ST. TAMMANY PARISH
MICHAEL B. COOPER
PARISH PRESIDENT

September 23, 2021

Please find the following addendum to the below mentioned BID.

Addendum No.: 2

Bid#: 21-21-2

Project Name: West St. Tammany WWTP Expansion

Bid Due Date: September 30, 2021

GENERAL INFORMATION:

1. A Mandatory Pre-Bid meting took place on site, September 16, 2021 @ 10:00 am. The Sign-In Sheet is attached.

2. Bidders are reminded to closely follow the requirements of the contract documents when preparing and submitting their bid.

3. The following were topics discussed during the pre-bid meeting:
    a. Certified payrolls are not required for this project.
    b. Davis-Bacon wage rates do not apply to this project.
    c. This project is not obligated to meet American Iron and Steel requirements.
    d. This project is not tax exempt.
    e. Contractor will be responsible for maintaining access at all times for parish personnel to operate the existing treatment plant throughout construction.
    f. Contractor will be responsible for coordinating with parish personnel for any tie-ins, temporary shutdowns, access issues, etc. throughout construction.

4. The license classification for this project is Municipal and Public Works Construction. Only those bidders having this license classification and that attended the mandatory pre-bid meeting are eligible to bid on this project.

5. The address for the site is 108 LA Hwy 1085, Madisonville, LA 70447.

6. The site is located in Flood Zone AE per FEMA FIRM Map No. 22103C0280F, dated 04/30/2008. Base Flood Elevation is approx. 24.50 and all slabs are set at a minimum elevation of 25.50. No elevation certificate is available. If one is necessary for insurance coverage, then the Contractor will be responsible for obtaining said certificate.

7. Contractor will be responsible for providing advanced notice of night/weekend work and coordinating with the parish on any particular conflicts. Approval may be granted for night/weekend work depending on the type of work to be performed and its potential impact to the surrounding neighborhood.

8. Contractor is responsible for providing their own temporary restroom facilities for their workers for the duration of the contract.

9. Contractor is responsible for providing a separate office trailer for the Engineer/resident inspector. Refer to Specification Section 01590 that is being added as part of this addendum. (Attached)

10. All concrete wash-outs will be required to be removed from the site by the Contractor.

11. Pre-bid prior approvals are not being considered for this project. The equipment specified is the Basis of Design for the project and any potential substitution shall be handled during the shop drawing review process once a contract is awarded. It is the responsibility of the Bidder to ensure that any equipment included in their bid meets the specifications.

12. Revised Drawings – Sheet GC-2 (dated 7/30/21) – **REMOVE** and **REPLACE** with Sheet C-3 (dated 9/23/21) (Attached)

13. Revised Drawings – Sheet C-3 (dated 7/30/21) – **REMOVE** and **REPLACE** with Sheet C-3 (dated 9/23/21) (Attached)

14. Revised Drawings – Sheet C-4 (dated 7/30/21) – **REMOVE** and **REPLACE** with Sheet C-4 (dated 9/23/21) (Attached)

15. Revised Drawings – Sheet C-6 (dated 7/30/21) – **REMOVE** and **REPLACE** with Sheet C-6 (dated 9/23/21) (Attached)

16. Revised Drawings – Sheet GM-1 (dated 7/30/21) – **REMOVE** and **REPLACE** with Sheet C-3 (dated 9/23/21) (Attached)

17. Revised Drawings – Sheet 1M-1 (dated 7/30/21) – **REMOVE** and **REPLACE** with Sheet 1M-1 (dated 9/23/21) (Attached)

18. Revised Drawings – Sheet 1M-2 (dated 7/30/21) – **REMOVE** and **REPLACE** with Sheet 1M-2 (dated 9/23/21) (Attached)

19. Revised Drawings – Sheet 1M-3 (dated 7/30/21) – **REMOVE** and **REPLACE** with Sheet 1M-2 (dated 9/23/21) (Attached)

20. Revised Drawings – Sheet 1M-4 (dated 7/30/21) – **REMOVE** and **REPLACE** with Sheet 1M-2 (dated 9/23/21) (Attached)

21. Revised Drawings – Sheet 2M-1 (dated 7/30/21) – **REMOVE** and **REPLACE** with Sheet 2M-1 (dated 9/23/21). (Attached)

22. Revised Drawings – Sheet 2M-3 (dated 7/30/21) – **REMOVE** and **REPLACE** with Sheet 2M-3 (dated 9/23/21). (Attached)

23. Revised Drawings – Sheet 3M-1 (dated 7/30/21) – **REMOVE** and **REPLACE** with Sheet 3M-1 (dated 9/23/21). (Attached)

24. Revised Drawings – Sheet 4M-1 (dated 7/30/21) – **REMOVE** and **REPLACE** with Sheet 4M-1 (dated 9/23/21). (Attached)

25. Revised Drawings – Sheet 3S-1 (dated 7/30/21) – **REMOVE** and **REPLACE** with Sheet 3S-1 (dated 9/23/21). (Attached)

26. Specification Section 01400 – Quality Control (dated 7/30/21) – **REMOVE** and **REPLACE** with Specification Section 01400 – Quality Control (dated 9/23/21). (Attached)

27. **ADD** Specification Section 01590 – Field Offices (dated 9/23/21). (Attached)

28. Specification Section 11390 – Package Plant System (dated 9/10/21) – **REMOVE** and **REPLACE** with Specification Section 11390 – Package Plant System (dated 9/23/21). (Attached)

29. Specification Section 11501 – Positive Displacement Blowers (dated 7/30/21) – **REMOVE** and **REPLACE** with Specification Section 11501 – Positive Displacement Blowers (dated 9/23/21). (Attached)

QUESTIONS & ANSWERS:

Question #1: Drawing calls for 8" diameter peripheral air header, sch 10 304 S.S. We would like to propose our standard 304 SS rectangular header.

Answer #1: There is no objection to the use of a rectangular header as long as it is sized to be equivalent to the specified 8" diameter header. The peripheral air header shall be 304 SS regardless of the size or type.

Question #2: We recommend the aeration air inlet supply be located near the 270 degree for equal airflow to the peripheral air header.

Answer #2: The air inlet supply shall be located as currently indicated on the drawings. Per the specifications, each diffuser drop assembly shall be equipped with an air regulating/shut-off valve that can be used to adjust airflow through the header to ensure even air distribution. The plant manufacturer, as part of the start-up process, will be required to adjust these valves as necessary to ensure equal air flow distribution.

Question #3: Please verify what type material the stilling well will be. Drawing calls for aluminum. Spec calls for painted carbon steel. We would recommend HDG

Answer #3: The stilling well shall be constructed with hot-dipped galvanized material. Refer to Sheet 2M-1 (revised 09.23.21) being issued as part of this addendum. Refer to Specification Section 11390 (revised 09.23.21) being issued as part of this addendum. (Attached)

Question #4: Please verify what type material the scum trough will be. Drawing calls for aluminum. We would recommend HDG

Answer #4: The scum trough wall shall be constructed with hot-dipped galvanized material. Refer to Sheet 2M-1 (revised 09.23.21) being issued as part of this addendum. Refer to Specification Section 11390 (revised 09.23.21) being issued as part of this addendum. (Attached)

Question #5: Please verify what type material the clarifier effluent weir trough will be. Drawing calls for aluminum, spec calls for steel. Our standard is painted carbon steel.

Answer #5: The clarifier effluent weir trough shall be constructed with painted carbon steel. Refer to Sheet 2M-1 (revised 09.23.21) being issued as part of this addendum. Refer to Specification Section 11390 (revised 09.23.21) being issued as part of this addendum. (Attached)

Question #6: Please verify what type material the clarifier scum baffle will be. Drawing calls for aluminum. Our standard is painted carbon steel.

Answer #6: The clarifier scum baffle shall be constructed with painted carbon steel. Refer to Sheet 2M-1 (revised 09.23.21) being issued as part of this addendum. (Attached)

Question #7: Please verify type material for fasteners, plant spec says 316SS and EQ spec says 304SS. Our standard is 304SS.

Answer #7: Fasteners for both the plant and EQ shall be 304 SS. Refer to Specification Section 11390 (revised 09.23.21) being issued as part of this addendum. (Attached)

Question #8: Please verify type of materials for sludge piping airlift piping. Our standard is painted carbon. These items have to be field welded so I would recommend carbon or ss.

Answer #8: Sludge airlift piping shall be 304 SS. Refer to Specification Section 11390 (revised 09.23.21) being issued as part of this addendum. (Attached)

Question #9: Please verify type of materials for clarifier effluent pipe. Our standard is painted carbon. This item has to be field welded so I would recommend carbon or ss.

Answer #9: Clarifier effluent piping shall be 304 SS. Refer to Specification Section 11390 (revised 09.23.21) being issued as part of this addendum. (Attached)

Question #10: Based on our original design, the influent BOD was 203 mg/L. The spec calls for an influent BOD of 240 mg/L, please confirm what the influent BOD will be.

Answer #10: There was a typo in this specification. The design influent bod shall be 204 mg/l and the TSS shall be 240 mg/l. Refer to Specification Section 11390 (revised 09.23.21) being issued as part of this addendum. (Attached)

Question #11: Clarifier influent pipe: Drawing 2M-2 shows the 24" clarifier influent pipe above the slab. If this pipe is located as shown the grout on the clarifier wall will be approximately 72" high. We would recommend this pipe be located under the slab.

Answer #11: Construct the clarifier influent pipe and grout as indicated on the referenced drawing.

Question #12: Based on our original design, the height of the EQ tank was 12.5 feet. The spec calls for 13 foot tall tank, 12.5 foot tall tank is our standard. Please verify what the height should be as well as the diameter of the tank.

Answer #12: EQ tank shall be 13-ft tall as indicated. Sheet 1M-3 (Revised 09.23.21) is also being issued as part of this addendum to clarify the elevation of the 8-inch pipe. (Attached)

Question #13: Please verify the diameter of the manway davit in EQ tank. The plant calls for 30 inch diameter and the EQ tank calls for 36 inch diameter.

Answer #13: EQ tank shall have a 36" diameter manway with davit. Plant shall have three (3) 30" diameter manways with davits in the located indicated on the drawing. Refer to Sheets 1M-2 and 2M-1 (revised 09.23.21) being issued as part of this addendum. (Attached)

Question #14: Is this a wage rate job?

Answer #14: No.

Question #15: Please verify that the interior coating system for the package plant and EQ tank is system 100 and the exterior is system 4.

Answer #15: Coating systems are as indicated within specification section 09800.

Question #16: At the Chlorine Contact Chamber, are the baffle walls to be anchored to the existing tank walls? If so, can a detail be provided?

Answer #16: Refer to Sheet 3S-1(revised 09.23.21) being issued as part of this addendum for details. (Attached)

Question #17: At the Chlorine Contact Chamber, can a detail be provided for the support of the ¼" Steel Weir Box?

Answer #17: Refer to Sheet 3S-1(revised 09.23.21) being issued as part of this addendum for details. (Attached)

Question #18: Is independent testing paid for by the owner?

Answer #18: All testing shall be paid for by the contractor. Contractor shall select a testing firm from the list of parish-approved vendors. The list of approved vendors is being provided as part of this addendum. Refer to Specification Section 01400 (revised 09.23.21) being issued as part of this addendum. (Attached)

Question #19: Please confirm this project is not tax exempt.

Answer #19: This project is not tax exempt.

Question #20: Are any permits required?

Answer #20: The only permit required is a DOTD utility permit for the force main installation work. This permit will be obtained by the engineer/owner prior to this portion of the work.

Question #21: Is an engineer's office trailer required?

Answer #21: Yes. A separate office trailer should be provided for the engineer/resident inspector. Refer to Specification Section 01590 (dated 09.23.21) being issued as part of this addendum. (Attached)

Question #22: The drawings call for the existing pump station to be removed. Can this just be cut down below grade and backfilled?

Answer #22: Yes, the existing pump station may be cut down below grade and filled with compacted structural fill once all pumps, piping, etc. have been removed and all holes are capped.

Question #23: The drawings appear to call for areas beneath slabs to be proof rolled. The Geotech site preparation section states to remove 24" of the existing site fill, stockpile that fill, and then proof roll the site, followed by building the site backup again with the stockpiled material. Please advise if that is required.

Answer #23: The existing ground shall be stripped of all deleterious materials and cut down to the subgrade elevation necessary for the installation of the base course/structural fill as indicated on the drawings per the specific scope of work. All excavated material shall be removed from the site and properly disposed of by the contractor. The existing subgrade shall then be proofrolled prior to installing compacted fill material in accordance with the drawings per the specific scope of work. Any areas that do not pass the proofroll will be addressed in the field on a case-by-case basis.

Question #24: Should all concrete slabs include Xypex?

Answer #24: Yes.

Question #25: Section 06 - Insurance Requirements – B. 4. Deductibles/Self-Insured Retentions - This section states that deductibles over $100,000 must be approved by the Parish. What happens if the Parish rejects a deductible?

Answer #25: If the parish rejects a deductible higher than $100,000, the contractor would have to lower the deductible to $100,000.

Question #26: Section 06 – Insurance Requirements – 8. Builder's Risk Insurance - Builder's Risk deductible cannot be greater than $5,000. We feel this won't be possible for flood or windstorm: these could potentially have a larger than $5,000 deductible.

Answer #26: We expect the $5,000 deductible on the non-flood portion of the builder's risk policy. We would expect a deductible on the flood/windstorm to be as close to the $5,000 as possible.

Question #27: Section 06 – Insurance Requirements – 8. Builder's Risk Insurance - Builder's Risk is to be written in an amount equal to 100% of the contract cost. This amount won't be available for flood: flood will be written for a lesser amount

Answer #27: We know that the flood policy would not be 100% of the contract cost, but instead would be limited to ten percent (10%) of the total contract cost per occurrence. The non-flood builder's risk policy must be 100% of the contract cost.

Question #28: Plan Page GC-1 – Suggested Sequence of Construction – Item 3. Can the amount of time available be provided for shutting down the influent force main lines to perform the necessary temporary and permanent tie-ins.

Answer #28: The contractor should plan for only approximately 4 hours for the shutdowns necessary to make these tie-ins. This work will need to be closely coordinated with the parish to be done at a time when there is dry weather and low flow within the sewer collection system. It is likely that this work may need to be done at night.

Question #29: Plan Page GC-1 – Suggested Sequence of Construction – Is the intent for the work at the existing treatment unit to be performed after the new treatment unit is in operation? The work at the existing treatment unit will require it to be shut down for a period of time.

Answer #29: Yes.

Question #30: Plan Page 1M-1 – There are a couple of places on this plan page where the 4" Influent Forcemain is called out as 6". Please advise which is correct?

Answer #30: Influent forcemain is 4 inches. Refer to sheet 1M-1 (revised 09.23.21) being issued as part of this addendum that clarifies this discrepancy. (Attached)

Question #31: Plan Page 2M-2 – The 12" inlet from splitter box to the new package unit shows 2 bends in the line on 2M-2 but plan page 2M-3 doesn't appear to have the same bends. Which is correct?

Answer #31: Refer to sheets 2M-2 and 2M-3 (revised 09.23.21) being issued as part of this addendum that clarifies this discrepancy. (Attached)

Question #32: Plan Page 2M-3 – The plans are not clear if effluent piping for the existing treatment unit is to be replaced or not. Can this be confirmed? Also, can elevations be provided for the existing treatment effluent line.

Answer #32: The effluent piping from the existing treatment unit is being replaced as indicated on Sheets C-4 and 2M-3 (Revised 09.23.21) being issued as part of this addendum. The elevation of the existing effluent line is unknown and will need to be field verified by the contractor. (Attached)

Question #33: Plan Page 2M-3 – Is any portion of the existing treatment unit to be coated?

Answer #33: No.

Question #34: Plan Page 4M-1 and C-4 – The effluent piping on 4M-1 shows a 90° Bend looking into the ground and C-4 shows 2 - 45° bends and some additional piping. Which is correct?

Answer #34: Refer to sheet 4M-1 (revised 09.23.21) being issued as part of this addendum that clarifies this discrepancy. (Attached)

Question #35: Plan page 4M-1. – We are concerned that the effluent flowmeter in its proposed location will not read properly. The meter will not have always have a full pipe being that the forcemain and outfall is at a lower elevation than the meter. Please advise to any required changes.

Answer #35: The effluent flow meter is being moved to the 14" pipe entering the chlorine contact tank. Refer to Sheets 3M-1 and 4M-1 (revised 09.23.21) being issued as part of this addendum that addresses this comment. (Attached)

Question #36: Plan Page 1M-4 and 4M-1 –We noticed there are no air release valves at the transfer pumps or effluent pumps. Please advise to any required changes.

Answer #36: Refer to Sheets 1M-1 and 4M-1 (revised 09.23.21) being issued as part of this addendum that addresses this comment. (Attached)

Question #37: Plan Page C-4 – what is the intent of the concrete slab at the valve assembly? It appears the valves and surrounding piping are for buried service and then the slab is on top of the valves. Please advise to any required changes.

Answer #37: The concrete slab is a housekeeping slab installed at grade above the valves and surrounding piping. The valve stems will be extended into this slab. No changes to the current plans are necessary.

Question #38: Plan Page C-3 and C-4 – the site waterline is called out to be ductile iron per the piping material schedule on G-3. 2" ductile iron is not available. Any issue with using PVC for the site water line?

Answer #38: Yes, PVC pipe (SCH 40) for the 2" water line is acceptable. Refer to Sheets C-3, C-4, 1M-1 and 2M-3 (Revised 09.23.21) being issued as part of this addendum. (Attached)

Question #39: Plan Page 3M-1 – How much time is available to shut down the plant to tie-in the temp. chlorine contact chamber from the existing chlorine contact chamber?

Answer #39: The contractor should plan for only approximately 4 hours for the shutdowns necessary to make these tie-ins. This work will need to be closely coordinated with the parish.

Question #40: At the pre-bid meeting, I understood that the bid package has to be turned in through www.bidexpress.com. However, Notice to Bidders page give the option to mail or hand deliver. Also, Instruction to Bidders, Line 10 details how the hand delivered bid is to be formatted and also Line 27 discusses sealed bids.

Answer #40: Bids can be submitted electronically through bid express, by mail or hand delivered.

Question #41: Due to current lead times, there are concerns if 365 days is enough contract time. Can the contract time be extended?

Answer #41: The contract time shall remain 365 calendar days; however, a 60-calendar day assembly period will be allowed to submit shop drawings/submittals for review prior to the official notice-to-proceed that would commence the contract time. Contractor shall be responsible for timely procurement of equipment (signing contracts with suppliers, etc.) And scheduling the construction tasks for timely completion in accordance with the contract time.

Question #42: The specs indicate the lining of the ductile piping to be cement lined. Since this is sewer, should this be 401 lined?

Answer #42: Ductile piping shall be cement lined as indicated in the specifications.

Question #43: Please provide the depth of the 2-1/2" GRS.

Answer #43: Min. Four (4) feet below finished grade.

Question #44: Refer to Plan Page E-9: Please provide the conductor size of the ground wire from the electrical rack to the ground C/C rod.

Answer #44: #6 AWG

Question #45: Plan Page E-9: Electrical Mounting for Large or Multiple Panels, call for 4" x 7.25 Galvanized Channel, which is not common and may not be readily available. Can we substitute this with 4" X 5.4 or C-channel (Unit-strut)?

Answer #45: Either requested substitution is acceptable.

Question #46: New Treatment Plan - Will galvanized components, above grade or submerged, require a coating?

Answer #46: No.

Question #47: Chlorine Contact Tank (RE: Sheet 3S-1) - Are we to coat the entire tank or just the new baffles?

Answer #47: The entire chlorine contact tank requires coating once the new baffles are installed.

Question #48: Will any of the concrete interiors of the wet wells need to be coated?

Answer #48: Any new concrete (Pre-Cast or Cast-in-Place) is required to have the crystalline admixture per the specifications. No additional coating is required.

Question #49: There is a de-chlorination tote shown on drawing 3M-1. What side is this tank? Are there preferred manufacture's?

Answer #49: This is an existing de-chlorination tote. A new slab is being poured and the pump will be mounted to the tank. Refer to Sheet 3M-1 (Revised 09.23.21) being issued as part of this addendum that clarifies this question. Slab detail is shown on Sheet 3S-2. (Attached)

Question #50: Reference Specification Section 11501: Please clarify the warranty requirements and advise if an outdoor weather hood is required.

Answer #50: Refer to Specification Section 11501 (Revised 09.23.21) being issued as part of this addendum. (Attached)

Question #51: The plan view on 1M-1 & C-3 calls out a 4"RW(11), but Section A calls it out as 6" RW(11). Please verify if this pipe is 4" and not 6".

Answer #51: The pipe should be 4". Refer to Sheet 1M-1 (Revised 09.23.21) being issued as part of this addendum that clarifies this discrepancy. (Attached)

Question #52: Sheet C-6 shows ductile iron pipe directly before air release manhole, but everywhere else it shows C900. Please verify this pipe is to remain C900.

Answer #52: This pipe should remain C900. Refer to Sheet C-6 (Revised 09.23.21) being issued as part of this addendum that clarifies this discrepancy. (Attached)

Question #53: C-4 shows a 10' x 15' slab calling out detail C-8/GC-2 that has a backflow preventer, however; there appears to be a valve cluster underground here. Please advise.

Answer #53: The detail call-out should be C-7 for the valve box. Refer to Sheet C-4 (Revised 09.23.21) being issued as part of this addendum that clarifies this discrepancy. (Attached)

Question #54: Please provide clarity on the backflow preventer GC-2/C-8. The 4" UW is ductile iron pipe underground; do we keep this as 4" ductile with a 4" backflow preventer or reducing to 2" threaded galvanized pipe while above ground then return to 4" ductile iron pipe underground

Answer #54: The entire backflow preventer assembly shall be 4 inches.

Question #55: Sheet C6 demonstrates a tapping saddle with an air release and the detail on GC-2/C-12 does not call out a size. Please provide the size of the tap and air release valve.

Answer #55: Air release valves shall be 1-inch in size throughout unless noted otherwise. Refer to Sheet GC-2 (Revised 09.23.21) being issued as part of this addendum. (Attached).

Question #56: Sheet C4 shows the utility water line reducing from 4" to 2", but remaining as ductile iron. I do not believe they make 2" ductile iron pipe. Please clarify what material pipe we should use.

Answer #56: 2" water line shall be schedule 40 PVC. Refer to Sheets C-3, C-4, 1M-1 and 2M-3 (Revised 09.23.21) being issued as part of this addendum. (Attached)

Question #57: We are failing to identify the size of the hose bibs further then the 2" underground piping. Please advise.

Answer #57: All hose bibs shall be ¾". Refer to Sheet GM-1 (Revised 09.23.21) being issued as part of this addendum. (Attached)

Question #58: We were failing to find in specs the aluminum grating sizes other than only a ¼" of deflection is allowed. Please advise.

Answer #58: Aluminum grating shall be designed/sized by manufacturer in accordance with the loading provided in the Specifications.

Question #59: Reference Specification Sections 11390 and 11400 – Specification section 11400 states the field installation shall be performed by the equipment manufacturer's personnel. Specification section 11390 states the opposite in that the Contractor shall install all systems components. Is the Contractor installing equipment under 11390 the correct intent or is the intent for the Package Plant System Manufacturer to install their supplied equipment similar to spec section 11400?

Answer #59: While the contractor is ultimately responsible for the construction/performance of all systems and equipment related to the project, it is intended that the personnel for the manufacturers of both the equalization basin and the treatment plant system perform the installations, testing, etc.

Question #60: Reference Plan Page 1M-2 – We noticed there is no access to the top of the EQ tank to allow for visual inspection by the operators. Please advise to any changes.

Answer #60: Visual inspection of the EQ tank is available by way of the platform at the intake screens. No additional platforms are required.

Question #61: Is there an elevation certificated for this job site? If so, please send a copy: we'll need it to try and obtain flood insurance, which is a required coverage.

Answer #61: No, there is not an elevation certificate available for this site. Contractor will be responsible for obtaining this certificate if necessary.

Question 62: Attached are two Request for prior approval for the West St Tammany Wastewater Treatment Plant Expansion (Hydro Gate & Andritz). Please consider the attached and do not hesitate to contact me if further information is needed.

Answer #62: Pre-bid prior approvals are not being considered for this project. The equipment specified is the Basis of Design for the project and any potential substitution shall be handled during the shop drawing review process once a contract is awarded. It is the responsibility of the Bidder to ensure that any equipment included in their bid meets the specifications.

ATTACHMENTS:

Sign-in sheet from pre-bid meeting.

Parish List of Approved Vendors.

Revised/Added Specifications:
Section 01400 – Quality Control (revised 09.23.21)
Section 01590 – Field Offices (dated 09.23.21)
Section 11390 – Package Plant System (revised 09.23.21)
Section 11501 – Positive Displacement Blowers (revised 09.23.21)

Revised Drawings:
Sheet GC-2 (revised 09.23.21)
Sheet C-3 (revised 09.23.21)
Sheet C-4 (revised 09.23.21)
Sheet C-6 (revised 09.23.21)
Sheet GM-1 (revised 09.23.21)
Sheet 1M-1 (revised 09.23.21)
Sheet 1M-2 (revised 09.23.21)
Sheet 1M-3 (revised 09.23.21)
Sheet 1M-4 (revised 09.23.21)
Sheet 2M-1 (revised 09.23.21)
Sheet 2M-3 (revised 09.23.21)
Sheet 3M-1 (revised 09.23.21)
Sheet 4M-1 (revised 09.23.21)
Sheet 3S-1 (revised 09.23.21)

<< End of Addendum #2 >>

16 September 2021
10:00 am

Location

LA 1085 West of the intersection of LA 1085 & Winward Dr.

Pre-Bid Sign-In Sheet
WEST ST TAMMANY WWTP EXPANSION

	Name	Company	Email	Phone	Time In	Time Out
1	Eddie Powell	Kyle Associates	epowell@kyleassociates.net	(985)727-9377 ext 202	9:44a	10:33a
2	Zach Lewis	Kyle Associates	zlewis@kyleassociates.net	(985)727-9377 ext. 218	9:45	10:33a
3	GLEN SMITH	FLUID PROCESS'S PUMPS	GS@FLUIDPROCESS.NET	504 615-4181	9:46	10:35
4	Corey Laudermill	Wharton Smith Construction	claudermill@whartonsmith.com	225-281-3584	9:45	10:25
5	J.D. TSBROWN	MAXFOOTE CONSTRUCTION	JDBROWN@MAXFOOTE.COM	985 624 8569	9:47 AM	10:20 AM
6	Clayton Walker	max Foote Construction	cwalker@maxfoote.com	985-624-8569	9:45 AM	10:20 AM
7	Josh Rea	NCMC construction	Ken@NCMC-LLC.com	352 4279586	9:45	10:20
8	GARY GRILLOT	CYCLE CONSTRUCTION	MROTH@cycleconstruction.com	504-467-1444	9:50	10:20
9	Brandon Montgomery	L.King Company, LLC	brandon@LKingCompany.com	225-667-3931	9:50	10:20
10	ALLEN RICHARD	M.R. PITTMAN GROUP	ALLEN@MRPITTMAN.COM	504-733-3040	9:50	10:30
11	Rolando Dominguez	BARNES	rdominguez@wjbe.com	504.302.7405	9:51	10:45
12	Daniel Hebert	ETEC	dhebert@etecsales.com	225-295-1200	9:52	10:45

	Name	Company	Email	Phone	Time In	Time Out
13	Joseph Hebert	ETEC	JHebert@etec-Sales.com	225-295-1200	9:52	10:45
14	Todd Burnett	Coastal Process	tburnett@coastalprocess.net	225 573 1355	9:53	10:20
15	CHUCK BAGWELL	HEMPHILL CONST.	jcampbell@hemphillconstruction.com	601 939 2060	9:53	10:15
16	CHASE BREEDLOVE	THE LEMOINE COMPANY	chase.breedlove@lemoine	225 362-7511	9:55	10:15
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						

2021 VENDOR LIST CATEGORIES

FIRM	Airport Engineering	Civil Engineering	Environmental Engineering	Other Engineering Sepcialtity	Engineering Management	Architectural	Environmental Study & Review	Planning	Appraisal	Land Acquisition	Surveying	Grant Program Mgt	Laboratory & Field Contruction
Abell & Crozier Architects						X							
Acadia Architects					X	X							
Accu-Environmental, LLC			X				X						
Adaptation Strategies							X	X					
AECOM Technical	X	X		X	X		X	X				X	
Aerostar SES							X						
Aims	X	X	X	X	X								
All South	X	X		X	X						X	X	
Allegiance Title & Land Services										X			
Alliance Transportation								X					
Alphonse Barcia III Landscape						X							
APS Design & Testing				X									
Arcadis US Inc		X		X			X					X	
Ardaman & Associates, Inc.				X									
Ardurra Group LLC		X	X	X	X								
Artovia					X							X	
Asakura Robinson						X		X					
Atlas Technical Consultants		X	X										X
August Schultz									X				
Barowka & Bonura Engineers (BBEC)		X	X	X	X							X	
Batture LLC		X		X	X						X		
BFM											X		
Biological Survey							X						
Blitch Knevel Architects, LLC						X							
Bryant Hammett & Associates											X		
Buchart Horn-Engineering				X	X		X						
Burgdahl & Graves Archutects						X							
Burk Kleinpeter		X	X	X			X	X					
C.H. Fenstermaker & Associates		X		X	X		X				X	X	

2021 VENDOR LIST CATEGORIES

FIRM	Airport Engineering	Civil Engineering	Environmental Engineering	Other Engineering Sepcialtity	Engineering Management	Architectural	Environmental Study & Review	Planning	Appraisal	Land Acquisition	Surveying	Grant Program Mgt	Laboratory & Field Contruction
CE Hydro		X		X									
Charles Raymond, LLC										X			
Coastal Engineering		X	X	X	X		X	X					
Comite Resources							X						
Compliance Consulting Inc			X										
Compliance Enviro System		X	X	X									
Contract Land Staff										X			
Covington Civil & Environmental		X	X	X	X								
CSRS		X	X	X	X	X	X	X		X	X	X	
Cultural Resources Analysts							X						
Curtis Environmental													X
Dammon Engineering		X		X	X								
Dana Brown						X		X					
Design Engineering		X		X	X								
Digital Engineering		X		X	X			X				X	
Duplantis Design Group		X	X	X	X	X					X	X	
ECM Consultants	X	X		X	X								
EDS Inc				X									
ELOS							X						
Eustis Engineering				X									X
Evans-Graves	X	X		X									
Fairway Consulting		X	X	X	X			X				X	
FL & WB Architects						X							
Forte & Tablada		X		X							X		
Fourrier & de Abreu Engineers				X	X								X
Freese & Nichols		X	X	X	X		X	X					
Furgo USA Land				X			X				X		X
GCR Inc								X		X		X	
GEC	X	X	X	X	X		X	X				X	

2021 VENDOR LIST CATEGORIES

FIRM	Airport Engineering	Civil Engineering	Environmental Engineering	Other Engineering Sepcialtity	Engineering Management	Architectural	Environmental Study & Review	Planning	Appraisal	Land Acquisition	Surveying	Grant Program Mgt	Laboratory & Field Contruction
GeoEngineers			X	X			X						
Gillen Engineering				X									
GIS Engineering		X	X	X	X		X				X	X	
Gotech											X		
Gould Evans						X							
GP Strategies Corporation												X	
Green Leaf Lawson Architects						X							
Greenpoint		X	X	X	X								
Gresham Smith		X		X	X			X				X	
GSA Consulting Engineers		X	X	X	X			X					
Gulf South				X									X
H. Davis Cole		X	X	X	X							X	
Harold J Anderson										X			
Hartman Engineering		X	X	X	X		X					X	
High Tide		X		X	X								
HNTB		**X**	**X**	**X**	**X**		**X**						
Holly and Smith						X							
Huval & Associates Inc		X		X	X								
IMC Consulting Engineers				X									
Infinity Engineering Consultants		X		X	X								
Integrated Logistical Support	X	X		X	X								
ITS Regional LLC		X		X				X					
John Bonneau & Associates											X		
JV Burkes & Associates		X		X							X		
K&L Testing													X
Kelly McHugh		X											
Kenall Inc	X	X	X	X	X								X
KVS Architecture						X							
Kyle Associates	X	X		X	X	X						X	

2021 VENDOR LIST CATEGORIES

FIRM	Airport Engineering	Civil Engineering	Environmental Engineering	Other Engineering Sepcialtity	Engineering Management	Architectural	Environmental Study & Review	Planning	Appraisal	Land Acquisition	Surveying	Grant Program Mgt	Laboratory & Field Contruction
Linfield Hunter & Junius		X		X		X					X		
Louisiana Property Acquisition				X						X			
Lowe Engineers											X		
Lucien T Vivien				X									
Manchac Engineering		X	X	X	X								
Marrero Couvillon & Associates	X			X	X								
Matrix HVAC				X									
Matrix New World Engineers	X	X	X	X			X					X	
Meyer Engineers		X		X	X	X							
Modjeski and Master		X		X	X								
Mott McDonald	X	X	X	X	X	X					X		
Mougeot Architecture						X							
MSH Architecture						X							
MSMM Engineering LLC		X	X	X	X								
Murphy Appraisal Services									X				
Native Engineers	X	X	X	X	X	X						X	
Natural Resources				X									
Neel-Schaffer		X		X			X						
Newell		X	X	X							X		
NewGen									X				
NTB & Associates		X		X	X						X		
N-Y Associates	X	X		X	X	X	X	X					
Pascal Architects					X	X							
Perrin & Carter		X		X	X								
Phoenix Global		X		X	X								
Piazza Architecture Planning						X							
Pinnacle		X	X	X	X								
Pivotal Engineering		X	X	X	X								
Pond & Company	X	X	X	X	X	X		X					

2021 VENDOR LIST CATEGORIES

FIRM	Airport Engineering	Civil Engineering	Environmental Engineering	Other Engineering Sepcialtity	Engineering Management	Architectural	Environmental Study & Review	Planning	Appraisal	Land Acquisition	Surveying	Grant Program Mgt	Laboratory & Field Contruction
Premier Geotech				X									X
Principal Engineering		X	X	X	X								
Professional Engineering & Enviro (PEEC)		X	X	X	X		X						
Professional Engineering Consultants (PEC)		X		X	X					X			
Professional Services Insudtries (PSI)				X									X
Providence Engineering		X	X	X	X	X	X				X		
Quality Engineering & Surveying		X		X		X					X	X	
Quatermary Resource Investigations							X						
Rahman & Associates		X		X									
Ramboll US Corporation							X						
Randall Brown											X		
Reich Landscape Architecture						X							
Resilient Development & Management							X					X	
RHH Architects						X							
Richard C Lamber Architecture, LLC (RCL)						X							
Richard C Lambert Consultants, LLC (RCL)	X	X	X	X	X		X	X					
Ritter Consulting							X						
Rostan Solution												X	
Royal Engineers & Consultants		X	X	X	X								
RRL Real Estate Appraisal									X				
Sain & Associates		X		X									
Scairono Martinez Architects						X							
SCNZ Architects						X							
SDR Engineering				X									
Shread-Kuyrkendall & Assoc		X		X	X								
Sigma Consulting Group		X		X							X		
Sizeler Thompson Brown						X							
SJB Group		X				X		X			X		
Solutient Corporation					X							X	

2021 VENDOR LIST CATEGORIES

FIRM	Airport Engineering	Civil Engineering	Environmental Engineering	Other Engineering Sepcialtity	Engineering Management	Architectural	Environmental Study & Review	Planning	Appraisal	Land Acquisition	Surveying	Grant Program Mgt	Laboratory & Field Contruction
Spackman Mossop Michaels						X							
Stanley Consultants	X	X	X	X	X								
Stantec Consulting		X	X	X	X								
Stratum Engineering				X									X
Stuart Consulting		X	X	X	X							X	
Studio WTA						X							
Sura Inc							X						
T. Baker Smith	X	x	x	x	X		X				X		
Team Title										X			
Terracon			X				X						X
The Beta Group				X									X
The McEnery Company									X				
Thompson Engineering		X	X	X	X	X	X				X		X
TLC Engineering for Architects				X									
Torre Design						X		X					
Trigon		X	X	X			X					X	
Urban Systems INC				X									
VergesRome						X							
Volkert	X	X	X	X	X		X						
Volume Zero						X							
Waggoner Engineering		X		X			X				X		
Waggonneer & Ball						X		X					
WDG Engineers				X									
Wingate Engineers		X		X	X								
WSP USA	X	X		X	X								
Yeates and Yeates						X							

SECTION 01400 - QUALITY CONTROL

PART 1 -- GENERAL

1.1 DEFINITION

A. Specific quality control requirements for the WORK are indicated throughout the Contract Documents. The requirements of this Section are primarily related to performance of the WORK beyond furnishing of manufactured products. The term "Quality Control" includes inspection, sampling and testing, and associated requirements.

1.2 INSPECTION AT PLACE OF MANUFACTURE

A. Unless otherwise indicated, all products, materials, and equipment shall be subject to inspection by the ENGINEER at the place of manufacture.

B. The presence of the ENGINEER at the place of manufacturer, however, shall not relieve the CONTRACTOR of the responsibility for providing products, materials, and equipment which comply with all requirements of the Contract Documents. Compliance is a duty of the CONTRACTOR, and said duty shall not be avoided by any act or omission on the part of the ENGINEER.

1.3 SAMPLING AND TESTING

A. Unless otherwise indicated, all sampling and testing will be in accordance with the methods prescribed in the current standards of the ASTM, as applicable to the class and nature of the article or materials considered; however, the OWNER reserves the right to use any generally-accepted system of sampling and testing which, in the opinion of the ENGINEER will assure the OWNER that the quality of the workmanship is in full accord with the Contract Documents.

B. Any waiver by the OWNER of any specific testing or other quality assurance measures, whether or not such waiver is accompanied by a guarantee of substantial performance as a relief from the testing or other quality assurance requirements originally indicated, and whether or not such guarantee is accompanied by a performance bond to assure execution of any necessary corrective or remedial WORK, shall not be construed as a waiver of any requirements of the Contract Documents.

C. Notwithstanding the existence of such waiver, the ENGINEER reserves the right to make independent investigations and tests, and failure of any portion of the WORK to meet any of the requirements of the Contract Documents, shall be reasonable cause for the ENGINEER to require the removal or correction and reconstruction of any such WORK in accordance with the General Conditions.

1.4 INSPECTION AND TESTING SERVICE

A. Inspection and testing laboratory service shall consist of with the following:

1. The CONTRACTOR will select, employ, and pay for all services of an independent firm to perform inspection and testing. Materials testing for proposed materials to be incorporated into the work shall be the responsibility of the CONTRACTOR per the General Conditions. Testing firm shall be selected from the St. Tammany Parish-approved list of vendors.

2. The independent firm will perform inspections, testings, and other services as required by the ENGINEER under Paragraph 1.3C above.

3. Reports of testing, regardless of whether the testing was the OWNER'S or the CONTRACTOR'S responsibility, will be submitted to the ENGINEER in duplicate, indicating observations and results of tests and indicating compliance or noncompliance with Contract Documents.

4. The CONTRACTOR shall cooperate with the independent firm and furnish samples of materials, design mix, equipment, tools, storage, and assistance as requested.

5. The CONTRACTOR shall notify ENGINEER forty-eight (48) hours prior to the expected time for operations requiring inspection and laboratory testing services.

6. Retesting required because of non-conformance to requirements shall be performed by the same independent firm on instructions by the ENGINEER. The CONTRACTOR shall bear all costs from such retesting.

7. For samples and tests required for CONTRACTOR'S use, the CONTRACTOR shall make arrangements with an independent firm for payment and scheduling of testing. The cost of sampling and testing for the CONTRACTOR'S use shall be the CONTRACTOR'S responsibility per the General Conditions.

PART 2 -- PRODUCTS (NOT USED)

PART 3 -- EXECUTION

3.1 INSTALLATION

A. Inspection: The CONTRACTOR shall inspect materials or equipment upon the arrival on the job site and immediately prior to installation, and reject damaged and defective items.

B. Measurements: The CONTRACTOR shall verify measurements and dimensions of the WORK, as an integral step of starting each installation.

C. Manufacturer's Instructions: Where installations include manufactured products, the CONTRACTOR shall comply with manufacturer's applicable instructions and recommendations for installation, to whatever extent these are more explicit or more stringent than applicable requirements indicated in Contract Documents.

END OF SECTION 01400

PART 1 -- GENERAL

1.1 FIELD OFFICES

A. Field offices shall be established on the job site at location approved or directed by the ENGINEER, adequately furnished, and maintained in a clean, orderly condition by the CONTRACTOR. The CONTRACTOR or an authorized representative shall be present in the field office at all times while work is in progress. Instructions received there from the ENGINEER shall be considered as delivered to the CONTRACTOR.

B. CONTRACTOR shall provide a separate building of at least 200 sq ft of floor space for the exclusive use of the ENGINEER throughout the period of construction. The temporary office shall be weathertight, have a tight floor at least 8-in off the ground and shall be insulated all around with rigid insulation board not less than 1/2-in thick and suitably ventilated. The office shall have at least three screened windows capable of being opened, a screen door and a solid door provided with cylinder lock and three keys. The lock shall have a separate key from the CONTRACTOR’s facilities. The office shall be provided with janitor service (at least once a week), sewage disposal, heating and air conditioning equipment, electrical wiring, outlets and fixtures suitable to light the tables and desk adequately as directed. Provide separate toilet facilities for the exclusive use of the ENGINEER.

C. CONTRACTOR shall furnish their separate field office as necessary for their day-to-day operations.

D. CONTRACTOR shall provide the following furniture and equipment in the ENGINEER's field office:

1. One plan table, 3-ft by 5-ft and one (1) stool
2. Desk about 3-ft by 5-ft with desk chair
3. Two (2) additional chairs
4. Two (2) Four-drawer, filing cabinet with lock, (legal sized)
5. Coat rack and hooks
6. Air Conditioner (12,000 BTU/minimum)
7. One (1) conference table (6-ft).
8. Eight (8) folding chairs.
9. First aid kit suitable for 25 people.
10. Trash can and trash bags.
11. All paper products for use with the office equipment and sanitary facilities.

E. Supply all fuel for heating and pay all electrical bills.

F. An approved, suitably constructed and equipped trailer of proper size may be furnished for the ENGINEER's office.

1.2 TEMPORARY TELEPHONE AND INTERNET SERVICE

A. Provide high speed internet access in the ENGINEER's field office (minimum 3.0 MBPS bandwidth DSL, or equal).

B. Provide a color laser printer, plain paper copier and scanner device up to 11x17 size. The device shall be suitable for email transmission via flatbed scanner. The CONTRACTOR shall provide a printer cable and all maintenance and expendable supplies, including paper and toner, for the device.

C. Pay all cost for installation, maintenance and removal of the high-speed Internet and instruments.

1.3. TEMPORARY LIGHT AND POWER

A. Furnish temporary light and power, complete with wiring, lamps and similar equipment as required to adequately light all office areas. Make all necessary arrangements with the local electric company for temporary electric service and pay all expenses in connection therewith.

B. Provide properly configured NEMA polarized outlets to prevent insertion of 110-120 Volt plugs into higher voltage outlets.

C. Provide grounded extension cords. Use "hard-service" cords where exposed to abrasion and traffic. Provide waterproof connectors to connect separate lengths of electric cords if more than one length is required.

D. Provide general service incandescent lamps as required for adequate illumination. Provide guard cages or tempered glass enclosures where exposed to breakage. Provide exterior fixtures where exposed to moisture.

1.4 FIRE EXTINGUISHERS

A. Provide portable UL-rated, Class A fire extinguishers for field offices.

1.5 LAYOUT OF FIELD OFFICES

A. Before starting the work, the CONTRACTOR shall submit to the ENGINEER his requirements for field offices. Where onsite space is limited, the allocation of the available space will be made by the ENGINEER. Should the CONTRACTOR require space in addition to that allocated, the CONTRACTOR shall make his own arrangements for storage of materials and equipment in locations off the construction site. For the allocated space, the CONTRACTOR shall submit to the ENGINEER for approval, his proposed plan and layout for all temporary offices.

1.6 REMOVAL OF FIELD OFFICES AND TEMPORARY UTILITIES

A. At such time or times any field offices are no longer required for the work, the CONTRACTOR shall notify the ENGINEER of his intent and schedule for removal of same, and obtain the Engineer's approval before removing the same. As approved, the CONTRACTOR shall disconnect and/or dismantle the field office and utilities and remove them from the site as his property. The CONTRACTOR shall leave the site in such condition as specified, as directed by the ENGINEER, and/or as shown on the Plans.

B. In unfinished areas, the condition of the site shall be left in a condition that will restore original drainage, evenly graded, seeded or planted as necessary, and left with an appearance equal to, or better than original.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01590

SECTION 11390 – PACKAGE PLANT SYSTEM

PART 1 -- GENERAL

1.1 THE REQUIREMENT

A. The CONTRACTOR shall provide all labor, materials and equipment necessary to install the Package Plant System in accordance with the Contract Documents. The Package Plant System (System) is a compact wastewater treatment system that produces clarified water from raw wastewater. The package plant treatment equipment shall be provided by a single Package Plant System Supplier (Supplier) as specified herein.

B. Related Sections:

1. Section 11000 – Equipment General Provisions

2. Section 11100 – Pumps, General

3. Section 11501 – Positive Displacement Blowers

C. Unit Responsibility: The CONTRACTOR shall require the Supplier to be responsible for designing and furnishing the System equipment, and for coordination of assembly, testing, and startup of the System; however, the CONTRACTOR shall install, test, and startup all System components and related items. The CONTRACTOR shall provide and install all interconnecting piping, piping appurtenances, and supports. The CONTRACTOR shall provide and install all equipment supports including anchor bolts and nuts. The CONTRACTOR shall provide and install all electrical equipment supports, including anchor bolts and nuts, and all electrical interconnections including conduit and wiring.

1.2 CONTRACTOR SUBMITTALS

A. Furnish submittals for System equipment in accordance with Section 01300 - Contractor Submittals.

PART 2 -- PRODUCTS

2.1 GENERAL

A. Components of the System provided by the CONTRACTOR shall be entirely compatible with the Supplier furnished items.

2.2 MATERIALS

A. Materials shall be suitable for the intended application; materials not indicated shall be high-grade, standard commercial quality, free from defects and imperfections that might affect the serviceability of the product for the purpose for which it is intended, and shall conform to the following requirements:

1. Anchor bolts, washers, and nuts shall be Type 304 stainless steel in accordance with Section 05500.

2. Piping and piping appurtenances shall be fully compatible with the fluids being conveyed.

3. All materials in contact with process water and utility water shall be NSF 61 certified for potable water use.

2.3 SYSTEM COMPONENTS

A. TANK CONSTRUCTION

1. The work covered in these specifications consist of furnishing all labor and materials, required to manufacture a factory fabricated sewage treatment plant; including all treatment components, piping, equipment, and appurtenances as shown on the drawings and/or as specified herein to provide a satisfactorily operating sewage treatment plant.

2. The wastewater treatment system shall be of the activated sludge type, specifically known as "Extended Aeration Activated Sludge ", the system shall be designed for treating a total of 750,000 gallons per day of 204 mg/l-BOD5; 240 mg/l TSS domestic sewage based on composite sewage samples of the average daily flow. No substances shall be introduced in quantities, which are toxic to biological organisms. The plant shall be designed to handle average daily flows fluctuating over the range of 60% to 100% of design flow and peak hourly flow rates not to exceed 300% of design flow, with an effluent quality of 10 mg/l-BOD5; 15 mg/l TSS; 0.92 mg/l NH3-N. The complete system shall include all necessary equipment for efficient plant operation.

B. GENERAL DESCRIPTION

1. The plant shall be fabricated complete with all treatment components, equipment and appurtenances that may be required to accomplish aeration and mixing, clarification, sludge activation, activated sludge recirculation and aerobic sludge digestion – all in one single steel structure having separate compartments.

2. The composite structure shall consist of two concentric steel tanks forming an inner chamber and an outer annulus. The inner chamber shall serve as a clarifier or settling basin. The outer annulus shall be divided into compartments or chambers to form a mixing chamber, a sludge activation chamber and an aerobic digester. The structure shall be fabricated and erected as shown on the drawings.

3. The principle items of equipment to be supplied as follows: Complete aeration assemblies and facilities, complete clarification equipment and appurtenances, sludge airlifts, air blowers and accessories and all other items of equipment and accessories required to provide a complete installation as specified herein.

4. The system shall be manufactured by Evoqua Water Technologies, LLC, AUC Group; ClearStream Environmental; or approved equal.

C. TANK CONSTRUCTION (STEEL)

1. All structural plates associated with the outer and inner vertical tank walls and all partition walls shall be carbon steel plate conforming to ASTM A-36. Wall thickness shall be determined by the Supplier’s Engineer, but shall not be less than 1/4 inch; All walls shall be continuous and watertight and shall be supported by structural reinforcing members where required. Fabrication and erection shall conform to the appropriate requirements of "AISC Specification for Buildings". Connection shall conform to the requirements of the American Welding Society's Code and shall develop the full strength of the member. Tank welding shall meet American Welding Society AWS D1.1 - Structural Welding Code:

Steel. Weld materials shall conform to AWS A5.18. Welding operators shall be qualified in accordance with AWS D1.1.

2. All interconnecting walls in the annulus of the plant need to be hydrostatic allowing one tank to be empty while another tank is full.

3. Plant Supplier shall provide design for steel base channels for outer circular walls and for each partition wall.

4. A steel bridge shall be provided. This bridge shall span the clarifier and shall extend to the outer tank wall meeting the access stairway. The bridge shall be designed to safely support all normal operating loads plus a 1000 pound concentrated live load. The walkway surfaces shall be as listed herein.

D. AEROBIC SLUDGE DIGESTOR

1. An aerated aerobic digester chamber shall be provided as specified and shown on the plans. It shall have a minimum volume of 170,000 gallons.

2. The digester chamber shall be constructed as an integral part of the wastewater treatment system. The chamber shall have the same protective coating as specified for the treatment plant. It shall also have the same structural requirements as the wastewater treatment plant.

3. The chamber shall be of the aerated type. Diffused air shall be supplied by the plant blower system supplying one scfm of air per foot of tank length. The diffusers shall be located parallel to and near the bottom of the tank. All piping and valves within the chamber shall be factory installed.

4. An airlift pump with vertically adjustable intake and air control valve shall be provided for the purpose of decanting supernatant from the aerobic digester. The airlift piping shall be 304 stainless steel, and neoprene bands shall isolate the piping from all steel surfaces. The pipe shall pivot on a swivel joint. The intake elevation adjustment shall allow the water level in the digester to be lowered a minimum of 48 inches.

5. The digester chamber shall be set on the same concrete foundation pad as the wastewater treatment plant and set at the location as shown on the plans.

E. AERATION CHAMBER

1. There shall be supplied, an aeration chamber to work in conjunction with the clarifier chamber. The aeration chamber shall conform to the following specifications:

2. The aeration chamber shall be of sufficient capacity to provide a minimum of 24 hours retention of the average daily flow, and/or a minimum chamber volume of 750,000 gallons. The vessel shall be so shaped on each side to prevent sludge accumulation, to enhance rotation of the vessel contents, and to prevent scum and froth accumulation. To ensure maximum retention and eliminate short circuiting of raw sewage particles, the aeration chamber shall be constructed with air diffusers, placed longitudinally along one side of the chamber so as to, in conjunction with the flow control baffles, enhance the spiral rotation of the chamber contents. To ensure adequate circulation velocity, the proportion of the chamber width to depth, in the direction of rotation, shall not exceed 1.33 to 1. The velocity of rotation shall be sufficient to scour the bottom and prevent sludge filleting as well as to

prevent the escape to the surface of minuscule air diffusion bubbles and by so causing their entrapment to provide maximum oxygenation efficiency.

3. An air distribution manifold shall be installed longitudinally on one side of the tank with diffuser drop assemblies connected thereto.

4. Each diffuser drop assembly shall be equipped with an air regulating and/or shutoff valve, a disconnecting union and a diffuser bar with non-clog air diffuser nozzles mounted thereon at approximately 70" centers. With this spacing, the airflow per diffuser shall range from 1 to 30 SCFM. This minimum air velocity shall be maintained to insure sufficient velocity for self- cleaning. The diffusers shall be parallel to and near the base of the vessel sidewall and at an elevation, which will provide the optimum diffusion and mixing of the vessel contents. The oxygen transfer capacity of each diffuser shall be such that an adequate supply of oxygen will be maintained in the aeration chamber to meet treatment requirements of the design sewage load.

5. The diffusers will be manufactured to produce a double shear when air is released. The air is sheared as it discharges the air orifice of the air diffuser body and again as it crosses over the diaphragm baffle. The air check diaphragm located on top of the diffuser is molded directly to the diffuser body, preventing the cap from blowing off when excess CFM is delivered to the diffuser. The diffuser will be supplied with standard male pipe thread connections.

F. CIRCULAR MECHANICAL CLARIFIER

1. There shall be furnished a clarifier chamber to work in conjunction with the aeration chamber of that system. The clarifier shall conform to the following specifications:

2. The clarifier chamber shall be of such size as to provide a minimum of four (4) hours retention, based upon the same design flow rate governing the aeration chamber, and shall have proper baffling to prevent short circuiting and to provide maximum uniform retention. The clarifier inlet shall be baffled to prevent short-circuiting and provide maximum uniform solids settling area. The slope of the clarifier grout shall not be less than 1 vertical to 12.0 horizontal. Settled sludge shall be returned from the clarifier sludge hopper to the aeration chamber by the positive sludge return system, consisting of an airlift pump. The clarifier effluent shall pass over the edge of the baffled adjustable effluent weir into the effluent trough and then out of the chamber. The weir plate will be constructed of 10 gauge galvanized steel and will be gasketed with 1/4" neoprene.

G. SUPPORT BRIDGE

1. The drive unit support and bridge shall consist of two beams spanning the top of the tank including cross-supporting members, handrails, and grating walkway. The 1-1/2” handrails shall be anchored to the structural beams.

H. INLET STILLING WELL

1. An influent well of 12 feet in diameter by 3'-0" feet depth shall be provided to cut down the influent velocity and prevent short circuitry. The stilling well shall be a rotating type supported off the torque tube.

2. The inlet stilling well shall be fabricated of 1/4" steel plate and shall be hot-dipped galvanized.

I. SLUDGE SCRAPER ASSEMBLY (RAKE ARMS)

1. The sludge scraper assembly shall consist of two scraping arms fabricated of steel angles and a central torque cage.

2. The scraper arm assembly shall be adjusted vertically and horizontally by means of threaded rods attached to the torque cage.

3. Each scraper arm shall be fabricated from steel angle and have a neoprene squeegee blade attached to each angle to allow for sufficient movement of sludge into the center sludge collector pit.

4. The bottom of the clarifier shall be grouted concrete which conforms to the dimensions shown on the Drawings.

5. There shall be installed within the clarifier chamber, a positive sludge recirculation system, consisting of 10” diameter airlift sludge return assembly, meeting the following specifications: The airlift pump system shall have the recirculation capacity ranging from 0% to 150% of the design flow. The airline supplying air to the pump shall be equipped with a needle valve varying the capacity of the pump. The airlift pump shall be firmly supported and shall be equipped with a clean-out plug to allow for easy cleaning and maintenance.

J. SURFACE SKIMMER ARM AND SCUM TROUGH

1. A surface skimmer consisting of a steel angle with neoprene blade attached shall be provided to move the surface scum to the scum trough.

2. The surface skimmer shall be attached to the torque and shall rotate with the sludge scraper assembly.

3. A scum trough shall be fabricated of 1/4" steel plate (hot-dipped galvanized) and shall be provided to collect the scum from the surface skimmer and remove the scum by means of a 4" diameter scum discharge pipe.

4. There shall be installed within the clarifier chamber a positive scum and skimming recirculation system consisting of 4” diameter airlift skimming device (s) meeting the following specifications: The skimming device shall be of the positive airlift pump type, located in a position to skim and return floating material to the aeration chamber. The airline supplying air to the skimming device shall be equipped with a needle valve to regulate the rate of return.

K. EFFLUENT WEIR ASSEMBLY

1. Supplier shall furnish a steel weir trough (painted carbon steel) with serrated weir plates fabricated from 10 gauge galvanized steel plate allowing up to an including 2 inches of adjustment. The weir trough shall be firmly fastened to the clarifier wall.

L. DRIVE UNIT

1. Product: Gear reducers or gear motors supplied shall be of such design that helical gears shall be the standard acceptable unit. Other types of gear reduction systems are acceptable provided the losses are not greater than helical gearing, which provides 98.5% efficiency up to a 200:1 gear ratio. Worm gearing, bevel gearing, and spur gearing are acceptable provided efficiencies are equal to helical gearing at the same gear ratios.

2. Gear motors are preferred and are to be manufactured by the same company and provided as an integral unit completely assembled. If c-face type of reducers and motors are supplied, they are to be connected with an external three-piece flexible coupling. Hollow shafts or quill design input shafts are not acceptable. All materials is to be of the highest quality and shall meet the intended use as described within the complete project specifications, and meet or exceed current NEMA, AGMA, and IEEE standards for material, capacity ratings, and testing procedures.

3. Electrical Specifications:

    a. The motors shall be squirrel cage design, NEMA design B or C, TEFC enclosures, Class F insulation 1.15 service factor suitable for 3/460 operation, continuous duty. The motors shall be protected with the manufacturer's standard treatment for corrosive/moist environments and to include (a) weep holes in end brackets and conduit box for condensate drainage (b) stator bore, rotor o.d., and all interior metal surfaces are to be coated with polyurethane (c) stainless steel nameplates and attachment screw pins (d) plastic non-corrosive fan (e) cadmium plated fan cover.

4. Mechanical Specifications (Gear Reducer):

    a. The gear unit shall be manufactured of cast iron equal to SAE Grade #27 for rigid support and high strength. The gear material shall be SAE 4140 drop forged steel and carbonized to a 55-60 Rc hardness with a finishing grinding to meet AGMA Quality Class 6 finish for low noise, minimum backlash, and maximum efficiency. The interior of the reducer shall be painted with a non-corrosive material for protection from oil contaminates. Maximum ambient is 40º c.

    b. Gears are to be pressed fit and secured with keys and snap rings or shaft steps. Shrink fit gears are not acceptable. The gear reducer or gear motors shall be suitable to be mounted in any position regardless of initial mounting position without adding special parts or modifications. The unit shall utilize either roller or ball bearings as manufactured and rated in according to current AFBMA standards and with a minimum of 100,000 hours. Bearings can be either splash or grease lubricated. Lubricating as with an oil pump are not acceptable. The thermal capacity of the reducer at rated load conditions shall exceed the mechanical capacity with relying upon auxiliary means for reducer. All reducers shall be supplied with an initial oil fill for the specified mounting position.

5. Service Factor:

    a. All process drives shall be selected on the basis of AGMA application tables, reference AGMA420.04 December, 1975 but with a minimum of class II or 1.41 service factor for drives operating 10 hours per day, AGMA Class III or 2.0 service factor shall be the minimum acceptable. The service factor or gear class shall be stamped on the nameplate and be based upon motor horsepower.

6. Torque Limiter:

    a. Torque limiting device is to be factory set to specified torque limits for alarm and shutdown. The drive and torque unit will be designed to prevent over-torquing of the torque cage. The torque control unit shall include contacts for remote hook-up of an alarm light or bell for indication of an overload condition if one occurs.

    b. System components for torque indication, shutdown and alarms shall operate from reactive mechanical torque. Devices which read motor load are not acceptable.

    c. Torque indication is to be simple mechanical device, suitable for ambient conditions. Dial indicators, meters, etc. are not acceptable

    d. Torque monitoring or limiting shall be obtained from the reactive torque and motions on a freely rotating gear housing which will vary in direct proportion to the applied load torque. The reactive motion shall be restrained by an external torque arm with compression springs. Accuracy of the torque limiting system shell be ±10% of the set points.

    e. The torque limiting system shall be completely external to the gear reducers. Gear housings and internal parts shall be manufacture's standard and readily available. To ensure proper performance, sizing, selections, and warranty responsibility, the torque limiting components shall be supplied and mounted by the manufacturer of the reducer.

M. MAIN AERATION AIR SUPPLY BLOWER MOTOR UNITS

1. Refer to Specification Section 11501 – Positive Displacement Blowers.

N. AERATION ELECTRICAL CONTROL CONSOLE

1. An electrical control panel shall be installed within a NEMA 3R/4X weatherproof enclosure with a locking hasp. The control console shall be provided for mounting as indicated on the plans. Any exterior mounting hardware shall be stainless steel or other corrosion resistant material.

2. The control console shall be completely factory assembled and tested prior to shipment. The control console shall be furnished with all necessary controls for each blower motor unit and associated plant equipment. Control voltage shall be 120 VAC, 1 Phase.

3. Controls shall be mounted to a removable sub-panel within the enclosure and shall be wired and spaced in accordance with the latest National Electrical Code. The control console shall be supplied with a properly sized magnetic-circuit breaker to act as the main disconnects for the control console. Magnetic starters with overload protection shall be supplied for all blower motor units. To vary the air supply, a program timer shall be supplied. An electrical alternator shall be furnished to alternate the operation of each blower motor unit. An electrical alternator shall be provided with a manual selector switch to allow manual selection of the lead blower if desired.

4. The 24-hour, 7-day time clock shall be capable of being programmed to control the blower run cycle and to adjust both the start set point and the blower run time. The clock shall also include a skip-a-day feature which will allow a separate program for weekends (when required). The clock shall be by Paragon, Model #1015.

5. All wiring conductors within the control console shall be U.L. type THHN, stranded #14 AWG minimum, rated at 600 volts. Control wiring shall be numbered on each end.

6. All wire and conduit required between the control panel and the electrical power service should be furnished and installed by the purchaser. Wiring and conduit between the control panel and plant equipment shall be furnished by the manufacturer of the wastewater treatment plant. The panel may be detached for shipping. The main power supply shall be 480 Volt,3 Phase, 60 Cycle. The control voltage shall be 120 Volt, single Phase.

O. ACCESS BRIDGE

1. The main Access Bridge with a 36” wide access platform shall be made of structural steel shapes 1/4" minimum thickness and shall be supported on the plant walls. The bridge shall extend across the tanks as shown on the drawings.

2. The bridge shall have a 36" wide deck made of, 1"x 3/16" galvanized or aluminum bar grating and shall be designed to withstand a uniform live load of 75 lbs. per square foot plus the dead load of the structure. The deflection shall not exceed L/360 of the unsupported span when the design loads are applied. The bridge shall be provided with handrails on both sides consisting of an upper and intermediate rail and vertical posts fabricated of 1-1/2” diameter anodized aluminum pipe. 4” x ¼” painted steel or aluminum toe plates shall also be provided.

3. Walkways shall be provided for access to and maintenance of the clarifier weir and all air diffuser drop pipes and regulating valves. Additional walkways shall be provided in locations as shown on the drawings or as needed to service the equipment.

4. All other walkways shall be a minimum of 24 inches wide and shall be of 1" x 3/16" galvanized or aluminum bar grating adequately supported to withstand a live load of 75 lbs. per square foot. All walkways shall be provided with handrails on both sides consisting of an upper, intermediate rail, and vertical posts fabricated from 1-1/2" diameter schedule 40, painted steel or anodized aluminum pipe. 4 x ¼” painted steel or aluminum toe plates shall also be provided.

P. EFFLUENT CONNECTION

1. The effluent connection of the wastewater treatment system shall be located as shown on the plans and shall consist of one, 14” diameter 150# standard flange. Clarifier effluent piping shall be 304 SS.

Q. PLANT START-UP

1. At the time the wastewater treatment system is filled with water or sewage, and all power connections have been completed, and all equipment is approved for service, the contractor shall provide the services of a representative of the manufacturer who shall instruct the owner's representative in the proper operation and maintenance of the wastewater treatment system, including instructions in conducting all required operational tests. The manufacturer's representative

shall furnish at this time, a service manual on the equipment installed within the wastewater treatment system.

R. MANUFACTURER QUALIFICATIONS

1. The manufacturer of specified equipment must have a minimum of five (5) years active experience in the design and manufacture of similar wastewater treatment equipment, and upon request, furnish supporting evidence.

2. The manufacturer of specified equipment must have a minimum of five (5) year's active experience in the design and manufacture of similar wastewater treatment equipment, and upon request, furnish supporting evidence. Consideration will be given only to products of manufacturers who can demonstrate that their equipment fully complies with all requirements of the specifications and contract documents. The equipment shall be supplied by a firm which has been regularly engaged in the design, fabrication, assembly, testing, start-up and service of full scale treatment systems, of the same model and size as proposed, operating in the U.S., with similar characteristics

PART 3 -- EXECUTION

3.1 INSTALLATION

A. General: Equipment and System components shall be installed in accordance with the manufacturer's written recommendations.

B. Alignment: Equipment shall be field tested to verify proper alignment and freedom from binding, scraping, or other defects. Equipment shall be secure in position and neat in appearance.

C. Lubricants: The CONTRACTOR shall provide any necessary oil and grease for initial operation.

D. Piping: Piping shall comply with Division 15. All piping shall be well supported as shown on the Drawings and as specified in Section 15006 - Pipe Supports. All equipment drains shall be routed to the trench drains in the building. All tank drains shall be routed to the drain boxes on each tank pad. All exterior pressure piping shall be insulated.

E. Piping appurtenances: Valves, instruments and other piping appurtenances provided by the Supplier shall be installed by the CONTRACTOR in strict accordance with the manufacturer's recommendations.

F. Electrical and control items provided by the Supplier shall be installed by the CONTRACTOR as shown in the Contract Drawings. Conduit and wiring shall comply with Division 16.

3.2 TESTING AND STARTUP

A. The CONTRACTOR shall test and start-up the System with the supervision and assistance of the Supplier provided manufacturer's representatives as specified in Division 11.

3.3 TECHNICAL MANUALS

A. The CONTRACTOR shall provide technical manuals in DVD format for the entire package plant system including all components. The manuals shall be complete and include the items listed below as a minimum.

1. Individual mechanical equipment sections with installation, operation, and maintenance materials. Complete spare parts listing for each equipment item.

2. Instrumentation and controls equipment section.

3. Process operation section including system optimization and troubleshooting.

4. Installation instructions

5. Safety materials

6. Warranty information

END OF SECTION 11390

SECTION 11501 – POSITIVE DISPLACEMENT BLOWERS

PART 1 -- GENERAL

1.1 REQUIREMENTS

A. The CONTRACTOR shall provide all labor, materials, equipment and services necessary for furnishing and installing complete positive displacement blower units as shown on the Drawings and specified herein. Each blower shall be furnished completely packaged with all accessories, factory tested and ready for operation, as a single comprehensive unit. The blower units shall be assembled by the blower manufacturer at the manufacturers' facility.

1.2 SUBMITTALS

A. Submittal sheets shall be 8½ x 11 inches, or if larger, shall be folded to 8½ x 11 inches so that the title block is clearly visible without unfolding. Drawings shall be similarly folded and inserted in pockets as appropriate. Paper copies shall be contained in a soft cover binder. Submittals may be made in digital format transmitted via email.

B. Shop Drawings: The CONTRACTOR shall submit an integrated shop drawing for the blower system. All mechanical and electrical equipment and components specified herein shall be included to be considered a complete shop drawing.

C. Installation, Operation, and Maintenance Manuals: The CONTRACTOR shall submit required number of copies of the manuals within eight (8) weeks of receiving approved shop drawings.

1.3 TESTING

A. A certified factory slip test report form shall be submitted for each blower.

PART 2 -- PRODUCTS

2.1 DESIGN CRITERIA

A. Schedule:

Name	Equalization Tank Blower	Aeration Blower	Digester Blower
Quantity	2 (1 duty, 1 standby)	3 (2 duty, 1 standby)	2 (1 duty, 1 standby)
Tag number	01-E3, 01-E4	02-E2, 02-E3, 02-E4	02-E5, 02-E6
Discharge Pressure	6 PSIG	9 PSIG	9 PSIG
Required Volume, SCFM	650	990	685
Max Speed, RPM	4,270	3,530	3,720
Motor Horsepower	30	75	50

B. Operating Conditions:

1.	Elevation, Feet, NAVD88	28
2.	Inlet Air Temperature, ° F	100
3.	Inlet Air Humidity, %	90

2.2 POSITIVE DISPLACEMENT BLOWERS

A. General:

1. Each blower shall be oil-free, positive displacement, rotary lobe type with three lobes per roter, designed for air or other inert gas services, and belt-driven via electric motor. Each assembly shall be rugged in construction and of such design that it may be disassembled and inspected without disturbing the inlet or discharge piping.

2. Nameplates stating the name of the manufacturer, blower/blower package model number, blower/blower package serial number, the rated capacity, speed, and other pertinent data, shall be attached to each blower/blower package.

3. Nameplates stating the name of the manufacturer, the motor model number, the motor serial number, the rated horsepower, speed, voltage, amps, rated service factor, and other pertinent data, shall be attached to each motor.

B. Casing: The casing shall be made of high strength, close grained, cast iron, and shall be adequately ribbed to prevent casing deflection and facilitate cooling. The casing shall be precision machined to allow for minimum clearances. Casing shall be of EN GJL 200 material with integrated pulsation-damping interference channels.

C. Rotor Assemblies: The rotors shall be one piece casting EN GJS 500 material. The rotor design shall incorporate replaceable seal ring wear sleeves and be designed to carry loads that exceed those required at maximum design conditions. The rotor assemblies shall be statically and dynamically balanced to ISO standard 1940/1- Q2.5 (turbine rotor). The rotors shall be a tri-lobe design in order to minimize pulsation and noise.

D. End Plates: The gear-end plate shall be cast iron. The drive-end plate shall be integral to the blower casing. Bearing fits shall be precision machined to ensure accurate positioning of the rotors in the casing. Replaceable seal wear inserts shall be provided on the drive-end and gear-end plates. The oil chamber covers shall be heavy-duty cast iron with a precision-machined sealing face. Aluminum oil covers are not allowed.

E. Timing Gears

1. The rotor timing gears shall be precision machined from case hardened, ground alloy steel to quality standard 5f 21. Each timing gear shall be straight cut and beveled to eliminate axial bearing loads and ensure long life as well as quiet operation.
2. Each timing gear shall be manufactured in accordance with:
   a. DIN 3960, Specifications for Spur Gear Sets
   b. DIN 3961 & DIN 3962, Tolerances for Spur Gear Mesh
   c. DIN 3964, Specifications for Shaft Centering

3. Gears shall be finish ground on a precision grinder to ensure concentricity. The timing gear set shall be taper-mounted on the rotors. Keyed, hub mounted, taper-pinned, or splined shaft timing gear mounting designs are not acceptable.

F. Bearings: All four shaft support locations shall incorporate large, heavy-duty, full complement, cylindrical roller bearings with metal cages, designed with at least 5-times the dynamic capacity of ball bearings. The bearing maximum speeds must be at least two times the maximum recommended blower speed. The minimum acceptable L_{10} design life at the blower's maximum rated speed and maximum rated differential pressure shall be 74,000 hours.

G. Lubrication: Both the gear end and the drive end of the blowers shall be oil splash lubricated for minimal maintenance and long service life. Grease lubricated bearings are not acceptable. The lubrication design shall ensure adequate lubrication of the timing gears and bearings.

H. Seals

1. There shall be four (4) piston ring type labyrinth seals at each end of each rotor to minimize leakage and maintenance costs.

2. A vent cavity shall be provided between the air side and oil side rotor shaft seals on all four (4) sets of piston ring type labyrinth seals. The two (2) vent holes located on the bottom side of the blower shall be left open. The vent holes at other locations shall be closed off with threaded metal plugs.

3. The input drive shaft seal shall be a high temperature radial lip type seal with Viton elastomers. The seal design shall incorporate a replaceable wear sleeve on the input drive shaft.

4. The input shaft seal design must allow for the lip seal and the shaft sleeve to be replaced without removing the oil chamber shaft.

I. Drive Motors

1. Drive motors shall be designed, manufactured, and tested in accordance with the latest revised editions of NEMA MG-1, IEC, IEEE, ANSI, and AFBMMA standards as applicable and shall be capable of continuous operation.

2. Motor must meet or exceed Energy Independence and Security Act (EISA 2007) standards for motor efficiency.

3. The motor nameplate horsepower rating shall not be exceeded at the design speed.

4. The temperature rise of the motor windings shall not exceed IEC and NEMA standards when the motor is operated continuously at the rated horsepower, rated voltage, and rated frequency in ambient conditions of 40°C / 104°F.

5. The motors shall conform to the following:

Mounting:	Horizontal
Type:	Squirrel Cage Induction
Enclosure:	TEFC

Service Factor:	1.15
Duty Cycle:	Continuous
Ambient Temperature Rating:	40°C / 104°F
Starting Current:	6-10X Full Load Current Maximum
Winding Insulation:	Class F
Temperature Rise:	Class B
Voltage/Phase/Frequency	208, 230, or 460V/3ph/60Hz
Bearing Lubrication:	Grease
Maximum Speed:	3,600 rpm
Speeds:	Single Speed
Motor Protection:	PTC Thermistors

J. Drive

1. The packages shall be driven through V-belts and sheaves with SPZ or SPB profile. The drive assembly shall be of the high-capacity type, oil and heat resistant, with a 1.5 safety factor.

2. Automatic tensioning of the V-belts by use of a pivoting, swing frame motor base, with adjustable spring assistance and visual indication of V-belt tension, shall be provided to ensure the V-belts remain properly tensioned with minimal maintenance and to extend V-belt, sheave, and bearing life. Adjustment of the tensioning device shall be accomplished without removal of the guard or loosening of the motor mounting bolts. The drive guard shall be the manufacturer's standard sheet metal with provision for ventilation. The installed guard shall be fully-enclosed and designed to meet current OSHA standards.

3. Belt shall be 100% oil-resistant.

K. Standard Blower Gauges

1. A pressure gauge shall be provided, pre-piped and panel mounted, on the sound enclosure.

2. A temperature gauge, with adjustable switching point and contact, shall be provided pre-piped and panel mounted on the sound enclosure (wiring of switch by others).

3. A filter differential pressure gauge shall be provided pre-piped and panel mounted on the sound enclosure.

L. Enclosure

1. A sound enclosure shall be provided. The sound enclosure shall be sheet steel construction with a "powder coat" type paint finish, which shall be durable and scratch resistant.

2. To prevent transmission of vibration and noise, the legs of the base shall include vibration isolators made of rubber in a steel footing equipped with mounting holes for securing the package to the

enclosure. bottom.

3. All access panels/doors shall have slotted key locks or handles. A door key shall be provided.

4. At least one installed, integral ventilation fan, sized to provide adequate cooling of the package, shall be provided (wiring of fan by others). The desired fan voltage should be specified (115V/1Ph or 3Ph-main motor voltage). If not specified, fan voltage will be 115V/1Ph/60Hz. The fan should run congruent to blower.

5. The blower package shall be capable of being installed directly adjacent to another blower packages of similar design and shall be capable of mounting next to the wall without maintenance interference.

6. Stainless steel weather hoods shall be made available for units that are installed outdoors.

M. Blower Package

1. The inlet filter shall be integral to the inlet silencer and shall include a washable and reusable polyester element for minimal pressure drop. Air filtration shall be to EN 779, Class G4.

2. The inlet silencer shall be of the wear-free absorptive type, directly connected to the inlet port of the blower, and shall be mounted horizontally.

3. The discharge silencer shall be designed specifically for all frequency ranges of the blower to maximize attenuation and shall use a combination of absorption, reflection, and diffusion. The silencer shall be directly connected to the outlet port of the blower. The discharge silencer shall be mounted horizontally and shall be integral to the base frame.

4. Oil drains from the blower drive-end and gear-end lubricating oil sumps shall be piped to the front of the base for ease of maintenance. The drain valves shall be a ball valve with a fully retained and gasketed threaded cap.

5. The relief valve shall be spring loaded and factory installed in a location to protect the blower.

N. Piping: An elastomeric compensator/flex connector shall be provided for connection of the packaged blower to the system piping to reduce transmission of structure borne noise as well as prevent unacceptable loading of the silencer connection and blower casing. On packages with tube outlets (4” and below) the compensator shall be hose-type. On packages with outlets larger than 4”, the compensator shall be arch-type, flanged with both ANSI 125/150 lbs. and DIN PN10 bolting patterns.

O. Manufacturers

1. Kaeser

2. Gardner Denver

3. Aerzen

4. Approved equal

PART 3 -- EXECUTION

3.1 INSTALLATION

A. General: The CONTRACTOR shall install the preassembled blower packages on concrete slabs at the locations shown on the drawings. The CONTRACTOR shall install any accessory times shipped loose.

3.2 MANUFACTURER'S REPRESENTATIVE

A. General: The CONTRACTOR shall provide the services of a qualified factory certified representative for the required days as specified herein and in Section 11000.

1. Initial Operation and Training: A minimum of two (2) day(s) for blower equipment installation inspection, certification, start-up, training, and corrective adjustments.

B. Revisit: A separate visit of a minimum of one (1) day for re-inspecting of the blower packages after they have been in operation one (1) month. The factory authorized representative shall perform a vibration test, as well as verify RPM, and discharge temperature.

3.3 TESTING AND INSPECTION

A. Parts must be inspected as part of a strict ISO 9001:2008 quality control program.

B. All critical dimensions of the blower components provided by the manufacturer shall be verified and documented prior to assembly.

C. The rotating parts of each blower actually provided by the manufacturer shall be statically and dynamically balanced before final assembly. The blower alone shall operate without excessive vibration. Removal of material from the face of the rotors for balancing purposes is not acceptable.

D. Each blower provided by the manufacturer shall be slip tested (per ISO 1217).

E. Each blower provided by the manufacturer shall be operated at its maximum rated speed and differential pressure for thirty (30) minutes.

F. On completion of final assembly of the packaged blower and prior to shipment, each packaged blower shall be mechanically run for a minimum of fifteen (15) minutes.

3.4 QUALITY ASSURANCE

A. All blowers and equipment covered by this specification…. are intended to be standard blower equipment, of proven ability, as manufactured by a reputable CE certified manufacturer having at least two (2) years experience in the production of such blowers. The blowers furnished shall be designed, constructed, and installed in accordance with the best practice and methods and shall operate satisfactorily when installed.

B. All equipment furnished under this specification…. shall be unused, and shall be the standard product of a manufacturer having a successful record of manufacturing and servicing the equipment and systems specified herein for a minimum of two (2) years.

3.5 WARRANTY

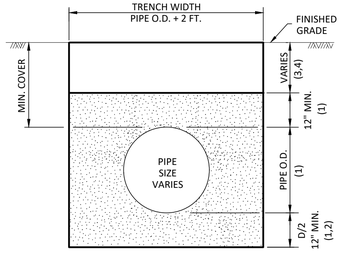
A. The manufacturer shall warrant the bare blower being supplied against all defects in workmanship and materials for a period of sixty (60) months from date of startup, not to exceed sixty-six (66) months from date of shipment from the manufacturer of the blowers. All other package components shall be warranted for a period of twelve (12) months from the date of startup, not to exceed eighteen (18) months from the date of shipment.

B. Warranties and guarantees by the suppliers of various components in lieu of a single source responsibility by the equipment manufacturer shall not be accepted. The equipment manufacturer shall be solely responsible for the warranty of the equipment and all related components.

C. In the event a component fails to perform as specified or is proven defective in service during the warranty period, excluding items of supply normally expanded during operation, the manufacturer shall provide a replacement part without cost to the owner.

D. This warranty shall be valid only if the product is properly serviced and operated under normal conditions and in accordance with the manufacturer's instructions.

END OF SECTION 11501

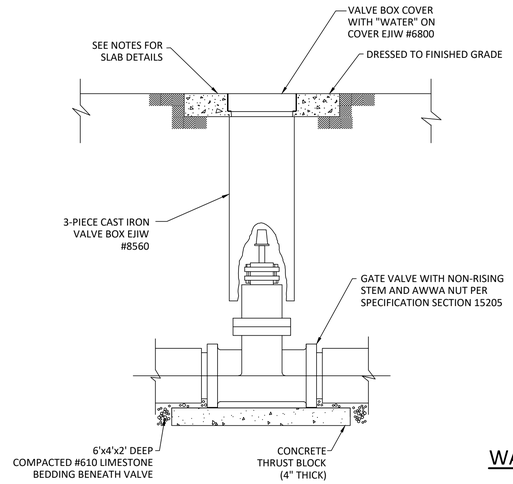


MIN. COVER	PIPE SIZE (IN.)
3 FT.	LESS THAN 12
4 FT.	12 AND GREATER

NOTES:

1. COMPACTED GRANULAR MATERIAL MIN. DENSITY 95% STANDARD PROCTOR (ASTM D698) 6" MAX. LAYERS.
2. PROVIDE BELL HOLES AT EACH JOINT.
3. SELECT EXCAVATED MATERIAL FREE OF STUMPS, DEBRIS AND VOIDS FOR NON-PAVED AREA.
4. COMPACTED GRANULAR MATERIAL WITHIN THE STREETS RIGHT-OF-WAY MIN. DENSITY 95% STANDARD PROCTOR (ASTM D698) 6" MAX. LAYERS.
5. WHERE GROUND WATER OR UNSTABLE TRENCH BOTTOM EXISTS, TRENCH BOTTOM SHALL BE STABILIZED (ASTM D2321) TO PROVIDE A WORKING PLATFORM.
6. TRENCH DETAIL SHOWN SHALL BE MINIMUM REQUIREMENTS TO SAFEGUARD THE INTEGRITY OF THE UTILITY LINE INSTALLATION AT REQUIRED DEPTHS. THE CONTRACTOR SHALL PROVIDE SUFFICIENT SHEETING AND BRACING TO PROVIDE SAFE WORKING CONDITIONS FOR HIS WORKERS.

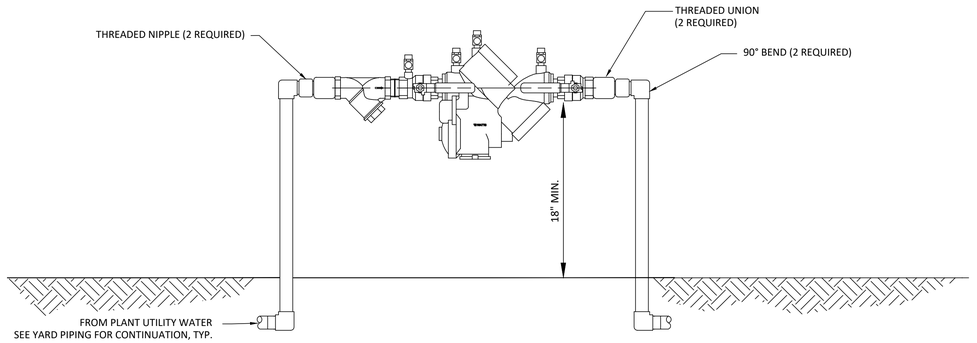
STANDARD PIPE TRENCH — C-6



NOTES:

1. FOR NON-PAVEMENT AREAS, SLAB SHALL BE 2'x2'x4" CONCRETE.
2. FOR TRAFFIC AREAS, SLAB SHALL BE 2'x2' WITH THICKNESS TO MATCH PAVEMENT (8" MIN.)
3. IN CONCRETE PAVEMENT, USE EXPANSION JOINT ON ALL SIDES OF VALVE BOX SLAB.
4. FOR VALVE CLUSTERS, SLAB SHALL BE SIZE INDICATED ON SITE PLAN.

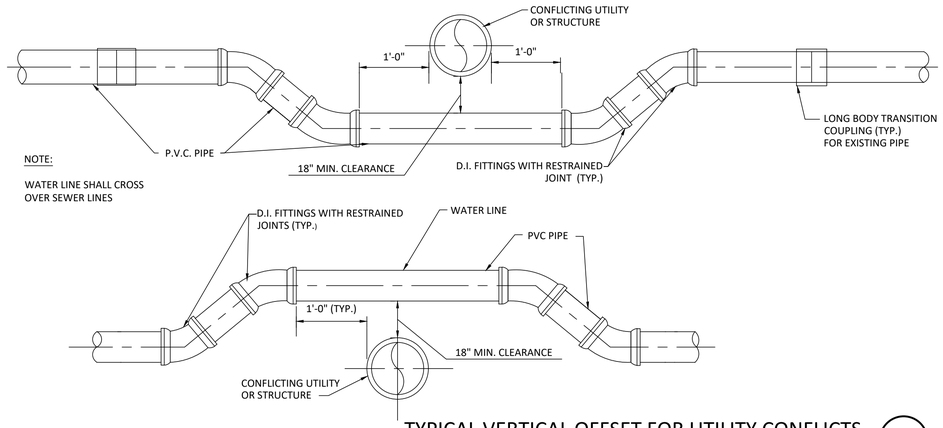
WATER VALVE AND VALVE BOX DETAIL — C-7



NOTES:

1. SUPPORT PIPING AS REQUIRED, PER SPECIFICATION SECTION 15006.
2. BACKFLOW PREVENTER SHALL BE INSULATED TO PROTECT AGAINST FREEZING.

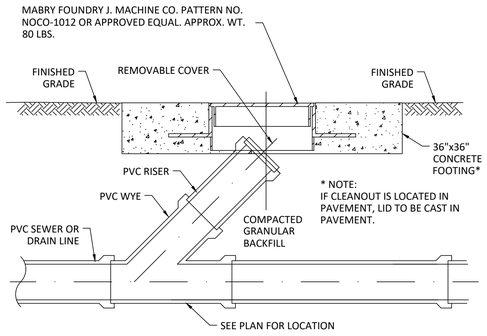
BACK-FLOW PREVENTER DETAIL — C-8



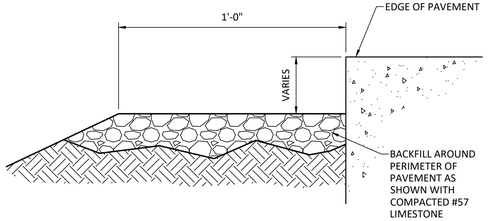
NOTE:

WATER LINE SHALL CROSS OVER SEWER LINES

TYPICAL VERTICAL OFFSET FOR UTILITY CONFLICTS — C-9



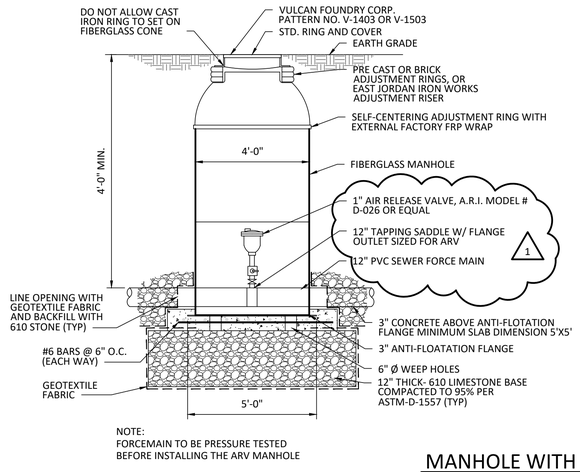
TYPICAL CLEANOUT DETAIL — C-10



NOTE:

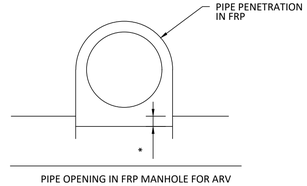
TYPICAL DETAIL TO BE USED WHERE NO GRADES ARE INDICATED ADJACENT TO PAVEMENT.

BACKFILL AROUND PAVEMENT — C-11

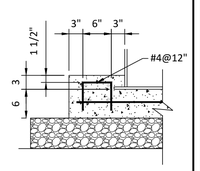


NOTE:
FORCEMAIN TO BE PRESSURE TESTED BEFORE INSTALLING THE ARV MANHOLE

MANHOLE WITH AIR RELEASE VALVE — C-12



WALL DETAIL



ANTI-FLOATATION JOINT

CADD FILE NAME: 14066-GC-02.dwg

DESIGNED BY: KMD	DRAWN BY: GAL	CHECKED BY: JEP	JOB NO. 14066
SCALE: (22x34) NONE	SCALE: (11x17) NONE	DATE: JULY 30, 2021	

WEST ST. TAMMANY WWTP EXPANSION

COVINGTON, LOUISIANA

ST. TAMMANY PARISH PROJECT NO. TU17000251
ST. TAMMANY PARISH BID NO. 21-21-2

CIVIL DETAILS - II

NO.	DATE:	REVISIONS	APPD
1	9/23/21	ADDENDUM NO. 2	JEP

STAMP: STATE OF LOUISIANA — JAMES E. POWELL, JR. — License No. 31063 — PROFESSIONAL ENGINEER — 9/24/21 — ENGINEERING

Kyle Associates, LLC
Planning, Engineering, and Landscape Architecture
838 Village Lane N. • Mandeville, LA 70471 • 985.727.9377

SHEET NO.

GC-2

Plot Date: Thursday, September 23, 2021 7:41:52 AM

User: Gwen Ladner

4" EXISTING SEWER FORCE MAIN

C-1 GC-1 FENCE

SCALE IN FEET 0 5 10 20

4" SFM (11)

TIE INTO EXISTING SEWER FORCEMAIN WITH 12" 90° DI MJ BEND

BORE UNDER ELECTRICAL CONDUITS, SEE NOTE 2

12" EFM (19)

TIE INTO EXISTING 4" SEWER FORCEMAIN WITH 4" 90° DI MJ BEND

4"X4"X2" DI MJ TEE (TYP)

C-3 GC-1 ROLLING GATE

GRAVEL DRIVE

APPROX. LOCATION OF CLECO SERVITUDE

SAMPLE TAP PER TAMMANY UTILITIES STANDARDS

4" UW (11)

4"X2" DI MJ TEE

12" SFM (11)

4" UW (11)

2" UW (16)

1

BACKFLOW PREVENTER C-8 GC-2

TIE INTO EXISTING WATER LINE WITH 4"DI MJ BEND

4" EXISTING WATER LINE

HORIZONTAL DIRECTIONAL DRILL

6'-0" MIN

MANHOLE W/ AIR RELEASE VALVE C-12 GC-2

12" EFM (31)

SEE SHEET C-6 FOR CONTINUATION

INFLUENT SCREENS, SEE SHEET 1M-1

SEE SHEET 1M-1 FOR CONTINUATION

C-2 GC-1 PEDESTRIAN GATE

12" EXISTING SEWER FORCE MAIN

1

2" UW (16)

SEE SHEET 1M-2 FOR CONTINUATION

400,000 GALLON EQUALIZATION TANK, SEE SHEET 1M-2

FENCE W/PRIVACY SCREEN ON LA HWY 1085 SIDE ONLY C-1 GC-1

AGGREGATE SURFACING

BENCHMARK= 1/2" IRON ROD, ELEVATION=23.84'

LA HWY 1085 (BOOTLEGGERS RD) (ASPHALT)

18"x65" CONC. CULVERT

18"x48" CONC. CULVERT

CONSTRUCTION LAYDOWN AREA

PARKING AREA

GREEN SPACE

TRANSFER PUMP STATION, SEE SHEET 1M-4

EQUALIZATION TANK BLOWER STATION, SEE SHEET 1M-3

12" 90° DI MJ BEND

12" PI (11)

BORE UNDER ELECTRICAL CONDUITS, SEE NOTE 2

APPROX. LOCATION OF CLECO SERVITUDE

125' CLECO R.O.W.

185.00'

326.6'

10'

FLOOD ZONE "A+"

FLOOD ZONE "C"

MATCH LINE SEE SHEET C-4

NOTES:

1. THIS DRAWING IS BASED UPON A LAND TITLE SURVEY BY KELLY J McHUGH & ASSOC, INC. , DATED 06/08/2016
2. THE CONTRACTOR SHALL VERIFY ALL LOCATIONS AND ELEVATIONS OF EXISTING UTILITIES BY POTHOLE AS NECESSARY.
3. CONTRACTOR SHALL FIELD LOCATE CONDUITS BY HAND PRIOR TO MECHANICAL EXCAVATION.

File:N:\2014\14066 - West St. Tammany WWTP Expansion\Drawings\Civil\14066-PL-YP.dwg

CADD FILE NAME: 14066-PL-YP.dwg

DESIGNED BY:	DRAWN BY:	CHECKED BY:	JOB NO.
KMD	GAL	JEP	14066

SCALE: (22x34)	SCALE: (11x17)	DATE:
1"=10'-0"	1"=20'-0"	JULY 30, 2021

WEST ST. TAMMANY WWTP EXPANSION

COVINGTON, LOUISIANA

ST. TAMMANY PARISH PROJECT NO. TU17000251
ST. TAMMANY PARISH BID NO. 21-21-2

YARD PIPING PLAN - I

REVISIONS

NO.	DATE:		APP'D
1	9/23/21	ADDENDUM NO. 2	JEP

STAMP: JAMES E. POWELL, JR. LICENSE NO. 31963 PROFESSIONAL ENGINEER STATE OF LOUISIANA 09-30-21

Kyle Associates, LLC
Planning, Engineering, and Landscape Architecture
638 Village Lane N. • Mandeville, LA 70471 • 985.727.3377

SHEET NO.

C-3

MATCHLINE SEE SHEET C-3

12" EFM (19)

AGGREGATE SURFACING

4" UW (11)

14" 90° DI BEND

14-GV-402

14" SE (11)

2" UW (16)
SEE SHEET 2M-1 FOR CONTINUATION

14" SE (11)

10'x15', 4" SLAB
C-7
GC-2

14-GV-401
BURIED VALVE (TYP) 14"x12" DI MJ TEE

14" DI MJ TEE

PLUG FOR FUTURE PROCESS

12-GV-402

12-GV-401

12" SE (11)

PACKAGE TREATMENT UNIT (750,000 GPD), SEE SHEET 2M-1

12" 45° BEND

4" 45° BEND

12" 45° BEND

12" EFM (19)

MODIFIED CHLORINE CONTACT TANK, SEE SHEET 3M-1

2" UW (16)

2" UW (16)
SEE SHEET 3M-1 FOR CONTINUATION

12" FE (11)

2" UW (16)
SEE SHEET 4M-1 FOR CONTINUATION

12" 45° BEND

EFFLUENT PUMP STATION, SEE SHEET 4M-1

NEW EDGE OF SLAB

SPLITTER BOX, SEE SHEET 2M-3

STAIRS, SEE SHEET 2S-2

12" A (15)

8" A (15)

SEE SHEET 2M-3 FOR DETAILS ON CONNECTION TO EXISTING PLANT EFFLUENT

12" 45° DI MJ BEND

12" PI (11)

AGGREGATE SURFACING

EXISTING BLOWER BUILDING

EXISTING TREATMENT UNIT (500,000 GPD)

PACKAGE TREATMENT UNIT BLOWER STATION, SEE SHEET 2M-4

EXISTING CLECO TRANSFORMER

EXISTING MAIN ELECTRICAL GEAR

FENCE C-1 GC-1

DITCH

TOP OF TANK–35.3'

TOP OF SLAB–24.3'

TOP OF PIPE–43.3'

INV. BOX–40.8'

WALK

TOP OF BOX–45.9'

TOP OF WALK–41.8'

TOP OF TANK–41.7'

TOP OF WEIR–40.3'

TOP OF TANK SLAB – 25.4'

TOP OF WEIR–40.2'

TOP OF TANK SLAB – 25.2'

TOP OF SLAB–24.2'

TREATMENT TANK (ON CONC. SLAB)

250.00'

NOTES:

1. THIS DRAWING IS BASED UPON A LAND TITLE SURVEY BY KELLY J McHUGH & ASSOC, INC. , DATED 06/08/2016
2. THE CONTRACTOR SHALL VERIFY ALL LOCATIONS AND ELEVATIONS OF EXISTING UTILITIES BY POTHOLE AS NECESSARY.
3. CONTRACTOR SHALL FIELD LOCATE CONDUITS BY HAND PRIOR TO MECHANICAL EXCAVATION.

0 5 10 20
SCALE IN FEET

CADD FILE NAME: 14066-PL-YP.dwg

DESIGNED BY: KMD	DRAWN BY: GAL	CHECKED BY: JEP	JOB NO. 14066
SCALE: (22x34) 1"=10'-0"	SCALE: (11x17) 1"=20'-0"	DATE: JULY 30, 2021	

WEST ST. TAMMANY WWTP EXPANSION

COVINGTON, LOUISIANA

ST. TAMMANY PARISH PROJECT NO. TU17000251
ST. TAMMANY PARISH BID NO. 21-21-2

YARD PIPING PLAN - II

NO.	DATE:	REVISIONS	APP'D
1	9/23/21	ADDENDUM NO. 2	JEP

STAMP: STATE OF LOUISIANA — JAMES E. POWELL, JR. — LICENSE NO. 31063 — PROFESSIONAL ENGINEER — CIVIL ENGINEERING

Kyle Associates, LLC
Planning, Engineering, and Landscape Architecture
638 Village Lane N. • Mandeville, LA 70471 • 985.727.3377

SHEET NO.
C-4

CADD FILE NAME: 14066-PP1.dwg

DESIGNED BY: KMD	DRAWN BY: GAL	CHECKED BY: JEP	JOB NO. 14066
SCALE: (22x34) 1"=20'-0"	SCALE: (11x17) 1"=40'-0"		DATE: JULY 30, 2021

WEST ST. TAMMANY WWTP EXPANSION

COVINGTON, LOUISIANA

ST. TAMMANY PARISH PROJECT NO. TU17000251
ST. TAMMANY PARISH BID NO. 21-21-2

EFFLUENT FORCE MAIN STA. 4+00 - STA. 9+00

APP'D
JEP

REVISIONS

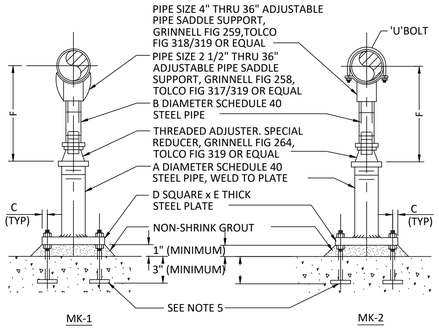
NO.	DATE:	
1	9/23/21	ADDENDUM NO. 2

STAMP:
STATE OF LOUISIANA
JAMES E. POWELL, JR.
LICENSE NO. 31063
PROFESSIONAL ENGINEER
CIVIL ENGINEERING

Kyle Associates, LLC
Planning, Engineering, and Landscape Architecture
638 Village Lane N. • Mandeville, LA 70471 • 985.727.9377

SHEET NO.
C-6

Plot Date: Thursday, September 23, 2021 7:38:49 AM
User: Gwen Ladner
File:N:\2014\14066 - West St. Tammany WWTP Expansion\Drawings\Civil\14066-PP1.dwg



DIMENSIONS IN INCHES							
NOMINAL PIPE SIZE	A	B	C	D	E	F (APPROX) (MINIMUM)	F (APPROX) (MAXIMUM)
2 1/2	2	1 1/2	1	6	3/8	7	11 1/2
3	2	1 1/2	1	6	3/8	7 5/16	11 13/16
3 1/2	2	1 1/2	1	6	3/8	7 9/16	12 1/16
4	3	* 2 1/2 / 3	1 1/8	7 1/2	1/2	10 1/4	14 3/4
6	3	* 2 1/2 / 3	1 1/8	7 1/2	1/2	11 9/16	16 1/16
8	3	* 2 1/2 / 3	1 1/8	7 1/2	1/2	13 9/16	18 1/16
10	3	* 2 1/2 / 3	1 1/8	7 1/2	1/2	14 5/8	19 1/8
12	3	* 2 1/2 / 3	1 1/8	7 1/2	1/2	15 5/8	20 1/8
14	4	3	1 1/4	9	5/8	18 7/8	23 3/8
16	4	3	1 1/4	9	5/8	19 7/8	24 3/8
18	6	4	1 1/2	11	3/4	22 1/4	26 3/4
20	6	4	1 1/2	11	3/4	23 1/4	27 3/4
24	6	4	1 1/2	11	3/4	26 1/2	31
30	6	4	1 1/2	11	3/4	29 5/8	34 1/8
32	6	4	1 1/2	11	3/4	30 5/8	35 1/8
36	6	4	1 1/2	11	3/4	32 5/8	37 1/8

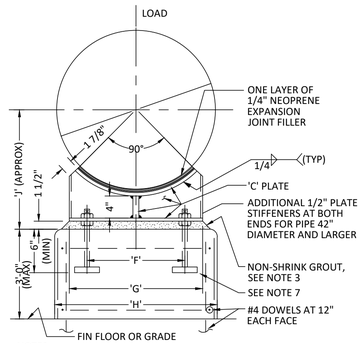
* SEE MANUFACTURER

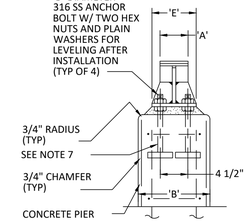
NOTES:

1. FOR ADDITIONAL REQUIREMENTS SEE SPEC SECTION 'PIPE SUPPORT'.
2. GALVANIZE ALL PARTS AFTER FABRICATION.
3. WHERE PIPE SUPPORT OCCURS ON GRADE REFER TO STRUCTURAL DRAWINGS FOR DETAILS.
4. THIS PIPE SUPPORT IS LIMITED TO PIPE FROM 2 1/2" DIAMETER TO 36" DIAMETER INCLUSIVE.
5. ANCHOR BOLT OR CONCRETE ANCHOR WITH TWO NUTS AND ONE LOCKWASHER. PROVIDE BAR 4 x 1/2" x 4" WELDED TO BOLT (TYP OF 4) SEE SPECIFICATIONS.

ADJUSTABLE PIPE SUPPORT WITH OR WITHOUT 'U' BOLT
(FOR PIPE 36" DIAMETER AND SMALLER)

M-1





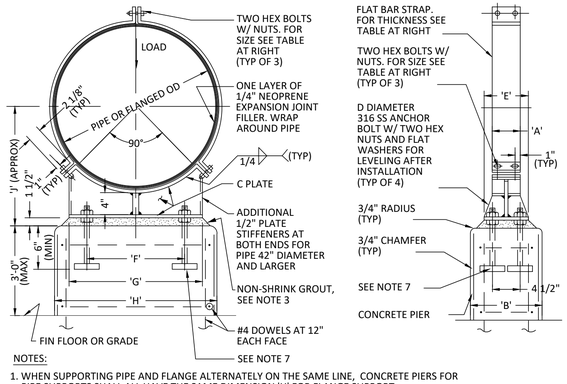
DIMENSIONS IN INCHES															
NOMINAL PIPE SIZE						SUPPORTING									
						PIPE				FLANGE					
	A	B	C	D	E	F	G	H	J	F	G	H	J		
6	4	12	3/8	5/8	6	4 1/2	6	12	10	6 1/2	9	16	13		
8	4	12	3/8	5/8	6	5	8	13	11	7 1/2	9	16	14		
10	4	12	3/8	5/8	6	6	9	15	12	9	13	18	15		
12	4	12	3/8	5/8	6	7	11	17	13	10	15	20	16		
14	4	12	3/8	5/8	6	8	12	17	14	11	16	21	17		
16	4	12	3/8	5/8	6	9	13	19	15	12	18	24	18		
18	4	12	3/8	5/8	6	10	14	20	16	13	19	24	19		
20	5	12	3/8	5/8	6	10	15	21	17	15	21	26	21		
22	5	12	3/8	5/8	6	12	18	24	18	16	23	28	22		
24	5	12	3/8	5/8	6	13	19	24	19	16	24	30	23		
26	5	12	3/8	3/4	6	14	21	27	20	18	26	32	24		
30	5	12	3/8	3/4	6	16	23	28	22	20	29	34	26		
34	5	15	3/8	3/4	6	18	26	32	24	22	33	39	29		
36	6	15	3/8	3/4	6	19	27	32	25	24	34	40	30		
42	6	18	1/2	1	8	21	31	36	28	27	39	45	33		
48	6	18	1/2	1	8	24	36	42	31	30	44	50	37		
54	6	18	1/2	1	8	28	40	46	34	34	50	56	40		
60	6	18	1/2	1 1/8	8	32	45	52	37	36	56	62	44		
66	6	18	1/2	1 1/8	8	33	49	56	40	40	59	66	47		
72	6	18	1/2	1 1/8	8	36	53	60	43	44	63	70	50		

NOTES:

1. WHEN SUPPORTING PIPE AND FLANGE ALTERNATELY ON THE SAME LINE, CONCRETE PIERS FOR PIPE SUPPORTS SHALL ALL HAVE THE SAME DIMENSION 'H' FOR FLANGE SUPPORT.
2. PIPE SUPPORTS SHALL BE LOCATED IN PLAN AT POINTS MARKED THUS: (X)
3. WHERE DIFFERENTIAL SETTLEMENT IS LIKELY TO OCCUR, OMIT GROUT AS DIRECTED BY THE ENGINEER.
4. GALVANIZE ALL PARTS AFTER FABRICATION.
5. WHERE DIRECTED BY THE STRUCTURAL ENGINEER, BOTTOM OF PIERS SHALL EXTEND BELOW BOTTOM OF SLAB.
6. WHERE PIPE SUPPORT OCCURS ON GRADE REFER TO STRUCTURAL DRAWINGS FOR DETAILS.
7. ANCHOR BOLT OR CONCRETE ANCHOR WITH TWO NUTS AND ONE LOCKWASHER. PROVIDE BAR 4x1/2x4" WELDED TO BOLT. (TYP OF 4) SEE SPECIFICATIONS.

PIPE SUPPORT
(FOR PIPE 72" DIAMETER AND SMALLER)

M-2



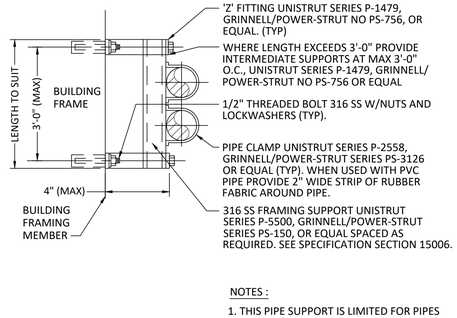
DIMENSIONS IN INCHES															
NOMINAL PIPE SIZE						STRAP		SUPPORTING							
						BOLT	FLAT BAR	PIPE				FLANGE			
	A	B	C	D	E			F	G	H	J	F	G	H	J
6	4	12	3/8	5/8	6	1/2	1/4	4 1/2	6	12	10	6 1/2	11	16	13
8	4	12	3/8	5/8	6	1/2	1/4	5	8	13	11	7 1/2	13	18	14
10	4	12	3/8	5/8	6	1/2	1/4	6	9	15	12	9	15	20	15
12	4	12	3/8	5/8	6	1/2	1/4	7	11	17	13	10	17	22	16
14	4	12	3/8	5/8	6	1/2	1/4	8	12	17	14	11	18	23	17
16	4	12	3/8	5/8	6	1/2	1/4	9	13	19	15	12	20	26	18
18	4	12	3/8	5/8	6	1/2	1/4	10	14	20	16	13	21	26	19
20	5	12	3/8	5/8	6	5/8	3/8	10	15	21	17	15	23	28	21
22	5	12	3/8	5/8	6	5/8	3/8	12	18	24	18	16	25	30	22
24	5	12	3/8	5/8	6	5/8	3/8	13	19	24	19	16	26	32	23
26	5	12	3/8	3/4	6	5/8	3/8	14	21	27	20	18	28	34	24
30	5	12	3/8	3/4	6	5/8	3/8	16	23	28	22	20	31	36	26
34	5	15	3/8	3/4	6	5/8	3/8	18	26	32	24	22	35	41	29
36	6	15	3/8	3/4	6	3/4	3/8	19	27	32	25	24	36	42	30
42	6	18	3/8	1	8	3/4	3/8	21	31	36	28	27	41	47	33
48	6	18	3/8	1	8	3/4	3/8	24	36	42	31	30	46	52	37
54	6	18	3/8	1	8	3/4	3/8	28	40	46	34	34	50	56	40
60	6	18	3/8	1 1/8	8	3/4	3/8	32	45	52	37	36	56	62	44
66	6	18	1/2	1 1/8	8	3/4	3/8	33	49	56	40	40	61	68	47
72	6	18	1/2	1 1/8	8	3/4	3/8	36	53	60	43	44	65	72	50

NOTES:

1. WHEN SUPPORTING PIPE AND FLANGE ALTERNATELY ON THE SAME LINE, CONCRETE PIERS FOR PIPE SUPPORTS SHALL ALL HAVE THE SAME DIMENSION 'H' FOR FLANGE SUPPORT.
2. PIPE SUPPORTS SHALL BE LOCATED IN PLAN AT POINTS MARKED THUS: (X).
3. WHERE DIFFERENTIAL SETTLEMENT IS LIKELY TO OCCUR, OMIT GROUT AS DIRECTED BY THE ENGINEER.
4. GALVANIZE ALL PARTS AFTER FABRICATION.
5. WHERE DIRECTED BY THE STRUCTURAL ENGINEER, BOTTOM OF PIERS SHALL EXTEND BELOW BOTTOM OF SLAB.
6. WHERE PIPE SUPPORT OCCURS ON GRADE REFER TO STRUCTURAL DRAWINGS FOR DETAILS.
7. ANCHOR BOLT OR CONCRETE ANCHOR WITH TWO NUTS AND ONE LOCKWASHER. PROVIDE BAR 4x1/2x4" WELDED TO BOLT. (TYP OF 4) SEE SPECIFICATIONS.

PIPE SUPPORT WITH STRAP
(FOR PIPE 72" DIAMETER AND SMALLER)

M-3

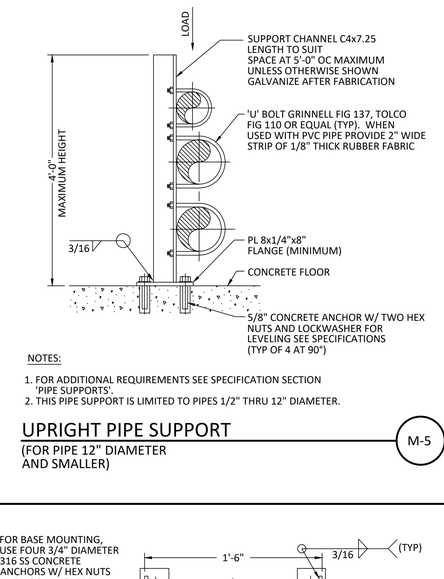


NOTES :

1. THIS PIPE SUPPORT IS LIMITED FOR PIPES UP TO 6" DIAMETER, INCLUSIVE
2. FOR ADDITIONAL REQUIREMENTS SEE SPECIFICATION SECTION 15006.
3. PIPE SUPPORTS LOCATED IN CHEMICAL STORAGE OR CHEMICAL FEED AREAS, ALL MATERIALS SHALL BE TYPE 316 SS.

EXTENDED PIPE SUPPORT

M-4

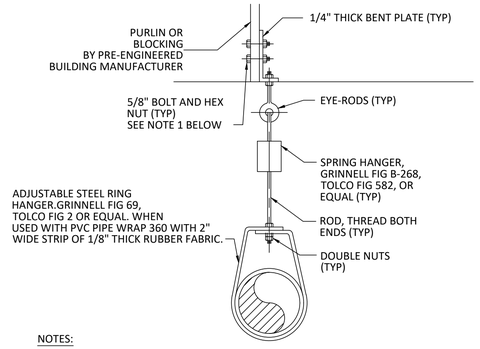


NOTES:

1. FOR ADDITIONAL REQUIREMENTS SEE SPECIFICATION SECTION 'PIPE SUPPORTS'.
2. THIS PIPE SUPPORT IS LIMITED TO PIPES 1/2" THRU 12" DIAMETER.

UPRIGHT PIPE SUPPORT
(FOR PIPE 12" DIAMETER AND SMALLER)

M-5

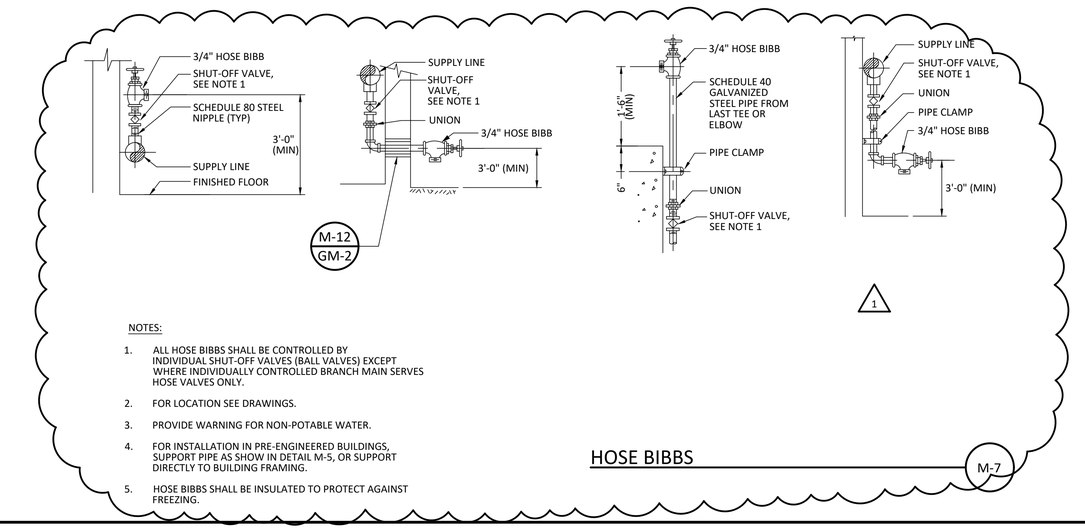


NOTES:

1. EXPANSION TYPE BOLTS ARE NOT ALLOWED.
2. GALVANIZE ALL PARTS AFTER FABRICATION.
3. FOR SPACING AND ADDITIONAL REQUIREMENTS SEE SPECIFICATION SECTION 15006 "PIPE SUPPORTS".

PIPE HANGER FROM STEEL PURLINS

M-6

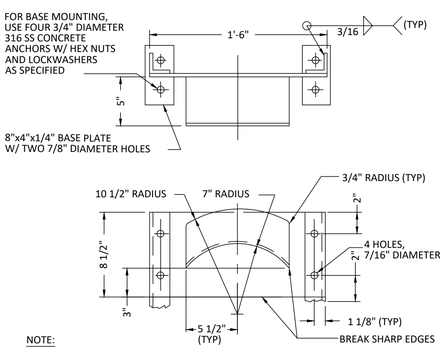


NOTES:

1. ALL HOSE BIBBS SHALL BE CONTROLLED BY INDIVIDUAL SHUT-OFF VALVES (BALL VALVES) EXCEPT WHERE INDIVIDUALLY CONTROLLED BRANCH MAIN SERVES HOSE VALVES ONLY.
2. FOR LOCATION SEE DRAWINGS.
3. PROVIDE WARNING FOR NON-POTABLE WATER.
4. FOR INSTALLATION IN PRE-ENGINEERED BUILDINGS, SUPPORT PIPE AS SHOW IN DETAIL M-5, OR SUPPORT DIRECTLY TO BUILDING FRAMING.
5. HOSE BIBBS SHALL BE INSULATED TO PROTECT AGAINST FREEZING.

HOSE BIBBS

M-7



NOTE:

1. WHERE HOSE RACK IS FREE-STANDING, PROVIDE TWO STEEL ANGLES 2x2x1/4 W/BASE PLATES.
2. ALL WELDED CONSTRUCTION. 8 GAUGE STEEL SHEET SHOP HOT DIP GALVANIZED AFTER FABRICATION. SHOP PRIMED AND FINISHED COATED IN THE FIELD.

HOSE RACK

M-8

CADD FILE NAME: 14066-GM1.dwg

DESIGNED BY: KMD
DRAWN BY: GAL
CHECKED BY: JEP
JOB NO. 14066
SCALE: (22x34) 1/4"-1'-0"
SCALE: (11x17)
DATE: JULY 30, 2021

WEST ST. TAMMANY WWTP EXPANSION
COVINGTON, LOUISIANA
ST. TAMMANY PARISH PROJECT NO. TU17000251
ST. TAMMANY PARISH BID NO. 21-21-2

PROCESS MECHANICAL DETAILS - I

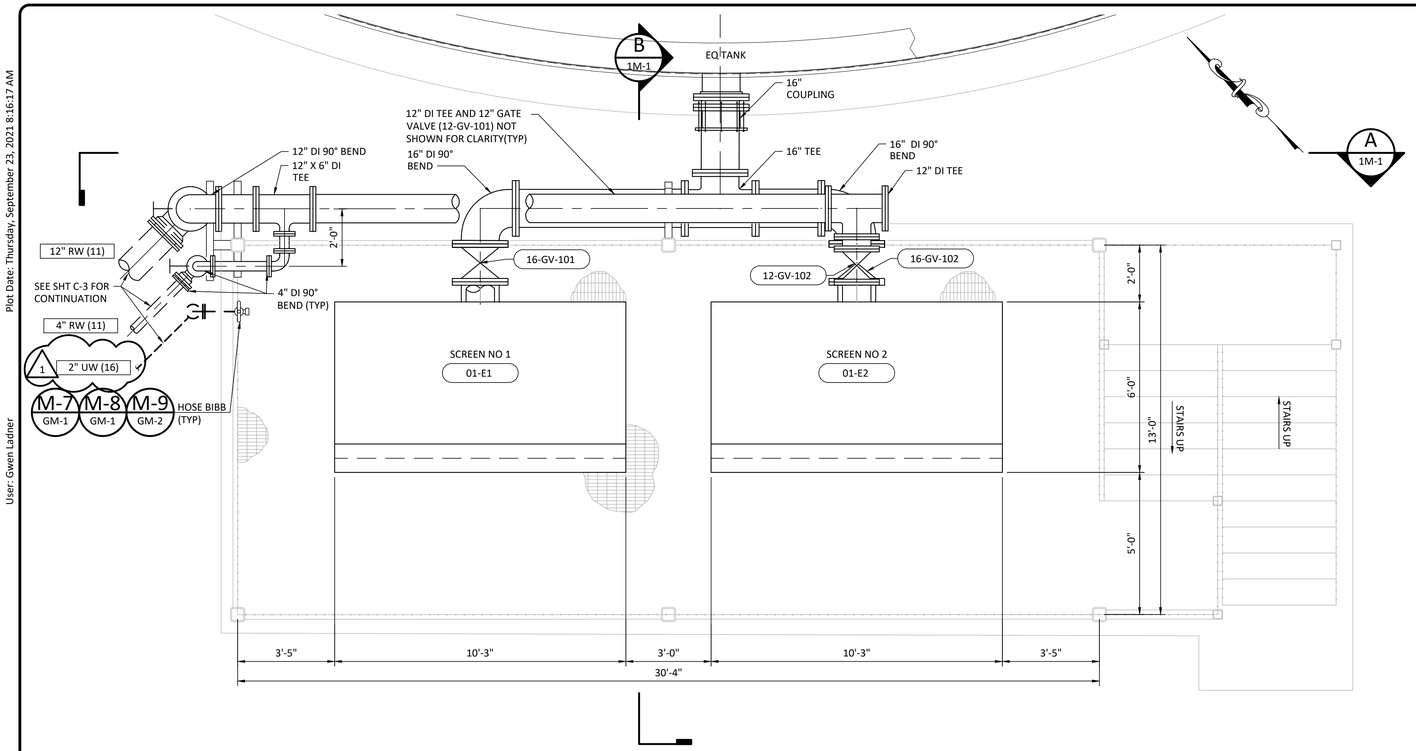
REVISIONS			
NO.	DATE:		APPD
1	9/23/21	ADDENDUM NO. 2	JEP

STAMP: JAMES E. POWELL, JR. License No. 31063 PROFESSIONAL ENGINEER STATE OF LOUISIANA

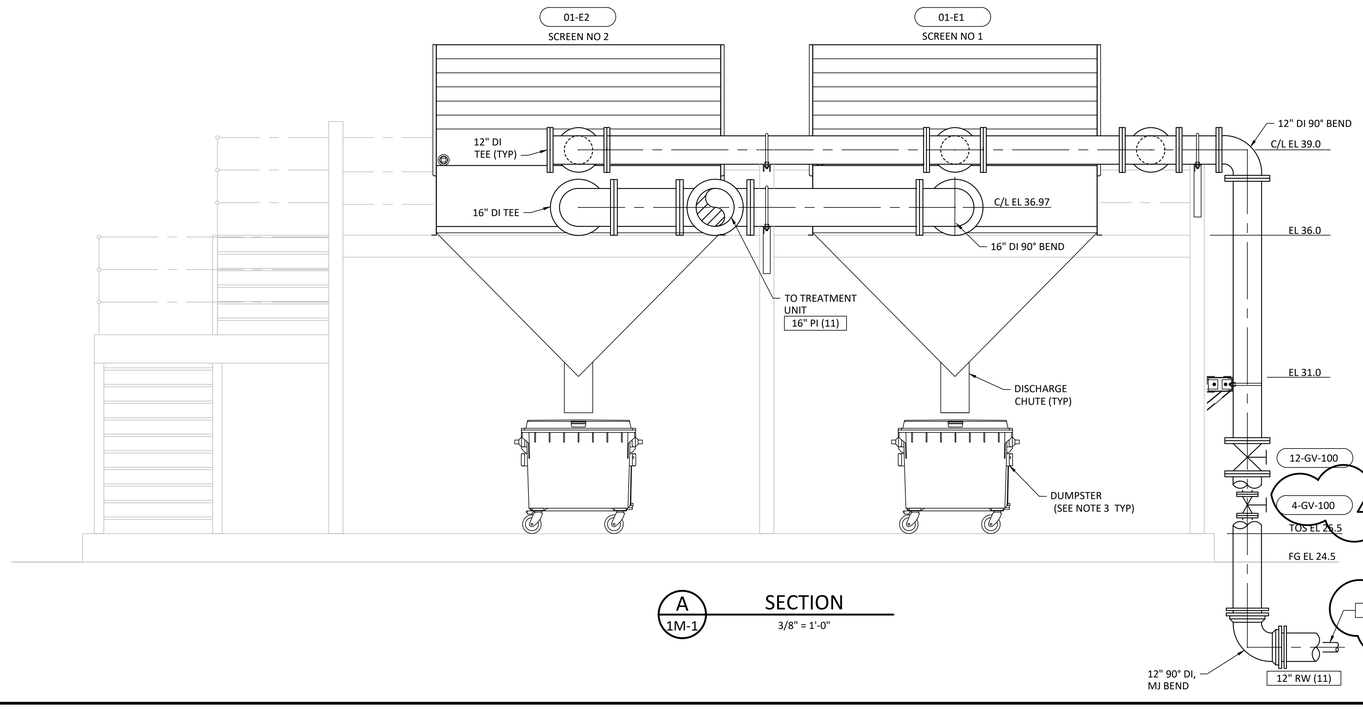
Kyle Associates, LLC
Planning, Engineering, and Landscape Architecture
638 Village Lane N. • Mandeville, LA 70471 • 985.727.9377

SHEET NO.
GM-1

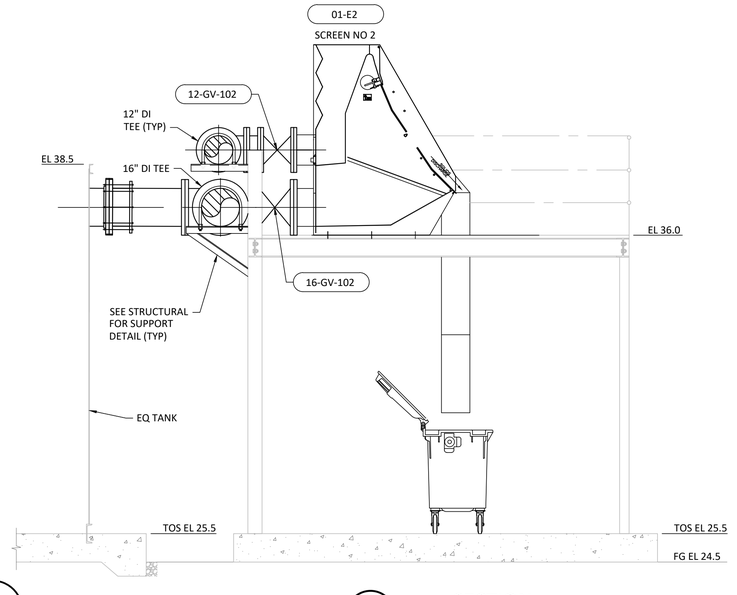
Plot Date: Thursday, September 23, 2021 4:07:19 AM
User: Gwen Ladner
File:N:\2014\14066 - West St. Tammany WWTP Expansion\Drawings\Mechanical\14066-GM1.dwg



PLAN
3/8" = 1'-0"



A SECTION
1M-1
3/8" = 1'-0"



B SECTION
1M-1
3/8" = 1'-0"

GENERAL SHEET NOTES

1. DISCHARGE CHUTES TO BE SUPPLIED BY SCREEN MANUFACTURER.
2. SEE SHEET GM-3 FOR EQUIPMENT AND VALVE SCHEDULES.
3. DUMPSTER TO BE PROVIDED BY OWNER.

CADD FILE NAME: 14066-1M1-SCRN.dwg

DESIGNED BY: KMD	DRAWN BY: GAL	CHECKED BY: JEP	JOB NO. 14066
SCALE: (22x34) 3/8"=1'-0"	SCALE: (11x17) -		DATE: JULY 30, 2021

WEST ST. TAMMANY WWTP EXPANSION
COVINGTON, LOUISIANA
ST. TAMMANY PARISH PROJECT NO. TU17000251
ST. TAMMANY PARISH BID NO. 21-21-2

INFLUENT SCREENS - PLAN AND SECTIONS

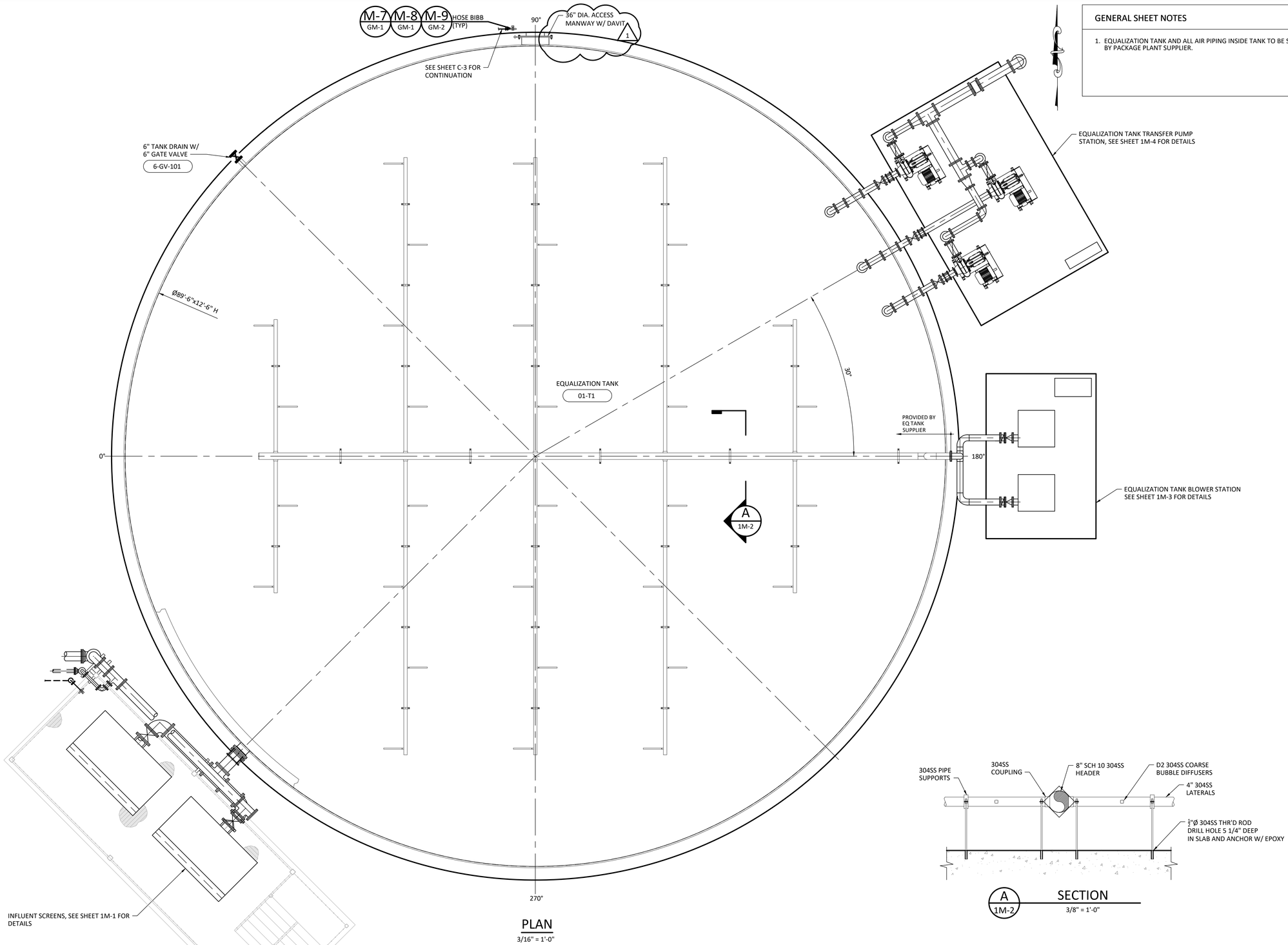
REVISIONS

NO.	DATE:		APPD
1	9/23/21	ADDENDUM NO. 2	JEP

STAMP: STATE OF LOUISIANA — JAMES E. POWELL, JR. — License No. 31063 — PROFESSIONAL ENGINEER — CIVIL ENGINEERING

Kyle Associates, LLC
Planning, Engineering, and Landscape Architecture
638 Village Lane N. • Mandeville, LA 70471 • 985.727.9377

SHEET NO.
1M-1



PLAN

3/16" = 1'-0"

A
1M-2
SECTION

3/8" = 1'-0"

GENERAL SHEET NOTES

1. EQUALIZATION TANK AND ALL AIR PIPING INSIDE TANK TO BE SUPPLIED BY PACKAGE PLANT SUPPLIER.

CADD FILE NAME: 14066-1M2-EQTK.dwg

DESIGNED BY:	DRAWN BY:	CHECKED BY:	JOB NO.
KMD	GAL	JEP	14066

SCALE: (22x34) 3/16"=1'-0"

SCALE: (11x17) -

DATE: JULY 30, 2021

WEST ST. TAMMANY WWTP EXPANSION

COVINGTON, LOUISIANA

ST. TAMMANY PARISH PROJECT NO. TU17000251
ST. TAMMANY PARISH BID NO. 21-21-2

EQUALIZATION TANK - PLAN

REVISIONS

NO.	DATE:		APP'D
1	9/23/21	ADDENDUM NO. 2	JEP

STAMP: STATE OF LOUISIANA — JAMES E. POWELL, JR. — License No. 31063 — PROFESSIONAL ENGINEER — 9/23/21 — KYLE ASSOCIATES ENGINEERING

Kyle Associates, LLC
Planning, Engineering, and Landscape Architecture
838 Village Lane N. • Mandeville, LA 70471 • 985.727.9377

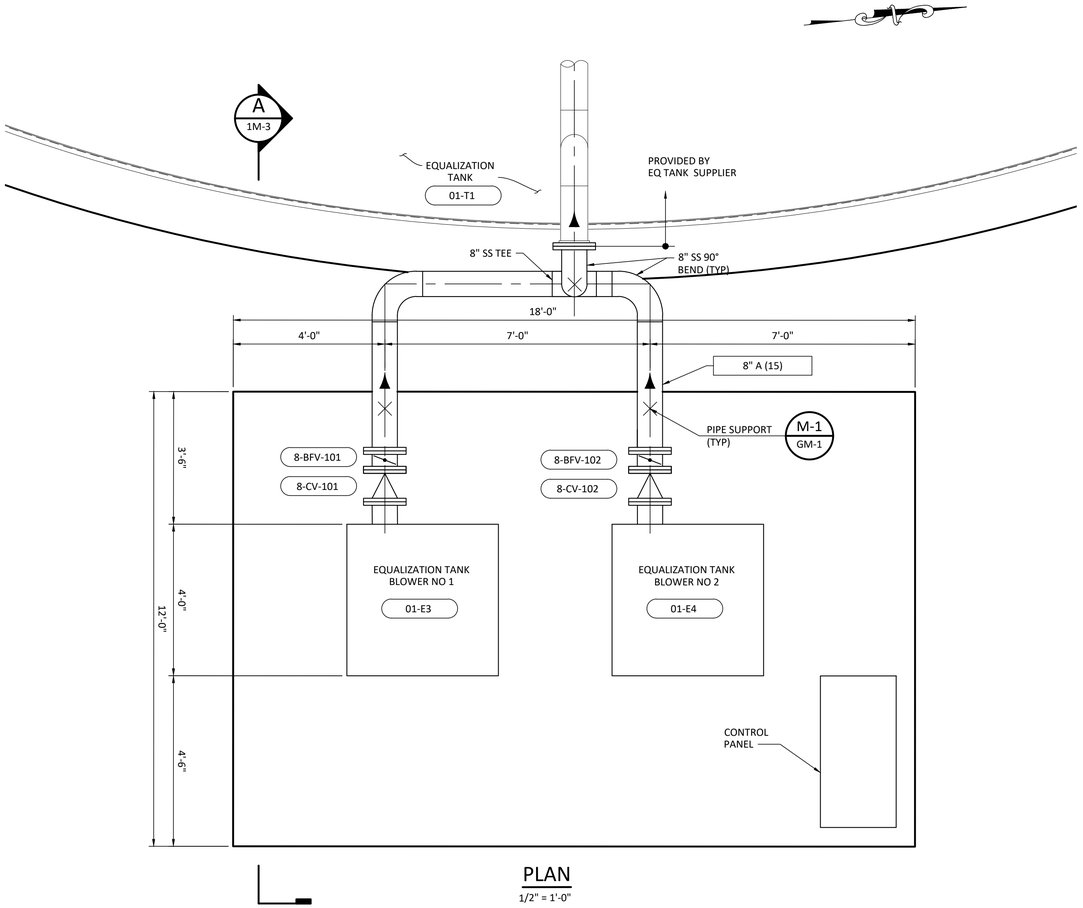
SHEET NO.

1M-2

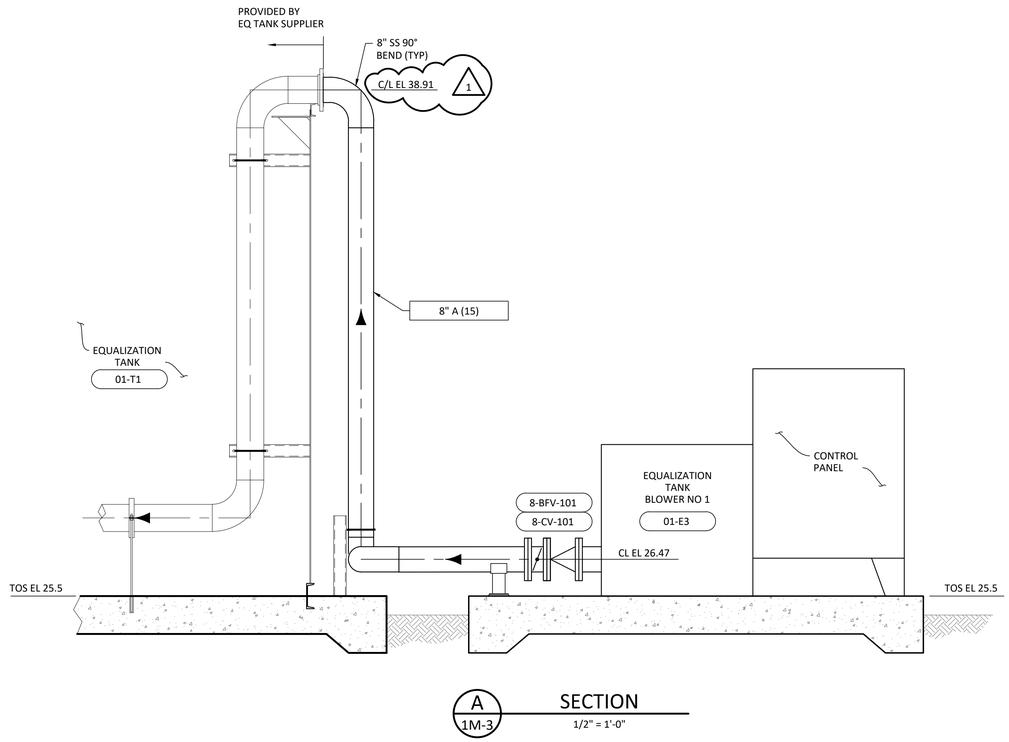
Plot Date: Thursday, September 23, 2021 11:00:07 AM

User: Gwen Ladner

File:N:\2014\14066 - West St. Tammany WWTP Expansion\Drawings\Mechanical\14066-1M2-EQTK.dwg



PLAN
1/2" = 1'-0"



A
1M-3
SECTION
1/2" = 1'-0"

GENERAL SHEET NOTES

1. EQUALIZATION TANK BLOWERS AND CHECK VALVES SUPPLIED BY EQUALIZATION TANK SUPPLIER.
2. SEE SHEET GM-3 FOR EQUIPMENT AND VALVE SCHEDULES.

CADD FILE NAME: 14066-1M3-EQTK-BLWR.dwg

DESIGNED BY:	DRAWN BY:	CHECKED BY:	JOB NO.
KMD	GAL	JEP	14066

SCALE: (22x34) 1/2"=1'-0" | SCALE: (11x17) - | DATE: JULY 30, 2021

WEST ST. TAMMANY WWTP EXPANSION

COVINGTON, LOUISIANA

ST. TAMMANY PARISH PROJECT NO. TU17000251
ST. TAMMANY PARISH BID NO. 21-21-2

EQ. TANK BLOWER STATION-PLAN AND SECTIONS

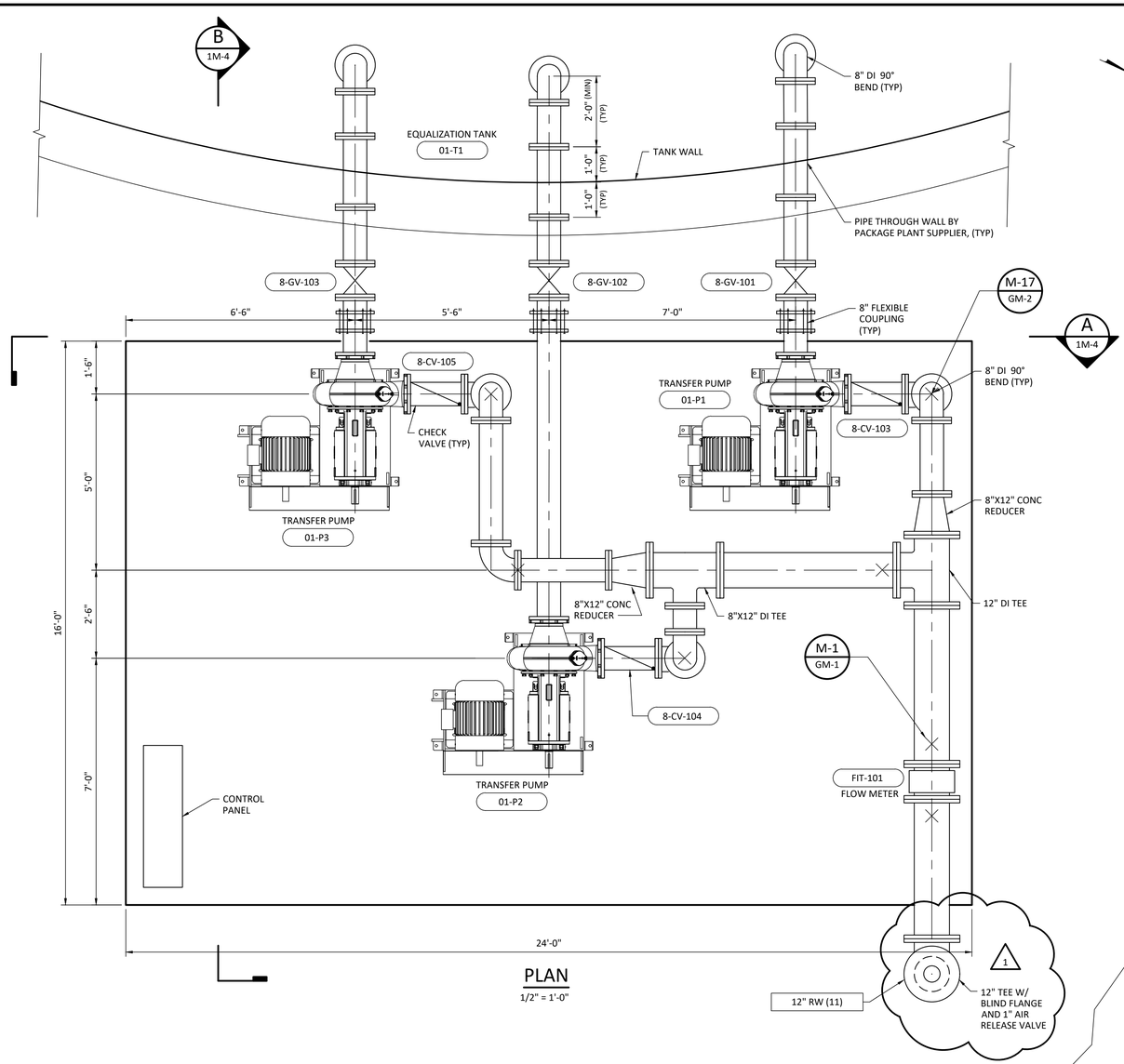
REVISIONS

NO.	DATE:		APPD
1	9/23/21	ADDENDUM NO. 2	JEP

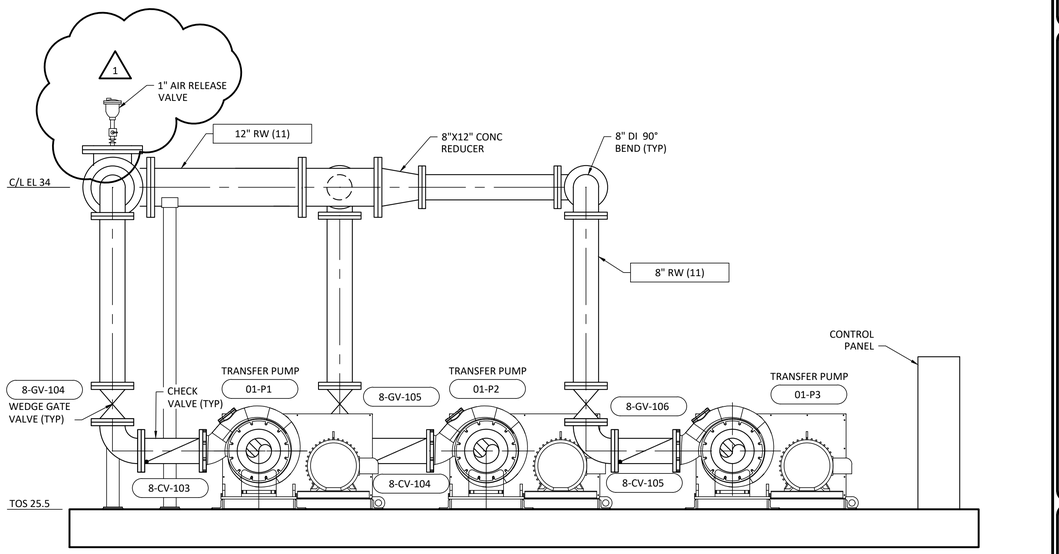
STAMP:
STATE OF LOUISIANA
JAMES E. POWELL, JR.
LICENSE NO. 31063
PROFESSIONAL ENGINEER
CIVIL ENGINEERING
9/23/21

Kyle Associates, LLC
Planning, Engineering, and Landscape Architecture
638 Village Lane N. • Mandeville, LA 70471 • 985.727.9377

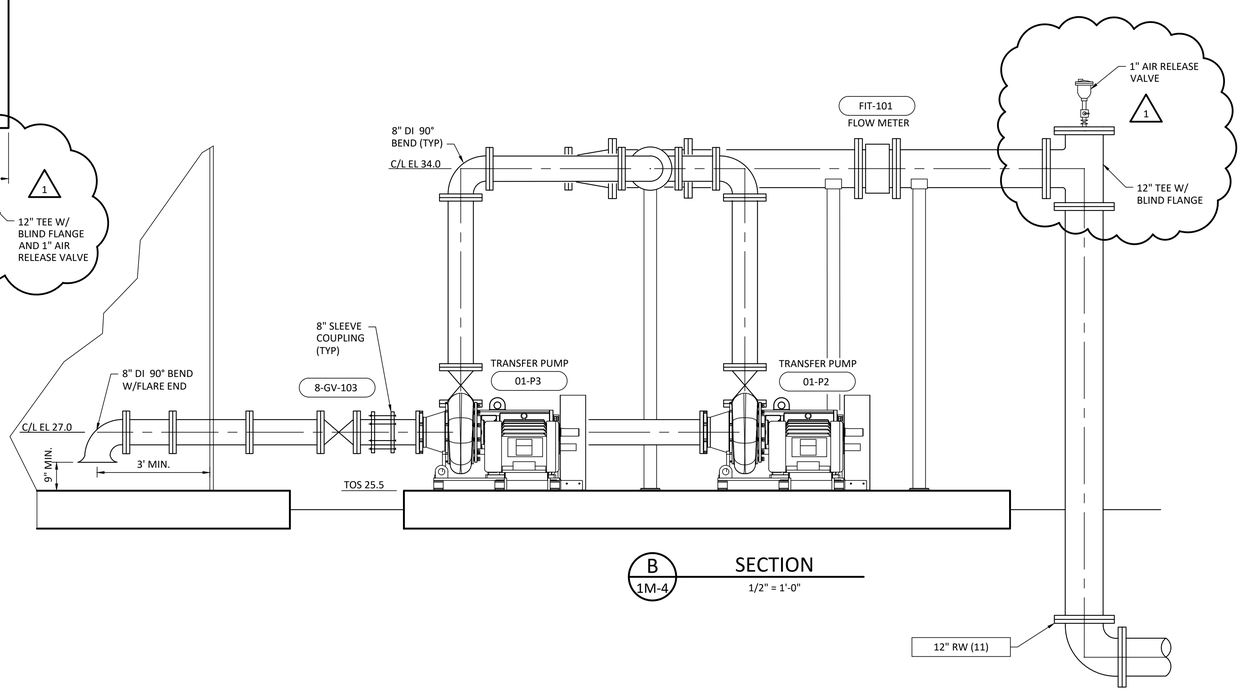
SHEET NO.
1M-3



PLAN
1/2" = 1'-0"



A 1M-4 SECTION
1/2" = 1'-0"



B 1M-4 SECTION
1/2" = 1'-0"

GENERAL SHEET NOTES

1. SEE SHEET GM-3 FOR EQUIPMENT AND VALVE SCHEDULE.

CADD FILE NAME: 14066-1M4-TFPS.dwg

DESIGNED BY:	DRAWN BY:	CHECKED BY:	JOB NO.
KMD	GAL	JEP	14066

SCALE: (22x34) 1/2"=1'-0" | SCALE: (11x17) - | DATE: JULY 30, 2021

WEST ST. TAMMANY WWTP EXPANSION

COVINGTON, LOUISIANA

ST. TAMMANY PARISH PROJECT NO. TU17000251
ST. TAMMANY PARISH BID NO. 21-21-2

TRANSFER PUMP STATION

REVISIONS

NO.	DATE:		APPD
1	9/23/21	ADDENDUM NO. 2	JEP

STAMP: STATE OF LOUISIANA — JAMES E. POWELL, JR. — License No. 31063 — PROFESSIONAL ENGINEER — KYLE ASSOCIATES ENGINEERING

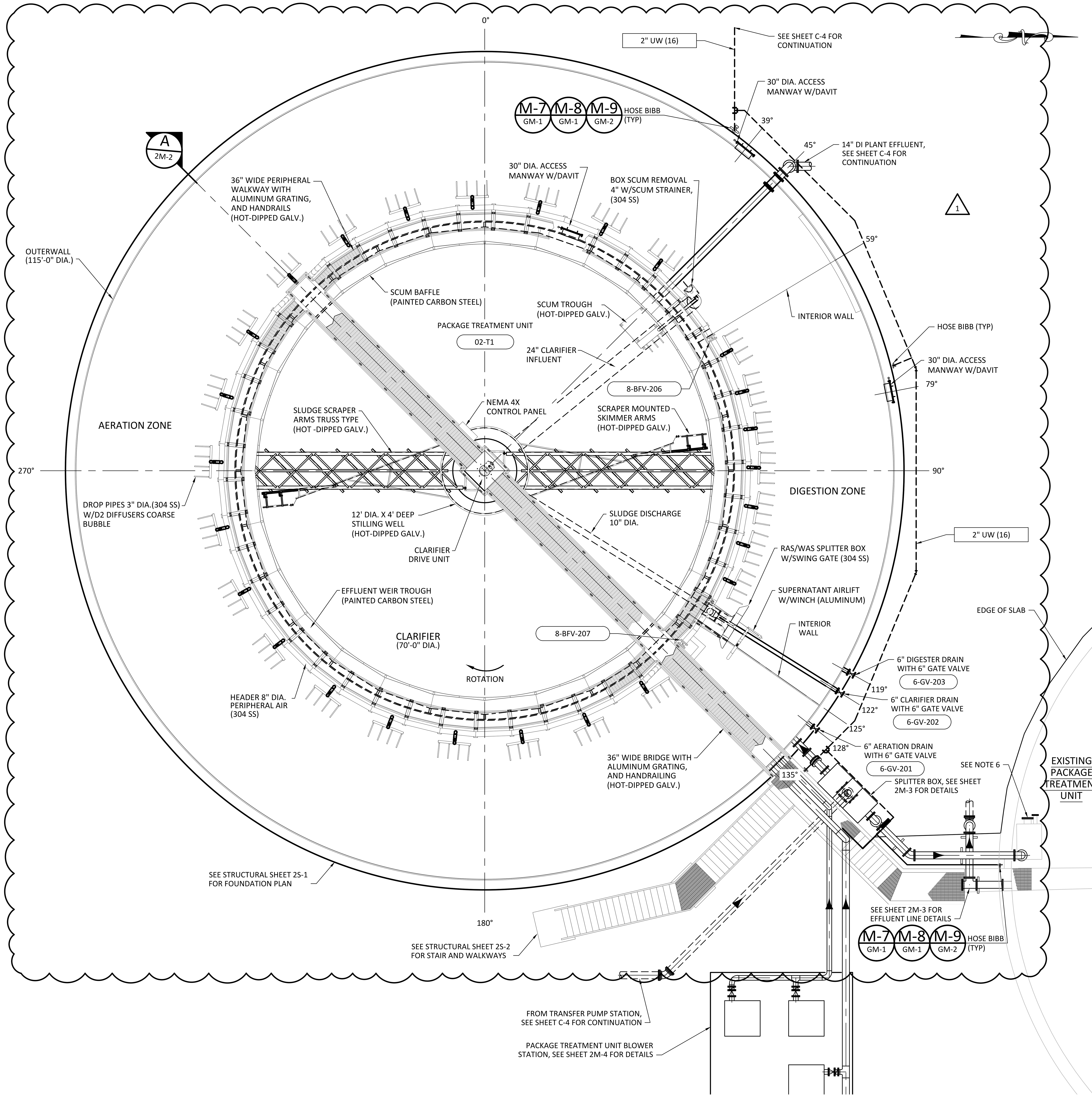
Kyle Associates, LLC
Planning, Engineering, and Landscape Architecture
638 Village Lane N. • Mandeville, LA 70471 • 985.727.9377

SHEET NO.
1M-4

Plot Date: Thursday, September 23, 2021 11:21:53 AM

User: Gwen Ladner

File: N:\2014\14066 - West St. Tammany WWTP Expansion\Drawings\Mechanical\14066-2M1-WWTP.dwg



PLAN

1/8" = 1'-0"

GENERAL SHEET NOTES

1. ORIENTATION OF TANK WALL PENETRATIONS TO BE FIELD VERIFIED BY CONTRACTOR PRIOR TO SUBMITTAL.
2. ALL EQUIPMENT INSIDE TANK TO BE SUPPLIED BY PACKAGE TREATMENT PLANT SUPPLIER. SEE SECTION 11390.
3. SEE SHEET GM-3 FOR EQUIPMENT AND VALVE SCHEDULES.
4. SEE SHEET 2M-3 FOR SPLITTER BOX AND WALKWAY DETAILS.
5. SEE SHEET 2S-1 FOR FOUNDATION DETAILS.
6. EXISTING 12" AND 4" SEWER FORCE MAINS TO EXISTING PLANT TO BE CAPPED AT SCREEN AFTER COMPLETION OF NEW PLANT.

CADD FILE NAME: 14066-2M1-WWTP.dwg

DESIGNED BY: KMD
DRAWN BY: GAL
CHECKED BY: JEP
JOB NO. 14066
SCALE: (22x34) 1/8"=1'-0"
SCALE: (11x17) -
DATE: JULY 30, 2021

WEST ST. TAMMANY WWTP EXPANSION

COVINGTON, LOUISIANA

ST. TAMMANY PARISH PROJECT NO. TU17000251
ST. TAMMANY PARISH BID NO. 21-21-2

PACKAGE TREATMENT UNIT - PLAN

REVISIONS

NO.	DATE:		APP'D
1	9/23/21	ADDENDUM NO. 2	JEP

STAMP:

STATE OF LOUISIANA
JAMES E. POWELL, JR.
License No. 31063
PROFESSIONAL ENGINEER
IN
CIVIL ENGINEERING

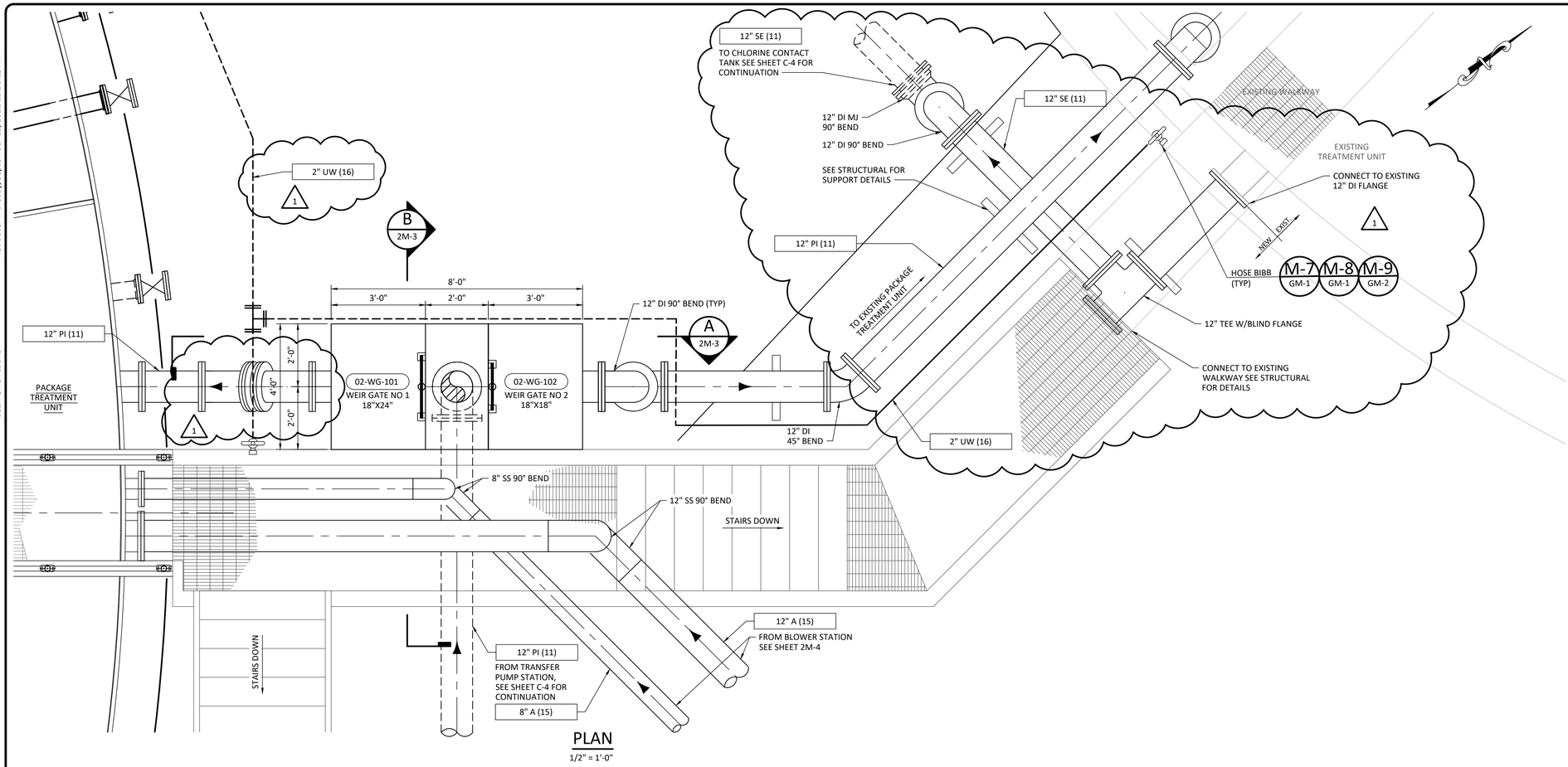
Kyle Associates, LLC
Planning, Engineering, and Landscape Architecture
638 Village Lane N. • Mandeville, LA 70471 • 985.727.9377

SHEET NO.

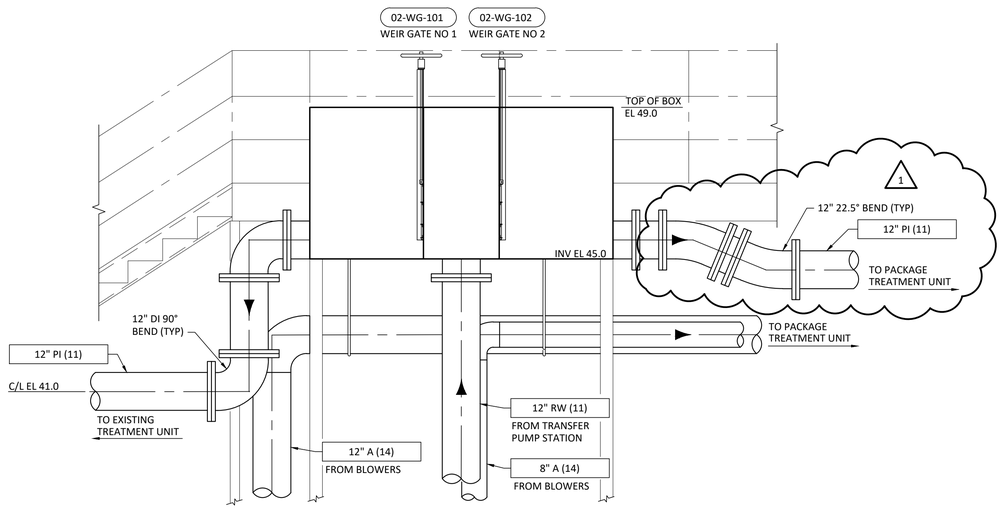
2M-1

GENERAL SHEET NOTES

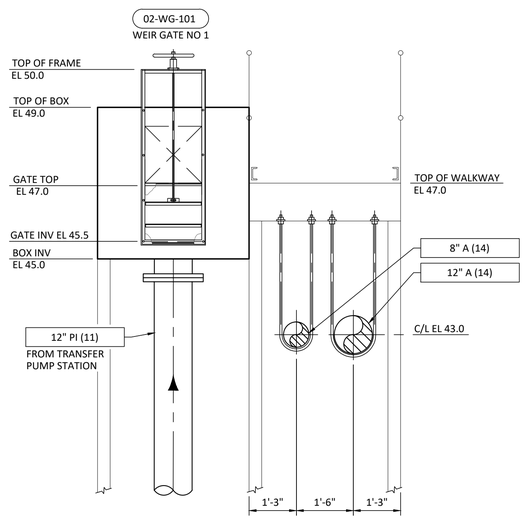
1. CONTRACTOR SHALL FIELD VERIFY ELEVATION AND LOCATION OF EXISTING WALKWAY AND TIE IN PIPING.
2. SEE SHEET 2S-2 FOR WALKWAY AND STAIRS.
3. SEE SECTION 15254 FOR WEIR GATE SCHEDULE AND REQUIREMENTS.



PLAN
1/2" = 1'-0"



A 2M-3 SECTION
1/2" = 1'-0"



B 2M-3 SECTION
1/2" = 1'-0"

CADD FILE NAME: 14066-2M3-SPBX.dwg

DESIGNED BY: KMD	DRAWN BY: GAL	CHECKED BY: JEP	JOB NO. 14066
SCALE: (22x34) 1/2"=1'-0"	SCALE: (11x17) -	DATE: JULY 30, 2021	

WEST ST. TAMMANY WWTP EXPANSION
COVINGTON, LOUISIANA
ST. TAMMANY PARISH PROJECT NO. TU17000251
ST. TAMMANY PARISH BID NO. 21-21-2

PACKAGE TREATMENT UNIT - SPLITTER BOX

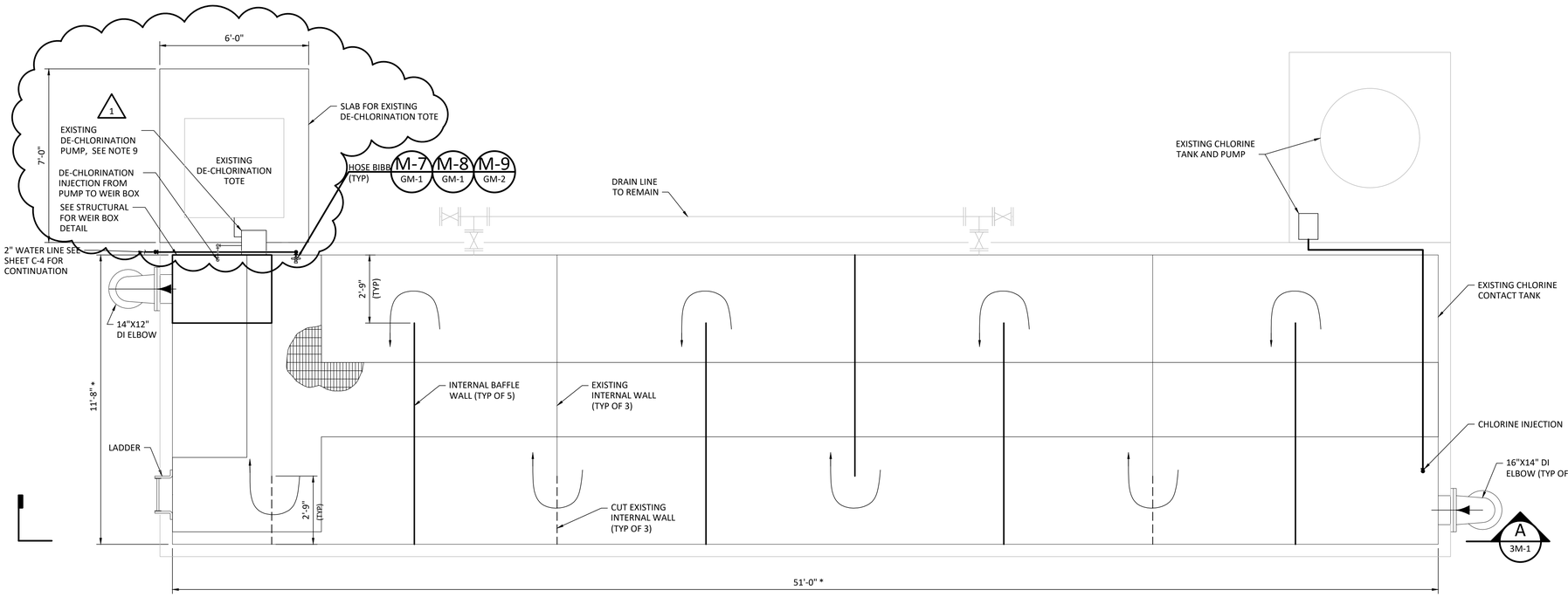
REVISIONS

NO.	DATE:		APP'D
1	9/23/21	ADDENDUM NO. 2	JEP

STAMP: STATE OF LOUISIANA — JAMES E. POWELL, JR. — License No. 31063 — PROFESSIONAL ENGINEER — CIVIL ENGINEERING — 07/30/21

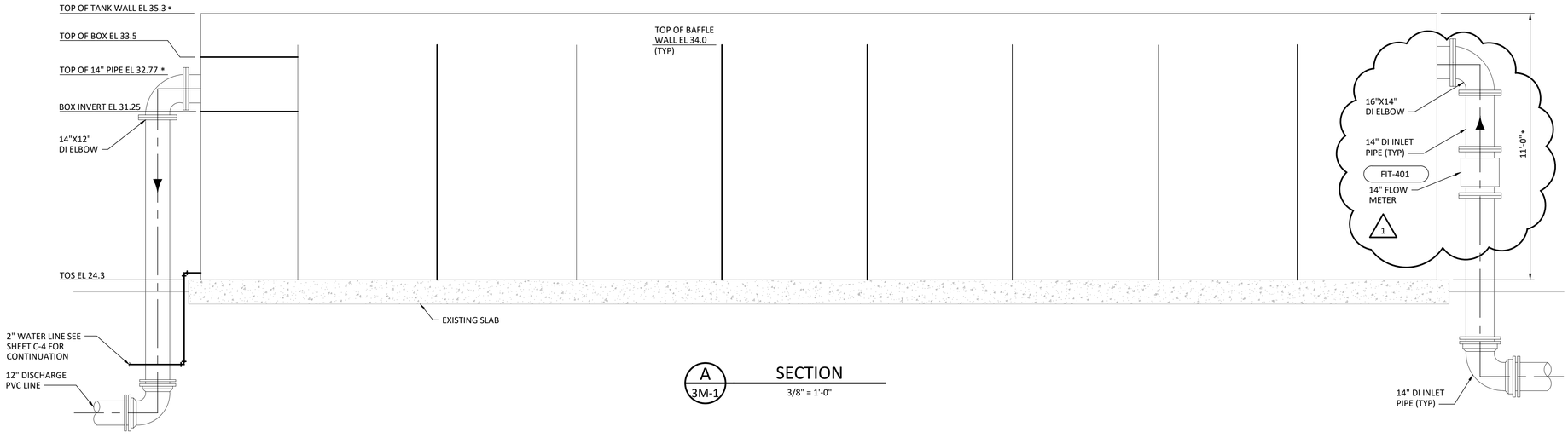
Kyle Associates, LLC
Planning, Engineering, and Landscape Architecture
638 Village Lane N. • Mandeville, LA 70471 • 985.727.9377

SHEET NO.
2M-3



PLAN

3/8" = 1'-0"



A
3M-1

SECTION

3/8" = 1'-0"

NOTES

1. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS OF EXISTING TANK DENOTED WITH *, INCLUDING INTERIOR WALLS, PRIOR TO SUBMITTAL.
2. CONTRACTOR TO PROVIDE TEMPORARY CHLORINE CONTACT TANK FOR DURATION OF PLANT MODIFICATIONS, MINIMUM OF 17,000 GALLONS.
3. CONTRACTOR TO COORDINATE STARTUP OF TEMPORARY TANK WITH PLANT OPERATOR PRIOR TO INSTALLATION.
4. REMOVE ALL EXISTING WALKWAYS, HANDRAIL, GRATING, AND ALL INTERNAL ITEMS OTHER THAN WALLS, INCLUDING WEIRS, LAUNDERS, AND PIPING NOT SHOWN ON THIS DRAWING FOR CLARITY.
5. PROVIDE NEW LADDER, WALKWAY, HANDRAILS AND GRATING. SEE SHEETS 3S-1 AND 3S-2 FOR DETAILS.
6. CONTRACTOR TO VERIFY EXISTING PIPING SIZES.
7. SEE SHEET 3S-1 AND 3S-2 FOR DETAILS OF NEW BAFFLE WALLS AND EFFLUENT WEIR BOX.
8. CONTRACTOR TO REINSTALL CHLORINE AND DE-CHLORINATION INJECTION LINES.
9. EXISTING DE-CHLORINATION PUMP SHALL BE ENCLOSED IN PUMP ENCLOSURE AND MOUNTED TO THE SIDE OF THE CHLORINE CONTACT TANK.

1

CADD FILE NAME: 14066-3M1-CCT.dwg

DESIGNED BY:	DRAWN BY:	CHECKED BY:	JOB NO.
KMD	GAL	JEP	14066

SCALE: (22x34)	SCALE: (11x17)	DATE:
3/8"=1'-0"	-	JULY 30, 2021

WEST ST. TAMMANY WWTP EXPANSION

COVINGTON, LOUISIANA

ST. TAMMANY PARISH PROJECT NO. TU17000251
ST. TAMMANY PARISH BID NO. 21-21-2

CHLORINE CONTACT TANK MODIFICATIONS

REVISIONS

NO.	DATE:		APP'D
1	9/23/21	ADDENDUM NO. 2	JEP

STAMP:

STATE OF LOUISIANA
JAMES E. POWELL, JR.
LICENSE NO. 31063
PROFESSIONAL ENGINEER
CIVIL ENGINEERING

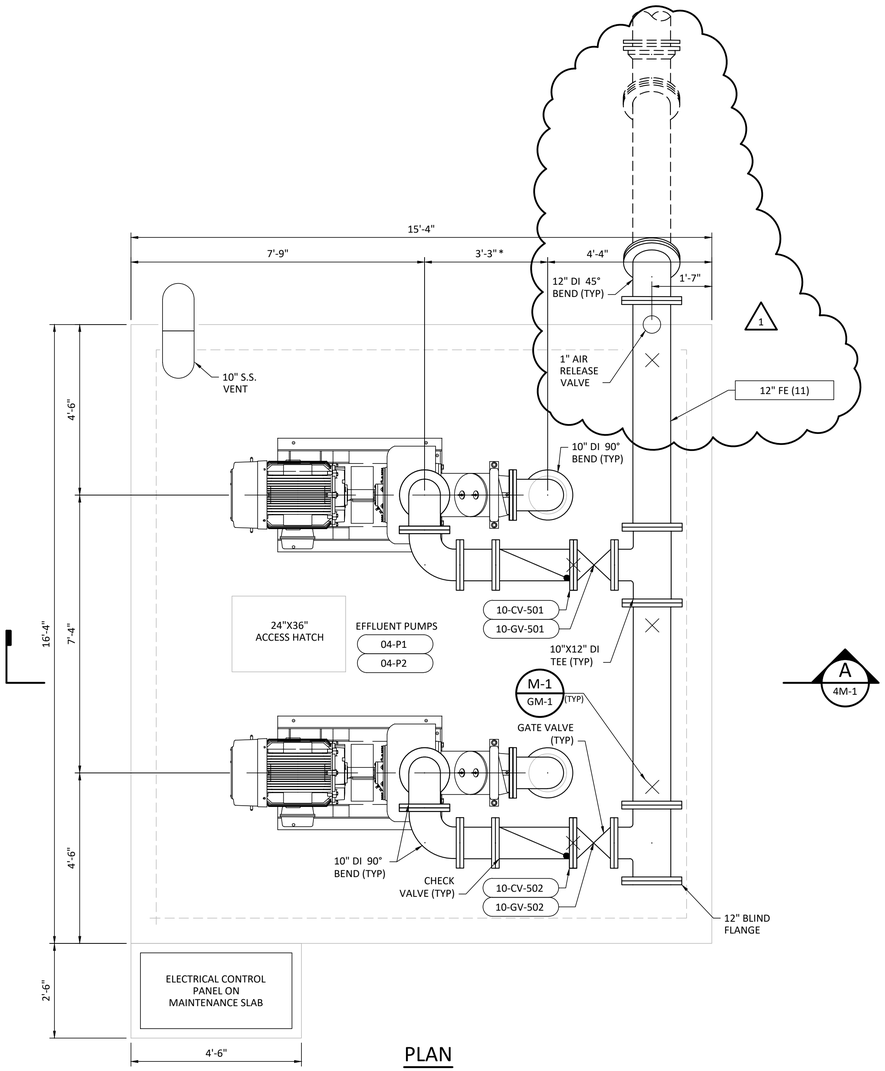
Kyle Associates, LLC
Planning, Engineering, and Landscape Architecture
638 Village Lane N. • Mandeville, LA 70471 • 985.727.9377

SHEET NO.

3M-1

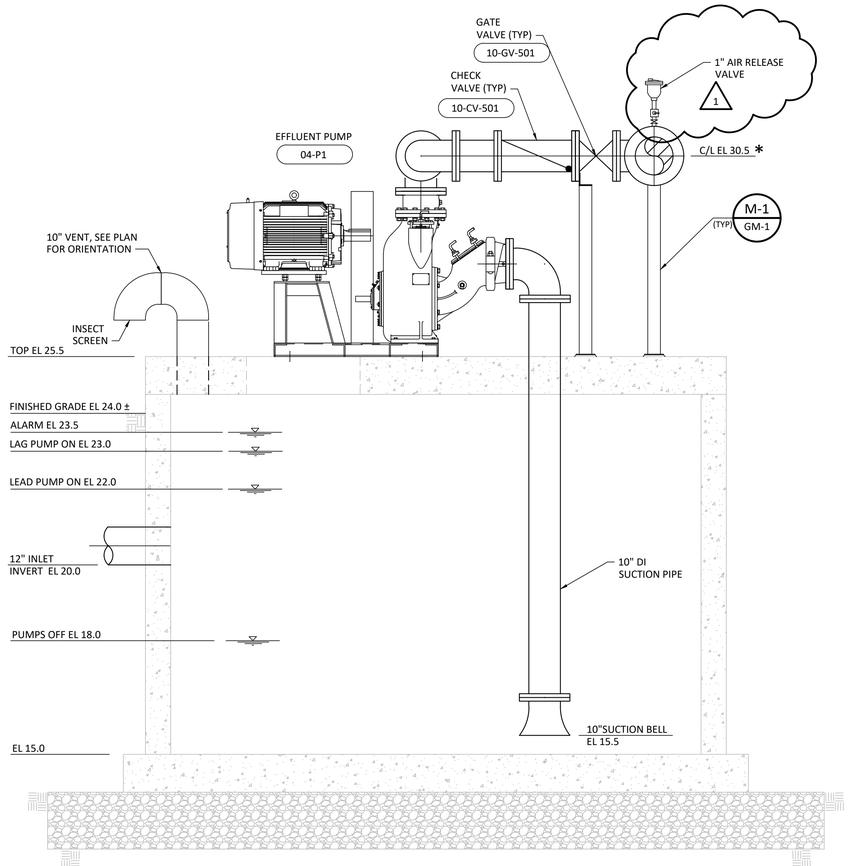
GENERAL SHEET NOTES

1. SEE SHEET 4S-1 FOR PRECAST STRUCTURE AND FOUNDATION DETAILS.
2. CONTRACTOR SHALL VERIFY DIMENSIONS INDICATED AS "*" WITH EQUIPMENT SUPPLIER BEFORE EQUIPMENT SUBMITTAL.



A
4M-1

PLAN
1/2" = 1'-0"



A
4M-1

SECTION
1/2" = 1'-0"

CADD FILE NAME:
14066-4M1-EFPS.dwg

DESIGNED BY:	DRAWN BY:	CHECKED BY:	JOB NO.
KMD	GAL	JEP	14066

SCALE: (22x34)	SCALE: (11x17)	DATE:
1/2"=1'-0"	-	JULY 30, 2021

WEST ST. TAMMANY WWTP EXPANSION
COVINGTON, LOUISIANA
ST. TAMMANY PARISH PROJECT NO. TU17000251
ST. TAMMANY PARISH BID NO. 21-21-2

EFFLUENT PUMP STATION - PLAN AND SECTION

REVISIONS

NO.	DATE:		APP'D
1	9/23/21	ADDENDUM NO. 2	JEP

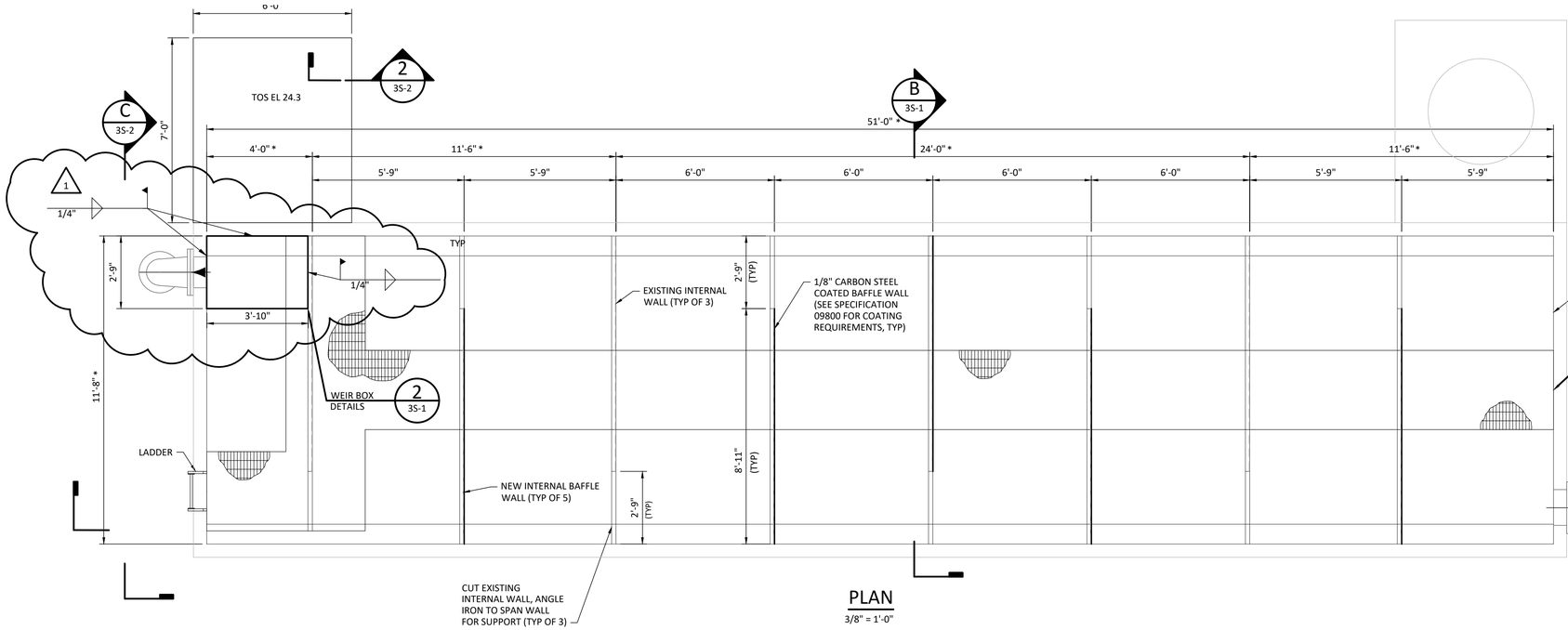
STAMP:
STATE OF LOUISIANA
JAMES E. POWELL, JR.
License No. 31063
PROFESSIONAL ENGINEER
FOR
KYLE ENGINEERING
ASSOCIATES, LLC

Kyle Associates, LLC
Planning, Engineering, and Landscape Architecture
638 Village Lane N. • Mandeville, LA 70471 • 985.727.9377

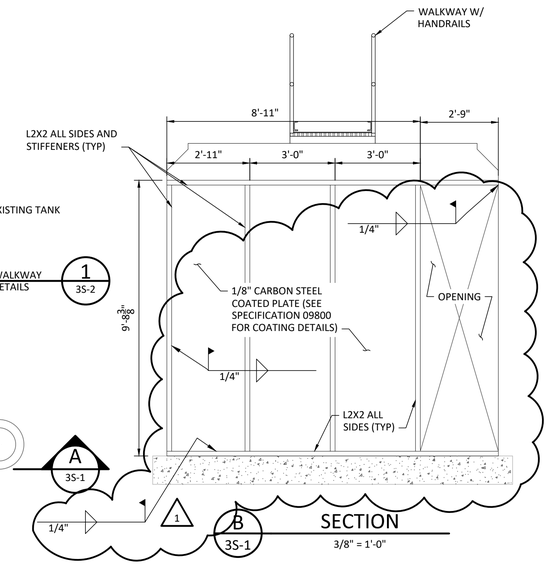
SHEET NO.
4M-1

GENERAL SHEET NOTES

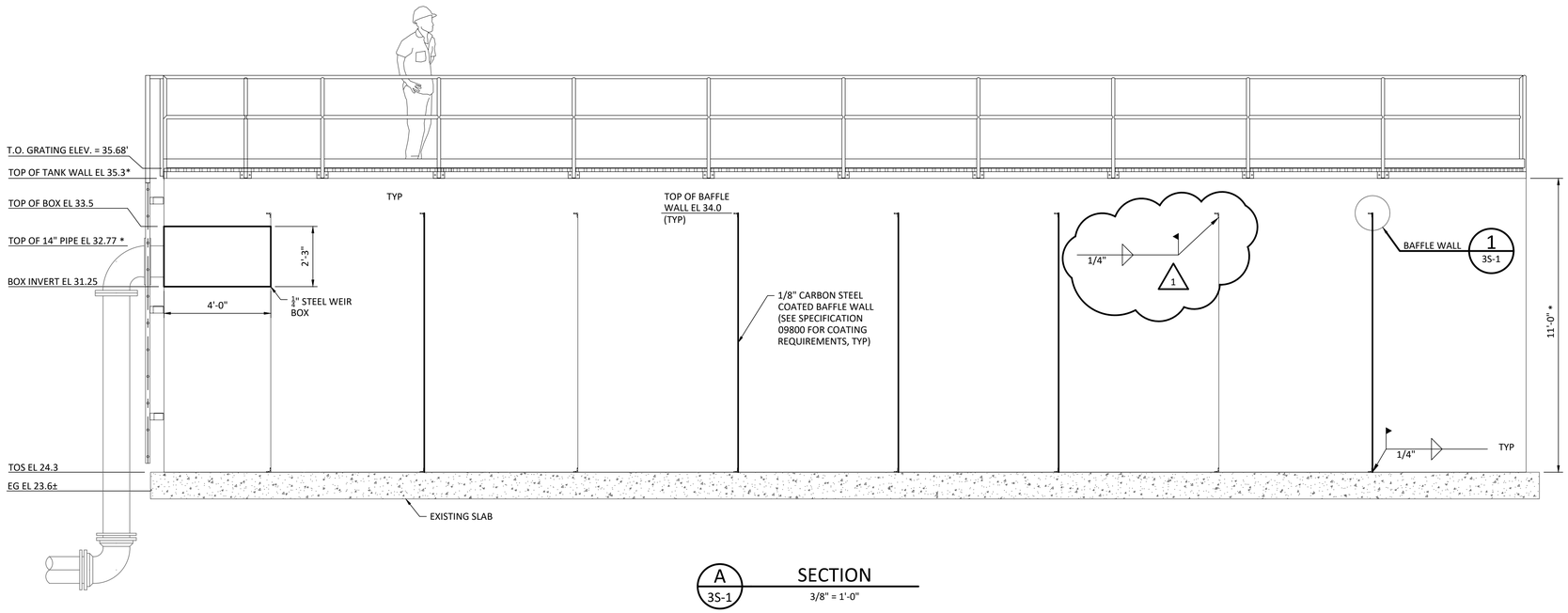
1. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS OF EXISTING TANK DENOTED WITH *, INCLUDING INTERIOR WALLS, PRIOR TO SUBMITTAL.
2. REMOVE ALL EXISTING WALKWAYS, HANDRAIL, GRATING, AND ALL INTERNAL ITEMS OTHER THAN WALLS, INCLUDING WEIRS, LAUNDERS, AND PIPING NOT SHOWN ON THIS DRAWING FOR CLARITY.
3. CONTRACTOR TO INSTALL WALKWAYS, HANDRAILS, AND GRATING IN KIND. INFLUENT WEIR BOX TO BE REPLACED WITH IN KIND.
4. TANK, BAFFLE WALLS AND WEIRS TO BE COATED SEE SPECIFICATION 9800 FOR DETAILS.



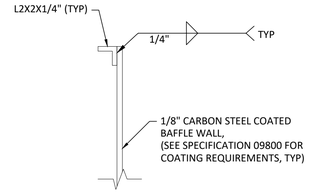
PLAN
3/8" = 1'-0"



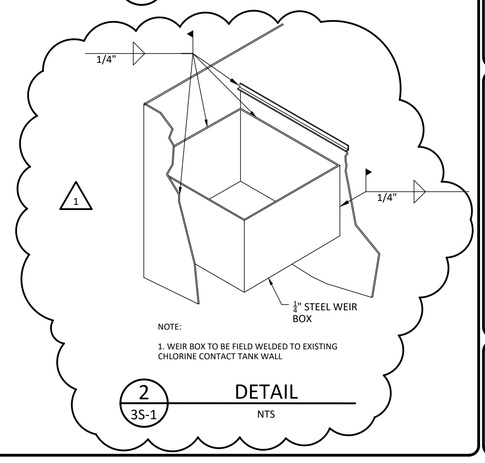
SECTION
3/8" = 1'-0"



A 3S-1 SECTION
3/8" = 1'-0"



1 3S-1 DETAIL
NTS



NOTE:
1. WEIR BOX TO BE FIELD WELDED TO EXISTING CHLORINE CONTACT TANK WALL

2 3S-1 DETAIL
NTS

CADD FILE NAME: 3S-1.dwg

DESIGNED BY:	DRAWN BY:	CHECKED BY:	JOB NO.
DAM	GAL	TPD	14066

SCALE: (22x34) 3/8"=1'-0" | SCALE: (11x17) - | DATE: JULY 30, 2021

WEST ST. TAMMANY WWTP EXPANSION

COVINGTON, LOUISIANA

ST. TAMMANY PARISH PROJECT NO. TU17000251
ST. TAMMANY PARISH BID NO. 21-21-2

CHLORINE CONTACT TANK MODIFICATIONS

REVISIONS

NO.	DATE:	
1	9/23/21	ADDENDUM NO. 2

APP'D: JEP

STATE OF LOUISIANA
THOMAS DYER
License No. 36743
PROFESSIONAL ENGINEER
STAMP
9/30/21

Kyle Associates, LLC
Planning, Engineering, and Landscape Architecture
638 Village Lane N. • Mandeville, LA 70471 • 985.727.9377

SHEET NO.
3S-1

ST. TAMMANY PARISH
MICHAEL B. COOPER
PARISH PRESIDENT

September 10, 2021

Please find the following addendum to the below mentioned BID.

Addendum No.: 1

Bid#: 21-21-2

Project Name: West St. Tammany WWTP Expansion

Bid Due Date: September 30, 2021

GENERAL INFORMATION:

1. Section 09 – Engineer Certifications – **ADD** page 2 of the certification (dated 07/30/21) that includes the seals page for the electrical specifications. (Attached)

2. Specification Section 11139 (dated 07/30/21) – **REMOVE** this section in its entirety and **REPLACE** with Specification Section 11139 (revised 09/10/21). (Attached)

3. Specification Section 11151 (dated 07/30/21) – **REMOVE** this section in its entirety and **REPLACE** with Specification Section 11151 (revised 09/10/21). (Attached)

4. Specification Section 11333 (dated 07/30/21) – **REMOVE** this section in its entirety and **REPLACE** with Specification Section 11333 (revised 09/10/21). (Attached)

5. Specification Section 11390 (dated 07/30/21) – **REMOVE** this section in its entirety and **REPLACE** with Specification Section 11390 (revised 09/10/21). (Attached)

6. Specification Section 11400 (dated 07/30/21) – **REMOVE** this section in its entirety and **REPLACE** with Specification Section 11400 (revised 09/10/21). (Attached)

7. Specification Section 16010 (dated 10/01/19) – **REMOVE** this section in its entirety and **REPLACE** with Specification Section 16010 (dated 07/30/21). (Attached)

8. Specification Section 16100 (dated 02/14/19) – **REMOVE** this section in its entirety and **REPLACE** with Specification Section 16100 (dated 07/30/21). (Attached)

9. Specification Section 16200 (dated 02/14/19) – **REMOVE** this section in its entirety and **REPLACE** with Specification Section 16200 (dated 07/30/21). (Attached)

10. Specification Section 16540 (dated 02/14/19) – **REMOVE** this section in its entirety and **REPLACE** with Specification Section 16540 (dated 07/30/21). (Attached)

11. Specification Section 16550 (dated 02/14/19) – **REMOVE** this section in its entirety and **REPLACE** with Specification Section 16550 (dated 07/30/21). (Attached)

12. Specification Section 16600 (dated 02/14/19) – **REMOVE** this section in its entirety and **REPLACE** with Specification Section 16600 (dated 07/30/21). (Attached)

13. Specification Section 16610 (dated 02/14/19) – **REMOVE** this section in its entirety and **REPLACE** with Specification Section 16610 (dated 07/30/21). (Attached)

14. Specification Section 16800 (dated 02/14/19) – **REMOVE** this section in its entirety and **REPLACE** with Specification Section 16800 (dated 07/30/21). (Attached)

15. Specification Section 17100 (dated 02/14/19) – **REMOVE** this section in its entirety and **REPLACE** with Specification Section 17100 (dated 07/30/21). (Attached)

16. Specification Section 17110 (dated 02/14/19) – **REMOVE** this section in its entirety and **REPLACE** with Specification Section 17110 (dated 07/30/21). (Attached)

17. The geotechnical engineering report and addendum by Stratum Engineering is being provided for general information. (Attached)

ATTACHMENTS:

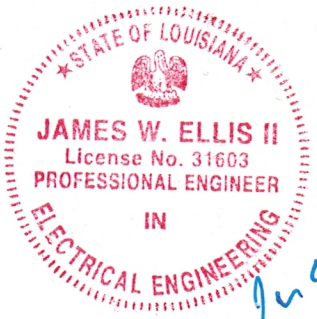
1. Section 09 – Engineer Certifications – page 2 (dated 07/30/21)

2. Specification Section 11139 – Horizontal Screw-Centrifugal Pumps (revised 09/10/21)
3. Specification Section 11151 – Self Priming Centrifugal Pumps (revised 09/10/21)
4. Specification Section 11333 – Static Screens (revised 09/10/21)
5. Specification Section 11390 – Package Plant System (revised 09/10/21)
6. Specification Section 11400 – Flow Equalization Tank (revised 09/10/21)
7. Specification Section 16010 – Basic Electrical Requirements (dated 07/30/21)
8. Specification Section 16100 – General Specifications for Electrical Installation (dated 07/30/21)
9. Specification Section 16200 – Detail Specifications for Electrical Installation (dated 07/30/21)
10. Specification Section 16540 – 600 Volt Multi-Conductor Instrumentation Cable (dated 07/30/21)
11. Specification Section 16550 – 600 Volt Single Conductor Wire (dated 07/30/21)
12. Specification Section 16600 – PVC Conduit (dated 07/30/21)
13. Specification Section 16610 – Rigid Aluminum Conduit (dated 07/30/21)
14. Specification Section 16800 – Grounding and Bonding for Electrical Systems (dated 07/30/21)
15. Specification Section 17100 – Instrumentation (dated 07/30/21)
16. Specification Section 17110 – Control Panels (dated 07/30/21)

17. Geotechnical Engineering Report by Stratum Engineering, LLC, dated January 19, 2016.
18. Geotechnical Engineering Report Addendum by Stratum Engineering, LLC, dated April 26, 2016.

<< End of Addendum #1 >>

SPECIFICATION SECTIONS 16010 THROUGH 16800 (INCLUSIVE) AND SECTIONS 17100 THROUGH 17110 (INCLUSIVE) WERE PREPARED UNDER THE RESPONSIBLE CHARGE OF JAMES W. ELLIS II, P.E., LOUISIANA LICENSE NO. 31603.



7/29/31

SECTION 11139 - HORIZONTAL SCREW-CENTRIFUGAL PUMPS

PART 1 -- GENERAL

1.1 SCOPE OF WORK

A. The Contractor shall furnish all materials, equipment, transportation, tools and labor necessary and complete the installation with all pump/motors, controls, piping, valves, wiring, etc. necessary for a complete and operating effluent pumping system. The transfer pump station shall be outfitted with two (2) horizontal screw-centrifugal pumps. The pumps shall be of heavy-duty construction intended for services requiring reliable solids handling, gentle pumping action, high efficiency, and low positive suction head requirements. Equipment shall be new, suitable for intended usage, and installed in complete conformance with the manufacturer's instructions and these specifications.

1.2 SUBMITTALS

A. Copies of all materials required to establish compliance with the specifications shall be submitted in accordance with the provisions of the General Conditions. Submittal shall include at least the following:

B. Certified shop and erection drawings showing all important details of construction, dimensions, and anchor bolt locations.

C. Descriptive literature, bulletins, and/or catalogs of the equipment.

D. Data on characteristics and performance of the pump. Data shall include guaranteed performance curves, based on actual shop tests of duplicate units, which show that they meet the specified requirements for head, capacity, efficiency, allowable NPSH, allowable suction lift, and horsepower. Curves shall be submitted on separate 8 ½ inch by 11 inch sheets. Curves for multiple speed pumps shall be provided with curves plotted for each specified rpm.

E. The total weight of the equipment including the weight of the single largest items.

F. A complete total bill of materials for all equipment.

G. A list of the manufacturer's recommended spare parts with the manufacturer's current price for each item. Include gaskets, packing, and related items on the list. List bearings by the bearing manufacturer's number only.

1.3 OPERATING INSTRUCTIONS

A. Copies of an operating and maintenance manual for each pump shall be furnished to the Engineer as provided for in General Requirements. The manuals shall be prepared specifically for this installation and shall include all required cuts, drawings, equipment lists, descriptions, and other material required to instruct operating and maintenance personnel unfamiliar with such equipment.

B. A factory representative who has complete knowledge of proper operation and maintenance shall be provided for one (1) day to instruct representatives of the Owner and the Engineer on proper operation and maintenance of this equipment. This work may be conducted in conjunction with the inspection of the installation and test run. If there are difficulties in operation of the equipment due to the manufacturer's design of fabrications, additional service shall be provided at no cost to the Owner.

1.4 RELATED WORK SPECIFIED ELSEWHERE

A. Electrical Work and controls.

1.5 WARRANTY

A. Contractor shall warrant equipment and installation to be free from defects for a period of one (1) year from the date of acceptance, excepting only those items normally consumed in service.

B. Components which fail under this warranty shall be repaired or replaced without cost of labor or materials to the owner.

C. The pump manufacturer shall provide a minimum 4-year warranty on the pumps.

PART 2 -- PRODUCTS

2.1 SCREW CENTRIFUGAL PUMPS

A. Pumps shall be as manufactured by Hayward Gordon; Vaughan Co., Inc.; or approved equal.

B. It is the express intent of these specifications to accurately describe equipment that is a regular production item of the manufacturer, and that has a proven record of performance in identical or similar applications in other municipal wastewater treatment facilities. The pump manufacturer shall have a minimum of twenty (20) years of documented experience in the design and production of wastewater pumps.

2.2 SERVICE CONDITIONS

A. The pumps specified in this section shall transfer wastewater using the following design flow criteria:

B. GPM: 1250

C. TDH: 25 feet

D. MOTOR SIZE: 20 HP, 1200 RPM

E. PUMP SPEED: VARIABLE

F. MIN. SPHERICAL SOLID SIZE: 4.5”

2.3 PUMP CONSTRUCTION

A. Casing, Back Plate and Wear Plate: The pump casing shall be of volute design, spiraling outward to the 125 lb. flanged centerline discharge. Back pull-out design shall incorporate adjusting sleeves for accurate adjustment of impeller-to-suction cone clearance and shall allow removal of pump components without requiring disconnection of casing from inlet or discharge piping. A ½"-NPT pressure tap shall be included on or near the discharge flange. Casing and back plate shall be ductile cast iron with all water passages to be smooth, and free of blowholes and imperfections for good flow characteristics. The replaceable wear plate shall be heat treated alloy steel plate with cutting groove to cut against insert cutter in the impeller hub.

B. Inlet Suction Cone: The inlet suction cone shall be cast ductile iron with all water passages to be smooth, and free of blowholes and imperfections for good flow characteristics. The suction cone shall incorporate a spiral groove to channel into the casing trapped fiber that would otherwise bind between the impeller OD and the inlet cone ID. The clearance of the impeller to the cone shall be externally adjustable without requiring pump or piping disassembly or special tools.

C. Impeller: Shall be open channel, screw-centrifugal type. The impeller shall be cast ductile iron and shall be dynamically balanced. The single-passage impeller shall combine the action of a positive displacement screw and a single-vane centrifugal impeller.

D. Insert Cutter: Shall be installed in the impeller hub, designed to cut against the cutter groove in the replaceable wear plate, reducing and removing stringy materials from between the impeller and wear plate and from the mechanical seal area. Insert cutter shall be steel, heat treated to minimum Rockwell C 60. The insert cutter clearance from the impeller hub to wear plate shall be externally adjustable without requiring pump disassembly.

E. Upper Cutter: Shall be threaded into the back pullout adapter plate behind the impeller, designed to cut against the pump-out vanes and the impeller hub, reducing and removing stringy materials from the mechanical seal area. Upper cutter shall be cast steel heat treated to minimum Rockwell C 60. The upper cutter clearance from the impeller shall be externally adjustable without requiring pump disassembly.

F. Pump Shafting: The pump shaft and impeller shall be supported by ball and tapered roller bearings. Shafting shall be heat treated steel.

G. Stuffing Box: The stuffing box shall be ductile cast iron. The stuffing box shall be designed to accommodate the mechanical seal.

H. Seal: The single mechanical seal shall be specifically designed to require no seal water flush. The mechanical seal shall be located immediately behind the impeller hub to minimize the depth of the stuffing box and maximize the flushing available from the impeller pump-out vanes. The seal shall be cartridge-type with Viton O-rings and controlled silicon carbide or tungsten carbide faces. This cartridge seal shall be a pre-assembled, pre-tested so that no seal settings or adjustments are required from the installer. Any springs used to push the seal faces together must be shielded from the fluid to be pumped. The cartridge shall also include a 17-4PH, heat-treated seal sleeve and an ASTM A536 ductile iron seal gland.

I. Bearings: Shaft thrust in both directions shall be taken up by two back-to-back mounted single-row angular contact ball bearings. Roller bearings shall be provided for radial loads. Bearings shall be rated with a minimum B10 bearing life of 100,000 hours at the operating point, which must include the effects of belt loading from the belt drive system, if applicable.

J. Bearing Housing: Shall be cast iron and machined with piloted bearing fits for concentricity of all components. Bearing housing shall have oil bath lubrication using ISO Gr. 46 turbine oil and a side mounted site glass to provide a permanently lubricated assembly. Fill and drain ports shall be provided. Viton® double lip seals riding on stainless steel shaft sleeves are to provide sealing at each end of the bearing housing. Bearing housing shall include a cast-in lifting eye to aid in removing the back-pullout assembly from the pump casing during maintenance.

K. Belt Drive Assembly: Adjustable brackets shall be used to support a side-mounted mounted motor. Sheaves and belts shall be properly sized for horsepower ratings with a service factor of at least 1.5, and all guards are to be supplied with the belt drive system and shall meet the requirements of ANSI B15.1.

L. Stainless Steel Nameplates: Shall be attached to the pump and drive motor giving the manufacturer's model and serial number, rated capacity, head, pump and motor speed, motor power, and plant pump number (if applicable).

2.4 MOTOR REQUIREMENTS

A. Drive motor shall be 20 HP, 1200 RPM, 460 volts, 3 phase, 60 hertz, Inverter Duty rated, 1.0 service factor, foot mounted, TEFC enclosure. The motor shall be sized for non-overloading conditions.

2.5 SURFACE PREPARATION

A. Pump shall be SSPC-SP5 sandblasted and primed with a single coat of Tnemec Zinc-filled Primer and finish coat of Tnemec 27WB Epoxy. (Except Motor)

PART 3 -- EXECUTION

3.1 INSTALLATION

A. Installation of pumping equipment shall be in strict accordance with the manufacturer's instructions and recommendation in the locations shown on the drawings.

3.2 TESTING AND ACCEPTANCE

A. Factory Tests: Each pump being furnished under these specifications shall be factory tested. Certified copies of the Hydrostatic Test Report shall be supplied prior to conducting a pump performance test.

B. Installation & Field Acceptance Tests: The pumps and motors shall be installed in accordance with the instructions of the manufacturer and as indicated on the Drawings. In addition, the pumps and motors shall be installed under the supervision of a factory representative of the manufacturer supplying the equipment.

C. The Contractor shall submit certification by the equipment manufacturer that their equipment has been satisfactorily installed and ready for operation and that the operating personnel have been adequately instructed in the operation, lubrication, and maintenance of their equipment.

D. Installation shall include furnishing the required oil and grease for initial operation. The grades of oil and grease shall be in accordance with the manufacturer's recommendations. Furnish all anchor bolts, temporary lifting equipment, power, water, labor and all other incidentals required for the proper installation of the pumps.

E. Furnish the services of a factory representative who has complete knowledge and experience in the proper installation, operation, and maintenance of the pumping equipment, to inspect the final installation and supervise the field acceptance tests of the equipment. These services shall be provided for a minimum of one (1) day with additional time provided, if required by the Engineer, to correct problems or deficiencies. These services shall be combined with those provided under Paragraph 1.5, Operating Instructions.

F. Field testing shall be conducted after the installation of all equipment has been completed, and the equipment operated for a sufficient period to make all desirable corrections and adjustments. Each pumping unit and all associated equipment shall be given a field test to determine that operation is satisfactory and in compliance with the Specification.

END OF SECTION 11139

SECTION 11151 – SELF PRIMING CENTRIFUGAL PUMPS

PART 1 -- GENERAL

1.1 SCOPE OF WORK

A. The Contractor shall furnish all materials, equipment, transportation, tools and labor necessary and complete the installation with all pump/motors, controls, piping, valves, wiring, etc. necessary for a complete and operating effluent pumping system. The effluent pump station shall be outfitted with two (2) horizontal self-priming solids handling centrifugal pumps. Equipment shall be new, suitable for intended usage, and installed in complete conformance with the manufacturer's instructions and these specifications.

1.2 SUBMITTALS

A. Copies of all materials required to establish compliance with the specifications shall be submitted in accordance with the provisions of the General Conditions. Submittal shall include at least the following:

B. Certified shop and erection drawings showing all important details of construction, dimensions, and anchor bolt locations.

C. Descriptive literature, bulletins, and/or catalogs of the equipment.

D. Data on characteristics and performance of the pump. Data shall include guaranteed performance curves, based on actual shop tests of duplicate units, which show that they meet the specified requirements for head, capacity, efficiency, allowable NPSH, allowable suction lift, and horsepower. Curves shall be submitted on separate 8 ½ inch by 11 inch sheets. Curves for multiple speed pumps shall be provided with curves plotted for each specified rpm.

E. The total weight of the equipment including the weight of the single largest items.

F. A complete total bill of materials for all equipment.

G. A list of the manufacturer's recommended spare parts with the manufacturer's current price for each item. Include gaskets, packing, and related items on the list. List bearings by the bearing manufacturer's number only.

1.3 OPERATING INSTRUCTIONS

A. Copies of an operating and maintenance manual for each pump shall be furnished to the Engineer as provided for in General Requirements. The manuals shall be prepared specifically for this installation and shall include all required cuts, drawings, equipment lists, descriptions, and other material required to instruct operating and maintenance personnel unfamiliar with such equipment.

B. A factory representative who has complete knowledge of proper operation and maintenance shall be provided for one (1) day to instruct representatives of the Owner and the Engineer on proper operation and maintenance of this equipment. This work may be conducted in conjunction with the inspection of the installation and test run. If there are difficulties in operation of the equipment due to the manufacturer's design of fabrications, additional service shall be provided at no cost to the Owner.

1.4 RELATED WORK SPECIFIED ELSEWHERE

A. Electrical Work and controls.

1.5 WARRANTY

A. Contractor shall warrant equipment and installation to be free from defects for a period of one (1) year from the date of acceptance, excepting only those items normally consumed in service.

B. Components which fail under this warranty shall be repaired or replaced without cost of labor or materials to the owner.

C. The pump manufacturer shall provide a minimum 4-year warranty on the self priming pumps

PART 2 -- PRODUCTS

2.1 SELF-PRIMING PUMPS

A. Performance Criteria. Self-priming pumps must be designed to handle raw, unscreened, domestic sanitary sewage. Each pump shall be guaranteed to perform at the following conditions: 1) 2500 GPM @ 52.5 feet TDH at 1160 RPM, minimum hydraulic efficiency of 65%, 2) 2000 GPM @ 43 feet TDH at 1160 RPM, minimum hydraulic efficiency of 60%. The minimum shut off head for each pump shall be 48 feet. The motors shall be suitable for 3 phase, 60 hertz, 480 volt, 4 wire power supply. The motors shall be 50 horsepower. Pump performance shall be stable and free from cavitation and noise throughout the entire specified operating range.

B. Solids Handling Capability.

1. All internal passages, impeller vanes, and recirculation ports shall pass a 3” spherical solid. Smaller internal passages that create a maintenance nuisance or interfere with priming and pump performance shall not be permitted. Certified drawings showing size and location of the recirculation port(s) shall be submitted for approval.

C. Reprime Performance.

1. Consideration shall be given to the sanitary sewage service anticipated, in which debris is expected to lodge between the suction check valve and its seat, resulting in the loss of the pump suction leg, and siphoning of liquid from the pump casing to the approximate center line of the impeller. Such occurrence shall be considered normal, and the pump must be capable of automatic, unattended operation with an air release line installed.

2. During unattended operation, the pump shall retain adequate liquid in the casing to insure automatic repriming while operating at its rated speed in a completely open system. The need for a suction check valve or external priming device shall not be required.

3. Pump must reprime the vertical distance shown on the plans at the specified speed and impeller diameter. Reprime lift is defined as the static height of the pump suction above the liquid, while operating with only one-half of the liquid remaining in the pump casing. The pump must reprime and deliver full capacity within five minutes after the pump is energized in the reprime condition. Reprime performance must be confirmed with the following test set-up:

D. A check valve to be installed downstream from the pump discharge flange. The check valve size shall be equal (or greater than) the pump discharge diameter.

E. A length of air release pipe shall be installed between pump and the discharge check valve. This line shall be open to atmosphere at all times duplicating the air displacement rate anticipated at a typical pump station fitted with an air release valve.

F. The pump suction check valve shall be removed. No restrictions in the pump or suction piping will prevent the siphon drop of the suction leg. Suction pipe configuration for reprime test shall incorporate a 2 feet minimum horizontal run, a 90° elbow and vertical run at the specified lift. Pipe size shall be equal to the pump suction diameter.

G. Impeller clearances shall be set as recommended in the pump service manual.

H. Repeatability of performance shall be demonstrated by testing five consecutive reprime cycles. Full pump capacity (flow) shall be achieved within five minutes during each cycle.

I. Liquid to be used for reprime test shall be water.

J. Upon request from the Engineer, certified reprime performance test results, prepared by the manufacturer, and certified by a registered professional engineer, shall be submitted for approval prior to shipment.

K. Manufacturer

1. All Prime
2. Gorman Rupp
3. Approved Equal

2.2 Pump Design.

A. Pumps shall be horizontal, self-priming centrifugal type, designed specifically for handling raw, unscreened, domestic sanitary sewage. Pump solids handling capability and performance criteria shall be in accordance with requirements listed herein.

B. Materials and Construction Features.

1. Pump casing: Casing shall be cast iron Class 30 with integral volute scroll. Casing shall incorporate following features:

2. Mounting feet sized to prevent tipping or binding when pump is completely disassembled for maintenance.

3. Fill port cover plate, 3 1/2" diameter, shall be opened after loosening a hand nut/clamp bar assembly. In consideration for safety, hand nut threads must provide slow release of pressure, and the clamp bar shall be retained by detente lugs. A Teflon gasket shall prevent adhesion of the fill port cover to the casing.

4. Casing drain plug shall be at least 1 1/4" NPT to insure complete and rapid draining.

C. Liquid volume and recirculation port design shall be consistent with performance criteria listed herein.

D. Cover plate: Cover plate shall be cast iron Class 30. Design must incorporate following maintenance features:

E. Retained by hand nuts for complete access to pump interior. Cover plate removal must provide ample clearance for removal of stoppages, and allow service the impeller, seal, wear plate or check valve without removing suction or discharge piping.

F. A replaceable wear plate secured to the cover plate by weld studs and nuts shall be AISI 1018 HRS.

G. In consideration for safety, a pressure relief valve shall be supplied in the cover plate. Relief valve shall open at 75-200 PSI.

H. O-ring of Buna-N material shall seal cover plate to pump casing.

I. Rotating Assembly: A rotating assembly, which includes impeller, shaft, mechanical shaft seal, lip seals, bearings, seal plate and bearing housing, must be removable as a single unit without disturbing the pump casing or piping. Design shall incorporate following features:

J. Seal plate and bearing housing shall be cast iron Class 30. Separate oil filled cavities, vented to atmosphere, shall be provided for shaft seal and bearings. Cavities must be cooled by the liquid pumped and lip seals will prevent leakage of oil. The bearing cavity to have an oil level sight gauge and fill plug check valve. The check valve shall vent the cavity but prevent introduction of moist air to the bearings.

K. Impeller shall be ductile iron, two-vane, semi-open, non-clog, with integral pump out vanes on the back shroud. Impeller shall thread onto the pump shaft and be secured with a lockscrew and conical washer.

L. Shaft shall be AISI 17-4 PH stainless steel.

M. Bearings shall be anti-friction ball or tapered roller type of proper size and design to withstand all radial and thrust loads expected during normal operation. Bearings shall be oil lubricated from a dedicated reservoir. Pump designs which use the same oil to lubricate the bearings and shaft seal shall not be used.

N. Shaft seal shall be oil lubricated mechanical type. The stationary and rotating seal faces shall be tungsten titanium carbide alloy. Each mating surface shall be lapped to three light band flatness, as measured by an optical flat under monochromatic light. The stationary seal seat shall be double floating by virtue of a dual O-ring design; an external O-ring secures the stationary seat to the seal plate, and an internal O-ring holds the faces in alignment during periods of mechanical or hydraulic shock (loads which cause shaft deflection, vibration, and axial/radial movement). Elastomers shall be viton. Cage and spring to be AISI 316 stainless steel. Seal shall be oil lubricated from a dedicated reservoir. The same oil shall not lubricate both shaft seal and shaft bearings. Seal shall be warranted in accordance with requirements listed herein.

O. Adjustment of the impeller face clearance (distance between impeller and wear plate) shall be accomplished by external means. Stainless steel adjusting shims shall be used to move the entire rotating assembly as a unit when adjusting the working clearances. Clearance adjustment which requires movement of the shaft only, thereby adversely affecting seal working length or impeller back clearance, shall not be used.

P. Suction check valve shall be molded Neoprene with integral steel and nylon reinforcement. A blow-out center shall protect pump casing from hydraulic shock or excessive pressure. Removal or installation of the check valve must be accomplished through the cover plate opening, without disturbing the suction piping. Sole function of check valve shall be to save energy by eliminating need to reprime after each pumping cycle. Pumps requiring a suction check valve to assist reprime shall not be used.

Q. Spool flanges shall be one-piece cast iron, Class 30 fitted to suction and/or discharge ports. Each spool shall have one 1-1/4" NPT and one 1/4" NPT tapped hole with pipe plugs for mounting gauges or other equipment.

R. A cast iron flare fitting shall be used at the end of the suction line in the wetwell.

S. Anchor Bolts: Anchor bolts shall be Type 304 Stainless Steel.

2.3 CONTROLS

A. Controls shall be as specified in Section 17110 - Control Panels.

PART 3 -- EXECUTION

3.1 INSTALLATION

A. Installation of pumping equipment shall be in strict accordance with the manufacturer's instructions and recommendation in the locations shown on the drawings.

3.2 TESTING AND ACCEPTANCE

A. Factory Tests: Each pump being furnished under these specifications shall be factory tested. Certified copies of the Hydrostatic Test Report shall be supplied prior to conducting a pump performance test.

B. Installation & Field Acceptance Tests: The pumps and motors shall be installed in accordance with the instructions of the manufacturer and as indicated on the Drawings. In addition, the pumps and motors shall be installed under the supervision of a factory representative of the manufacturer supplying the equipment.

C. The Contractor shall submit certification by the equipment manufacturer that their equipment has been satisfactorily installed and ready for operation and that the operating personnel have been adequately instructed in the operation, lubrication, and maintenance of their equipment.

D. Installation shall include furnishing the required oil and grease for initial operation. The grades of oil and grease shall be in accordance with the manufacturer=s recommendations. Furnish all anchor bolts, temporary lifting equipment, power, water, labor and all other incidentals required for the proper installation of the pumps.

E. Furnish the services of a factory representative who has complete knowledge and experience in the proper installation, operation, and maintenance of the pumping equipment, to inspect the final installation and supervise the field acceptance tests of the equipment. These services shall be provided for a minimum of one (1) day with additional time provided, if required by the Engineer, to correct problems or deficiencies. These services shall be combined with those provided under Paragraph 1.5, Operating Instructions.

F. Field testing shall be conducted after the installation of all equipment has been completed, and the equipment operated for a sufficient period to make all desirable corrections and adjustments. Each pumping unit and all associated equipment shall be given a field test to determine that operation is satisfactory and in compliance with the Specification.

END OF SECTION 11151

SECTION 11333 – STATIC SCREENS

PART 1 -- GENERAL

1.1 THE REQUIREMENT

A. The CONTRACTOR will furnish and install the static screen and associated piping, valves, controls, wiring, and appurtenances as specified and shown on the drawings. A single manufacturer to ensure coordination and compatibility of equipment will provide the static screen specified in this section. Compliance with the requirements and stipulations specified herein may necessitate modifications to the manufacturer's standard equipment. In addition, the contractor will be responsible for ensuring a complete and operable static screen and will establish the exact limits of work between the contractor and static screen supplier.

1.2 REFERENCES

A. The design, manufacture, and installation of this equipment will meet or exceed the applicable provisions and recommendations of the following codes and standards:

1. ASME, American Society of Mechanical Engineers

2. ASTM, American Society of Testing and Materials

3. ANSI, American National Standards Institute

4. AWS, American Welding Society

5. IEEE, Institute of Electrical and Electronics Engineers

6. NEC, National Electrical Code

7. OSHA, Occupational Safety and Health Act

1.3 SUBMITTALS

A. The following will be submitted for the static screen furnished under this specification

1. Certificate of Compliance or complete list of all deviations from the drawings and specifications.

2. Complete installation and assembly drawings, showing the manufacturer's dimensions, weights, and loadings.

3. Detailed specifications and data covering materials used, parts, instrumentation devices, and other accessories forming a part of the equipment furnished will be submitted for review.

4. Manufacturer's installation instruction and certification.

5. Operation and maintenance manual.

6. Manufacturer's warranty agreement.

7. Electrical/pneumatic requirements, schematic diagrams, and details of components including.

8. Manufacturer's spare parts.

1.4 QUALITY ASSURANCE

A. In order to assure uniform quality, ease of maintenance and minimal parts storage, it is the intent of these Specifications that all equipment called for under this Section will be supplied by a single manufacturer.

B. No equipment will be supplied by any manufacturer not regularly engaged in the manufacturing and production of the static screen equipment for a minimum of five (5) years. The manufacturer must have installed and had in satisfactory use in this application a minimum of ten (10) installations of similar size units and screen openings to the unit specified.

C. The Contract Documents represent the minimum acceptable standards for static screen for this project. All equipment will conform fully in every respect to the requirements of the respective parts and sections of the drawings and specifications. Equipment which is a "standard project" with the manufacturer will be modified, redesigned from the standard mode, and will be furnished with the special features, accessories, materials of construction or finishes as may be necessary to conform to the quality mandated by the technical and performance requirements of the specification.

D. All manufacturers proposing equipment described herein, will provide a detailed submittal package, which will consist, at a minimum, of all information and details prescribed in Section 1.3 of this specification.

E. If submitted equipment requires arrangement differing from that indicated on the drawings or specified, prepare and submit for review complete structural, mechanical, and electrical drawings and equipment lists showing all necessary changes and embodying all special features of equipment proposed. Any changes are at no additional compensation and the Contractor will be responsible for all engineering costs of redesign by the Engineer, if necessary.

1.5 DELIVERY, STORAGE, & HANDLING

A. Items to be shipped as complete assemblies except where partial disassembly is required by transportation regulations or for protection of components.

1.6 CONDITIONS OF SERVICE

A. Condition of influent is based on the following design requirements as specified by the customer:

1. Applications:	Sanitary Wastewater	
2. Objective:	Solids removal	
3. Total Flow per Screen:	Peak:	1,250 gpm
	Avg:	435 gpm

4.	Type/Composition of Solids:	Municipal Wastewater
5.	Maximum Total Suspended Solids (TSSS):	250 PPM or mg/L
6.	Size of Solids:	Maximum: N/S Inch
7.	Maximum Total fats, oils, greases (FOG):	150 PPM or mg/L
8.	Number of Screens:	2 96” (JWCE-IPEC Model SHS 9642)
9.	Design Flow per Screen:	1250 gpm
10.	Screen Opening:	0.10 Inch

N/S = Information not specified by customer

1.7 WARRANTY

A. The manufacturer will warrant against any defects in material or workmanship to the screen frame and panel. This warranty will commence upon delivery of the products and will expire on the earlier to occur of one (1) year from initial operation of the product or 18 months from delivery thereof (the “Warranty Period”). Initial operation will be deemed to take place when the products are first in production or, if applicable, when the product passes or is deemed to pass a performance test, whichever comes first.

B. The environment or materials the equipment may be exposed to may be abrasive or corrosive. This warranty does not cover the service life of the equipment against such abrasive or corrosion.

PART 2 -- PRODUCTS

2.1 MANUFACTURERS

A. The static screens will be as manufactured by JWCE-IPEC or approved equal.

2.2 MATERIALS

A. All components of the static screen will be 304 stainless steel. No carbon steel, wetted or non-wetted will be permitted.

B. All structural stainless steel components will be fabricated in the United States and will conform to the requirements of “Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings” published by the American Institute of Steel Construction.

C. Fabricate all frame parts and assemblies from sheets and plates of 304 stainless steel with a 2B finish conforming to ASTM A240.

D. All welding in the factory will used shielded arc, inert gas, MIG or TIG method. Add filler wire 304 stainless steel to all welds to provide for a cross section equal to or greater than the parent metal. Fully penetrate butt welds to the interior surface and provide gas shielding to interior and exterior of the joint. All welds will be finished to include the following as a minimum:

1. Remove all pointed protrusions from underside and face of welds and remove all weld spatter.

E. Field welding of stainless steel will not be permitted, except to connect customer piping to frame influent and effluent connections.

F. Bolts, nuts and washers will be ANSI 316 stainless steel.

2.3 EQUIPMENT

A. Each static screen will consist of:

1. Screen frame with inlet

2. Outlet and drain connections

3. Influent distribution chamber

4. Screen panel with parabolic shape

2.4 CONSTRUCTION

A. The static screen will be designed and built to withstand maximum possible static and hydraulic forces exerted by the liquid. All structural and functional parts will be sized for the loads encountered during the screening operations.

B. Frame

1. The frame will be constructed of minimum 10 gauge 304 stainless steel material. The side panels will support the screen, headbox, and discharge hopper. The side panels will be flanged and will have predrilled mounting holes.

a. The frame will have a 12 inch diameter flanged end influent connection and a 16-inch diameter flanged end effluent connection.

b. The influent and effluent pipes will be constructed of a minimum Schedule 10 304 stainless steel. Longitudinal seams will be welded continuous inside and out, with external welds ground flush.

c. The influent and effluent pipes will be secured to the lower back panel with full penetration welds.

d. Back panel will reinforce with a minimum of three (3) formed stiffeners to prevent deflection and/or movement.

e. Stiffeners will not impede movement of water or solids through the headbox, nor will they provide a ledge for solids to stagnate.

2. Each side frame panel will be fitted with a 6-inch diameter hole to serve as an observation point.

3. The frame will include a minimum of two (2) 304 stainless steel rods, 3/8-inch diameter, with threaded ends. The rods will be positioned and utilized to pull the side panel tight against the screen. They will not impede the flow of water or solids, nor will they interfere with screen. Rods will be assembled to the frame with 3/8-16 NC nuts and jam nuts on each end.

4. After final weld and weld clean up, frame will be cleaned to uniform finish. Entire exterior surface, including inlet and discharge connections, will have weld discoloration removed.

C. Influent Distribution Chamber (Headbox)

1. The screen will have an integral influent distribution chamber constructed of 304 stainless steel. The chamber will receive the incoming flow and evenly distribute the flow to the weir. The discharge weir be the full width of the frame, having a well radiused crown with a 14-inch long screen approach apron.

2. The influent chamber will have a 2-inch NPT drain, 304 stainless steel, with a PVC pipe plug for periodic draining of the headbox.

D. Flow Distribution Baffle (Vane Deflector)

1. A fully hinged flow distribution baffle extending the full width of the weir will be furnished. The baffle will be constructed of 16 gauge, 304 stainless steel. The baffle will be accurately positioned and located so that the contoured extension lip is parallel with the weir approach apron.

2. The baffle (vane deflector) will distribute the influent over the width of the screen after it has flowed over the weir.

E. Screen Panel

1. The screen element will be a single panel following a parabolic contour and positioned in the frame in the direction of the slurry flow. The screen panel will measure 96-inches wide by 42-inches long. The screen panel will be constructed of 304 stainless steel transverse bars having a triangular cross section and a 360 degree looped attachment of each bar to the longitudinal .25 inch diameter support rods. The stainless steel support rods will be on 2-3/4” centers and be constructed of 304 stainless steel. The screen opening will be 0.10 inches. The coined transverse bars will have a minimum face width of 0.074 inches and a minimum depth of 0.137 inches.

2. Top and bottom of screen panel will be reinforced with minimum 3/8 inch by 1 inch bars running full width of screen panel. Each longitudinal support rod will be welded to top and bottom reinforcing bar.

3. Bottom of screen panel will have minimum 10 gauge by 2-1/2 inch wide sheet running full width of screen panel, to serve as solids discharge lip. The solids discharge lip will be welded continuous to bottom reinforced bar. Topside (screen surface) weld will be ground smooth.

4. The wedge wire screen panel will be pivot-mounted at the center, on the horizontal axis, to allow for inspection and cleaning the backside of the screen panel.

5. Backside of screen panel will be adequately reinforced to allow screen pivot without sagging, bending or deflection of screen during cleaning or operation of unit.

PART 3 -- EXECUTION

3.1 INSTALLATION

A. Static screens shall be installed by the contractor in complete accordance with the manufacturer's recommendation.

3.2 START-UP and TESTING

A. Manufacturer's Representative for Start-up and Testing

1. The services of the manufacturer's technical representative are offered for pre-start-up installation checks, start-up assistance, troubleshooting, testing, and training of Owner's operating personnel.

B. Functional Test

1. Functional testing is offered for each static screen installed. Prior to system start-up, system components will be inspected for proper alignment, proper connection, and satisfactory operation. The manufacturer's representative can inspect installation, provide certification that the system components have been installed correctly and are ready for operation. The performance test will not begin until functional testing has been completed to the owner's and engineer's satisfaction.

C. Performance

1. Performance testing is offered for the static screen installation. After plant start-up, the manufacturer could conduct a performance test using the owner's liquid to determine the actual system operating conditions and verify that the unit meets the requirements specified in 1.6A.

2. Should the static screen fail to meet requirements of 1.6A, manufacturer will, at its own expense, make all necessary modifications to the equipment until such tests can be passed.

D. Travel and On-Site Requirements for Manufacturer's Rep

1. One (1) trip with one (1) eight-hour day(s) on site for start-up assistance, troubleshooting, testing, training owner's operating personnel, and performance testing.

END OF SECTION 11333

SECTION 11390 – PACKAGE PLANT SYSTEM

PART 1 -- GENERAL

1.1 THE REQUIREMENT

A. The CONTRACTOR shall provide all labor, materials and equipment necessary to install the Package Plant System in accordance with the Contract Documents. The Package Plant System (System) is a compact wastewater treatment system that produces clarified water from raw wastewater. The package plant treatment equipment shall be provided by a single Package Plant System Supplier (Supplier) as specified herein.

B. Related Sections:

1. Section 11000 – Equipment General Provisions

2. Section 11100 – Pumps, General

3. Section 11501 – Positive Displacement Blowers

C. Unit Responsibility: The CONTRACTOR shall require the Supplier to be responsible for designing and furnishing the System equipment, and for coordination of assembly, testing, and startup of the System; however, the CONTRACTOR shall install, test, and startup all System components and related items. The CONTRACTOR shall provide and install all interconnecting piping, piping appurtenances, and supports. The CONTRACTOR shall provide and install all equipment supports including anchor bolts and nuts. The CONTRACTOR shall provide and install all electrical equipment supports, including anchor bolts and nuts, and all electrical interconnections including conduit and wiring.

1.2 CONTRACTOR SUBMITTALS

A. Furnish submittals for System equipment in accordance with Section 01300 - Contractor Submittals.

PART 2 -- PRODUCTS

2.1 GENERAL

A. Components of the System provided by the CONTRACTOR shall be entirely compatible with the Supplier furnished items.

2.2 MATERIALS

A. Materials shall be suitable for the intended application; materials not indicated shall be high-grade, standard commercial quality, free from defects and imperfections that might affect the serviceability of the product for the purpose for which it is intended, and shall conform to the following requirements:

1. Anchor bolts, washers, and nuts shall be Type 316 stainless steel in accordance with Section 05500.

2. Piping and piping appurtenances shall be fully compatible with the fluids being conveyed.

3. All materials in contact with process water and utility water shall be NSF 61 certified for potable water use.

2.3 SYSTEM COMPONENTS

A. TANK CONSTRUCTION

1. The work covered in these specifications consist of furnishing all labor and materials, required to manufacture a factory fabricated sewage treatment plant; including all treatment components, piping, equipment, and appurtenances as shown on the drawings and/or as specified herein to provide a satisfactorily operating sewage treatment plant.

2. The wastewater treatment system shall be of the activated sludge type, specifically known as "Extended Aeration Activated Sludge ", the system shall be designed for treating a total of 750,000 gallons per day of 240 mg/l-BOD5; 240 mg/l TSS domestic sewage based on composite sewage samples of the average daily flow. No substances shall be introduced in quantities, which are toxic to biological organisms. The plant shall be designed to handle average daily flows fluctuating over the range of 60% to 100% of design flow and peak hourly flow rates not to exceed 300% of design flow, with an effluent quality of 10 mg/l-BOD5; 15 mg/l TSS; 0.92 mg/l NH3-N. The complete system shall include all necessary equipment for efficient plant operation.

B. GENERAL DESCRIPTION

1. The plant shall be fabricated complete with all treatment components, equipment and appurtenances that may be required to accomplish aeration and mixing, clarification, sludge activation, activated sludge recirculation and aerobic sludge digestion – all in one single steel structure having separate compartments.

2. The composite structure shall consist of two concentric steel tanks forming an inner chamber and an outer annulus. The inner chamber shall serve as a clarifier or settling basin. The outer annulus shall be divided into compartments or chambers to form a mixing chamber, a sludge activation chamber and an aerobic digester. The structure shall be fabricated and erected as shown on the drawings.

3. The principle items of equipment to be supplied as follows: Complete aeration assemblies and facilities, complete clarification equipment and appurtenances, sludge airlifts, air blowers and accessories and all other items of equipment and accessories required to provide a complete installation as specified herein.

4. The system shall be manufactured by Evoqua Water Technologies, LLC, AUC Group; ClearStream Environmental; or approved equal.

C. TANK CONSTRUCTION (STEEL)

1. All structural plates associated with the outer and inner vertical tank walls and all partition walls shall be carbon steel plate conforming to ASTM A-36. Wall thickness shall be determined by the Supplier’s Engineer, but shall not be less than 1/4 inch; All walls shall be continuous and watertight and shall be supported by structural reinforcing members where required. Fabrication and erection shall conform to the appropriate requirements of "AISC Specification for Buildings". Connection shall conform to the requirements of the American Welding Society's Code and shall develop the full strength of the member. Tank welding shall meet American Welding Society AWS D1.1 - Structural Welding Code:

Steel. Weld materials shall conform to AWS A5.18. Welding operators shall be qualified in accordance with AWS D1.1.

2. All interconnecting walls in the annulus of the plant need to be hydrostatic allowing one tank to be empty while another tank is full.

3. Plant Supplier shall provide design for steel base channels for outer circular walls and for each partition wall.

4. A steel bridge shall be provided. This bridge shall span the clarifier and shall extend to the outer tank wall meeting the access stairway. The bridge shall be designed to safely support all normal operating loads plus a 1000 pound concentrated live load. The walkway surfaces shall be as listed herein.

D. AEROBIC SLUDGE DIGESTOR

1. An aerated aerobic digester chamber shall be provided as specified and shown on the plans. It shall have a minimum volume of 170,000 gallons.

2. The digester chamber shall be constructed as an integral part of the wastewater treatment system. The chamber shall have the same protective coating as specified for the treatment plant. It shall also have the same structural requirements as the wastewater treatment plant.

3. The chamber shall be of the aerated type. Diffused air shall be supplied by the plant blower system supplying one scfm of air per foot of tank length. The diffusers shall be located parallel to and near the bottom of the tank. All piping and valves within the chamber shall be factory installed.

4. An airlift pump with vertically adjustable intake and air control valve shall be provided for the purpose of decanting supernatant from the aerobic digester. The airlift piping shall be schedule 40 painted steel piping, and neoprene bands shall isolate the piping from all steel surfaces. The pipe shall pivot on a swivel joint. The intake elevation adjustment shall allow the water level in the digester to be lowered a minimum of 48 inches.

5. The digester chamber shall be set on the same concrete foundation pad as the wastewater treatment plant and set at the location as shown on the plans.

E. AERATION CHAMBER

1. There shall be supplied, an aeration chamber to work in conjunction with the clarifier chamber. The aeration chamber shall conform to the following specifications:

2. The aeration chamber shall be of sufficient capacity to provide a minimum of 24 hours retention of the average daily flow, and/or a minimum chamber volume of 750,000 gallons. The vessel shall be so shaped on each side to prevent sludge accumulation, to enhance rotation of the vessel contents, and to prevent scum and froth accumulation. To ensure maximum retention and eliminate short circuiting of raw sewage particles, the aeration chamber shall be constructed with air diffusers, placed longitudinally along one side of the chamber so as to, in conjunction with the flow control baffles, enhance the spiral rotation of the chamber contents. To ensure adequate circulation velocity, the proportion of the chamber width to depth, in the direction of rotation, shall not exceed 1.33 to 1. The velocity of rotation shall be sufficient to scour the bottom and prevent sludge filleting as well as to

prevent the escape to the surface of minuscule air diffusion bubbles and by so causing their entrapment to provide maximum oxygenation efficiency.

3. An air distribution manifold shall be installed longitudinally on one side of the tank with diffuser drop assemblies connected thereto.

4. Each diffuser drop assembly shall be equipped with an air regulating and/or shutoff valve, a disconnecting union and a diffuser bar with non-clog air diffuser nozzles mounted thereon at approximately 70" centers. With this spacing, the airflow per diffuser shall range from 1 to 30 SCFM. This minimum air velocity shall be maintained to insure sufficient velocity for self- cleaning. The diffusers shall be parallel to and near the base of the vessel sidewall and at an elevation, which will provide the optimum diffusion and mixing of the vessel contents. The oxygen transfer capacity of each diffuser shall be such that an adequate supply of oxygen will be maintained in the aeration chamber to meet treatment requirements of the design sewage load.

5. The diffusers will be manufactured to produce a double shear when air is released. The air is sheared as it discharges the air orifice of the air diffuser body and again as it crosses over the diaphragm baffle. The air check diaphragm located on top of the diffuser is molded directly to the diffuser body, preventing the cap from blowing off when excess CFM is delivered to the diffuser. The diffuser will be supplied with standard male pipe thread connections.

F. CIRCULAR MECHANICAL CLARIFIER

1. There shall be furnished a clarifier chamber to work in conjunction with the aeration chamber of that system. The clarifier shall conform to the following specifications:

2. The clarifier chamber shall be of such size as to provide a minimum of four (4) hours retention, based upon the same design flow rate governing the aeration chamber, and shall have proper baffling to prevent short circuiting and to provide maximum uniform retention. The clarifier inlet shall be baffled to prevent short-circuiting and provide maximum uniform solids settling area. The slope of the clarifier grout shall not be less than 1 vertical to 12.0 horizontal. Settled sludge shall be returned from the clarifier sludge hopper to the aeration chamber by the positive sludge return system, consisting of an airlift pump. The clarifier effluent shall pass over the edge of the baffled adjustable effluent weir into the effluent trough and then out of the chamber. The weir plate will be constructed of 10 gauge galvanized steel and will be gasketed with 1/4" neoprene.

G. SUPPORT BRIDGE

1. The drive unit support and bridge shall consist of two beams spanning the top of the tank including cross-supporting members, handrails, and grating walkway. The 1-1/2” handrails shall be anchored to the structural beams.

H. INLET STILLING WELL

1. An influent well of 12 feet in diameter by 3'-0" feet depth shall be provided to cut down the influent velocity and prevent short circuitry. The stilling well shall be a rotating type supported off the torque tube.

2. The inlet stilling well shall be fabricated of 1/4" steel plate and painted the same as the main vessel.

I. SLUDGE SCRAPER ASSEMBLY (RAKE ARMS)

1. The sludge scraper assembly shall consist of two scraping arms fabricated of steel angles and a central torque cage.

2. The scraper arm assembly shall be adjusted vertically and horizontally by means of threaded rods attached to the torque cage.

3. Each scraper arm shall be fabricated from steel angle and have a neoprene squeegee blade attached to each angle to allow for sufficient movement of sludge into the center sludge collector pit.

4. The bottom of the clarifier shall be grouted concrete which conforms to the dimensions shown on the Drawings.

5. There shall be installed within the clarifier chamber, a positive sludge recirculation system, consisting of 10” diameter airlift sludge return assembly, meeting the following specifications: The airlift pump system shall have the recirculation capacity ranging from 0% to 150% of the design flow. The airline supplying air to the pump shall be equipped with a needle valve varying the capacity of the pump. The airlift pump shall be firmly supported and shall be equipped with a clean-out plug to allow for easy cleaning and maintenance.

J. SURFACE SKIMMER ARM AND SCUM TROUGH

1. A surface skimmer consisting of a steel angle with neoprene blade attached shall be provided to move the surface scum to the scum trough.

2. The surface skimmer shall be attached to the torque and shall rotate with the sludge scraper assembly.

3. A scum trough shall be fabricated of 1/4" steel plate and shall be provided to collect the scum from the surface skimmer and remove the scum by means of a 4" diameter scum discharge pipe.

4. There shall be installed within the clarifier chamber a positive scum and skimming recirculation system consisting of 4” diameter airlift skimming device (s) meeting the following specifications: The skimming device shall be of the positive airlift pump type, located in a position to skim and return floating material to the aeration chamber. The airline supplying air to the skimming device shall be equipped with a needle valve to regulate the rate of return.

K. EFFLUENT WEIR ASSEMBLY

1. Supplier shall furnish a steel weir trough with serrated weir plates fabricated from 10 gauge galvanized steel plate allowing up to an including 2 inches of adjustment. The weir trough shall be firmly fastened to the clarifier wall.

L. DRIVE UNIT

1. Product: Gear reducers or gear motors supplied shall be of such design that helical gears shall be the standard acceptable unit. Other types of gear reduction systems are acceptable provided the losses are not greater than helical gearing, which provides 98.5% efficiency up to a 200:1 gear ratio. Worm gearing, bevel gearing, and spur gearing are acceptable provided efficiencies are equal to helical gearing at the same gear ratios.

2. Gear motors are preferred and are to be manufactured by the same company and provided as an integral unit completely assembled. If c-face type of reducers and motors are supplied, they are to be connected with an external three-piece flexible coupling. Hollow shafts or quill design input shafts are not acceptable. All materials is to be of the highest quality and shall meet the intended use as described within the complete project specifications, and meet or exceed current NEMA, AGMA, and IEEE standards for material, capacity ratings, and testing procedures.

3. Electrical Specifications:

    a. The motors shall be squirrel cage design, NEMA design B or C, TEFC enclosures, Class F insulation 1.15 service factor suitable for 3/460 operation, continuous duty. The motors shall be protected with the manufacturer's standard treatment for corrosive/moist environments and to include (a) weep holes in end brackets and conduit box for condensate drainage (b) stator bore, rotor o.d., and all interior metal surfaces are to be coated with polyurethane (c) stainless steel nameplates and attachment screw pins (d) plastic non-corrosive fan (e) cadmium plated fan cover.

4. Mechanical Specifications (Gear Reducer):

    a. The gear unit shall be manufactured of cast iron equal to SAE Grade #27 for rigid support and high strength. The gear material shall be SAE 4140 drop forged steel and carbonized to a 55-60 Rc hardness with a finishing grinding to meet AGMA Quality Class 6 finish for low noise, minimum backlash, and maximum efficiency. The interior of the reducer shall be painted with a non-corrosive material for protection from oil contaminates. Maximum ambient is 40º c.

    b. Gears are to be pressed fit and secured with keys and snap rings or shaft steps. Shrink fit gears are not acceptable. The gear reducer or gear motors shall be suitable to be mounted in any position regardless of initial mounting position without adding special parts or modifications. The unit shall utilize either roller or ball bearings as manufactured and rated in according to current AFBMA standards and with a minimum of 100,000 hours. Bearings can be either splash or grease lubricated. Lubricating as with an oil pump are not acceptable. The thermal capacity of the reducer at rated load conditions shall exceed the mechanical capacity with relying upon auxiliary means for reducer. All reducers shall be supplied with an initial oil fill for the specified mounting position.

5. Service Factor:

    a. All process drives shall be selected on the basis of AGMA application tables, reference AGMA420.04 December, 1975 but with a minimum of class II or 1.41 service factor for drives operating 10 hours per day, AGMA Class III or 2.0 service factor shall be the minimum acceptable. The service factor or gear class shall be stamped on the nameplate and be based upon motor horsepower.

6. Torque Limiter:

    a. Torque limiting device is to be factory set to specified torque limits for alarm and shutdown. The drive and torque unit will be designed to prevent over-torquing of the torque cage. The torque control unit shall include contacts for remote hook-up of an alarm light or bell for indication of an overload condition if one occurs.

    b. System components for torque indication, shutdown and alarms shall operate from reactive mechanical torque. Devices which read motor load are not acceptable.

    c. Torque indication is to be simple mechanical device, suitable for ambient conditions. Dial indicators, meters, etc. are not acceptable

    d. Torque monitoring or limiting shall be obtained from the reactive torque and motions on a freely rotating gear housing which will vary in direct proportion to the applied load torque. The reactive motion shall be restrained by an external torque arm with compression springs. Accuracy of the torque limiting system shell be ±10% of the set points.

    e. The torque limiting system shall be completely external to the gear reducers. Gear housings and internal parts shall be manufacture's standard and readily available. To ensure proper performance, sizing, selections, and warranty responsibility, the torque limiting components shall be supplied and mounted by the manufacturer of the reducer.

M. MAIN AERATION AIR SUPPLY BLOWER MOTOR UNITS

1. Refer to Specification Section 11501 – Positive Displacement Blowers.

N. AERATION ELECTRICAL CONTROL CONSOLE

1. An electrical control panel shall be installed within a NEMA 3R/4X weatherproof enclosure with a locking hasp. The control console shall be provided for mounting as indicated on the plans. Any exterior mounting hardware shall be stainless steel or other corrosion resistant material.

2. The control console shall be completely factory assembled and tested prior to shipment. The control console shall be furnished with all necessary controls for each blower motor unit and associated plant equipment. Control voltage shall be 120 VAC, 1 Phase.

3. Controls shall be mounted to a removable sub-panel within the enclosure and shall be wired and spaced in accordance with the latest National Electrical Code. The control console shall be supplied with a properly sized magnetic-circuit breaker to act as the main disconnects for the control console. Magnetic starters with overload protection shall be supplied for all blower motor units. To vary the air supply, a program timer shall be supplied. An electrical alternator shall be furnished to alternate the operation of each blower motor unit. An electrical alternator shall be provided with a manual selector switch to allow manual selection of the lead blower if desired.

4. The 24-hour, 7-day time clock shall be capable of being programmed to control the blower run cycle and to adjust both the start set point and the blower run time. The clock shall also include a skip-a-

day feature which will allow a separate program for weekends (when required). The clock shall be by Paragon, Model #1015.

5. All wiring conductors within the control console shall be U.L. type THHN, stranded #14 AWG minimum, rated at 600 volts. Control wiring shall be numbered on each end.

6. All wire and conduit required between the control panel and the electrical power service should be furnished and installed by the purchaser. Wiring and conduit between the control panel and plant equipment shall be furnished by the manufacturer of the wastewater treatment plant. The panel may be detached for shipping. The main power supply shall be 480 Volt,3 Phase, 60 Cycle. The control voltage shall be 120 Volt, single Phase.

O. ACCESS BRIDGE

1. The main Access Bridge with a 36” wide access platform shall be made of structural steel shapes 1/4" minimum thickness and shall be supported on the plant walls. The bridge shall extend across the tanks as shown on the drawings.

2. The bridge shall have a 36" wide deck made of, 1"x 3/16" galvanized or aluminum bar grating and shall be designed to withstand a uniform live load of 75 lbs. per square foot plus the dead load of the structure. The deflection shall not exceed L/360 of the unsupported span when the design loads are applied. The bridge shall be provided with handrails on both sides consisting of an upper and intermediate rail and vertical posts fabricated of 1-1/2” diameter anodized aluminum pipe. 4” x ¼” painted steel or aluminum toe plates shall also be provided.

3. Walkways shall be provided for access to and maintenance of the clarifier weir and all air diffuser drop pipes and regulating valves. Additional walkways shall be provided in locations as shown on the drawings or as needed to service the equipment.

4. All other walkways shall be a minimum of 24 inches wide and shall be of 1" x 3/16" galvanized or aluminum bar grating adequately supported to withstand a live load of 75 lbs. per square foot. All walkways shall be provided with handrails on both sides consisting of an upper, intermediate rail, and vertical posts fabricated from 1-1/2" diameter schedule 40, painted steel or anodized aluminum pipe. 4 x ¼” painted steel or aluminum toe plates shall also be provided.

P. EFFLUENT CONNECTION

1. The effluent connection of the wastewater treatment system shall be located as shown on the plans and shall consist of one, 12” diameter 150# standard flange.

Q. PLANT START-UP

1. At the time the wastewater treatment system is filled with water or sewage, and all power connections have been completed, and all equipment is approved for service, the contractor shall provide the services of a representative of the manufacturer who shall instruct the owner's representative in the proper operation and maintenance of the wastewater treatment system, including instructions in conducting all required operational tests. The manufacturer's representative shall furnish at this time, a service manual on the equipment installed within the wastewater treatment system.

R. MANUFACTURER QUALIFICATIONS

1. The manufacturer of specified equipment must have a minimum of five (5) years active experience in the design and manufacture of similar wastewater treatment equipment, and upon request, furnish supporting evidence.

2. The manufacturer of specified equipment must have a minimum of five (5) year's active experience in the design and manufacture of similar wastewater treatment equipment, and upon request, furnish supporting evidence. Consideration will be given only to products of manufacturers who can demonstrate that their equipment fully complies with all requirements of the specifications and contract documents. The equipment shall be supplied by a firm which has been regularly engaged in the design, fabrication, assembly, testing, start-up and service of full scale treatment systems, of the same model and size as proposed, operating in the U.S., with similar characteristics

PART 3 -- EXECUTION

3.1 INSTALLATION

A. General: Equipment and System components shall be installed in accordance with the manufacturer's written recommendations.

B. Alignment: Equipment shall be field tested to verify proper alignment and freedom from binding, scraping, or other defects. Equipment shall be secure in position and neat in appearance.

C. Lubricants: The CONTRACTOR shall provide any necessary oil and grease for initial operation.

D. Piping: Piping shall comply with Division 15. All piping shall be well supported as shown on the Drawings and as specified in Section 15006 - Pipe Supports. All equipment drains shall be routed to the trench drains in the building. All tank drains shall be routed to the drain boxes on each tank pad. All exterior pressure piping shall be insulated.

E. Piping appurtenances: Valves, instruments and other piping appurtenances provided by the Supplier shall be installed by the CONTRACTOR in strict accordance with the manufacturer's recommendations.

F. Electrical and control items provided by the Supplier shall be installed by the CONTRACTOR as shown in the Contract Drawings. Conduit and wiring shall comply with Division 16.

3.2 TESTING AND STARTUP

A. The CONTRACTOR shall test and start-up the System with the supervision and assistance of the Supplier provided manufacturer's representatives as specified in Division 11.

3.3 TECHNICAL MANUALS

A. The CONTRACTOR shall provide technical manuals in DVD format for the entire package plant system including all components. The manuals shall be complete and include the items listed below as a minimum.

1. Individual mechanical equipment sections with installation, operation, and maintenance materials. Complete spare parts listing for each equipment item.

2. Instrumentation and controls equipment section.

3. Process operation section including system optimization and troubleshooting.

4. Installation instructions

5. Safety materials

6. Warranty information

END OF SECTION 11390

SECTION 11400 – FLOW EQUALIZATION TANK

PART 1 -- GENERAL

1.1 DESCRIPTION

A. The CONTRACTOR shall furnish a Flow Equalization Tank as specified in the enclosed specification.

B. The Flow Equalization Tank shall consist of a circular welded steel tank. Tank diameter shall be 85 feet and the overall tank height shall be 13 feet. Useable water depth and useable tank volume shall be as shown on the plans. A bolted steel field erected tank wall shall not be accepted as equal.

C. In addition to the above-mentioned equipment, the following principal items of equipment shall be included.

1. Access Manway with Davit

2. Air Distribution System with Coarse Bubble Diffusers

D. The above equipment shall be as manufactured by Evoqua Water Technologies LLC, AUC Group; ClearStream Environmental; or approved equal.

1.2 SUBMITTAL SHOP DRAWINGS

A. The contractor shall submit a minimum of six (6) copies of all shop drawings to the engineer for approval. Of these, two (2) copies will be returned to the contractor with appropriate action taken. Receipt of less than the minimum required number of copies will be cause for withholding the shop drawings from being checked until receipt of the necessary additional copies.

B. Each set of shop drawings shall include but not necessarily be limited to:

1. Drawings showing dimensions of all steel units and minimum recommended spacing.

2. All other information necessary to enable the ENGINEER to determine whether the proposed equipment meets the specified requirements.

PART 2 -- – PRODUCTS

2.1 DESIGN REQUIREMENTS

A. All components supplied shall conform to the size requirements as set forth in the plans, to the requirements included in other sections of this specification, and to the following broad design parameters.

2.2 STRUCTURAL

A. The circular welded steel wall shall be of a thickness designed to withstand a full hydrostatic internal loading causing a hoop stress of less than 24,000 psi with a weld efficiency of 75%. Minimum wall plate thickness shall be ¼”-inch.

B. The circular steel wall shall also be designed to withstand a wind load of 150 MPH. Minimum ¼” thick steel reinforcing wind girder shall be provided and installed completely around the top of the tank wall as shown on the drawings. The wind girder shall be gusseted to develop the full strength of the reinforcing girder.

C. The full wall height shall be developed utilizing no more than two (2) vertical steel sheets to assure the ease of field installation and to avoid aesthetically any extra weld seams.

D. All shop welds shall have burrs, spatter, etc. removed prior to blasting. All chain or skip welds on surfaces above water level or on an outer surface shall be caulked prior to painting.

E. The method used to initially fill the tank with liquid may be selected by the engineer to test the hydrostatic design. Any failure or excessive deflection shall be remedied and all costs shall be borne by the manufacturer.

PART 3 -- EXECUTION

3.1 PLANT FABRICATION AND INSTALLATION

A. Each tank component shall be prefabricated in the factory of the manufacturer and shall be shipped in assemblies complete and operable as detailed on the drawings and specified herein. Each component assembly shall be erected in the field in accordance with the manufacturer’s installation drawings.

B. The field installation shall be performed by the equipment manufacturer’s personnel, directly employed by the equipment manufacturer and normally engaged in the field installation of the equipment specified herein.

C. Any field welding accomplished on surfaces down to a point two (2) feet below the top of the plant shall have weld spatter and burrs removed by chipping and grinding to prevent operator injury. Any accessories mounted on or attached to the exterior of the tank and supplied by the plant manufacturer will be considered part of the manufacturer’s erection responsibility. The manufacturer shall also be responsible for furnishing all necessary construction equipment for erection of the basin as supplied by the manufacturer. Installation shall encompass the total basin including but not limited to manway, diffusers, flood grid piping with pipe supports and drop pipe.

D. Field painting of the basin and any accessories mounted on or attached to the exterior of the tank and supplied by the manufacturer shall be performed by the equipment manufacturer and shall include masking of all aluminum, galvanized steel and stainless-steel surfaces.

E. These requirements shall be met so that discrepancies between erector and manufacturer will be totally avoided with the end result being a trouble-free installation with single source responsibility for the finished product.

3.2 COMPONENT CONSTRUCTION

A. A steel base channel rolled to the circular dimension of the tank wall shall be provided for installation into the slab. These channels shall be ASTM A36, 8" x 13.75 lbs/ft. and shall be embedded 4" deep in the slab. Base ring hooks shall be provided for the tank wall base channels. The installing slab contractor will be required to field weld the hooks to the base ring channels. Delivery of the base channels and base ring hooks shall be coordinated with the contractor and furnished with detailed installation drawings. The base ring channels shall be used as a base for welding the upright steel wall of the EQ Tank. A keyway in the slab shall not be required or accepted as equal.

B. A trim channel rolled to the circular dimension of the tank wall shall be provided to form the top wall perimeter. The channel shall be ASTM A36, 4" x 5.4 lbs/ft.

C. A 36-inch diameter fabricated steel access manway with davit shall be provided in the tank wall, near the bottom of the tank wall for access into the Flow Equalization Tank.

D. The air distribution system shall consist of a drop-pipe, floor grid piping with pipe supports and coarse bubble diffusers.

E. An 8-inch diameter Sch. 10 304SS diffuser drop-pipe shall be provided. The drop-pipe shall be provided with a flanged connection at the top of the tank wall as shown on the drawing. The drop-pipe shall extend to the bottom of the tank and shall be connected to the center floor grid header as shown on the drawing.

F. An 8-inch diameter Sch. 10 304SS center flood grid header shall be provided and shall be connected to the bottom of the drop-pipe as shown on the drawing. A sufficient number of 4-inch diameter Sch. 10 304SS branch laterals shall be provided and connected to the center floor grid header as shown on the drawing. The branch laterals shall be fabricated with a sufficient number of diffuser connections so a sufficient number of coarse bubble diffusers will be supplied for proper operation.

G. A sufficient number of 304SS pipe supports with 304SS anchor bolts shall be provided to support the center floor grid header and branch laterals.

H. The coarse bubble air diffusers shall be of a non-clog, multi-leaf spring design, each with a capacity of not less than 30 CFM. The diffuser shall be fabricated of 304SS with 0.20 inch minimum wall thickness.

I. Each diffuser shall have three (3) stainless steel leaf springs fastened to the body with 3/16" stainless steel blind rivets and each covering four (4), 7/8 inch diameter air discharge ports. The spring shall act as a check valve to eliminate plugging. The leaf spring deflects only slightly, oscillating at a high frequency, shearing the air as it is released to provide optimum bubble size and high oxygen transfer. The springs automatically produce a controlled back pressure to assure uniform air discharge through the entire diffuser network without the use of air restrictors, balancing inserts, or orifices in the header system.

J. The aeration system shall be designed based on an air flow rate of 25 CFM per diffuser with a maximum pressure loss of 14" of water. Guaranteed oxygen transfer efficiency shall be 9.3% minimum at a diffuser submergence of 13.75' and air flow rate as stated. Oxygen transfer efficiency shall be guaranteed and substantiated by submission of test data compiled by a nationally recognized independent testing laboratory.

3.3 SURFACE PREPARATION AND CORROSION PROTECTION (SHOP)

A. Refer to Section 09800 for specified surface preparation and coatings.

3.4 SURFACE PREPARATION AND CORROSION PROTECTION (FIELD)

A. Refer to Section 09800 for specified surface preparation and coatings.

3.5 FASTENERS

A. All fasteners shall be 304SS.

3.6 INSTALLATION DRAWINGS

A. The equipment manufacturer shall provide a minimum of two (2) bound sets of installation drawings.

3.7 WARRANTY

A. Seller shall furnish its standard warranty against defects in material and workmanship for all Equipment provided by Seller under this Section. The Seller shall warrant the Equipment, or any components thereof, through the earlier of: (i) eighteen (18) months from delivery of the Equipment or (ii) twelve (12) months from initial operation of the Equipment.

B. Warranties and guarantees by the suppliers of various components in lieu of a single source responsibility by the equipment manufacturer shall not be accepted. The equipment manufacturer shall be solely responsible for the warranty of the equipment and all related components.

C. In the event a component fails to perform as specified or is proven defective in service during the warranty period, excluding items of supply normally expanded during operation, the manufacturer shall provide a replacement part without cost to the owner.

D. This warranty shall be valid only if the product is properly serviced and operated under normal conditions and in accordance with the manufacturer’s instructions.

END OF SECTION 11400

SECTION 16010 – BASIC ELECTRICAL REQUIREMENTS

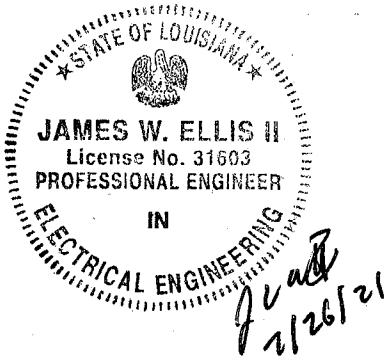
PART 1 - GENERAL

RELATED DOCUMENTS

All drawings and general provisions of the contract, including General Conditions, Supplementary Conditions, and other Division 1 Specifications, apply to this section.

Separation of Specifications into Sections is for convenience only and is not intended to establish limits of work or liability. The following sections apply to this project:

16010 – Basic Electrical Requirements
16100 – General Specifications for Electrical Installation
16200 - Detailed Specifications for Electrical Installation
16540 – Multi Conductor Instrument Cable
16550 – Single Conductor Wire
16600 – PVC Conduit
16610 – Rigid Aluminum Conduit
16800 – Grounding
17100 – Instrumentation
17110 – Control Panels



DESCRIPTION OF WORK

Furnish all labor, tools, materials, fixtures, equipment, accessories, transportation, etc., required for a complete electrical lighting and power systems, complete with necessary auxiliaries as indicated on the drawings and specifications.

Also included in the work is the power wiring for connection of items indicated on the architectural plans, as well as power wiring for the equipment specified in DIVISION 15 – MECHANICAL.

Removal of existing electrical equipment not being reused.

DRAWINGS AND SPECIFICATIONS

The drawings showing the layout of electrical work indicate the approximate location of transformers, switchboards, panelboards, disconnects, outlets, and conduit routing. The contractor shall refer to architectural, structural, and mechanical drawings as well as equipment manufacturer's shop drawings and rough-in drawings, and adjust work accordingly to provide a coordinated installation. All adjustments and minor deviations necessary shall be made without additional cost to the owner. It shall be the electrical contractor's responsibility to see that all equipment such as pull boxes, junction boxes, panelboards, and other apparatus, that may require maintenance from time to time, is made accessible. Any condition that may occur during construction which conflicts with accessibility to the proposed installation of the electrical equipment, shall be brought to the Architect's attention prior to the point at which a change in location would require additional cost and delays to construction. The contractor shall install fire alarm devices as near as possible to the locations indicated on the drawings but shall move them as necessary to avoid conflicts with existing equipment and to be located sufficiently away from heat producing objects.

All electrical gear shall be mounted at or above the first floor slab or base flood elevation, whichever is higher, unless noted otherwise.

The drawings and specifications are complementary and what is shown and/or called for on one shall be furnished and installed the same as if shown and/or called for on the other.

Where the Contractor is not certain about the method of installation, he shall ask the Architect for further installation details. Lack of details, not requested, will not be an excuse for improper installation.

When a color or other condition for a product is specified to be determined by the architect, the submittal for that item shall be clearly marked with the available options. (Do not select a color or other condition in the submittal) The architect shall be specifically asked by the contractor to provide the required information, and that product shall not be manufactured prior to obtaining such information.

LAWS, CODES, AND PERMITS

The latest accepted edition of the National Electrical Code (NFPA 70), National Fire Alarm Code (NFPA 72), and all State, Parish, City, and local building codes shall be considered a part of these specifications, and pertinent articles will not be repeated herein. These codes establish the minimum acceptable criteria where more stringent requirements have not been defined in these specifications and/or drawings.

The Contractor shall apply for all permits and pay all fees incidental to completing the electrical work. This Contractor shall give notice to the proper authorities in ample time for the work to be inspected and approved as it progresses, and no work shall be concealed until inspected and approved by authorized inspectors. If the plans or these specifications in any way conflict with the Code, State or Local Rules, these latter are to be followed, without expense to the Owner, but the Architect shall be notified of this condition and approval secured before changes are made.

Comply with utility company standards. Coordinate all work for installation of metering and all aspects of the service with the utility company prior to roughin.

Upon completion and before acceptance of work, a certificate of approval from the appropriate regulatory agency shall be furnished to the Architect.

No work shall be concealed until approved by the local inspector. Local regulations shall be adhered to.

The contractor shall assure that he does not install electrical equipment including raceways in or through areas restricted by the international building code and local building codes.

JOB SITE

Prior to submitting quotation for electrical work, Contractor shall visit and examine the job site with all authorities concerned in order to become familiar with all existing conditions pertinent to the work to be performed thereon. No additional compensation will be allowed for failure to be so informed.

Where existing equipment including raceways and wiring is in conflict with work of this project, the contractor shall rework/reroute/relocate this equipment as necessary.

TEMPORARY POWER

The Contractor shall be responsible for providing temporary light and power to the construction site as necessary to meet all of the OSHA requirements for construction, and as required by the general contractor and various sub-contractors.

SERVICE INTERRUPTIONS

Services to the pumps shall be kept in operation at all times during construction. If a situation occurs

that the service needs to be interrupted, the Contractor shall be responsible for contacting the proper authorities to schedule the outage at a time that is convenient to the occupants. It shall be understood that this outage may have to be scheduled after regular working hours or on the weekends. Allowances shall be added to the Contractors bid to cover the cost of any overtime work. This shall come at no additional cost to the Owner after the bid date.

WARRANTY

The contractor shall guarantee all labor and materials for a period of twelve (12) months from the date of final acceptance. All defective materials and work shall be replaced with new materials or equipment. This shall come at no additional cost to the Owner.

PART 2 – PRODUCTS

MATERIALS

Equipment and materials shall be new and shall be listed by Underwriters Laboratories for the purpose for which they are being used. All material of similar use shall be of the same manufacturer.

Substitutions to materials listed on the drawings and specifications can be made as long as they are approved as acceptable by the Architect. Requests for prior approval shall be submitted no later than seven working days prior to bidding. All requests for prior approval shall be in writing by providing a hard copy of the submittal data to the engineer's office.

All termination lugs shall be rated 75 degree C minimum and shall be compatible with the number and size of wires to be terminated.

SUBSTITUTIONS

Names of manufacturers or catalog numbers are mentioned herein in order to establish a standard as to design quality. Other products similar in design and of equal quality may be used if submitted to the architect and found acceptable by him. Refer to the general conditions for additional information.

Any substitution to items specified, that are not approved prior to bidding, shall be brought to the attention of the architect and engineer as an alternative product prior to the official submittal of electrical products along with the specific reason for the proposed substitution. Refer to the general conditions for additional information.

When the contractor elects to use an acceptable alternate manufacturer's equipment, the contractor shall be responsible to coordinate the change with all trades affected and pay for any additional work required under this or any other division affected by the substitution.

SUBMITTALS

Within thirty days of the award of the contract, the Contractor shall be responsible for submitting six (6) copies of submittals containing catalog cuts and performance data for all material and equipment proposed for use. These submittals shall be reviewed by the Architect for general compliance to the contract documents. The Architect's review of these submittals in no way modifies the contract or relieves the Contractor from compliance with the contract unless a difference is clearly stated in the submission and specific acceptance is given by the Architect as a change to the contract.

Submittals shall be identified with the project name and the contractor's name and have the contractor's stamp showing that he has reviewed the submittal and found it to be in accordance with the plans and specifications. Submittals shall be bound.

The complete arc flash hazard study shall be included in the gear and control panel submittal.

Items of division 16 shall be submitted in one package.

Submittals that do not comply with the above may be returned, without review, for resubmission.

All shop drawings must be reviewed before the various factories start fabrication. The contractor shall allow a minimum of 30 days for this review.

Developing electronic or CAD files shall be the responsibility of the contractor. Electronic CAD drawings will not be provided to the contractor.

PART 3 – EXECUTION

INSTALLATION

Ask for details whenever uncertain about installation methods. Lack of details requested shall not excuse proper installation and corrections shall be the responsibility of the contractor.

AS-BUILT DRAWINGS & OPERATING INSTRUCTIONS

The Contractor shall be responsible for providing As-Built drawings to the Architect at the completion of the project. The Contractor shall make a reproducible set of the original contract drawings, and in a neat and understandable manner, show any significant changes made during construction. Unless noted otherwise in the contract documents, the Contractor shall provide one additional copy of these drawings to the Architect. The Contractor shall pay for all reproduction costs. Final payment shall be withheld until these drawings are accepted by the Architect.

The Contractor shall furnish two bound sets of any operating instructions and maintenance manuals to the Architect upon completion of the project.

CUTTING AND PATCHING

The Contractor shall be responsible for all cutting and patching that is required to complete the installation of the electrical systems. All work shall be coordinated between trades with strict accordance with the requirements of the General Conditions. Structural members shall not be cut or modified without the approval of the architect.

The Contractor shall be responsible for covering, caulking, or otherwise to make weatherproof all openings left in the structure for electrical work. This includes openings around conduit penetrations.

EXCAVATING AND BACKFILLING

The Contractor shall be responsible for all excavating and backfilling required to complete the installation of the electrical systems. All excess material and debris shall be removed. All backfilling shall be with sand. Backfilling shall be thoroughly tamped and compacted.

It shall be the Contractor’s responsibility to locate all underground utilities before trenching and excavating. Care shall be taken to avoid damage to the existing utilities. Any damage shall be repaired or replaced by the Contractor at no expense to the Owner.

PAINTING

No painting shall be required under DIVISION 16, except for factory-finished items. Any damaged surfaces of factory items shall be repaired by the Contractor to an acceptable level determined by the

Architect.

EXISTING EQUIPMENT

The Contractor shall be responsible for the removal and reinstallation of any electrical equipment, such as light fixtures, that shall be reused. Any existing electrical equipment that is removed and not reused shall be returned to the Owner. Any material that the Owner does not wish to keep shall be removed from the site by the Contractor.

When existing electrical items such as outlets are removed from service, care shall be taken to keep the integrity of the remaining electrical systems.

SERVICE EQUIPMENT MARKING

In addition to other marking requirements, all service equipment shall be marked with the available fault current and the date of calculation of the fault current. See other areas of these specifications for additional labeling requirements. Labels shall be engraved metal or laminated-plastic nameplate mounted with corrosion-resistant screws.

END OF SECTION 16010

SECTON 16100 – GENERAL SPECIFICATIONS FOR ELECTRICAL INSTALLATION

PART 1 – GENERAL

1.1 GENERAL

A. The Electrical Drawings and Specifications under this division are an integral part of the Contract Documents. The Drawings and Specifications of other divisions of this contract, as well as supplements issued thereto, information to bidders and pertinent documents issued by the Owner's representative are a part of these drawings and specifications and shall be complied with in every respect. All the above documents will be on file at the office of the Owner's representative and shall be examined by all bidders. Failure to examine all Contract Documents shall not relieve the responsibility or be used as a basis for additional compensation due to omission of details of other requirements in these Contract Documents from the Division 16 documents.

B. The Contractor shall furnish all work, labor, tools, superintendence, material, equipment and operations necessary to provide for complete and workable electrical systems as defined by the contract documents.

C. The Contractor shall be responsible for inspecting the project site and checking the existing conditions and ascertaining the conditions to be met for installing the work and adjusting his bid accordingly.

D. It is the intent of the Contract Documents that upon completion of the electrical work, each entire system shall be in a finished, workable condition.

E. All work that may be called for in the Specifications but not shown on the Drawings; or, all work that may be shown on the drawings but not called for in the Specifications, shall be performed by the Contractor as if described in both. Should work be required which is not set forth in either document, but which work is nevertheless required for fulfilling of the intent thereof; then, the Contractor shall perform all work as fully as if it were specifically set forth in the Contract Documents.

F. The definition of terms used throughout the contract documents shall be as specified by the following agencies:

1. Underwriters Laboratories (UL)
2. National Electrical Manufacturers Association (NEMA)
3. American National Standards Institute (ANSI)
4. Insulated Cable Engineers Association (ICEA)
5. National Electrical Code (NEC)
6. National Fire Protection Association (NFPA)

G. The use of the terms: "as (or where) indicated"; "as (or Where) shown"; "as (or Where) specified"; or "as (or where) scheduled" shall be taken to mean that the reference is made to the Contract Documents, either on the drawings or in the specifications, or both documents.

H. The use of the words "furnish," provide," or "install" shall be taken to mean that the item or facility is to be both furnished and installed under this Section unless stated to the contrary that the item or facility is to be either furnished under another Section or under another Contract, furnished under this Section and installed under another Section or under another Contract.

1.2 PERMITS, CODES AND REGULATIONS

A. Secure all permits, licenses, and inspection as required by all authorities having jurisdiction. Give all notices and comply with all laws, ordinances, rules, regulations and contract requirements bearing on the work.

B. The minimum requirements of the electrical systems installations shall conform to the latest edition of the National Electrical Code as well as state and local codes.

C. Codes and ordinances having jurisdiction and specified codes shall serve as minimum requirements; but, if the Contract Documents indicate requirements which are in excess of those minimum requirements, then the requirements of the Contract Documents shall be followed. Should there be any conflicts between the Contract Documents and codes, or any ordinances, report these with bid.

D. Determine the exact requirements for the utility service connections and metering facilities as set forth by the utilities that will serve the project, and pay for and perform all work as required by those utilities.

1.3 STANDARDS

A. All materials and equipment shall conform to the requirements of the Contract Documents. They shall be new, free from defects, and they shall conform to the following standards where these organizations have set standards:

1. Underwriters Laboratories, Inc. (UL)
2. National Electrical Manufacturer's Association (NEMA)
3. American National Standards Association (ANSI)
4. Insulated Cable Engineers Association (ICEA)

B. All material and equipment, of the same class shall be supplied by the same manufacturer, unless specified to the contrary.

C. All products shall bear UL labels where standards have been set for listing.

1.4 SHOP DRAWINGS AND SUBMITTALS

Shop drawings and submittals shall conform to the quality and quantity requirements detailed in other sections of these specifications.

1.5 RECORD DRAWINGS

The Contractor shall keep one separate set of blue-line prints for making construction notes and mark-ups and shall include the following:

A. Show conduit routing and wiring runs as constructed and identify each.

B. Show all terminal number and schematic changes.

C. Record all deviations from the Contract Documents.

D. Submit set of marked-up drawings for review with necessary details and clarity to have an auto-cad operator transfer the mark-ups to permanent drawings without intervention with others.

1.6 OPERATIONS AND MAINTENANCE MANUALS

A. Submit operation and maintenance data as detailed in Division 01.

1.7 ACCEPTANCE AND SUBSTITUTIONS

A. All manufacturers named are a basis as a standard of quality and substitutions of any equal product will be considered for acceptance unless prohibited under other divisions of these Specifications. The judgement of equality of product substitutions shall be made by the Engineer.

B. Substitutions after award of contract shall be made after the award of contract. Furnish all required supporting data. The submittal of substitutions for review shall not be cause for time extensions.

C. Where substitutions are offered, the substituted product shall meet the product performance as set forth in the specified manufacturer's current catalog literature, as well as meeting the details of the contract documents.

D. The details on the drawings and the requirements of the specifications are based on the first listed item of material or equipment; if any other than the first listed materials or equipment is furnished, then contractor shall assume responsibility for the correct function, operation, and accommodation of the substituted item. In the event of misfits or changes in work required, either in this Section or other Sections of the contract, or in both; bear all costs in connection with all changes arising out of the use of other than the first listed item specified.

E. Substitutions of products under another Section may occur. Make necessary adjustments and additions to work under this Section to accommodate those substitutions. Such adjustments and additions shall be performed in compliance with specifications at no additional charge.

1.8 CERTIFICATIONS

The Contractor shall submit the following certifications upon completion of the project:

A. All motor overload heaters and circuit breakers have been properly selected and installed. Attach a completed form "Motor Overload Heater and Circuit Breaker Data Sheet".

B. All wiring has been properly connected to all equipment in accordance with the manufacturer’s recommendations and the plans and specifications.

C. All electrical systems and subsystems are operating properly and have been operationally tested by simulations of all possible operating conditions.

D. All electronic instruments and switches are calibrated and functioning properly.

E. The emergency generation system and transfer switch (if specified) is operating properly and has been tested at maximum expected operating conditions.

F. The Graphic Display Panel (if specified) has been tested and is functioning properly.

G. The Distributed Control System (if specified) has been properly connected to all required equipment, is operating properly and has been operationally tested by simulation of all possible operating conditions.

H. Other certifications as to proper electrical operation as deemed necessary by the Engineer.

1.9 COOPERATION

A. Cooperate with all other trades so as to facilitate the general progress of the work. Allow all other trades every reasonable opportunity for the installation of their work and the storage of their materials.

B. The work under this section shall follow the general building construction closely. Set all pipe sleeves, inserts, etc., and see that openings for cases, pipes, etc. are provided before concrete is placed or masonry installed.

C. Work with other trades in determining exact locations or outlets, conduits, fixtures, and pieces of equipment to avoid interference with lines as required to maintain proper installation of other work.

D. Make such progress in work that will not delay the work of other trades. Schedule the work so that completion dates as established by the Engineer are met. Furnish sufficient labor or work overtime to accomplish these requirements if necessary or directed to do so.

1.10 ADDITIONAL REQUIREMENTS

A. Electrical wire and conduit schedules, and interconnection drawings are prepared by the Engineer to assist the electrical subcontractors in estimating the cost of the project and are based on the latest information available from the vendors at the time of design. Once shop drawings are received, changes may be required on the project external wiring to accommodate their latest design and to make the system function properly.

B. It shall be the Contractors responsibility to check with the various vendors before bidding the project and to include monies in his bid to accommodate these requirements since no changes to the contract price will be allowed for these changes.

1.11 ELECTRICAL EQUIPMENT REQUIREMENTS

A. The plant electrical system is custom designed to the specific requirements of the Owner and the Engineer using a sophisticated control system. The vendors shall custom design their electrical equipment and panels to match these electrical requirements. This means that it is highly unlikely that the vendor’s standard panels and electrical equipment will be compatible with the requirements of this project. Shop drawings shall be submitted showing external wiring terminals and shall properly identify the devices to which that they are to be interconnected. At a minimum the drawings shall be prepared with the same engineering effort as can be expected to be utilized in motor control center class 2, type B wiring. Wiring and elementary and control drawings shall be prepared using drawing sizes sufficient to show wiring details clearly and shall have the Owner's name and project on each sheet. All options furnished shall be identified. Any item not furnished shall be entirely deleted from the drawing. Drawings that indicate such things as "if supplied" "these models only" "optional" etc. will be rejected. Any drawings submitted where it is obvious that no effort was made to properly prepare them for easy checking by the Engineer will be rejected.

B. Shop drawings, unless mark-ups are very trivial, will not be returned "approved as noted". They will be returned for resubmittal as many times as necessary. Therefore make every effort to comply with the requirements of this project on the first submittal in order to avoid project delays.

C. The Contractor shall include monies in his bid to strictly adhere to the above.

PART – 2 – PRODUCTS

2.1 WIRE AND CABLE

See other sections of these specifications for wire and cable to be used on this project.

2.2 CONNECTORS

A. Mechanical connectors shall be copper alloy bolted pressure type with bronze hardware. Such connectors unless otherwise indicated shall be Square D, OZ/Gedney, T&B, or equal.

TYPE	MANUFACTURER
Single conductor to flat plate connector	Square Type LU OZ Type XLH, or equal
Multiple conductor to flat place connector	Square LU Series T&B Type 32000 DB, or equal
One-bolt parallel connector	Type T or equal
Split-bolt parallel connector	Square D Type CPS, T&B Type TP or equal
Two-bolt parallel connector	Square D Type K.R., OZ Type 5TS or equal
Splice connector	Square D Type SS OZ Type XW or equal
Cross-connector	Square D Type XP OZ Type T, or equal
Ground rod connector	Square D Type CG OZ Type ABG, or equal
Flush floor connector	Square D Type GCJ OZ Type VG, or equal

B. Insulated spring wire connectors shall be plated spring steel with thermoplastic jacket. Connectors shall be rated at 150 degrees C continuous.

C. Insulated set-screw connectors shall consist of copper body with flame retardant, 600 V class insulated shell that threads over set-screw body.

D. Terminal connectors for flat-head terminal screws shall be locking spade type with vinyl insulated compression indent tubular wire shaft.

E. Terminal strip connectors shall be channel-mounted type with tin-plated solderless box lugs contained within nylon-insulated separable carriers.

F. Furnish terminal strips complete with channels, channel mounting hardware, and closures, and fittments.

2.3 INSULATING PRODUCTS

A. General purpose electrical tape shall be 7-mil thick stretchable vinyl plastic with pressure adhesive backing, 3M "Scotch #33, Plymouth "Slipknot Grey", or equal.

B. Insulating void-filling tape shall be stretchable ethylene propylene rubber with high-tack and fast fusing surfaces. Tape shall be rated for 90 degrees C continuous, 130 degrees C overload and it shall be moisture-proof. Void-filling tape shall be 3M "Scotch #23," Plymouth "Plysafe", or equal.

C. Arc-proof tape shall be flame-retardant, self-extinguishing compound. Tape shall be resistant to ultraviolet, water, salt water, raw sewage and acids. Arc-proof tape shall be "3M" Scotch #7700, Plymouth "Plyarc", or equal.

D. Insulation putty filler tape shall be elastic, moisture proof rubber compound suitable for bedding and rounding out irregular surfaces.

E. Conduit insulation putty shall be waterproof, stretchable, non-hardening compound suitable for duct seal.

2.4 CONDUIT:

A. Detail Specifications will indicate the type of conduit system to be used. Liquid tight flexible metallic conduit shall be U.L. listed and shall consist of a metallic interlocking core with an extruded thermoplastic cover.

2.5 CONDUIT FITTINGS

A. Conduit fittings shall be compatible with the conduit system used. Outdoor enclosures shall be weatherproof. Insulating bushings shall be non-combustible high-impact thermosetting phenolic with 150 degrees C temperature rating and shall not support combustion.

2.6 CONDUIT BODIES AND BOXES

Conduit bodies and boxes for pulling and installation of outlets shall be compatible with the conduit system and shall be as follows:

CONDUIT SYSTEM

Item	Galvanized Rigid Steel	Rigid Aluminum
Outlet Bodies	Threaded Zinc Coated Malleable Iron w/ Gasketed Cast Metal Crouse Hinds Form 7 Or Equal	Threaded Copper Free Aluminum w/Gasketed Sheet Aluminum Covers. Crouse Hinds Form 9 or Equal
Outlet Boxes	Same as Above Except Crouse Hinds FD, FS and DS or Equal. Outdoor or Wet Locations To Have Outdoor Covers.	Threaded Copper Free Aluminum w/Gasketed Cast Aluminum Outdoor Covers Crouse-Hinds FD, FS and DS or Equal

2.7 SUPPORT DEVICES

A. Single opening slotted channel supports shall be 2" deep x 1 5/8" wide. Double opening slotted channel supports shall be 4" deep x 1 5/8" wide. All slotted channel members shall be manufactured of ASTM 6063-T-6 aluminum. Furnish nuts, clamps, and hardware that shall be compatible with the slotted channel members.

B. Conduit clamps for use with slotted channel members shall consist of locking aluminum straps with aluminum hardware. All such straps and hardware shall be manufactured of hardened aluminum alloy with less than 0.5% copper content.

C. After-set concrete inserts shall be expansion-shield type with stainless steel hardware, 500 pounds minimum pull-out resistance.

D. Beam clamps shall be hot-dipped galvanized malleable iron. Furnish right angle, edge, or parallel types as required.

E. Nest-back supports shall consist of one-hole pipe clamp with conduit wall spacer clamp-back, all manufactured of hot-dipped galvanized malleable iron.

F. One-hole pipe clamps shall be manufactured of hot-dipped galvanized malleable iron.

G. Surface mounted swivel joints shall be double closed "U" brackets of plated malleable iron with attachment openings top and bottom.

H. Adjustable screw-mounted swinging hangers shall be manufactured of plated steel. Mounting bracket shall have four screw-holes.

I. All thread rod shall be stainless steel, 3/8" diameter (min. size).

2.8 CONNECTING LUGS

A. In many instances, due to the long distances between equipment and voltage drop limitation, larger wire sizes may be required that would normally be expected for some items of equipment. The Contractor and equipment vendor shall identify these requirements and provide proper lugs to match the wire sizes.

2.9 IDENTIFYING AND TAGGING

A. Individual phases and routing of each power and control circuit shall be identified by appropriate identifying permanent tags, at points near each end of the cables.

B. All equipment and electrical devices shall be identified. The Contractor and manufacturer shall be responsible for properly identifying and tagging equipment as to safe operation under adverse conditions by personnel normally associated with the proposed facility. Additional signs as the Engineer may require for safety shall be furnished and installed by the Contractor at no additional costs.

C. Voltage warning labels where shown or required by N.E.C or local codes shall be waterproof vinyl with permanent red letters "DANGER 480V (or 240V)", or with other voltage designations. Letters shall be at least 2" high.

2.10 WIRING DEVICES

All wiring devices shall be specification grade and shall meet NEMA WD1-1971 requirements. Furnish types of wiring devices as follows:

A. 2P/3W grounding, 20A/125V, NEMA 6-20R; Single receptacle: Hubbell #5361, Arrow Hart #5361, or equal.

B. GFCI receptacle shall be Square D "GFSR-115-B" with NEMA 5-15R style receptacle or "GFSR-120-B" with NEMA 6-20R style receptacle. GFCI receptacle shall be in duplex configuration; that is, top half shall contain test and reset button and bottom half shall contain protected receptacle.

C. Single-pole, single-throw 20A tumbler switch: Hubbell #1223, Arrow Hart #1992, or equal.

D. Single-pole, double-throw (three-way) 20A tumbler switch: Hubbell #1224, Arrow Hart #1993, or equal.

E. Double-pole, double-throw (four-way) 20A tumbler switch: Hubbell #1224, Arrow Hart #1994, or equal.

F. Double-pole, single-throw 20A, tumbler switch: Hubbell #1222, Arrow Hart #1992 or equal.

G. Single-pole, single-throw, momentary center - off 20A tumbler switch: Hubbell #1556, Arrow Hart #1995, or equal.

H. Manual motor starters shall be furnished complete with overloads and shall be Square D Type KO-Z, Westinghouse MS-TO1, or equal.

I. Furnish other types of wiring devices as may be indicated and specified on the drawings.

2.11 MISCELLANEOUS MATERIAL

A. Empty raceway pull cords shall be glass fiber reinforced tape that is foot-marked along its length, Thomas "True Tape", Greenlee "Foot-Marked", or equal.

B. Conduit thread compound for use with joining dissimilar metals and aluminum threads shall be conductive, non-galling, and corrosion inhibiting lithium-based compound.

C. Cable pulling compound shall be non-injurious to raceways, conductors, and insulation. Compound shall be non-toxic, non-hardening type.

D. Ground rods shall be copper-clad steel in lengths and diameters as indicated and shall be Blackburn, Hubbard, or equal.

PART – 3 – EXECUTION

3.1 INSTALLATION

A. Except where specifically noted or shown, the locations and elevations of equipment are approximate and are subject to small revisions as may prove necessary or desirable at the time the work is installed. Final locations shall be confirmed with the Engineer in advance of construction.

B. Where equipment is being furnished under another Section, request from the Engineer accepted drawings that will show exact dimensions of required locations of connections. Install the required facilities to the exact requirements of the accepted drawings.

C. All work shall be done in the best and most workmanlike manner by qualified, careful electricians who are skilled in their trade. The standards of work required throughout shall be of the first class. All work must meet the approval of the Engineer.

D. Unless shown in detail, the Drawings are diagrammatic and do not give exact details as to

elevations and routing of conduits, nor do they show all offsets and fittings; nevertheless, install the conduit system to conform to the structural and mechanical conditions of the construction. Unless locations and routing of exposed conduits are shown, confirm locations and routing prior to installation with the Engineer.

E. Holes for raceway penetration into sheet metal cabinets and boxes shall be accurately made with a hole punch. Cutting openings with a torch or other device that produces a jagged, rough-cut will not be acceptable.

F. Cabling inside equipment shall be carefully routed, trained and laced. Cables so placed that they obstruct equipment devices will not be acceptable.

G. Equipment shall be set level and plumb. Supporting devices installed shall be set and so braced that equipment is held in a rigid, tight fitting manner.

H. The Contractor shall verify the electrical capacities of all motors and electrical equipment furnished under other Sections, or furnished by the Owner, and request wiring information from the Engineer if wiring requirements are different from that specified under this Section. Do not make rough-ins until equipment verifications have been received.

I. The Contractor shall install all controllers, instruments, Distributed Control System Equipment (if specified), terminal boxes, pilot devices, and miscellaneous items of electrical equipment that are not integrally mounted with the equipment furnished under other Sections. All such equipment shall be securely mounted and adequately supported in a neat and workmanlike manner.

3.2 EXCAVATION AND BACKFILLING

A. All excavating and backfilling necessary for the installation of the work shall be performed. This shall include shoring and pumping in ditches to keep them dry until the work in question has been installed. All shoring required to protect the excavation and safeguard employees shall be properly performed.

B. All excavations shall be made to the proper depth, with allowances made for floors, slabs, forms, beams, piping, finished grades, etc. Ground under conduits shall be well compacted before conduits are installed.

C. All backfilling shall be made with selected soil, free of rocks and debris and shall be tamped as required to prevent settlement.

D. All excavated material not suitable and not used in the backfill shall be removed to the on-site disposal area. Area shall be as directed by the Engineer.

E. Field check and verify the locations of all underground utilities prior to any excavating. Avoid disturbing these as far as possible. In the event existing utilities are broken into or damaged, they shall be repaired so as to make their operation equal to that before the trenching was started.

F. Where the excavation required the opening of existing walks, drives, or other existing pavement, these facilities shall be cut as required to install new lines and to make connections to existing lines. The sizes of the cut shall be held to minimum consistent with the work to be installed. After installation of new work is completed and the excavation has been backfilled in accordance with above, repair existing walks, drives or other existing pavement to match existing installation.

3.3 CUTTING AND PATCHING

A. Cutting and patching required under this section shall be done in a neat workmanlike manner. Cutting lines shall be uniform and smooth.

B. Use concrete saws for large cuts in concrete and use core drills for small round cuts in concrete.

C. Where openings are cut through masonry walls, provide lintel or other structural supports to protect the remaining masonry. Adequate support shall be provided during the cutting operations to prevent damage to masonry.

D. Where large openings are cut through metal surfaces, attach metal angles around the opening.

E. Patch concrete openings that are to be filled with non-shrinking cementing compound. Finished concrete patching shall be trowled smooth and shall be uniform with surrounding surfaces.

3.4 WATERPROOFING

A. Provide waterproof flashing for each penetration of exterior walls and roofs.

B. Flashing for conduit penetrations through built-up roofs shall be made with pitch pans filled full with pitch. Conduit penetrations through poured concrete roofs shall be made with sleeves and annulus caulked.

C. Penetrations through walls at below ground elevations shall be waterproofed by conduit sealing fittings or other methods as indicated.

D. Interiors of raceways that are likely to have water ingress such as runs from handholes into below-grade installations shall have waterstops installed to prevent water from entering into installations.

3.5 PROTECTION

A. The Contractor shall provide suitable protection for all equipment, work and property against damage during construction.

B. The Contractor shall assume full responsibility for material and equipment stored at the site.

C. Conduit openings shall be closed with caps during installation. All outlet boxes and cabinets shall be kept free of concrete, plaster, dirt and debris.

D. Equipment shall be covered and tightly sealed against entrance of water, dust, dirt and debris.

E. All dry transformers prior to energization shall be protected against moisture and dirt absorption by a suitable covering. Also, maintain heat inside the covering by suitable means to prevent condensation.

F. Interiors of electrical equipment shall be kept clean and dry prior to energization.

3.6 DUCT LINES AND PULL BOXES

A. The Contractor shall excavate, backfill, remove excess soil, and furnish material for and install duct lines wherever shown on the plans. Conduit encased in concrete shall have three inch minimum covering of concrete on outside walls of ducts bank, and one inch minimum of concrete between the outside walls of adjacent conduits. The top of the ducts shall in general be 1'-6" below ground unless specifically shown otherwise on the drawings or is required to be deeper by N.E.C. or other codes.

B. It shall be the electrical subcontractor's responsibility to determine in advance any conflicts of duct banks with underground obstructions of electrical or any other disciplines and report these anticipated conflicts to the Engineer well in advance of operations such that the conflicts can be easily and economically resolved by all parties.

C. Conduit shall be firmly secured by driving reinforcing rod 12" in ground and tying with No. 10 wire or utilize plastic saddles with proper NEC spacing.

D. Where excavation has been made to a greater depth than that required, backfill shall be tamped solid and level to the required depth. All concrete forms shall be removed after the concrete has set, and all trenches shall be backfilled and tamped.

E. Pull boxes shall be installed as shown on the plans.

3.7 RACEWAY INSTALLATION

A. Install the raceway system to provide the facility with the utmost degree of reliability and maintenance-free operation. The raceway system shall have the appearance of having been installed by competent workmen. Kinked conduit, conduit inadequately supported or carelessly installed do not give such reliability and maintenance-free operation and will not be accepted.

B. Raceway shall be installed for all wiring runs except as otherwise indicated.

C. Exposed raceways shall be installed with their lines parallel to the lines of the building or structure to which they are attached.

D. Conduit runs that enter bottom of floor mounted enclosures that are open on the bottom shall be each equipped with grounding bushing on each conduit.

E. Conduit entries into sheet metal enclosures located inside shall be made with double locknuts and capped with molded bakelite grounding type bushings. Threaded penetration shall expose enough threads to adequately thread on bushing.

F. Conduit entries into NEMA 3, 3R, 4 or 12 enclosures located outside and in wet or damp location inside, shall be made with field-applied watertight hubs. Install locknut inside and cap each conduit with grounding bushing.

G. Conduit runs into boxes, cabinets, and the like shall be set in a neat manner. Vertical runs shall be set plumb. Conduits set crooked or out-of-plumb shall be replaced.

H. Conduits entrances into enclosures shall be carefully planned. Cutting away of enclosure structure, torching and/or cutting away sills, braces and structural members of the enclosure will not be acceptable.

I. Use approved hole cutting tools for entrances into sheet metal enclosures. Use of cutting torch or incorrect tools will not be acceptable. Holes shall be carefully planned and then cleanly cut and they shall be free from burrs, jagged edges, and torn metal.

J. Make-up of some conduit runs will require union fittings or split couplings. Install such fittings where required.

K. Liquidtight conduit shall be used for connections to motors, solenoids, pressure switches, limit switches, unit heaters, fans, motorized louvers, and other devices that may need to be removed for servicing. Each run of liquidtight flex shall be joined with liquidtight flex connectors. Make up each connection tightly; finished connector shall have minimum of 100 pounds pull-out resistance.

L. Empty conduits shall have pull tape installed the length of each run. Identify each terminal as to location of other end. Use blank waterproof label with waterproof ink. Cap exposed open ends of empty conduits.

M. Conduit bodies shall be installed in exposed runs of conduit where indicated and also wherever required to overcome obstructions and to provide access to wires. Covers for such fittings shall be accessible and unobstructed by the adjacent construction.

N. All raceway systems shall be adequately and safely supported. Loose, sloppy and inadequately supported raceways will not be acceptable and shall be replaced. Supports shall be installed at intervals not greater than those set forth under Article 300 of N.E.C. unless shorter intervals are otherwise indicated; or, unless conditions require shorter intervals of supports.

3.8 WIRING INSTALLATION

A. Conductors for power and control wiring shall be sized as indicated and where no size is given, the conductor size shall be #12 AWG minimum.

B. Color of power wire insulation and color of phase indicating tape shall be as follows:

Conductor	Wire Color	Tape Color 120/240v	Tape Color 120/208v	Tape Color 277/480v
Phase A	Black	Black	Black	Brown
Phase B	Black	Orange(H.L.)	Red	Orange
Phase C	Black	Blue	Blue	Yellow
Neutral (120v)	White			
Neutral (277v)	Gray			
Neutral (277v)	White/Red Stripe			
Equipment Ground	Green			

* Where in same conduit or box with 120/240 or 120/208 volt systems. Label

all panel boards with permanent tags as to the color coding.

C. All wiring shall be installed in raceways, except as otherwise specified. No wire or cable shall be drawn into a raceway until the raceway run has been completed, swabbed, and outfitted with specified bushings and fitments.

D. Do not exceed wire and cable manufacturer's recommended pulling tensions. Cable pulling compound shall be used as a lubricant for difficult pulls.

E. Carefully handle wire and cable, do not kink, scrape or damage conductors or their insulation.

F. Feeder and branch circuit wiring shall be installed from supply to load without splice, unless otherwise indicated. Branch circuits may be spliced for receptacle, lighting, and small appliance load inside appropriate junction boxes, and inside lighting fixtures.

G. Except as otherwise specified, taps and splices with #10 AWG, and smaller shall be made with insulated spring-wire connectors. Such connectors in damp or wet locations shall have opening in wire nut filled with silicone rubber cement and then wrapped with a layer of EPR tape or spring wire connectors manufactured for this use shall be used.

H. Motor connections made with #10 AWG and smaller wire shall be made up with set-screw copper lugs and with threaded-on set-screw copper lugs and with threaded-on insulating jacket. Where motors are located in damp or wet locations, fill opening under jacket with silicone rubber and cover connector with a layer of EPR tape.

I. Taps and splices in #8 AWG and larger wires shall be made up with copper alloy connectors. Apply over each connector a bedding of insulation putty. Then, apply at least four layers, half-lapped each layer of EPR tape. Finally, apply at least four layers half-lapped each layer of electrical tape.

J. Each wiring connection shall be made up tightly so that resistance of connection is as low as one-foot length of associated largest conductor resistance.

K. Numbered marking labels shall be installed to identify circuit numbers from panelboards and to identify control wiring. Install labels on each wire in each panelboard, junction, and pull box, and device connection. See "Identifying and Tagging" sections of these specifications.

L. Install numbered marking labels on each control wire termination at each terminal strip. Number selected shall correspond to manufacturer's terminal numbers.

M. Where control wiring terminates onto flat head type terminals, equip each such wire with crimp-type locking spade connector.

N. All wiring inside enclosure shall be neatly trained and laced. Bundle wires into groups and lace with plastic tie-wraps.

O. Install "DANGER 480V (or 240V)" labels on motor control equipment, and on other enclosures such as safety switches, wire-ways, and large enclosures that contain 480V (or 240V) wiring.

P. Install wiring devices where indicated. Each wiring device shall be set with axes plumb and installed with its yoke screws so as to adequately support device and provide grounding means to box. Where ganged devices are shown, install them into ganged boxes.

Q. Each item of equipment shall be adequately and thoroughly grounded. Comply with Article 250 of N.E.C.

R. Equipment grounding conductors into equipment shall be grounded to equipment ground bus or ground lug. Where no ground lugs are provided install ground lug and bond EGC thereto.

S. Where grounding bushings are installed, bond EGC there to end and furthermore ground each bushing lug to equipment ground bus or ground lug.

3.9 GROUNDING SYSTEM

A. The Contractor shall furnish and install a complete grounding system as shown on the Drawings consisting primarily of bare copper conductor and copper clad steel ground rods. All electrical equipment shall be tied to this system either with cable shown or the metallic conduit system per N.E.C. Attach grounding system to metallic buildings as required by N.E.C. weather specifically shown on drawings or not.

3.10 MANUFACTURING OF ELECTRICAL CONTROL PANELS

A. All electrical control panels including unit motor starters shall be factory assembled. In no case shall the electrician assemble and wire internal components in the field. The only onsite wiring that will be allowed inside panels is connections of external wiring to factory installed terminal strips.

3.11 NAMEPLATES

A. The electrical subcontractor shall install nameplates on all electrical equipment and devices including remote operating stations that clearly identifies the device. Nameplates shall be sized appropriately for the device and shall be attached with stainless steel screws or double sided tape suitable for outdoor use, 3M Scotch Brand Very High Bond 4930 or equal. Tape shall cover the entire surface of the nameplate.

B. A nameplate schedule indicating proposed wording and sizes shall be submitted to the Engineer for approval.

3.12 OVERLOAD HEATERS

A. The Contractor shall submit to the Engineer a form entitled "Motor Overload Heaters and Circuit Breaker Data Sheet" which shall contain actual nameplate information on the motors and motor starters which he shall inspect and record. He shall use the appropriate charts and tables supplied with the starting equipment and select, for approval by the Engineer, the manufacturer's recommended overload heaters and circuit breaker settings. Along with the data sheet he shall also submit a copy of the manufacturer's charts and tables. Motors shall not be started until overload heaters and circuit breaker settings are approved by the Engineer.

3.13 CLEAN- UP

A. Remove all temporary labels, dirt, paint, grease and stains from all exposed equipment. Upon completion of work clean equipment and the entire installation so as to present a first class job suitable for occupancy. No loose parts or scraps of equipment shall be left on the premises.

B. Equipment paint scars shall be repaired with paint kits supplied by the equipment manufacturer, or with an approved paint.

C. Clean interiors of each item of electrical equipment. At completion of work all equipment interior shall be free from dust.

3.14 TESTS

A. Each run of power and control wiring shall be tested prior to connection of line and load. Make tests with 1000V dc hand-crank megger. Each run of wiring shall be tested phase-to-phase and/or phase-to-neutral, and phase-to-ground. Test results for each test shall be equal to or greater than 5 megohms with 1000V dc applied. Defective wiring shall be replaced and retested. All tests shall be made in the presence of the Engineer.

B. High voltage cables, where used, shall be Hi-Pot tested in accordance with test procedures as outlined in other sections of these specifications or as directed.

C. All equipment shall be put through a trial run-in test to ascertain the performance complies with the intent of the specifications. All run-in tests shall be made in the presence of the Engineer.

END OF SECTION

SECTION 16200 - DETAIL SPECIFICATIONS FOR ELECTRICAL INSTALLATION

PART – 1 GENERAL

1.1 SCOPE

A. The work covered by this section shall include furnishing and/or installation and/or connection to all electrical equipment and necessary wiring systems required to provide the owner with a complete and operating system and shall consist of the following basic items of work:

1. Main distribution panel additions
2. Control panels
3. Instrumentation system
4. Circuit breakers
5. Mini power zone
6. Area lighting
7. Low voltage wire, conduit and fittings
8. Receptacles
9. Junction boxes
10. Duct lines and pull boxes
11. Grounding system
12. Support and mounting racks
13 Other equipment and work as shown on the drawings and as required for a complete and working installation

The above list is basic and general in nature. Refer to drawings and other sections and articles of the specifications.

B. All work shall be done in accordance with the equipment manufacturer's instructions and as indicated on the drawings and specified herein.

PART 2 – PRODUCTS

2.1 CONTROL PANELS

A. The Contractor shall furnish and install control panels for all equipment as indicated on the drawings. Control panels shall be as follows:

1. EQ Tank Blowers Control Panel (EQBCP). See specifications SECTION 17110.
2. Transfer Pumps Control Panel (TPCP). See specifications SECTION 17110.
3. Aeration Blowers Control Panel (ABCP). See specifications SECTION 17110.
4. Digestion Blowers Control Panel (DBCP). See specifications SECTION 17110.
5. Effluent Pumps Control Panel (EPCP). See specifications SECTION 17110.
6. Scraper Control Panel (SCP). See specifications SECTION 17110.

2.2 MAIN DISTRIBUTION PANEL (MDP)

A. Panel shall be fully rated with all copper bussing as manufactured by Square D.

2.3 MINI POWER ZONE

A. The Contractor shall furnish and install a single phase 480-120/240 volt mini power zone, as manufactured by Square D, as shown and specified on the drawings.

2.4 DISCONNECT SWITCHES

A. The Contractor shall furnish and install disconnect switches if and as shown and as sized on the drawings. All disconnect witches shall be NEMA 4X 316 stainless steel. Switches shall be heavy duty and horse power rated for the connected load applied. General purpose switches for motor loads are not acceptable. Provide disconnect switches at all locations as required by NEC.

2.5 CONDUIT

A. The Contractor shall furnish and install all conduit as shown on the drawings and as required. See specifications SECTION 16600 and 16610 for conduit specifications. All conduit on this project shall be of the following types:

1. Underground in trench – U.L. Listed Schedule 40 PVC installed in homogeneous red tinted reinforced concrete duct bank. Install duct bank 2'-0" below grade unless shown otherwise on drawings. Install electric warning tape 12" above duct bank. Underground stub up elbows shall be Schedule 80 long radius PVC.
2. Aboveground – U.L. Listed Schedule 40 rigid aluminum. Coat with coal tar epoxy where it is embedded in concrete. Do not use tape.
3. All metallic outlet boxes shall be cast aluminum.
4. Minimum conduit size shall be ¾".
5. Utilize Meyers hubs where conduit enters outdoor panels
6. All electrical mounting hardware and materials shall be non-corrosive. All conduit clamps, condulets, covers, unistrut and mounting hardware shall be aluminum or stainless steel. Anchor bolts shall be stainless steel. Many items of hardware may appear to be stainless steel and aluminum, therefore test each item before installing. No galvanized material shall be used. Where in conflict with any other wording in these specifications, this paragraph shall govern.

2.6 WIRE

A. The Contractor shall furnish and install wire and wiring systems as indicated on the drawings. Refer to the drawings for specific types of wire for each application and specifications SECTIONS 16540 and 16550 for wire specifications. All power, control and standard instrument wire shall be as recommended by the manufacturer or as follows:

1. 600 volt instrument cable – 2 conductor # 16 shielded. See specifications SECTION 16540.
2. 600 volt single conductor – XHHW-2. See specifications SECTION 16550

2.7 LIGHTING SYSTEMS

A. The Contractor shall furnish and install all lights and lighting systems as indicated on the drawings. The lighting system is to be a heavy-duty, heavyweight, industrial class system. The Contractor is cautioned that vendors routinely try to obtain approval on lightweight industrial or commercial systems with different materials, lenses, light distribution, ballasts etc. These will not be accepted. Only systems of at least equal quality as that specified will be approved. Install a poured seal-off fitting at each outdoor light.

Type G and G1 Stanchion Mount Units As Follows:

1.	Watts	74
2.	Lamp	LED
3.	Voltage	120 volt (or as required on drawings)
4.	Lens	Prismatic glass for long, narrow distribution along walkways and symmetrical distribution at other areas.
5.	Mtg. Access	Stanchion mount adapter for stanchion mounted units
6.	Type	G - Holophane PXLH-10000LM-ND-120-40K-80-XX-WG G1 - Holophane PXLH-10000LM-WD-120-40K-80-XX-WG

2.8 RACKS

A. The Contractor shall construct all equipment and mounting racks, including conduit support racks, as required for a complete and properly operating installation.

2.9 INSTRUMENTATION

A. The Contractor shall furnish and install instrumentation systems as specified in SECTIONS 17100 and 17110 and as required for proper operation of the plant.

2.10 CERTIFICATIONS

A. All electrical equipment shall be UL listed for its intended purpose.

PART 3 – EXECUTION

3.1 DEMOLITION

A. The Contractor shall disconnect and remove all existing electrical and instrumentation equipment that is not to remain in service at the completion of this project and which is l ocated in buildings or areas to be renovated. Verify that the equipment is not being used and not going to be used. All removed equipment shall be turned over to the Owner for selection of items that he wishes to keep in stores. All other items shall be properly disposed of by the Contractor.

3.2 COORDINATION WITH FACTORY SERVICEMAN

A. The Contractor shall coordinate his work with the factory serviceman of the various vendors and shall provide whatever assistance is necessary to place the entire system in operation.

3.3 COORDINATION WITH THE POWER COMPANY

A. All work on the service entrance from weather head or pad mounted transformer to utilization equipment shall be per local power company requirements. Where there is conflict with plans and specifications with the Cleco requirements, Cleco's requirements shall govern. The Contractor shall notify the Engineer in advance of making a change for the Engineer's approval.

B. The Contractor shall coordinate all work with the local power company including scheduling of service.

C. Seal all conduits entering panels with duct seal where it is possible that water or moisture

can enter electrical equipment.

3.4 Arc Flash Study

A. Provide a complete fault current coordination study and an arc flash hazard study and tag all gear accordingly, in compliance with NFPA 70, including the date of calculation. Provide labeling on all switchgear, motor control centers, switch boards, and additional equipment as required by NFPA 70. Adjust all trip and parameter settings in accordance with the calculations.

3.5 ELECTRICAL TECHNICIANS

A. The Contractor shall employ and pay for electrical technicians as necessary to insure proper installation, connection, testing, and placing of electrical and instrumentation systems into proper service. Coordinate all work with other vendor's technicians and service personnel. Utilize only personnel experienced in motors, motor controls, sophisticated electrical and instrumentation systems as well as installations in hazardous areas.

3.6 GROUNDING

A. The Contractor shall furnish and install a complete grounding system to provide a safe operating environment. See SECTION 16800.

3.7 SUBMITTALS

A. Submittal data shall include, but not be limited to the following requirements:

1. Complete materials list and items proposed to be furnished and installed.
2. Enclosure dimensions materials of construction and NEMA ratings.
3. Circuit breaker and other equipment interrupting ratings.
4. All electrical drawings so that the system can be checked for compatibility with other systems to which it interfaces.

B. Submittals sent to engineer for processing that require information on equipment that has not been previously submitted for approval may or may not be reviewed before dependent submittals are sent.

C. Each item of the submittal shall be marked as to the specification section and article.

D. Submittal sheets that have multiple specified and un-specified selections shall have the selected option clearly marked and the un-selected options marked out.

E. Submittals submitted via e-mail shall be marked such that they can be printed using a black and white printer.

F. Any submittals that are not complete, causes the engineer to ponder, or where it is obvious that no effort was made to properly prepare them for easy checking by the engineer will be rejected in their entirety.

3.8 SUBSTITUTIONS

A. On any proposed substitute to the specified item, it shall be the responsibility of the Contractor to show proof to the Engineer, that the proposed substitute is equal to the specified item by making written evaluation comparisons on material, performance, workmanship, maintenance features, energy use, durability, appearance, and the effect on compatibility with the other elements of the system which the item will be used. All changes required in the wiring and other electrical modifications shall be the responsibility of the Contractor.

3.9 GUARANTEE

A. All equipment shall be guaranteed against defects in material and workmanship for a period of one year from date of owner's final inspection and acceptance, except equipment specifically indicated in these specifications as having an extended warranty period, to the effect that any defective equipment shall be repaired or replaced without cost or obligation to the owner.

3.10 OTHER PROVISIONS

A. Where there are conflicts between various sections of the electrical specifications and/or drawings and/or other sections of the specifications, then the more stringent wording for a particular product, material, or item of work shall apply unless approved otherwise by the Engineer. Should a discrepancy occur, notify the Engineer before proceeding. The electrical drawings show the general locations of the equipment. The Contractor shall refer to the mechanical and civil drawings to obtain more accurate and the latest location of the equipment as well as to scale the drawings for distances. Equipment shown shall be mounted and placed so as not to violate any OSHA or NEC rules as to working space and obstruction clearance.

3.11 LIST OF SUBMITTALS

A. The following items shall be submitted for approval and /or records:

1. Control panels
2. Circuit breakers
3. Mini Power Zone
4. Disconnect switches
5. Area lighting
6. Low voltage wire, conduit and fittings
7. Receptacles
8. Junction boxes
9. Grounding materials and accessories
10. Any other items that require electrical connection or as requested by the Engineer

END OF SECTION

SECTION 16540 - 600 VOLT MULTI-CONDUCTOR INSTRUMENTATION CABLE

PART 1 – GENERAL

1.1 SCOPE

A. The Contractor shall furnish and install wire and cable as specified herein and as shown on the drawings.
B. This specification is for 600 volt multi-conductor cable tray rated instrumentation cable.

1.2 REFERENCES

1. UL83 – Thermoplastic Insulated Wires
2. UL 1277
3. UL 1581
4. UL 1685 – UL Flame Exposure Test.
5. IEEE 1202 - Flame Test
6. ICEA T--30-250 – Vertical Cable Tray Flame Test
7. ICEA T-29-520 – Vertical Cable Tray Flame Test

PART 2 – PRODUCTS

2.1 CONSTRUCTION

A. Each conductor shall be 7strand copper conductors insulated with nylon covered PVC.
B. Outer jacket shall be flame retardant polyvinyl Chloride (PVC) with nylon ripcord.
C. Conductors shall be color coded, twisted pairs.
D. Shield shall be aluminum polyester foil with 100% coverage and overall tinned drain wire.
E. Wire shall be rated for use in cable trays.
F. Wire shall be rated for 600 volts.

PART 3 EXECUTION

3.1 INSTALLATION

A. All conduit which will house the wire shall be completely in place before pulling wire.
B. Pull and terminate wire in accordance with manufacturer’s instructions.
C. After installing wire, test with a megger before energizing, record results and submit to the Engineer for approval.

END OF SECTION

SECTION 16550 - 600 VOLT SINGLE CONDUCTOR WIRE

PART 1 GENERAL

1.1 SCOPE

A. The Contractor shall furnish and install wire and cable as specified herein and as shown on the drawings.
B. This specification is for size 14 thru 1000 kcmil, single conductor 600 volt wire.

1.2 REFERENCES

1. UL 44 – Thermoset-insulated Wires and Cables.
2. ASTM - All applicable standards
3. NEMA WC 70
4. IEEE 1202/FT4 – Sizes 350 kcmil and larger
5. Federal Specification A-A-59544.
6. NFPA-70

PART 2 PRODUCTS

2.1 CONSTRUCTION

A. Wire shall be Type XHHW-2 soft annealed stranded copper rated for wet or dry locations at 90 degrees C.
B. Insulation shall be abrasion, moisture, heat and sunlight resistant, flame retardant cross-linked polyethylene (XLP).
C. Wire shall be stranded.
D. Wire shall be rated for 600 volts.

PART 3 EXECUTION

3.1 INSTALLATION

A. All conduit which will house the wire shall be completely in place before pulling wire.
B. Pull and terminate wire in accordance with manufacturer’s instructions.
C. After installing wire, test with a megger before energizing, record results and submit to the Engineer for approval.

END OF SECTION

SECTION 16600 - PVC CONDUIT

PART 1 – GENERAL

1.1 SCOPE

A. The Contractor shall furnish and install all electrical conduit as required for the project.

1.2 REFERENCES

A. All conduit shall be UL listed for its intended purpose.

1.3 SUBMITTALS - FOR REVIEW/APPROVAL

A. Submit all cut sheets and catalog data which clearly indicates what is proposed to be furnished.

1.4 QUALIFICATIONS

A. Only vendors with a minimum of five (5) years of specified conduit manufacturing experience will be considered.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver, unload and store in a location that will prevent damage to and debris from entering the conduit.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Carlon
B. Cantex

The listing of specific manufacturers above does not imply acceptance of their products that do not meet the specified ratings, features and functions. Manufacturers listed above are not relieved from meeting these specifications in their entirety. Products in compliance with the specification and manufactured by others not named will be considered only if pre- approved by the Engineer.

2.2 CONSTRUCTION

A. Conduit to be PVC Schedule 40 or schedule 80 as indicated on the drawings. Conduit shall be for application underground, encased or exposed applications in accordance with the National Electrical Code (Article 347).

B. Conduit shall be rated for use with 90° C conductors and UL Listed.

.

C. Material shall comply to NEMA Specification TC-2 (Conduit), TC-3 (Fittings) and UL 651 (Conduit) and 514b (Fittings).

D. Conduit and fittings shall carry a UL label (Conduit - on each 10 foot length; Fittings - stamped or molded on each fitting).

E. Conduit and fittings shall be identified for type and manufacturer and shall be traceable to location of plant and date manufactured. The markings shall be legible and permanent.

F. The Conduit shall be made from polyvinyl chloride compound (recognized by UL) which includes inert modifiers to improve weatherability and heat distortion.

G. The conduit and fittings shall be homogeneous plastic material free from visible cracks, holes or foreign inclusions. The conduit bore shall be smooth and free of blisters, nicks or other imperfections which could mar conductors or cables.

H. Conduit, fittings and cement shall be produced by the same manufacturer to assure system integrity.

2.3 TESTING AND ACCEPTANCE

A. Conduit and fittings shall be tested in accordance with the testing requirements defined in NEMA TC-2, NEMA TC-3 and UL-651 and 514. The acceptance criteria shall be given in the same standards.

2.4 CONNECTIONS

A. All conduit and fittings shall be solvent cemented in applications in accordance with instructions from the manufacturer.

PART 3 – EXECUTION

3.2 INSTALLATION

A. The Contractors shall install all conduit per the manufacturer's recommendations and the contract drawings.

END OF SECTION

SECTION 16610 - RIGID ALUMINUM CONDUIT

PART 1 – GENERAL

1.1 SCOPE

A. The Contractor shall furnish and install all electrical conduit as required for the project.

1.2 REFERENCES

A. All conduit shall be UL listed for its intended purpose.

1.3 SUBMITTALS - FOR REVIEW/APPROVAL

A. Submit all cut sheets and catalog data which clearly indicates what is proposed to be furnished.

1.4 QUALIFICATIONS

A. Only vendors with a minimum of five (5) years of specified conduit manufacturing experience will be considered.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver, unload and store in a location that will prevent damage to and debris from entering the conduit.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Allied
B. Wheatland
C. Cooper Industries
D. Republic

The listing of specific manufacturers above does not imply acceptance of their products that do not meet the specified ratings, features and functions. Manufacturers listed above are not relieved from meeting these specifications in their entirety. Products in compliance with the specification and manufactured by others not named will be considered only if pre- approved by the Engineer.

2.2 CONSTRUCTION

A. Conduit shall be rigid Schedule 40. Conduit shall be for above ground application exposed in accordance with the National Electrical Code.

B. Conduit shall be rated for use with 90° C conductors and UL Listed.

.

C. Material shall comply to ANSI Specification C80.5 and UL 6A.

D. Conduit and fittings shall carry a UL label.

E. The markings shall be legible and permanent.

F. The Conduit shall be made from 6063 aluminum alloy.

2.3 TESTING AND ACCEPTANCE

A. Conduit and fittings shall be tested in accordance with the testing requirements defined in the standards listed above.

PART 3 EXECUTION

3.1 INSTALLATION

A. The Contractors shall install all conduit per the manufacturer's recommendations and the contract drawings.

3.2 PROTECTION

A. Where aluminum conduit contacts concrete, coat conduit with coal tar epoxy. Tape wrap is not acceptable.

END OF SECTION

SECTION 16800 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 – GENERAL

1.1 DESCRIPTION

A. This section specifies general grounding and bonding requirements of electrical equipment operations and to provide a low impedance path for possible ground fault currents.

B. Grounding electrode system" refers to all electrodes required by NEC, as well as made and supplementary grounding electrodes. It shall also apply to external ground wire systems which provide supplemental grounding of motors, steel structures, conveyors and other electrical equipment.

C. The terms "connect" and "bond" are used interchangeably in this specification and have the same meaning.

PART 2 – PRODUCTS

2.1 GROUNDING AND BONDING CONDUCTORS

A. Equipment grounding conductors shall be UL 83 insulated stranded copper. Insulation color shall be continuous green for all equipment grounding conductors, except that wire sizes #4 AWG and larger shall be permitted to be identified per NEC.

B. Bonding conductors shall be ASTM B8 bare stranded copper.

C. Electrical System Grounding: Conductor sizes shall not be less than what is shown on the drawings and not less than required by the NEC, whichever is greater.

2.2 GROUND RODS

A. Copper clad steel, 3/4 inch diameter by 10 feet long, conforming to UL 467.

B. Quantity of rods shall be as required to obtain the specified ground resistance.

2.3 GROUND CONNECTIONS

A. Below Grade: Exothermic-welded type connectors.

B. Above Grade: Mechanical pressure.

2.4 GROUND TERMINAL BLOCKS

A. At any equipment mounting location (e.g. backboards and hinged cover enclosures) where rack-type ground bars cannot be mounted, provide screw lug-type terminal blocks.

PART 3 - EXECUTION

3.1 GENERAL

A. Ground in accordance with the NEC, as shown on drawings, and as hereinafter specified.

B. System Grounding:

1. Secondary service neutrals: Ground at the supply side of the secondary disconnecting means and at the related transformers.
2. Separately derived systems (transformers downstream from the service entrance): Ground the secondary neutral.
3. Isolation transformers and isolated power systems shall not be system grounded.

C. Equipment Grounding: Metallic structures including ductwork, building steel), enclosures, raceways, junction boxes, outlet boxes, cabinets, machine frames, conveyors, conveyor support structures, motors and other conductive items shall be bonded and grounded.

3.2 INACCESSIBLE GROUNDING CONNECTIONS

A. Make grounding connections, which are buried or otherwise normally inaccessible (except connections for which periodic testing access is required) by exothermic weld.

3.3 SECONDARY EQUIPMENT AND CIRCUITS

A. Main Bonding Jumper: Bond the secondary service neutral to the ground bus in the service equipment.

B. Metallic Piping, Building Steel, and Supplemental Electrode(s):

1. Provide a grounding electrode conductor sized per NEC between the service equipment ground bus and all metallic water and gas pipe systems, building steel,

   and supplemental or made electrodes. Jumper insulating joints in the metallic piping. All connections to electrodes shall be made with fittings that conform to UL 467.
2. Provide a supplemental ground electrode and bond to the grounding electrode system.

C. Service Disconnect (Separate Individual Enclosure): Provide a ground bar bolted to the enclosure with lugs for connecting the various grounding conductors.

D. Switchgear, Switchboards, Unit Substations, and Motor Control Centers:
   1. Connect the various feeder equipment grounding conductors to the ground bus in the enclosure with suitable pressure connectors.
   2. For service entrance equipment, connect the grounding electrode conductor to the ground bus.
   3. Connect metallic conduits, which terminate without mechanical connection to the housing, by grounding bushings and grounding conductor to the equipment ground bus.

E. Transformers:
   1. Exterior: Exterior transformers supplying interior service equipment shall have the neutral grounded at the transformer secondary. Provide a grounding electrode at the transformer. Bond neutral to ground at transformer.
   2. Separately derived systems (transformers downstream from service equipment): Ground the secondary neutral at the transformer. Provide a grounding electrode conductor from the transformer to the nearest component of the grounding electrode system. Bond neutral to ground at transformer.

F. Conduit Systems:
   1. Ground all metallic conduit systems in accordance with accepted methods and NEC.
   2. Conduit containing only a grounding conductor, and which is provided for mechanical protection of the conductor, shall be bonded to that conductor at the entrance and exit from the conduit.

G. Feeders and Branch Circuits: Install equipment grounding conductors with all feeders and power and lighting branch circuits.

H. Boxes, Cabinets, Enclosures, and Panelboards:
   1. Bond the equipment grounding conductor to each pullbox, junction box, outlet box, device box, cabinets, and other enclosures through which the conductor passes.
   2. Provide lugs in each box and enclosure for equipment grounding conductor termination.
   3. Provide ground bars in panelboards, bolted to the housing, with sufficient lugs to terminate the equipment grounding conductors.

I. Motors and Starters: Provide lugs in motor terminal box and starter housing or motor control center compartment to terminate equipment grounding conductors.

J. Receptacles shall not be grounded through their mounting screws. Ground with a jumper from the receptacle green ground terminal to the device box ground screw and the branch circuit equipment grounding conductor.

K. Ground lighting fixtures to the equipment grounding conductor of the wiring system when the green ground is provided; otherwise, ground the fixtures through the conduit systems. Fixtures connected with flexible conduit shall have a green ground wire included with the power wires from the fixture through the flexible conduit to the first outlet box.

L. Fixed electrical appliances and equipment shall be provided with a ground lug for termination of the equipment grounding conductor.

3.4 CORROSION INHIBITORS

A. When making ground and ground bonding connections, apply a corrosion inhibitor to all contact surfaces. Use corrosion inhibitor appropriate for protecting a connection between the metals used.

3.5 WIREWAY GROUNDING

A. Ground and Bond Metallic Wireway Systems as follows:
   1. Bond the metallic structures of wireway to provide 100 percent electrical continuity throughout the wireway system by connecting a #6 AWG bonding jumper at all intermediate metallic enclosures and across all section junctions.
   2. Install insulated #6 AWG bonding jumpers between the wireway system bonded as required in paragraph 1 above, and the closest building ground at each end and approximately every 50 feet.
   3. Use insulated #6 AWG bonding jumpers to ground or bond metallic wireway at each end at all intermediate metallic enclosures and cross all section junctions.

3.7 GROUND RESISTANCE

A. Grounding system resistance to ground shall not exceed 5 ohms. Make necessary modifications or additions to the grounding electrode system for compliance without additional cost. Final tests shall assure that this requirement is met.

B. Resistance of the grounding electrode system shall be measured using a four-terminal fall-of-potential method as defined in IEEE 81. Ground resistance measurements shall be made before the electrical distribution system is energized and shall be made in normally dry conditions not less than 48 hours after the last rainfall. Resistance measurements of separate grounding electrode systems shall be made before the systems are bonded together below grade. The combined resistance of separate systems may be used to meet the required resistance, but the specified number of electrodes must still be provided.

C. Services at power company interface points shall comply with the power company ground resistance requirements.

D. Below-grade connections shall be visually inspected by the Owners representative prior to backfilling. The Contractor shall notify the

3.8 GROUND ROD INSTALLATION

A. Drive each rod vertically in the earth, not less than 10 feet in depth.

B. Where permanently concealed ground connections are required, make the connections by the exothermic process to form solid metal joints. Make accessible ground connections with mechanical pressure type ground connectors.

END OF SECTION

SECTON 17100 – INSTRUMENTATION

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS:

A. The Contractor shall furnish and install all instrumentation as shown on the drawings and as indicated herein.

PART 2 – PRODUCTS

2.1 MAGNETIC FLOW METERS AND ACCESSORIES

A. The Contractor shall furnish and install all instrumentation equipment as shown on the drawings and as specified herein and as required to provide a complete and operational system. The flow sensor tube shall be made of stainless steel with carbon steel or stainless steel flanges pressure rated as required for the piping system as specified in other sections of the specifications. A wafer style sensor will not be acceptable. The flow sensor shall be to NEMA 6 (IP-68) suitable for permanent submersion to 30 feet. The signal converter shall translate the signal induced in the flow sensor into proportional analog output. There shall also be provided a digital indicator representing actual flow and total flow. The converter shall be capable of remote mounting. Integral converters are not acceptable. The signal converter shall have automatic zero stability and built-in “zero”, “span”, and “calibration” check circuitry. There shall be no need for external calibration devices. The flow range shall be digitally adjustable from 0-33 fps with a $1/100^{th}$ resolution. The output signal shall represent the true volumetric flow with a maximum error under application conditions not only under “reference” or laboratory calibration conditions. Accuracy: ±0.5% of reading for flows 1.0 fps – 33 fps. The converter shall have bi-directional flow capability and provide isolated 4-20 ma and scaleable pulse frequency outputs from separate terminals. A reverse flow indicator shall be provided. The signal converter shall be “user friendly”. No programming knowledge shall be required for its operation. The enclosure shall meet NEMA 4X and IP65 standards. Furnish and install grounding rings where they are required or necessary for proper operation of the system such as where they are used in non-conductive piping or non-conductive piping lining systems. The contractor and vendor shall identify these locations and submit the ring drawings and installation instructions with flow meter submittals. Units and all accessories shall be rated for outdoor service with UV exposure.

B. Approved manufacturers are Rosemount and ABB or equal with polymer liner and remote converter/display or pre-approved equal. Display shall indicate totalized flow and instantaneous flow.

C. Magnetic flow meter shall be guaranteed for a period of 3 years after placing into operation. Flow range shall be as shown on drawings or determined during shop drawing review.

2.2 CIRCULAR CHART RECORDERS

A. The Contractor shall furnish and install a circular chart recorder for each magnetic flow meter.

B. Recorders shall be 10’ circular with a 1 year supply of charts scaled 0-100%. Charts shall be daily or weekly as selected by Owner. Recorder shall indicate instantaneous flow and totalized flow on an electronic display. Recorder shall be ABB C1300 or pre-approved equal. Case shall be for wall mounting. Supply 1 year supply of charts scaled 0-100%. Recorder shall have the capability of being switched from daily to weekly recording.

C. Each recorder shall be mounted in a separate NEMA 4X non-metallic enclosure with a

Plexiglas cutout for extra rain protection and for viewing from the outside.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Installation shall be in accordance with the manufacturers recommendations.

B. Submittals shall be in accordance with SECTION 16200.

END OF SECTION

SECTION 17110 – CONTROL PANELS

PART – 1 GENERAL

1.1 SCOPE

A. The Contractor shall furnish and install control panels and systems as listed below. For single source responsibility and warranty considerations, these panels shall be supplied by the manufacturer/vendor of the of the equipment which it operates.

B. All free standing panels shall have legs and shall be between 6 feet and 7 feet tall including legs. Breakers and switch handles shall be no higher than 6'7" to the center of the handle.

PART - 2 PRODUCTS

2.1 TRANSFER PUMPS CONTROL PANEL (TPCP)

A. Transfer pumps control panel shall contain at a minimum the following basic components:

1. NEMA 4x stainless steel enclosure with 3 point latches, and inner swing-out panels - Hoffman or equal. Panel to be free standing on legs.
2. All controls and indicators to be mounted on inner swing-out panels. No equipment shall be mounted on the outer doors.
3. Three (3) VFD's, ABB ACS 550 or approved equal. VFD keypads to be mounted on inner swing out door
4. Circuit breakers for each motor
5. Surge protection - Square D SDSA 3650
6. Triplex alternator with pump out of service switch
7. One (1) 5,000 Btu/hour NEMA 4X stainless steel side mounted industrial control panel air conditioner - ICEqube IQ5000V
8. Control power transformer with 3 fuses
9. Two (2) set-point controllers Precision Digital or approved equal. One detecting EQ tank level and the other detecting transfer pump flow. Furnish a submersible transducer.
10. 22mm HOA switch and run lights for each pump
11. Analog splitters as required to avoid looped signals
12. Lugs to accept feeders as indicated on drawings
13. 20/1 CB for control power
14. Terminals for all external wiring
15. Aux contacts that close upon loss of power, pump running (3), VFD fail (3), high level in EQ tank, analog output terminals that indicate EQ tank level
16. Intrinsically safe barrier for the transducer
17. Camo system in control panel for easy maintenance
18. Alarm light with red glass globe and guard and mounting accessories to indicate general alarm
19. Repeat cycle timer to alternate the pumps every 24 hours.
20. Other devices as indicated on the drawings
22. Panel to be manufactured by a UL Certified UL 508A manufacturer. Panel to have serialized UL seal as proof of certification. Submit manufacturer's certification number with submittals

B. Operation shall be as follows:

1. The pumps shall try to maintain a set-point level in the EQ tank. As the level rises the pumps shall increase speed and as it falls the pumps shall decrease speed. The lead pump shall start first and attempt to maintain the level, however, if it reaches full speed, the lag pump shall start. All running pumps shall operate at the same speed and only 2 pumps shall be allowed to operate at a time.
All 3 pumps shall be in the alternation sequence. The alternator shall sequence when all pumps stop. The VFD's shall be set such that they have a minimum operating speed. All operating pumps shall pump to the stop level. In the event that a pump operates continuously in a 24 hour period then the control system shall cause the pumps to alternate.

2. The flow signal shall control the maximum pump speed. At critical flow set- points, the maximum pump speed of all pumps shall be reduced simultaneously to limit the flow to the treatment plant. The maximum speed adjustments shall occur at 3 different flows (flows 1, 2 and 3). It shall be re-adjusted to 60 hz after a lower reset flow (flow 4) is obtained.

2.2 EQ TANK BLOWERS CONTROL PANEL (EQBCP)

A. EQ tank blowers control panel shall contain at a minimum the following basic components:

1. NEMA 4x stainless steel enclosure with 3 point latches, and inner swing-out panels - Hoffman or equal.
2. All controls and indicators to be mounted on inner swing-out panels. No equipment shall be mounted on the outer doors.
3. Two (2) soft start motor starters with NEMA rated external bypass contactors and overloads. Soft starts shall have 3 SCR's and shall be Square D ATS 48, ABB PST or approved equal.
4. Circuit breakers for each motor
5. Phase monitor active only when in bypass mode
6. Surge protection - Square D SDSA 3650 or approved equal.
7. Duplex alternator with 1-ALT-2 switch
8. Control power transformer with 3 fuses
9. 22mm HOA switch and run lights for each pump
10. 22mm SS-ACL switch
11. Lugs to accept feeders as indicated on drawings
12. 20/1 CB for control power
13. Terminals for all external wiring
14. Aux contacts that close upon loss of power, pump running (2)
15. Camo system in control panel for easy maintenance
16. Repeat cycle timer to alternate blowers every 24 hours
17. Other devices as indicated on the drawings
18. Panel to be manufactured by a UL Certified UL 508A manufacturer. Panel to have serialized UL seal as proof of certification. Submit manufacturer's certification number with submittals

2.3 DIGESTION BLOWERS CONTROL PANEL (DBCP)

A. Digestion blowers control panel shall contain at a minimum the following basic

components:

1. NEMA 4x stainless steel enclosure with 3 point latches, and inner swing-out panels - Hoffman or equal.
2. All controls and indicators to be mounted on inner swing-out panels. No equipment shall be mounted on the outer doors.
3. Two (2) soft start motor starters with NEMA rated external bypass contactors and overloads. Soft starts shall have 3 SCR's and shall be Square D ATS 48, ABB PST or approved equal.
4. Circuit breakers for each motor
5. Phase monitor active only when in bypass mode
6. Surge protection - Square D SDSA 3650 or approved equal.
7. Duplex alternator with 1-ALT-2 switch
8. Control power transformer with 3 fuses
9. 22mm HOA switch and run lights for each pump
10. 22mm SS-ACL switch for each pump
11. Lugs to accept feeders as indicated on drawings
12. 20/1 CB for control power
13. Terminals for all external wiring
14. Aux contacts that close upon loss of power, pump running (2)
15. Camo system in control panel for easy maintenance
16. Repeat cycle timer to alternate blowers every 24 hours
17. Other devices as indicated on the drawings
18. Panel to be manufactured by a UL Certified UL 508A manufacturer. Panel to have serialized UL seal as proof of certification. Submit manufacturer's certification number with submittals

2.4 AERATION BLOWERS CONTROL PANEL (ABCP)

A. Digestion blowers control panel shall contain at a minimum the following basic components:

1. NEMA 4x stainless steel enclosure with 3 point latches, and inner swing-out panels - Hoffman or equal. Panel to be free standing on legs.
2. All controls and indicators to be mounted on inner swing-out panels. No equipment shall be mounted on the outer doors.
3. Three (3) soft start motor starters with NEMA rated external bypass contactors and overloads. Soft starts shall have 3 SCR's and shall be Square D ATS 48, ABB PST or approved equal.
4. Circuit breakers for each motor
5. Phase monitor active only when in bypass mode
6. Surge protection - Square D SDSA 3650 or approved equal.
7. Triplex alternator with pump out of service switch
8. Control power transformer with 3 fuses
9. 22mm HOA switch and run lights for each pump
10. 22mm SS-ACL switch for each pump
11. Lugs to accept feeders as indicated on drawings
12. 20/1 CB for control power
13. Terminals for all external wiring
14. Aux contacts that close upon loss of power, pump running (2)
15. Camo system in control panel for easy maintenance
16. Repeat cycle timer to alternate blowers every 24 hours
17. Circuit breaker to feed scraper drive control panel
18. Circuit breaker for panel for MPZ

18. Other devices as indicated on the drawings
19. Panel to be manufactured by a UL Certified UL 508A manufacturer. Panel to have serialized UL seal as proof of certification. Submit manufacturer's certification number with submittals

2.5 EFFLUENT PUMPS CONTROL PANEL (EPCP)

A. Effluent pumps control panel shall contain at a minimum the following basic components:

1. NEMA 4x stainless steel enclosure with 3 point latches, and inner swing-out panels - Hoffman or equal. Panel to be free standing on legs.
2. All controls and indicators to be mounted on inner swing-out panels. No equipment shall be mounted on the outer doors.
3. Two (2) VFD's, ABB ACS 550 or approved equal. VFD keypads to be mounted on inner swing out door
4. Circuit breakers for each motor
5. Surge protection - Square D SDSA 3650
6. Duplex alternator with 1-ALT-2 switch
7. One (1) 5,000 Btu/hour NEMA 4X stainless steel side mounted industrial control panel air conditioner - ICEqube IQ5000V
8. Control power transformer with 3 fuses
9. One (1) set-point controller with submersible transducer detecting level
10. 22mm HOA switch and run lights for each pump
11. Analog splitters as required to avoid looped signals
12. Lugs to accept feeders as indicated on drawings
13. 20/1 CB for control power
14. Terminals for all external wiring
15. Aux contacts that close upon loss of power, pump running (2), VFD fail (2), high level in wet-well, analog output terminals that indicate wet-well level
16. Intrinsically safe barrier for the transducer
17. Camo system in control panel for easy maintenance
18. Alarm light with red glass globe and guard and mounting accessories to indicate general alarm
19. Repeat cycle timer to alternate pumps every 24 hours.
20. Other devices as indicated on the drawings
21. Panel to be manufactured by a UL Certified UL 508A manufacturer. Panel to have serialized UL seal as proof of certification. Submit manufacturer's certification number with submittals

B. Operation shall be as follows:

1. The pumps shall try to maintain a set-point level in the wet-well. As the level rises the pumps shall increase speed and as it falls the pumps shall decrease speed. The lead pump shall start first and attempt to maintain the level, however, if it reaches full speed, the lag pump shall start. All running pumps shall operate at the same speed. The alternator shall sequence when all pumps stop. All operating pumps shall pump to the stop level. In the event that a pump operates continuously in a 24 hour period, then the control system shall cause the pumps to alternate.

2.6 SCRAPER CONTROL PANEL (SCP)

Scraper control panel shall contain at a minimum the following basic components:

1. NEMA 4x stainless steel enclosure with 3 point latches, and inner swing-out panels - Hoffman or equal.
2. All controls and indicators to be mounted on inner swing-out panels. No equipment shall be mounted on the outer doors.
3. Across the line motor starter with overloads
4. Circuit breakers for motor
5. Phase monitor
6. Surge protection - Square D SDSA 3650 or approved equal.
7. Control power transformer with 3 fuses
8. 22mm HOA switch and run light
9. Lugs to accept feeders as indicated on drawings
10. 20/1 CB for control power
11. Terminals for all external wiring
12. Aux contacts that close upon loss of power, drive running
13. Camo system in control panel for easy maintenance
14. Other devices as indicated on the drawings
15. Panel to be manufactured by a UL Certified UL 508A manufacturer. Panel to have serialized UL seal as proof of certification. Submit manufacturer's certification number with submittals

PART - 3 EXECUTION

3.1 INSTALLATION

A. Install all panels and interconnecting wiring in accordance with the manufacturer’s instructions

B. Store all panels in a weather protected area until installation.

3.2 SUBMITTALS

A. Provide submittals in accordance with SECTION 16200.

END OF SECTION

STRATUM ENGINEERING, LLC
Geotechnical Engineering ♦ Testing and Inspection Services

January 19, 2016

Kyle Associates, LLC
638 Village Lane North
Mandeville, Louisiana 70471

Attn: Mr. Phil Nelson, P.E.

Re: Geotechnical Engineering Report
Proposed West St. Tammany Parish
Waste Water Treatment Plant Expansion
Covington, Louisiana
Project No. G15-108

Dear Phil:

Stratum Engineering, LLC (SE) is pleased to submit our Geotechnical Engineering Report for the above referenced project. This report includes the results of our field exploration and laboratory testing, and recommendations for foundation design as well as general site development.

We appreciate the opportunity to perform this geotechnical study and look forward to working with you during the design and construction phases of this project. If you have any questions pertaining to this report, or if we may be of further service, please do not hesitate to call.

Respectfully submitted,
STRATUM ENGINEERING, LLC

William "Dean" McInnis, P.E.
Project Manager

Tony Y. Maroun, P.E.
Principal

STATE OF LOUISIANA
TONY Y. MAROUN
License No. 26198
PROFESSIONAL ENGINEER
CIVIL ENGINEERING
1/19/16

WDM/TYM:nsv

TABLE OF CONTENTS

PROJECT INFORMATION

Project Authorization

Stratum Engineering, LLC (SE) has completed a geotechnical exploration for the proposed expansion to the West St. Tammany Regional Waste Water Treatment Plant (WWTP) to be completed for Tammany Utilities in Covington, Louisiana. The exploration was accomplished in general accordance with SE Proposal No. G15-185, dated November 24, 2015.

Project Description

The project includes the installation of new waste water treatment units consisting of an above ground steel aeration/clarifier tank as well as a steel equalization (EQ) tank. Both tanks will be supported on reinforced concrete mats. The units will have plan areas of approximately 5,000 and 12,000 square feet. The aeration/clarifier tank and equalization tank will each be about 16 ½ feet high with empty weights of approximately 300 kips and 85 kips, respectively. Each tank will exert a slab load of about 1,400 pounds per square foot when filled to capacity.

The geotechnical recommendations presented in this report are based on the available project information, plant location, and the subsurface materials described in this report. If any of the noted information is incorrect, please inform SE in writing so that we may amend the recommendations presented in this report, if appropriate and if desired by the client. SE will not be responsible for the implementation of its recommendations when it is not notified of changes in the project.

Purpose and Scope of Services

The purpose of this study was to explore the subsurface conditions at the site to enable an evaluation of cost effective foundation systems for the proposed Waste Water Treatment Plant Expansion. Two (2) borings were drilled at the site to a depth of 30 feet below the existing ground surface. The borings were located in the field by a Stratum Engineering representative using normal taping from existing landmarks. The approximate locations of the borings are indicated on the boring location plan included in the Appendix.

Our scope of services included a reconnaissance of the project site, drilling the soil borings, select laboratory testing, and preparation of this geotechnical report. The report briefly outlines the testing procedures, presents available project information, describes the site and subsurface conditions, and presents recommendations regarding the following:

- Foundation type, allowable bearing capacity, and an estimate of settlement;
- Seismic site classification;
- Site preparation, including subgrade preparation and fill compaction requirements;
- Factors influencing construction and performance of the proposed improvements.

SITE AND SUBSURFACE CONDITIONS

Site Location and Description

The site encompasses about 1 acre of property currently occupied by an existing aeration/clarifier tank and associated pump house structure. The property is located off LA Highway 1085 just north of Interstate 12 in Covington, Louisiana. Detailed grading information was unavailable at the time of this report. However, based on conversations with Mr. Phil Nelson of Kyle Associates, we understand that the existing ground surface elevation at the tank locations ranges from +23 to +24 feet. Considering a slab finished floor elevation of +26 feet, 2 to 3 feet of fill may be required to achieve the design grades. Furthermore, we understand that about two (2) feet of fill was previously placed during the initial development of the site.

The site is bounded by a wooded area followed by commercial properties to the north, LA Highway 1085 to the south, Windward Drive to the east, and a wooded area followed by residential properties to the west.

Drilling, Sampling, and Laboratory Testing Procedures

The borings were drilled with an All Terrain Vehicle (ATV) mounted drill rig. Auger and wet rotary drilling techniques were used to advance the borings. Samples were generally obtained continuously from the ground surface to a depth of ten feet and at maximum five foot intervals thereafter. Drilling and sampling techniques were accomplished in general accordance with ASTM Standards.

Undisturbed samples of cohesive soils were generally obtained using thin-wall tube sampling procedures in general accordance with the procedures for "Thin-Walled Tube Geotechnical Sampling of Soils" (ASTM D1587). These samples were extruded in the field with a hydraulic ram and were wrapped in aluminum foil prior to placement in a plastic wrapping to preserve moisture. The samples were transported to the laboratory in containers to prevent disturbance.

For cohesionless soils and semi-cohesive soils, Standard Penetration Tests (SPT) were performed to obtain standard penetration values of the soil. The standard penetration value (N) is defined as the number of blows of a 140-pound hammer, falling 30 inches, required to advance the split-barrel sampler one (1) foot into the soil. Samples of granular soils were obtained utilizing a two (2) inch O.D. split-barrel sampler in general accordance with procedures for "Penetration Test and Split-Barrel Sampling of Soils" (ASTM D1586). To perform the test and obtain a sample, the sampler is lowered to the bottom of the previously cleaned drill hole and advanced by blows from the hammer. The number of blows is recorded for each of three (3) successive increments of six (6) inches penetration. The "N" value is obtained by adding the second and third incremental numbers. The results of the standard penetration test indicate the relative density of cohesionless soils and thereby provide a basis for estimating the relative strength and compressibility of the soil profile components. The split spoon samples were identified according to the project number, boring number, and depth, and were also placed in polyethylene plastic wrapping to protect against moisture loss.

The laboratory testing program included supplementary visual classification and water content tests on all of the soil samples. In addition, selected samples were subjected to unconfined compression testing, percent passing the #200 sieve, and Atterberg Limits determination. Additional estimates of unconfined compressive strength were made using a hand penetrometer. The laboratory testing was performed in general accordance with ASTM Standard Procedures.

Subsurface Conditions

Based on the borings, about 24 inches of previously placed fill consisting of sand and limestone mixture was encountered at the surface of the site. The surficial material was underlain by firm to stiff reddish sandy lean clay to a depth of about 4 feet and was followed by stiff tannish gray lean clay to a depth of about 12 feet. The lean clay was underlain by firm to stiff tannish gray fat clay to a depth of 30 feet, the maximum depth explored.

The above subsurface description is of a generalized nature to highlight the major subsurface stratification features and material characteristics. The boring logs included in the Appendix should be reviewed for specific information at the boring locations. These records include soil descriptions, stratification, penetration resistance, and locations of the samples and laboratory test data. The stratification shown on the boring logs represent the conditions only at the actual boring locations. Variations may occur and should be expected across the site. The stratification represents the approximate boundary between subsurface materials and the actual transition may be gradual. Water level information obtained during field operations is also shown on the boring logs. The samples, which were not altered by laboratory testing, will be retained for 60 days from the date of this report and then will be discarded.

Groundwater Conditions

Groundwater was encountered at a depth between 9 ½ and 10 feet during the drilling operations. However, it should be noted that groundwater levels will fluctuate with seasonal variations in rainfall, extended periods of drought and surface runoff. Therefore, it is recommended that the actual groundwater levels at the site be determined by the contractor at the time of the construction activities.

IBC Site Classification

The International Building Code (IBC), 2012 edition, was reviewed to determine the site classification for seismic design. Based on the soils encountered in the boring and our experience in the general vicinity, the site can be classified as Site Class "D", as outlined in Section 1613.3.2 of the Building Code.

EVALUATION AND RECOMMENDATIONS

General

The type and depth of foundation suitable for a given structure primarily depends on several factors including the subsurface conditions, the function of the structure, the loads it may carry, the cost of the foundation and the criteria set by the Design Engineer with respect to vertical and differential movement which the structure can withstand without damage.

The results of this exploration indicate that the subsurface soils present at the site are fair in bearing quality and suitable to support the structure on a shallow foundation system. Details related to site preparation, foundation design, and construction considerations are presented in subsequent sections of this report.

Site Preparation

We understand that the area may have been filled some time ago and graded to achieve the current elevations. Since the tank sand pads and underlying sandy clay have been filled without any technical observation, it is recommended that 24 inches of the sandy fill be removed and stockpiled for re-use. The bottom 12 inches of the sandy clay fill should be proofrolled and field density tests conducted to verify the density of the in-situ fill.

The subgrade fill should be proofrolled with a tandem axle dump truck or a similar heavily loaded rubber tired vehicle weighing 20 tons. Soils, which are observed to rut or deflect excessively under the moving load, should be undercut and replaced with properly compacted structural fill. The proofrolling and undercutting activities should be witnessed by a representative of the Geotechnical Engineer and should be performed during a period of dry weather.

The remaining fill should be placed in a relatively uniform horizontal lift and should be adequately keyed into the previous lift. The structural fill may consist of sandy clay or clayey sand having a maximum liquid limit of 40 and a plasticity index of less than 18 percent. The structural fill should be compacted to at least 95 percent of the fill's maximum dry density as determined by ASTM D698 (Standard Proctor).

The structural fill should be placed in maximum lifts of eight (8) inches of loose material and should be compacted within the range of one (1) percentage point below to three (3) percentage points above the optimum moisture content value. If water must be added, it should be uniformly applied and thoroughly mixed into the soil by disking or scarifying. Each lift of compacted structural fill should be tested by a representative of the Geotechnical Engineer prior to placement of subsequent lifts. In-place density measurements should be taken to assure that the above degree of compaction is achieved.

Mat Foundations

We understand that the proposed waste water treatment plant will be supported on a shallow mat type of foundation bearing at least two (2) feet below the finished grade in the naturally occurring stiff clay or on compacted structural fill. The foundation may be designed for a maximum allowable bearing pressure of 2,500 psf which includes a design factor of safety of three (3).

Estimates of Modulus of Subgrade Reaction (k) for mat foundations will depend on the type and strength of bearing soils, mat size, shape, bearing depth, and magnitude of sustained loads. Since limited information regarding the bearing depth was available at the time the report was prepared, estimates for the subgrade reaction modulus for the soils encountered in the upper 4 feet are tabulated below:

Modulus of Subgrade Reaction (k)		
Soil Type	**Depth (ft)**	**k (pci)**
Silty Clayey Sand with Limestone	0 to 2	250
Sandy Clay	2 to 4	125

The Modulus of Subgrade Reaction (k) can be better estimated by plate load tests conducted on the soils in question at the actual bearing depth.

The foundation excavations should be observed by a representative of SE prior to steel or concrete placement to assess that the foundation materials are capable of supporting the design loads and are consistent with the materials discussed in this report. Soft or loose soil zones encountered at the bottom of the footing excavations should be removed to the level of firm soils or adequately compacted fill as directed by the Geotechnical Engineer. Cavities formed as a result of excavation of soft or loose soil zones should be backfilled with compacted structural fill or crushed stone, as determined by the Geotechnical Engineer.

Footing excavations should be observed and concrete placed as quickly as possible to avoid exposure of the footing bottoms to wetting and drying. Surface run-off water should be drained away from the excavations and not be allowed to pond prior to or after concrete placement. The foundation concrete should be placed during the same day the excavation is made. If it is required that footing excavations be left open for more than one day, they should be protected to reduce evaporation or entry of moisture.

Settlement

Differential settlements of mat foundations depend on the rigidity of the mat. Differential settlements for mats with a rigidity factor greater that 0.5 will be negligible. For mat foundations with rigidity factors less than 0.5, differential settlements will generally be on the order of 50 percent of the total settlement.

Analyses were made to estimate the settlement under a loaded area roughly about 130 feet by 130 feet. Based on a loading condition exerted by a uniform load of 1,400 psf, long term settlement at the center of the loaded area was estimated to be about one (1) to 1 ½ inches. Settlement at the edge and corner of the mat were estimated to be about ¾ inch and ½ inch, respectively.

CONSTRUCTION CONSIDERATIONS

It is recommended that SE be retained to provide observation and testing of construction activities involved in the foundations and related activities of this project. SE cannot accept any responsibility for any conditions which deviate from those described in this report, nor for the performance of the foundations, if not engaged to also provide construction observation and testing for this project.

Moisture Sensitive Soils/Weather Related Concerns

The upper soils encountered at this site are relatively sensitive to disturbances caused by construction traffic and changes in moisture content. During wet weather periods, an increase in the moisture content of the soil can cause significant reduction in the soil strength and support capabilities. In addition, soils that become wet may be slow to dry and thus significantly retard the progress of grading and compaction activities. It will, therefore, be advantageous to perform earthwork and foundation construction activities during dry weather.

Drainage and Groundwater Concerns

Water should not be allowed to collect in the foundation excavations or on the prepared subgrade in the construction area either during or after construction. Undercut or excavated areas should be sloped toward one corner to facilitate removal of any collected rainwater, groundwater, or surface runoff. Positive site surface drainage should be provided to reduce infiltration of surface water around the foundation elements.

Groundwater was encountered at a depth between 9 ½ and 10 feet during the drilling operations. However, it is possible that seasonal variations will cause fluctuations of the water table. Additionally, perched water may be encountered in discontinuous zones within the overburden soils. Any water accumulation should be removed from the excavations by pumping. If excessive and uncontrolled amounts of seepage occur, the Geotechnical Engineer should be consulted.

Excavations

In Federal Register, Volume 54, No. 209 (October 1989), the United States Department of Labor, Occupational Safety and Health Administration (OSHA) amended its "Construction Standards for Excavations, 29 CFR, Part 1928, Subpart P". This document was issued to better ensure the safety of workmen entering trenches or excavations. It is mandated by this federal regulation that excavations, whether they be utility trenches, basement excavation or footing excavation, be constructed in accordance with the new OSHA guidelines. It is our understanding that these regulations are being strictly enforced and if they are not closely followed, the owner and the contractor could be liable for substantial penalties.

The contractor is solely responsible for designing and constructing stable, temporary excavations and should shore, slope or bench the sides of the excavations as required to maintain stability of both the excavation sides and bottom. The contractor's "responsible person", as defined in 29 CFR, Part 1926, should evaluate the soil exposed in the excavations as part of the contractor's safety procedures. In no case should slope height, slope inclination, or excavation depth, including utility trench excavation depth, exceed those specified in local, state, and federal safety regulations.

We are providing this information solely as a service to our client. SE does not assume responsibility for construction site safety or the contractor's or other parties' compliance with local, state, and federal safety or other regulations.

REPORT LIMITATIONS

The recommendations submitted in this report are based on the available subsurface information obtained by SE and design details furnished by Kyle Associates, LLC. If there are any revisions to the plans for this project, or if deviations from the subsurface conditions noted in this report are encountered during construction, SE should be notified immediately to determine if changes in the foundation or pavement recommendations are required. If SE is not notified of such changes, SE will not be responsible for the impact of those changes on the project.

The Geotechnical Engineer warrants that the findings, recommendations, specifications, or professional advice contained herein have been made in accordance with generally accepted professional geotechnical engineering practices in the local area. No other warranties are implied or expressed.

The scope of services does not include an environmental or biological assessment of the site. Any statements in the report or supplementary documentation concerning odors or other suspicious observations are for information purposes only. If there are contamination or environmental concerns with the site, the owner should have further investigations conducted by others.

After the plans and specifications are more complete, the Geotechnical Engineer should be retained and provided the opportunity to review the final design plans and specifications to check that our engineering recommendations have been properly incorporated in to the design documents. At that time, it may be necessary to submit supplementary recommendations. If SE is not retained to perform these functions, SE will not be responsible for the impact of those conditions on the project. This report has been prepared for the exclusive use of Kyle Associates, LLC for the specific application to the proposed West St. Tammany Parish Waste Water Treatment Plant Expansion to be constructed in Covington, Louisiana.

APPENDIX

STRATUM ENGINEERING, LLC

= BORING LOCATION

STRATUM ENGINEERING, LLC

BORING LOCATION PLAN

GEOTECHNICAL ENGINEERING SERVICES
PROPOSED WEST ST. TAMMANY PARISH WASTE WATER TREATMENT PLANT EXPANSION
COVINGTON, LOUISIANA

STRATUM ENGINEERING, LLC

LOG OF BORING B-1

PROPOSED WEST ST. TAMMANY PARISH
WASTE WATER TREATMENT PLANT EXPASION
COVINGTON, LOUISIANA

TYPE OF BORING: WET ROTARY **LOCATION:** TREATMENT PLANT AREA **PROJECT NO.:** G15-108

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Reddish tan Clayey Sand with limestone - Fill						13			
			Firm to stiff reddish Sandy Lean Clay		0.41	1.00		106	21	31	14	66
5			Stiff tannish gray Lean Clay with silt seams and sand lenses			1.50			20			
					1.45	1.50		110	21			
10			▽			1.50			23	41	25	
			Firm to stiff tannish gray Fat Clay		0.87	1.00		90	33			
15												
20						1.50			31			
25			-becomes gray at 23'		0.93	1.00		82	41			
30			-stiff to very stiff at 28'			2.00			36			
			Boring Terminated at 30 Feet									
35												
40												
45												
50												

DEPTH OF BORING: 30 Feet **GROUNDWATER:** Encountered at 9 ½ Feet During Drilling
DATE: 12/14/2015

STRATUM ENGINEERING, LLC

LOG OF BORING B-2

PROPOSED WEST ST. TAMMANY PARISH
WASTE WATER TREATMENT PLANT EXPASION
COVINGTON, LOUISIANA

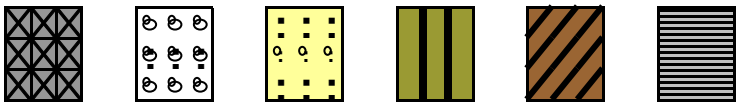
TYPE OF BORING: WET ROTARY **LOCATION:** TREATMENT PLANT AREA **PROJECT NO.:** G15-108

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Reddish tan Poorly Graded Sand with limestone						6			
			Stiff gray Silty Sandy Clay	12					19			78
5			Stiff to very stiff tannish gray Lean Clay with sand			2.00			21			
					1.32	1.50		112	19	40	24	83
						1.50			23			
10			▽									
			-firm to stiff at 13'		0.93	1.00		106	25			
15												
			Stiff tannish gray Fat Clay			1.50			42			
20												
			-becomes gray at 23'		1.23	1.25		88	36			
25												
						1.50			33			
30												
			Boring Terminated at 30 Feet									
35												
40												
45												
50												

DEPTH OF BORING: 30 Feet **GROUNDWATER:** Encountered at 10 Feet During Drilling
DATE: 12/14/2015

KEY TO TERMS AND SYMBOLS USED ON LOGS

SOIL TYPE

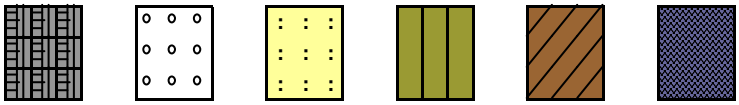


ROCK | GRAVEL | SAND | SILT | CLAY | PEAT

SAMPLER TYPE

NO SAMPLE | AUGER SAMPLE | SHELBY TUBE | SPLIT SPOON

MODIFIERS



STONE | GRAVELY | SANDY | SILTY | CLAYEY | FILL

NO RECOVERY | ROCK CORE | 2" SHELBY TUBE | TXDOT CONE

UNIFIED SOIL CLASSIFICATION SYSTEM - ASTM D 2487 (1980)

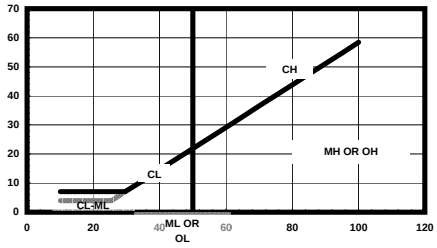
MAJOR DIVISIONS			LETTER SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS LESS THAN 50% PASSING NO. 200 SIEVE	GRAVEL & GRAVELY SOILS LESS THAN 50% PASSING NO. 4 SIEVE	CLEAN GRAVEL (LITTLE OR NO FINES	GW	WELL GRADED GRAVEL, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES
			GP	POORLY GRADED GRAVEL, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES
		W/ APPRECIABLE FINES	GM	SILTY GRAVEL, GRAVEL-SAND-SILT MIXTURES
			GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	SANDS MORE THAN 50% PASSING NO. 4 SIEVE	CLEAN SANDS LITTLE FINES	SW	WELL GRADED SAND, GRAVELY SAND (LITTLE FINES)
			SP	POORLY GRADED SANDS, GRAVELY SAND (L.FINES)
		SANDS WITH APPREA. FINES	SM	SILTY SANDS, SAND-SILT MIXTURES
			SC	CLAYEY SANDS,SAND-CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% PASSING NO. 200 SIEVE	SILTS AND CLAYS LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS & VERY FINE SANDS,ROCK FLOUR SILTY OR CLAYEY FINE SANDS OR CLAYEY SILT W/ LOW PI
			CL	INORGANIC CLAY OF LOW TO MEDIUM PI LEAN CLAY GRAVELY CLAYS, SANDY CLAYS, SILTY CLAYS
			OL	ORGANIC SILTS & ORGANIC SILTY CLAYS OF LOW PI
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS
			CH	INORGANIC CLAYS OF HIGH PLASTICITY FAT CLAYS
			OH	ORGANIC CLAYS OF MED TO HIGH PI, ORGANIC SILT
HIGHLY ORGANIC SOIL			PT	PEAT AND OTHER HIGHLY ORGANIC SOILS
UNCLASSIFIED FILL MATERIALS			ARTIFICIALLY DEPOSITED AND OTHER UNCLASSIFIED SOILS AND MAN-MADE SOIL MIXTURES	

CONSISTENCY OF COHESIVE SOILS

CONSISTENCY	SHEAR STRENGTH IN TONS/FT^2
VERY SOFT	0. TO 0.125
SOFT	0.125 TO 0.25
FIRM	0.25 TO 0.5
STIFF	0.5 TO 1.0
VERY STIFF	1.0 TO 2.0
HARD	> 2.0 OR 2.0+

RELATIVE DENSITY - GRANULAR SOILS

CONSISTENCY	N-VALUE (BLOWS/FOOT)
VERY LOOSE	0-4
LOOSE	4-9
MEDIUM DENSE	10-29
DENSE	30-49
VERY DENSE	> 50 OR 50+



ABBREVIATIONS

HP - HAND PENETROMETER
TV - TORVANE
MV - MINIATURE VANE
UC - UNCONFINED COMPRESSION TEST
UU - UNCONSOLIDATED UNDRAINED TRAIXIAL
CU - CONSOLIDATED UNDRAINED

NOTE: PLOT INDICATES SHEAR STRENGTH AS OBTAINED BY ABOVE TESTS

DELAYED GROUNDWATER LVL

LEVEL GROUNDWATER ENCOUNTERED

CLASSIFICATION OF GRANULAR SOILS

U.S. STANDARD SIEVE SIZE(S)

6"	3"	3/4"	4	10	40	200

BOUL--DERS	COBBLES	GRAVEL		SAND			SILT	CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE		

152	76.2	19.1	4.76	2.0	0.42	0.075	0.002

GRAIN SIZE IN MM

STRATUM ENGINEERING, LLC
Geotechnical Engineering ◆ Testing and Inspection Services

April 26, 2016

Kyle Associates, LLC
638 Village Lane North
Mandeville, Louisiana 70471

Attn: Mr. Phil Nelson, P.E.

Re: Additional Geotechnical Recommendations
Proposed West St. Tammany Parish
Waste Water Treatment Plant Expansion
Covington, Louisiana
SE Project No. G15-108
Addendum No. 1

Dear Phil:

Stratum Engineering (SE) is pleased to submit supplemental foundation recommendations for the above referenced project. SE conducted an initial geotechnical investigation for the project and our recommendations were provided in SE Report No. G15-108, dated January 19, 2016. During the initial investigation, two (2) borings were advanced to a depth of 30 feet below the existing ground surface in the tank areas. The report provided shallow mat foundation recommendations for the proposed new 5,000 and 12,000 square foot waste water treatment plants. Subsequent to the initial investigation, a recent revision to the plans includes the addition of a pump station in the southwest corner of the property.

We understand that the new pump station will consist of a pre-cast concrete wet well with a footprint of approximately 200 square feet installed at a bottom depth of approximately 12 feet below the existing ground surface. Consequently, SE was requested to advance one (1) additional boring to a depth of 30 feet in the pump station area so that design recommendations could be provided for the structure. The approximate location of the boring is indicated on the boring location plan included with this letter. Based on the results of the exploration, the subsurface soil conditions are generally consistent with the material encountered during the initial investigation. The soil appears to be generally fair in bearing quality and suitable for support of the proposed lift station on a shallow foundation system. Details related to the lift station, foundation recommendations, as well as construction consideration are presented in subsequent sections of this letter.

Lift Station Wet Well

It is understood that a pre-cast concrete wet well with a plan area of about 200 square feet will be installed at a depth of approximately 12 feet below the existing ground surface. Based on the boring drilled in the wet well area, loose clayey sand was encountered to a depth of about two (2) feet. The clayey sand was underlain by firm to stiff silty sandy clay to a depth of about six (6) feet and was followed by firm to stiff lean clay to a depth of 12 feet. The lean clay was underlain by stiff to very stiff lean clay with sand to a depth of about 22 feet. The boring was terminated in stiff to very stiff lean clay at a depth of 30 feet, the maximum depth explored. The log included with this letter should be reviewed for specific information at the boring location.

Based on the field data and laboratory test results, the soils at the bottom of the wet well elevation are estimated to have an allowable bearing pressure of about 2,000 psf which includes a factor of safety of 3.0.

Since wet conditions may be encountered at the bottom of the excavation, the wet well should bear on a minimum of 18 inches of #57 limestone to distribute the load and minimize the initial subsidence. The wet well excavation should be side bedded and backfilled to the surface with granular fill. The granular fill may consist of sand or an equivalent granular fill approved by the Geotechnical Engineer. The sand should have less than ten (10) percent passing the #200 sieve and be placed in lifts not exceeding 12 inches and compacted to 95 percent of the maximum dry density, as determined by ASTM D698.

Groundwater was encountered at a depth of about 7 ½ feet during the drilling operations. Dewatering of the excavation area may be necessary to allow proper installation of the wet well. Based on the laboratory test results, a coefficient of permeability (K) for the lean clay encountered in the upper 12 feet of the boring was estimated to be on the order of 1×10^{-8} cm/sec. Dewatering is anticipated to be accomplished using a sump/pump system due to the low permeability of the clay. However, should dewatering be required, it is recommended that the groundwater be lowered about two (2) feet below the bottom of the excavation. This can be accomplished by well points or other means of forced withdrawal. Braced excavations may be necessary to maintain a safe access to the wet well area. The design of the dewatering system and bulkhead for the wet well braced excavation should be the responsibility of the contractor who should maintain both systems, as necessary, throughout the installation.

Although groundwater was encountered at a depth of 7 ½ at the time of the investigation it may be encountered at shallower depths during construction. Therefore, the design of the wet well should take into consideration any buoyant forces exerted on the structure.

The foundation excavation should be observed by a representative of Stratum Engineering prior to placement of the wet well to assess that the foundation materials are consistent with the materials discussed in this letter. Soft or loose soil zones encountered at the bottom of the excavation should be removed to the level of firm, suitable bearing soils or adequately compacted fill as directed by the Geotechnical Engineer.

The foundation excavation should be observed and the well installed as quickly as possible to avoid exposure of the excavation bottom to wetting and drying. Surface run-off water should be drained away from the excavation and not be allowed to pond. If it is required that the excavation be left open for more than one day, it should be protected to reduce changes in the moisture content of the bearing soils.

Bedding Material

The wet well and associated sanitary gravity sewer lines and force mains should be supported on aggregate bedding to distribute the load and minimize initial subsidence. The bedding material below the wet well slab should be at least 18 inches in thickness and should extend at least 2 feet below the edge of the structure. The bedding material below the pipes should be at least 6 inches in thickness and should extend one-half of the pipe diameters beyond the edge of either side of the pipe or a minimum of 12 inches, whichever is greater. The pipes should be side bedded to the mid-height of the pipe. The bedding material should consist of well-graded, free draining aggregate, meeting the requirements of #57 stone.

The trench excavation should be backfilled to the surface with granular fill (sand). The fill should be placed in lifts not exceeding 8 inches and compacted to 95 percent of the maximum dry density, as determined by ASTM D698.

Report Limitations

These additional recommendations have been provided for the exclusive use of Kyle Associates, LLC for the specific application to West St. Tammany Parish Waste Water Treatment Plant Expansion in Covington, Louisiana. Site preparation and other recommendations provided in the initial geotechnical report remain in effect. If you should have any questions, please do not hesitate to call.

Respectfully submitted,
STRATUM ENGINEERING, LLC

William "Dean" McInnis, P.E.
Project Manager

Tony Y. Maroun, P.E.
Principal

STATE OF LOUISIANA
TONY Y. MAROUN
License No. 26198
PROFESSIONAL ENGINEER
CIVIL ENGINEERING
4/26/16

WDM/TYM:nsv

APPENDIX

STRATUM ENGINEERING, LLC

STRATUM ENGINEERING, LLC

BORING LOCATION PLAN

GEOTECHNICAL ENGINEERING SERVICES
PROPOSED WEST ST. TAMMANY PARISH WASTE WATER TREATMENT PLANT EXPANSION
COVINGTON, LOUISIANA

STRATUM ENGINEERING, LLC

LOG OF BORING B-3

PROPOSED WEST ST. TAMMANY PARISH
WASTE WATER TREATMENT PLANT EXPASION
COVINGTON, LOUISIANA

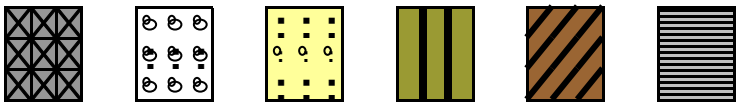
TYPE OF BORING: WET ROTARY **LOCATION:** WET WELL AREA **PROJECT NO.:** G15-108

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			6" Silty Sandy Topsoil with organics						17			
			Reddish tan Clayey Sand									
			Firm to stiff reddish tan Silty Sandy Clay		0.36	0.75		103	22	23	6	55
5			-becomes gray at 4'			1.75			20			
			Firm to stiff gray Lean Clay ▽		0.73	0.75		102	26			
10						1.50			23	37	20	
			Stiff to very stiff tannish gray Lean Clay with sand		1.60	2.00		104	22			
15												
20						2.25			22			
			Stiff to very stiff tannish gray Lean Clay		0.85	1.25		98	25			
25												
30						2.00			25			
			Boring Terminated at 30 Feet									
35												
40												
45												
50												

DEPTH OF BORING: 30 Feet **GROUNDWATER:** Encountered at 7 ½ Feet During Drilling
DATE: 4/13/2016

KEY TO TERMS AND SYMBOLS USED ON LOGS

SOIL TYPE

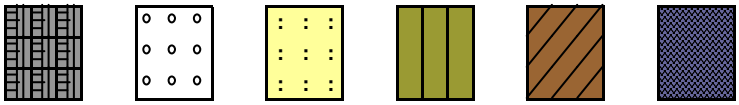


ROCK | GRAVEL | SAND | SILT | CLAY | PEAT

SAMPLER TYPE

NO SAMPLE | AUGER SAMPLE | SHELBY TUBE | SPLIT SPOON

MODIFIERS



STONE | GRAVELY | SANDY | SILTY | CLAYEY | FILL

NO RECOVERY | ROCK CORE | 2" SHELBY TUBE | TXDOT CONE

UNIFIED SOIL CLASSIFICATION SYSTEM - ASTM D 2487 (1980)

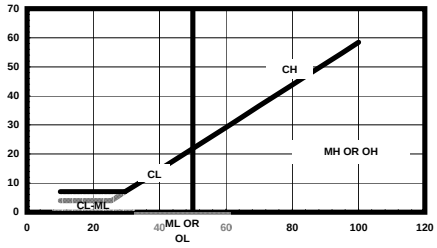
MAJOR DIVISIONS			LETTER SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS LESS THAN 50% PASSING NO. 200 SIEVE	GRAVEL & GRAVELY SOILS LESS THAN 50% PASSING NO. 4 SIEVE	CLEAN GRAVEL (LITTLE OR NO FINES	GW	WELL GRADED GRAVEL, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES
			GP	POORLY GRADED GRAVEL, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES
		W/ APPRECIABLE FINES	GM	SILTY GRAVEL, GRAVEL-SAND-SILT MIXTURES
			GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	SANDS MORE THAN 50% PASSING NO. 4 SIEVE	CLEAN SANDS LITTLE FINES	SW	WELL GRADED SAND, GRAVELY SAND (LITTLE FINES)
			SP	POORLY GRADED SANDS, GRAVELY SAND (L.FINES)
		SANDS WITH APPREA. FINES	SM	SILTY SANDS, SAND-SILT MIXTURES
			SC	CLAYEY SANDS,SAND-CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% PASSING NO. 200 SIEVE	SILTS AND CLAYS LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS & VERY FINE SANDS,ROCK FLOUR SILTY OR CLAYEY FINE SANDS OR CLAYEY SILT W/ LOW PI
			CL	INORGANIC CLAY OF LOW TO MEDIUM PI LEAN CLAY GRAVELY CLAYS, SANDY CLAYS, SILTY CLAYS
			OL	ORGANIC SILTS & ORGANIC SILTY CLAYS OF LOW PI
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS
			CH	INORGANIC CLAYS OF HIGH PLASTICITY FAT CLAYS
			OH	ORGANIC CLAYS OF MED TO HIGH PI, ORGANIC SILT
HIGHLY ORGANIC SOIL			PT	PEAT AND OTHER HIGHLY ORGANIC SOILS
UNCLASSIFIED FILL MATERIALS			ARTIFICIALLY DEPOSITED AND OTHER UNCLASSIFIED SOILS AND MAN-MADE SOIL MIXTURES	

CONSISTENCY OF COHESIVE SOILS

CONSISTENCY	SHEAR STRENGTH IN TONS/FT^2
VERY SOFT	0. TO 0.125
SOFT	0.125 TO 0.25
FIRM	0.25 TO 0.5
STIFF	0.5 TO 1.0
VERY STIFF	1.0 TO 2.0
HARD	> 2.0 OR 2.0+

RELATIVE DENSITY - GRANULAR SOILS

CONSISTENCY	N-VALUE (BLOWS/FOOT)
VERY LOOSE	0-4
LOOSE	4-9
MEDIUM DENSE	10-29
DENSE	30-49
VERY DENSE	> 50 OR 50+



ABBREVIATIONS

HP - HAND PENETROMETER
TV - TORVANE
MV - MINIATURE VANE
UC - UNCONFINED COMPRESSION TEST
UU - UNCONSOLIDATED UNDRAINED TRAIXIAL
CU - CONSOLIDATED UNDRAINED

NOTE: PLOT INDICATES SHEAR STRENGTH AS OBTAINED BY ABOVE TESTS

DELAYED GROUNDWATER LVL

LEVEL GROUNDWATER ENCOUNTERED

CLASSIFICATION OF GRANULAR SOILS

U.S. STANDARD SIEVE SIZE(S)

6"	3"	3/4"	4	10	40	200

BOUL--DERS	COBBLES	GRAVEL		SAND			SILT	CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE		

152	76.2	19.1	4.76	2.0	0.42	0.075	0.002

GRAIN SIZE IN MM