



Installation of New Generator at Master Lift Station #4

Invitation for Bids # PSUT-20-11

General Information		
Project Cost Estimate	\$260,000	See Section 1.4
Project Timeline	220 calendar days from NTP	See Section 1.4
Evaluation of Proposals	Staff	See Section 1.7
Mandatory	9:00 a.m. on October 19, 2020 at 11300 SW 9 th Street, Pembroke Pines, FL 33025	See Section 1.8
Question Due Date	October 26, 2020	See Section 1.8
Proposals will be accepted until	2:00 p.m. on November 10, 2020	See Section 1.8
5% Proposal Security / Bid Bond	Required in the event that the proposal exceeds \$200,000	See Section 4.1
100% Payment and Performance Bonds	Required in the event that the proposal exceeds \$200,000	See Section 4.2

THE CITY OF PEMBROKE PINES
PURCHASING DIVISION
8300 SOUTH PALM DRIVE
PEMBROKE PINES, FLORIDA 33025
(954) 518-9020



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- Attachment A: Contact Information Form
- Attachment B: Non-Collusive Affidavit
- Attachment C: Proposer’s Qualifications Statement
- Attachment D: Sample Insurance Certificate
- Attachment E: Specimen Contract - **Construction Agreement**
- Attachment F: References Form
- Attachment G: Standard Release of Lien Form
- Attachment H: Contract Documents

**SECTION 1 - INSTRUCTIONS****1.1 NOTICE**

Notice is hereby given that the City Commission of the City of Pembroke Pines is seeking sealed proposals for:

**IFB # PSUT-20-11
Installation of New Generator at Master Lift Station #4**

Solicitations may be obtained from the City of Pembroke Pines website at <http://www.ppines.com/index.aspx?NID=667> and on the www.BidSync.com website.

If you have any problems downloading the solicitation, please contact the BidSync Support line at 1-800-990-9339.

If additional information help is needed with downloading the solicitation package please contact the Purchasing Office at (954) 518-9020 or by email at purchasing@ppines.com. The Purchasing Office hours are between 7:00 a.m. - 6:00 p.m. on Monday through Thursday and is located at 8300 South Palm Drive, Pembroke Pines, Florida 33025.

The City requires all questions relating to the solicitation be entered through the "Ask a Question" option tab available on the BidSync website. Responses to the questions will be provided online at www.bidsync.com. Such request must be received by the "Question Due Date" stated in the solicitation. The issuance of a response via BidSync is considered an Addendum and shall be the only official method whereby such an interpretation or clarification will be made.

Proposals will be accepted until 2:00 p.m., Tuesday, November 10, 2020. Proposals must be **submitted electronically at www.BidSync.com**. The sealed electronic proposals will be publicly opened at 2:30 p.m. by the City Clerk's Office, in the City Hall Administration Building, 4th Floor Conference Room located at 601 City Center Way, Pembroke Pines, Florida, 33025.

1.1.1 VIRTUAL BID OPENING

At the time of writing of this notice, Florida Governor Ron DeSantis' Executive Order No. 20-69 (extended by EO 20-150 and EO 20-179) on the Coronavirus health alert, is due to expire on **October 1, 2020**. If the executive order is not extended then meetings may be a combination of in-person and virtual, all as provided by law, or as otherwise entered via an executive order of the governor. **In any event, the public is encouraged to attend the bid opening process virtually in lieu of attending the meeting in person.**

In addition, at the time of writing this notice, the City will not be opening up the physical location for public access as **City offices are closed to the public**, due to the COVID-19 Coronavirus Pandemic.



Bid openings for this project will be live-streamed from the City Clerk's Office, in the City Hall Administration Building, 4th Floor Conference Room located at 601 City Center Way, Pembroke Pines, Florida, 33025 at **2:30 PM on the bid due date**.

While recognizing the importance of public accessibility to the bid openings, and considering public health concerns, in the abundance of caution, the City is requesting that interested parties utilize live streaming as a safe way for vendors and the public to view the bid opening process in lieu of attending the meeting in person.

The public is invited to attend the meeting virtually via the Cisco Webex Meetings platform.

- Cisco Webex Meeting Number: 717 019 586
- Join by Phone Number: +1-408-418-9388

The public may download the **Cisco Webex Meetings app** from <https://www.webex.com/downloads.html/>, to view and listen to the meeting, however please make sure to mute your phone/microphone/device's audio and camera as the **public may attend the meeting but will not be allowed to comment or participate in the proceedings.**

If any member of the public requires additional information about this meeting or has any questions about how to access the meeting, please contact:

Danny Benedict, Procurement Department
City of Pembroke Pines
8300 South Palm Drive,
Pembroke Pines, FL 33025
954-518-9022
purchasing@ppines.com

1.2 PURPOSE

The City of Pembroke Pines is seeking proposals from qualified firms, hereinafter referred to as the Contractor, to install a new 230KW standby diesel fuel generator and 1000 gallon fuel tank at Master Lift Station #4 located around 11300 SW 9th Street, Pembroke Pines, FL 33025, in accordance with the terms, conditions, and specifications contained in this solicitation.

1.3 SCOPE OF WORK

The following is a general list of the work included. It is not limited to be complete. Consult the contract drawings and specifications for all contract requirements.

- Furnish new 230KW, 288kVA, 60Hz, Standby Diesel/Gas Fuel Generator.



- Furnish new 1000 Gallon Double Wall Round Fuel Tank with overfill protection device, backflow preventer, visual leak detector and anti-syphon valve.
- Contractor to furnish new conduits for power and control wiring. Refer to Attachment H – Contract Documents.
- Construction of new concrete pads for both new Standby Diesel Fuel Generator and new 1000 Gallon Round Fuel Tank. Refer to Attachment H- Contract Documents.
- Installation of a new 230KW Standby Diesel/Gas Fuel Generator that will provide standby power to three (3) existing 50HP Lift Station Pumps. Refer to Attachment H– Contract Documents.
- Installation of a new 1000 Gallon Round Fuel Tank and piping adjacent to the new 230KW Standby Diesel/Gas Fuel Generator. Refer to Attachment H– Contract Documents.

All to be in compliance with FDEP requirements.

1.4 PROJECT COST ESTIMATE & TIMELINE

Staff estimates this project to cost approximately \$260,000, which does not include permit costs.

Please note the City will include a Permit Allowance for this project, **therefore proposers should not include permit costs in their total proposal price.**

The work shall be completed within 220 days from issuance of CITY’s Notice to Proceed.

1.4.1 PERMITS

The City anticipates this project to require the following permits:

Permit	Agency	Cost (or related method of calculation)
Building	City of Pembroke Pines Building Department (Calvin, Giordano & Associates, Inc.)	1. Construction costs up to \$2,500 (Per structure per trade) = \$97.17 2. Construction costs greater than \$2,500 up to \$1,000,000 = 2.96%

1.4.2 PERMIT ALLOWANCE

The City shall include a “Permit Allowance” for this project. The Contractor shall obtain all required permits to complete the work, however the City shall utilize the Permit Allowance to reimburse the contractor for the related permit, license, impact or inspection fees. Payments will be made to the contractor based on the actual cost of permits upon submission of paid permit receipts. The City shall not pay for other costs related to obtaining or securing permits.



The City shall determine the amount of the allowance at time of award. The allowance may be based on a specified percent of the proposed project amount and shall be established for the specific project being performed under the contract. This dollar amount shall be shown on the specific project purchase order as a distinct item from the vendor's overall offer to determine the total potential dollar value of the contract. Any Permit Allowance funds that have not been utilized at the end of the project will remain with the City, if the City Permit fees exceed the allowance indicated, the City will reimburse the contractor the actual amount of City Permit Fees required for project completion.

1.5 PROPOSAL REQUIREMENTS

The www.bidsync.com website allows for vendors to complete, scan and upload their documents as part of the bidder's submittal on the website. Prospective proposers interested in responding to this solicitation are requested to provide all of the information listed in this section. Submittals that do not respond completely to all of requirements specified herein may be considered non-responsive and eliminated from the process. Brevity and clarity are encouraged.

1.5.1 Attachment A: Contact Information Form

- a. Attached is contact information form (Attachment A) where the vendor will enter their contact information and complete the proposal checklist. The Contact information form shall be electronically signed by the contact person authorized to represent the contractor. This form must be completed and submitted through www.bidsync.com as part of the bidder's submittal.
- b. The vendor must provide their pricing through the designated lines items listed on the BidSync website.
- c. Please note vendors should be registered on BidSync under the name of the organization that they are operating as and it should match the organization name on the documents that they are submitting and utilizing when responding to the solicitation.
- d. The contact information form should contain an electronic signature of the authorized representative of the Proposer along with the address and telephone number for communications regarding the Proposal.
- e. Proposals by corporations should be executed in the corporate name by the President or other corporate officer accompanied by evidence of authority to sign. The corporate address and state of incorporation must also be shown.
- f. Proposals by partnerships should be executed in the partnership name and signed by a partner whose title and the official address of the partnership must be shown.

**1.5.2 Attachment B: Non-Collusive Affidavit****1.5.3 Attachment C: Proposer's Qualifications Statement****1.5.4 Attachment F: References Form**

- a. Complete **Attachment F: References Form**, preferably where the team was the same. References should be from the last five years and should be capable of explaining and confirming your firm's capacity to successfully complete the scope of work outlined herein. As part of the proposal evaluation process, the City may conduct an investigation of references, including a record check or consumer affairs complaints. Proposers' submission of a proposal constitutes acknowledgment of the process and consent to investigate. The City is the sole judge in determining Proposers qualifications.

1.5.5 Proposal Security (Bid Bond Form or Cashier's Check)

- a. Each Proposal should be accompanied by a certified or cashier's check or by a Bid Bond made payable to the City of Pembroke Pines on an approved form, duly executed by the Proposer as principal and having as surety thereon a surety company acceptable to CITY and authorized to write such Bond under the laws of the State of Florida, in an amount not less than five percent (5%) of the amount of the base Proposal price.
- b. Contingency is not to be counted in the total amount the proposal security is based on.
- c. Proposers must submit a scanned copy of their bid security (bid bond form or cashier's check) with their bid submittal through BidSync.
- d. Proposers should also submit their original bid security (bid bond form or cashier's check) at time of the bid due date, or they may be deemed as non-responsive.
 - e. The original Bid Bond or Cashier's Check should be in a sealed envelope, plainly marked "**BID SECURITY - IFB # PSUT-20-11 Installation of New Generator at Master Lift Station #4**" and sent to the City of Pembroke Pines, City Clerk's Office, 4th Floor, 601 City Center Way, Pembroke Pines, Florida, 33025.
- f. Please see SECTION 4 - SPECIAL TERMS & CONDITIONS of this RFP for additional information.



1.6 VENDOR REGISTRATION AND QUALIFICATION DOCUMENTS

The City has implemented a new process that is intended to make the bidding process easier for vendors that bid on multiple City projects. This process will require vendors to complete and submit the following standard forms and documents at any time prior to bidding on a project. In addition, the vendors will be able to utilize these same forms without the need to re-fill and re-submit the forms each time they bid on a City project.

Furthermore, please make sure to update this information on an as-needed basis so that all pertinent information is accurate, such as local business tax receipts, and any other relevant information.

These forms will be found under the “Vendor Registration” group of “Qualifications” on the BidSync website for the City of Pembroke Pines. Please note that the BidSync website requires bidders to complete all of these qualifications prior to being able to submit questions on any bids, therefore, please make sure to complete this information as soon as possible.

The following documents can be completed prior to the bidding process through the BidSync website and do not need to be attached to your submittal as the BidSync website will automatically include it.

1.6.1 Vendor Information Form

1.6.2 Form W-9 (Rev. October 2018)

- a. Previously dated versions of this form will delay the processing of any payments to the selected vendor.

1.6.3 Sworn Statement on Public Entity Crimes Form

1.6.4 Local Vendor Preference Certification

- a. If claiming Local Pembroke Pines Vendor Preference, business must attach a current business tax receipt from the City of Pembroke Pines
- b. If claiming Local Broward County Vendor Preference, business must attach a current business tax receipt from Broward County or the city within Broward County where the business resides.
- c. The Local Vendor Preference Certification form must be completed by/for the proposer; the proposer **WILL NOT** qualify for Local Vendor Preference based on their sub-contractors’ qualifications.

1.6.5 Local Business Tax Receipts



1.6.6 Veteran Owned Small Business Preference Certification

- a. If claiming Veteran Owned Small Business Preference Certification, business must attach the “Determination Letter” from the United States Department of Veteran Affairs Center for Verification and Evaluation notifying the business that they have been approved as a Veteran Owned Small Business (VOSB).
- b. The Veteran Owned Small Business Preference Certification form must be completed by/for the proposer; the proposer **WILL NOT** qualify for Veteran Owned Small Business Preference based on their sub-contractors’ qualifications.

1.6.7 Equal Benefits Certification Form

1.6.8 Vendor Drug-Free Workplace Certification Form

1.6.9 Scrutinized Company Certification

1.7 EVALUATION OF PROPOSALS & PROCESS OF SELECTION

- A. Staff will evaluate all responsive proposals received from proposers who meet or exceed the bid requirements contained in the solicitation. Evaluations shall be based upon the information contained in the proposals as submitted.
- B. Staff will make a recommendation to the City Commission for award of contract.

1.8 TENTATIVE SCHEDULE OF EVENTS

Event	Time &/or Date
Issuance of Solicitation (Posting Date)	October 13, 2020
Mandatory Pre-Bid Meeting	9:00 a.m. on October 19, 2020
Question Due Date	October 26, 2020
Anticipated Date of Issuance for the Addenda with Questions and Answers	October 29, 2020
Proposals will be accepted until	2:00 p.m. on November 10, 2020
Proposals will be opened at	2:30 p.m. on November 10 , 2020
Evaluation of Proposals by Staff	TBD
Recommendation of Contractor to City Commission award	TBD
Issuance of Notice to Proceed	TBD
Project Commencement	Not later than 10 days after NTP
Project Completion	220 days after NTP



1.8.1 MANDATORY PRE-BID MEETING / SITE VISIT

There will be a mandatory scheduled pre-bid meeting on **October 19, 2020 at 9:00 a.m.** Meeting location will be at the 11300 SW 9th Street, Pembroke Pines, FL 33025.

All vendors will be required to sign in at the meeting to show proof of attendance to the mandatory meeting. It is the vendor's responsibility to make sure that they sign in at the meeting.

1.9 SUBMISSION REQUIREMENTS

Bids/proposals **must be submitted electronically** at www.bidsync.com on or before **2:00 p.m. on November 10, 2020.**

Please note vendors should be registered on BidSync under the name of the organization that they are operating as and it should match the organization name on the documents that they are submitting and utilizing when responding to the solicitation.

The vendor must provide their pricing through the designated lines items listed on the BidSync website. In addition, the vendor must complete any webforms on the BidSync website and provide any additional information requested throughout this solicitation. Any additional information requested in the solicitation should be scanned and uploaded. **Unless otherwise specified, the City requests for vendors to upload their documents as one (1) PDF document in the order that is outline in the bid package.**

The City recommends for proposers to submit their proposals as soon as they are ready to do so. Please allow ample time to submit your proposals on the BidSync website. Proposals may be modified or withdrawn prior to the deadline for submitting Proposals. BidSync Support is happy to help you with submitting your proposal and to ensure that you are submitting your proposals correctly, but we ask that you contact their support line at 1-800-990-9339 with ample time before the bid closing date and time.

PLEASE DO NOT SUBMIT ANY PROPOSALS VIA MAIL, E-MAIL OR FAX.

However, please note that any required Bid Bond or Cashier's Check should be in a sealed envelope, plainly marked "**BID SECURITY - IFB # PSUT-20-11 Installation of New Generator at Master Lift Station #4**" and sent to the City of Pembroke Pines, City Clerk's Office, 4th Floor, 601 City Center Way, Pembroke Pines, Florida, 33025.



CONTACT INFORMATION FORM

IN ACCORDANCE WITH “PSUT-20-11” titled “Installation of New Generator at Master Lift Station #4” attached hereto as a part hereof, the undersigned submits the following:

A) Contact Information

The Contact information form shall be electronically signed by one duly authorized to do so, and in case signed by a deputy or subordinate, the principal's properly written authority to such deputy or subordinate must accompany the proposal. This form must be completed and submitted through www.bidsync.com as part of the bidder's submittal. The vendor must provide their pricing through the designated lines items listed on the BidSync website.

COMPANY INFORMATION:

COMPANY: _____

STREET ADDRESS: _____

CITY, STATE & ZIP CODE: _____

PRIMARY CONTACT FOR THE PROJECT:

NAME: _____ TITLE: _____

E-MAIL: _____

TELEPHONE: _____ FAX: _____

AUTHORIZED APPROVER:

NAME: _____ TITLE: _____

E-MAIL: _____

TELEPHONE: _____ FAX: _____

SIGNATURE: _____

B) Proposal Checklist

Are all materials, freight, labor and warranties included?	Yes_____
--	----------

Did you make sure to submit the following items, as stated in section 1.5 “Proposal Requirements” of the bid package?



Attachment A - Contact Information Form	Yes_____
Attachment B - Non-Collusive Affidavit	Yes_____
Attachment C - Proposer's Completed Qualification Statement	Yes_____
Attachment F - References Form	Yes_____
Attachment G – Standard Release of Lien Form	Yes_____
Attachment H – Mandatory Pre-Bid Meeting Form	Yes_____
Does your proposal exceed \$200,000 for this construction project? If so, please include a Proposal Security (Bid Bond or Cashier's Check) along with a separate line item to provide a Payment and Performance Bond. (See Bid Package for details)	Yes_____

Did you make sure to update the following documents found under the “Vendor Registration” group of “Qualifications” on the BidSync website for the City of Pembroke Pines?

Vendor Information Form	Yes_____
Form W-9 (Rev. October 2018)	Yes_____
Sworn Statement on Public Entity Crimes Form	Yes_____
Local Vendor Preference Certification	Yes_____
Local Business Tax Receipts	Yes_____
Veteran Owned Small Business Preference Certification	Yes_____
Equal Benefits Certification Form	Yes_____
Vendor Drug-Free Workplace Certification Form	Yes_____
Scrutinized Company Certification	Yes_____

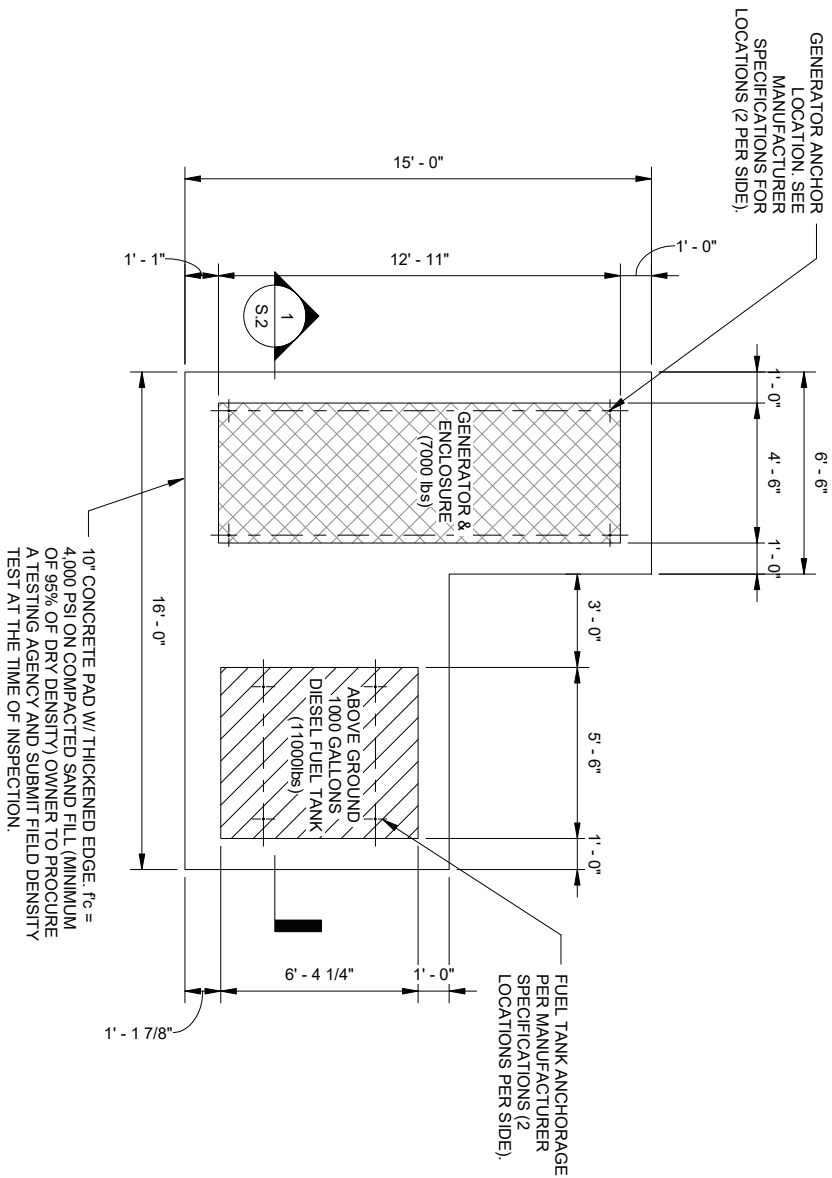
C) Sample Proposal Form

The following sample price proposal is for information only. The vendor must provide their pricing through the designated lines items listed on the BidSync website.

**Base Option: Installation of New Generator at Master Lift Station #4**

Item #	Item Description	Total Cost
1)	New 230KW, 288kVA, 60Hz, Standby Diesel/Gas Fuel Generator	Price to be Submitted Via BidSync
2)	New 1000 Gallon Double Wall Round Fuel Tank with overfill protection device, backflow preventer, visual leak detector and anti-syphon valve	Price to be Submitted Via BidSync
3)	Furnish new conduits for power and control wiring	Price to be Submitted Via BidSync
4)	Construction of new concrete pads for both new Standby Diesel Fuel Generator and new 1000 Gallon Round Fuel Tank	Price to be Submitted Via BidSync
5)	Installation of a new 230KW Standby Diesel/Gas Fuel Generator	Price to be Submitted Via BidSync
6)	Installation of a new 1000 Gallon Round Fuel Tank and piping adjacent to the new 230KW Standby Diesel/Gas Fuel Generator	Price to be Submitted Via BidSync
7)	Additional Cost to provide a Payment & Performance Bond in the form of a Percent of the total contract amount.	Price to be Submitted Via BidSync

Attachment H-Contract Documents
Appendix 1 - Generator Pad Plan



1 GENERATOR PAD PLAN VIEW
1/4" = 1'-0"



1433 COMMERCE WAY
MIAMI LAKES, FLORIDA 33016
PH: 786-646-2344
PE #74028 CA #30862
WWW.GARCIAWILLIAMS.COM

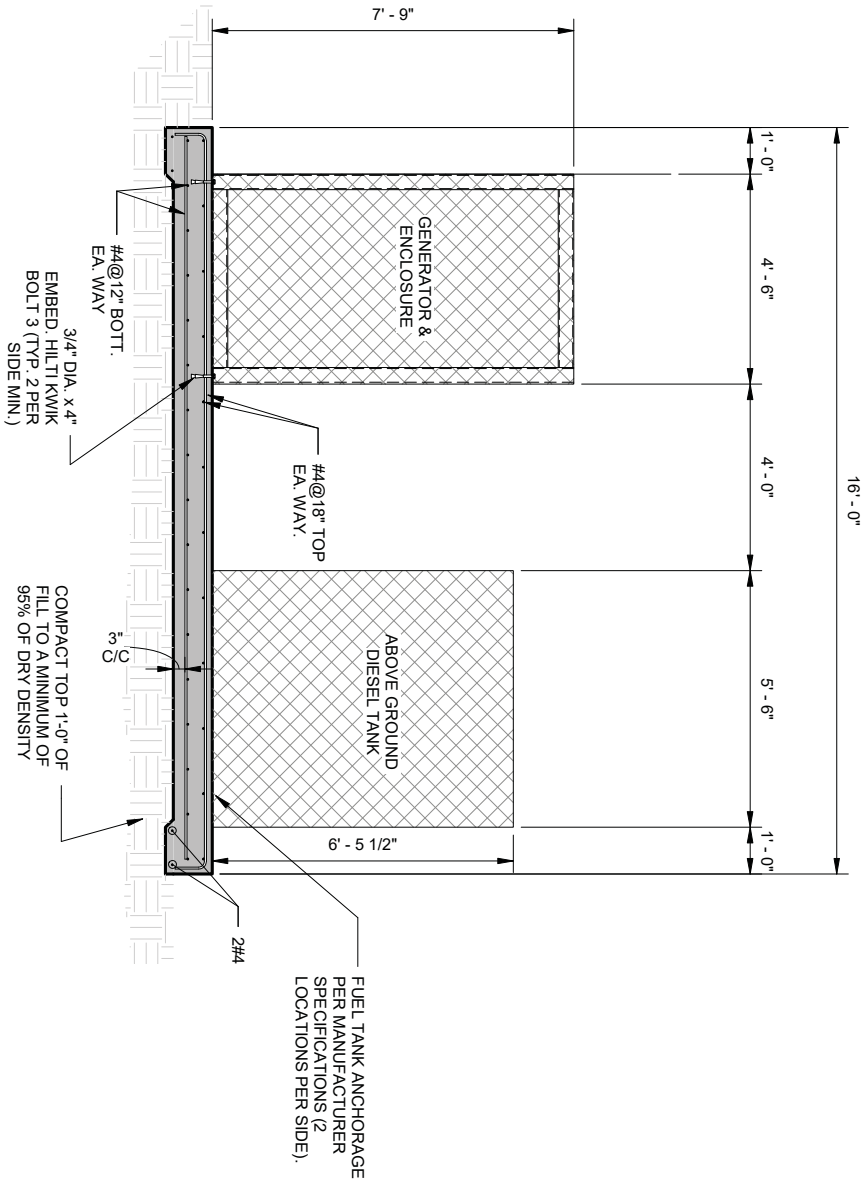
PEMBROKE PINES LIFT STATION #4 GENERATOR PAD

902 SW 113TH WAY, PEMBROKE PINES, FL 33025

No.	Description	Date

GENERATOR PLAN

Project number	20063	S.1
Date	06/30/20	
Drawn by	EG	
Checked by	EG	Scale 1/4" = 1'-0"



1 GENERATOR SECTION
3/8" = 1'-0"

GMC
STRUCTURAL ENGINEERS
14333 COMMERCE WAY
MIAMI LAKES, FLORIDA 33016
PH: 786-646-2344
PE #74028 CA #30882
WWW.GARCIAMULLIN.COM

PEMBROKE PINES LIFT STATION #4 GENERATOR PAD
902 SW 113TH WAY, PEMBROKE PINES, FL 33025

No.	Description	Date

GENERATOR SECTION		
Project number	20063	S.2
Date	06/30/20	
Drawn by	EG	
Checked by	EG	Scale 3/8" = 1'-0"

PERMIT CALCULATIONS

03/10/2017

City of Pembroke Pines Lift Station #4 New Generator

902 SW 113th Way

Pembroke Pines, FL 33025.

GMG PROJ. #:

20063

GMG
STRUCTURAL ENGINEERS

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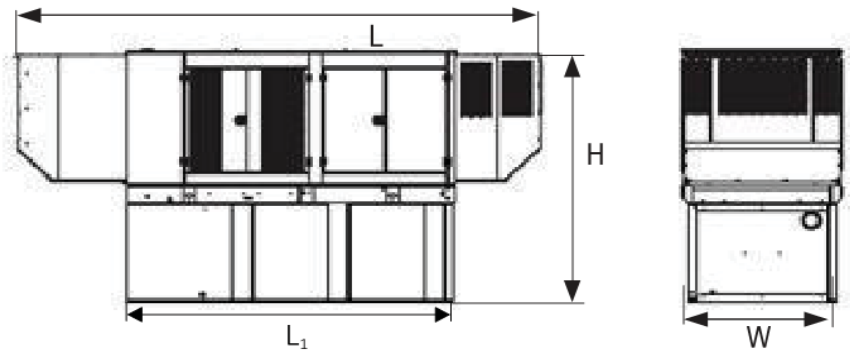
1. CALCULATIONS	
1.01 OVERTUNING & UPLIFT ANALYSIS	01
1.02 HILTI ANCHOR CALCULATIONS	03
1.03 CONCRETE PAD DESIGN	11

JORGE GARCIA
FLORIDA P.E. #74028

GENERATOR PAD WIND LOAD CALCULATIONS

Generator Dimensions and Weight:

	(in)
L:	155
L1:	155
H:	93
W:	54
	(lbs)
Tank Weight (Empty):	0
Enclosure Weight & Generator:	5947
Total Weight:	5947



Wind Loads:

Exposure Category: C

$$F = q_z * G * C_f * A_f \quad (29.5-1, "DESIGN WIND LOADS OTHER STRUCTURES" ASCE 7)$$

$$A_f = L \times H = 100.1 \text{ sq. ft}$$

$$G = 0.85$$

$$q_z = .00256 * K_z * K_{zt} * K_d * V^2 \quad (29.3-1, "DESIGN WIND LOADS OTHER STRUCTURES" ASCE 7)$$

$K_z =$	0.85	(Table 29.3-1)
$K_d =$	0.90	(Table 26.6-1)
$K_{zt} =$	1	(Section 26.8.2)
$V =$	175 mph	

$$q_z = 60.0 \text{ psf}$$

$C_f = 1.3 \text{ for } h/D = 1$	$H/W =$	1.7
$C_f = 1.4 \text{ for } h/D = 7$		

Using Linear Interpolation:	$C_f =$	1.31
-----------------------------	---------	------

$$F = 6.70 \text{ kips}$$

Overturning Moment:

$M = F * H/2$	25.9 k-ft
$M/ft = M/L1 =$	2.01 k-ft/ft

Self Weight Reaction:

$SW \text{ (Per side)} =$	2973.5 lbs
$SW/ft = SW/L1 =$	0.23 k/ft

Uplift Reaction:

$$R_w = M/ft / W = 0.45 \text{ k/ft}$$

$$R_u = .9D - 1.0W = -0.24 \text{ k/ft}$$

Anchoring of tank must be designed to resist this uplift loading.

Frame comes with (2) mounting points per side.

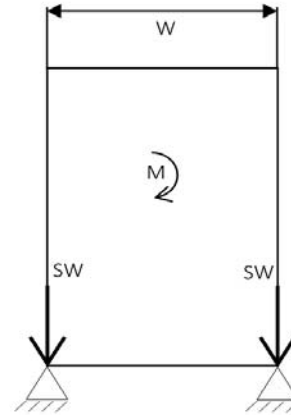
$$\text{Tension force per anchor} = R_u * L_1 / 2$$

$$T = -1.5 \text{ kips of tension per anchor}$$

$$\text{Shear force per anchor} = F / 4$$

$$V = 1.7$$

Use Hilti Kwik Bolt 3 5/8" Dia x 4" embedment.



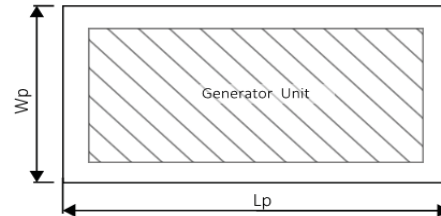
Concrete Pad:

$$W_p = 15 \text{ ft}$$

$$L_p = 6.5 \text{ ft}$$

$$\text{Pad Thickness} = 0.83 \text{ ft}$$

$$\text{Weight of Pad} = 12.19 \text{ kips}$$



Per Florida Building Code Section 1806.2, Assume the value of 2000 psf for bearing & .25 coefficient of friction

Overturning w/ 1.5 Safety Factor

$$\text{Convert overturning Moment to Service} = M * .6$$

$$M_s = 15.6 \text{ k-ft}$$

$$\begin{aligned} \text{Weight of Pad} + \\ \text{Weight of Unit} &= 18.13 \text{ kips} \end{aligned}$$

$$\begin{aligned} \text{Pad Capacity} = \\ \text{Weight} * W_p / 2 &= 136.0 \text{ k-ft} \end{aligned}$$

$$\text{Safety Ratio} = 8.7 > 1.5 \text{ Ok}$$

Sliding Check:

$$\text{Service Level Shear} = 4.0$$

$$\begin{aligned} \text{Friction Capacity w/} \\ \text{Thickened Edge} = W * .25 &= 4.5 \text{ kips} \quad \text{OK for Sliding} \end{aligned}$$

$$\text{Max Applied Soil Pressure} = 323 \text{ psf (See Safe Output)}$$

$$\text{Reinf. Required} = \#4@12" \text{ bottom, } f'_c = 4 \text{ ksi}$$



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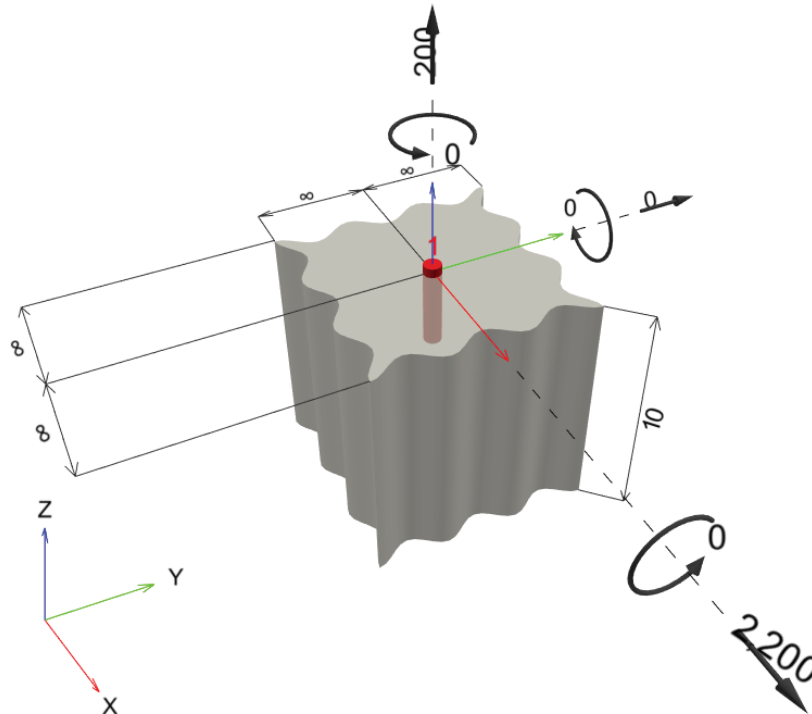
Specifier's comments:

1 Input data

Anchor type and diameter:	Kwik Bolt TZ - CS 3/4 (3 1/4)
Item number:	not available
Effective embedment depth:	$h_{ef,act} = 3.250 \text{ in.}$, $h_{nom} = 3.813 \text{ in.}$
Material:	Carbon Steel
Evaluation Service Report:	ESR-1917
Issued Valid:	4/1/2018 5/1/2019
Proof:	Design Method ACI 318-14 / Mech.
Stand-off installation:	
Profile:	no profile
Base material:	cracked concrete, 4000, $f'_c = 4,000 \text{ psi}$; $h = 10.000 \text{ in.}$
Installation:	hammer drilled hole, Installation condition: Dry
Reinforcement:	tension: condition B, shear: condition B; no supplemental splitting reinforcement present edge reinforcement: none or < No. 4 bar



Geometry [in.] & Loading [lb, in.lb]



Input data and results must be checked for conformity with the existing conditions and for plausibility!
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2 Load case/Resulting anchor forces

Load case: Design loads

Anchor reactions [lb]

Tension force: (+Tension, -Compression)

Anchor	Tension force	Shear force	Shear force x	Shear force y
1	200	2,200	2,200	0

max. concrete compressive strain: - [%]
 max. concrete compressive stress: - [psi]
 resulting tension force in (x/y)=(0.000/0.000): 0 [lb]
 resulting compression force in (x/y)=(0.000/0.000): 0 [lb]

3 Tension load

	Load N_{ua} [lb]	Capacity ϕN_n [lb]	Utilization $\beta_N = N_{ua}/\phi N_n$	Status
Steel Strength*	200	18,840	2	OK
Pullout Strength*	N/A	N/A	N/A	N/A
Concrete Breakout Failure**	200	4,095	5	OK

* highest loaded anchor **anchor group (anchors in tension)

3.1 Steel Strength

N_{sa} = ESR value refer to ICC-ES ESR-1917
 $\phi N_{sa} \geq N_{ua}$ ACI 318-14 Table 17.3.1.1

Variables

$A_{se,N}$ [in. ²]	f_{uta} [psi]
0.24	106,000

Calculations

N_{sa} [lb]
25,120

Results

N_{sa} [lb]	ϕ_{steel}	ϕN_{sa} [lb]	N_{ua} [lb]
25,120	0.750	18,840	200



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3.2 Concrete Breakout Failure

$$N_{cb} = \left(\frac{A_{Nc}}{A_{Nc0}} \right) \Psi_{ed,N} \Psi_{c,N} \Psi_{cp,N} N_b \quad \text{ACI 318-14 Eq. (17.4.2.1a)}$$

$$\phi N_{cb} \geq N_{ua} \quad \text{ACI 318-14 Table 17.3.1.1}$$

$$A_{Nc} \text{ see ACI 318-14, Section 17.4.2.1, Fig. R 17.4.2.1(b)}$$

$$A_{Nc0} = 9 h_{ef}^2 \quad \text{ACI 318-14 Eq. (17.4.2.1c)}$$

$$\Psi_{ed,N} = 0.7 + 0.3 \left(\frac{c_{a,min}}{1.5 h_{ef}} \right) \leq 1.0 \quad \text{ACI 318-14 Eq. (17.4.2.5b)}$$

$$\Psi_{cp,N} = \text{MAX} \left(\frac{c_{a,min}}{c_{ac}}, \frac{1.5 h_{ef}}{c_{ac}} \right) \leq 1.0 \quad \text{ACI 318-14 Eq. (17.4.2.7b)}$$

$$N_b = k_c \lambda_a \sqrt{f_c} h_{ef}^{1.5} \quad \text{ACI 318-14 Eq. (17.4.2.2a)}$$

Variables

h_{ef} [in.]	$c_{a,min}$ [in.]	$\Psi_{c,N}$	c_{ac} [in.]	k_c	λ_a	f_c [psi]
3.250	∞	1.000	12.000	17	1.000	4,000

Calculations

A_{Nc} [in. ²]	A_{Nc0} [in. ²]	$\Psi_{ed,N}$	$\Psi_{cp,N}$	N_b [lb]
95.06	95.06	1.000	1.000	6,299

Results

N_{cb} [lb]	$\phi_{concrete}$	ϕN_{cb} [lb]	N_{ua} [lb]
6,299	0.650	4,095	200



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Fastening point:			

4 Shear load

	Load V_{ua} [lb]	Capacity ϕV_n [lb]	Utilization $\beta_v = V_{ua}/\phi V_n$	Status
Steel Strength*	2,200	8,888	25	OK
Steel failure (with lever arm)*	N/A	N/A	N/A	N/A
Pryout Strength**	2,200	8,819	25	OK
Concrete edge failure in direction **	N/A	N/A	N/A	N/A

* highest loaded anchor **anchor group (relevant anchors)

4.1 Steel Strength

V_{sa} = ESR value refer to ICC-ES ESR-1917
 $\phi V_{steel} \geq V_{ua}$ ACI 318-14 Table 17.3.1.1

Variables

$A_{se,V}$ [in. ²]	f_{uta} [psi]
0.24	106,000

Calculations

V_{sa} [lb]
13,674

Results

V_{sa} [lb]	ϕ_{steel}	ϕV_{sa} [lb]	V_{ua} [lb]
13,674	0.650	8,888	2,200



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4.2 Pryout Strength

$$V_{cp} = k_{cp} \left[\left(\frac{A_{Nc}}{A_{Nc0}} \right) \psi_{ed,N} \psi_{c,N} \psi_{cp,N} N_b \right] \quad \text{ACI 318-14 Eq. (17.5.3.1a)}$$

$$\phi V_{cp} \geq V_{ua} \quad \text{ACI 318-14 Table 17.3.1.1}$$

$$A_{Nc} \text{ see ACI 318-14, Section 17.4.2.1, Fig. R 17.4.2.1(b)}$$

$$A_{Nc0} = 9 h_{ef}^2 \quad \text{ACI 318-14 Eq. (17.4.2.1c)}$$

$$\psi_{ed,N} = 0.7 + 0.3 \left(\frac{c_{a,min}}{1.5 h_{ef}} \right) \leq 1.0 \quad \text{ACI 318-14 Eq. (17.4.2.5b)}$$

$$\psi_{cp,N} = \text{MAX} \left(\frac{c_{a,min}}{c_{ac}}, \frac{1.5 h_{ef}}{c_{ac}} \right) \leq 1.0 \quad \text{ACI 318-14 Eq. (17.4.2.7b)}$$

$$N_b = k_c \lambda_a \sqrt{f_c} h_{ef}^{1.5} \quad \text{ACI 318-14 Eq. (17.4.2.2a)}$$

Variables

k_{cp}	h_{ef} [in.]	$c_{a,min}$ [in.]	$\psi_{c,N}$
2	3.250	∞	1.000
c_{ac} [in.]	k_c	λ_a	f'_c [psi]
12.000	17	1.000	4,000

Calculations

A_{Nc} [in. ²]	A_{Nc0} [in. ²]	$\psi_{ed,N}$	$\psi_{cp,N}$	N_b [lb]
95.06	95.06	1.000	1.000	6,299

Results

V_{cp} [lb]	$\phi_{concrete}$	ϕV_{cp} [lb]	V_{ua} [lb]
12,599	0.700	8,819	2,200

5 Combined tension and shear loads

β_N	β_V	ζ	Utilization $\beta_{N,V}$ [%]	Status
0.049	0.249	5/3	11	OK

$$\beta_{NV} = \beta_N^{\zeta} + \beta_V^{\zeta} \leq 1$$


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6 Warnings

- The anchor design methods in PROFIS Engineering require rigid anchor plates per current regulations (ETAG 001/Annex C, EOTA TR029, etc.). This means load re-distribution on the anchors due to elastic deformations of the anchor plate are not considered - the anchor plate is assumed to be sufficiently stiff, in order not to be deformed when subjected to the design loading. PROFIS Engineering calculates the minimum required anchor plate thickness with FEM to limit the stress of the anchor plate based on the assumptions explained above. The proof if the rigid anchor plate assumption is valid is not carried out by PROFIS Engineering. Input data and results must be checked for agreement with the existing conditions and for plausibility!
- Condition A applies where the potential concrete failure surfaces are crossed by supplementary reinforcement proportioned to tie the potential concrete failure prism into the structural member. Condition B applies where such supplementary reinforcement is not provided, or where pullout or pryout strength governs.
- Refer to the manufacturer's product literature for cleaning and installation instructions.
- For additional information about ACI 318 strength design provisions, please go to <https://submittals.us.hilti.com/PROFISAnchorDesignGuide/>
- Hilti post-installed anchors shall be installed in accordance with the Hilti Manufacturer's Printed Installation Instructions (MPII). Reference ACI 318-14, Section 17.8.1.

Fastening meets the design criteria!


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7 Installation data

Profile: -

Hole diameter in the fixture: -

Plate thickness (input): -

Drilling method: Hammer drilled

Cleaning: Manual cleaning of the drilled hole according to instructions for use is required.

Anchor type and diameter: Kwik Bolt TZ - CS 3/4 (3 1/4)

Item number: not available

Installation torque: 1,320 in.lb

Hole diameter in the base material: 0.750 in.

Hole depth in the base material: 4.000 in.

Minimum thickness of the base material: 5.500 in.

Hilti KB-TZ stud anchor with 3.81252 in embedment, 3/4 (3 1/4), Carbon steel, installation per ESR-1917

7.1 Recommended accessories

Drilling

- Suitable Rotary Hammer
- Properly sized drill bit

Cleaning

- Manual blow-out pump

Setting

- Torque wrench
- Hammer

Coordinates Anchor in.

Anchor	x	y	C _{-x}	C _{+x}	C _{-y}	C _{+y}
1	0.000	0.000	-	-	-	-



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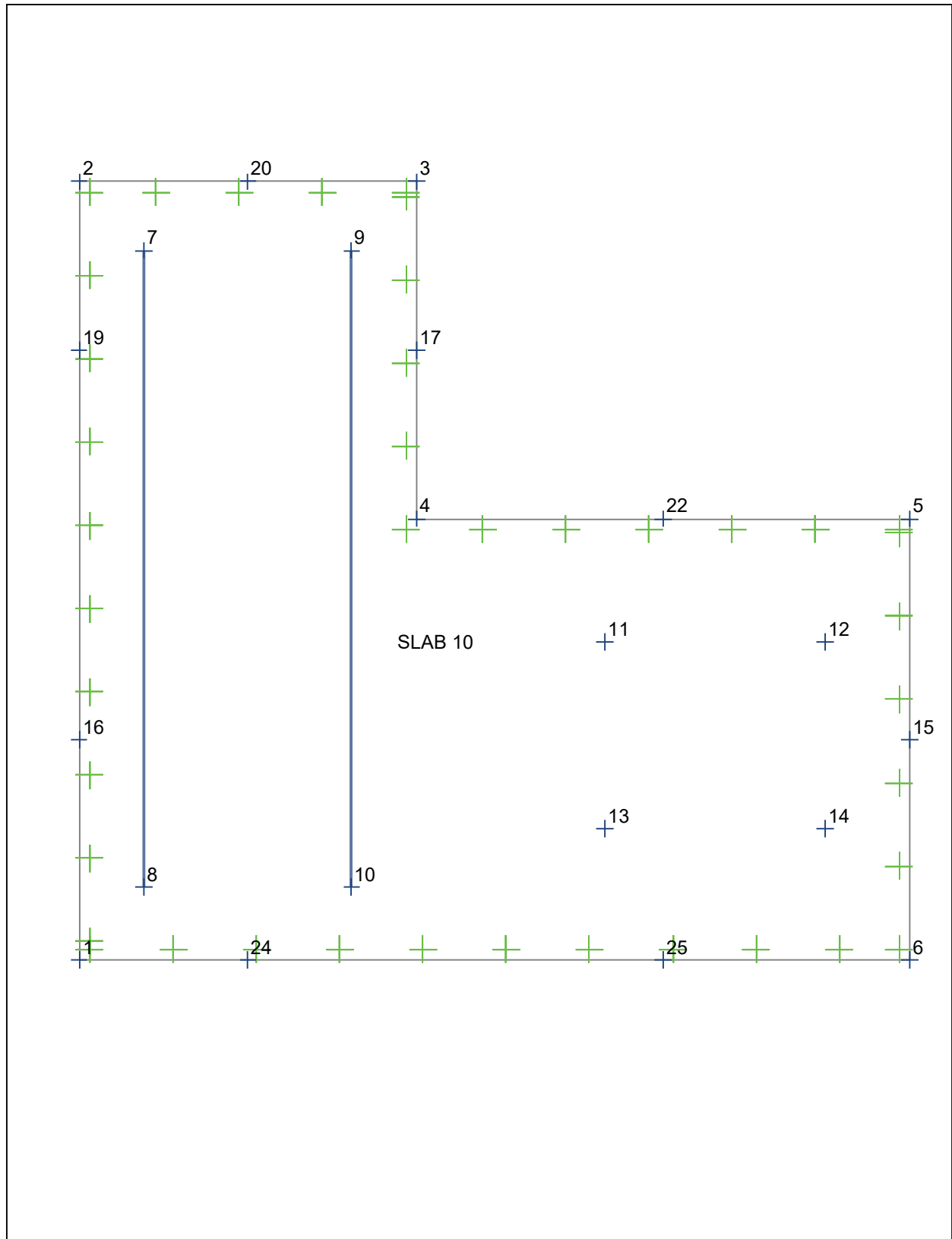
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8 Remarks; Your Cooperation Duties

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SAFE 2016 16.0.2

Plan View

kip - ft

Table: Load Assignments - Line Objects - Distributed Loads, Part 1 of 2

Table: Load Assignments - Line Objects - Distributed Loads, Part 1 of 2

Line	LoadPat	Type	Dir	DistType	RelDistA	RelDistB	AbsDistA ft	AbsDistB ft
1	WIND	Force	Gravity	RelDist	0.0000	1.0000	0.0000	12.2599
2	DEAD	Force	Gravity	RelDist	0.0000	1.0000	0.0000	12.2599

Table: Load Assignments - Line Objects - Distributed Loads, Part 2 of 2Table: Load Assignments - Line Objects -
Distributed Loads, Part 2 of 2

Line	FOverLA kip/ft	FOverLB kip/ft
1	-0.240	-0.240
2	0.450	0.450

Table: Load Assignments - Point Loads, Part 1 of 2

Table: Load Assignments - Point Loads, Part 1 of 2

Point	LoadPat	Fx kip	Fy kip	Fgrav kip	Mx kip-ft	My kip-ft	Mz kip-ft	XDim in
11	DEAD	0.000	0.000	2.750	0.0000	0.0000	0.0000	0.0000
12	DEAD	0.000	0.000	2.750	0.0000	0.0000	0.0000	0.0000
13	DEAD	0.000	0.000	2.750	0.0000	0.0000	0.0000	0.0000
14	DEAD	0.000	0.000	2.750	0.0000	0.0000	0.0000	0.0000

Table: Load Assignments - Point Loads, Part 2 of 2Table: Load Assignments
- Point Loads, Part 2 of 2

Point	YDim in
11	0.0000
12	0.0000
13	0.0000
14	0.0000

Table: Material Properties 03 - Concrete

Table: Material Properties 03 - Concrete

Material	E kip/in2	U	A 1/F	UnitWt lb/ft3	Fc kip/in2	LtWtConc	UserModRu p
4000Psi	3604.997	0.200000	5.5000E-06	1.5000E+02	4.000	No	No

Table: Slab Properties 02 - Solid Slabs

Table: Slab Properties 02 - Solid Slabs

Slab	Type	MatProp	Thickness in	Ortho
SLAB 10	Slab	4000Psi	10.0000	No

Table: Slab Property Assignments

Table: Slab Property Assignments

Area	SlabProp
1	SLAB 10

Table: Soil Properties

Table: Soil Properties

Soil	Subgrade lb/ft3	NonlinOpt	Color
SOIL1	1.7280E+05	Compression Only	Cyan

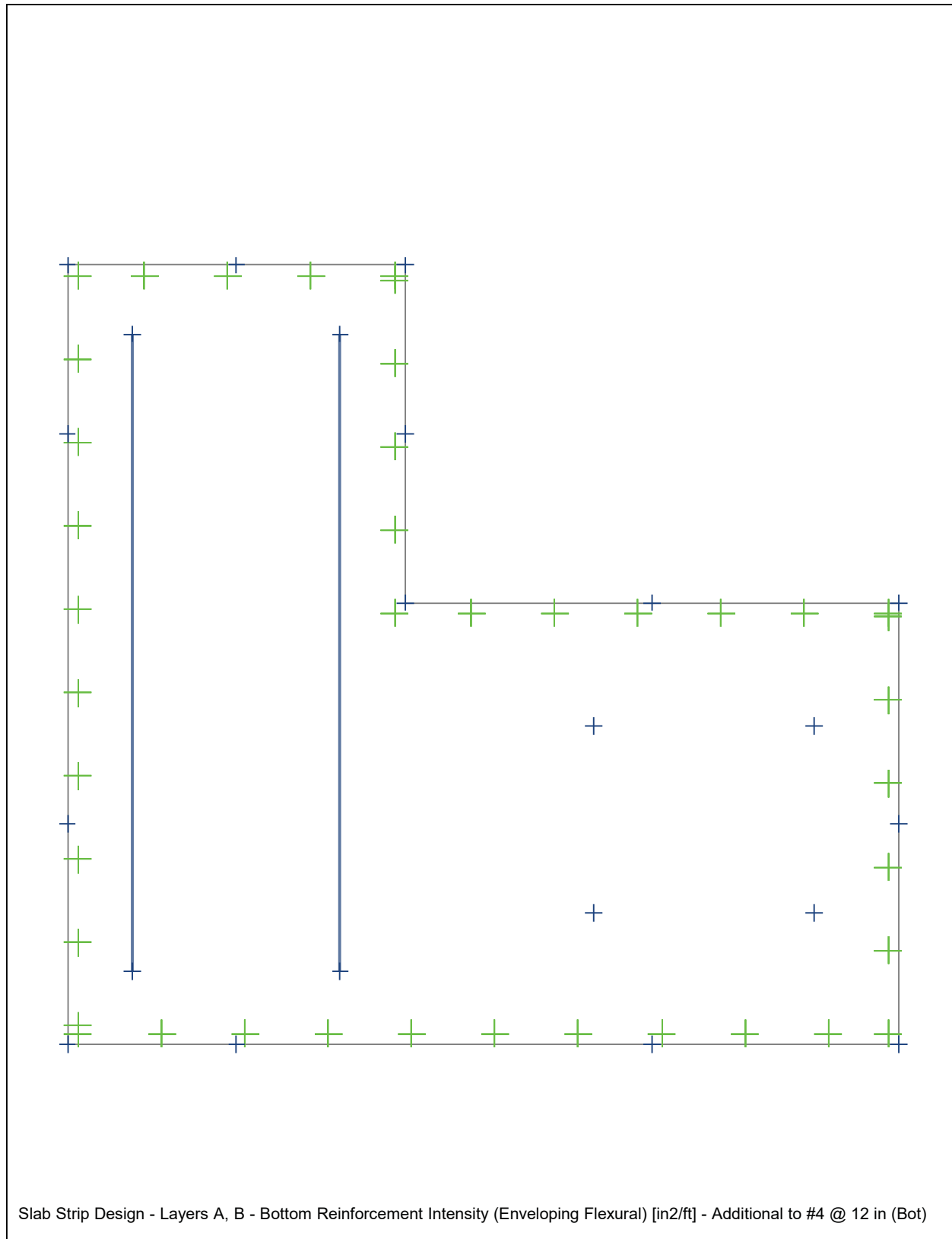
Table: Soil Property Assignments

Table: Soil Property Assignments

Area	SoilProp
1	SOIL1

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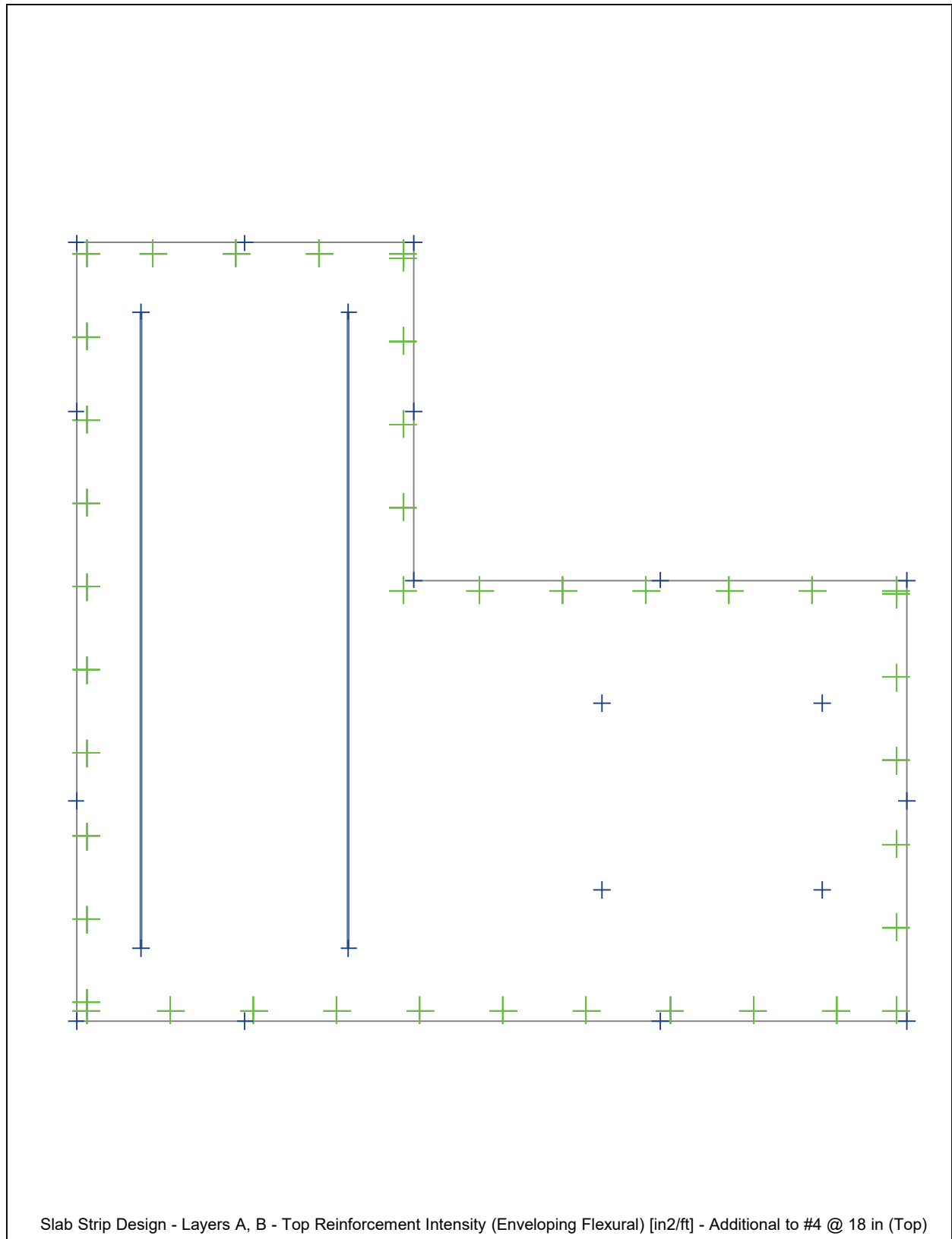


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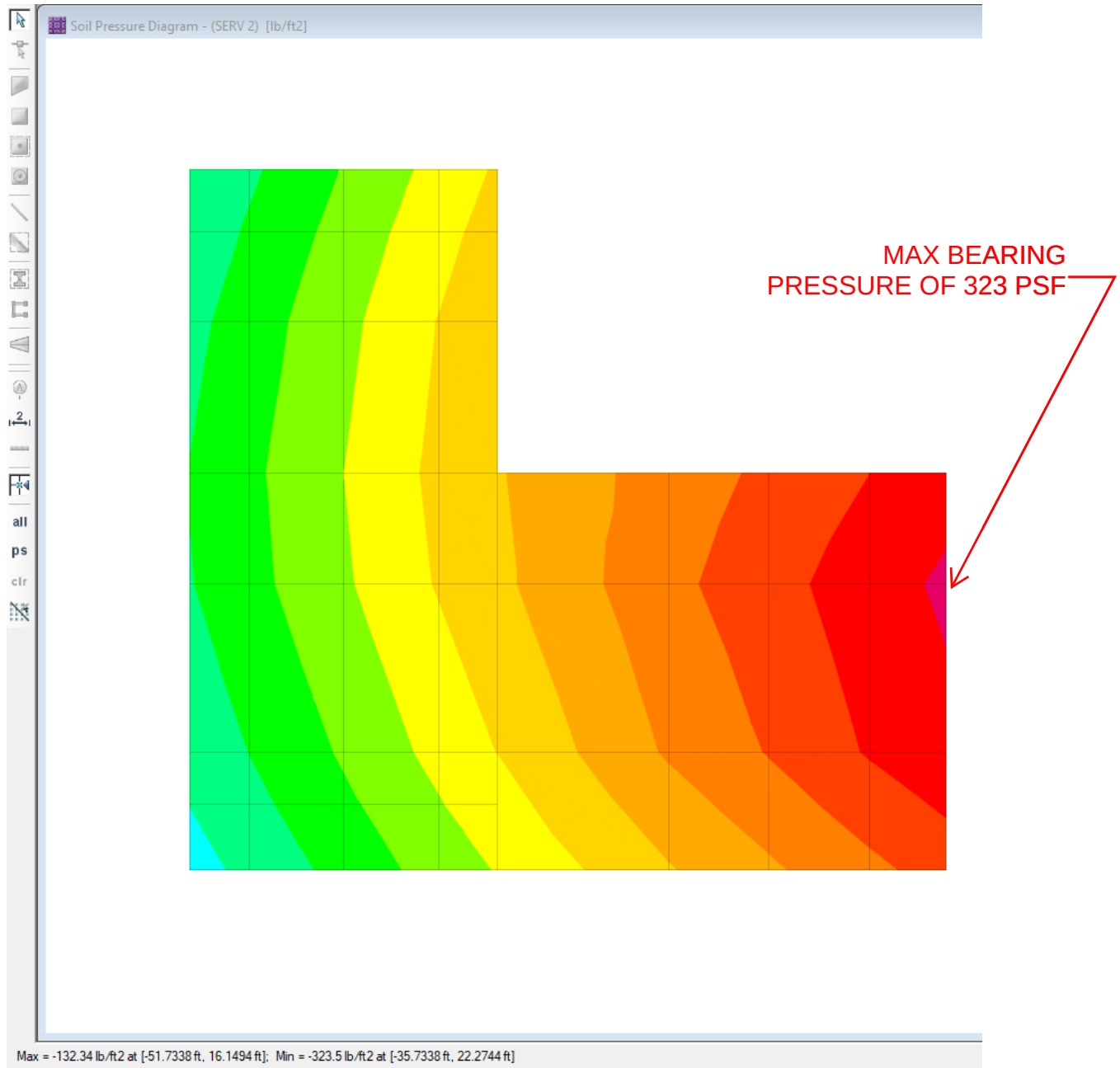
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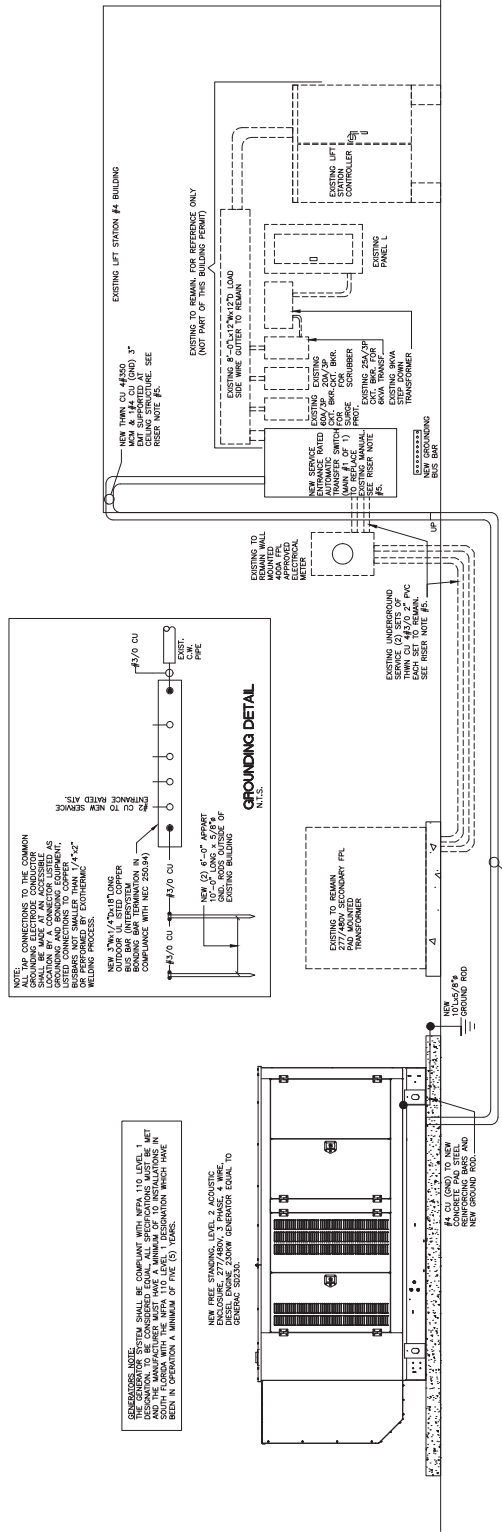




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date:	JULY 7, 2020
sheet no:	

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project:	



GENERAL ELECTRICAL NOTES

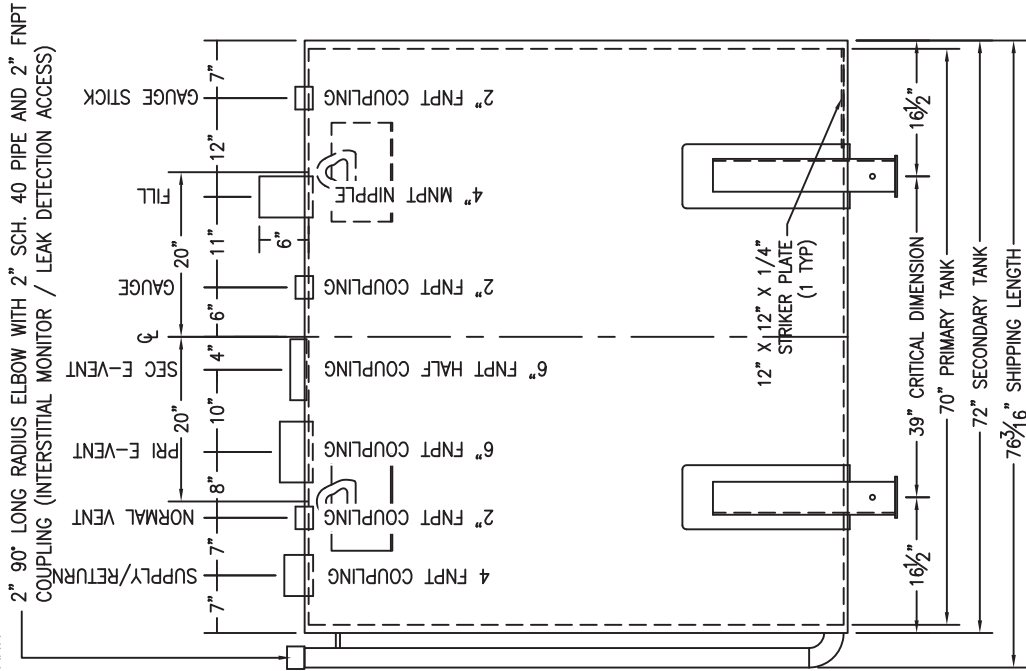
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PANEL	AMPS	WATTS	PHASES	WIRE	PHASE	MEV/TH/AC	MOUNTING	LOCATION	CATALOG NUMBER
L	60	1200/708	30	4	3				
CUT	CONDUCTOR	COT BBS							
WIRE	WIRE	HOLE	SPACING						
1	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
2	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
3	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
4	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
5	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
6	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
7	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
8	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
9	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
10	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
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12	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
13	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
14	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
15	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
16	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
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36	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
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51	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
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54	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
55	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
56	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
57	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
58	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
59	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
60	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
61	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
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63	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
64	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
65	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
66	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
67	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
68	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
69	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
70	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
71	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
72	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
73	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
74	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
75	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
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79	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
80	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
81	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
82	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
83	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
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85	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
86	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
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91	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
92	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
93	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
94	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
95	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
96	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
97	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
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99	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
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122	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
123	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
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129	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
130	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
131	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
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133	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
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135	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
136	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
137	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
138	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
139	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
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143	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
144	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
145	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
146	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
147	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
148	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
149	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
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153	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
154	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
155	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
156	12	1/2	2	15	POSTING EXN. PAN	720	8	1	SPARE
157	12	1/2	2	15	POSTING EXN. PAN	720	8	1	

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Appendix 4

*SADDLES ARE SEAL WELDED TO TANK



Underwriters
Laboratories Inc.
LISTED ®

DRAFT DOCUMENT FOR COMMISSION REVIEW

CUSTOMER APPROVAL SIGNATURE/DATE:		1,000 GALLON HORIZONTAL DW ABOVE GROUND TANK		CUSTOMER: PROJECT: AGENT:
SURFACE PREPARATION/COATING INFORMATION: INTERIOR SURFACES: SSPC-SP-3 POWER TOOL CLEAN WELDS ONLY REMOVE ALL LOOSE DEBRIS EXTERIOR SURFACES: SSPC-SP-6 COMMERCIAL BLAST 5-7 MILS ALIPHATIC URETHANE (WHITE)		MATERIAL /CONSTRUCTION/ LABELING INFORMATION: MATERIAL: CARBON STEEL ASTM A 36 OR A 569 MATERIAL THICKNESS: PRIMARY TANK SHELL AND HEADS: 7 GA SECONDARY TANK SHELL AND HEADS: 10 GA		GENERAL INDUSTRIES P.O. BOX 1279 GOLDSBORO, NC 27533 TEL: (919) 751-1791 FAX: (919) 751-8186 DRAWING NUMBER: GIDH01K65
QUANTITY: ONE (1) REQUIRED WEIGHT: 2,200 lbs ± 10%		LABELING/MARKING: UNDERWRITERS LABORATORIES UL-142/STI F921		REVISED 7/14



1,000 GAL 6" TALL SADDLE FOR 66" DIAMETER TANK

MATERIAL / CONSTRUCTION / LABELING INFORMATION:

SURFACE PREPARATION/COATING INFORMATION:

MATERIAL: CARBON STEEL ASTM A 36 OR A 569

EXTERIOR SURFACES: SSPC-SP-6 COMMERCIAL BLAST
5-7 MILS ALIPHATIC URETHANE (WHITE)

QUANTITY: TWO (2) REQUIRED
WEIGHT: 145 lb ea $\pm$ 10%

CUSTOMER APPROVAL SIGNATURE/DATE:

SH

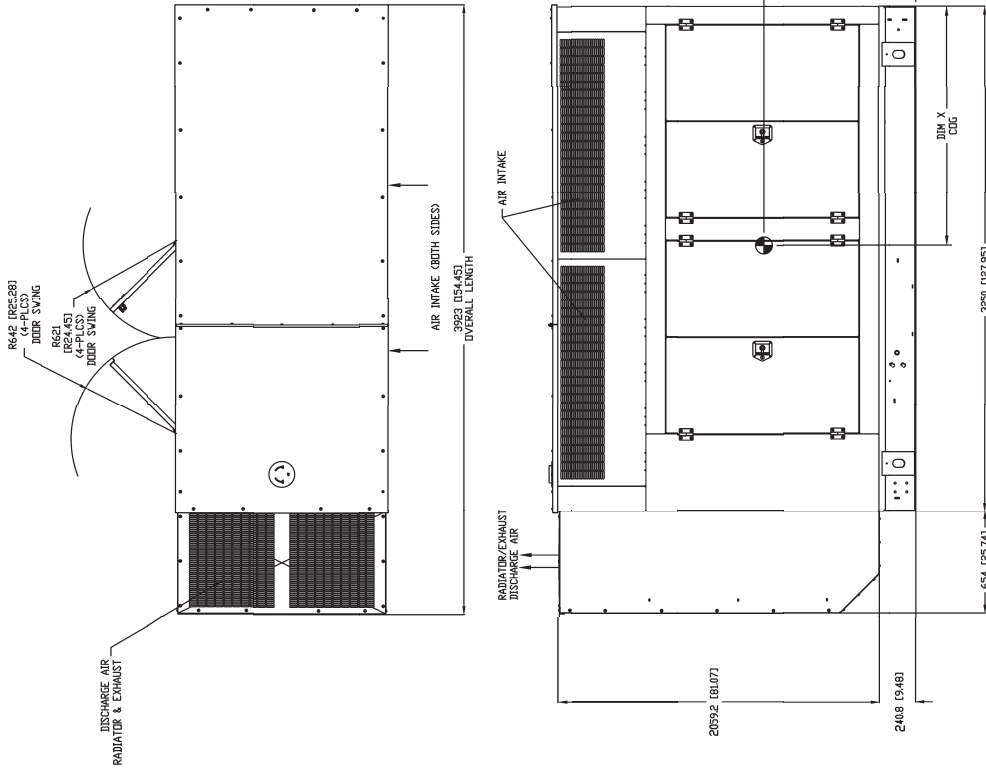
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Appendix - 7

FOR ALL STUB-UP, WEIGHT, AND COG DETAILS, SEE
CORRESPONDING OPEN SET DRAWING PER UNIT CONFIGURATION.



GENERAC

DIMENSIONS ARE IN MILLIMETERS [INCHES]

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

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ELECTRONICALLY APPROVED
INSIDE WINDCHILL

TITLE

L2A ENCLOSURE
D8.7L, 60 HZ: SD200, PD180
SD230, PD207, SD250, PD225

ISSUE DATE: 6/2/14

SIZE	CAGE NO	DWG NO	REV
B	N/A	0J3429C	D
SCALE	0.05	WT-KG	SHEET 1 of 1

INSTALLATION DRAWING

4

3

2

1

SD230 | 8.7L | 230 kW
INDUSTRIAL DIESEL GENERATOR SET
EPA Certified Stationary Emergency



Standby Power Rating
230 kW, 288 kVA, 60 Hz

Prime Power Rating*
207 kW, 259 kVA, 60 Hz

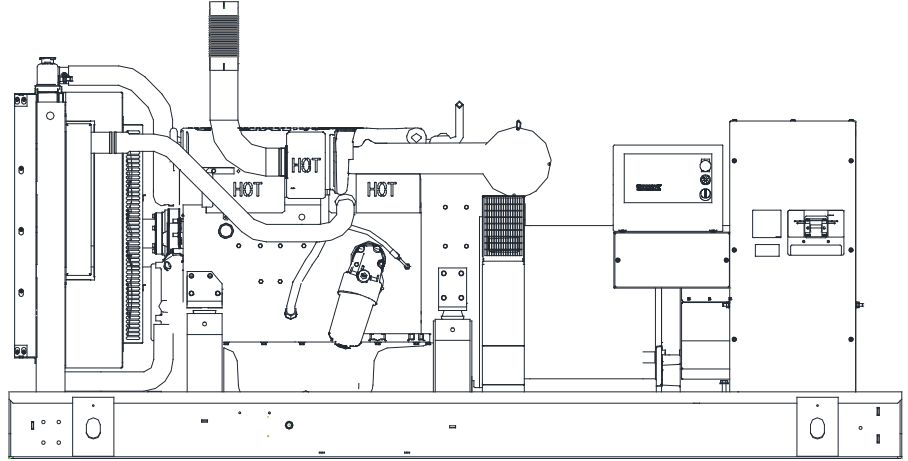


Image used for illustration purposes only



*EPA Certified Prime ratings are not available in the US or its Territories
*Built in the USA using domestic and foreign parts

Codes and Standards

Generac products are designed to the following standards:



UL2200, UL508, UL142, UL489



NFPA 37, 70, 99, 110



NEC700, 701, 702, 708



ISO 3046, 7637, 8528, 9001



NEMA ICS10, MG1, 250, ICS6, AB1



ANSI C62.41



IBC 2009, CBC 2010, IBC 2012,
ASCE 7-05, ASCE 7-10,
ICC-ES AC-156 (2012)

Powering Ahead

For over 50 years, Generac has provided innovative design and superior manufacturing.

Generac ensures superior quality by designing and manufacturing most of its generator components, including alternators, enclosures and base tanks, control systems and communications software.

Generac gensets utilize a wide variety of options, configurations and arrangements, allowing us to meet the standby power needs of practically every application.

Generac searched globally to ensure the most reliable engines power our generators. We choose only engines that have already been proven in heavy-duty industrial applications under adverse conditions.

Generac is committed to ensuring our customers' service support continues after their generator purchase.

SD230

|

8.7L

|

230 kW

INDUSTRIAL DIESEL GENERATOR SET

EPA Certified Stationary Emergency



STANDARD FEATURES

ENGINE SYSTEM

- Oil Drain Extension
- Air Cleaner
- Fan Guard
- Stainless Steel Flexible Exhaust Connection
- Factory Filled Oil
- Radiator Duct Adapter (Open Set Only)
- Critical Exhaust Silencer (Enclosed Only)

Fuel System

- Fuel Lockoff Solenoid
- Primary Fuel Filter

Cooling System

- Closed Coolant Recovery System
- UV/Ozone Resistant Hoses
- Factory-Installed Radiator
- Radiator Drain Extension
- 50/50 Ethylene Glycol Antifreeze
- 120 VAC Coolant Heater

Electrical System

- Battery Charging Alternator
- Battery Cables
- Battery Tray
- Rubber-Booted Engine Electrical Connections
- Solenoid Activated Starter Motor

ALTERNATOR SYSTEM

- GenProtect™
- 12 Leads (3-Phase, Non 600V)
- Class H Insulation Material
- Vented Rotor
- 2/3 Pitch
- Skewed Stator
- Auxiliary Voltage Regulator Power Winding
- Permanent Magnet Excitation
- Sealed Bearings
- Automated Manufacturing (Winding, Insertion, Lacing, Varnishing)
- Rotor Dynamically Spin Balanced (Get Tolerance)
- Amortisseur Winding
- Full Load Capacity Alternator
- Protective Thermal Switch

GENERATOR SET

- Internal Genset Vibration Isolation
- Separation of Circuits - High/Low Voltage
- Separation of Circuits - Multiple Breakers
- Wrapped Exhaust Piping
- Standard Factory Testing
- 2 Year Limited Warranty (Standby Rated Units)
- 1 Year Warranty (Prime Rated Units)
- Silencer Mounted in the Discharge Hood (Enclosed Only)

ENCLOSURE (if selected)

- Rust-Proof Fasteners with Nylon Washers to Protect Finish
- High Performance Sound-Absorbing Material (L1 & L2)
- Gasketed Doors
- Stamped Air-Intake Louvers
- Air Discharge Hoods for Radiator-Upward Pointing
- Stainless Steel Lift Off Door Hinges
- Stainless Steel Lockable Handles
- Rhino Coat™ - Textured Polyester Powder Coat

TANKS (if selected)

- UL 142
- Double Wall
- Vents
- Sloped Top
- Sloped Bottom
- Factory Pressure Tested (2 psi)
- Rupture Basin Alarm
- Fuel Level
- Check Valve In Supply and Return Lines
- Rhino Coat™ - Textured Polyester Powder Coat
- Stainless Steel Hardware

CONTROL SYSTEM



Control Panel

- Digital H Control Panel - Dual 4x20 Display
- Programmable Crank Limiter
- 7-Day Programmable Exerciser
- Special Applications Programmable PLC
- RS-232/485
- All-Phase Sensing DVR
- Full System Status
- Utility Monitoring
- 2-Wire Start Compatible
- Power Output (kW)
- Power Factor
- kW Hours, Total & Last Run
- Real/Reactive/Apparent Power

- All Phase AC Voltage
- All Phase Currents
- Oil Pressure
- Coolant Temperature
- Coolant Level
- Engine Speed
- Battery Voltage
- Frequency
- Date/Time Fault History (Event Log)
- Isochronous Governor Control
- Waterproof/Sealed Connectors
- Audible Alarms and Shutdowns
- Not in Auto (Flashing Light)
- Auto/Off/Manual Switch
- E-Stop (Red Mushroom-Type)
- NFPA110 Level I and II (Programmable)
- Customizable Alarms, Warnings, and Events
- Modbus protocol
- Predictive Maintenance algorithm
- Sealed Boards
- Password Parameter Adjustment Protection Single Point Ground
- 15 Channel Data Logging
- 0.2 msec High Speed Data Logging
- Alarm Information Automatically Comes Up On the Display

Alarms

- Oil Pressure (Pre-Programmable Low Pressure Shutdown)
- Coolant Temperature (Pre-Programmed High Temp Shutdown)
- Coolant Level (Pre-Programmed Low Level Shutdown)
- Low Fuel Pressure Alarm
- Engine Speed (Pre-Programmed Over Speed Shutdown)
- Battery Voltage Warning
- Alarms & Warnings Time and Date Stamped
- Alarms & Warnings for Transient and Steady State Conditions
- Snap Shots of Key Operation Parameters During Alarms & Warnings
- Alarms and Warnings Spelled Out (No Alarm Codes)

SD230 | 8.7L | 230 kW
INDUSTRIAL DIESEL GENERATOR SET
EPA Certified Stationary Emergency



CONFIGURABLE OPTIONS

ENGINE SYSTEM

- Oil Make-Up System
- Oil Heater
- Industrial Exhaust Silencer (Open Set)

FUEL SYSTEM

- Flexible Fuel Lines
- Primary Fuel Filter

ELECTRICAL SYSTEM

- 10A UL Battery Charger
- 2.5A Battery Charger
- Battery Warmer

ALTERNATOR SYSTEM

- Alternator Upsizing
- Anti-Condensation Heater
- Tropical Coating

CIRCUIT BREAKER OPTIONS

- Main Line Circuit Breaker
- 2nd Main Line Circuit Breaker
- Shunt Trip and Auxiliary Contact
- Electronic Trip Breakers

GENERATOR SET

- Gen-Link Communications Software (English Only)
- Extended Factory Testing
- IBC Seismic Certification
- 8 Position Load Center
- 2 Year Extended Warranty
- 5 Year Warranty
- 5 Year Extended Warranty
- 7 Year Extended Warranty
- 10 Year Extended Warranty

ENCLOSURE

- Standard Enclosure
- Level 1 Sound Attenuation
- Level 2 Sound Attenuation
- Steel Enclosure
- Aluminum Enclosure
- Up to 200 MPH Wind Load Rating*

- AC/DC Enclosure Lighting Kit
- 12 VDC Enclosure Light Kit
- 120 VAC Enclosure Light Kit

CONTROL SYSTEM

- 21-Light Remote Annunciator
- Remote Relay Panel (8 or 16)
- Oil Temperature Sender with Indication Alarm
- Remote E-Stop (Break Glass-Type, Surface Mount)
- Remote E-Stop (Red Mushroom-Type, Surface Mount)
- Remote E-Stop (Red Mushroom-Type, Flush Mount)
- Remote Communication - Modem
- Remote Communication - Ethernet
- 10A Run Relay
- Ground Fault Indication and Protection Functions

TANKS (SIZE ON LAST PAGE)

- Electric Fuel Level
- Mechanical Fuel Level
- 8" Fill Extension
- 13" Fill Extension
- 19" Fill Extension

ENGINEERED OPTIONS

ENGINE SYSTEM

- Coolant Heater Ball Valves
- Fluid Containment Pans
- Block Heaters

CONTROL SYSTEM

- Spare Inputs (x4) / Outputs (x4) - H Panel Only
- Battery Disconnect Switch

ALTERNATOR SYSTEM

- 3rd Breaker System

GENERATOR SET

- Special Testing

ENCLOSURE

- Motorized Dampers
- Door Switch for Intrusion Alarm
- Enclosure Ambient Heaters

TANKS

- Overfill Protection Valve
- UL2085 Tank
- ULC S-601 Tank
- Special Fuel Tanks
- Vent Extensions

RATING DEFINITIONS

Standby - Applicable for a varying emergency load for the duration of a utility power outage with no overload capability.

Prime - Applicable for supplying power to a varying load in lieu of utility for an unlimited amount of running time. A 10% overload capacity is available for 1 out of every 12 hours. The Prime Power option is only available on International applications. Power ratings in accordance with ISO 8528-1, Second Edition.

*Consult factory for availability

SD230 | 8.7L | 230 kW
INDUSTRIAL DIESEL GENERATOR SET
 EPA Certified Stationary Emergency



APPLICATION AND ENGINEERING DATA

ENGINE SPECIFICATIONS

General

Make	Iveco/FPT
EPA Emissions Compliance	Stationary Emergency
EPA Emissions Reference	See Emission Data Sheet
Cylinder #	6
Type	In-Line
Displacement - L (cu. in)	8.7 (530.91)
Bore - mm (in)	117 (4.61)
Stroke - mm (in)	135 (5.31)
Compression Ratio	16.5:1
Intake Air Method	Turbocharged/Aftercooled
Cylinder Head	4-Valve
Piston Type	Aluminum
Crankshaft Type	Dropped Forged Steel

Engine Governing

Governor	Electronic Isochronous
Frequency Regulation (Steady State)	±0.25%

Lubrication System

Oil Pump Type	Gear
Oil Filter Type	Full Flow
Crankcase Capacity - L (qts)	28 (29.57)

Cooling System

Cooling System Type	Closed Recovery
Water Pump Type	Pre-Lubed, Self Sealing
Fan Type	Pusher
Fan Speed (rpm)	2538
Fan Diameter - mm (in)	762 (30.0)
Coolant Heater Wattage	2000
Coolant Heater Standard Voltage	240V

Fuel System

Fuel Type	Ultra Low Sulfur Diesel Fuel
Fuel Specifications	ASTM
Fuel Filtering (microns)	5
Fuel Inject Pump Make	Electronic
Fuel Pump Type	Engine Driven Gear
Injector Type	Common Rail
Engine Type	Direct Injection
Fuel Supply Line - mm (in.)	12.7 (0.5) NPT
Fuel Return Line - mm (in.)	12.7 (0.5) NPT

Engine Electrical System

System Voltage	24 VDC
Battery Charger Alternator	Std
Battery Size	See Battery Index 0161970SBY
Battery Voltage	12 VDC
Ground Polarity	Negative

ALTERNATOR SPECIFICATIONS

Standard Model	520 mm
Poles	4
Field Type	Revolving
Insulation Class - Rotor	H
Insulation Class - Stator	H
Total Harmonic Distortion	<5%
Telephone Interference Factor (TIF)	< 50

Standard Excitation	Permanent Magnet Excitation
Bearings	Single Sealed Cartridge
Coupling	Direct, Flexible Disc
Prototype Short Circuit Test	Yes
Voltage Regulator Type	Digital
Number of Sensed Phases	All
Regulation Accuracy (Steady State)	±0.25%

SD230 | 8.7L | 230 kW
INDUSTRIAL DIESEL GENERATOR SET
 EPA Certified Stationary Emergency



OPERATING DATA

POWER RATINGS

Standby		
Single-Phase 120/240 VAC @1.0pf	230 kW	Amps: 958
Three-Phase 120/208 VAC @0.8pf	230 kW	Amps: 798
Three-Phase 120/240 VAC @0.8pf	230 kW	Amps: 692
Three-Phase 277/480 VAC @0.8pf	230 kW	Amps: 346
Three-Phase 346/600 VAC @0.8pf	230 kW	Amps: 277

STARTING CAPABILITIES (sKVA)

480 VAC								208/240 VAC							
Alternator	kW	10%	15%	20%	25%	30%	35%	Alternator	kW	10%	15%	20%	25%	30%	35%
Standard	250	263	395	527	658	790	922	Standard	250	197	296	395	494	593	692
Upsize 1	300	303	454	605	757	908	1059	Upsize 1	300	277	341	454	568	681	794
Upsize 2	350	383	575	767	958	1150	1342	Upsize 2	350	280	410	535	640	770	900

FUEL CONSUMPTION RATES*

Fuel Pump Lift- ft (m)		Diesel - gal/hr (l/hr)	
3 (1)		Percent Load	Standby
Total Fuel Pump Flow (Combustion + Return) - gal/hr (l/hr)		25%	5.1 (19.3)
		50%	9.6 (36.3)
		75%	13.7 (51.9)
		100%	17 (64.3)
		* Fuel supply installation must accommodate fuel consumption rates at 100% load.	
26 (98)			

COOLING

		Standby
Coolant Flow per Minute	gal/min (l/min)	63.3 (240)
Coolant System Capacity	gal (l)	12.7 (49.2)
Heat Rejection to Coolant	BTU/hr	626,756
Inlet Air	cfm (m³/hr)	8872 (251)
Max. Operating Radiator Air Temp	°F (°C)	122 (50)
Max. Operating Ambient Temperature (Before Derate)	°F (°C)	110 (43.3)
Maximum Radiator Backpressure	in H ₂ O	0.5

COMBUSTION AIR REQUIREMENTS

Standby
Flow at Rated Power cfm (m³/min)
660 (18.69)

ENGINE

Standby		
Rated Engine Speed	rpm	1800
Horsepower at Rated kW**	hp	359
Piston Speed	ft/min	1593
BMEP	psi	305

EXHAUST

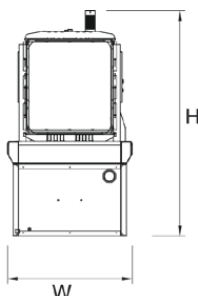
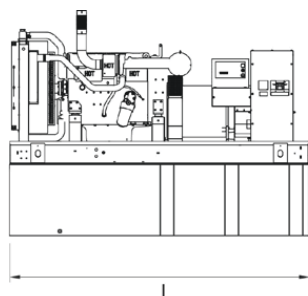
Standby		
Exhaust Flow (Rated Output)	cfm (m³/min)	1424 (40.4)
Max. Backpressure (Post Silencer)	in Hg (Kpa)	1.5 (5.1)
Exhaust Temp (Rated Output - Post Silencer)	°F (°C)	955 (513)
Exhaust Outlet Size (Open Set)	mm (in)	101.6 (4)

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

Deration – Operational characteristics consider maximum ambient conditions. Derate factors may apply under atypical site conditions. Please consult a Generac Power Systems Industrial Dealer for additional details. All performance ratings in accordance with ISO3046, BS5514, ISO8528 and DIN6271 standards.

SD230 | 8.7L | 230 kW**INDUSTRIAL DIESEL GENERATOR SET**

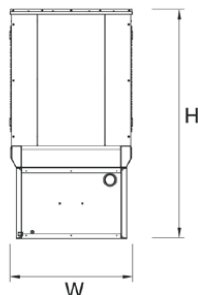
EPA Certified Stationary Emergency

GENERAC® | **INDUSTRIAL
POWER****DIMENSIONS AND WEIGHTS*****OPEN SET (Includes Exhaust Flex)**

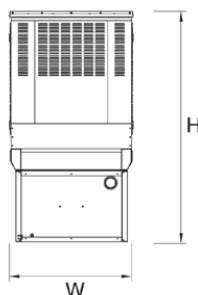
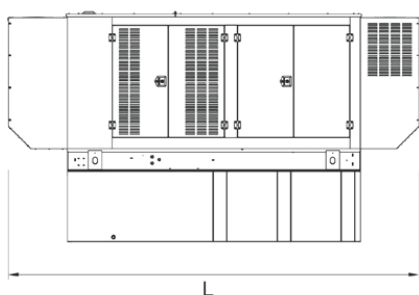
Run Time Hours	Usable Capacity Gal (L)	L x W x H (in (mm))	Weight lbs (kg)
No Tank	-	128 (3251) x 54 (1372) x 58 (1473)	4465 (2025)
10	153 (579.2)	128 (3251) x 54 (1372) x 71 (1803)	5470 (2481)
25	372 (1407)	128 (3251) x 54 (1372) x 83 (2108)	5892 (2673)
40	589 (2227)	128 (3251) x 54 (1372) x 95 (2413)	6309 (2862)
47	693 (2623.3)	136 (3454) x 54 (1372) x 95 (2413)	6060 (2749)
64	946 (3581)	208 (5283) x 54 (1372) x 99 (2515)	7490 (3397)
90	1325 (5015.7)	278 (7061) x 54 (1372) x 99 (2515)	8505 (3858)

STANDARD ENCLOSURE

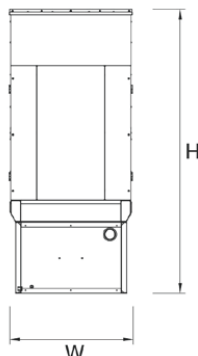
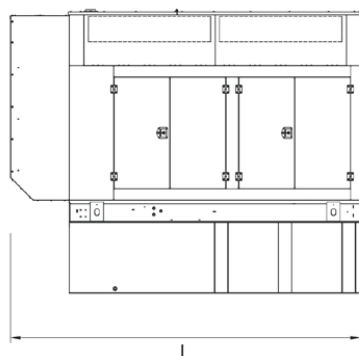
Run Time Hours	Usable Capacity Gal (L)	L x W x H (in (mm))	Weight lbs (kg) Enclosure Only	
			Steel	Aluminum
No Tank	-	155 (3937) x 54 (1372) x 70 (1778)		
10	153 (579.2)	155 (3937) x 54 (1372) x 83 (2108)		
25	372 (1407)	155 (3937) x 54 (1372) x 95 (2413)		
40	589 (2227)	155 (3937) x 54 (1372) x 107 (2718)	941 (427)	474 (215)
47	693 (2623.3)	155 (3937) x 54 (1372) x 107 (2718)		
64	946 (3581)	208 (5283) x 54 (1372) x 111 (2819)		
90	1325 (5015.7)	278 (7061) x 54 (1372) x 111 (2819)		

**LEVEL 1 ACOUSTIC ENCLOSURE**

Run Time Hours	Usable Capacity Gal (L)	L x W x H (in (mm))	Weight lbs (kg) Enclosure Only	
			Steel	Aluminum
No Tank	-	180 (4572) x 54 (1372) x 70 (1778)		
10	153 (579.2)	180 (4572) x 54 (1372) x 83 (2108)		
25	372 (1407)	180 (4572) x 54 (1372) x 95 (2413)		
40	589 (2227)	180 (4572) x 54 (1372) x 107 (2718)	1246 (565)	606 (275)
47	693 (2623.3)	180 (4572) x 54 (1372) x 107 (2718)		
64	946 (3581)	234 (5944) x 54 (1372) x 111 (2819)		
90	1325 (5015.7)	304 (7722) x 54 (1372) x 111 (2819)		

**LEVEL 2 ACOUSTIC ENCLOSURE**

Run Time Hours	Usable Capacity Gal (L)	L x W x H (in (mm))	Weight lbs (kg) Enclosure Only	
			Steel	Aluminum
No Tank	-	155 (3937) x 54 (1372) x 93 (2362)		
10	153 (579.2)	155 (3937) x 54 (1372) x 106 (2692)		
25	372 (1407)	155 (3937) x 54 (1372) x 118 (2997)		
40	589 (2227)	155 (3937) x 54 (1372) x 130 (3302)	1482 (672)	708 (321)
47	693 (2623.3)	155 (3937) x 54 (1372) x 130 (3302)		
64	946 (3581)	208 (5283) x 54 (1372) x 132 (3353)		
90	1325 (5015.7)	278 (7061) x 54 (1372) x 132 (3353)		



* All measurements are approximate and for estimation purposes only.

Specification characteristics may change without notice. Dimensions and weights are for preliminary purposes only. Please consult a Generac Power Systems Industrial Dealer for detailed installation drawings.