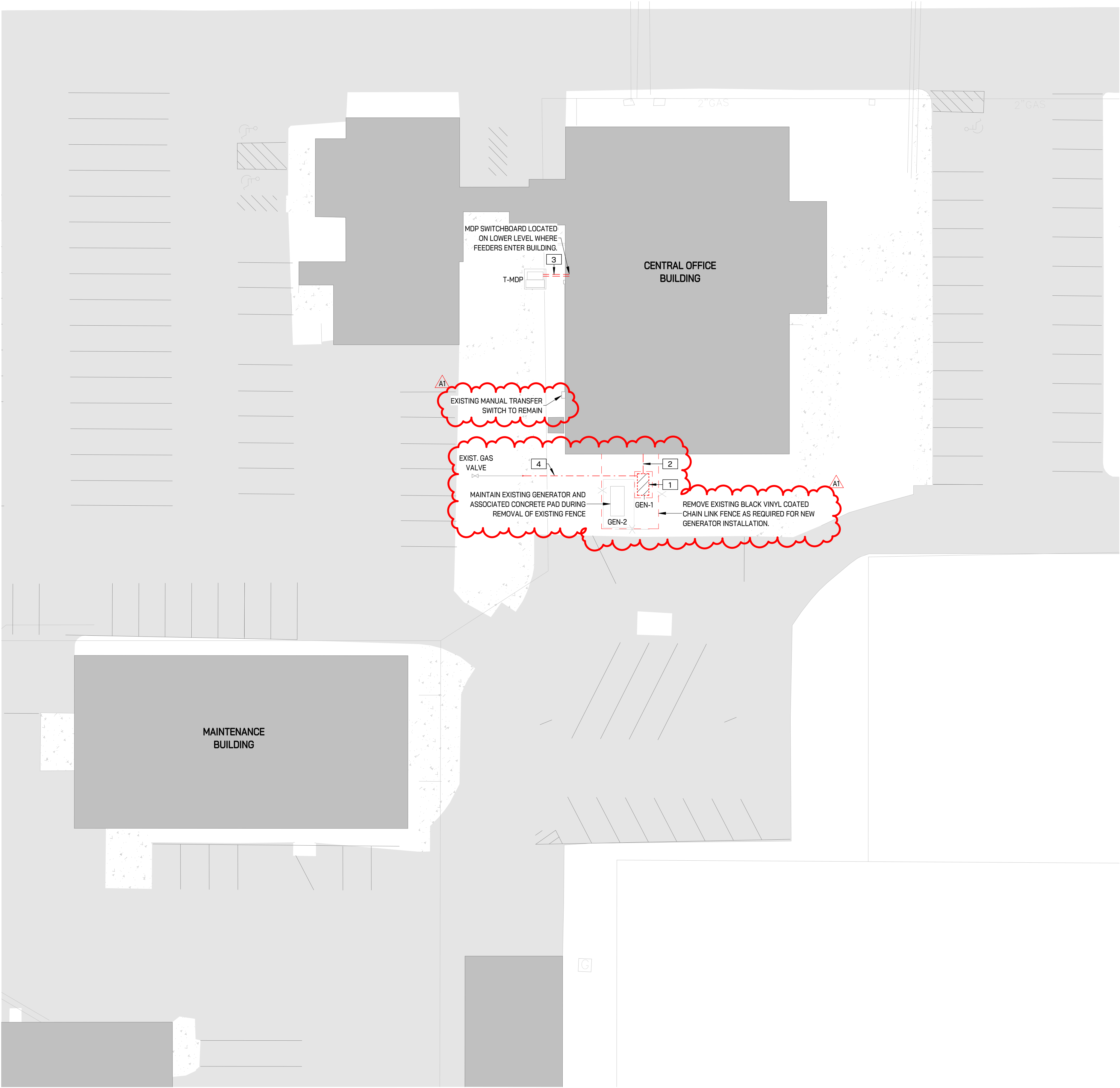




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ELECTRICAL DEMOLITION KEYED NOTES

1

REMOVE EXISTING 60KW NATURAL GAS GENERATOR AND ALL ASSOCIATED ELECTRICAL CONNECTIONS. REMOVE EXISTING CONCRETE PAD DEDICATED FOR GENERATOR BEING DEMOLISHED. PREPARE ELECTRICAL INFRASTRUCTURE FOR NEW WORK AS REQUIRED.

2

REMOVE CONDUIT AND FEEDER FROM DISCONNECT SWITCH SERVING ATS-EM BACK TO GENERATOR. EXISTING FEEDER ENTERS BUILDING BELOW GRADE. FEEDER TO BE REPLACED IN NEW CONSTRUCTION.

3

REMOVE CONDUIT AND FEEDER FROM MEDIUM VOLTAGE TRANSFORMER TO MDP. EXISTING SERVICE FEEDER ENTERS BUILDING BELOW GRADE. FEEDER TO BE REPLACED IN NEW CONSTRUCTION.

4

DISCONNECT, REMOVE, AND CAP GENERATOR GAS PIPING BACK TO EXISTING SIDEWALK.

KEY PLAN

ISSUE DATE	ISSUED FOR
09/10/2025	Bids
09/23/2025	Addendum #1
DRAWN	NB
CHECKED	LB
APPROVED	MB

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2851 High Meadow Circle | Suite 100
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248.656.1377

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PROJECT

Livonia Public Schools

Central Office
Generator Upgrades

Livonia,
Michigan

SHEET

ELECTRICAL SITE
DEMOLITION PLAN

PROJECT NUMBER

2025-044

SHEET NUMBER

ED100



A1

- PROVIDE (3) 20A/1P SQUARE D CIRCUIT BREAKERS TO AVAILABLE SPACE IN PANELBOARD FOR GENERATOR ACCESSORY CIRCUITS. PROVIDE GENERATOR AND ATS-MDP ANNUNCIATOR PANELS IN BUILDING SUPERVISOR'S OFFICE. ROUTE CONDUIT AND CABLING FROM GENERATOR AND TRANSFER SWITCH AS RECOMMENDED BY MANUFACTURER.

ISSUED FOR

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Bids

09/23/2025

Addendum #1

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MECHANICAL + ELECTRICAL DESIGN

PROJECT

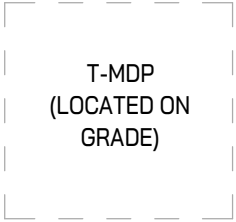
Livonia,
Michigan

SHEET

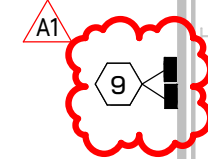
PROJECT NUMBER

SHEET NUMBER

ES100



T-MDP
(LOCATED ON
GRADE)



A1

9

1
E100

LOWER LEVEL POWER PLAN

$$1/8'' = 1'-0''$$

A1

- 1 PROVIDE NEW DIESEL EMERGENCY GENERATOR WITH 24-HOUR BASE MOUNTED TANK AND LEVEL 2 WEATHERPROOF ENCLOSURE. EXPAND ON EXISTING CONCRETE EQUIPMENT PAD TO SUPPORT NEW GENERATOR. REFER TO GENERATOR MANUFACTURERS REQUIREMENTS FOR ALL ADDITIONAL LOW VOLTAGE CONNECTIONS.
- 2 PROVIDE NEW AUTOMATIC TRANSFER SWITCH (ATS-MDP) IN NEMA 4X RATED ENCLOSURE. TRANSFER SWITCH SHALL BE 4-POLE, CLOSED TRANSITION, AND ULSE RATED WITH MAIN BREAKER, ROUTE CONDUIT AND FEEDERS BELOW GRADE TO TRANSFER SWITCH AND FROM TRANSFER SWITCH TO EXISTING MDP (LOCATED IN LOWER LEVEL). BASIS OF DESIGN: CUMMINS POWER COMMAND X-SERIES.
- 3 PROVIDE NEW GENERATOR BYPASS SWITCH (GBS) FOR LIFE SAFETY EMERGENCY FEED FROM NEW GENERATOR. SWITCH SHALL BE NEMA 4X RATED, LOCKABLE, AND CONTAIN INTEGRAL CAM LOCK CONNECTION FOR PORTABLE GENERATOR. TRYSTAN TMTS-2 OR EQUIVALENT. ROUTE CONDUIT AND FEEDER BELOW GRADE TO SWITCH AND FROM SWITCH TO EXISTING ATS-EM DISCONNECT SWITCH.
- 4 PROVIDE DEDICATED 20A, 120V CIRCUITS FOR GENERATOR FUEL TANK ACCESSORIES. COORDINATE EXACT REQUIREMENTS WITH MANUFACTURER'S SPECIFICATIONS.
- 5 PROVIDE CONDUIT AND FEEDER FROM ATS-MDP (REFER TO SITE PLAN) TO EXISTING MDP SWITCHBOARD.
- 6 PROVIDE CONDUIT AND FEEDER FROM GBS (REFER TO SITE PLAN) TO ATS-EM DISCONNECT SWITCH.
- 7 PROVIDE GENERATOR MANUFACTURER'S CONTROL WIRING FROM ALL EXISTING AUTOMATIC TRANSFER SWITCHES TO ATS-MDP SO THAT ALL EQUIPMENT CAN BE MONITORED BY BUILDING BMS SYSTEM. CONTRACTOR SHALL INVESTIGATE AND PROVIDE ANY SOFTWARE/HARDWARE UPDATES TO EXISTING TRANSFER SWITCHES TO ENSURE EMERGENCY SYSTEM OPERATES AS DESCRIBED IN THE SEQUENCE OF OPERATIONS.
- 8 PROVIDE (3) 20A/1P SQUARE D CIRCUIT BREAKERS TO AVAILABLE SPACE IN PANELBOARD FOR GENERATOR ACCESSORY CIRCUITS.
- 9 PROVIDE GENERATOR AND ATS-MDP ANNUNCIATOR PANELS IN BUILDING SUPERVISOR'S OFFICE. ROUTE CONDUIT AND CABLING FROM GENERATOR AND TRANSFER SWITCH AS RECOMMENDED BY MANUFACTURER.

KEY PLAN

ISSUE DATE

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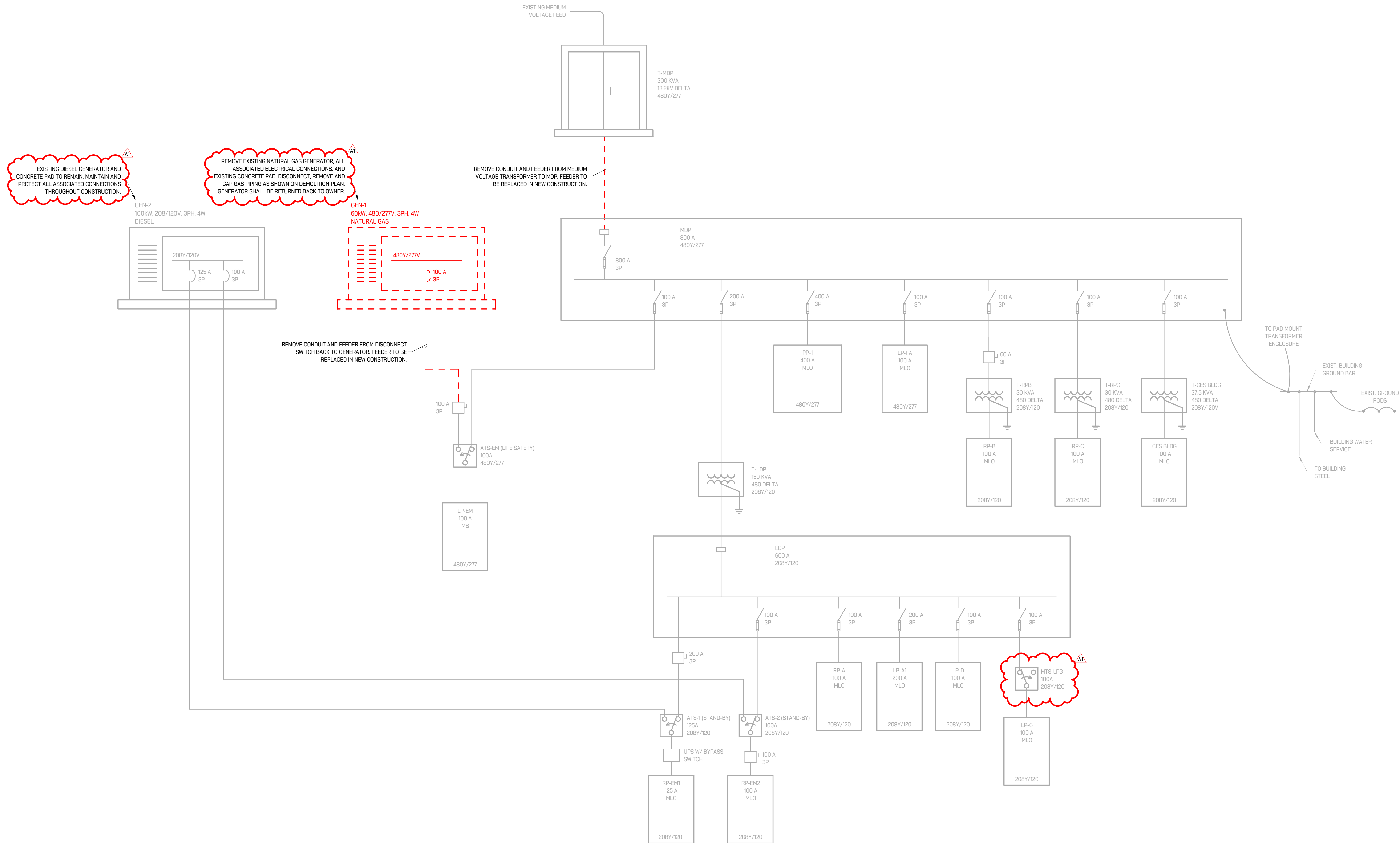
POWER LEVEL ELECTRICAL PLAN

PROJECT NUMBER

025-044

SHEET NUMBER

E100



ISSUE DATE	ISSUED FOR
09/10/2025	Bids
09/23/2025	Addendum #1
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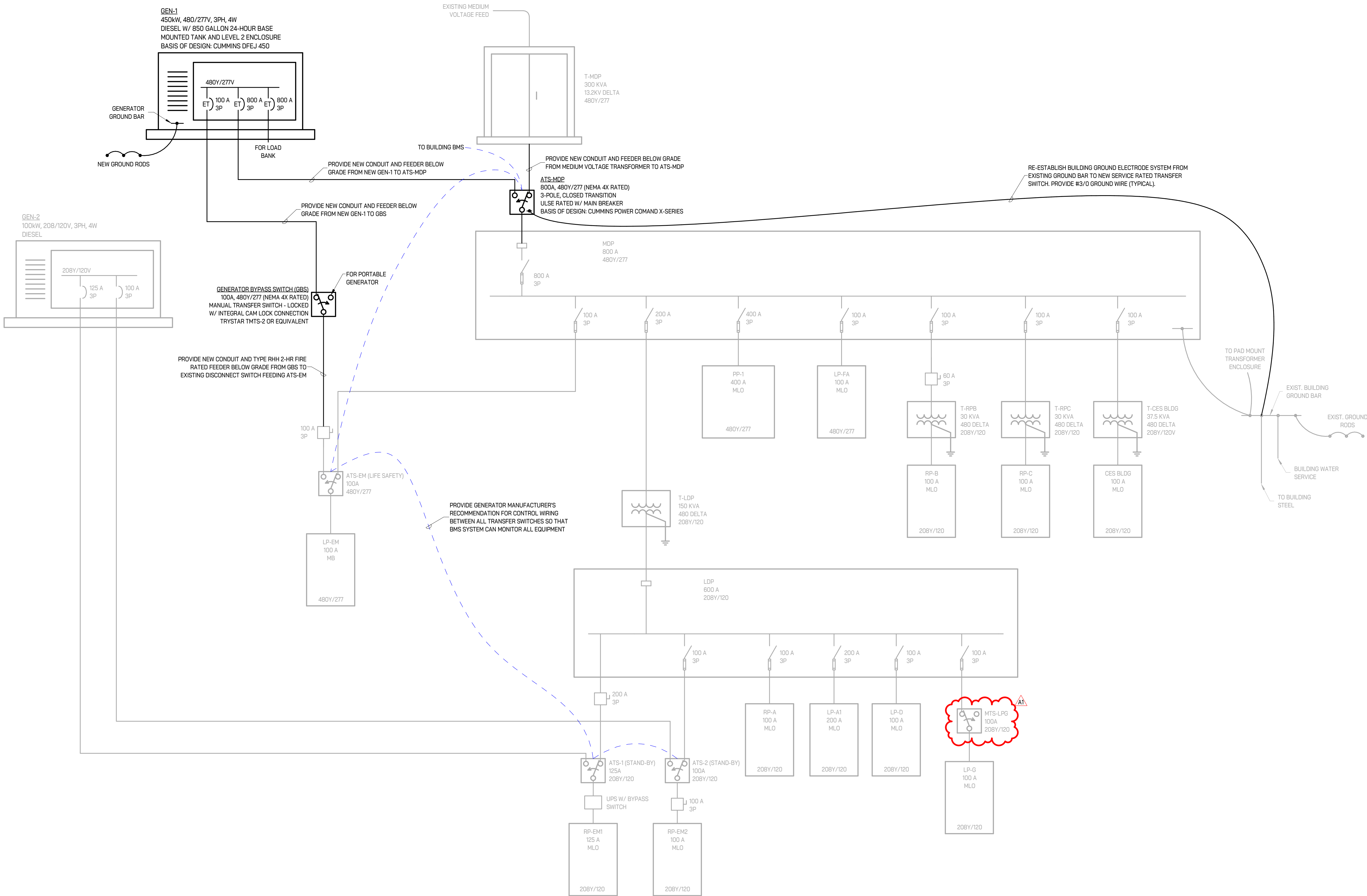
ELECTRICAL
ONE-LINE DIAGRAM -
DEMOLITION

PROJECT NUMBER

2025-044

SHEET NUMBER

E401



1
E402 ELECTRICAL ONE LINE DIAGRAM
1" = 1'-0"

KEY PLAN

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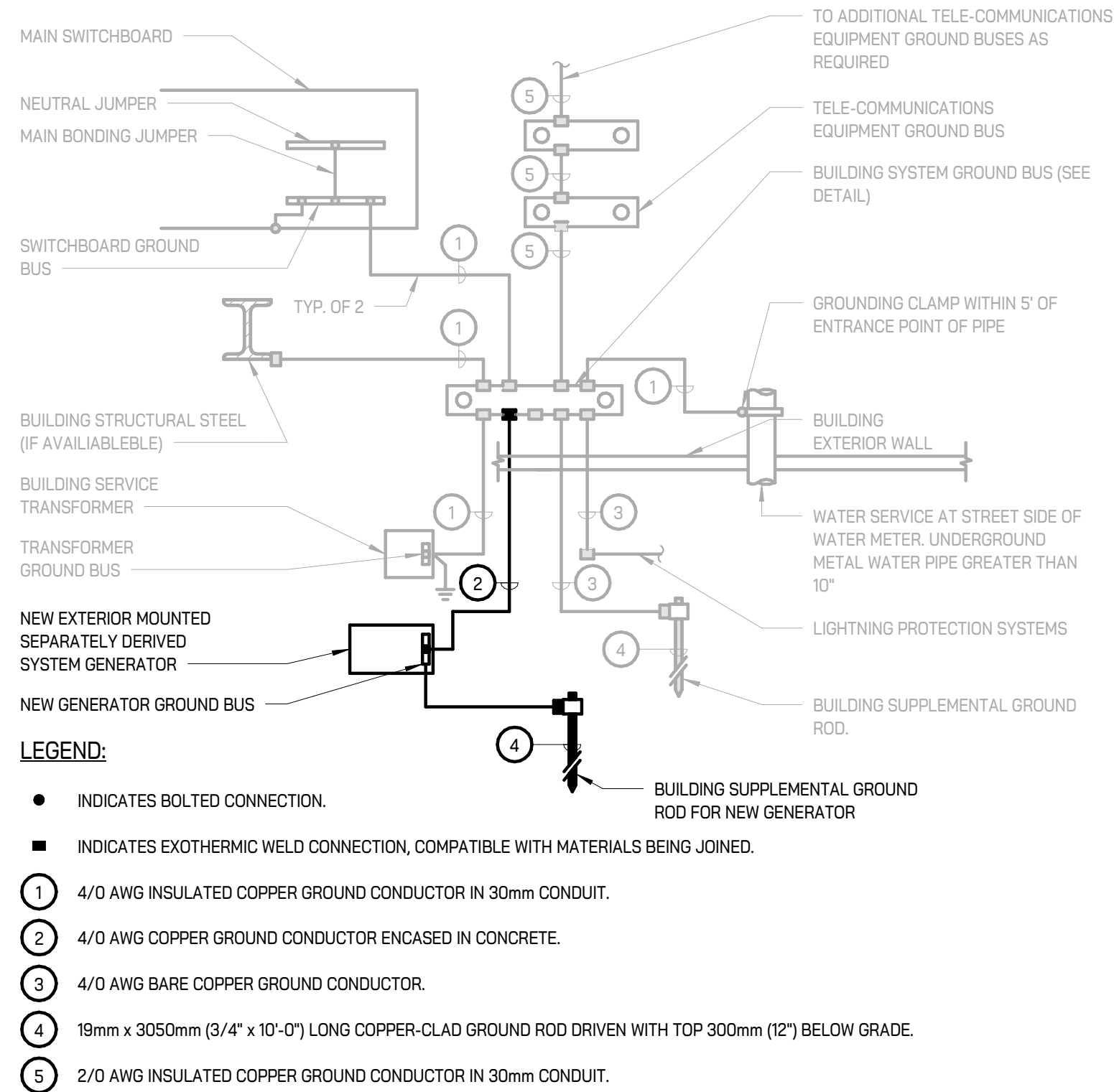
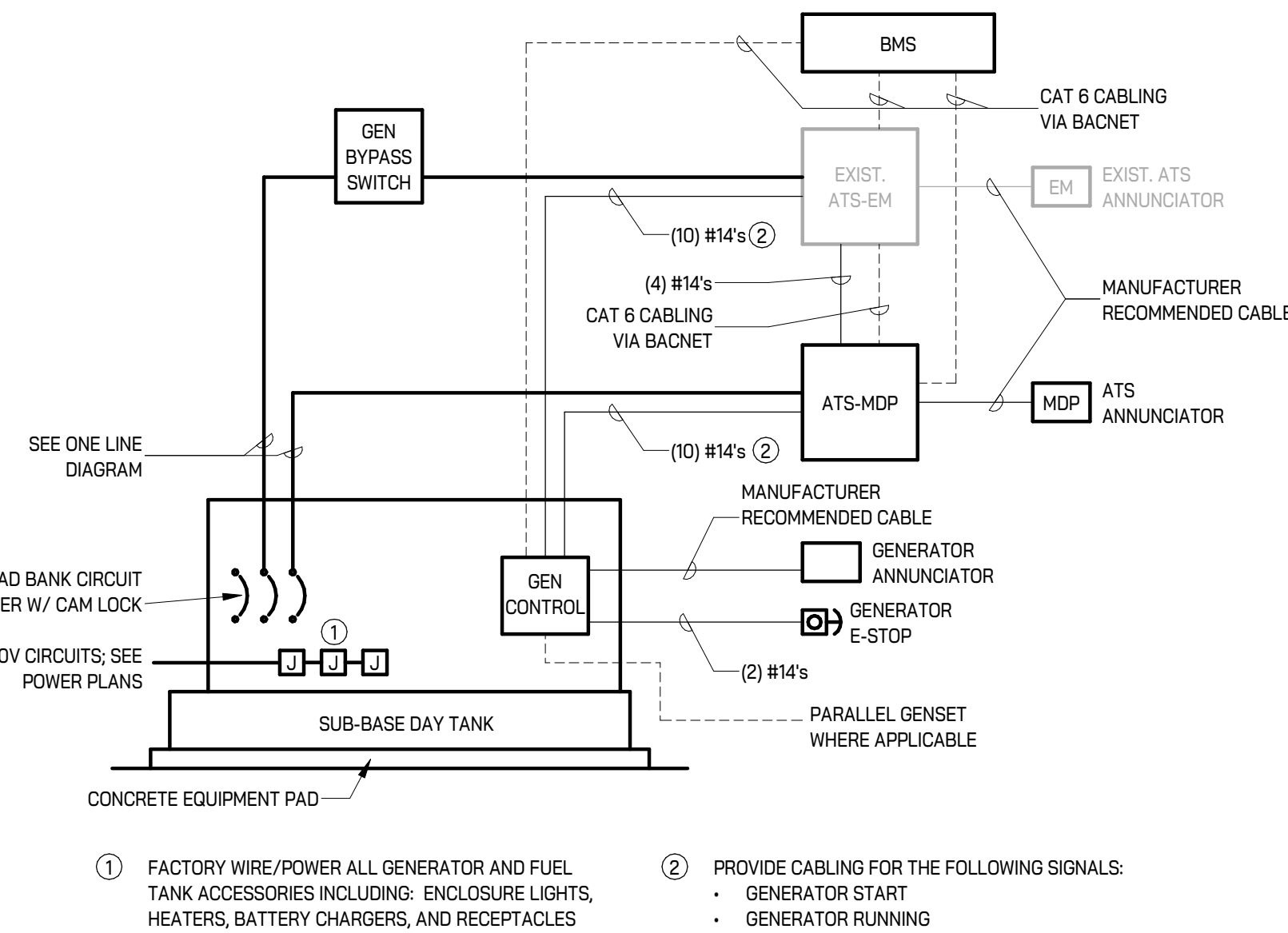
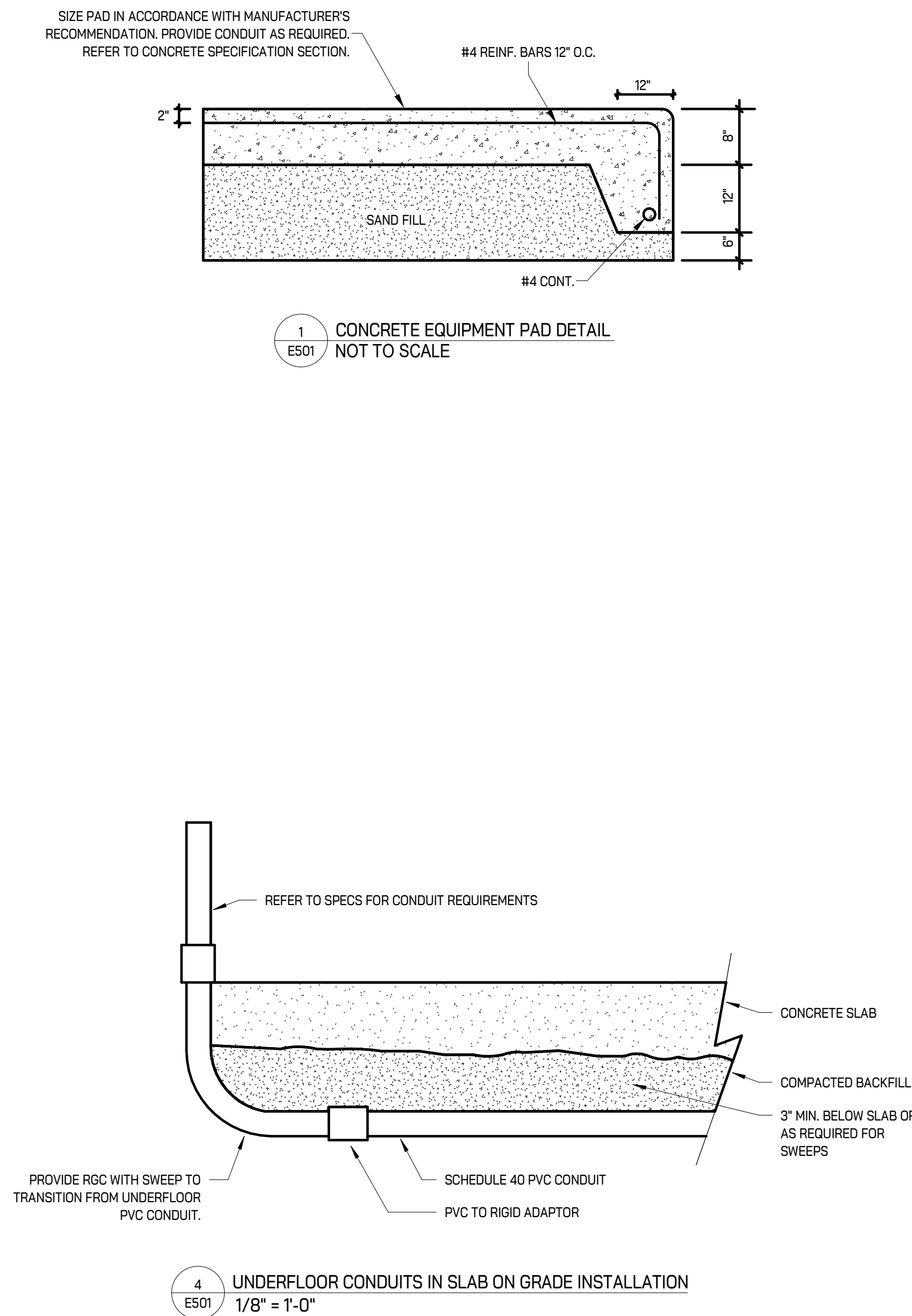
SHEET
ELECTRICAL
ONE-LINE DIAGRAM -
NEW CONSTRUCTION

PROJECT NUMBER
2025-044

SHEET NUMBER
E402

ELECTRICAL PANEL FEEDER SCHEDULE								
PANELBOARD	FED FROM	FEEDER INFORMATION						
	PANEL - CIRCUIT	LOAD CURRENT	BREAKER / POLES	# OF RUNS	WIRE	NEUTRAL	GROUND	CONDUIT
480Y/277								
ATS-EM	GBS - 1	23 A	100 A / 3	1	#3	#3	#8	2" C
ATS-MDP	GEN-1 - 2,4,6	346 A	800 A / 3	2	600kcmil	600kcmil	1/0	3-1/2" C
GBS	GEN-1 - 1,3,5	23 A	100 A / 3	1	#3	#3	#8	1-1/4" C
MDP	ATS-MDP - 1	346 A	800 A / 3	2	600kcmil	600kcmil	1/0	3-1/2" C

NOTES:
1. FOR ALL AUTOMATIC TRANSFER SWITCHES, PROVIDE CONDUIT AND FEEDER SIZES FROM BOTH NORMAL AND EMERGENCY SOURCES AS INDICATED IN THE SCHEDULE ABOVE.
2. FOR LIFE SAFETY FEEDERS, PROVIDE 2-HOUR RATED RHH TYPE CABLE WHEN ROUTED WITHIN BUILDING.



KEY PLAN	
ISSUE DATE	ISSUED FOR
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GENERATOR SOLUTION SUMMARY

PROJECT PARAMETERS	
Frequency (Hz): 60.0	Number of Genset to Parallel: 1.0
Duty: Standby	Ambient Temperature (F): 77.0
Phase: Three	Altitude (ft): 360.99
Voltage: 277/480, Series Wye	Max Allowable Temperature Rise: 125.0
Fuel Types: Diesel	Max Allowable Project Voltage Dip (%): 35.0
Emissions Preference: US Stationary Emergency	Max Allowable Project Frequency Dip (%): 10.0
Country: United States	
Min Load Capacity (%): 30.0	
Max Load Capacity (%): 90.0	
RECOMMENDED GENERATOR SET CONFIGURATION	
Generator Set Name: DFE	B-Code: B252
Engine Name: C6K15-G9 Nonroad 2	R-Code: R002
Fuel: Diesel	Number of Loads: 12.0
Cooling System: Enhanced High Ambient	Reconnectable: Yes
Alternator Frame: HCSD	Fuel Single Phase Output: No
Alternator Winding: 311.0	Increased Motor Starting: No
Alternator Excitation: PMS	Extended Slack: No
Temperature Rise: 125.0	
Max SKVA: 1896.0	

POWER SYSTEM SUMMARY								
LOADS AND STEPS								
Step Name			Starting		Running		Cyclic Load	NonLinear Load
Step #	Load Name	Load Qty	kW	kVA	kW	kVA		
1	Step 1		10.0	10.53	10.0	10.53	12.68	
	Light Load	1	10.0	10.53	10.0	10.53	12.68	Y
	Step 2		34.5	36.33	34.5	36.33	46.16	
3	UPS Load	1	34.5	36.33	34.5	36.33	46.16	Y
	Step 3		264.0	293.33	244.0	271.11	326.48	
	General load		144.0	160.0	144.0	160.0	192.68	
	ATS1		12.0	13.00	10.0	11.11	13.8	Y
	HVAC Loads		120.0	136.33	100.0	111.11	133.8	

PRODUCT CAPACITY			
Project Running (kW):	288.5	Project Max Starting(kW):	308.5
Base Product Rating (kW):	450	Project Effective Max Starting(kW):	294.16
Site Adjusted Product Rating (kW):	450	Max Starting kW:	516
Product kW Capacity (%):	64.11	Product Capacity (%):	57.01
Project Running (kVA):	319.97	Total Running Non-Linear kVA:	48.86
Base Alternator Rating (kVA):	643.8	Max Allowed (THDV %):	10
Site Adjusted Alternator Rating (kVA):	643.8	Total Voltage Harmonic Distortion (THDV%):	2.54
Product kVA Capacity (%):	49.7		

Note: Capacity % values are within the user-selected project parameters for product capacity. If the number of generator sets is greater than one, the values here will reflect one generator set assuming the loads are evenly shared.

TRANSIENT PERFORMANCE					
Step Name			Voltage	Frequency	
Step #	Step Name	Dip %	Recovery Time	Dip %	Recovery Time
1	Step 1	0.34	0.21	0.12	0.11
2	Step 2	1.17	0.74	0.4	0.37
3	Step 3	12.35	3.44	3.3	2.08

Note: Voltage and frequency dips and recovery times are estimates based on measured performance of prototype testing or advanced simulation. Recovery times may be assumed to be based on ISO5828-5 G2 class bandwidths unless otherwise stated in the model Spec Sheet. Typically, best practice may allow for approximately 5 seconds between application of load steps when designing your system. These values are within the user-selected project parameters for max allowable voltage and frequency dip performance.

General load ATS1			
Load Type: General			
User Inputs		Load Requirements	
Phase:	Three	Running PF:	0.90
Voltage:	480.0	Running KW:	144.0
Running KW:	144.0	Running KVA:	160.0
Running KVA:	160.0	Starting PF:	0.5
Power Factor:	0.9	Starting KW:	144.0
Running Amps:	192.68	Running Amps:	192.68
Rectifier Type:	None	Starting KVA:	160.0
Unit of Rating:	KVA		

HVAC Loads	
Load Type: User Defined	
User Inputs	Load Requirements
Phases	Running PF: 0.90
Voltage:	Running KW: 100.00
Running KW:	Running KVA: 111.11
Running KVA:	Starting PF: 0.90
Starting KW:	Starting KW: 120.00
Power Factor:	Running Amps: 133.8
Running Amps:	Starting KVA: 133.33
Starting KVA:	Starting Amps: 160.57
Starting Amps:	
Efficiency (%):	
Rectifier Type:	
Running Unit of rating:	
Starting Unit of rating:	
Harmonic Content (THD(%)):	

Light Load 1		
Load Type: Light		
User Inputs		Load Requirements
Phase:	Three	Running PF: 0.95
Voltage:	480.0	Running kW: 10.0
Light type:	LED	Running kVA: 10.53
Running kW:	10.0	Starting PF: 0.95
Running kVA:	10.53	Starting kW: 10.0
Power Factor:	0.95	Running Amps: 12.68
Running Amps:	12.68	Starting kVA: 10.53
Rectifier Type:	LED Driver (EN61000-3-2)	Running NLL kVA: 10.53
Unit of Rating:	kW	
Harmonic Content	33.0	

UPS Load 1		
Load Type: UPS		
User Inputs		Load Requirements
Phase:	Three	Running PF: 0.90
Voltage:	480.0	Running KW: 34.5
Rated KVA:	30.0	Running KVA: 38.33
Soft Start:	None	Starting PF: 0.90
Load Factor:	100.0	Starting KW: 44.5
Power Factor:	0.9	Running Amps: 36.33
Efficiency (%):	90.0	Starting KVA: 38.33
Rectifier Type:	12 pulse	Running NLL KVA: 38.33
Unit of Rating:	Output	
Battery Charge Rate (%):	15.0	
Harmonic Content (THD%):	10.0	

NOTE:

1. EQUALS MANUFACTURER(S) SHALL MEET OR EXCEED DESIGN PARAMETERS OF GENERATOR CALCULATION AS SHOWN. GENERATOR LOADING BASED ON EXISTING METERING DATA. CONTRACTOR SHALL PROVIDE COST IMPACTS COMPARED TO BASIS OF DESIGN FOR OWNER/ENGINEER REVIEW.
2. GENERATOR SHALL BE PROVIDED WITH BACNET IP GATEWAY FOR COMMUNICATION TO BUILDING BMS.
3. CONTRACTOR SHALL INVESTIGATE EXISTING AUTOMATIC TRANSFER SWITCHES AND EXISTING 100KW GENERATOR CONTROLLER TO ENSURE EMERGENCY SYSTEM OPERATES AS DESCRIBED IN THE SEQUENCE OF OPERATIONS. PROVIDE ALL SOFTWARE/HARDWARE UPDATES TO EXISTING EQUIPMENT AS REQUIRED.
4. MAXIMUM SOUND LEVEL SHALL BE 74dBA AT 7 METERS UNDER FULL LOAD PER CUMMINS REQUIREMENTS.
5. PROVIDE ANY START-UP AND TESTING VERIFICATION FOR ANY THIRD PARTY COMMISSIONING REQUIREMENT.

GENERATOR SEQUENCE OF OPERATIONS

1. UPON LOSS OF UTILITY POWER, ATS-MDP SHALL SIGNAL GENERATOR-1 TO START. ATS-EM SHALL TRANSFER WITHIN 10 SECONDS TO SUPPLY LIFE SAFETY LOAD IN ACCORDANCE WITH NATIONAL ELECTRIC CODE.

2. ONCE ATS-EM LOAD IS SUPPLIED, ATS-MDP SHALL TRANSFER TO EMERGENCY POSITION. ATS-EM SHALL REMAIN IN THE EMERGENCY POSITION UNTIL UTILITY POWER HAS RETURNED.

3. GENERATOR-1 SHALL CONTINUOUSLY MONITOR TOTAL DEMAND ON ATS-MDP AND LOAD SHED AS REQUIRED IF GENERATOR BECOMES OVERLOADED. GENERATOR AND TRANSFER SWITCH COMMUNICATION SHALL ENSURE ATS-EM LOAD IS PRIORITIZED.

4. GENERATOR-2 SHALL BE PROGRAMMED WITH TIME DELAY AND ALLOW GENERATOR-1 TO CARRY ATS-1 AND ATS-2 LOADS IN A TYPICAL POWER OUTAGE SCENARIO. IN THE EVENT OF GENERATOR-1 FAILURE, GENERATOR-2 SHALL ENERGIZE AND CARRY ATS-1 AND ATS-2 LOADS. CONTRACTOR AND MANUFACTURER'S TECHNICIAN SHALL FIELD VERIFY AND TEST TIME DELAY SETTINGS.

5. ONCE UTILITY POWER HAS RETURNED, ATS-MDP AND ATS-EM SHALL TRANSFER BACK TO NORMAL POSITION AFTER A MINIMUM OF 5 MINUTES. GENERATOR SHALL RUN THROUGHOUT THE 5 MINUTE DURATION AND ENTER COOL-DOWN MODE ONCE TRANSFER SWITCHES ARE BACK TO NORMAL POSITION.

(REFER TO GENERATOR INTERCONNECTION DETAIL FOR WIRING TO AUTOMATIC TRANSFER SWITCHES AND BMS)

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ELECTRICAL SCHEDULES AND DETAILS

PROJECT NUMBER

2025-044

SHEET NUMBER

E501