The Woodlands Off-Site Sanitary Lift Station, Force Main & Gravity Sewer Line A (RFCSP)
Solicitation Number: CO-00682
Job No.: 20-1630

ADDENDUM 3
November 15, 2023

To Respondent of Record:

This addendum, applicable to work referenced above, is an amendment to the bid proposal, plans and specifications and as such will be a part of and included in the Contract Documents. Acknowledge receipt of this addendum by entering the Addendum number and issue date on the space provided in submitted copies of the Respondent Questionnaire.

RESPONSES TO QUESTIONS

1. **Question:** Are we able to access the lift station?

   Answer: *Yes, access now for a walk through can be made through a gated entry off of Red Wing Road. In service access will be a paved access drive beginning at FM 471.*

2. **Question:** Reference Spec Section Instrumentation and Controls - 16901.1.05. Quality Assurance. Will SAWS be adding a list of Pre-Approved PCSI's like they have done on previous projects like this one?

   Answer: *Approved PCSI's are as follows:*

   Prime Controls
   1725 Lakepointe Dr.
   Lewisville, TX 75057
   972-221-4849

   Control Panels USA
   16310 Bratton Lane, Suite 100
   Austin, TX 78728
   512-863-3224

   RLC Controls Inc.
   8115 Hicks Hollow
   McKinney, TX 75071
   972-542-7375

Walker Industrial
408 W. Nakoma Dr.
San Antonio, TX 78216
210-824-9000

3. **Question:** One Line diagram E-3 indicates Lift Pump P-3 and P-4 as "Future", whereas all other bid documents seem to indicate these are to be included in this scope of work. Please clarify.

   Answer: *Lift Station pumps P-3 and P-4 are not future and will be installed as part of this contract. See Changes to the Plans #1. A revised sheet E-3 is included with this addendum.*

4. **Question:** Please provide the specifications for Wet Well Aerators (Wet Well Wizard), as it shows disconnect switches inside of the WW aerators. Bid documents refers to the odor control system as Wet Well Aerators (Wet Well Wizard), please confirm this is the intentions for the nomenclature. And they are not a separate system.

   Answer: *Correct, Odor control in the plans refers to the wet well wizard apparatus, blower and hoses. Details for these are attached with this addendum.*

5. **Question:** Please provide specifications for the Electrical building & HVAC system. Will there be any architectural drawings available?

   Answer: *The SAWS electrical building standards are attached with this addendum. Each HVAC unit (2 total) will need to be a 24000 BTU/ 2TON ductless mini split air condition with heat pump. 230V, 1-phase power, 60Hz. Mitsubishi Mini-split or approved equal.*

6. **Question:** Grounding specification section 16450 2.01 B states ¾"x10' Copper clad steel ground rods, specification section 16450 3.02.I calls for 5/8"x8', and plan detail sheets E-2 shows as 5/8"x 8', and E-5 and E-23 shows as 5/8"x 10'. Please clarify which is required.

   Answer: *Please provide 5/8" x 8' See Changes to the Specifications #4. 16450 – Grounding has been revised accordingly.*

7. **Question:** ATS specification in Section 16100 2.11 A.2 calls for ASCO Bulletin 300 (assuming 300 Series) however, Sheet E-3 Keynote #5 specifies ASCO 7000 Series, Model 7ADTSJ. Please clarify which is to be utilized. Also, if it's to be 300 Series, please whether 300 Series Entrance Rated Power Transfer switch is required.

   Answer: *See Changes to the Specifications #5. Section 16100 – Emergency Generator. This specification has been updated to refer to the 7000 series to comply with SAWS requirements. The ATS is not required to be service entrance rated.*

8. **Question:** Specification Section 16461 calls for a Self Contained Unit Power Center (MPZ), Sheet E-3 One-line diagram has Keynote #11 for a MPZ and refers to E-13, Keynote #11 does

not show on the one-line diagram, sheet E-13 shows SCADA Panel Schematics. Please clarify if MPZ is required for the project or not.

Answer: *An MPZ is not required. Panelboard will be used instead. Sheet E-16 shows panelboard schedule. See Changes to the Plans #1. Sheet E-3 has been revised to remove reference to an MPZ.*

9. **Question:** Please provide Lighting Fixture Schedule for the electrical building.

   Answer:
   Type A Fixtures: Lithonia DMW2 L24 4000LM PCL WD 120V 40K 80CRI, or approved equal.
   Type B Fixtures: WDGE P1 40K 80CRI VW MOVLT PE DDBXD, or approved equal.
   Type C Fixture: Lithonia ECRG SQ M6, or approved equal.

10. **Question:** SAWS has been requiring the Radio Antenna Towers to be designed, furnished, and installed by Qualified contractors, including the complete design of the tower and foundations. Will this not be the case for this project? Please clarify.

    Answer: *This is the case on this project as well. SAWS has minimum foundation requirements for lift station antenna towers. A qualified contractor will be required to evaluate the required antenna foundation and formulate a design, which is permitted to be altered from SAWS standards only if the qualified contractor demonstrates that a larger foundation is required.*

11. **Question:** Will lightning protection be required for the electrical building on this project?

    Answer: *No, no lightning protection will be required.*

12. **Question:** On drawing E-4 keynote 9 it says the SCADA cabinet shall be a NEMA 12 wall mount enclosure. On drawing E-21 note 5 calls out for the enclosure to be NEMA 4X 316SS painted white. Which is correct?

    Answer: *Since this will be installed indoors, NEMA 12 is acceptable. See Changes to the Plans #2. The previous sheet E-21 has been revised accordingly and re-issued as E-22 due to a previous duplication of sheet numbers.*

13. **Question:** Per the Supplemental Conditions it appears that the insurance requirement for this project is higher than the typical SAWS Project. This project has a $5,000,000 requirement rather than the $2,000,000. Can you provide a circumstance that is causing this increase? For example, blasting. There is not a mention that blasting is being accepted.

    Answer: *After further review of insurance requirements, SAWS has decided to lower Excess Liability from $5,000,000.00 to $2,000,000.00. Please see Changes to the Specifications #2.*

14. **Question:** Please advise if there is an electrical building or an electrical rack required. There is not a spec section for a pre-cast building, or any materials for a building. Drawing E-4 references the electrical building. Drawing S1.0 shows an electrical rack.

Answer: *Electrical Building is required. See the SAWS electrical building standards attached to this addendum.*

15. **Question:** Reference sheet no. GS6.2 detail 19: supplemental drum scrubber. Do you have a schedule or specs for this? If not, can you confirm air flow? How many of these are required?

    Answer: *See Changes to the Plans #3. Sheet GS6.2 has been revised to remove reference to a supplemental drum scrubber, which is not required.*

16. **Question:** Is it the intention to run the building exterior light (circuit LV-9) through the single pole double throw switch along with the area lights LV-2 as shown on sheet E4?? Panel Schedule on E-16 shows the building exterior light to be on a dedicated switch. The typical SAWS detail would utilize a lighting contactor for multiple circuits to be controlled by photocells. Please clarify.

    Answer: *It is correct as shown- SAWS detail was updated for this project.*

17. **Question:** Who is responsible for furnishing OCU1-CP and OCU2-CP? If contractor is to provide these panels, please provide specifications for FVNR starters required.

    Answer: *The Contractor. FVNR Specification: FVNR shall be Square D or approved equal, NEMA rated FVNR type with HMCP disconnects and solid state overload units equal to Square D Motor Logic Plus, or approved equal.*

18. **Question:** The one-line diagram on E-3 shows circuits P1-A, P2-A, P3-A, & P4-A routed to the lift pump soft starters. However, sheet E-7 shows these circuits to be routed to the LCP. Please clarify which is correct.

    Answer: *P1-A, P2-A, P3-A should all be routed to the respective SSRV. See Changes to the Plans #1. Sheets E-7, E-10, and E-11 have been revised accordingly.*

19. **Question:** Plan sheet C3.1 calls for 24" steel casing and plan sheet C3.2 calls for 30" steel casing, but the only bid item is for 36" steel casing. Is all of the casing for the force main bores to be 36"?

    Answer: *The bid Item is correct. All steel casing is to be 36" See Changes to the Plans #4. Sheets C3.1 and C3.2 have been revised accordingly.*

20. **Question:** On plan sheet C3.6 the plan and profile view calls for the road bore to end at station 54+60.90, but the profile shows the casing extending past station 55+00. Is the additional casing to be installed by open cut? And if so will a bid item be added for this?

    Answer: *The road bore with steel casing is to begin at 53+60.31 and end at 54+60.90 with open cut trenching with steel casing from 54+60.90 to 55+07.11. See Changes to the Plans #5. Sheet C3.6 has been revised accordingly.*

21. **Question:** Detail DD-846-01 on plan sheet C8.0 calls to be for installation of force main plug valves, but the detail is SAWS air release valve detail. Can a detail be provided for the isolation plug valves?

    Answer: *There is no detail for isolation plug valves. The SAWS buried water distribution valve details can be used as it's the same installation concept. A transition coupling between the HDPE force main and the plug valve is required to make the connection. The plug valves are for sewer service application and the fasteners are to be stainless steel 316.*

22. **Question:** Will the gravity line B be installed prior to the lift station being installed? If so, will the manhole have a stub-out for the 27" FRP or will a new t-base have to be installed on this manhole?

    Answer: *Yes, gravity line B will finish construction prior to the finishing of construction of the lift station. MH B-1 will be installed with the Line "B" construction. This project will tie into the downstream section of MH B-1 Tee Base manhole.*

23. **Question:** Does the manhole at station 72+02.58, where we will tie into for gravity line A have a stub-out for the 30" FRP or will a new t-base have to be installed on this manhole?

    Answer: *The tie-in manhole does not have a stub-out. A new t-base manhole will be required for that connection. See Changes to the Specifications #1. Bid items have been added for this work as well as for bypass of the existing main. The existing main to be bypassed is expected to have minimal flow, as it is currently under construction and there are currently no approved sewer connections upstream of the tie-in manhole. See Changes to the Plans #8. Sheet GS3.0 has been revised to show the existing tee-base manhole being removed with a new tee-base to be installed.*

24. **Question:** Bid item 13 is force main tie-in to existing manhole and a quantity of 2 EA. There is not an existing manhole that we tie into. The manhole is one that will be installed with gravity line A. Is this bid item needed?

    Answer: *See Changes to the Specifications #1. The Price Proposal has been revised to remove this line item as there are no instances of the force main tying into an existing main.*

25. **Question:** Can you explain what bid item 21 (pavement patching at lift station) is for?

    Answer: *See Changes to the Specifications #1. The Price Proposal has been revised to remove this line item.*

26. **Question:** On sewer line B at the lift station, the profile calls for 60" FRP manholes, but the detail on sheet C8.3 shows precast concrete. Are these manholes to be precast concrete or fiberglass?

    Answer: *All manholes to be fiberglass except the manhole immediately adjacent to wet well for the purpose assisting in helping catch rocks and heavy debris to help protect the wet well pumps. The precast concrete manhole detail on sheet C8.3 is to be used for this manhole.*

27. **Question:** On plan sheet C1.0, Supplementary Note 1 says the contractor will be responsible for obtaining the floodplain development permit. Is there a cost involved with this permit, and if so, what is the cost?

    Answer: *Yes, there is a $50 fee for that permit.*

28. **Question:** Is there a cost for the San Antonio ROW Permit? If so, what is the cost?

    Answer: *The San Antonio ROW permit does not apply to this project as it is located outside of City limits.*

29. **Question:** Is there any livestock on the property where the lift station, force main, and gravity sewer line will be installed?

    Answer: *There are no livestock on the lift station property. The force main and gravity sewer crosses a cultivated Farm Field. No livestock have been observed there but it is suggested the contractor coordinate properly with the owner before starting construction activities on that property.*

30. **Question:** In the Supplementary Instruction to Respondents o page SIR-11 it states that the SMWB goal is 21%. On the Good Faith Effort Plan it states the goal is 21.17%. Can you clarify which is correct?

    Answer: *The SMWB Goal for this solicitation is 21%. Please see Changes to the Specifications #3 correcting the Good Faith Effort Plan.*

31. **Question:** What are the bedding and initial backfill requirements for the HDPE force main? Table 1 in specification 804 only addresses HDPE water line.

    Answer: *Although specification 804 only mentions water line, this same specification can be used for bedding when regarding HDPE force main.*

32. **Question:** Can a bid item be added for the concrete drive approach at the end of the access road at FM 471?

    Answer: *See Changes to the Specifications #1. A line item has been added for the concrete drive approach.*

33. **Question:** The access cover is extremely long. Please confirm that a manufacturer can make a cover this size to meet the specs. Is there a possibility that multiple covers can be used and bolted together?

    Answer: *Hatch detail was a collaborative effort with LJA, Xylem and USF Manufacture ultimately approved by SAWS during the approval process. To the best of our knowledge USF is capable of manufacturing. Multiple bolted covers will not be permitted.*

34. **Question:** There is a conflict in the drawings and the spec for the pump sensor relays. Flygt does not make a pump sensor relay to monitor the thermals, the leak and the bearing temperature. To accomplish this, a separate sensor cable has to be run. The specs call for the MAS 801 to be used which is a two wire system to monitor multiple pump sensors. This uses the set of control wires from the power cable to accomplish this.

    Answer: *There will be two Minicas pump sensors installed per pump. See Changes to the Plans #1. Sheets E-10, E-11, and E-20 have been revised accordingly.*

35. **Question:** There is no table of contents for the technical specifications. Can you provide this information so I can incorporate it into the specifications?

    Answer: *See Changes to the Specifications #6. A Table of Contents is provided with this addendum.*

CHANGES TO THE SPECIFICATIONS

1. **Remove** the Price Proposal in its entirety and replace with the attached revised Price Proposal. The line items for force main tie-in to existing manhole and pavement patching at lift station have been removed. A line item has been added for the concrete approach at FM 471. Bid items have been added for removal of the existing tee-base manhole and the installation of a new tee-base manhole at the tie-in to the existing main. A bid item has been added for bypass of the existing main. Respondents shall use the revised price proposal when submitting for this project. Failure to use the revised version may result in the proposal being found non-responsive.
2. Page SS-3, Supplemental Conditions, Article V – Contract Responsibilities, **remove** section 5.7.1.1.6 in its entirety and **replace** with the following:

    .6 Excess/Umbrella Liability (UL) insurance shall have minimum policy limits of $2,000,000 per occurrence and $2,000,000 in the aggregate. This policy shall be of an "Occurrence" type and the limit of liability shall be concurrent with (following form) and in excess of the EL, CGL, and AL lines of insurance coverage as described in Articles 5.7.1.1.2, 5.7.1.1.3, and 5.7.1.1.5 listed above.

    NOTE – For the Excess/Umbrella Liability policy, describe in the Description of Operations section of the Certificate of Liability Insurance ("Certificate"), the coverage form under which this line of coverage is written – either:

    • Umbrella liability form; or

    • Excess Liability form.

    This line of insurance coverage shall be endorsed:

• Additional Insured - The Commercial General Liability policy shall be endorsed naming the SAWS and the City of San Antonio as an Additional Insured for both ongoing and completed operations.

• Waiver of Subrogation - The Commercial General Liability policy shall be endorsed with the Waiver of Subrogation in favor of SAWS and the City of San Antonio.

All other sections remain the same.

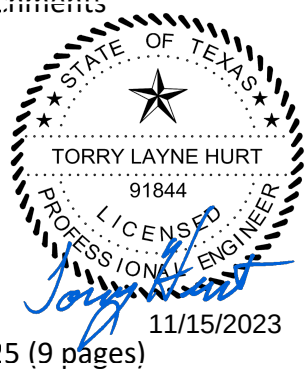
3. **Remove** Good Faith Effort Plan (GFEP) and **replace** with the version attached to this addendum.
4. **Remove** Specification 16450 – Grounding in its entirety and **replace** with the version attached to this addendum.
5. **Remove** Specification 16100 – Emergency Generator in its entirety and **replace** with the version attached to this addendum
6. **Insert** Table of Contents attached to this addendum into the Bid Documents.

CHANGES TO THE PLANS

1. **Remove** sheets E-3, E-7, E-10, E-11, and E-20 in their entirety and **replace** with the versions attached to this addendum.
2. **Remove** sheets E-21, E-22, E-23, and E-24 in their entirety and **replace** with sheets E-22, E-23, E-24, and E-25 attached to this addendum. The previous version of plans had two plan sheets labeled E-21. The second of these has been re-named E-22 and the succeeding sheets have been renumbered accordingly.
3. **Remove** sheet GS6.2 and **replace** with the version attached to this addendum.
4. **Remove** sheets C3.1 and C3.2 and **replace** with the versions attached to this addendum.
5. **Remove** sheet C3.6 and **replace** with the version attached to this addendum.
6. **Remove** sheet C3.0 and **replace** with the version attached to this addendum.
7. **Remove** sheets E-10 and E-11 and **replace** with the versions attached to this addendum.
8. **Remove** sheet C3.0 and **replace** with the version attached to this addendum.

END OF ADDENDUM 3

This addendum is fifty-eight (58) pages in its entirety, with ten (10) attachments



Attachments: Price Proposal (3 pages)
Good Faith Effort Plan (3 pages)
Wet Well Wizard Details (7 pages)
SAWS Electrical Building Standards (2 pages)
Table of Contents (3 pages)
16450 – Grounding (3 pages)
16100 – Emergency Generator (15 pages)
Sheets E-3, E-7, E-10, E-11, E-20, E-22, E-23, E-24, and E-25 (9 pages)
Sheet GS3.0 (1 page)
Sheet GS6.2 (1 page)

PRICE PROPOSAL

PROPOSAL OF _____, a corporation

a partnership consisting of _____

an individual doing business as _____

THE SAN ANTONIO WATER SYSTEM:
Pursuant to Instructions and Request for Competitive Sealed Proposals, the undersigned proposes to furnish all labor and materials as specified and perform the work required for the project as specified, in accordance with the Plans and Specifications for the following prices in the bid proposal to wit:

PLEASE SEE ATTACHED LIST OF BID ITEMS.

_____
RESPONDENT'S SIGNATURE & TITLE

_____
FIRM'S NAME (TYPE OR PRINT)

_____
FIRM'S ADDRESS

_____
FIRM'S PHONE NO. /FAX NO.

_____
FIRM'S EMAIL ADDRESS

The Contractor herein acknowledges receipt of the following: Addendum Nos._____

OWNER RESERVES THE RIGHT TO ACCEPT THE OVERALL MOST RESPONSIBLE PROPOSAL.

The Respondent offers to construct the Project in accordance with the Contract Documents for the contract price, and to complete the Project within **550** calendar days after the start date, as set forth in the Authorization to Proceed. **The Respondent understands and accepts the provisions of the contract Documents relating to liquidated damages of the project if not completed on time.**

Complete the additional requirements of the Proposal which are included on the following pages.

Statement on President's Executive Orders

Has your firm previously performed work subject to the President's Executive Orders Numbers 11246 and 11375 or any preceding similar executive orders (Numbers 10925 and 11114)?

Yes ☐ No ☐

Quotes						
Line No.	**Item No.**	**Item Description**	**Unit**	**Quantity**	**Unit Price**	**Total**
1		Lift Station	LS	1		
2	200	8" Lime Treated Subgrade (Access Road)	SY	10,620		
3	200	12" Flex Base (Access Road)	SY	10,620		
4	200	3" HMAC Type "D" (Access Road)	SY	8,790		
5	848	18" DIPS DR-11 HDPE Force Main	LF	17,162		
6	857	30" FRP SN72 Pipe (8'-12')	LF	1,248		
7	857	30" FRP SN72 Pipe (12'-16')	LF	1,960		
8	857	30" FRP SN72 Pipe (16'-20')	LF	450		
9	853	60" FRP Tee Base Manhole	EA	7		
10	853	60" FRP Tee Base Manhole (Vented)	EA	2		
11	852	60" Water Tight Ring & Cover Sewer Manhole	EA	1		
12	550	Trench Excavation Safety Protection	LF	12,239		
13	848	Remove Existing Vented Tee-Base Manhole at Gravity Tie-In	EA	1		
14	848	New Vented Tee-Base Manhole at Gravity Tie-In	EA	1		
15	864	Bypass Pumping at Gravity Tie-In	LS	1		
16	856	Jacking, Boring, & Directional Drilling	LF	750		
17	856	36" Steel Casing	LF	600		
18	856	18" DIPS DR-11 HDPE Force Main Carrier Pipe	LF	600		
19	856	48" Steel Casing	LF	150		
20	856	30" FRP SN72 Carrier Pipe	LF	150		
21	858	Concrete Encasement	CY	200		
22		Concrete Drive Approach at FM 471	SY	105		
23		Miscellaneous Appurtenances	LS	1		
24	841	Hydrostatic Testing	LS	1		
25	866	Post Sanitary Sewer Televeision inspection	LF	3,658		
26	104	Temporary Sedimentation & Erosion Control	LS	1		
SUBTOTAL (ITEMS 1-26)						

27	100	Mobilization Maximum 10% of line items 1-26	LS	1		
28	100A	Intermediate Mobilization and Demobilization (Gravity Main Work)- This item shall include project move-in and move-out of personnel and equipment, for all work including furnishing all labor, materials, tools, equipment, and incidentals required to mobilize, demobilize, bond and insure the Work for the project in accordance with the Contract Documents, complete in place.	EA	1		
29	100B	Intermediate Mobilization and Demobilization (Lift Station Work) - This item shall include project move-in and move-out of personnel and equipment, for all work including furnishing all labor, materials, tools, equipment, and incidentals required to mobilize, demobilize, bond and insure the Work for the project in accordance with the Contract Documents, complete in place.	EA	1		
30	101	Preparation of Right-of-Way - This item shall include preparing the right-of-way for construction operations be removing and disposing all obstructions from the right-of-way and from designated easements where removal of such obstructions is not otherwise povided for in the contract documents. Maximum 5% of line items 1-26	LS	1		

MOBILIZATION AND PREPARATION OF RIGHT-OF-WAY SHALL BE LIMITED TO THE MAXIMUM PERCENTAGE SHOWN. IF THE PERCENTAGE WRITTEN EXCEEDS THE ALLOWABLE MAXIMUM STATED FOR MOBILIZATION AND PREPARATION OF RIGHT-OF-WAY, SAWS RESERVES THE RIGHT TO CAP THE AMOUNT AT THE PERCENTAGES SHOWN AND ADJUST THE EXTENSIONS OF THE BID ITEMS ACCORDINGLY.

TOTAL PROPOSAL PRICE (TO INCLUDE LINE ITEMS 1- 30)	

Good Faith Effort Plan for Construction SUBCONTRACTS for:

NAME OF PROJECT: The Woodlands Off-Site Sanitary Lift Station, Force Main & Gravity Sewer Line A

SECTION A - PRIME CONTRACTOR INFORMATION

Legal Name of Firm, including "doing business as" if applicable: _____

Address of Office to Perform Project Work: _____

City: _____ **State:** _____ **Zip Code:** _____

Telephone: _____ **Fax:** _____

Contact Person: _____

Email Address: _____ **Is your firm Certified as an SMWB?** **Yes:** _____ **No:** _____

If "Yes", was your firm certified by the South Central Texas Regional Certification Agency (SCTRCA) or the Texas Comptroller's Office (HUB)? Only SCTRCA or HUB certifications granted to "local" firms are recognized. Please see the Good Faith Effort Plan Definition for "Local":

Yes: _____ **No:** _____

Type/s of Certification: **SBE:** _____ **MBE:** _____ **VBE:** _____ **WBE:** _____

If Prime Contractor has a San Antonio location, what date was the local office established? ____/____/_____

Number of Full Time Employees in San Antonio? _____

	Prime Contractor's Percentage of Participation (may not be less than 40%): (Ex: 56% is the total value of the contract.)				_____%
	Legal Name of Subcontractor/Supplier (including "doing business as", if applicable).	**Address of Office Location to Perform Project Work or Provide Supplies. (Only Local firms will be counted for SMWB credit):**	**Scope of Work/Supplies to be Performed/Provided by Firm:**	**Estimated Contract (dollar) Amount on this Project:**	**Certification Type & Agency. (Only SCTRCA or HUB certifications are recognized):**
1				$	
2				$	
3				$	
4				$	
5				$	

1. List **ALL** SUBCONTRACTORS/SUPPLIERS that will be utilized on this project/contract. (SMWB **AND** Non-SMWB)

SECTION B. – SMWB COMMITMENTS

The SMWB goal on this project is 21 %

1. The undersigned proposer has satisfied the requirements of the BID specification in the following manner (please check the appropriate space):

If the Respondent/Bidder is unable to meet the goal, please fill out Section C and submit documented good faith efforts.

2. Name and phone number of person appointed to coordinate and administer the SMWB requirements on this project.

Name: _____

Title: _____

Phone Number: _____

Email Address: _____

IF THE SMWB GOAL WAS MET, PROCEED TO AFFIRMATION AND SIGN THE GFEP. IF GOAL WAS NOT MET, PROCEED TO SECTION C.

SECTION C – GOOD FAITH EFFORTS (Fill out only if the SMWB goal was not achieved).

1. SOLICITATION METHOD(S) UTILIZED

At least two methods of solicitation are required. Select the method(s) below that were utilized for good faith outreach. Copies of the actual postings, direct contact email/phone log, etc. must be attached to this form as support documentation for each method used. Failure to adequately follow these steps will result in the requirement to take additional steps to become compliant.

Newspaper Advertisements

Meetings or Conferences

Trade Association Publications

Minority Media

Internet & Web Postings Other Government Publications

Direct Contact by Phone, Fax, USPS Mail, or Email*

*If using direct contact, entities must solicit to a minimum of 3 SMWB businesses/firms for each scope of work that Respondent intends to engage a subconsultant for, (i.e., construction, supplies, equipment, or services) to demonstrate a Good Faith Effort.

2. On a separate sheet of paper, list and attach to this Good Faith Effort Plan written, posted, or published notification and/or proof of direct contact to all firms you contacted as a part of your company's Good Faith Outreach.

AFFIRMATION

I hereby affirm that the above information is true and complete to the best of my knowledge. I further understand and agree that, this document shall be attached thereto and become a binding part of the contract.

Name and Title of Authorized Official:

Name: _____

Title: _____

Signature: _____

Date: _____

NOTE:

This Good Faith Effort Plan is reviewed by SAWS Contracting Department. For questions and/or clarifications, please contact the SMWB Program Manager, at SMWB@saws.org.

DEFINITIONS

Note: To be eligible for participation in the SAWS Small, Minority, and Woman-owned Business Program, a firm must have an established place of business in the Relevant Marketplace and must be certified as a Small Business Enterprise (SBE) or Historically Underutilized Business (HUB). This includes firms certified as Minority and/or Woman-owned Business Enterprises (MBEs and WBEs).

African American Business Enterprise (AABE): A business structure that is Certified by the Texas Historically Underutilized Business (HUB) Program or the South Central Texas Regional Certification Agency as being 51% owned, operated and controlled by African American minority group member(s) who are legally residing in or are citizens of the United States.

Local: A business located in the Relevant Marketplace, which includes the counties of Bexar, Comal, Guadalupe, Hays, Kendall, Travis, and Williamson. A business's presence in the local area that consists solely of a P.O. box, a mail drop, or a telephone message center does not count as being local.

Minority Business Enterprise (MBE): A business structure that is Certified by the Texas Historically Underutilized Business (HUB) Program or the South Central Texas Regional Certification Agency as being 51% owned, operated, and controlled by an ethnic minority group member(s) who is legally residing in or a citizen of the United States. For purposes of the SMWB program, the following are recognized as minority groups:

- **African American**: Persons having origins in any of the black racial groups of Africa.
- **Asian**: Persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent or the Pacific Islands, or persons whose origins are from India, Pakistan, Bangladesh, Sri Lanka, Maldives Islands, Bhutan, or Nepal.
- **Hispanic American**: Persons of Mexican, Puerto Rican, Cuban, Spanish or Central or South American origin.
- **Native American**: Persons having no less than 1/16 percentage origin in any of the American Indian Tribes, as recognized by the United States Department of Indian Affairs and as demonstrated by possession of personal tribal role documents, to include persons who are Eskimos, Aleuts, or Native Hawaiians, for all SCTRCA purposes.

Prime Contractor: Any person, firm, partnership, corporation, association, or joint venture which has been awarded a San Antonio Water System contract.

Relevant Marketplace. The geographic market area affecting the SMWB Program as determined for purposes of collecting data for the prior and any future Disparity Study, and for determining eligibility for participation under various programs established by this Policy. The Relevant Marketplace consists of the following Texas counties: Bexar, Comal, Guadalupe, Hays, Kendall, Travis, and Williamson.

Small Business Enterprise (SBE): A business structure that is Certified by the South Central Texas Regional Certification Agency as being 51% owned, operated and controlled by someone who is legally residing in or a citizen of the United States, and the business structure meets the U.S. Small Business Administration's (SBA) size standard for a small business within the appropriate industry category, as determined by the South Central Texas Regional Certification Agency.

Small, Minority, and Woman-owned Business (SMWB): All business structures Certified by the Texas Historically Underutilized Business (HUB) Program or the South Central Texas Regional Certification Agency that are 51% owned, operated, and controlled by individuals or a group of individuals that qualify for certification as a Small Business Enterprise, a Minority Business Enterprise, or a Woman-owned Business Enterprise, and are located in the Relevant Marketplace.

Subcontractor: Any named person, firm, partnership, corporation, association, or joint venture identified as providing work, labor, services, supplies, equipment, materials or any combination thereof under contract with a prime contractor on a San Antonio Water System contract.

Woman-owned Business Enterprise (WBE): A business structure that is Certified by the Texas Historically Underutilized Business (HUB) Program or the South Central Texas Regional Certification Agency as being 51% owned, operated and controlled by a woman or women who are legally residing in or citizens of the United States.

Web Submittal of Subcontractor/Supplier Payment Reports:
The Consultant will be required to electronically report the actual payments to all sub-consultants and suppliers utilizing the Subcontractor Payment and Utilization Reporting (S.P.U.R.) System, beginning with the first SAWS payment for services under the contract, and with every payment thereafter (for the duration of the contract). Electronic submittal of monthly subconsultant payment information will be accessed through a link on SAWS' "Business Center" web page. This information will be utilized for subconsultant participation tracking purposes. Any unjustified failure to comply with the committed SMWB levels may be considered breach of contract.

The Consultant and all subconsultants will be provided a unique log-in credential and password to access the SAWS subconsultant payment reporting system. The link may also be accessed through the following internet address: https://saws.smwbe.com/

WET WELL WIZARD™

The Remedy for Collection System Problems

- **Dissolves FOG within hours**
- **Eliminates odor completely**
- **Eliminates the septicity of H_2S in the wet well and downstream**
- **Transforms the microbes in the wet well to a completely aerobic population**
- **Improves the water quality of the collection system to the point of pre-processing the water, which can improve wastewater plant operations**

The *WIZARD* Ejector

The ***WET WELL WIZARD***™ is the only 'one-size-fits-all' wet well aeration system that has no moving parts, is completely non-corrodible, is simple to install, requires no lifting chains, and utilizes no electricity underwater. It can be installed in 30 minutes and requires almost no maintenance. This multi-patented technology consists of a unique set of antipodal bubble cleaving disks inside a confined tube that cuts and shapes large air bubbles into high speed, spinning "FOG cutters." For large wet wells (over 10' in diameter) multiple Wizards operate with the use of a single air generation source. The only maintenance is cleaning an air filter occasionally.

The ***WET WELL WIZARD***™ is designed in such a manner that it will not cause air entrainment in pumps and it will not become clogged with floating well debris. The air source is an industrial grade regenerative blower that incorporates many stainless steel components, and total blower noise level is rated at only 68dB to 75dB depending on blower HP. An HDPE blower weather cover or fiberglass locking weather enclosure are available. Watch this short 3 minute video https://youtu.be/Yb7v4jiiZck to view the ***WIZARD*** system's capabilities.

Why the *WET WELL WIZARD*?

Collection systems containing lift stations all have the same problems –

- The buildup of FOG (fats, oils and grease)
- Odor – both in the lift stations and down-line
- Increased pump maintenance due to short cycling and clogging
- Septicity in the collection system causing H_2S gas corrosion
- Costly cleaning and maintenance – often reoccurring vacuum disposal and/or chemical use

The Reliant Water ***WET WELL WIZARD*** is the answer to all of these problems. So, why is it so effective –

1. The ejection of a continuous flow of cleaved spinning bubbles into the wet well water, breaks up and liquefies FOG and other viscous semi-solids. Solid non-dissolvable waste items will be freed of their FOG coatings for easy dip screen collection and disposal.
2. All indigenous microbial activity in the wet well becomes aerobic, so bio-degradation of organic matter, and odors, is continuous. **Odor-masking chemicals are no longer required.**
3. When FOG and trash buildup becomes thick in the wet well, float switches have a tendency to lie on top of, or get trapped below, the FOG and debris. This allows the waste to collect closer to pump intakes and cause premature damage to the pumps. Short cycling and premature pump failure is also common under these conditions. With a ***WIZARD*** system these problems disappear.
4. Due to the high levels of dissolved oxygen in the wet well, the formation and buildup of H_2S and corrosive gas is eliminated and no longer cause odors and corrosion to concrete and steel components throughout the entire lift station. ***Thiobacillus sp.*** **is eliminated.**
5. Collection system crews no longer have to spend hours in lift stations cleaning FOG and debris. A simple screen scoop for small floating debris is all that is necessary.

Visual Proof of the *WET WELL WIZARD'S* Capability

A 5' diameter wet well with a 2.5 foot thick FOG cap. Note the float switch lying on top – causing pump short-cycling

←

Same wet well just 10 minutes following the start-up of the ***WET WELL WIZARD***. Note that the float switch has already repositioned itself.

←

The same wet well 24 hours later.

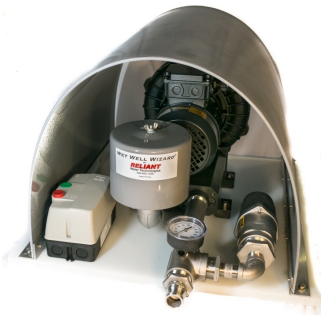
The *WET WELL WIZARD* is Customer Installable
Standard Components are -

The Wiz with HDPE body and internal bubble cleavers

10 pound stainless steel base and support

Three ply reinforced EPDM air hose w/ Cam Loc connections

Brass and stainless steel Cam Loc hose connections



Blower, SS manifold with over-pressure protection and manual starter

Locking Weather Blower Cover

HDPE Blower Weather Cover

Options Available

- HDPE non-corrosive blower cover
- Locking fiberglass full cover for weather protection from long-term freezing applications
- Automatic restart switch
- Stainless steel filter element
- For wet wells larger than 10' dia, or 80sqft, use multiple Wizards with a multiple hose manifold on the blower
- Blowers up to 10HP for large wet wells
- Stainless steel air balancing valves
- Stainless steel hose/cable grips
- Extended hose lengths are available, but depend on elevation and blower HP

Specifications

Wiz body – 3" (76mm) dia. HDPE tube
Bubble cleaving disks – ¼" (6.35mm) HDPE
Hardware & base – all 316L stainless steel
Hose – 1" ID 3-ply EPDM high pressure hose
Blower – 1.5 HP (1.1 kW) to 10HP (7.5kW); two stage, low volume, high pressure regenerative blower; any desired voltage, phase, and Hz; includes stainless steel manifold, pressure relief valve, inches of water gauge, magnetic manual starter, polyester intake filter, and complete SS intake filter system. Sound level at 68dB to 76dB.

Supplied Standard for a Single Wiz Installation (for <80sqft wet wells)

- 1 Wizard complete with stainless steel base and Camlock hardware.
- 35 feet of 3-ply reinforced EPDM air hose with Camlock connection hardware
- 1 1.5HP regenerative blower to meet your required source power, including IP65 motor protection, manual starter, pressure relief valve, inches of water gauge and complete stainless steel manifold, intake filter plumbing, polyester filter with a stainless steel filter hood. Includes all necessary hardware for operation.
- 1 Installation manual.

Necessary Information for a Firm Price Quote

Lift station ID_____ Town/State or Elevation_____

1. How deep is your lift station wet well? _____

2. What is the diameter, or surface dimensions, of the wet well for that lift station? _____ A single Wizard ejector will handle wet wells up to 10 feet in diameter. Two Wizards will handle wet wells up to 15 feet in diameter or 180 sqft of surface area. In this case the same blower will drive both Wizard ejectors. Larger round, square or rectangular wells are possible. Larger blowers can always drive more than 2 Wizard ejectors

3. What is the minimum water level in the wet well (pump-off depth)? _____

4. What is the maximum water level in the wet well (pump-on depth)? _____

5. Are pumps located in the absolute center of the wet well? _____
   Most pumps are located close to the wall of a wet well. If they are in the center, away from the wall (circular or square wells under 80sq feet of surface area) two Wizards will be required.

6. Distance, in feet, from the bottom of the wet well to the preferred location of the blower? _____
   Air hose must reach from the bottom of the wet well to the location where the blower will be located. Blower location is your choice.

7. Voltage and phase, and Hz of the power for your lift station? _____
   Single and three phase blowers, and any Hz are available.

8. Primary problem – H2S odor ___ FOG Cap ____ Wall scum ____ Other ____

WELCOME TO THE WORLD OF
MINIMAL MAINTENANCE WET WELLS

RELIANT
Water Technologies

5670 Hayne Blvd.
New Orleans, LA 70126
Tel 504-400-1239
FAX 504-242-8887

sales@reliantwater.us.com
www.reliantwater.us.com

Represented by -

Parker GST® II (Series 7031, 7057, 7092, 7093, 7096)

PARKER (SERIES) GST® II (ID) XXX PSI MAX WP MADE IN USA (DATE CODE)

GST II Series 7031 7057 7092 7093 7096

GST® II hose is a versatile general purpose hose designed to handle air, mild chemicals and water. The hose construction incorporates a tube that is compatible with light oil mists found in air tool lubricating systems, and the multiple plies of textile reinforcement provide flexibility. The cover is resistant to abrasion, heat and ozone, and is available in multiple standard colors for color-coded identification. **NOTE:** Do not with use with oil or refined fuel.

Series 7092 (Red) and Series 7093 (Black)

Part Number	Hose I.D.		Reinf Plies	Hose O.D.		Approx Weight		Min Bend Rad		Max Rec WP		Perm Cplg Rec	Std Pack Qty
→ 7092 or 7093	inch	mm		in	mm	lbs/ft	kg/ft	in	mm	psi	bar		ft
-100200	1	25.4	2	1.406	35.7	0.47	0.21	7.0	177.8	200	13.8	HY	300

SCL R20 / R30 / R40

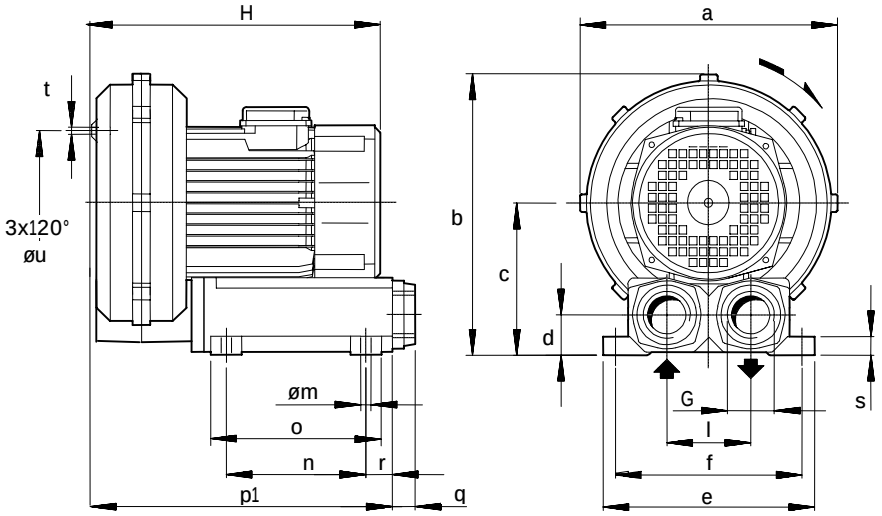
MD SERIES

SN 2464-7 1/2

STANDARD FEATURES
- Low weight cast aluminum construction.
- Quiet operation with integral inlet and outlet muffling.
- Recognized TEFC - cURus motor.
- High efficiency / low noise impeller design.
- No lubrication / maintenance required.
- Allowed ambient: +5 °F to +104 °F.
- Mountable in any plane.

OPTIONS
- Remote drive models (belt or coupling).
- Special voltages.
- Surface treatment or plating.
- Gas tight sealing.
- Special designs available.

ACCESSORIES
- Inlet and/or inline filters.
- Additional inlet/outlet silencers.
- Relief valves.
- Flow converting devices.
- Optionals connectors



Dimensions in inches.
Dimension for reference only.

Model	a	b	c	d	e	f	G	l	m	n	o	p1	q	r	s	t	u
R20-MD	11.14	12.17	6.57	1.85	9.25	8.27	1" ¼ NPT	3.54	0.39	5.91	7.87	13.58	0.71	1.77	0.87	M6	5.91
R30-MD	12.56	13.62	7.36	1.85	9.25	8.27	1" ¼ NPT	3.54	0.39	5.91	7.87	13.94	0.71	1.77	0.87	M6	7.09
R40-MD	13.78	14.65	7.76	1.85	9.25	8.27	1" ¼ NPT	3.54	0.39	5.91	7.87	14.33	0.71	1.77	0.87	M8	8.86

Model	Maximum flow Scfm		Installed power Hp		Maximum differential pressure Δp (In WG)		Noise level Lp dB (A) (1)		Overall dimensions H	Weight
	60 Hz 3500 rpm	50 Hz 2900 rpm	60 Hz 3500 rpm	50 Hz 2900 rpm	60 Hz 3500 rpm	50 Hz 2900 rpm	60 Hz 3500 rpm	50 Hz 2900 rpm	Inches	Lbs
R20-MD	41	35	1 ½	1 ½	161	161	68.5	66.5	13.39	48.5
R30-MD	65	54	2	2	140	170	72.2	69.2	15.58	57.3
			3	-	191	-	72.8	69.7	15.55	66.1
R40-MD	78	69	3	3	141	170	72.8	70.8	16.22	77.2
			4	4	201	201	73.3	71.3	17.09	88.2

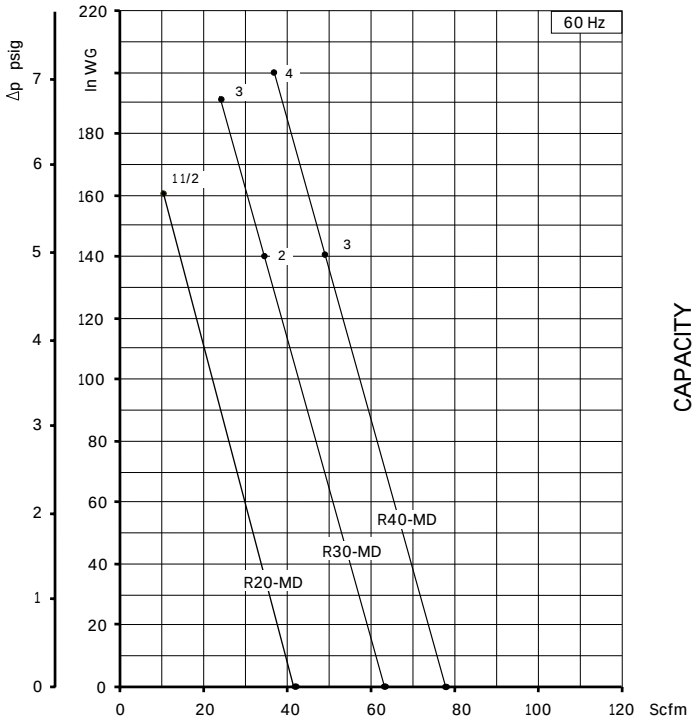
(1) Noise measured at 1 m distance with inlet and outlet ports piped, in accordance to ISO 3744.

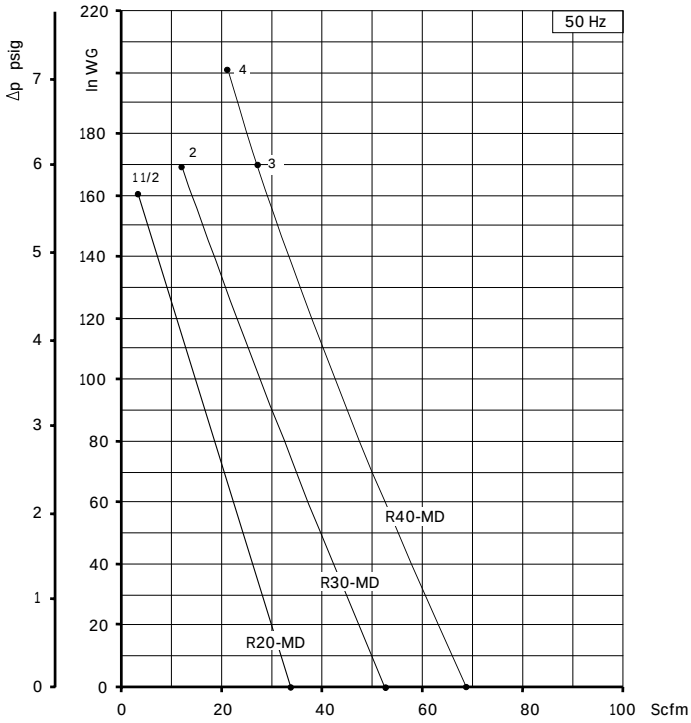
- For proper use, the blower should be equipped with inlet filter and relief valve; other accessories available on request.
- Ambient temperaturefrom +5° to +104°F.
- Specifications subject to change without notice.

SCL R20 / R30 / R40 MD SERIES

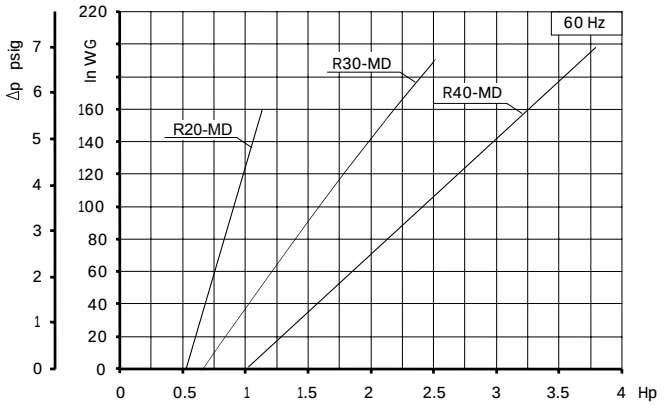
SN 2464-7 2/2

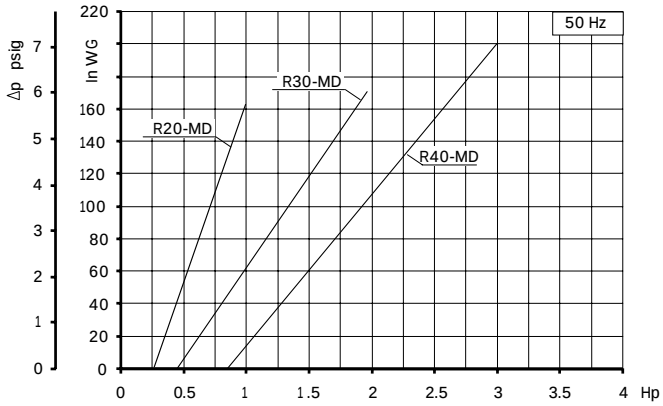
CAPACITY



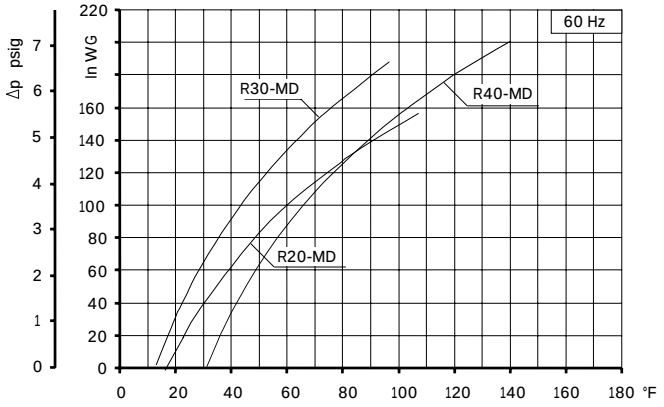


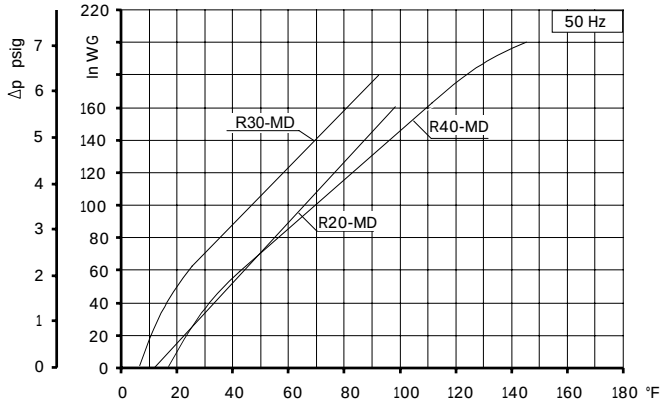
ABSORBED POWER





TEMPERATURE INCREASE





Curves refer to air at 68°F temperature and 29.92 In Hg atmospheric pressure (abs) measured at inlet port.
Values for flow, power consumption and temperature rise: +/-10% tolerance.
Data subject to change without notice.

Electric Building Standards:

a. The electrical building shall be of the prefabricated concrete panel type and be assembled at the lift station site.

b. The electrical building will be installed within a sanitary sewer lift station. The lift station site layout shall be designed in a manner that the prevailing wind blows wet well gases away from the building.

c. The building shall be watertight and shall be sealed in a manner to avoid entrance of wet well gases inside the building.

d. Structural engineer shall be responsible for the design of the foundation. The design of the foundation shall be done in strict coordination with the building manufacturer, electrical engineer and civil engineer. All electric conduits entering and leaving the building shall be underground. Penetrations through the building walls shall not be permitted, except for building external receptacles, external building lighting and high level alarm horn and beacon, and provided the wall penetrations are sealed to be water proof.

e. The internal length and width shall be coordinated with the electrical engineer considering the enclosures and equipment to be installed inside. In no case shall the building width be less than 10 feet.

f. The prefabricated building walls shall be placed over the concrete foundation.

g. The design loads shall be in compliance with the local requirements of the IBC, including loads imposed by wall mounted enclosures and equipment.

h. Building shall be fully insulated in a manner to provide a minimum insulation rating of R20.

i. Components of the building shall be made of non-combustible materials. The complete building shall meet a minimum of one hour fire rating.

j. There shall be two means of egress at opposite ends of the building. Doors shall be provided with panic exit bar opening. Doors shall open towards outside of the building. Doors shall be provided with sight window.

k. Minimum door dimensions shall be 3-ft wide x 9-ft high. For special cases in which there will be enclosures or equipment which overall dimensions will not fit through the specified doors, then at least one door shall be replaced with a double door to provide sufficient working clearance to pass through the oversized equipment or enclosures.

l. The building height shall be about 12-ft.

m. The climate controlled electrical building shall have dual climate control units with full redundancy to provide both hearing and cooling. Each cooling climate control unit shall

be sized to maintain an internal temperature of 75-ºF and 50% relative humidity while the external ambient temperature is 105-ºF with direct sunlight exposure. Similarly, each heating climate control unit shall be sized to maintain an internal temperature of 70-ºF and 50% relative humidity while the external ambient temperature is 25-ºF. The climate control units shall be located one on each extreme of the building and they shall be controlled by a thermostat that allows the units to alternate upon each operating cycle and also operate under a Lead-Lag Control algorithm.

n. HVAC and dust filtering equipment shall be located in a manner that it does not interfere with any electrical enclosure and wiring system.

o. The structure of the building shall be self supporting and designed for road shipment, lifting and assembling at lift station site. Special lifting bars and slings shall be provided.

p. The roof shall have 1-inch pitch minimum to the foot. Rain gutters shall be included to capture and drain rain water to grade level. Drain gutters shall not be placed near the doors.

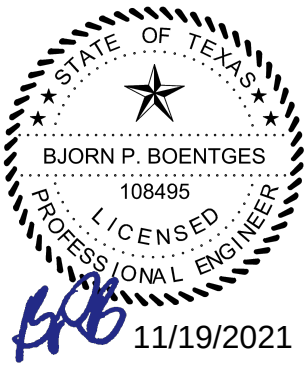
q. External color finish shall be of the light gray to light beige tones.

APPENDIX F

100% PROJECT SPECIFICATIONS

SPECIFICATION INDEX

CIVIL SPECIFICATIONS (Refer to San Antonio Water System Standard Specifications)



100	Mobilization
101	Preparing Right-of-Way
200	Flexible Base
300	Concrete (Natural Aggregate)
301	Reinforcing Steel
307	Concrete Structures
550	Trench Excavation Safety Protection
804	Excavation, Trenching, & Backfill
824	Water Service Supply Lines
833	Meter and Meter Box Installation
839	Anchorage/Thrust Blocking and Joint Restraint
845	Gate, Fencing, and Property Marker Details
846	Air Release Assemblies
848	Sanitary Sewers
849	Sanitary Sewer Pipe Air and Deflection Testing
850	Sanitary Sewer Structures
852	Sanitary Sewer Manholes
853	Glass-Fiber Reinforced Polyester (FRP) Manholes
858	Concrete Encasement, Cradles, Saddles, and Collars
864	Bypass Pumping
866	Sewer Main Television Inspection
869	Project Signs
902	Construction Safety and Health Program
903	Construction QC/QA Program
904	Construction Phase Procedures
1110	Progress Schedule
1112	Project Record Documents

STRUCTURAL SPECIFICATIONS (Provided by Intelligent Engineering Solution, LLP)

3100	Cast-In-Place Concrete

SPECIAL SPECIFICATIONS

13100	Electrical Building (to be provided in next submittal)
15240	Pump Specification

ELECTRICAL & SCADA SPECIFICATIONS (Provided by JRSA Engineering, Inc.)

16010	Electrical General Information
16011	Transient Voltage Surge Suppression (TVSS)
16100	Generator
16110	Conduit Systems
16120	Wire and Cable
16130	Boxes and Fittings
16140	Wiring Devices and Plates
16180	Safety Switches
16402	Electrical Service
16450	Grounding
16461	Self Contained Unit Power Centers
16470	Panelboards
16476	Circuit Breakers
16530	Lighting
16901	Instrumentation and Controls
16902	Control Panels
16904	SCADA Radio System
16940	Instrumentation Heat Trace System
16950	Calibration and Testing
16951	Testing Instrumentation and Controls

SECTION 16450

GROUNDING

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. The work performed under this Section consists of providing all labor, material, tools, equipment and related items required to furnish and install an electrical grounding system in conduits.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 01300 “Submittals”

B. Section 16010 “Electrical General Provisions”

C. Section 16950 “Calibration and Testing”

1.03 REFERENCE STANDARDS

A. NEC

B. IEEE Standard 142 - Recommended Practice for Grounding of Industrial and Commercial Power Systems.

C. ANSI/UL 467 - Safety Standard for Grounding and Bonding Equipment.

PART 2 - PRODUCTS

2.01 MATERIAL

A. All wire and fittings shall be 98 percent conductivity copper.

B. Ground Rods shall be Copperweld, or equal, copperclad steel rods, 5/8” x 8’ unless otherwise noted.

C. Above ground connections shall be made with ground lugs, terminals, posts, etc., Burndy, Thomas & Betts, or equal.

D. Connections below grade shall be made with Cadweld process, or equal, connections.

PART 3 - EXECUTION

3.01 SYSTEM GROUNDING

A. The secondary of all alternating current distribution systems which are to be grounded shall have the common conductor connected directly to the grounding conductor at the point of supply, i.e., on the line side of the main disconnect switch.

B. All grounding shall be tested in accordance with Section 16950.

3.02 SAFETY GROUNDING OF EQUIPMENT

A. Safety grounding of equipment will be accomplished by providing an equipment ground wire, as shown on the drawings which will be no less than the size recommended in Article 250 of the National Electric Code. This ground will extend throughout the system by means of insulated green

ground wires connected to ground buses in each switchgear, switches, pump control panel, SCADA panel, panelboard and terminal on each outlet box, light fixture housing or grounding terminal of the motor. Install bonding jumpers from ground lugs on conduit grounding bushings to ground buses.

B. Each ground bus in addition to connecting to its feeder ground will be grounded to the building ground rods where applicable.

C. Connect ground wires entering outlet boxes in a manner which will allow removal of the receptacle without interrupting the continuity of the grounding circuit. A grounding screw attached to the box, and used for no other purpose, will accomplish this.

D. Where the equipment has no facility to attach an equipment ground wire, use a Burndy Quick lug or equal. Clean the metal surface under the lug to bright metal so that good contact can be made.

E. Connect equipment grounds to motors using a grounding stud threaded into the stationary frame of the motor and not the end bell.

F. Make ground connections to equipment by using ground lugs; or, ground bars where they are provided. Do not make connections to equipment anchor bolts.

G. Connect equipment ground wires to grounding lugs in the lighting panel. DO NOT CONNECT EQUIPMENT GROUNDS AND NEUTRALS AT THE PANELBOARD.

H. All underground cable connections and taps shall be made by a thermoweld process similar or equal to the Cadweld process. Coat connections with Koppers Bitumastic No. 505, or equal.

I. Grounding rods shall be used for grounding electrodes. They shall be placed at convenient locations as shown on the drawings. Ground rods shall be Copperweld with machined drive points and chamfered drive ends. The top of the rods shall be driven at least 18-inches below finished grade. Rods shall be a minimum of 5/8-inch in diameter and not less than 8-feet in length.

J. Furnish a separate dedicated insulated ground conductor and ground rod for the instrumentation and telemetry system. Connect ground wire to a dedicated insulated ground bus in the Pump Control Panel and in the RTU respectively.

K. General items to be grounded shall consist of enclosures and/or frames for motor starters, circuit breakers, transformers, safety switches, switchgear, panelboards, motors, capacitors, transfer switches, control panel, antenna towers, and exposed metal parts of similar equipment. These items shall have solidly grounded cable connections to the grounding system.

L. Connect the Xo terminal of the lighting transformer driven electrode to building steel or underground metallic water piping where available. Otherwise connect to ground loop.

M. Ground cable termination to enclosure and frames shall be similar to Thomas and Betts 71000 Series.

N. Ground wires installed above grade to be insulated and in conduit for protection. Bare ground wires shall be installed in Schedule 40 PVC conduit.

O. In general, resistance to ground shall not exceed 5 Ohms; however, resistance to ground of the instrument ground shall not exceed 1 Ohm.

P. Separate grounding shall be provided for insturmentation circiuts including all SCADA and control

panels.

Q. Provide a ground moisturizing port as detailed on the drawings. Port shall be a 1”Sch. 80 PVC pipe with 1/8”” diameter perforated holes. Place as close as possible to the ground rods.

R. The entire grounding system shall be connected to a #4/0 ground loop with gorund rods located as shown on the drawings.

S. A moisturizing system shall be provided as indicated on the drawings.

T. A means for testing the system shall be provided. Refer to the drawngs for details.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT AND PAYMENT

A. The work performed, materials furnished and all labor, tools, equipment and incidentals necessary to complete the work under this item will not be measured or paid for directly, but shall be considered subsidiary to the various bid items of the contract.

END OF SECTION 16450

SECTION 16100

EMERGENCY GENERATOR

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. The work under this Section consists of the furnishing of all labor, equipment, supplies and materials, and the performing of all operations necessary to complete the installation of the following:

1. A diesel powered standby generator as backup for normal CPS power.

2. Steel reinforced concrete foundation for the generator.

3. An automatic transfer switch.

B. The generator shall be sized so that the maximum voltage dip on starting and running shall not exceed 15% at any time. Manufacturer shall provide calculations done in KVA units to show the voltage dip on starting and running. Pumps shall be started in steps with the number of steps equal to the number of pumps. Voltage drop for soft starters with bypass shall be calculated with the starter in bypass mode.

C. The generator shall be furnished in a sound attenuating, weatherproof enclosure as specified herein. Sound level shall not exceed 68 dB at 7 meters (23 ft), 60 Hz.

D. Generator shall also be furnished with a cold weather package to enable the generator set to start easier during cold temperatures, increasing reliability under harsh, wintery conditions. It includes Door inlet and air inlet actuators for damper control, pump style jacket water heater, space heaters, Battery charger and a load center.

E. The work includes supplying a complete integrated emergency generator system to provide an alternate source of power to the emergency load in the event of a utility outage. The system consists of a diesel generator set in a sound attenuating housing with related component and accessories specified under this section. Furnish complete with an automatic transfer switch.

F. Furnish generator with a UL lsted double walled base-mounted fuel tank sized to run the generator for at least 10 hours continuous operation at 100% load.

G. Generator shall be installed on a steeel reinforced concrete pad with spill containment and a drain valve as shown on the drawings.

H. Conduct a complete 4 hour system load bank . Fill fuel tank after testing is completed.

I. The equipment supplied and installed shall meet the requirements of the NEC and all applicable local codes and regulations. All equipment shall be of new and current production by a MANUFACTURER who has 25 years of experience building this type of equipment. Manufacturer shall be ISO 9001 certified.

1.02 REFERENCES

A. The generator covered by these specifications shall be designed, tested, rated, assembled and installed in strict accordance with all applicable standards of ANSI, NEC, ISO, UL, IEEE and NEMA.

B. The generator shall be listed to UL 22000, Standard for Safety for Stationary Engine Generator Assemblies.

1.03 RELATED SECTIONs

A. Section 16010: Electrical General Informat

B. Division 1: General Requirement

C. Bidding requirements, contract forms, and general terms and conditions of the contract.

1.04 SUBSTITUTION RESPONSIBILITY

A. The emergency power system has been designed to the specified manufacturer's electrical and physical characteristics. The equipment sizing, spacing, amounts, electrical wiring, ventilation equipment, fuel and exhaust components have all been sized and designed around Caterpillar/Olympian supplied equipment. Should any substitutions be made, the Contractor shall bear responsibility for the coordination and operation of the system as well as any engineering and redesign costs that may result from such substitutions. Cummins/Onan, Kohler and Generac will be considered as approved equals providing they meet these specifications.

1.05 SUBMITTALS

A. Engine-generator submittals shall include the following information:

1. Factory published specification sheet indicating standard and optional accessories, ratings, etc.

2. Manufacturer's catalog cut sheets of all auxiliary components such as isolators, battery charger, silencer, exhaust flex, main circuit breaker, etc.

3. Dimensional elevation and layout drawings of the generator set, enclosure and transfer and related accessories.

4. Weights of all equipment.

5. Concrete pad recommendation, layout and stub-up locations of electrical and fuel systems.

6. Interconnect wiring diagram of complete emergency system, including generator, switchgear, fuel tank, remote pumps, battery charger, remote alarm indications.

7. Engine mechanical data at varying loads up to full load, including heat rejection, exhaust gas flows, combustion air and ventilation air flows, noise data, fuel consumption, etc.

8. Generator electrical data including temperature and insulation data, cooling requirements, excitation ratings, voltage regulation, voltage regulator, efficiencies, waveform distortion and telephone influence factor.

9. Generator resistance, reactance, and time constants.

10. Generator current decrement curve.

11. Generator motor starting capability.

12. Control panel schematics.

13. Automatic load transfer switches.

14. Manufacturer's and dealers written warranty.

1.06 FACTORY PROTOTYPE TESTING

A. The system manufacturer must certify that engine; generator, controls, and switchgear have been tested as complete system of representative engineering models (not on equipment sold).

B. Prototype testing shall include:

1. Fuel consumption at 1/4, 1/2, 3/4, and full load

2. Exhaust emissions

3. Mechanical and exhaust noise

4. Governor speed regulation at 1/4, 1/2, 3/4, and full load; and during transients
5. Motor starting kVA

6. Generator temperature rise in accordance with NEMA MG1-22.40

7. Harmonic analysis, voltage waveform deviation and telephone influence factor

8. Generator short circuit capability

9. Cooling system performance

10. Generator revolving field assembly for 2 hours at 2700 rpm (150% overspeed) and 70C, and each production unit tested at 2250 rpm (125% overspeed) at room temperature.

B. The manufacturer shall supply equipment that is a current factory production model.

1.01 SYSTEM RESPONSIBILITY

A. Generator Set Manufacturer

The manufacturer shall be Caterpillar, Onan, Kohler, Generac, or approved equal.

B. Requirements, Codes and Regulations

The equipment supplied and installed shall meet the requirements of NEC and all applicable local codes and regulations. All equipment shall be new, of current production. There shall be one source responsibility for warranty, parts and service through a local representative with factory trained service personnel.

C. Authorized Distributor

The equipment supplier shall be the local authorized distributor for the product supplied.

1.02 WARRANTY

A. Two Year Warranty

The manufacturer's standard warranty shall be for a period of not less than two (2) years from date of initial start-up of the system. It shall include repair parts, labor, reasonable travel expense necessary for repairs at the job site, and expendables (lubricating oil, filters, antifreeze, and other service items made unusable by the defect) used during the course of repair. Running hours shall not be a limiting factor for the system warranty by either the manufacturer or servicing distributor. Submittals received without written warranties as specified will be rejected in their entirety.

1.03 PARTS AND SERVICE QUALIFICATIONS

A. Service Facility

The engine-generator supplier shall have service facilities within 50 miles of the project site and maintain 24-hour parts and service capability. The distributor shall stock parts as needed to support the generator set package for this specific project.

B. Service Personnel

The dealer shall maintain qualified, factory trained service personnel that can respond to an emergency call within 4 hours of notification.

PART 2: PRODUCTS

2.01 GENERAL REQUIREMENTS

A. Genset Requirements

The generator set shall be Standby rated with the minimum KW and KVA rating as shown on the drawings, 277/480 Volts, three phase, four wire. Larger size generator shall be provided if

the voltage drop requirements can't be met by the proposed generator.

B. Generator shall be sized so that the maximum voltage drop will not exceed 15% at any time. Motors shall be started in a sequential manner so that only one motor will start at a time.

C. Generator shall be sized to accommodate the present and future loads.

D. Material and Parts

All materials and parts comprising the unit shall be new and unused.

2.02 DIESEL ENGINE

A. Engine Requirements

1. The engine shall be compression ignition type diesel fueled, four (4) cycle, water cooled, vertical in-line, operating with nominal speed not exceeding 1800 RPM. No two (2) cycle engines will be considered. It shall be sized to deliver the required kW rating with a voltage drop not to exceed 15% during startup. Full pressure lubrication shall be supplied by a positive displacement lube oil pump. The engine shall have air cleaner, coolant, fuel and oil filters with replaceable elements; lube oil cooler and a fuel lift pump. The engine shall have a 12-volt battery charging DC, alternator with a transistorized voltage regulator. Starting shall be a 12-volt, solenoid shaft, electric starter.

B. Governor, Electronic Speed Control

1. Engine speed shall be governed by a mechanical governor to maintain steady state alternator frequency within +/- 0.8% of rated frequency. Speed drop will be a maximum of 4% from no load to full load.

2.03 GENERATOR

A. Generator Specifications

1. The synchronous three-phase generator shall be a single bearing, self-ventilated, drip-proof design in accordance with NEMA MG 1 and directly connected to the engine flywheel housing with a flex coupling.

B. Insulation

1. The insulation material shall meet NEMA standards for Class H insulation and be vacuum impregnated with epoxy varnish to be fungus resistant. Temperature rise of the rotor and stator shall not exceed 130ºC rise by resistance over 40°C ambient. The excitation system shall be of brushless construction.

C. Space Heater

1. Alternator shall be equipped with 120 or 230 VAC, single phase, space heater to minimize condensation while the alternator set is idle. The heaters shall be capable of easily mounting in the assembled alternator.

D. Excitation

1. A self excited generator (SE) shall be included to provide an economical and reliable source of excitation power.

E. Voltage Regulator

1. The automatic voltage regulator (AVR) shall maintain generator output voltage within +/- 0.5% for any constant load between no load and full load.

2. The regulator shall be a totally solid state design, which includes electronic voltage buildup, volts per Hertz regulation, overexcitation protection, shall limit voltage overshoot on startup, and shall be environmentally sealed.

F. Motor Starting

1. Generator shall be capable of starting the connected loads in a stepped manner without the instantaneous voltage dip exceeding 15%. Minimum generator size shall be as indicated on the drawings, and as noted below:

a. Step 1: 25kVA Transformer (60% Loaded), WWW-1 (3HP), WWW-2 (3HP)
b. Step 2: LSP-1 (90HP, Letter Code G), FVNR
c. Step 3: LSP-2 (90HP, Letter Code G), FVNR
d. Step 4: LSP-3 (90HP, Letter Code G), FVNR
e. Step 5: LSP-4 (90HP, Letter Code G), FVNR

2.04 CIRCUIT BREAKER

A. Provide a generator mounted circuit breaker, molded case or insulated case construction, rating as shown on the drawings. Breaker shall utilize a thermal magnetic trip. Breaker shall be housed in a steel NEMA 1 enclosure mounted on a separate support stand vibration isolated from the engine / generator arrangement. Bus bars, sized for the cable type shown on drawing, shall be supplied on the load side of breaker.

2.05 CONTROL PANEL

A. Generator Mounted Control Panel

1. Provide a generator mounted control panel for complete control and monitoring of the engine and generator set functions. Panel shall include automatic start/stop operation, adjustable cycle cranking, digital AC metering (0.5% true rms accuracy) with phase selector switch, digital engine monitoring, shutdown sensors and alarms with horn and reset, adjustable cool down timer and emergency stop push-button. Panel shall incorporate self-diagnostics capabilities and fault logging. Critical components shall be

environmentally sealed to protect against failure from moisture and dirt. Components shall be housed in a NEMA 1/IP22 enclosure with hinged lid.

B. Digital Readouts

Provide the following digital readouts:

1. Engine oil pressure
2. Coolant temperature
3. Engine RPM
4. System DC Volts
5. Engine running hours
6. Generator AC volts
7. Generator AC amps
8. Generator frequency
9. kW meter
10. Percentage of rated Power
11. KVA meter
12. kVAR meter
13. Power Factor meter
14. KWHR meter

C. Alarm NFPA 110

Provide the following indications for protection and diagnostics according to NFPA 110 level 1:

1. Low oil pressure
2. High water temperature
3. Low coolant level
4. Overspeed
5. Overcrank

6. Emergency stop depressed

7. Approaching high coolant temperature

8. Approaching low oil pressure

9. Low coolant temperature

10. Low voltage in battery

11. Control switch not in auto position

12. Low fuel main tank

13. Battery charger AC failure

14. High battery voltage

15. EPS supplying load

16. Spare

D. Programmable Control Panel

Provide programmable protective relay functions inside the control panel to include the following:

1. Undervoltage

2. Overvoltage

3. Overfrequency

4. Underfrequency

5. Reverse power

6. Overcurrent (phase and total)

7. KW level (overload)

8. Three spare LED's

9. Four spare inputs

E. Provide global alarm contact and engine running contact for connection to a remote SCADA system.

2.06 COOLING SYSTEM

A. Radiator

The generator set shall be equipped with a rail-mounted, engine-driven radiator with blower fan and all accessories. The cooling system shall be sized to operate at full load conditions and 110 F ambient air entering the room or enclosure (If an enclosure is specified). The generator set supplier is responsible for providing a properly sized cooling system based on the enclosure static pressure restriction.

2.07 FUEL SYSTEM

A. All fuel piping shall be black iron or flexible fuel hose rated for this service.

B. Flexible fuel lines rated 300 degrees F and 100 PSI.

C. A fuel tank base of 24 hour capacity shall be provided. It shall be contained in a rupture basin with 110% capacity. The tank shall be pressure tested for leaks prior to shipment and have all necessary venting per UL142 standards. A locking fill cap, a mechanical reading fuel level gauge, low fuel level alarm contact, and fuel tank rupture alarm contact shall be provided.

2.08 EXHAUST SYSTEM

A. Silencer

1. A critical rated silencer, companion flanges, and flexible stainless steel exhaust fitting properly sized shall be furnished. The silencer shall be mounted so that its weight is not supported by the engine nor will exhaust system growth due to thermal expansion be imposed on the engine. Exhaust pipe size shall be sufficient to ensure that exhaust back pressure does not exceed the maximum limitations specified by the engine manufacturer.

2.09 STARTING SYSTEM

A. Starting Motor

B. A 24 VDC electric starting system with positive engagement shall be furnished. The motor voltage shall be as recommended by the engine manufacturer.

C. Jacket Water Heater

D. A unit mounted thermal circulation type water heater. The heater Watt rating shall be sized by the manufacturer to maintain jacket water temperature at 90 degrees F.

E. Batteries

F. A lead-acid storage battery set of the heavy-duty diesel starting type shall be provided. Battery voltage shall be compatible with the starting system. The battery set shall be rated no less than 200-ampere hours. Necessary cables and clamps shall be provided.

G. Battery Trays

H. Battery Trays - A battery tray shall be provided for the batteries and shall conform to NEC 480-7(b). It shall treated to be resistant to deterioration by battery electrolyte. Further, construction shall be such that any spillage or boil-over battery electrolyte shall be contained within the tray to prevent a direct path to ground.

I. Battery Charger

J. Battery Charger - A current limiting battery charger shall be furnish to automatically recharge batteries. Charger shall float at 2.17 volts per cell and equalize at 2.33 volts per cell. It shall include overload protection, silicon diode full wave rectifiers, voltage surge suppressor, DC ammeter, DC voltmeter, and fused AC input. Input voltage shall be 120 VAC, single phase. Charger shall have LED annunciation for low DC volts, rectifier failure, loss of AC power, high DC volts. Amperage output shall be no less than ten (10) amperes. Charger shall be wall-mounting type in NEMA 1 enclosure.

2.10 WEATHER PROTECTIVE ENCLOSURE – SOUND ATTENUATING

A. A weather resistant, sound attenuated enclosure of HR4P steel with electrostatically applied powder coated baked polyester paint. The enclosure shall have a resulting maximum sound level of 68 dBA at 23 feet with the genset running under full load. It shall consist of a roof, side walls, and end walls. Fasteners shall be either zinc plated or stainless steel.

B. Number of doors on enclosure shall be as required so that all normal maintenance operations, such as lube oil change, filter change, belt adjustment and replacements, hose replacements, access to the control panels, etc., may be accomplished without disassembly of any enclosure components. Access doors shall be fabricated of the same material as the enclosure walls and shall be reinforced for rigidity. Handles shall be key lockable, all doors keyed alike, and hinges shall be zinc die cast or stainless steel. Fasteners shall be zinc plated or stainless steel.

C. Air handling will be sized and designed by the manufacturer for 0.5" static pressure drop through enclosure. Intake openings shall be screened to prevent the entrance of rodents. The system shall include a cooling and combustion air inlet silencer system, and equipment enclosure section, and a cooling air discharge silencer section.

D. Lube oil and coolant drains shall be extended to the exterior of the enclosure and terminated with drain valves and capped with pipe nipples on flanged connectors. Radiator access shall be through a hinged, lockable cover on enclosure. Cooling fan and charging alternator shall be fully guarded to prevent injury.

E. A critical type silencer, companion flanges, and flexible stainless steel exhaust fitting properly sized shall be furnished. Enclosure manufacturer shall internally mount the exhaust silencer and maintain the weather resistant integrity and aesthetic appearance of the system. Externally mounted silencers will not be permitted for safety reasons.

F. Enclosure Sound Attenuation: Acoustical foam shall be provided between all supports and inside doors and sound baffles on air intake and air discharge.

G. Lifting points on base frame suitable for lifting combined weight on base tank, generator set

and enclosure. A tested and certified single point lifting facility to aid in generator placement

2.11 AUTOMATIC TRANSFER SWITCH

A. General

1. Provide complete factory assembled transfer equipment with electronic controls designed for surge voltage isolation, and including voltage sensors on all phases of both sources, linear operator, permanently attached manual handles, positive mechanical and electrical interlocking, and mechanically held contacts.

2. Transfer switch shall be ASCO Bulletin 7000, or approved equal.

B. Transfer Switch Ratings:

1. Refer to the project drawings for specifications on the sizes and types of transfer switch equipment, withstand and closing ratings, number of poles, voltage and ampere ratings, enclosures, and accessories.

2. All transfer switches and accessories shall be UL listed and labeled, tested per UL Standard 1008, and CSA Approved. Transfer switches used for fire pump applications shall be specifically listed for that service, per NFPA20.

3. Main contacts shall be rated for 600 Volts AC minimum.

4. Transfer switches shall be rated to carry 100 percent of rated current continuously in the enclosure, in ambient temperatures of -40 to +50 degrees C, relative humidity up to 95% (non-condensing), and altitudes up to 10,000 feet (3000M).

5. Transfer switch equipment shall have a withstand and closing rating (WCR) in RMS symmetrical amperes greater than the available fault currents shown on the drawings. The transfer switch and its upstream protection shall be coordinated. The transfer switch shall be third-party listed and labeled for use with the specific protective device(s) installed in the application.

C. Construction:

1. Transfer switches shall be double-throw, electrically and mechanically interlocked, and mechanically held in both positions.

2. Transfer switches shall be delayed, open-transition.

3. Transfer switches rated through 1000 amperes shall be equipped with permanently attached manual operating handles and quick-break, quick-make over-center contact mechanisms suitable for safe manual operation under load. Transfer switches over 1000 amperes shall be equipped with manual operators for service use only under de-energized conditions.

4. Main switch contacts shall be high-pressure silver alloy. Contact assemblies shall have arc chutes for positive arc auxiliary contacts on both sides, operated by transfer switch position, rated 10 amps 250 VAC.

5. Transfer switches designated on the drawings as 4-poles shall be provided with a switched neutral pole. The neutral pole shall be of the same construction and have the same ratings as the phase poles. All poles shall be switched simultaneously using a common crossbar. Equipment using add-on accessory overlapping contacts are not acceptable.

6. Transfer switches which are designated on the drawings as 3-pole shall be provided with a neutral bus and lugs, sized to carry 100% of the current designated on the switch rating.

7. Enclosures shall be UL listed. The enclosure shall provide NEC wire bend space. The cabinet door shall be key-locking. Controls on cabinet door shall be key-operated.

8. Transfer switches shall be mounted in enclosures as designated on the drawings. Separate enclosures shall be the NEMA type specified. The cabinet shall provide required wire bend space at point of entry as shown on the drawings. Manual operating handles and all control switches (other than key-operated switches) shall be accessible to authorized personnel only by opening the key-locking cabinet door. Transfer switches with manual operating handles and/or non key-operated control switches located on outside of cabinet do not meet this specification and are not acceptable.

D. Automatic Controls:

1. Transfer switches that are designated on the drawing as automatic shall be provided with a fully automatic control system, and provisions for manual operation as described in this section.

2. Control shall be solid-state and designed for a high level of immunity to power line surges and transients, demonstrated by test to IEEE Standard 587-1980. The control shall have optically isolated logic inputs, high isolation transformers for AC inputs, and relays on all outputs.

3. Solid-state undervoltage sensors shall simultaneously monitor all phases of both sources. Pick-up and drop-out settings shall be adjustable. Voltage sensors shall allow for adjustment to sense partial loss of voltage on any phase. Voltage sensors shall have field calibration of actual supply voltage to nominal system voltage.

4. Controls shall be provided with solid-state overvoltage sensors, adjustable from 100-130% of nominal, to monitor all phases of both sources. Provide adjustable time delay of 0.5 to 2.2 sec.

5. Provide Phase Sequence Monitor and Balance module to protect against inadvertent phase rotation hookup and monitor for voltage phase imbalance between phases.

6. The switch shall transfer when the emergency source reaches the set point voltage and frequency. Provide a solid-state time delay on transfer, adjustable from 0 to 120 seconds.

7. The switch shall retransfer the load to the normal source after a time delay retransfer, adjustable from 0 to 30 minutes. Retransfer time delay shall be immediately bypassed if the emergency power source fails.

8. Controls shall signal the engine-generator set to stop after a time delay, adjustable from 0 to 10 minutes, beginning on return to the normal source.

9. Power for transfer operation shall be from the source to which the load is being transferred.

10. The control shall include latching diagnostic indicators to pinpoint the last successful step in the sequence of control functions, and to indicate the present status of the control functions in real time, as follows:

    a. Source 1 OK
    b. Start Gen Set
    c. Source 2 OK
    d. Transfer Timing
    e. Transfer Complete
    f. Retransfer Timing
    g. Retransfer Complete
    h. Timing for Stop

11. The control shall include remote transfer inhibit and area protection features.

12. Transfer switches shall be equipped with a field adjustable controls to allow the operator to control the transfer switch operating time during switching in both directions. The controls shall control the time the load is isolated from both power sources, to allow load residual voltage to decay before closure to the opposite source. The transfer switch operating speed control feature shall have an adjustable range of 0 to 7.5 seconds. Phase angle monitor is not acceptable substitute for this feature.

E. Interior Panel Devices:

1. Provide devices mounted on cabinet interior swing out panel consisting of:

    a. A key-operated selector switch to provide the following positions and functions:

    b. Test - Simulates normal power loss to control for testing of generator set. Controls shall
    c. provide for a test with or without load transfer.

    d. Normal - Normal operating position.

    e. Retransfer - Momentary position to override retransfer time delay and cause immediate return to normal source, if available.

    f. Transfer switch position and source available lamps.

    g. Normal position shall transfer load to an energized normal power source.

F. Accessory Items:

1. Transfer switches shall be equipped with accessories as follows:
   a. Meters: Provide an AC Voltmeter, an Ammeter, and a Frequency meter; minimum 2% accuracy. Provide a phase selector switch to read L-L voltage and current of both power sources.

   b. Exerciser Clock: Provide an exerciser clock to set the day, time, and duration of generator set exercise/test period. Provide a with/without load selector switch for the exercise period. Clock functions shall be field-adjustable by the Operator.

   c. Manual Selector Switch: Provide a manual/automatic retransfer selector switch to provide either automatic retransfer after the retransfer time delay, or a manual retransfer when selected by an operator.

PART 3: EXECUTION

3.01 INSTALLATION

A. Install equipment in accordance with manufacturer's recommendations, the project drawings and specifications, and all applicable codes.

B. Where the neutral is not switched in the ATS the bonding jumper from the generator neutral to the ground lug in the generator shall be removed.

C. The frame of the generator shall be connected to the equipment ground.

3.02 START-UP AND TESTING

A. Coordinate all start-up and testing activities with the Engineer and Owner.

B. After installation is complete and normal power is available, the manufacturer's local dealer shall perform the following:

1. Verify that the equipment is installed properly.

2. Check all auxiliary devices for proper operation, including battery charger, jacket water heater(s), generator space heater, remote annunciator, etc.

3. Test all alarms and safety shutdown devices for proper operation and annunciation.

4. Check all fluid levels.

5. Start engine and check for exhaust, oil, fuel leaks, vibrations, etc.

6. Verify proper voltage and phase rotation at the transfer switch before connecting to the load.

7. Connect the generator to building load and verify that the generator will start and run all designated loads.

8. The system shall be tested under full load and monitor the following readings:

   a. Oil pressure
   b. Coolant temperature
   c. Battery charge rate
   d. AC volts
   e. AC Amperes- all phases
   f. Frequency
   g. Kilowatts
   h. Ambient Temperature

C. After startup and testing, fill the fuel tank completely.

3.03 OPERATION AND MAINTENANCE MANUALS

Provide operation and maintenance manuals covering the generator, switchgear, and auxiliary components. Include parts manuals, final as-built wiring interconnect diagrams and recommended preventative maintenance schedules. Comply with Section 16010 and the other sections referenced therein.

3.04 TRAINING

Provide one day of training to instruct the owner's personnel in the proper operation and maintenance of the equipment. Review operation and maintenance manuals, parts manuals, and emergency service procedures.

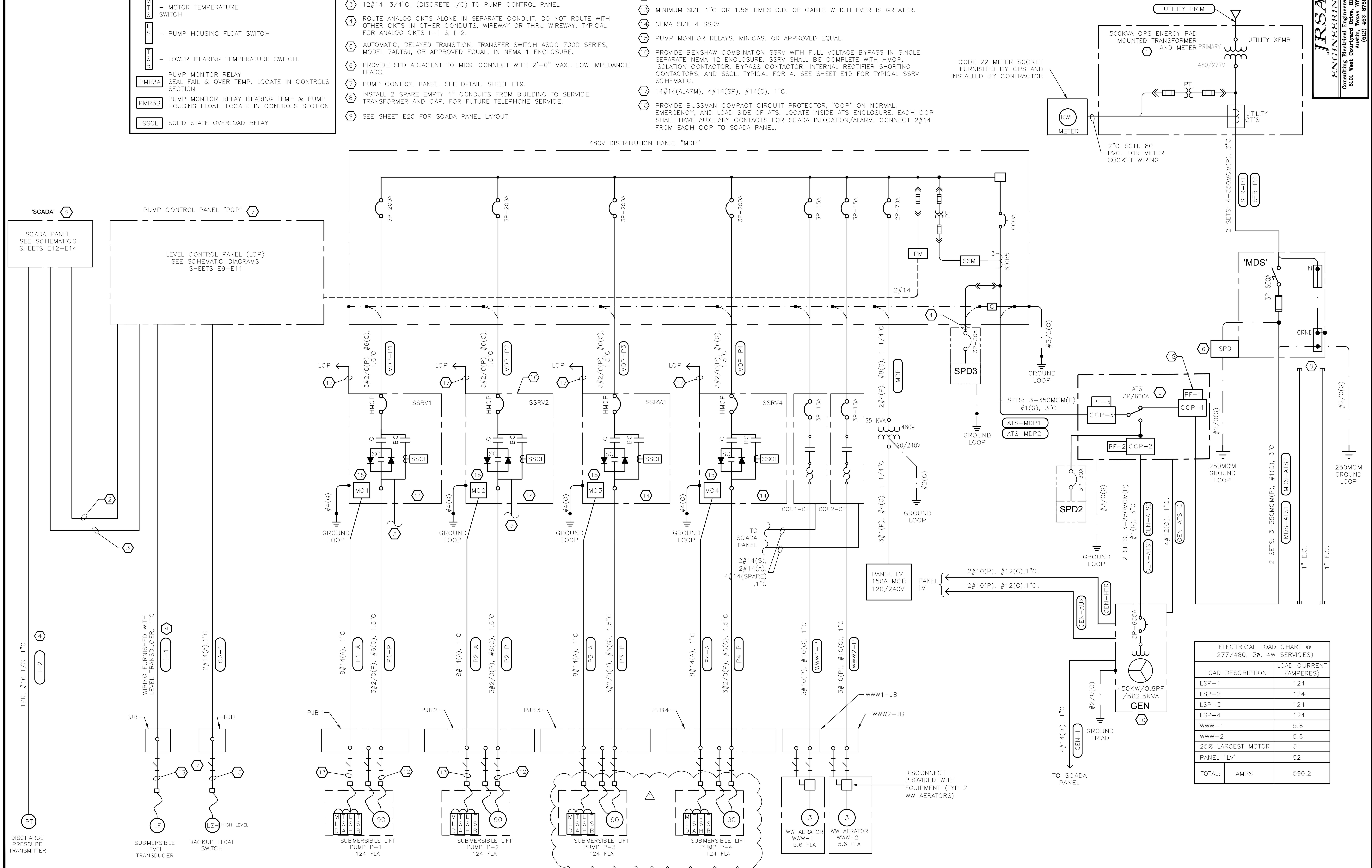
END OF SECTION

LEGEND

Symbol	Description
M L D	MOISTURE LEAK DETECTOR
M T S	MOTOR TEMPERATURE SWITCH
F S T	PUMP HOUSING FLOAT SWITCH
L S B	LOWER BEARING TEMPERATURE SWITCH.
PMR3A	PUMP MONITOR RELAY SEAL FAIL & OVER TEMP. LOCATE IN CONTROLS SECTION
PMR3B	PUMP MONITOR RELAY BEARING TEMP & PUMP HOUSING FLOAT. LOCATE IN CONTROLS SECTION.
SSOL	SOLID STATE OVERLOAD RELAY

KEYNOTES:

1. 480/277V, 3Φ, 4W SERVICE. COORDINATE POWER WITH CPS ENERGY & VERIFY LOCATION OF TRANSFORMER PAD. CONDUIT ELBOWS INTO PAD SHALL BE SCH. 80 PVC.
2. 1PR #16 T/S, 3/4"C (ANALOG I/O)
3. 12#14, 3/4"C, (DISCRETE I/O) TO PUMP CONTROL PANEL
4. ROUTE ANALOG CKTS ALONE IN SEPARATE CONDUIT. DO NOT ROUTE WITH OTHER CKTS IN OTHER CONDUITS, WIREWAY OR THRU WIREWAY. TYPICAL FOR ANALOG CKTS I-1 & I-2.
5. AUTOMATIC, DELAYED TRANSITION, TRANSFER SWITCH ASCO 7000 SERIES, MODEL 7ADTSJ, OR APPROVED EQUAL, IN NEMA 1 ENCLOSURE.
6. PROVIDE SPD ADJACENT TO MDS. CONNECT WITH 2'-0" MAX., LOW IMPEDANCE LEADS.
7. PUMP CONTROL PANEL. SEE DETAIL, SHEET E19.
8. INSTALL 2 SPARE EMPTY 1" CONDUITS FROM BUILDING TO SERVICE TRANSFORMER AND CAP. FOR FUTURE TELEPHONE SERVICE.
9. SEE SHEET E20 FOR SCADA PANEL LAYOUT.
10. GENERATOR IN WEATHERPROOF, SOUND-ATTENUATED ENCLOSURE
11. SEE PANEL LV SCHEDULE, SHEET E13. (Δ1)
12. MINIMUM SIZE 2"C OR 1.58 TIMES O.D. OF CABLE WHICH EVER IS GREATER.
13. MINIMUM SIZE 1"C OR 1.58 TIMES O.D. OF CABLE WHICH EVER IS GREATER.
14. NEMA SIZE 4 SSRV.
15. PUMP MONITOR RELAYS. MINICAS, OR APPROVED EQUAL.
16. PROVIDE BENSHAW COMBINATION SSRV WITH FULL VOLTAGE BYPASS IN SINGLE, SEPARATE NEMA 12 ENCLOSURE. SSRV SHALL BE COMPLETE WITH HMCP, ISOLATION CONTACTOR, BYPASS CONTACTOR, INVERSE RECTIFIER SHORTING CONTACTORS, AND SSOL. TYPICAL FOR 4. SEE SHEET E15 FOR TYPICAL SSRV SCHEMATIC.
17. 14#14(ALARM), 4#14(SP), #14(G), 1"C.
18. PROVIDE BUSSMAN COMPACT CIRCUIT PROTECTOR, "CCP" ON NORMAL, EMERGENCY, AND LOAD SIDE OF ATS. LOCATE INSIDE ATS ENCLOSURE. EACH CCP SHALL HAVE AUXILIARY CONTACTS FOR SCADA INDICATION/ALARM. CONNECT 2#14 FROM EACH CCP TO SCADA PANEL.



ELECTRICAL LOAD CHART @ 277/480, 3Φ, 4W SERVICES)

LOAD DESCRIPTION	LOAD CURRENT (AMPERES)
LSP-1	124
LSP-2	124
LSP-3	124
LSP-4	124
WWW-1	5.6
WWW-2	5.6
25% LARGEST MOTOR	31
PANEL "LV"	52
TOTAL: AMPS	590.2

JRSA ENGINEERING, INC.
Consulting Electrical Engineers, TBPE #F-3997
6101 West Courtyard Drive, Bldg. 1, Suite 200
Austin, Texas 78730
(512) 452-8789

THE WOODLANDS OFF-SITE SANITARY SEWER, LIFT STATION, & FORCE MAIN

ELECTRICAL ONE-LINE DIAGRAM

REVISIONS

NO.	DESCRIPTION	BY	DATE
1	ADDENDUM 1 DRAWING REVISIONS	ESZ	11/9/23

DATE: 11/13/2020
DESIGNED BY:
DRAWN BY:
CHECKED BY:
DRAWING NAME:

6/22/2023
STATE OF TEXAS — ELIZABETH SEDANO-ZARATE — 105870 — LICENSED PROFESSIONAL ENGINEER

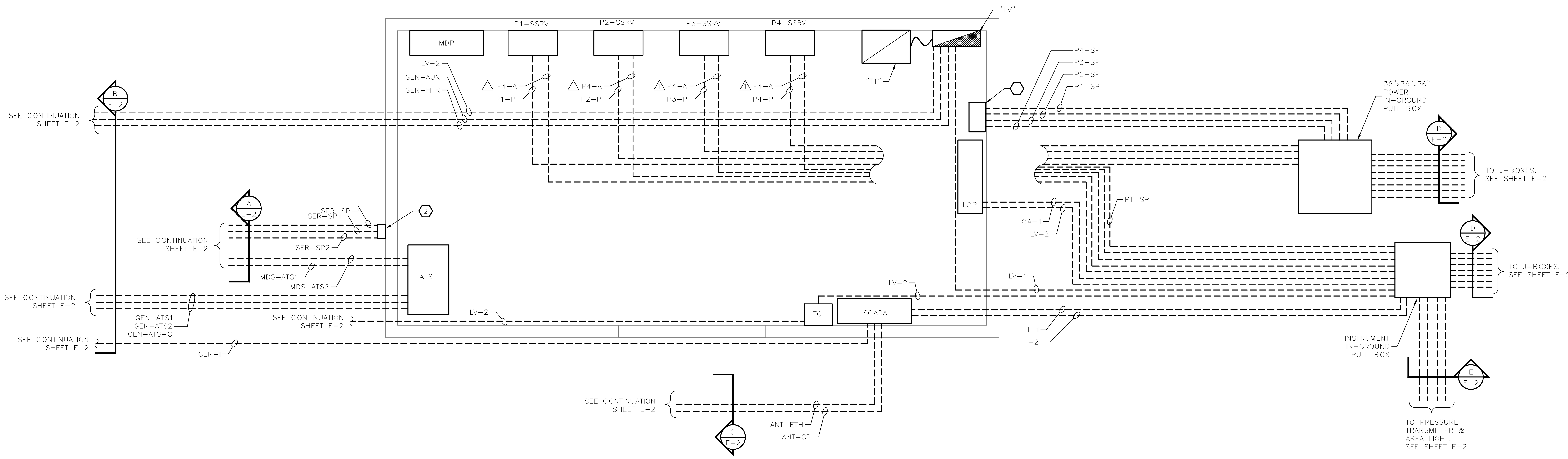
LJA Engineering, Inc.
1100 NE Loop 410
Suite 850
San Antonio, Texas 78209
Phone 210.503.2700
Fax 210.503.2749
TBPE No. F-1386

JOB NUMBER: SA190-0404.426

SHEET NO. E-3

KEYNOTES:

1. TERMINATE EMPTY CONDUITS IN WALL MOUNTED TERMINAL BOX.
2. WEATHERPROOF NEMA 4X SS BOX FOR FUTURE TELEPHONE SERVICE.



1 CONTROL BUILDING - EXTERNAL WIRING CONNECTIONS
SCALE: 1/2" = 1'–0"

JRSA ENGINEERING, INC.
Consulting Electrical Engineers, TBPE #F–3997
6101 West Courtyard Drive, Bldg. 1, Suite 200
Austin, Texas 78730
(512) 452–8789

THE WOODLANDS OFF-SITE SANITARY SEWER, LIFT STATION, & FORCE MAIN

CONTROL BUILDING EXTERNAL WIRING CONNECTIONS

REVISIONS

NO.	DESCRIPTION	BY	DATE
1	ADDENDUM 1 DRAWING REVISIONS	ESZ	11/9/23

DATE: 11/13/2020
DESIGNED BY:
DRAWN BY:
CHECKED BY:
DRAWING NAME:

6/22/2023
STATE OF TEXAS
ELIZABETH SEGNER–ZARATE
108870
LICENSED PROFESSIONAL ENGINEER

LJA Engineering, Inc.
1100 NE Loop 410
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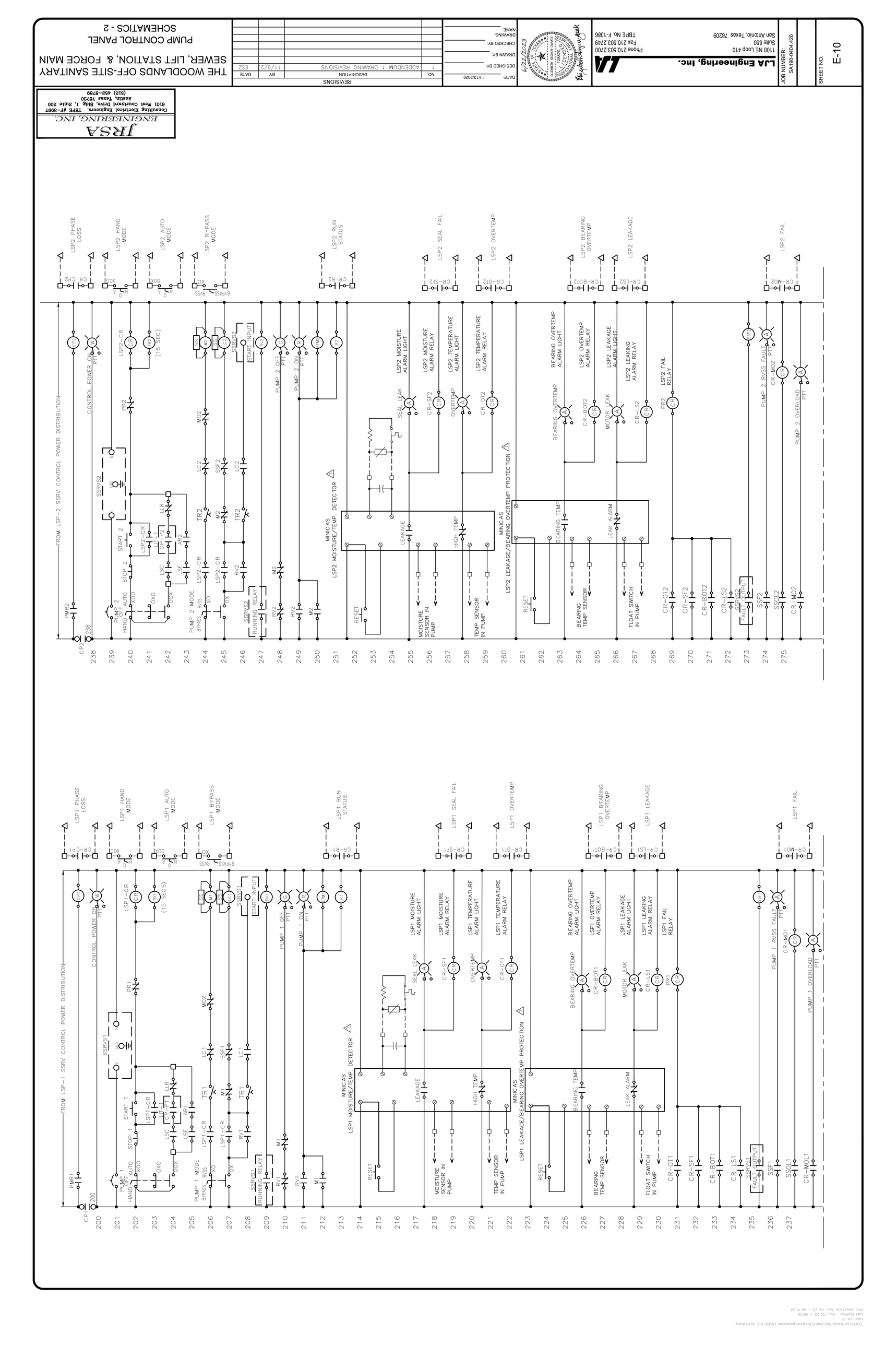
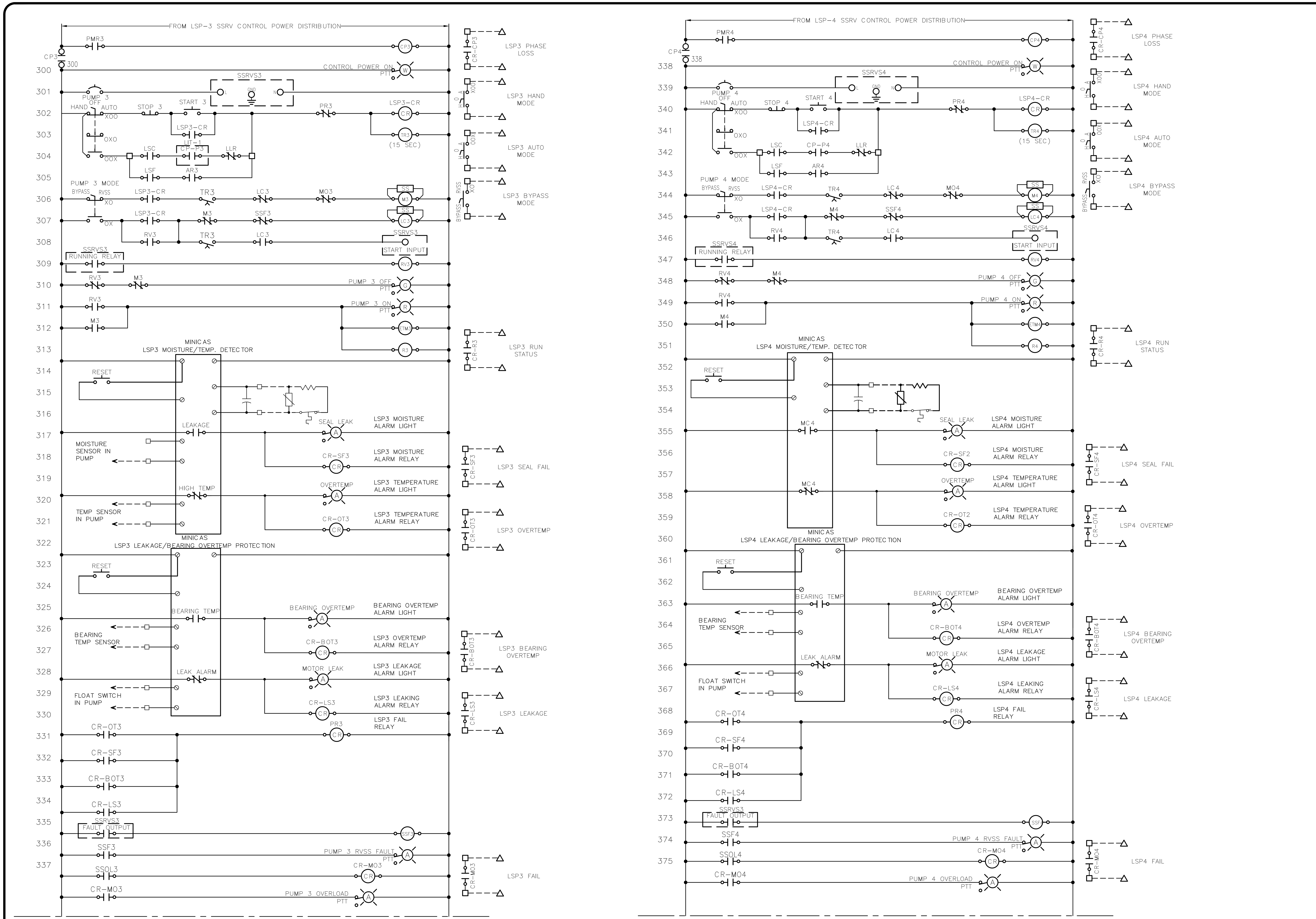
San Antonio, Texas 78209
Phone 210.503.2700
Fax 210.503.2749
TBPE No. F-1386

JOB NUMBER:
SA190-0404.426

SHEET NO.
E-7


THE WOODLANDS OFF-SITE SANITARY SEWER, LIFT STATION, & FORCE MAIN
PUMP CONTROL PANEL SCHEMATICS - 2
REVISIONS
NO. DESCRIPTION BY DATE
1 ADDENDUM 1 DRAWING REVISIONS ESZ 11/9/23
DATE: 11/13/2020
DESIGNED BY:
DRAWN BY:
CHECKED BY:
DRAWING NAME:
6/22/2023
LJA Engineering, Inc.
1100 NE Loop 410
Suite 850
San Antonio, Texas 78209
Phone 210.503.2700
Fax 210.503.2749
TBPE No. F-1386
JOB NUMBER: SA190-0404.426
SHEET NO. E-10
JRSA ENGINEERING, INC.
Consulting Electrical Engineers, TBPE #F-3997
6101 West Courtyard Drive, Bldg. 1, Suite 200
Austin, Texas 78730
(512) 452-8788
FROM LSP-1 SSRV CONTROL POWER DISTRIBUTION
FROM LSP-2 SSRV CONTROL POWER DISTRIBUTION
CONTROL POWER ON
PUMP 1 HAND AUTO
PUMP 2 HAND AUTO
START 1
START 2
STOP 1
STOP 2
PUMP 1 MODE BYPASS RVSS
PUMP 2 MODE BYPASS RSS
SSRVS1
SSRVS2
RUNNING RELAY
START INPUT
PUMP 1 OFF PTT
PUMP 1 ON PTT
PUMP 2 OFF PTT
PUMP 2 ON PTT
(15 SECS)
MINICAS LSP1 MOISTURE/TEMP. DETECTOR
MINICAS LSP2 MOISTURE/TEMP. DETECTOR
MINICAS LSP1 LEAKAGE/BEARING OVERTEMP PROTECTION
MINICAS LSP2 LEAKAGE/BEARING OVERTEMP PROTECTION
LSP1 MOISTURE ALARM LIGHT
LSP1 MOISTURE ALARM RELAY
LSP1 TEMPERATURE ALARM LIGHT
LSP1 TEMPERATURE ALARM RELAY
LSP1 LEAKAGE ALARM LIGHT
LSP1 LEAKING ALARM RELAY
LSP1 FAIL RELAY
LSP2 MOISTURE ALARM LIGHT
LSP2 MOISTURE ALARM RELAY
LSP2 TEMPERATURE ALARM LIGHT
LSP2 TEMPERATURE ALARM RELAY
LSP2 LEAKAGE ALARM LIGHT
LSP2 LEAKING ALARM RELAY
LSP2 FAIL RELAY
BEARING OVERTEMP ALARM LIGHT
LSP1 OVERTEMP ALARM RELAY
LSP2 OVERTEMP ALARM RELAY
MOISTURE SENSOR IN PUMP
TEMP SENSOR IN PUMP
BEARING TEMP SENSOR
FLOAT SWITCH IN PUMP
RESET
LEAKAGE
HIGH TEMP
BEARING TEMP
LEAK ALARM
SEAL LEAK
OVERTEMP
MOTOR LEAK
FAULT OUTPUT
PUMP 1 RVSS FAULT
PUMP 2 RVSS FAULT
PUMP 1 OVERLOAD
PUMP 2 OVERLOAD
LSP1 PHASE LOSS
LSP1 HAND MODE
LSP1 AUTO MODE
LSP1 BYPASS MODE
LSP1 RUN STATUS
LSP1 SEAL FAIL
LSP1 OVERTEMP
LSP1 BEARING OVERTEMP
LSP1 LEAKAGE
LSP1 FAIL
LSP2 PHASE LOSS
LSP2 HAND MODE
LSP2 AUTO MODE
LSP2 BYPASS MODE
LSP2 RUN STATUS
LSP2 SEAL FAIL
LSP2 OVERTEMP
LSP2 BEARING OVERTEMP
LSP2 LEAKAGE
LSP2 FAIL
CR-SF1
CR-SF2
CR-BOT1
CR-BOT2
CR-LS1
CR-LS2
CR-OT1
CR-OT2
CR-MOL1
CR-MO2
SSF1
SSF2
SSOL1
SSOL2



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THE WOODLANDS OFF-SITE SANITARY SEWER, LIFT STATION, & FORCE MAIN

PUMP CONTROL PANEL SCHEMATICS - 3

REVISIONS

NO.	DESCRIPTION	BY	DATE
1	ADDENDUM 1 DRAWING REVISIONS	11/9/23	ESZ

DATE: 11/13/2020
DESIGNED BY:
DRAWN BY:
CHECKED BY:
DRAWING NAME:

6/22/2023
STATE OF TEXAS
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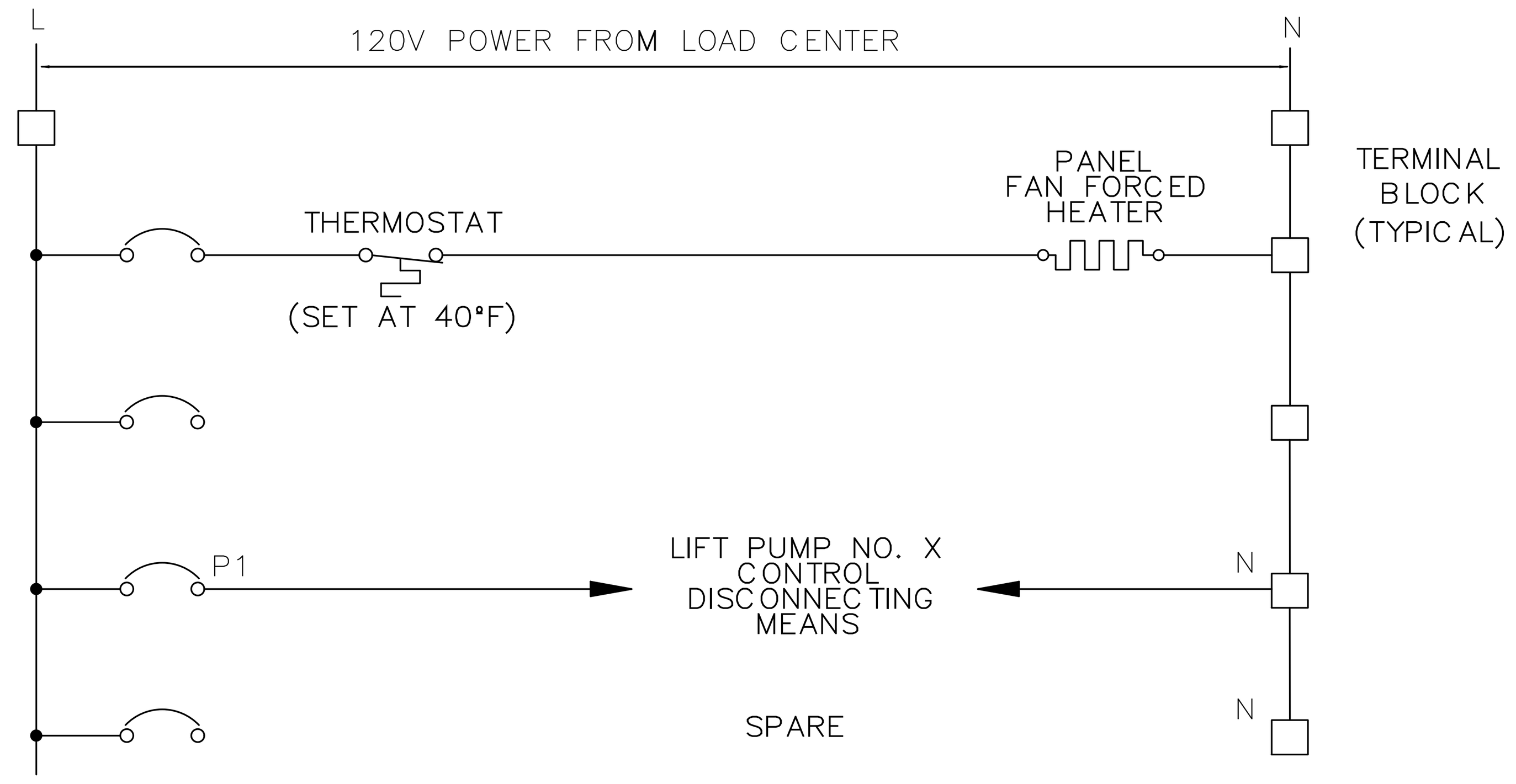
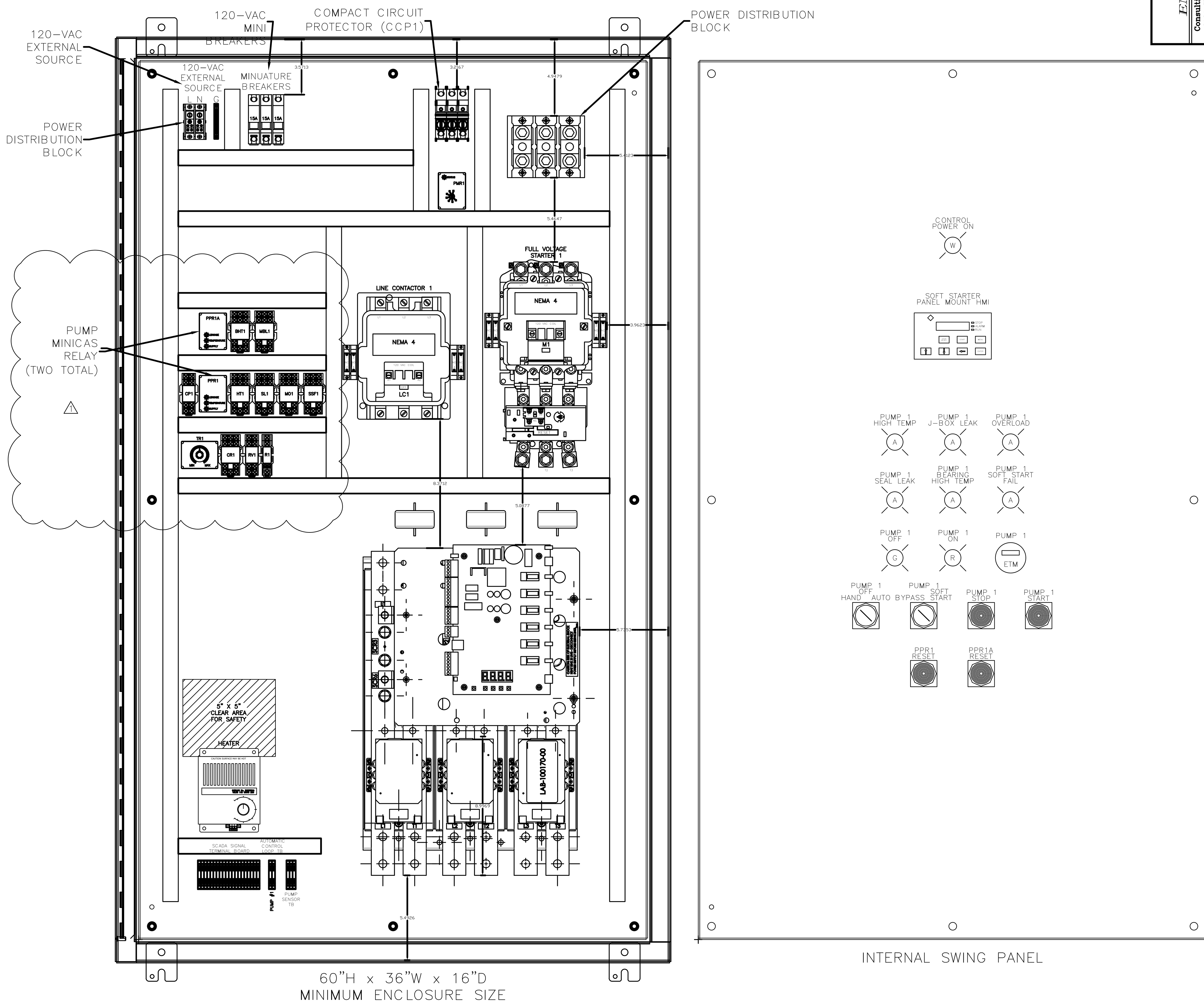
JOB NUMBER:
SA190-0404.426

SHEET NO.
E-11



① PUMP SSRV PANEL: CONTROL POWER DISTRIBUTION SCHEMATIC (TYP. FOR 4)

SCALE: N.T.S.



② PUMP SSRV PANEL LAYOUT (TYP. FOR 4)

SCALE: N.T.S.

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PUMP SSRV PANEL

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1	ADDENDUM 1 DRAWING REVISIONS	11/9/23	ESZ

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JOB NUMBER:
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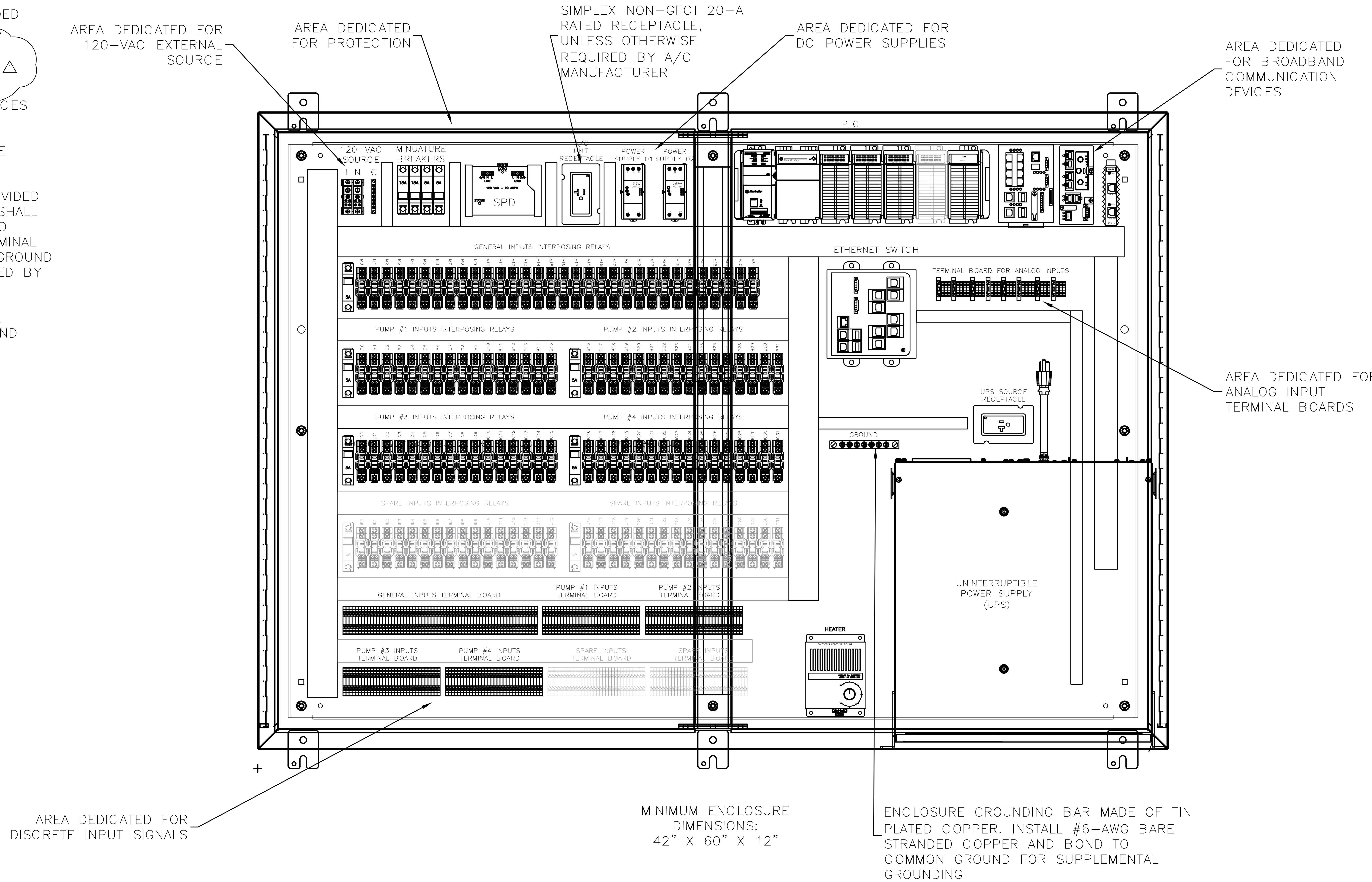
SHEET NO.
E-20

NOTES:

1. USE SUBMERSIBLE LEVEL TRANSDUCER FOR WET WELL LEVEL CONTROL. A WEIGHT MADE OF SOLID CARBON STEEL SHALL BE SOLIDLY FASTENED TO THE INSTRUMENT, PER DETAILS SHOWN ON THESE DRAWINGS.
2. ALL INSTRUMENT SIGNAL CABLES (SHIELDED CABLES) SHALL BE CONTINUOUS WITHOUT SPLICES.
3. THE UNINTERRUPTIBLE POWER SUPPLY SHALL BE INSTALLED WITHIN THE SCADA ENCLOSURE WITHOUT INTERFERING WITH ACCESS TO TERMINAL STRIPS, RELAYS, SPACE HEATER OR ANY OTHER TYPE OF DEVICE.
4. THE ENCLOSURE TEMPERATURE TRANSDUCER SHALL BE PROVIDED ~~WITH RTD TO COVER A TEMPERATURE RANGE OF 0 TO 150 °F.~~
5. ENCLOSURE SHALL BE RATED NEMA 12 AND SHALL BE WHITE ENAMELED COATED. △
6. SPACE HEATER SHALL COMPLY WITH MINIMUM SAFETY CLEARANCES ABOUT IT AS INDICATED BY HEATER MANUFACTURER.
7. ALL BROADBAND COMMUNICATION DEVICES REQUIRED SHALL BE INSTALLED IN THE AREA INDICATED.
8. INSTALL ONE ISOLATION RELAY FOR EACH DISCRETE INPUT PROVIDED PER EACH MODULE INSTALLED. EACH DISCRETE INPUT LOOP SHALL BE PRE WIRED FROM TERMINAL BOARD, TO ISOLATION RELAY TO MODULE INPUT CHANNEL. SIMILARLY, INSTALL ONE FUSED TERMINAL BOARD WITH A 32-mA FUSE AND ASSOCIATED NEGATIVE AND GROUND TERMINAL BOARDS FOR EACH ANALOG INPUT CHANNEL PROVIDED BY THE MODULE AND ALSO PRE WIRE THE ANALOG LOOPS.
9. THE ENCLOSURE DOOR SHALL BE PROVIDED WITH AN INTERNAL FOLDING TABLE. AND A POCKET TO STORE WIRING DIAGRAMS AND O&M INFORMATION.



1 SCADA INTERIOR PANEL LAYOUT
SCALE: N.T.S.

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SCADA PANEL

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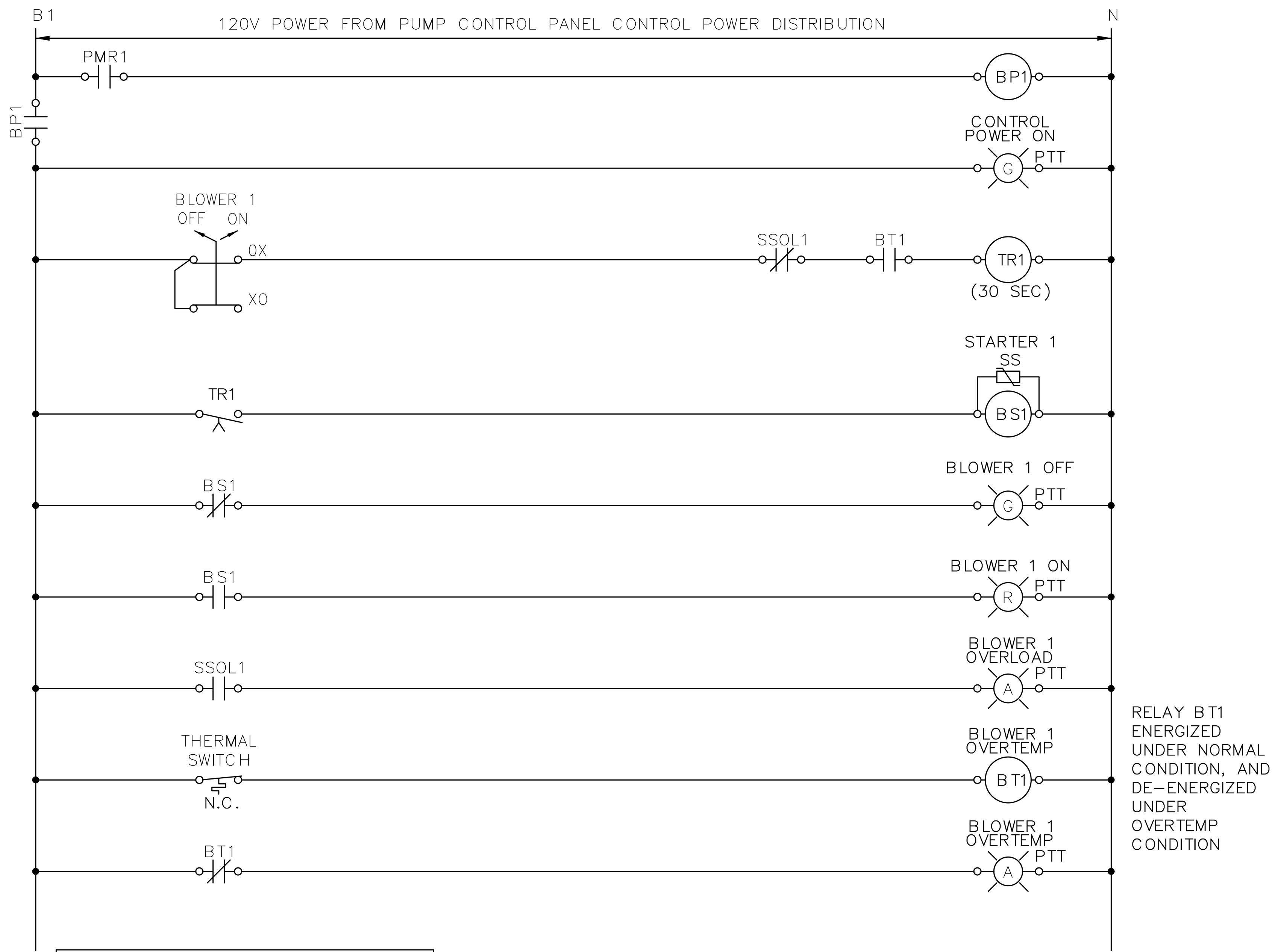
JOB NUMBER: SA190-0404.426

SHEET NO. △ E-22

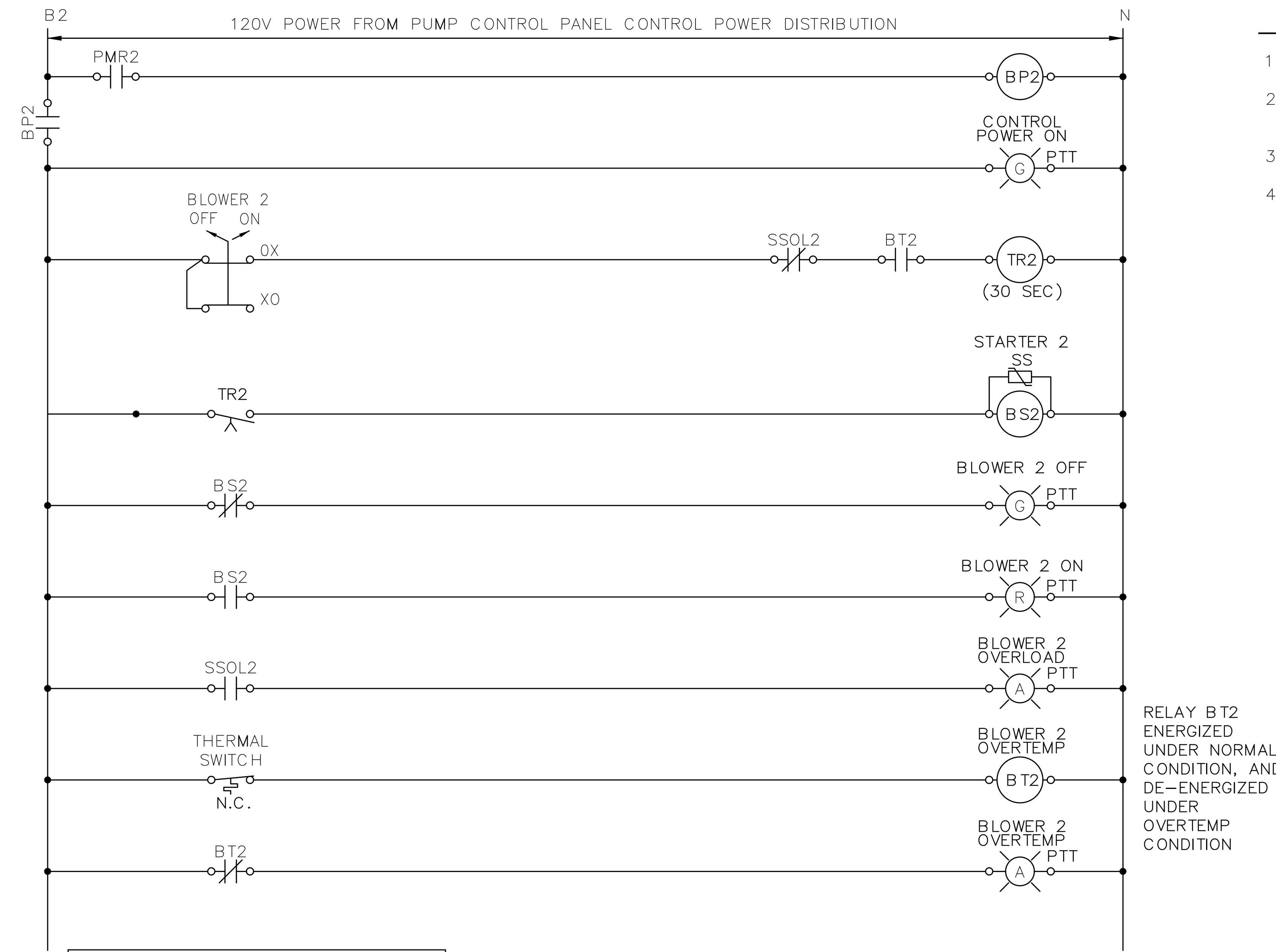


BLOWERS NOT REQUIRED TO BE MONITORED THROUGH SCADA

NOTE:
CONTROL LOOPS SPECIFIC FOR EACH ODOR CONTROL BLOWER INSTALLED. DESIGN ENGINEER MUST DUPLICATE THESE CONTROL LOOPS IN THE ODOR CONTROL BLOWER MOTOR CONTROL DESIGN AND MUST UPDATE RELAY NUMBERING RESPECTIVELY.

(A) TYPICAL ODOR CONTROL BLOWER 1 CONTROL SCHEMATIC – FVNR STARTER

SCALE: N.T.S.
TYPICAL CONTROL LOGIC FOR ODOR CONTROL BLOWER WITH FULL VOLTAGE NON–REVERSING STARTER.

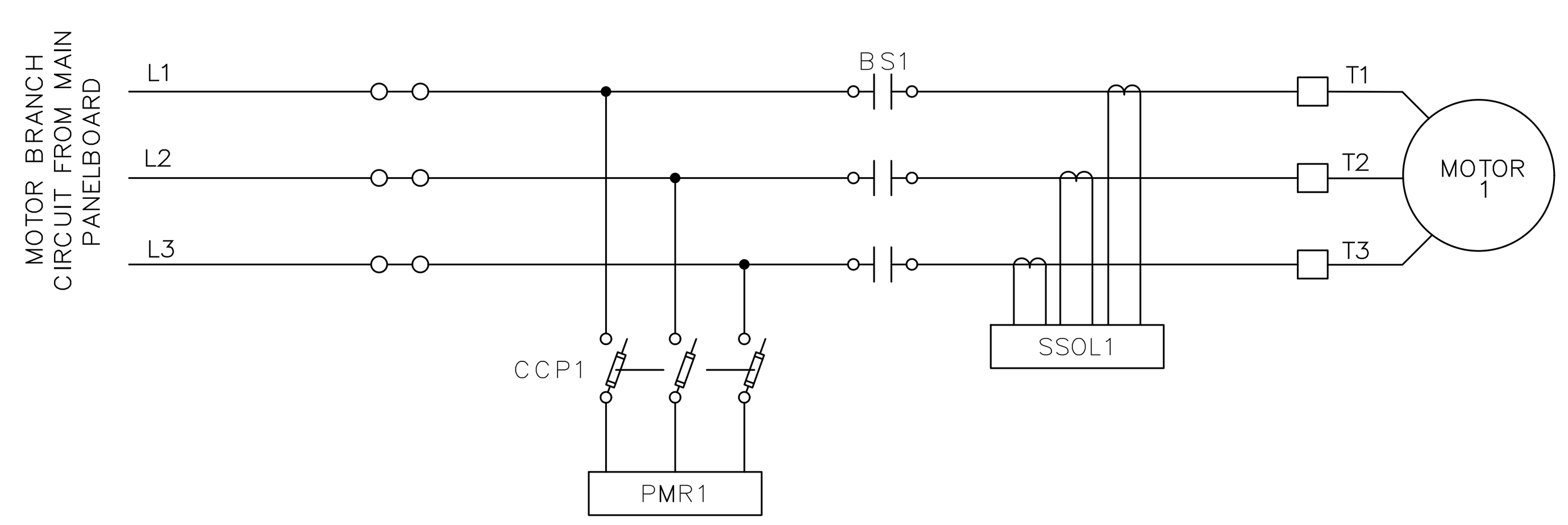


BLOWERS NOT REQUIRED TO BE MONITORED THROUGH SCADA

NOTE:
CONTROL LOOPS SPECIFIC FOR EACH ODOR CONTROL BLOWER INSTALLED. DESIGN ENGINEER MUST DUPLICATE THESE CONTROL LOOPS IN THE ODOR CONTROL BLOWER MOTOR CONTROL DESIGN AND MUST UPDATE RELAY NUMBERING RESPECTIVELY.

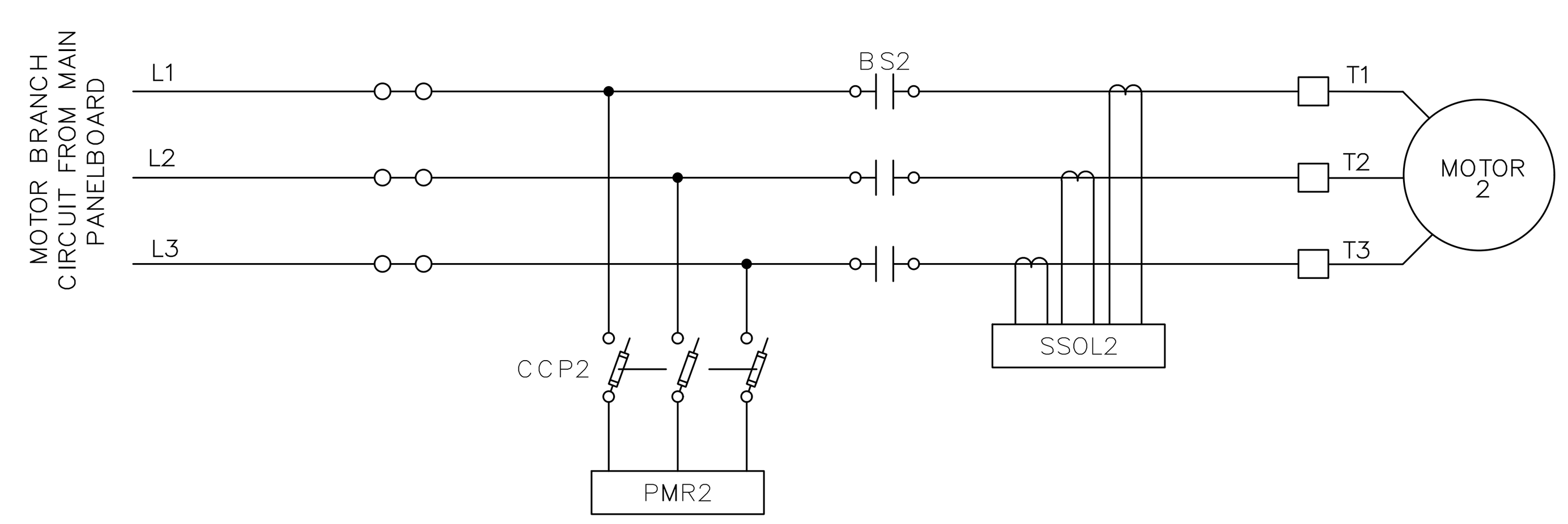
(D) TYPICAL ODOR CONTROL BLOWER 2 CONTROL SCHEMATIC – FVNR STARTER

SCALE: N.T.S.
TYPICAL CONTROL LOGIC FOR ODOR CONTROL BLOWER WITH FULL VOLTAGE NON–REVERSING STARTER.



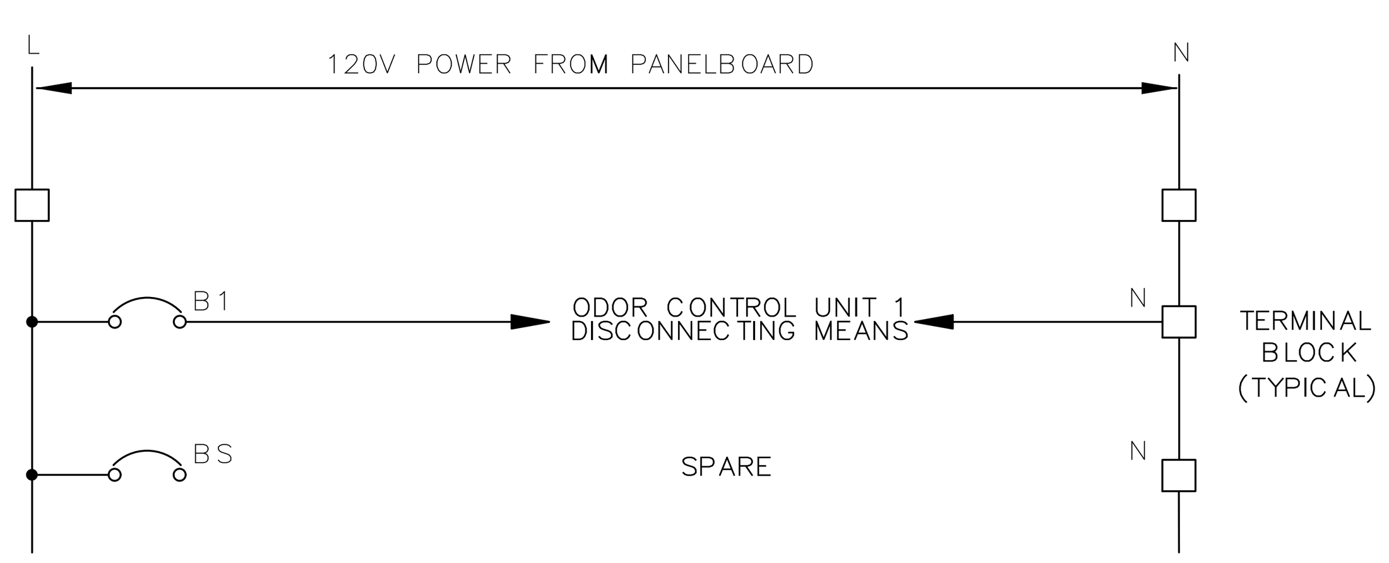
(B) ODOR CONTROL BLOWER 1 THREE LINE DIAGRAM – FVNR STARTER

SCALE: N.T.S.
TYPICAL ODOR CONTROL BLOWER WITH FULL VOLTAGE STARTER.

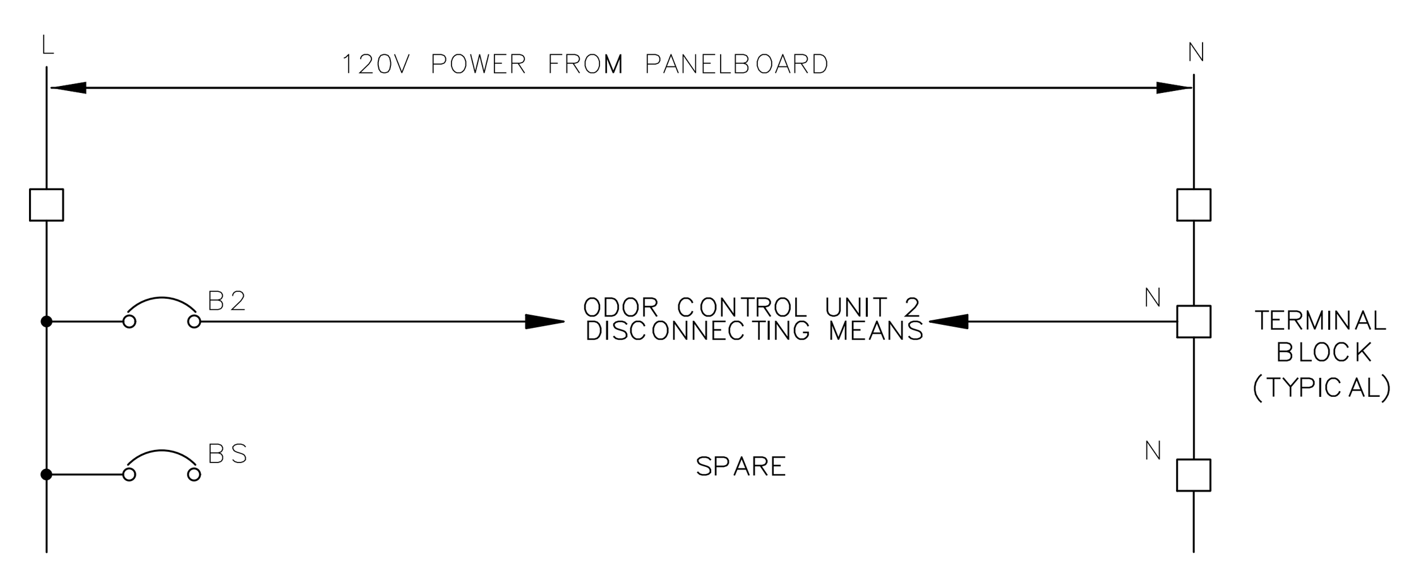


(E) ODOR CONTROL BLOWER 2 THREE LINE DIAGRAM – FVNR STARTER

SCALE: N.T.S.
TYPICAL ODOR CONTROL BLOWER WITH FULL VOLTAGE STARTER.



(C) ODOR CONTROL UNIT 1 PANEL CONTROL POWER DISTRIBUTION SCHEMATIC



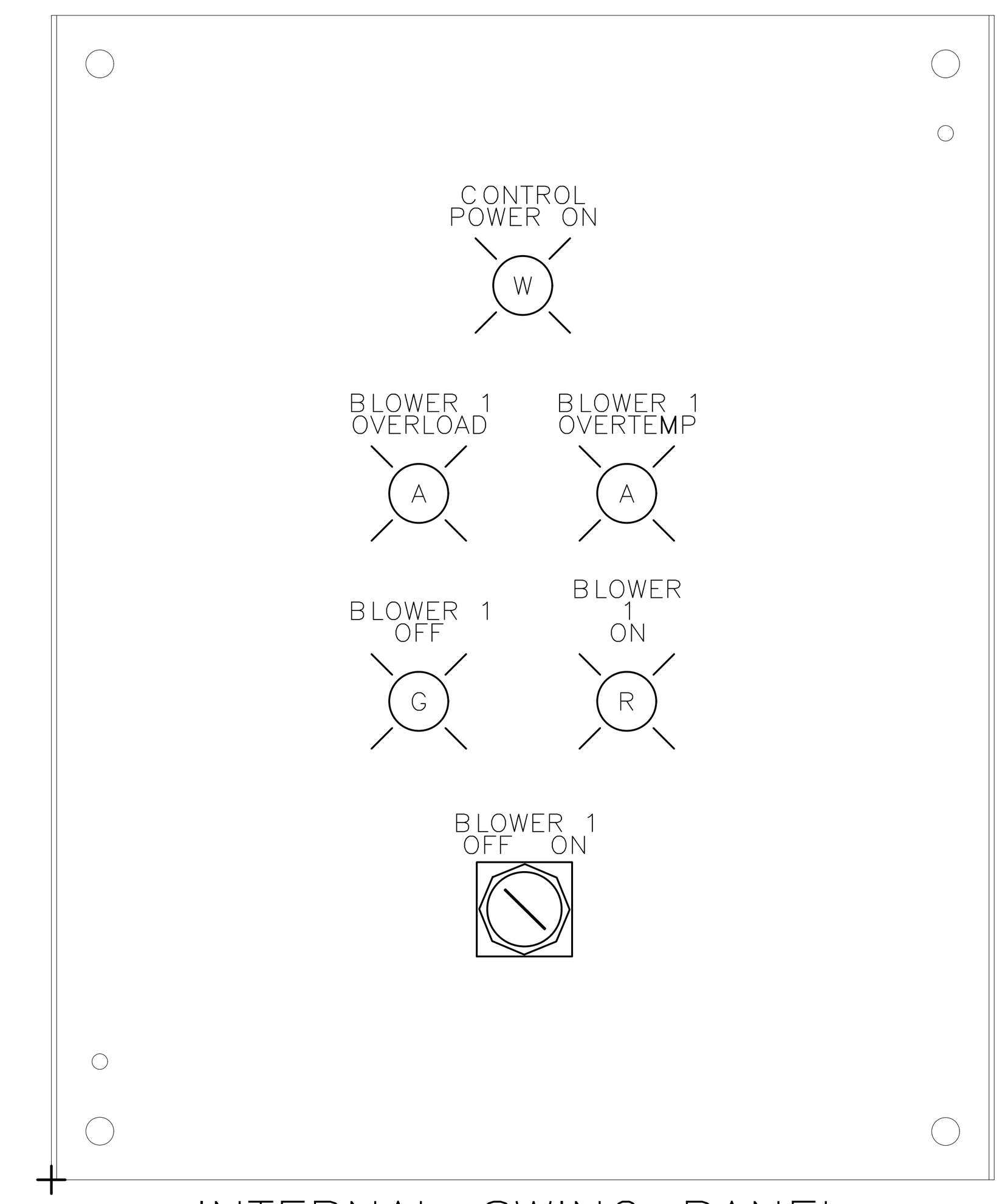
(F) ODOR CONTROL UNIT 2 PANEL CONTROL POWER DISTRIBUTION SCHEMATIC

NOTES

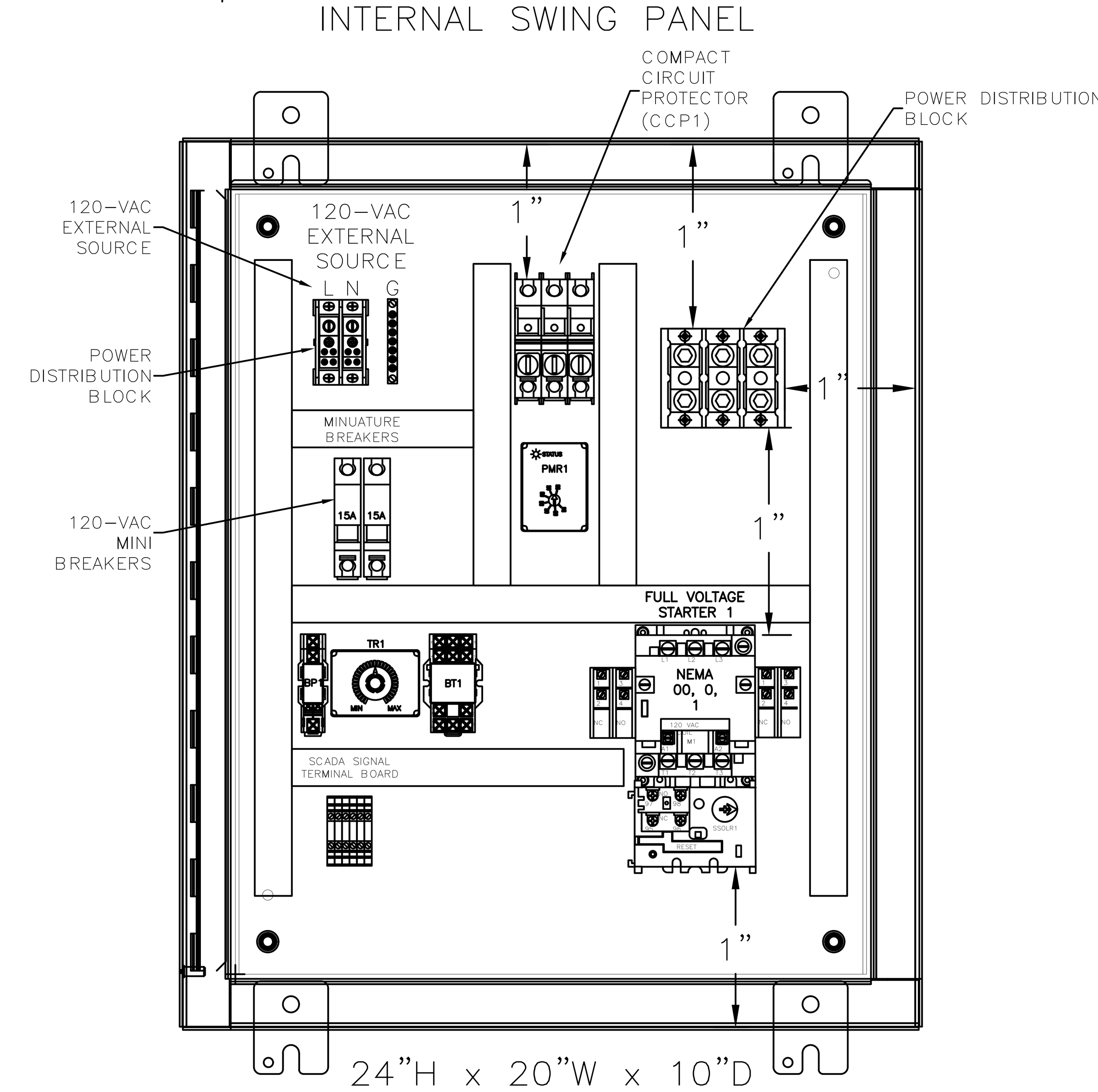
1. ALL INDICATING LAMPS SHALL BE PUSH–TO–TEST TYPE.
2. THE BLOWER INTERNAL THERMAL SWITCH IS CLOSED UNDER NORMAL CONDITION AND SHALL OPEN UNDER BLOWER OVERTEMPERATURE CONDITION.
3. PHASE MONITORING RELAY SHALL BE MACROMATIC PMP, OR EQUIVALENT.
4. COMPACT CIRCUIT PROTECTOR SHALL CONSIST OF DISCONNECT SWITCH WITH CLASS CC FAST ACTING FUSES. BUSSMANN COMPACT CIRCUIT PROTECTOR, OR EQUIVALENT.

ELECTRICAL ABBREVIATIONS

BS	BLOWER FULL VOLTAGE STARTER
BT	BLOWER OVER TEMPERATURE RELAY
CP	CONTROL POWER RELAY
CCP	COMPACT CIRCUIT PROTECTOR
ETM	ELAPSED TIME METER
PMR	PHASE MONITORING RELAY
SS	COIL SURGE SUPPRESSOR
SSOL	SOLID STATE OVERLOAD RELAY
TR	TIME DELAY RELAY



INTERNAL SWING PANEL



24"H x 20"W x 10"D MINIMUM ENCLOSURE SIZE

(G) ODOR CONTROL UNIT PANEL LAYOUT (TYP. FOR 2)

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THE WOODLANDS OFF-SITE SANITARY SEWER, LIFT STATION, & FORCE MAIN

ODOR CONTROL UNIT SCHEMATIC

REVISIONS

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6/22/2023
STATE OF TEXAS
ELIZABETH SCONER–ZARATE
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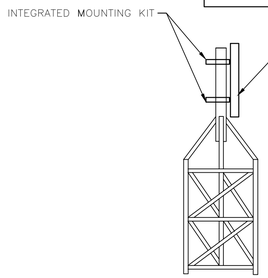
Fax 210.503.2749
TBPE No. F-1386

JOB NUMBER: SA190-0404.426

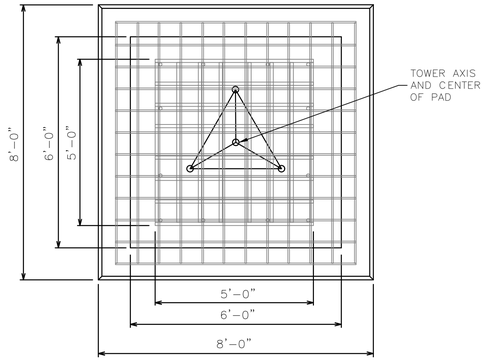
SHEET NO. E-23

INCLUDE TOWER NAD83 STATE COORDINATES:
LATITUDE: __D__M__S = __.______
LONGITUDE: __D__M__S = __.____

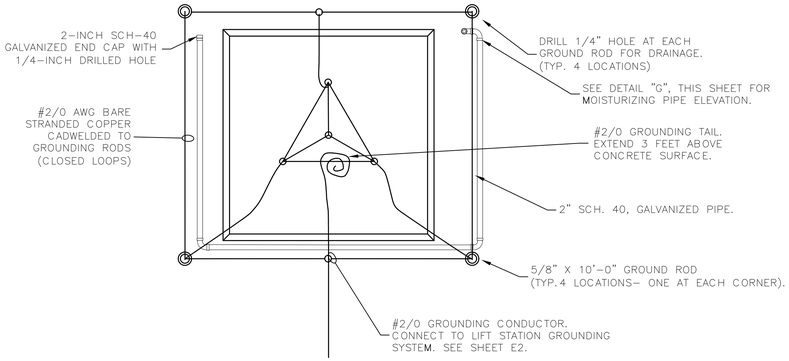


NOTES:

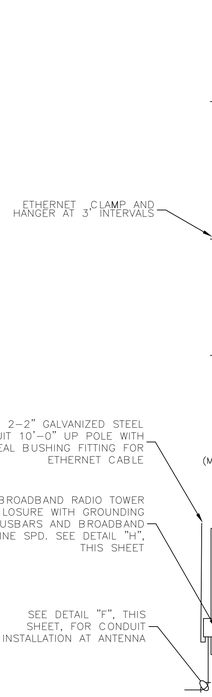
1. TOWER SHALL BE ROHN SELF-SUPPORTED TOWER MODEL 65G PART No. 65SS050 OR EQUIVALENT
2. OVERTURNING MOMENT: 22,900 FT-LB
3. MAX ALLOWABLE SHEAR: 1,600 LB
4. TOWER HEIGHT SHALL BE MINIMUM 50'-0".



B TOWER FOUNDATION- PLAN VIEW
SCALE: N.T.S.

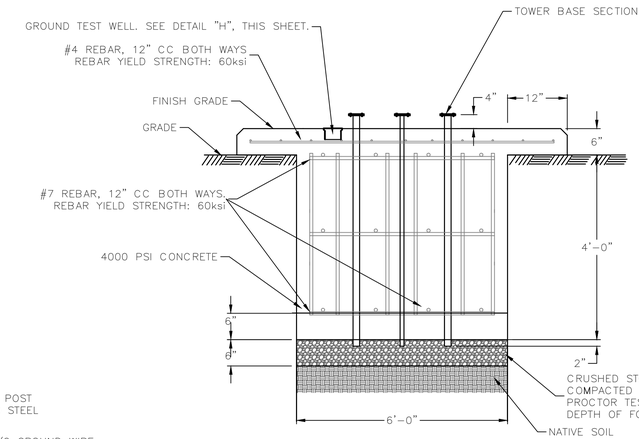


E ANTENNA GROUNDING DETAIL- PLAN
SCALE: N.T.S.

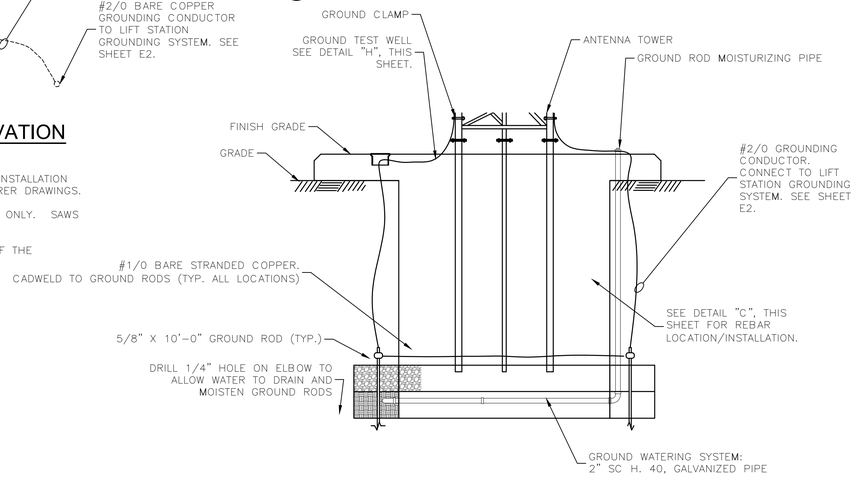


A ANTENNA TOWER ELEVATION
SCALE: N.T.S.

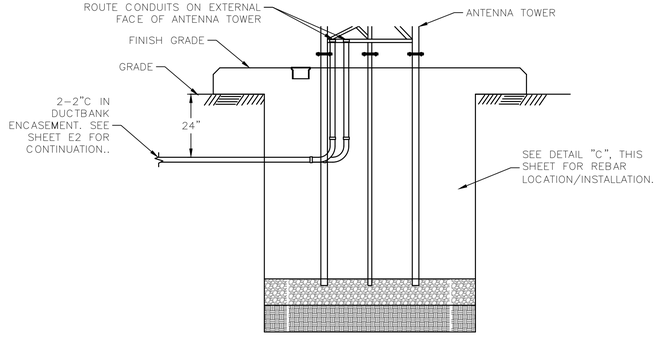
1. FOR REQUIRED MATERIAL SPECIFICATIONS, INSTALLATION NOTES, AND TOLERANCES SEE MANUFACTURER DRAWINGS.
2. MAST SHOWN FOR INFORMATION PURPOSES ONLY. SAWS TO DETERMINE MAST HEIGHT AND TYPE.
3. ROUTE ALL CONDUITS ON THE EXTERIOR OF THE ANTENNA STRUCTURE.



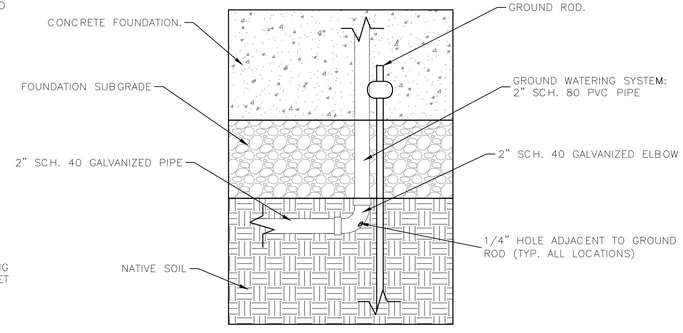
C TOWER FOUNDATION- ELEVATION
SCALE: N.T.S.



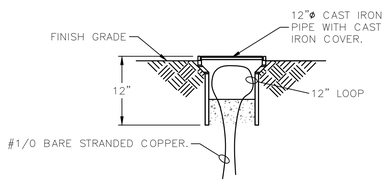
D ANTENNA GROUNDING DETAIL- ELEVATION
SCALE: N.T.S.



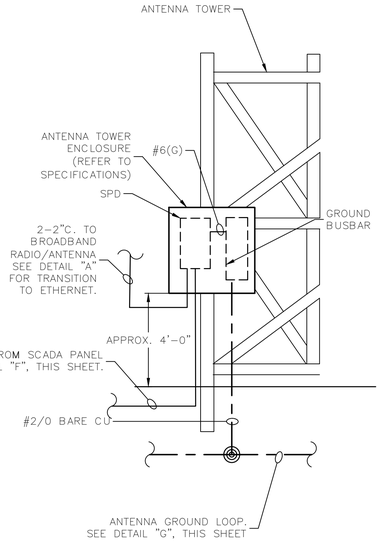
F ANTENNA CONDUIT INSTALLATION DETAIL
SCALE: N.T.S.



G MOISTURIZING PIPE DETAIL
SCALE: N.T.S.



H GROUND TEST WELL
SCALE: N.T.S.



I TOWER ENCLOSURE
SCALE: N.T.S.

NOTES:
1. ALL CONDUITS SHALL BE ROUTED THROUGH BOTTOM OF TOWER ENCLOSURE

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THE WOODLANDS OFF-SITE SANITARY SEWER, LIFT STATION, & FORCE MAIN

ANTENNA DETAILS

REVISIONS			
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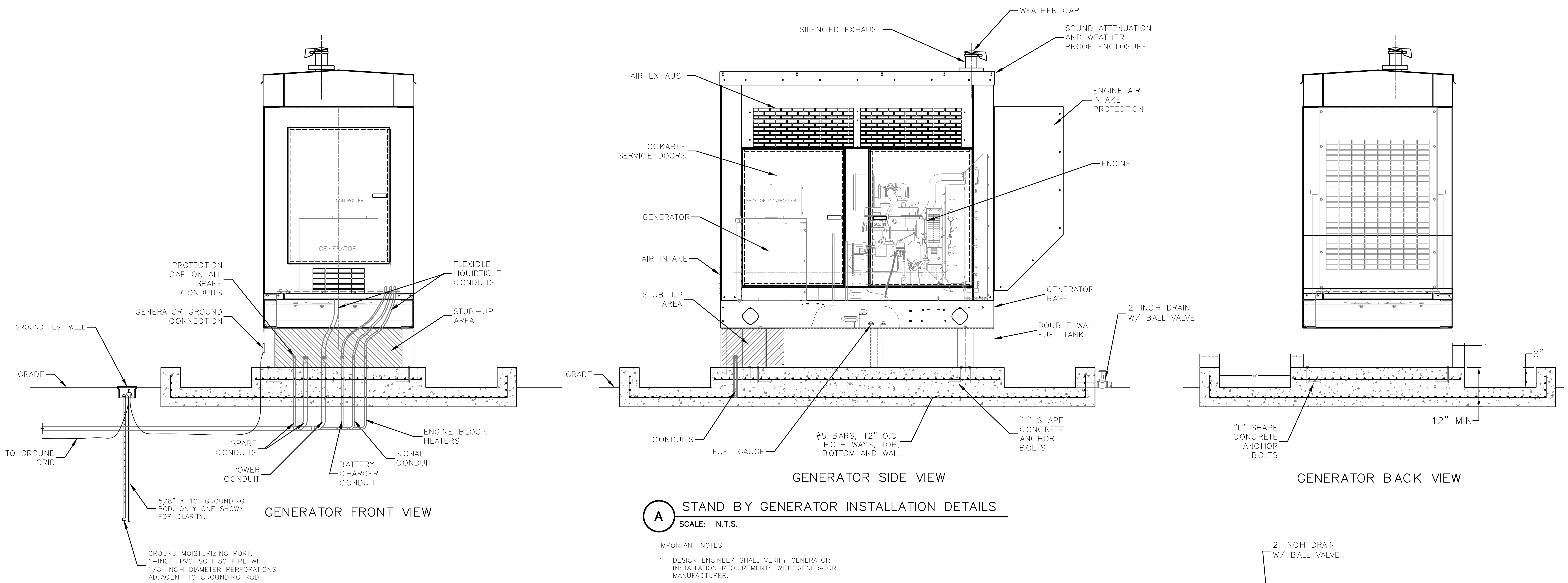
JOB NUMBER: SA190-0404.426

SHEET NO.
⚠ E-24



(A) STAND BY GENERATOR INSTALLATION DETAILS
SCALE: N.T.S.

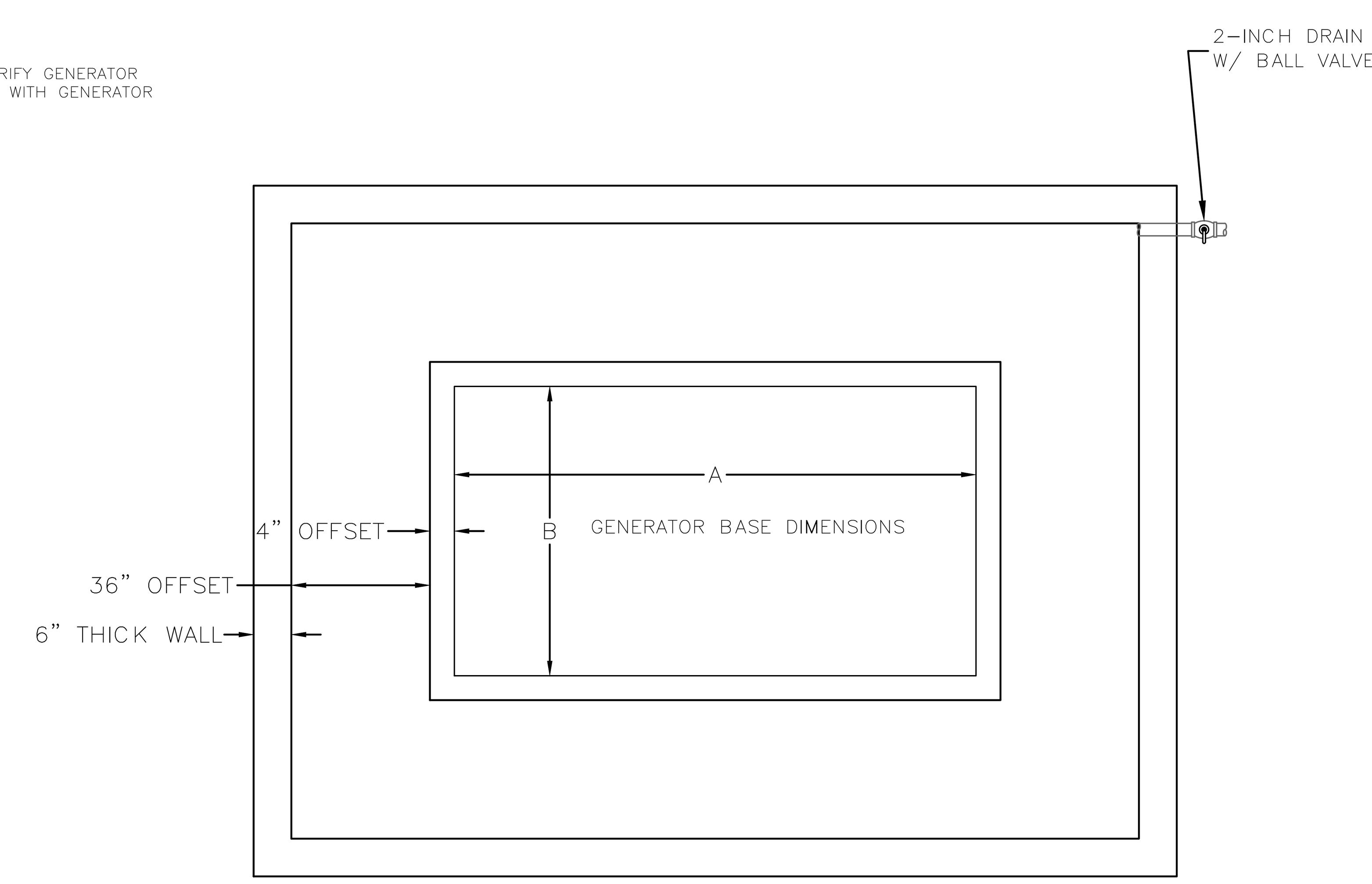
IMPORTANT NOTES:

1. DESIGN ENGINEER SHALL VERIFY GENERATOR INSTALLATION REQUIREMENTS WITH GENERATOR MANUFACTURER.

NOTES

1. VOLTAGE DIP SHALL NOT DROP BELOW 15% AND FREQUENCY SHALL NOT DROP BELOW 5% WHEN STARTING ACROSS-THE-LINE THE LARGEST MOTOR WHILE ALL OTHER LIFT STATION MOTORS AND AUXILIARY TRANSFORMER (OR DISTRIBUTION PANELBOARD IF NO AUXILIARY TRANSFORMER) ARE RUNNING AT FULL LOAD.
2. GENERATOR FRAME SHALL BE SOLIDLY BONDED TO THE REST OF THE GROUNDING SYSTEM AT EACH CORNER. GROUND RESISTANCE MEASURED AT THE GENERATOR SHALL HAVE THE SAME MAGNITUDE AS THE REST OF THE GROUNDING SYSTEM, AND IT SHALL NOT EXCEED 5 OHMS.
3. GENERATOR SHALL BE WIRED AS A NON-SEPARATELY DERIVED SYSTEM, IN STRICT COMPLIANCE WITH NEC CURRENT REQUIREMENT.
4. GENERATOR SHALL BE PROVIDED WITH SOUND ATTENUATION ENCLOSURE AND EXHAUST, AND MUST BE WEATHER PROOF. SEE SAWS LIFT STATION DESIGN AND CONSTRUCTION STANDARDS TEXT DOCUMENT FOR OTHER GENERATOR REQUIREMENTS.
5. GENERATOR FRAME SHALL BE SOLIDLY ANCHORED TO CONCRETE SLAB. ALL COMPONENTS USED TO FASTEN THE GENERATOR SHALL BE MADE OF STAINLESS STEEL 316.
6. CONDUITS SHALL INCLUDE AC POWER, BATTERY CHARGER, ENGINE BLOCK HEATER, SIGNAL AND SPARE.
7. FUEL TANK SHALL BE DOUBLE WALL TYPE.
8. CONCRETE SLAB SHALL BE MADE OF CONCRETE MIX WITH A COMPRESSIVE STRENGTH OF 3,000 PSI. CONCRETE SLAB MUST INCLUDE A CONTAINMENT STRUCTURE AS SHOWN IN DETAIL B OF THIS SHEET. A 2-INCH DRAIN PIPE AND BALL VALVE SHALL BE PROVIDED.
9. A 5-FOOT DEDICATED CLEARANCE AROUND GENERATOR CONTAINMENT SLAB SHALL BE PROVIDED, IN STRICT COMPLIANCE WITH SAWS LIFT STATION DESIGN AND CONSTRUCTION STANDARDS TEXT DOCUMENT.
10. CONDUIT STUB-UP AREA SHOWN IN THIS DRAWING IS FOR ILLUSTRATION PURPOSES ONLY. DESIGN ENGINEER MUST VERIFY THE LOCATION OF THE STUB-UP AREA WITH THE GENERATOR MANUFACTURER. CONDUIT DUCT BANK AND STUBUPS SHALL COMPLY WITH STANDARD DETAILS OF THESE STANDARDS DRAWINGS.

GENERATOR INFORMATION	
MANUFACTURER	
GENERATOR MODEL	
ENGINE MODEL	
ALTERNATOR MODEL	
STAND-BY POWER CAPACITY	________ kW
STAND-BY POWER CAPACITY	________ kVA
RATED VOLTAGE	________ V
FULL LOAD AMPS	________ A
MOTOR STARTING CAPACITY	________ kVA
PERCENT OF VOLTAGE DIP	________ %



(B) CONTAINMENT BASE DETAILS
SCALE: N.T.S.

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Austin, Texas 78730
(512) 452-8789

THE WOODLANDS OFF-SITE SANITARY SEWER, LIFT STATION, & FORCE MAIN

GENERATOR DETAILS

REVISIONS			
NO.	DESCRIPTION	BY	DATE
1	ADDENDUM 1 DRAWING REVISIONS	11/9/23	ESZ

DATE: 11/13/2020
DESIGNED BY:
DRAWN BY:
CHECKED BY:
DRAWING NAME:

6/22/2023
STATE OF TEXAS
ELIZABETH SEGNER-ZARATE
108870
LICENSED
PROFESSIONAL ENGINEER

LJA Engineering, Inc.
1100 NE Loop 410
Suite 850
San Antonio, Texas 78209
Phone 210.503.2700
Fax 210.503.2749
TBPE No. F-1386

JOB NUMBER: SA190-0404.426

SHEET NO. △ E-25

100% SUBMITTAL

GENERAL NOTES

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MEETING THE COMPACTION REQUIREMENTS ON ALL TRENCH BACKFILL AND FOR PAYING FOR THE TESTS PERFORMED BY A THIRD PARTY. COMPACTION TESTS WILL BE DONE AT LOCATION POINTS RANDOMLY SELECTED OR AS INDICATED BY SAWS' INSPECTOR/TEST ADMINISTRATOR, PER EACH 18 (FIRST LIFT FROM BOTTOM) AND 12 INCH LOOSE LIFT PER 100 LINEAR FEET, AT A PROBE DEPTH OF SIX (6) INCHES. ONE PER LIFT PER 100 FT.
2. THE CONTRACTOR IS RESPONSIBLE FOR CONSTRUCTING AND TESTING THE SANITARY SEWER SYSTEM IN ACCORDANCE WITH 30 TAC 217 & THE DESIGN PLANS AND SAWS SPECIFICATIONS.
3. THE CONTRACTOR MUST PROVIDE CERTIFICATION UPON REQUEST OF THE ENGINEER THAT ALL MATERIALS FOR THE CONSTRUCTION OF THE SANITARY SEWER SYSTEM MEET TCEQ AND SAWS SPECIFICATIONS.
4. THE CONTRACTOR SHALL SUBMIT MANUFACTURE'S PRODUCT DATA INSTRUCTIONS, RECOMMENDATIONS, SHOP DRAWINGS, AND CERTIFICATIONS, BEFORE TESTING BEGINS AND IN ADEQUATE TIME TO OBTAIN APPROVAL THROUGH SUBMITTAL PROCESS, PREPARE, AND SUBMIT TEST PLAN FOR APPROVAL BY ENGINEER. INCLUDE TESTING PROCEDURES, METHODS, EQUIPMENT, AND TENTATIVE SCHEDULE. OBTAIN ADVANCE WRITTEN APPROVAL FOR DEVIATIONS FROM DRAWINGS AND SPECIFICATIONS. SUBMIT TEST REPORTS FOR EACH TEST ON EACH SEGMENT OF SANITARY SEWER.
5. ANY TESTING PERFORMED MUST HAVE SAW'S INSPECTOR AND/OR THE ENGINEER PRESENT.
6. THE CONTRACTOR MUST PROVIDE THE ENGINEER WITH COPIES OF TV-VIDEO INSPECTIONS WHEN COMPLETED AND COMPACTION TESTING RESULTS PRIOR TO FINAL TESTING OBSERVATION BY THE ENGINEER.
7. AFTER ALL SANITARY SEWER CONSTRUCTION HAS BEEN COMPLETED, FINAL STABILIZATION OF THE CONSTRUCTION AREA ON ALL UNPAVED AREAS AND AREAS NOT COVERED BY PERMANENT STRUCTURES SHALL BE COMPLETED BY EVENLY DISTRIBUTING SEEDING AND WATERING TO THE MINIMUM OF THE NATIVE BACKGROUND VEGETATIVE COVER. REFER TO SAWS STANDARD SPECIFICATIONS FOR CONSTRUCTION ITEM NO. 103.
8. REFER TO SHEET C4.0 FOR WATER & WASTEWATER CROSSING DETAILS.

SEWER:
THE WOODLANDS OFF-SITE SEWER LINE 'A'

DEVELOPER'S NAME: LUCRA TERRA, LLC
DEVELOPER'S ADDRESS: 15720 BANDERA RD, STE 103
CITY HELOTES STATE TEXAS ZIP 78103
PHONE # 830-837-2349 FAX #
SAWS BLOCK MAP # WWL 'A' 06460, 062606 TOTAL EDUS 0 TOTAL ACREAGE NA
TOTAL LINEAR FOOTAGE OF PIPE: 3,658.58 LF - 30" PIPE PLAT NO. N/A
NUMBER OF LOTS: 0 SAWS JOB NO. 20-1630

TRENCH EXCAVATION SAFETY PROTECTION
CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR STRUCTURAL DESIGN/GEOTECHNICAL/ SAFETY/EQUIPMENT CONSULTANT, IF ANY, SHALL REVIEW THESE PLANS AND AVAILABLE GEOTECHNICAL INFORMATION AND THE ANTICIPATED INSTALLATION SITE(S) WITHIN THE PROJECT WORK AREA IN ORDER TO IMPLEMENT CONTRACTOR'S TRENCH EXCAVATION SAFETY PROTECTION SYSTEMS, PROGRAMS AND/OR PROCEDURES. THE CONTRACTOR'S IMPLEMENTATION OF THE SYSTEMS, PROGRAMS AND/OR PROCEDURES SHALL PROVIDE FOR ADEQUATE TRENCH EXCAVATION, SAFETY PROTECTION THAT COMPLIES WITH AS A MINIMUM, OSHA STANDARDS FOR TRENCH EXCAVATIONS. SPECIFICALLY, CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR SAFETY CONSULTANT SHALL IMPLEMENT A TRENCH SAFETY PROGRAM IN ACCORDANCE WITH OSHA STANDARDS GOVERNING THE PRESENCE AND ACTIVITIES OF INDIVIDUALS WORKING IN AND AROUND TRENCH EXCAVATION.

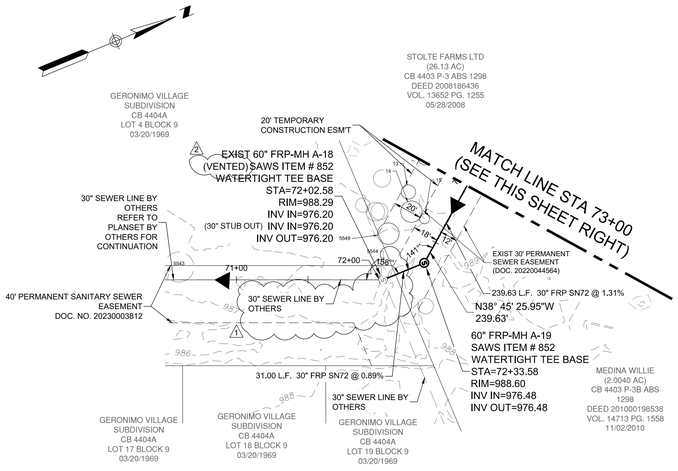
SAWS CONSTRUCTION NOTES
CONTRACTOR SHALL REFERENCE THE 2021 SAWS CONSTRUCTION AND SPECIFICATIONS AT THE TIME OF THE DATED PLAN SHEET. SEE BELOW FOR REFERENCED DETAILS

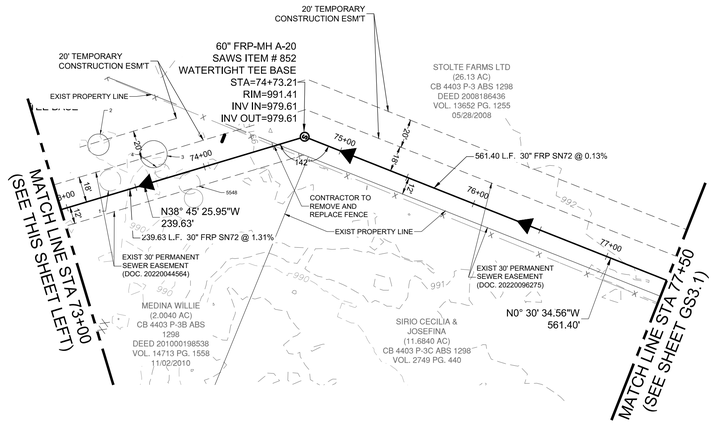
BORE NOTES:
1. ALL BORE PIT SIZE AND LOCATIONS ARE APPROXIMATE AND ARE TO BE USED FOR PLANNING PURPOSES ONLY.
2. BORE CONTRACTOR SHALL EVALUATE AND ADJUST BORES AS REQUIRED IN EFFORTS TO PRESERVE TREES SHOWN TO BE PRESERVED.

50 25 0 50 100
HORIZONTAL SCALE 1" = 50'
VERTICAL SCALE 1" = 5'

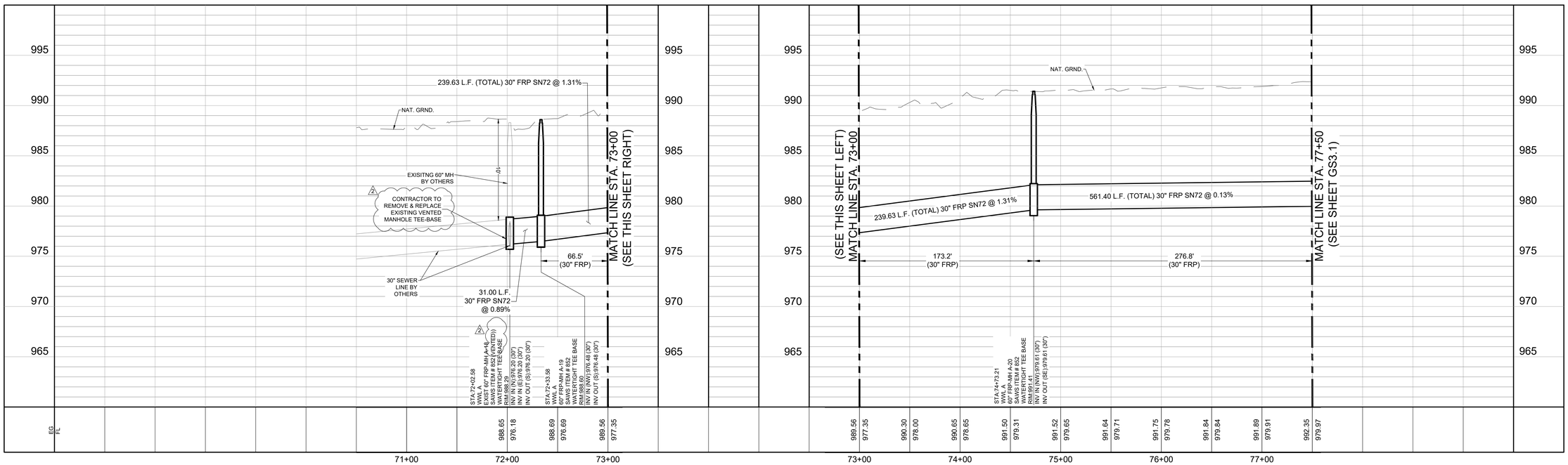
ESTIMATED QUANTITIES

Item No.	DESCRIPTION	UNIT	QUANTITY
	Sanitary Sewer Improvements		
857	30" FRP SN72 Pipe (8'-12')	LF	548
852	FRP Tee Base Manhole	EA	2
550	Trench Excavation Safety Protection	LF	548
866	Sanitary Sewer Television Inspection	LF	548
103	Revegetation	SY	3044





WASTEWATER LINE 'A' STA. 72+00.00 TO 77+50.00



LEGEND

PROPOSED	EXISTING	
S	S	SANITARY SEWER MANHOLE
	8"WW	SANITARY SEWER LINE
	EX W	WATER LINE
	C/O	SANITARY SEWER LATERAL
	C/O	CLEAN OUT
		WATER VALVE
		FIRE HYDRANT
	GV	GAS VALVE
	G	GAS LINE
	D	STORM SEWER MANHOLE
		POWER POLE
		STREET LIGHT (100 WATT LED)
		GUY WIRE
	OU	OVERHEAD ELECTRIC
		BENCHMARK
	G,E,T,CA	GAS, ELEC, TELE & CABLE TV ESM'T.
	ESM'T.	EASEMENT
	VOL	VOLUME
	PG	PAGE
		SIGNIFICANT TREE PRESERVED
		HERITAGE TREE PRESERVED
		TREE OUT OF BOUNDS
		TREE REMOVE
	FM	FORCE MAIN
		10YR FLOOD PLAIN
		100YR FLOOD PLAIN
		500YR FLOOD PLAIN
		CONCRETE CASING
		STEEL CASING
		APPROXIMATE BORE PIT SIZE & LOCATION
		EXISTING FENCE

CAUTION: CONTRACTOR TO NOTIFY TEXAS ONE CALL AT 1-800-245-4545 48 HOURS PRIOR TO CONSTRUCTION FOR UTILITY LINE LOCATE. CONTRACTOR SHALL VERIFY HORIZONTAL AND VERTICAL LOCATION OF ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION. ENGINEER SHALL BE NOTIFIED IMMEDIATELY OF ANY SIGNIFICANT DISCREPANCIES OR REQUIRED DESIGN CHANGES. EXISTING UTILITIES SHOWN HEREON ARE FOR INFORMATIONAL PURPOSES ONLY. ENGINEER ASSUMES NO RESPONSIBILITY FOR THE ACCURACY OF THIS INFORMATION.

THE WOODLANDS OFF-SITE SANITARY SEWER LINE 'A'

WASTEWATER LINE 'A' STA. 72+00 TO 77+50
PLAN & PROFILE

REVISIONS

NO.	DESCRIPTION	BY	DATE
1	ANNOTATION, LINEWORK AND/OR QUANTITIES REVISION	TH	11/10/2023
2	REMOVE & REPLACE EXIST VENTED TEE BASE CALL OUT INCLUDED.	TH	11/15/2023

DATE: 11/15/2023
DESIGNED BY: PJR
DRAWN BY: MAS, PJR, JD
CHECKED BY: TH
DRAWING NAME: WWL A 77+50-85+00.dwg

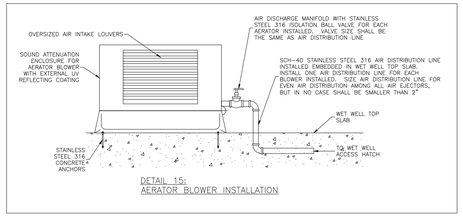
STATE OF TEXAS
TORRY LAYNE HURT
91844
LICENSED PROFESSIONAL ENGINEER
11/15/2023

LJA Engineering, Inc.
9830 Colonnade Blvd
Suite 300
San Antonio, Texas 78230
Phone 210.503.2700
LJA.COM
TBPE No. F-1386

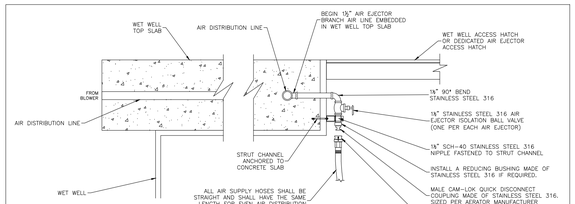
JOB NUMBER: SA190-0404.426

SHEET NO.
GS3.0

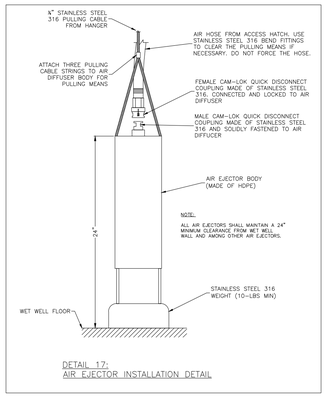
100% SUBMITTAL



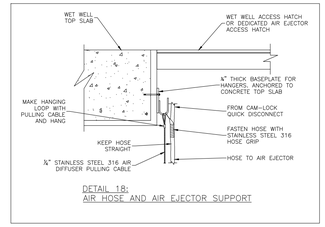
DETAIL 15:
AERATOR BLOWER INSTALLATION



DETAIL 16:
AIR LINE AND HOSE CONNECTION AT ACCESS HATCH

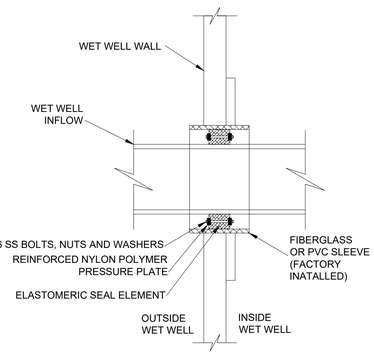


DETAIL 17:
AIR EJECTOR INSTALLATION DETAIL

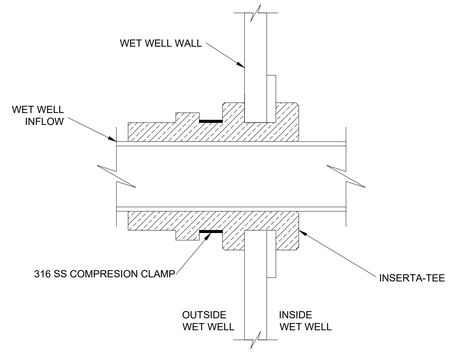


DETAIL 18:
AIR HOSE AND AIR EJECTOR SUPPORT

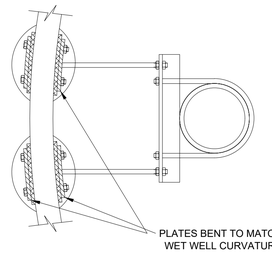
	ODOR CONTROL DETAILS
REVISION: MAY 2022	MASTER PLANNING
	PROPERTY OF: SAN ANTONIO WATER SYSTEM, SAN ANTONIO, TEXAS
	DD-903-02
	SHEET 5 OF 5



LINK-SEAL DETAIL



INSERTA-TEE DETAIL



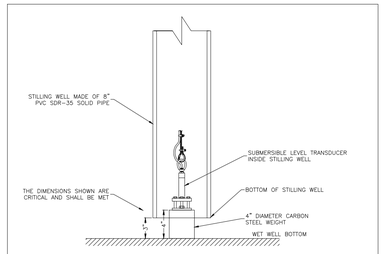
INFLOW TOP VIEW DETAIL

REVISIONS			
NO.	DESCRIPTION	BY	DATE
2	ANNOTATION, LINEWORK AND/OR QUANTITIES REVISION.	TH	11/1/2023

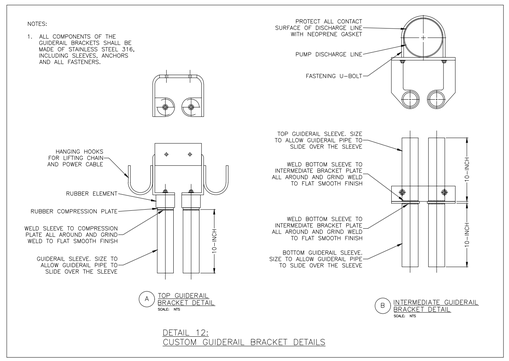
THE WOODLANDS OFF-SITE SANITARY SEWER LINE 'A'

CIVIL DETAILS III

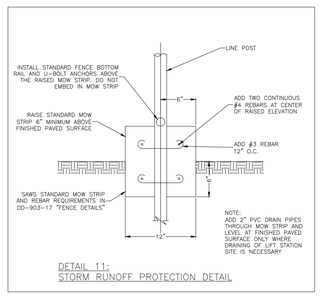
DATE:	11/11/2023
DESIGNED BY:	BPB
DRAWN BY:	MAS, PJR, JD
CHECKED BY:	TH
DRAWING NAME:	CIVIL DETAILSIV.dwg



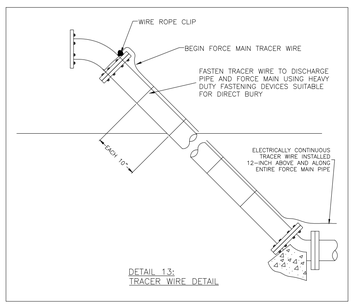
DETAIL 10:
SUBMERSIBLE LEVEL TRANSDUCER INSTALLATION WITHIN STILLING WELL DETAIL – NTS



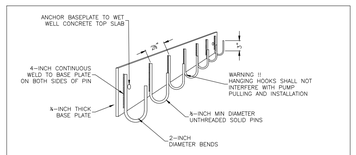
DETAIL 12:
CUSTOM GUIDERAIL BRACKET DETAILS



DETAIL 11:
STORM RUNOFF PROTECTION DETAIL



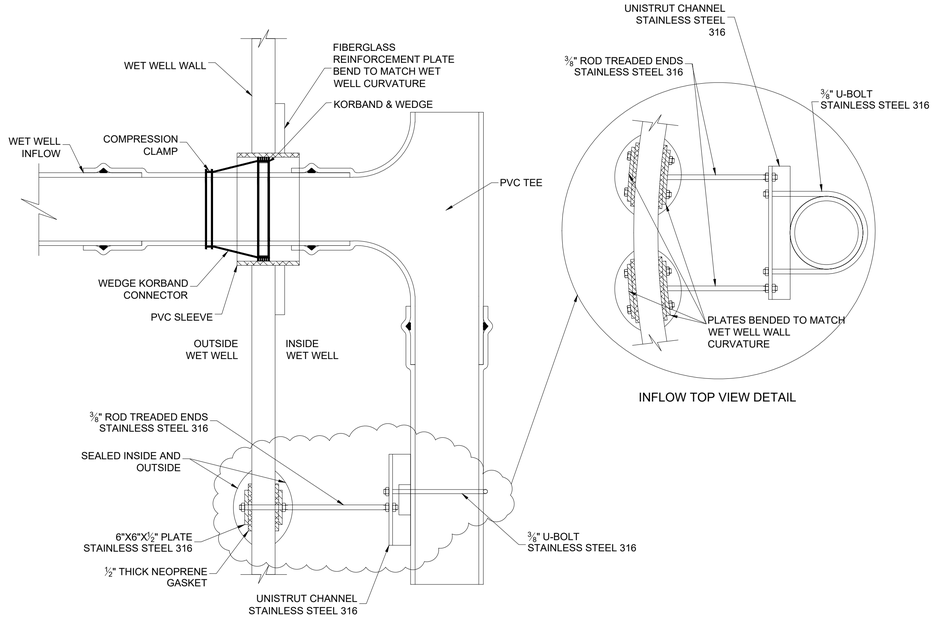
DETAIL 13:
TRACER WIRE DETAIL



DETAIL 14:
WET WELL CABLE AND CHAIN HANGING PLATE DETAIL

NOTES:
1. ALL COMPONENTS, INCLUDING ANCHORS SHALL BE STAINLESS STEEL 316.
2. LENGTH OF BASEPLATE VARIES PER PROJECT. TWO OR MORE HANGERS MAY BE REQUIRED ON CASE-BY-CASE BASIS.

	MISCELLANEOUS DETAILS
REVISION: SEP 2021	MASTER PLANNING
	PROPERTY OF: SAN ANTONIO WATER SYSTEM, SAN ANTONIO, TEXAS
	DD-903-02
	SHEET 5 OF 5



INFLOW TOP VIEW DETAIL

*NOTE: ALLL NUTS SHALL BE LOCK-NUTS

WET WELL INFLOW DROP TEE PENETRATION DETAILS

N.T.S.

STATE OF TEXAS
TORRY LAYNE HURT
91844
LICENSED PROFESSIONAL ENGINEER
11/02/2023

LJA Engineering, Inc.
9830 Colorado Blvd
Suite 300
San Antonio, Texas 78230
Phone 210.503.2700
LJA.COM
TBPE No. F-1386

JOB NUMBER: SA190-0404.426

SHEET NO.
GS6.2

100% SUBMITTAL

GENERAL NOTES

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MEETING THE COMPACTION REQUIREMENTS ON ALL TRENCH BACKFILL AND FOR PAYING FOR THE TESTS PERFORMED BY A THIRD PARTY. COMPACTION TESTS WILL BE DONE AT ONE LOCATION POINT RANDOMLY SELECTED, OR AS INDICATED BY THE SAWS INSPECTOR AND/OR THE TEST ADMINISTRATOR, PER EACH 12-INCH LOOSE LIFT PER 400 LINEAR FEET AT A MINIMUM. THIS PROJECT WILL NOT BE ACCEPTED AND FINALIZED BY SAWS WITHOUT THIS REQUIREMENT BEING MET AND VERIFIED BY PROVIDING ALL NECESSARY DOCUMENTED TEST RESULTS.
2. THE CONTRACTOR IS RESPONSIBLE FOR CONSTRUCTING AND TESTING THE SANITARY SEWER SYSTEM IN ACCORDANCE WITH 30 TAC 217 [AND 213.5 FOR PROJECTS IN THE ERZD], THE DESIGN PLANS AND SAWS SPECIFICATIONS.
3. THE CONTRACTOR MUST PROVIDE CERTIFICATION UPON REQUEST OF THE ENGINEER THAT ALL MATERIALS FOR THE CONSTRUCTION OF THE SANITARY SEWER SYSTEM MEET TCEQ AND SAWS SPECIFICATIONS.
4. THE CONTRACTOR IS TO NOTIFY THE ENGINEER AT LEAST THREE (3) DAYS PRIOR TO BEGINNING CONSTRUCTION AND TESTING SCHEDULE.
5. THE CONTRACTOR SHALL NOTIFY THE ENGINEER AT LEAST THREE (3) DAYS PRIOR TO ALL TESTING ON THE SANITARY SEWER SYSTEM.
6. ANY TESTING PERFORMED WITHOUT THE PRESENCE OF THE ENGINEER WILL BE REDONE AT THE CONTRACTOR'S EXPENSE.
7. THE CONTRACTOR MUST PROVIDE THE ENGINEER WITH COPIES OF TV-VIDEO INSPECTIONS WHEN COMPLETED AND COMPACTION TESTING RESULTS PRIOR TO FINAL TESTING OBSERVATION BY THE ENGINEER.
8. AFTER ALL SANITARY SEWER CONSTRUCTION HAS BEEN COMPLETED, FINAL STABILIZATION OF THE CONSTRUCTION AREA ON ALL UNPAVED AREAS AND AREAS NOT COVERED BY PERMANENT STRUCTURES SHALL BE COMPLETED BY EVENLY DISTRIBUTING SEEDING AND WATERING TO A MINIMUM OF 70% OF THE NATIVE BACKGROUND VEGETATIVE COVER.
9. ALL RESIDENTIAL SEWER SERVICE LATERALS ARE 6" DIA. AND 35 FEET IN LENGTH UNLESS NOTED OTHERWISE.
10. ALL RESIDENTIAL SEWER SERVICE LATERALS SHALL BE EXTENDED TO THE 10' G.E.T.CA. EASEMENT AND CAPPED AND SEALED.
11. LATERALS TO LOTS THAT SLOPE AWAY FROM STREET SHALL BE SLOPED FROM THE TEE OR STACK AT 1% TO THE 10' G.E.T.CA..
12. REFER TO SHEET C4.0 FOR WATER & WASTEWATER CROSSING DETAILS.
13. 18" HDPE FORCEMAIN SHALL BE DUCTILE IRON PIPE SIZES.

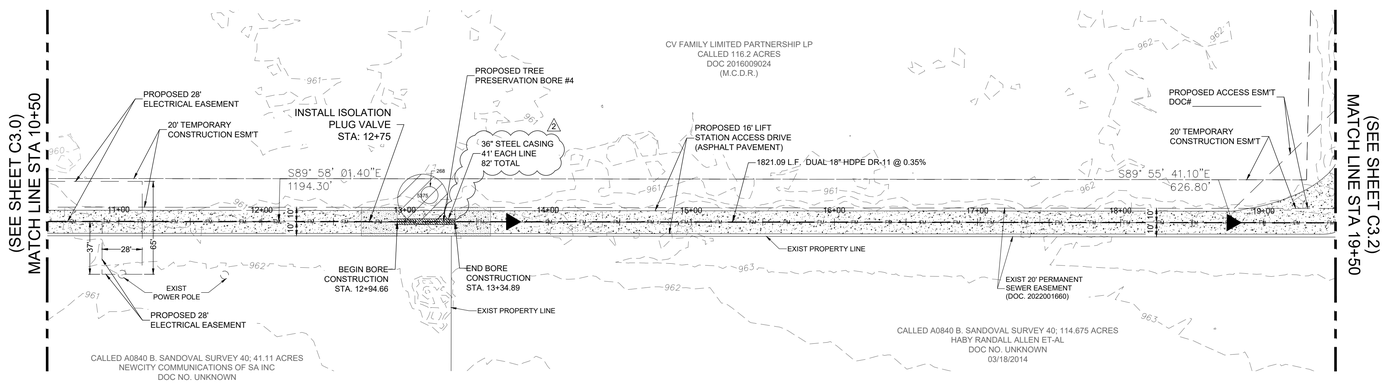
SEWER:
THE WOODLANDS OFF-SITE SEWER LIFT STATION &
FORCE MAIN EXTENSIONS

DEVELOPER'S NAME: LUCRA TERRA, LLC
DEVELOPER'S ADDRESS: 15720 BANDERA RD, STE 103
CITY HELOTES STATE TEXAS ZIP 78103
PHONE # 830-837-2349 FAX #
SAWS BLOCK MAP # 06460, 062606 TOTAL EDU'S 0 TOTAL ACREAGE NA
TOTAL LINEAR FOOTAGE OF PIPE: 18" 17,482' 27" 115' PLAT NO. N/A
NUMBER OF LOTS: 0 SAWS JOB NO. 20-1630

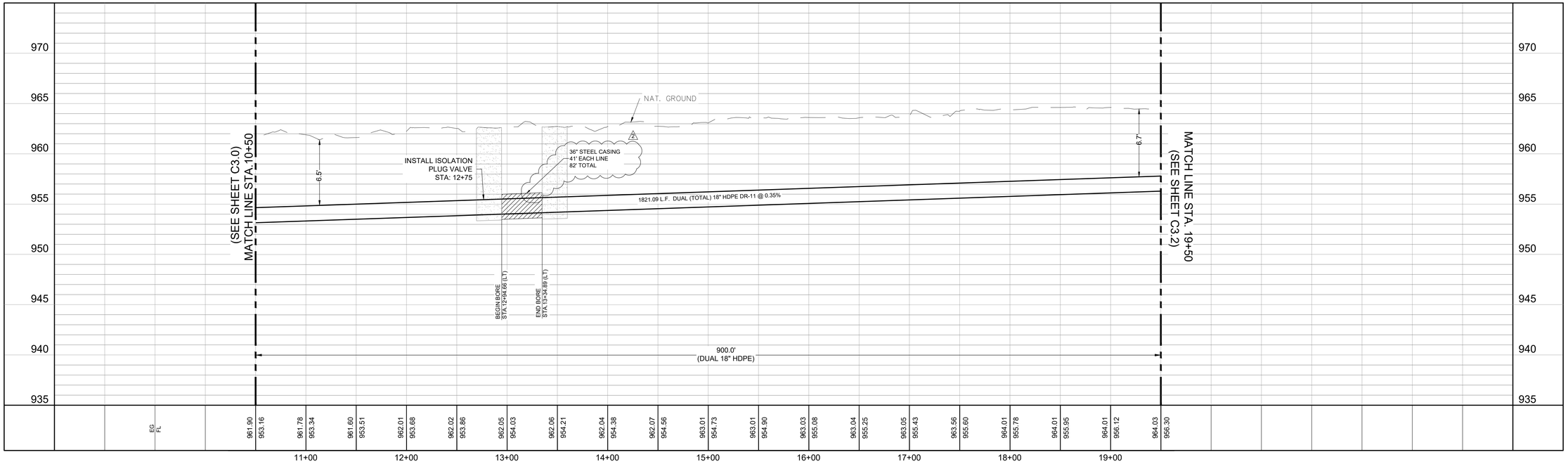
TRENCH EXCAVATION SAFETY PROTECTION
CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR STRUCTURAL DESIGN/GEOTECHNICAL/ SAFETY/EQUIPMENT CONSULTANT, IF ANY, SHALL REVIEW THESE PLANS AND AVAILABLE GEOTECHNICAL INFORMATION AND THE ANTICIPATED INSTALLATION SITE(S) WITHIN THE PROJECT WORK AREA IN ORDER TO IMPLEMENT CONTRACTOR'S TRENCH EXCAVATION SAFETY PROTECTION SYSTEMS, PROGRAMS AND/OR PROCEDURES. THE CONTRACTOR'S IMPLEMENTATION OF THE SYSTEMS, PROGRAMS AND/OR PROCEDURES SHALL PROVIDE FOR ADEQUATE TRENCH EXCAVATION, SAFETY PROTECTION THAT COMPLIES WITH AS A MINIMUM, OSHA STANDARDS FOR TRENCH EXCAVATIONS. SPECIFICALLY, CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR SAFETY CONSULTANT SHALL IMPLEMENT A TRENCH SAFETY PROGRAM IN ACCORDANCE WITH OSHA STANDARDS GOVERNING THE PRESENCE AND ACTIVITIES OF INDIVIDUALS WORKING IN AND AROUND TRENCH EXCAVATION.

SAWS CONSTRUCTION NOTES
CONTRACTOR SHALL REFERENCE THE 2019 SAWS CONSTRUCTION AND SPECIFICATIONS AT THE TIME OF THE DATED PLAN SHEET. SEE BELOW FOR REFERENCED DETAILS

DESCRIPTION	QUANTITY	UNIT
Sanitary Sewer Improvements		
DUAL 18" HDPE DR-11 Pipe (6'-10')	1800	LF
Trench Excavation Safety Protection	900	LF
Sanitary Sewer Television Inspection	1800	LF
Jack, Boring, or Tunneling	82	LF
36" Steel Casing	82	LF
Vegetation	4000	SQYD



SEWER FORCE MAIN STA. 10+50 TO 19+50



LEGEND

PROPOSED	EXISTING	
S	S	SANITARY SEWER MANHOLE
FM		DUAL 18" FORCE MAIN
		SANITARY SEWER LINE TO BE ABANDONED
	EX W	WATER LINE
		SANITARY SEWER LATERAL
	C/O	CLEAN OUT
		WATER VALVE
		FIRE HYDRANT
	G	GAS LINE
	D	STORM SEWER MANHOLE
		CURB INLET
		POWER POLE
		STREET LIGHT (100 WATT LED)
		STREET LIGHT (250 WATT LED)
		GUY WIRE
	OU	OVERHEAD ELECTRIC
		BENCHMARK
	TMH	TOP OF MANHOLE
	EX.	EXISTING
	G,E,T,CA	GAS, ELEC, TELE & CABLE TV ESM'T.
	ESM'T.	EASEMENT
	VOL	VOLUME
	PG	PAGE
		SIGNIFICANT TREE PRESERVED
		HERITAGE TREE PRESERVED
	FM	FORCE MAIN
		100YR FLOOD PLAIN FLOW LINE
		ASPHALT LIFT STATION ACCESS ROAD
		STEEL CASING
		CONCRETE CASING

HORIZONTAL SCALE 1" = 50'
VERTICAL SCALE 1" = 5'

CAUTION: CONTRACTOR TO NOTIFY TEXAS ONE CALL AT 1-800-245-4545 48 HOURS PRIOR TO CONSTRUCTION FOR UTILITY LINE LOCATE. CONTRACTOR SHALL VERIFY HORIZONTAL AND VERTICAL LOCATION OF ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION. ENGINEER SHALL BE NOTIFIED IMMEDIATELY OF ANY SIGNIFICANT DISCREPANCIES OR REQUIRED DESIGN CHANGES. EXISTING UTILITIES SHOWN HEREON ARE FOR INFORMATIONAL PURPOSES ONLY. ENGINEER ASSUMES NO RESPONSIBILITY FOR THE ACCURACY OF THIS INFORMATION.

THE WOODLANDS OFF-SITE SANITARY SEWER LIFT STATION & FORCE MAIN

SEWER FORCE MAIN STA. 10+50 TO 19+50
PLAN & PROFILE

NO.	DESCRIPTION	BY	DATE
1	ANNOTATION, LINEWORK AND/OR QUANTITIES REVISION.	TH	11/1/2023

REVISIONS

DATE: 11/1/2023
DESIGNED BY: PJR
DRAWN BY: MAS, PJR, JD
CHECKED BY: TH
DRAWING NAME: sh_WWL FM 1+00-11+00.dwg

STATE OF TEXAS
TORRY LAYNE HURT
91844
LICENSED PROFESSIONAL ENGINEER
11/10/2023

LJA Engineering, Inc.
9830 Colonnade Blvd
Suite 300
San Antonio, Texas 78230
Phone 210.503.2700
LJA.COM
TBPE No. F-1386

JOB NUMBER:
SA190-0404.426

SHEET NO.
C3.1

100% SUBMITTAL

GENERAL NOTES

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MEETING THE COMPACTION REQUIREMENTS ON ALL TRENCH BACKFILL AND FOR PAYING FOR THE TESTS PERFORMED BY A THIRD PARTY. COMPACTION TESTS WILL BE DONE AT ONE LOCATION POINT RANDOMLY SELECTED, OR AS INDICATED BY THE SAWS INSPECTOR AND/OR THE TEST ADMINISTRATOR, PER EACH 12-INCH LOOSE LIFT PER 400 LINEAR FEET AT A MINIMUM. THIS PROJECT WILL NOT BE ACCEPTED AND FINALIZED BY SAWS WITHOUT THIS REQUIREMENT BEING MET AND VERIFIED BY PROVIDING ALL NECESSARY DOCUMENTED TEST RESULTS.
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3. THE CONTRACTOR MUST PROVIDE CERTIFICATION UPON REQUEST OF THE ENGINEER THAT ALL MATERIALS FOR THE CONSTRUCTION OF THE SANITARY SEWER SYSTEM MEET TCEQ AND SAWS SPECIFICATIONS.
4. THE CONTRACTOR IS TO NOTIFY THE ENGINEER AT LEAST THREE (3) DAYS PRIOR TO BEGINNING CONSTRUCTION AND TESTING SCHEDULE.
5. THE CONTRACTOR SHALL NOTIFY THE ENGINEER AT LEAST THREE (3) DAYS PRIOR TO ALL TESTING ON THE SANITARY SEWER SYSTEM.
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7. THE CONTRACTOR MUST PROVIDE THE ENGINEER WITH COPIES OF TV-VIDEO INSPECTIONS WHEN COMPLETED AND COMPACTION TESTING RESULTS PRIOR TO FINAL TESTING OBSERVATION BY THE ENGINEER.
8. AFTER ALL SANITARY SEWER CONSTRUCTION HAS BEEN COMPLETED, FINAL STABILIZATION OF THE CONSTRUCTION AREA ON ALL UNPAVED AREAS AND AREAS NOT COVERED BY PERMANENT STRUCTURES SHALL BE COMPLETED BY EVENLY DISTRIBUTING SEEDING AND WATERING TO A MINIMUM OF 70% OF THE NATIVE BACKGROUND VEGETATIVE COVER.
9. ALL RESIDENTIAL SEWER SERVICE LATERALS ARE 6" DIA. AND 35 FEET IN LENGTH UNLESS NOTED OTHERWISE.
10. ALL RESIDENTIAL SEWER SERVICE LATERALS SHALL BE EXTENDED TO THE 10' G.E.T.CA. EASEMENT AND CAPPED AND SEALED.
11. LATERALS TO LOTS THAT SLOPE AWAY FROM STREET SHALL BE SLOPED FROM THE TEE OR STACK AT 1% TO THE 10' G.E.T.CA..
12. REFER TO SHEET C4.0 FOR WATER & WASTEWATER CROSSING DETAILS.
13. 18" HDPE FORCEMAIN SHALL BE DUCTILE IRON PIPE SIZES.

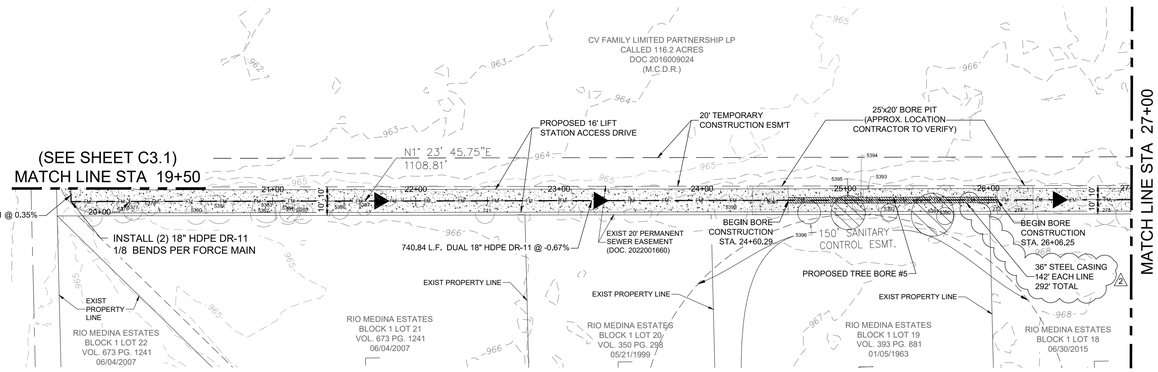
SEWER:
THE WOODLANDS OFF-SITE SEWER LIFT STATION & FORCE MAIN EXTENSIONS

DEVELOPER'S NAME: LUCRA TERRA, LLC
DEVELOPER'S ADDRESS: 15720 BANDERA RD, STE 103
CITY HELOTES STATE TEXAS ZIP 78103
PHONE # 830-837-2349 FAX #
SAWS BLOCK MAP # 06460, 062606 TOTAL EDU'S 0 TOTAL ACREAGE NA
TOTAL LINEAR FOOTAGE OF PIPE: 18" 17,462' 27" 115'
PLAT NO. N/A
NUMBER OF LOTS: 0 SAWS JOB NO. 20-1630

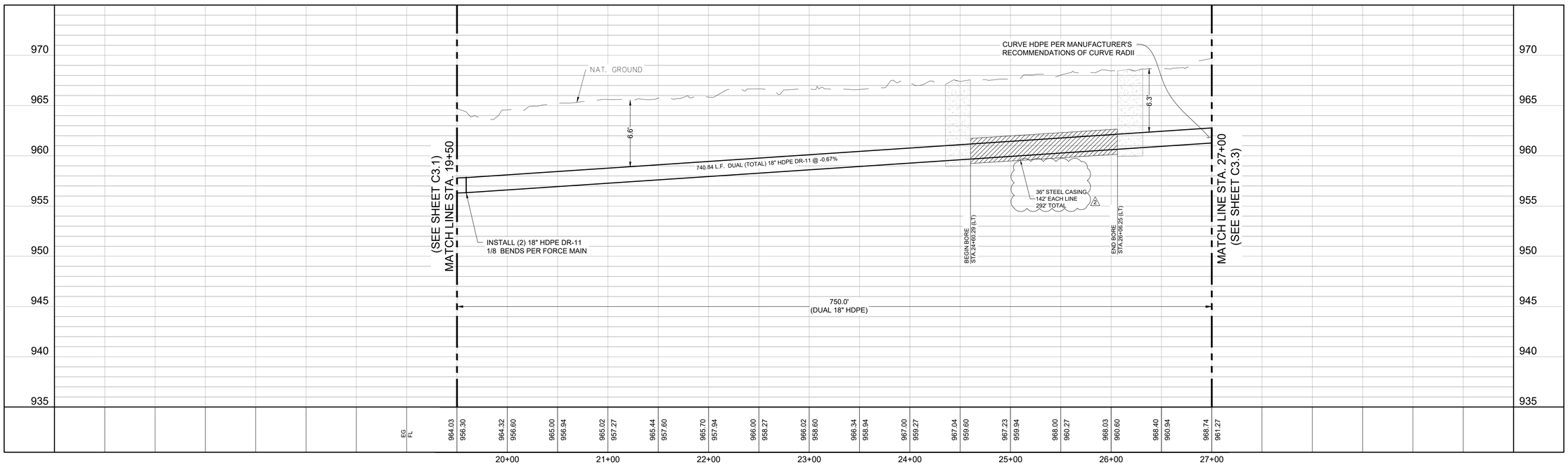
TRENCH EXCAVATION SAFETY PROTECTION
CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR STRUCTURAL DESIGN/GEOTECHNICAL/ SAFETY/EQUIPMENT CONSULTANT, IF ANY, SHALL REVIEW THESE PLANS AND AVAILABLE GEOTECHNICAL INFORMATION AND THE ANTICIPATED INSTALLATION SITE(S) WITHIN THE PROJECT WORK AREA IN ORDER TO IMPLEMENT CONTRACTOR'S TRENCH EXCAVATION SAFETY PROTECTION SYSTEMS, PROGRAMS AND/OR PROCEDURES. THE CONTRACTOR'S IMPLEMENTATION OF THE SYSTEMS, PROGRAMS AND/OR PROCEDURES SHALL PROVIDE FOR ADEQUATE TRENCH EXCAVATION, SAFETY PROTECTION THAT COMPLIES WITH AS A MINIMUM, OSHA STANDARDS FOR TRENCH EXCAVATIONS. SPECIFICALLY, CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR SAFETY CONSULTANT SHALL IMPLEMENT A TRENCH SAFETY PROGRAM IN ACCORDANCE WITH OSHA STANDARDS GOVERNING THE PRESENCE AND ACTIVITIES OF INDIVIDUALS WORKING IN AND AROUND TRENCH EXCAVATION.

SAWS CONSTRUCTION NOTES
CONTRACTOR SHALL REFERENCE THE 2019 SAWS CONSTRUCTION AND SPECIFICATIONS AT THE TIME OF THE DATED PLAN SHEET. SEE BELOW FOR REFERENCED DETAILS

DESCRIPTION	QUANTITY	UNIT
Sanitary Sewer Improvements		
18" HDPE DR-11 Pipe (6'-10')	1500	LF
Trench Excavation Safety Protection	750	LF
Sanitary Sewer Television Inspection	1500	LF
Jack, Boring, or Tunneling	292	LF
2 36" Steel Casing	292	LF
Vegetation	3333	SQYD



SEWER FORCE MAIN STA. 19+50 TO 27+00



LEGEND

PROPOSED	EXISTING	
S	S	SANITARY SEWER MANHOLE
FM		DUAL 18" FORCE MAIN
		SANITARY SEWER LINE TO BE ABANDONED
	EX W	WATER LINE
		SANITARY SEWER LATERAL
	C/O	CLEAN OUT
		WATER VALVE
		FIRE HYDRANT
	G	GAS LINE
	D	STORM SEWER MANHOLE
		CURB INLET
		POWER POLE
		STREET LIGHT (100 WATT LED)
		STREET LIGHT (250 WATT LED)
		GUY WIRE
	OU	OVERHEAD ELECTRIC
		BENCHMARK
	TMH	TOP OF MANHOLE
	EX.	EXISTING
	G,E,T,CA	GAS, ELEC, TELE & CABLE TV ESMT.
	ESM'T.	EASEMENT
	VOL	VOLUME
	PG	PAGE
		SIGNIFICANT TREE PRESERVED
		HERITAGE TREE PRESERVED
	FM	FORCE MAIN
		100YR FLOOD PLAIN FLOW LINE
		ASPHALT LIFT STATION ACCESS ROAD
		STEEL CASING
		CONCRETE CASING

HORIZONTAL SCALE 1" = 50'
VERTICAL SCALE 1" = 5'

CAUTION: CONTRACTOR TO NOTIFY TEXAS ONE CALL AT 1-800-245-4545 48 HOURS PRIOR TO CONSTRUCTION FOR UTILITY LINE LOCATE. CONTRACTOR SHALL VERIFY HORIZONTAL AND VERTICAL LOCATION OF ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION. ENGINEER SHALL BE NOTIFIED IMMEDIATELY OF ANY SIGNIFICANT DISCREPANCIES OR REQUIRED DESIGN CHANGES. EXISTING UTILITIES SHOWN HEREON ARE FOR INFORMATIONAL PURPOSES ONLY. ENGINEER ASSUMES NO RESPONSIBILITY FOR THE ACCURACY OF THIS INFORMATION.

THE WOODLANDS OFF-SITE SANITARY SEWER LIFT STATION & FORCE MAIN

SEWER FORCE MAIN STA. 19+50 TO 27+00
PLAN & PROFILE

NO.	DESCRIPTION	BY	DATE
2	ANNOTATION, LINEWORK AND/OR QUANTITIES REVISION.	TH	11/1/2023

REVISIONS

DATE: 11/1/2023
DESIGNED BY: PJR
DRAWN BY: MAS, PJR, JD
CHECKED BY: TH
DRAWING NAME: sh...WWL FM 1+00-11+00.dwg

STATE OF TEXAS
TORRY LAYNE HURT
91844
LICENSED PROFESSIONAL ENGINEER
11/10/2023

LJA Engineering, Inc.
9830 Colonnade Blvd
Suite 300
San Antonio, Texas 78230
Phone 210.503.2700
LJA.COM
TBPE No. F-1386

JOB NUMBER:
SA190-0404.426

SHEET NO.
C3.2

100% SUBMITTAL

GENERAL NOTES

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MEETING THE COMPACTION REQUIREMENTS ON ALL TRENCH BACKFILL AND FOR PAYING FOR THE TESTS PERFORMED BY A THIRD PARTY. COMPACTION TESTS WILL BE DONE AT ONE LOCATION POINT RANDOMLY SELECTED, OR AS INDICATED BY THE SAWS INSPECTOR AND/OR THE TEST ADMINISTRATOR, PER EACH 12-INCH LOOSE LIFT PER 400 LINEAR FEET AT A MINIMUM. THIS PROJECT WILL NOT BE ACCEPTED AND FINALIZED BY SAWS WITHOUT THIS REQUIREMENT BEING MET AND VERIFIED BY PROVIDING ALL NECESSARY DOCUMENTED TEST RESULTS.
2. THE CONTRACTOR IS RESPONSIBLE FOR CONSTRUCTING AND TESTING THE SANITARY SEWER SYSTEM IN ACCORDANCE WITH 30 TAC 217 [AND 213.5 FOR PROJECTS IN THE ERZD], THE DESIGN PLANS AND SAWS SPECIFICATIONS.
3. THE CONTRACTOR MUST PROVIDE CERTIFICATION UPON REQUEST OF THE ENGINEER THAT ALL MATERIALS FOR THE CONSTRUCTION OF THE SANITARY SEWER SYSTEM MEET TCEQ AND SAWS SPECIFICATIONS.
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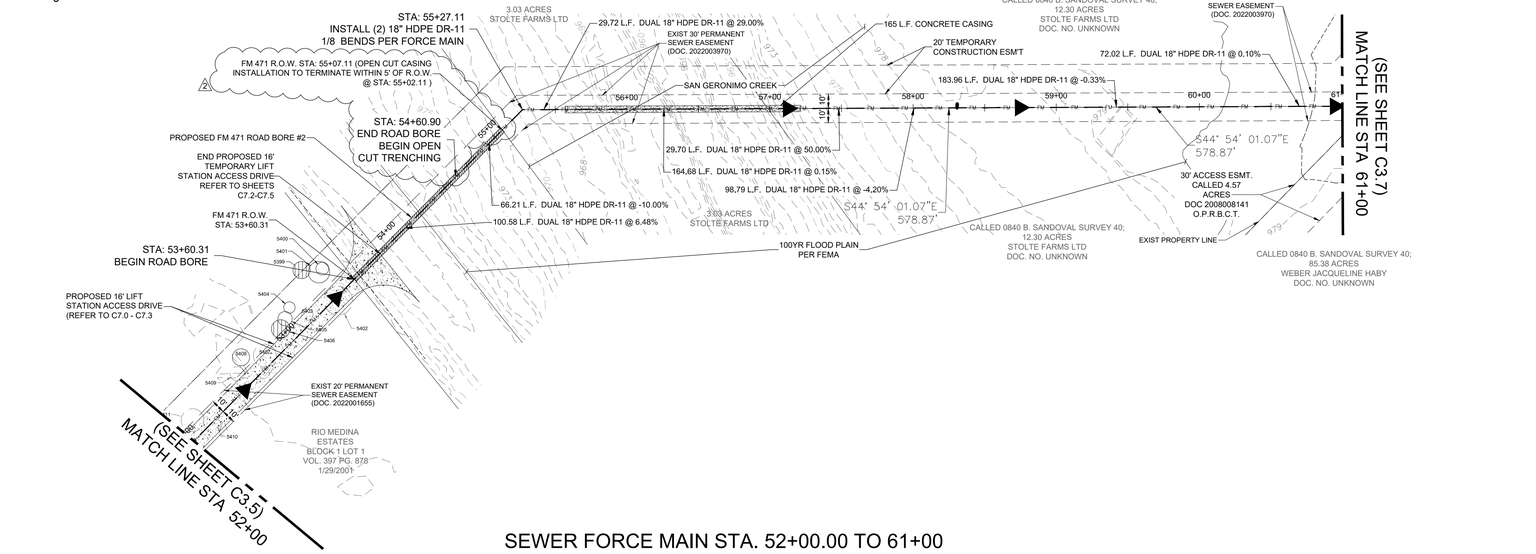
DESCRIPTION	QUANTITY	UNIT
Sanitary Sewer Improvements		
18" HDPE DR-11 Pipe (6'-10')	1500	LF
18" HDPE DR-11 Pipe (10'-14')	300	LF
Trench Excavation Safety Protection	900	LF
Sanitary Sewer Television Inspection	1800	LF
Jack, Boring, or Tunneling	201	LF
36" Steel Casing	300	LF
Vegetation	3360	SQYD



SEWER FORCE MAIN STA. 52+00.00 TO 61+00

LEGEND

PROPOSED	EXISTING	
S	S	SANITARY SEWER MANHOLE
FM		DUAL 18" FORCE MAIN
		SANITARY SEWER LINE TO BE ABANDONED
	EX W	WATER LINE
		SANITARY SEWER LATERAL
	C/O	CLEAN OUT
		WATER VALVE
		FIRE HYDRANT
	G	GAS LINE
	D	STORM SEWER MANHOLE
		CURB INLET
		POWER POLE
		STREET LIGHT (100 WATT LED)
		STREET LIGHT (250 WATT LED)
		GUY WIRE
	OU	OVERHEAD ELECTRIC
		BENCHMARK
	TMH	TOP OF MANHOLE
	EX.	EXISTING
	G,E,T,CA	GAS, ELEC, TELE & CABLE TV ESM'T.
	ESM'T.	EASEMENT
	VOL	VOLUME
	PG	PAGE
		SIGNIFICANT TREE PRESERVED
		HERITAGE TREE PRESERVED
	FM	FORCE MAIN
		100YR FLOOD PLAIN FLOW LINE
		ASPHALT LIFT STATION ACCESS ROAD
		STEEL CASING
		CONCRETE CASING

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50 25 0 50 100
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THE WOODLANDS OFF-SITE SANITARY SEWER LIFT STATION & FORCE MAIN

SEWER FORCE MAIN' STA. 52+00 TO 61+00
PLAN & PROFILE

NO.	DESCRIPTION	BY	DATE
1	ANNOTATION, LINEWORK AND/OR QUANTITIES REVISION.	TH	11/1/2023

REVISIONS

DATE: 11/1/2023
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DRAWN BY: MAS, PJR, JD
CHECKED BY: TH
DRAWING NAME: sh WWL FM 68+00-77+00.dwg

STATE OF TEXAS
TORRY LAYNE HURT
91844
LICENSED PROFESSIONAL ENGINEER
11/10/2023

LJA Engineering, Inc.
9830 Colonnade Blvd
Suite 300
San Antonio, Texas 78230
Phone 210.503.2700
LJA.COM
TBPE No. F-1386

JOB NUMBER: SA190-0404.426

SHEET NO. **C3.6**