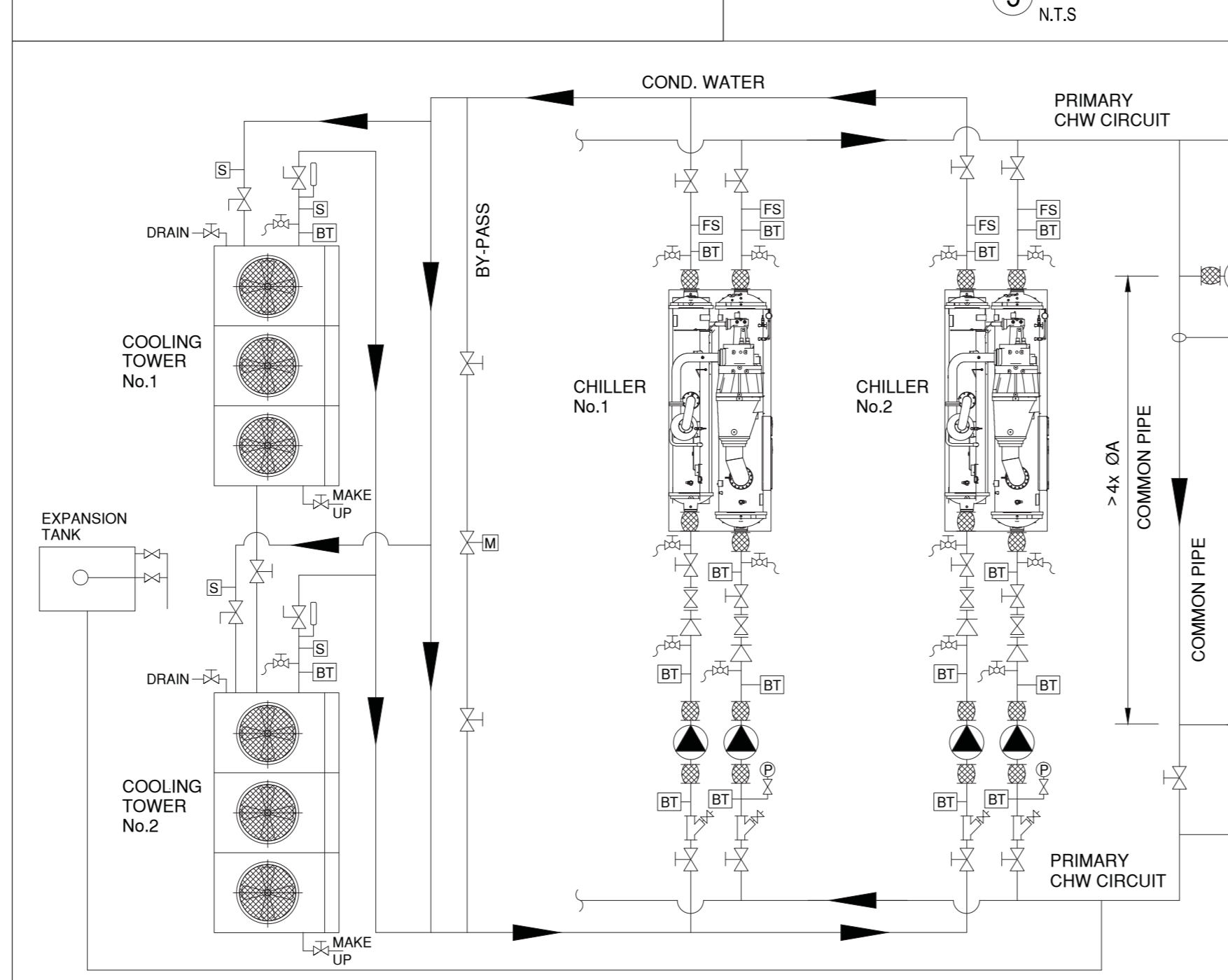
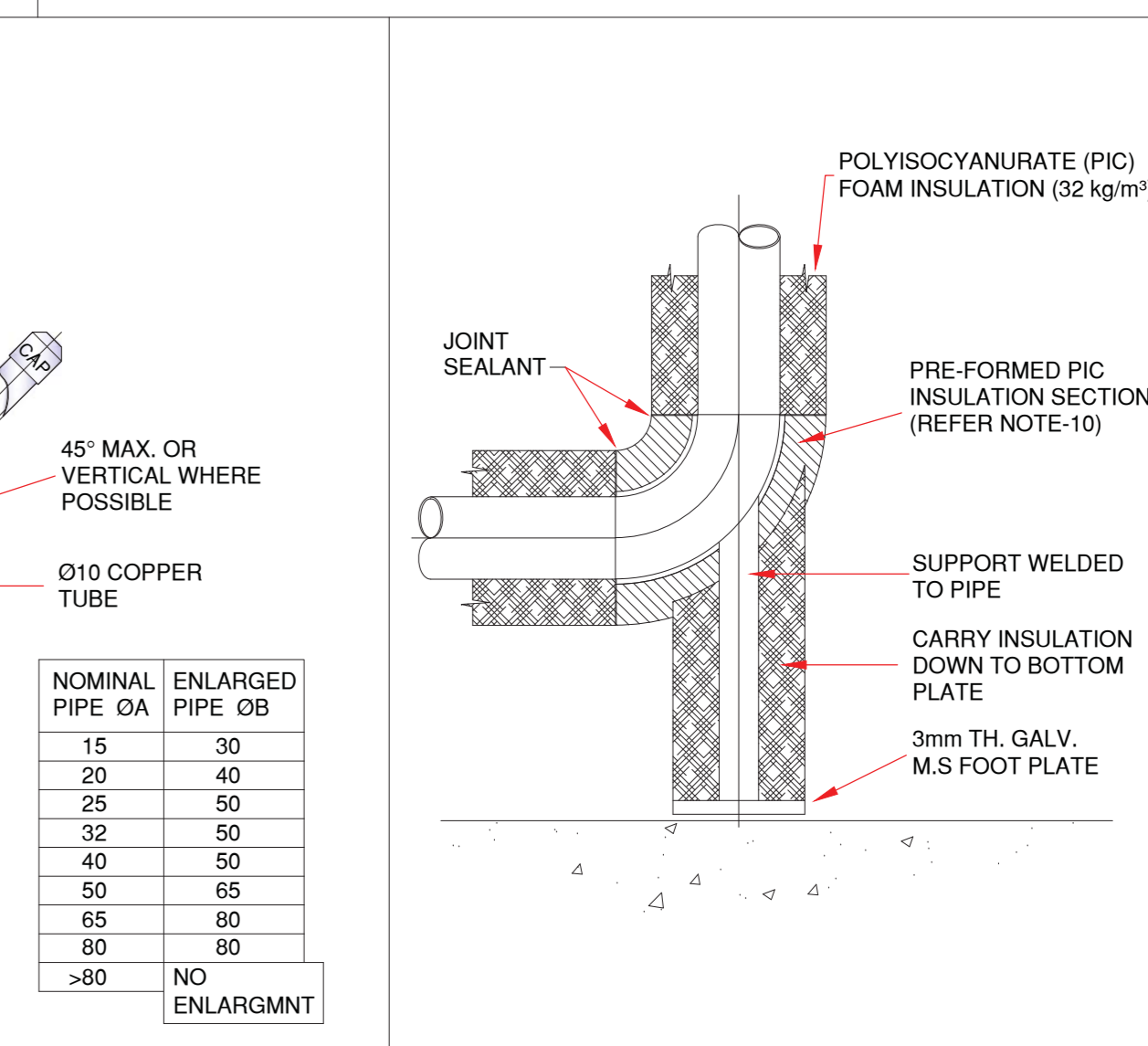
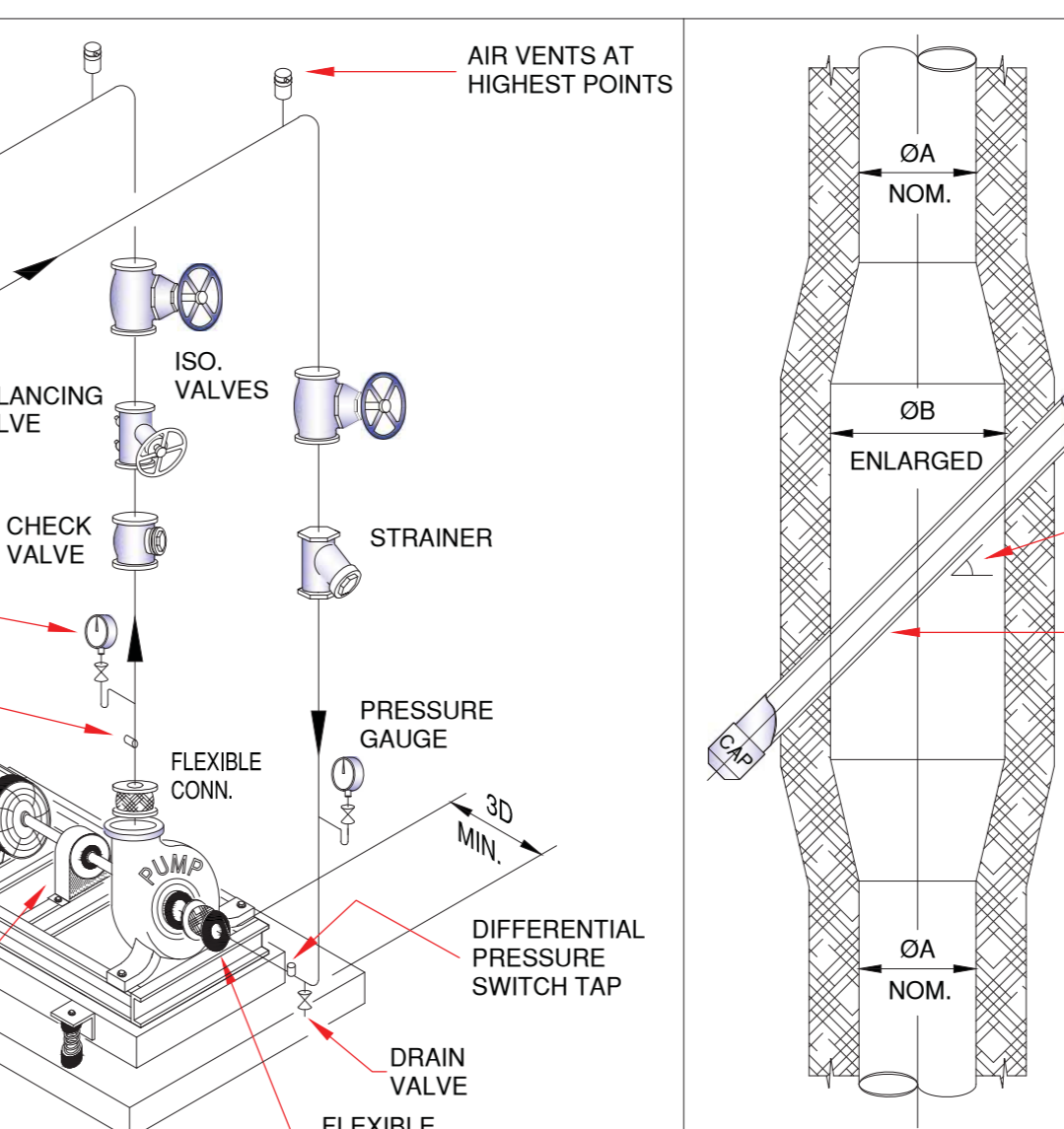
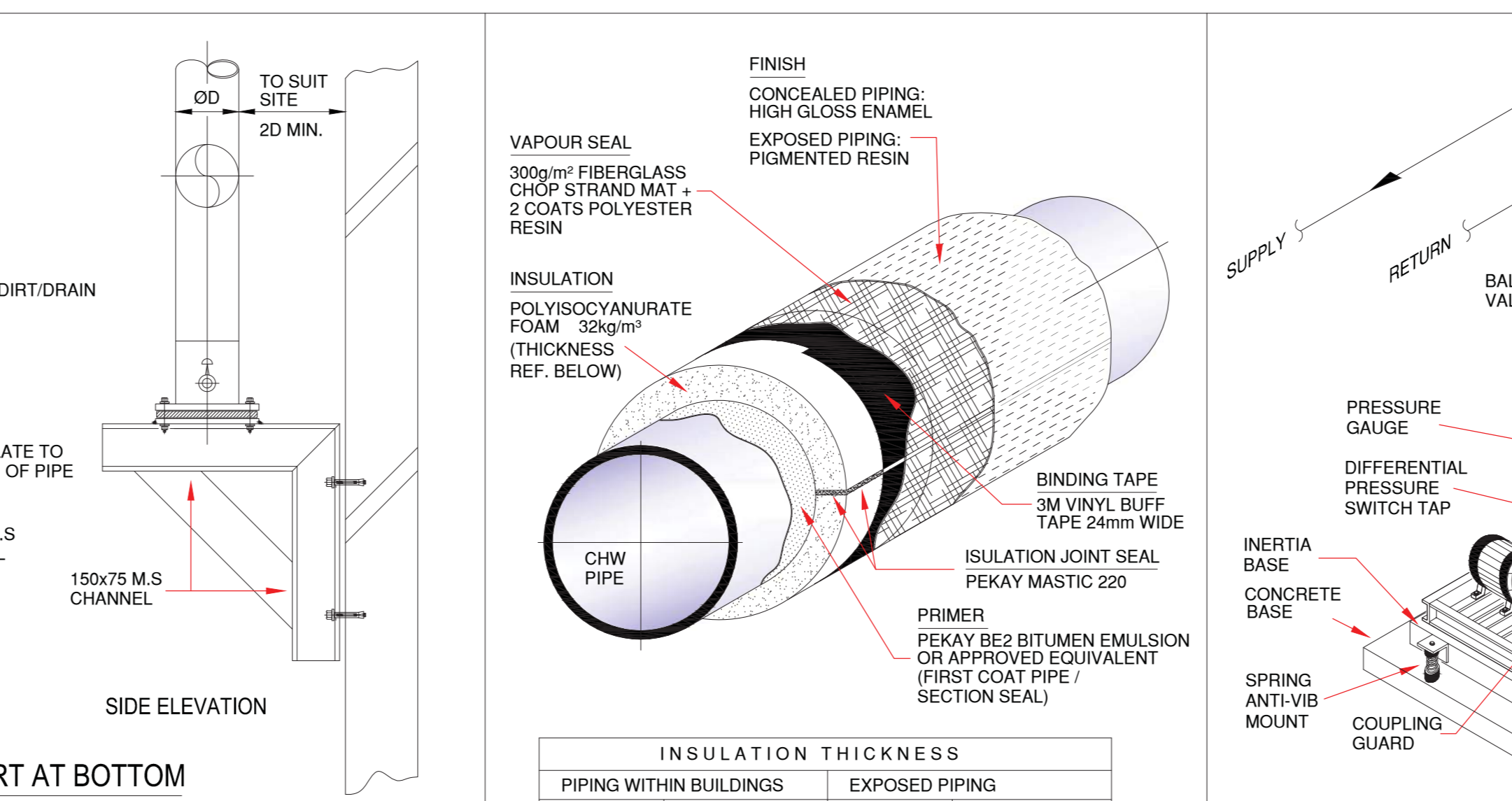
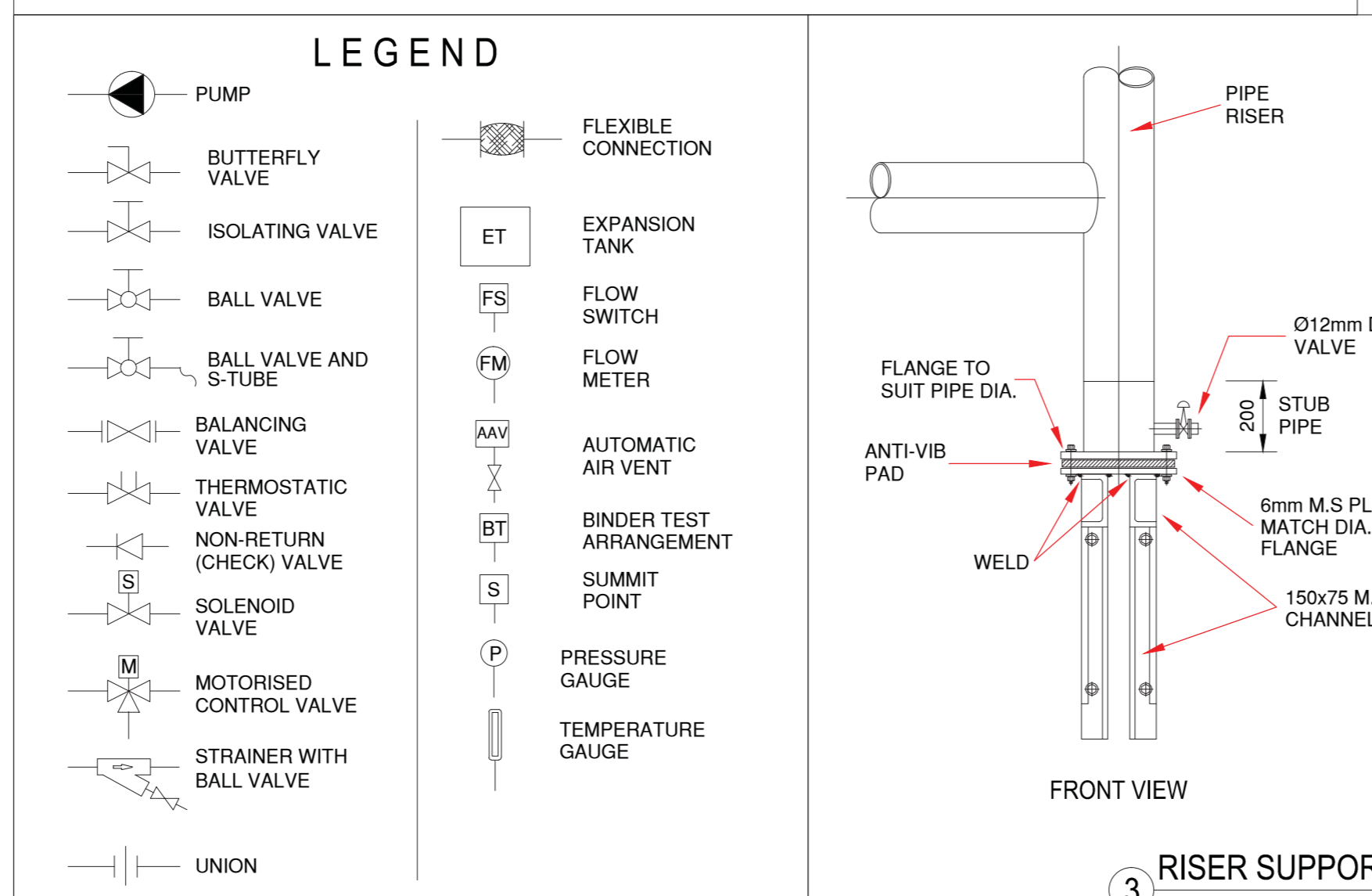
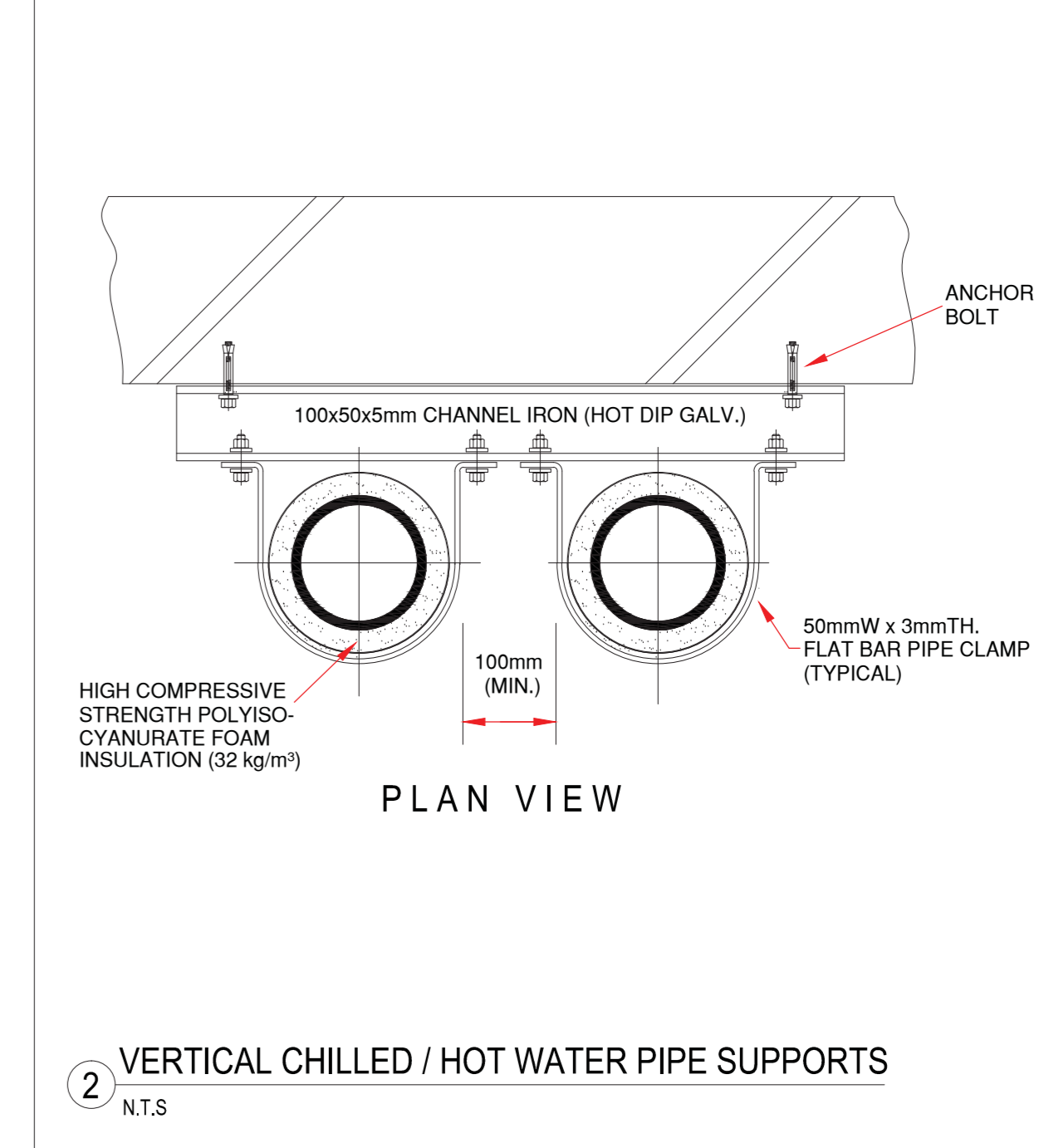
(iii) Before starting a system ensure that the Pipework is clean, and free of Contaminants.
(a) Contaminants: Air, Moisture, Copper Oxide, Metal chips and dirt.
(b) Contaminants will cause Compressor failure.
(c) Purge system with dry Nitrogen.
(d) Draw a vacuum.

(iv) Oil return to Compressor
(a) Oil travels with the Refrigerant around the system.
(b) Excessive lengths of pipework is detrimental to oil return to the Compressor.
(c) After start-up of the system, check Compressor oil level, and top up if necessary.
(d) Should the pipe lengths be run beyond the Manufacturer's recommendations, then topping up of Compressor oil is necessary.

(v) Suction line Accumulator
(a) Required to prevent Liquid flooding back to the Compressor, after the system is shut down.
(b) Systems which have excessive lengths of pipe, and fitted with "Capillary tube metering devices"
(c) Suction Accumulator to either be part of the Condensing unit, or fitted within the Suction line.
(d) Suction Accumulator must be correctly sized.



NOMINAL PIPE Ø (mm)	1200	1500	1800	2100	2400	2700	3000	3300	3700
80	100	100	100	100	100	100	100	100	150
100	100	100	100	100	100	100	100	100	200
150	150	150	150	150	200	200	200	200	200
200	200	200	200	200	200	200	200	200	300
250	200	200	200	300	300	300	300	300	300
300	200	200	300	300	300	300	300	300	300
400	300	300	450	450	450	450	450	450	450



NOTES
1. DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED
2. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.

DRAWING NO.	REFERENCE
1	
2	
3	
4	
5	
6	
7	
8	

REFERENCE DRAWINGS

NO	DESCRIPTION	BY	CHKD	APPD	DATE
00	ISSUED FOR CONSTRUCTION	KC	JJ	AD	27-01-17

REVISIONS

NO	DESCRIPTION	BY	CHKD	APPD	DATE
00	ISSUED FOR CONSTRUCTION	KC	JJ	AD	27-01-17

CONTRACTOR/CONSULTANT
TITLE NAME SIGN DATE

TRANSNET CAPITAL PROJECTS
DRAWN: K.C. 27 01 17
CHECKED: J.J. 27 01 17
DESIGNED: A.D. 27 01 17
CHECKED: J.J. 27 01 17

OPERATING DIVISIONS
TITLE NAME SIGN DATE

PR. ENG./PR. TECH./PR. ARCH
NAME: ANDREW DALRY
SIGNATURE: [Signature]
REG. NUMBER: 517004
SCALE: N.T.S.

PROJECT NUMBER
IAO 19247012510MST0090100AE

PORT OF SALDANHA
IRON ORE TIPLER 3 PROJECT
BULK POWER UPGRADE:
MAIN INTAKE SUBSTATION
STANDARD PIPING DETAILS

AECOM
CAPE TOWN OFFICE
WATERLOO PLACE, SOUTH GATE
TYGER WATERFRONT
CARL CRONJE DRIVE
TEL: +27 (0)21 950 7500
FAX: +27 (0)21 950 7502
REG. NO. 1996/00626/07

TRANSNET
TRANSNET LTD (TRADING AS TRANSNET CAPITAL PROJECTS) REG NO. 1980000000
TABLE BAY BUILDING, TYGERBERG PARK, TEL: 021 940 1999
163 LYS KRIGE DRIVE, PLATTELOOF, FAX: 086 877 2465
8001

MASTER
18 FEB 2017
ASCOM