

WARNING: ALL INDIVIDUALS INTERESTED IN BIDDING ON THIS PROJECT MUST OBTAIN THE FINAL PLANS AND SPECIFICATIONS FROM THE DEPARTMENT MANAGING THE PROJECT OR AS OTHERWISE STATED IN THE ADVERTISEMENT FOR BIDS FOR THE PROJECT. DO NOT USE THE PLANS AND SPECIFICATIONS POSTED ON THE CLERK OF THE BOARD'S WEBSITE FOR BIDDING ON THIS PROJECT.

[illegible]

SOBE PROJECT NO:	20015
DATE:	11/09/2009
DRAWN BY:	
CHECKED BY:	
APPROVED BY:	

SHEET TITLE
COVER SHEET

SCALE: AS NOTED	AS NOTED
THIS DRAWING IS 30" X 42" AT FULL SCALE	

G-0.0

County Project #10.10.0923
Project Address: 18901 Institution Rd,
San Bernardino, CA 92407

1. ALL WORK, MATERIALS AND METHODS USED SHALL CONFORM TO MEP COMPONENT ANCHORAGE NOTES.
2. ALL WORK SHALL CONFORM WITH ALL APPLICABLE LOCAL, STATE, AND NATIONAL CODES.
3. PIPE HANGERS AND SUPPORTS SHALL BE SUPERSTRUT OR EQUAL INCLUDING CHANNEL, HANGERS, STRAPS, ISOLATORS, INSULATION, SHAW PIPE SHIELDS, INC., PORTABLE PIPE HANGERS, INC.
4. PATCH EXISTING AND NEW OPENINGS SO FINISH PROFILES, FIXTURES, ETC. MATCH ADJACENT UNDISTURBED WORK.
5. ALL DIMENSIONS ARE APPROXIMATE. THE DRAWINGS ARE DIAGRAMMATIC TO THE EXTENT THAT ALL FITTINGS, OFFSETS, ETC. ARE NOT SHOWN. THESE DRAWINGS ARE FOR THE GUIDANCE OF THE CONTRACTOR. CONTRACTOR SHALL VERIFY ALL DIMENSIONS IN THE FIELD FOR FABRICATION OF THE PIPING, PENETRATIONS, CONDUIT, WIRING, AND ALL COMPONENTS INTO A COMPLETE AND OPERABLE SYSTEM.
6. ALL WORK MUST BE SCHEDULED WITH THE PROJECT MANAGER TO MINIMIZE DISTURBANCE OF NORMAL ACTIVITIES. COORDINATE WORK WITH PROJECT MANAGER.
7. WHERE DISCREPANCIES OCCUR BETWEEN THE PLANS AND SPECIFICATIONS CONTRACTOR SHALL NOTIFY OWNER OF ANY DISCREPANCIES IN WRITING. ANY ADJUSTMENT OF THE CONTRACT DOCUMENTS WITHOUT A DETERMINATION BY THE OWNER SHALL BE AT THE CONTRACTOR'S OWN RISK AND EXPENSE. THE MOST STRINGENT REQUIREMENTS SHALL APPLY AS DETERMINED BY THE OWNER.
8. CONTRACTOR SHALL PERFORM ALL WORK IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS.
9. THE INTENT OF THESE DRAWINGS AND SPECIFICATIONS IS THAT THE WORK OR THE ALTERATION, REHABILITATION OR RECONSTRUCTION IS TO BE IN ACCORDANCE WITH TITLE 24, CALIFORNIA CODE OF REGULATIONS. SHOULD ANY EXISTING CONDITIONS SUCH AS OBSTRUCTION OR NONCOMPLYING CONSTRUCTION BE DISCOVERED WHICH IS NOT COVERED IN THE CONTRACT DOCUMENTS WHEREIN THE FINISHED WORK WILL NOT COMPLY WITH TITLE 24, CALIFORNIA CODE OF REGULATIONS, A CONSTRUCTION CHANGE DOCUMENT, OR A SEPARATE SET OF PLANS AND SPECIFICATIONS, DETAILING AND SPECIFYING THE REQUIRED WORK SHALL BE SUBMITTED TO AND APPROVED BY THE ENGINEER AND DSA BEFORE PROCEEDING WITH THE WORK.
10. PRIOR TO SUBMITTING PROPOSAL, BIDDER SHALL EXAMINE ALL GENERAL CONSTRUCTION DRAWINGS AND SHALL HAVE HAD VISITED THE CONSTRUCTION SITE. HE SHALL BE FAMILIAR WITH THE EXISTING CONDITIONS UNDER WHICH HE WILL HAVE TO OPERATE AND WHICH WILL IN ANY WAY AFFECT THE WORK UNDER THIS CONTRACT. NO SUBSEQUENT ALLOWANCE WILL BE MADE IN THIS CONNECTION IN BEHALF OF THE CONTRACTOR FOR ANY ERROR OR NEGLIGENCE ON HIS PART.
11. THE CONTRACTOR SHALL BE HELD FULLY RESPONSIBLE FOR THE PROPER RESTORATION OF ALL EXISTING SURFACES REQUIRING PATCHING, PLASTERING, PAINTING AND/OR OTHER REPAIR DUE TO THE INSTALLATION OF WORK UNDER THE TERMS OF THIS SPECIFICATION. CLOSE ALL OPENINGS, REPAIR ALL SURFACES, ETC., AS REQUIRED.
12. ALL TEMPORARY AND REMODELING WORK SHALL BE CONSIDERED A PART OF THIS CONTRACT AND NO EXTRA CHARGES WILL BE ALLOWED. THIS SHALL INCLUDE MINOR ITEMS OF MATERIAL OR EQUIPMENT NECESSARY TO MEET THE REQUIREMENTS AND INTENT OF THE PROJECT.
13. EXAMINE MECHANICAL & STRUCTURAL DRAWINGS AND SPECIFICATIONS TO DETERMINE THE SEQUENCE OF CONSTRUCTION THROUGHOUT THE PROJECT, INCLUDING EXISTING, TEMPORARY, REMODELED AND NEW.
14. ALL DEVICES & EQUIPMENT ARE NEW, UNLESS OTHERWISE NOTED.
15. CONTRACTOR SHALL PROPERLY DISPOSE OF OR RECYCLE DEMOLISHED MATERIALS.
16. MAINTAIN FIRE RATING OF ALL ASSEMBLIES PENETRATED.
17. SEAL ALL EXTERIOR PENETRATIONS WATER-TIGHT.

1. FURNISH AND INSTALL ELECTRICAL PANELS, ATS, GENERATOR, WIRELESS CONNECTION TO EXISTING CAMP BMS (COORDINATE WITH COUNTY OF SAN BERNARDINO FOR LOCATION AND REQUIREMENT), NEW WORK PER FLOOR PLAN.
2. FURNISH AND INSTALL DIESEL GENERATOR WITH LEVEL 2 ENCLOSURE, DUAL WALL BELLY TANKS AND LEAK SENSOR, CONCRETE PAD AND FUEL TANK OF FUEL SHALL BE PROVIDED.
3. FURNISH AND INSTALL H-FRAME FOR EXTERIOR EQUIPMENT/DEVICES PER SITE PLAN.
4. PROVIDE TEMPORARY GENERATOR DURING CONSTRUCTION FOR COUNTY OF SAN BERNARDINO DOT EQUIPMENT ROOM TO MAINTAIN BACKUP POWER AVAILABILITY.
5. CONTRACTOR SHALL BE RESPONSIBLE TO APPLY AND OBTAIN APPROVAL FROM AOMD FOR THE NEW GENERATOR.
6. FURNISH AND INSTALL ALL ELECTRICAL CONNECTION, COMPONENTS, DEVICES AND EQUIPMENT PER FLOOR PLAN.
7. REMOVE EXISTING GENERATOR AND ENCLOSURE, DISCONNECT POWER AND PROPANE CONNECTION PROPERLY PRIOR TO DEMOLITION OF EXISTING GENERATOR AND ENCLOSURE. COORDINATE WITH COUNTY OF SAN BERNARDINO FOR REQUIREMENT.
8. REMOVE EXISTING PROPANE TANK, DISCONNECT PROPANE CONNECTION PROPERLY PRIOR TO DEMOLITION. COORDINATE WITH LOCAL ENVIRONMENTAL AGENCY FOR DISPOSAL OF EXISTING PROPANE TANKS AND ASSOCIATED EQUIPMENT/DEVICES REQUIREMENT.
9. CONTRACTOR TO PROVIDE ADDITIONAL ROCKS TO COVER EXISTING CONCRETE PADS OF THE EXISTING PROPANE TANKS, GENERATOR AND GENERATOR ENCLOSURE AREA. NEW ADDITIONAL ROCKS TO MATCH EXISTING AND SHALL BE PAVED TO MATCH EXISTING SURFACE.

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UNLESS OTHERWISE INDICATED OR SPECIFIED, PERFORM THE WORK IN CONFORMANCE WITH THE LATEST EDITIONS OF ALL APPLICABLE REGULATORY REQUIREMENTS, INCLUDING, BUT NOT LIMITED TO, THE FOLLOWING:

1. CALIFORNIA BUILDING STANDARDS ADMINISTRATIVE CODE (PART 1, TITLE 24): 2019
2. CALIFORNIA BUILDING CODE (PART 2, TITLE 24): 2018 IBC WITH 2019 CA AMENDMENTS
3. CALIFORNIA ELECTRICAL CODE (PART 3, TITLE 24): 2017 NEC WITH 2019 CA AMENDMENTS
4. CALIFORNIA MECHANICAL CODE (PART 4, TITLE 24): 2018 UMC WITH 2019 CA AMENDMENTS
5. CALIFORNIA PLUMBING CODE (PART 5, TITLE 24) 2018 UPC WITH 2019 CA AMENDMENTS
6. CALIFORNIA ENERGY CODE (PART 6, TITLE 24): 2019
7. CALIFORNIA HISTORICAL BUILDING CODE, (PART 8, TITLE 24): 2019
8. CALIFORNIA FIRE CODE (PART 9, TITLE 24): 2018 IFC WITH CA AMENDMENTS
9. CALIFORNIA EXISTING BUILDING CODE (PART 10, TITLE 24): 2019 (2018 INTERNATIONAL EXISTING BUILDING CODE WITH CA AMENDMENTS)
10. CALIFORNIA GREEN BUILDING STANDARDS CODE OR CAL GREEN (PART 11, TITLE 24): 2019
11. CALIFORNIA REFERENCED STANDARDS CODE (PART 12, TITLE 24): 2019
12. PUBLIC SAFETY (CCR TITLE 19), STATE FIRE MARSHAL: CURRENT REVISION
13. NFPA 72, NATIONAL FIRE ALARM CODE, 2019 EDITION

<u>SHEET NO.</u>	<u>DESCRIPTION</u>
G-0.0	COVER SHEET
E-0.1	ELECTRICAL GENERAL NOTES, SYMBOLS & ABBREVIATIONS
E-0.2	ELECTRICAL SPECIFICATIONS
E-0.3	ELECTRICAL SPECIFICATIONS
ES-1.1	ELECTRICAL SITE PLAN
E-4.1	ELECTRICAL PARTIAL SITE PLANS
E-4.2	ELECTRICAL PARTIAL SITE PLANS
E-5.1	ELECTRICAL DETAILS
ED-7.1	ELECTRICAL SINGLE LINE DIAGRAM - DEMO
E-7.1	ELECTRICAL SINGLE LINE DIAGRAM - NEW
S1.0	GENERAL NOTES & DETAILS



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WWW.SALASOBRIEN.COM

National **Strength.**
Local **Action.**



800MHz Generator
Replacement Glen
Helen Tower

SOBE PROJECT NO:	2001547
DATE:	11/09/20
DRAWN BY:	-
CHECKED BY:	-
APPROVED BY:	AC

SHEET TITLE

ELECTRICAL GENERAL NOTES, SYMBOLS & ABBREVIATIONS

SCALE:	AS NOTED	AS NOTED
THIS DRAWING IS 30" X 42" AT FULL SIZE		

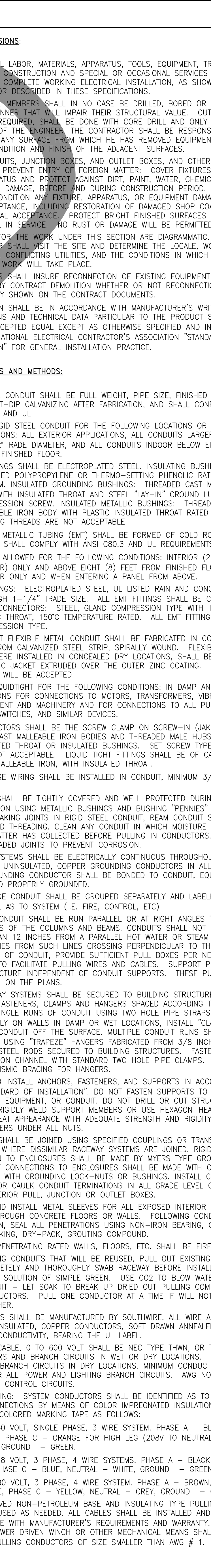
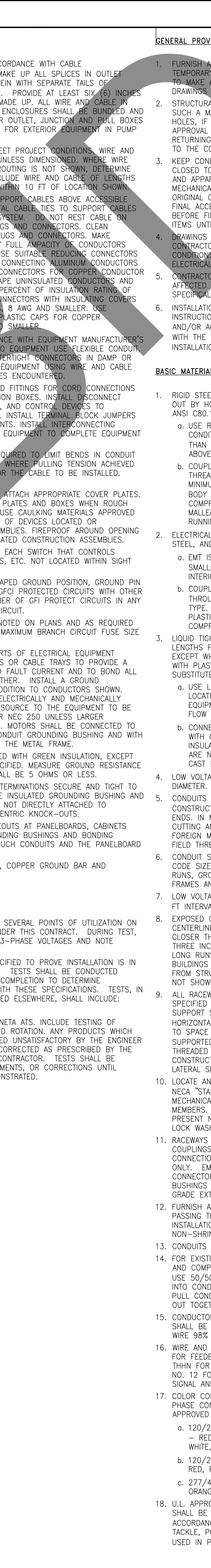
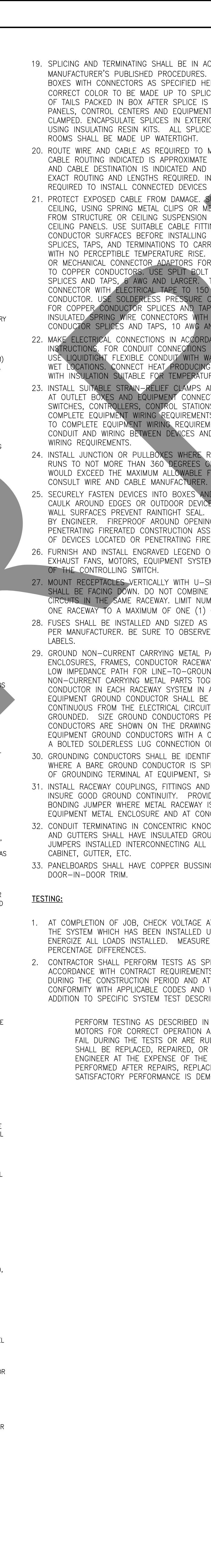
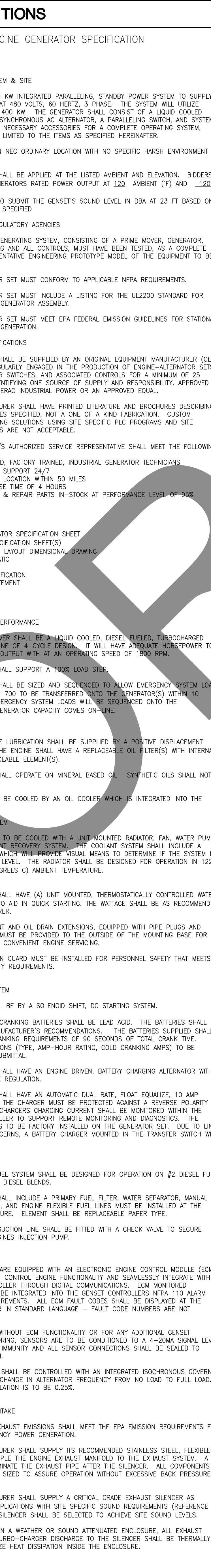
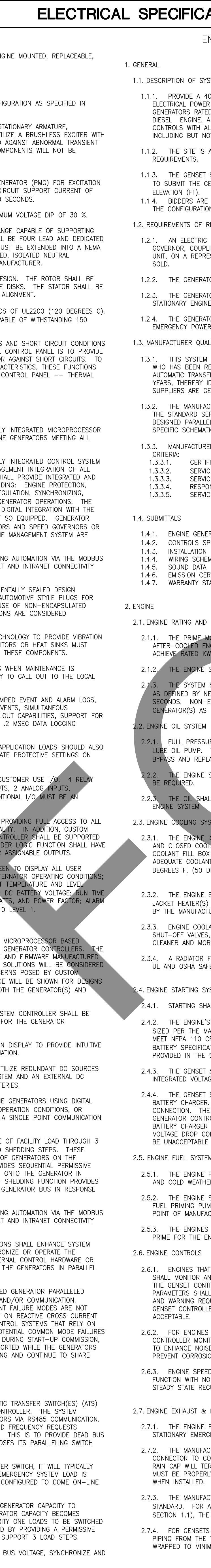
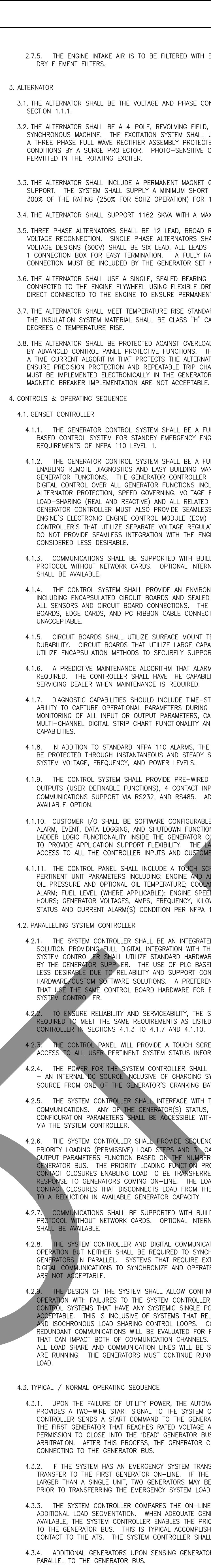
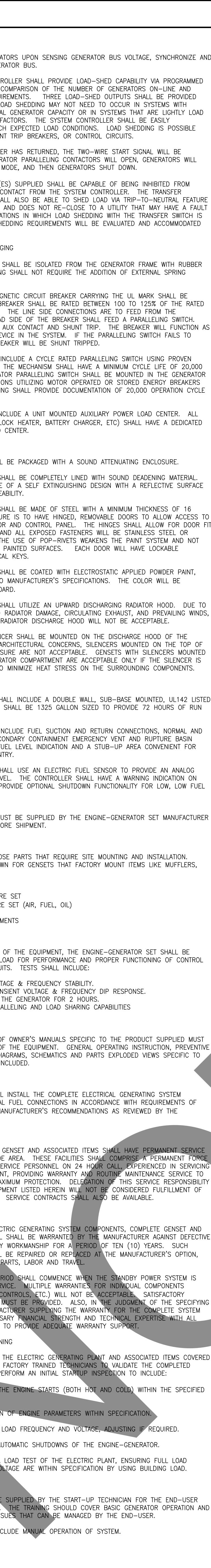
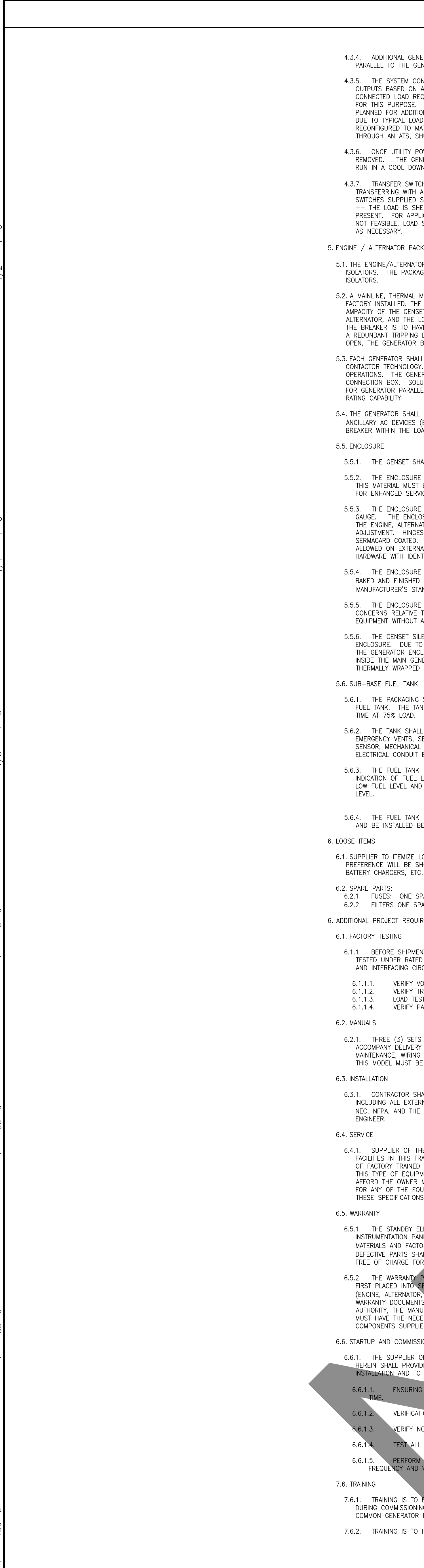
E-0.1

ELECTRICAL DEMOLITION NOTES

ELECTRICAL SCOPE OF WORK

1. ELECTRICAL CONTRACTOR IS RESPONSIBLE TO DISCONNECT AND REMOVE ALL EXISTING ELECTRICAL EQUIPMENT AFFECTED BY THE PROJECT. THIS INCLUDES REROUTING OR THE EXTENSION OF EXISTING CONDUIT AND FEEDER WHERE NECESSARY TO MAINTAIN OPERATION OF ANY EXISTING EQUIPMENT.
 2. WHERE EXISTING CONDUIT IS TO BE ABANDONED OR DEMOLISHED, THE CONDUIT SHALL BE REMOVED IF IT IS EXPOSED, IN A CRAWL SPACE OR IN AN ACCESSIBLE CEILING. ABANDONED OR DEMOLISHED CONDUIT FEEDS UP THROUGH THE FLOOR SHALL BE CUT OFF AND PLUGGED FLUSH WITH THE FLOOR.
 3. EXISTING CIRCUITS WHICH ARE REMOVED AND NOT REUSED SHALL BE IDENTIFIED ON THE PANEL SCHEDULE AS "SPARE".
 4. ELECTRICAL CONTRACTOR SHALL COORDINATE WITH THE OWNER PRIOR TO REMOVAL OF EXISTING ELECTRICAL EQUIPMENT AND TURN OVER REMOVED EQUIPMENT THAT THE OWNER REQUESTS IN AN "AS-FOUND" CONDITION.
 5. ALL DEMOLITION WORK SHOWN, IF ANY, WAS PREPARED FOR THE CONVENIENCE OF THE CONTRACTOR. NO REPRESENTATION HAS BEEN MADE THAT ALL ITEMS THAT MAY REQUIRE DEMOLITION HAVE BEEN SHOWN. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO CAREFULLY EXAMINE THE SITE AND THE CONTRACT DOCUMENTS AND TO PERFORM ALL DEMOLITION AND RECONSTRUCTION WHICH MAY BE REQUIRED FOR THE PROPER EXECUTION AND COMPLETION OF THE WORK.
 6. WHEN CALLED FOR, OR SCOPE OF WORK REQUIRES ELECTRICAL EQUIPMENT TO BE REMOVED ALL CONDUIT, WIRE, BOXES, HANGERS, ETC. SHALL BE REMOVED COMPLETELY. ALL OPENINGS SHALL BE PATCHED, SEALED AND PAINTED TO MATCH THE ADJACENT FINISH.
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- ## ELECTRICAL SCOPE OF WORK
1. FURNISH AND INSTALL ELECTRICAL PANELS, MTS, ATS, GENERATOR, GENERATOR ANNUNCIATOR WIRELESS CONNECTION TO EXISTING CAMP BMS (COORDINATE WITH COUNTY OF SAN BERNARDINO FOR LOCATION AND REQUIREMENT), NEW WORK PER FLOOR PLAN.
 2. FURNISH AND INSTALL DIESEL GENERATOR WITH LEVEL 2 ENCLOSURE, DUAL WALL BELLY TANK AND LEAK SENSOR, CONCRETE PAD AND FULL TANK OF FUEL SHALL BE PROVIDED.
 3. CONTRACTOR SHALL BE RESPONSIBLE TO APPLY AND OBTAIN APPROVAL FROM AQMD FOR THE NEW GENERATOR.
 4. PROVIDE TEMPORARY GENERATOR DURING CONSTRUCTION FOR COUNTY OF SAN BERNARDINO DOTT EQUIPMENT ROOM TO MAINTAIN BACKUP POWER AVAILABILITY.
 5. FURNISH AND INSTALL ALL ELECTRICAL CONNECTION, COMPONENTS, DEVICES AND EQUIPMENT PER FLOOR PLAN.
 6. ALL PERMIT FEES SHALL BE CONTRACTOR'S RESPONSIBILITY.

- | | |
|--------|--|
| | NEW TO EXISTING CONNECTION |
| | WORK ITEM (ELECTRICAL) |
| | DETAIL DESIGNATION |
| | EQUIPMENT DESIGNATION |
| | SECTION DESIGNATION |
| | EXISTING CONDUIT |
| | NEW CONDUIT |
| | CONDUIT TO BE DEMOLISHED |
| | PANEL BOARD/TERMINAL CABINET – FLUSH/SURFACE MOUNTED |
| | BRANCH CIRCUIT WIRING IN CONDUIT CONCEALED IN CEILING SPACE OR WHERE POSSIBLE, EXPOSED ON ROOF OR BUILDING EXTERIOR. |
| | BRANCH CIRCUIT WIRING IN CONDUIT CONCEALED UNDER FLOOR, UNDERGROUND OR WHERE POSSIBLE. |
| | BRANCH CIRCUIT HOME RUN TO PANEL, CONCEALED IN CEILING SPACE OR WHERE POSSIBLE. |
| | PANEL BOARD & CIRCUIT # |
| | EXISTING DEVICES, CONDUITS, WIRES, ETC TO REMAIN |
| | NEW (BOLD) DEVICES, CONDUITS, WIRES, ETC. |
| | CONDUIT UP |
| | CONDUIT DOWN |
| | DUPLEX GFI RECEPTACLE, WEATHERPROOF, 20A, 155V, 3WG, NEMA 5-20R, GFI |
| | JUNCTION BOX – CEILING/FLOOR/ROOF/WALL MOUNTED |
| | HORSEPOWER RATED TOGGLE WITH THERMAL OVERLOAD WEATHER PROOF |
| | LIGHTING AUTOMATIC TIMER SWITCH. |
| | LIGHTING FIXTURE, SURFACE MOUNTED. |
| | EXIT SIGN, PENDANT / WALL MOUNTED. |
| | HEAVY DUTY HEAVY NON-FUSED DISCONNECT SWITCH, WALL MOUNTED |
| | HEAVY DUTY HEAVY FUSED DISCONNECT SWITCH, WALL MOUNTED |
| | THERMOSTAT |
| | CARBON DIOXIDE SENSOR |
| | CARBON MONOXIDE DETECTOR WITH SOUNDER BASE |
| | AT |
| AHJ | AUTHORITY HAVING JURISDICTION |
| BLDG | BUILDING |
| C | CONDUIT |
| CB | CIRCUIT BREAKER |
| CL | CENTERLINE |
| CLG | CEILING |
| CKT | CIRCUIT |
| C.O. | CONDUIT ONLY (W/PULLROPE) |
| CONT | CONTINUATION |
| CSFM | CALIFORNIA STATE FIRE MARSHALL |
| DN | DOWN |
| DS | DISCONNECT SWITCH |
| DWG | DRAWING |
| <E> | EXISTING |
| ELEC | ELECTRICAL |
| EM | EMERGENCY |
| EMS | ENERGY MANAGEMENT SYSTEM |
| EQ | EQUAL |
| EQUIP. | EQUIPMENT |
| <ERR> | EXISTING TO REMAIN AND BE RECONNECTED |
| FA | FIRE ALARM |
| FACP | FIRE ALARM CONTROL PANEL |
| FATC | FIRE ALARM TERMINAL CABINET |
| FLR | FLOOR |
| GFI | GROUND FAULT INTERRUPTER |
| GND | GROUND |
| IDR | INSPECTOR OF RECORD |
| LTG | LIGHTING |
| LTS | LIGHTS |
| MAX. | MAXIMUM |
| MIN. | MINIMUM |
| <N> | NEW (BOLD) |
| NAC | NETWORK AREA CONTROLLER |
| N.T.S. | NOT TO SCALE |
| PEC | PROGRAMMABLE EQUIPMENT CONTROLLER |
| PNL | PANEL |
| <R> | REMOVE |
| <RRN> | REMOVE REPLACE W/ NEW |
| REC | RECEPTACLE |
| RM | ROOM |
| RPS | REMOTE POWER SUPPLY |
| SPB | SIGNAL PULL BOX |
| SPECS | SPECIFICATIONS |
| TYP | TYPICAL |
| TP | TWISTED PAIR (SHIELDED) |
| U.O.N. | UNLESS OTHERWISE NOTED |
| V | VOLT |
| VA | VOLT AMP |
| V.I.F. | VERIFY IN FIELD |
| W | WATTS |
| WP | WEATHERPROOF (NEMA 3R) |
| XFMR | TRANSFORMER |



ELECTRICAL SPECIFICATIONS

ENGINE GENERATOR SPECIFICATION

1. GENERAL

1.1. DESCRIPTION OF SYSTEM & SITE

1.1.1. PROVIDE A 400 KW INTEGRATED PARALLELING, STANDBY POWER SYSTEM TO SUPPLY ELECTRICAL POWER TO THE GENERATOR BUS. THE SYSTEM WILL UTILIZE SYSTEMS WITH GENERATORS RATED 400 KW. THE GENERATOR SHALL CONSIST OF A LIQUID COOLED DIESEL ENGINE, A SYNCHRONOUS ALTERNATOR, A PARALLELING SWITCH, AND SYSTEM CONTROLS WITH ALL NECESSARY ACCESSORIES FOR A COMPLETE OPERATING SYSTEM, INCLUDING BUT NOT LIMITED TO THE ITEMS AS SPECIFIED HEREINAFTER.

1.1.2. THE SITE IS AN NEC ORDINARY LOCATION WITH NO SPECIFIC HARSH ENVIRONMENT REQUIREMENTS.

1.1.3. THE GENSET SHALL BE APPLIED AT THE LISTED AMBIENT AND ELEVATION. BIDDERS TO SUBMIT THE GENERATORS RATED POWER OUTPUT AT 120° AMBIENT (7°) AND 1200° ELEVATION (17°).

1.1.4. BIDDERS ARE TO SUBMIT THE GENSET'S SOUND LEVEL IN DBA AT 23 FT BASED ON THE CONFIGURATION SPECIFIED

1.2. REQUIREMENTS OF REGULATORY AGENCIES

1.2.1. AN ELECTRIC GENERATING SYSTEM, CONSISTING OF A PRIME MOVER, GENERATOR, GOVERNOR, COUPLING AND ALL CONTROLS, MUST HAVE BEEN TESTED, AS A COMPLETE UNIT, ON A REPRESENTATIVE ENGINEERING PROTOTYPE MODEL OF THE EQUIPMENT TO BE SOLD.

1.2.2. THE GENERATOR SET MUST CONFORM TO APPLICABLE NFPA REQUIREMENTS.

1.2.3. THE GENERATOR SET MUST INCLUDE A LISTING FOR THE UL2200 STANDARD FOR STATIONARY ENGINE GENERATOR ASSEMBLY.

1.2.4. THE GENERATOR SET MUST MEET EPA FEDERAL EMISSION GUIDELINES FOR STATIONARY EMERGENCY POWER GENERATION.

1.3. MANUFACTURER QUALIFICATIONS

1.3.1. THIS SYSTEM SHALL BE SUPPLIED BY AN ORIGINAL EQUIPMENT MANUFACTURER (OEM) WHO HAS BEEN REGULARLY ENGAGED IN THE PRODUCTION OF ENGINE-ALTERNATOR SETS, WITH PROVEN TRANSFER SWITCHES, AND ASSOCIATED CONTROLS FOR A MINIMUM OF 25 YEARS, THEREBY IDENTIFYING ONE SOURCE OF SUPPLY AND RESPONSIBILITY. APPROVED SUPPLIERS ARE GENERAL INDUSTRIAL POWER OR AN APPROVED EQUAL.

1.3.2. THE MANUFACTURER SHALL HAVE PRINTED LITERATURE AND BROCHURES DESCRIBING THE STANDARD SERIES SPECIFIED, NOT A ONE OF A KIND FABRICATION. CUSTOM DESIGNED PARALLELING SOLUTIONS USING SITE SPECIFIC PLC PROGRAMS AND SITE SPECIFIC SCHEMATICS ARE NOT ACCEPTABLE.

1.3.3. MANUFACTURER'S AUTHORIZED SERVICE REPRESENTATIVE SHALL MEET THE FOLLOWING CRITERIA:

- 1.3.3.1. CERTIFIED, FACTORY TRAINED, INDUSTRIAL GENERATOR TECHNICIANS
- 1.3.3.2. SERVICE SUPPORT 24/7
- 1.3.3.3. SERVICE LOCATION WITHIN 50 MILES
- 1.3.3.4. RESPONSE TIME OF 4 HOURS
- 1.3.3.5. SERVICE & REPAIR PARTS IN-STOCK AT PERFORMANCE LEVEL OF 90%

1.4. SUBMITTALS

- 1.4.1. ENGINE GENERATOR SPECIFICATION SHEET
- 1.4.2. CONTROLS SPECIFICATION SHEET(S)
- 1.4.3. INSTALLATION / LAYOUT DIMENSIONAL DRAWING
- 1.4.4. WIRING SCHEMATIC
- 1.4.5. SOUND DATA
- 1.4.6. EMISSION CERTIFICATION
- 1.4.7. WARRANTY STATEMENT

2. ENGINE

2.1. ENGINE RATING AND PERFORMANCE

2.1.1. THE PRIME MOVER SHALL BE A LIQUID COOLED, DIESEL, DIELED, TURBOCHARGED K1700-1500 ENGINE OF 4-CYCLE DESIGN. IT WILL HAVE ADEQUATE HORSEPOWER TO ACHIEVE RATED KW OUTPUT WITH AN OPERATING SPEED OF 1800 RPM.

2.1.2. THE ENGINE SHALL SUPPORT A 100% LOAD SEQUENCE.

2.1.3. THE SYSTEM SHALL BE SIZED AND SPECIFIED TO ALLOW EMERGENCY SYSTEM LOADS AS DEFINED BY NEC 700 TO BE TRANSFERRED ONTO THE GENERATOR(S) WITHIN 10 SECONDS. NON-EMERGENCY SYSTEM LOADS WILL BE SEQUENCED ONTO THE GENERATOR(S) AS GENERATOR CAPACITY COMES ON-LINE.

2.2. ENGINE OIL SYSTEM

2.2.1. FULL PRESSURE LUBRICATION SHALL BE SUPPLIED BY A POSITIVE DISPLACEMENT LUBE OIL PUMP. THE ENGINE SHALL HAVE A REPLACEABLE OIL FILTER(S) WITH INTERNAL BYPASS AND REPLACEABLE ELEMENT(S).

2.2.2. THE ENGINE SHALL OPERATE ON MINERAL BASED OIL. SYNTHETIC OILS SHALL NOT BE USED.

2.2.3. THE OIL SHALL BE COOLED BY AN OIL COOLER WHICH IS INTEGRATED INTO THE ENGINE SYSTEM.

2.3. ENGINE COOLING SYSTEM

2.3.1. THE ENGINE IS TO BE COOLED WITH A UNIT MOUNTED RADIATOR, FAN, WATER PUMP, AND CLOSED COOLANT/RECOVERY SYSTEM. THE COOLANT SYSTEM SHALL INCLUDE A COOLANT FILL BOX WHICH WILL PROVIDE VISUAL MEANS TO DETERMINE IF THE SYSTEM HAS ADEQUATE COOLANT LEVEL. THE RADIATOR SHALL BE DESIGNED FOR OPERATION IN 122 DEGREES F. (50 DEGREES C) AMBIENT TEMPERATURE.

2.3.2. THE ENGINE SHALL HAVE (A) UNIT MOUNTED, THERMOSTATICALLY CONTROLLED WATER JACKET HEATER(S) TO AID IN QUICK STARTING. THE WATERGATE SHALL BE AS RECOMMENDED BY THE MANUFACTURER.

2.3.3. ENGINE COOLANT AND OIL DRAIN EXTENSIONS, EQUIPPED WITH PIPE PLUGS AND SHUT-OFF VALVES, MUST BE PROVIDED TO THE OUTSIDE OF THE MOUNTING BASE FOR CLEANER AND MORE CONVENIENT ENGINE SERVICING.

2.3.4. A RADIATOR FAN GUARD MUST BE INSTALLED FOR PERSONNEL SAFETY THAT MEETS UL AND OSHA SAFETY REQUIREMENTS.

2.4. ENGINE STARTING SYSTEM

2.4.1. STARTING SHALL BE BY A SOLENOID SHIFT, DC STARTING SYSTEM.

2.4.2. THE ENGINE'S CRANKING BATTERIES SHALL BE LEAD ACID. THE BATTERIES SHALL BE MAINTAINED BY THE MANUFACTURER'S RECOMMENDATIONS. THE BATTERIES SUPPLIED SHALL MEET NPA 110 CRANKING REQUIREMENTS OF 90 SECONDS OF TOTAL CRANK TIME. BATTERY SPECIFICATIONS (TYPE, AMP-HOUR RATING, COLD CRANKING AMPS) TO BE PROVIDED IN THE SUBMITAL.

2.4.3. THE GENSET SHALL HAVE AN ENGINE DRIVE, BATTERY CHARGING ALTERNATOR WITH INTEGRATED VOLTAGE REGULATOR.

2.4.4. THE GENSET SHALL HAVE AN AUTOMATIC DUAL, RATE, FLOAT EQUALIZE, 10 AMP BATTERY CHARGER. THE CHARGER MUST BE PROTECTED AGAINST A REVERSE POLARITY CONNECTION. THE CHARGERS CHARGING CURRENT SHALL BE MONITORED WITH THE GENERATOR CONTROLLER. THE CHARGERS SHALL BE ACCESSIBLE WITH A SINGLE POINT COMMUNICATION VIA THE SYSTEM CONTROLLER.

2.4.5. THE SYSTEM CONTROLLER SHALL INTERFACE WITH THE GENERATORS USING DIGITAL COMMUNICATIONS. ANY OF THE GENERATOR(S) STATUS, OPERATING CONDITIONS, OR CONFIGURATION PARAMETERS SHALL BE ACCESSIBLE WITH A SINGLE POINT COMMUNICATION VIA THE SYSTEM CONTROLLER.

2.4.6. THE SYSTEM CONTROLLER SHALL PROVIDE SEQUENCE OF FACILITY LOAD THROUGH 3 PRIORITY LOADING (PERMISSIVE) LOAD STEPS AND 3 LOAD SHEDDING STEPS. THESE OUTPUT PARAMETERS FUNCTION BASED ON THE NUMBER OF GENERATORS ON THE GENERATOR BUS. THE PRIORITY LOADING FUNCTION PROVIDES SEQUENTIAL PERMISSIVE CONTACT CLOSURES ENABLING LOAD TO BE TRANSFERRED ONTO THE GENERATOR IN RESPONSE TO GENERATORS COMING ON-LINE. THE LOAD SHEDDING FUNCTION PROVIDES CONTACT CLOSURES THAT DISCONNECTS LOAD FROM THE GENERATOR BUS IN RESPONSE TO A REDUCTION IN AVAILABLE GENERATOR CAPACITY.

2.4.7. COMMUNICATIONS SHALL BE SUPPORTED WITH BUILDING AUTOMATION VIA THE MODBUS PROTOCOL WITHOUT NETWORK CARDS. OPTIONAL INTRNET AND INTRANET CONNECTIVITY SHALL BE AVAILABLE.

2.4.8. THE SYSTEM CONTROLLER AND DIGITAL COMMUNICATIONS SHALL ENHANCE SYSTEM OPERATION BUT NEITHER SHALL BE REQUIRED TO SYNCHRONIZE OR OPERATE THE GENERATORS IN PARALLEL. SYSTEMS THAT REQUIRE EXTERNAL CONTROL HARDWARE OR DIGITAL COMMUNICATIONS TO SYNCHRONIZE AND OPERATE THE GENERATORS IN PARALLEL SHALL BE UNACCEPTABLE.

2.4.9. THE DESIGN OF THE SYSTEM SHALL ALLOW CONTINUED GENERATOR PARALLEL OPERATION WITH FAILURES TO THE SYSTEM CONTROLLER AND/OR COMMUNICATION. CONTROL SYSTEMS THAT HAVE ANY SYSTEMIC SINGLE POINT FAILURE MODES ARE NOT ACCEPTABLE. THE SYSTEM IS TO BE DESIGNED TO BE INDEPENDENT OF THE CONTROLLER AND ISOCRONOUS LOAD SHARING CONTROL LOOPS. CONTROL SYSTEMS THAT RELY ON REDUNDANT COMMUNICATIONS WILL BE EVALUATED FOR POTENTIAL COMMON MODE FAILURES THAT CAN IMPACT BOTH OF COMMUNICATOR CHANNELS.

2.4.10. ALL LOAD SHARE AND COMMUNICATION LINES WILL BE SHORDED WHILE THE GENERATORS ARE RUNNING. THE GENERATORS MUST CONTINUE RUNNING AND CONTINUE TO SHARE LOAD.

2.5. ENGINE FUEL SYSTEM

2.5.1. THE ENGINE FUEL SYSTEM SHALL BE DESIGNED FOR OPERATION ON #2 DIESEL FUEL AND COLD WEATHER DIESEL BLENDS.

2.5.2. THE ENGINE SHALL INCLUDE A PRIMARY FUEL FILTER, WATER SEPARATOR, MANUAL FUEL PRIMING PUMP, AND ENGINE FLEXIBLE FUEL LINES MUST BE INSTALLED AT THE POINT OF MANUFACTURE. ELEMENT SHALL BE REPLACEABLE PAPER TYPE.

2.5.3. THE ENGINES SUCTION LINE SHALL BE FITTED WITH A CHECK VALVE TO SECURE PRIME FOR THE ENGINES INJECTION PUMP.

2.6. ENGINE CONTROLS

2.6.1. ENGINES THAT ARE EQUIPPED WITH AN ELECTRONIC ENGINE CONTROL MODULE (ECM), SHALL MONITOR AND CONTROL ENGINE FUNCTIONALITY AND SEAMLESSLY INTEGRATE WITH THE GENSET CONTROLLER THROUGH DIGITAL COMMUNICATIONS. ECM MONITORED PARAMETERS SHALL BE INTEGRATED INTO THE GENSET CONTROLLERS NPA 110 ALARM AND WARNING REQUIREMENTS. ALL ECM FAULT CODES SHALL BE DISPLAYED AT THE GENSET CONTROLLER IN STANDARD LANGUAGE - FAULT CODE NUMBERS ARE NOT ACCEPTABLE.

2.6.2. FOR ENGINES WITHOUT ECM FUNCTIONALITY OR FOR ANY ADDITIONAL GENSET CONTROLLER MONITORING, THE GENERATOR START-UP TO A 4-20MA SIGNAL LEVEL TO ENHANCE NOISE IMMUNITY AND ALL SENSOR CONNECTIONS SHALL BE SEALED TO PREVENT CORROSION.

2.6.3. ENGINE SPEED SHALL BE CONTROLLED WITH AN INTEGRATED ISOCRONOUS GOVERNOR FUNCTION WITH NO CHANGE IN ALTERNATOR FREQUENCY FROM NO LOAD TO FULL LOAD. STEADY STATE REGULATION IS TO BE 0.25%.

2.7. ENGINE EXHAUST & INTAKE

2.7.1. THE ENGINE EXHAUST EMISSIONS SHALL MEET THE EPA EMISSION REQUIREMENTS FOR STATIONARY EMERGENCY POWER GENERATION.

2.7.2. THE MANUFACTURER SHALL SUPPLY ITS RECOMMENDED STAINLESS STEEL, FLEXIBLE CONNECTOR TO COUPLE THE ENGINE EXHAUST MANIFOLD TO THE EXHAUST SYSTEM. A RAIN CAP WILL TERMINATE THE EXHAUST PIPE AFTER THE SILENCER. ALL COMPONENTS MUST BE PROPERLY SEALED TO ASSURE OPERATION WITHOUT EXCESSIVE BACK PRESSURE WHEN INSTALLED.

2.7.3. THE MANUFACTURER SHALL SUPPLY A CRITICAL GRADE EXHAUST SILENCER AS STANDARD. FOR APPLICATIONS WITH SITE SPECIFIC SOUND REQUIREMENTS (REFERENCE SECTION 1.1), THE SILENCER SHALL BE SELECTED TO ACHIEVE SITE SOUND LEVELS.

2.7.4. FOR GENSETS IN A WEATHER OR SOUND ATTENUATED ENCLOSURE, ALL EXHAUST PIPING FROM THE TURBO-CHARGER DISCHARGE TO THE SILENCER SHALL BE THERMALLY WRAPPED TO MINIMIZE HEAT DISSIPATION INSIDE THE ENCLOSURE.

2.7.5. THE ENGINE INTAKE AIR IS TO BE FILTERED WITH ENGINE MOUNTED, REPLACEABLE, FINE ELEMENT FILTERS.

3. ALTERNATOR

3.1. THE ALTERNATOR SHALL BE THE VOLTAGE AND PHASE CONFIGURATION AS SPECIFIED IN SECTION 1.1.1.

3.2. THE ALTERNATOR SHALL BE A 4-POLE, REVOLVING FIELD, STATIONARY ARMATURE, SYNCHRONOUS MACHINE. THE EXCITATION SYSTEM SHALL UTILIZE A BRUSHLESS EXCITER WITH A THREE PHASE FULL WAVE RECTIFIER PROTECTED AGAINST ABNORMAL TRANSIENT CONDITIONS BY A SURGE PROTECTOR. PHOTO-SENSITIVE COMPONENTS WILL NOT BE PERMITTED IN THE ROTATING EXCITER.

3.3. THE ALTERNATOR SHALL INCLUDE A PERMANENT MAGNET GENERATOR (PMG) FOR EXCITATION SUPPORT. THE SYSTEM SHALL SUPPLY A MINIMUM SHORT CIRCUIT SUPPORT CURRENT OF 300% OF THE RATING (250% FOR 50HZ OPERATION) FOR 10 SECONDS.

3.4. THE ALTERNATOR SHALL SUPPORT 1160 SKVA WITH A MAXIMUM VOLTAGE DIP OF 30 %.

3.5. THREE PHASE ALTERNATORS SHALL BE 12 LEAD, BROAD RANGE CAPABLE OF SUPPORTING VOLTAGE RECONNECTION. SINGLE PHASE ALTERNATORS SHALL BE FOUR LEAD AND DEDICATED VOLTAGE DESIGNS (600V) SHALL BE SIX LEAD. ALL LEADS MUST BE EXTENDED INTO A NEMA 1 CONNECTION BOX FOR EASY TERMINATION. A FULLY RATED, ISOLATED NEUTRAL CONNECTION MUST BE INCLUDED BY THE GENERATOR SET MANUFACTURER.

3.6. THE ALTERNATOR SHALL USE A SINGLE, SEALED BEARING DESIGN. THE ROTOR SHALL BE CONNECTED TO THE ENGINE SYNCHRONOUS SHAFT. THE STATOR SHALL BE DIRECT CONNECTED TO THE ENGINE TO ENSURE PERMANENT ALIGNMENT.

3.7. THE ALTERNATOR SHALL MEET TEMPERATURE RISE STANDARDS OF UL2200 (120 DEGREES C). THE INSULATION SYSTEM MATERIAL SHALL BE CLASS "H" CAPABLE OF WITHSTANDING 150 DEGREES C TEMPERATURE RISE.

3.8. THE ALTERNATOR SHALL BE PROTECTED AGAINST OVERLOADS AND SHORT CIRCUIT CONDITIONS BY ADVANCED CONTROLLER. THE CONTROLLER SHALL PROVIDE A PANEL TO PROVIDE A TIME CURRENT ALGORITHM THAT PROTECTS THE ALTERNATOR AGAINST SHORT CIRCUITS, TO ENSURE PRECISION PROTECTION AND REPEATABLE RPT CHARACTERISTICS, THESE FUNCTIONS MUST BE MONITORED ELECTRONICALLY IN THE GENERATOR CONTROL PANEL. -- THERMAL MAGNETIC BREAKER IMPLEMENTATION ARE NOT ACCEPTABLE.

4. CONTROLS & OPERATING SEQUENCE

4.1. GENSET CONTROLLER

4.1.1. THE GENERATOR CONTROL SYSTEM SHALL BE A FULLY INTEGRATED MICROPROCESSOR BASED CONTROL SYSTEM FOR STATIONARY EMERGENCY ENGINE GENERATORS MEETING ALL REQUIREMENTS OF NFPA 110 LEVEL 1.

4.1.2. THE GENERATOR CONTROL SYSTEM SHALL BE A FULLY INTEGRATED CONTROL SYSTEM ENABLING REMOTE DIAGNOSTICS AND EASY BUILDING MANAGEMENT INTEGRATION OF ALL GENERATOR FUNCTIONS. THE GENERATOR CONTROLLER SHALL PROVIDE INTEGRATED AND DIGITAL CONTROL OVER ALL GENERATOR FUNCTIONS INCLUDING: ENGINE PROTECTION, ALTERNATOR PROTECTION, SPEED GOVERNING, VOLTAGE REGULATION, SYNCHRONIZING, LOAD-SHARING (REAL AND REACTIVE) AND ALL RELATED GENERATOR OPERATIONS. THE GENERATOR CONTROLLER MUST ALSO PROVIDE SEAMLESS DIGITAL INTEGRATION WITH THE ENGINE'S ELECTRONIC ENGINE CONTROL MODULE (ECM) IF SO EQUIPPED. GENERATOR CONTROLLERS THAT UTILIZE SEPARATE VOLTAGE REGULATORS AND SPEED GOVERNORS OR DO NOT PROVIDE SEAMLESS INTEGRATION WITH THE ENGINE MANAGEMENT SYSTEM ARE CONSIDERED LESS DESIRABLE.

4.1.3. COMMUNICATIONS SHALL BE SUPPORTED WITH BUILDING AUTOMATION VIA THE MODBUS PROTOCOL WITHOUT NETWORK CARDS. OPTIONAL INTRNET AND INTRANET CONNECTIVITY SHALL BE AVAILABLE.

4.1.4. THE CONTROL SYSTEM SHALL PROVIDE AN ENVIRONMENTALLY SEALED DESIGN INCLUDING ENCAPSULATED CIRCUIT BOARDS AND SEALED CONNECTIONS. THE SYSTEM SHALL BE PROTECTED THROUGH INSTANTANEOUS AND STEADY STATE PROTECTIVE SETTINGS ON SYSTEM VOLTAGE, FREQUENCY, AND POWER LEVELS.

4.1.5. CIRCUIT BOARDS SHALL UTILIZE SURFACE MOUNT TECHNOLOGY TO PROVIDE VIBRATION DURABILITY. CIRCUIT BOARDS THAT UTILIZE LARGE CAPACITORS OR HEAT SINKS MUST UTILIZE DISCREET PROTECTION METHODS TO SECURELY SUPPORT THESE COMPONENTS.

4.1.6. A PREDICTIVE MAINTENANCE ALGORITHM THAT ALARMS WHEN MAINTENANCE IS REQUIRED. THE CONTROLLER SHALL HAVE THE CAPABILITY TO CALL OUT TO THE LOCAL SERVICE PROVIDER WHEN MAINTENANCE IS REQUIRED.

4.1.7. DIAGNOSTIC CAPABILITIES SHOULD INCLUDE TIME-STAMPED EVENT AND ALARM LOGS, ABILITY TO CAPTURE OPERATIONAL PARAMETERS DURING EVENTS, SIMULTANEOUS MONITORING OF ALL INPUT OR OUTPUT PARAMETERS, CALLOUT CAPABILITIES, SUPPORT FOR MULTI-CHANNEL DIGITAL STRIP CHART FUNCTIONALITY AND 2 MSEC DATA LOGGING CAPABILITIES.

4.1.8. IN ADDITION TO STANDARD NEMA 110 ALARMS, THE APPLICATION LOGS SHOULD ALSO BE PROTECTED THROUGH INSTANTANEOUS AND STEADY STATE PROTECTIVE SETTINGS ON SYSTEM VOLTAGE, FREQUENCY, AND POWER LEVELS.

4.1.9. THE CONTROL SYSTEM SHALL PROVIDE PRE-WIRED CUSTOMER USE I/O: 4 RELAY OUTPUTS (USER DEFINABLE FUNCTIONS), 4 CONTACT INPUTS, 2 ANALOG INPUTS, 2 ANALOG OUTPUTS SUPPORT VIA RS232, AND RS485. ADDITIONAL I/O MUST BE IN AVAILABLE OPTION.

4.1.10. CUSTOMER I/O SHALL BE SOFTWARE CONFIGURABLE PROVIDING FULL ACCESS TO ALL ALARM, EVENT, DATA LOGGING, AND SHUTDOWN FUNCTIONALITY. IN ADDITION, CUSTOM LADDER LOGIC FUNCTIONALITY INSIDE THE GENERATOR CONTROLLER SHALL BE SUPPORTED TO PROVIDE ADDITIONAL LOGIC. THE CUSTOMER LADDER LOGIC SHALL HAVE ACCESS TO ALL THE CONTROLLER INPUTS AND CUSTOMER ASSIGNABLE OUTPUTS.

4.1.11. THE CONTROL PANEL SHALL INCLUDE A TOUCH SCREEN TO DISPLAY ALL USER PERTINENT UNIT PARAMETERS INCLUDING: ENGINE AND ALTERNATOR OPERATING CONDITIONS, OIL PRESSURE AND OPTIONAL OIL TEMPERATURE, COOLANT TEMPERATURE AND LEVEL, AND FUEL LEVEL (WHERE APPLICABLE). THE CONTROL PANEL SHALL ALSO DISPLAY: RUN TIME HOURS; GENERATOR VOLTAGES, AMPS, FREQUENCY, KILOWATTS, AND POWER FACTOR; ALARM STATUS AND CURRENT ALARMS CONDITION PER NEMA 110 LEVEL 1.

4.2. PARALLELING SYSTEM CONTROLLER

4.2.1. THE SYSTEM CONTROLLER SHALL BE AN INTEGRATED MICROPROCESSOR BASED SOLUTION PROVIDING FULL DIGITAL INTEGRATION WITH THE GENERATOR CONTROLLERS. THE SYSTEM CONTROLLER SHALL PROVIDE REMOTE MONITORING AND DIAGNOSTICS. THE SYSTEM CONTROLLER SHALL BE SUPPORTED BY THE GENERATOR SUPPLIER. THE USE OF PLC BASED SOLUTIONS WILL BE CONSIDERED LESS DESIRABLE DUE TO RELIABILITY AND SUPPORT CONCERNS POSED BY CUSTOMER DESIGNED AUTOMATED SOFTWARE SOLUTIONS. A PREFERENCE WILL BE SHOWN FOR DESIGNS THAT USE THE SAME CONTROL BOARD HARDWARE FOR BOTH THE GENERATOR(S) AND SYSTEM CONTROLLER.

4.2.2. TO ENSURE RELIABILITY AND SERVICEABILITY, THE SYSTEM CONTROLLER SHALL BE REQUIRED TO MEET THE SAME REQUIREMENTS AS LISTED FOR THE GENERATOR CONTROLLER IN SECTIONS 4.1.3 TO 4.1.7 AND 4.1.9.

4.2.3. THE CONTROL PANEL WILL PROVIDE A TOUCH SCREEN DISPLAY TO PROVIDE INTUITIVE ACCESS TO ALL USER PERTINENT SYSTEM INFORMATION.

4.2.4. THE POWER FOR THE SYSTEM CONTROLLER SHALL UTILIZE REDUNDANT DC SOURCES - AN INTERNAL DC SOURCE INCLUSIVE OF CHARGING SYSTEM AND AN EXTERNAL DC SOURCE FROM ONE OF THE GENERATOR'S CRANKING BATTERIES.

4.2.5. THE SYSTEM CONTROLLER SHALL INTERFACE WITH THE GENERATORS USING DIGITAL COMMUNICATIONS. ANY OF THE GENERATOR(S) STATUS, OPERATING CONDITIONS, OR CONFIGURATION PARAMETERS SHALL BE ACCESSIBLE WITH A SINGLE POINT COMMUNICATION VIA THE SYSTEM CONTROLLER.

4.2.6. THE SYSTEM CONTROLLER SHALL PROVIDE SEQUENCE OF FACILITY LOAD THROUGH 3 PRIORITY LOADING (PERMISSIVE) LOAD STEPS AND 3 LOAD SHEDDING STEPS. THESE OUTPUT PARAMETERS FUNCTION BASED ON THE NUMBER OF GENERATORS ON THE GENERATOR BUS. THE PRIORITY LOADING FUNCTION PROVIDES SEQUENTIAL PERMISSIVE CONTACT CLOSURES ENABLING LOAD TO BE TRANSFERRED ONTO THE GENERATOR IN RESPONSE TO GENERATORS COMING ON-LINE. THE LOAD SHEDDING FUNCTION PROVIDES CONTACT CLOSURES THAT DISCONNECTS LOAD FROM THE GENERATOR BUS IN RESPONSE TO A REDUCTION IN AVAILABLE GENERATOR CAPACITY.

4.2.7. COMMUNICATIONS SHALL BE SUPPORTED WITH BUILDING AUTOMATION VIA THE MODBUS PROTOCOL WITHOUT NETWORK CARDS. OPTIONAL INTRNET AND INTRANET CONNECTIVITY SHALL BE AVAILABLE.

4.2.8. THE SYSTEM CONTROLLER AND DIGITAL COMMUNICATIONS SHALL ENHANCE SYSTEM OPERATION BUT NEITHER SHALL BE REQUIRED TO SYNCHRONIZE OR OPERATE THE GENERATORS IN PARALLEL. SYSTEMS THAT REQUIRE EXTERNAL CONTROL HARDWARE OR DIGITAL COMMUNICATIONS TO SYNCHRONIZE AND OPERATE THE GENERATORS IN PARALLEL SHALL BE UNACCEPTABLE.

4.2.9. THE DESIGN OF THE SYSTEM SHALL ALLOW CONTINUED GENERATOR PARALLEL OPERATION WITH FAILURES TO THE SYSTEM CONTROLLER AND/OR COMMUNICATION. CONTROL SYSTEMS THAT HAVE ANY SYSTEMIC SINGLE POINT FAILURE MODES ARE NOT ACCEPTABLE. THE SYSTEM IS TO BE DESIGNED TO BE INDEPENDENT OF THE CONTROLLER AND ISOCRONOUS LOAD SHARING CONTROL LOOPS. CONTROL SYSTEMS THAT RELY ON REDUNDANT COMMUNICATIONS WILL BE EVALUATED FOR POTENTIAL COMMON MODE FAILURES THAT CAN IMPACT BOTH OF COMMUNICATOR CHANNELS.

4.2.10. ALL LOAD SHARE AND COMMUNICATION LINES WILL BE SHORDED WHILE THE GENERATORS ARE RUNNING. THE GENERATORS MUST CONTINUE RUNNING AND CONTINUE TO SHARE LOAD.

4.3. TYPICAL / NORMAL OPERATION SEQUENCE

4.3.1. UPON THE FAILURE OF UTILITY POWER, THE AUTOMATIC TRANSFER SWITCH(ES) (ATS) PROVIDES A TWO-WIRE START SIGNAL TO THE SYSTEM CONTROLLER. THE SYSTEM CONTROLLER SENDS A START COMMAND TO THE GENERATORS VIA RS485 COMMUNICATION. THE FIRST GENERATOR THAT COMES ON-LINE SHALL BE THE FIRST TO START. THE FIRST GENERATOR TO START SHALL BE THE FIRST TO START. THE FIRST GENERATOR TO START SHALL BE THE FIRST TO START.

4.3.2. IF THE SYSTEM HAS AN EMERGENCY SYSTEM TRANSFER SWITCH, IT WILL TYPICALLY TRANSFER TO THE FIRST GENERATOR ON-LINE. IF THE EMERGENCY SYSTEM LOAD IS LARGER THAN A SINGLE UNIT, TWO GENERATORS MAY BE CONFIGURED TO COME ON-LINE PRIOR TO TRANSFERRING THE EMERGENCY SYSTEM LOAD.

4.3.3. THE SYSTEM CONTROLLER COMPARES THE ON-LINE GENERATOR CAPACITY TO A FULL LOAD DEMANDATION. IF THE ON-LINE GENERATOR CAPACITY BECOMES AVAILABLE, THE SYSTEM CONTROLLER ENABLES THE PRIORITY ONE LOADS TO BE SWITCHED TO THE GENERATOR BUS. THIS IS TYPICALLY ACCOMPLISHED BY PROVIDING A PERMISSIVE CONTACT TO THE ATS. THE SYSTEM CONTROLLER SHALL SUPPORT 3 LOAD STEPS.

4.3.4. ADDITIONAL GENERATORS UPON SENSING GENERATOR BUS VOLTAGE, SYNCHRONIZE AND PARALLEL TO THE GENERATOR BUS.

4.3.4. ADDITIONAL GENERATORS UPON SENSING GENERATOR BUS VOLTAGE, SYNCHRONIZE AND PARALLEL TO THE GENERATOR BUS.

4.3.5. THE SYSTEM CONTROLLER SHALL PROVIDE LOAD-SHED CAPABILITY VIA PROGRAMMED OUTPUTS BASED ON A COMPARISON OF THE NUMBER OF GENERATORS ON-LINE AND CONNECTED LOAD REQUIREMENTS. THREE LOAD-SHED OUTPUTS SHALL BE PROVIDED FOR THIS PURPOSE. LOAD SHEDDING WILL NOT NEED TO OCCUR IN SYSTEMS WITH PLANNED FOR ADDITIONAL GENERATOR CAPACITY OR IN SYSTEMS THAT ARE LIGHTLY LOADED DUE TO TYPICAL LOAD FACTORS. THE SYSTEM CONTROLLER SHALL BE EASILY RECONFIGURED TO MATCH EXPECTED LOAD CONDITIONS FOR A COMPLETE OPERATIONS IS POSSIBLE THROUGH AN ATS, SHUNT TRIP BREAKERS, OR CONTROL CIRCUITS.

4.3.6. ONCE UTILITY POWER HAS RETURNED, THE TWO-WIRE START SIGNAL WILL BE REMOVED. THE GENERATOR PARALLELING CONTACTORS WILL OPEN, GENERATORS WILL RUN IN A COOL DOWN MODE, AND THEN GENERATORS SHUT DOWN.

4.3.7. TRANSFER SWITCH(ES) SUPPLIED SHALL BE CAPABLE OF BEING INHIBITED FROM TRANSFERRING WITH A CONTACT FROM THE SYSTEM CONTROLLER. THE TRANSFER SWITCHES SUPPLIED SHALL ALSO BE ABLE TO SHED LOAD VIA TRIP-TO-NEUTRAL FEATURE -- THE LOAD IS SHED AND DOES NOT RE-CLOSE TO A UTILITY THAT MAY HAVE A FAULT PRESENT. FOR APPLICATIONS WITH SHEDDING WITH THE TRANSFER SWITCH IS NOT FEASIBLE, LOAD SHEDDING REQUIREMENTS WILL BE EVALUATED AND ACCOMMODATED AS NECESSARY.

5. ENGINE / ALTERNATOR PACKAGING

5.1. THE ENGINE/ALTERNATOR SHALL BE ISOLATED FROM THE GENERATOR FRAME WITH RUBBER ISOLATORS. THE PACKAGING SHALL NOT REQUIRE THE ADDITION OF EXTERNAL SPRING ISOLATORS.

5.2. A MAINLINE THERMAL MAGNETIC CIRCUIT BREAKER CARRYING THE UL MARK SHALL BE FACTORY INSTALLED. THE BREAKER SHALL BE RATED BETWEEN 100 TO 125% OF THE RATED AMPLITUDE OF THE GENSET. THE LINE SIDE CONNECTIONS ARE TO FEED FROM THE ALTERNATOR, AND THE LOAD SIDE OF THE BREAKER SHALL FEED A PARALLELING SWITCH. THE BREAKER IS TO HAVE AUX CONTACT AND SHUNT TRIP. THE BREAKER WILL FUNCTION AS A REDUNDANT TRIPPING DEVICE IN THE SYSTEM. IF THE PARALLELING SWITCH FAILS TO OPEN, THE GENERATOR BREAKER WILL BE SHUNT TRIPPED.

5.3. EACH GENERATOR SHALL INCLUDE A CYCLE RATED PARALLELING SWITCH USING PROVEN CONTACT TECHNOLOGY. THE MECHANISM SHALL HAVE A MINIMUM CYCLE LIFE OF 20,000 OPERATIONS. THE GENERATOR PARALLELING SWITCH SHALL BE FACTORY INSTALLED IN THE GENERATOR CONNECTION BOX. SOLUTIONS UTILIZING MOTOR OPERATED OR STORED ENERGY BREAKERS FOR GENERATOR PARALLELING SHALL PROVIDE DOCUMENTATION OF 20,000 OPERATION CYCLE RATING CAPABILITY.

5.4. THE GENERATOR SHALL INCLUDE A UNIT MOUNTED AUXILIARY POWER LOAD CENTER. ALL AUXILIARY AC DEVICES (BLOCK HEATER, BATTERY CHARGER, ETC) SHALL HAVE A DEDICATED BREAKER WITHIN THE LOAD CENTER.

5.5. ENCLOSURE

5.5.1. THE GENSET SHALL BE PACKAGED WITH A SOUND ATTENUATING ENCLOSURE.

5.5.2. THE ENCLOSURE SHALL BE COMPLETELY LINED WITH SOUND DEADENING MATERIAL. THIS MATERIAL MUST BE OF A SELF EXTINGUISHING DESIGN WITH A REFLECTIVE SURFACE FOR ENHANCED SAFETY.

5.5.3. THE ENCLOSURE SHALL BE MADE OF STEEL WITH A MINIMUM THICKNESS OF 16 GAUGE. THE ENCLOSURE IS TO HAVE HINGED, REMOVABLE DOORS TO ALLOW ACCESS TO THE ENGINE, ALTERNATOR AND CONTROL PANEL. THE HINGES SHALL ALLOW FOR DOOR FIT ADJUSTMENT. HINGES AND ALL EXPOSED FASTENERS WILL BE STAINLESS STEEL OR SERMAQUAD COATED. THE USE OF POP-RETS WEAKENS THE PAINT SYSTEM AND NOT ALLOWED ON EXTERNAL PAINTED SURFACES. EACH DOOR WILL HAVE LOCKABLE HARDWARE WITH IDENTICAL KEYS.

5.5.4. THE ENCLOSURE SHALL BE COATED WITH ELECTROSTATIC APPLIED POWDER PAINT, BAKED AND FINISHED TO MANUFACTURER'S SPECIFICATIONS. THE COLOR WILL BE MANUFACTURER'S STANDARD.

5.5.5. THE ENCLOSURE SHALL UTILIZE AN UPWARD DISCHARGING RADIATOR HOOD. DUE TO CONCERNS RELATIVE TO RADIATOR DAMAGE, CIRCULATING EXHAUST, AND PREVAILING WINDS, EQUIPMENT WITHOUT A RADIATOR DISCHARGE HOOD WILL NOT BE ACCEPTABLE.

5.5.6. THE GENSET SILENCER SHALL BE MOUNTED ON THE DISCHARGE HOOD OF THE ENCLOSURE. DUE TO ARCHITECTURAL CONCERNS, SILENCERS MOUNTED ON THE TOP OF THE GENERATOR ENCLOSURE ARE NOT ACCEPTABLE. GENSETS WITH SILENCERS MOUNTED INSIDE THE MAIN GENERATOR COMPARTMENT ARE ACCEPTABLE ONLY IF THE SILENCER IS THERMALLY WRAPPED TO MINIMIZE HEAT STRESS ON THE SURROUNDING COMPONENTS.

5.6. SUB-BASE FUEL TANK

5.6.1. THE PACKAGING SHALL INCLUDE A DOUBLE WALL, SUB-BASE MOUNTED, UL142 LISTED FUEL TANK. THE TANK SHALL BE 132% GALLON SIZED TO PROVIDE 72 HOURS OF RUN TIME AT 75% LOAD.

5.6.2. THE TANK SHALL INCLUDE FUEL SUCTION AND RETURN CONNECTIONS, NORMAL AND EMERGENCY VENTS, SECONDARY CONTAINMENT EMERGENCY VENT AND RUPTURE BASIN SENSOR, MECHANICAL FUEL LEVEL INDICATION AND A SUB-UP AREA CONVENIENT FOR ELECTRICAL CONTROL UNIT.

5.6.3. THE FUEL TANK SHALL USE AN ELECTRIC FUEL SENSOR TO PROVIDE AN ANALOG INDICATION OF FUEL LEVEL. THE CONTROLLER SHALL HAVE A WARNING INDICATION ON LOW FUEL LEVEL AND PROVIDE OPTIONAL SHUTDOWN FUNCTIONALITY FOR LOW, LOW FUEL LEVEL.

5.6.4. THE FUEL TANK MUST BE SUPPLIED BY THE ENGINE-GENERATOR SET MANUFACTURER AND BE INSTALLED BEFORE SHIPMENT.

6. LOOSE ITEMS

6.1. SUPPLIER TO ITEMIZE LOOSE PARTS THAT REQUIRE SITE MOUNTING AND INSTALLATION, PREFERENCE WILL BE SHOWN FOR GENSETS THAT FACTORY MOUNT ITEMS LIKE MUFFLERS, BATTERY CHARGERS, ETC.

6.2. SPARE PARTS

6.2.1. EXISTING ONE SPARE SET

6.2.2. FILTERS ONE SPARE SET (AIR, FUEL, OIL)

6.3. ADDITIONAL PROJECT REQUIREMENTS

6.1. FACTORY TESTING

6.1.1. BEFORE SHIPMENT OF THE EQUIPMENT, THE ENGINE-GENERATOR SET SHALL BE TESTED UNDER RATED LOAD FOR PERFORMANCE AND PROPER FUNCTIONING OF CONTROL AND INTERFACING CIRCUITS. TESTS SHALL INCLUDE:

- 6.1.1.1. VERY VOLTAGE & FREQUENCY STABILITY
- 6.1.1.2. VERY TRANSIENT VOLTAGE & FREQUENCY DIP RESPONSE
- 6.1.1.3. LOAD TEST THE GENERATOR FOR 2 HOURS
- 6.1.1.4. VERY PARALLELING AND LOAD SHARING CAPABILITIES

6.2. MANUALS

6.2.1. THREE (3) SETS OF OWNER'S MANUALS SPECIFIC TO THE PRODUCT SUPPLIED MUST ACCOMPANY DELIVERY OF THE EQUIPMENT. GENERAL OPERATING INSTRUCTION, PREVENTIVE MAINTENANCE, WIRING DIAGRAMS, SCHEMATICS AND PARTS EXPLODED VIEWS SPECIFIC TO THIS MODEL MUST BE INCLUDED.

6.3. INSTALLATION

6.3.1. CONTRACTOR SHALL INSTALL THE COMPLETE ELECTRICAL GENERATING SYSTEM INCLUDING ALL EXTERNAL FUEL CONNECTIONS IN ACCORDANCE WITH REQUIREMENTS OF NEC, NPA, AND THE MANUFACTURER'S RECOMMENDATIONS AS REVIEWED BY THE ENGINEER.

6.4. SERVICE

6.4.1. SUPPLIER OF THE GENSET AND ASSOCIATED ITEMS SHALL HAVE PERMANENT SERVICE FACILITIES IN THIS TRADE AREA. THESE FACILITIES SHALL COMPREHENSIVE PERMANENT FORCE OF FACTORY TRAINED SERVICE PERSONNEL ON 24 HOUR CALL. EXPERIENCED IN SERVING THIS TYPE OF EQUIPMENT, PROVIDING WARRANTY AND ROUTINE MAINTENANCE SERVICE TO AFFORD THE OWNER MAXIMUM PROTECTION. DELEGATION OF THIS SERVICE RESPONSIBILITY FOR ANY OF THE EQUIPMENT LISTED HEREIN WILL NOT BE CONSIDERED FULFILLMENT OF THESE SPECIFICATIONS. SERVICE CONTRACTS SHALL ALSO BE AVAILABLE.

6.5. WARRANTY

6.5.1. THE STANDBY ELECTRICAL GENERATING SYSTEM COMPONENTS, COMPLETE GENSET AND INSTRUMENTATION PANEL SHALL BE WARRANTED BY

- A. COORDINATE WITH COUNTY OF SAN BERNARDINO FOR SEQUENCE OF REMOVAL OF EXISTING GENERATOR/ATS. MOP SHALL BE SUBMITTED AND APPROVED BY COUNTY OF SAN BERNARDINO PRIOR TO ANY DISCONNECTION/DEMOLITION. PROVIDE TEMPORARY GENERATOR, LIGHTING AND HVAC TO DATA ROOM AS REQUIRED BY COUNTY OF SAN BERNARDINO.
- B. ALL SPARE CIRCUIT BREAKERS SHALL BE TAG AND TURN TO "OFF" POSITION.
- C. CONTRACTOR IS RESPONSIBLE FOR ALL OBTAINING PERMITS, DISPOSAL AND CLEAN UP DURING & AFTER REMOVAL OF GENERATOR, ABOVEGROUND TANK AND FUEL. COORDINATE WITH LOCAL ENVIRONMENT PROTECTION AGENCY FOR EXACT REQUIREMENT.
- D. COORDINATE WITH COUNTY FOR ANY GENERATOR/EQUIPMENT/DEVICES SALVAGE REQUIREMENT. SHIP THE SALVAGED GENERATOR/EQUIPMENT/DEVICES TO COUNTY STORAGE PER COUNTY.
- E. CONTRACTOR IS RESPONSIBLE FOR ALL OBTAINING PERMITS, FEES AND REMOVAL OF ALL DEBRIS/MATERIALS/SOILS PER LOCAL JURISDICTION REQUIREMENT.
- F. CONTRACTOR SHALL PROVIDE AND PERFORM LOAD BANK TEST OF THE NEWLY INSTALLED GENERATOR AS PART OF THE COMMISSIONING.



800MHz Generator Replacement Glen Helen Tower

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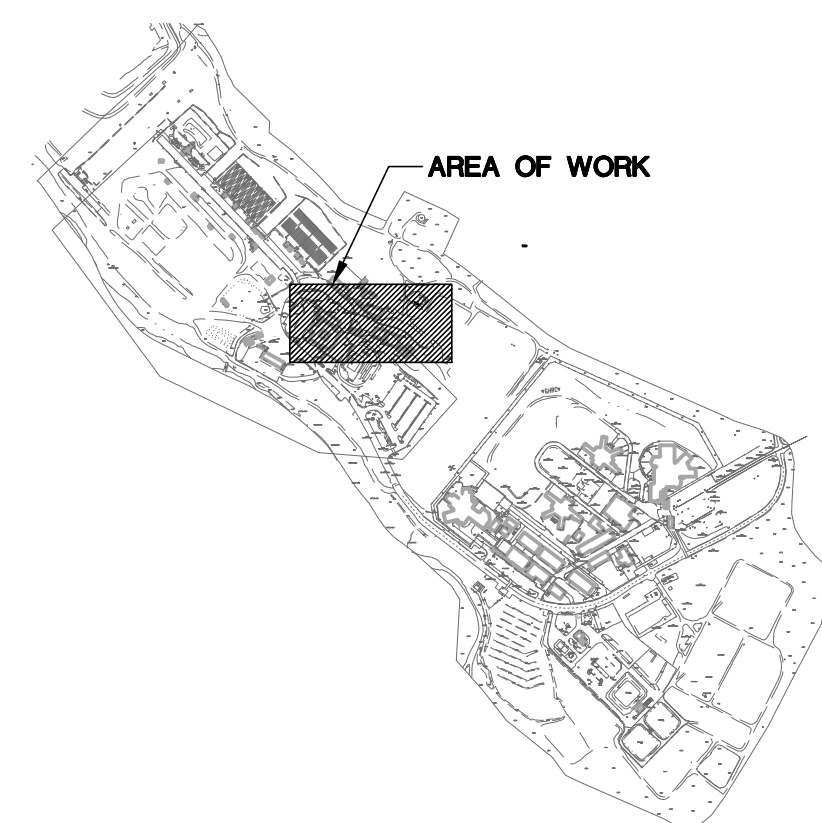
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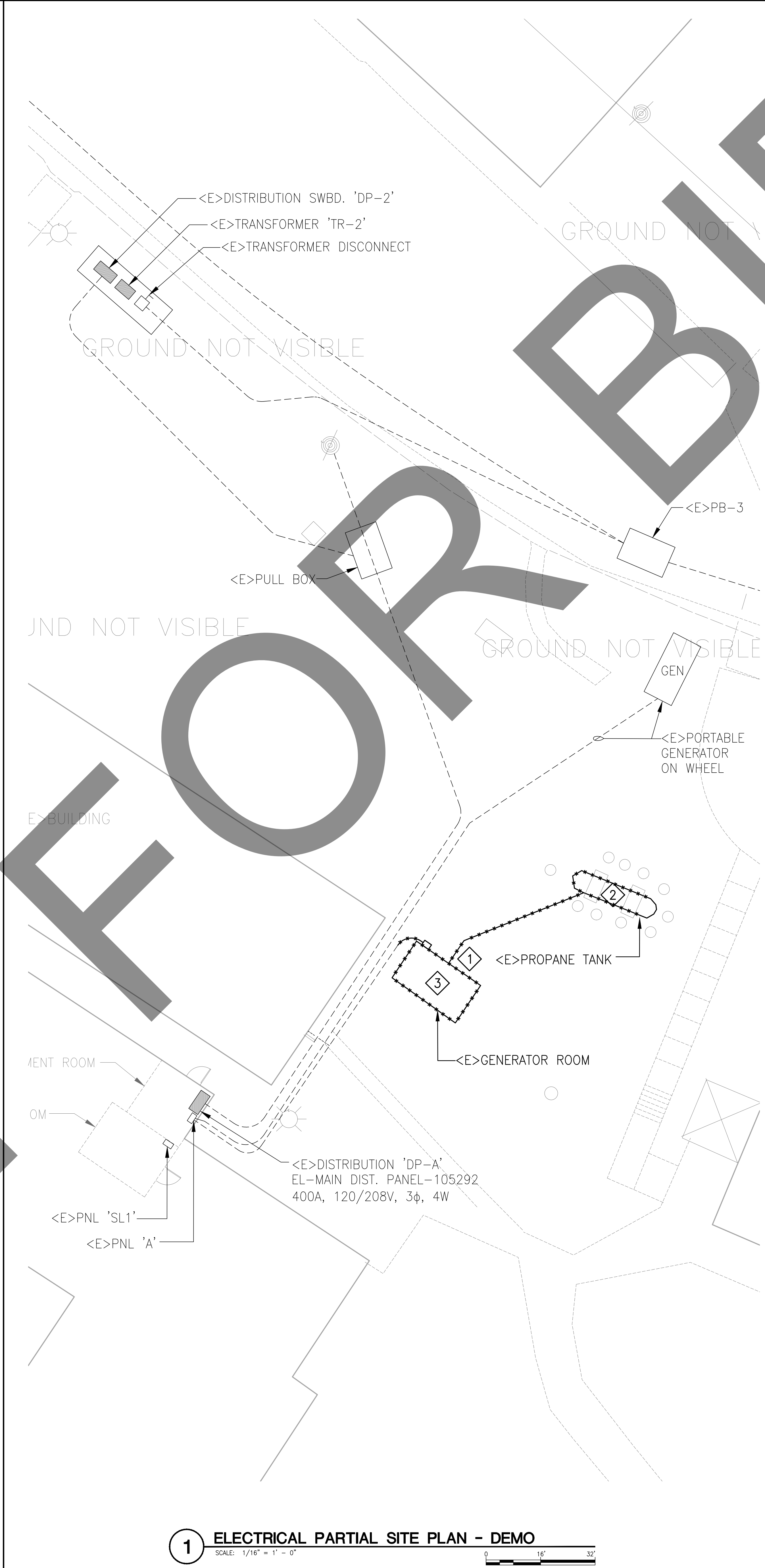
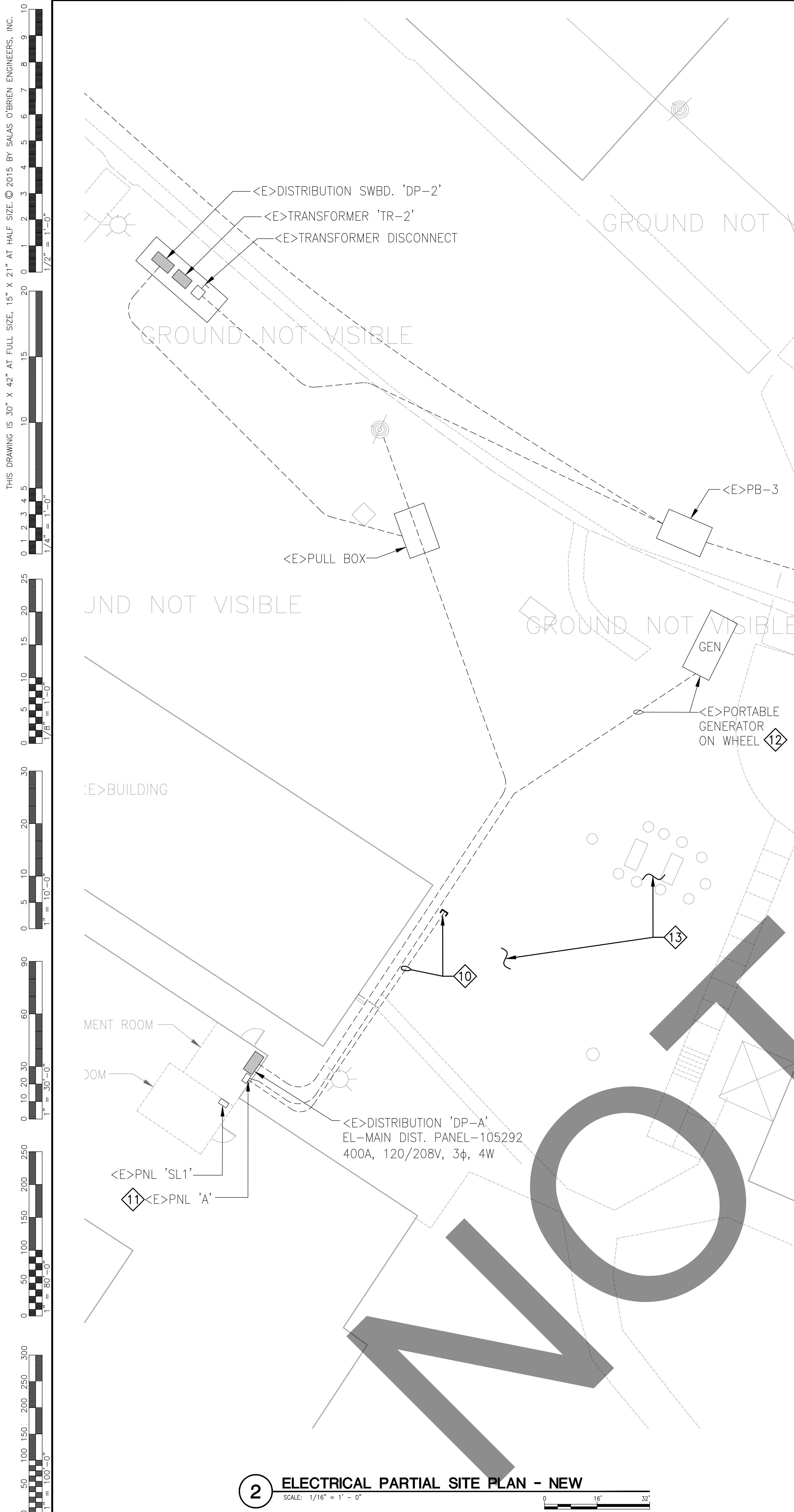
SHEET TITLE
ELECTRICAL SITE PLAN

SCALE: AS NOTED	AS NOTED
THIS DRAWING IS 30" X 42" AT FULL SIZE	

ES-1.1

SCALE: N.T.S.





GENERAL SHEET NOTES

- A. COORDINATE WITH COUNTY OF SAN BERNARDINO FOR SEQUENCE OF REMOVAL OF EXISTING GENERATOR/ATS. MOP SHALL BE SUBMITTED AND APPROVED BY COUNTY OF SAN BERNARDINO PRIOR TO ANY DISCONNECTION/DEMOLITION. PROVIDE TEMPORARY GENERATOR, LIGHTING AND HVAC TO DATA ROOM DURING CONSTRUCTION, AS REQUIRED BY COUNTY OF SAN BERNARDINO.
- B. ALL SPARE CIRCUIT BREAKERS SHALL BE TAG AND TURN TO "OFF" POSITION.
- C. CONTRACTOR IS RESPONSIBLE FOR ALL OBTAINING PERMITS, DISPOSAL AND CLEAN UP DURING & AFTER REMOVAL OF GENERATOR, ABOVEGROUND TANK AND FLUE. COORDINATE WITH LOCAL ENVIRONMENT PROTECTION AGENCY FOR EXACT REQUIREMENT.
- D. COORDINATE WITH COUNTY FOR ALL GENERATOR/EQUIPMENT/DEVICES SALVAGE REQUIREMENT. SHIP THE SALVAGED GENERATOR/EQUIPMENT/DEVICES TO COUNTY STORAGE PER COUNTY.
- E. CONTRACTOR IS RESPONSIBLE FOR ALL OBTAINING PERMITS, FEES AND REMOVAL OF ALL DEBRIS/MATERIALS/SOILS PER LOCAL JURISDICTION REQUIREMENT.
- F. CONTRACTOR SHALL PROVIDE AND PERFORM LOAD BANK TEST OF THE NEWLY INSTALLED GENERATOR AS PART OF THE COMMISSIONING.

REFERENCE SHEET NOTES

DEMO

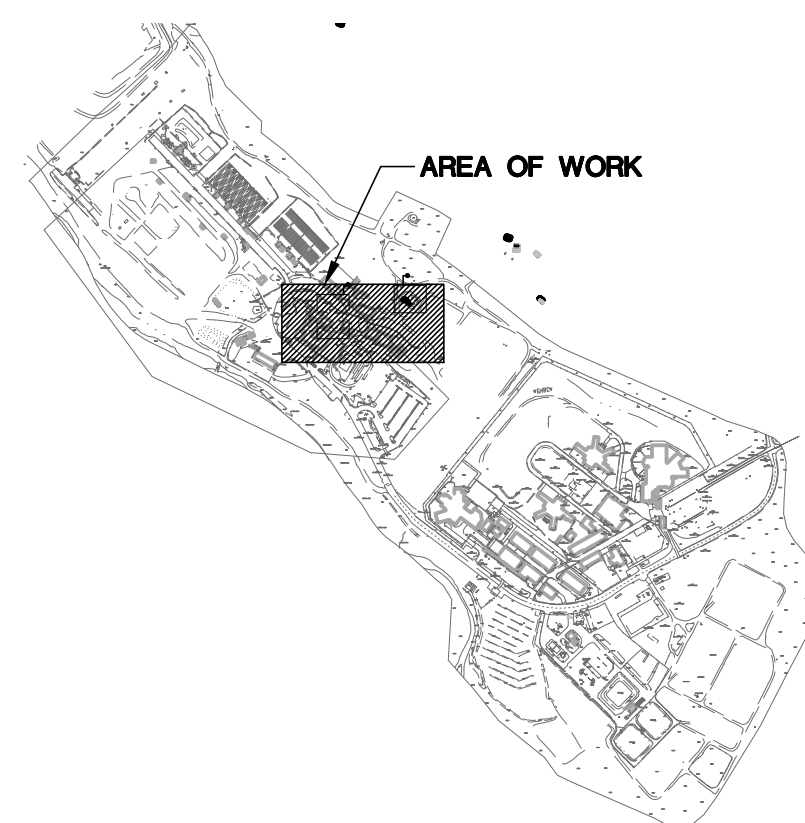
1. DISCONNECT AND REMOVE EXISTING EXISTING PROPANE TANK AND ASSOCIATED EQUIPMENT/DEVICES.
DISCONNECT UNDERGROUND PROPANE PIPES. CUT, CAP PIPES AT GRADE LEVEL AND ABANDON-IN-PLACE. REPAIR GROUND/SOIL WITH NATIVE SOIL. COORDINATE WITH LOCAL ENVIRONMENTAL AGENCY FOR DISPOSAL OF EXISTING PROPANE TANKS AND ASSOCIATED EQUIPMENT/DEVICES REQUIREMENT.
2. REMOVE EXISTING PROPANE TANK. CONCRETE PADS AND BOLLARDS TO REMAIN.
3. REMOVE EXISTING GENERATOR ENCLOSURE WITH EXHAUST FAN, ATS, PANEL, DISCONNECT SWITCH, LIGHT FIXTURES, FIRE ALARM DEVICES, ETC. CUT AND CAP EXISTING CONDUITS PER COUNTY REQUIREMENT.

NEW

10. DISCONNECT AND REMOVE EXISTING WIRING FROM THE DEMO GENERATOR BACK TO SOURCE AND EXISTING PANEL 'A'. EXISTING CONDUIT TO REMAIN AND SHALL BE PROPERLY CAPPED.
11. EXISTING PANEL 'A' SHALL BE RECONNECTED TO EXISTING DISTRIBUTION 'DP-A', REFER TO SINGLE LINE DIAGRAM FOR DETAILS.
12. EXISTING PORTABLE GENERATOR AND WIRING CONNECTION, TO REMAIN. COORDINATE WITH THE COUNTY OF SAN BERNARDINO, IF NEEDS TO BE REMOVED AFTER THE NEW 400 KW GENERATOR HAD BEEN INSTALLED, TESTED AND COMMISSIONED.
13. PROVIDE ADDITIONAL ROCKS TO COVER EXISTING CONCRETE PADS OF THE DEMOLISHED PROPANE TANK, GENERATOR AND GENERATOR ENCLOSURE. NEW ADDITIONAL ROCKS TO MATCH EXISTING AND SHALL BE PAVED TO MATCH EXISTING SURFACE.

KEY PLAN

SCALE: N.T.S.

[illegible]

SOBE PROJECT NO:	2001547
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SHEET TITLE	
ELECTRICAL SITE PARTIAL PLANS	
SCALE: AS NOTED	AS NOTED
THIS DRAWING IS 30" X 42" AT FULL SIZE	

E-4.1



SALAS O'BRIEN

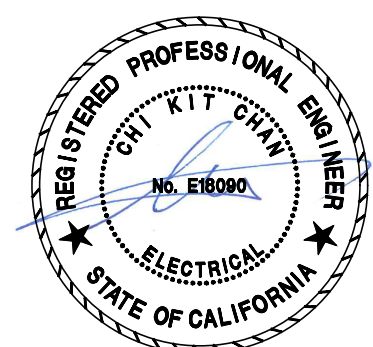
expect a difference

305 South 11th Street

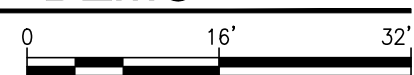
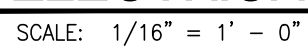
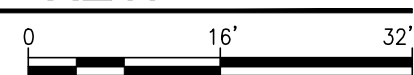
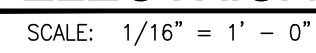
San Jose, California 95112-2218

WWW.SALASOBRIEN.COM

National **Strength.**
Local **Action.**

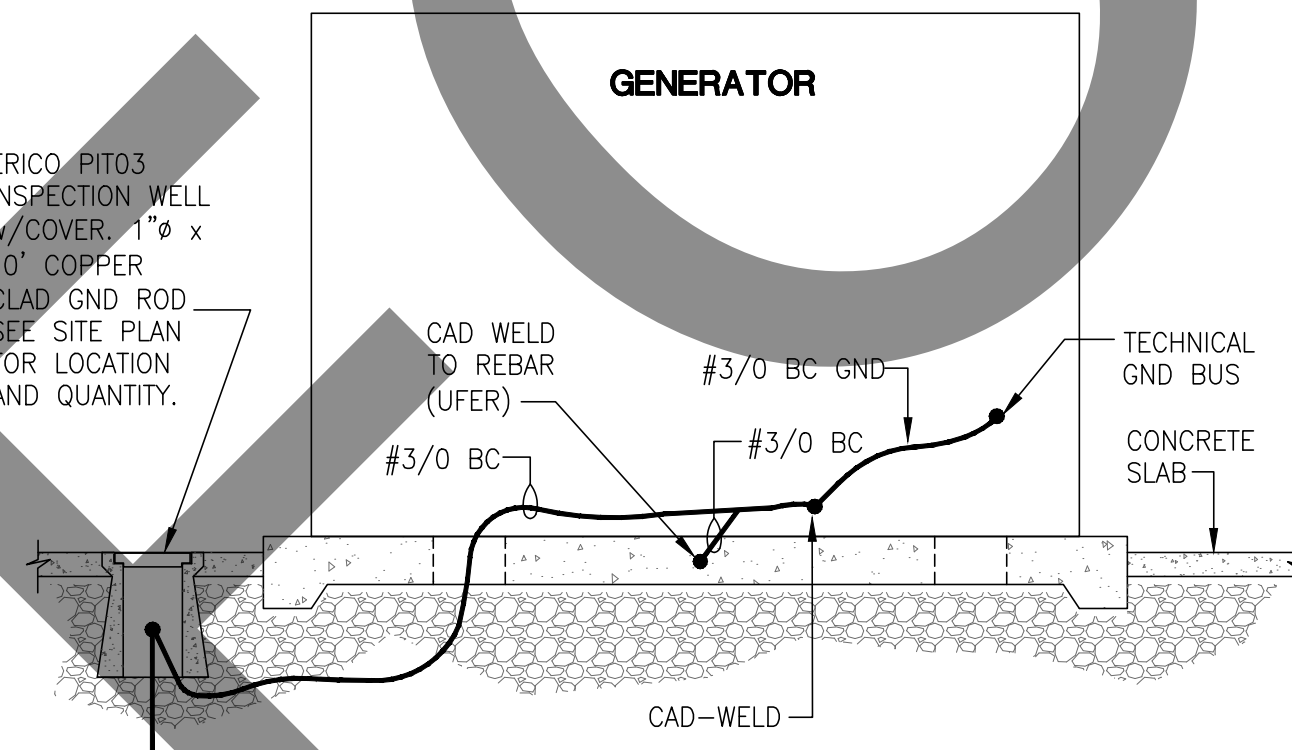


800MHz Generator Replacement Glen Helen Tower



E-4.2

5 GROUND ROD WITH ACCESS
SCALE: N.T.S.



Technical drawing showing a cross-section of a concrete pier. The pier is labeled "4\" STD. PIPE, CONCRETE-FILLED BOLLARD, 4' 0\" HIGH EXIST. A.C. PAVING". The pier is topped with a "ROUNDED CONCRETE CAP". The pier is shown extending through a "12\"# CONC. DRILLED PIER" into the ground. The drawing includes dimensions for the pier height (4' 0") and the drilled pier diameter (12").

Diagram illustrating the minimum clearance requirements (inches) for various conduits and cables in a trench. The diagram shows a cross-section of a trench with different layers: SIZE, COMPACTION, and CONDUIT BEDDING. It illustrates the placement of LOW VOLTAGE CONDUITS (QTY VARIES), CONC. ENCASEMENT (RED), PRIMARY CONDUIT W/ PULLSTRING, TYP. QTY VARIES, and SECONDARY POWER CONDUIT W/ PULLSTRING, TYP. QTY VARIES. Dimensions are given in inches, including 18" MIN. for the trench width and 6" for the clearance between conduits.

	PC	SC	0	TEL	TV	LV	W
PRIMARY CONDUIT (601V-22KV) (PC)	6	36	12	12	36	36	36
SECONDARY POWER CONDUIT (0-600V) (SC)	6	12	12	12	12	36	36
GAS (G)	36	12	12	12	12	36	36
TELEPHONE (TEL)	36	12	2	2	2	36	36
CABLE (TV)	36	12	2	2	2	36	36
OTHER LOW VOLTAGE (LV)	36	12	2	2	2	36	36
WET UTILITIES (W)	36	36	36	36	36	36	36

NOTES:

1. UTILITY OWNED AND END-USER CONDUITS AND TRENCH SHALL NOT BE COMBINED.
2. PROVIDE 12" SEPARATION WHEN CROSSING "WET" UTILITIES.

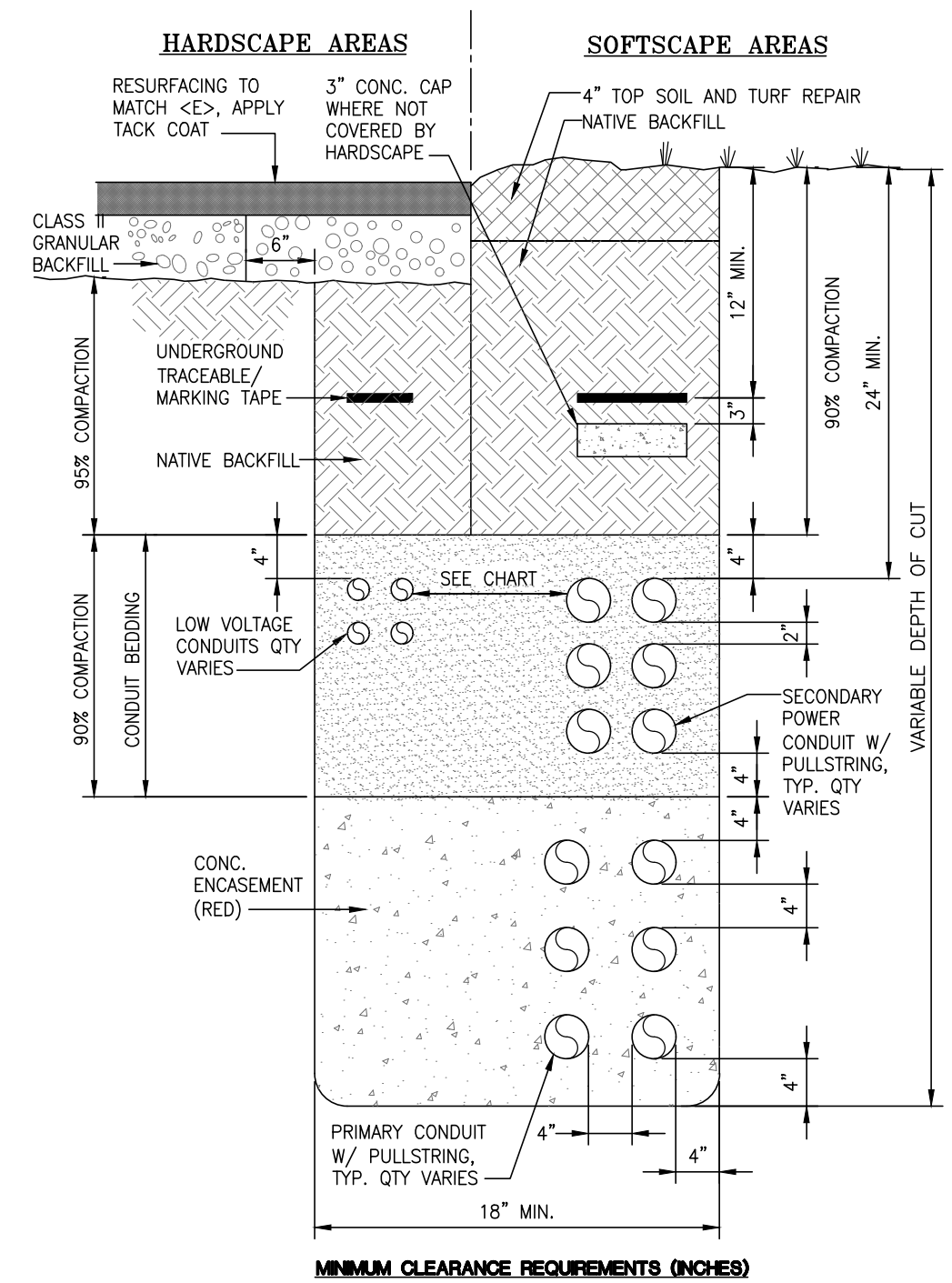


Diagram illustrating the components and installation details of a vertical riser pipe:

- GALVANIZED RIGID CONDUIT
- EXTEND WRAP +8" AFG
- FINISH GRADE
- SEE ELUOT IN RESEARCH REPORT
- WRAPPED RIGID CONDUIT (OR PVC COATED GALVANIZED RIGID CONDUIT)
- PVC TO RIGID COUPLING
- UNDERGROUND PVC CONDUIT - SEE RESEARCH REPORT

7"

BLACK LETTERS/BORDER

WARNING

ARC FLASH HAZARD
APPROPRIATE PPE REQUIRED
FAILURE TO COMPLY CAN RESULT
IN DEATH OR INJURY
REFER TO NFPA 70E

5"

10"

CAUTION

THIS EQUIPMENT
STARTS AND STOPS
AUTOMATICALLY

7"

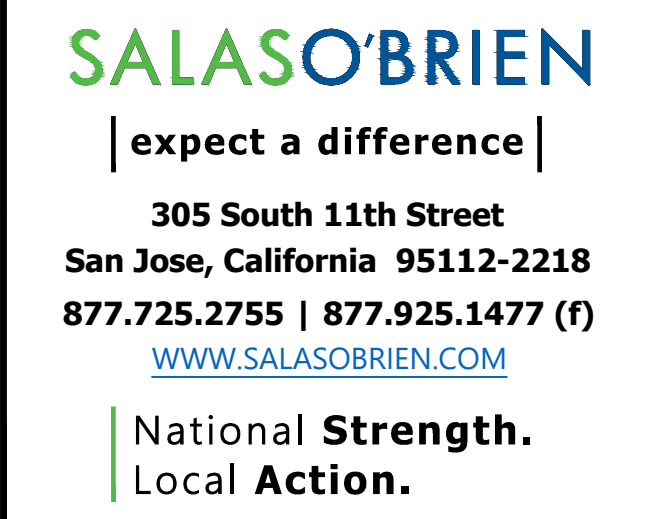
YELLOW BACKGROUND

ARC FLASH WARNING LABEL

AUTO START/STOP SIGN



Diagram illustrating the Feeder Junction F-1. The junction is labeled "FEEDER JUNCTION F-1". The hardware is labeled "1/4\" ϕ x 1-1/2\" STAINLESS STEEL WEDGE ANCHOR AND HARDWARE". A permanent label is shown attached to the junction, labeled "PERMANENT LABEL".



800MHz Generator
Replacement Glen
Helen Tower

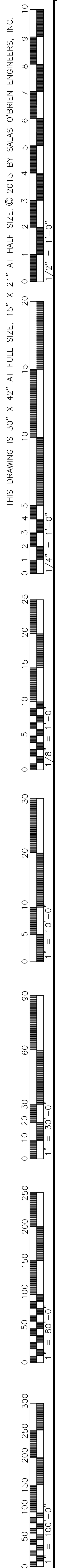
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SHEET TITLE
ELECTRICAL DETAILS

SCALE:	AS NOTED	AS NOTED
THIS DRAWING IS 30" X 42" AT FULL SIZE		

E-5.1



- A. ALL EQUIPMENT SHALL HAVE COPPER BUSING AND WIRING. ALL TRANSFORMERS SHALL HAVE COPPER WINDING.
- B. PROVIDE NEW PRINTED PANEL SCHEDULE AT PANEL DOOR FOR ALL AFFECTED PANEL OR SWITCHBOARD.
- C. POWER SHUTDOWN OR CUTOVER SHALL BE APPROVED BY COUNTY OF SAN BERNARDINO PRIOR TO ANY WORK. COORDINATE WITH COUNTY OF SAN BERNARDINO FOR SEQUENCE OF REMOVAL OF EXISTING GENERATOR/ATS AND THE DISCONNECTION OF EXISTING 200V CABLES AT THE MAIN SERVICE & DISTRIBUTION SWITCHBOARD "MS", PRIOR TO INTERCONNECTION OF THE NEW "ATS" AND STANDBY GENERATOR. WORK SHALL BE SUBMITTED AND APPROVED BY COUNTY OF SAN BERNARDINO PRIOR TO DISCONNECTION/REMOVAL. PROVIDE TEMPORARY GENERATOR, LIGHTING AND HVAC TO DATA ROOM AS REQUIRED BY COUNTY OF SAN BERNARDINO.
- D. CONTRACTOR IS RESPONSIBLE TO MATCH NEW EQUIPMENT WITH EXISTING EQUIPMENT RATING.

1. DISCONNECT AND REMOVE EXISTING GENERATOR ENCLOSURE WITH EXHAUST FAN, PANEL, DISCONNECT SWITCH, LIGHT FIXTURES, FIRE ALARM DEVICES, ETC. CUT AND CAP EXISTING CONDUITS PER COUNTY REQUIREMENT.
2. DISCONNECT EXISTING 2000 AMPS CABLE CONNECTION BETWEEN MAIN SERVICE BUS BARS AND DISTRIBUTION SWITCHBOARD 'MS' BUS BARS, IN PREPARATION FOR INTERCONNECTION OF THE NEW 'ATS' AND STANDBY GENERATOR. FIELD VERIFY EXISTING SWITCHBOARD CABLE AND BUS BAR INTERCONNECTION AND COORDINATE EQUIPMENT MANUFACTURER FOR WIRING REQUIREMENTS.

National **Strength.**
Local **Action.**

[illegible]

SHEET TITLE
ELECTRICAL SINGLE LINE DIAGRAM - DEMO

ED-7.1

