

INSTRUCTIONS TO BIDDERS: This Proposal shall be legibly prepared with ink. UNIT PRICES, and LUMP SUM BIDS when called for on the itemized bid sheet, shall be entered with ink, in the Unit Price column. The unit prices as stated will govern in determining the correct total of bid. If a unit price already entered by the bidder on the bid sheet is to be altered, it shall be crossed out with ink, the new unit price entered above or below it and initialed by the bidder, also with ink. Proposals with any unit price prepared with pencil or omitted will be rejected. Failure to fill in the extensions and the total may invalidate the Proposal.

Signatures must comply with section 102.05 and 102.06 of the current Standard Specifications for Construction of the Michigan Department of Transportation to which attention is particularly directed.

BOARD OF PUBLIC WORKS  
OF THE COUNTY OF ST. CLAIR

PROPOSAL  
FOR

WWTP EMERGENCY GENERATOR AND SWITCH GEAR REPLACEMENT

---

BIDS WILL BE OPENED AT 10:00 a.m., local prevailing time, Tuesday, November 14, 2023.

TO: Board of Public Works  
of the County of St. Clair  
21 Airport Drive,  
St. Clair, MI 48079

Sirs: The undersigned has examined the plans, specifications and the location of the work described herein and is fully informed as to the nature of the work and the conditions relating to its performance and understands that the quantities shown are approximate only and are subject to either increase or decrease.

The undersigned hereby proposes to furnish all necessary labor, machinery, tools, apparatus and other means of construction, do all the work, furnish all the materials except as otherwise specified herein, and, for the unit prices named in the itemized bid, to complete the work herein described in strict accordance with the plans therefore and in strict conformity with the requirements of the current Standard Specifications for Construction of the Michigan Department of Transportation and such other special provisions and supplemental specifications as may be a part of this proposal.

The undersigned further proposes to do such extra work as may be authorized by the Department of Public Works, prices for which are not included in the itemized bid. Compensation shall be made on the basis agreed upon before such extra work is begun.

The contractor is to complete and submit the attached BIDDER INFORMATION SHEET and the SUMMARY OF EXPERIENCE as part of their proposal to be an eligible bidder. If the contractor has two (2) or more years of experience with the St. Clair County DPW, they may omit this requirement.

St. Clair County Department of Public Works  
Specifications  
WWTP Emergency Generator and Switch Gear Replacement

GENERAL

All work under this contract shall conform to the Michigan Department of Transportation's current Standard Specifications for Construction.

PROTECTION AND RESTORATION OF PROPERTY

The contractor shall restore, at their own expense, any public or private property damaged or injured in consequence of any act or omission on their part or on the part of their employees or agents to a condition similar and equal to that existing before such damage or injury was done. If the contractor neglects to repair or make restorations the Managing Director may, after 48 hours notice to the contractor, proceed to make such repairs or restorations and will deduct the cost thereof from any monies that are or may become due to the contractor.

CONTRACTOR'S RESPONSIBILITY FOR WORK

The contractor shall be responsible for any and all damages that the work may sustain prior to its acceptance and shall rebuild, repair, restore and make good, at their own expense, all injuries and damages to any portion of the work by the action of the elements or from any cause whatsoever prior to its acceptance.

UTILITIES

It shall be the responsibility of the contractor to protect utilities at all times which are shown on the plans, designated by the engineer or encountered during the contract.

The contractor shall notify the owners of the utilities as to their starting date of construction, and the contractor shall conduct their operations so as to interfere as little as possible with utilities or any public authority on or near the work.

FAIR EMPLOYMENT PRACTICES

The contractor agrees that they will not discriminate against any employee or applicant for employment, to be employed in the performance of this contract with respect to their hire, tenure, terms, conditions or privileges of employment or any matter directly or indirectly related to employment because of their age, except when based on a bona fide occupation qualification, or because of their race, color, religion, national origin, ancestry, sex, weight, marital status, veteran status or handicap unrelated to the ability to perform the duties of a particular job. (Act. No. 251 P.A. 1955, as amended).

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FAILURE TO COMPLETE ON TIME

Should the contractor fail to complete the work on or before the final completion date specified in the proposal or on or before the extended final completion date determined as specified under Determination and Extension of Final Completion Date , 1.08.08c, of the Standard Specifications, there shall be deducted from any monies due or to become due the contractor for each calendar day that the work shall remain incomplete, the applicable sum set forth in the following schedule, except as otherwise provided therein. This sum shall not be considered a penalty, but as liquidated damages due the County from the contractor for their failure to complete the work within the specified time which the parties agree is a reasonable pre-estimate of the damages which will be sustained by the County.

CONTRACT BONDS

No Bond is necessary.

COMPLETION DATE

Completion date for all items of work listed in this proposal is 60 days following the award of contract.

MEASUREMENTS AND PAYMENTS

Payment for Idle Equipment and Labor

In the event that machinery or equipment is idled due to the failure of the DPW to properly provide for the contractor to proceed with the performance of the work in accordance with the terms of the contract, payment WILL NOT be allowed on a rental basis of the idle equipment.

In the event that labor is idled due to the failure of the DPW to properly provide for the contractor to proceed with the performance of the work within the terms of their contract, payment WILL NOT be allowed.

St. Clair County Department of Public Works  
Specifications  
WWTP Emergency Generator and Switch Gear Replacement

DAMAGE LIABILITY AND INSURANCE

The Contractor shall hold harmless and indemnify the St. Clair County Department of Public Works, its Commissioners, officers, directors, employees and agents against all claims for damage to public or private property and for injuries to persons arising out of and/or during the work contemplated by the contract to be executed. The contractor shall, prior to execution of the contract, file with the DPW a certificate that they carry Worker's Compensation Insurance which the Contractor will keep in force for the duration of the contract.

The Contractor, prior to execution of the contract, shall file with the DPW copies of completed certificates of insurance, as evidence that they carry adequate insurance satisfactory to the DPW, to afford protection against all claims for damages to public or private property, and injuries to persons arising out of the work, and where specified in the proposal, similar insurance to protect the owner of premises on or near where construction operations are to be performed.

All insurance policies and certificates must name the St. Clair County Department of Public Works, its Commissioners, officers, directors, employees and agents as additional insured.

A blanket additional insured endorsement must be attached (which may also include the Contractor's Xtend endorsement). All insurance policies must also include an endorsement providing 30 days prior written notice to the DPW of cancellation, termination, nonrenewal or reduction of coverage. The Contractor shall cease operation on the occurrence of any such cancellation, termination, nonrenewal or reduction of coverage, and shall not resume operations until new insurance is in force.

General Liability

Unless otherwise specifically required by special provisions in the proposal, the minimum limits of property damage and bodily injury liability covering each contract shall be:

Bodily Injury and	\$1,000,000 Each Occurrence
Property Damage	\$1,000,000 Aggregate

Such insurance shall include, but not be limited to, coverage for: (a) underground damage to facilities due to drilling and excavating with mechanical equipment; and (b) collapses or structural injury to structures due to blasting or explosion, excavation, tunneling, pile driving, cofferdam work or building moving or demolition.

Owners Protective Liability

As an alternative to General Liability, you may provide Owner's Protective Liability. Bodily injury and property damage protection shall be extended to the DPW; and, where indicated by the identity of the contracting parties, the protection shall be extended to all participating political subdivision and political corporations.

Automobile Liability

Unless otherwise specifically required by special provisions in the proposal, the minimum limits of property damage and bodily injury liability covering each contract shall be:

Bodily Injury and Property Damage	\$1,000,000 per Accident
Michigan No-Fault	-
	Personal Injury Protection
	Property Protection Indemnity

St. Clair County Department of Public Works  
Specifications  
WWTP Emergency Generator and Switch Gear Replacement

**PART 1 GENERAL**

1.1 SECTION INCLUDES

- A. Provide complete replacement of existing generator and switch gear as outlined in the bid spec packet handed out during the mandatory pre bid meeting.

1.2 QUALITY ASSURANCE

- A. Perform work in accordance with manufacturer's installation instructions.
- B. Installer Qualifications: Company specializing or experienced in installation of industrial back-up generator and switchgear systems similar to those specified in this project and approved by the manufacturer.
- C. There shall be no deviations from the generator manufacturer's specifications without the prior written approval of the manufacturer.
- D. There shall be no deviations from the switchgear manufacturer's specifications without the prior written approval of the manufacturer.

1.3 REGULATORY REQUIREMENTS

- A. Contractor is to obtain and pay for all building and electrical permits.
- B. Conform to applicable building and electrical codes.

1.4 PRE-BID MEETING

- A. A mandatory pre bid meeting will be held at the premises of the St. Clair County WWTP, 451 State St., Algonac MI 48001 at 9AM on November 09, 2023.

1.5 DELIVERY, STORAGE AND HANDLING

- A. New generator and switch gear are existing on site, contractor is responsible for handling from existing locations to install site.

St. Clair County Department of Public Works  
Specifications  
WWTP Emergency Generator and Switch Gear Replacement

1.6 WARRANTY

- A. Contractor's Warranty: The contractor shall warrant the installation with respect to workmanship and proper application for two (2) years from the effective date of the warranty issued by the manufacturer.
  - 1. No exclusions for incidental or consequential damages.
  - 2. No additional charge for the warranty.

**PART 2 EXECUTION**

2.1 EXAMINATION

- A. Verify that the site conditions are ready to receive work.

2.2 INSTALLATION

- A. Contractor shall provide two temporary 150KW generators to adequately supply power for the plant to operate in a normal manner during all stages of construction.
- B. Contractor to complete all demo work as outlined in attached bid packet.
- C. Install in accordance the Generac 300KW generator to manufacturer's requirements.
- D. Install in accordance the Square D QED-2 switchgear to manufacturer's requirements.

2.3 FIELD QUALITY CONTROL

- A. Start up and troubleshooting labor included.
- B. Startup of generator and switch gear by manufacturer reps with support labor included.

DELIVERY:

Indicate time of installation after awarding of bid: \_\_\_\_\_ Days

Number of days required to complete the project: \_\_\_\_\_ Days

RIGHT TO REJECT:

The Department of Public Works may award bids in whole or parts thereof, reserve the right to reject any and all proposals, waive irregularities in any bid and make award in any manner deemed in the best interest of the DPW.

St. Clair County Department of Public Works  
Proposal  
WWTP Emergency Generator and Switch Gear Replacement

PRICING:

**Cost for complete replacement of the WWTP's Generator and Switchgear as outlined in the bid spec packet \$\_\_\_\_\_.**

THE UNDERSIGNED HAVING BECOME FULLY CONVERSANT WITH ALL THE EXISTING DIMENSIONS AND CONDITIONS AND HAVING EXAMINED THE PLANS AND SPECIFICATIONS FOR THIS PROJECT, HEREBY SUBMITS THE FOLLOWING BID FOR YOUR CONSIDERATION:

ALL PROPOSALS MUST BE SIGNED BY A PERSON AUTHORIZED TO BIND THE COMPANY TO ITS CONTENTS. THIS PROPOSAL IS BINDING ON THE COMPANY SUBMITTING THE PROPOSAL FOR A PERIOD OF 30 DAYS AFTER THE DUE DATE FOR SUBMISSIONS AND MAY NOT BE WITHDRAWN FOR ANY REASON DURING SUCH 30 DAY PERIOD. IN THE EVENT A COMPANY SUBMITTING A PROPOSAL ATTEMPTS TO WITHDRAW IT DURING THE 30 DAY PERIOD AND WOULD BE THE SUCCESSFUL BIDDER OR IF A COMPANY REFUSES TO HONOR ITS BID AFTER AWARD BY THE DEPARTMENT OF PUBLIC WORKS, IN SUCH EVENT, THE COMPANY WILL BE RESPONSIBLE FOR ANY INCREASED COST INCURRED BY THE DPW DUE TO REBIDDING OR AN AWARD AT A HIGHER PRICE. IF PROVIDED, DPW PROPOSAL FORMS MUST BE USED. ANY ALTERATIONS TO THIS FORM WILL RENDER THE PROPOSAL VOID. IF ADDITIONAL OR CHANGED INFORMATION IS NEEDED, IT MUST BE DONE USING AN ATTACHED SHEET AND MARKED AS SUCH.

Name: \_\_\_\_\_  
(Signature)

Name: \_\_\_\_\_  
(Typed or Printed)

Title: \_\_\_\_\_

Company Name: \_\_\_\_\_

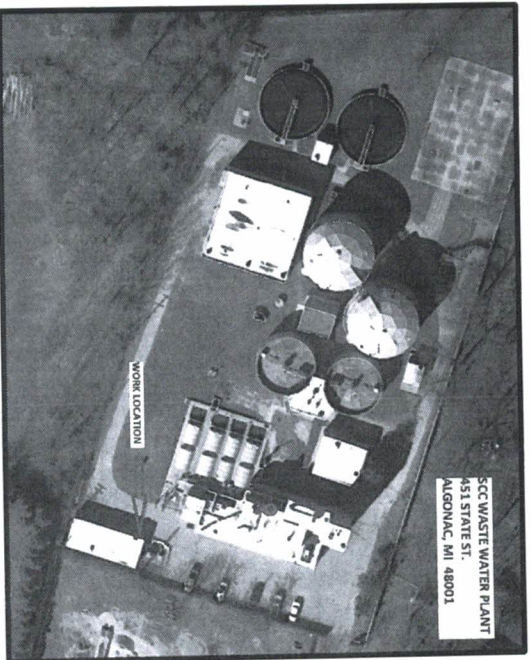
Address: \_\_\_\_\_  
\_\_\_\_\_

Telephone: \_\_\_\_\_

Fax Number: \_\_\_\_\_

E-mail Address: \_\_\_\_\_

Date: \_\_\_\_\_



**SCC WASTE WATER TREATMENT PLANT**  
**451 STATE ST.**  
**ALGONAC, MI 48001**

**MAIN ELECTRIC SWITCHGEAR AND  
 GENERATOR UPGRADES  
 2023**

**CONSULTANT**  
**BLUE WATER ELECTRICAL SERVICES, INC.**  
**3638 GRANT AVE.**  
**FORT GRATIOT, MI 48059**

**PROJECT MANAGER**  
**ROBERT J. BENNATTS**  
**STATE OF MICHIGAN**  
**MASTER ELECTRICIAN**  
**LIC. NO. 6208952**

Blue Water Electrical Services Inc.	
Customer	Saint Clair County Waste Water Plant
	451 State St. Algonac, Michigan 48001
Drawing Date:	04/24/2023
Revision Date:	Drawn by: R. Bennatts
Job Number: 23-050	Checked by:
<b>C-1</b>	



## LOAD CALCULATIONS AND INSTALLATION REQUIREMENTS

**ELECTRICAL:**

- NOMINAL VOLTAGE 480/277 VOLTS 3 PHASE
- TRANSFORMER RATING 1000KVA Y CONNECTED
- SWITCHGEAR RATING 1600 AMP
- SWITCHGEAR MCB 1600 AMP GFI PROTECTED
- ATS RATING 1600 AMP
- GENERATOR RATING 300 kW
- GENERATOR MCB 500 AMP
- GENERATOR skVA 790 kVA @ 30% VDIP
- GENERATOR ENGINE HP 448 hp NATURAL GAS
- MAXIMUM RECORDED 383.5 AMP (MOST RECENT 5YEAR HIGH)
- CONNECTED LOAD 383.5/1600 = 23.96% LOADED
- SWITCHGEAR 383.5/5000 = 76.70 % LOADED
- CONNECTED LOAD 40 hp CODE G
- GENERATOR 40 hp CODE G
- LARGEST MOTOR

**GENERATOR skVA CALCULATION**

locked rotor kVA = motor hp x max code letter value  
 skVA = locked rotor kVA x 125%

locked rotor kVA = 40hp x 6.29 = 251.9kVA  
 skVA =251.9 kVA x 1.25 = 314.5 skVA

skVA loading 314.5/790 = 39.81%

**AIR FLOW REQUIREMENTS:**

- COOLING AIR FLOW 15,946 scfm 452 cm/min
- COMBUSTION AIR REQ. 540 scfm 15.3 cm/min
- TOTAL AIR FLOW 16,486 scfm 467.3 cm/min

**FUEL:**

- Natural Gas
- 3420 scfh / 96.8 cmhr 100% loaded

Blue Water Electrical Services Inc.

Customer  
 Saint Clair County Waste Water Plant  
 451 State St.  
 Algonac, Michigan 48001

Drawing Date: 04/24/2023

Drawn by: R. Bennatts

Revision Date:

Checked by:

Job Number: 23-050

C-2

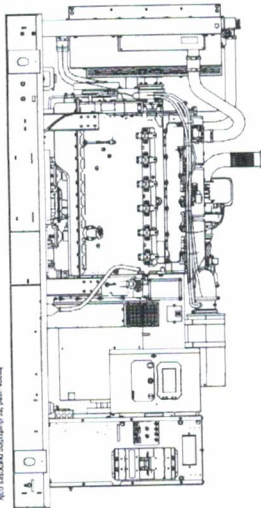
**SG300 | 14.2L | 300 kW**  
**INDUSTRIAL SPARK-IGNITED GENERATOR SET**

EPA Certified Stationary Emergency and Non-Emergency

**GENERAC** | INDUSTRIAL







**DEMAND RESPONSE READY**

- Standby Power Rating**  
300 kW, 375 kVA, 60 Hz
- Demand Response Rating**  
300 kW, 375 kVA, 60 Hz
- Prime Power Rating**  
270 kW, 338 kVA, 60 Hz



**Codes and Standards**

Not all codes and standards apply to all configurations. Contact factory for details.

-   
 UL2200, UL6200, UL1236, UL489
-   
 CSA C22.2  
 BSS514 and DIN 6271
-   
 SAE J1349
-   
 NFPA 37, 70, 99, 110
-   
 NEMA ICS10, MG1, 250, ICS6, AB1
-   
 ANSI C62.41
-   
 ISO 3006, 7637, 8528, 9001
-   
 IBC 2009, IBC 2012, ASCE 7-05, ASCE 7-10, ICC-ES AC-156 (2012)

**Powering Ahead**

Generac ensures superior quality by designing and manufacturing most of its generator components, such as alternators, enclosures, control systems and communications software. Generac also makes its own spark-ignited engines, and you'll find them on every Generac gaseous-fueled generator. We engineer and manufacture them from the block up — all at our facilities throughout Wisconsin. Applying natural gas and LP-fueled engines to generators requires advanced engineering expertise to ensure reliability, durability and necessary performance. By designing specifically for these dry, hotter-burning fuels, the engines last longer and require less maintenance. Building our own engines also means we control every step of the supply chain and delivery process, so you benefit from single-source responsibility.

Plus, Generac Industrial Power's distribution network provides all parts and service so you don't have to deal with third-party suppliers. It all leads to a positive owner experience and higher confidence level. Generac spark-ignited engines give you more options in commercial and industrial generator applications as well as extended run time from utility-supplied natural gas.

1-866-4-GEN-5622  
 SPEC SHEET

Blue Water Electrical Services Inc.	
Customer: Saint Clair County Waste Water Plant 451 State St. Algonac, Michigan 48001	
Drawing Date: 04/24/2023	Drawn by: R. Bennetts
Revision Date:	Checked by:
Job Number: 23-050	

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**SG300 | 14.2L | 300 kW**  
**INDUSTRIAL SPARK-IGNITED GENERATOR SET**

EPA Certified Stationary Emergency and Non-Emergency



**APPLICATION AND ENGINEERING DATA**

**DEMAND RESPONSE READY**

**ENGINE SPECIFICATIONS**

General	General	Cooling System
Make	Generac	Cooling System Type
Cylinder #	6	Pressurized Diesel Recovery
Type	Inline	Fan Type
Displacement - in <sup>3</sup> (L)	864.7 (14.2)	Fan Speed - RPM
Bore - in (mm)	5.31 (135)	Fan Diameter - in (mm)
Stroke - in (mm)	6.50 (165)	Fuel System
Compression Ratio	9.5:1	Fuel Type
Inlet Air Method	Turbocharged/Aircooled	Calorifier
Number of Main Bearings	7	Secondary Fuel Regulator
Connecting Rods	Steel Alloy	Fuel Shut Off Solenoid
Cylinder Head	Cast Iron G1750, 01IV	Operating Fuel Pressure - in H <sub>2</sub> O (psi)
Cylinder Liners	Ductile Iron	Standard
Ignition	Electronic	Engine Electrical System
Piston Type	Aluminum	System Voltage
Crankcase Type	Ductile Iron	Battery Charger Alternator
Inlet Valve Material	Special Heat-Resistant Steel	Battery Size
Exhaust Valve Material	High Temp Steel Alloy	Battery Voltage
Inlet Valve Seats	High Temp Steel Alloy	Ground Polarity
Engine Governing	Electronic	
Governor	Electronic	
Frequency Regulation (Steady State)	± 0.25%	
Lubrication System	Gear	
Oil Pump Type	Full Flow with Cartridge	
Oil Filter Type	36.2 (34.3)	
Crackcase Capacity - qt (L)		

**ALTERNATOR SPECIFICATIONS**

Standard Model	Permanent Magnet
Model	KG30012V21
Poles	4
Field Type	Brushless
Insulation Class - Rotor	H
Insulation Class - Stator	H
Total Harmonic Distortion	< 5% (3-Phase)
Temperature Rise Factor (TRF)	< 50
Standard Excitation	Permanent Magnet
Bearings	Shielded Ball
Cooling	Direct via Flexible Disc
Protectors - Std. Circuit Test	Yes
Voltage Regulator Type	Full Digital
Number of Service Phases	All
Regulation Accuracy (Steady State)	± 0.25%

SPEC SHEET

Blue Water Electrical Services Inc.	
Customer	
Saint Clair County Waste Water Plant	
451 State St.	
Algonac, Michigan 48001	
Drawing Date: 04/24/2023	Drawn by: R. Bennatts
Revision Date:	Checked by:
Job Number: 23-050	

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# SG300 | 14.2L | 300 kW

## INDUSTRIAL SPARK-IGNITED GENERATOR SET

EPA Certified Stationary Emergency and Non-Emergency



### OPERATING DATA

### DEMAND RESPONSE READY

#### POWER RATINGS — NATURAL GAS

	Standby/Demand Response	Prime
Three-Phase 120/208 VAC @60 Hz	300 kW/375 kVA Amps 1042	270 kW/337.5 kVA Amps 838
Three-Phase 120/240 VAC @60 Hz	300 kW/375 kVA Amps 903	270 kW/337.5 kVA Amps 813
Three-Phase 277/480 VAC @60 Hz	300 kW/375 kVA Amps 452	270 kW/337.5 kVA Amps 408
Three-Phase 346/600 VAC @60 Hz	300 kW/375 kVA Amps 361	270 kW/337.5 kVA Amps 325

#### MOTOR STARTING CAPABILITIES (kVA)

	SMA vs Voltage Dip
277/480 VAC	30%
208/240 VAC	30%
K03001242121	790
K030012421	609

#### FUEL CONSUMPTION RATES\*

Percent Load	Standby/Demand Response	Prime
25%	1,280 (35.7)	1,200 (34.0)
50%	1,960 (56.1)	1,860 (52.7)
75%	2,700 (76.5)	2,460 (69.7)
100%	3,420 (96.8)	3,120 (88.3)

\* Fuel supply restriction must accommodate fuel consumption rates at 100% load.

#### COOLING

	Standby/Demand Response	Prime
Air Flow (Fan Air Flow Across Radiator)	scfm (m <sup>3</sup> /min)	15,946 (452)
Coolant Flow	gpm (L/min)	90 (340.7)
Coolant System Capacity	gal (L)	15 (54.9)
Maximum Operating Ambient Temperature	°F (°C)	122 (50)
Maximum Operating Ambient Temperature (Before Derate)	°F (°C)	See Bulletin No. 0199270550
Maximum Radiator Backpressure	in-H <sub>2</sub> O (kPa)	0.5 (0.12)

#### COMBUSTION AIR REQUIREMENTS

Flow at Rated Power - scfm (m <sup>3</sup> /min)	Standby/Demand Response	Prime
	540 (15.3)	497 (14.1)

#### ENGINE

Standby/Demand Response	Prime	Standby/Demand Response	Prime
Rated Engine Speed	1,800	1,800	
Maximum of Rated kW**	448	403	
Rated Speed	1,950 (594)	1,950 (594)	
Rated Speed	227 (1,586)	202 (1,411)	
Exhaust Flow (Rated Output)	scfm (m <sup>3</sup> /min)	2,194 (62)	1,958 (55)
Max Backpressure (Post Silencer)	inHg (kPa)	0.73 (2.54)	0.75 (2.54)
Exhaust Temp (Rated Output - Post Silencer)	°F (°C)	1,415 (768)	1,385 (752)

\*\* Refer to "Emissions Data Sheet" for maximum BHP for EPA and SCAQMD permitting purposes.

Derate - Operational characteristics consider maximum ambient conditions. Derate factors may apply under specific site conditions. Please contact a Generac Power Systems Industrial Dealer for additional details. All performance ratings in accordance with ISO9046, ISO8514, ISO8528, and DIN6271 standards. Standby - See Bulletin 019/200558 Demand Response - See Bulletin 100/00018259 Prime - See Bulletin 019/10559

SPEC SHEET

Blue Water Electrical Services Inc.

Customer  
Saint Clair County Waste Water Plant  
451 State St.  
Algonac, Michigan 48001

Drawing Date: 04/24/2023

Drawn by: R. Bernattis

Revision Date:

Checked by:

Job Number: 23-050

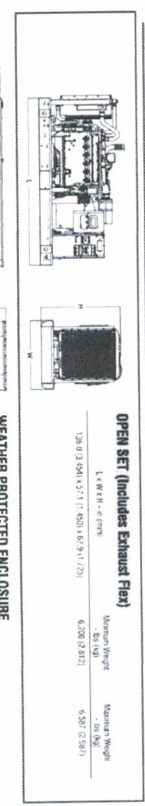
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**SG300 | 14.2L | 300 kW**  
**INDUSTRIAL SPARK-IGNITED GENERATOR SET**  
 EPA Certified Stationary Emergency and Non-Emergency



**DIMENSIONS AND WEIGHTS\***

**DEMAND RESPONSE READY**



**OPEN SET (Includes Exhaust Flex)**

L x W x H - 0 (mm)	Maximum Weight	Minimum Weight
12603 (5044 x 3111 x 5523) (41'9 1/2" x 10'1 1/2" x 18'3")	6200 (13700)	5200 (11500)

**WEATHER PROTECTED ENCLOSURE**

L x W x H - 0 (mm)	Standard Weatherproof Enclosure	Standard Weatherproof Enclosure with 1000 BTU/hr Cooling	Standard Weatherproof Enclosure with 2000 BTU/hr Cooling	Standard Weatherproof Enclosure with 3000 BTU/hr Cooling
17478 (6877 x 5754 x 4811) x 27'8 1/2" (8480)	7610 (16800)	7610 (16800)	7610 (16800)	7610 (16800)
	7610 (16800)	7610 (16800)	7610 (16800)	7610 (16800)
	7610 (16800)	7610 (16800)	7610 (16800)	7610 (16800)

**LEVEL 1 SOUND ATTENUATED ENCLOSURE**

L x W x H - 0 (mm)	Standard Weatherproof Enclosure	Standard Weatherproof Enclosure with 1000 BTU/hr Cooling	Standard Weatherproof Enclosure with 2000 BTU/hr Cooling	Standard Weatherproof Enclosure with 3000 BTU/hr Cooling
2002 (5300) x 3124 (8011) x 27'8 1/2" (8480)	7710 (17100)	7710 (17100)	7710 (17100)	7710 (17100)
	7710 (17100)	7710 (17100)	7710 (17100)	7710 (17100)
	7710 (17100)	7710 (17100)	7710 (17100)	7710 (17100)

**LEVEL 2 SOUND ATTENUATED ENCLOSURE**

L x W x H - 0 (mm)	Standard Weatherproof Enclosure	Standard Weatherproof Enclosure with 1000 BTU/hr Cooling	Standard Weatherproof Enclosure with 2000 BTU/hr Cooling	Standard Weatherproof Enclosure with 3000 BTU/hr Cooling
1804 (4507) x 3124 (8011) x 27'8 1/2" (8480)	8304 (18300)	8304 (18300)	8304 (18300)	8304 (18300)
	8304 (18300)	8304 (18300)	8304 (18300)	8304 (18300)
	8304 (18300)	8304 (18300)	8304 (18300)	8304 (18300)

**LEVEL 3 SOUND ATTENUATED ENCLOSURE**

L x W x H - 0 (mm)	Standard Weatherproof Enclosure	Standard Weatherproof Enclosure with 1000 BTU/hr Cooling	Standard Weatherproof Enclosure with 2000 BTU/hr Cooling	Standard Weatherproof Enclosure with 3000 BTU/hr Cooling
2007 (5106) x 4217 (10681) x 22'8 1/2" (6926)	10270 (22700)	10270 (22700)	10270 (22700)	10270 (22700)
	10270 (22700)	10270 (22700)	10270 (22700)	10270 (22700)
	10270 (22700)	10270 (22700)	10270 (22700)	10270 (22700)

\* All measurements are approximate and for estimation purposes only.  
 YOUR FACTORY RECOGNIZED GENERAC INDUSTRIAL DEALER

Specifications are subject to change without notice. Please contact your local dealer for detailed specifications.

Generac Power Systems, Inc. | P.O. Box 6 | Watkinsia, WI 53188  
 P: (262) 544-4611 | ©2019 Generac Power Systems, Inc. All rights reserved. All specifications are subject to change without notice.  
 Part No. 1000002085 Rev. C 10/08/19

10/19 SPEC SHEET


Blue Water Electrical Services Inc.  
 Customer  
 Saint Clair County Waste Water Plant  
 451 State St.  
 Algonac, Michigan 48001  
 Drawing Date: 04/24/2023  
 Drawn by: R. Bennetts  
 Revision Date:  
 Checked by:  
 Job Number: 23-050

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**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
2022 MODEL YEAR  
CERTIFICATE OF CONFORMITY  
WITH THE CLEAN AIR ACT**

**OFFICE OF TRANSPORTATION  
AND AIR QUALITY  
ANN ARBOR, MICHIGAN 48105**

<b>Certificate Issued To:</b> Generac Power Systems, Inc. (U.S. Manufacturer or Importer)	<b>Effective Date:</b> 09/30/2021	 Byron J. Bunker, Division Director Compliance Division	<b>Issue Date:</b> 09/30/2021
<b>Certificate Number:</b> NGNXXB14.22C1-020	<b>Expiration Date:</b> 12/31/2022		<b>Revision Date:</b> N/A

**Manufacturer:** Generac Power Systems, Inc.  
**Engine Family:** NGNXXB14.22C1  
**Mobile/Stationary Certification Type:** Stationary  
**Fuel:** Natural Gas (CNG/LNG)  
**Emission Standards:**  
Part 60 Subpart IIIJ Table 1  
CO ( g/Hp-hr ) : 4.0  
NOx ( g/Hp-hr ) : 2.0  
VOC ( g/Hp-hr ) : 1.0  
**Emergency Use Only:** Y

Pursuant to Section 213 of the Clean Air Act (42 U.S.C. section 7547) and 40 CFR Part 60, 1065, 1068, and 60 ( stationary only and combined stationary and mobile ) and subject to the terms and conditions prescribed in those provisions, this certificate of conformity is hereby issued with respect to the **test engines** which have been found to conform to applicable requirements and which represent the following nonroad engines, by engine family, more fully described in the documentation required by 40 CFR Part 60 and produced in the stated model year.

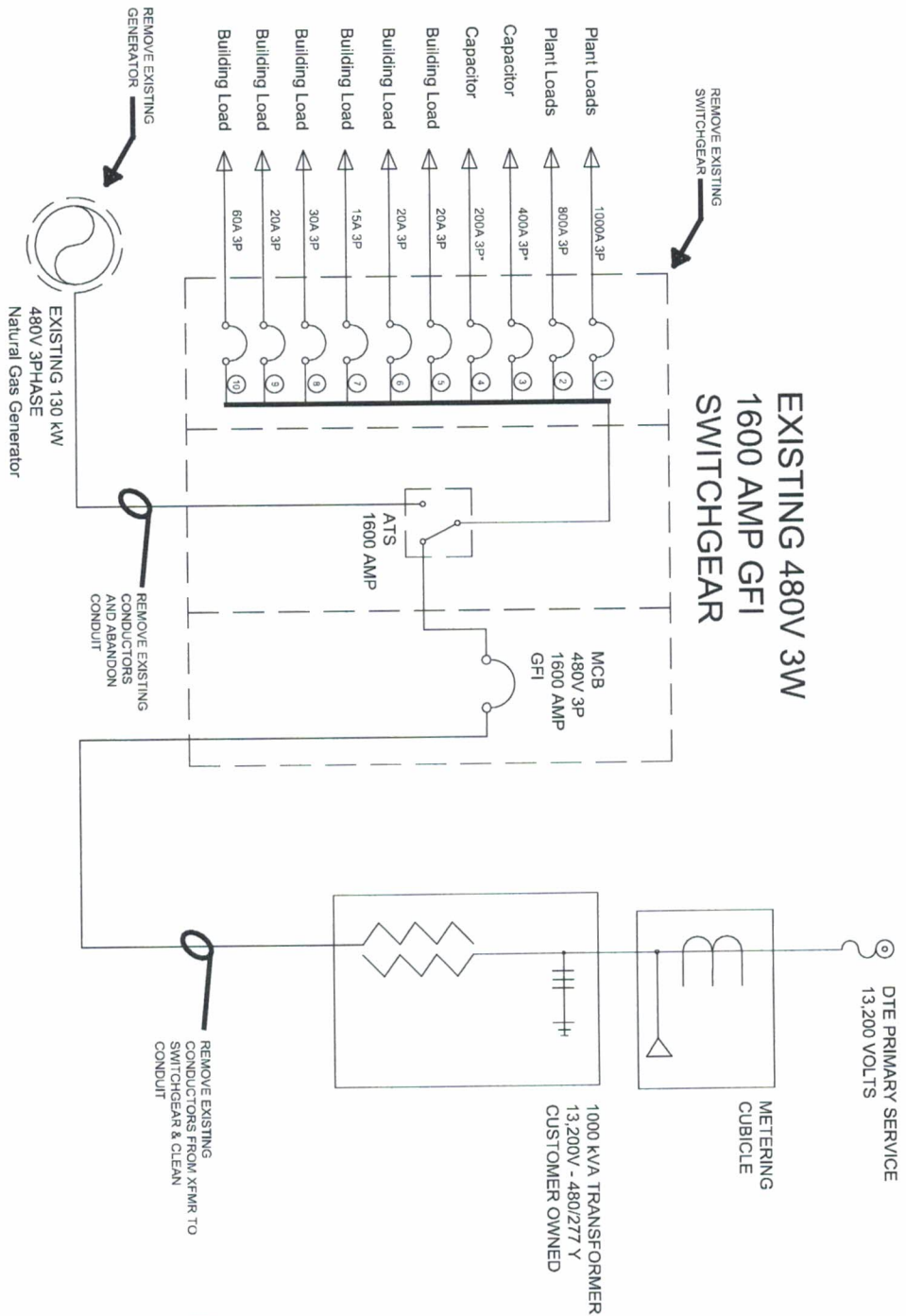
This certificate of conformity covers only those new nonroad spark-ignition engines which conform in all material respects to the design specifications that applied to those engines described in the documentation required by 40 CFR Part 60 and which are produced during the model year stated on this certificate of the said manufacturer, as defined in 40 CFR Part 60. This certificate of conformity does not cover nonroad engines imported prior to the effective date of the certificate.

It is a term of this certificate that the manufacturer shall consent to all inspections described in 40 CFR 1068.20 and authorized in a warrant or court order. Failure to comply with the requirements of such a warrant or court order may lead to revocation or suspension of this certificate for reasons specified in 40 CFR Part 60. It is also a term of this certificate that this certificate may be revoked or suspended or rendered void *ab initio* for other reasons specified in 40 CFR Part 60.

This certificate does not cover large nonroad engines sold, offered for sale, or introduced, or delivered for introduction, into commerce in the U.S. prior to the effective date of the certificate.

Blue Water Electrical Services Inc.	
Customer	Saint Clair County Waste Water Plant
	451 State St. Algonac, Michigan 48001
Drawing Date:	04/24/2023
Revision Date:	04/24/2023
Job Number:	23-050
Drawn by:	R. Bennatts
Checked by:	

**A-5**



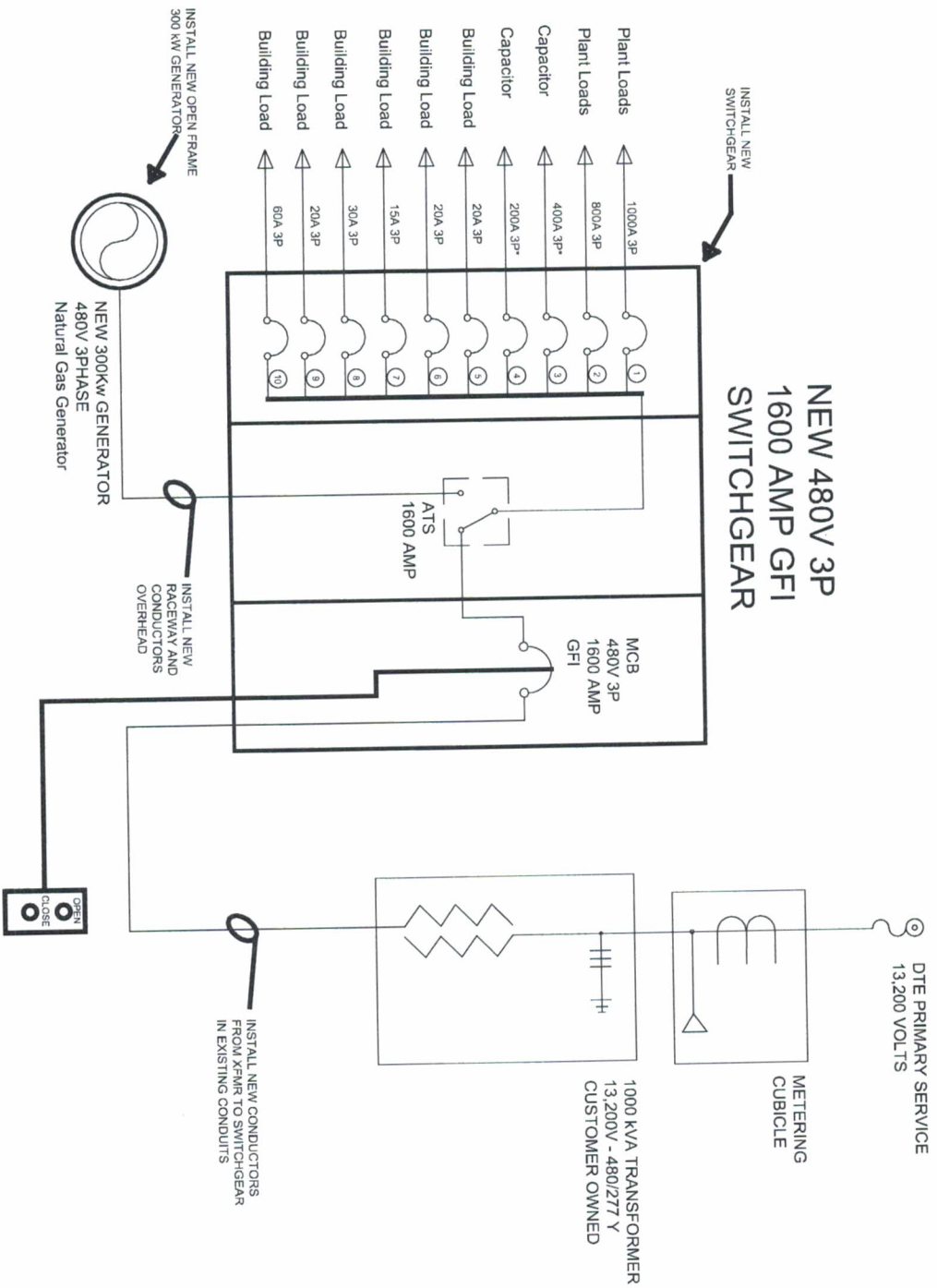
**DEMO NOTES:**

1. PRIOR TO DEMOLITION CONTRACTOR SHALL PROVIDE A TEMPORARY GENERATOR TO ADEQUATELY SUPPLY POWER FOR THE PLANT TO OPERATE IN A NORMAL MANNER.
2. CONTRACTOR SHALL CORRELATE ALL SHUTDOWNS WITH THE OWNERS REP.
3. CONTRACTOR TO REMOVE EXISTING SWITCHGEAR AND EXISTING GENERATOR AND TRANSPORT TO A LOCATION ON SITE ASREABLE WITH THE OWNERS REP.
4. CONTRACTOR TO REMOVE ALL OTHER DEMO MATERIAL FROM SITE.
5. PRIOR TO DE-TERMINATING ANY WIRES CONTRACTOR SHALL VERIFY 3-PHASE ROTATION AND PROPERLY MAKE ALL CONDUCTORS FOR RE-TERMINATING.
6. CONTRACTOR SHALL DISCONNECT AND REMOVE ALL LOAD CONDUCTORS FROM TRANSFORMER TO EXISTING SWITCHGEAR.
7. CONTRACTOR SHALL CLEAN AND PREPARE EXISTING CONDUITS FOR NEW CABLE PULS.
8. CONTRACTOR SHALL REMOVE ALL POWER AND EXISTING GENERATOR AND ABANDON UNDERGROUND CONDUITS.
9. CONTRACTOR TO REUSE EXISTING INLET AND EXHAUST DAMPER CONTROL WIRES.
10. CONTRACTOR SHALL COORDINATE SERVICE SHUTDOWN WITH OWNER AND DTE PRIMARY SERVICES.
11. OWNER SHALL PAY ALL DTE EXPENSES

\* DENOTES SHUNT TRIP BREAKER

Blue Water Electrical Services Inc.	
Customer	Saint Clair County Waste Water Plant 451 State St. Algonac, Michigan 48001
Drawing Date:	04/24/2023
Revision Date:	Checked by: R. Bernattis
Job Number:	23-050

**D-1**



- INSTALLATION NOTES
1. CONTRACTOR SHALL OBTAIN ALL CITY REQUIRED PERMITS. UPON FINAL INSPECTION CONTRACTOR SHALL PROVIDE OWNER ALL FINAL INSPECTION CERTIFICATIONS.
  2. CONTRACTOR SHALL FOLLOW ALL APPLICABLE NFPA REQUIREMENTS PER CITY ORDINANCE.
  3. CONTRACTOR SHALL INSTALL NEW SWITCHGEAR PER MANUFACTURER'S INSTALLATION REQUIREMENTS.
  4. CONTRACTOR SHALL INSTALL NEW GENERATOR PER MANUFACTURER'S INSTALLATION REQUIREMENTS.
  5. CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING 48" CLEARANCE BETWEEN NEW SWITCHGEAR AND NEW GENERATOR. IF NOT ABLE TO BE MAINTAINED A WRITTEN VARIANCE WILL BE REQUIRED FROM THE AHI.

\* DENOTES SHUNT TRIP BREAKER

Blue Water Electrical Services Inc.	
Customer	
Saint Clair County Waste Water Plant 451 State St. Algonac, Michigan 48001	
Drawing Date: 04/24/2023	Drawn by: R. Bennatts
Revision Date:	Checked by:
Job Number: 23-050	

E-1

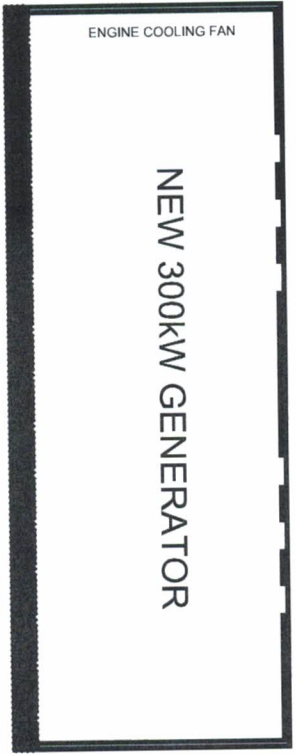


# SWITCHGEAR ROOM



← EXTEND CONCRETE PAD TO ALLOW 1'-1" LIP TO ACCOMMODATE NEW SWITCHGEAR

**MAINTAIN 48" OF CLEARANCE BETWEEN SWITCHGEAR AND GENERATOR**



← EXTEND CONCRETE PAD TO ALLOW 1'-1" LIP TO ACCOMMODATE NEW GENERATOR

- INSTALLATION NOTES:**
1. CONTRACTOR SHALL EXTEND CONCRETE PADS FOR BOTH SWITCHGEAR AND GENERATOR TO ACCOMMODATE EQUIPMENT PLUS 1" LIP ON ALL SIDES.
  2. CONTRACTOR SHALL INSTALL POWER AND CONTROL WIRING IN OVERHEAD CONDUIT FROM GENERATOR TO SWITCHGEAR.
  3. CONTRACTOR SHALL INSTALL NEW CONDUCTIONS IN EXISTING CONDUIT FROM SWITCHGEAR TO XFMR.
  4. CONTRACTOR SHALL MODIFY OR INSTALL NEW GAS LINE OF APPROPRIATE SIZE FROM GAS METER TO NEW GENERATOR.
  5. CONTRACTOR SHALL MODIFY OR INSTALL NEW DUCTWORK TO ACCOMMODATE NEW GENERATOR COOLING EXHAUST.
  6. CONTRACTOR SHALL RE-CONNECT AND MAKE WORK INLET AND OUTLET AIR DAMPERS.
  7. CONTRACTOR SHALL MAKE ALL ROOF PENETRATIONS TO ACCOMMODATE ENGINE EXHAUST PIPING AND SEAL FOR WATER TIGHT.
  8. CONTRACTOR SHALL INSTALL ALL PIPING AND SUPPORTS FOR ENGINE EXHAUST INCLUDING OWNER SUPPLIED WUFLEER PER MANUFACTURERS REQUIREMENTS.
  9. CONTRACTOR SHALL INSTALL MCB REMOTE CONTROL BUTTONS ON SOUTH WALL AS CLOSE AS POSSIBLE TO MAN DOOR.
  10. CONTRACTOR SHALL FOLLOW EXISTING ROOM CONDITIONS TO MAINTAIN UNIFORM INSTALLATION PRACTICES.

Blue Water Electrical Services Inc.	
Customer	
Saint Clair County Waste Water Plant 451 State St. Algonac, Michigan 48001	
Drawing Date: 04/24/2023	Drawn by: R. Bernatis
Revision Date:	Checked by:
Job Number: 23-050	

**E-2**

- Notes:
- CONTROL PANEL (OPTIONAL) BATTERY CARRIER (NOTED).
  - CONNECTION POINTS FOR CONTROL WIRES PROVIDED IN THE LOW VOLTAGE CONNECTION BOX (SEE DIMENSIONS IN THE LOW VOLTAGE CONNECTION BOX (USE DIMENSIONED UP AREA).
  - MAIN LINE CIRCUIT BREAKER (M.C.B.) AS LOAD LEAS & NEUTRAL CONNECTIONS.
  - FOLLOWING DIMENSIONS MAY VARY DUE TO MANUFACTURING TOLERANCES. FOR WEIGHT AND CENTER OF GRAVITY DATA SEE NOTE 6, AND SHEET 4.5.
  - ENGINE SERVICE CONNECTIONS: 1) FEMALE COUPLING; 2) FEMALE COUPLING; 3) FEMALE COUPLING; 4) FEMALE COUPLING; 5) FEMALE COUPLING; 6) FEMALE COUPLING; 7) FEMALE COUPLING; 8) FEMALE COUPLING; 9) FEMALE COUPLING; 10) FEMALE COUPLING; 11) FEMALE COUPLING; 12) FEMALE COUPLING; 13) FEMALE COUPLING; 14) FEMALE COUPLING; 15) FEMALE COUPLING; 16) FEMALE COUPLING; 17) FEMALE COUPLING; 18) FEMALE COUPLING; 19) FEMALE COUPLING.

TABLE 1

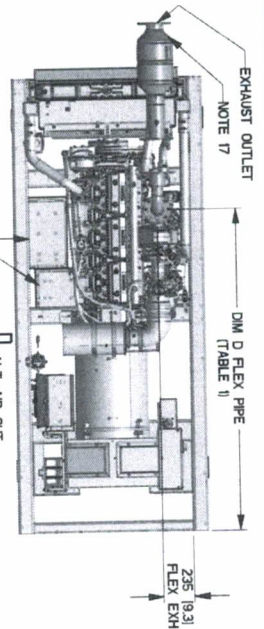
DIM	OPEN SET L1A ENCLOSED	L1A ENCLOSED
A	486 (161)	731 (238)
B	2680 (104.7)	2803 (110.4)
C	2550 (100.4)	2626 (103.4)
D	2455 (96.7)	2531 (99.6)

TABLE 2

DIM	SINGLE (50/PG)	MULTIPLE (MG/MS)
E	644 (25.3)	977 (38.5)
F	661 (26.0)	429 (16.9)

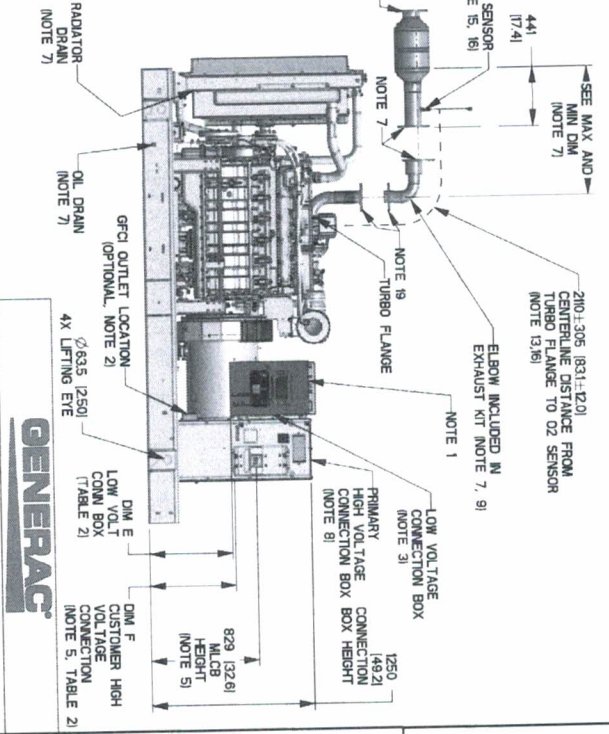
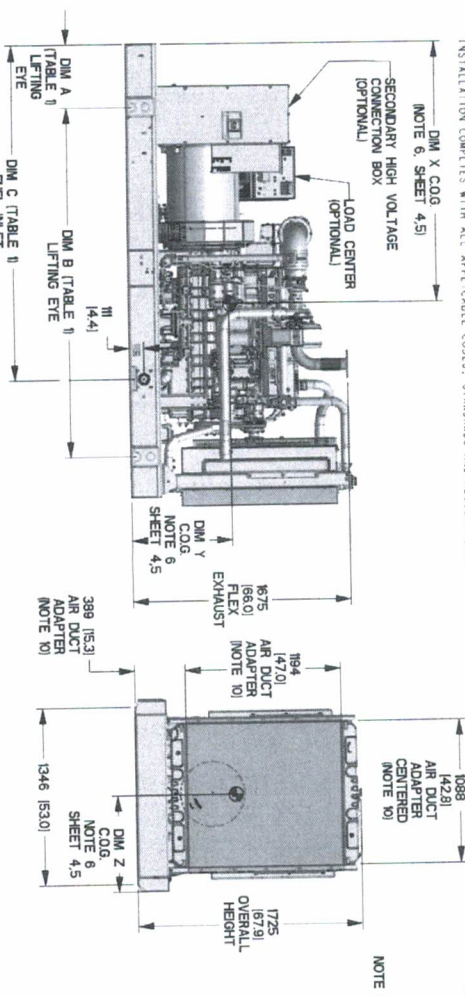
B

- CONNECT THE GREEN SET EXHAUST TO THE ENGINE.
- BLANKETS SHOULD NOT BE CONNECTED BETWEEN ENGINE EXHAUST AND CATALYST INLET AS SHOWN. IF ELBOWS ARE REQUIRED, ONLY TWO ELBOWS ARE ALLOWED. THE EXHAUST LINE MUST BE USED. OXYGEN SENSOR MUST BE LOCATED AT LEAST 508MM (20IN) DOWNSTREAM OF ANY ELBOW. PIPES WITH SMALLER DIAMETERS THAN MOST OF THE LINE MUST BE USED.
- THE EXHAUST LINE MUST BE INSTALLED SUCH THAT FRESH COOLING AIR IS AVAILABLE AND DISCHARGE AIR FROM THE RADIATOR IS NOT RECIRCULATED.
- SET THE EXHAUSTOR SET MUST BE ENCLOSED TO PREVENT PEST INFESTATION.
- AND RECIRCULATION OF DISCHARGE AIR AND/OR HUMIDIFIED COOLING AIR FLOW.
- EMERGENCY INSTALL EXHAUST BLANKETS (SUPPLIED BY OTHERS) ALONG THIS LINE OF SENSOR TO BE PLACED THIS DISTANCE FROM THE TURBO FLANGE. BLANKETS MUST HAVE MINIMUM CONTINUOUS OPERATING TEMPERATURE OF 150°F (60°C).
- CONNECT THE GREEN SET EXHAUST TO THE ENGINE.
- BLANKETS SHOULD NOT BE CONNECTED BETWEEN ENGINE EXHAUST AND CATALYST INLET AS SHOWN. IF ELBOWS ARE REQUIRED, ONLY TWO ELBOWS ARE ALLOWED. THE EXHAUST LINE MUST BE USED. OXYGEN SENSOR MUST BE LOCATED AT LEAST 508MM (20IN) DOWNSTREAM OF ANY ELBOW. PIPES WITH SMALLER DIAMETERS THAN MOST OF THE LINE MUST BE USED.
- THE EXHAUST LINE MUST BE INSTALLED SUCH THAT FRESH COOLING AIR IS AVAILABLE AND DISCHARGE AIR FROM THE RADIATOR IS NOT RECIRCULATED.
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- AND RECIRCULATION OF DISCHARGE AIR AND/OR HUMIDIFIED COOLING AIR FLOW.
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- CONNECT THE GREEN SET EXHAUST TO THE ENGINE.
- BLANKETS SHOULD NOT BE CONNECTED BETWEEN ENGINE EXHAUST AND CATALYST INLET AS SHOWN. IF ELBOWS ARE REQUIRED, ONLY TWO ELBOWS ARE ALLOWED. THE EXHAUST LINE MUST BE USED. OXYGEN SENSOR MUST BE LOCATED AT LEAST 508MM (20IN) DOWNSTREAM OF ANY ELBOW. PIPES WITH SMALLER DIAMETERS THAN MOST OF THE LINE MUST BE USED.
- THE EXHAUST LINE MUST BE INSTALLED SUCH THAT FRESH COOLING AIR IS AVAILABLE AND DISCHARGE AIR FROM THE RADIATOR IS NOT RECIRCULATED.
- SET THE EXHAUSTOR SET MUST BE ENCLOSED TO PREVENT PEST INFESTATION.
- AND RECIRCULATION OF DISCHARGE AIR AND/OR HUMIDIFIED COOLING AIR FLOW.
- EMERGENCY INSTALL EXHAUST BLANKETS (SUPPLIED BY OTHERS) ALONG THIS LINE OF SENSOR TO BE PLACED THIS DISTANCE FROM THE TURBO FLANGE. BLANKETS MUST HAVE MINIMUM CONTINUOUS OPERATING TEMPERATURE OF 150°F (60°C).
- CONNECT THE GREEN SET EXHAUST TO THE ENGINE.



B

A



A

# INSTALLATION DRAWING

DIMENSIONS ARE IN MILLIMETERS (INCHES)

GENERATOR

TITLE

OPEN SET  
G14.2L 50HZ AND 60HZ  
SG/MG: 230KW-300KW  
PG/MG: 147-184

ISSUE DATE: 11/26/14

SCALE: 0.016 WT-KG

10000039616

REV E

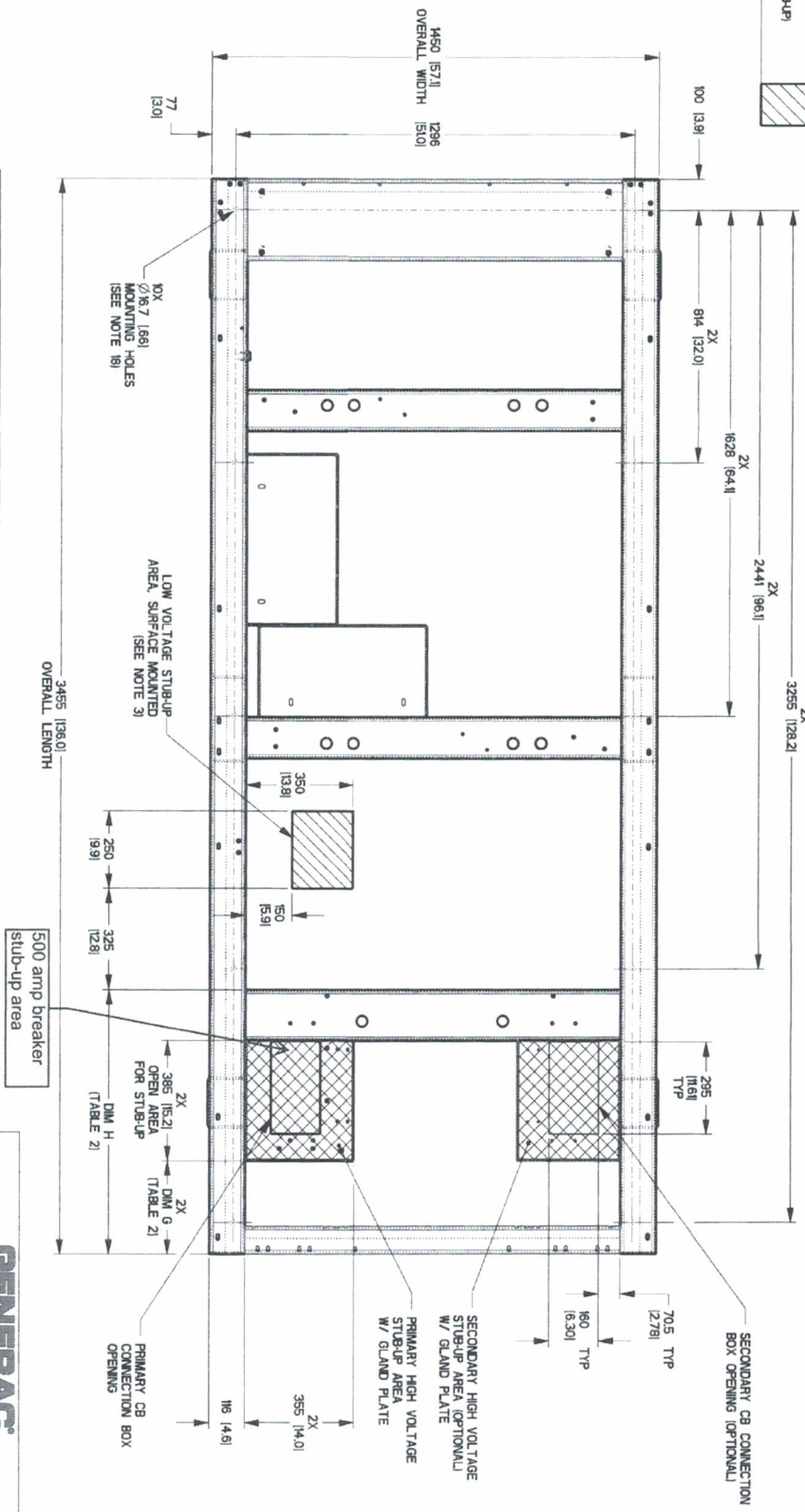
SHEET 1 OF 5

DRAWING CREATED FROM PRO/ENGINEER 3D FILE. ECO MODIFICATION TO BE APPLIED TO SOLID MODEL ONLY.

ELECTRONICALLY APPROVED

INSIDE WINDSHIELD

RECOMMENDED ELECTRICAL STUB-UP  
 HIGH VOLTAGE STUB-UP AREA  
 AVAILABLE FOR PERMANENT MAGNET EXCITATION  
 CONNECTION BOX  
 LOW VOLTAGE STUB-UP



DRAWING CREATED FROM PRO/ENGINEER  
 3D FILE. ECO MODIFICATION TO BE  
 APPLIED TO SOLID MODEL ONLY.

TABLE 2

MODEL	DM G	DM H
SG/MG 230/250/275/300	299 (11.8)	848 (33.4)
SG/MG 275/300 UPSIZE	189 (7.4)	748 (29.4)

DIMENSIONS ARE IN MILLIMETERS (INCHES)

# INSTALLATION DRAWING

TITLE  
**STUB-UP VIEW**  
 G14 2L 50HZ AND 60HZ  
 230KW-300KW OPEN SET, L1A, L2A

ISSUE DATE: 11/28/14  
 CAGE NO. N/A  
 DMG NO. 10000039616  
 SCALE 0.075  
 WT-KG  
 SHEET 2 OF 5



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 ARE THE PROPERTY OF GENERAC. IT IS TO BE USED ONLY FOR THE  
 PROJECT AND SITE SPECIFIC TO WHICH IT IS ISSUED. IT IS NOT TO  
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 MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING,  
 RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL  
 SYSTEMS, WITHOUT THE WRITTEN PERMISSION OF GENERAC.  
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ELECTRIC/MECHANICAL APPROVED  
 INSIDE WINDCHILL

4

3

SH A/5 REV E WINCHILL VERSION E.1

1

OPEN SET

MODEL	VOLTAGE	WEIGHT	CENTER OF GRAVITY DIM X	CENTER OF GRAVITY DIM Y	CENTER OF GRAVITY DIM Z
SG/MG184/230, 200/250, PG/MG147/184, 160/200	600V	2,669 kg (5,883 lbs)	1,874 (73.8)	690 (27.2)	
SG/MG184/230, 200/250, PG/MG147/184, 160/200	208V, 240V, 480V	2,677 kg (5,901 lbs)	1,871 (73.7)	690 (27.2)	
SG/MG184/230, 200/250, PG/MG147/184, 160/200	600V (UPS/IEZ)	2,729 kg (6,015 lbs)	1,851 (72.9)	667 (27.1)	668 (26.3)
SG/MG184/230, 200/250, PG/MG147/184, 160/200	208V, 240V, 480V (UPS/IEZ)	2,736 kg (6,031 lbs)	1,849 (72.8)	667 (27.1)	

STD ENCLOSURE, STEEL

MODEL	VOLTAGE	WEIGHT	CENTER OF GRAVITY DIM X	CENTER OF GRAVITY DIM Y	CENTER OF GRAVITY DIM Z
SG/MG184/230, 200/250, PG/MG147/184, 160/200	600V	3,378 kg (7,448 lbs)	1,999 (78.7)	810 (31.9)	
SG/MG184/230, 200/250, PG/MG147/184, 160/200	208V, 240V, 480V	3,386 kg (7,465 lbs)	1,997 (78.6)	809 (31.8)	634 (24.9)
SG/MG184/230, 200/250, PG/MG147/184, 160/200	600V (UPS/IEZ)	3,438 kg (7,580 lbs)	1,979 (77.9)	805 (31.7)	
SG/MG184/230, 200/250, PG/MG147/184, 160/200	208V, 240V, 480V (UPS/IEZ)	3,445 kg (7,596 lbs)	1,977 (77.8)	805 (31.7)	

L1A ENCLOSURE, STEEL

MODEL	VOLTAGE	WEIGHT	CENTER OF GRAVITY DIM X	CENTER OF GRAVITY DIM Y	CENTER OF GRAVITY DIM Z
SG/MG184/230, 200/250, PG/MG147/184, 160/200	600V	3,588 kg (7,911 lbs)	1,906 (75.0)	834 (32.8)	
SG/MG184/230, 200/250, PG/MG147/184, 160/200	208V, 240V, 480V	3,596 kg (7,928 lbs)	1,904 (75.0)	833 (32.8)	636 (25.0)
SG/MG184/230, 200/250, PG/MG147/184, 160/200	600V (UPS/IEZ)	3,648 kg (8,043 lbs)	1,889 (74.4)	829 (32.6)	
SG/MG184/230, 200/250, PG/MG147/184, 160/200	208V, 240V, 480V (UPS/IEZ)	3,655 kg (8,059 lbs)	1,887 (74.3)	829 (32.6)	

L1A ENCLOSURE, ALUMINUM

MODEL	VOLTAGE	WEIGHT	CENTER OF GRAVITY DIM X	CENTER OF GRAVITY DIM Y	CENTER OF GRAVITY DIM Z
SG/MG184/230, 200/250, PG/MG147/184, 160/200	600V	3,018 kg (6,654 lbs)	1,956 (77.4)	762 (30.0)	
SG/MG184/230, 200/250, PG/MG147/184, 160/200	208V, 240V, 480V	3,026 kg (6,671 lbs)	1,953 (77.3)	761 (30.0)	628 (24.7)
SG/MG184/230, 200/250, PG/MG147/184, 160/200	600V (UPS/IEZ)	3,078 kg (6,786 lbs)	1,944 (76.5)	758 (29.8)	
SG/MG184/230, 200/250, PG/MG147/184, 160/200	208V, 240V, 480V (UPS/IEZ)	3,085 kg (6,801 lbs)	1,942 (76.5)	758 (29.8)	

L2A ENCLOSURE, STEEL

MODEL	VOLTAGE	WEIGHT	CENTER OF GRAVITY DIM X	CENTER OF GRAVITY DIM Y	CENTER OF GRAVITY DIM Z
SG/MG184/230, 200/250, PG/MG147/184, 160/200	600V	3,848 kg (8,484 lbs)	2,032 (80.0)	1,003 (39.5)	
SG/MG184/230, 200/250, PG/MG147/184, 160/200	208V, 240V, 480V	3,856 kg (8,502 lbs)	2,029 (79.9)	1,002 (39.5)	638 (25.1)
SG/MG184/230, 200/250, PG/MG147/184, 160/200	600V (UPS/IEZ)	3,908 kg (8,616 lbs)	2,014 (79.3)	996 (39.2)	
SG/MG184/230, 200/250, PG/MG147/184, 160/200	208V, 240V, 480V (UPS/IEZ)	3,915 kg (8,632 lbs)	2,012 (79.2)	995 (39.2)	

L2A ENCLOSURE, ALUMINUM

MODEL	VOLTAGE	WEIGHT	CENTER OF GRAVITY DIM X	CENTER OF GRAVITY DIM Y	CENTER OF GRAVITY DIM Z
SG/MG184/230, 200/250, PG/MG147/184, 160/200	600V	3,220 kg (7,099 lbs)	1,985 (78.2)	867 (34.1)	
SG/MG184/230, 200/250, PG/MG147/184, 160/200	208V, 240V, 480V	3,228 kg (7,117 lbs)	1,983 (78.1)	867 (34.1)	631 (24.9)
SG/MG184/230, 200/250, PG/MG147/184, 160/200	600V (UPS/IEZ)	3,280 kg (7,231 lbs)	1,965 (77.3)	861 (33.9)	
SG/MG184/230, 200/250, PG/MG147/184, 160/200	208V, 240V, 480V (UPS/IEZ)	3,287 kg (7,247 lbs)	1,962 (77.3)	861 (33.9)	

DRAWING CREATED FROM PRO/ENGINEER 3D FILE. ECO MODIFICATION TO BE APPLIED TO SOLID MODEL ONLY.

MODEL	VOLTAGE	WEIGHT	CENTER OF GRAVITY DIM X	CENTER OF GRAVITY DIM Y	CENTER OF GRAVITY DIM Z
SG/MG184/230, 200/250, PG/MG147/184, 160/200	600V	4,917 kg (10,840 lbs)	2,172 (85.5)	1,085 (42.7)	
SG/MG184/230, 200/250, PG/MG147/184, 160/200	208V, 240V, 480V	4,925 kg (10,857 lbs)	2,169 (85.4)	1,083 (42.6)	722 (28.4)
SG/MG184/230, 200/250, PG/MG147/184, 160/200	600V (UPS/IEZ)	4,977 kg (10,972 lbs)	2,155 (84.8)	1,079 (42.5)	
SG/MG184/230, 200/250, PG/MG147/184, 160/200	208V, 240V, 480V (UPS/IEZ)	4,984 kg (10,990 lbs)	2,153 (84.8)	1,079 (42.5)	

**GENERAC**

**WEIGHT AND CENTER OF GRAVITY**  
G14.2L, 50HZ AND 60HZ  
230KW-250KW

ISSUE DATE: 11/28/14  
CAGE NO: N/A  
DWG NO: 10000039616  
SCALE: N/A WT-KG: 1 SHEET 4 OF 5

INSTALLATION DRAWING

4

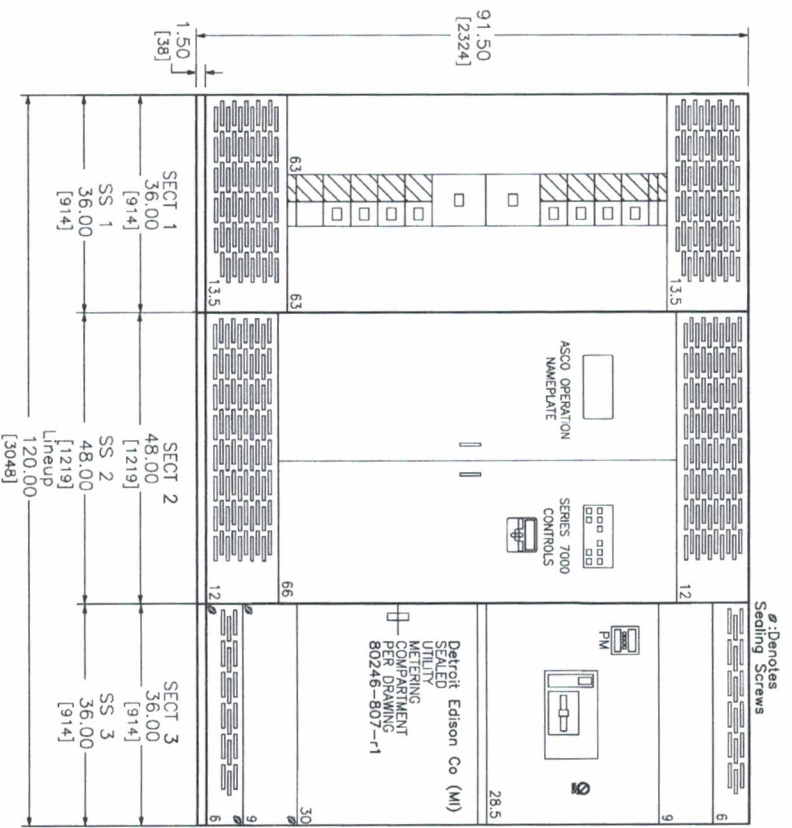
3

2

1

REV	DESCRIPTION	BY	DATE

T-bus 19.5 in  
T-bus 43.5 in  
T-bus 19.5 in



**SWITCHBOARD GENERAL NOTES**  
**PRODUCT DESCRIPTION & RATINGS**

**Power System Data**

480Y/277V 3Ph 4W 60Hz / 3 Phase Wye  
Solidly Grounded  
System Short Circuit Current Rating: 65KA RMS  
Incoming Section 3 Cable Through the Bottom Right of Lineup

**Bus System Data**

1600A Tin/Aluminum & Silver/Copper Main Bus  
(4) .25x2.00 IN/6x51 mm Al Bus Bar Per Phase/Neutral  
(1) .25x1.50 IN/6x38 mm Al Ground Bus

**Enclosure Data**

Type 1 Free Standing  
Exterior Paint Color: ANSI 49  
Front Accessibility Only Required  
Handling: Rollers & Lifting Assemblies

**Estimated Shipping Weight**

Shipping Split 1 1000.00 lbs / 453.60 kgs  
Shipping Split 2 1573.00 lbs / 713.51 kgs  
Shipping Split 3 1089.00 lbs / 493.97 kgs  
Complete Lineup 3662.00 lbs / 1661.08 kgs

**Code Standards**

U.L. Deadfront and suitable for use as Service Entrance when not more than six (6) disconnecting means are provided.  
Section 2 built to ULL1008 standards

**Rating Nameplates**

ST1- Deadfront - Section Bus 1600A  
ST2- Deadfront - Section Bus 1600A  
ST3- Service Entrance - Section Bus 1600A

**PRODUCT INFORMATION**

**Wiring**

All wiring to be Machine Tool Wire type

**Instruction Bulletins**

Reference 80043-055 For Handling, Installation, Anchoring, Inspection And Maintenance information

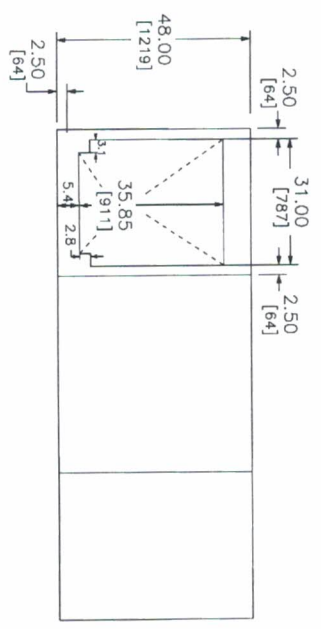
**Product Accessories/Options**

ASCO Controller with Open Transition  
- Automatic Transfer  
- Emergency Cable Entrance: Bottom  
- Switched Neutral  
24V Trip Unit Display Power  
Locally Mounted MMS Switch

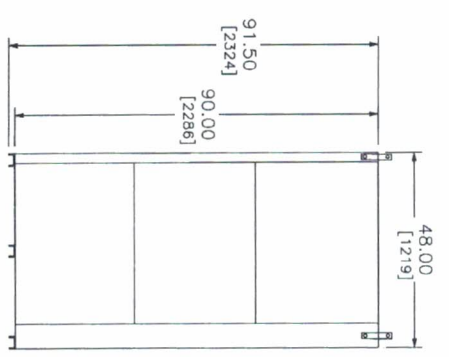
ENGLISH DIMENSIONS: INCHES

JOB NAME:	Algonac Pumping Station	EQUIPMENT DESIGNATION:	QED-2 Switchboard
JOB LOCATION:	(02C)	EQUIPMENT TYPE:	ELEVATION VIEW
DRAWN BY:	ENGR	DRAWING TYPE:	SQUARE
DATE:	February 18 2022	DWG#	FD-3114887-87297562-01
DRAWING STATUS:	NOT FOR CONSTRUCTION	PG	1 OF 2 REV

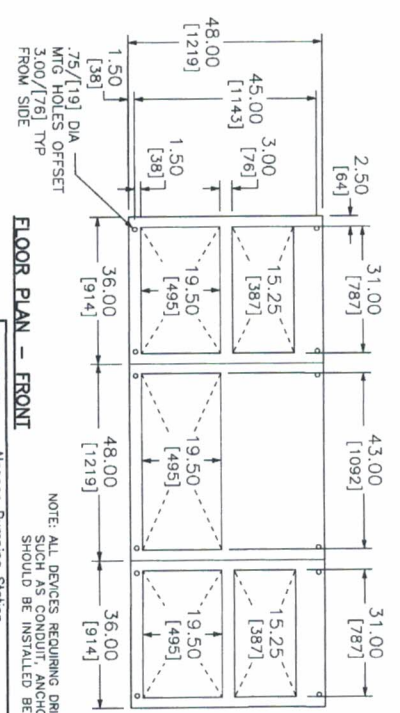
REV	DESCRIPTION	BY	DATE



TOP VIEW - FRONT



LEFT SIDE VIEW



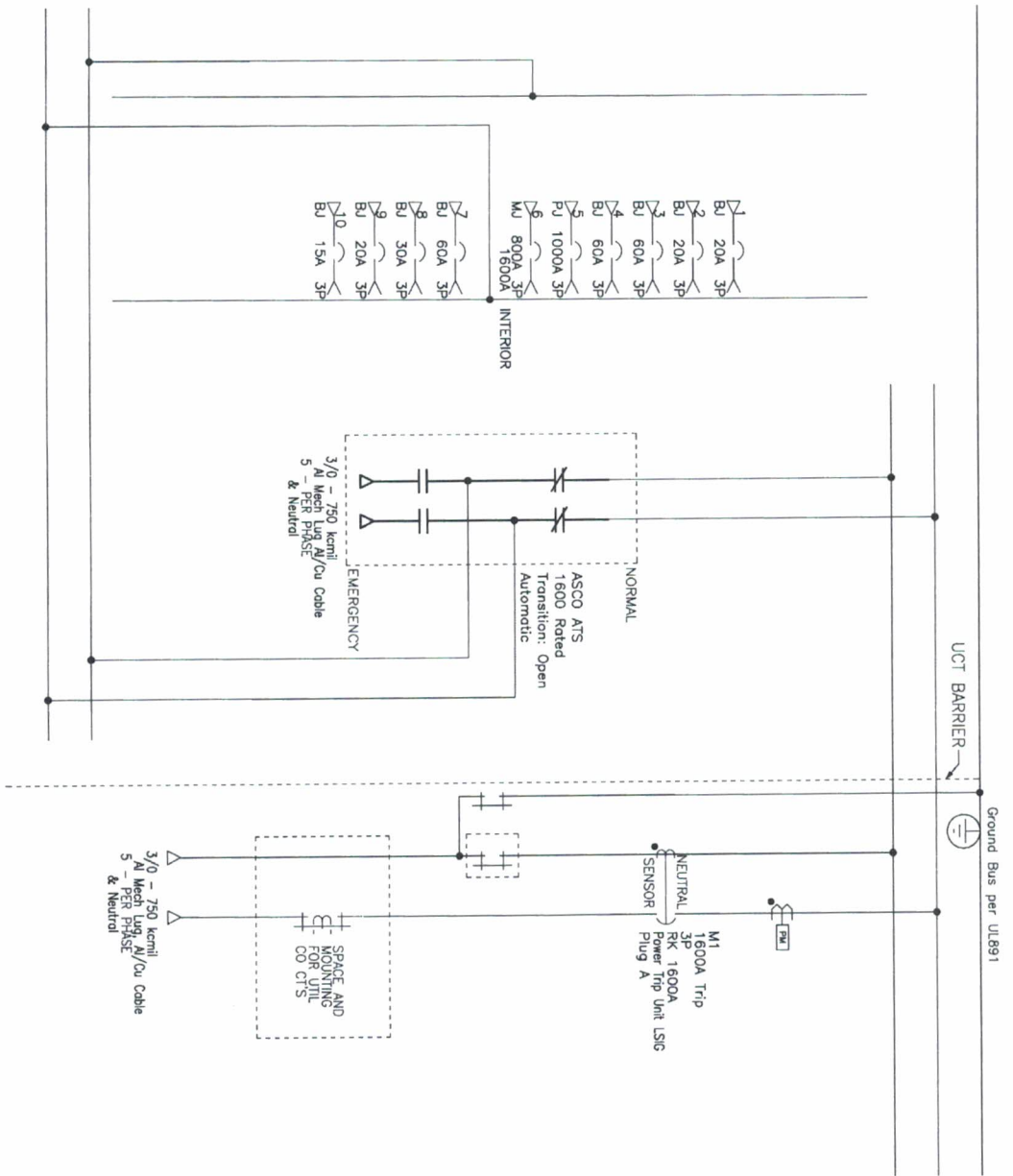
FLOOR PLAN - FRONT

NOTE: ALL DEVICES REQUIRING DRILLING OR INSERTION IN MOUNTING PAD SUCH AS CONDUIT, ANCHORING STUDS, SLEEVE INSERTS, ETC. SHOULD BE INSTALLED BEFORE SETTING EQUIPMENT IN PLACE.

ENGLISH DIMENSIONS: INCHES

JOB NAME:	Algonac Pumping Station	EQUIPMENT DESIGNATION:	GED-2 Switchboard
JOB LOCATION:	(02C)	DRAWING TYPE:	SIDE, TOP VIEW & FLOOR PLAN
DRAWN BY:	(02C)	DATE:	February 18, 2022
ENGR:		DWG#	FQ-3114897-87297562-01
DATE:	February 18, 2022	DRAWING STATUS:	QUOTE
NOT FOR CONSTRUCTION		PG	2 OF 2

REV	DESCRIPTION	BY	DATE										



SECTION 1

SECTION 2

SECTION 3

JOB NAME:	Agonac Pumping Station	EQUIPMENT DESIGNATION:	QED-2 Switchboard
JOB LOCATION:	02C	EQUIPMENT TYPE:	ONE LINE
DRAWN BY:		DRAWING TYPE:	ONE LINE
ENGR:			
DATE:	February 18 2022		
DRAWING STATUS:	QUOTE		
DWG#	00-3114887-87297562-01	PG	1 OF 2



REV	DESCRIPTION	BY	DATE

**POWER STYLE QED-2 SWITCHBOARD**

SECT NO	CKT /GMD CONFIG	DEVICE/ FRAME RATING	TRIP AMP	FUSE/ TRIP	#P	DESIGNATION	N/P	LUG/WIRE INFORMATION			ACCESSORIES / NOTES	
								QTY	PHASE	WIRE RANGE		RANGE
1	1	4.5 in	20A	-	3P		No	1	#14 - 2/0 AWG	-	3W Load	
1	2	4.5 in	20A	-	3P		No	1	#14 - 2/0 AWG	-	3W Load	
1	3	4.5 in	60A	-	3P		No	1	#14 - 2/0 AWG	-	3W Load	MX1
1	4	4.5 in	60A	-	3P		No	1	#14 - 2/0 AWG	-	3W Load	
1	5	9 in	1000A	-	3P		No	4	3/0 - 500 kcmil	-	3W Load	
1	6	9 in	800A	-	3P		No	3	3/0 - 500 kcmil	-	3W Load	
1	7	4.5 in	60A	-	3P		No	1	#14 - 2/0 AWG	-	3W Load	MX1
1	8	4.5 in	30A	-	3P		No	1	#14 - 2/0 AWG	-	3W Load	
1	9	4.5 in	20A	-	3P		No	1	#14 - 2/0 AWG	-	3W Load	
1	10	4.5 in	15A	-	3P		No	1	#14 - 2/0 AWG	-	3W Load	
2	ATS	FIX	RCO ATS 6 FRAME 1600A	-	4P		No	5	3/0 - 750 kcmil	5	3/0 - 750 kcmil	4QMB
3	M1	FIX	RK 1600 Pkg A	P-LSIG	3P		No	-	-	-	-	GF PM5K,MMS,TU
3	UCT	-	1600A	-	-	Detroit Edison Co (MI)	No	5	3/0 - 750 kcmil	5	3/0 - 750 kcmil	

LEGEND	
4QMB	Emergency Bottom Entry 1600A
GF	Ground Fault
MMS	Maintenance Mode Setting Switch
MX1	Shunt Trip
PM5K	Power Meter PM55XX
TU	24V Trip Unit Display Power

JOB NAME:	Algona Pumping Station	EQUIPMENT DESIGNATION:	QED-2 Switchboard
JOB LOCATION:	(02C)	EQUIPMENT TYPE:	SCHEDULE
DRAWN BY:		DRAWING TYPE:	
DATE:	February 18 2022		
DRAWING STATUS:	QUOTE		

FIG 2	OF 2	REV -
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DIVISION 16000 - ELECTRICAL SECTION 16100 - GENERAL ELECTRICAL

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## DIVISION 16000 - ELECTRICAL

### SECTION 16100 - GENERAL ELECTRICAL

#### 1. GENERAL PROVISIONS

- 1.1 The applicable provisions of the Division 1 General Conditions, Supplemental Conditions, Special Contract Requirements, Amendments and Additions to the General Conditions, and all project addenda are hereby made an integral part of this section.
- 1.2 These specifications apply to all electrical work performed.
- 1.3 When apparent conflict exists between these specifications and the contract drawings, within the specifications, or within the drawings, the engineer will determine the intent.
- 1.4 The term "provide" means "furnish and install". The terms "contractor", "E.C.", and "EC" mean "electrical contractor", unless otherwise noted. All work indicated in specifications division 16000 and on the electrical drawings is by the electrical contractor, unless otherwise noted.
- 1.5 The terms "unless otherwise noted" or "unless otherwise indicated" in any form of wording mean "unless specifically indicated otherwise on the electrical drawings, in the electrical specifications, or in the General Conditions and Requirements to the specifications and/or contract". These terms do not mean "unless indicated otherwise on the general construction, mechanical construction, or other disciplines' drawings or specifications", except where specifically so worded on the electrical drawings or electrical specifications.
- 1.6 Materials and equipment manufacturers and catalog numbers specified constitute the type and quality of design, material, workmanship, ruggedness of construction, resistance to vandalism, exact operating and performance characteristics, features, configuration, dimensions, etc. Where multiple manufacturers are shown in the drawings and/or specifications, not all manufacturers shown may be capable of providing materials and equipment meeting the specifications, field conditions, etc. Manufacturers not specifically shown on the drawings or specifications shall be considered, provided the products are equivalent or superior to the requirements of the drawings and specifications (including equivalent or superior to products and/or manufacturers specifically shown on drawings and specifications). Manufacturers, whether shown on the drawings or specifications or not, are acceptable only if they can meet the specifications, conditions, and requirements specific to this project. Provide materials and equipment as required (include all costs in bid). The terms "equivalent", "equal", "equaling", and "approved equal" mean "equivalent or superior to the item/process specified when approved by the engineer", unless otherwise noted.
- 1.7 For any equipment indicated on the drawings as furnished by the owner, contact the owner prior to submitting bid to obtain all requirements of such equipment as necessary to provide a complete installation. Provide all ancillary equipment as necessary which is not furnished by the owner but which is required for a complete installation of owner furnished equipment.

## 2. SCOPE OF WORK

- 2.1 The work governed by these specifications consists of providing all labor, materials, equipment, services, and related items/work necessary to complete all the electrical work as indicated and described in the drawings and specifications.
- 2.2 Electrical work includes but is not limited to:
  - A. Electric service and service equipment
  - B. Power distribution and wiring
  - C. Emergency power and lighting
  - D. Utilization equipment connections

## 3. CONTRACT DRAWINGS AND SPECIFICATIONS

- 3.1 Drawings are diagrammatic and indicate the general arrangement of the various systems and approximate and relative locations of the materials and equipment defined by the specifications. Coordinate with and obtain the approval of the owner, architect, and engineer for the exact locations of all materials and equipment. Check the drawings, specifications, and all fabrication and shop drawings (including fabrication and shop drawings of other trades) to verify space conditions, headroom requirements, characteristics, and for coordination. Where space conditions and headroom requirements appear inadequate, notify the engineer before submitting a bid. No extra consideration, claims, charges, or compensation will be granted under any circumstance for failure to notify the engineer, or for any alleged misunderstanding of the requirements above. Completely furnish, install, connect, and interconnect all components of all systems in accordance with contract requirements, manufacturer's instructions, applicable codes and standards, and best practices of the trade.
- 3.2 Minor deviations, variations, changes, and corrections from layouts shown on the drawings (based on coordination, conditions, manufacturer's instructions, codes and standards, shop drawings, and verification of measurements and conditions) are permitted to facilitate construction provided the changes do not represent potential changes in scope of work (see the section of these specifications "Changes to the Scope of Work") and provided the changes are acceptable to the owner, architect, and engineer.
- 3.3 Before submitting bid, examine and check all drawings and specifications relating to all work, including electrical, mechanical, plumbing, general construction, fire protection, and any other trades' drawings and specifications (as well as Division 1 General Conditions) and become fully informed as to the extent and character of work required and its relation to the work of other trades. No extra consideration, claims, charges, or compensation will be granted under any circumstance for any alleged misunderstanding of the work to be performed, or the force and intent of these specifications.

#### 4. VISIT TO SITE

- 4.1 Before estimating work, visit the project site and verify all measurements and field conditions affecting the work. The contractor is fully responsible for the correctness of all measurements and for any connections to existing work. Submission of bid is considered evidence that this contractor has visited and examined the site. No extra consideration, claims, charges, or compensation will be granted under any circumstance for extra work as a result of the contractor's failure to visit the site or verify conditions and measurements.

#### 5. VERIFICATION OF MEASUREMENTS AND CONDITIONS

- 5.1 The electrical contractor is solely responsible for verifying field measurements, conditions, and drawing and specifications information (for all trades) before ordering materials and equipment and before commencing work. The electrical contractor is solely responsible for verifying shop drawings (including shop drawings of other trades) before releasing related materials and equipment. No extra consideration, claims, charges, or compensation will be granted under any circumstance due to any differences between the actual dimensions and any dimensions indicated on the drawings.
- 5.2 Report any apparent discrepancies or conflicts found at once to the engineer for consideration and wait for a decision before proceeding with any work in the affected area.
- 5.3 The engineer's decisions in cases of discrepancies, conflicts, and related to verification of measurements and conditions are final and binding upon the contractor, make all installation accordingly.

#### 6. EXISTING CONDITIONS AND UTILITIES

- 6.1 Information and data indicated on the drawings regarding existing conditions (including underground utilities) is from the best available sources. However, no assurance is made as to completeness and/or accuracy.
- 6.2 Contact all utility companies operating in the project vicinity (water, gas, sewage, electric, telephone, cable television, etc.) and the owner's maintenance department (where applicable) and verify all existing underground systems before any excavation commences. Utilize applicable "one-call" or "before you dig" utilities marking services, including paying all associated fees.

#### 7. ITEMS NOT SHOWN OR SPECIFIED

- 7.1 Provide any items of material not indicated on the drawings and/or not specified, but which are required for the complete and proper installation and/or operation of any part of the work, as if indicated and specified.

- 7.2 Provide any work not indicated on the drawings and/or not specified, but which is required for compliance with applicable codes and regulations, as if indicated and specified.
- 7.3 No extra consideration, claims, charges, or compensation will be granted under any circumstance for performing work required for complete and proper installation/operation or required for compliance with applicable codes and regulations.

## 8. REGULATIONS AND CODES

- 8.1 Perform work in accordance with all respective requirements of the latest adopted editions (as of the date of electrical construction permit approval) of all applicable federal, state, and local codes, standards, regulations, ordinances, laws, etc. and industry standards. This includes applicable requirements of the National Electrical Code (NEC), National Fire Protection Association (NFPA), American National Standards Institute (ANSI), Americans with Disabilities Act (ADA) (as well as all related state disabled access and/or barrier free codes and standards and ANSI A117.1), International Building Code (IBC), International Energy Conservation Code (IECC), International Residential Code (IRC), Factory Mutual (FM), Illuminating Engineering Society of North America (IES, IESNA), Institute of Electrical and Electronic Engineers (IEEE), Insulated Power Cable Engineer's Association, National Electrical Contractors' Association (NECA) "Standard of Installation", National Electrical Manufacturer's Association (NEMA), National Electrical Safety Code (N.E.S.C.), Underwriter's Laboratories (UL), United States Department of Labor Occupational Safety and Health Administration (OSHA), utility companies requirements, etc..
- 8.2 Where listing or labeling (in any form, i.e., UL, CSA, ETL, etc.) is indicated in the drawings or specifications or is otherwise required by the NEC or other applicable code, provide equipment and materials as either listed or labeled by a qualified product evaluating organization (UL, CSA, ETL, or approved equal) acceptable to local authorities having jurisdiction. Include all costs in bid. No extra consideration, claims, charges, or compensation will be granted under any circumstance associated with providing listed equipment.
- A. The electrical contractor is fully responsible for verifying (before submitting bid) the applicability and extent of code required listing with local authorities. Specifically verify if the municipality has any requirements that "listable" (capable of being listed) products must be "listed". Provide accordingly where applicable.
  - B. Submission and/or approval of shop drawings (which may or may not show listing) do not relieve the contractor of the responsibility to meet listing requirements.
  - C. Where products required (by specifications/code) as listed are installed without listing or as non-listed (without prior written approval), the contractor shall remove the products and install listed products at no cost to the owner. Written approval will only be considered if all the following are satisfied:

- 1) The contractor is fully responsible for (including all costs) and must prepare and submit any and all information necessary for review and evaluation of products (by the authority having jurisdiction, engineer, architect, and owner). This includes all processing costs for all parties involved and costs for any special or independent third-party inspections, investigations, evaluations, engineering services (including sealing by a registered professional engineer), etc. which may be required or requested in conjunction with approval. In the absence of listing, the contractor is fully responsible for proving that products are acceptable.
- 2) The contractor must show one (1) or more of the following:
  - a) That listed products are not available.
  - b) That providing available listed products involves excessive costs or hardships.
  - c) That listing of products involves requirements that unreasonably exceed the requirements of the specifications, codes, and project conditions.
- 3) Products must meet or exceed all specified requirements, industry standards, code requirements, and conditions specific to the project.
- 4) There must be no change in contract price (except that the owner reserves the right to require credit pricing).
- 5) Where acceptable to the owner.

8.3 Where NEC article numbers are referenced in the drawings and specifications, they apply to the latest edition. Where the authority having jurisdiction has not adopted the latest edition, refer to the corresponding applicable code requirement article.

## 9. PERMITS, CERTIFICATES, AND FEES

- 9.1 Apply for, obtain, pick-up, and pay for (pay all costs associate with) all permits, licenses, certificates, etc., required for execution of the project. Procure all permits immediately upon notice to proceed with the contract. The contractor is fully responsible for verifying all permits, licenses, certificates, etc. which are required. Submit (see the section of these specifications "Summary of Submissions") copies of all permits, licenses, certificates, etc. in conjunction with this project for record. Prepare all information and data for submittal to any authority as required to obtain permits and certification of compliance for the permits.
- 9.2 Obtain and submit (see the section of these specifications "Summary of Submissions") six (6) copies of inspection certificate(s) from authorities having jurisdiction indicating approval of the electrical installation.
- 9.3 Applicable utility service charges will be paid directly by the owner.

## 10. GUARANTEE AND WARRANTIES

- 10.1 Completely replace or repair, to the satisfaction of the owner, any equipment (as part of this project) improperly installed or damaged before or after installation until expiration of the guarantee period. Completely replace or repair, to the satisfaction of the owner, any equipment (including existing equipment and equipment installed by any other contractor or party) damaged by the electrical contractor (or any subcontractor thereof).

## 11. SEQUENCE OF WORK

- 11.1 Perform work in areas or general sequences (including applicable project phasing) as determined and directed by the owner and architect. Submit (see the section of these specifications "Summary of Submissions") a complete schedule of construction for approval, showing delivery of equipment, erection of equipment, pertinent work related to installation, and when equipment will be placed in operation. Fully coordinate exact sequencing, phasing, and scheduling with all contractors, the architect, and the owner in detail and obtain approval of sequencing, phasing, and scheduling before starting work.
- 11.2 Perform all work in such a manner and associated with sequencing, phasing, and scheduling as required and include all costs and manpower allocations in bid. For example, to complete a particular sequence or phase of the work, it may be necessary to perform work in physical areas of the project areas which are covered by and/or part of prior phases or subsequent phases of work (i.e. work in initial phases of the project may involve installing the electrical service and electrical distribution equipment in areas which are proposed for renovation as part of a later phase; this would require installing the electrical service and electrical distribution equipment as part of the initial phase). Verify all such conditions, implications, requirements and include costs in bid. No extra consideration, claims, charges, or compensation will be granted under any circumstance for sequencing, phasing, and scheduling.
- 11.3 Maintain service at all times (except as provided elsewhere in the drawings and specifications for shutdowns) and minimize disruptions to all active areas, activities, and operations in and around the scope of work. This specifically includes activities and operations of the owner, third parties in the vicinity of the project, roads and highways surrounding the project, and utility companies serving the project. Coordinate specific requirements with the owner before submitting bids.
- 11.4 Maintain service of life safety systems (specifically emergency lighting and fire alarm) at all times.
  - A. As a minimum, maintain the following during construction (except brief periods, not exceeding one (1) working day, while making connections to or transitions between existing, proposed, and temporary systems [where applicable]):
    - 1) Maintain code compliant emergency lighting in all occupied areas of the building. Emergency lighting is not required in unoccupied areas and other areas closed to use by building occupants.

## 12. CHANGES TO THE SCOPE OF WORK

- 12.1 Changes to the scope of work include any change effecting the overall nature or cost of the project. Examples of changes to the scope of work include, but are not limited to, additions or deletions of equipment or items of work, substitutions not equivalent or superior to equipment specified, substitutions with characteristics or operation varying from equipment specified, changes which effect the ultimate use or functioning of equipment or areas of the building, changes considered to be "substantial", any change which any party (contractors, sub-contractors, owner, architect, engineers, etc.) believes may involve a possible change in contract price, etc..
- 12.2 Make all changes to the scope of work in complete accordance with the general conditions of the specifications. Submit (see the section of these specifications "Summary of Submissions") changes to the scope of work immediately upon proposal of changes. Do not proceed with any work associated with or affected by changes to the scope of work unless the owner approves changes in writing or authorizes proceeding in writing.
- 12.3 All applicable provisions of the contract drawings and specifications, including addenda and prior changes, apply to all changes to the scope of work, unless specifically indicated otherwise.
- 12.4 In addition to all requirements of the general conditions, submit all pricing related to changes to the scope of work as indicated below. Pricing will not be reviewed until the required breakdowns (summarized below) are submitted.
- 12.5 Submit pricing for a proposed change to the scope of work with detailed breakdown as follows.
  - A. Submit a complete detailed breakdown of all material associated with the proposed change in scope of work. Itemize each unit of material and the respective cost.
  - B. Submit a complete detailed breakdown of all labor associated with each respective item of the above material breakdown. Itemize labor hours and classification for each item of material. Summarize total labor costs, broken down by worker classification and/or billing rate.
- 12.6 Where instructed to proceed with a change to the scope of work on a time-and-material (T&M) basis, submit pricing with detailed breakdown as follows.
  - A. Submit a complete detailed breakdown of all material. Submit copies of all receipts, invoices, and stock material lists.
  - B. Submit a complete detailed breakdown of all actual labor hours. Submit copies of time sheets. Summarize total labor costs, broken down by worker classification and/or billing rate.



### 13. TEMPORARY POWER AND LIGHTING

- 13.1 For this specification section only, the term "responsible" (in any form) means "responsible to pay all costs (pay to the electrical contractor) to erect the described work". For this specification section only, the term "erect" (in any form) means "furnish, install, maintain, and remove".
- 13.2 The electrical contractor is responsible for temporary power and lighting service/source and distribution during construction. Provide service capacity as required for construction. Provide service including any required utility or private metering.
- 13.3 The electrical contractor is responsible for all temporary lighting, all 120 V power for small construction tools, and all other temporary power not exceeding 120 V or 20 A. Power for large tools and equipment exceeding 120 V or 20 A (including arc welders, etc.) is the responsibility of the contractor requesting such power. Temporary power during construction (exceeding 120 V or 20 A) to permanent equipment installed as part of this project (for installing, testing, operating, etc., including mechanical equipment, elevators, etc.) is the responsibility of the contractor requesting such power.
- 13.4 Where utility power is not available and during shutdowns of utility power, the contractor is responsible for providing portable generator(s), associated temporary wiring, and fuel (as required to meet power requirements during these conditions). Generator power to owner loads during construction is required.
- 13.5 The electrical contractor is responsible for temporary power to existing and/or other owner loads, equipment, and wiring as indicated on the drawings.
- 13.6 The electrical contractor shall erect all temporary power equipment and wiring as required for complete temporary power installation, regardless of the contractor who is responsible for the temporary power.
- 13.7 Erect all temporary power and lighting during construction in accordance with OSHA and the NEC. This includes required ground fault circuit interrupter (GFCI) protection for personnel and "assured grounding program".

### 14. TESTING

- 14.1 After completing installation of equipment and wiring and prior to energizing or placing in service, test all electrical equipment, conductors, systems, and each and every part thereof to ensure continuity, proper splicing, freedom from unwanted grounds, acceptable insulation values, proper operation and functioning, and a complete workmanlike installation to the satisfaction of the engineer and owner.
- 14.2 Completely test all equipment installed. This includes all equipment furnished and installed by the electrical contractor as well as equipment furnished by others and installed by the electrical contractor and equipment furnished and installed by others and wired by the electrical contractor.
  - A. Electrical tests of panels, switches, and circuit breakers rated 800 A and less and 600 V and less are not required, except that meg-ohm meter testing is required.

- B. Electrical tests of motors 75 kW (100 hp) and less are not required.
  - C. Electrical tests of individual motor starters are not required. This does not apply to motor control centers (where applicable), where complete testing is required.
  - D. Visual and mechanical checks are required for all equipment (including all panels, switches, circuit breakers, motors, motor starters, and all other equipment) without exception.
- 14.3 Where any abnormal, questionable, "failing", or "borderline" test results are encountered or where discrepancies are noted during testing, submit results immediately to the engineer before energizing equipment. Do not energize until authorized in writing by the engineer. Test results submitted under these circumstances are not required to be bound or complete.
- 14.4 Where connecting to or otherwise modifying existing wiring, test wiring as follows.
- A. Test existing wiring before performing work to confirm integrity (where testing is performed, the electrical contractor is not responsible for the prior existing condition of wiring).
  - B. Test new wiring before connecting to existing wiring.
  - C. Test connections of new to existing wiring (test new wiring and existing wiring together) and modified existing wiring after performing work.

Where this testing is not performed, the condition of existing wiring will be assumed to be a direct and sole result of work performed and the electrical contractor will be held fully responsible for the condition of existing wiring. Where this testing is not performed and where existing wiring is not in acceptable condition for maintained use or service, the electrical contractor shall repair or replace wiring to the satisfaction of the owner at no cost to the owner.

## 15. SUBSTITUTIONS

- 15.1 Materials and equipment manufacturers and catalog numbers specified constitute the type and quality of design, material, workmanship, ruggedness of construction, resistance to vandalism, exact operating and performance characteristics, features, configuration, dimensions, etc. The engineer will consider substitutions of similar equipment superior to specified equipment (meeting or exceeding all characteristics of the specified equipment).
- 15.2 Submit shop drawings associated with substitutions complete with documentation necessary to establish compliance with the specifications (see the sections of these specifications "Shop Drawings" and "Summary of Submissions"). Submit samples of substitutions where requested (see the sections of these specifications "Samples" and "Summary of Submissions"). If documentation and/or samples are not submitted when required, the request for substitution will be denied.

- 15.3 Determination of compliance with specifications rests with the engineer. When a request for substitution is denied, furnish the equipment specified. The engineer's decisions in cases of substitutions are final and binding upon the contractor, provide equipment accordingly.
- 15.4 Pay all costs associated with a substitution where granted. For the provisions of this section, "substitutions" includes equipment where characteristics or operation vary significantly from equipment specified (including equipment of the specified manufacturer). This includes costs incurred by any party (electrical contractor, other contractors, sub-contractors, owner, architect, engineers, etc.), costs resulting from differences of details, configuration, ratings, operation, characteristics, and dimensions between the specified and substituted equipment, costs to provide features of the specified equipment which may be manufacturer's options of the substituted equipment, and costs to remove and replace work already installed and any other remedial work as a result of substitutions. Approval of substitutions is conditional that there is no cost change to the contract, unless specifically indicated on the shop drawings submittal and corresponding approval. The electrical contractor is fully responsible for coordinating with the owner, architect, and other trades to identify all possible cost impacts associated with any substitution before releasing equipment and before any party proceeds with work effected by the substitution.
- 15.5 Submit bid based on the items as specified. Substitutions will be considered only after a contract has been awarded.

## 16. AS-BUILT DRAWINGS, MANUALS, AND DEMONSTRATION

- 16.1 Prepare and submit (see the section of these specifications "Summary of Submissions") as-built record drawings showing conditions exactly as installed.
- A. Indicate the exact locations and elevations of all equipment and devices and underground, concealed, and hidden work (including raceways, junction and pull boxes, etc.).
  - B. Indicate exact layout, connections, and conductor routing for all grounding.
- 16.2 During the progress of work, maintain an accurate record of all deviations, variations, changes, and corrections from the layouts shown on the drawings. Maintain this information on a "record working" set of drawings and specifications kept at the job site.
- 16.3 Upon completion of work, incorporate all information from the "record working" drawings onto a "marked-up as-built" set of drawings. Submit the "marked-up as-built" drawings to the engineer for review, comment, and approval.
- 16.4 Explain and demonstrate the complete electrical system and all work installed by the electrical contractor to the owner's operating and maintenance personnel. Demonstration is to instruct owner's personnel in the operation and maintenance of systems as well as to prove to the owner correct and adequate operation of all parts of the electrical system. Provide a demonstration period of one (1) full working day for the general electrical installation (including, but not limited to, contactors, time clocks, customer metering

equipment, lighting controllers, dimming cabinets, motor controls [where furnished by the electrical contractor], transformer fan controls, generators, transfer switches, key interlocking schemes, and similar equipment, where applicable). Wherever demonstrations are indicated elsewhere in the specifications for equipment furnished by the electrical contractor (i.e., for fire alarm, dimming, sports lighting, stage lighting, UPS units, MCC's, VFD's, metal clad switchgear, power management, sound/paging, security, CCTV, and similar systems, where applicable), provide the specified additional demonstrations during additional periods of time (above and beyond the period above for the general electrical demonstration). Conduct all demonstrations at the project site and after all systems are fully operational.

## 17. SUMMARY OF SUBMISSIONS

- 17.1 Submit items as indicated elsewhere in the specifications (applicable sections are shown for convenience) and as summarized as follows. Information below indicates relative schedule of submission.
- 17.2 Submit within ten (10) days of receiving notice to proceed; resubmit within seven (7) days of notification:
  - A. Permits, licenses, certificates (see 16100-9)
  - B. Schedule of work (see 16100-10)
  - C. Shop drawings (see 16100-17)
- 17.3 Submit during the project as applicable (refer to respective specifications sections for conditions and schedule of submission):
  - A. Utility service charge estimates (see 16100-9)
  - B. Scope of work changes, w/ breakdowns (see 16100-11)
  - C. Test results, abnormal/failing only (16100-15)
  - D. Short circuit and coordination report (where specified for adjustable circuit breakers)
- 17.4 Submit upon substantial completion of the project:
  - A. Approved inspection certificate(s) (see 16100-9)
  - B. Written manufacturers' warranties (see 16100-14)
  - C. Test results (see 16100-15)
  - D. As-built drawings (see 16100-19)
  - E. O&M manuals (see 16100-19)
  - F. Spare parts (where specified elsewhere)

## 18. SAFETY

- 18.1 Perform all work and work practices in strict accordance with all applicable local, state, and federal codes, standards, regulations, and requirements including OSHA (including the proper use and maintenance of personal protective equipment (PPE) and clothing), state labor and industry, the NEC, ASTM, the National Electrical Safety Code, NFPA, etc.

- 18.2 The term "live" means "energized or capable of being energized at any time for any reason, either intentionally or accidentally".
- 18.3 Suitably protect all live equipment against accidental contact at all times. Install and maintain covers on all live equipment. Where covers are not installed, provide suitable insulating barriers at all live parts. Suitable barriers include arc-resistant NEMA GPO- 2 or GPO-3 and UL 94 V-0 electrical grade fiberglass reinforced epoxy compound sheets, rubber insulating blankets, suitable thermoplastic insulating materials, etc. as per OSHA, ASTM, and the NEC. Cardboard and similar materials are not acceptable. Provide listed OSHA approved signs reading "Danger: High Voltage" at locations of live parts and on doors/gates leading to rooms/fences/areas containing the equipment and keep doors/gates locked at all times.
- 18.4 Protect and enclose equipment operating at over 600 V at all times. Equipment is considered adequately protected where all requirements of NEC Articles 110.26 through 110.34 (including all other articles and codes referenced therein) are satisfied at all times. Where equipment must be exposed for work, or where work is to be performed around normally exposed live parts, provide suitable insulating barriers (suitable for the voltage involved), listed warning signs, and door/gate locking, etc. as required above. Provide listed OSHA approved warning tape (reading "Danger: High Voltage") around the equipment and all code required working spaces at equipment.
- 18.5 When working on equipment or wiring, properly identify and use lockout devices and tags (in accordance with OSHA requirements) to prevent unauthorized or accidental energizing of equipment and wiring.
- 18.6 Perform all work in or associated with confined spaces (including manholes, hand holes, vaults, crawl spaces, etc.) in accordance with all safety codes referenced above. Obtain appropriate permits where required by the above codes and/or the owner.
- 18.7 Perform all excavation and work in and associated with excavation in accordance with all safety codes referenced above (include all required sloping, benching, shoring, bracing, supporting, shields, protective systems [fall protection, protection of personnel in excavation, protection of structures, etc.], ramps, access/egress, warning systems, rescue equipment, etc.). Provide suitable barricades and safety procedures to restrict pedestrian and vehicular access to areas where work is being performed (including open excavations, lay-down areas, clearance space around operating excavation equipment, etc.). Do not leave excavations open when not actually performing associated work (including at night, during weekends, or when working away from excavations). Leaving excavations open for short periods of time will be considered only when approved in writing by the owner and only where suitably protected. Any request for owner's approval must include a written plan on proposed protection and safety procedures. No extra consideration, claims, charges, or compensation will be granted under any circumstance for any multiple excavations and backfilling needed to satisfy safety requirements.
- 18.8 When working in, on, or near areas subject to vehicular traffic (including public and private roadways, driveways, parking lots, etc. and including loading and unloading equipment/materials in the vicinity of traffic), perform all work and provide appropriate work zone traffic control in accordance with all safety codes referenced above as well as

state department of transportation regulations, requirements, and recommendations. Where requested by the owner, architect, or engineer, submit a traffic control plan detailing proposed work zone traffic control and associated safety procedures.

## 19. HAZARDOUS MATERIALS

- 19.1 The electrical contractor is not responsible for and is not required to remove equipment contaminated by hazardous materials, except as indicated below. For this specification section, the term "hazardous material(s)" applies to any materials classified by federal, state, or local authorities having jurisdiction as environmental or health hazards (including, but not limited to, polychlorinated biphenyls (PCB's), asbestos, mercury, radioactive materials, lead, etc.). For this specification section, the term "contaminated" (in any form) means "contains or is contaminated by hazardous material(s)."
- 19.2 The electrical contractor (and all applicable subcontractors) shall be fully insured for performing all work related to, on, and around contaminated equipment and for all work specifically shown in this specifications section as by the electrical contractor. Submit proof of insurance to the owner as part of or along with other applicable insurance submittals (as per Division 1 General Conditions, Supplemental Conditions, and Special Contract Requirements).
- 19.3 Immediately notify the owner if any electrical equipment or wiring to be removed or modified as part of this project is contaminated or suspected as contaminated. Identify all areas where disruptive work is proposed (including, but not limited to, excavation, cutting, penetration, drilling, etc.) in advance of performing work so the owner can arrange to have any necessary abatement completed, include all costs and schedule time accordingly. No extra consideration, claims, charges, or compensation will be granted under any circumstance under any circumstance for any delays resulting from abatement of hazardous materials.
- 19.4 When performing work with, on, and around equipment contaminated or suspected as contaminated, assume that the equipment is contaminated until/unless proven otherwise by testing. Exercise care and suitably guard and protect equipment at all times from the start of work until the equipment is either proven by testing as not contaminated or is removed from the project site.

END OF SECTION