

BM 362/1/18 - 1802218 - Ontario Shores Powerhouse/1802218-0400v4
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MOTORIZED DAMPER SCHEDULE						
SYMBOL	SYSTEM	LOCATION	ROUGH OPENING SIZE (ft.)	QUANTITY	MANUFACTURER	ACTUATORS
VMD 1, 2	VENTILATION/COMBUSTION AIR DG-1, 2	GEN. ROOM	25.5'x16.7'	2	TAMCO 9000BF	BELIMO NORMALLY OPEN-SPRING OPEN, POWER TO CLOSE WITH AUXILIARY SWITCH
EMD 1	EXHAUST AIR DG-1, 2	GEN. ROOM	23.5'x14'	2	TAMCO 9000BF	BELIMO NORMALLY OPEN (MODULATING WITH AUXILIARY SWITCH)
RMD 1, 2 & 3	RECIRCULATION AIR DG-1, 2	GEN. ROOM	8'x4'	6	TAMCO 9000BF	BELIMO NORMALLY CLOSED (MODULATING WITH AUXILIARY SWITCH) SEE NOTE 3
EFMD 1, 2	EXHAUST FAN EF-1, 2	GEN. ROOM	4'x2'	2	TAMCO 9000BF	BELIMO NORMALLY OPEN
EFMD 3	INTAKE EXH. FAN EF-3	ELEC. ROOM	3'x2'	1	TAMCO 9000BF	BELIMO NORMALLY OPEN
EFMD 4	EXHAUST AIR EF-3	ELEC. ROOM	3'x2'	1	TAMCO 9000BF	BELIMO NORMALLY OPEN
EFMD 5	INTAKE EF-4	TANK ROOM	2'x2'	1	TAMCO 9000BF	BELIMO NORMALLY OPEN
EFMD 6	EXHAUST AIR EF-4	TANK ROOM	1.5'x1.5'	1	TAMCO 9000BF	BELIMO NORMALLY OPEN
NOTES:						
1. THE DAMPERS SHALL BE SUPPLIED & INSTALLED BY THE MECHANICAL CONTRACTOR. DAMPER ACTUATORS & CONTROL WIRING SHALL BE PROVIDED BY CONTROLS CONTRACTOR.						
2. ALL DAMPERS WITHOUT EXCEPTION SHALL BE THERMALLY INSULATED WITH THERMALLY BROKEN FRAMES.						
3. RECIRCULATION MOTORIZED DAMPER RMDX-2 IS SITUATED AT THE TOP OF PLENUM. (TYP. OF 2)						
RMDX-1 IS A DOOR DAMPER ON HINGES THAT ALLOW ACCESS TO THE PLENUM (TYP. OF 2). RMDX-3 IS A STATIONARY DAMPER OR THE SIDE OF THE PLENUM. (TYP. OF 2)						
4. FIELD MEASURE AND COORDINATE WITH OTHER TRADES PRIOR TO SUBMITTING SHOP DRAWINGS.						
5. OVERALL DAMPER SIZES ARE SHOWN. CONTRACTOR SHALL DETERMINE THE NUMBER OF DAMPER SECTIONS REQUIRED TO FILL ROUGH OPENING AND NUMBER OF ACTUATORS REQUIRED TO PROVIDE THE NECESSARY TORQUE TO OPERATE THE DAMPER SECTIONS.						

SILENCER SCHEDULE															
NO.	QUANTITY	WEIGHT Kg (lbs)	SERVICE	PERFORMANCE DATA									CONSTRUCTION	REMARKS	
				CAPACITY l/s (CFM)	PRESS. DROP Pa (inch WC)	MINIMUM INSERTION LOSS VALUES (dB)									
						63	125	250	500	1000	2000	4000	8000		
SL-1, SL-2	2	6873 (15,153)	GEN. RM. EXH.	46,718 (99,000)	(0.08)	24	35	48	55	55	55	54	35	7163x4267x3048 (23.5'x14'x10')	SEE NOTE 1, 3, 5
SL-3, SL-4	2	5236 (11,545)	GEN. RM. INTAKE	50,163 (106,300)	(0.05)	11	21	36	55	55	55	48	32	7772x5090x1524 (25.5'x16.7'x5')	SEE NOTE 1, 3, 5
SL-5, SL-6	2	49 (107)	GEN. ROOM EF-1 & EF-2	1210 (2564)	(0.18)	9	16	28	39	40	31	22	17	508x610x1524 (20"x24"x60")	SEE NOTE 2, 3, 4, 5
SL-7	1	37 (81)	TANK RM. EF-4	315 (668)	(0.04)	10	16	28	43	44	39	27	18	457x457x1829 (18"x18"x60")	SEE NOTE 1, 3, 5
SL-8	1	43 (95)	EL. RM. EF-3	812 (1,720)	(0.24)	10	16	28	44	46	38	27	19	508x356x1524 (20"x14"x72")	SEE NOTE 1, 3, 5
SL-9, SL-10	2	1121 (2471)	GEN. EXHAUST MUFFLER	8,989 (19,049)	(0.17)	25	45	50	45	35	30	30	30	1372x4445 (54"Dia. x 175"L)	SEE NOTE 2, 3, 4, 5
NOTES:															
1. EH PRICE SILENCERS ARE BASIS OF DESIGN, OTHERS MAY BE APPROVED AT THE SOLE DISCRETION OF THE OWNER.															
2. SILEX SILENCERS ARE BASIS OF DESIGN, OTHERS MAY BE APPROVED AT THE SOLE DISCRETION OF THE OWNER. SILEX JDD5 HOSPITAL CYLINDRICAL SILENCER (MUFFLER), ULC LISTED.															
3. PERFORMANCE, WEIGHTS AND DIMENSIONS MAY CHANGE FROM MANUFACTURER TO MANUFACTURER. MAKE THE NECESSARY ALLOWANCES TO ACCOUNT FOR THESE CHANGES INCLUDING BUT NOT LIMITED TO: PERFORMANCE, INSTALLATION, SUPPORTS, ETC.															
4. SIDE IN, SIDE OUT, 508mm (20") FLANGE CONNECTION.															
5. FIELD MEASURE AND COORDINATE WITH OTHER TRADES PRIOR TO SUBMITTING SHOP DRAWINGS.															

UNIT HEATER SCHEDULE							
UNIT	LOCATION	MANUFACTURER	MODEL	OUTPUT		MOTOR	REMARKS
				KW	MBH	V/PH/Hz	
UH-1	GEN. ROOM	OULLET	OASO3038	3	10.2	240/1/60	7 ₅₀ 510 240
UH-2	GEN. ROOM	OULLET	OASO3038	3	10.2	240/1/60	7 ₅₀ 510 240
UH-3	GEN. ROOM	OULLET	OASO3038	3	10.2	240/1/60	7 ₅₀ 510 240
UH-4	GEN. ROOM	OULLET	OASO3038	3	10.2	240/1/60	7 ₅₀ 510 240
UH-5	ELEC. ROOM	OULLET	OASO3038	3	10.2	240/1/60	7 ₅₀ 510 240
UH-6	ELEC. ROOM	OULLET	OASO3038	3	10.2	240/1/60	7 ₅₀ 510 240
UH-7	TANK ROOM	OULLET	OASO2038	2	6.8	240/1/60	7 ₅₀ 510 240
UH-8	TANK ROOM	OULLET	OASO2038	2	6.8	240/1/60	7 ₅₀ 510 240
NOTES: 1. PROVIDE WALL MOUNTED THERMOSTATS UNLESS NOTED OTHERWISE.							

FUEL MONITORING SYSTEM					
TAG	MAKE	MODEL	DESIGNATION	V/PH/Hz	REMARKS
FM-1	VEEDER ROOT/INCON	—	TANK LEVEL & LEAK DETECTION	120/1/60	PROVIDE POWER AND CONTROL WIRING TO CONNECT TO BAS AND ALL FUEL SENSORS
<u>NOTES:</u> 1. PROVIDE CHIPKIN INTERFACE CARD FOR INTEGRATION WITH HONEYWELL BAS SYSTEM.					

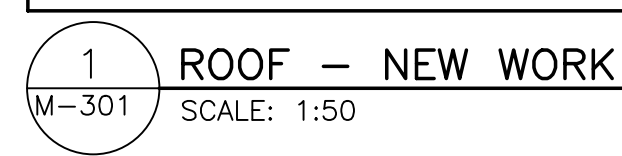
FUEL SENSOR SCHEDULE						
DESIG.	DESCRIPTION	LOCATION	QUANTITY	MAKE	SUGGESTED MODEL NO.	REMARKS
FLD	FLOOR LEAK DETECTOR	VARIOUS	5	VEEDER ROOT	794380-208	SENSORS TO BE ULC LISTED. SEE NOTE 2
PTD	PUMP TRAY LEAK DETECTOR	GEN. ROOM	2	BY PUMP MFR.	—	SEE NOTE 3
CH-1	CRITICAL HIGH (DAY TANK)	TANK ROOM	2	K-TECH	—	SEE NOTE 3
CH-2	CRITICAL HIGH (MAIN TANK)	TANK ROOM	1	K-TECH	—	SEE NOTE 2
HLF	S-LEVEL FLOAT (DAY TANK)	GEN. ROOM	2	K-TECH	—	SEE NOTE 3
CL	CONTINUOUS LEVEL SENSOR (MAIN TANK)	TANK ROOM	1	VEEDER ROOT	846391-307	SEE NOTE 2
NOTES:						
1. ALL SENSORS SHALL BE CERTIFIED FOR INTENDED USE AS PER CSA B139-15 AND TSSA REQUIREMENTS, ULC AND/OR CSA LISTED.						
2. WIRE SENSORS TO VEEDER ROOT CONSOLE.						
3. WIRE SENSORS TO PUMP CONTROL PANEL.						
4. BASIS OF DESIGN SENSORS SHOWN OTHERS MAY BE ACCEPTED AT SOLE DISCRETION OF OWNER.						
5. PROVIDE POWER TO OVERFILL ALARM CONSOLE LOCATED OUTDOORS BY TANK FILL PIPE.						

DAY TANK SCHEDULE							
TAG	MANUFACTURER	PART NO.	LOCATION	CAPACITY (L)	QUANTITY	REMARKS	
DT-1, DT-2	WESTEEL	—	GENERATOR ROOM	1100	2	TANK SHALL BE OBLONG DOUBLE WALL CONTAINMENT TANK, ULC S602 LISTED AND LEAK TESTED. VACUUM MONITORED TANK. PROVIDE ALL REQUIRED OPENINGS AS INDICATED. INSTALL AS PER MANUFACTURER RECOMMENDATION/INSTRUCTIONS AND AS PER AUTHORITIES HAVING JURISDICTION. OBTAIN ALL TSSA APPROVALS. TANK SHALL BE BLAST CLEANED WITH ONE COAT PRIMER AND FINISHED WITH ONE COAT WHITE ENAMEL. REFER TO SPECIFICATION 33 56 13 FOR FURTHER DETAILS. ALL TANK COMPONENTS AND FITTINGS CONNECTED TO THE TANK MUST BE RATED FOR MINIMUM OF 70kPa (10psig) AS PER CSA B139-15 10.5.1.2	

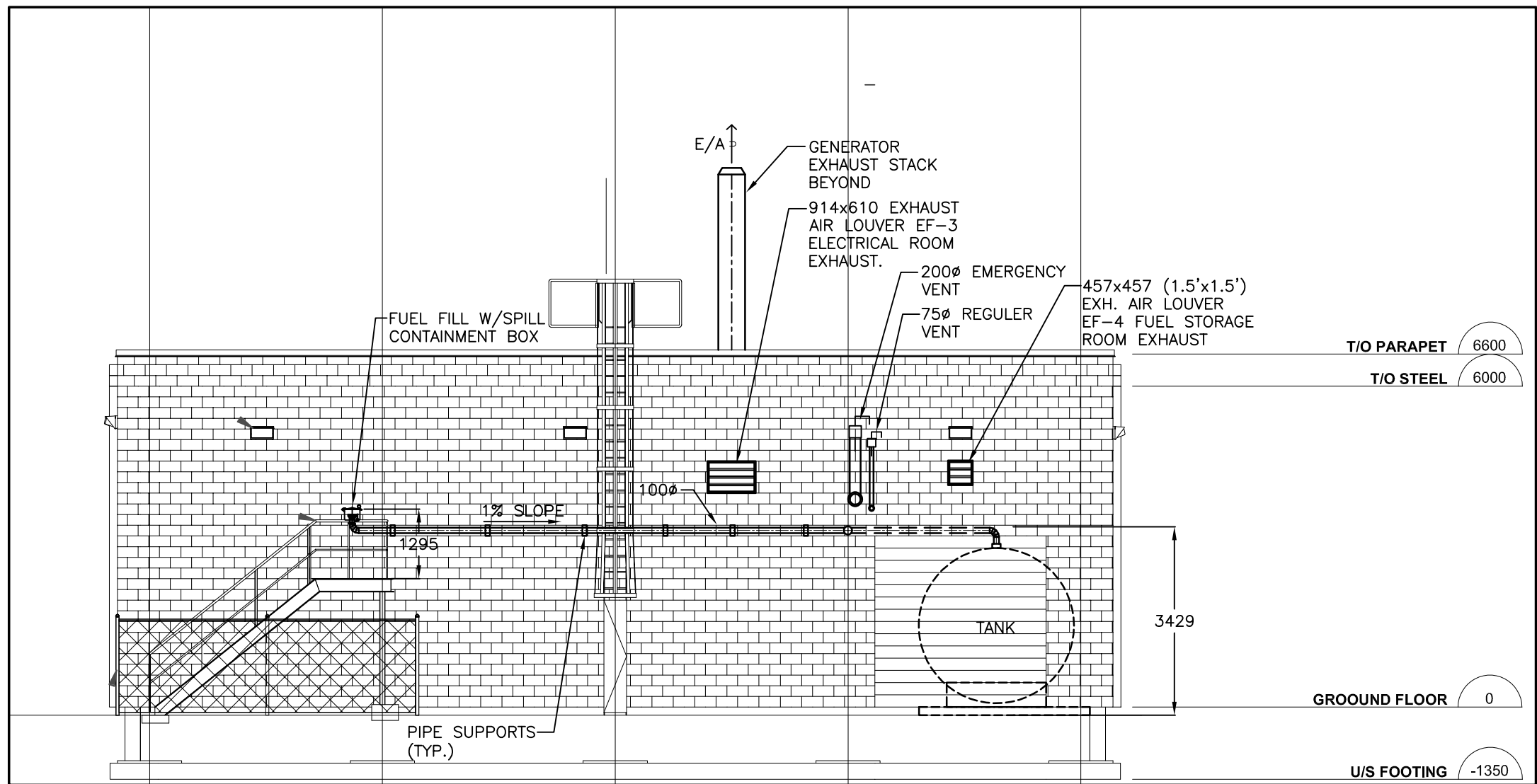
FUEL TRANSFER PUMP SCHEDULE														
TAG	LOCATION	MANUFACTURER	MODEL	SERVICE	QUANTITY	WEIGHT (KG)	FLOW (GPM)	HEAD (FT)	FLANGE SIZE IN. (mm)	MOTOR			REMARKS	
										RPM	HP	VOLTA (V/ø/Hz)		
TP-1	GENERATOR ROOM	ALBANY PUMPS		FUEL OIL SUPPLY	1	—	6	40	1" (25)	1750	1	—	PACKAGE DUPLEX UNIT. 1" INLET/OUTLET, C/W BASKET STRAINER, BALL VALVES, PRESSURE GAUGES WITH 1/4" BALL VALVES, SPRING CHECK VALVE, IN-LINE RELIEF VALVES, FLOAT SWITCH FOR DRIP TRAY LEAK DETECTION AND DUAL STAGE PRESSURE SWITCH. ALSO C/W MANUFACTURERS CONTROL PANEL, NEMA 1 ENCLOSURE WITH H-0-A STARTERS, DISCONNECT, ALTERNATOR SWITCH. PROVIDE AUTO-FILL FUNCTION SO THAT DAY TANK ALWAYS TOPS UP EVEN IF GENERATOR SHUTS OFF DURING THE FILL CYCLE.	
TP-2	GENERATOR ROOM	ALBANY PUMPS		FUEL OIL SUPPLY	1	—	6	40	1" (25)	1750	1	—		
NOTES:														
1. ALBANY PUMPS ARE BASIS OF DESIGN, VIKING PUMPS MAY BE ACCEPTED AT THE SOLE DISCRETION OF THE OWNER.														
2. ALL COMPONENTS AND VALVES IN DUPLEX PUMP ASSEMBLY MUST BE ULC LISTED.														
3. PROVIDE BACNET CARD FOR INTEGRATION WITH HONEYWELL BAS SYSTEM.														

EXHAUST FAN SCHEDULE										MOTOR		STARTER					REMARKS		
No.	DESIGNATION	LOCATION	MANUFACTURER	MODEL	PERFORMANCE DATA			CONSTRUCTION DATA			MIN. HP		POWER SOURCE		REMOTE ACCESSORIES		CONTROLS		BAS
					CAPACITY L/s	STATIC PRESSURE Pa	R.P.M.	TYPE	WHEEL DIA. mm (in)	SONES	1PH 120V	1PH 230V	E	N	DEVICE	LOC'N	SAFETY		
EF-1	GEN. ROOM EXHAUST FAN	GEN. ROOM	LAUREN COOK	150SQ17D	1210	50	1725	IN-LINE CENTRIFUGAL	380 (15)	25	—	1	—	•	DISC	LOCAL	OL	•	
EF-2	GEN. ROOM EXHAUST FAN	GEN. ROOM	LAUREN COOK	150SQ17D	1210	50	1725	IN-LINE CENTRIFUGAL	380 (15)	25	—	1	—	•	DISC	LOCAL	OL	•	
EF-3	ELEC. ROOM EXHAUST FAN	ELEC. ROOM	LAUREN COOK	150SQ10D	810	50	1075	IN-LINE CENTRIFUGAL	380 (15)	11.5	1/3	—	—	•	DISC	LOCAL	OL	•	
EF-4	TANK ROOM EXHAUST FAN	TANK ROOM	LAUREN COOK	90SQ12D	315	50	1200	IN-LINE CENTRIFUGAL	230 (9)	7.0	1/6	—	—	•	DISC	LOCAL	OL	•	
NOTES:																			
1. ALL EXHAUST FANS ARE DIRECT DRIVE. PROVIDE ACCESSORIES: DISCONNECT SWITCHES, FLEX DUCT CONNECTOR, INLET/OUTLET COMPANION FLANGE, INLET/OUTLET SCREEN, INSULATED HOUSING, ALUMINUM CONSTRUCTION, SPRING ISOLATORS FOR CEILING MOUNT.																			
2. BAS SHALL MONITOR FAN RUN STATUS.																			
3. PROVIDE WALL MOUNTED THERMOSTATS UNLESS NOTED OTHERWISE.																			
4. COMBINATION STARTERS FOR THE FANS SHALL BE SUPPLIED BY THE MECHANICAL TRADE TO MATCH THE ASSOCIATED FAN MOTORS.																			

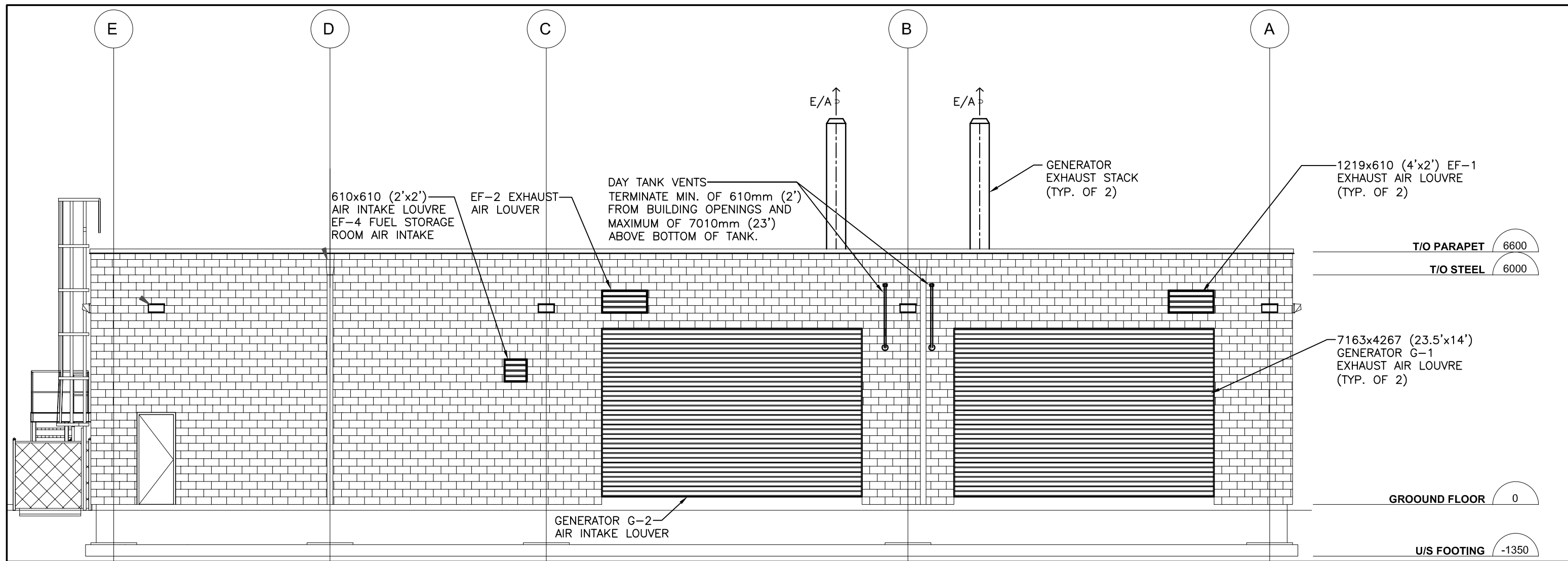
ABOVE GROUND FUEL TANK SCHEDULE									
TAG	MANUFACTURER	MODEL NO.	LOCATION	CAPACITY (L)	DIMENSIONS (mm)		QUANTITY	REMARKS	
					TANK (ø)	TANK LENGTH			
T-1	STEEL CRAFT	FIREGUARD TH7K045400W28X	TANK ROOM	45,400	2947 (116")	7798 (307")	1	DOUBLE WALL VACUUM MONITORED REFER TO SPECIFICATION 33 56 16 AND DWG. M-703 FOR DETAILS OF THE ABOVE GROUND FUEL TANK. PROVIDE ALL EQUIPMENT AND ACCESSORIES SPECIFIED. ULC S655 TANK ALL TANK COMPONENTS AND FITTINGS CONNECTED TO THE TANK MUST BE RATED FOR MINIMUM OF 70KPa (10psig) AS PER CSA B139-15 10.5.1.2	



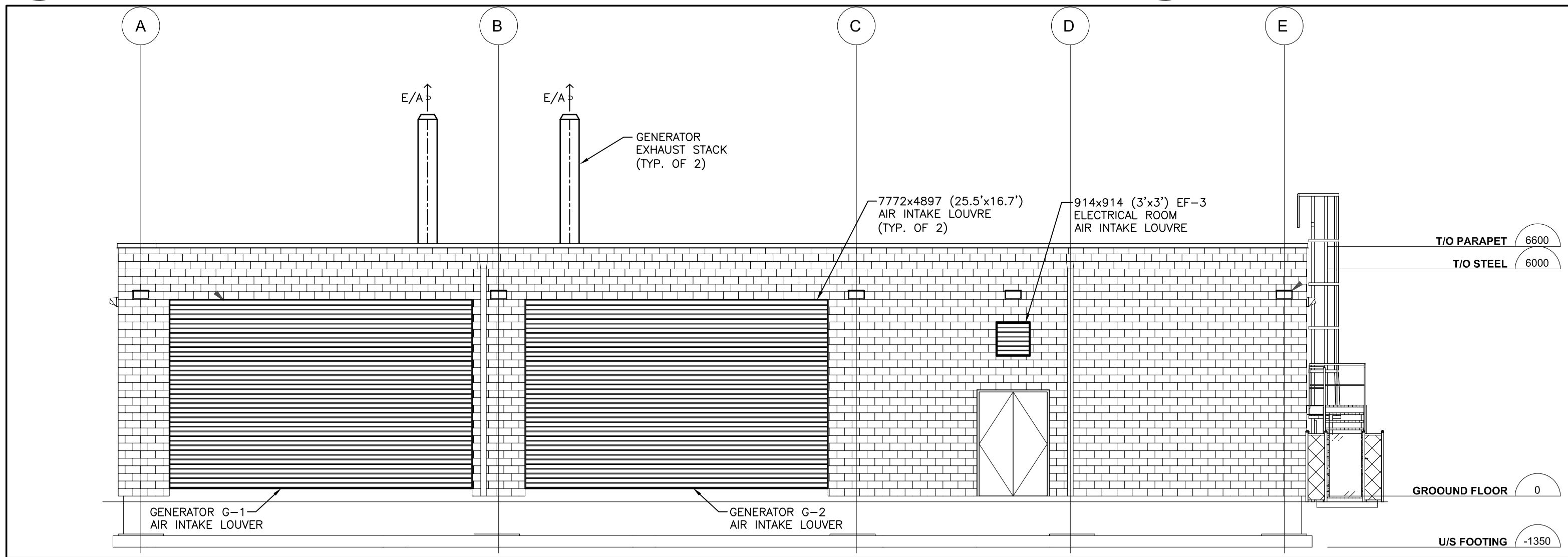
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Designed By:	G.F.	Checked By:	G.F.
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Project No:	1802218		Drawing No: M-301



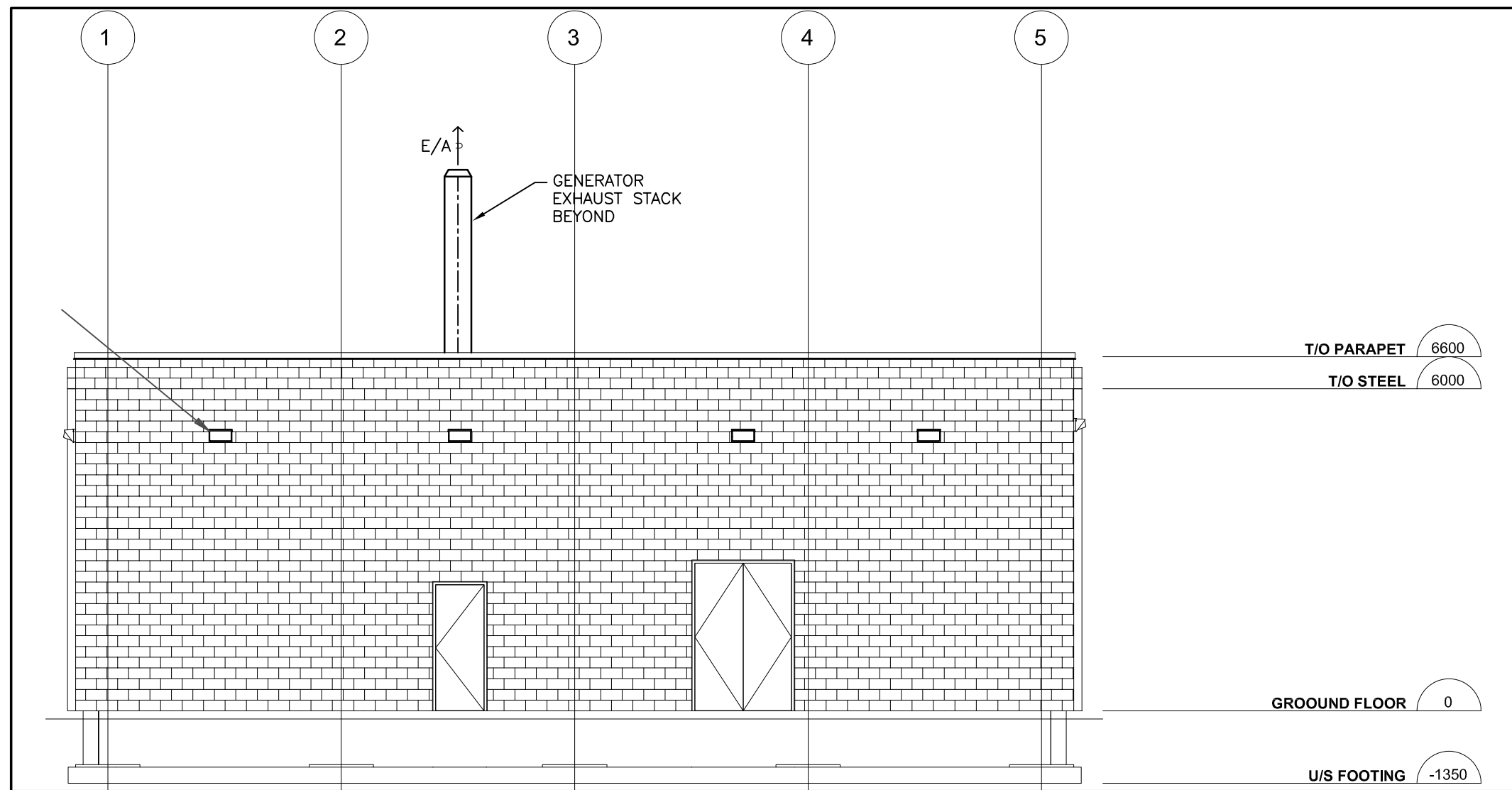
2 EAST ELEVATION
M-302 SCALE: 1:100



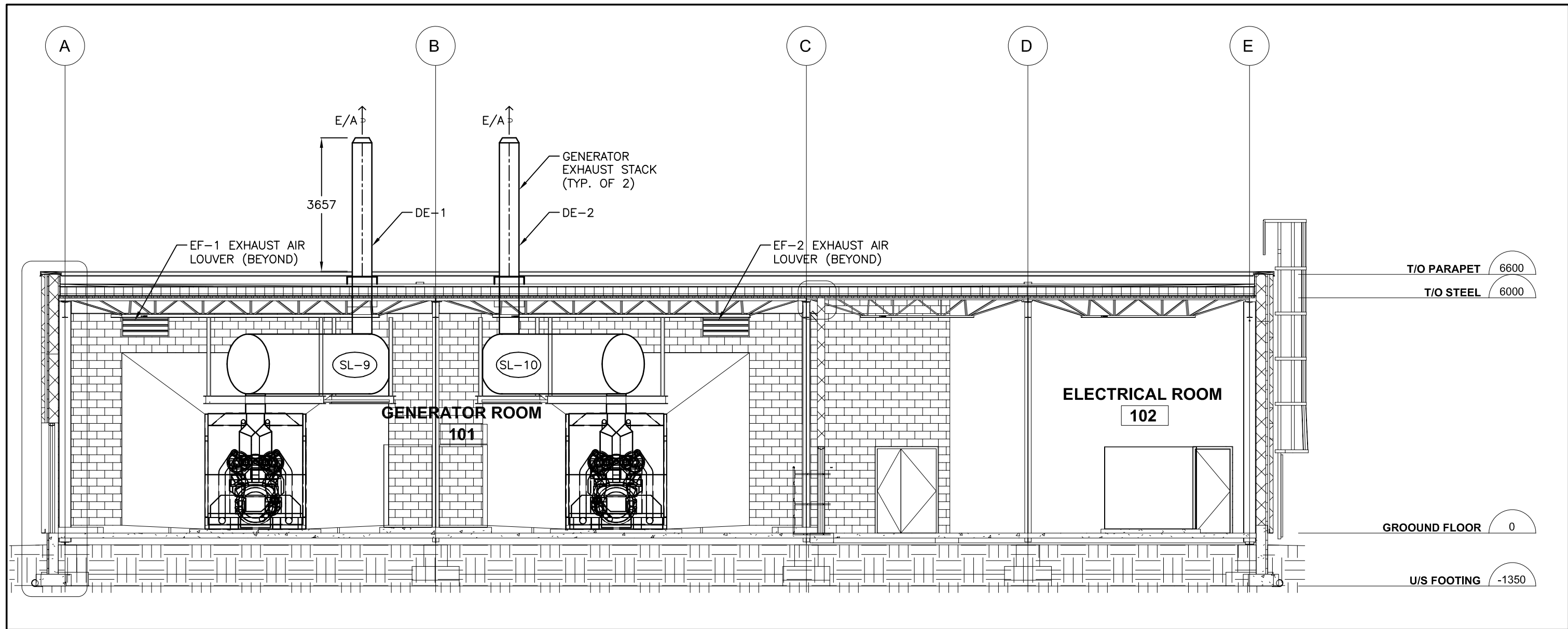
1 NORTH ELEVATION
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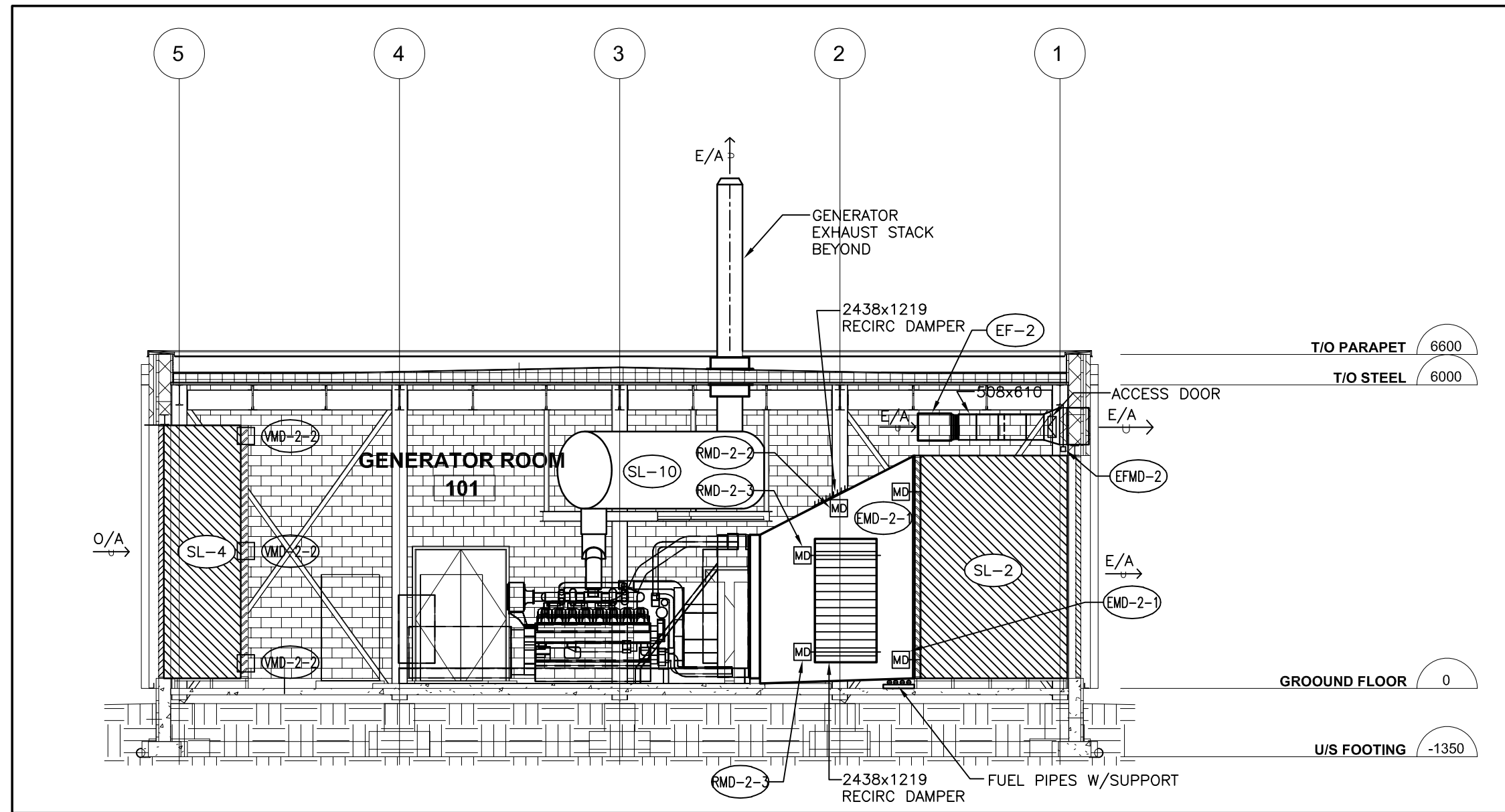
4 SOUTH ELEVATION
M-302 SCALE: 1:100



3 WEST ELEVATION
M-302 SCALE: 1:100



6 SECTION 2
M-302 SCALE: 1:100



5 SECTION 1
M-302 SCALE: 1:100

Key Plan:

Consultant:



Suite 300, 125 Commerce Valley Drive W.
Markham, ON L3T 7W4
Tel: (416) 499-3110 Fax: (416) 499-9658

Seal:

2	ISSUED FOR TENDER	OCT. 23/19	GF
1	ISSUED FOR REVIEW	OCT. 11/19	GF
REV	DESCRIPTION	DATE	BY

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Project:

NEW POWERHOUSE

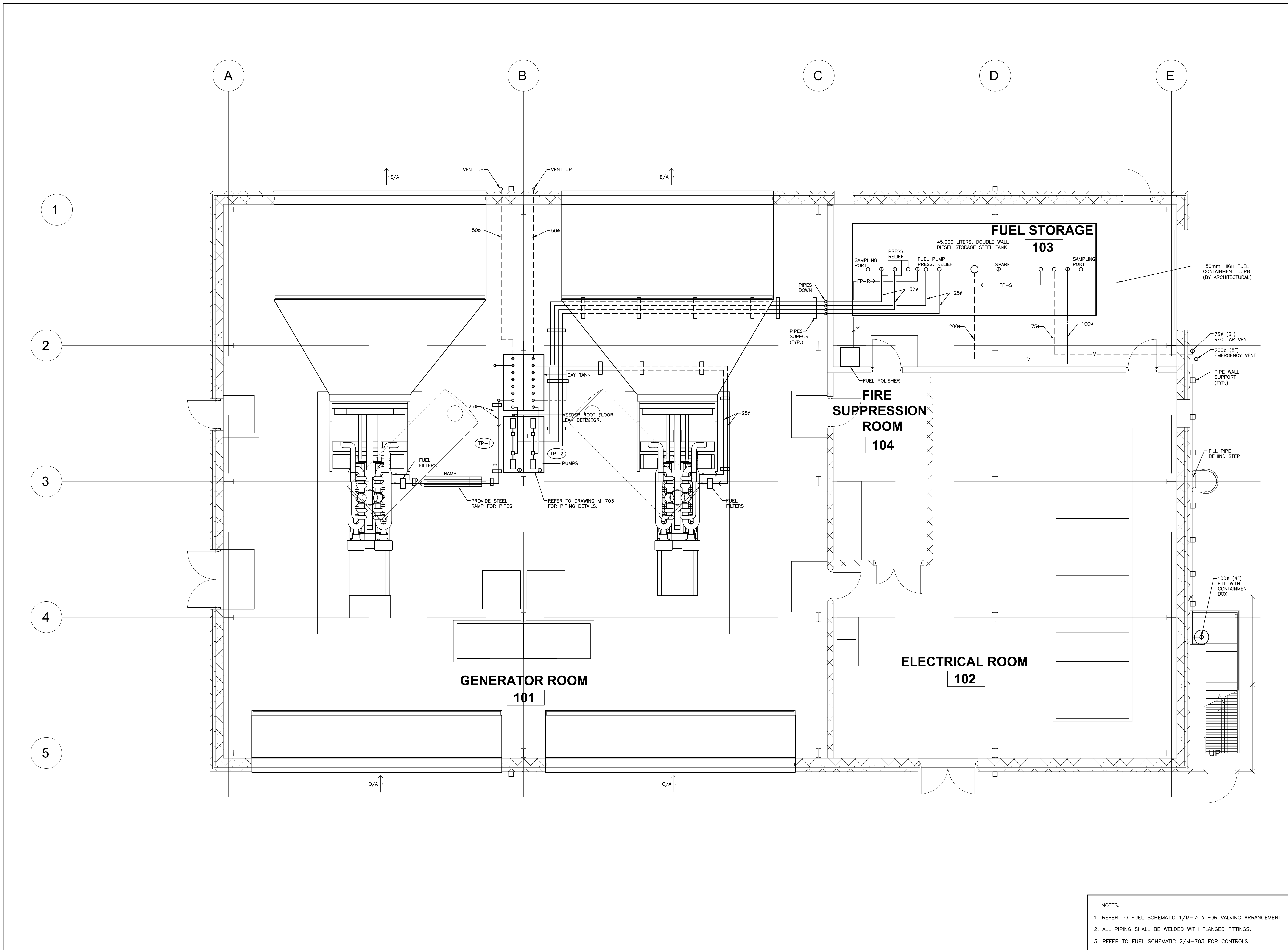
700 GORDON STREET, WHITBY, ON L1N 5S9

Sheet Title:

SECTIONS AND ELEVATIONS

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Designed By:	G.F.	Checked By:	G.F.
Scale:	AS SHOWN	File Path:	BM 2020.NH - 1802218 - Ontario Shores Powerhouse\1802218\Drawings\Powerhouse\1802218-01.dwg
Project No:	1802218	Drawing No:	M-302

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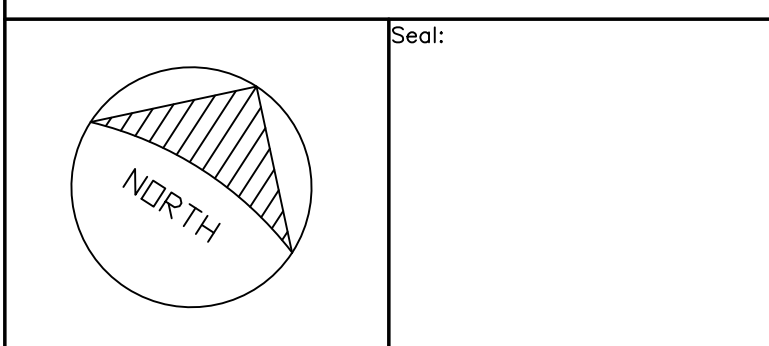
NOTES:

1. REFER TO FUEL SCHEMATIC 1/M-703 FOR VALVING ARRANGEMENT.
2. ALL PIPING SHALL BE WELDED WITH FLANGED FITTINGS.
3. REFER TO FUEL SCHEMATIC 2/M-703 FOR CONTROLS.

Key Plan:

Consultant:

MORRISON HERSHFIELD
Suite 300, 125 Commerce Valley Drive W.
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Tel: (416) 499-3110 Fax: (416) 499-9658



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Project:

NEW POWERHOUSE
700 GORDON STREET, WHITBY, ON L1N 5S9

Sheet Title:

GENERATOR ROOM - FUEL PIPE LAYOUT

Drawn By:	N.P.	Date:	
Designed By:	G.F.	Checked By:	G.F.
Scale:	1:50	File Path:	BM 362/114 - 1802218 - Ontario Shores Powerhouse/1802218-0400-01 Shores Powerhouse-1802218-0400-01
Project No:	1802218	Drawing No:	M-400



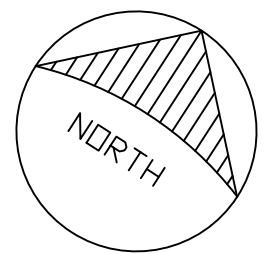
Key Plan:

Consultant:



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Markham, ON L3T 7W4
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Seal:



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REV	DESCRIPTION	DATE	BY

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Client:



Ontario Shores
Centre for Mental Health Sciences

Project:

NEW POWERHOUSE

700 GORDON STREET, WHITBY, ON L1N 5S9

Sheet Title:

FIRE PROTECTION - FIRE EXTINGUISHERS & FIRE SUPPRESSION SYSTEM

Drawn By: NP

Date:

Designed By:	G.F.
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Checked By:	G.F.
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Scale: 1:50

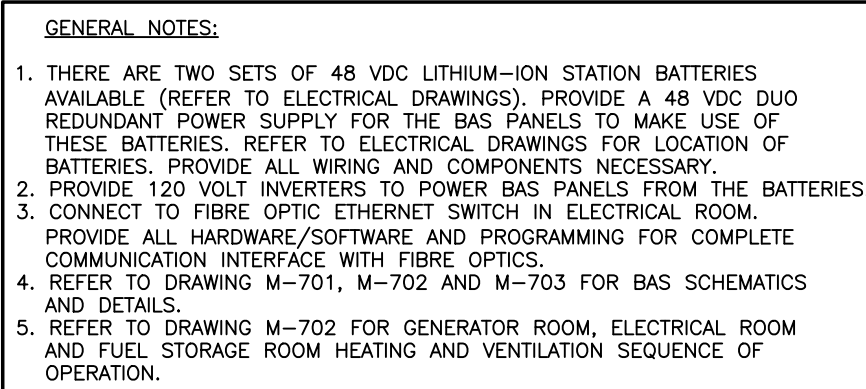
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Powerhouse/1802218-Ontario Shores

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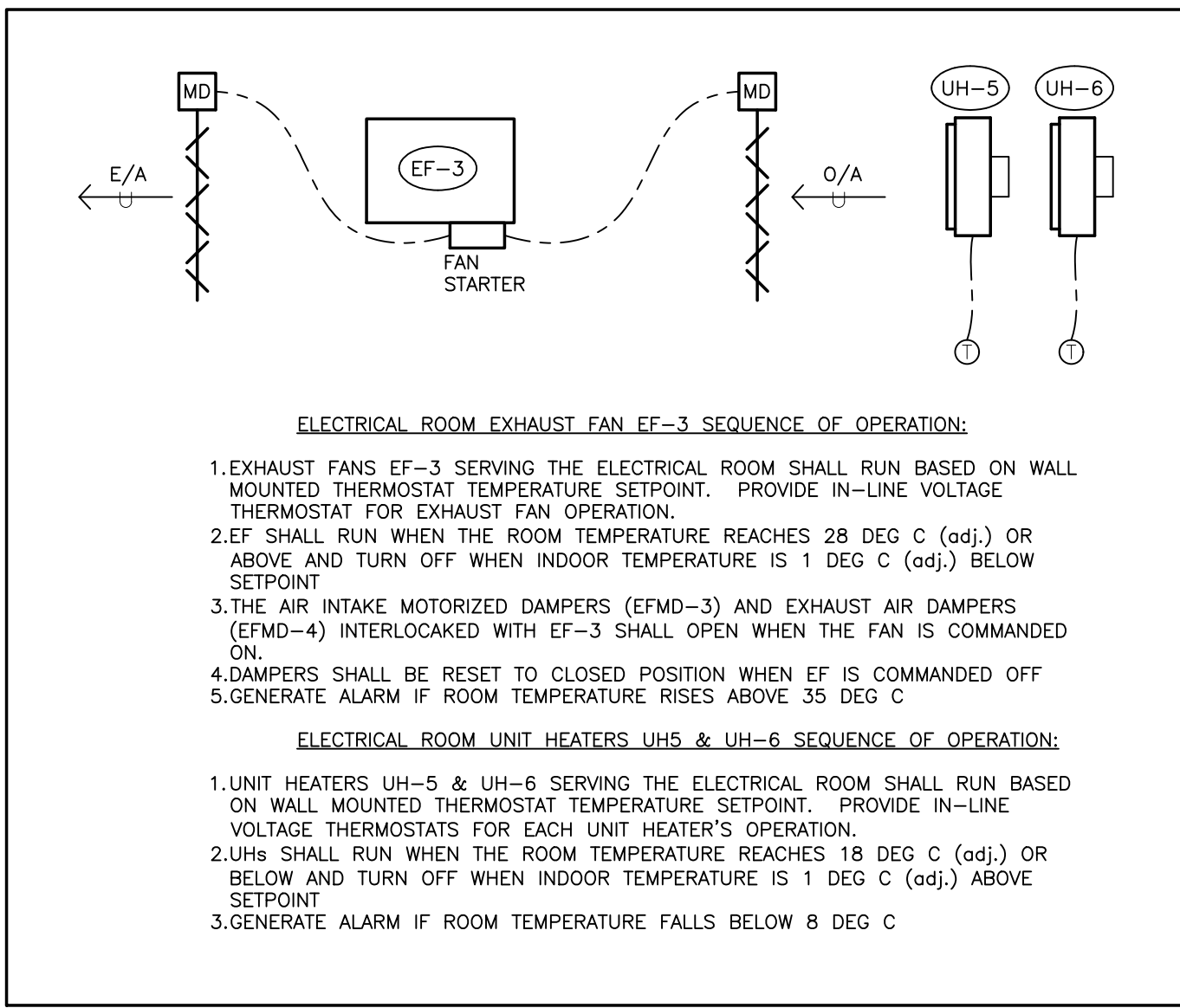
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1802218

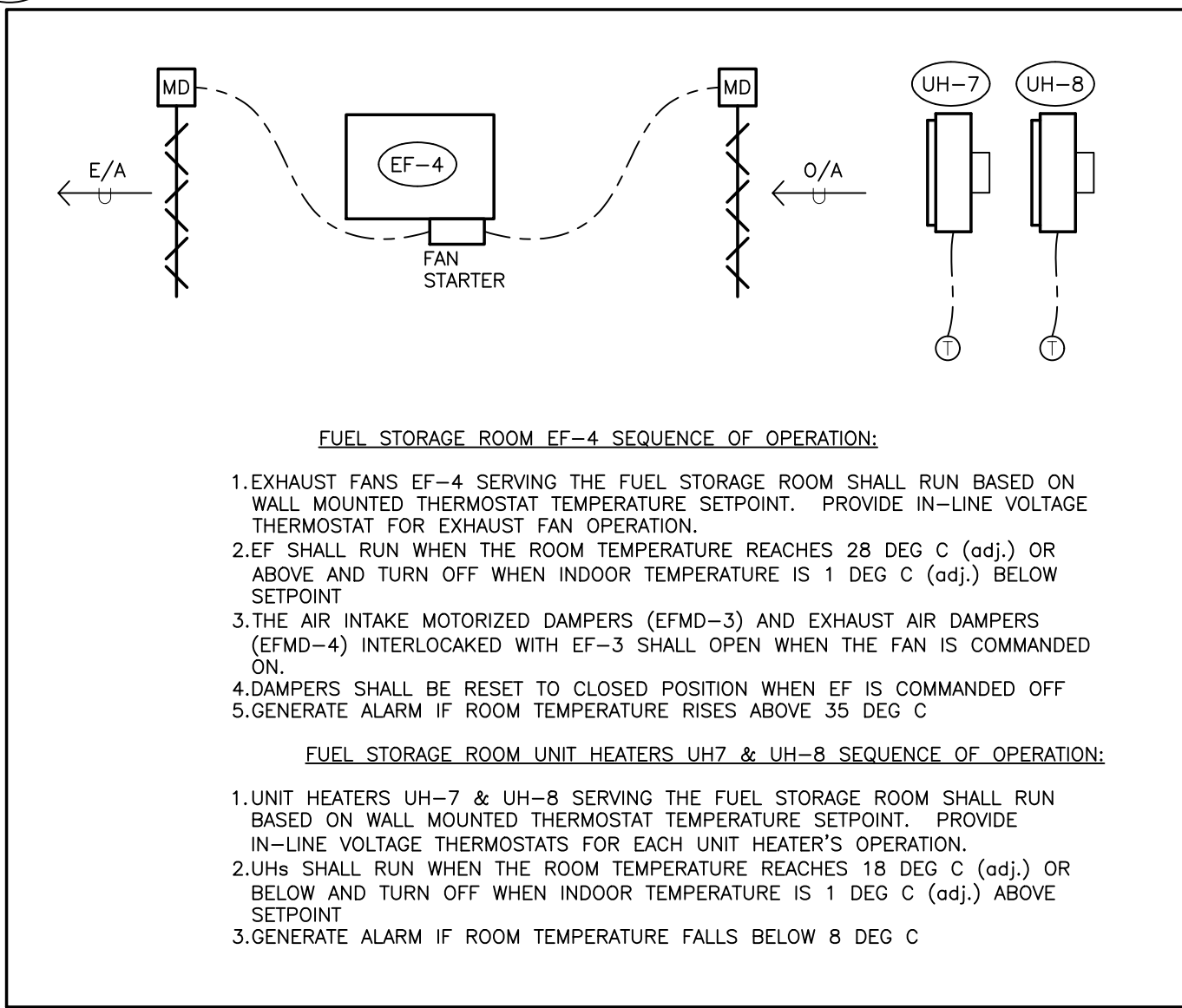
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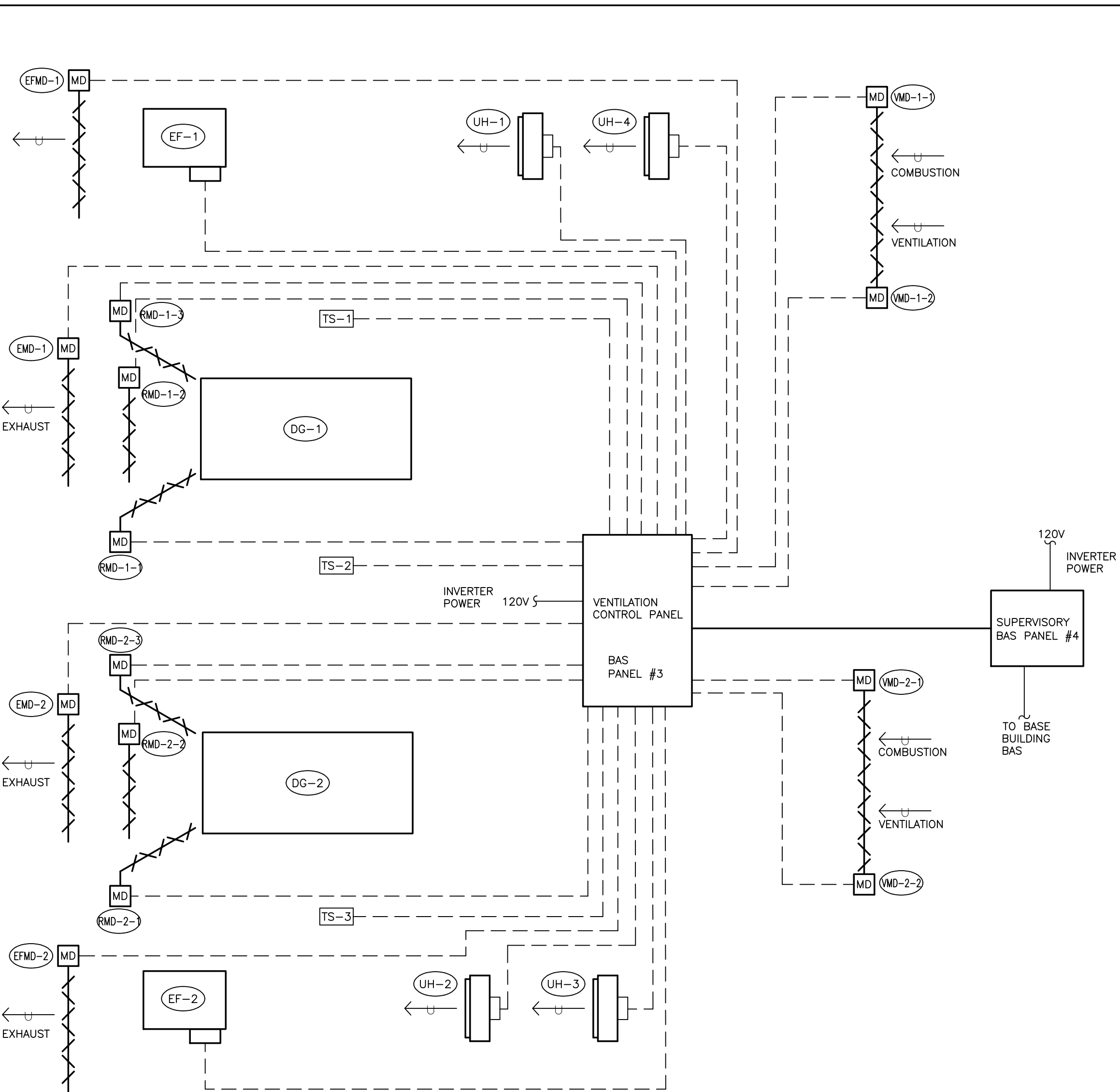
M-700



2 ELECTRICAL RM. HEATING & VENTILATION-CONTROL SCHEMATIC
M-702 N.T.S.



3 FUEL STORAGE RM. HEATING & VENTILATION-CONTROL SCHEMATIC
M-702 N.T.S.



GENERATOR ROOM EXHAUST FANS EF-1 & 2 SEQUENCE OF OPERATION:

1. EXHAUST FANS EF-1 AND EF-2 SERVING THE GENERATOR ROOM SHALL BE ENABLED ONLY WHEN THE GENERATOR IS OFF. WHEN GENERATOR IS RUNNING THE EFs ARE DISABLED
2. EFs SHALL RUN WHEN THE ROOM TEMPERATURE REACHES 28 DEG C (adj.) OR ABOVE AND TURN OFF WHEN INDOOR TEMPERATURE IS 1 DEG C (adj.) BELOW SETPOINT
3. ROOM TEMPERATURE SHALL BE BASED ON READINGS FROM TEMPERATURE SENSORS TS-1 AND TS-3 LOCATED AT EACH END OF THE GENERATOR ROOM, WHERE TS-1 CONTROLS EF-1 AND TS-3 CONTROLS EF-2
4. A SECTION OF MOTORIZED DAMPERS (VMD-1 OR VMD-2) SHALL OPEN WHEN THE CORRESPONDING EF (EF-1 OR EF-2) IS COMMANDED ON. IN ADDITION THE EF INTERLOCKED DAMPERS EFMD-1 OR EFMD-2 SHALL OPEN WHEN THE CORRESPONDING EF IS CALLED TO RUN
5. DAMPERS SHALL BE RESET TO CLOSED POSITION WHEN EF IS COMMANDED OFF
6. GENERATE ALARM IF ROOM TEMPERATURE RISES ABOVE 35 DEG C

GENERATOR ROOM UNIT HEATERS UH-1 TO UH-4 SEQUENCE OF OPERATION:

1. UNIT HEATERS SERVING THE GENERATOR ROOM SHALL BE ENABLED ONLY WHEN THE GENERATOR IS OFF. WHEN GENERATOR IS RUNNING THE UHs ARE DISABLED
2. UHs SHALL RUN WHEN THE ROOM TEMPERATURE REACHES 18 DEG C (adj.) OR BELOW AND TURN OFF WHEN INDOOR TEMPERATURE IS 1 DEG C (adj.) ABOVE SETPOINT
3. ROOM TEMPERATURE SHALL BE BASED ON READINGS FROM TEMPERATURE SENSORS TS-1 AND TS-3 LOCATED AT EACH END OF THE GENERATOR ROOM, WHERE TS-1 CONTROLS UH-1 & UH-4 AND TS-3 CONTROLS UH-2 & UH-3
4. GENERATE ALARM IF ROOM TEMPERATURE FALLS BELOW 8 DEG C

1 GENERATOR ROOM VENTILATION - CONTROL SCHEMATIC
M-702 N.T.S.

SEQUENCE OF OPERATIONS:

PROVIDE ALL COMPONENTS, HARDWARE, SOFTWARE, WIRING, INSTALLATION, PROGRAMMING, GRAPHICS, ENGINEERING, TESTING AND COMMISSIONING FOR A FULLY FUNCTIONAL SYSTEM. VENTILATION CONTROL PANEL SHALL HAVE A MINIMUM OF TWO CONTROLLERS, ONE PER GENERATOR FOR THE PURPOSE OF CONTROLLING VENTILATION. ALL WIRING UNLESS NOTED OTHERWISE IS THE RESPONSIBILITY OF THE BAS CONTRACTOR.

DAMPER SIZES ARE NOMINAL. DIMENSIONS MUST BE CONFIRMED WITH SITE MEASUREMENTS AND COORDINATED WITH OTHER TRADES. PROVIDE AS MANY DAMPER SECTIONS AS REQUIRED FOR SIZE OF OPENING. PROVIDE AS MANY ACTUATORS AS NECESSARY FOR DAMPER SECTIONS.

1. CONTROLS SYSTEM SHALL ADMINISTER AIR FOR COMBUSTION AND VENTILATION TO THE GENERATOR ROOM WHEN GENERATORS ARE RUNNING AND PROVIDE HEATING AND COOLING WHEN GENERATORS ARE OFF. IN ADDITION, MONITORING AND ALARMS SHALL BE ANNUNCIATED LOCALLY AND REMOTELY BY THE BAS.
2. COMBUSTION AND VENTILATION DAMPERS (AIR INTAKE) SHALL FAIL SAFE SPRING OPEN UNDER 30 SECONDS AND REQUIRES POWER TO CLOSE. TWO POSITION ACTUATORS WITH AUXILIARY SWITCH FOR POSITIONAL FEED BACK.
3. EXHAUST AIR DAMPERS SHALL BE FAIL SAFE SPRING OPEN, POWER TO CLOSE WITH MODULATING ACTUATORS.
4. RE CIRCULATION DAMPERS SHALL BE NORMALLY CLOSED. SPRING CLOSE, POWER TO OPEN, MODULATING ACTUATORS.
5. THE COMBUSTION, VENTILATION (AIR INTAKE) AND EXHAUST AIR DAMPERS MUST FAIL OPEN BY SPRING ACTION IN UNDER 30 SECONDS DUE TO LOSS OF POWER, OR INTERRUPTION OF POWER WHEN THE GENERATOR STARTS. IF DAMPERS FAIL TO OPEN WITHIN SPECIFIED TIME, GENERATE A NON-LATCHING ALARM AT THE BAS.
6. BAS SHALL BE NATIVE BACKUP
7. CABLING SHALL BE CAT6. TYPICAL OF ALL BAS COMMUNICATIONS CABLING UNLESS NOTED OTHERWISE.
8. COORDINATE BACNET COMMUNICATIONS REQUIREMENTS WITH THE VARIOUS VENDORS FOR: FUEL PUMP, FUEL MANAGEMENT AND FUEL POLISHER.
9. COORDINATE REQUIREMENTS FOR LAN DROPS WITH HOSPITAL IT PERSONNEL.
10. MS/TP - BACNET WIRING GUIDELINES (BACNET PAIGE 740045 OR BELDEN 82760)
 - a. ALL FIELD WIRING MUST CONFORM TO LOCAL ELECTRICAL CODES AND ORDINANCES OR AS SPECIFIED ON INSTALLATION WIRING DIAGRAMS.
 - b. AN MS/TP EIA-485 NETWORK SHALL USE SHIELDED, TWISTED-PAIR CABLE WITH CHARACTERISTIC IMPEDANCE BETWEEN 100 AND 130 OHMS. DISTRIBUTED CAPACITANCE BETWEEN CONDUCTORS SHALL BE LESS THAN 100 PF PER METER (30 PF PER FOOT). DISTRIBUTED CAPACITANCE BETWEEN CONDUCTORS AND SHIELD SHALL BE LESS THAN 200 PF PER METER (60 PF PER FOOT). FOIL OR BRAIDED SHIELDS ARE ACCEPTABLE. THE MAXIMUM RECOMMENDED LENGTH OF AN MS/TP SEGMENT IS 1200 METERS (4000 FEET) WITH AWG 18 (0.82 MM2 CONDUCTOR AREA) CABLE. THE USE OF GREATER DISTANCES AND/OR DIFFERENT WIRE GAUGES SHALL COMPLY WITH THE ELECTRICAL SPECIFICATIONS OF EIA-485. SOME POSSIBLE WIRE TYPES:
BELDEN 8780, 18 AWG (0.82 SQ MM) ONE TWISTED PAIR, STRANDED, SHIELDED, NON--PLENUM BELDEN 82760, 18 AWG (0.82 SQ MM) ONE TWISTED PAIR, STRANDED, SHIELDED, PLENUM
BELDEN 9841, 24 AWG (0.20 SQ MM) ONE TWISTED PAIR, STRANDED, SHIELDED, NON--PLENUM BELDEN 9842, 24 AWG (0.20 SQ MM) TWO TWISTED PAIR, STRANDED, SHIELDED, NON--PLENUM PAIGE 740045, 18 AWG (0.82 SQ MM) ONE TWISTED PAIR, STRANDED, SHIELDED, PLENUM
PAIGE 740057, 18 AWG (0.82 SQ MM) ONE TWISTED PAIR, STRANDED, SHIELDED, NON--PLENUM
 - c. UNSWITCHED 24 VAC POWER WIRING CAN BE RUN IN THE SAME CONDUIT AS THE BACNET MS/TP BUS CABLE.
 - d. DO NOT USE UNTERFEDS WIRE TYPES OR GAUGES ON THE SAME BACNET MS/TP SEGMENT. THE STEP CHANGE IN LINE IMPEDANCE CHARACTERISTICS CAUSES UNPREDICTABLE REFLECTIONS ON THE BUS.
 - e. IN NOISY (HIGH EM) ENVIRONMENTS, AVOID WIRE RUNS PARALLEL TO NOISY POWER CABLES, OR LINES CONTAINING LIGHTING DIMMER SWITCHES, AND KEEP AT LEAST 3 IN (76 MM) OF SEPARATION BETWEEN NOISY LINES AND THE BACNET MS/TP CABLE.
 - f. DO NOT ROUTE ANY NETWORK WIRES CLOSE TO HIGH VOLTAGE OR HIGH CURRENT WIRES. IT IS RECOMMENDED THAT NETWORK WIRING BE IN ITS OWN CONDUIT OR TROUGH. IT MAY, HOWEVER, BE ROUTED WITH LOW VOLTAGE WIRES. IF THE NETWORK CABLE MUST CROSS HIGH VOLTAGE OR CURRENT WIRES, THE NETWORK CABLE MUST CROSS PERPENDICULAR TO THE HIGH VOLTAGE OR CURRENT WIRES.
 - g. MAKE SURE THAT THE BACNET MS/TP SHIELD IS NOT BROKEN THROUGHOUT THE ENTIRE LENGTH OF CABLE.
 - h. CONNECT THE SHIELD TO FGND AT EVERY CONTROLLER. CONNECT THE SHIELD TO EARTH GROUND AT THE PLANT CONTROLLER END OF THE BUS ONLY.
 - i. CONNECT SHIELD THROUGH EACH DEVICE ON THE FGND TERMINAL, AND ONE END TO THE LOCAL EARTH POINT.
 - j. DO NOT CONNECT SHIELD TO CONTROLLER COMMON TERMINALS. CONNECT TO FGND TERMINAL ONLY.
11. EMERGENCY POWER (GENERATORS RUNNING):
 - i) UPON RECEIVING A GENERATOR START SIGNAL FROM THE GENERATOR CONTROL PANEL:
 - a) COMBUSTION AND VENTILATION DAMPERS OPEN
 - b) EXHAUST AND RECIRCULATION AIR DAMPERS OPEN AND BEGIN TO MODULATE
 - c) BASED ON TEMPERATURE SET POINT
- ii) UNIT HEATERS AND EXHAUST FANS ARE DISABLED.

12. THERE ARE TWO MODES OF OPERATION:
 - A) NORMAL POWER - GENERATORS OFF
 - B) EMERGENCY POWER - GENERATOR RUNNING
- A) NORMAL POWER (GENERATORS OFF):
 - i) COMBUSTION AND VENTILATION DAMPERS ARE CLOSED
 - ii) EXHAUST AIR DAMPERS ARE CLOSED
 - iii) RECIRCULATION DAMPERS ARE CLOSED
 - iv) WHEN THE GENERATORS ARE OFF, THE UNIT HEATERS AND EXHAUST FANS ARE ENABLED.
 - v) UNIT HEATERS AND EXHAUST FANS STATUS AND ALARMS ARE MONITORED.
 - vi) THE TEMPERATURE SENSORS TS-1 TO TS-3 SHALL START/STOP UNIT HEATERS OR EF's VIA THE VENTILATION CONTROL PANEL TO MAINTAIN TEMPERATURE SET POINT:
 - a) HEATING TEMPERATURE SET POINT IS 18 DEG C (ADJ.) - UNIT HEATERS TURN ON WHEN AVERAGE ROOM TEMPERATURE FALLS BELOW SET POINT AND TURN OFF WHEN SET POINT IS REACHED.
 - b) COOLING TEMPERATURE SET POINT IS 28 DEG C (ADJ.) - EXHAUST FANS TURN ON WHEN AVERAGE ROOM TEMPERATURE EXCEEDS SET POINT AND TURN OFF WHEN SET POINT IS REACHED.
 - c) DEAD BAND BETWEEN 18 AND 28 DEG C WHERE NEITHER HEATING NOR COOLING TAKES PLACE
 - vi) WHEN THE GENERATORS ARE OFF AND THE EXHAUST FANS ARE COMMANDED ON (TEMPERATURE ABOVE 28°C), BOTH VENTILATION (AIR INTAKE) AND EXHAUST FAN DAMPERS SHOULD OPEN AND BE PROVED OPEN BEFORE STARTING THE FAN.

Key Plan:

Consultant:



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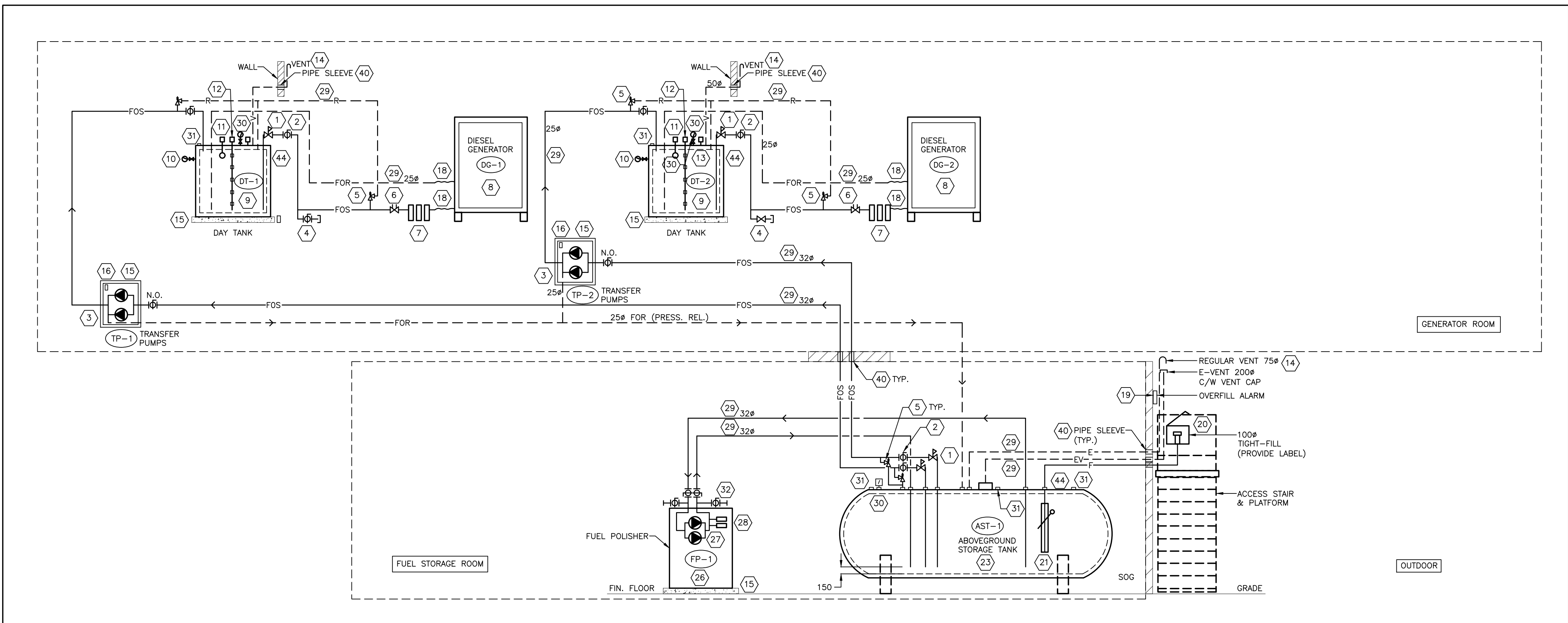
NEW POWERHOUSE

700 GORDON STREET, WHITBY, ON L1N 5S9

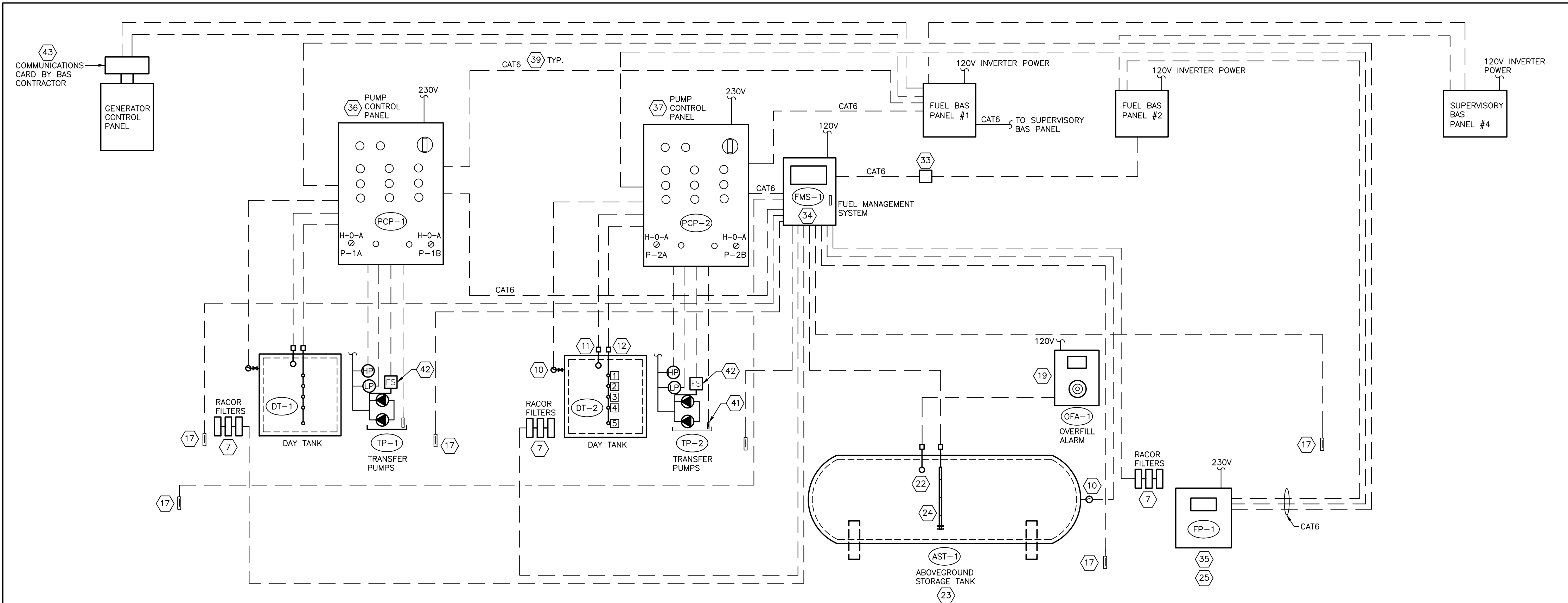
Sheet Title:

GENERATOR ROOM VENTILATION SCHEMATIC

Drawn By:	N.P.	Date:	
Designed By:	G.F.	Checked By:	G.F.
Scale:	N.T.S.	File Path:	BM 362//MH - 1802218 - Ontario Shores Powerhouse/1802218-Generator Room Ventilation-REV018-4024-V4
Project No:	1802218	Drawing No:	M-702



1 FUEL SYSTEM PIPING SCHEMATIC
M-703 N.T.S.



2 FUEL SYSTEM CONTROLS SCHEMATIC
M-703 N.T.S.

- REFERENCE NOTES:
- ANTI-SIPHON VALVE (ASV-1 & ASV-2) - EBW C/W BUILT-IN PRESSURE RELIEF. ULC LISTED
 - SHUT-OFF VALVE (SV-1 & ASV-2) - JOMAR BALL VALVE. ULC LISTED
 - DUPLEX PUMPS C/W BACNET COMMUNICATIONS CARD, SHUT-OFF VALVES, PRESSURE SWITCHES, FLOW SWITCHES & DRIP TRAY 100mm HIGH HOUSEKEEPING PAD. (BY ARCHITECTURAL)
 - TEST-TEE FOR ANTI-SIPHON VALVE. INSTALL AT LOWEST POINT.
 - PRESSURE RELIEF VALVE (PRV-1) - FULFLO
 - FIRE VALVE (FS-1) - MORRISON BROS
 - FUEL FILTERS - RACOR, 3 CARTRIDGE WITH WATER SEPARATOR. MONITOR WATER ALARM AT FILTERS.
 - GENERATOR
 - DAY TANK - DOUBLE WALL ULC S602
 - VACUUM GAUGE & SWITCH. WIRE TO PUMP CONTROL PANEL UNLESS NOTED OTHERWISE.
 - CRITICAL HIGH LEVEL PROBE CH-1 SET AT 95% LEVEL. WIRE TO PUMP CONTROL PANEL
 - S-LEVEL PUMP CONTROL PROBE (HLP). WIRE TO PUMP CONTROL PANEL
 - 90% - PUMP STOP & HIGH LEVEL ALARM
 - 85% - PUMP STOP
 - 70% - PUMP START
 - 60% - START LAD PUMP & LOW LEVEL ALARM
 - 10% - VERY LOW LEVEL. SHUT DOWN GENERATOR
 - TANK ANALOG GAUGE
 - NORMAL VENT C/W ULC VENT CAP TERMINATION AND PIPE SLEEVE
 - HOUSEKEEPING PAD - 100mm HIGH (BY ARCHITECTURAL)
 - LEAK DETECTOR IN DRIP TRAY. WIRE TO PUMP CONTROL PANEL
 - FLOOR LEAK DETECTOR (FLD) - VEEDER ROOT. WIRE TO VEEDER ROOT CONSOLE (TYP. OF 5)
 - FIRE RATED HOSE - STAINLESS STEEL, ULC LISTED
 - OVERFILL ALARM - K-TECH
 - SPILL BOX (SC-1) C/W CAM-LOCK CONNECTION, ULC LISTED
 - OVERFILL VALVE (OFV-1)
 - OVERFILL PROBE (CH-2). CONNECT TO OVERFILL ALARM OUTDOORS
 - ABOVEGROUND STORAGE TANK. DOUBLE-WALL
 - CONTINUOUS LEVEL PROBE (CL) - VEEDER ROOT, MAGNETO-STRICTIVE PROBE
 - SHUT-OFF FUEL POLISHER IF RECEIVE GEN. START SIGNAL. WIRE TO PUMP CONTROL PANEL
 - FUEL POLISHER
 - FUEL POLISHER PUMPS
 - FUEL POLISHER FILTERS
 - SCHEDULE 40 STEEL PIPE AND FITTINGS. SOCKET WELDED PIPE WITH FLANGED AND/OR THREADED FITTINGS.
 - ANALOG FUEL GAUGE
 - SPARE TANK OPENING FOR BRIGHT & CLEAR TEST
 - DRAIN VALVES INSTALLED AT LOWEST POINT
 - CHIPKIN BAS BACNET INTERFACE MODULE
 - VEEDER ROOT FUEL MANAGEMENT SYSTEM
 - FUEL POLISHING SYSTEM CONTROL PANEL C/W BACNET COMMUNICATIONS CARD
 - PUMP CONTROL PANEL
 - PUMP CONTROL PANEL
 - RESERVED
 - CAT6 CABLE
 - WALL PIPE SLEEVE (TYP.). ALL WALL SLEEVES SHALL BE WEATHERPROOF AND/OR FILLED WITH FIRE PROOF MATERIAL.
 - PUMP TRAY LEAK DETECTOR (PTD)
 - PUMP FLOW SWITCHES, MFR: GEMS SENSORS & CONTROLS, MODEL: FS-10798
 - BACNET/MODBUS COMMUNICATIONS CARD
 - ALL TANK COMPONENTS AND FITTINGS CONNECTED TO THE DAY TANK MUST BE RATED FOR MINIMUM OF 70kPa (10psig) AS PER CSA B139-15 10.5.1.2

Key Plan:

Consultant:

MORRISON HERSHFIELD

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Client:

Ontario Shores
Centre for Mental Health Sciences

Project:

NEW POWERHOUSE

700 GORDON STREET, WHITBY, ON L1N 5S9

Sheet Title:

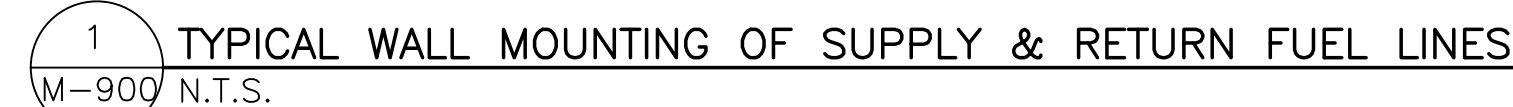
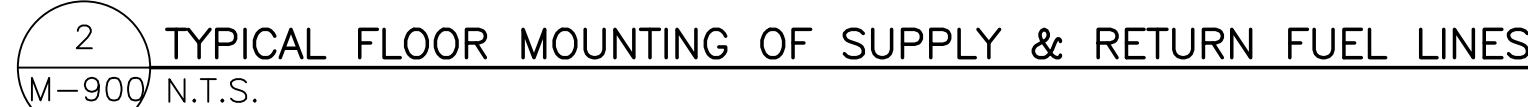
FUEL SYSTEM SCHEMATICS

Drawn By: N.P. Date:

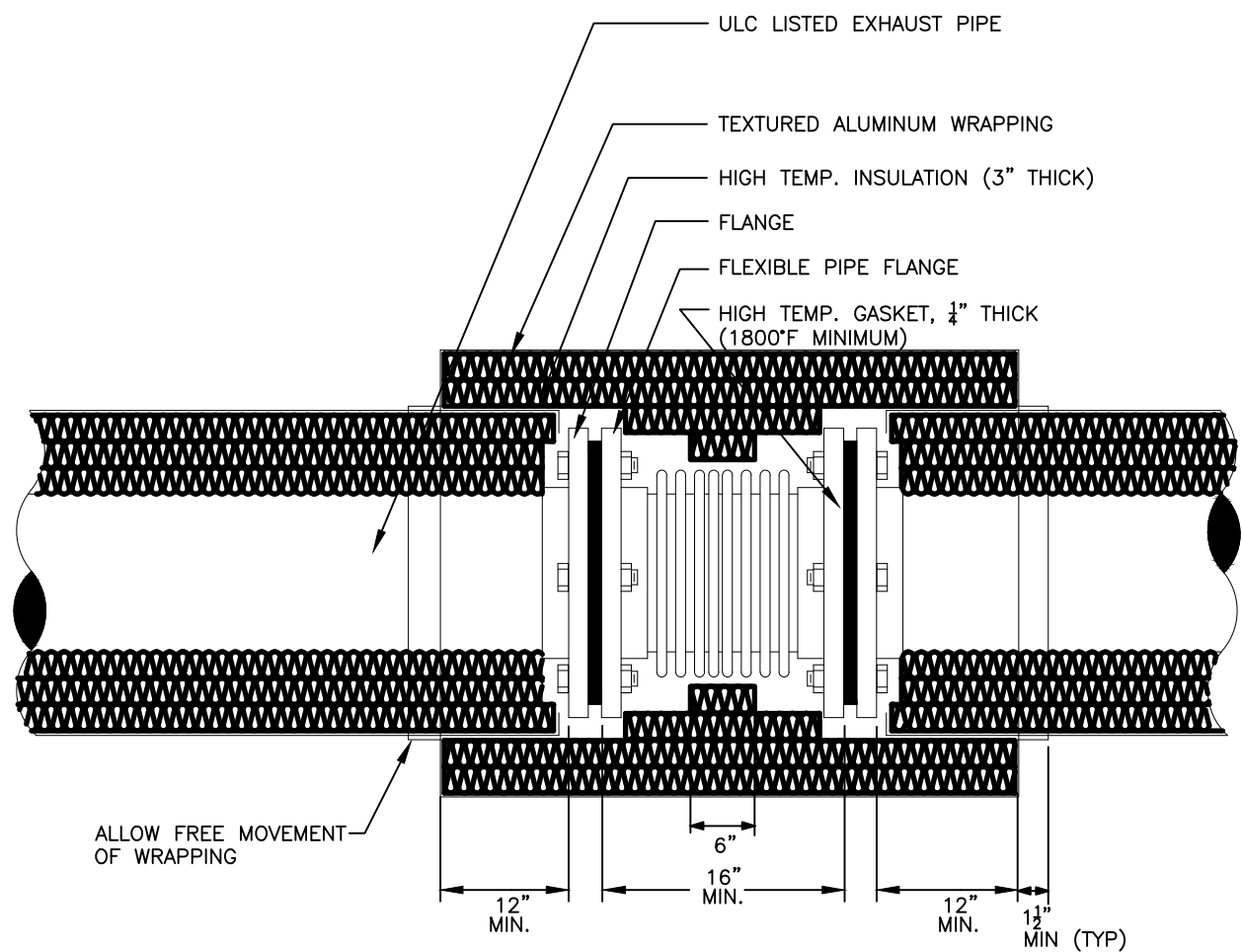
Designed By: G.F. Checked By: G.F.

Scale: N.T.S. File Path: B:\2020\08\1802218-0401a-0001v1\Powerhouse\1802218-0401a-0001v1.dwg

Project No: 1802218 Drawing No: M-703



M-900

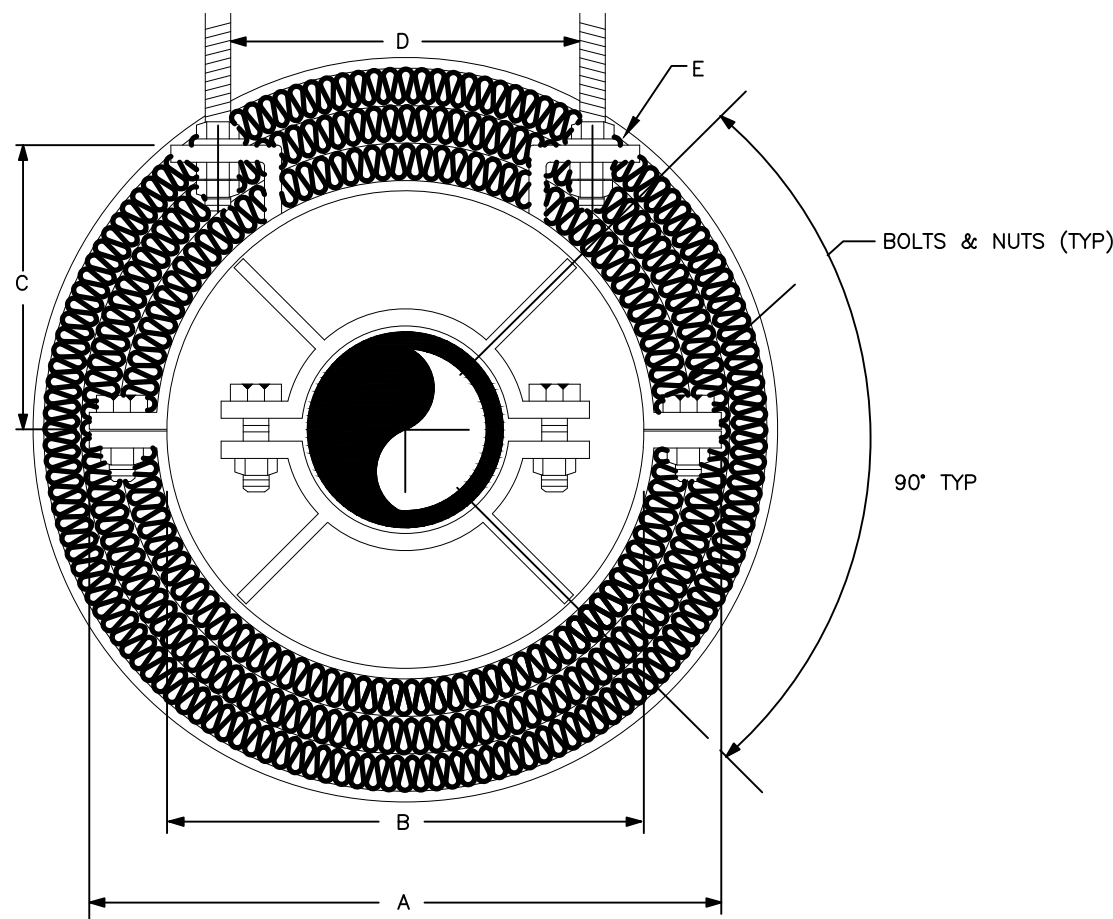


REMARKS

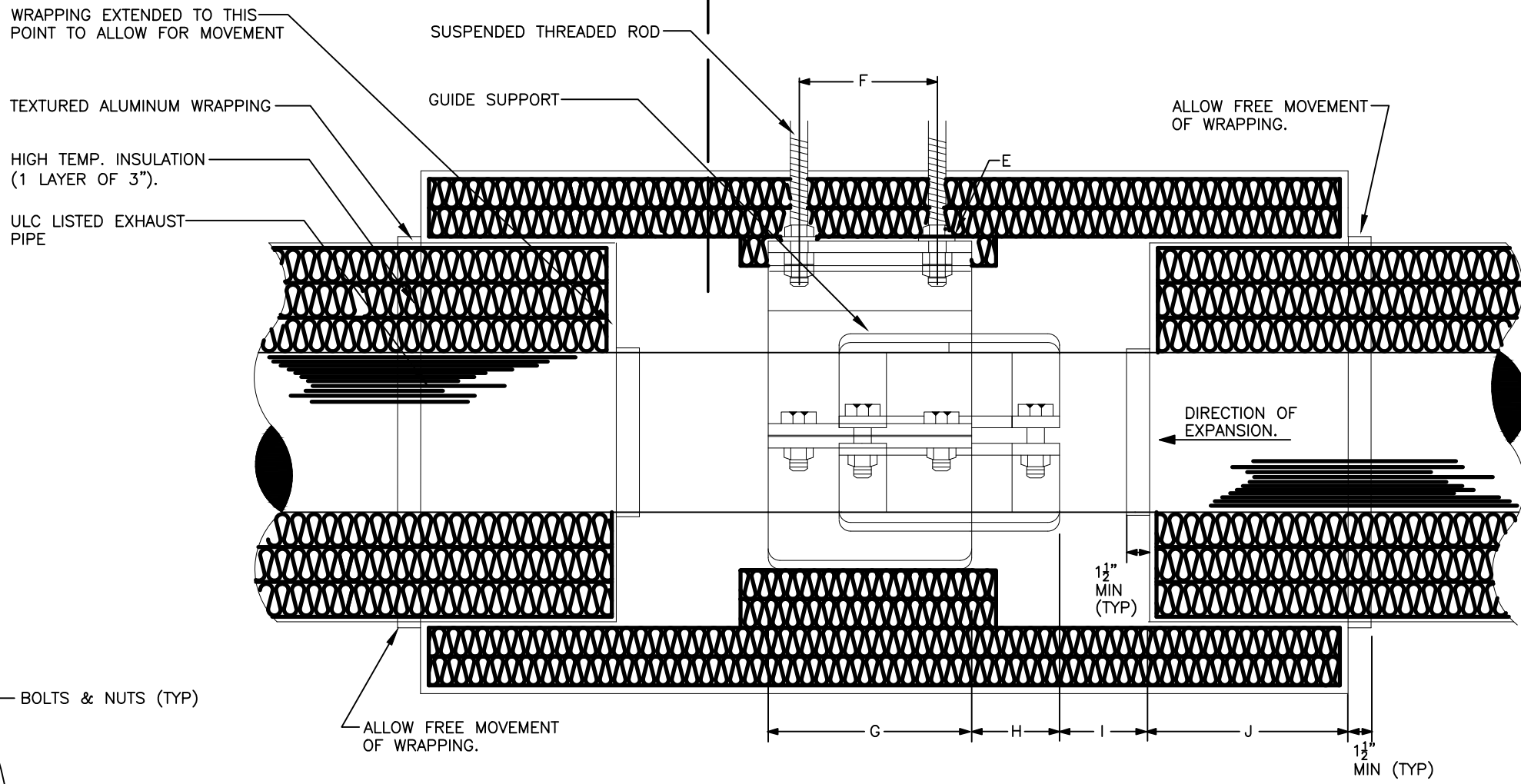
1. INSTALL THE FLEXIBLE JOINT WITH THE TEMPORARY JOINT SUPPORT RODS IN PLACE UNTIL SUCH A TIME THAT THE ENTIRE EXHAUST SYSTEM IS ADEQUATELY SUPPORTED. THIS SHALL PREVENT THE FLEXIBLE JOINT FROM BECOMING DAMAGED.
2. THE NUTS & BOLTS FOR THE CONNECTION OF THE FLEXIBLE JOINT SHALL HAVE THE SAME CHARACTERISTICS AS THE FLEXIBLE JOINT AND SHALL ALLOW FOR EASY REMOVAL OF THE JOINT.
3. THE FLEXIBLE JOINT SHALL NOT BE DAMAGED PRIOR TO BEING PUT INTO SERVICE. IF DAMAGED THE JOINT MUST BE REPLACED AT NO EXTRA COST TO THE OWNER.
4. THE FLEXIBLE JOINT MUST BE ULC LISTED.

DESCRIPTION	A	B	C	D	E	F	G
75	324	273	152	178	13	102	152
100	394	336	190	211	16	102	152
150	467	432	235	297	19	127	203
200	568	514	279	336	19	127	203
250	711	660	349	387	22	127	203
300	864	800	413	476	25	127	203

H: THERMAL EXPANSION OF PIPE, MAXIMUM 1/2 OF "G".
I: FREE SPACE (NO INSULATION) TO ALLOW PIPE MOVEMENT (MINIMUM, "H" + 50mm).
J: INSULATION OVERLAP (300mm) ATTACHED TO THE GUIDE, WHICH TRAVELS ALONG METALLIC WRAPPING OF THE EXHAUST PIPE.



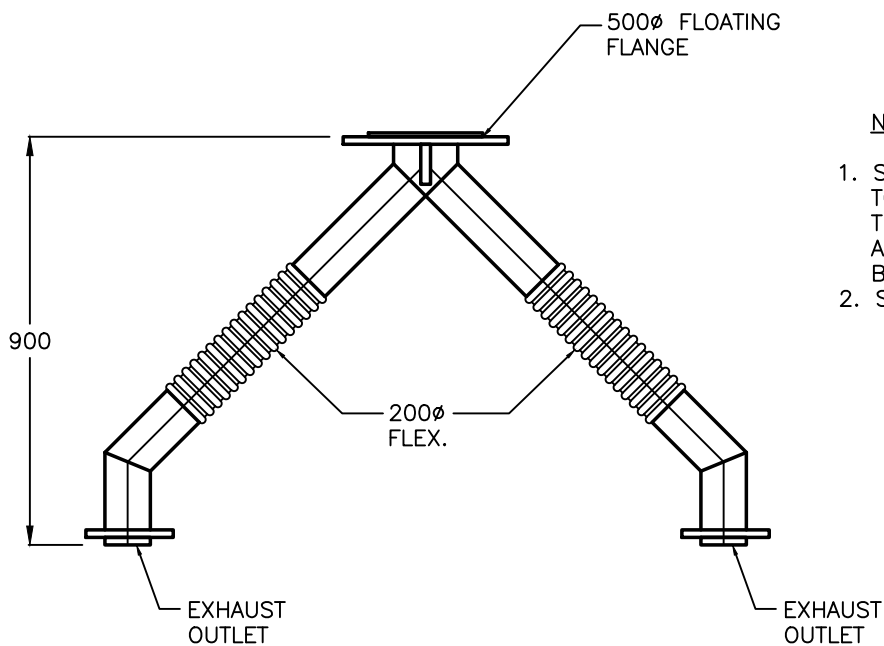
SECTION "A-A"



REMARKS

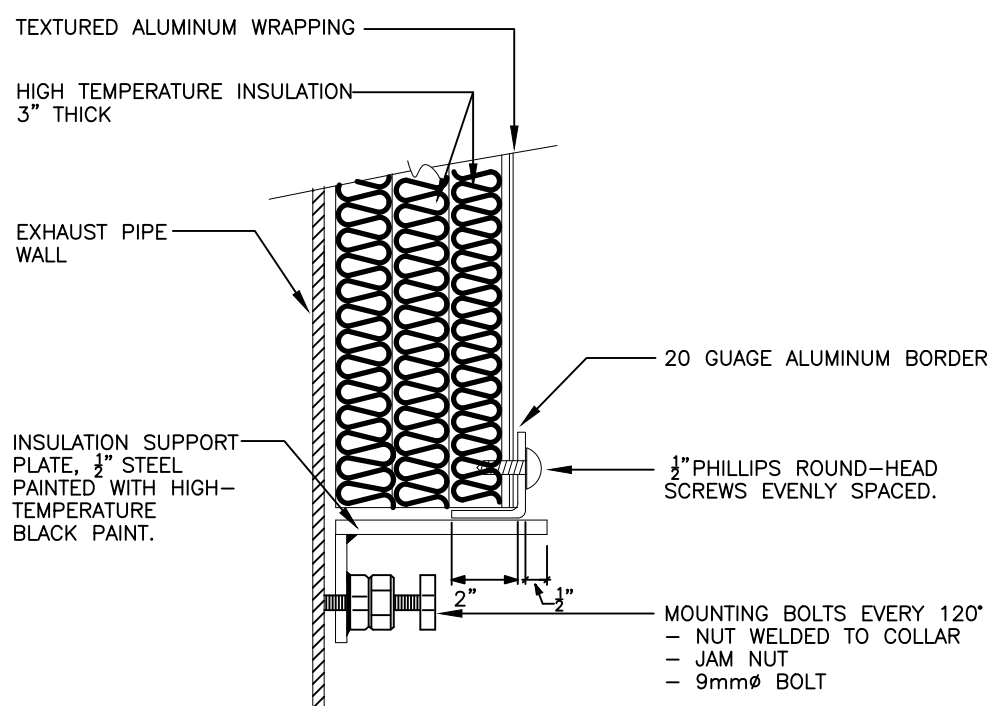
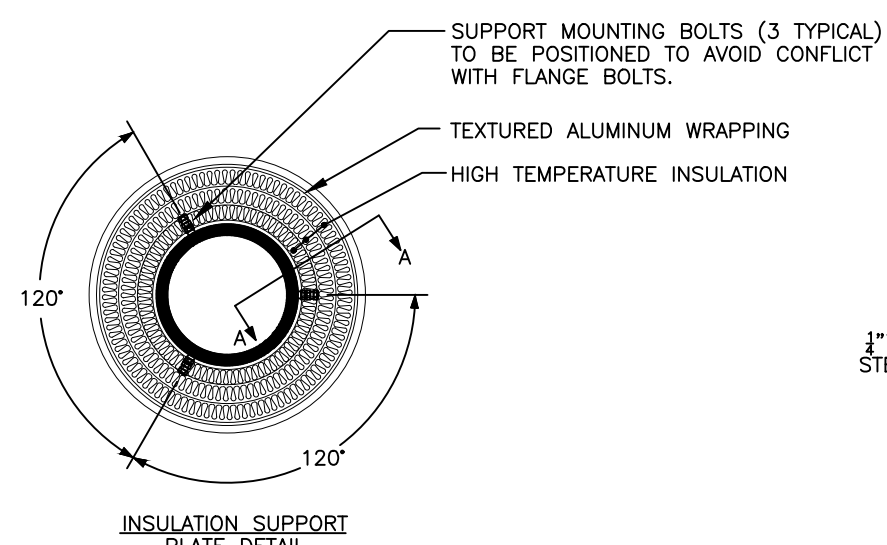
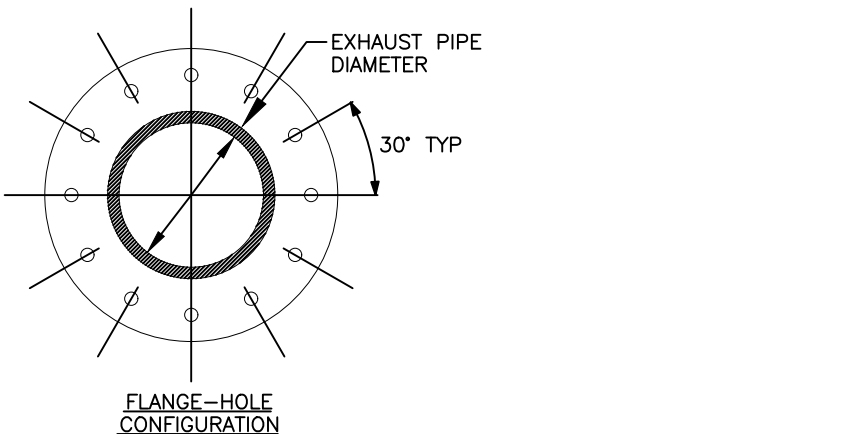
1. THE GUIDE SUPPORTS SHALL BE IDENTICAL TO #PG794, THOMAS & BETTS OR EQUIVALENT "TEXI-TUBE".
2. PROVIDE GUIDE SUPPORT
3. CUT SHORT THE INSULATION INSIDE THE GUIDE SUPPORT TO PREVENT DAMAGE TO INSULATION & ALUMINUM WRAPPING.
4. THE EXHAUST PIPE SHALL HAVE 1 LAYER (3" EACH) OF INSULATION. DEPENDING ON THE DIAMETER OF THE GUIDE, EACH LAYER OF INSULATION SHALL OVERLAP INSULATED EXHAUST PIPE BY 12".
EX.: - IF THE GUIDE DIAMETER IS 4" GREATER THAN THE INSULATED EXHAUST PIPE THEN THERE SHALL BE ONE 2" LAYER OF INSULATION OUTSIDE OF GUIDE.
- IF THE GUIDE DIAMETER IS 8" GREATER THAN THE INSULATED EXHAUST PIPE THEN THERE SHALL BE TWO 2" LAYERS OF INSULATION OUTSIDE OF GUIDE.

1 EXHAUST PIPE SUSPENSION DETAIL
M-901 N.T.S.

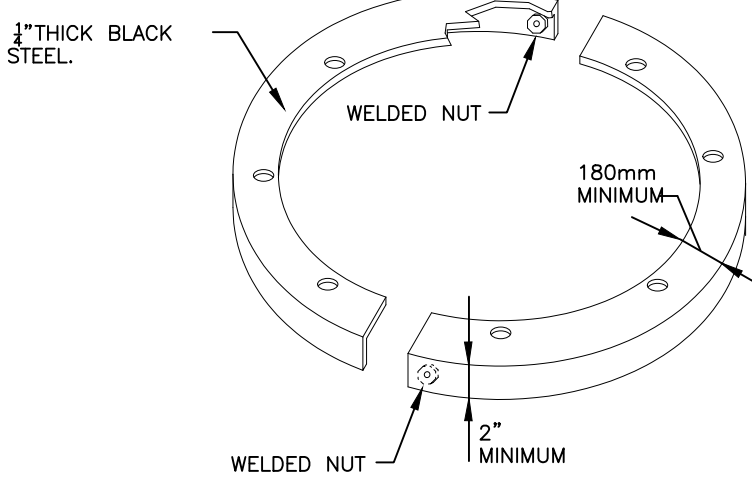


NOTES:

1. SOME VARIATIONS MAY EXIST FOR THIS WYE-CONNECTION TO SUIT VARIOUS GENERATOR MANUFACTURERS. IT IS SHOWN THUS FOR ILLUSTRATION PURPOSES. MAKE THE NECESSARY ALLOWANCES FOR VARIATIONS IN CONSTRUCTION THAT MAY BE REQUIRED.
2. SELECT A LOW PRESSURE DROP WYE.



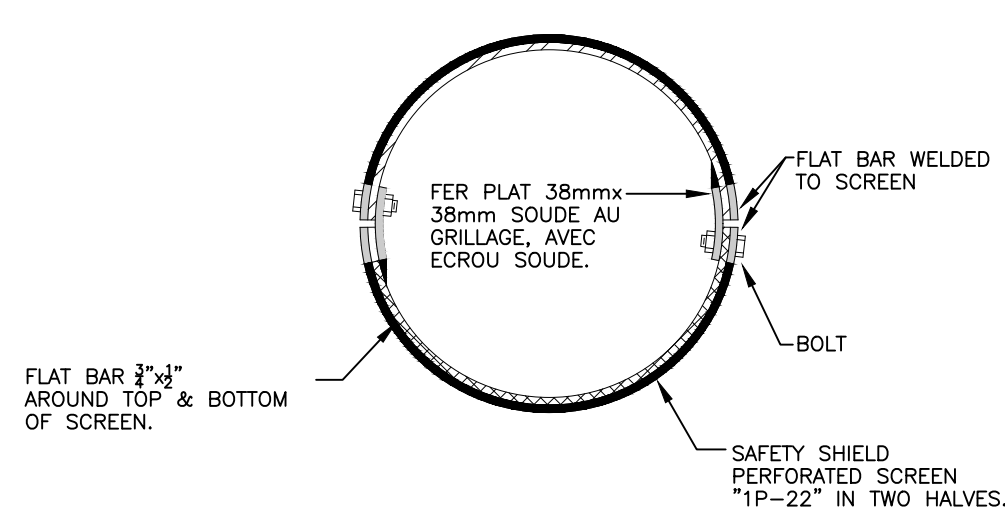
SECTION "A-A" SUPPORT PLATE



SPACER-DETAIL

REMARKS

- A) THE MUFFLER, THE FLEXIBLE PIPE SAFETY SHIELD SHALL BE INSTALLED BY DIV.#15.
- B) THE FLANGE FOLLOWING THE FLEXIBLE PIPE SHALL BE INSTALLED BY DIV.#15.
- C) THE FLEXIBLE PIPE SHALL BE PERFECTLY ALIGNED IN BOTH AXIS. IT SHALL NOT BE COMPRESSED AND/OR STRETCHED DURING INSTALLATION ON THE GEN-SET. THE EXHAUST SYSTEM SHALL BE INSTALLED IN THE PRESENCE OF THE GEN-SET MANUFACTURER. ALL FLEXIBLE PIPE ADJUSTMENT SHALL BE MADE BY THE GEN-SET MANUFACTURER IN COORDINATION WITH THE DIV.#15 CONTRACTOR.
- D) REFER TO THE SPECIFICATIONS DOCUMENTS FOR MATERIAL CHARACTERISTICS.



SECTION "B-B" SAFETY SHIELD

3 DETAILED INSTALLATION OF ENGINE PIPE
M-901 N.T.S.

2 GENERAL CONFIGURATION OF EXPANSION & COMPRESSION JOINT-INSULATION
M-901 N.T.S.

4 WYE FLEX. EXHAUST
M-901 N.T.S.

Key Plan:

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Project:

NEW POWERHOUSE

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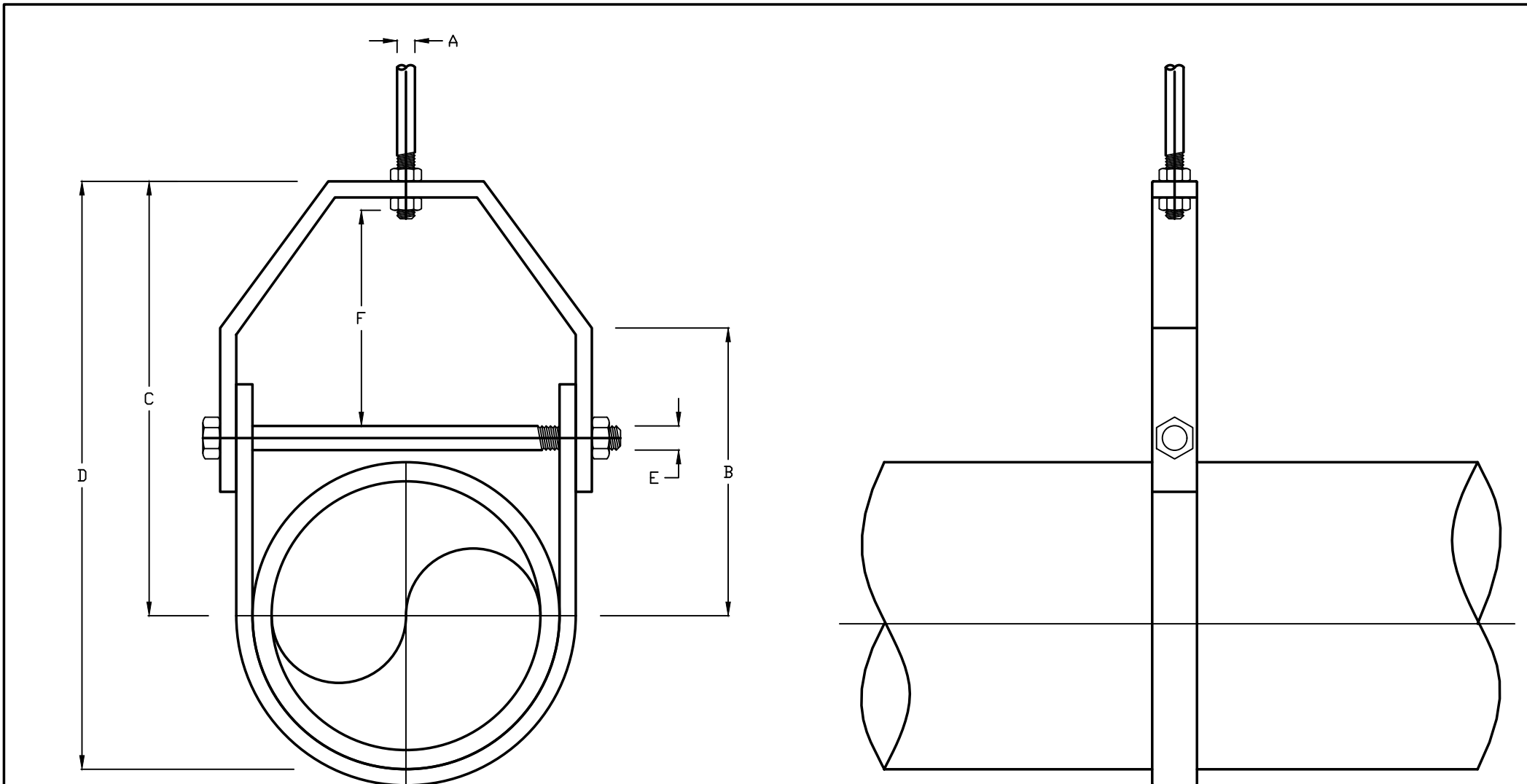
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Project No:	1802218	Drawing No:	M-901
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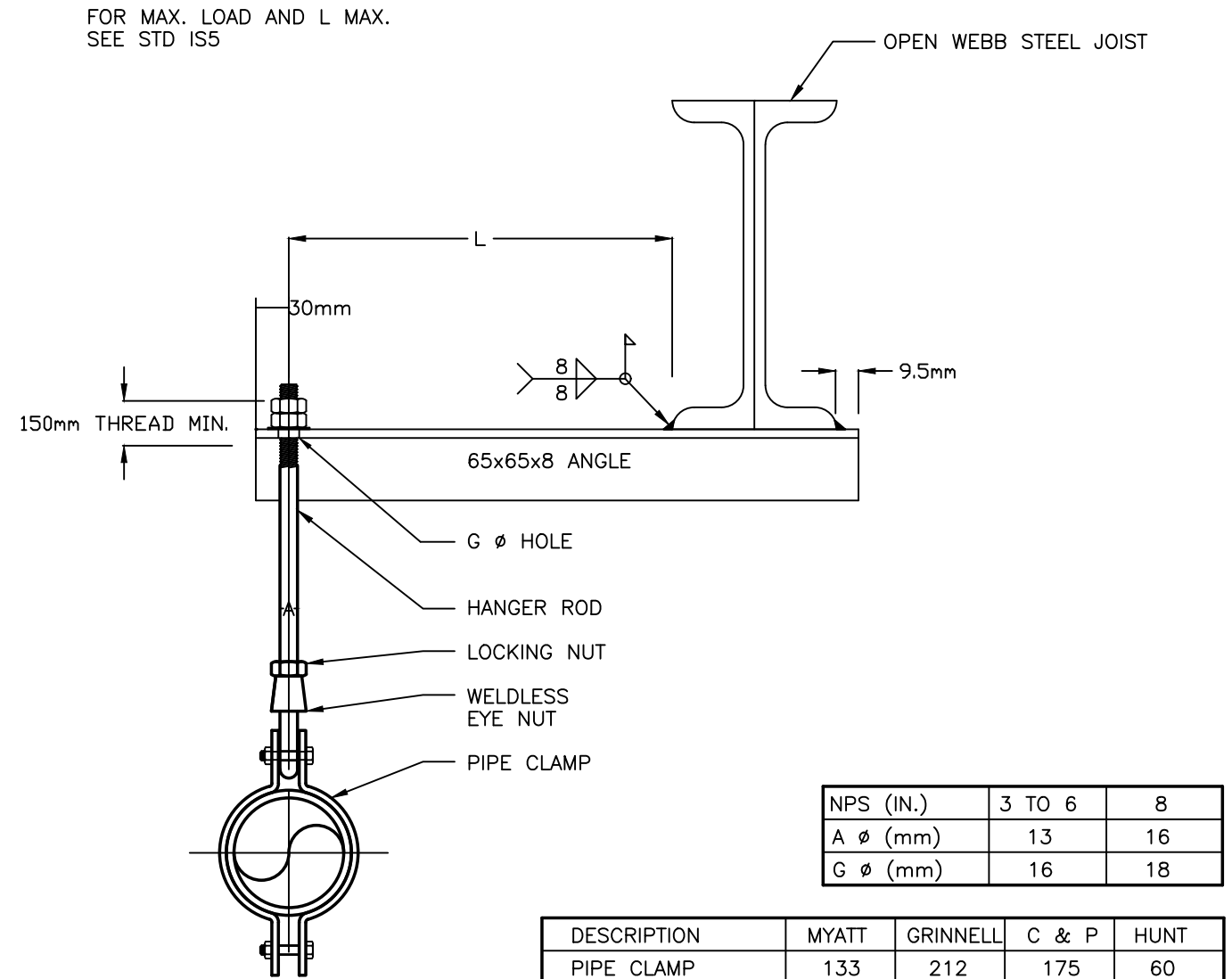


M-902



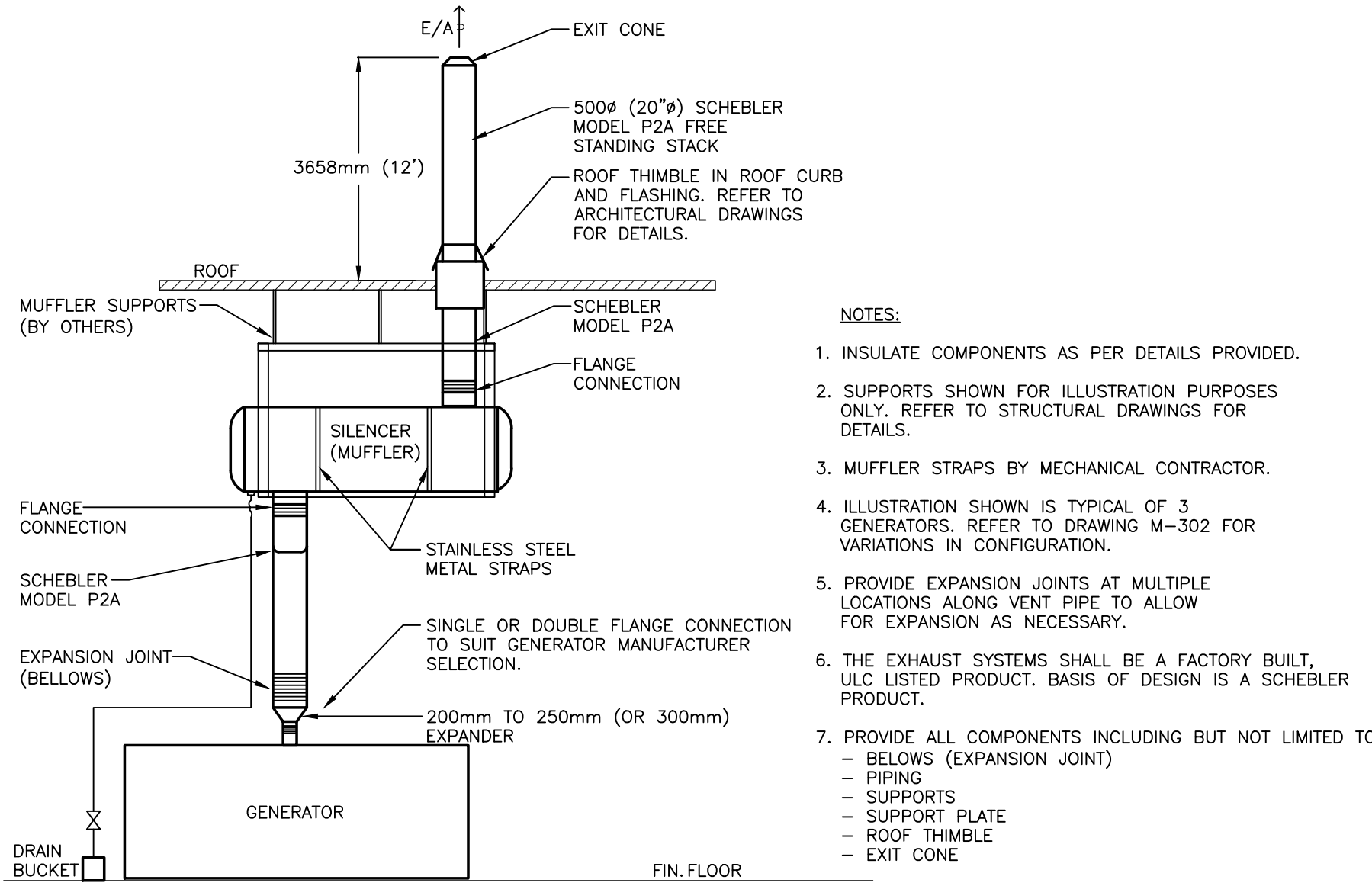
ENGINEERING DATA				DIMENSION DATA				MATERIAL	
PIPE SIZE	REC. HSR SPACING	HANGER ROD DIA.(A)	ROD TAKE-OUT(B)	C	D	E	F	UPPER	LOWER
1/2"	5'-0"	3/8"	1 1/4"	1 3/4"	2 1/4"	1/4"	1/4"	16Gax7/8	16gx7/8
3/4"	6'-0"	3/8"	1 7/8"	2 3/4"	3 5/16"	5/16"	7/8"	1/8 x 1	1/8 x 1
1"	7'-0"	3/8"	1 1/8"	1 13/16"	2 5/16"	5/16"	7/8"	1/8 x 1 1/8	1/8 x 1 1/8
1 1/4"	8'-0"	3/8"	1 1/8"	1 13/16"	2 5/16"	3/8"	3/4"	3/16 x 1	3/16 x 1
1 1/2"	9'-0"	3/8"	1 1/8"	1 13/16"	2 5/16"	3/8"	3/4"	3/16 x 1	3/16 x 1
2"	10'-0"	3/8"	1 1/8"	1 13/16"	2 5/16"	3/8"	1 1/4"	3/16 x 1	3/16 x 1
2 1/2"	11'-0"	1/2"	1 1/8"	1 13/16"	2 5/16"	3/8"	1 1/4"	3/16 x 1 /1/4	3/16 x 1 1/4
3"	12'-0"	1/2"	1 1/8"	1 13/16"	2 5/16"	7/16"	1 5/8"	3/16 x 1 /1/4	3/16 x 1 1/2
4"	14'-0"	5/8"	1 1/8"	1 13/16"	2 5/16"	1/2"	1 1/2"	3/16 x 1 1 /2	3/16 x 1 1/2
6"	17'-0"	3/4"	1 1/8"	1 13/16"	2 5/16"	1/2"	2"	5/16 x 1 /1/2	3/16 x 1 1/2
8"	19'-0"	3/4"	1 1/8"	1 13/16"	2 5/16"	5/8"	2 7/8"	3/8 x 1 1/2	1/4 x1 1/2
10"	22'-0"	7/8"	1 1/8"	1 13/16"	2 5/16"	3/4"	2 3/4"	3/8 x 2	1/4 x 2
12"	23'-0"	7/8"	1 1/8"	1 13/16"	2 5/16"	3/4"	2 7/8"	1/2 x 2	2/3 x 2

2 STANDARD CLEVIS HANGER
M-903 N.T.S.



DESCRIPTION	MYATT	GRINNELL	C & P	HUNT
PIPE CLAMP	133	212	175	60
MACHINE ROD OR ALL-THREAD ROD	432	146	94	99
WELDLESS EYE NUT	480	290	279	88

1 PS-01 WELDED BRACKET WITH HANGER (UNINSULATED 3-8")
M-903 N.T.S.



- NOTES:
1. INSULATE COMPONENTS AS PER DETAILS PROVIDED.
 2. SUPPORTS SHOWN FOR ILLUSTRATION PURPOSES ONLY. REFER TO STRUCTURAL DRAWINGS FOR DETAILS.
 3. MUFFLER STRAPS BY MECHANICAL CONTRACTOR.
 4. ILLUSTRATION SHOWN IS TYPICAL OF 3 GENERATORS. REFER TO DRAWING M-302 FOR VARIATIONS IN CONFIGURATION.
 5. PROVIDE EXPANSION JOINTS AT MULTIPLE LOCATIONS ALONG VENT PIPE TO ALLOW FOR EXPANSION AS NECESSARY.
 6. THE EXHAUST SYSTEMS SHALL BE A FACTORY BUILT, ULC LISTED PRODUCT. BASIS OF DESIGN IS A SCHEBLER PRODUCT.
 7. PROVIDE ALL COMPONENTS INCLUDING BUT NOT LIMITED TO
 - BELLOWS (EXPANSION JOINT)
 - PIPING
 - SUPPORTS
 - SUPPORT PLATE
 - ROOF THIMBLE
 - EXIT CONE

3 GENERATOR EXHAUST SYSTEM - ELEVATION
M-903 N.T.S.

Key Plan:

Consultant:

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NEW POWERHOUSE
700 GORDON STREET, WHITBY, ON L1N 5S9

Sheet Title:

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Project No:	1802218	Drawing No:	M-903