

SUBMITTALS

NO.	DATE	DESCRIPTION
A	11.20.2024	ISSUE FOR REVIEW
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C	02.09.2024	ISSUE FOR PERMIT

PROJECT NO. AS397-22 | NY154  
 DRAWN BY NGF

SHEET TITLE  
**ELECTRICAL ONE LINE DIAGRAM & SCHEMATICS**

SHEET NO.

**E5.0**

**DRY TYPE TRANSFORMER FEEDER SCHEDULE**

FEEDER TAG	NUMBER OF RACEWAYS	SIZE OF RACEWAY	TYPE OF RACEWAY	QUANTITY AND SIZE OF CU CONDUCTORS PER CONDUIT	PRIMARY BREAKER	SECONDARY BREAKER	PRIMARY DISCONNECT IF TX IS NOT IN THE SAME ROOM AS THE PRIMARY BREAKER
TX-#X	1	1 1/4"	EMT/FMC	3 #3 AWG & 1 #8 EGC	80A		
TX-30P	1	1 1/4"	EMT/FMC	3 #3 AWG & 1 #8 EGC			
TX-30S	1	1 1/2"	EMT/FMC	4 #1 AWG & 1 #6 SUPPLY SIDE BONDING JUMPER		100A	100A/3P/600V NFSS

NOTES:  
 1. ALL CONDUCTORS INDICATED ABOVE ARE COPPER THHN/THWN-2  
 2. THIS SCHEDULE ONLY APPLIES TO 480-208/120 VOLT STEP DOWN DRY TYPE TRANSFORMERS  
 3. THIS SCHEDULE DOES NOT ACCOUNT FOR VOLTAGE DROP. E.C. SHALL ADJUST IF REQUIRED.

**FEEDER SCHEDULE**

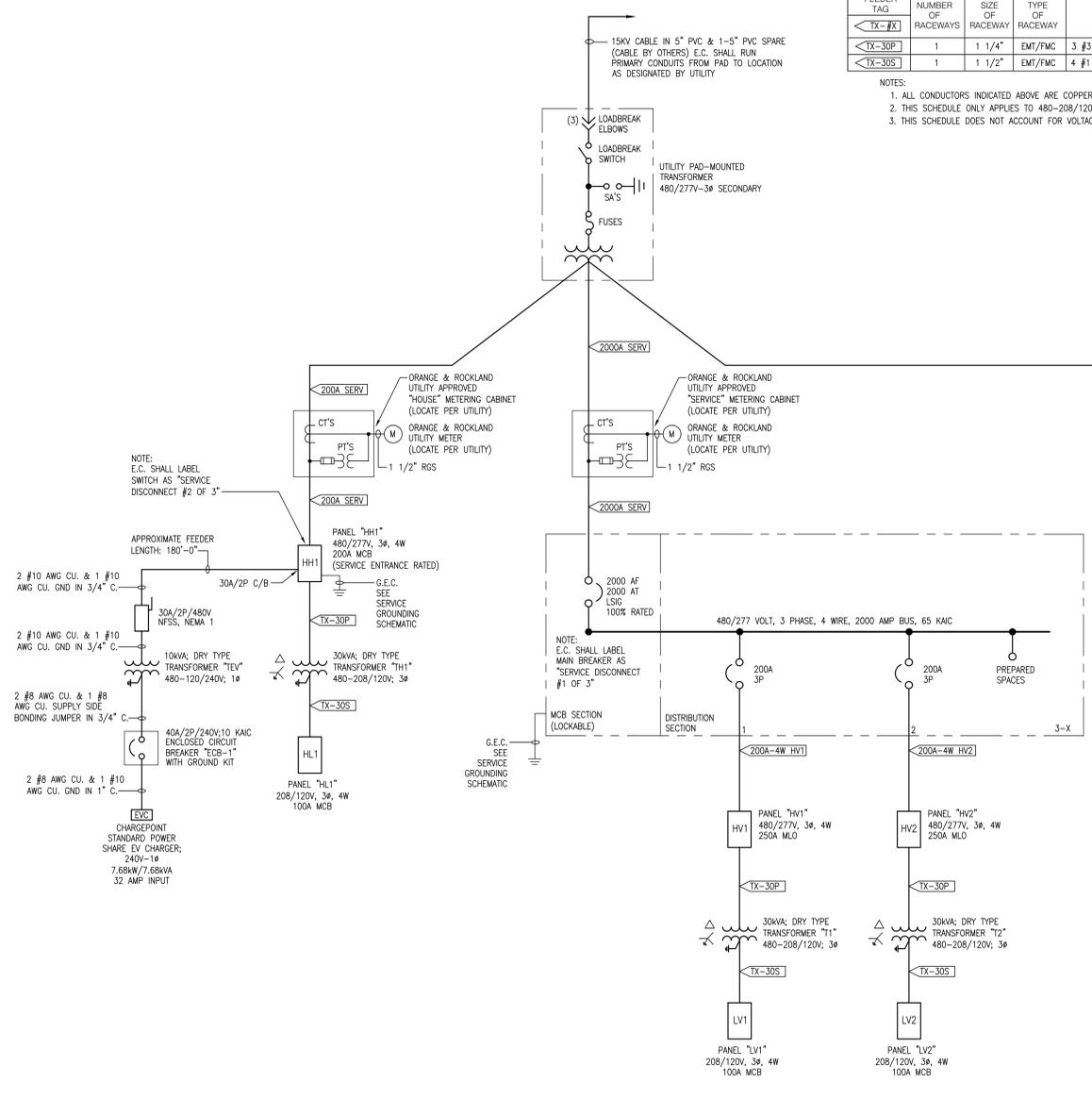
FEEDER TAG	NUMBER OF CONDUITS	SIZE OF CONDUITS	QUANTITY AND SIZE OF CONDUCTORS PER CONDUIT
200A-4W (HV1)	1	2 1/2"	4 #250 KCMIL AL & 1 #4 AWG AL GND.
200A-4W (HV2)	1	2 1/2"	4 #250 KCMIL AL & 1 #4 AWG AL GND.
200A-SERV	1	2 1/2"	4 #250 KCMIL AL
2000A-SERV	6	4"	4 #600 KCMIL AL
125 HP FP	1	2 1/2"	4 #4/0 AWG CU.

**ELECTRICAL SERVICE LOAD SUMMARY**

DESCRIPTION	CONNECTED LOAD (KVA)	MULTIPLIER	N.E.C. LOAD (KVA)
INTERIOR LIGHTING	33.57	(NOTE #2)	108.55
EXTERIOR LIGHTING	5.42	1.25	6.77
ELECTRIC HEAT	8.00	1.25	0.00
AIR CONDITIONING	20.87	1.00	20.87
VENTILATION	10.48	1.00	10.48
INSTA HOT - STORAGE WATER HEATER	0.00	1.25	0.00
RECEPTACLES	6.12	(NOTE #1)	6.12
ELEVATOR	0.00	1.00	0.00
KITCHEN EQUIPMENT	0.00	0.65	0.00
REFRIGERATION EQUIPMENT	0.00	1.00	0.00
SIGNS	0.00	1.25	0.00
SHOW WINDOW (LIGHTING)	0.00	1.25	0.00
EV CHARGER	7.68	1.25	9.60
FIXED MULTI-OUTLET ASSEMBLIES	0.00	1.00	0.00
MISC. LOADS @100%	6.61	1.00	6.61
LARGEST MOTOR	0.00	0.25	0.00
<b>TOTAL LOAD</b>	<b>98.76 KVA</b>		<b>169.01 KVA</b>
<b>TOTAL AMPS @480Y/277V, 3-PHASE</b>	<b>118.5 A</b>		<b>203.4 A</b>
<b>VA PER FT² CALCULATION:</b>	<b>170,500 FT² @ 189,005 VA= 1.0 W/FT²</b>		

NOTE: CODE LOAD CALCULATED AT 125% FOR CONTINUOUS LOAD AND 100% FOR NON-CONTINUOUS LOADS EXCEPT AS NOTED BELOW.

- RECEPTMISC: 100% OF 10KVA PLUS 50% OF REMAINDER. (NEC 220.44)
- INTERIOR LIGHTING: THE MINIMUM LIGHTING LOAD SHALL BE CALCULATED IN ACCORDANCE WITH NEC TABLE 220.12 FOR NON DWELLING OCCUPANCIES (WAREHOUSE: 1.2VA/FT²) LIGHTING LOAD DEMAND FACTOR MAY BE TAKEN IN ACCORDANCE WITH NEC TABLE 220.42 (WAREHOUSES: 100% OF 12.5KVA PLUS 50% OF REMAINDER.) (NEC 220.42)
- A/C AND ELECTRIC HEAT: THE LARGER OF THE TWO LOADS (NEC 220.60)
- FIXED ELECTRIC SPACE HEATING: 125% (NEC 424.3)
- SIGNS: THE LARGER TO 1200VA PER SIGN OR THE ACTUAL LOAD (NEC 220.14(F)).



**1 ELECTRICAL ONE LINE DIAGRAM**  
 SCALE: NONE

NOTES:  
 1. ALL SHOWN IS NEW & BY EC UNLESS SPECIFICALLY NOTED OTHERWISE.

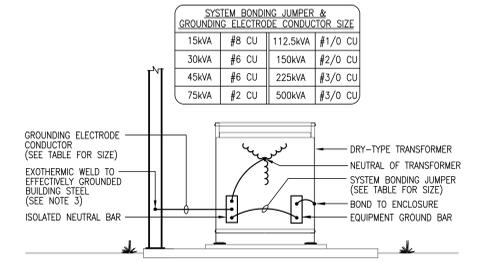
- ONE LINE DIAGRAM NOTES:**
- ALL EQUIPMENT & WIRING IS NEW AND BY E.C. UNLESS SPECIFICALLY NOTED OTHERWISE.
  - EXACT LOCATION OF UTILITY TRANSFORMER & METER MUST BE APPROVED BY UTILITY AND GC AND/OR CONSTRUCTION MANAGER AND OWNERS PROJECT MANAGER.
  - UTILITY TRANSFORMER ELBOWS AND TERMINATIONS MAY BE FURNISHED & INSTALLED BY E.C. (COORDINATE WITH UTILITY). PROVIDE 200A, (15) KV CLASS 3Ø LOADBREAK ELBOW CONNECTOR: ESTABLISH OR COOPER POWER SYSTEMS WITH CONCENTRIC NEUTRAL JACKET SEAL & TEST POINT. CONNECTOR MUST BE APPROVED BY UTILITY AND THIS ENGINEER. PROVIDE SECONDARY TERMINATIONS TO UTILITY SPACE TERMINALS USING UTILITY APPROVED DOUBLE BARREL COMPRESSION TYPE LUGS, BURNED OR EQUAL. LUGS MUST BE APPROVED BY UTILITY.
  - VERIFY CUSTOMER VS. UTILITY RESPONSIBILITIES.
  - VERIFY NAMEPLATE RATING OF HVAC EQUIPMENT PRIOR TO ORDERING BREAKERS, DISCONNECTS, CABLES, AND PRIOR TO ROUGH-IN.
  - A POWER SYSTEMS STUDY (SHORT CIRCUIT, COORDINATION, ARC FLASH) HAS NOT BEEN PERFORMED FOR THIS PROJECT. SHORT CIRCUIT CALCULATIONS HAVE BEEN ESTIMATED BASED ON UTILITY EXPECTED TRANSFORMER SIZE & LOCATION AND BASED ON AN INFINITE PRIMARY BUS AND TYPICAL UTILITY TRANSFORMER IMPEDANCE VALUES (CONSERVATIVE APPROACH).
  - CONFIRM SERVICE ENTRANCE CONDUIT AND CONDUCTOR QUANTITIES AND SIZES WITH THE LOCAL UTILITY PRIOR TO START OF WORK. INCREASE QUANTITIES AND SIZES AS REQUIRED TO MEET LOCAL UTILITY SERVICE AND INSTALLATION REGULATIONS.
  - CONFIRM COLD SEQUENCE METERING VERSUS HOT SEQUENCE METERING WITH THE LOCAL UTILITY PRIOR TO START OF CONSTRUCTION.
  - EACH DISCONNECTING MEANS SHALL BE MARKED TO INDICATE ITS PURPOSE PER 2017 NEC 110.22.
  - FIELD MARK SERVICE EQUIPMENT WITH THE MAXIMUM AVAILABLE FAULT CURRENT PER 2017 NEC 110.24. COORDINATE WITH UTILITY COMPANY TO DETERMINE MAXIMUM AVAILABLE FAULT CURRENT AT TRANSFORMER.
  - GROUND FAULT CIRCUIT BREAKER(S) SHALL BE PERFORMANCE TESTED IN ACCORDANCE WITH 2017 NEC SECTION 230.95 (C). THIS TEST SHALL BE CONDUCTED BY A QUALIFIED PERSON(S) USING A TEST PROCESS OF PRIMARY CURRENT INJECTION, IN ACCORDANCE WITH INSTRUCTIONS THAT SHALL BE PROVIDED WITH THE EQUIPMENT. A WRITTEN RECORD OF TESTS MUST BE SENT TO OWNER/ENGINEER AND THE AUTHORITY HAVING JURISDICTION.
  - ALL BREAKERS/LUGS/TERMINATIONS SHALL BE RATED FOR COPPER AND ALUMINUM CONDUCTORS.
  - ALL SERVICE ENTRANCE CONDUITS SHALL BE SEALED IN ACCORDANCE WITH NEC 230.8 AND NEC 300.5 (C). THE CONTRACTOR SHALL SEAL THE CONDUITS AT THE TRANSFORMER (WHERE PAD MOUNTED IN LIEU OF VAULT MOUNTED) AND AT THE POINT THAT THE SERVICE CONDUITS STUB UP INTO THE BUILDING. UL LISTED SEALING BUSHINGS OR DUCT SEAL SHALL BE USED. ALL SPARE/UNUSED RACEWAYS SHALL ALSO BE PROPERLY SEALED/CAPPED.

**NEC TABLE 250.66  
 GROUNDING ELECTRODE CONDUCTOR FOR AC SYSTEMS**

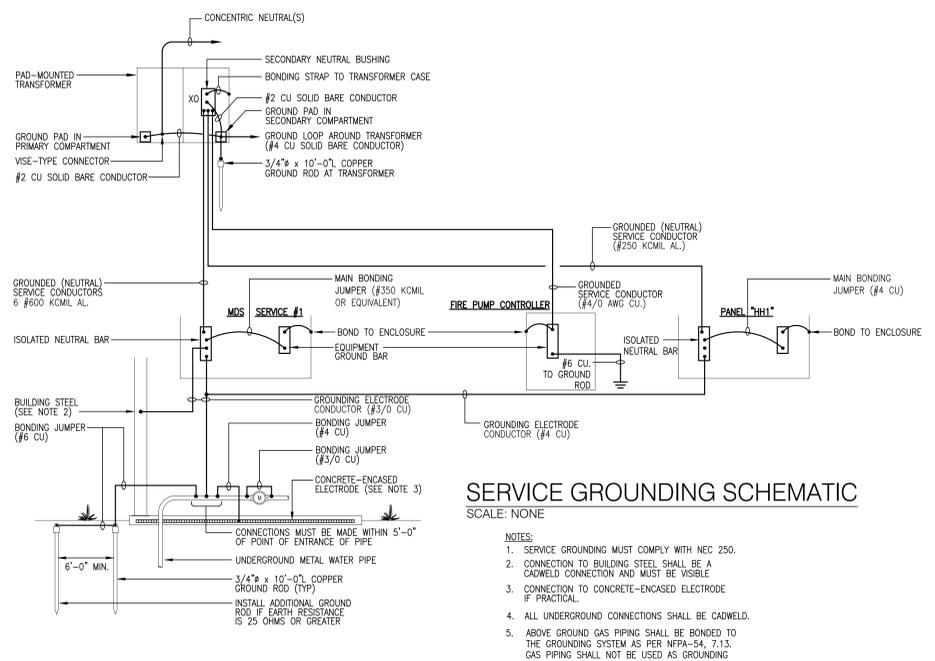
SIZE OF LARGEST UNGROUNDED SERVICE-ENTRANCE CONDUCTOR (OR EQUIVALENT AREA FOR PARALLEL CONDUCTORS) (AWG/KCMIL)		SIZE OF GROUNDING ELECTRODE CONDUCTOR (AWG/KCMIL)	
COPPER (CU)	ALUMINUM (AL) OR COPPER-CLAD ALUMINUM (CCA)	COPPER (CU)	ALUMINUM (AL) OR COPPER-CLAD ALUMINUM (CCA)*
#2 OR SMALLER	#1/0 OR SMALLER	#8	#6
#1 OR #1/0	#2/0 OR #3/0	#6	#4
#2/0 OR #3/0	#4/0 OR #250 KCMIL	#4	#2
OVER #3/0 THRU #350 KCMIL	OVER #250 KCMIL THRU #500 KCMIL	#2	#1/0
OVER #350 KCMIL THRU #600 KCMIL	OVER #500 KCMIL THRU #900 KCMIL	#1/0	#3/0
OVER #600 KCMIL THRU #1100 KCMIL	OVER #900 KCMIL THRU #1750 KCMIL	#2/0	#4/0
OVER #1100 KCMIL	OVER #1750 KCMIL	#3/0	#250 KCMIL

\* INSTALLATION RESTRICTIONS APPLY; SEE NEC 250.64(A)

MAIN BONDING JUMPER & SYSTEM BONDING JUMPER SIZING [PER 250.28(D)(1)]: MAIN BONDING JUMPER & SYSTEM BONDING JUMPER SHALL NOT BE SMALLER THAN THE SIZES SHOWN IN TABLE 250.66, WHERE THE SUPPLY CONDUCTORS ARE LARGER [THAN LISTED]. THE BONDING JUMPER SHALL HAVE AN AREA THAT IS NOT LESS THAN 12 1/2 PERCENT OF THE AREA OF THE LARGEST PHASE CONDUCTOR.



- NOTES:
- TRANSFORMER GROUNDING MUST COMPLY WITH NEC ARTICLE 250.
  - ALL GROUND CONNECTION AREAS SHALL BE PREPARED BY GRINDING OR WIRE BRUSH CLEANING. ALL SURFACES AFFECTED SHALL BE PAINTED WITH RUST INHIBITING PAINT AFTER WELDING IS COMPLETED.
  - IF EFFECTIVELY GROUNDED BUILDING STEEL IS NOT PRESENT DUE TO BUILDING CONSTRUCTION, PROVIDE CONNECTION TO EFFECTIVELY GROUNDED METAL WATER PIPE WITHIN 5'-0" OF POINT OF ENTRANCE OF PIPE.
  - SYSTEM BONDING JUMPER AND GROUNDING ELECTRODE CONDUCTOR SIZE TABLE IS ONLY APPLICABLE TO TRANSFORMERS WITH A 208/120V, 3Ø SECONDARY.
  - THIS DETAIL ONLY APPLIES TO DELTA / GROUNDED WYE STEP DOWN DRY TYPE TRANSFORMERS.



- NOTES:
- SERVICE GROUNDING MUST COMPLY WITH NEC 250.
  - CONNECTION TO BUILDING STEEL SHALL BE A CADWELD CONNECTION AND MUST BE VISIBLE.
  - CONNECTION TO CONCRETE-ENCASED ELECTRODE IF PRACTICAL.
  - ALL UNDERGROUND CONNECTIONS SHALL BE CADWELDED.
  - ABOVE GROUND GAS PIPING SHALL BE BONDED TO THE GROUNDING SYSTEM AS PER NFPA-54, 7.1.1. GAS PIPING SHALL NOT BE USED AS GROUNDING ELECTRODE [SEE NEC 250.52(B)(1)]; SEE 250.104(C)(8) FOR FURTHER INSTRUCTIONS RELATED TO GAS PIPING.