THE COUNTY OF GALVESTON

RUFUS G. CROWDER, CPPO, CPPB
PURCHASING AGENT

GWEN MCLAREN, CPPB
ASST. PURCHASING AGENT

COUNTY COURTHOUSE
722 Moody (21st Street)
Fifth (5th) Floor
GALVESTON, TEXAS 77550
(409) 770-5371

September 23, 2020

PROJECT NAME: **Bolivar Peninsula Special Utility District Elevated Water Storage Tank**

SOLICITATION NO: **ITB #B201045**

RE: **ADDENDUM #1**

To All Prospective Proposers:

The following information is being provided to aid in preparation of your proposal submittal(s)

Site Visit:
A site view has been scheduled to take place for this project at the following location and is scheduled as follows:

Bolivar Peninsula Special Utility District
1840 Hwy 87
Crystal Beach, TX 77650

Friday, September 25, 2020
10:00 a.m. CST

As a reminder, all questions regarding this bid must be submitted in writing to:

Rufus G. Crowder, CPPO CPPB
Galveston County Purchasing Agent
722 Moody, Fifth (5th) Floor
Galveston, Texas 77550
E-mail: purchasing.bids@co.galveston.tx.us

If you have any further questions regarding this bid, please address them to Rufus Crowder, CPPO CPPB, Purchasing Agent, via e-mail at purchasing.bids@co.galveston.tx.us, or contact the Purchasing Department at (409) 770-5371.

Please excuse us for any inconvenience that this may have caused.

Sincerely,

Rufus Crowder EGM

Rufus G. Crowder, CPPO CPPB
Purchasing Agent
Galveston County

THE COUNTY OF GALVESTON

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COUNTY COURTHOUSE
722 Moody (21st Street)
Fifth (5th) Floor
GALVESTON, TEXAS 77550

October 2, 2020

PROJECT NAME: **Bolivar Peninsula Elevated Water Storage Tank**

SOLICITATION NO: **ITB #B201045**

RE: **ADDENDUM #2**

To All Prospective Bidders:

The following information is being provided to aid in preparation of your bid submittal(s):

PROPOSAL OPENING / DUE DATE:

RFP #B201045, Bolivar Peninsula Elevated Water Storage Tank scheduled to be opened on Thursday, October 8, 2020 at 2:30 P.M ***has been re-scheduled***.

The new deadline for submitting a bid is as follows:

Date: Friday, October 9, 2020

Time: 2:00 P.M. CST

REVISIONS:

REVISIONS TO THE PLANS:

- Replace plan sheets G-1 through G-3, C-3 through C-11 with the attached. The seals have been signed.
- Replace plan sheet C-1, Demolition Plan, and C-2, Site Plan, with the attached. Note has been added to protect existing gate operator, to keep 4' walkway gate in place, and seals have been signed.
- Replace plan sheet E-5, Elevated Storage Tank Mezzanine Floor Plan, with the attached.
- Replace plan sheet E-7, One Line Diagram, with the attached.
- Replace plan sheet E-8, Electrical Schedules, with the attached.
- Replace plan sheet E-9, SCADA and Radio Diagrams, with the attached.
- Replace plan sheet E-10, Details 1 of 2, with the attached.
- Replace plan sheet E-11, Details 2 of 2, with the attached.

REVISIONS TO THE PROJECT MANUAL:

- Wage rates for "Building" may be used in place of wage rates for "Heavy".
- Remove the Table of Contents in its entirety and replace it with the attached.
- Remove Section 01110 Summary of Work in its entirety and replace it with the attached.
- Remove Section 02830 – Chain Link Fences and Gates in its entirety and replace it with the attached.
- Remove Section 11501 – Storage Tank Mixing System in its entirety and replace it with the attached.

- Remove Section 13210 – Composite Elevated Water Storage Tank in its entirety and replace it with the attached.
- Section 16290 – Surge Protection Devices has been added.
- Report of Inspection Elevated Water Storage Tank @ Crystal Beach Bolivar Pen SUD by Dunham Engineering, May 16, 2013 added to the end of the project manual.
- Bolivar Peninsula SUD 250 Thousand Gallon Metal Elevated Tank "Crystal Beach" by Marcan Underwater Services, LLC, March 13, 2018 added to the end of the project manual.
- Design drawing for Bolivar Peninsula Water Supply Corporation Water Plant and Elevated Tank, April 8, 1968 added to the end of the project manual.
- Scope of work from the BPSUD SCADA Servicer Provider, TraC-N-Trol, has been provided.

QUESTIONS:

Question 1: While going through the bid specifications I have found that sections 09920 and 09970 were in included twice. Sections 15020, 15050, 15140, 15260 and 15480 are listed on the table of contents bur are not included. Will these be provided at a later time?

Response: The redundant sections of Division 9 have been removed. Sections 15020, 15050, 15040, 15260, and 15480 are not needed for this project and have been removed from the Table of Contents.

Question 2: DWG # E-2; Are the existing Panels A/B on the ground floor of the Maintenance/Generator Building, or on the mezzanine level?

Response: Mezzanine. Drawing E-2 states the "MEZZANINE LEVEL" is illustrated and Drawing E-7 clearly States the Equipment Location.

Question 3: DWG E-3; How tall in the ceiling in the Maintenance/Generator Building? Could someone provide a picture of the inside (of the building) so that we may see what obstructions are in the way for routing the overhead conduits?

Response: Engineer recommends the Contractor visit the site for accuracy of their bid.

Question 4: DWG #E-10; Crouse-Hinds #50012-GR-116 is an incandescent obstruction light fixture. The detail on E-10 lists an LED fixture with the same part number as the incandescent fixture. Please clarify which type of light (incandescent or LED) and part number are correct.

Response: The incandescent fixture called out is correct and is to be provided with an LED light bulb equivalent in lieu of an incandescent. Drawing E-10 has been updated to with correct part numbers.

The remainder of this page intentionally left blank

Question 5: I'm having a difficult time determining what forms should be submitted with the bid... it appears as though there are different sections in the middle of the start and end of the bid form. Then the Bid Bond Form is in the Contract Agreement. I cannot distinguish what is for prebid/post bid since there aren't bookmarks/complete page numbers/titles and things aren't in the order in which they're referenced. Please clarify what items should be included with the bid... and where to find them.

Response: The forms listed below should be included in your submittal:

- Acknowledgement of all addenda;
- One (1) original and two (2) unbound copies of bid submittal;
- Bid Form (Proposer Information);
- Vendor Qualification Packet;
- Debarment Certification Form;
- Non-Collusion Affidavit;
- Lobbyist Certification;
- Bid Bond;
- Special Provisions for Construction;
- Bid Proposal;
- Contract Award;
- Contractor's Affidavit of Release of Lien;
- Contractor's Affidavit of Payment of Debts & Claims;
- Consent of Surety to Reduction in or Partial Release of Retainage;
- Consent of Surety Company to Final Payment;
- Contractor's Local Opportunity Plan;
- Proposed Contracts Breakdown;
- Estimated Project Workforce Breakdown;
- Statement of Bidder's Qualification;
- Contractor Certifications;
- Policy of Non-discrimination on the Basis of Disability;
- Attorney's Review Certification;
- Section 3 Resident Employment Opportunity Data Eligibility for Preference;
- Certification for Business Concerns;
- Contractor Certification of Efforts to fully Comply with Employment and Training Provision of section 3

Question 6: Section 11501; C-2 states that all power and control conduits shall be GRC (galvanized rigid conduit), all of the other drawings/documents state that exposed conduit shall be ARC (aluminum rigid conduit). Please clarify.

Response: GRC is not listed for use under Section 16111 for this project. Reference to conduit type was removed from Section 11501 to eliminate this conflicting information with Division 16. Section 16111 Part 3 defines acceptable conduit for use on this project. Yes – ARC will be installed in most locations for this project.

Question 7: Please confirm which SolarBee model and options are to be provided per Section 11501.

Response: Model No. SB1250Pwc. Please DELETE Specification Section 11501 and REPLACE with the new Section 11501 attached to this Addendum.

Question 8: DWG #E-5 Notes #6 & #7; are these notes referring to the solar mixing panel?

Response: No, disregard Notes 6 and 7, they are not relevant to the current design. See revised Drawing E-5.

Question 9: Does this project require Domestic requirements, such as American Iron & Steel. I don't see domestic materials called out, but it is looks to be a Federally Funded Project.

Response: This project does not have domestic requirements.

Question 10: In Division 15- Mechanical, are Sections 15260 & 15480 not used?

Response: Sections 15260 and 15480 are not used.

Question 11: Ref Plan Page M-2. Can you provide a specification for the expansion joints? Also, is an expansion joint required on the 12" Overflow Line?

Response: Per Section 13210, Paragraph 2.6L, both the Inlet/Outlet Pipe and the Overflow Pipe "shall be designed and constructed to accommodate any differential movement caused by settlement and by thermal expansion and contraction… The required flexibility shall be provided by an expansion joint located near grade in the vertical section of pipe". The Tank Manufacturer is responsible for the design of the piping and shall select the expansion joint required to accommodate for any expected settlement and/or thermal expansion of the piping system.

Question 12: Please provide a specification for the Butterfly Valves.

Response: Section 13210 – Composite Elevated Water Storage Tank has been revised with paragraph 2.6Q –AWWA Butterfly Valves for Clear Water Services.

Question 13: Please verify the piping material at the base of the tank as shown on M-2 is stainless steel sch10 per spec 13210.

Response: The elevated storage tank piping shall be **stainless steel** per Section 13210.

Question 14: We would like clarification on when the demolition is likely to happen. December 2020, January 2021? Any additional information that you can provide regarding the specifics of the demo time line would be greatly appreciated.

Response: Demolition of the existing tank will be one of the first construction activities upon receipt of NTP. This could be scheduled as early as mid-November.

Question 15: Section 11501- Paragraph 1.08 (B); states that the Owner is responsible for relocation/de-energizing any electrical or utility lines that may interfere with the construction of the tank foundation/structure. DWG #E-1 Note #1; states that the Electrical Contractor is to coordinate with Entergy to ensure the overhead feeder to the Maintenance Building is removed prior to the start of construction. Please clarify whose responsibility it is to coordinate and facilitate demolition of the feeder.

Response: The feeder line has been removed by Entergy. Contractor will need to remove power pole as part of the demolition bid item.

Question 16: Section 16111 Paragraph 3.02- (E); states that we are to use PVC coated ARC (aluminum rigid conduit) elbows/nipples for all stub-ups. Section 16402 Paragraph 2.02- (A); states that all horizontal duct bank bends over 15° and all conduit stub-ups shall be epoxy fiberglass conduit. Please clarify which is correct.

Response: 16111 does not have fiberglass conduit in the spec. Use PVC coated ARC where fiberglass is referenced in 16402.

Question 17: What type of pipe is the 20" waterline?

Response: The **existing** 20" water main is PVC C900.

Question 18: Please confirm the following on DWG #E-3; Duct bank SP-1 is not routed overhead inside the existing shop building to the power equipment rack. The "future maintenance shop disconnect" is not included in this proposed SOW (scope of work).

Response: Confirmed. Conduit SP-1 stops at the pull box outside the building. Future disconnect is shown for reference only and is not a part of this SOW.

Question 19: In Division 16, there is no spec for the cable tray we are to provide for the antenna cables from the RTU panel. Please clarify what type/material to provide.

Response: Aluminum or Fiberglass. Ferrous metal tray is not acceptable.

Question 20: What height is the photocell to be installed at for the exterior tank lights?

Response: 25'-0" Maximum, above finish grade, just above mezzanine floor level will be acceptable.

Question 21: DWG #E-9; what size is conduit SM-A? What is the conductor fill for this conduit?

Response: Provide 1" Conduit with #16 Twisted Shielded Pair (TSP) with integral Ground for Mixer.

Question 22: Regarding the CMU block wall electrical room inside the EST; will the conduits and outlet boxes (switches, receptacles, etc) be surface mounted?

Response: Yes, all Electrical shall be routed outside the block walls. All penetrations shall be sealed, in accordance with Tank Provider Requirements.

Question 23: Does the existing PLC have enough I/O points to support the proposed equipment for the new EST? Who is responsible for programming the PLC?

Response: Contractor is to coordinate all SCADA requirements with the BPSUD SCADA Services Provider indicated on E-9, TraC-N-Trol, as they are responsible for the programing of the PLC to reflect the I/O points as specified. It is TraC-N-Trol's responsibility to determine if the existing PLC has enough I/O points to support the proposed equipment. Reference the scope of work provided by BPSUD SCADA Services Provider in the attached addendum.

Question 24: Please provide a light fixture schedule for the EST. There is no spec or schedule for the fixtures in the proposal package.

Response: Fixtures are described on E-5, in the Notes. Where specific manufacturer and part number are not listed, fixture shall meet requirements listed.

Question 25: Will the service disconnect for the HVAC need to be NEMA 4X SS?

Response: Enclosures inside the EST may be NEMA 1, in accordance with Specification 16476.

Question 26: There is no information about the SPD needed for the proposed Panel "L", nor is there a spec in the contract documents. Please clarify.

Response: Specification 16290 has been included in this addendum.

Question 27: Are we providing a NEMA 3R or NEMA 4X enclosure for the main service disconnect on DWG #E-7? The spec in Section 16476 does not specify.

Response: The Existing 225A Enclosed "Main Circuit Breaker" shall be replaced "in kind". Contractor to match existing disconnect specifications including enclosure rating. Existing disconnect is in a NEMA 3R enclosure. Note 1 on E-7 was reworded to note enclosure type is also to match existing equipment.

Question 28: Who can we talk to about scheduling a site visit?

Response: Addendum 1 issued 9/23/2020 addressed this question. A site visit was scheduled for 10:00 AM Friday, September 25, 2020 at 1840 State Hwy 87, Crystal Beach, TX 77650.

Question 29: DWG C-2 references a motorized sliding gate, Detail-8 on DWG #C-8. Detail-8 on DWG #C-8 does not show a motor actuated gate. The panel schedules on DWG #E-8 do not list a circuit for the motor actuated gate. Please clarify.

Response: Existing motor operator is to be protected and reinstalled with proposed slide gate. This is to be paid under Item 10 – Chain Link Fence and Gates. Drawings C-1 and C-2 have been revised with a note and callouts.

Question 30: Can the overhead power lines that run diagonally across the lot, from the power lines on Kahla Drive to the DPW building be removed during the demolition/will they be removed prior to the demolition?

Response:Entergy has removed the lines connecting to the existing garage. The existing garage will be demolished prior to this contract's notice to proceed.

Question 31: On the attached overhead we see that the concrete in front of the existing DPW building needs removed. Is that entire DPW building being removed as well? Is it is hard for us to understand why the concrete would be removed unless the buildings were also being removed thank you.

Response: The existing garage structure and slab have been demolished and disposed of by BPSUD prior to the start of construction for this contract.

Question 32: It appears the demo is before the new on this project, when [approximately] do you expect the demolition of the existing water tank/tower to take place?

Response: Demolition of the existing tank will be one of the first construction activities upon receipt of NTP. This could be scheduled as early as mid-November.

Question 33: We are aware that there are numerous variables that will determine this, such as the speed in which our prime contractor moves, however, let's assume prices come in within budget, and all the bonds, contracts and insurance is submitted in the timeframe required, when is the soonest the council meeting will / can be scheduled for approval?

Response: It is anticipated that contract will be presented for award at the Galveston County Commissioners Court meeting on October 19, 2020.

Question 34: Based on that plan/schedule, approximately when is the actual tank demolition expected to take place? We ask this, because often times there are planned delays/timing issues dealing with the funding agency and/or city councils that we are unaware of. We are not asking for an answer accurate enough that we would remotely consider holding you responsible for missing a date. We simply want to know in your master schedule/master plan, when you would anticipate the demolition occurring?

Response: Demolition of the existing tank will be one of the first construction activities upon receipt of NTP. This could be scheduled as early as mid-November.

Question 35: Who is to provide the new SCADA Control Panel/RTU Panel, Antennas, etc. including the components? DWG #E-9 says that TRAC-N-Trol is the SUD's SCADA service provider. Is the electrical contractor supposed to procure the equipment from your service provider (TNT), or is TNT providing all of the equipment and the electrical contractor will install, program, and coordinate with TNT? More clarification is needed, as the project specifications do not include this work.

Response: TraC-N-Trol (TNT) is "Communications" provider, as Stated on Drawing E-9.Contractor shall Coordinate with TNT to include all Equipment and work required. Specifications are not required for the BP SUD SCADA Services Provider's Scope. Again, Contractor Shall Coordinate Prior to the Bid to provide a Complete and Working System.

Question 36: **On the 12" Flap Valve, is a cast iron flap valve acceptable? or is a stainless Flap Valve required?**

Response: Flap valve shall be stainless steel to match pipe material. Section 13210, Paragraph 2.6L,2.d should be revised to read "...discharge through a stainless steel flap valve...".

Question 37: Is it known if this tank is coated with lead-based paint interior or exterior? Are there any painting records available?

Response: The existing tank was rehabilitated and coated with an epoxy/urethane system in 2005. An inspection report prepared by Dunham Engineering in 2013 is attached as part of this addendum.

Question 38: Are there any tank inspection reports/cleanout reports available?

Response: Inspection reports prepared by Dunham Engineering in 2013, and Marcan Underwater Services in 2018 are attached as part of this addendum.

Question 39: Has an asbestos inspection been performed on this tank ever?

Response: The existing tank was rehabilitated and recoated in 2005. However, there are no available asbestos inspection reports.

Question 40: When we looked up everything referenced in item 69 – we feel they all deal with housing/child occupied housing/child occupied playgrounds. Obviously this water tower is not federal housing!
Our standard operating procedures include dealing with the lead-based paint as follows.

1. ***Will you the Owner/Engineer handling this project require lead based paint (LBP) abatement on the cut lines prior to torch cutting?***
    a. ***Our standard tank dismantle procedure is based on torch cutting the steel with the paint intact. Workers will be wearing proper personal protection equipment, including PAPR's and disposable clothing, and utilizing engineering controls (long torches and minimal cutting). We have also worked on many military bases, and have not had to remove the LBP from any of these projects. We have also worked for multiple chemical companies, railroad and power companies, and for multiple general contractors, complying with the most stringent requirements requested. OSHA Reg. 29CFR 1926.62 does not require paint removal prior to torch cutting. If you, the Engineer/ Project Manager were to require it, a standard dismantle price would get multiplied by (5) five.***

Response: Removal of lead based paint is not required prior to torch cutting. However, demolition and disposal shall be in accordance with applicable state and local guidelines and regulations.

Question 41: DWG #E-5 Note #1; states we are providing a NEMA-3R enclosure for the Lighting Control Panel. DWG #E-11 shows that the Lighting Control Panel is NEMA-12. Please clarify.

Response: Provide NEMA 12 enclosure and components per E-11 Detail. Disregard Note 1 on Drawing E-5 has been corrected in this Addendum.

Question 42: DWG #E-11 Note #4; refers to (2) Lithonia LED pole-mounted floodlights. There are no such devices shown on the contract drawings. Please clarify.

Response: Disregard the Standard Pole Light Detail, it is not utilized in this project.

Question 43: The Special Provision G. Procurement Timeline - states the Deadline for questions is Friday, September 25, 2020 by 5 PM CST. However, the Special Provision I. Personnel Contact - States Clarifications must be received in writing no later than seven (7) calendar days prior to the Bid due date, which would be Thursday, October 1, 2020. The later bid date would be more appropriate, please confirm questions can be submitted up to 2:30 pm on Thursday October 1st.

Response: The question deadline has passed. Please utilize the responses in this addendum to prepare your submittal.

Question 44: Is this project subject to any Buy American provisions?

Response: "Buy America" does not apply to this project.

Question 45: Can a wage rate be provided for a Boilermaker and a Painter?

Response: The attached "Building" wage rates can be submitted in place of the previously submitted "Heavy" rates.

Question 46: How many "CRYSTAL BEACH" logos are required to be painted on the tank?

Response: Two (2) in an orientation designated by the OWNER.

Question 47: Can a fee schedule for the permits listed in Section 011110 Item 1.09 be provided so we can include the appropriate costs within our bid? Or can the permit fees be waived? Also, Section 13210 Item 1.9 says the Owner shall obtain and pay for building permits, etc. Please clarify permit responsibility and costs associated with such permits.

Response: Floodplain building permit from Galveston County is the only permit required. The fee for this permit will be waived.

Question 48: Invitation to Bid No. 22. Resultant Contract - states "if applicable to the attached bid the Bidder must sign three (3) original contracts and return all three with their bid submittal", also states "Bidder should submit a proposed contract with its Bid." Please confirm this is all post bid and no sample or executed contracts are required at this time.

Response: No sample or executed contracts are required with the bid.

Question 49: Please clarify who pays for concrete testing. Section 01410 says testing is by the Contract, whereas Section 03310 says it is by the Owner. Or is all testing covered under the cash allowance?

Response: The contractor shall provide testing. All testing is covered under the Cash Allowance.

Question 50: Section 13210 Item 2.6.D specifies rest platforms at 50ft intervals. Drawing M-1 specifies swing out rest seats at 30 ft spacing. Please clarify.

Response: Section 13210 – Composite Elevated Water Storage Tank 2.6D1 has been revised to read, "Rest platforms shall be provided at maximum 30 ft. intervals".

Question 51: Are there any inspection reports or condition surveys of the existing tank?

Response: Inspection reports prepared by Dunham Engineering in 2013, and Marcan Underwater Services in 2018 are attached as part of this addendum.

Question 52: Are there any test reports on the coating system of the existing tank?

Response: The existing tank was rehabilitated and coated with an epoxy/urethane system in 2005. An inspection report prepared by Dunham Engineering in 2013 is attached as part of this addendum.

Question 53: Are there any as built drawings of the existing tank?

Response: There are no available as-built drawings for the existing tank. A drawing from the original tank design is attached to this addendum for reference purposes only.

Question 54: Is the existing tank supported by a pile foundation? The new tank is within the same footprint of the existing tank, as such we need to know what we have to remove to install our new piled foundation.

Response: The foundation of the existing tank is not known. For the purposes of bidding, it is assumed that the existing tank is supported on either drilled shafts or driven concrete piles. A geotechnical engineering report was provided in the project manual.

Question 55: Drawing C-8, what is the height of the new fence, 6 ft or 8 ft?

Response: The height of the proposed fence will be 6' with three strands of barbed wire.

Question 56: Is a temporary construction easement on the lots to the north of the site available to us?

Response: A temporary easement is not available.

Question 57: Can Kahla Drive be temporary closed or occupied periodically throughout construction for the purposes of staging materials and equipment?

Response: Yes, temporary closures may be allowed for brief periods of time. However, contractor must provide continuous access for local traffic.

Question 58: Is weekend work allowed at this location?

Response: Weekend work will be allowed except for any work requiring inspection. No work is allowed past 6:00 PM on the weekends.

Question 59: Please confirm the gate is a manual slide gate per detail 8 on drawing C8 and not a swing gate as specified in 02830 / 2.01.B.

Response: The proposed gate for the tank access drive is a manual slide gate.

Question 60: Spec section 02830 / 2.01.A specifies Intermediate posts to be 2.375" O.D.; however, detail 8 on drawing C-8 shows Line Posts to be 2.5" O.D. Please confirm diameter.

Response: Specification 02830 2.01.A has been revised to match the O.D. on the detail of 2.5".

Question 61: A motorized Sliding Gate is shown at secondary entrance along Kahla Drive, referencing detail 8 on Drawing C-8. Please provide details / specifications for the gate operator as it is not shown on Detail 8 of Drawing C-8.

Response: Existing gate operator, Liftmaster Model CSL24U, is to remain and be utilized for proposed gate. The contractor shall provide all electrical and mechanical services require to remove and relocate gate operator if required for proper operation of new gate.

Question 62: If the secondary entrance gate is to have a motor operator, please provide electrical details on power to the gate operator.

Response: Existing gate operator, Liftmaster Model CSL24U, is to remain and be utilized for proposed gate. The contractor shall provide all electrical and mechanical services require to remove and relocate gate operator if required for proper operation of new gate.

Question 63: Please confirm how wide each slide gate should be.

Response: The proposed manual slide gate will be 19'. The proposed motorized slide gate will be 18'. See revised Drawing C-2 Proposed Site Layout.

Question 64: According to Medora/Ixom, there are three different options regarding the SCADA accessories for the solar tank mixer. RS232 to RS485 converter, Modbus to Analog Converter, and Modbus to Discrete Converter. Please clarify how the signal for the mixer is to be configured.

Response: Contractor shall coordinate all SCADA requirements with the BPSUD SCADA Services Provider, Trac-N-Trol, prior to bid. Contact Ryan Wood at rwood@tracntrol.com or via phone at 512-930-5721 ext. 16.

Question 65: Section 11501- 2.02 Mixing System - Paragraph (F) 1; states that the SCADA Controller or the tank mixer needs to have a 24VDC relay for remote on/off control of the mixer. According to Medora/Ixom this is not an option that is supported by the manufacturer. Please clarify.

Response: See revised Section 11501.

Question 66: It is assumed that the PV Module (photovoltaic) will be positioned on the top of the tank. According to the Medora/Ixom owner's manual, the replacement battery for the PV Module weighs 140lbs. How is the replacement battery going to transported to the top of the tank?

Response: Per Section 11501, a Medora/Ixom factory crew will deliver, place and startup the SolarBee equipment. This crew will require access to a crane to lift all components to the top of the tank for placement.

Question 67: According to the bid-walk meeting, the existing SCADA antenna will need to be relocated when the tank is demo'd. This SOW is not mentioned in the contract drawings or specifications. Please clarify all material/work that will need to be salvaged and put back in service while the new tank is being constructed.

Response: Contractor shall coordinate all SCADA requirements with the BPSUD SCADA Services Provider, Trac-N-Trol, prior to bid. Contact Ryan Wood at rwood@tracntrol.com or via phone at 512-930-5721 ext. 16.

Question 68: The Composite Elevated Water Storage Tank Specification, Section 13210, Part 3.2.A.6. states "Concrete pour height shall be a minimum of 6 ft. and a maximum of 10 ft." We respectfully request that "6 ft." be revised to "4 ft.". It is important that owners or engineers developing a CET specification should be careful not to restrict the means and methods of construction. CET suppliers own their own forms and equipment, and each have developed different systems for their own forms and equipment, and each have developed different systems for their pedestal construction. Form material, form size, and methods of construction vary greatly between manufacturers. Different equipment requires different construction techniques and a restrictive specification can include sections that are not applicable to some manufacturers. Some competitors in the CET market use form systems that are between 6' and 12' tall. Caldwell Tanks, Inc. has developed a form specifically designed for the construction of CET's that utilizes locking steel form panels. Our system is made up of (3) three rings of 4' high form panels that provides a 12 foot high form system. However, only 4 feet of concrete is poured per lift and we typically make two pours per day yielding a total of 8' per day. Our forming system does not use through wall form ties, and the associate grout patching of form tie holes is therefore not needed. Our rigid forming system allows for efficient concrete consolidation and limits any pours.

Response: A concrete pour height of 6 ft minimum is preferred for a concrete support wall or pedestal over 4 ft height. The reason is that the former height limits the prevalence of forming cold joints in the wall. It also reduces the number of construction joints in the wall along the wall height. Structurally any locations of joints in the wall along the wall height is treated as a weak spot for shear failure and potential source of crack propagation. Such joints are treated as construction joints and the concrete joint interface at such locations is assumed as cracked surface and shear transfer is neglected. Only the rebars are accounted for shear at such locations. Therefore, the higher the pour height, the lower the number of such joints and the lower locations of such weak shear spots in the walls. 6 ft pour stays within the recommended concrete free fall height per ACI 336. 6 ft is also an acceptable height to control the liquid concrete hydrostatic pressure on the formwork.

As a reminder, all questions regarding this proposal must be submitted in writing to:

Rufus G. Crowder, CPPO CPPB
Galveston County Purchasing Agent
722 Moody, Fifth (5th) Floor
Galveston, Texas 77550
E-mail: purchasing.bids@co.galveston.tx.us

If you have any further questions regarding this bid, please address them to Rufus Crowder, CPPO CPPB, Purchasing Agent, via e-mail at purchasing.bids@co.galveston.tx.us, or contact the Purchasing Department at (409) 770-5371.

Please excuse us for any inconvenience that this may have caused.

Sincerely,

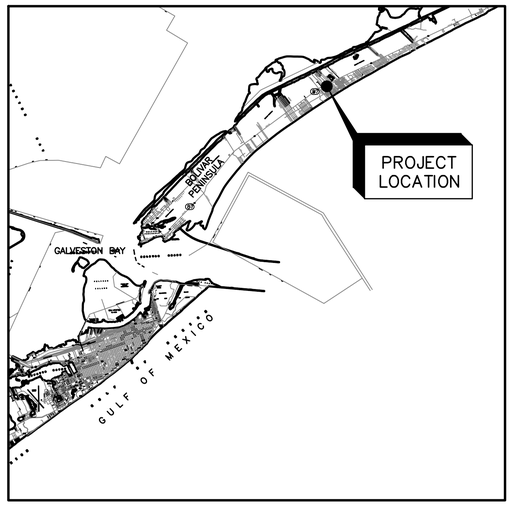
Rufus Crowder

Rufus G. Crowder, CPPO CPPB
Purchasing Agent
Galveston County

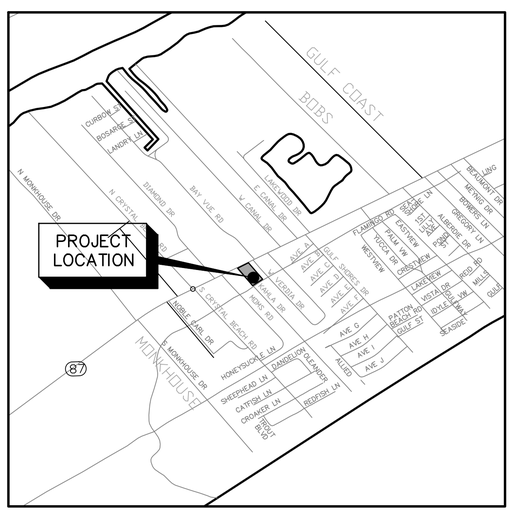
CONSTRUCTION PLANS FOR

BOLIVAR PENINSULA SPECIAL UTILITY DISTRICT (BPSUD)
ELEVATED WATER STORAGE TANK
GALVESTON COUNTY, TEXAS

AUGUST 2020
GLO CONTRACT NO. 10-5052-000-5028
GLO PROJECT NO. P017203-1A



LOCATION MAP
N.T.S.
KEYMAP 734D
GALVESTON COUNTY



VICINITY MAP
N.T.S.
BOLIVAR PENINSULA, TEXAS 77650

100% SUBMITTAL

COMMISSIONER'S COURT

MARK HENRY
COUNTY JUDGE

DARRELL APFFEL
PRECINCT 1

JOE GIUSTI
PRECINCT 2

STEPHEN D. HOLMES
PRECINCT 3

KEN CLARK
PRECINCT 4

1 STATE OF TEXAS SYLVESTER JOHNSON, JR. 111505 LICENSED PROFESSIONAL ENGINEER 9/25/2020

Texas PE Firm Reg. #F-929
575 N. Dairy Ashford, Suite 700, Houston, Texas 77079
T +1 281 589 7257 E usinfrastructure@rpsgroup.com

PROJECT No. 007517 (1068.002.001)

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LEGEND

EXISTING TOPOGRAPHY

- CORE BORING
- MONUMENT
- PK NAIL
- IRON ROD
- IRON PIPE
- POWER POLE/TELE & ELEC POLE
- DOWN GUY/ANCHOR
- UNDERGROUND ELECTRICAL AS LOCATED
- ELECTRICAL PEDESTAL
- ELECTRICAL TRANSFORMER
- ELECTRICAL MANHOLE
- GROUND LIGHT
- TELEPHONE MANHOLE
- TELEPHONE/CABLE TV
- TELEPHONE MARKER SIGN
- GAS VALVE
- GAS METER
- GAS LINE MARKER SIGN
- CABLE PEDESTAL
- CABLE MARKER SIGN
- PIPELINE VENT
- PIPELINE MARKER SIGN
- WATER LINE MARKER
- SEWER LINE PIN FLAG
- TRAFFIC SIGNAL POLE
- TRAFFIC SIGNAL PULL BOX
- TRAFFIC SIGN
- STOP SIGN
- TREE
- BURIED CABLE MARKER
- SHRUB
- PEDESTAL C.A.T.V.
- SPRINKLER CONTROL BOX
- SPRINKLER VALVE BOX
- BOLLARD
- WOOD POST
- CABLE-TV
- BARBED WIRE FENCE
- CHAIN LINK FENCE
- WOOD FENCE
- WROUGHT FENCE
- FORCE MAIN
- GAS
- AERIAL POWER
- ABOVE/UNDER GROUND WATER PIPE
- PIPELINE
- TELEPHONE (AT&T PIN FLAG LINE)
- TREE LINE
- BUILDING
- BRICK FENCE

PLAN / EXISTING / PROPOSED

- RIGHT-OF-WAY
- EASEMENT LINE
- PROPERTY LINE
- DITCH HIGH BANK
- DITCH FLOW LINE
- CURB & GUTTER
- CENTERLINE
- EDGE OF ASPHALT PAVEMENT
- SWALE
- FIRE HYDRANT
- WATER VALVE
- WATER METER
- TAPPING SLEEVE & VALVE
- REDUCER
- WATER LINE 24" & SMALLER
- WATER LINE 30" & LARGER
- STORM SEWER MANHOLE
- TYPE "A" INLET
- GRATE INLET
- TYPE "BB" INLET
- TYPE "C1" INLET
- TYPE "C3" INLET
- CULVERT
- STORM SEWER 24" & SMALLER
- STORM SEWER 30" & LARGER
- SANITARY SEWER MANHOLE
- SANITARY SEWER CLEANOUT
- SANITARY SEWER STACK
- SANITARY SEWER 24" & SMALLER
- SANITARY SEWER 30" & LARGER
- WATER STORAGE TANK
- POINT OF INTERSECTION (PI)
- POINT OF CURVE (PC)
- POINT OF TANGENCY (PT)

GENERAL & CIVIL ABBREVIATIONS

APS	ADJUSTABLE PIPE SUPPORT
BC	BACK OF CURB
℄	BASELINE
BFV	BUTTERFLY VALVE
C/C	CENTER TO CENTER
CARV	COMBINATION AIR RELIEF VALVE
℄/CL	CENTER LINE
CLR	CLEAR DISTANCE
CO	CLEAN OUT
CONC	CONCRETE
CONT	CONTINUOUS
DIP	DUCTILE IRON PIPE
DR	DRAIN
EAP	EDGE OF ASPHALT
ECP	EDGE OF CONCRETE PAVEMENT
ECC	ECCENTRIC
EL	ELEVATION
EXIST	EXISTING
EXP	EXPANSION
F	FLANGED
FC	FRONT OF CURB
FG	FINISHED GRADE
FH	FIRE HYDRANT
FM	FORCE MAIN
FL	FLOW LINE
HMAC	HOT MIX ASPHALTIC CONCRETE
JT	JOINT
LR	LONG RADIUS
IE	INVERT ELEVATION
LT	LEFT
MAX	MAXIMUM
MH	MANHOLE
MIN	MINIMUM
MISC	MISCELLANEOUS
MJ	MECHANICAL JOINT
NG	NATURAL GROUND
NTS	NOT TO SCALE
OPNG	OPENING
PROP	PROPOSED
RED	REDUCER
RCP	REINFORCED CONCRETE PIPE
REF	REFERENCE
REQD	REQUIRED
ROW	RIGHT OF WAY
RT	RIGHT
SAN	SANITARY
SB/BH	SOIL BORING/BORE HOLE
SHT	SHEET
STA	SURVEY STATION
STD	STANDARD
SIM	SIMILAR
SPECS	SPECIFICATIONS
STL	STEEL
STM	STORM
TCE	TEMPORARY CONSTRUCTION EASEMENT
TOC	TOP OF CONCRETE
TOP	TOP OF PIPE
TG	TOP OF GRATE
THK	THICK
TP	TOP OF PAVEMENT
TYP	TYPICAL
UNO	UNLESS NOTED OTHERWISE
VERT	VERTICAL
W/	WITH
WL	WATER LINE
WLE	WATER LINE EASEMENT

DRAWING NO. / DRAWING NAME

GENERAL

G-1	COVER SHEET
G-2	DRAWING INDEX, LEGEND & ABBREVIATIONS
G-3	GENERAL NOTES

CIVIL

C-1	DEMOLITION PLAN
C-2	PROPOSED SITE PLAN
C-3	GRADING PLAN
C-4	STORM WATER POLLUTION PREVENTION PLAN
C-5	STORM WATER POLLUTION PREVENTION PLAN DETAILS
C-6	PROJECT SIGN DETAILS
C-7	WATERLINE DETAILS
C-8	MISCELLANEOUS DETAILS
C-9	PAVEMENT DETAILS
C-10	TRAFFIC CONTROL PLAN NOTES CHANNELIZING DEVICES AND BARRICADES
C-11	TRAFFIC CONTROL PLAN TYPICAL ONE LANE CLOSURE

MECHANICAL

M-1	ELEVATED STORAGE TANK – ELEVATION AND SECTION
M-2	ELEVATED STORAGE TANK – LOWER LEVEL PLAN AND DETAILS
M-3	ELEVATED STORAGE TANK – MEZZANINE LEVEL PLAN

ELECTRICAL

E-1	EXISTING SITE PLAN
E-2	PROPOSED SITE PLAN
E-3	ENLARGED PROPOSED SITE PLAN
E-4	ELEVATED STORAGE TANK GROUND PLAN
E-5	ELEVATED STORAGE TANK MEZZANINE FLOOR PLAN
E-6	ELEVATED STORAGE TANK SECTIONS
E-7	ONE LINE DIAGRAM
E-8	ELECTRICAL SCHEDULES
E-9	SCADA AND RADIO DIAGRAMS
E-10	ELECTRICAL DETAILS 1 OF 2
E-11	ELECTRICAL DETAILS 2 OF 2

RPS
Texas PE Firm Reg. #F-929
575 N.Dairy Ashford, Suite 700, Houston, Texas 77079
T +1 281 589 7257 E usinfrastructure@rpsgroup.com

TEXAS GENERAL LAND OFFICE

BPSUD Elevated Water Storage Tank

Bolivar Peninsula Special Utility District

SURVEY COMPANY:

HIGH TIDE LAND SURVEYING LLC.
975 LAZY LANE WEST
CRYSTAL BEACH, TX 77650
MAILING P.O. BOX 16142 GALVESTON, TX 77552

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TO ARRANGE FOR LINES TO BE TURNED OFF OR MOVED, CALL ENTERGY AT 1-800-368-3749

NOTICE:

FOR YOUR SAFETY, YOU ARE REQUIRED BY TEXAS LAW TO CALL 811 AT LEAST 48 HOURS BEFORE YOU DIG SO THAT UNDERGROUND LINES CAN BE MARKED. THIS VERIFICATION DOES NOT FULFILL YOUR OBLIGATION TO CALL 811.

REV	DESCRIPTION	BY	DATE
1	ADDENDUM No. 2	SJ	9/30/2020

STATE OF TEXAS
SYLVESTER JOHNSON, JR.
111505
LICENSED
PROFESSIONAL ENGINEER
9/25/2020

DRAWING INDEX, LEGEND & ABBREVIATIONS

RPS Project No	007517 (1068.002.001)
Drawn By JAH	Checked By NMW
Scale NTS	Date AUGUST 2020
DWG No G-2	Sheet 2 Of 28

J:\1068.002.001\07.00 CADD\BPSUD Elevated Storage Tank Site Plan\02-Construction Drawings\007517.Drawing Index Sheet.dwg Aug 24 2020

GENERAL CONSTRUCTION NOTES

1. THERE WILL BE NO SEPARATE PAYMENT FOR WORK SHOWN ON THESE PLANS, UNLESS SPECIFICALLY ESTABLISHED IN THE BID SECTION OF THE CONTRACT DOCUMENTS. CONTRACTOR SHALL INCLUDE COST OF THIS WORK IN THE CONTRACT UNIT PRICE FOR ITEMS OF WHICH THIS WORK IS A COMPONENT OR INCIDENTAL.

2. CONTRACTOR SHALL VERIFY LOCATION AND ELEVATION OF EXISTING FACILITIES PRIOR TO CONSTRUCTION OF PROPOSED FACILITIES. ANY DAMAGE TO EXISTING FACILITIES, INCLUDING PUBLIC OR PRIVATE UTILITIES, INCURRED AS A RESULT OF CONSTRUCTION OPERATIONS SHALL BE REPAIRED BY THE CONTRACTOR AT HIS EXPENSE.

3. CONTRACTOR SHALL VERIFY LOCATION OF UNDERGROUND UTILITY LINES AND SHALL NOTIFY THE FOLLOWING AGENCIES 48 HOURS PRIOR TO EXCAVATING NEAR EXISTING FACILITIES: A.) BOLIVAR PENINSULA SPECIAL UTILITY DISTRICT AT 409-684-3515 B.) TEXAS ONE CALL SYSTEM AT 1-800-245-4545 C.) LONE STAR NOTIFICATION CENTER AT 713-223-4567 D.) TEXAS EXCAVATION SAFETY SYSTEM INC. AT 1-800-344-8377.

4. CONTRACTOR SHALL COMPLY WITH ALL FEDERAL, STATE, AND LOCAL LAWS AND ALL REGULATIONS OF UTILITY COMPANIES CONCERNING SAFETY AND HEALTH PRACTICES.

5. OWNER SHALL PERFORM INITIAL LABORATORY TESTS. SUBSEQUENT TESTING DUE TO FAILED DENSITIES SHALL BE AT CONTRACTOR'S EXPENSE. A COPY OF ALL TEST RESULTS SHALL BE SUBMITTED TO THE PROJECT MANAGER.

6. ALL AREAS DISTURBED BY CONSTRUCTION WHICH ARE NOT REPAVED OR OTHERWISE COVERED SHALL BE HYDRO-MULCH SEEDED.

7. CONTRACTOR SHALL REMOVE ALL MUD, DIRT AND DEBRIS DEPOSITED OR DROPPED ON EXISTING PAVEMENT DUE TO HIS CONSTRUCTION ACTIVITY DAILY. MATERIAL THAT IS HAZARDOUS TO TRAFFIC SHALL BE REMOVED IMMEDIATELY.

8. THESE PLANS DO NOT EXTEND TO OR INCLUDE DESIGNS OR SYSTEMS PERTAINING TO THE SAFETY OF THE CONTRACTOR OR ITS EMPLOYEES, AGENTS, OR REPRESENTATIVES IN THE PERFORMANCE OF THE WORK. THE SEAL OF THE REGISTERED PROFESSIONAL ENGINEER(S) HEREON DOES NOT EXTEND TO ANY SUCH SAFETY SYSTEMS THAT MAY NOW OR HEREAFTER BE INCORPORATED IN THESE PLANS. THE CONTRACTOR SHALL PREPARE OR OBTAIN THE APPROPRIATE SAFETY SYSTEM (S).

9. CONTRACTOR SHALL PROTECT ALL TREES ADJACENT TO WORK AREA. NO TREES OUTSIDE THE WORK AREA SHALL BE REMOVED OR DAMANGED WITHOUT PERMISSION OF OWNER.

10. CONTRACTOR SHALL GIVE NOTICE TO ALL AUTHORIZED INSPECTORS, SUPERINTENDENTS, OR PERSONS IN CHARGE OF PRIVATE AND PUBLIC UTILITIES OR RAILROADS AFFECTED BY HIS OPERATIONS PRIOR TO COMMENCEMENT OF WORK. CONTRACTOR SHALL OBTAIN ALL CONSTRUCTION PERMITS PRIOR TO STARTING CONSTRUCTION.

11. CONTRACTOR WILL OBTAIN ALL PERMITS REQUIRED BY GALVESTON COUNTY, TEXAS PRIOR TO STARTING CONSTRUCTION OF UTILITIES AND/OR CULVERTS WITHIN COUNTY ROAD RIGHTS-OF-WAY, IF APPLICABLE.

12. CONTRACTOR SHALL OBTAIN BUILDING PERMIT FROM GALVESTON COUNTY. CONTACT GALVESTON COUNTY PERMIT OFFICE AT (409) 770-5552.

13. CONTRACTOR SHALL NOTIFY JO BALL, GENERAL MANAGER, WITH THE BOLIVAR PENINSULA SPECIAL UTILITY DISTRICT AT LEAST 48 HOURS PRIOR TO START OF CONSTRUCTION AT (409) 684-3515.

WATER LINE CONSTRUCTION NOTES

1. CONTRACTOR SHALL CONTACT BOLIVAR PENINSULA SPECIAL UTILITY DISTRICT PRIOR TO MAKING ANY CONNECTION TO THE EXISTING WATER LINES OR ANYTIME A VALVE ON AN EXISTING WATER LINE IS TO BE OPENED OR CLOSED.

2. ALL WATER LINES TO HAVE A MINIMUM COVER OF 4' BELOW FINISHED GRADE. VARY FLOWLINE UNIFORMLY FROM DEPTH AND LOCATION SHOWN ON PLANS TO ACHIEVE REQUIRED COVER AND CLEARANCE.

3. ALL BURIED WATER LINE FITTINGS TO BE DUCTILE IRON MECHANICAL JOINT.

4. CONTRACTOR TO PROVIDE ADEQUATE CONCRETE THRUST BLOCKING TO WITHSTAND TEST PRESSURE. SEE THRUST BLOCK DETAILS.

5. WATER LINE, OUTSIDE OF PUBLIC STREET RIGHT-OF-WAY OR PUBLIC EASEMENTS, UNDER PAVEMENT OR WITHIN ONE (1) FOOT BACK OF ALL CURBS TO BE BACKFILLED WITH CEMENT STABILIZED SAND TO A POINT ONE (1) FOOT BELOW PAVEMENT. THE REMAINING BACKFILL TO BE MADE WITH COMPACTED SELECT MATERIAL.

6. WATER LINE INSTALLATION AND TESTING SHALL COMPLY WITH AWWA AND THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY REQUIREMENTS.

PRIVATE UTILITY NOTES

AT&T TEXAS/SWBT FACILITIES

1. THE LOCATIONS OF AT&T TEXAS/SWBT FACILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION BEFORE COMMENCING WORK. CONTRACTOR AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THIS FAILURE TO EXACTLY LOCATE AND PRESERVE THESE UNDERGROUND UTILITIES.

2. THE CONTRACTOR SHALL CALL 1-800-344-8377 (TEXAS 811) A MINIMUM OF 48 HOURS PRIOR TO CONSTRUCTION TO HAVE UNDERGROUND LINES FIELD LOCATED.

3. WHEN EXCAVATING WITHIN EIGHTEEN INCHES (18") OF THE INDICATED LOCATION OF AT&T TEXAS/SWBT FACILITIES, ALL EXCAVATIONS MUST BE ACCOMPLISHED USING NON-MECHANIZED EXCAVATION PROCEDURES. WHEN BORING, THE CONTRACTOR SHALL EXPOSE THE AT&T TEXAS/SWBT FACILITIES.

4. WHEN AT&T TEXAS/SWBT FACILITIES ARE EXPOSED, THE CONTRACTOR WILL PROVIDE SUPPORT TO PREVENT DAMAGE TO THE CONDUIT DUCTS OR CABLES. WHEN EXCAVATING NEAR TELEPHONE POLES THE CONTRACTOR SHALL BRACE THE POLE FOR SUPPORT.

5. THE PRESENCE OR ABSENCE OF AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES OR BURIED CABLE FACILITIES SHOWN ON THESE PLANS DOES NOT MEAN THAT THERE ARE NO DIRECT BURIED CABLES OR OTHER CABLES IN THE CONDUIT AREA.

6. PLEASE CONTACT THE AT&T TEXAS DAMAGE PREVENTION MANAGER ROOSEVELT LEE JR. AT (713) 567-4552 OR E-MAIL HIM AT ri7259@att.com, IF THERE ARE QUESTIONS ABOUT BORING OR EXCAVATING NEAR OUR AT&T TEXAS/SWBT FACILITIES.

ENTERGY

UNDERGROUND GAS FACILITIES

1. LOCATIONS OF ENTERGY MAIN LINES ARE SHOWN IN AN APPROXIMATE LOCATION ONLY. SERVICE LINES ARE USUALLY NOT SHOWN. OUR SIGNATURE ON THESE PLANS ONLY INDICATES THAT OUR FACILITIES ARE SHOWN IN APPROXIMATE LOCATION. IT DOES NOT IMPLY THAT A CONFLICT ANALYSIS HAS BEEN MADE. THE CONTRACTOR SHALL CONTACT THE UTILITY COORDINATING COMMITTEE AT (713) 223-4567 OR 1-800-669-8344 OR 811 A MINIMUM OF 48 HOURS PRIOR TO CONSTRUCTION TO HAVE MAIN AND SERVICE LINES FIELD LOCATED.

2. WHEN ENTERGY PIPE LINE MARKINGS ARE NOT VISIBLE, CALL (713) 945-8036 OR (713) 945-8037 (7:00 A.M. TO 4:30 P.M.) FOR STATUS OF LINE LOCATION REQUEST BEFORE EXCAVATION BEGINS.

3. WHEN EXCAVATING WITHIN EIGHTEEN INCHES (18") OF THE INDICATED LOCATION OF ENTERGY FACILITIES, ALL EXCAVATION MUST BE ACCOMPLISHED USING NON-MECHANIZED EXCAVATION PROCEDURES.

4. WHEN ENTERGY FACILITIES ARE EXPOSED, SUFFICIENT SUPPORT MUST BE PROVIDED TO THE FACILITIES TO PREVENT EXCESSIVE STRESS ON THE PIPING.

5. FOR EMERGENCIES REGARDING GAS LINES CALL (713) 659-3552 OR (713) 207-4200.

6. THE CONTRACTOR IS FULLY RESPONSIBLE FOR ANY DAMAGES CAUSED BY FAILURE TO EXACTLY LOCATE AND PRESERVE THESE UNDERGROUND FACILITIES.

OVERHEAD ELECTRICAL FACILITIES

1. OVERHEAD LINES MAY EXIST ON THE PROPERTY. THE LOCATION OF OVERHEAD LINES HAS NOT BEEN SHOWN ON THESE DRAWINGS AS THE LINES ARE CLEARLY VISIBLE, BUT YOU SHOULD LOCATE THEM PRIOR TO BEGINNING ANY CONSTRUCTION. TEXAS LAW, SECTION 752, HEALTH & SAFETY CODE, FORBIDS ACTIVITIES THAT OCCUR IN CLOSE PROXIMITY TO HIGH VOLTAGE LINES, SPECIFICALLY:

2. ANY ACTIVITY WHERE PERSON OR THINGS MAY COME WITHIN SIX (6) FEET OF LIVE OVERHEAD HIGH VOLTAGE LINES; AND

3. OPERATING A CRANE, DERRICK, POWER SHOVEL, DRILLING RIG, PILE DRIVER, HOISTING EQUIPMENT, OR SIMILAR APPARATUS WITHIN 10 FEET OF LIVE OVERHEAD HIGH VOLTAGE LINES.

4. PARTIES RESPONSIBLE FOR THE WORK, INCLUDING CONTRACTORS, ARE LEGALLY RESPONSIBLE FOR THE SAFETY OF CONSTRUCTION WORKERS UNDER THIS LAW. THIS LAW CARRIES BOTH CRIMINAL AND CIVIL LIABILITY. TO ARRANGE FOR LINES TO BE TURNED OFF OR REMOVED CALL ENTERGY AT (800) 368-3749.

5. ACTIVITIES ON OR ACROSS ENTERGY FEE OR EASEMENT PROPERTY

   NO APPROVAL TO USE, CROSS OR OCCUPY ENTERGY FEE OR EASEMENT PROPERTY IS GIVEN. IF YOU NEED TO USE ENTERGY PROPERTY, PLEASE CONTACT OUR SURVEYING & RIGHT OF WAY DIVISION AT (713) 207-6248 OR (713) 207-5769.

rps Texas PE Firm Reg. #F-929
575 N.Dairy Ashford, Suite 700, Houston, Texas 77079
T +1 281 589 7257 E usinfrastructure@rpsgroup.com

TEXAS GENERAL LAND OFFICE
BPSUD Elevated Water Storage Tank

Bolivar Peninsula Special Utility District

SURVEY COMPANY:

HIGH TIDE LAND SURVEYING LLC.
975 LAZY LANE WEST
CRYSTAL BEACH, TX 77650
MAILING P.O. BOX 16142 GALVESTON, TX 77552

BENCHMARK: ①

NGS MARK HGCSD 64 PID AW6988 SITUATED ABOUT 7.5 MILES SOUTHWEST OF GILCHREST ABOUT 2.5 MILES NORTHEASE OF CRYSTAL BEACH ON THE BOLAVAR PENINSULA AND ON THE SOUTH SIDE OF STATE HIGHWAY 87 ELEVATION 5.1' FEET NAVD 88.

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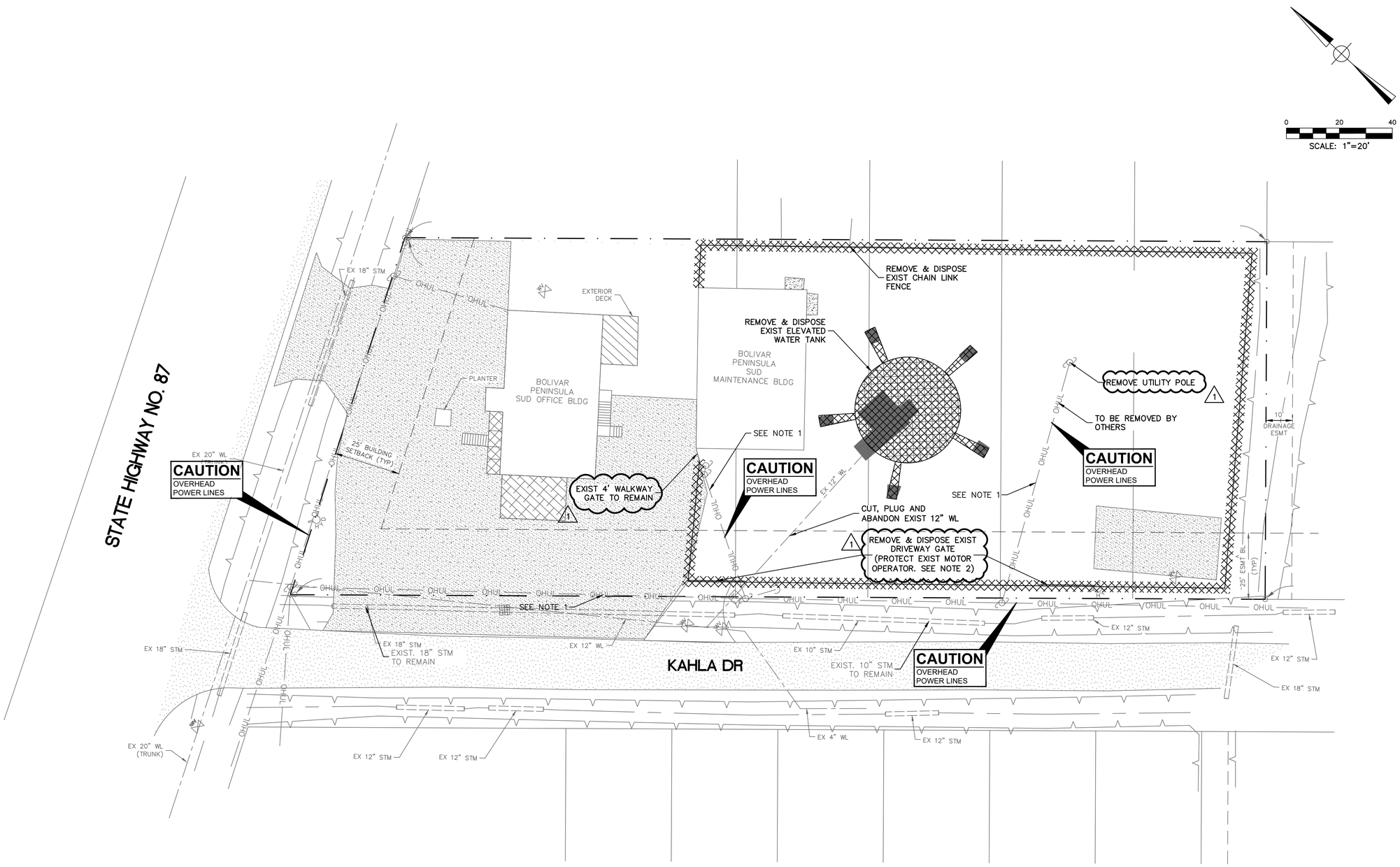
REV	DESCRIPTION	BY	DATE
1	ADDENDUM No. 2	SJ	9/30/2020

STATE OF TEXAS
SYLVESTER JOHNSON, JR.
111505
LICENSED
PROFESSIONAL ENGINEER
9/25/2020

GENERAL NOTES

RPS Project No 007517 (1068.002.001)	
Drawn By JAH	Checked By MRM
Scale NTS	Date AUGUST 2020
DWG No G-3	Sheet 3 Of 28

J:\1068.002.001\07.00 CADD\BPSUD Elevated Storage Tank Site Plan\02-Construction Drawings\007517.General Notes.dwg Sep 02 2020



LEGEND:

- REMOVE & DISPOSE EXIST
- EXISTING CONCRETE PAVEMENT
- EXISTING CONCRETE ROADWAY

NOTES:

1. CONTRACTOR SHALL COORDINATE WITH ENTERGY (1-800-368-3749) ON DE-ENGERGIZATING OR RELOCATING OVERHEAD POWER POLES AND POWER LINES AS REQUIRED FOR SITE WORK.
2. EXISTING GATE OPERATOR, LIFTMASTER MODEL CSL24U, IS TO REMAIN AND BE UTILIZED FOR PROPOSED GATE. THE CONTRACTOR SHALL PROVIDE ALL ELECTRICAL AND MECHANICAL SERVICES REQUIRED TO REMOVE AND RELOCATE GATE OPERATOR IF REQUIRED, FOR PROPER OPERATION OF NEW GATE.

RPS
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1	ADDENDUM No. 2	SJ	9/30/2020

STATE OF TEXAS
SYLVESTER JOHNSON, JR.
111505
LICENSED PROFESSIONAL ENGINEER
9/25/2020

DEMOLITION PLAN

RPS Project No	007517 (1068.002.001)
Drawn By JAH	Checked By MRM
Scale 1"=20'	Date AUGUST 2020
DWG No C-1	Sheet 4 Of 28

J:\1068.002.001\07.00 CADD\BPSUD Elevated Storage Tank Site Plan\02-Construction Drawings\007517.Demolition Plan.dwg Oct 01 2020

LEGEND:

- PROPERTY LINE
- PROPOSED CHAIN LINK FENCE
- PROPOSED SWALE
- PROPOSED DRIVEWAY
  5" PORTLAND CEMENT CONCRETE (PCC)
  6" LIME/FLYASH TREATED SUBGRADE
- PROPOSED DRIVEWAY
  2" ASPHALTIC CONCRETE
  8" CRUSHED CONCRETE BASE MATERIAL
  6" LIME/FLYASH TREATED SUBGRADE
- PAVEMENT REPAIR
- SOD (1' OFFSET FROM PAVEMENT)
- PROPOSED CRUSHED CONCRETE
- EXISTING CONCRETE PAVEMENT
- EXISTING CONCRETE ROADWAY

NOTES:

1. COORDINATES FOR STRUCTURES ARE LOCATED ON THE OUTSIDE CORNER OF CONCRETE SLAB.
2. COORDINATES FOR CIRCULAR STRUCTURES ARE LOCATED ON THE OUTSIDE OF THE STRUCTURE.
3. CONTRACTOR SHALL COORDINATE WITH ENTERGY (1-800-368-3749) ON DE-ENGERGIZATING OR RELOCATING OVERHEAD POWER POLES AND POWER LINES AS REQUIRED FOR SITE WORK.
4. CONTRACTOR TO HYDROSEED ALL AREAS DISTURBED FROM SITE WORK.
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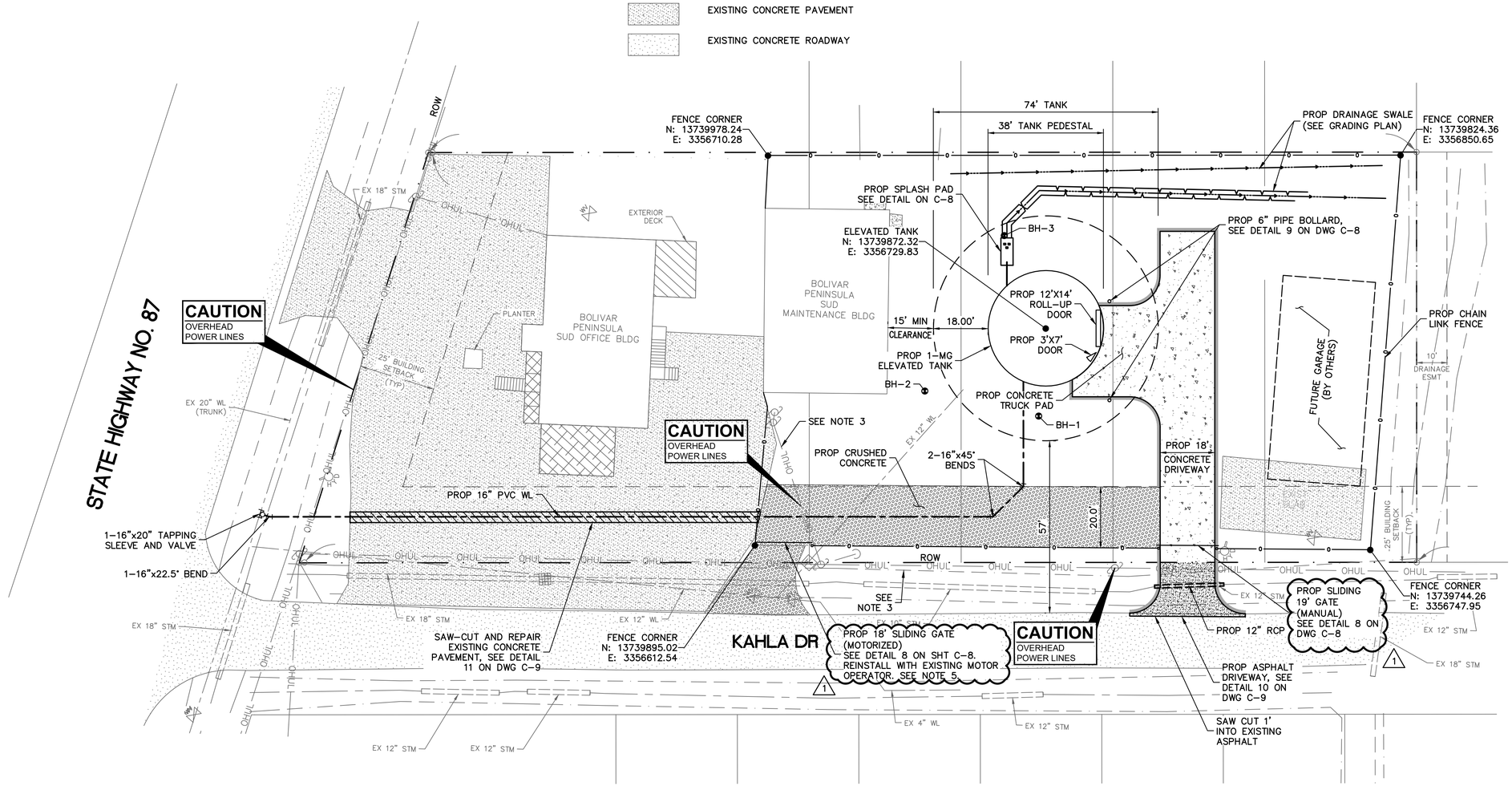
0 20 40
SCALE: 1"=20'



BORE HOLE TABLE (BH) ⊕			
POINT	ELEVATION	NORTHING	EASTING
1	6.40	13739854.63	3356706.96
2	6.81	13739887.88	3356687.81
3	7.28	13739903.01	3356743.24

rps
Texas PE Firm Reg. #F-929
575 N.Dairy Ashford, Suite 700, Houston, Texas 77079
T +1 281 589 7257 E usinfrastructure@rpsgroup.com

TEXAS GENERAL LAND OFFICE

BPSUD Elevated Water Storage Tank

Bolivar Peninsula Special Utility District

SURVEY COMPANY:

HIGH TIDE LAND SURVEYING LLC.
975 LAZY LANE WEST
CRYSTAL BEACH, TX 77650
MAILING P.O. BOX 16142 GALVESTON, TX 77552

BENCHMARK: (1)

NGS MARK HGCSD 64 PID AW6988 SITUATED ABOUT 7.5 MILES SOUTHWEST OF GILCHREST ABOUT 2.5 MILES NORTHEASE OF CRYSTAL BEACH ON THE BOLAVAR PENINSULA AND ON THE SOUTH SIDE OF STATE HIGHWAY 87 ELEVATION 5.1' FEET NAVD 88.

FLOODPLAIN:

THIS PROJECT LIES WITHIN THE 100 YEAR FLOOD PLAIN AS ESTABLISHED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY. ACCORDING TO THE FLOOD INSURANCE RATE MAP NUMBER 48167C0309G, EFFECTIVE DATE AUGUST 15, 2019. THIS MAP LIES WITHIN ZONE "AE" WITH A BASE FLOOD ELEVATION OF 13 FEET.

TO ARRANGE FOR LINES TO BE TURNED OFF OR MOVED, CALL ENTERGY AT 1-800-368-3749

NOTICE:

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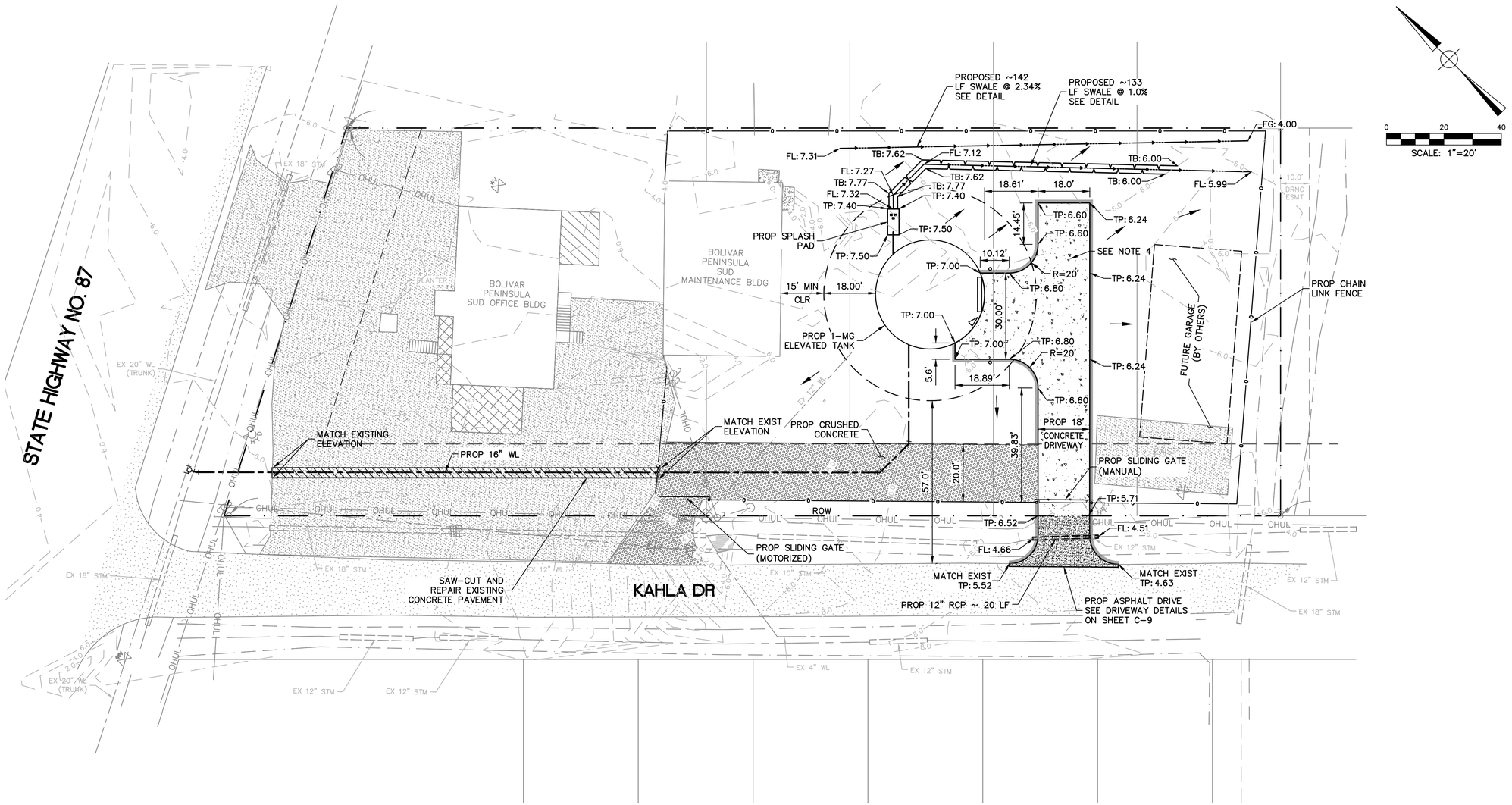
REV	DESCRIPTION	BY	DATE
1	ADDENDUM No. 2	SJ	9/30/2020

STATE OF TEXAS
SYLVESTER JOHNSON, JR.
111505
LICENSED PROFESSIONAL ENGINEER
9/25/2020

PROPOSED SITE PLAN

RPS Project No 007517 (1068.002.001)	
Drawn By JAH	Checked By MRM
Scale 1"=20'	Date AUGUST 2020
DWG No C-2	Sheet 5 Of 28

J:\1068.002.001\07.00 CADD\BPSUD Elevated Storage Tank Site Plan\02-Construction Drawings\007517.Site_Plan.dwg Oct 01 2020

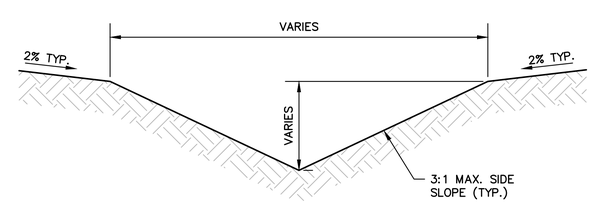


NOTES:

1. GRADE AREAS AROUND FOUNDATION PADS TO DRAIN AWAY FROM THE STRUCTURE.
2. CONTRACTOR TO RESTORE ALL AREAS DISTURBED FROM WORK.
3. CONTRACTOR TO GRADE REMAINING GRAVEL LOT AS NECESSARY TO PROVIDE POSITIVE DRAINAGE.
4. CONTRACTOR SHALL COORDINATE WITH ENTERGY (1-800-368-3749) ON DE-ENGERGIZATING OR RELOCATING OVERHEAD POWER POLES AND POWER LINES AS REQUIRED FOR SITE WORK.

LEGEND:

- PROPERTY LINE
- PROPOSED CHAIN LINK FENCE
- PROPOSED SWALE
- GRADE SLOPE ARROWS
- PROPOSED DRIVEWAY 7" PORTLAND CEMENT CONCRETE (PCC) 6" LIME TREATED SUBGRADE
- PROPOSED DRIVEWAY 2" ASPHALTIC CONCRETE 8" CRUSHED CONCRETE BASE MATERIAL 6" LIME/FLYASH TREATED SUBGRADE
- PAVEMENT REPAIR
- SOD (1' OFFSET FROM PAVEMENT)
- PROPOSED CRUSHED CONCRETE
- EXISTING CONCRETE PAVEMENT
- EXISTING CONCRETE ROADWAY



SWALE
N.T.S.

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Texas PE Firm Reg. #F-929
575 N.Dairy Ashford, Suite 700, Houston, Texas 77079
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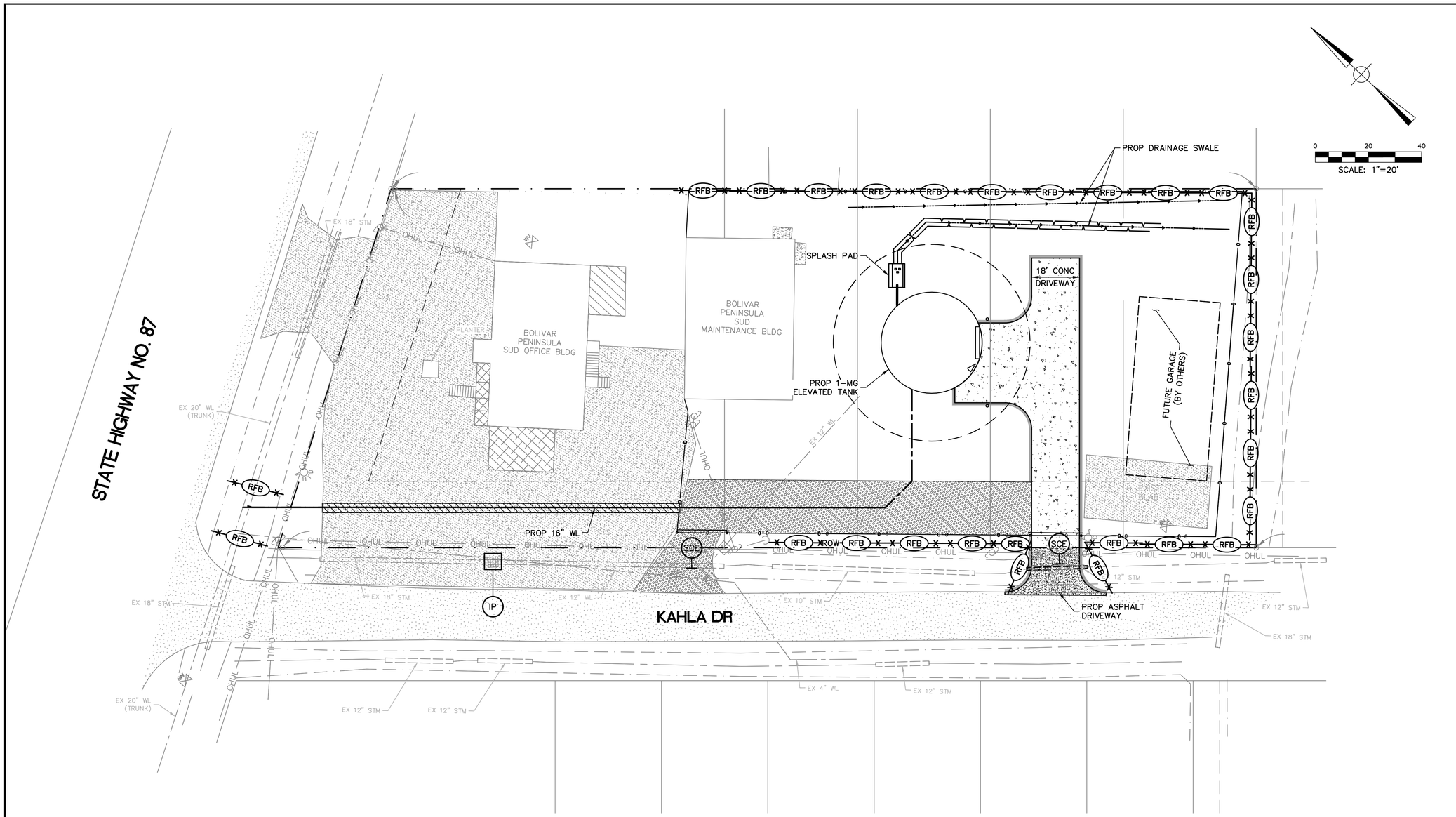
9/25/2020

GRADING PLAN

RPS Project No 007517 (1068.002.001)	
Drawn By JAH	Checked By MRM
Scale 1"=20'	Date AUGUST 2020
DWG No C-3	Sheet 6 Of 28

J:\1068.002.001\07.00 CADD\BPSUD Elevated Storage Tank Site Plan\02-Construction Drawings\007517.Grading_Plan.dwg Aug 24 2020



NOTES

1. SEE DRAWING C-8 FOR STORM WATER POLLUTION PREVENTION DETAILS.
2. CONTRACTOR SHALL PROVIDE STABILIZED STAGING/PARKING AREA.
3. MAINTENANCE AND INSPECTION OF EROSION/SEDIMENT CONTROL DEVICES SHALL BE PROVIDED PER SPECIFICATION SECTIONS 01566, 01568, 01569, 01571.

LEGEND:

SCE	STABILIZED CONSTRUCTION EXIT
RFB	REINFORCED FILTER FABRIC BARRIER
IP	INLET PROTECTION BARRIER

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575 N.Dairy Ashford, Suite 700, Houston, Texas 77079
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LICENSED
PROFESSIONAL ENGINEER
9/25/2020

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STORM WATER POLLUTION PREVENTION PLAN

RPS Project No 007517 (1068.002.001)	
Drawn By JAH	Checked By MRM
Scale 1"=20'	Date AUGUST 2020
DWG No C-4	Sheet 7 Of 28

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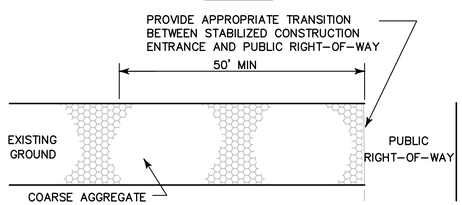
PROFILE



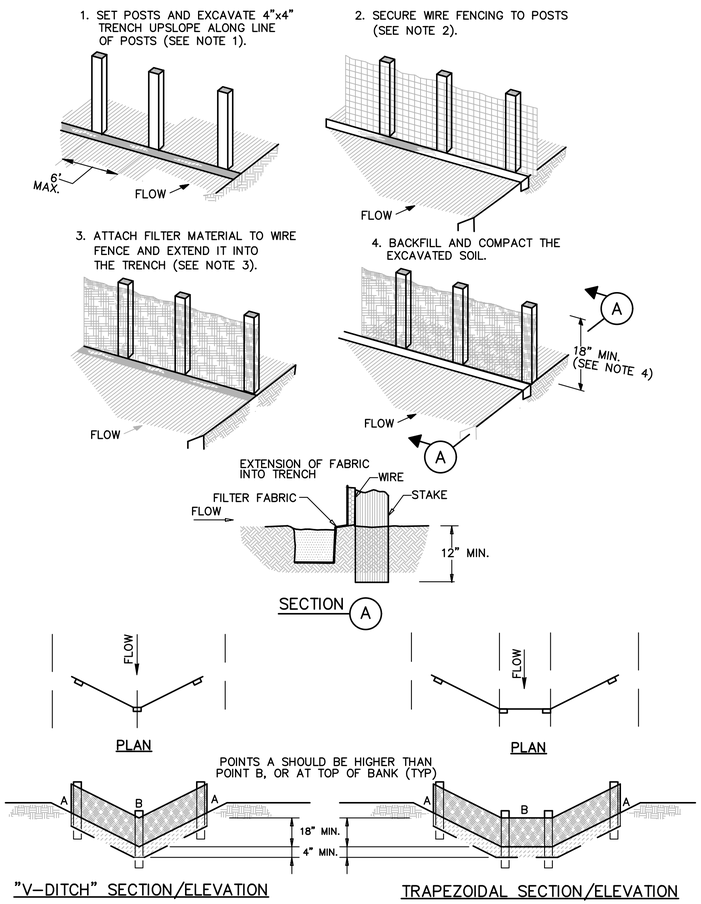
PLAN VIEW

STABILIZED CONSTRUCTION EXIT

SCE
SYMBOL

CONSTRUCTION NOTES:

1. LENGTH SHALL BE AS SHOWN ON THE CONSTRUCTION DRAWINGS, BUT NOT LESS THAN 50 FEET.
2. THICKNESS SHALL BE NOT LESS THAN 8 INCHES.
3. WIDTH SHALL BE NOT LESS THAN FULL WIDTH OF ALL POINTS OF INGRESS OR EGRESS.
4. STABILIZATION FOR OTHER AREAS SHALL HAVE THE SAME AGGREGATE THICKNESS AND WIDTH REQUIREMENTS AS THE STABILIZED CONSTRUCTION EXIT, UNLESS OTHERWISE SHOWN ON THE CONSTRUCTION DRAWINGS.
5. STABILIZED AREA MAY BE WIDENED OR LENGTHENED TO ACCOMMODATE A TRUCK WASHING AREA. AN OUTLET SEDIMENT TRAP MUST BE PROVIDED FOR THE TRUCK WASHING AREA.
6. STABILIZED CONSTRUCTION EXIT SHALL BE MAINTAINED FREE OF SEDIMENT FOR THE DURATION OF THE PROJECT.



NOTES:

1. SET 2 INCH BY 2 INCH WOODEN STAKES SPACED A MAX. OF 6 FEET APART AND EMBEDDED A MIN. OF 12 INCHES.
2. WOVEN WIRE FENCE TO BE FASTENED SECURELY TO FENCE POSTS WITH STAPLES.
3. FILTER CLOTH TO BE FASTENED SECURELY TO WOVEN WIRE FENCE, WITH TIES SPACED EVERY 24 INCHES AT TOP AND MIDSECTION.
4. MINIMUM HEIGHT OF FILTER SHOULD BE 18 INCHES AND A MAXIMUM OF 36 INCHES ABOVE NATURAL GROUND.
5. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVERLAPPED 6 INCHES AT THE POSTS, AND FOLDED.

REINFORCED FILTER FABRIC BARRIER

×— RFB — ×
SYMBOL

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STATE OF TEXAS
SYLVESTER JOHNSON, JR.
111505
LICENSED PROFESSIONAL ENGINEER
9/25/2020

1

STORM WATER POLLUTION PERVENTION PLAN DETAILS

RPS Project No 007517 (1068.002.001)	
Drawn By JAH	Checked By NMW
Scale NTS	Date AUGUST 2020
DWG No C-5	Sheet 8 Of 28

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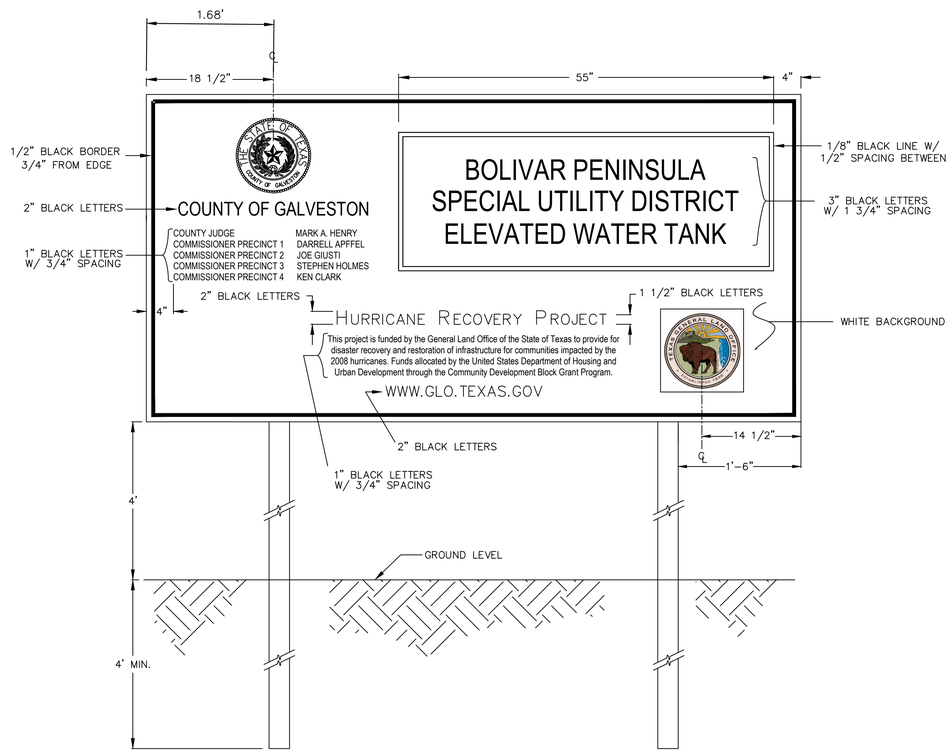
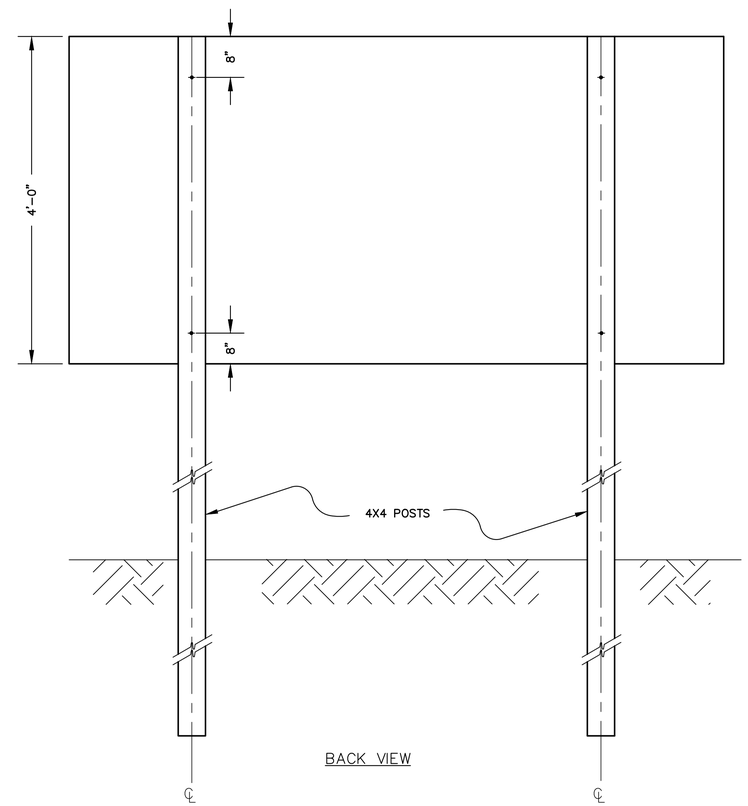


FRONT VIEW



BACK VIEW

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575 N.Dairy Ashford, Suite 700, Houston, Texas 77079
T +1 281 589 7257 E usinfrastructure@rpsgroup.com

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STATE OF TEXAS
SYLVESTER JOHNSON, JR.
111505
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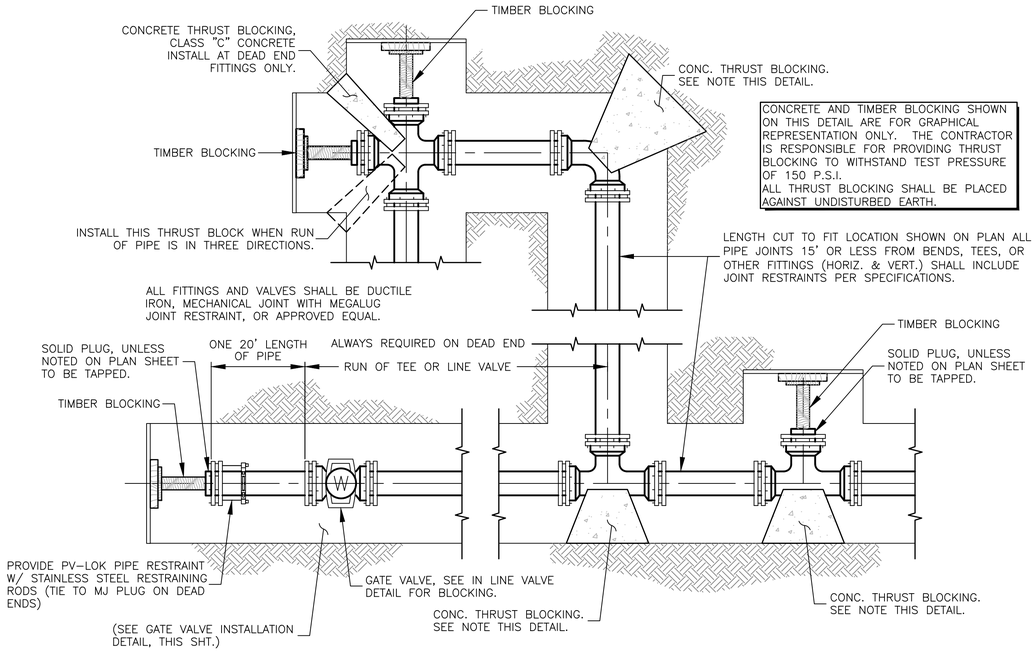
PROFESSIONAL ENGINEER
9/25/2020

PROJECT SIGN DETAILS

RPS Project No 007517 (1068.002.001)	
Drawn By JAH	Checked By NMW
Scale NTS	Date AUGUST 2020
DWG No C-6	Sheet 9 Of 28

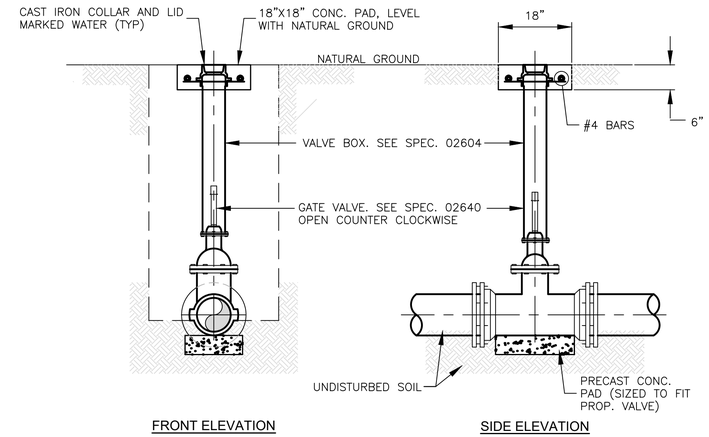
J:\1068.002.001\07.00 CADD\BPSUD Elevated Storage Tank Site Plan\02-Construction Drawings\007517.Project Sign.dwg Aug 24 2020



CONCRETE AND TIMBER BLOCKING SHOWN ON THIS DETAIL ARE FOR GRAPHICAL REPRESENTATION ONLY. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING THRUST BLOCKING TO WITHSTAND TEST PRESSURE OF 150 P.S.I.
ALL THRUST BLOCKING SHALL BE PLACED AGAINST UNDISTURBED EARTH.

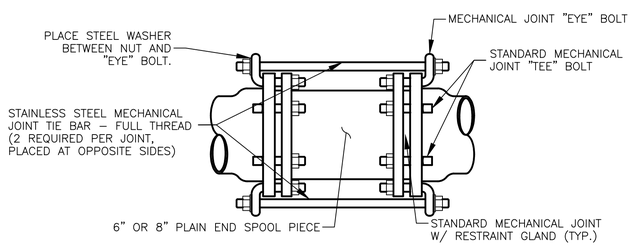
FITTING ASSEMBLY & THRUST BLOCK DETAIL

DETAIL 1
N.T.S.



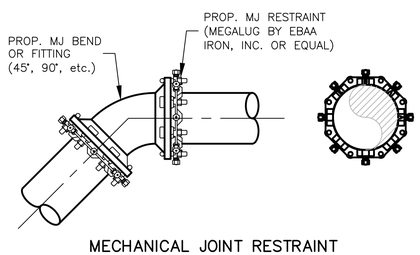
GATE VALVE INSTALLATION DETAIL

DETAIL 2
N.T.S.



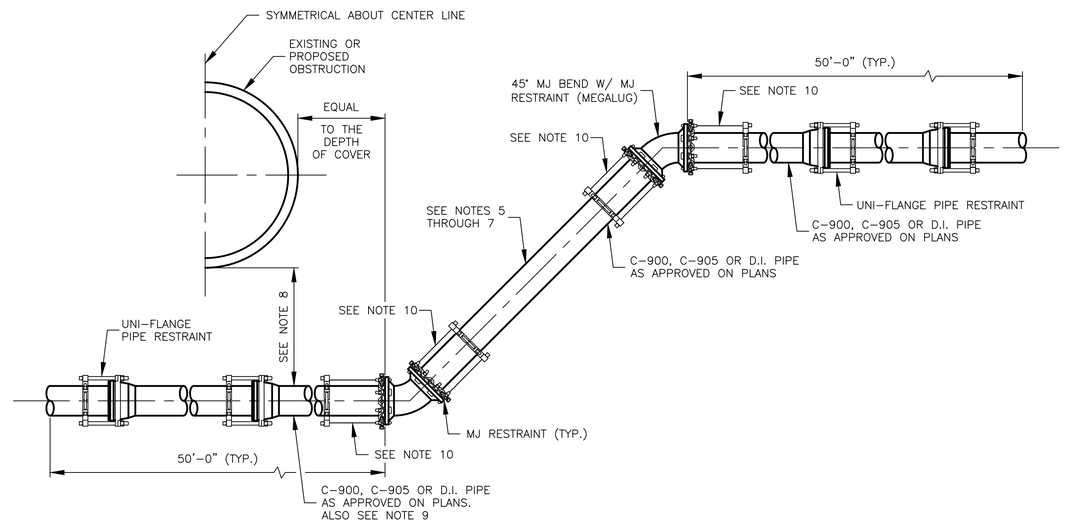
MECHANICAL RESTRAINT W/ RESTRAINING RODS

DETAIL 3
N.T.S.



MECHANICAL JOINT RESTRAINT

DETAIL 4
N.T.S.



NOTES:

1. WHEN ALTERING EXISTING LINES RESTRAIN ANY EXISTING JOINTS EXPOSED BY CONSTRUCTION BEFORE OR AFTER PROPOSED FITTINGS WITH UNI-FLANGE BELL AND SPIGOT PIPE RESTRAINT.
2. RESTRAIN ALL JOINTS WITHIN 50 FEET OF PROPOSED FITTINGS.
3. APPROPRIATE BEDDING AND BACKFILL SHALL BE IN ACCORDANCE WITH THE DETAILS AND DESIGN STANDARDS.
4. USE APPROPRIATE SERIES MODEL RESTRAINT FOR PIPE MATERIAL.
5. WHERE POSSIBLE THERE SHOULD BE NO PIPE JOINTS WITHIN THE VERTICAL OR HORIZONTAL RUN OF THE OFFSET (WHEN AND WHERE APPROVED SEE NOTE 6 AND 7).
6. IF A PIPE JOINT IS REQUIRED WITHIN THE VERTICAL OFFSET IT SHALL BE RESTRAINED WITH UNI-FLANGE BELL AND SPIGOT TYPE RESTRAINT.
7. WHEN DEPTH OF OFFSET REQUIRES MORE THAN A STANDARD LENGTH OF PIPE NO SEGMENT SHALL BE LESS THAN 5' IN LENGTH.
8. THE MINIMUM CLEARANCE SHALL BE DETERMINED BY THE AMOUNT OF BEDDING AND BACKFILL REQUIRED BY THE PROSPECTIVE PIPE AND THEIR USAGE. SEE THE BEDDING AND BACKFILL DETAILS FOR DIMENSIONS.
9. A SOLID CONTINUOUS JOINT OF PIPE SHALL BE USED AT ALL TIMES FOR THE HORIZONTAL SECTION OF THE OFFSET.
10. INSTALL STAINLESS STEEL RESTRAINING RODS FROM 45° MJ BEND TO ADJACENT MJ FITTING OR VALVE. IF NO FITTING OR VALVE EXISTS, INSTALL PV-LOK PIPE RESTRAINT OR APPROVED EQUAL.

RESTRAINED MECHANICAL JOINT VERTICAL OFFSET

DETAIL 5
N.T.S.

RPS
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575 N.Dairy Ashford, Suite 700, Houston, Texas 77079
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9/25/2020

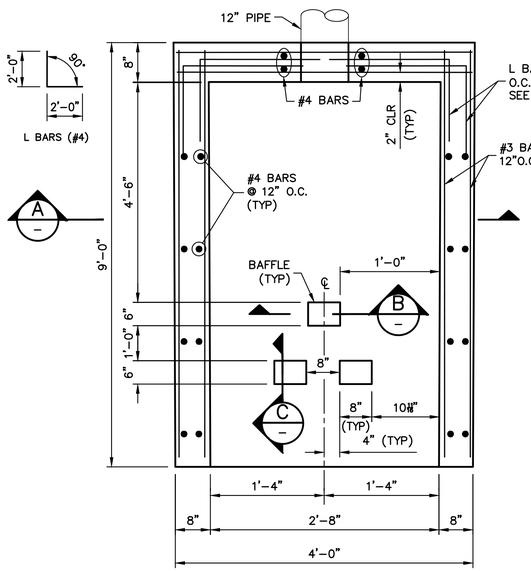
1

WATERLINE DETAILS

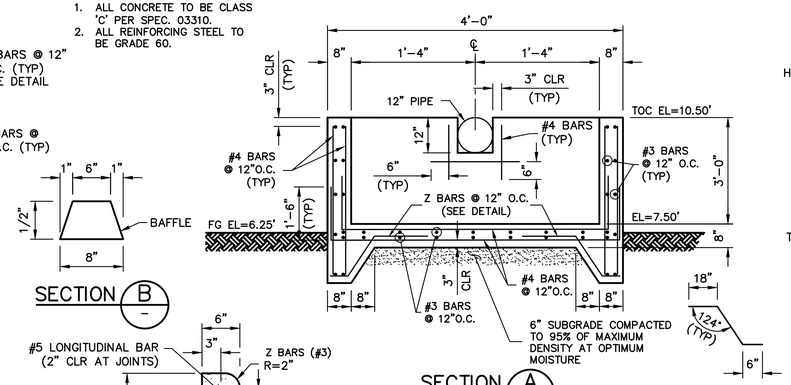
RPS Project No 007517 (1068.002.001)	
Drawn By JAH	Checked By NMW
Scale NTS	Date AUGUST 2020
DWG No C-7	Sheet 10 Of 28

J:\1068.002.001\07.00 CADD\BPSUD Elevated Storage Tank Site Plan\02-Construction Drawings\007517.Waterline Details.dwg Aug 24 2020

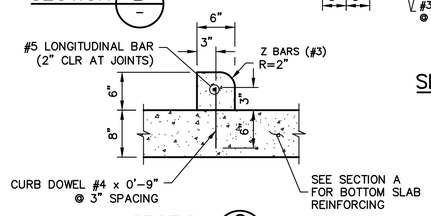
NOTES:
1. ALL CONCRETE TO BE CLASS 'C' PER SPEC. 03310.
2. ALL REINFORCING STEEL TO BE GRADE 60.



PLAN



SECTION A

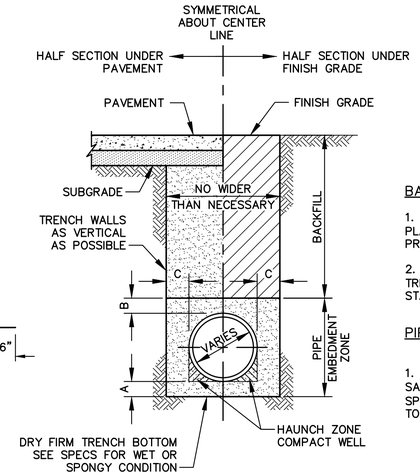


SECTION B

SECTION C

CONCRETE SPLASH PAD

DETAIL 6
NTS



BURIED PIPE INSTALLATION

DETAIL 7
NTS

DIMENSIONAL REQUIREMENTS

PIPE SIZE	A	B	C
20" AND SMALLER	6"	6"	9"
21" THRU 48"	6"	6"	12"
54" THRU 66"	9"	12"	15"
72" AND LARGER	12"	18"	15"

MATERIAL REQUIREMENTS

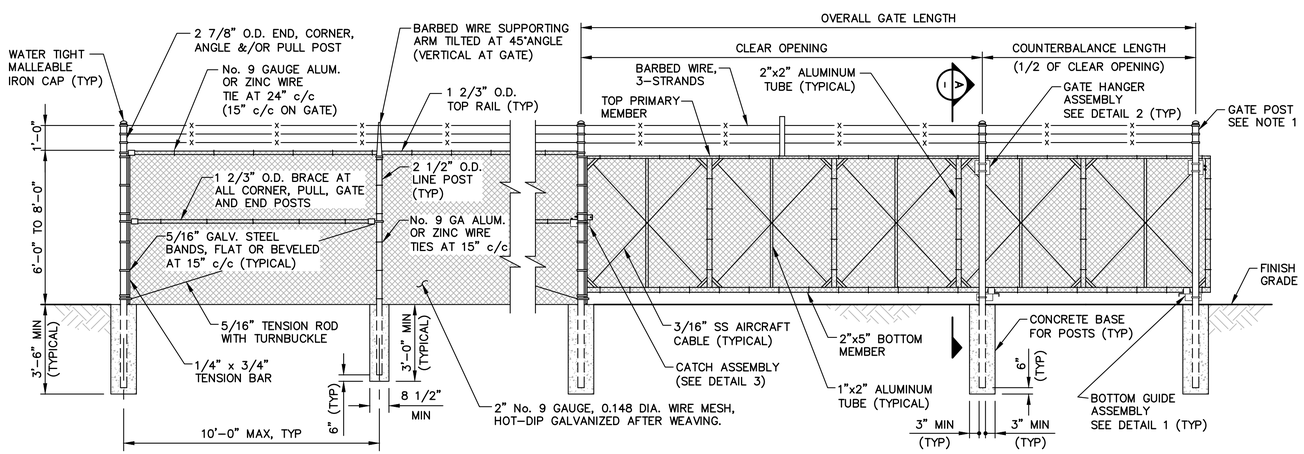
BACKFILL

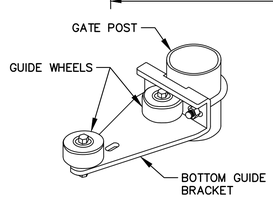
1. IN PAVED AREAS, USE CEMENT STABILIZED SAND, PLACE IN 6" LIFTS AND COMPACT TO 95% STANDARD PROCTOR DENSITY.

2. IN UNPAVED AREAS, USE SOIL EXCAVATED FROM TRENCH, PLACE IN 6" LIFTS AND COMPACT TO 85% STANDARD PROCTOR DENSITY.

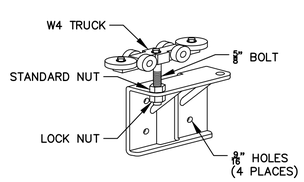
PIPE EMBEDMENT ZONE

1. FOR WATER LINES, USE WELL (DENSELY) GRADED SAND/GRAVEL MIX OR COURSE SOIL (SEE SPECIFICATIONS). PLACE IN 6" LIFTS AND COMPACT TO 95% STANDARD PROCTOR DENSITY.

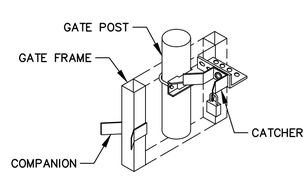




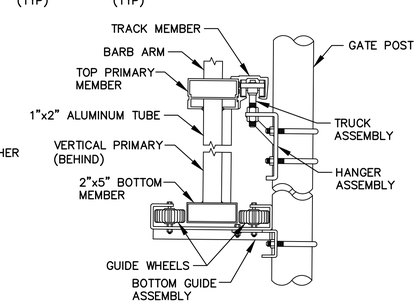
BOTTOM GUIDE ASSEMBLY 1



GATE HANGER ASSEMBLY 2



CATCH ASSEMBLY 3

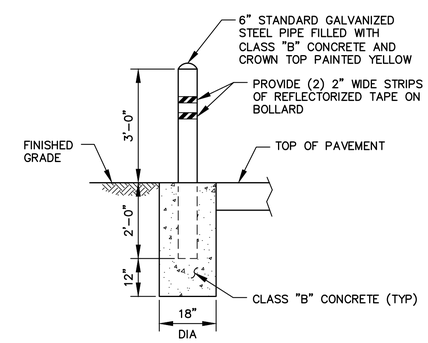


ASSEMBLY SECTION A

NOTES:
1. OUTSIDE DIAMETER OF GATE POSTS VARY ACCORDING TO LEAF WIDTH:
   6' OR LESS = 2 7/8" O.D.
   13' OR LESS = 4" O.D.
   18' OR LESS = 6 5/8" O.D.
   OVER 18' = 8 5/8" O.D.

CHAIN LINK FENCE WITH SLIDE GATE

DETAIL 8
NTS



BOLLARD

DETAIL 9
NTS

RPS
Texas PE Firm Reg. #F-929
575 N.Dairy Ashford, Suite 700, Houston, Texas 77079
T +1 281 589 7257 E usinfrastructure@rpsgroup.com

TEXAS GENERAL LAND OFFICE

BPSUD Elevated Water Storage Tank

Bolivar Peninsula Special Utility District

SURVEY COMPANY:

HIGH TIDE LAND SURVEYING LLC.
975 LAZY LANE WEST
CRYSTAL BEACH, TX 77650
MAILING P.O. BOX 16142 GALVESTON, TX 77552

BENCHMARK:

NGS MARK HGCSD 64 PID AW6988 SITUATED ABOUT 7.5 MILES SOUTHWEST OF GILCHREST ABOUT 2.5 MILES NORTHEASE OF CRYSTAL BEACH ON THE BOLAVAR PENINSULA AND ON THE SOUTH SIDE OF STATE HIGHWAY 87 ELEVATION 5.1' FEET NAVD 88.

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STATE OF TEXAS
SYLVESTER JOHNSON, JR.
111505
LICENSED PROFESSIONAL ENGINEER
9/25/2020

MISCELLANEOUS DETAILS

RPS Project No	007517 (1068.002.001)
Drawn By JAH	Checked By NMW
Scale NTS	Date AUGUST 2020
DWG No C-8	Sheet 11 Of 28

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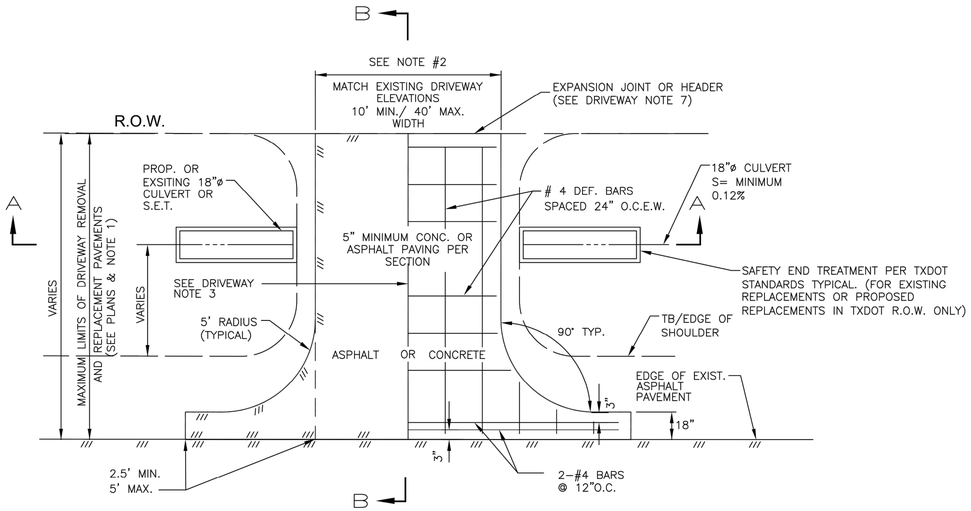
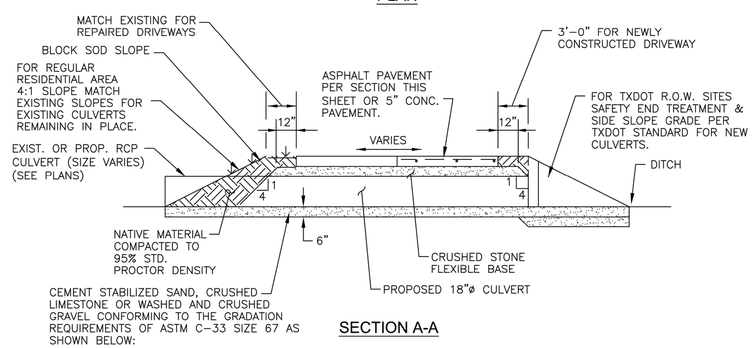
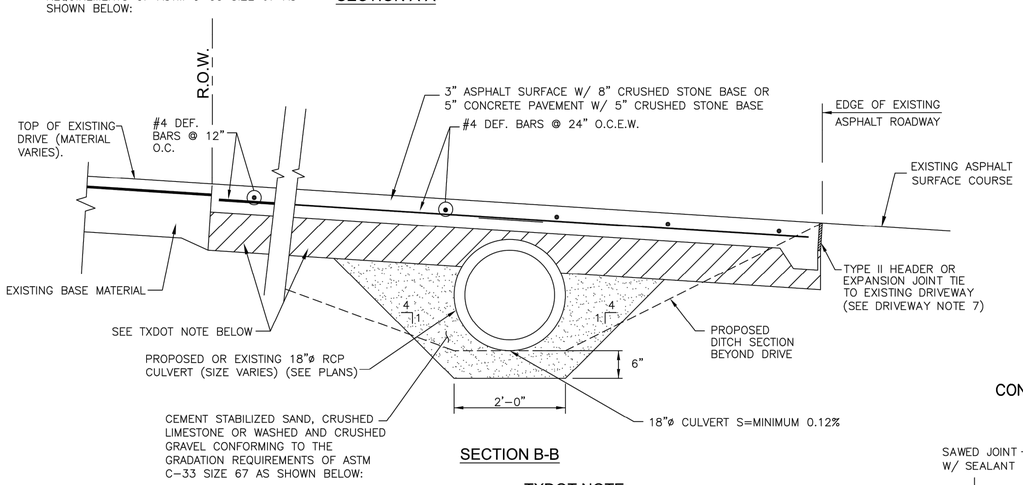


PLAN



SECTION A-A



SECTION B-B

PASSING	1 INCH SIEVE	100%
PASSING	¾ INCH SIEVE	90 – 100%
PASSING	⅜ INCH SIEVE	20 – 55%
PASSING	NO. 4 SIEVE	0 – 10%
PASSING	NO. 8 SIEVE	0 – 5%

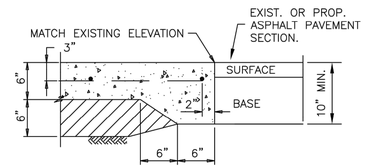
TXDOT NOTE:

6" MINIMUM CONRETE AND ANY ASPHALT DRIVEWAYS TO BE REPAIRED/REPLACED IN TXDOT RIGHT-OF-WAY SHALL MATCH EXISTING TXDOT PAVEMENT SECTION. BASE MATERIAL FOR ASPHALT DRIVEWAYS SHALL BE CRUSHED LIMESTONE. CRUSHED RECYCLED CONCRETE IS NOT ACCEPTABLE TO TXDOT.

CONCRETE OR ASPHALT DRIVEWAY DETAIL

DETAIL 10

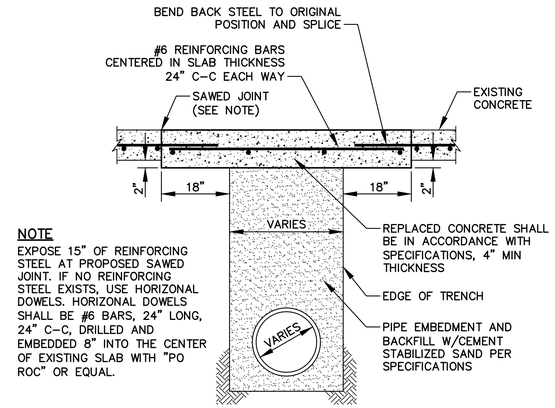
NTS



CONCRETE TO ASPHALT TYPE II PAVING HEADER

DETAIL 11

NTS



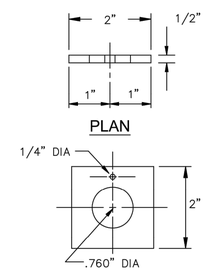
NOTE

EXPOSE 15" OF REINFORCING STEEL AT PROPOSED SAWED JOINT. IF NO REINFORCING STEEL EXISTS, USE HORIZONAL DOWELS. HORIZONAL DOWELS SHALL BE #6 BARS, 24" LONG, 24" C-C, DRILLED AND EMBEDDED 8" INTO THE CENTER OF EXISTING SLAB WITH "PO ROC" OR EQUAL.

CONCRETE DRIVEWAY REPAIR

DETAIL 12

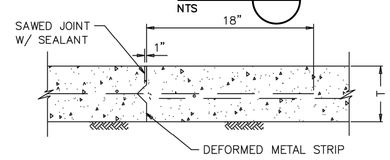
NTS



CONCRETE OR ASPHALT DRIVEWAY DETAIL

DETAIL 13

NTS



CONSTRUCTION JOINT DETAIL

DETAIL 14

NTS

rps
Texas PE Firm Reg. #F-929
575 N.Dairy Ashford, Suite 700, Houston, Texas 77079
T +1 281 589 7257 E usinfrastructure@rpsgroup.com

TEXAS GENERAL LAND OFFICE

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Bolivar Peninsula Special Utility District

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LICENSED
PROFESSIONAL ENGINEER
9/25/2020

1

DRIVEWAY DETIALS

RPS Project No 007517 (1068.002.001)	
Drawn By JAH	Checked By NMW
Scale N.T.S.	Date AUGUST 2020
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GENERAL NOTES

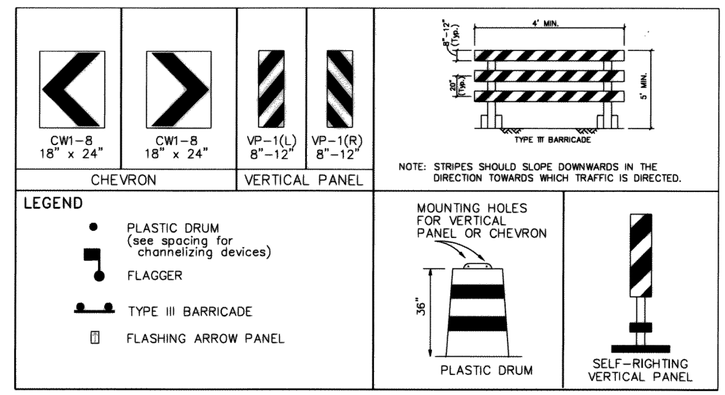
1. The Contractor shall provide and install traffic control devices in conformance with Part VI of Texas Manual on Uniform Traffic Control Devices (TMUTCD) latest edition with revisions during the entire construction period.
2. All signs and traffic control devices shall conform to the latest version of the TMUTCD.
3. No lanes shall be closed during the hours of 7:00 AM to 9:00 AM and 4:00 PM to 6:00 PM Monday thru Friday without approval of the City Traffic Engineer.
4. No work shall be performed in residential areas from 7:00 PM to 7:00 AM.
5. Contractor shall maintain approved number of thru lanes of traffic in each direction during construction working hours. Traffic control plans shall include one-way and/or detour plans.
6. Contractor shall maintain traffic lanes and detours according to traffic control plans during working hours.
7. Contractor shall cover open pavement excavations for minor utility work with anchored steel plates during non-working hours, and open lanes for normal traffic flow when feasible.
8. If the Contractor chooses to use a different method of "Traffic Control Plans" during the construction than what is outlined in the contract drawings, the Contractor shall be responsible to prepare and submit an alternate set of traffic control plans to the City of Houston Project Manager for approval ten working days prior to implementation. These plans shall be drawn to scale on reproducible mylars and shall be sealed by a Licensed Engineer in the State of Texas. Traffic Operations Division representative approval is required to accept the proposed changes.
9. Contractor shall secure lane/sidewalk closure permits from Traffic Operations Division (Mobility Permit Section at http://www.gims.houstontx.gov/portalWS/MainPortal.aspx) before implementing the traffic control plan. The application must be submitted at least ten business days prior to the implementation of the traffic control plan and/or beginning construction work. The contractor shall provide traffic control plans, construction sequencing, and schedule with the application.
10. Contractor shall have approved traffic control plan and permit at the job site for inspection at all times.
11. During pavement surface restoration projects; the Contractor shall not open closed lanes until the pavement surface has cured enough to allow vehicular traffic according to City of Houston Standard Specifications.
12. The Contractor is responsible for scheduling and coordinating all construction activities with stake holders in the vicinity including emergency response agencies such as Houston Police Department, Houston Fire Department, and Metropolitan Transit Authority.
13. Contractor shall be responsible for issuing all work directives to all sub-contractors, utility companies, and all other entities performing construction work associated with the project.
14. Nothing in these notes or plans shall relieve the Contractor of the responsibility for job site conditions during the course of construction of the project; including safety of all modes of transportation, persons, and property, and that this requirement shall apply continuously and not be limited to working hours.
15. The Traffic Operation Division (Mobility Permits Group) per the direction of the City Traffic Engineer have the right to demand the installation of additional traffic control devices or modifications to these plans and notes, as deemed necessary to promote the safe and orderly flow of traffic and pedestrians through the construction work zone. The Contractor shall comply with these additional requests or modifications with due diligence.
16. All existing traffic control signs and pavement markings shall be maintained in visible locations during construction unless prior written approval is obtained from City of Houston Project Manager. The Contractor shall restore or replace (at the discretion of the City Traffic Engineer) any pavement marking or signing damaged during construction operations, including Raised Pavement Markers (RPMs) and chip seal markers.
17. When entering or leaving roadways carrying public traffic, the Contractor's equipment, whether empty or loaded shall in all cases yield to public traffic with assistance by Contractor provided certified flagger/peace officer.
18. Access to driveways adjacent to the construction work zone shall be maintained at all times as much as possible. Additional cones delineators may be required to delineate the driveway access route through the construction work zone. A minimum of one travel lane shall be maintained across the driveways, unless prior written approval is obtained from City of Houston Project Manager.
19. Spillage resulting from hauling operations along or across any public traveled way shall be removed immediately by the Contractor.
20. The Contractor shall submit an application for temporary parking restrictions if there are parking meters located at the proposed lane closures from Parking Management Division (832-393-8690) at least ten business days before implementation of lane closures. In addition, temporary no parking signs shall be posted 24 hours prior to commencement of work.
21. Additional off duty police officers/flaggers may be requested to direct traffic when lanes are blocked at the discretion of the City Project Manager even if they are not specifically identified on the project plans.
22. The Contractor shall replace within 72 hours, all traffic signal loop detectors damaged during construction.
23. In general, a solar powered flashing arrow board shall be required on all major thoroughfare lane closures. Exceptions to flashing arrow boards and/or implementation on residential lane closures shall be approved by the City Traffic Engineer.
24. Approved traffic control plan shall be in place before starting any excavation.

SPACING FOR CHANNELIZING DEVICES

A. Plastic drums on merging taper @ 30' c - c with chevron sign @ 60' c - c and warning lights for overnight closure.
B. Plastic drums on downstream taper @ 30' c - c (return taper and barricade are optional and divided roadway section)
C. Plastic drums on radii @ 35' c -c.
D. Plastic drums on tangent @ 35' c - c with vertical panel at 70' c - c and approved warning light @ 70' c - c (for overnight closure).
E. Plastic drums in front of construction zone @ 20' c - c with vertical panel at 40' c - c and approved warning light @ 40' c - c (for overnight closure).
F. Concrete Traffic Barrier (CTB) or Low Profile Concrete Traffic Barrier (LPCTB) with approved reflectors @ 10' c - c if pavement drop is greater than 1 foot.
G. Plastic drums w/Guard rail mounted.
H. Self- Righting vertical panel spacing.
   - 4 lanes to 2 lanes undivided roadway section @ 20' c - c.
   - 4 lanes divided roadway to one side two way roadway @ 20' c - c.
   - Left lane and right lane storage bays @ 15' c - c.

I. Spacing shown on traffic control shall supersede the above spacing.
J. Spacing may be adjusted to provide driveways, intersections and /or median openings.

CHANNELIZATION AND BARRICADES



TYPICAL SIGN SPACING, TAPER LENGTHS, AND SUGGESTED SPACING OF CHANNELIZATION DEVICES						
		Min. Desirable Taper Length "L"			Suggested Maximum Spacing Of Device	
Posted Speed (mph)	Sign Spacing "X"	10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent
30	120'	150'	165'	180'	30'	60' – 75'
35	160'	205'	225'	245'	35'	70' – 90'
40	240'	265'	295'	320'	40'	80' – 100'
45	320'	450'	495'	540'	45'	90' – 110'
50	400'	500'	550'	600'	50'	100' – 125'
55	500'	550'	605'	660'	55'	110' – 140'

Length for Buffers	
Posted Speed (mph)	Length in Feet (B)
20	40
25	60
30	90
35	120
40	155
45	195
50	240
55	295
60	350
65	410
70	475

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Texas PE Firm Reg. #F-929
575 N.Dairy Ashford, Suite 700, Houston, Texas 77079
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STATE OF TEXAS
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111505
LICENSED
PROFESSIONAL ENGINEER
9/25/2020

TRAFFIC CONTROL PLAN NOTES
CHANNELIZING DEVICES
AND BARRICADES

RPS Project No 007517 (1068.002.001)	
Drawn By JAH	Checked By NMW
Scale NTS	Date AUGUST 2020
DWG No C-10	Sheet 13 Of 28

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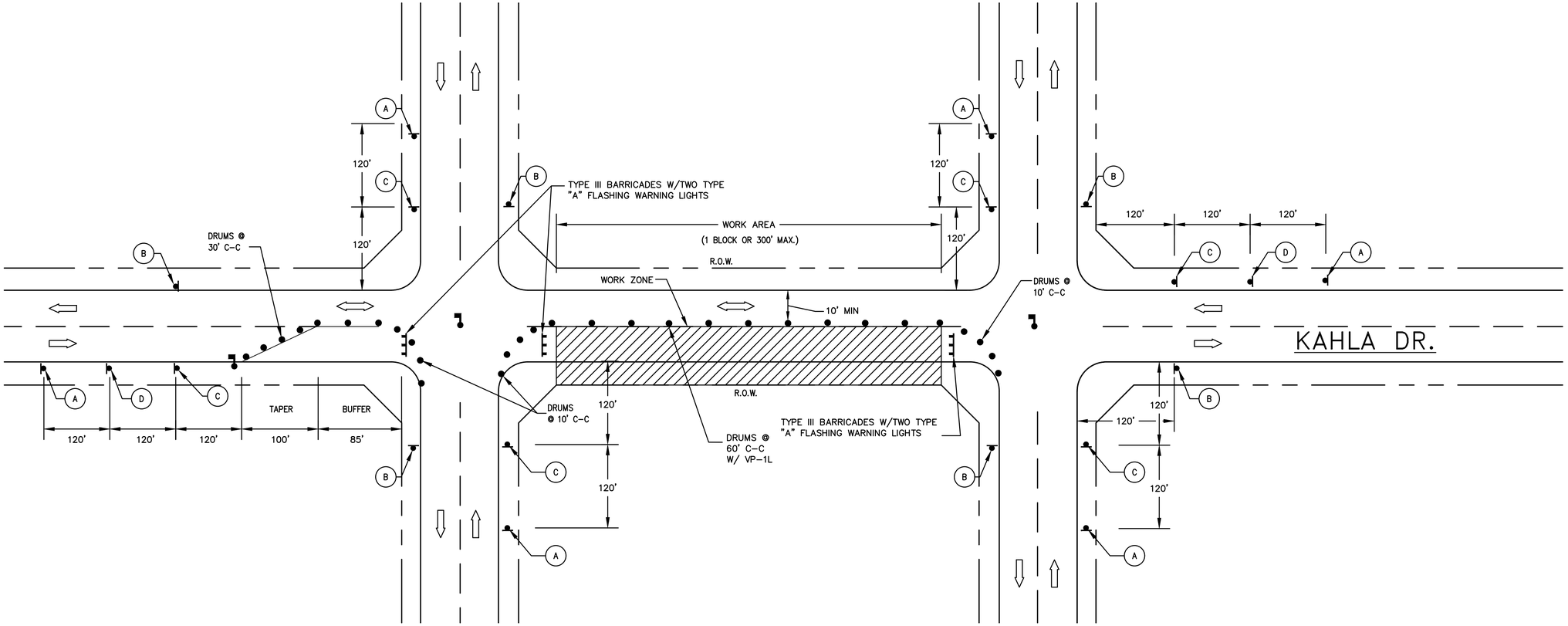
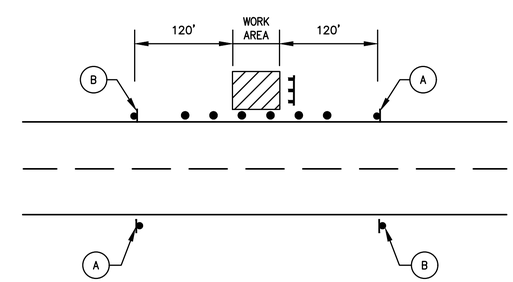


TYPICAL ONE LANE CLOSURE PLAN
TWO WAY FLAGGING OPERATION
(DURING DAYTIME WORKING HOURS ONLY)

LEGEND

- WORK ZONE
- PLASTIC DRUM (see spacing for channelizing devices)
- TYPE III BARRICADE W/TWO TYPE "A" FLASHING WARNING LIGHTS
- FLASHING ARROW PANEL
- SIGN ON POST
- TRAFFIC FLOW DIRECTION
- TUBULAR MARKER
- FLAGGER



TYPICAL APPLICATION–MINOR OPERATION, WORK OFF SIDE OF ROAD

A	UTILITY WORK AHEAD	CW21–7D	48 X 48
B	END ROAD WORK	G20–2a	36 X 18
C		CW20–7a	48 x 48
D	ONE LANE ROAD AHEAD	CW20–4D	48 X 48
E	RIGHT LANE CLOSED / AHEAD	CW20–5RD	48 X 48 FLAQUE 30 X 12
F	LEFT LANE CLOSED / AHEAD	CW20–5LD	48 X 48 FLAQUE 30 X 12
G		CW6–3	30 X 30
H		CW1–6a	30 X 30
J		CW1–3L	30 X 30
K		CW1–3R	30 X 30
L	20 M.P.H.	CW13–1	18 X 18
M	DO NOT ENTER	R5–1	36 X 36
N	ROAD CLOSED	R11–2	48 X 30
P	ROAD WORK AHEAD	CW20–1D	48 X 48
R	DO NOT PASS	R4–1	18 X 24
S	DETOUR	M4–10L	48 X 18
		TYPE III BARRICADE	
	LEFT	CW1-8	18 x 24
	RIGHT	CW1-8	18 x 24
	8"-12"	VP-1L	
	8"-12"	VP-1R	
	MOUNTING HOLES FOR VERTICAL PANEL OR CHEVRON, 36"	DRUM	

RPS
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TRAFFIC CONTROL PLAN
TYPICAL ONE LANE CLOSURE

RPS Project No	007517 (1068.002.001)
Drawn By JAH	Checked By NMW
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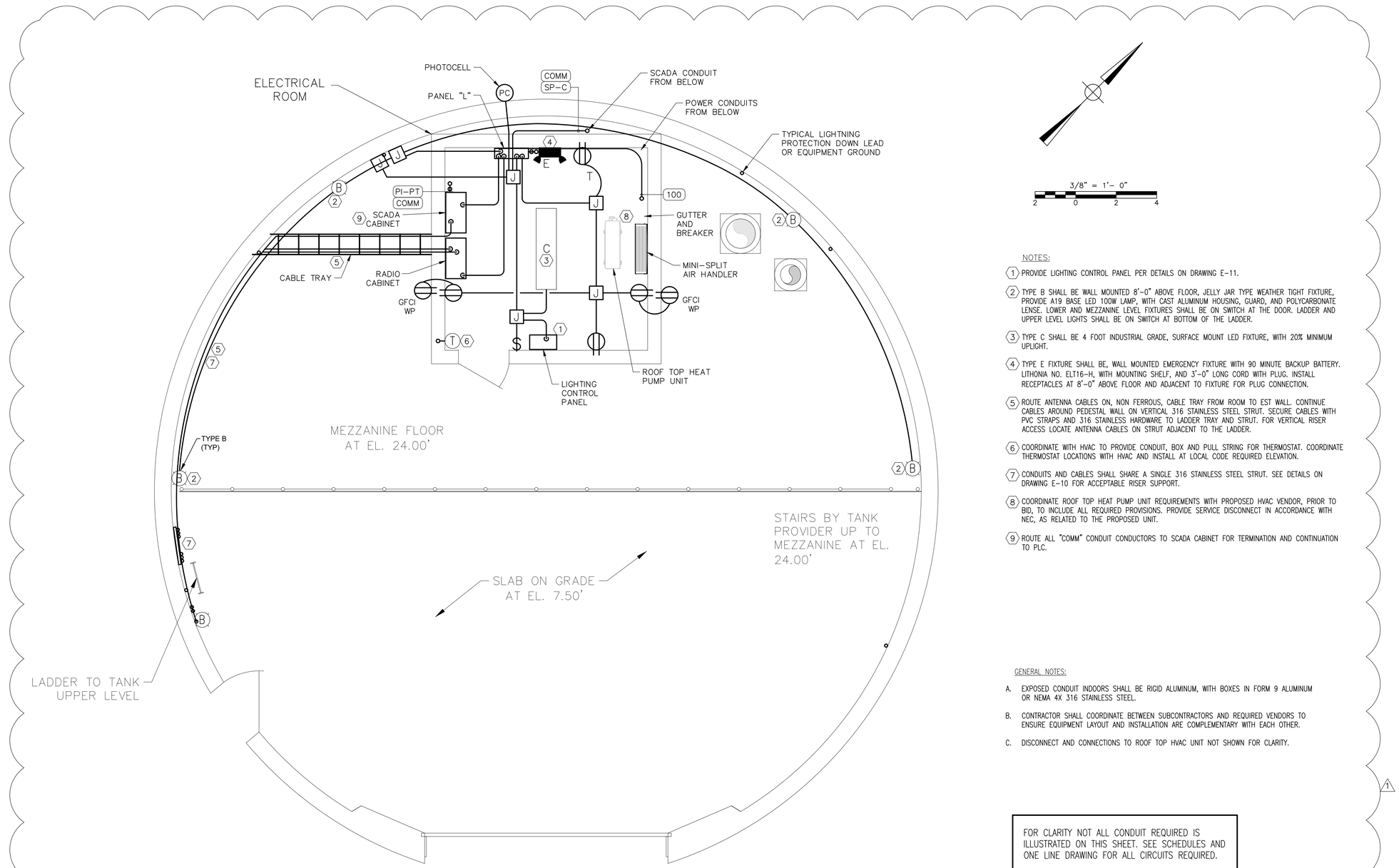

ELEVATED STORAGE TANK MEZZANINE FLOOR

PLAN

3/8" = 1'-0"

NOTES:

1. PROVIDE LIGHTING CONTROL PANEL PER DETAILS ON DRAWING E-11.
2. TYPE B SHALL BE WALL MOUNTED 8'-0" ABOVE FLOOR, JELLY JAR TYPE WEATHER TIGHT FIXTURE, PROVIDE A19 BASE LED 100W LAMP, WITH CAST ALUMINUM HOUSING, GUARD, AND POLYCARBONATE LENSE. LOWER AND MEZZANINE LEVEL FIXTURES SHALL BE ON SWITCH AT THE DOOR. LADDER AND UPPER LEVEL LIGHTS SHALL BE ON SWITCH AT BOTTOM OF THE LADDER.
3. TYPE C SHALL BE 4 FOOT INDUSTRIAL GRADE, SURFACE MOUNT LED FIXTURE, WITH 20% MINIMUM UPLIGHT.
4. TYPE E FIXTURE SHALL BE, WALL MOUNTED EMERGENCY FIXTURE WITH 90 MINUTE BACKUP BATTERY. LITHONIA NO. ELT16-H, WITH MOUNTING SHELF, AND 3'-0" LONG CORD WITH PLUG. INSTALL RECEPTACLES AT 8'-0" ABOVE FLOOR AND ADJACENT TO FIXTURE FOR PLUG CONNECTION.
5. ROUTE ANTENNA CABLES ON, NON FERROUS, CABLE TRAY FROM ROOM TO EST WALL. CONTINUE CABLES AROUND PEDESTAL WALL ON VERTICAL 316 STAINLESS STEEL STRUT. SECURE CABLES WITH PVC STRAPS AND 316 STAINLESS HARDWARE TO LADDER TRAY AND STRUT. FOR VERTICAL RISER ACCESS LOCATE ANTENNA CABLES ON STRUT ADJACENT TO THE LADDER.
6. COORDINATE WITH HVAC TO PROVIDE CONDUIT, BOX AND PULL STRING FOR THERMOSTAT. COORDINATE THERMOSTAT LOCATIONS WITH HVAC AND INSTALL AT LOCAL CODE REQUIRED ELEVATION.
7. CONDUITS AND CABLES SHALL SHARE A SINGLE 316 STAINLESS STEEL STRUT. SEE DETAILS ON DRAWING E-10 FOR ACCEPTABLE RISER SUPPORT.
8. COORDINATE ROOF TOP HEAT PUMP UNIT REQUIREMENTS WITH PROPOSED HVAC VENDOR, PRIOR TO BID, TO INCLUDE ALL REQUIRED PROVISIONS. PROVIDE SERVICE DISCONNECT IN ACCORDANCE WITH NEC, AS RELATED TO THE PROPOSED UNIT.
9. ROUTE ALL "COMM" CONDUIT CONDUCTORS TO SCADA CABINET FOR TERMINATION AND CONTINUATION TO PLC.

GENERAL NOTES:

A. EXPOSED CONDUIT INDOORS SHALL BE RIGID ALUMINUM, WITH BOXES IN FORM 9 ALUMINUM OR NEMA 4X 316 STAINLESS STEEL.

B. CONTRACTOR SHALL COORDINATE BETWEEN SUBCONTRACTORS AND REQUIRED VENDORS TO ENSURE EQUIPMENT LAYOUT AND INSTALLATION ARE COMPLEMENTARY WITH EACH OTHER.

C. DISCONNECT AND CONNECTIONS TO ROOF TOP HVAC UNIT NOT SHOWN FOR CLARITY.

FOR CLARITY NOT ALL CONDUIT REQUIRED IS ILLUSTRATED ON THIS SHEET. SEE SCHEDULES AND ONE LINE DRAWING FOR ALL CIRCUITS REQUIRED.

rps
Texas PE Firm Reg. #F-929
575 N.Dairy Ashford, Suite 700, Houston, Texas 77079
T +1 281 589 7257 E usinfrastructure@rpsgroup.com

TEXAS GENERAL LAND OFFICE

BPSUD Elevated Water Storage Tank

Bolivar Peninsula Special Utility District

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
Consulting Engineers & Project Managers
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BENCHMARK: (1)

NGS MARK HGCSD 64 PID AW6988 SITUATED ABOUT 7.5 MILES SOUTHWEST OF GILCHREST ABOUT 2.5 MILES NORTHEASE OF CRYSTAL BEACH ON THE BOLAVAR PENINSULA AND ON THE SOUTH SIDE OF STATE HIGHWAY 87 ELEVATION 5.1' FEET NAVD 88.

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REV	DESCRIPTION	BY	DATE
1	ADDENDUM 2	WH	9/30/2020

STATE OF TEXAS
WADE A HUBBLE
121581
LICENSED PROFESSIONAL ENGINEER

Wade A. Hubble
09.30.2020

ELEVATED STORAGE TANK MEZZANINE FLOOR PLAN

RPS Project No 007517 / 1068.002.001	
Drawn By	Checked By
Scale 3/8"=1'-0"	Date AUGUST 2020
DWG No E-5	Sheet 22 Of 28

L:\Active Projects\419-RPS (BPSUD ELT)\Drawings\E-5 ST Mezzanine Fl Power and Lighting Plan - Revised Sep 30 2020

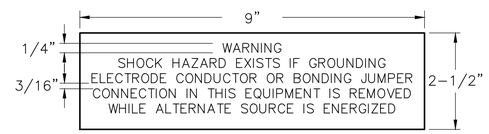
SERVICE LOAD ANALYSIS
240V, 1PH, 3W

	KVA
EXISTING LOAD	
PANEL A	299.3
PANEL B	37.5
	15
ADDED LOAD	
EST PANEL L	25
SUB TOTAL	376.5
25% LARGEST MOTOR LOAD = 45 AMPS	37.4
TOTAL LOAD	413.9

413.9 KVA AT 480V, 3 PHASE = 513.2 AMPS
2 SETS OF 350 KCMIL CABLE HAS A RATING OF 620 AMPS.
THE SERVICE IS ADEQUATE.

NOTE:
TWO PUMP MOTORS ARE SERVICE DUTY AT ANY TIME, ONE PUMP IS STANDBY.
ALL PUMPS ARE ON SOLID STATE SOFT STARTERS

ELECTRICAL "WARNING" NAMEPLATE

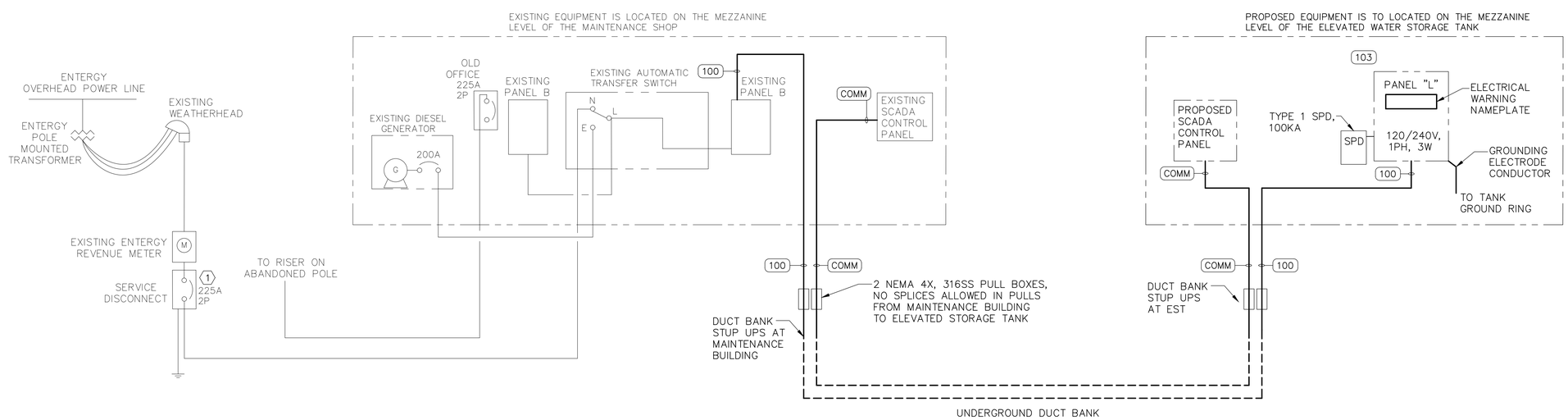


1/16" THICK PHENOLIC NAMEPLATE–RED WITH WHITE LETTERS. CENTER ENGRAVING AND ANCHOR TO ENCLOSURE WITH 316 SS SELF TAPPING SCREWS. APPLY SILICON SEALER INSIDE DOOR AT SCREW PENETRATION TO SEAL SCREWS.

1

NOTES:

1. REMOVE AND REPLACE EXISTING MAIN SERVICE ENCLOSED CIRCUIT BREAKER. CONTRACTOR SHALL COORDINATE THE OUTAGE WITH ENTERGY AND BPSUD PROJECT MANAGER. PROVIDE NEW BREAKER WITH SPECIFICATIONS MATCHING THE EXISTING, FOR BREAKER AND ENCLOSURE.



ONE LINE DIAGRAM
NTS

rps
Texas PE Firm Reg. #F-929
575 N.Dairy Ashford, Suite 700, Houston, Texas 77079
T +1 281 589 7257 E usinfrastructure@rpsgroup.com

TEXAS GENERAL LAND OFFICE
BPSUD Elevated Water Storage Tank

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1	ADDENDUM 2	WH	9/30/2020

STATE OF TEXAS
WADE A HUBBLE
121581
LICENSED PROFESSIONAL ENGINEER
Wade A. Hubble
09.30.2020

ONE LINE DIAGRAM

RPS Project No 007517 / 1068.002.001	
Drawn By	Checked By
Scale N.T.S.	Date AUGUST 2020
DWG No E-7	Sheet 24 Of 28

L:\Active projects\4119-RPS (BPSUD EST)\Drawings\E-7 EST Electrical One Line Diagram Rev1.dwg Sep 30 2020

EXISTING POWER PANEL "A"
LOCATED IN MAINTENANCE BUILDING ON SECOND LEVEL

PANEL "A"

BUS AMPS 225 MLO ✓
VOLTS 120/240V
PHASE 1 WIRE 3 SN ✓
WIRE SIZE 2/0
AIC 10KA

CKT. DESCRIPTION	LOAD	BKR.	A	B	BKR.	LOAD	CKT. DESCRIPTION
NORTH AREA LIGHT	75	20	1	2	20	180	SHED
SPACE			3	4	20		SPARE
DOWN STAIRS LIGHTS	110	20	5	6	20	100	LIGHTS
SHOP LIGHTS	80	20	7	8	20	110	LIGHTS
SPARE		20	9	10	20		SPARE
SPACE			11	12	20	75	OUTSIDE LIGHTS
GENERATOR BLOCK HEATER			13	14	20		SPARE
CLIFF'S OFFICE			15	16	20	360	RECEPTACLES
SPACE			17	18	20	100	SCADA CONTROL PANEL
AIR COMPRESSOR	2780	40	19	20	20	360	RECEPTACLES
	2780		21	22	20	180	COUNTER RECEPTACLE
WELDING MACHINE	3240	50	23	24			SPACE
	3240		25	26	30	2160	ELECTRIC HEATER
WATER HEATER	800	30	27	28		2160	
	800		29	30	40	1610	CONDENSING UNIT
SPACE			31	32		1610	
	13,905					9,005	

N

TOTAL = 22,910 VA

EXISTING POWER PANEL "B"
LOCATED IN MAINTENANCE BUILDING ON SECOND LEVEL

PANEL "B"

BUS AMPS 225 MLO ✓
VOLTS 120/240V
PHASE 1 WIRE 3 SN ✓
WIRE SIZE 2/0
AIC 10KA

CKT. DESCRIPTION	LOAD	BKR.	A	B	BKR.	LOAD	CKT. DESCRIPTION
RECEPTACLES	360	20	1	2	20	1400	ICE MACHINE
RECEPTACLES	360	20	3	4	20	300	REFRIDGERATOR
RECEPTACLES	360	20	5	6	20	360	RECEPTACLES
RECEPTACLES	360	20	7	8	20	360	RECEPTACLES
DRYER	2200	40	9	10	20	1000	ELECTRIC HEATER
	2200		11	12		1000	
SPACE			13	14			SPACE
SPACE			15	16			SPACE
SPACE			17	18			SPACE
SPACE			19	20			SPACE
SPACE			21	22			SPACE
SPACE			23	24			SPACE
SPACE			25	26			SPACE
SPACE			27	28			SPACE
(1) EST – PANEL L FEEDER	4950	60	29	30			SPACE
	4215		31	32			SPACE
	5,840					4,420	

N

TOTAL = 10,260 VA

NOTES:

(1) PROVIDE A NEW 60 AMP FEEDER BREAKER FOR THE EST PANEL L. VERIFY EXACT EATON CIRCUIT BREAKER MODEL REQUIRED FOR EXISTING PANEL.

PROPOSED POWER PANEL "L"
LOCATED ON MEZZANINE LEVEL INSIDE EST

PANEL "L"

BUS AMPS 150 MLO
MAIN BRKR. AMPS 60 WIRE SIZE 2/0
VOLTS 120/240V AIC 10KA
PHASE 1 WIRE 3 SN ✓

NOTES
1. BREAKERS 1P/20A UNLESS MARKED OTHERWISE
2. SURFACE MOUNT ON RACK
3. NEMA 4X, 316 SS ENCLOSURE

60

CKT. DESCRIPTION	WIRE	LOAD	BKR.	A	B	BKR.	LOAD	WIRE	CKT. DESCRIPTION
RADIO CABINET UPS	12	900	20	1	2	20	900	12	SCADA PANEL UPS
RADIO CABINET RECEPTACLE	12	300	20	3	4	20	300	12	SCADA CABINET RECEPTACLE
EST OUTDOOR WALL PACK LIGHTS	12	240	20	5	6	20	100	12	LIGHTING CONTROLS
INDOOR FLOOR LIGHTING	12	150	20	7	8	20	435	12	UPPER LVL LIGHTS & RECEPTACLES
SPARE			20	9	10	20	280	12	LADDER AND TUBE LIGHTS
SPARE			20	11	12	20	200	12	OBSTRUCTION LIGHTS
SPARE			20	13	14	20			SPARE
SPARE			20	15	16	20			SPARE
HVAC CONDENSING UNIT	10	1680	30	17	18	30	1000		HVAC EVAPORATION UNIT
	10	1680		19	20		1000		
SURGE PROTECTIVE DEVICE	–	–	30	21	22	30			SPARE
	–	–		23	24				
		4,950					4,215		

N

TOTAL = 9,165 VA

CONDUIT AND CABLE SCHEDULE

TAG	DESCRIPTION	VOLTAGE	ROUTING FROM	ROUTING TO	VIA	CONDUIT & WIRE SIZES
100	ELEVATED STORAGE TANK (EST) FEEDER	240V	EXISTING DISTRIBUTION PANELBOARD	WIREWAY ON EST MEZZANINE LEVEL	UNDERGROUND PVC DUCT BANK	1 1/4"C, WITH 2–#4 AWG, #4 AWG NEUTRAL, #6 GROUND
SP–1	FUTURE GARAGE FEEDER DUCT	–	POWER PULL BOX AT MAINTENANCE BUILDING	UNDERGROUND PULL BOX ACROSS DRIVEWAY	UNDERGROUND PVC DUCT BANK	2"C, WITH JET LINE
COMM	SCADA CONNECTION	–	EXISTING SCADA CONTROL PANEL	PROPOSED SCADA CONTROL PANEL	UNDERGROUND PVC DUCT BANK	2"C, WITH 2–CAT 6, 3–#16 TSP, 4–#14 AWG, #10 GROUND
DS–S	EST SECURITY DOOR SWITCH	–	PROPOSED SCADA CONTROL PANEL	DOOR SWITCH	EXPOSED RIGID ALUMINUM CONDUIT	1"C, WITH 2 #14, #10 GROUND
PI–PT	PRESSURE TRANSMITTER	–	PRESSURE TRANSMITTER	PROPOSED SCADA CONTROL PANEL	EXPOSED RIGID ALUMINUM CONDUIT	1"C, WITH 2 #14, #10 GROUND

RPS
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STATE OF TEXAS
WADE A HUBBLE
121581
LICENSED PROFESSIONAL ENGINEER
Wade A. Hubble
09.30.2020

ELECTRICAL SCHEDULES

RPS Project No 007517 / 1068.002.001	
Drawn By	Checked By
Scale N.T.S.	Date AUGUST 2020
DWG No E–8	Sheet 25 Of 28

L:\Active projects\4119-RPS (BPSUD EST)\Drawings\E-8 Electrical Schedules - Rev1.dwg Sep 30 2020

SCADA NOTES:

A. PROVIDE NEMA 12 STEEL ENCLOSURES WITH 3 POINT LATCH AND LOCKABLE HASP. SIZE ENCLOSURE AS REQUIRED FOR STANDARDS COMPLIANCE.

B. PROVIDE INSTALLATION, PROGRAMING, TESTING AND COMMISSIONING OF SCADA SYSTEM EQUIPMENT.

C. PROVIDE ONE 19 INCH WALL SHELF AND 900VA MINIMUM UPS UNIT, APC OR APPROVED EQUAL, INSTALL UPS UNITS OUTSIDE RADIO PANEL. PROVIDE 24VDC POWER SUPPLY, AS REQUIRED, SIZED ACCORDING TO PROPOSED EQUIPMENT.

D. PROVIDE ANY RELAYS, FUSE BLOCKS, TERMINAL BLOCKS, PANDUIT WIREWAY, AND ANCILLARY COMPONENTS TO COMPLETE A WORKING SYSTEM.

E. COORDINATE WITH BPSUD OPERATIONS TO PROVIDE THE CURRENT VERSION OF TWO MDS ETHERNET RADIOS, YAGI ANTENNAS, POLYPHASE COAX SURGE PROTECTORS AND ALL MOUNTING HARDWARE. ESTABLISH, TEST, AND COMMISSION RADIO COMMUNICATIONS FOR BOTH SYSTEMS. CONNECT RADIOS TO ANTENNA WITH LMR 600 COAX CABLE PROVIDED WITH FACTORY N-TYPE MALE CONNEXCTORS, NO SPLICES ARE ALLOWED IN THE CABLE. PROVIDE NON METALLIC CABLE CLAMPS SPECIFIC TO THE APPLICATION.

F. PROVIDE ONE PRESSURE TRANSMITTER, TWO TO BE INSTALLED WITH ALL CALIBRATION, TESTING, AND COMMISSIONING.

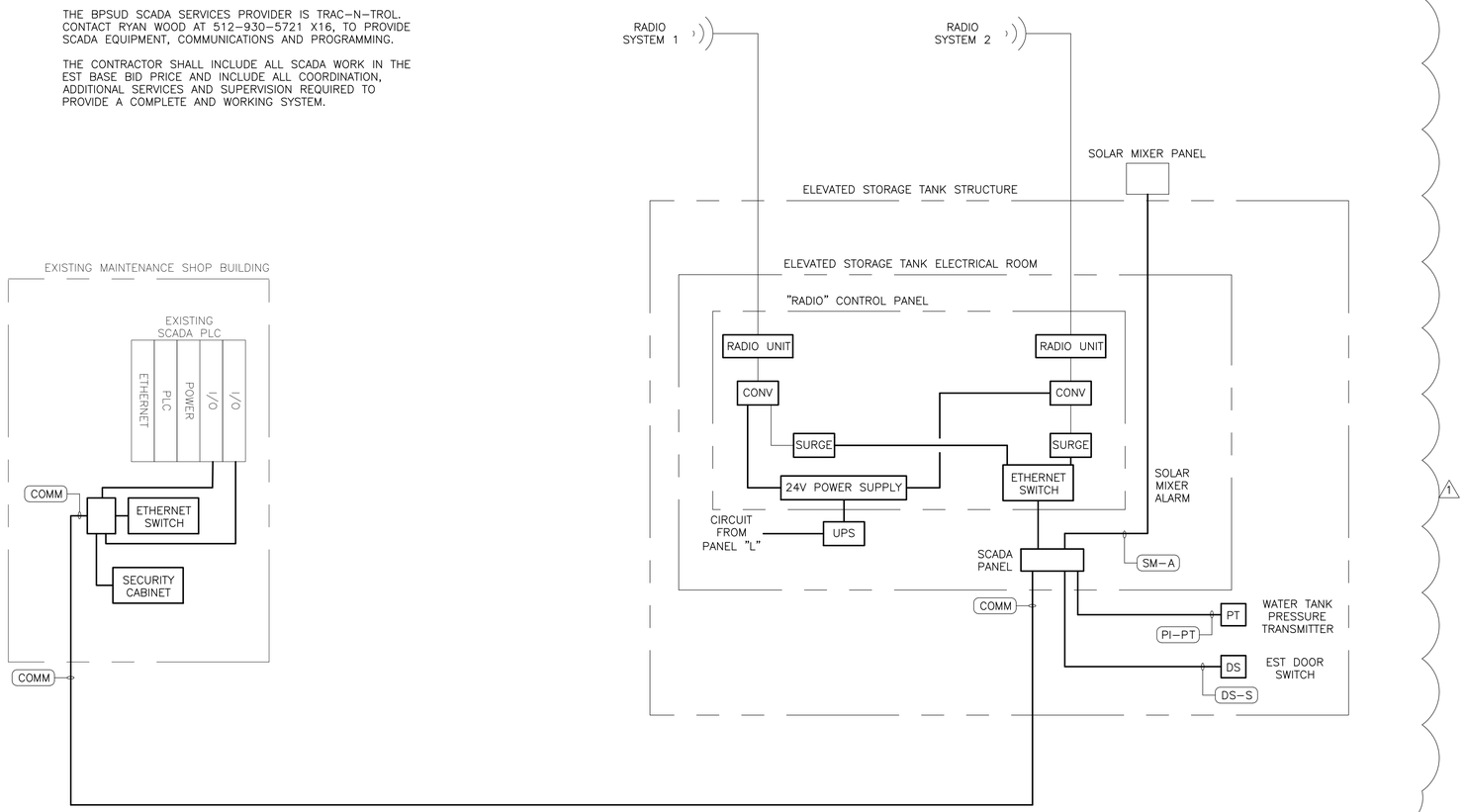
G. CONTRACTOR SHALL COORDINATE TO SUPPLY A COMPLETE SOLAR MIXER SYSTEM WITH INSTALLATION, TRAINING AND WARRANTY.

H. CONTRACTOR SHALL PROVIDE SCADA, RADIO AND MIXER SYSTEM SUBMITTALS INCLUDING CABINET LAYOUT DRAWINGS, BILL OF MATERIALS, WIRING DIAGRAMS, CUT SHEETS OF ALL COMPONENTS. O&M MANUALS SHALL BE PROVIDED PRIOR TO TRAINING, 4 HOURS OF ONSITE TRAINING SHALL BE INCLUDED PER SYSTEM.

SCADA SYSTEM

THE BPSUD SCADA SERVICES PROVIDER IS TRAC-N-TROL. CONTACT RYAN WOOD AT 512-930-5721 X16, TO PROVIDE SCADA EQUIPMENT, COMMUNICATIONS AND PROGRAMMING.

THE CONTRACTOR SHALL INCLUDE ALL SCADA WORK IN THE EST BASE BID PRICE AND INCLUDE ALL COORDINATION, ADDITIONAL SERVICES AND SUPERVISION REQUIRED TO PROVIDE A COMPLETE AND WORKING SYSTEM.



SCADA AND RADIO SIMPLIFIED DIAGRAM

NTS

rps
Texas PE Firm Reg. #F-929
575 N.Dairy Ashford, Suite 700, Houston, Texas 77079
T +1 281 589 7257 E usinfrastructure@rpsgroup.com

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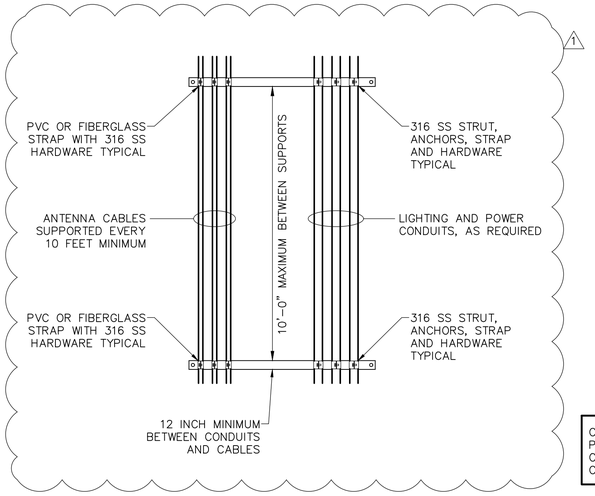
121581
LICENSED PROFESSIONAL ENGINEER
Wade A. Hubble
09.30.2020

SCADA AND RADIO DIAGRAMS

RPS Project No	007517 / 1068.002.001		
Drawn By		Checked By	
Scale	NTS	Date	AUGUST 2020
DWG No	E-9	Sheet 26	Of 28

L:\Active projects\4119-RPS (BPSUD EST)\Drawings\E-9 SCADA Diagram - Rev1.dwg Sep 30 2020

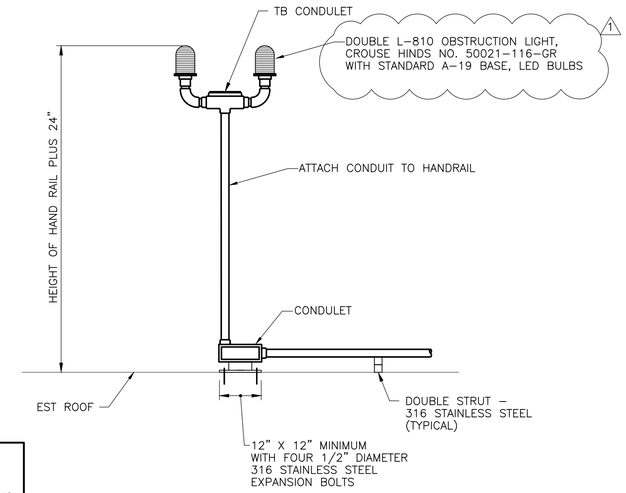


EST RISER SUPPORTS

DETAIL 1 / –

NTS

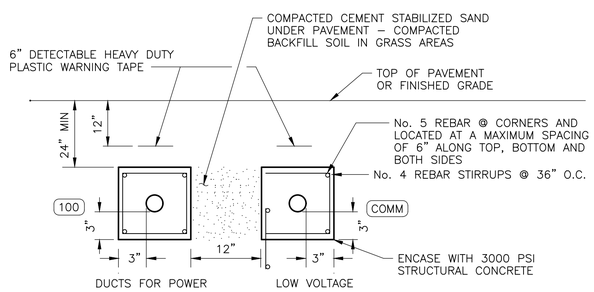
COORDINATE WITH THE TANK MANUFACTURER TO PROVIDE ALL THROUGH ROOF FITTINGS FOR OBSTRUCTION LIGHTING, LIGHTNING PROTECTION, CURRENT AND FUTURE ANTENNAS, AND GROUNDING



EST OBSTRUCTION LIGHTS

DETAIL 2 / –

NTS



DUCT BANK INSTALLATION

DETAIL 3 / –

NTS

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Texas PE Firm Reg. #F-929

575 N.Dairy Ashford, Suite 700, Houston, Texas 77079

T +1 281 589 7257 E usinfrastructure@rpsgroup.com

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DETAILS 1 OF 2

RPS Project No	007517 / 1068.002.001
Drawn By	Checked By
Scale NTS	Date AUGUST 2020
DWG No E-10	Sheet 27 Of 28

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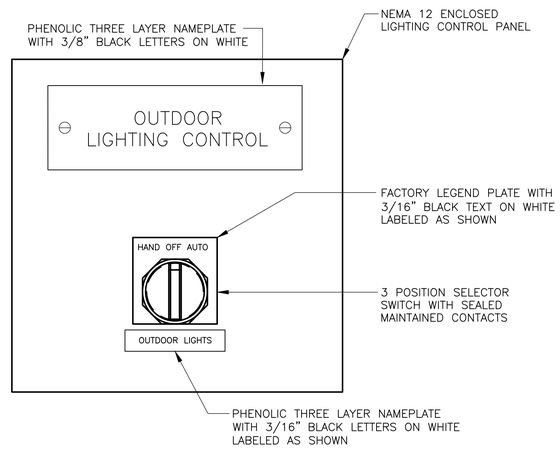
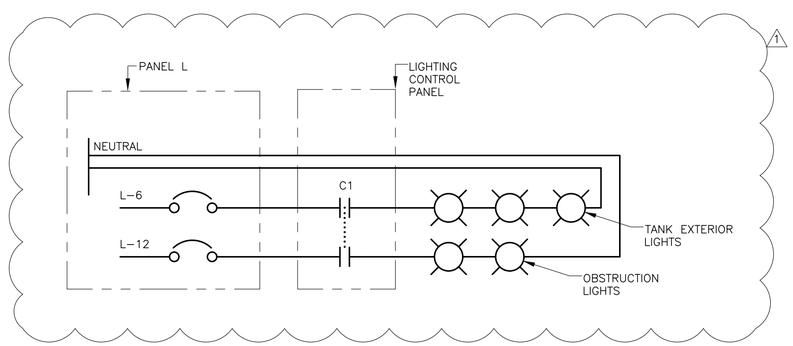


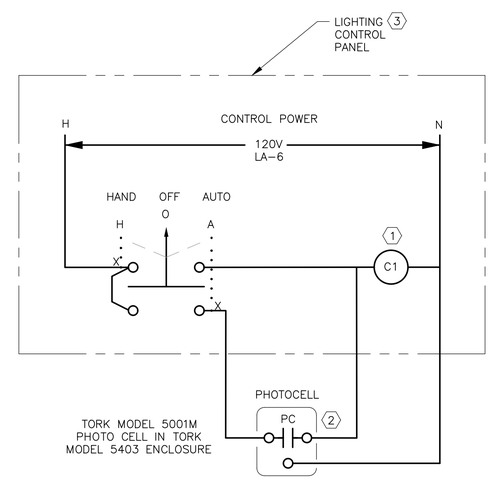
LIGHTING CONTROL PANEL LAYOUT

NOTES:

1. PROVIDE EATON "CN35 SERIES" (OR EQUAL) ELECTRICALLY HELD LIGHTING CONTACTOR, WITH MINIMUM OF TWO SPARE CONTACTS PER CONTACTOR.
2. PROVIDE PHOTOCELL ABOVE ROOF LINE LOCATED WITH NORTHERN EXPOSURE AND PROVEN FUNCTIONAL FOR SUNSET TO SUNRISE OPERATION.
3. INSTALL COMPONENTS ON SUB PANEL AND PROVIDE FIELD WIRING TERMINALS, RAIL MOUNTED, AND RATED FOR 30 AMP. PROVIDE TERMINAL POINTS FOR ALL CONDUCTORS PASSING THROUGH LIGHTING CONTROL PANEL. PANEL WIRING SHOP DRAWING SHALL BE SUBMITTED FOR ENGINEER APPROVAL AND A PERMANENT COPY OF APPROVED DRAWING SHALL BE PROVIDE IN POCKET INSIDE ON PANEL DOOR.
4. PROVIDE TWO LITHONIA "DXF3 LED 6 P1 50K NSP MVOLT" FIXTURES, WITH TENON ADAPTORS FOR POLE LIGHTS.



LIGHTING POWER WIRING SCHEMATIC



LIGHTING CONTROL WIRING DIAGRAM

EST LIGHTING CONTROL

DETAIL 2 / –

NTS

rps
Texas PE Firm Reg. #F-929
575 N.Dairy Ashford, Suite 700, Houston, Texas 77079
T +1 281 589 7257 E usinfrastructure@rpsgroup.com

TEXAS GENERAL LAND OFFICE

BPSUD Elevated Water Storage Tank

Bolivar Peninsula Special Utility District

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
Consulting Engineers & Project Managers
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BENCHMARK:

NGS MARK HCCSD 64 PID AW6988 SITUATED ABOUT 7.5 MILES SOUTHWEST OF GILCHREST ABOUT 2.5 MILES NORTHEASE OF CRYSTAL BEACH ON THE BOLAVAR PENINSULA AND ON THE SOUTH SIDE OF STATE HIGHWAY 87 ELEVATION 5.1' FEET NAVD 88.

FLOODPLAIN:

THIS PROJECT LIES WITHIN THE 100 YEAR FLOOD PLAIN AS ESTABLISHED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY. ACCORDING TO THE FLOOD INSURANCE RATE MAP NUMBER 48167C0309G, EFFECTIVE DATE AUGUST 15, 2019. THIS MAP LIES WITHIN ZONE "AE" WITH A BASE FLOOD ELEVATION OF 13 FEET.

TO ARRANGE FOR LINES TO BE TURNED OFF OR MOVED, CALL ENTERGY AT 1-800-368-3749

NOTICE:

FOR YOUR SAFETY, YOU ARE REQUIRED BY TEXAS LAW TO CALL 811 AT LEAST 48 HOURS BEFORE YOU DIG SO THAT UNDERGROUND LINES CAN BE MARKED. THIS VERIFICATION DOES NOT FULFILL YOUR OBLIGATION TO CALL 811.

REV	DESCRIPTION	BY	DATE
1	ADDENDUM 2	WH	9/30/2020

STATE OF TEXAS
WADE A HUBBLE
121581
LICENSED PROFESSIONAL ENGINEER
Wade A. Hubble
09.30.2020

DETAILS 2 OF 2

RPS Project No	007517 / 1068.002.001		
Drawn By		Checked By	
Scale	NTS	Date	AUGUST 2020
DWG No	E-11	Sheet 28	Of 28

L:\Active projects\4119-RPS (BPSUD EST)\Drawings\E-11 Details 2 of 2 - Rev1.dwg Sep 30 2020

"General Decision Number: TX20200248 09/11/2020

Superseded General Decision Number: TX20190248

State: Texas

Construction Type: Building

County: Galveston County in Texas.

BUILDING CONSTRUCTION PROJECTS (does not include single family homes or apartments up to and including 4 stories).

Note: Under Executive Order (EO) 13658, an hourly minimum wage of $10.80 for calendar year 2020 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least $10.80 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2020. If this contract is covered by the EO and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must pay workers in that classification at least the wage rate determined through the conformance process set forth in 29 CFR 5.5(a)(1)(ii) (or the EO minimum wage rate,if it is higher than the conformed wage rate). The EO minimum wage rate will be adjusted annually. Please note that this EO applies to the above-mentioned types of contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60). Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/03/2020
1	02/14/2020
2	08/28/2020
3	09/11/2020

ASBE0022-009 06/01/2019

	Rates	Fringes
ASBESTOS WORKER/HEAT & FROST INSULATOR (Duct, Pipe and		

Mechanical System Insulation)....$ 24.28 14.16

BOIL0074-003 01/01/2017

	Rates	Fringes
BOILERMAKER.....	$ 28.00	22.35

CARP0551-011 04/01/2016

	Rates	Fringes
CARPENTER (Excludes Acoustical Ceiling Installation, Drywall Finishing/Taping, Drywall Hanging, Form Work and Metal Stud Installation).....	$ 23.05	8.78

ELEC0527-002 10/28/2019

	Rates	Fringes
ELECTRICIAN (Excludes Low Voltage Wiring and Installation of Alarms).....	$ 29.43	3% + 10.65

ELEV0031-003 01/01/2020

	Rates	Fringes
ELEVATOR MECHANIC.....	$ 44.00	34.765

FOOTNOTES:

A. 6% under 5 years based on regular hourly rate for all hours worked. 8% over 5 years based on regular hourly rate for all hours worked.

B. Holidays: New Year's Day; Memorial Day; Independence Day; Labor Day; Thanksgiving Day; Friday after Thanksgiving Day; Christmas Day; and Veterans Day.

ENGI0450-002 04/01/2014

	Rates	Fringes
POWER EQUIPMENT OPERATOR		
Cranes.....	$ 34.85	9.85

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* IRON0084-011 06/01/2020

Rates Fringes

IRONWORKER, ORNAMENTAL.....$ 25.26 7.13

PAIN0130-002 06/01/2018

Rates Fringes

PAINTER (Brush, Roller, and
Drywall Finishing/Taping).....$ 17.88 9.50

PLAS0079-004 01/01/2015

Rates Fringes

PLASTERER.....$ 19.92 1.00

PLUM0068-002 10/01/2019

Rates Fringes

PLUMBER.....$ 36.15 11.04

PLUM0211-010 10/01/2018

Rates Fringes

PIPEFITTER (Including HVAC
Pipe Installation).....$ 33.30 12.26

SHEE0054-012 04/01/2020

Rates Fringes

SHEET METAL WORKER
Excludes HVAC Duct and
Unit Installation.....$ 29.70 13.85
HVAC Duct Installation Only.$ 29.70 13.85

SUTX2014-024 07/21/2014

Rates Fringes

ACOUSTICAL CEILING MECHANIC.....$ 16.41 3.98

BRICKLAYER.....$ 19.86 0.00

CAULKER.....$ 15.36 0.00

CEMENT MASON/CONCRETE FINISHER...$ 13.82 0.00

DRYWALL HANGER AND METAL STUD
INSTALLER.....$ 17.88 5.24

ELECTRICIAN (Alarm
Installation Only).....$ 17.97 3.37

ELECTRICIAN (Low Voltage
Wiring Only).....$ 19.23 3.55

FLOOR LAYER: Carpet.....$ 20.00 0.00

FORM WORKER.....$ 12.07 0.00

GLAZIER.....$ 17.09 3.41

HVAC MECHANIC (Installation
of HVAC Unit Only).....$ 17.40 0.00

IRONWORKER, REINFORCING.....$ 12.10 0.00

IRONWORKER, STRUCTURAL.....$ 25.37 6.00

LABORER: Common or General.....$ 11.47 0.00

LABORER: Mason Tender - Brick...$ 13.37 0.00

LABORER: Mason Tender -
Cement/Concrete.....$ 10.50 0.00

LABORER: Pipelayer.....$ 12.94 0.00

LABORER: Roof Tearoff.....$ 11.28 0.00

LABORER: Landscape and
Irrigation.....$ 9.49 0.00

LATHER.....$ 20.11 0.00

OPERATOR:
Backhoe/Excavator/Trackhoe.....$ 14.10 0.00

OPERATOR: Bobcat/Skid
Steer/Skid Loader.....$ 13.93 0.00

OPERATOR: Bulldozer.....$ 20.77 0.00

OPERATOR: Drill.....$ 16.22 0.34

OPERATOR: Forklift.....$ 15.64 0.00

OPERATOR: Grader/Blade.....$ 13.37 0.00

OPERATOR: Loader.....$ 13.55 0.94

OPERATOR: Mechanic.....$ 17.52 3.33

OPERATOR: Paver (Asphalt,
Aggregate, and Concrete).....$ 16.03 0.00

OPERATOR: Roller.....$ 16.00 0.00

PAINTER: Spray (Excludes
Drywall Finishing/Taping).....$ 17.43 4.43

ROOFER.....$ 15.40 0.00

SPRINKLER FITTER (Fire
Sprinklers).....$ 18.62 3.03

TILE FINISHER.....$ 12.00 0.00

TILE SETTER.....$ 16.17 0.00

TRUCK DRIVER: 1/Single Axle
Truck.....$ 14.95 5.23

TRUCK DRIVER: Dump Truck.....$ 12.39 1.18

TRUCK DRIVER: Flatbed Truck.....$ 19.65 8.57

TRUCK DRIVER: Semi-Trailer
Truck.....$ 12.50 0.00

TRUCK DRIVER: Water Truck.....$ 12.00 4.11

WATERPROOFER.....$ 14.39 0.00

WELDERS - Receive rate prescribed for craft performing
operation to which welding is incidental.

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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave
for Federal Contractors applies to all contracts subject to the
Davis-Bacon Act for which the contract is awarded (and any
solicitation was issued) on or after January 1, 2017. If this
contract is covered by the EO, the contractor must provide
employees with 1 hour of paid sick leave for every 30 hours
they work, up to 56 hours of paid sick leave each year.
Employees must be permitted to use paid sick leave for their

own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of ""identifiers"" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than ""SU"" or ""UAVG"" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the ""SU"" identifier indicate that

no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour

Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION"

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Geotechnical Engineering Report Bolivar Peninsula SUD Elevated Storage Tank Crystal Beach, Texas Terracon Project No. 91195081

Environmental Assessment Determination and Compliance Findings for HUD-assisted Projects 24 CFR Part 58 for Bolivar Peninsula Special Utility District (BPSUD) Elevated Water Storage Tank

Report of Inspection Elevated Water Storage Tank @ Crystal Beach Bolivar Pen SUD by Dunham Engineering, May 16, 2013.

Bolivar Peninsula SUD 250 Thousand Gallon Metal Elevated Tank "Crystal Beach" by Marcan Underwater Services, LLC, March 13, 2018.

Design Drawing for Bolivar Peninsula Water Supply Corporation Water Plant and Elevated Tank, April 8, 1968.

TraC-N-Trol Project Quotation and Scope October 1, 2020

SECTION 01110
SUMMARY OF WORK

PART 1 GENERAL

1.01 PROJECT DESCRIPTION

A. Work of this Contract comprises construction of a 1 million gallon (MG) composite elevated water storage tank (EST) as specified herein and as shown on Drawings, including all piping, valves, intermediate floors, stairs, ladders, separate equipment room, air conditioning, plumbing, electrical and SCADA work, tank coating, shrouding, appurtenances, logo and related site work. Work shall also include the following:

B.

1. A pile foundation designed in accordance with recommendations provided in Geotechnical Engineering Report and Supplement prepared by Terracon Consultants, Inc. (Project No. 91195081). Submittal shall include the slab design (including concrete mix design and shall be signed and sealed by an engineer registered in the State of Texas.

2. A minimum 38-foot diameter 6-inch concrete floor design for H-20 loading as shown on drawings. Submittal shall include the design and shall be signed and sealed by an engineer registered in the State of Texas. Concrete Material Specification: TxDOT Item 360

3. Installation of approximately 290 LF of 16-inch water line by open cut construction method.

4. Removal and Installation of approximately 601 LF of Fence and slide gates.

5. Repair of approximately 52 SY of Concrete Pavement Repair.

6. Installation of approximately 297 SY of 5” Concrete Pavement.

C. The project is located at 1840 State Highway 87, Crystal Beach, Texas 77650

1.02 FORMS OF SPECIFICATIONS

A. These Specifications are written in imperative and abbreviated form. Imperative language of Specification sections is directed at Contractor, unless specifically noted otherwise. Incomplete sentences in Specifications shall be completed by inserting "shall," "Contractor shall," "shall be," and similar

mandatory phrases by inference in same manner as they are applied to notes on Drawings. Words "shall be" shall be supplied by inference where colon (:) used within sentences or phrases. Except as worded to contrary, fulfill (perform) indicated requirements whether stated imperatively or otherwise.

B. Term "provide" shall mean "furnish, install, test and make operable as specified."

C. Two or more Specification sections may be related. However, related sections are not identified in individual sections. Use the Project Manual table of contents to find related sections.

1.03 GEOTECHNICAL INFORMATION

A. The following geotechnical report is provided for this project:

Geotechnical Engineering Report
Bolivar Penninsula SUD Elevated Storage Tank
Terracon Project No. 91195081

1.04 ENVIRONMENTAL INFORMATION

A. The following environmental report is provided for this project:

Phase I Environmental Site Assessment Environmental Assessment
Determination and Compliance Findings for HUD-Assisted Projects
24 CFR Part 58

1.05 FEDERAL AVIATION ADMINISTRATION (FAA) REQUIREMENTS

A. The proposed elevated storage tank does not exceed FAA Notice Criteria. Filing with FAA is not required.

B. Lighting shall be installed in accordance with Division 16 specifications and FAA Advisory Circular 70/7460-1 L Change 1.

1.06 CONTRACTS

A. Perform Work under single Contract with Texas General Land Office.

1.07 WORK BY OTHERS

A. Utility Services:
1. Contractor shall be responsible for coordination with Entergy, the electric utility provider, for the removal or de-energizing of existing

overhead lines for construction of the elevated storage tank, and replacement of the overhead lines upon completion of the tank construction.

B. There is no scheduled concurrent work by others at the proposed site.

1.08 WORK SEQUENCE

A. Use methods and sequences that will minimize disruptions in the operation of existing facilities during construction.

B. Coordinate with Owner at least 3 working days in advance prior to making connection to the distribution system.

1.09 LICENSES AND PERMITS

A. Obtain the following permit(s) from Galveston County:
1. Building/ Development Permit
2. Permit for Construction of Project on Galveston County Property
3. Application for Proposed Contruction Project on Galveston County Property

1.10 SURVEYING AND STAKING

A. Site boundaries, temporary benchmarks and reference points are shown and described in the Drawings.

B. It is the Contractor's responsibility to undertake required field surveying as needed for construction.

C. Construction staking is the responsibility of the Contractor.

1.11 PROTECTION OF THE ENVIRONMENT

A. In general, take all precautions to minimize the impact of construction operations on the environment.

B. As a minimum, Contractor shall adhere to the following:
1. Comply with local and state environmental regulations;
2 Comply with Section 01565 – TPDES Requirements;
3. Spray water on roads being used by construction vehicles to keep dust down;
4. Do not burn trash on construction site; and
5. Promptly report spills of fuel and other hazardous chemicals to the Texas Commission on Environmental Quality.

PART 2 PRODUCTS (Not Used)
PART 3 EXECUTION (Not Used)

END OF SECTION

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SECTION 02830
CHAIN LINK FENCES AND GATES

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment and incidentals required and install the chain link fence and gates as shown on the Drawings and as specified herein.

1.02 MEASUREMENT AND PAYMENT

A. No separate payment will be made for work performed under this section. Include the cost of such work within the lump sum bid item.

1.03 SUBMITTALS

A. Submit, in accordance with Section 01300, shop drawings showing dimensions layouts and details of construction and accessories required. Submittals shall include the following:

1. Product data including manufacturer's technical data, specifications and installation instructions.

2. Shop drawings showing finish, pipe and fabric gauge, footings dimensions, locking mechanism on gates, heights, top and bottom fabric wire condition, dimension of fabric to finish grade.

1.04 REFERENCE STANDARDS

A. American Standards for Testing and Materials (ASTM)

1. ASTM A824 - Standard Specification for Metallic-Coated Steel Marcelled Tension Wire for Use with Chain Link Fence

2. ASTM C387 - Standard Specification for Packaged, Dry Combined Materials for Mortar and Concrete.

3. ASTM F567 - Standard Specification for Installation of Chain Link Fence

4. ASTM F626 - Standard Specification for Fence Fittings

5. ASTM F900 - Standard Specification for Industrial and Commercial Swing Gates

6. ASTM F1043 - Standard Specifications for Strength and Protective Coatings on Metal Industrial Chain Link Fence Framework

7. ASTM F1083 - Standard Specification for Pipe, Steel, Hot-Dipped Zinc Coated (Galvanized) Welded for Fence Structures

B. Where reference is made to one of the above standards, the revision in effect at the time of the bid opening shall apply.

PART 2 PRODUCTS

2.01 MATERIALS

A. Posts, gate frames, braces, rails, stretcher bars, truss rods, and tension wire shall be made of steel. Gate hinges, post caps, tops, rail ends, ties, clips, stretcher bar bands, and other parts shall also be of hot dipped galvanized steel.

1. Intermediate posts, terminal posts, braces and rails shall be Type I round, hot dipped galvanized with a minimum average zinc (Grade E) coating of 1.8 oz/sq ft meeting ASTM F1083 for standard weight (Schedule 40) galvanized pipe. Dimensions shall conform to the following:

Use and Section	Nominal Outside Diameter Inches
End, corner and pull posts fabric height 8-ft	2.875
Rails & Post Braces	1.66
Intermediate posts fabric height 8-ft	2.5

2. Post braces shall be provided for each gate, corner, pull, and end post with fabric 8-ft or more in height, and shall consist of a round tubular brace extending to each adjacent line post at approximately mid-height of the fabric, and a truss consisting of a rod not less than 5/16-in nominal diameter from the line post back to the gate, corner, pull, or end post, with a turnbuckle or other equivalent provision for adjustment.

3. Post tops shall consist of a hole suitable for the through passage of the top rail and shall fit over the outside of posts, excluding moisture from inside of posts.

4. All fences shall have continuous top rails. Rails shall consist of lengths not greater than 18-ft and shall be fitted with hot dipped galvanized steel sleeves or couplings for connecting the lengths into a continuous run. Couplings shall not be less than 6-in long with 0.070-in minimum wall thickness and shall allow for expansion and contraction of the rail. Means shall be provided for attaching the top rail to each gate, corner, pull, and end post.

5. Tension bars shall not be less than 3/4-in and not less than 2-in shorter than normal height of fabric to which they are attached. Provide one tension bar for each end and gate post and two bars for each corner and pull post.

6. Tie fasteners shall be 6 gauge galvanized steel wire, attaching the fabric securely to all line posts at intervals not exceeding 15-in. Tie fasteners shall be attached securely to the top rail at intervals not exceeding 18-in.

7. Bands of galvanized steel per ASTM F626 shall be provided for attaching fabric and stretcher bars to all terminal posts at intervals not exceeding 12-in. Bands shall have a minimum thickness after galvanizing of 0.078-in and minimum width of 3/4-in for posts 4-in OD or less and 0.108-in thick by 7/8-in for posts larger than 4-in. Attachment bolts shall be 5/16-in by 1-1/4-in galvanized carriage bolts with nuts.

8. Tension wire shall be No. 7 gauge conforming to ASTM A824 with zinc-coating Class 2, 1.20 oz/sf.

B. Swing gates shall conform to ASTM F900. Base materials of the gate frame shall be round tubular members, welded at all corners or assembled with corner fittings. Corner fittings shall have adjustable truss rods 5/16-in minimum diameter on panels 5-ft wide or wider. And constructed of the same base metal and finish as the frame. Interior bracing, when needed, shall be the same metal and shape tubular material and finish as the frame, but need not be the same size. Leaves shall have vertical interior bracing at maximum intervals of 8-ft and shall have a horizontal interior member if the fabric height is 8-ft or more.

1. Frame shall be zinc-coated steel in accordance with ASTM F1043 and F1083 and shall match adjoining fence framework.

2. Gate fabric shall be the same type as used in fence construction and attached securely to the frame with ties at intervals not exceeding 15-in.

3. Size of the gate opening shall be measured from the inside face to inside face of gate posts.

4. Outer members shall not sag in excess of the lesser of 1 percent of the gate leaf width or 2-in.

5. Accessories shall be of the same materials as specified for the fence.

6. Hinges shall be structurally capable of supporting the gate leaf and allow the gate to open and close without binding and designed to permit the gate to swing a full 180 degrees.

7. Gate latch shall be a drop rod or plunger bar arranged to engage the gate stop. Locking devices shall be constructed so that the center drop rod or plunger bar

cannot be raised when the gate is locked. Latching devices shall have a provision for a padlock.

8. Gate stops shall be provided for all double gates. Keeper shall be provided for each gate leaf over 5-ft wide.

C. Concrete: Portland cement, 1-in maximum size aggregate and potable water producing concrete with a 3-in slump and a 28-day compressive strength of at least 3000 psi. Packaged Concrete Mix: Mix dry-packaged normal-weight concrete conforming to ASTM C387 with clean water to obtain a 2-in to 3-in slump.

D. Fabric shall be standard Heavy Industrial Grade of 6 gauge (nominal diameter 0.192-in) coated wire with a 2-in mesh with zinc-coating (Class 2) weight of not less than 2.00 oz/sf of uncoated wire surface hot-dip galvanized after fabrication.

1. Height shall be as shown on the Drawings, with overall dimension measured from ends of twists with tolerances of plus or minus 1-in.

2. Fabric on fences 72-in high and over shall be knuckled at the bottom selvage and twisted on the top selvage. On fences less than 72-in in height, top and bottom selvages shall be knuckled.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install fence to comply with ASTM F567. Do not begin installation and erection before final grading is completed, unless otherwise permitted.

1. Place fabric on the outside of the framework of the area to be enclosed. Install fencing on boundary lines inside of property line established by survey as required by Division 1.

2. Place fabric by securing one end, applying sufficient tension to remove all slack before making attachments elsewhere. Tighten the fabric to provide a smooth uniform appearance free from sag. The fabric can be cut by untwisting a picket and attaching each span independently at all terminal posts. Use stretcher bars with tension bands at 15-in maximum intervals. Fabric shall be installed min. 2-in above finished grade. Fasten fabric with ties to line posts at intervals not exceeding 15-in. Fasten fabric to rails with ties at intervals not exceeding 18-in. Rolls of wire fabric can be joined by weaving a single picket into the ends of the rolls to form a continuous mesh.

3.02 EXCAVATION

A. Dig or drill each post hole to accommodate post and footing to the diameter and spacings indicated on the Drawings.

1. Each post foundation shall have hole diameter dug or drilled a minimum of 4 times the largest cross section of the post and a minimum depth below finished grade of 36-in. Depth of concrete footing shall be increased an additional 3-in for every 1-ft increase in the fence height over 6-ft.

3.03 SETTING POSTS

A. Center and align posts in holes 4-in above bottom of excavation. Space posts not more than 10-ft on center. Align posts vertically and align tops. Extend center top of concrete footing 1-in above grade and trowel to a crown to shed water.

B. If solid rock is encountered where an overburden of soil is not present, set fence posts in solid rock to a depth 3 times the largest cross section of fence posts. Diameter of hole shall be 1/2-in greater than the largest cross section of the fence post. Set post in rock with non-shrink grout.

C. Gate posts shall be set in concrete footings as follows:

Gate Leaf Width	Post Size Height	Diameter (Steel)	Size of Hole		Depth	
			Earth	Rock	Earth	Rock
4-ft or <	6-ft or <	2.375-in	10-in	post o.d. + 1/2-in	30-in	post o.d. x 3
>4-10-ft	6-ft or <	2.875-in	12-in	post o.d. + 1/2-in	36-in	post o.d. x 3
6-ft or <	>6-ft	2.875-in	10-in	post o.d. + 1/2-in	36-in	post o.d. x 3
>6-12-ft	>6-ft	4.0-in	12-in	post o.d. + 1/2-in	36-in	post o.d. x 3
>12-18-ft	>6-ft	6.625-in	16-in	post o.d. + 1/2-in	42-in	post o.d. x 3
>18-24-ft	>6-ft	8.625-in	18-in	post o.d. + 1/2-in	48-in	post o.d. x 3

D. End, corner and pull post bracing with a center rail shall be required on all fencing over 6-ft in height.

3.04 TOP RAILS

A. Run top rail on all fences continuously through line post caps with expansion couplings placed maximum 18-ft on center.

3.05 BRACE ASSEMBLIES

A. Install braces at end and gate posts and at both sides of corner and pull posts so posts are plumb when diagonal rod is under proper tension.

3.06 BOTTOM TENSION WIRE

A. Install bottom tension wire within 6-in of bottom of fabric and weave through the stretched portion of fence running tension wire from end to end of each stretch of fence. Fasten to fabric with 0.120-in diameter (11-gauge) hog rings spaced not more than 24-in on center. Tension wire shall be taut and free of sag.

3.07 GATES

A. Install gates to meet the requirements of ASTM F567 and according to manufacturer's instructions, plumb, level and secure for full 180 degree opening without interference.

B. Hinges shall be constructed to allow the gate to open and close without binding.

END OF SECTION

SECTION 11501
STORAGE TANK MIXING SYSTEM

PART 1 GENERAL

1.01 EQUIPMENT OVERVIEW

A. This section describes the design, fabrication, and erection of a solar powered mixing system for a new potable water system elevated storage tank (1,000,000 gallons). Contractor shall provide the mixing system, drives, motors, controls, pipe, connections, and other appurtenances shown on the Contract Documents or as specified for a complete and operable system.

1.02 MEASUREMENT AND PAYMENT

A. Measurement and payment shall be on a lump sum basis in accordance with Section 01025 – Measurement and Payment

1.03 QUALITY ASSURANCE

A. Continuous Operation Equipment. The circulation equipment shall operate continuously, all day and all night, during all seasons including winter.

B. No Visual Defects. The circulation equipment shall have no visual defects, and shall have high quality welds and assembly, corrosion resistant finish, and site specific operational controls.

C. Qualified US Manufacturer. The manufacturer of the equipment shall have extensive experience in the production of such equipment, and the equipment shall be manufactured in the continental United States.

D. Factory Startup Services. Delivery, placement, and startup services shall be included in the bid and performed by full time factory employees experienced in the operation of this equipment and who have completed OSHA safety trainings applicable to this type of work.

E. Warranty. The circulation equipment shall be warranted to be free of defects in materials and workmanship for a period of 2 years from the date of original placement. A copy of the warranty shall be included with the submittal. This equipment warranty would run directly from the manufacturer of the equipment to the owner. The equipment warranty would not be part of the contract or any required bond.

1.04 SUBMITTALS

A. The awarded Bidder shall provide 5 copies of the following documents. Upon acceptance of these documents by the Engineer, the Bidder will be issued a Notice to Proceed, and may then proceed to furnish the equipment.

1. A qualification statement demonstrating compliance with Section 1.03.

2. Shop drawings for the circulation equipment.

3. Manufacturer's literature, illustrations, and specification.

B. Following equipment placement, additional Submittals shall include:

1. A complete operation and maintenance manual.

2. Within 30 days of equipment placement, the manufacturers report including:
   a. Aerial photograph with labeling of pond, cell, or reservoir data.
   b. Work summary.
   c. Customer contact information.
   d. Climate / weather conditions.
   e. Circulation machine information.
   f. Technician field notes.
   g. GPS location of each circulation machine and test point.
   h. Water quality testing information (water temperature) at a minimum of one 1 location per tank or reservoir at one 1 meter increments starting at water surface down to bottom of tank or covered reservoir.

1.05 FIELD SERVICES

A. Factory Personnel. The placement and startup shall be performed by full time factory employees trained in the operation of the circulation equipment.

B. Safety. Technicians shall have received job-specific safety training on (a) Working over Water, (b) Boating Safety, (c) Disinfecting Procedures, (d) Confined Space Entry, (e) Fall Protection, and (f) DOT Compliance.

PART 2 PRODUCT SPECIFICATIONS

2.01 MANUFACTURER

A. Specified Equipment. The circulation equipment shall be manufactured by Ixom Watercare, Inc. of Dickinson, ND, or be a pre-approved alternative.

B. Pre-approved Alternative(s). Alternatives to the specified equipment will be considered on the following basis only.

1. Ten (10) Days Before Bid. To offer equipment as a pre-approved alternative, written application from the alternative supplier shall be made to the Engineer at least 10 days in advance of the bid opening.

2. No Material Difference in Quality of Equipment or in Vendor Support. The application should include:

a. A brief description of how the offered alternative does or does not meet each of the specifications in this document.
b. An analysis of how acceptance of the alternative equipment would likely affect the overall water quality goals of the project.
c. A statement of the science and support background of the supplier of the alternative equipment, so that the benefits and costs of the alternative equipment to the Owner can be estimated by the Engineer.

3. Five (5) Days Notice to Bidders. If the alternative equipment is accepted by the Engineer, an informational addendum to these specifications shall be distributed by the Engineer to plan holders at least 5 days in advance of the bid opening.

2.02 PERFORMANCE AND FEATURES

A. Units Required. To meet the project objectives, the following number of units per tank or reservoir shall be required.

Quantity	Model	Hatch Size
1	SB1250Pwc	30” x 30”

B. Minimum Hatch Requirement. The circulation equipment shall fit through the listed hatch size.

C. Stainless Steel Construction. The circulation equipment shall be constructed primarily of Type 316 stainless steel metal for strength and superior corrosion resistance. Each machine shall also undergo a passivation bath, also known as stainless steel pickling, to restore corrosion resistance to the welds and other areas of imperfections.

D. Motor. The circulation equipment shall be mechanically operated by a motor that meets the following criteria.

1. Brushless, brush motors requiring brush replacement not accepted.

2. Hall effect commutation for motor control.

3. Direct Drive, with no gearbox, to avoid lubrication maintenance.

4. Stainless Steel Bearings, requiring no scheduled lubrication, rated bearing life expectancy greater than 100,000 hours continuous operation.

5. Designed for marine, outdoor environment by having a sealed housing with polymeric encapsulated internal windings for superior corrosion resistance. Capable of withstanding the following environment conditions.
   a. -40°F to 140°F (-40°C to 60°C) ambient temperature range, freeze resistant
   b. 100% humidity
   c. Condensation resistant

d. Splash resistant

6. Designed for Continuous Operation without overheating or compromising motor life expectancy.

7. Less Than 48 volts DC power requirement, to avoid risk of electrocution.

E. Controller. The circulation equipment shall be supplied with a motor controller and power management with the following features.

1. Digital Electronic Control System, with firmware and software that is easily re-programmable to optimize the level of water quality achieved in the reservoir.

2. Anti-Jam Reverse, automated self-clearing for locked rotor triggered by high current occurrences caused from jammed impeller.

3. Operation Schedule, with daily and seasonal scheduling for motor speed and direction.

4. Scheduled Reverse Cycles, with daily reverse impeller cycling for self-clearing of impeller to minimize fouling.

5. Motor Health Status Monitoring and Recording, including scheduled speed, commanded speed, actual speed, motor current, motor voltage, and motor controller errors.

6. Fully Potted and Encapsulated Motor Control Circuit, for superior corrosion resistance in marine environment.

7. SD (Secured Digital) Card Reprogrammable features, so digital controller is capable of being field programmable using an SD card for uploading new firmware and changing programmed operations.

8. Manual On/Off Switch, to shut power off to the motor. On/Off switch shall be rated for marine environment and have yellow and red color markings for indicating emergency shut off.

9. Fused Main Power Line, for added protection against power surge through motor controller and motor.

10. Temperature Compensated Charging, so that battery charging parameters are automatically adjusted based on battery temperature.

11. Maximum Power Point Tracking (MPPT), so the charging algorithm is automatically adjusted for optimum results based on solar power input and battery capacity.

12. Power Conservation & Continued Operation Mode, a programmed algorithm for reducing motor load and continuing operation by incremental speed reduction. This feature to be automatically enabled when extended low sunlight conditions occur or battery reserve power is reduced.

13. Low Voltage Shut Off, a programmed shut off switch to disconnect motor load before reaching damaging depth of battery discharge. The motor load automatically re-connects when battery capacity is restored.

14. NEMA 4 Enclosure, for protection against condensation and moisture in a marine environment. The internal circuit boards shall be conformal coated for added protection against moisture.

F. Battery. The battery power storage shall meet the following criteria.

1. Single Battery, multiple batteries are not allowed unless connected in series, to avoid charging problems leading to failed batteries.

2. Battery Capacity Rating, at a 24 hour discharge rate, in watt hours, shall be at least 50 times the motor load in watts during normal operation (full speed, peak load).

3. Battery shall comply with DOT HMR49, non-spillable battery, for transport.

4. Battery shall be UL Listed, compliant to UL 1989.

5. Battery shall have a pressure relief Safety Valves for each cell that incorporates a flame-arrester for safety and rated as Explosion Resistant.

6. Battery shall be Maintenance Free and not require re-watering.

7. Battery shall contain power conductors constructed of multi strand power wire having a flexible outer jacket, all contained inside stainless steel sheathing for protection from the elements and from rodents.

8. Battery shall be Freeze Tolerant for frigid conditions.

9. Battery shall have a Self-Discharge Rate of 1% to 3% per month.

10. Battery shall have a Temperature Sensor monitoring battery housing temperature, not ambient temperature, to optimize charging cycles and extend battery life.

11. Battery shall be encased in Double Wall Plastic, and mounted in a stainless steel Cage, for safety and battery protection purposes.

G. Photovoltaic Modules (PV modules, Solar Panels). The PV modules shall meet the following criteria.

1. To ensure continuous operation of the motor and impeller in all seasons, the total Nominal Wattage Rating of the PV modules shall be a minimum of 5 times the normal operating wattage of the motor.

2. To ensure adequate power collection during low sunlight conditions, photovoltaic modules shall be Mono-Crystalline, not multi-crystalline.

3. Photovoltaic modules shall contain power conductors constructed of multi strand power wire having a flexible outer jacket and shall be contained inside stainless steel sheathing for protection from the elements and from rodents.

H. System Operation Monitoring. The digital controller shall have the following monitoring features.

1. LED (Light Emitting Diode) Flash Code, flashing LEDs in the control box readily accessible by service personnel shall provide continuous electrical diagnostics so the state of the power system can easily be determined.

2. SCADA (Supervisory Control and Data Acquisition), the digital controller shall output system state of health and operation monitoring using RS-232 serial communication (Modbus RTU), DB9 male connection point. A protocol document shall be provided for local network (PLC or RTU) programming assistance.

3. Operation Back Log, the digital controller shall store within controller memory a 30 day rolling log of all primary machine operation parameters.

I. Horizontal, Low Velocity Intake: The circulation equipment shall be supplied with an intake capable of being positioned at the lowest elevation of the tank or reservoir floor. The intake level setting shall bring water into the circulation equipment at horizontal layer within 1 inch (2.5 cm) of the tank or reservoir floor. The intake shall include a singular hose of adequate length to reach the required intake depth setting. The flow through the hose and intake shall not exceed 1 foot per second (0.3 meter per second.

J. Chlorine Boosting Line: The circulation equipment shall be supplied with a 1/2” (1.3 cm) diameter hose with supply end positioned where accessible at the top, inside of the tank or reservoir. The accessible supply end shall be equipped with quick connect fittings and valve. The injection end shall terminate within the intake of the circulation equipment to provide quick delivery, dilution, and distribution of boosted chlorine throughout the tank or reservoir by it entering into the direct flow of the circulation equipment. The boosting line components shall be rated for contact with 12.5% Sodium Hypochlorite solution.

K. The circulation equipment shall be NSF / ANSI Standard 61 and NSF Annex G listed for safe contact with potable water.

L. Maintenance Requirements. The circulation equipment shall operate normally with the following maintenance features.

1. No scheduled lubrication is required of any system components including motor and motor bearing.

2. No brush replacement, gearbox replacement, or motor replacement shall be expected or required during the expected life of the circulation equipment.

3. No spare parts shall be required to be kept on hand.

4. No tools beyond normal cleaning supplies and a few common hand tools shall be required for scheduled maintenance.

5. Impeller assembly shall be removable without requiring any tools.

6. Photovoltaic modules shall be equipped with a bird deterrent system to minimize bird roosting, droppings on photovoltaic modules.

7. Impeller assembly and motor shall not be damaged when operating if tank or reservoir is drained and without water.

M. Flotation: The circulation equipment shall contain a flotation system meeting the following criteria.

1. Flotation Capacity, flotation shall have a total buoyancy to support the circulation equipment weight with a safety factor greater than 1.5.

2. For Flotation Longevity, flotation shall contain Expanded Polystyrene Foam (EPS) beads that are steamed together to minimize water adsorption and provide a solid float core for structural strength. The EPS contents shall have a 0.9-1.2 pounds per cubic foot density with water adsorption not to exceed three pounds per cubic foot in accordance with the Hunt Water Adsorption Test. The flotation shall not sink should the float encasement be punctured.

3. Each Flotation Encasement shall be constructed of a linear polyethylene resin containing ultraviolet (UV) inhibitors to prevent accelerated deterioration in this marine environment. The float encasement shall offer a balance of toughness, rigidity, environmental stress-crack resistance, and low temperature impact performance. Resin shall also be in compliance with FDA title 21. Resin shall be made of a food grade material that will not contaminate the waterways and is recyclable. Encasements shall be rotationally molded for seamless, one-piece construction and shall have a nominal minimum wall thickness of 0.15 inches (4 mm). Encasements shall be resistant to damage by animals, ice, bumps by watercraft, contact deterioration from petroleum products and suitable for marine use.

N. Prevention of movement and rotation of circulation equipment: The circulation equipment shall be prevented from movement and rotating by the weighted intake assembly that is connected to the water intake hose and rests on the tank or reservoir floor.

PART 3 EXECUTION

3.01 PLACEMENT

A. The circulation equipment manufacturer shall provide Placement, Startup, and On-Site Water Testing Services to insure (a) proper machine spatial placement in the reservoir, and (b) proper intake depth setting.

B. The field services shall be performed by full time factory employees experienced in the operation of this equipment, and who have completed safety trainings required for this type of work in compliance with OSHA regulations including (a)Working over Water, (b) Boating Safety, (c) Disinfecting Procedures, (d) Confined Space Entry, (e) Fall Protection, and (f) DOT Compliance.

C. Within 30 days following equipment placement, the manufacturer shall provide a report detailing as described in submittal section.

D. The circulation equipment manufacturer shall have the following support team available for full service if ever needed following the equipment placement.

1. A minimum of (10) x (2)-member factory crews.

2. A full customer service staff including engineers and science personnel that are trained for assistance in this application.

END OF SECTION

SECTION 13210
COMPOSITE ELEVATED WATER STORAGE TANK

PART 1 – GENERAL

1.1 SCOPE OF WORK

A. This section includes the design, construction, testing, and commissioning of a one million gallon (MG) composite elevated water storage tank and related work including foundations, interim mezzanine storage level, electrical room, mechanical, and related appurtenances as shown on the Drawings and specified herein.

1.2 MEASUREMENT AND PAYMENT

A. Measurement and payment for this work shall be on a lump sum basis in accordance with Section 01025 – Measurement and Payment.

1.3 RELATED WORK

A. Masonry is included in Division 4.

B. Section 09970 – Coatings for Steel Water Storage Tanks

C. Electrical work is included in Division 16.

1.4 REFERENCES

A. The latest version of the following Specifications, Codes and Standards are referenced in this section.
1. ACI 117 - Standard Tolerances for Concrete Construction and Materials
2. ACI 304 - Guide for Measuring, Mixing, Transporting and Placing Concrete
3. ACI 305 - Hot Weather Concreting
4. ACI 306 - Cold Weather Concreting
5. ACI 318 - Building Code Requirements for Structural Concrete
6. ACI 347 - Guide to Formwork for Concrete
7. AISC S335 - Specification for Structural Steel Buildings
8. ANSI B16.5 - Pipe Flanges and Flanged Fittings
9. ANSI ASCE 7 - Minimum Design Loads for Buildings and Other Structures
10. API 650 - Welded Steel Tanks for Oil Storage
11. ASTM A 123 - Zinc Coatings on Iron and Steel Products
12. ASTM A 240 - Stainless Steel Plate, Sheet and Strip for Pressure Vessels
13. ASTM A 285 - Pressure Vessel Plates, Carbon Steel
14. ASTM A 774 - Welded Stainless Steel Fittings
15. ASTM A 778 - Welded Stainless Steel Tubular Products
16. AWWA D100 - Welded Steel Tanks for Water Storage
17. AWWA D102 - Coating Steel Water Storage Tanks
18. AWWA C652 - Disinfection of Water Storage Facilities

19. FAA 70/7460-1H - Obstruction Marking and Lighting
20. NACE RP0178 - Design, Fabrication, and Surface Finish Practices for Tanks and Vessels to Be Lined for Immersion Service
21. NFPA NEC - National Electric Code
22. NFPA 780 - Standard for the Installation of Lightning Protection Systems
23. NSF 61 - Standard for Drinking Water System Components
24. OSHA 29 CFR Part 1926 - Safety and Health Regulations for Construction
25. SPC VIS-89 - Visual Standard for Abrasive Blast Cleaned Steel

1.5 SYSTEM DESCRIPTION

A. Elevated Tank
1. The Composite elevated tank shall consist of the following: foundation, reinforced concrete support structure and a welded steel water tank. The support structure shall extend vertically from the foundation as a circular concrete wall. A concrete slab shall be provided as structural support for the steel tank within the perimeter of the wall. A reinforced concrete ring beam shall be provided to connect the steel tank, concrete dome and concrete support wall. The elevated tank shall be in accordance with the shape, dimensions and details required by the Drawings and Specifications.

B. Operating Parameters

1.	Minimum Capacity within Operating Range	1,000,000 gallons
2.	Maximum Operating Range	34.45 ft
3.	Maximum Fill Rate	3,100 GPM
4.	Overflow Elevation	163.50’
5.	High Water Elevation	163.00’
6.	Low Water Elevation	128.55’
7.	Grade Slab Elevation	7.50’
8.	Finish Grade Elevation	7.00’
9.	Support Wall Diameter	38 ft

C. General Design Standards: Structural design of the elevated storage tank shall conform to the following design standards except as modified by this section:
1. Foundations and Support Structure: ACI 318 and ASCE 7
2. Composite Tank: AWWA D107

D. Design loads shall be in accordance with ASCE 7-10 for Risk Category IV (essential facility) structure.
1. Dead load shall be the estimated weight of all permanent construction.
2. Water load shall be the weight of water when the tank is filled to overflow.
3. Roof live load in addition to snow load: None.
4. Roof snow load shall be the larger of 15 psf or the snow load determined in accordance with ASCE 7. Ground snow load shall be determined from Figure 7-1 in ASCE 7.
5. Wind loads shall be in accordance with ASCE 7-10 for wind exposure Category C

and ultimate wind speed of 158 mph (3 second gust).

6. Horizontal and vertical seismic loads shall be in accordance with ASCE 7 and the Site Class as determined in the soil investigation report. Importance factor I = 1.50. Response Modification Coefficient R = 3.0 in accordance with ASCE 7
7. Combination of Loads
8. The effect of combination of loads shall be considered in accordance with the following.

1.4D + 1.6F + 1.6(L+S)
1.2D + 1.2F + L + 0.5S + 1.6W
1.2D + 1.2F + L + E
0.9D + 1.6W
0.9D + F + E

D	=	Effect of dead load.
F	=	Effect of water load.
E	=	Effect of horizontal and vertical seismic load.
L	=	Effect of interior or roof live load.
S	=	Effect of roof snow load.
W	=	Effect of wind load.

E. Foundation Design
1. The foundations shall be designed by the Contractor to safely support the structure based on the recommendations of the geotechnical report. Foundations shall be sized in accordance with AWWA D107, Section 7, "Foundations".

1.6 SUBMITTALS

A. Submit to the Engineer, in accordance with Section 01300, copies of all materials required to establish compliance with this Section. Submittals shall include the following at a minimum:
1. A preliminary section view drawing of the tank proposed for this project. The drawing shall include sufficient detail to illustrate tank geometry, materials of construction, primary dimensions, support wall thickness and pour height, concrete slab thickness, the elevation of low and high water levels, interior wet, interior dry and exterior paint areas, and other information required to show compliance with the Drawings and Specifications (e.g., intermediate floors and rooms as applicable). If the proposed design does not comply with the specifications, the bid shall be rejected.
2. Construction Drawings
   a. Provide elevation, plan and sectional view drawings of the foundation, support structure, tank and all appurtenant equipment and accessories. Show the location, dimensions, material specifications, and finish requirements. The submission shall be sealed by professional engineer registered in the State of Texas.
   b. Foundation details shall include excavation, soil protection, backfill and pile details (if required).

c. Reinforced concrete details shall include construction joints, openings and inserts. Reinforcement shall be clearly indicated on the structural drawings and identified by mark numbers that are used on the fabrication schedule. Location, spacing and splice dimensions shall be shown. Placement and fabrication details shall conform to ACI 318.
d. Steel tank details shall include weld joints and a layout showing all primary and secondary shop and field welds.

3. Construction Procedures
   a. Provide procedures for the support structure forming system. Procedures shall include form removal criteria and minimum elapsed time for adjacent concrete placement.
   b. Provide shop and field weld procedures for all structural joints on the steel tank.
4. Design Data
   a. Provide a table showing capacity of the tank in gallons at all levels in one foot increments.
   b. Provide a summary of the design for the foundation, support structure, tank and other components. Include the design basis, loads and load combinations and results.
   c. Provide a finite element analysis that accurately models the intersecting elements of the interface region. The interface region includes those portions of the concrete support structure and steel tank affected by the transfer of forces from the tank cone and the tank floor to the concrete support wall. The analysis shall provide results including the shear, moment, and compression or tension caused by the intersecting elements in the interface region.
5. Product Data
   a. Provide a separate concrete mix design for each concrete compressive strength required or specified.
   b. Provide technical data and color samples of all coating products.
   c. Provide manufacturers descriptive information for appurtenant equipment and accessories that are not detailed on the construction drawings.
6. Reports/Certification
   a. Provide documentation of all tests, inspections and certifications required by this section.
   b. Provide qualifications of all welders.
   c. Provide proof of insurance for Professional Liability with a minimum limit of $2,000,000 each occurrence and aggregate.

1.7 QUALITY ASSURANCE

A. Experience Requirements of Tank Contractor
   1. The work described in this section shall be performed by a company that specializes in the design and construction of composite elevated tanks. The tank contractor shall have the following qualifications:
      a. A minimum of ten years experience in composite tank design and construction.

b. The design, construction and commissioning of a minimum ten (10) composite elevated tanks of equal or greater capacity in successful service for 10 years. These tanks shall be of the same design and constructed using forming systems as detailed by this specification.

B. Approved Tank Contractors
1. Acceptable contractors qualified to perform the work specified herein are:
   a. CB&I Constructors, Inc.
   b. Landmark Structures
   c. Caldwell Tanks, Inc.
   d. Phoenix Fabricators and Erectors, LLC
2. The Engineer and/or Owner shall be the sole and final judge as to the acceptability of a tank contractor's qualifications. Bidders not named as a qualified contractor will be considered non-responsive and their bid will not be opened.

C. Quality Assurance
1. Elevated tank design, concrete support structure construction and steel tank construction shall not be subcontracted. These items shall be self-performed by the contractor.
2. The contractor shall directly employ a full time professional engineer with a minimum five years cumulative experience in the design and construction of Composite elevated tanks. The engineer shall be registered in the State of Texas and shall be in responsible engineering charge of the work.
3. A qualified supervisor directly employed by the manufacturer shall be on site at all times during construction of the foundation, support structure and steel tank.

D. Regulatory Requirements
1. The specifications, codes and standards referenced in Paragraph 1.04 shall govern the work with regard to materials, design, construction, inspection and testing to the extent specified.
2. Personnel safety equipment shall be provided in accordance with OSHA requirements and manufacturers documentation.

1.8 DELIVERY, STORAGE & HANDLING

A. Handling and Shipping
1. The Contractor shall handle materials and fabricated components in a manner that will protect them from damage. Allow painted materials adequate cure time prior to stacking or shipping.

B. Storage and Protection
1. Protect delivered materials and equipment from damage. Store in well drained areas and provide blocking to minimize contact with the ground.

1.9 PROJECT CONDITIONS

A. Permits and Easements
1. Permits, licenses, and easements required for permanent structures, changes in

existing facilities or advancement of the construction as specified shall be secure and paid for by the Owner prior to the start of construction. These include building permits, airspace authority approval, site access easements, highway crossing permits, etc.

2. Licenses or permits of a temporary nature required by specific trades shall be the responsibility of the Contractor.

B. Existing Conditions

1. A geotechnical investigation has been carried out at the site and a report has been incorporated within these specifications. The net allowable bearing pressure of shallow foundations and/or the allowable capacity of deep foundation elements have been defined in this report. The Contractor shall be responsible for securing any further geotechnical information required beyond that provided in this report.

C. Access

1. The Contractor shall provide access from public roads to the tank site unless otherwise specified.

D. Working Conditions

1. Safety and Health - The Contractor shall comply with safe working practices and all health and safety regulations of OSHA, state and local health regulatory agencies and Material Safety Data Sheets (MSDS). Provide protective and lifesaving equipment for persons working at the site.

1.10 SEQUENCING AND SCHEDULING

A. Schedule

1. The Contractor shall provide a schedule, per Section 01310, indicating the design, submittals, site work and the major components of construction including foundation, support structure and steel tank. In addition, show tank painting, electrical installation and other significant activities. Update the schedule as required.

B. Certifications

1. Provide certification from the engineer of record that the elevated tank has been designed in accordance with the requirements of the specification.
2. Provide certification that testing and inspection requirements of 3.07 have been performed and the results comply with the requirements of the specification.

1.11 GUARANTEES

A. The Contractor shall guarantee the structure, appurtenant equipment and accessories provided under this section against defective design, workmanship or materials for a period of one year from the date of substantial completion. If notified within this period, the Contractor shall repair any defects at no cost to the Owner. Defects caused by damaging service conditions are not covered.

B. All guarantees for materials, equipment and accessories provided under this section shall be obtained by the Contractor and submitted.

1.12 INSURANCE

A. In addition to any requirements specified in the General and/or Supplemental Conditions, the Contractor shall maintain Professional Liability insurance with a minimum limit of $2,000,000 each occurrence and aggregate.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Reinforced Concrete
   1. Concrete materials and reinforcement shall comply with ACI 318, except as modified in this section.

B. Steel Tank
   1. Steel tank components, including steel plates, sheets, structural shapes and filler metals shall be in accordance with AWWA D107, Section 5, "Steel Tank".

2.2 CONCRETE FOUNDATION

A. The concrete foundation shall be designed in accordance with ACI 318. Minimum specified compressive strength shall be 4000 psi at 28 days. The service load reinforcement tension stress shall not exceed 30,000 psi under dead plus water load unless flexural cracking is otherwise controlled in accordance with ACI 318.

2.3 CONCRETE SUPPORT STRUCTURE

A. The concrete support structure shall be designed in accordance with ACI 318. The specified compressive strength of concrete shall be as required by design, but not less than 4000 psi at 28 days. The maximum specified compressive strength of concrete for the wall and dome shall be 6000 and 5000 psi respectively.

B. Support Wall
   1. Support wall shall be reinforced concrete with a minimum thickness of 8 inches exclusive of any architectural relief. Wall thickness shall be provided such that the average compressive stress due to the weight of the structure and stored water is limited to 25% of specified compressive strength, but not greater than 1000 psi. A minimum total wall reinforcement of 0.15% vertically and 0.20% horizontally shall be distributed approximately equally to each face. A minimum of 0.75% vertical reinforcement shall be provided in the top 6 ft. of the wall extending into the concrete ring beam. Minimum concrete cover for interior / exterior faces shall be 1 inch and 1-1/2 inches respectively.

C. Tank Floor
   1. Tank floor shall be a reinforced concrete dome not less than 8 inches thick. The average compressive stress due to the weight of the structure and stored water shall not exceed 13% of the specified compressive strength, nor greater than 600 psi. Minimum total reinforcement in orthogonal directions shall be 0.40% distributed approximately equally to each face. Additional reinforcement shall be provided for stress caused by edge restraint effects.

D. Openings
   1. The effects of openings in the wall shall be considered in the design. Not less than 60% of the interrupted reinforcement in each direction shall be placed each side of the opening. Reinforcement shall extend past the opening not less than half the transverse opening dimension.
   2. Openings wider than 3 ft. 6 in. shall be subjected to a rigorous analysis taking into account the stress concentrations and diminished lateral support that exist in the vicinity of such openings. Each side of the opening shall be designed as a column in accordance with ACI 318.
   3. Openings 8 ft. 0 in. or wider used for vehicle access shall be strengthened against vehicle impact and local buckling by means of an internal buttress located on each side of the opening. The buttress shall consist of a thickened, reinforced concrete wall section that is integrally formed and placed with the support wall. The buttress section shall be not less than 3 ft. 0 in. wide and 6 in. thicker than the nominal wall dimension.

2.4 CONCRETE SUPPORT STRUCTURE / STEEL TANK INTERFACE

A. Interface Region
   1. The interface region includes those portions of the concrete support structure and steel tank affected by the transfer of forces from the tank cone and the tank floor to the concrete support wall. This includes a ring beam and connection details. The Contractor shall provide evidence that a thorough review of the interface region has been performed. Finite element and finite difference analyses are the required methods for examining such local stresses in detail.
   2. The geometry of the interface shall provide for positive drainage and not allow either condensate or precipitation to accumulate at the top of the concrete wall or ring beam.

B. Ring Beam
   1. The ring beam shall be reinforced concrete with a nominal width and height of at least two times the support wall thickness. Minimum radial and circumferential reinforcement shall be 0.25%. For direct tension, reinforcement shall be provided such that the average service load stress in tension reinforcement due to the weight of the structure and stored water does not exceed 12,750 psi.
   2. Ring beam design shall consider unbalanced forces from the steel tank cone and concrete dome, load conditions varying with water level, eccentricity of loads resulting from design geometry, and allowance for variations due to construction imperfection and tolerance.

2.5 STEEL TANK

A. General
1. The steel tank shall be all welded construction and shall be designed in accordance with AWWA D107, Section 5, "Steel Tank". The required capacity and dimensions of the tank are noted on the Drawings and in this section of the specifications. All exposed lap joints shall be fully seal welded on both sides.

B. Plate Thickness
1. All members shall be designed to safely withstand the maximum stress to which they may be subjected during erection and operation. The minimum thickness of any steel plate shall be 1/4 in., except that plate used as a membrane over the structural concrete floor shall have a minimum thickness of 1/4 in.

C. Roof Support
1. All structural members supporting the roof of the steel tank shall be flat bar or sealed square tubular sections. I-beams or other sections with horizontal projections may be used if the nominal depth is 10 in. or greater. Support beams shall be seal welded to the underside of the roof plate along the entire length of the beam.

D. Cone
1. Conical sections of the tank that support water shall be designed in accordance with AWWA D107, Section 5, "Steel Tank".

2.6 APPURTENANCES AND ACCESSORIES

A. General
1. Accessories shall comply with the minimum requirements of the Specifications, Codes and Standards listed in Paragraph 1.04, and the operating requirements of the structure.

B. Ladder Access
1. Ladders shall be provided from the slab on grade inside the base of the support wall to the upper walkway platform located below the tank floor. The tank floor manhole shall be provided with ladder access from the upper platform. A ladder shall extend from the upper platform, through the access tube interior to the roof. A ladder mounted on the access tube exterior shall be provided for access to the tank interior, extending from the roof manhole to the tank floor.
2. Ladders that terminate at platforms or landings shall extend a minimum of 48 in. above the platform elevations. A safety extension shall be provided at the top of the ladder under hatch(s). The safety extension shall be a Ladder Up Safety Post as manufactured by Bilco or equal. The post shall extend 42-inches above the top of the ladder and be constructed of hot-dip galvanized steel. Mounting hardware shall also be galvanized steel.
3. Ladders located in the concrete support structure and access tube interior shall be galvanized steel. Tank interior ladders shall be coated in accordance with the tank interior coating system.

4. Ladder side rails shall be a minimum 3/8 in. by 2 in. with a 16 in. clear spacing. Rungs shall be minimum 3/4 in. diameter, spaced at 12 in. centers and plug welded into holes drilled in the side rails. Tank interior ladders shall be provided with 1 in. diameter rungs and 1/2 in. x 2 in. side rails and shall be fully seal welded.
5. Ladder shall be secured to the adjacent structure by brackets located at intervals not exceeding 10 ft. Brackets shall be of sufficient length to provide a minimum distance of 7 in. from the center of rung to the nearest permanent object behind the ladder. Ladder brackets located on the access tube exterior shall be reinforced at the access tube shell so that potential ice damage is confined to the ladder and bracket and not the access tube shell.

C. Safe Climbing Device
1. High strength aluminum, rigid rail safe climbing devices shall be provided on all ladders. Rails shall be center mounted and extend from 3 ft. above the ladder bottom to the top of the ladder section. Mounting brackets, fasteners and splice bars shall be provided as required for a rigid installation.
2. Three trolleys with snap hooks shall be provided that are designed to be operated with the aluminum rail. A safety body harness with front and side rings shall be supplied for each trolley.
3. A caution sign shall be provided at the lowest point of access to the ladder requiring safe climbing devices. The sign shall read “CAUTION – Safety Equipment Required When Climbing Ladder “. The sign shall be secured to the wall.

D. Rest Platforms
1. Rest platforms shall be provided at maximum 30 ft. intervals along the support wall ladder. Platforms shall be minimum 3 ft. by 5 ft. and complete with handrails, mid rails and toe plates in accordance with OSHA requirements. Grating shall be used for the walking surface and shall be suitably hinged at the ladder penetration. Platforms shall be arranged for straight run ladder and operable without removing fall prevention equipment. All components shall be galvanized steel.

E. Platforms
1. A 4 ft. wide upper walkway platform shall be located at the top of the support wall to provide access from the support wall ladder to the roof access ladder located on the interior of the access tube. Platforms shall be provided with handrails, mid rails and toe plates in accordance with OSHA requirements. Grating shall be used for the walking surface. All components shall be galvanized steel.

F. Support Wall Doors
1. Personnel Door - Door frames shall be 16-gauge with concealed reinforcement at hardware locations. Expansion type anchors for existing openings shall be installed near the top, bottom and intermediate point of each jamb to rigidly secure the frame. Doors shall be 1 3/4 in. thick insulated, reinforced, full, flush type with 18-gauge face sheets and concealed reinforcement at hardware locations. All edges shall be finished flush with watertight seams. Shop applied finish for the frame and door shall be baked on rust inhibitive primer. Field finish shall be compatible with

the tank exterior. Standard hardware shall be stainless steel and include three 4 1/2 in. by 4 1/2 in. hinges, industrial duty closer and lockset. Quantity and location of personnel door(s) shall be as shown on the Drawings.

2. Overhead Vehicle Door - Door installation shall be on the interior face of the support wall. The door frame shall be a steel plate fabrication suitably detailed, fastened and reinforced to accept the door. Operation shall be manual with a chain hoist. The curtain shall be formed of 22-gauge steel interlocking slats with end locks and wind locks designed for a wind loading of 20 psf. Torsion springs shall be mounted on a solid torsion rod, which is attached to an exterior mounted spring tension adjustment wheel. A 24-gauge steel hood shall be provided with a weather seal to protect the assembly. Steel brackets shall be installed to the interior face of the wall with expansion anchors which enclose and support the counterbalance assembly with sealed bearings. Steel curtain guides are mounted to the brackets. The curtain, bottom bar, brackets, guides, hood, pipe and chain shall be galvanized. Provide with locking device. Size, quantity and location of vehicle door(s) shall be as shown on the Drawings.

G. Tank Openings

1. Floor - Provide a 30 in. diameter manhole through the tank floor. The manhole shall be operable from a ladder located on the upper platform and shall be designed to withstand the pressure of the tank contents without leakage. The manhole assembly shall include a stainless steel hand wheel operator and threaded components.
2. Roof - Provide two 30 in. square weather proof access hatches on the roof of the tank. One hatch shall allow egress from the access tube to the roof. The second hatch, located adjacent to the first, shall allow access to the interior of the tank via the ladder mounted on the exterior of the access tube. The opening shall have a minimum 4 in. curb. Provide aluminum covers with a 2 in. down turned edge, stainless steel hardware, hold open arm and a locking mechanism.

H. Access Tube

1. Provide a minimum 48 in. diameter centrally located access tube through the steel tank to provide access to the tank roof from the upper walkway platform. The access tube shall incorporate a 2 in. by 2 in. channel to collect condensation that may form on the interior surface. A flexible 3/4 in. PVC hose complete with backflow preventer shall drain the channel to the overflow pipe.

I. Roof Railing

1. A 42 in. high roof handrail shall be provided to enclose all centrally located roof accessories. The roof railing shall be a minimum of 18 ft. in diameter.

J. Rigging Access

1. Provide a 24 in. x 36 in. opening at the top of the support wall. This opening shall be accessible from a platform and shall provide access to the exterior rigging rail located at the tank/support wall intersection. The access opening shall be provided with a hinged stainless steel cover or a removable vent in accordance with Paragraph 2.06.M.2.

2. A minimum 24 in. diameter opening shall be provided on the tank roof to provide access to the tank interior rigging rail.

K. Rigging Rails
1. Provide permanently installed rigging rails suitable for rolling trolleys at the interior of the tank at the wall/roof and access tube/roof connections. Provide an exterior rigging rail at the base of the tank adjacent to the support structure.

L. Piping
1. Inlet/Outlet Pipe - Provide a 16-inch diameter inlet/outlet pipe that extends from the base of the support structure to the tank floor elevation. Provide a minimum 6 in. high removable silt stop where the inlet/outlet pipe enters the tank. The bottom capacity level of the tank's operating range shall be at or above the elevation of the top of the silt stop. Pipe material within the support structure shall be Schedule 10S Type 304L stainless steel. Piping below the grade slab shall be flanged cement lined ductile iron suitably restrained to prevent movement.
   a. The inlet/outlet pipe shall be designed to support all related static and dynamic loads. Suitable galvanized steel brackets, guides and hangers shall be provided on the support wall and tank floor at intervals not exceeding 20 feet.
   b. The inlet/outlet pipe shall be designed and constructed to accommodate any differential movement caused by settlement and by thermal expansion and contraction over the range of extreme temperature differences expected for the support wall and pipe. The required flexibility shall be provided by an expansion joint located near grade in the vertical section of pipe.
2. Overflow Pipe - Provide a 12-inch diameter overflow. The top of the overflow shall be located within the tank at the overflow elevation. It shall run vertically beside the central access tube and extend through the tank floor, at which point it shall turn 90° and run under the tank floor to the support wall. This horizontal run shall be sloped to drain. The pipe shall then turn 90° and run vertically beside the support wall to grade. A base elbow shall direct the overflow through the support wall, where the pipe shall be terminated with a flap valve. Pipe material within the support structure shall be Type 304L (minimum 11 gauge) stainless steel. If the top of overflow is located above top capacity level, the tank shall be designed for the additional capacity provided by the difference.
   a. The entrance to the overflow pipe shall be designed for the maximum inlet flow rate specified in Paragraph 1.5B. The design shall be based on the water level cresting within 6 in. above the overflow elevation. A conical weir shall be provided if the entrance capacity of the overflow pipe diameter is not adequate. A vortex prevention device shall be used.
   b. The overflow shall be designed to support all related static and dynamic loads. Suitable galvanized steel brackets, guides and hangers shall be provided on the support wall and tank floor at intervals not exceeding 20 ft. The overflow pipe and weir section within the tank shall be carbon steel and supported by the central access tube.
   c. The overflow pipe shall be designed and constructed to accommodate any differential movement caused by settlement and by thermal expansion and

contraction over the range of extreme temperature differences expected for the support wall and pipe. A layout with sufficient upper offset to accommodate differential movement is acceptable. If this method is not applicable, the required flexibility shall be provided by an expansion joint located near grade in the vertical section of pipe.

d. The overflow pipe shall penetrate the support wall approximately 1 ft. above grade and discharge through a flap valve onto a 4 ft. wide x 9 ft. concrete splash pad.

3. Stainless Steel Requirements - Pipe and fittings shall be Type 304L stainless steel fabricated from material meeting the requirements of ASTM A-240. Fabrication, inspection, testing, marking and certification of pipe and fittings shall be in accordance with ASTM A-778 and A-774 respectively. All fittings less than 18 inches shall be smooth flow, fittings larger than 18 inches may be of five section mitre construction. Backing flanges shall be in accordance with ASTM A285-C drilled to ANSI B16.5 Class 150. Pipe, fittings and welds shall be cleaned and passivated.
   a. Pipe, fittings and flange thickness shall be in accordance with the manufacturers certified pressure rating for the applicable service pressures. The design pressure rating shall be minimum 125 psi for piping located within closed or valve sections.
4. Tank Drain – A tank drain shall be provided to completely drain the tank contents if the inlet/outlet pipe does not intersect the low point of the tank. A 4-inch drain pipe located at the low point of the tank floor shall be fitted with a threaded plug and tee handle.

M. Ventilation
1. Tank Ventilation - A tank vent shall be provided, located centrally on the tank roof above the maximum weir crest elevation. It shall consist of stainless steel or aluminum components, including a support frame, screened area and cap. The support shall be fastened to a flanged opening in the tank roof. The vent cap shall be provided with sufficient overhang to prevent the entrance of wind driven debris and precipitation. A minimum of 4 in. shall be provided between the roof surface and the vent cap.
   a. The tank vent shall have an intake and relief capacity sized to prevent excessive pressure differential during the maximum flow rate of water, either entering or leaving the tank. The overflow pipe will not be considered as a vent. The maximum flow rate of water entering the tank is specified in Paragraph 1.5B. The maximum flow rate of water exiting the tank shall be calculated assuming a break in the inlet/outlet at grade when the tank is full. The vent shall be provided with an insect screen. Vent capacity shall be determined based on open area provided by the screen.
   b. In addition to the tank vent, a pressure/vacuum relief mechanism shall be provided that will operate in the event of vent failure. The mechanism shall be designed to return automatically to its original position after operation. The pressure/vacuum relief mechanism shall be located on the tank roof above the maximum weir crest elevation, and may be incorporated in the vent assembly.

2. Support Structure Ventilation - Ventilation within the support structure shall comply with the governing building code requirements, based on occupancy classification. As a minimum, one louvered vent shall be provided at the top of the support wall. This vent shall be accessible from the upper platform and may also be designed to provide access to the exterior rigging rails located at the tank/support wall intersection. Vents shall be accessible from the interior ladders, platforms or floors provided. Vents shall be stainless steel or aluminum and provided with a removable insect screen.

N. Interior Floors
1. Slab on Grade - Provide a 6 in. thick, 3500 psi concrete floor slab in the base of the support structure. The slab shall be supported on compacted granular fill and shall be reinforced with #4 reinforcing steel at 12 in. centers each way. Provide 1/2 in. expansion joint between floor slab and support wall and at pipes and supports that extend through the floor. Place cap strip and sealant over the expansion joint. The slab shall be sloped at 0.5% toward the truck door for drainage.
2. Structural Floor – Provide a composite construction structural floor located 16.5 ft. above the slab on grade (top of intermediate floor at El. 24.00 per the Drawings). The structural floor shall be of mezzanine type covering half the tank base diameter as shown on the Drawings. The design shall comply with the applicable requirements of AISC S335. It shall be designed to support the CMU electrical room shown on the Drawings and for a minimum uniform live load of 125 psf. The floor shall consist of a concrete slab supported by a galvanized formed steel deck and galvanized steel girders.
   a. The structural floor shall be a clear span design supported entirely by the concrete support wall. All loads transferred from the structural floor to the support wall shall be considered in the design. The wall shall be strengthened as required in the vicinity of connections causing point load or eccentric conditions. Loads transferred from the structural floors to the foundation shall be considered in the design of the foundation.
   b. Unless structural floor and supports are isolated from the wall, loads on the wall caused by thermal stresses in these members shall be considered. An analysis of the lateral loading condition shall be performed and the wall strengthened accordingly.
   c. Provide a galvanized steel access stairway adjacent to the support wall. Access openings through the structural floor and the edge of the mezzanine shall be protected with 42 in. high galvanized steel handrails. Stairways shall not land within the projection of the Overhead Vehicle Door on the base slab so that access through the vehicle door is not impacted by the stairway.

O. Level Monitoring
1. General - Provide three 3/4 in. couplings welded to the inlet/outlet pipe 5 ft. above grade. Each coupling shall be provided with a stainless steel nipple and an isolation valve.

2. Pressure Gauge - Provide a pressure gauge in accordance with ASME B40.1 Grade 2A. The dial shall be 4 1/2 in. diameter with black markings on white background. Pressure range is 0-100 psi.

P. Lightning Protection
1. Provide a lightning protection system for the elevated tank structure and any roof mounted equipment that may be damaged by lightning.
2. Minimum requirements include two 28 strand by 14 gauge copper conductors bonded to the steel tank 180 degrees apart. The conductors shall be fastened to the interior support wall at 3 foot minimum spacing, and shall terminate with buried 5/8 inch diameter by 8 foot long copper clad ground rods.
3. Lightning protection for obstruction lights shall consist of an air terminal mounted on the support and formed to fit around the fixture. The 1/2 inch diameter copper air terminal shall extend a minimum of 10 inches above the light fixture and shall connect to a copper conductor that terminates in a bonding plate secured to the tank roof.

Q. AWWA Butterfly Valves for Clear Water Service
1. Butterfly valves and operators up to 72-in diameter shall conform to AWWA C504, Class B, except as specified herein. Manufacturer shall submit an affidavit of compliance stating that valves have been manufactured and tested in accordance with AWWA C504 and specifically listing all exceptions. Valves shall have a minimum 150 psi pressure rating or higher and be manufactured by M&H; Dezurik; Val-Matic; Henry Pratt; or equal.
2. Butterfly valves for above grade service shall be flanged end with face to face dimensions in accordance with Table 2 of AWWA C504 for short-body valve. Valves for dead end shut off service shall be flanged type.
3. Valve seats shall be full resilient seats retained in body or on disc edge in accordance with AWWA C504. Valve discs shall be constructed of cast iron, ASTM A 48, Class 40; Ni-resist, ASTM A 436, Type 1; or ductile iron, ASTM A 536, Grade 65-45-12.
   a. When resilient seats are attached to body, discs shall have Type 316 stainless steel seating edges. When resilient seat is attached to disc, it shall be fastened with a one piece Type 316 stainless steel retaining ring, Type 316 stainless steel Nylock set screws and a mating Type 316 stainless steel ring shall be installed in valve body. Resilient seats shall be EPDM. Seats shall be fully adjustable and replaceable with valves in place using no special tools.
4. Valve body shall be constructed of close grain cast iron per ASTM A 126, Class B with integrally cast hubs for shaft bearing housings of through boss-type. Permanently self-lubricating body bushings shall be provided and shall be sized to withstand bearing loads. Stuffing box of liberal dimensions shall be provided at operator end of vane shaft.
   a. Packing shall be of self-compensating V-type. A sealing element utilizing O-rings shall also be acceptable for up to and including 24-in valves. Over 24-in, pull down seals using a square braid of graphite fiber is an acceptable alternate.
   b. Packing shall be held in place by a bolted corrosion resistant retainer plate or gland; retainer clips are not acceptable. Valves 30-in or larger shall use a stuffing box with follower gland.

c. Replacement of seals, for all size butterfly valves, shall not require removal of valve from the line. In addition, adjustment or replacement of seals on valves of 30-in or larger shall not require disturbing any part of valve or operator assembly, except any packing follower gland.

5. Valve shaft shall be of Type 316 stainless steel and designed for both torsional and shearing stresses when valve is operated under its greatest dynamic or seating torque. No reductions of shaft diameter will be allowed except at operator connection. Any reduction shall have a full radius fillet.
6. Butterfly valve actuator shall conform to requirements of AWWA C504, insofar as applicable and as specified herein. Gearing for actuators where required shall be totally enclosed in a gear case in accordance with AWWA C504. Actuators shall have permanent indicators with raised or engraved marks to show position of valve disc.

2.7 ELECTRICAL AND LIGHTING

1. Electrical work shall be in accordance with Division 16
2. Obstruction lighting shall be provided in accordance with FAA standards. The obstruction light shall be centrally located on the roof of the tank above all permanent installations. It shall be a steady burning, dual fixture type with a lamp-out relay switch. The fixture shall be weather sealed, corrosion resistant, with aluminum base and housing. Red globes with 116-watt clear traffic signal lamps rated at 8,000 hour life shall be provided. A pilot light located near the electrical panel shall be provided to indicate when the primary bulb has failed.

2.8 STEEL TANK PAINTING

1. Refer to Division 09 for tank coatings. Galvanized, stainless steel and concrete surfaces are not coated.

2.9 SOURCE QUALITY CONTROL

A. Tests
1. Review mill test certifications of all steel plate, structural components and reinforcement to ensure compliance with specification requirements.

B. Inspections
1. Provide inspection of shop fabricated components in accordance with AWWA D107, Section 9, “Inspection and Testing”.

PART 3 - EXECUTION

3.1 FOUNDATION

A. Excavation

1. The foundation bearing surface and excavation shall be inspected by a representative of the geotechnical engineer prior to foundation construction. Verification of the applicable design and construction recommendations is required. The geotechnical engineer shall be retained by the Contractor. After verification of the foundation bearing surface, provide a 2 in. thick concrete working slab within the lower excavation limits. Grade the site to prevent runoff from entering the excavation.

B. Concrete Construction
1. For shallow foundations, reinforcement placed adjacent to a concrete working slab shall have a 2 in. minimum cover, and shall be supported by precast concrete block, metal or plastic bar supports.
2. The sides of foundations shall be formed using any suitable system conforming to ACI 318. Earth cuts shall not be used as forms for vertical surfaces. Forms shall be provided on top sloping surfaces steeper than 2.5 horizontal to 1 vertical. Straight form panels may be used to form circular foundation shapes. The minimum design radius shall be maintained at all sections.

C. Finish
1. Formed surfaces shall have a smooth form finish when exposed and a rough form finish when not exposed.
2. Unformed surfaces shall have a troweled finish when exposed and floated finish when not exposed.

3.2 CONCRETE SUPPORT STRUCTURE

A. Architectural Concrete Construction
1. The exposed exterior surface of the concrete support wall is designated architectural concrete. The concrete and formwork requirements of this section shall be strictly enforced to ensure concrete of the highest practicable architectural standard. Formwork design, installation and removal shall comply with the minimum requirements of ACI 318, ACI 117 and the applicable requirements of ACI 347, except as modified by this Section.
2. Attention shall be given to ensure the same concrete design mix is used throughout the support wall. The proportion, type and source of cement and aggregates shall not be changed. Uniform moisture content and placing consistency shall be maintained.
3. Placement is crucial to achieving architectural concrete. All wall concrete shall be placed vertically and directly inside the reinforcement cage with drop chutes to prevent form splatter and the resulting surface finish variations. Placement methods that introduce concrete horizontally through wall reinforcement are strictly prohibited.
4. Support wall reinforcement shall be installed with plastic supports. Maximum spacing of supports for welded wire fabric shall be 5 ft. centers, horizontal and vertically. Forming systems shall be designed with the provision of ties and bracing such that concrete components conform to the correct dimensions, shape, alignment and elevation. Embedded items shall be properly positioned and secured. Form

surfaces shall be thoroughly cleaned of concrete residue and coated with a release agent prior to placing reinforcement. Do not allow excessive release agent to accumulate on the form surface. Steel forms shall be coated with a non-staining, rust preventative form oil or otherwise protected. Steel formwork with rust stains and damaged surfaces shall not be used.

5. Support wall concreting shall incorporate segmented placement procedures. Temporary vertical bulkheads shall divide the wall pour into segments corresponding to a single truckload of concrete. The bulkheads shall be located at rustications, braced rigid and tight to maintain vertical alignment under concrete load. Wall segment concrete shall be placed vertically and continuously to full form height from a single truck load of concrete. Vertical pour rate shall be a minimum of 15 feet per hour. Placement from multiple loads is not permitted. Temporary bulkheads shall not be removed until adjacent concrete is placed.
6. The forming system for the pedestal wall shall be fully engineered and detailed with procedures to meet the increased demands of architectural concrete. The support wall shall be constructed with a jump form process using form segments prefabricated to match the wall curvature. Concrete pour height shall be a minimum of 6 ft. and a maximum of 10 ft. Form panels shall be designed for lateral pressures associated with full height plastic concrete head and eccentric loads resulting from the segmented wall pour procedure.
7. Form panels shall extend the full height of the concrete pour using only vertical panel joints. Form system shall be designed to lap and be secured to the previous wall pour. The space between the form and the previous pour shall be sealed to prevent grout leakage. Wall forms shall incorporate a positive means of adjustment to maintain dimensional tolerances specified. Wall forms shall be adjusted for vertical plumb and circularity and locked into position with through wall form ties prior to concrete placement. Working platforms that allow safe access for inspection and concrete placement shall be provided. Form surfaces shall be steel, plastic or fiberglass coated material.
8. The form system shall incorporate a uniform pattern of vertical and horizontal rustications to provide architectural relief to the exterior wall surface. Rustication strips shall be sealed to the form face to eliminate the grout leakage that results in broken corners, color variations and rock pockets. Broken edges and chamfers will not be accepted. All construction joints and panel joints shall be located in rustications. Vertical panel joints shall be sealed using closures which combine with the form pattern to eliminate grout leakage and panel joint lines. All joints shall be grout tight. The vertical and horizontal rustications shall be proportioned and combined to impart a symmetrical architectural pattern to the completed structure. Form ties shall be located in a uniform pattern. No architectural form treatment is required on the interior surface.
9. Wall forms shall not be disturbed or removed until the concrete has attained sufficient strength to prevent forming operations or environmental loads from causing surface damage or excessive stress. Support wall concreting operations shall occur a maximum of once per day. Forms are to be removed and the concrete finish inspected prior to the subsequent placement of the next wall pour. Multiple form movements and concrete placements within a day are not permitted Form

removal shall be based on early age concrete strength testing. The minimum concrete strength shall be established by the Contractor, based on an analysis of stress at critical stages throughout the forming and concrete operations. Early age concrete testing shall be in accordance with ACI 228.1R-95. Pull Out testing in accordance with ASTM C 900-99, Maturity Method testing in accordance with ASTM C 1074-93, or field cured cylinders compressive strength tested in accordance with ASTM C 172 are the acceptable methods to determine early concrete strength.

10. The structural floor system shall be designed to support all temporary construction loads. Adequate shoring and bracing shall be provided to transfer loads without appreciable movements. Shoring and forms for the structural dome slab shall remain in place until the concrete has gained sufficient strength to carry the floor weight without damaging deflections. A system of precast segments, concreted and structurally tied together can be used in lieu of cast in place.
11. In periods of cold weather as defined by ACI 306, concrete surfaces shall be protected in accordance with recommendations until the component attains 35% of the specified compressive strength. At this time, protection may be removed subject to the allowable temperature differential. A reasonable temperature differential shall be defined, based on component thickness and restraint conditions.

B. Finish
1. Provide a smooth form finish without rub for the interior and exterior support wall. Tie holes shall be plugged using grout on the interior and manufactured plugs on the exterior which match the color of the cured concrete as closely as possible. Provide a light sandblast to the exposed exterior concrete support wall surface.

C. Dimensional Tolerances
1. Support structure concrete construction shall conform to the following:
   a. Variation in thickness:
      1) Wall -3.0% to +5.0%
      2) Dome -6.0% to +10%
      3) Slab floor -3.0% to +5.0%
   b. Support wall variation from plumb:
      1) in any 10 feet of height 1 inch
      2) in any 50 feet of height 2 inch
      3) maximum in total height 3 inches
   c. Support wall diameter variation 0.4% (not to exceed 3 inches)
   d. Dome floor radius variation 1.0%
   e. Level alignment variation:
      1) from specified elevation 1 inch
      2) from horizontal plane 1/2 inch
   f. Offset between adjacent pieces of formwork:
      1) exterior exposed surfaces 1/8 inch
      2) interior exposed surfaces 1/4 inch

D. Mock Up Panel

1. A mock up panel shall be constructed using the proposed form surface and concrete. Minimum size will be 4 ft wide by 6 ft high. This panel shall be agreed upon by the Contractor and Engineer as the reference standard with which to judge surface quality, appearance and uniformity of texture and color for each individual lift.
2. Review and acceptance of formed concrete surface must be made immediately upon form removal. Succeeding pours shall not be placed until the most recent wall pour has been stripped and the form surface approved. The Engineer shall not delay the Contractor by lack of attendance. Non-attendance by the Engineer or designated representative will be understood to mean acceptance. The Contractor shall be responsible to inform the Engineer as to pour schedule.
3. Concrete with surface defects exceeding limitations specified herein or not meeting the standard represented by the mock-up panel shall be repaired to meet that standard.

3.3 STEEL TANK

A. Welding
1. Welding procedures and general welding requirements shall be in accordance with AWWA D107, Section 9.5, "Welding".
2. No structural welding is permitted to any steel embedded in hardened concrete, unless the weld is at least 2 ft. from the embedment interface.
3. Grinding of weld contour shall approximate Condition "D" of NACE Standard RP0178.

B. Fabrication
1. Layout, cutting, forming, edge preparation and workmanship for steel tank components and fabrications shall be in accordance with AWWA D107, Section 5.4, "Fabrication and Construction Requirements".

C. Tank Erection
1. Steel tank erection procedures and general requirements shall be in accordance with AWWA D107, Section 5.4, "Fabrication and Construction Requirements".

D. Tolerances
1. Steel tank tolerances shall be in accordance with the requirements of API 650, Section 5.5.
2. Steel cone shall be constructed to the following tolerance. The deviation from the theoretical conical surface shall not exceed $0.032\sqrt{RT}$, when measured in the radial direction over length $4\sqrt{RT}$, where R is the radius normal to the plate surface at the point of consideration, and T is the plate thickness.

3.4 FIELD QUALITY CONTROL

A. Concrete Testing and Inspection
1. The evaluation and acceptance of concrete shall be in accordance with Section 01410 – Testing Laboratory Services.

2. The support wall radius, plumb and thickness shall be verified for each concrete lift at all vertical form panel joints and at a minimum of 60 degree intervals. Vertical alignment and radius shall be checked using a visible beam laser. Measurement shall be made to the outside form surface. A log of the measurements and an inspection report certified by the tank designer shall be provided to the Owner at project completion.

B. Steel Tank Testing & Inspection
1. Inspection procedures for the steel tank shall be in accordance with AWWA D107, Section 9, "Inspection and Testing". Radiographic inspection of full penetration butt-welded joints shall be made by an independent inspection company retained by the Contractor.
2. Erection tolerance of the steel cone in the radial direction shall be measured. Provide field measurements at 30 degree intervals.
3. Weld joints of plate over the structural concrete floor shall be tested for leaks by vacuum box / soap solution testing, or equivalent method prior to grouting.

3.5 CLEANING

A. Site
1. The project site shall be kept in a clean and safe condition at all times. The Contractor shall remove all construction equipment and debris at project completion.

B. Tank Disinfection
1. Water and sufficient pressure for flushing, cleaning, initial testing and disinfection shall be supplied by the Owner at no cost to the Contractor. Disinfection shall be in accordance with AWWA C652. Tank leakage test shall be performed during disinfection.

END OF SECTION

SECTION 16290
SURGE PROTECTION DEVICES

PART 1 G E N E R A L

1.01 SCOPE OF WORK

A. Scope:

1. CONTRACTOR shall provide all labor, materials, equipment and incidentals as shown, specified and required to furnish and install surge protective devices (SPDs) in the MCC/power panel, control panels and field devices.

2. Provide surge protection devices to protect field instruments and equipment from the effects of transient surges caused by lightning and other electrical sources.

3. SPDs shall be installed at the following locations:

   a. On 480 VAC power and neutral connections at the MCC or power panels.

   b. On 120 VAC, 60Hz power connections to control panels.

   c. On all analog signals at the control panel. Include surge protection at 24 VDC loop powered field instruments for wiring distances greater than 75 feet from the control panel. Include surge protection on all four-wire, 120 VAC field instruments.

   d. On all discrete signals that have portions of interconnecting wiring located outside of protected buildings.

   e. On all copper data lines that have portions of interconnecting wiring located outside of protected buildings.

B. Related Sections:

1. Division 13: Instrumentation.

2. Division 16: Electrical.

1.02 QUALITY ASSURANCE

A. Standards, Codes and Regulations:

1. Surge protective devices and the installation and interconnection of the devices shall comply with applicable provisions of the following standards, codes and regulations:

National Fire Protection Association 79, Annex "D" Standards, (NFPA).

a. On 480 VAC power and neutral connections at the MCC or power panels.

b. On 120 VAC, 60Hz power connections to control panels.

c. On all analog signals at the control panel. Include surge protection at 24 VDC loop powered field instruments for wiring distances greater than 75 feet from the control panel. Include surge protection on all four-wire, 120 VAC field instruments.

d. On all discrete signals that have portions of interconnecting wiring located outside of protected buildings.

e. On all copper data lines that have portions of interconnecting wiring located outside of protected buildings.

PART 2 P R O D U C T S

2.01 SPD - GENERAL

A. Connect and ground in accordance with surge protection device manufacturer's instructions. SPDs shall use a separate path to building ground; the equipment safety ground is not to be used as a transient ground path.

B. SPDs shall be installed as close as practical to the protected equipment, panel, or switchboards to minimize connecting wire lead lengths.

C. All control panel SPDs shall be DIN-rail mountable and capable of being monitored by direct visual means and have remote indication for fault indication to a local monitoring and control system.

D. All control panel SPDs shall be pluggable for easy removal to facilitate testing to ensure proper protection levels. Removal shall not disrupt operation of protected circuits.

E. MOV based suppression products rated for use above 110 VAC, 60Hz, 95 percent humidity, shall incorporate a thermally sensitive device to remove the metal oxide varistor (MOV) from service should the event of severe overheating occur.

F. The surge protection devices shall be used as the interface terminal blocks when applicable.

2.02 SPD - 480 VAC POWER

A. General: Provide surge protection for 3-phase 480 VAC wye power connections. Include circuit breaker in series with each device to facilitate device removal and testing.

B. Features:

1. Suppression: Metal oxide varistors (MOVs) and gas-filled surge arresters.

2. Protection level Up (core-neutral): ≤ 1.6 kV.

3. Protection level Up (core-ground): ≤ 1.75 kV.

4. Protection level Up (neutral-ground): ≤1.5 kV.

5. Nominal discharge surge current (8/20 µs): 20 kA.

6. Maximum discharge surge current (8/20 µs): 40 kA.

7. Response time (core-neutral): ≤ 25 ns.

8. Response time (core-ground): ≤ 100 ns.

9. Operating temperature of -40 ºC to 80 ºC.

C. Product and manufacturer:

1. Phoenix Contact, VAL-MS 320/3+1.

2. Erico, TDS350TT277

3. Dehn, DG MU 3PY 480 4W+G

4. Or approved equal.

2.03 SPD - 120 VAC POWER

A. General: Provide modular, pluggable surge protective device of the incoming power feed to the control panel.

B. Features:

1. Suppression: Metal oxide varistors (MOVs) and gas-filled surge arresters.
2. Maximum Continuous Operating Voltage: 150V.
3. Nominal load current In: 26 A.
4. Protection level Up (L-N): 620 V.
5. Protection level Up (L-PE): 850 V.
6. Protection level Up (N-PE): 850 V.
7. Nominal discharge surge current (8/20 µs): 2.5 kA.
8. Response time: < 25 ns (L-N)
9. Operating temperature of -40 ºC to 85 ºC.

C. Product and manufacturer:

1. Phoenix Contact, MAINS-PLUGTRAB PT 2-PE/S-120AC-ST.
2. Erico, TDS1301TR150
3. Dehn, DR M 2P 150
4. Or approved equal.

2.04 SPD – 24 VDC ANALOG – CONTROL PANEL

A. General: Surge protection device (SPD) at the control panel for 24 VDC power connections to field instruments. SPD shall be pluggable, modular and able to be tested.

B. Features:

1. Suppression: Gas-filled surge arrester and silicon avalanche diode.
2. Maximum Continuous Operating Voltage: 28 VDC.
3. Nominal current In: 450 mA.
4. Protection level Up (core-core): ≤ 70 V (1 kV/500 A).

5. Protection level Up (core-ground): ≤ 450 V (1 kV/5 kA).

6. Resistance per path: 2.2 ohms.

7. Nominal discharge surge current (8/20 µs): 10 kA.

8. Total surge current (8/20 µs): 20 kA.

9. Response time (core-core): ≤ 1 ns

10. Response time (core-ground): ≤ 100 ns

11. Capable of being monitored by head-end module and LED indicators for status.

12. Operating temperature of -40 ºC to 85 ºC.

C. Monitoring Module Features:

1. Communicate status and provide power to SPD LEDs via TBUS connector on DIN rail.

2. Nominal Operating Voltage: 28 VDC (20 VDC – 30 VDC).

3. Provide two NC contacts for status of overload and performance limit reached of connected SPDs.

4. Capable of monitoring status of 28 SPDs.

5. Provide ON/OFF switch for SPD LED lights.

D. Product and manufacturer:

1. Phoenix Contact, MCR-PLUGTRAB PT 1x2-24DC-ST.

2. Erico, UTB30SP

3. Dehn, BXT ML4 BE 24

4. Or approved equal.

2.05 SPD – DISCRETE SURGE PROTECTION – 24 VDC

A. General: Surge protection at the control panel for 24 VDC discrete signal connections. SPD shall be pluggable, modular and able to be tested.

B. Features:

1. Suppression: Gas-filled surge arrester and silicon avalanche diode.

2. Maximum Continuous Operating Voltage: 28 VDC.

3. Nominal current In: 300 mA.

4. Protection level Up (core-ground): ≤ 60 V (1 kV/500 A)

5. Resistance in series: 4.7 ohms.

6. Nominal discharge surge current (8/20 µs): 10 kA.

7. Total surge current (8/20 µs): 20 kA.

8. Response time (core-ground): ≤ 1 ns

9. Operating temperature of -40 ºC to 85 ºC.

10. Capable of being monitored by head-end module and LED indicators for status.

C. Monitoring Module Features:

1. Communicate status and provide power to SPD LEDs via TBUS connector on DIN rail.

2. Nominal Operating Voltage: 28 VDC (20 VDC – 30 VDC).

3. Provide two NC contacts for status of overload and performance limit reached of connected SPDs.

4. Capable of monitoring status of 28 SPDs.

5. Provide ON/OFF switch for SPD LED lights.

D. Product and manufacturer:

1. Phoenix Contact, MCR-PLUGTRAB PT 2x1-24DC-ST

2. Erico, UTB30SP

3. Dehn, BXT ML4 BD 24

4. Or approved equal.

2.06 SPD – DISCRETE SURGE PROTECTION – 120 VAC

A. General: Surge protection at the control panel for 120 VAC discrete signal connections. SPD shall be pluggable, modular and able to be tested.

B. Features:

1. Suppression: Metal oxide varistors.

2. Maximum Continuous Operating Voltage: 150 VAC.

3. Nominal current In: 26 amps.

4. Protection level Up (Core-ground): ≤ 550 V.

5. Nominal discharge surge current (8/20 µs): 2.5 kA.

6. Total surge current (8/20 µs): 5 kA.

7. Response time (core-ground): ≤ 25 ns

8. Operating temperature of -40 ºC to 85 ºC.

C. Product and manufacturer:

1. Phoenix Contact, MCR-PLUGTRAB PT 2x1VA-120AC-ST.

2. Erico, UTB110DP

3. Dehn, BXT ML4 BE 180

4. Or approved equal.

2.07 SPD – 24 VDC POWER/ANALOG – FIELD DEVICE

A. General: Surge protection at the field device for 24 VDC power connections.

B. Features:

1. Suppression: Gas-filled surge arrester and silicon avalanche diode.

2. Maximum Continuous Operating Voltage: 36 VDC.

3. Nominal current In: 450 mA.

4. Protection level Up (core-core): ≤65 V.

5. Protection level Up (core-ground): ≤ 1.2 kV (C2- 10 kV/5 kA).

6. Nominal discharge surge current (8/20 µs) (core-ground): 10 kA.

7. Total surge current (8/20 µs): 20 kA.

8. Core to core response time: < 1 ns.

9. Core to ground response time: < 100 ns

10. Operating temperature of -25 ºC to 80 ºC.

11. Material and mounting: High grade steel with ½ inch NPT.

C. Product and manufacturer:

1. Phoenix Contact, SURGETRAB, S-PT-EX-24DC.

2. Erico, RTP3034

3. Dehn, BXT ML4 BE 36

4. Or approved equal.

2.08 SPD – 120 VAC POWER/24 VDC SIGNAL – FIELD DEVICE

A. General: Surge protection at the field device to protect the 120 VAC power and 24 VDC analog signal. Surge protection to be provided in a NEMA 4X enclosure.

B. 120 VAC Power Surge Features:

1. Suppression: Metal oxide varistors (MOVs) and gas-filled surge arresters.

2. Maximum Continuous Operating Voltage: 150V.

3. Nominal load current In: 26 A.

4. Protection level Up (L-N): 620 V.

5. Protection level Up (L-PE): 850 V.
6. Protection level Up (N-PE): 850 V.
7. Nominal discharge surge current (8/20 µs): 2.5 kA.
8. Response time: < 25 ns (L-N)
9. Operating temperature of -40 ºC to 85 ºC.

C. 24 VDC Signal Surge Features:

1. Suppression: Gas-filled surge arrester and silicon avalanche diode.
2. Maximum Continuous Operating Voltage: 28 VDC.
3. Nominal current In: 450 mA.
4. Protection level Up (core-core): ≤ 70 V.
5. Protection level Up (core-ground): ≤ 450 V.
6. Resistance per path: 2.2 ohms.
7. Nominal discharge surge current (8/20 µs): 10 kA.
8. Total surge current (8/20 µs): 20 kA.
9. Response time (core-core): ≤1 ns
10. Response time (core-ground): ≤ 100 ns
11. Operating temperature of -40 ºC to 85 ºC.

D. Product and manufacturer:

1. Phoenix Contact, BOXTRAB – BXT-N4X 4-WIRE.
2. Erico, MWE and TDS1301TR150
3. Dehn, 999.990-01
4. Or approved equal.

2.09 SPD – DATA SURGE PROTECTION - ETHERNET

A. General: Surge protection to protect CAT-5/6 Ethernet data signal. Provide attachment plug for DIN-rail mounting. Connection method to device by RJ45 plug.

B. Features:

1. Suppression: Gas-filled surge arrester and diodes.

2. Maximum Continuous Operating Voltage (core-ground): ≤ 180 VDC.

3. Nominal current In: ≤ 1.5 A.

4. Protection level Up (core-core): ≤ 9 V (1 kV/25A)

5. Protection level Up (core-core): ≤ 100 V (1 kV/25A - PoE)

6. Protection level Up (core-earth): ≤ 600 V.

7. Nominal discharge surge current (8/20 µs) (core-ground): 2 kA, per signal pair.

8. Total surge current (8/20 µs): 10 kA.

9. Response time (core-core): ≤ 1 ns.

10. Response time (core-ground): ≤ 100 ns

11. Operating temperature of -40 ºC to 70 ºC.

C. Product and manufacturer:

1. Phoenix Contact, DT-LAN-CAT.6.

2. Erico, LANRJ45C6

3. Dehn, DPA M CLE RJ45B 48

4. Or approved equal.

2.10 SPD – DATA SURGE PROTECTION – RS-485

A. General: Surge protection to protect RS-485 connection. Provide attachment plug for DIN-rail mounting. Connection method to device by 9-position D-SUB connector.

B. Features:

1. Suppression: Gas-filled surge arrester and diodes.

2. Maximum Continuous Operating Voltage: 12 VDC.

3. Nominal current In: ≤ 380 mA.

4. Protection level Up (core-core): ≤ 40 V (5 kA)

5. Protection level Up (core-ground): ≤ 750 V (5 kA).

6. Resistance in series: 3.3 ohms.

7. Nominal discharge surge current (8/20 µs) (core-ground): ≤ 5 kA.

8. Total surge current (8/20 µs): 10 kA.

9. Response time (core-core): ≤ 100 ns.

10. Response time (core-ground): ≤ 100 ns

11. Operating temperature of -40 ºC to 85 ºC.

C. Product and manufacturer:

1. Phoenix Contact, DT-UFB-485/BS.

2. Erico, DEPRS42299D

3. Dehn, BXT ML4 BD HF 5

4. Or approved equal.

2.11 SPD – DEVICE TESTER

A. General: Provide device tester for pluggable surge protective devices in convenient carrying case.

B. Features:

1. Barcode scanner or keypad for entering information on SPD.

2. Operating Voltage: 100 – 240 VAC.

3. Provide all test sockets for SPDs used on the project.

4. Provides documentation of test results.

C. Product and manufacturer:

1. Phoenix Contact, CHECKMASTER.

2. Erico, MGA TESTER

3. Dehn, DRC LC M3+

4. Or approved equal.

2.12 SPARE PARTS

A. Provide the following control system network component spare parts:

1. One per five of each type of surge protective device; minimum of one of each type of surge protective device.

PART 3 E X E C U T I O N

3.01 INSTALLATION

A. The installation shall follow the SPD manufacturer's recommended installation practices and comply with all applicable codes.

B. Coordinate the installation of the surge protection device with the installation of the equipment being protected. The surge protection device shall be installed as close as practical to or within the equipment being protected.

C. Conductor length between suppressor and connection point shall be as short and as straight as possible.

D. Upon completion of installation, provide the services of a factory-certified local service technician to perform start-up testing. Record test results and compare to factory testing to confirm proper operation of equipment. Submit test results with operation and maintenance manuals.

END OF SECTION

DUNHAM ENGINEERING, INC.

www.DunhamEngineering.com

Texas Registration Number: F- 002253

13141 Hill Rd., College Station, TX 77845

Phone: (979) 690-6555 Fax: (979) 690-7034

Report of Inspection
Elevated Water Storage Tank @ Crystal Beach
Bolivar Pen SUD

Conducted by Jimmy D. Dunham, P. E.
May 16, 2013

1. CONSTRUCTION

The 250,000 gallon welded steel structure was built by CB&I in 1970 and was rehabilitated approx. 2005. The height of the structure is approx. 150′. The shape of the tank is a torus bottom and ellipsoidal top.

2. FOUNDATION

Individual concrete footings support each of the five legs. The footings and base plates are level and in good condition. The anchor bolts and nuts are in good condition.

3. RISER PIPE

The 3′ diameter welded steel riser pipe is plumb with no leaks noted. The concrete foundation is level and in good condition. The manways are in good condition and were not opened for the inspection. The weld seams are in good condition and no evidence of prior leaks was observed. The interior ladder is in good condition.

4. LEVEL DEVICE

The pressure gauge on the yard piping is in good condition.

5. OVERFLOW

The overflow pipe runs to ground level and is in good condition. The flap valve operates properly. The pipe support welds appear to be in good condition.

POTABLE WATER STORAGE TANK
Inspection Form

"Section 290.46(p)(1)(2) of the Texas Commission on Environment Quality's *Rules and Regulations for Public Water Systems* requires documentation of annual ground, elevated and pressure storage tank maintenance inspections."

Location: Crystal Beach
Description: Elevated water storage tank
Date & Material of Exterior Coating System: 2006 - Epoxy/Urethane
Date & Material of Interior Coating System: 2006 - Epoxy

Exterior of Tank

O.K.	Problem	NA	Description
☒	☐	☐	*Foundation: settling, cracks, deterioration*
	x	☐	*Protective Coating: rust, pitting, corrosion, leaks*
☒	☐	☐	*Water Level Indicator: operable, cable access opening, sealed*
☒	☐	☐	*Overflow Pipe: flap valve cover accessible, operable, sealed*
☒	☐	☐	*Access Ladder: loose bolts or rungs*
☒	☐	☐	*Roof: low spots for ponding water, holes along seams, rust*
☒	☐	☐	*Air Vents: proper design, screened, sealed edges and seams*
☐	☐	☒	*Cathodic Protection Anode Plates: secured and sealed*
☒	☐	☐	*Roof Hatch: proper design, locked, hinged bolts secured, gasket*
☐	☐	☒	*Pressure Tank Operational Status: pressure release devices, pressure gauge, air-water volume device*

Interior of Tank

O.K.	Problem	NA	Description
☒	☐	☐	*Water Quality: insects, floating debris, sediment on bottom*
☒	☐	☐	*Protective Coating: rust, corrosion, scaling*

Date:	Last Inspection of Pressure Tank Indicator

Comments

Name of Inspector: Jimmy D. Dunham, P. E.
Date of Inspection: May 16, 2013

6. RODS & STRUTS

The rods are straight and in fair condition. Several of the rods have severe corrosion damage where they cross and rub against each other. The lower set of wind rods are doubled for wind loading.

The struts are level and in fair condition. Several of the struts have severe corrosion damage.

7. LADDERS

The exterior ladders and cable style safety climb devices are in good condition. The ladder gate is also in good condition. The interior ladders are also in good condition.

8. TOP HATCH/CONSTRUCTION HATCH

The top hatch and construction hatches are in good condition.

9. TOP VENT

The top vent is in good condition. The steel strap securing the top vent has corroded and is broken. The screen was secured with a plastic strap during the inspection.

10. ROOF

The roof is in good condition. No holes or cracked welds were observed.

11. BALCONY

The balcony is in good condition. The balcony manway was not opened and no leaks were noted. The weld seam is in good condition.

12. INTERIOR

The tank was drained for the inspection. The interior is in good condition with no floating debris or evidence of insects observed.

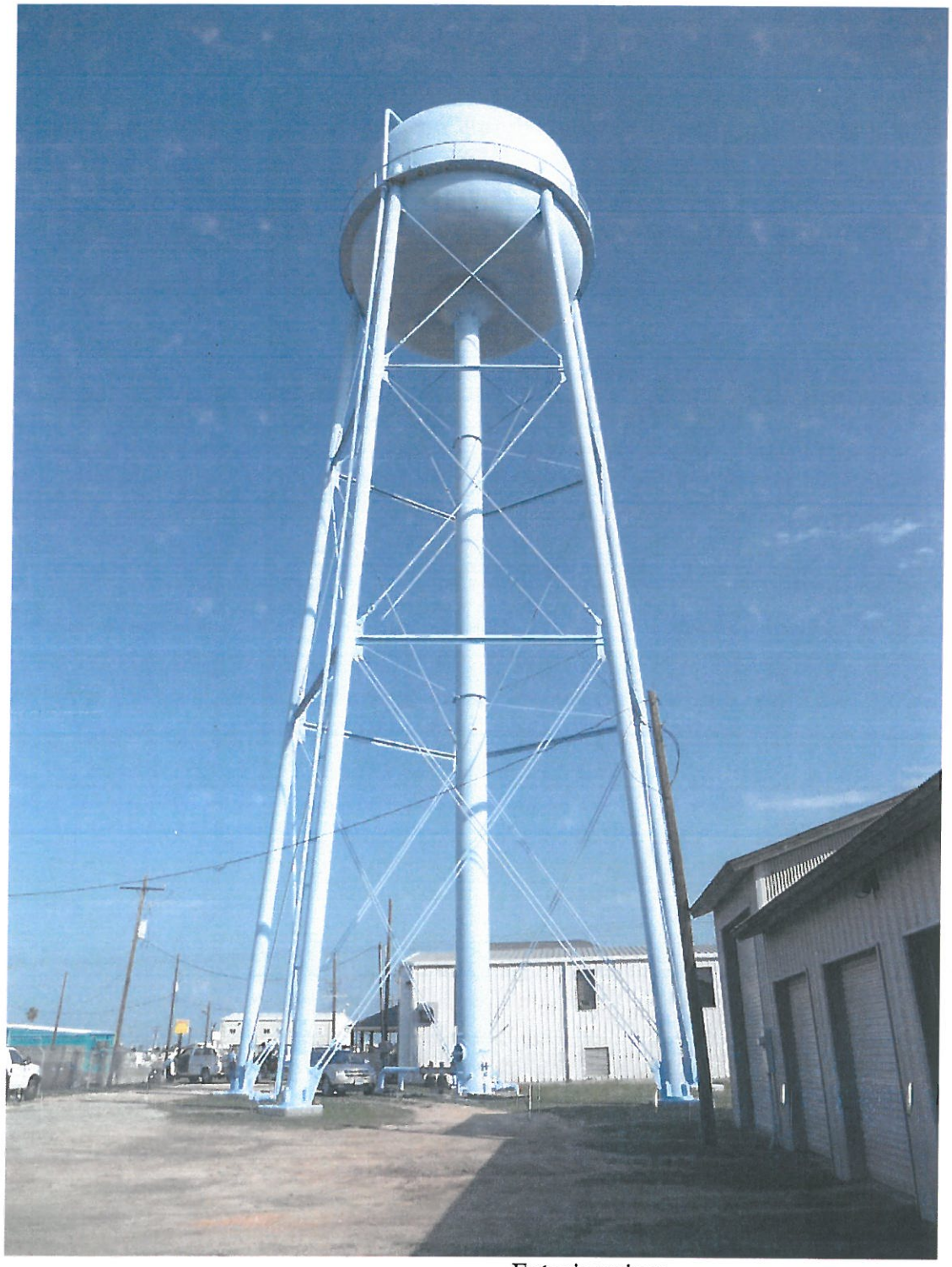
13. PROTECTIVE COATINGS

The exterior epoxy/urethane coating system is in fair condition with rust observed on the riser rods, struts, ladder rungs & balcony handrails.

The interior epoxy coating system is in good condition with minor rust spots on the riser transition cone and ceiling.

15. CONCLUSIONS & RECOMMENDATIONS

a. The structure is 43 years old and in good condition with corrosion damage to the exterior steel.



Exterior view

Typical leg foundation and overflow pipe outlet

Riser pipe

Ladder leg

Corrosion damage to strut and rod connections

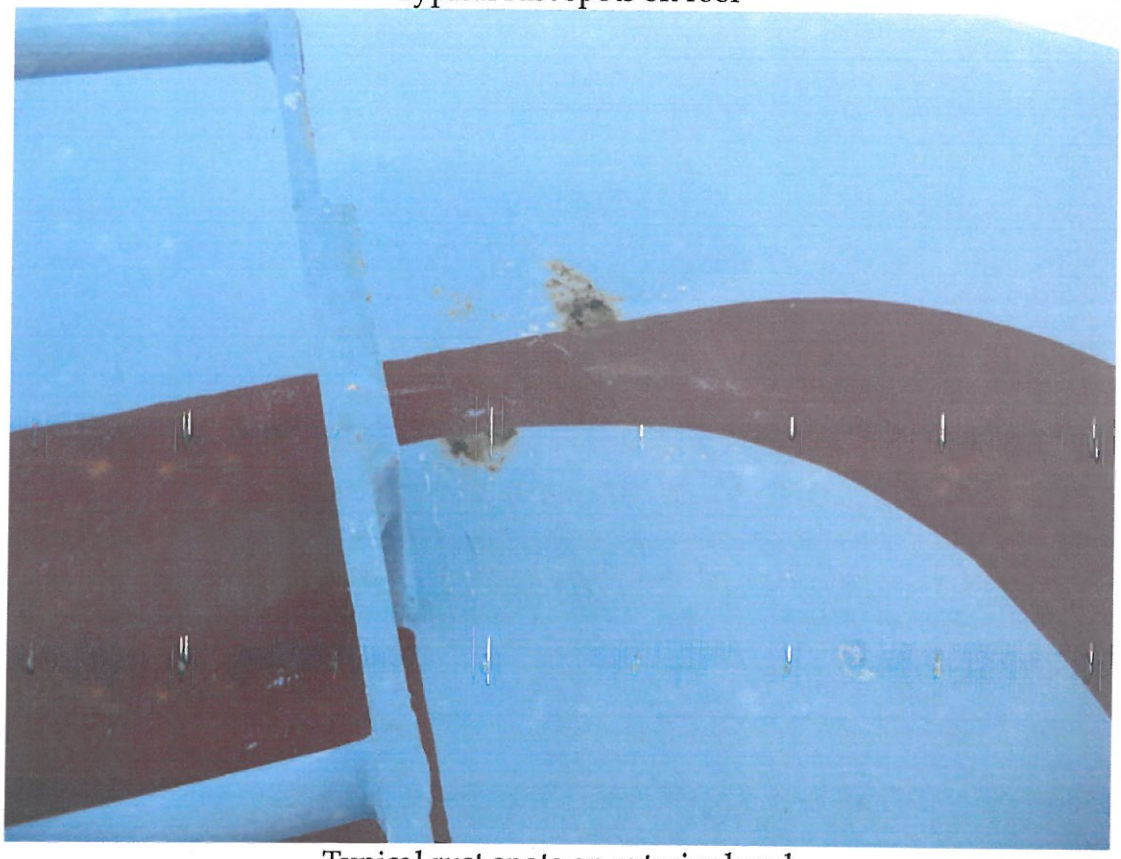
Riser transition cone

Balcony manway

Roof

Hatch

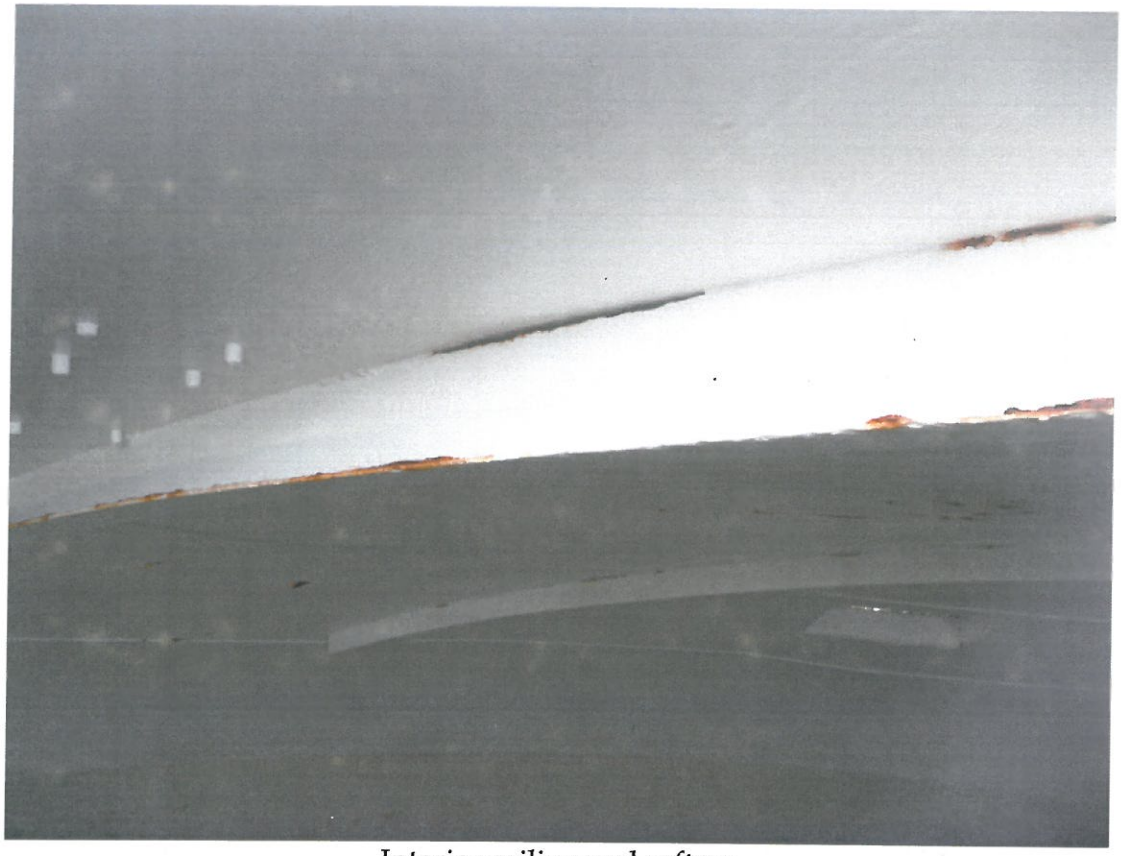
Typical rust spots on roof



Typical rust spots on exterior bowl

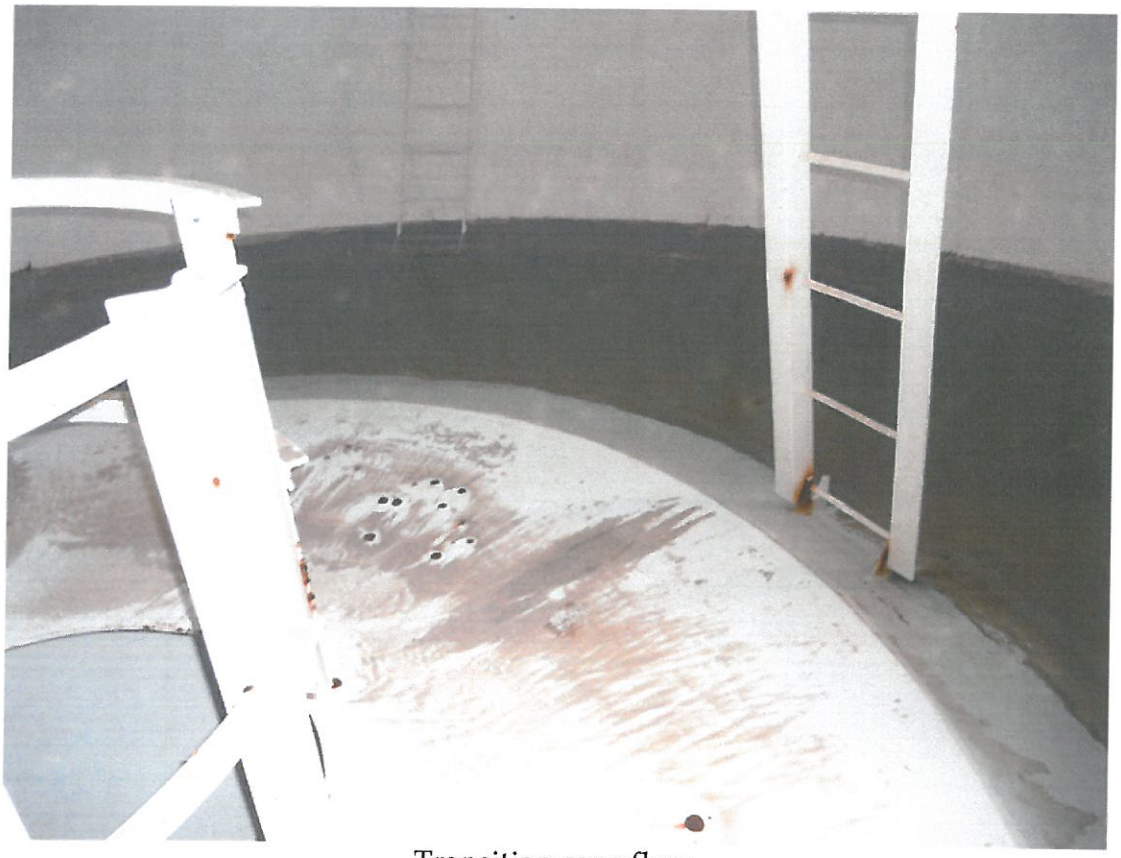
Construction hatch

Vent

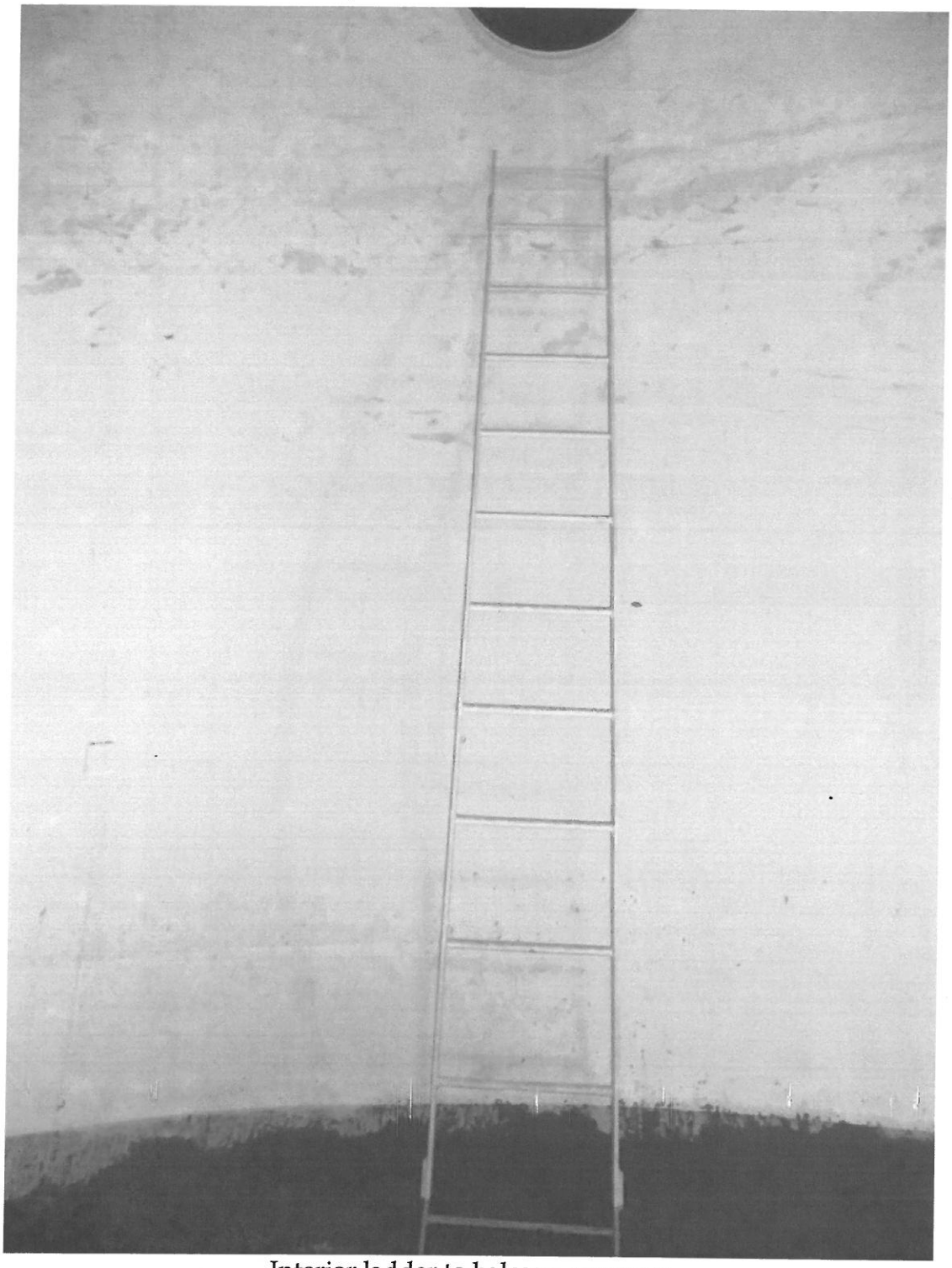


Interior ceiling and rafters

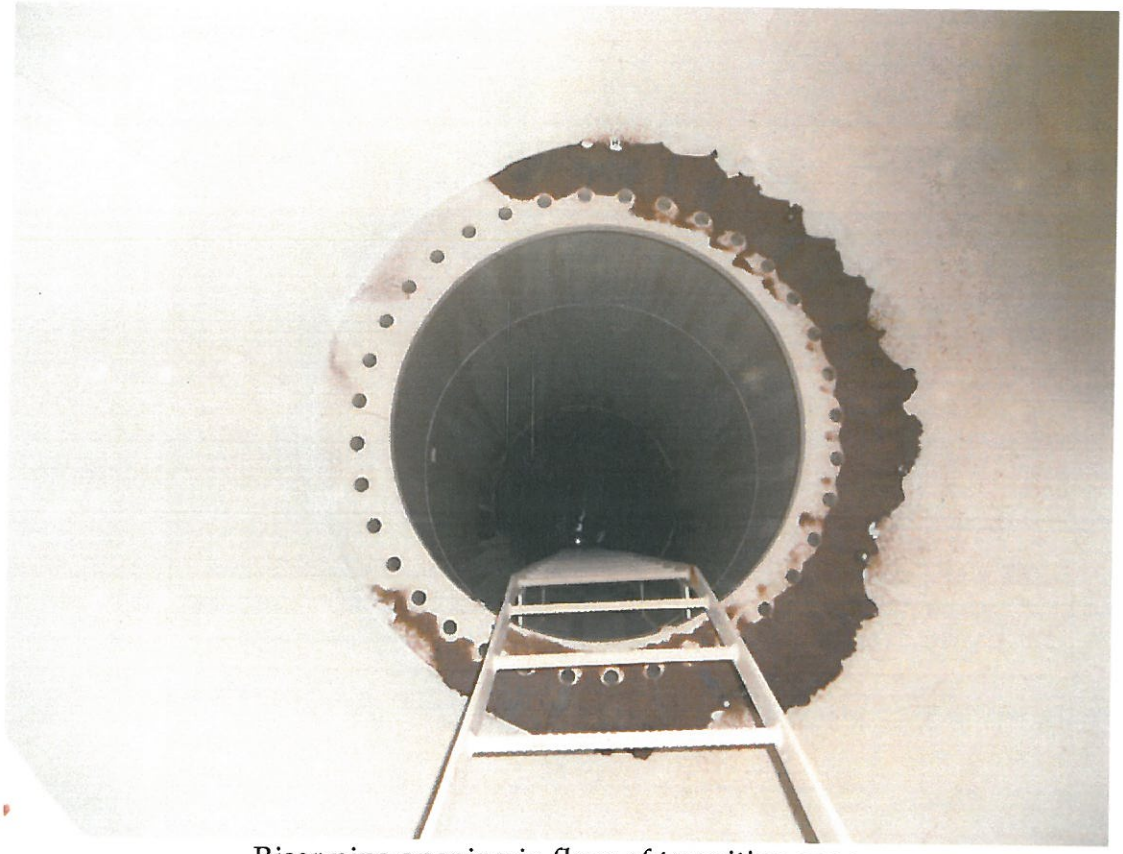
Rafter and vent opening



Transition cone floor



Interior ladder to balcony manway



Riser pipe opening in floor of transition cone

Interior riser pipe

MarCan
Underwater Services LLC

MARCAN UNDERWATER SERVICES, LLC
19011 Appletree Hill Ln
Houston, TX 77084
Office: (888) 568-4394
Direct: (936) 404-9514
info@marcanunderwater.com
www.marcanunderwater.com

Bolivar Peninsula SUD

250 Thousand Gallon Metal, Elevated Tank

" Crystal Beach "

March 13, 2018

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Inspection Report #1
March 13, 2018
" Crystal Beach "
Bolivar Peninsula SUD

STORAGE FACILITY INFORMATION:

Date of Inspection:	**March 13, 2018**
Inspection Agent:	**Joshua Martin**
Tank Size:	**250 Thousand Gallons**
Tank Type:	**Metal, Elevated**
Diameter:	**35 ft., approximately**
Height:	**120 ft., approximately**
Year Built:	**1970**
Sediment Depth:	**3 inches**

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EXTERIOR INSPECTION

Intruder Fence:

Is a fence present?	Yes
Height:	6’ 6”
Type:	Barbed Wire, Chain Link
Notes:	--

Exterior Plates:

Condition:	Good
Corrosion:	Thinning Paint, Staining
Notes:	--

Manway Access Hatch:

Condition:	Good
How Many:	2
Size:	24 in.
Confined Space Label:	No
Corrosion:	No
Notes:	--

Foundation:

Condition:	Good
Type:	Concrete
Notes:	--

External Ladder:

Condition:	Good
Width:	15 in.
Cage Diameter:	--
Fall Protection?	Yes
Rung Shape:	Round
Diameter:	5/8 in.
Corrosion:	No
Corrosion Amount:	--
Notes:	--

Water Level Indicator:

Condition:	Good
Type:	Pressure Gauge
Operable:	Yes
Notes:	--

Overflow Pipe and Flapper:

Condition:	Good
Pipe Size:	8 in.
Distance from the Ground to Pipe:	1 ft.
Flapper Size:	8 in.
Does Flapper Seal:	Yes
Notes:	--

External Support Legs:

Condition:	Good
Notes:	--

Facility Access Door:

Condition:	N/A
Type of Lock:	--
Notes:	--

MarCan
Underwater Services LLC

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Houston, TX 77084
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Direct: (936) 404-9514
info@marcanunderwater.com
www.marcanunderwater.com

EXTERIOR INSPECTION (cont.)

Center Access Tube:

Condition: N/A
Notes: --

Center Water Riser Pipe:

Condition: Good
Corrosion: No
Notes: --

Catwalk:

Condition: Fair
Aircraft Warning Lights: No
How Many: --
Notes: --

Ladder from Catwalk to Roof:

Condition: Good
Fall Protection: Yes
Notes: --

Roof Access Hatch:

Condition: None
Type of Lock: *Needs Replacement
Notes: ***Busted Lock Needs Replacement***

Aircraft Warning Lights:

Condition: Good
Number of Lights: 1
Operable: Operable
Notes: --

Roof Ventilation Structure:

Condition: Good
Type: Mushroom
Condition of Screen: Good
Quantity: 1
Size: 12 in.
Notes: --

External Roof Plates:

Condition: Good
Thinning P/C: Yes
Peeling P/C: No
Corrosion: No
Corrosion Weight: --
Notes: --

Anode Covers:

Condition: N/A
Quantity: --
Notes: --

Water Access Hatch:

Condition: Good
Quantity: 2
Size: 24 in.
Type of Lock: Key
Hatch Material: Steel
Lock Need Repair? Yes
Confined Space Label: Yes
Notes: No corrosion

MarCan
Underwater Services LLC

MARCAN UNDERWATER SERVICES, LLC
19011 Appletree Hill Ln
Houston, TX 77084
Office: (888) 568-4394
Direct: (936) 404-9514
info@marcanunderwater.com
www.marcanunderwater.com

INTERIOR INSPECTION

(Above the Water Line)

Roof Plates:

Condition:	Good		
Condensation:	Yes	Amount:	Moderate
Corrosion:	No	Amount:	--
Corrosion Around Support Beams:	Yes		
Cracks:	No		
Holes in Roof Plates:	No	Location/Size:	--
Protective Coating Failure:	No		
Notes:	--		

Sidewall Plates:

Condition:	Good		
Condensation:	Yes	Amount:	Light
Corrosion:	No	Amount:	--
Corrosion Around Support Braces:	No		
Cracks:	No		
Staining:	Yes	Amount:	Light
Notes:	--		

Center Access Tube:

Condition:	N/A
Corrosion:	--
Corrosion Amount:	--
Notes:	--

Ladder:

Condition:	Good
Corrosion:	Yes
Corrosion Amount:	Light
Corrosion Around Slider:	N/A
Corrosion Around Cage:	N/A
Fall Protection:	No
Notes:	--

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INTERIOR INSPECTION (cont.)

(Above the Water Line)

Overflow Pipe:

Condition: Good
Corrosion: Yes
Corrosion Amount: Moderate
Staining: Yes
Staining Amount: Light
Notes: --

Overflow Flume:

Condition: Good
Corrosion: Yes
Corrosion Amount: Moderate
Notes: 2 x 2 square box

Water Inlet:

Condition: Good
Corrosion: Yes
Corrosion Amount: Moderate
Staining: Yes
Staining Amount: Moderate
Notes: --

Center Support Column:

Condition: N/A
Corrosion: --
Notes: --

Water Level Float:

Condition: N/A
Notes: --

Water Level Indicator Probes:

Condition: N/A
Wires Tangled: --
Components in Position: --
System Intact: --
Notes: --

Cathodic Protection:

Condition: N/A
Wires Tangled: --
Components in Position: --
System Intact: --
Notes: --

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INTERIOR INSPECTION

(Below the Water Line)

Sidewall Plates:

Condition:	Good		
Corrosion:	No	Amount:	--
Staining:	Yes	Amount:	Moderate
Notes:	--		

Center Access Tube:

Condition:	N/A		
Corrosion:	--	Amount:	--
Notes:	--		

Ladder:

Condition:	Good		
Corrosion:	Yes	Amount:	Light
Staining:	Yes	Amount:	Moderate
Corrosion Around Slider:	N/A		
Corrosion Around Cage:	N/A		
Fall Protection:	No		
Notes:	--		

Baffle Wall:

Condition:	Good
Notes:	--

Manway Access Hatch:

Condition:	Good		
Gasket Intact:	Yes		
Corrosion:	No	Amount:	--
Staining:	Yes	Amount:	Heavy
Notes:	--		

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INTERIOR INSPECTION (cont.)

(Below the Water Line)

Center Support Column:

Condition: N/A
Corrosion: -- Amount: --
Notes: --

Water Inlet:

Condition: Good
Corrosion: Yes Amount: Moderate
Staining: Yes Amount: Moderate
Notes: --

Water Outlet:

Condition: Good
Corrosion: Yes Amount: Moderate
Staining: Yes Amount: Moderate
Notes: --

Manual Drain:

Condition: N/A
Corrosion: -- Amount: --
Staining: -- Amount: --
Notes: --

Overflow Pipe:

Condition: NOT BELOW WATER LINE
Corrosion: -- Amount: --
Staining: -- Amount: --
Notes: --

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INTERIOR INSPECTION (cont.)

(Below the Water Line)

Internal Piping:

Condition: N/A
Staining: -- Amount: --
Notes: --

Center Water Riser Pipe:

Condition: Good
Corrosion: No Amount: --
Staining: Yes Amount: Light
Notes: --

Floor Plates:

Condition: Good
Sediment Depth: **3 inches**
Staining: Yes Amount: Heavy
Debris: No Type: Sand/Silt
Notes: --

Protective Coating:

Peeling: 0 %
Blistering: 0 %
Pitting: 0 %
Notes: --

Water Condition:

Condition: Good
Temperature: Cold
Water Level: 95 % of the water tank
Oil Presence on the Water: No
Clarity: Good
Insects: No
Water Odor: No
Describe: --
Notes: --

"Section 290.46(p) (1) (2) of the Texas Commission on Environmental Quality's *Rules and Regulations for Public Water Systems* requires documentation of annual ground, elevated and pressure storage tank maintenance inspections."

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RECOMMENDATIONS

MARCAN UNDERWATER SERVICES recommends the following actions be taken: 1) Keep this facility on a scheduled maintenance program. 2) Install OHSA required Confined Space Entry labels. 3) Install fall protection on water access ladder. 4) Repair ventilation structure. 5) Replace mesh screen on ventilation structure. 6) Schedule cleaning to remove sediment on floor plates.

MARCAN UNDERWATER SERVICES would also like to make the following suggestions to improve and extend the life of this facility:

X	Cleaning					
X	Annual Inspection					
	Replace	X	Repair	Ventilation Structure		
X	Replace		Repair	Fine Mesh Screen on Ventilation Structure		
	Replace		Repair	Water Access Hatch		
	Replace		Repair	Roof Access Hatch		
	Replace		Repair	Manual Water Level Indicator (Float)		
	Replace		Repair	X	Install Fall Protection	Water Access Ladder
	Replace		Repair		Install Fall Protection	External Ladder
	Replace		Repair		Install Fall Protection	Catwalk to Roof Ladder
	Repair Holes on Roof Plates				How Many? Size?	
	Sandblast and Recoat				External	Internal
	Rehab Tank					
X	Install Confined Space Labels					
Notes: **Recommend out-of-service cleaning.**						

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TANK PHOTOS

MarCan
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TANK PHOTOS (cont.)

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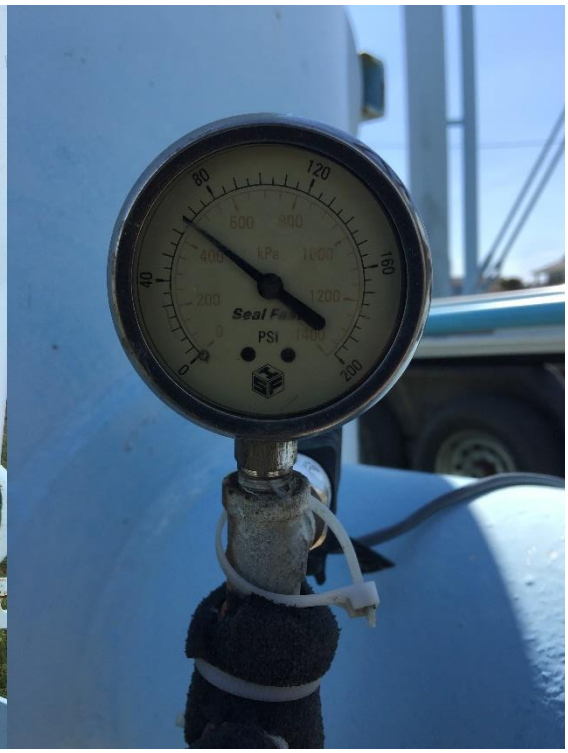
TANK PHOTOS (cont.)



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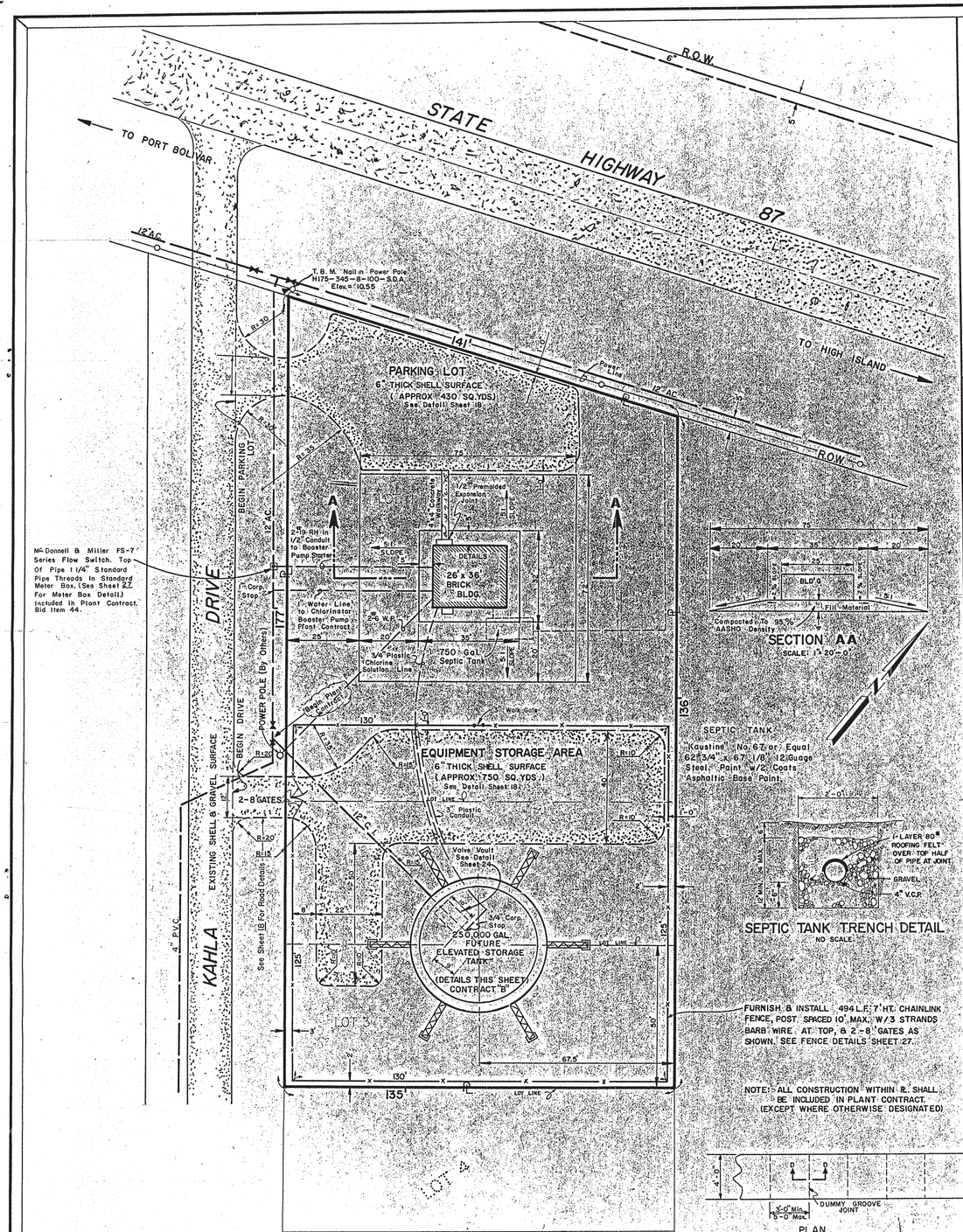
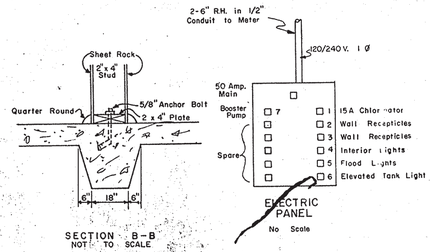
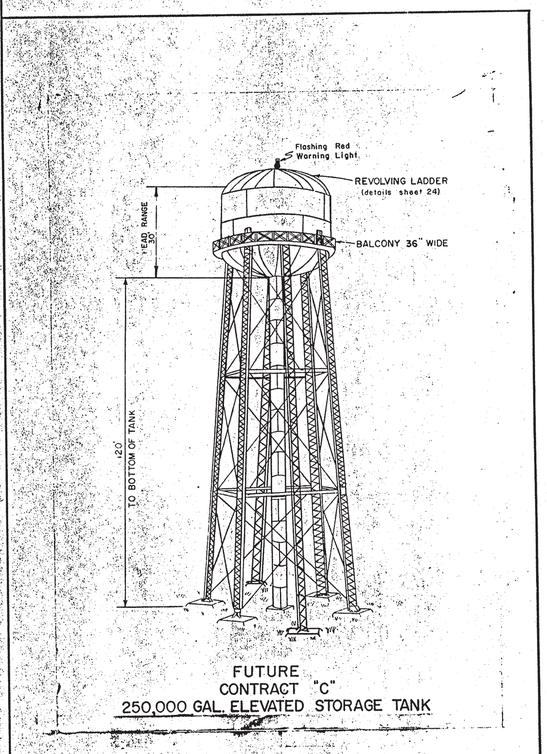


BID ITEM 44 – CONTRACT "B"
CRYSTAL BEACH LAYOUT PLAN-PLANT NO. 4
SCALE: 1"=20'



SECTION B-B
NOT TO SCALE

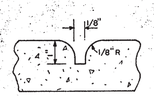
ELECTRIC PANEL
No Scale



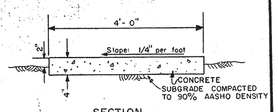
FUTURE
CONTRACT "C"
250,000 GAL. ELEVATED STORAGE TANK

FOR RISER INLET DETAIL SEE SHEET 24

PLAN



SECTION D-D
DUMMY GROOVE JOINT



SECTION

SIDEWALK DETAILS
NO SCALE

BOLIVAR PENINSULA WATER SUPPLY CORPORATION
WATER PLANT AND ELEVATED TANK

REVISIONS			DESIGNER: J.C.P.	DRAWN: DALE	SHEET 25 OF 27 SHEETS
1	6-20-68	WMG	CHECKED: W. M. G.	APPROVED: B L N.	
			DATE: 4-8-68	SCALE: N.T.S.	

B.L. NELSON & ASSOCIATES, INC.
CONSULTING ENGINEERS
DALLAS ▼ LONGVIEW

From: Ryan Wood
PO Box 5056
Georgetown, TX 78627
Phone: 512-930-5721
Fax: 512-869-7621
Email: rwood@tracntrol.com

Project Quotation

Date: October 1, 2020
To: All Bidding Contractors

Project: Bolivar Peninsula SUD Elevated Storage Tank - SCADA

SCOPE OF WORK

SCADA/Instrumentation & Controls - Furnish all labor, materials, tools and transportation required for the complete installation of the instrumentation work as shown and specified on the following drawings and specification sections. We have exercised due diligence in the preparation of our bid and you may rely confidently on our ability to complete the work required.

APPLICABLE SECTIONS/DRAWINGS

Drawings: #E1-E9 of plans.

Sections: N/A

ADDENDUMS ACKNOWLEDGED

Addendums No. 1 has been received, reviewed, and are hereby acknowledged.

DELIVERABLES

Elevated Storage Tank:

1. **Remove the existing SCADA antenna from the existing EST and relocate to the creosote pole at the SW corner of the Maintenance Building (prior to demo of the existing EST), in order to retain radio communications with the remote sites.**
2. **Provide a new SCADA Remote Terminal Unit (RTU) for installation in the new EST Electrical Room.**
3. **Provide and install a new pressure/level transducer for monitoring EST level as specified.**
4. **Provide new coaxial cable from the RTU to the top of the EST for radio communications.**
5. **Provide and install Ubiquiti Ethernet radios at the new EST and location of the SCADA HMI computer.**
6. **Terminations required for instrumentation field wiring.**
7. **Testing as required for instrument calibration.**
8. **Programming of PLC to reflect I/O points as specified.**

9. **Programming of existing HMI computer for graphical display, control, monitoring, trending, and alarming of site I/O as specified.**
10. **Submittals and Operation and Maintenance Manuals as required. Submittals shall be in electronic format, only.**
11. **Customer training and startup as specified for instruments and equipment.**

EXCLUSIONS

1. **State and Local sales tax**
2. **Performance and Payment Bond**
3. **Printed submittals are excluded; they will be provided in electronic format, only.**
4. **All electrical gear, lighting, conduit, and wire as required.**
5. **Mounting of SCADA RTU enclosure. The enclosure will be shipped to either the project site or contractor.**
6. **Intrusion switches for personnel access door and overhead vehicle door.**
7. **SolarBee Mixer, control panel, and all required accessories. The recommended SCADA option will be RS232 to RS485 converter.**
8. **All Valves & Piping as required, including tap for transducer.**
9. **Safety – trench safety and confined space ventilation mitigation is excluded from this quotation. General Contractor shall make provisions for all OSHA requirements under this proposal, as applicable.**

TERMS:

1. **TraC-n-trol, Inc. proposes to provide the scope of work for the price stated herein to a Contractor for the purposes of establishing terms of an agreement or subcontract or purchase order.**
2. **This quotation and its contents shall be made a part of any proposed subcontract/purchase order.**
3. **Certificates of insurance requested by the Contractor shall be limited to $2M in the aggregate (all other statutory coverage will be provided, as needed, including workers compensation, automobile, and builder's risk). Additional coverage or special endorsements may be provided as an added cost to the subcontract, if required by the Contractor, including requests for naming of "Additional Insured parties with endorsements for Completed Operations and Auto" provided however, that any contract indemnity is allowed by Texas law.**
4. **Reference to the name Contractor shall mean any contractor to which this quotation is subject of an agreement and a resulting subcontract and/or purchase order, whether a General Contractor or a Subcontractor to a General Contractor (sub to a sub).**
5. **Acceptance of this quotation by a Contractor by the presentation of a subcontract agreement and/or purchase order for acceptance of the scope of work and pricing included herein, or a negotiated variation thereof, shall also constitute acceptance of the terms set forth herein regardless of any terms in the subcontract and/or purchase order to the contrary, and acceptance of this quotation and inclusion of its terms in a subcontract or purchase order shall be precedent to the terms of the subcontract, if such terms are contrary terms of this quotation.**
6. **Progress payment requests shall be submitted to the Contractor in a manner consistent with the project pay schedule as established by the project Owner/Engineer.**
7. **Contractor shall include monthly progress payments to the Owner/Contractor for work completed, which shall include work and materials provided by TraC-n-trol, Inc. at the time such payment request is submitted by TraC-n-trol, Inc. to the General Contractor.**

8. **Unless otherwise directed, progress payment requests shall be submitted no later than the 25th day of the month in which the work was completed, as well as any prior months for which work was completed and not billed. In the event the Contractor alters the pay request schedule from the agreed deadline for progress payment application, the Contractor shall notify TraC-n-trol, Inc. at least three (3) working days in advance of the accelerated deadline.**
9. **Contractor shall pay TraC-n-trol, Inc. within five working days from receipt of payment from the Owner for work that includes progress payments requested by TraC-n-trol, Inc., provided however, that such pay requests have been approved for payment by Owner.**
10. **General Contractor may retain from the earnings of TraC-n-trol, Inc. the amount prescribed by the terms of the General Contract, unless otherwise agreed, until such time as the project is accepted for final completion.**
11. **General Contractor may require a release of lien to be issued by TraC-n-trol, Inc., provided however, that the release of lien specifically states that the release is contingent upon payment for which the release of lien is requested. General Contractor shall pay TraC-n-trol, Inc. prior to requesting a final release.**
12. **Contractor shall pay TraC-n-trol, Inc. no later than 65 days from date of any pay request submitted by TraC-n-trol, Inc. regardless of payment status by the Owner/General Contractor, if the delay in payment is not related to the scope of work, performance, or terms of this quotation and contract/subcontract/purchase order.**
13. **Work time required under this agreement shall be no less than the full term of the general contract. If a subcontract to TraC-n-trol, Inc. is not issued within 30 days of the general contractor's notice to proceed, general contractor shall consult with TraC-n-trol, Inc. prior to setting the date of completion for this scope of work. Contractor shall be responsible for any delays and associated damages resulting from a delay caused by the Contractor due to failure to issue a subcontract on a timely basis and provide updated schedules to TraC-n-trol, Inc. in order to facilitates the performance of its responsibilities under the subcontract or purchase order.**

QUOTATION:

Base Bid Items	Total Price
Bid Item #25: Elevated Storage Tank - SCADA & Instrumentation:	TBD

Respectfully submitted:

Ryan Wood

Ryan Wood, TraC-n-trol, Inc.

THE COUNTY OF GALVESTON

RUFUS G. CROWDER, CPPO, CPPB
PURCHASING AGENT

GWEN MCLAREN, CPPB
ASST. PURCHASING AGENT

COUNTY COURTHOUSE
722 Moody (21st Street)
Fifth (5th) Floor
GALVESTON, TEXAS 77550

October 6, 2020

PROJECT NAME: **Bolivar Peninsula Elevated Water Storage Tank**

SOLICITATION NO: **ITB #B201045**

RE: **ADDENDUM #3**

To All Prospective Bidders:

The following information is being provided to aid in preparation of your bid submittal(s):

PROPOSAL OPENING / DUE DATE:
RFP #B201045, Bolivar Peninsula Elevated Water Storage Tank scheduled to be opened on Friday, October 9, 2020 at 2:00 P.M ***has been re-scheduled***.

The new deadline for submitting a bid is as follows:

Date: Thursday, October 15, 2020
Time: 2:15 P.M. CST

CONSTRUCTION DURATION:
The new construction duration is **390 calendar days** instead of 437 calendar days which was listed on the original bid packet.

As a reminder, all questions regarding this proposal must be submitted in writing to:

Rufus G. Crowder, CPPO CPPB
Galveston County Purchasing Agent
722 Moody, Fifth (5th) Floor
Galveston, Texas 77550
E-mail: purchasing.bids@co.galveston.tx.us

If you have any further questions regarding this bid, please address them to Rufus Crowder, CPPO CPPB, Purchasing Agent, via e-mail at purchasing.bids@co.galveston.tx.us, or contact the Purchasing Department at (409) 770-5371.

Please excuse us for any inconvenience that this may have caused.

Sincerely,

Rufus Crowder

Rufus G. Crowder, CPPO CPPB
Purchasing Agent
Galveston County

THE COUNTY OF GALVESTON

RUFUS G. CROWDER, CPPO, CPPB
PURCHASING AGENT

GWEN MCLAREN, CPPB
ASST. PURCHASING AGENT

COUNTY COURTHOUSE
722 Moody (21st Street)
Fifth (5th) Floor
GALVESTON, TEXAS 77550

October 8, 2020

PROJECT NAME: **Bolivar Peninsula Elevated Water Storage Tank**

SOLICITATION NO: **ITB #B201045**

RE: **ADDENDUM #4**

To All Prospective Bidders:

The following information is being provided to aid in preparation of your bid submittal(s):

REVISIONS TO DRAWINGS

- Remove and replace drawing C-2 with the attached.
- Remove and replace drawing C-3 with the attached.

REVISIONS TO THE PROJECT MANUAL

- Remove and replace the front end documents Table of Contents with the attached.
- Remove and replace the Bid Form with the attached.
- Remove and replace Section 09970 – Coatings for Steel Water Storage Tank with the attached.
- Plan and Profile for existing 20" transmission line at proposed 16" connection has been provided for Contractor reference.

QUESTIONS

Question #1: ***I believe the following documents/forms may actually be due for submission post-bid. Can you please confirm that the following documents are in fact due post-bid:***

a. ***Special Provisions for Construction***
b. ***Contract Award***
c. ***Contractor's Affidavit of Release of Lien***
d. ***Contractor's Affidavit of Payment of Debts & Claims***
e. ***Consent of Surety to Reduction in or Partial Release of Retainage***
f. ***Consent of Surety Company to Final Payment***
g. ***Attorney's Review Certification***

Response: Yes, the above mentioned documents/forms are due post-bid.

Question #2: ***Addendum #2, question 67 states according to the bid walk meeting, the existing SCADA antenna will need to be relocated when the tank is dismantled. The response was the contractor shall coordinate all SCADA requirements with BPSUD SCADA services provider, Trac-N-Tool prior to bid.***

1. Are you expecting the tank demolition contractor to relocate the SCADA? Wouldn't this need to be done PRIOR to the demo, either by the Owner or the company constructing the new tower? Please clarify

Response: Per the scope provided in Addendum No. 2 by the BPSUD SCADA service provider, relocation of the existing SCADA antenna will performed by TRAC-N-TROL.

Question #3: ***After reviewing the specs w/ the addendum, I have one question I still need clarified regarding the Painting Section for Tanks along with the new tank section.***

Will we be required to prime in the field or will we be allowed prior to shipping?

Response: Shop priming is acceptable. However, all shop primed steel shall be field brush-off blast cleaned per SSPC-SP7 standard, and all weld seams shall be field near-white metal blast cleaned per SSPC-SP10 standard.

Question #4: ***Specification section 13210-1.4.D.8 references load combinations. The load combinations included are outdated and differ greatly from AWWA-D107. Please confirm we are to use the load combinations published in the latest version of AWWA-D107 for design of the composite water storage tank.***

Response: Load combinations shall be in accordance to the most recent AWWA D107.

Question #5: ***This is a very tight site. Is any of the adjacent land available for us to use as a laydown area or to stockpile our excavation spoils? There appears to be an empty lot just to the west across Kahla Drive. Is this lot or any other land nearby available for us to use.***

Response: Stockpile and laydown areas are restricted to the BPSUD property.

Question #6: ***Specification section 09970-1.7.C requires that sound levels stay under 65 Dba at fifty feet. With the equipment and tasks required to complete this tank, it will be impossible to stay under this very low limit as common earthwork, sandblasting, and grinding equipment all exceed this limit. Please confirm this requirement will be waived for this project.***

Response: Section 1.7.C.2 has been removed from this section. See revised specification 09970.

Question #7: ***Specification section 02220-3.4.E requires us to demolish the existing tank foundation to a depth of 2' below grade. However, from our site visit we believe the foundation for the existing center riser and some of the legs will be within the foundation of the new tank. Given that this is a deep foundation, the existing foundations will need to be completely removed wherever they interfere. You have stated that there is no information about the size of the existing***

foundations, which puts the contractor at risk as cost to remove the existing foundations cannot be calculated.

To mitigate this risk can a cash allowance be included on the bid form for removal (beyond base bid of 2 ft) of the existing foundations which need to be removed in order to install the new pile foundation.

Response: Bid Form is updated with Extra Unit Bid Item No. 28 for additional foundation removal beyond 2 ft.

Question #8: ***Addendum #2, question 67 states according to the bid walk meeting, the existing SCADA antenna will need to be relocated when the tank is dismantled. The response was the contractor shall coordinate all SCADA requirements with BPSUD SCADA services provider, Trac-N-Tool prior to bid.***

Is the tank demolition contractor expected to relocate the SCADA? Wouldn't this need to be done PRIOR to the demo, either by the Owner or the company constructing the new tower? Please clarify.

Response: See the Scope of Work attached in Addendum 2. Trac-N-Trol states their deliverable is to remove the existing SCADA antenna from the existing EST and relocate to creosote pole at the SW corner of the Maintenance Building (prior to demo of the existing EST), In order to retain radio communications with the remote sites. Contractor is to coordinate with Trac-N-Trol.

Question #9: ***Drawing C-1 has a note regarding the removal and disposal of existing concrete associated with the former garage. Are we fully removing or just to 2 ft below grade?***

What is the material? Poured concrete, concrete block? Any further information would be helpful.

Response: As stated in Addendum No. 2, the existing garage structure and slab have been demolished and disposed of by BPSUD prior to the start of construction for this contract.

Question #10: ***Please clarify the thickness of the proposed concrete paving. Bid Item #12 says 5" so do the drawings however Sheet 3 has a call out for 7".***

Response: Proposed concrete to be 5" per Sheet C-2, proposed site plan and according to geotechnical recommendations.

Question #11: ***Drawing C-3. What is the thickness of the existing concrete pavement along the route of the waterline?***

Response: Thickness of the existing concrete pavement is unknown.

Question #12: ***What is the minimum depth of cover required for the new water main?***

Response: The proposed water line requires a 4' minimum cover. See revised Sheet C-2.

Question #13: ***Is there any as built information that shows the depth of the existing water line along SH 87.***

Response: A plan sheet from 2007 is provided in this addendum.

Question #14: ***Bid Form Item #20 – please confirm the Unit should be 1 LS not 1 LF.***

Response: Bid Item #20 is revised to be 290 LF. Revised Bid Form is attached.

As a reminder, all questions regarding this proposal must be submitted in writing to:

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Galveston County Purchasing Agent
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Galveston, Texas 77550
E-mail: purchasing.bids@co.galveston.tx.us

If you have any further questions regarding this bid, please address them to Rufus Crowder, CPPO CPPB, Purchasing Agent, via e-mail at purchasing.bids@co.galveston.tx.us, or contact the Purchasing Department at (409) 770-5371.

Please excuse us for any inconvenience that this may have caused.

Sincerely,

Rufus Crowder

Rufus G. Crowder, CPPO CPPB
Purchasing Agent
Galveston County

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BID PROPOSAL

The bidder hereby proposes to furnish all labor, material, equipment and incidentals for:
Bolivar Peninsula Special Utility District Elevated Water Storage Tank.
Enclosed is a Cashier's Check or Bid Bond in the sum of 5% of the greatest amount bid.

Bidder agrees to perform in accordance with the requirements of the contract documents in consideration of payment by the County of the prices in this proposal.

IN CASE OF DISCREPANCY BETWEEN UNIT PRICES AND EXTENDED PRICES, UNIT PRICES WILL GOVERN.

This bid sheet must be completely filled out in ink or typewritten with any necessary supplemental information attached.

The undersigned hereby agrees to all of the foregoing terms and provisions and to all terms and provisions of the contract, if awarded, which includes all provisions of this bid package.

BIDDER _____

SIGNATURE _____

PRINT NAME _____

TITLE _____

ADDRESS _____

CITY, STATE _____

ZIP _____

TELEPHONE _____

FAX NO _____

DATE _____

TAX I.D. No. _____

Item No.	Section No.	Item Description[1]	Unit	Unit Quantity	Unit Price[2]	Total
		GENERAL SITE				
1	01502	Mobilization/Demobilization And Closeout	LS	1	$_____	$_____
2	02220	Demolition of Existing Tank	LS	1	$_____	$_____
3	01526	Trench Safety	LF	145	$_____	$_____
4	01568	Reinforced Filter Fabric Barrier	LF	613	$_____	$_____
5	01571	Inlet Protection Barrier	EA	1	$_____	$_____
6	01569	Stabilized Construction Access	SY	50	$_____	$_____
7	02935	Sodding (1' from pavement)	SY	30	$_____	$_____
8	02932	Hydromulch Seeding, Fertilizer, and Watering.	AC	0.26	$_____	$_____
9	02310	Site Grading	LS	1	$_____	$_____
10	02830	Chain Link Fence and Gates	LS	1	$_____	$_____
11	02630	12" RCP	LF	20	$_____	$_____
		PAVING				
12	02525	Concrete Pavement (5")	SY	297	$_____	$_____
13	02242	Lime Fly-Ash Treated Subgrade Material (6")	SY	340	$_____	$_____
14	02242	Lime (3%)	TON	3.06	$_____	$_____
15	02242	Fly Ash (8%)	TON	8.16	$_____	$_____
16	02741	Asphaltic Concrete (2")	SY	42	$_____	$_____
17	02571	Concrete Pavement Repair	SY	52	$_____	$_____
18	02713	Crushed Concrete Base Material	SY	392	$_____	$_____
19	03310	Concrete Splash Pad	LS	1	$_____	$_____
		WATER				
20	02664	16" Water Line by Open Cut Construction Method	LF	290	$_____	$_____

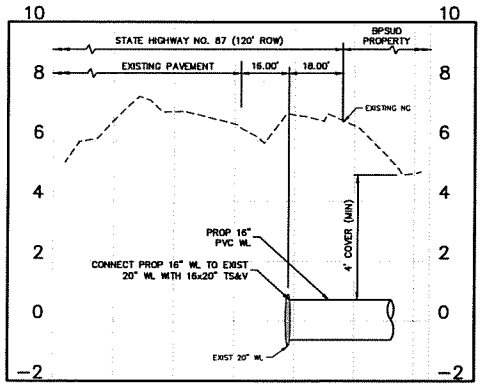
Item No.	Section No.	Item Description[1]	Unit	Unit Quantity	Unit Price[2]	Total
21	02626	20"x16" Tapping Sleeve and Valve, Complete in Place	LS	1	$_____	$_____
ELEVATED STORAGE TANK						
22	11501	Storage Tank Mixing System	LS	1	$_____	$_____
23	13210, Division 15	Construction of 1 MG Composite EST	LS	1	$_____	$_____
24	09920, 09970	Shrouding for Tank Coatin	LS	1	$_____	$_____
ELECTRICAL						
25	Divison 16	Electrical, Controls, and SCADA	LS	1	$_____	$_____
ALLOWANCES						
26		Entergy Coordination Allowance	LS	1	$ 10,000.00	$ 10,000.00
27		Construction Materials Testing	LS	1	$ 20,000.00	$ 20,000.00
EXTRA UNIT BID ITEMS						
28		Extra foundation removal beyond 2' linear feet deep	LF	1		

Subtotal General Site Items	$_____
Subtotal Paving Items	$_____
Subtotal Water Items	$_____
Subtotal Elevated Water Storage Tank	$_____
Subtotal Electrical Items	$_____
Subtotal Allowances	$_____
TOTAL BASE BID (SUM OF ITEMS ABOVE)	$_____

Notes:

(1) The intent of the Contract Documents is for the Contractor to include all items necessary for the proper execution and completion of the Work described in the Contract Documents. No separate measurement and payment shall be made for any work unless identified as a pay item in the BID. Include the cost of work not identified as a separate pay item in Contract price bid for items of which this work is a component. In case of discrepancy between measurement and payment within the BID and Technical Specification Section, the BID shall govern.

(2) In the event of a discrepancy, this column shall govern.



WATERLINE PROFILE

HORIZ: 1"=20'
VERT: 1"=2'

LEGEND:

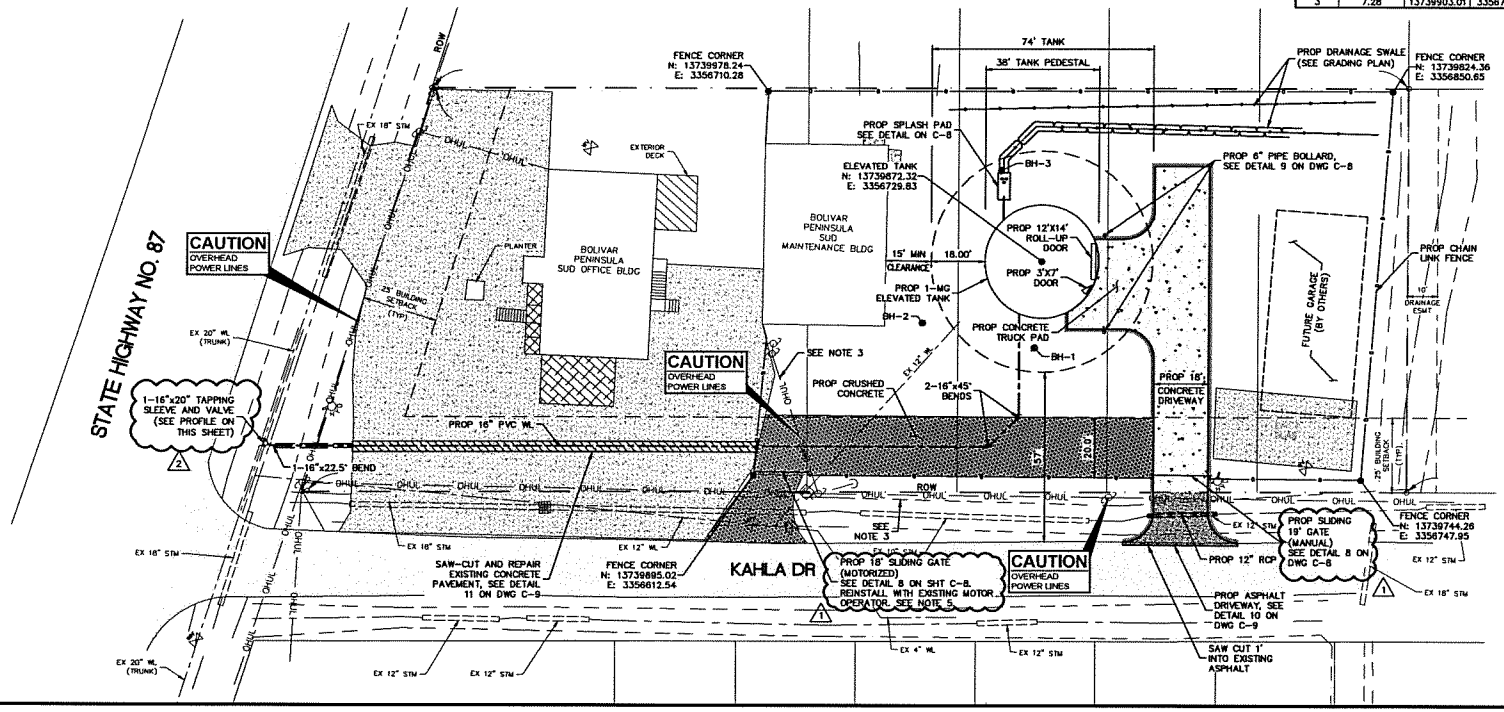
- PROPERTY LINE
- PROPOSED CHAIN LINK FENCE
- PROPOSED SWALE
- PROPOSED DRIVEWAY 5" PORTLAND CEMENT CONCRETE (PCC) 6" LIME/FLYASH TREATED SUBGRADE
- PROPOSED DRIVEWAY 2" ASPHALTIC CONCRETE 8" CRUSHED CONCRETE BASE MATERIAL 6" LIME/FLYASH TREATED SUBGRADE
- PAVEMENT REPAIR
- SOD (1' OFFSET FROM PAVEMENT)
- PROPOSED CRUSHED CONCRETE
- EXISTING CONCRETE PAVEMENT
- EXISTING CONCRETE ROADWAY

NOTES:

1. COORDINATES FOR STRUCTURES ARE LOCATED ON THE OUTSIDE CORNER OF CONCRETE SLAB.
2. COORDINATES FOR CIRCULAR STRUCTURES ARE LOCATED ON THE OUTSIDE OF THE STRUCTURE.
3. CONTRACTOR SHALL COORDINATE WITH ENTERGY (1-800-368-3749) ON DE-ENGERGIZATING OR RELOCATING OVERHEAD POWER POLES AND POWER LINES AS REQUIRED FOR SITE WORK.
4. CONTRACTOR TO HYDROSEED ALL AREAS DISTURBED FROM SITE WORK.
5. EXISTING GATE OPERATOR, LIFTMASTER MODEL CSL24U, IS TO REMAIN AND BE UTILIZED FOR PROPOSED GATE. THE CONTRACTOR SHALL PROVIDE ALL ELECTRICAL AND MECHANICAL SERVICES REQUIRED TO REMOVE AND RELOCATE GATE OPERATOR IF REQUIRED, FOR PROPER OPERATION OF NEW GATE.
6. NO DISCHARGE ALLOWED TO TXDOT ROW

HORIZ: 1"=20'
VERT: 1"=2'

BORE HOLE TABLE (BH)			
POINT	ELEVATION	NORTHING	EASTING
1	6.40	13739854.63	3356706.96
2	6.81	13739887.88	3356687.81
3	7.28	13739903.01	3356743.24



rps
Texas PE Firm Reg. 0F-629
575 N. Dairy Ashford, Suite 700, Houston, Texas 77079
T+1 281 589 7257 E: solutions@rpsgroup.com

TEXAS GENERAL LAND OFFICE

BPSUD Elevated Water Storage Tank

Bolivar Peninsula Special Utility District

SURVEY COMPANY:

HIGH TIDE LAND SURVEYING LLC.
975 LAZY LANE WEST
CRYSTAL BEACH, TX 77650
MAILING P.O. BOX 10142 GALVESTON, TX 77552

BENCHMARK:

NGS MARK HOCSD 84 PID AW6088 SITUATED ABOUT 7.5 MILES SOUTHWEST OF OLCHREST ABOUT 2.5 MILES NORTHEASE OF CRYSTAL BEACH ON THE BOLIVAR PENINSULA AND ON THE SOUTH SIDE OF STATE HIGHWAY 87 ELEVATION 3.1' FEET NAVD 88.

FLOODPLAIN:

THIS PROJECT LIES WITHIN THE 100 YEAR FLOOD PLAIN AS ESTABLISHED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY, ACCORDING TO THE FLOOD INSURANCE RATE MAP NUMBER 48167C0320G, EFFECTIVE DATE AUGUST 15, 2019. THIS MAP LIES WITHIN ZONE "AE" WITH A BASE FLOOD ELEVATION OF 13 FEET.

TO ARRANGE FOR LINES TO BE TURNED OFF OR MOVED, CALL ENTERGY AT 1-800-368-3749

NOTICE:

FOR YOUR SAFETY, YOU ARE REQUIRED BY TEXAS LAW TO CALL 811 AT LEAST 48 HOURS BEFORE YOU DIG SO THAT UNDERGROUND LINES CAN BE MARKED. THIS VERIFICATION DOES NOT FULFILL YOUR OBLIGATION TO CALL 811.

REV	DESCRIPTION	BY	DATE
2	ADDENDUM No. 4	SJ	10/07/2020
1	ADDENDUM No. 2	SJ	9/30/2020

STATE OF TEXAS — SYLVESTER JOHNSON, JR. — 111505 — LICENSED PROFESSIONAL ENGINEER
9/25/2020

PROPOSED SITE PLAN

RPS Project No	007517 (1068.002.001)
Drawn By JAH	Checked By MRM
Scale 1"=20'	Date AUGUST 2020
DWG No C-2	Sheet 5 Of 28

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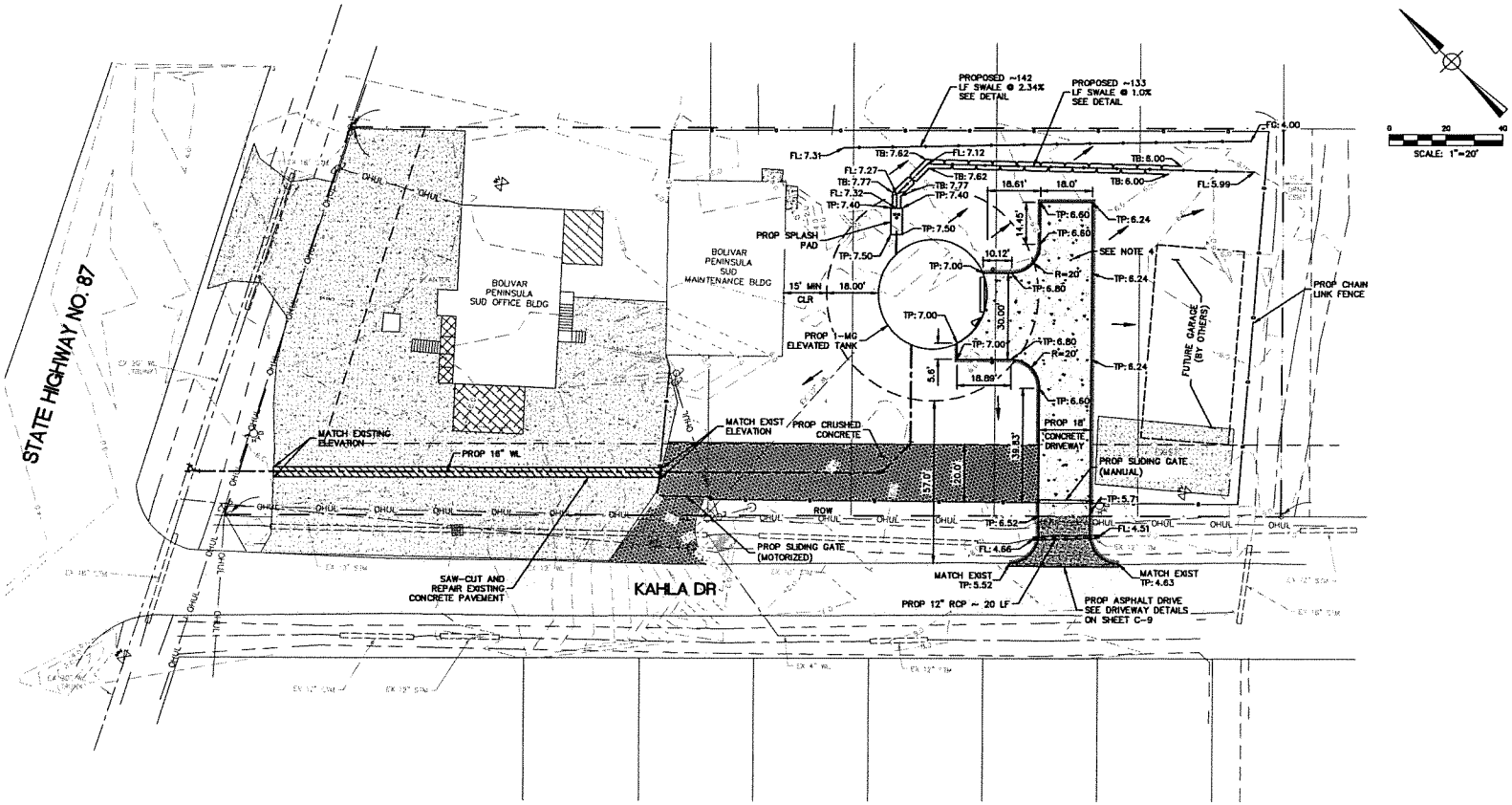
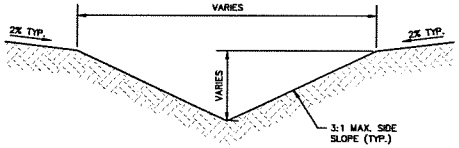


NOTES:

1. GRADE AREAS AROUND FOUNDATION PADS TO DRAIN AWAY FROM THE STRUCTURE.
2. CONTRACTOR TO RESTORE ALL AREAS DISTURBED FROM WORK.
3. CONTRACTOR TO GRADE REMAINING GRAVEL LOT AS NECESSARY TO PROVIDE POSITIVE DRAINAGE.
4. CONTRACTOR SHALL COORDINATE WITH ENTERGY (1-800-368-3749) ON DE-ENGERGIZATING OR RELOCATING OVERHEAD POWER POLES AND POWER LINES AS REQUIRED FOR SITE WORK.

LEGEND:

- PROPERTY LINE
- PROPOSED CHAIN LINK FENCE
- PROPOSED SWALE
- GRADE SLOPE ARROWS
- PROPOSED DRIVEWAY 5" PORTLAND CEMENT CONCRETE (PCC) 6" LIME TREATED SUBGRADE (2)
- PROPOSED DRIVEWAY 2" ASPHALTIC CONCRETE 8" CRUSHED CONCRETE BASE MATERIAL 6" LIME/FLYASH TREATED SUBGRADE
- PAVEMENT REPAIR
- SOD (1' OFFSET FROM PAVEMENT)
- PROPOSED CRUSHED CONCRETE
- EXISTING CONCRETE PAVEMENT
- EXISTING CONCRETE ROADWAY



SWALE
N.T.S.

rps
Texas PE Firm Reg. #F-829
575 N.Dairy Ashford, Suite 700, Houston, Texas 77079
T+1 281 589 7257 E:

TEXAS GENERAL LAND OFFICE

BPSUD Elevated Water Storage Tank

Bolivar Peninsula Special Utility District

SURVEY COMPANY:

HIGH TIDE LAND SURVEYING LLC.
875 LAZY LANE WEST
CRYSTAL BEACH, TX 77650
MAILING P.O. BOX 16142 GALVESTON, TX 77552

BENCHMARK: (1)

NGS MARK HGCSD 64 PID AW9986 SITUATED ABOUT 7.5 MILES SOUTHWEST OF GILCHREST ABOUT 2.5 MILES NORTHEASE OF CRYSTAL BEACH ON THE BOLIVAR PENINSULA AND ON THE SOUTH SIDE OF STATE HIGHWAY 87 ELEVATION 5.1' FEET NAVD 88.

FLOODPLAIN:

THIS PROJECT LIES WITHIN THE 100 YEAR FLOOD PLAIN AS ESTABLISHED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY, ACCORDING TO THE FLOOD INSURANCE RATE MAP NUMBER 48167C0305G, EFFECTIVE DATE AUGUST 15, 2018. THIS MAP LIES WITHIN ZONE "AE" WITH A BASE FLOOD ELEVATION OF 13 FEET.

TO ARRANGE FOR LINES TO BE TURNED OFF OR MOVED, CALL ENTERGY AT 1-800-368-3749

NOTICE:

FOR YOUR SAFETY, YOU ARE REQUIRED BY TEXAS LAW TO CALL 811 AT LEAST 48 HOURS BEFORE YOU DIG SO THAT UNDERGROUND LINES CAN BE MARKED. THIS VERIFICATION DOES NOT FULFILL YOUR OBLIGATION TO CALL 811.

REV.	DESCRIPTION	BY	DATE
2	ADDENDUM No. 4	SJ	10/6/2020
1	ADDENDUM No. 2	SJ	9/30/2020

STATE OF TEXAS — SYLVESTER JOHNSON, JR. — 111305 — LICENSED PROFESSIONAL ENGINEER — 8/25/2020

GRADING PLAN

RPS Project No	007517 (1068.002.001)		
Drawn By	JAH	Checked By	MRM
Scale	1"=20'	Date	AUGUST 2020
DWG No	C-3	Sheet	6 Of 28

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SECTION 09970

COATINGS FOR STEEL WATER STORAGE TANKS

PART 1 GENERAL

1.1 SUMMARY

A. Section includes:
   1. Coatings for all interior and exterior surfaces of steel water storage tanks.

1.2 UNIT PRICES

A. No payment will be made for coating the steel water storage tank. Include payment for tank coating in unit price for tank installation.

1.3 REFERENCE SPECIFICATIONS AND STANDARDS

A. Without limiting the general aspects of other requirements of these specifications, all surface preparation, coating and painting of interior and exterior surfaces and inspection shall conform to the applicable requirements of the Society for Protective Coatings, NACE International, ASTM (American Society for Testing and Materials), AWWA and the manufacturer's printed instructions.

   1. ASTM (American Society for Testing and Materials)
      a. ASTM D 520 Standard Specification for Zinc Dust Pigment
      b. ASTM D 4417 Standard Test Methods for Field Measurement of Surface Profile of Blast Cleaned Steel
      c. ASTM E 337 Standard Practice Test Method for Measuring Humidity with a Psychrometer
      d. ASTM D2200 Standard Methods of Evaluating Degree of Rusting on Painted Surfaces

   2. ANSI (American National Standards Institute)
      a. ANSI/ASC 29.4 Exhaust Systems Abrasive Blasting Operations – Ventilation and Safe Practice
      b. ANSI/NSF Standard 61 Drinking Water Components

   3. AWWA (American Water Works Association)
      a. AWWA D 102 Coating Steel Water Storage Tanks

4. Consumer Product Safety Act, Part 1303

5. NACE International
   a. NACE Publication TPC2 Coatings and Linings for Immersion Service: Chapter 1 Safety, Chapter Surface Preparation, Chapter 3 Curing, and Chapter 4 Inspection
   b. NACE Standard SP0178 Standard Recommended Practice – Fabrication Details, Surface Finish Requirements and Proper Design Considerations for Tanks and Vessels to be Lined for Immersion Service
   c. NACE Standard SP0188 Standard Recommended Practice – Discontinuity (Holiday) Testing of Protective Coatings
   d. NACE Standard RP0287 Field Measurement of Surface Profile of Abrasive Blast-Cleaned Steel Surfaces Using a Replica Tape
   e. NACE Standard RP0288 Standard Recommended Practice, Inspection of Linings on Steel and Concrete

6. OSHA (Occupational Safety & Health Administration)
   a. 1915.35 Standards – 29 CFR – Painting

7. SSPC (Society for Protective Coatings)
   a. SSPC-SP2 Hand Tool Cleaning
   b. SSPC-SP3 Power Tool Cleaning
   c. SSPC-SP11 Power Tool Cleaning to Bare Metal
   d. SSPC-PA-1 Shop, Field and Maintenance Painting
   e. SSPC-PA-2 Measurement of Dry Film Thickness with Magnetic Gages
   f. SSPC-PA-3 Guide to Safety in Paint Application
   g. SSPC-Guide 12 Guide for Illumination of Industrial Painting Project
   h. SSPC-VIS 1-89 Pictorial Surface Preparation Standards for Painting Steel Surfaces
   i. SSPC Paint Spec 36 Two Component Weatherable Aliphatic Polyurethane Topcoat, Performance-Based

8. SSPC/NACE Joint Standards
   a. SSPC-SP5/NACE 1 White Metal Blast Cleaning
   b. SSPC-SP6/NACE 3 Commercial Blast Cleaning
   c. SSPC-SP7/NACE 4 Brush-Off Blast Cleaning
   d. SSPC-SP10/NACE 2 Near-White Metal Blast Cleaning

B. The Engineer's decision shall be final as the interpretation and/or conflict between any of the referenced specifications and standards contained herein.

1.4 SUBMITTALS

A. Product Information
1. If a specified brand of coating is to be used, submit a certificate to that effect and confirm that there will be no deviations from the specifications. If there are to be any changes, explain those.
2. Submit manufacturer's complete installation procedures.
3. Submit color charts at least 30 days prior to application of final coats.

B. Submit design and details of support system for tank shrouding system to be used, designed, signed and sealed by a professional engineer registered in the State of Texas.
1. Shroud system must meet all TCEQ requirements.
2. Shroud tanks completely, including cap.
3. All shroud clips & anchor lugs, must be completely removed from structure when shroud is no longer in use.

1.5 QUALITY ASSURANCE

A. The Contractor shall have at least ten years of experience and a successful record in the coating of steel water tanks.

B. Single Source Responsibility
1. Coatings (including zinc primers, acrylic, polyurethane, fluoroplymer, and epoxy type coatings) and solvents or reducers shall be of a single manufacturers
2. Secondary materials, such as chalks, sealants or fairing compounds, which are produced or are specifically recommended by coating system manufacturer, may be used with prior approval by the coating system manufacturer.

C. Inspection and Owners responsibility:
1. The contractor is responsible for quality control of his own work.
2. The tank Owner shall be responsible for contracting an independent, third-party coating inspector to perform quality assurance.
3. The inspector shall have the authority to suspend coating work if the

work being performed is not in accordance with this specification.

D. Without limiting the general aspects of other requirements of these specifications, all surface preparation, coating and painting of interior and exterior surfaces and inspection shall conform to the applicable requirements of SSPC the Society for Protective Coatings, NACE International, ASTM (American Society for Testing and Materials), AWWA and the manufacturer's printed instructions.

E. Warranty inspection shall be conducted during the eleventh month following acceptance of all coating and painting work. All defective work shall be repaired in accordance with this specification and to the satisfaction of the Engineer and/or Owner.

1.6 PRODUCT DELIVERY, STORAGE & HANDLING

A. Use only products brought to the jobsite in original sealed containers.

B. Reject products, which have exceeded the storage life recommended by the manufacturer.

C. Store all coatings and paints in enclosed structures to protect them from weather and excessive heat or cold. Do not allow products to freeze.

D. Store flammable coatings and paints as required by applicable codes and regulations.

E. No products shall be allowed on the project site until submittals have been submitted and approved.

F. Only those products that have been accepted for use shall be permitted on the project site.

1.7 SAFETY AND HEALTH REQUIREMENTS

A. General: In accordance with requirements set forth by regulatory agencies applicable to the construction industry and manufacturer's printed instructions

and appropriate technical bulletins and manuals, the Contractor shall provide and require use of personal protective lifesaving equipment for persons working on or about the project site. The Contractor's work forces should comply with the provisions outlined in SSPC-PA-3 "A Guide to Safety in Paint Application".

B. Ventilation: Where ventilation is used to control hazardous exposure, all equipment shall be explosion-proof. Ventilation shall reduce the concentration of air contaminants to a degree a hazard does not exist. Air circulation and exhausting of solvent vapors shall be continued until coatings have fully cured.

C. Sound Levels:

1. Whenever the occupational noise exposure exceeds maximum allowable sound levels, the Contractor shall provide and require the use of approved ear protection devices.

D. Illumination: Adequate illumination shall be provided while work is in progress, including explosion-proof lights and electrical equipment. Whenever required by the Engineer, the Contractor shall provide additional illumination and necessary supports to cover all areas to be inspected. The level of illumination for inspection purposes shall be determined by the Engineer.

E. Temporary Ladders and Scaffolding: All temporary ladders and scaffolding shall conform to applicable safety requirements. They shall be erected where requested by the Engineer to facilitate inspection and be moved by the Contractor to locations requested by the Engineer.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Tnemec

B. Sherwin Williams

C. Induron

2.2 GENERAL REQUIREMENTS

A. Tnemec, Sherwin-Williams and Induron products have been specified to establish the standard of quality required for the products to be used.

B. Use only products that are lead-free as defined by the Consumer Product Safety Act, Part 1303.

C. For zinc dust pigment contained in any zinc-rich material, use only products that meet the requirements of ASTM D 520 Type II with respect to zinc content and purity.

D. For wetted areas, use only those products that meet the requirements of ANSI/NSF Standard 61 for potable water service.

2.3 TANK INTERIOR COATING SYSTEMS – WETTED SURFACES

A. Prime Coat:
- Tnemec Epoxoline Series 94-H2O applied at 2.5 to 3.5 dry mils or
- Sherwin-Williams Corothane I Galva-Pac 1K or Macropoxy 646 PW applied at 3.0 to 4.0 dry mils.
- Indura zinc MC 67 applied at 2.5 to 3.5 dry mils
- Thin only with approved thinner.

B. Stripe Coat:
- Tnemec Epoxoline Series 20HS or
- Sherwin-Williams SherPlate PW Epoxy or Macropoxy 646 PW or
- Induron PE 70 Epoxy
- Apply by brush and scrubbed into all weld seams. In addition to weld seams, all edges, corners, bolts, rivets, pits shall receive a stripe coat. Thin only with approved thinner.

C. Interior Coating:
- Tnemec Epoxoline Series 22 or Series FC22 applied at 25 dry mils in a one or two coat application or
- Sherwin-Williams SherPlate PW Epoxy or Dura-Plate UHS Epoxy applied at 25 dry mils in a one or two coat application or
- Induron Aquatapoxy A-6 thick applied at 25 dry mils in a one or two coat application
- Thin only with approved thinner.

2.4 TANK INTERIOR COATING SYSTEMS – DRY RISER SURFACES

A. Prime Coat:
- Tnemec Epoxoline Series 94-H2O Hydro-Zinc applied at 2.5 to 3.5 dry mils or
- Sherwin-Williams Corothane I Galva-Pac 1K or Macropoxy 646 PW or
- Indurazinc MC 67 applied at 2.5 to 3.5 dry mils

B. Stripe Coat:
- Tnemec Epoxoline Series 20HS-1255 Beige Pota-Pox or
- Sherwin-Williams Macropoxy 646 PW Epoxy or
- Induron PE 70 Epoxy
- Apply by brush and scrubbed into all weld seams. In addition to weld seams, all edges, corners, bolts, rivets, pits shall receive a stripe coat. Thin only with approved thinner.

C. Interior Coating:
- Tnemec Epoxoline Series 20HS-15BL Tank White applied at 4.0 to 6.0 dry mils or
- Sherwin-Williams Macropoxy 646 PW Epoxy at 4.0 to 6.0 dry mils or
- Induron PE 70 Epoxy at 3.0 to 6.0 dry mils
- Thin only with approved thinner.

2.5 TANK EXTERIOR COATING SYSTEMS

A. 1st Coat:
- Tnemec Series 90-97 Tneme-Zinc or Series 90G-1K97 Tneme-Zinc applied at 2.5 to 3.5 dry mils or
- Sherwin-Williams Corothane I GalvaPac 1K Zinc Primer applied at 3.0 to 4.0 dry mils or Zinc Clad III HS or
- Indurazinc MC 67 applied at 2.5 to 3.5 dry mils
- Thin only with approved thinner.

B. Stripe Coat (applied after 1st coat):
- Tnemec Series 66 Hi-Build Epoxoline or
- Sherwin-Williams Macropoxy 646 or
- Induron PE to Epoxy at 3.0 to 6.0 dry mils
- Apply stripe coat at 3.0 to 5.0 mils dry film thickness.
- Apply by brush or roller to all weld seams, structural edges and bolted connections.

C. 2nd Coat

- Tnemec Series 73 Endura-Shield applied at 3.0 to 5.0 dry mils or
- Sherwin-Williams Acrolon 218 HS acrylic polyurethane applied at 3.0 to 5.0 dry mils or
- Indurethane 6600 plus applied at 2.0 to 4.0 dry mils
- Apply by brush or roller. Do not spray.
- Thin only with approved thinner.

D. 3rd Coat:

- Tnemec Series 700 HydroFlon applied at 2.0 to 3.0 dry mils or
- Sherwin-Williams FluoroKem HS at a dry film thickness of 2.0 to 3.0 mils or
- Indurethane 6600 plus high gloss applied at 2.0 to 4.0 dry mils
- Apply by brush or roller. Do not spray.
- Thin only with approved thinner.

E. Logo/Design: Apply one complete coat of Tnemec Series 700 HydroFlon, Sherwin Williams FluoroKem HS or Indurethane 6600 plus high gloss at a dry film thickness of 2.0 to 3.0 mils.

PART 3 EXECUTION

3.1 GENERAL

A. Use only skilled craftsmen qualified to perform the required work.

B. Provide a supervisor at the work site during cleaning and application operations. The supervisor shall have the authority to sign change orders, coordinate work and make decisions pertaining to the fulfillment of the contract.

C. Remove dust, dirt, oil, grease or any foreign matter that will affect the adhesion or durability of the coating or paint in accordance with SSPC-SP 1 Solvent Cleaning.

D. Perform prime coating in the field unless otherwise approved in writing by the Engineer.

E. Use equipment designed for application of the specified coatings.

F. Application of the first coat shall follow immediately after surface preparation and cleaning and stripe coat, if applicable, before rust bloom occurs or the same day, whichever is less. Any cleaned areas not receiving first coat within this period shall be recleaned prior to application of first

coat. Use of dehumidification equipment shall be first reviewed by the Engineer and coatings manufacturer prior to deviating from this provision.

G. Complete coating of surfaces that will be inaccessible after assembly, before the associated components are installed.

H. All coatings shall be applied using brushes or rollers. No spraying is permitted.

3.2 GENERAL REQUIREMENTS FOR SURFACE PREPARATION

A. Comply with the surface preparation requirements of SSPC the Society of Protective Coatings. Summaries of those specifications are listed below for information. Consult the SSPC specifications for detail.

1. Solvent Cleaning (SSPC-SP1): Removal of oil, grease, soil and other contaminants by use of solvents, emulsions, cleaning compounds, steam cleaning or similar materials and methods which involve a solvent or cleaning action.
2. Hand Tool Cleaning (SSPC-SP2): Removal of loose rust, loose mil scale and other detrimental foreign matter to a degree specified by hand chipping, scraping, sanding and wire brushing.
3. Power Tool Cleaning (SSPC-SP3): Removal of loose rust, loose mil scale and other detrimental foreign matter by power wirebrushing, power impact tools or power sanders.
4. White Metal Blast Cleaning (SSPC-SP5/NACE No. 1): Air blast cleaning to a gray-white uniform metallic color until each element of surface area is free of all visible residues.
5. Commercial Blast Cleaning (SSPC-SP6 NACE No. 3): Air blast cleaning until at least two-thirds of each element of surface area is free of all visible residues.
6. Brush-Off Blast Cleaning (SSPC-SP7 NACE No. 4): Air blast cleaning to remove loose rust, loose mil scale and other detrimental foreign matter to a degree specified.
7. Near-White Metal Blast Cleaning (SSPC-SP10 NACE No. 2): Air blast cleaning until at least 95% of each element of surface area is free of all visible residues.
8. Power Tool Cleaning to Bare Metal (SSPC-SP11): Differs from SSPC-SP3 in that it requires more thorough cleaning and a surface profile not less than 1 mil.

B. Remove slag, weld metal accumulation and spatters not removed by the fabricator, erector or installer by chipping and/or grinding. Peen, grind or otherwise blunt all sharp edges.

C. Perform all grinding and finishing of welds, edges, etc. prior to solvent cleaning and abrasive blasting. Prepare welds per NACE Standard SP0178 for all interior and exterior surfaces:
   1. Butt Welds: Shall be ground smooth and free of all defects, designation "D".
   2. Lap Welds: Shall be ground smooth and blended, designation "D".
   3. Fillet Welded Tee Joint: Shall be ground smooth and blended, designation "D"

D. Use dry method for blast cleaning all surfaces unless otherwise authorized. Use venturi-type blast nozzle with a minimum pressure at the nozzle of 90 psi.

E. Particle size of abrasives used in blast cleaning shall be that which will produce the specified surface profile or in accordance with recommendations of the manufacturer of the specified coating or paint system to be applied.

F. If the profile of the blasted steel exceeds the profile specified, the Contractor may do one or both ofthe following:
   1. Reblast the surface using a finer aggregate in order to produce the required profile.
   2. Apply a thicker prime coat, if possible given the limitations of the products being applied, in order to adequately cover the blast profile.

G. Abrasive used in blast cleaning operations shall be new, washed, graded and free of contaminants that would interfere with adhesion of coating or paint and shall not be reused unless specifically approved in writing by the Engineer.

H. Use caution during blast cleaning operations to insure that existing coatings are not exposed to abrasion from blast cleaning.

I. Take all necessary precautions during blast cleaning operations to prevent blasting material from falling on adjacent property.

J. Keep the work area and the surrounding environment in a clean condition. Do not allow blasting materials to accumulate as to constitute a nuisance or hazard to the accomplishment of the work, the operation of the existing facilities or to the surrounding environment.

K. Remove all dust, dirt, and other residue after completing blasting operations.

L. Neutralize all welds with a suitable chemical compatible with the specified coating.

M. Repair pitted areas on the tank interior by filling with Tnemec Series 215 Surfacing Epoxy and Surfacer or Sherwin-Williams Steel Seam VSE Epoxy Fairing Compound or by welding. Fill pits deeper than 1/8" by welding. Epoxy filler shall be feathered smooth. No protrusions or spatter will be allowed.

3.3 SPECIFIC SURFACE PREPARATION

A. Tank Interior Coating Systems - Wetted Surfaces

1. Surface Preparation for surfaces with ultra-high solids and/or 100% solids epoxy applied directly to bare steel: SSPC-SP10/NACE Near-White Metal Blast Cleaning. An angular profile shall be 3.0 to 5.0 mils as per ASTM D 4417, Method C or NACE Standard RP0287.

2. Surface Preparation for surfaces primed with zinc-rich primer: SSPC-SP10/NACE Near-White Metal Blast Cleaning. An angular profile shall be 2.0 to 4.0 mils as per ASTM D 4417, Method C or NACE Standard RP0287.

B. Tank Interior Coating Systems - Dry Riser

1. Surface Preparation: SSPC-SP10/NACE Near-White Metal Blast Cleaning. An angular profile shall be 2.0 to 4.0 mils as per ASTM D 4417, Method C or NACE Standard RP0287.

C. Tank Exterior Coating Systems

1. Surface Preparation: SSPC-SP6/NACE 3 Commercial Blast Cleaning. An angular profile shall be 1.5 to 2.5 mils as per ASTM D 4417, Method C or NACE Standard RP0287.

3.4 NON-VISIBLE CONTAMINANTS

A. Surface shall be checked in three locations for the presence of chlorides, free iron and sulfates. New tanks shall be tested prior to abrasive blasting, tanks being rehabilitated shall be tested prior to blasting. If blisters are present in existing tank, testing shall also be performed after abrasive blasting. These tests are an Iron Test (Fe^{2+}), Chloride Test and Sulfate Test. Testing shall be carried out as per SSPC Technology Guide 15 "Field Methods for Retrieval

and Analysis of Soluble Salts on Steel and Other Nonporous Substrates". The maximum limits for these contaminants shall be:

1. The maximum level of chlorides is 30 milligrams per square meter or 3 micrograms per square centimeter.

2. The maximum level of sulfates is 100 milligrams per square meter or 10 micrograms per square centimeter.

3. The maximum level of ferrous ions (Fe^{2+}) is 50 milligrams per square meter or 5 micrograms per square centimeter.

4. Contamination levels above these limits will require washing and retesting in accordance with Item 2 (below) until the surface is under the allowable limits.

B. If testing shows amounts present in the test solution to be greater than the limits listed herein, the Contractor shall clean the surface of the entire tank interior with a 5,000 psi water blast with fine entrained abrasive until the levels in the test solutions are below the maximum acceptable level. Alternate cleaning methods may be allowed with prior approval of the Engineer. Surface shall be reblasted at no additional cost to the Owner.

C. Contractor shall provide a written statement from paint manufacturer stating that the maximum acceptable levels are not less than those listed herein. Results of the testing shall be provided to the Owner before any coatings are applied.

D. The following test kits are approved for use on this project:

a. Chlor*Rid Chlor*Test Kit

b. KTA SCAT Test Kit

c. Test kits from other vendors shall be submitted to the Engineer for prior approval before use.

3.5 COATING SYSTEMS APPLICATION

A. After completion of surface preparation as specified for the specific system, apply coatings specified in PART 2 - PRODUCTS.

B. Mix and thin materials according to manufacturer's latest printed instructions. Use thinners only as recommended by the manufacturer and utilizing the thinners stated in PART 2 - PRODUCTS.

C. Apply prime coat immediately after surface preparation and cleaning and stripe coat, if applicable, before rust bloom occurs or the same day, whichever is less. Any cleaned areas not receiving first coat within this period shall be recleaned prior to application of first coat.

D. Apply and cure coatings in accordance with manufacturer's recommendations and in accordance with SSPC guidelines. Provide, install and operate dehumidification equipment as required to properly cure coating system.

E. Apply stripe coat by brush and scrubbed into all weld seams. In addition to weld seams, all edges, corners, bolts, rivets, pits shall receive a stripe coat.

F. Apply each coating evenly and leave free of brush marks, sags, runs. Avoid lapping on glass or hardware. Coatings and paints shall be sharply cut to lines. Finished surfaces shall be free from defects or blemishes.

G. When two or more coats of coating or paint are specified, use different tints or colors in each coat so as to provide an indicator of coverage.

I. Film thicknesses per coat as specified in PART 2 PRODUCTS are the minimum required.

J. Do not apply coatings under the following conditions exist or are forecasted:
   1. The surrounding air temperature or the temperature of the surface to be coated is below the minimum surface temperature for the products specified herein.
   2. Rain, snow, fog or mist is present.
   3. The surface temperature is less than 5F above the dew point.

K. Capture and Store new abrasive blast media per TCEQ 2010 Best Available Control Technology guidelines.

L. Use protective coverings or drop cloths to protect floors, fixtures and equipment. Exercise care to prevent coatings or paints from being spattered onto surfaces which are not to be coated or painted.

M. Use shrouds and avoid application of coatings on windy days so as to avoid getting paint spray on nearby buildings, vehicles and other property.

1. Shroud shall be designed by an engineer registered in the State of Texas.
2. Shroud shall meet TCEQ 2010 Best Available Control Technology guidelines.

N. Application by roller is not allowed for interior wetted surfaces.

3.6 REPAIRS

A. After the interior coating system has been installed and holiday tested, repair pinholes and voids as follows:

1. Abrasive blasting shall be in accordance with SSPC-SP10/NACE No.2 Near White Blast Cleaning obtaining a minimal surface profile as specified herein.

2. Power tool cleaning, when permitted by the Engineer, shall be in accordance with SSPC-SP11 Power Tool Cleaning to Bare Metal. Surface profile shall be angular and not less than the surface profile as specified herein.

3. All edges of remaining sound, tightly adhering coating shall be feathered back (beveled) to create a smooth transition from the substrate to the coatings surface. The coating may be considered tightly adhering if an edge cannot be lifted with a dull putty knife.

4. Install the coating system as specified herein to provide a complete and monolithic system, free of voids and pinholes.

B. For exterior surfaces, repair as follows:

1. Hand or Power Tool Sand as per SSPC-SP2 or SP3 to remove the defect. In cases where the defect extends to the substrate, prepare the surface as per SSPC-SP11 Power Tool Cleaning to Bare Metal, obtaining a minimum anchor profile as specified herein.

2. All edges of remaining sound, tightly adhering coating shall be feathered back (beveled) to create a smooth transition from the substrate to the coatings surface. The coating may be considered tightly adhering if an edge cannot be lifted with a dull putty knife.

3. Install the coating system as specified herein to provide a complete and monolithic system, free of voids and pinholes.

3.7 DISINFECTION

A. Disinfect interior surfaces of tank in accordance with all the requirements of AWWA C652, Method 3.

B. Prior to disinfecting, wash down the complete interior with clean water and thoroughly flush.

C. Perform disinfection after protective coatings have been applied to the interior surfaces and allowed to thoroughly cure.

D. Drain chlorine solution accumulated on the bottom of the tank.

3.8 SOLVENT VAPOR REMOVAL

A. Completely remove all solvent vapors by suction-type exhaust fans and blowers before placing tank in operating service.

B. Exhaust solvent vapors both during and after coating application at a minimum rate of one air change every four hours to allow the proper curing of the coating material. High rates of production may require increased ventilation.

C. Continue ventilation until such time as the coating has reached "full cure" as specified by the coating manufacturer.

3.9 FIELD QUALITY CONTROL

A. Surface preparation shall be based upon comparison with "Pictorial Surface Preparation Standards for Painting Steel Surfaces: SSPC-VIS 1", ASTM Designation D2200, "Standard Methods of Evaluating Degree of Rusting on Painted Surfaces", ASTM D 4417, Method A and/or Method C or NACE Standard RP0287, and ASTM Designation D610 "Visual Standard for Surfaces of New Steel Air Blast Cleaned with Sand Abrasive". In all cases the written standard shall take precedence over the visual standard.

B. NACE Standard SP0178-91, along with the Visual Comparator, shall be used to verify the surface preparation of welds.

C. Thickness of coatings and paint shall be measured checked according to the procedures outlined in SSPC-PA 2 "Measurement of Dry Film Thickness with Magnetic Gages", May 2012 Edition. Dry film thickness shall be a Level 2 as defined in Paragraph 9.2, excepting that no single gage reading shall be less than 80% of the specified dry film thickness. Areas that fail to meet these criteria shall be corrected at no expense to the Owner. Use of an instrument such as a Tooke Gauge, precision groove grinder, etc. is permitted if a destructive test is deemed necessary by the Engineer and the total DFT is less than 50 mils.

D. The integrity of interior coated surfaces shall be tested for holidays in accordance with NACE Standard SP0188-2006. For dry films less than 20 mils, a non-destructive holiday detector shall not exceed 67.5 volts, nor shall destructive holiday detector exceed the voltage recommended by the manufacturer of the coating system. A solution of 1 ounce non-sudsing type wetting agent, such as Kodak Photo-Flo, and 1 gallon of tap water shall be used to perform the holiday testing. For coating thickness at 20 mils and greater, a high voltage Tinker & Rasor AP/W holiday tester shall be used. Contact coating manufacturer for voltage recommendations and curing parameters.

All pinholes and/or holidays shall be marked and repaired in accordance with the manufacturer's printed recommendations and retested. No pinholes or other irregularities will be permitted in the final coating.

E. Furnish in good working condition the following inspection devices for detection of holidays and measurement of dry film thicknesses of coatings by the Engineer or his representative:
1. U.S. Department of Commerce, National Bureau of Standards certified thickness calibration plates and/or plastic shims, depending upon the thickness gauge used, to test the accuracy of dry film thickness gauges.
2. Certified instrumentation to test the accuracy of holiday detectors.
3. Dry film gauges and holiday detectors.

F. No coating or paint shall be applied when:
1. the surrounding air temperature or the temperature of the surface to be coated or painted is below the minimum surface temperature for the products specified herein,
2. rain, snow, fog or mist is present,
3. the surface temperature is less than 5°F above the dew point,

4. the air temperature is expected to drop below the minimum temperature for the products specified within six hours after application of coating.

If any of the above conditions are prevalent, coating or painting shall be delayed or postponed until conditions are favorable. The day's coating or painting shall be completed in time to permit the film sufficient drying time prior to damage by atmospheric conditions.

G. Measure the dew point using a Sling Psychrometer in conjunction with U.S. Department of Commerce Weather Bureau Psychometric Tables.

H. "Hold point' inspections will be used for this project. The Engineer or his representative will inspect surfaces prior to abrasive blasting, after abrasive blasting but prior to application of coating materials, and between subsequent coats of material. Final inspection of coatings will take place prior to placing the tank in service. Provide rigging that will enable the Engineer or his representative to conduct the required inspections.

3.10 CLEAN UP

A. Remove all scaffolding, shrouding and containers from job site.

B. Remove coating or paint spots or oil stains from all surfaces.

C. Clean, repair, or refinished surfaces damaged during the course of the project.

END OF SECTION

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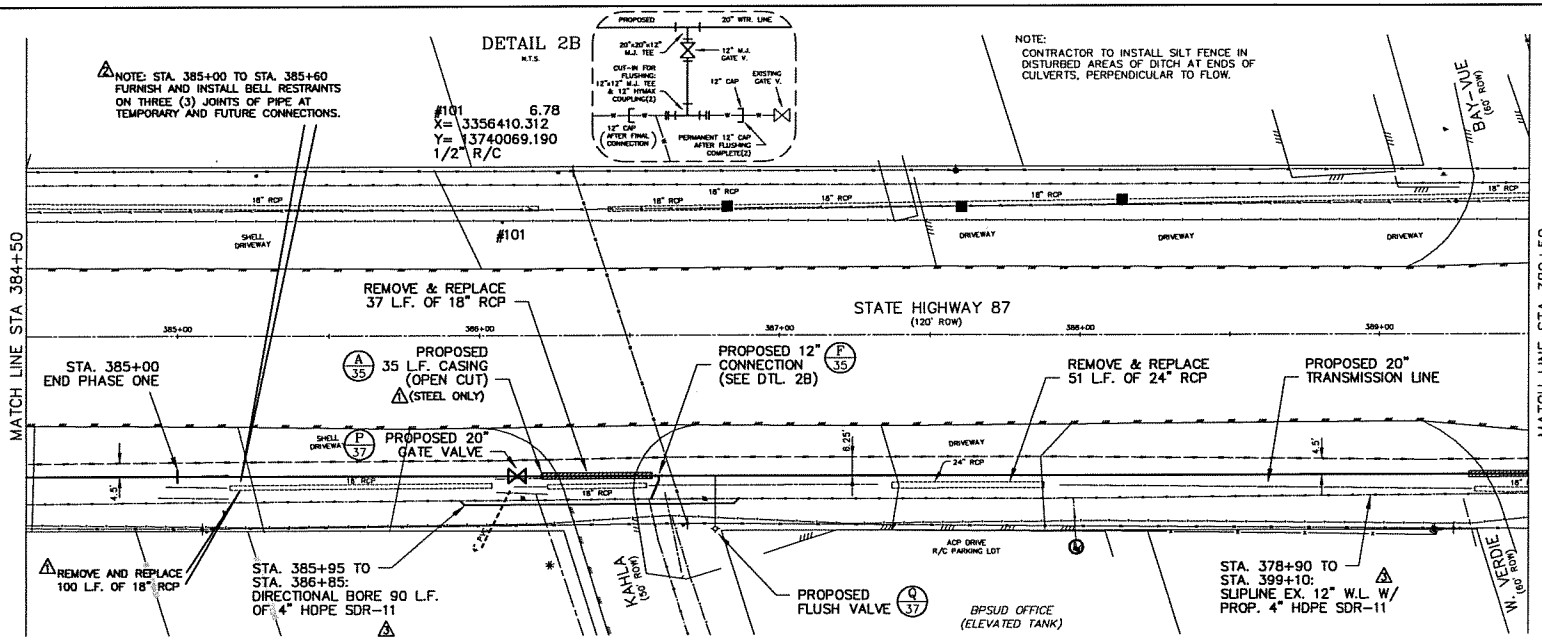


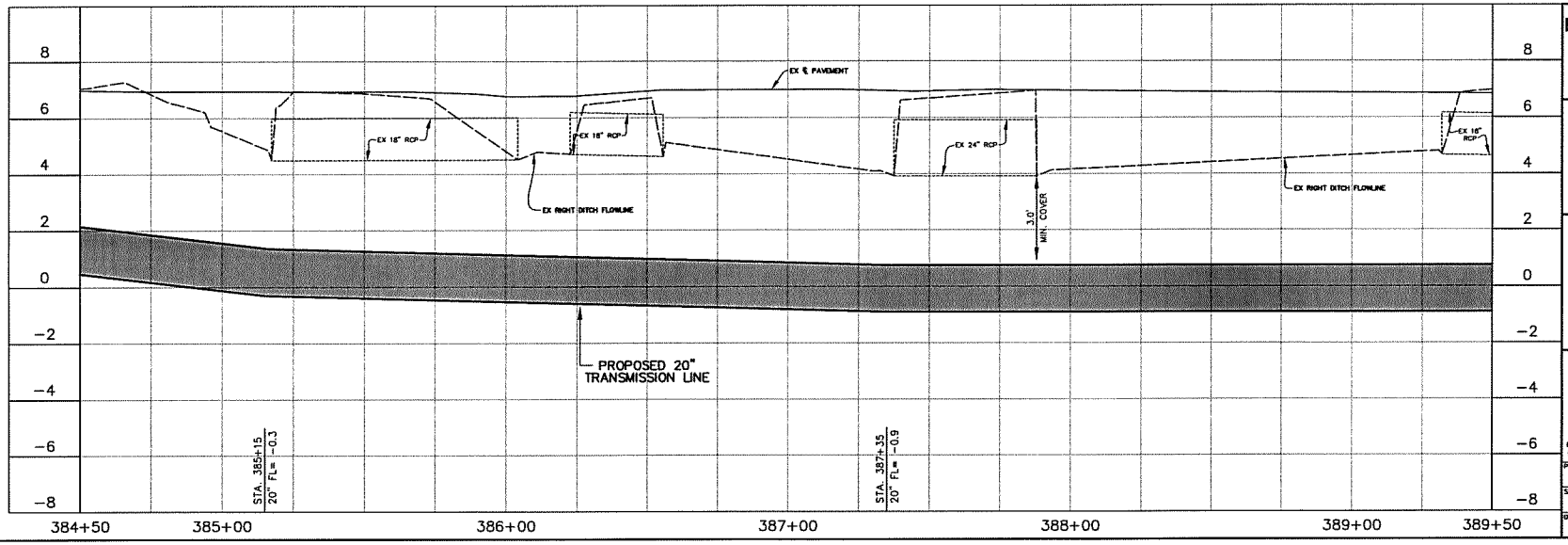
HORIZONTAL SCALE 1"=20'

VERTICAL SCALE 1"=2'

12/09		PW	RECORD DRAWINGS
1-08-08	3	TW	PER CHANGE ORDER No. 2
5-22-07	2	PW	PER ADDENDUM No. 2
5-25-07	1	PW	PER ADDENDUM No. 3
DATE	SYM	BY	REVISIONS

LEGEND

- DELINEATOR
- ELECTRICAL PULL BOX
- ELECTRICAL MANHOLE
- FLAG POLE
- DOWN GUY
- HEADSTONE
- IRON ROD
- MAIL BOX
- MONUMENT
- MONITORING WELL
- PAY PHONE
- PARKING LOT LIGHT
- PIPELINE SIGN
- PIPELINE VENT
- POWER POLE
- PULL BOX
- STORM INLET
- STREET LIGHT
- TELEPHONE MANHOLE
- TELEPHONE PEDESTAL
- BURIED CABLE SIGN
- TRAFFIC SIGNAL LIGHT
- TRAFFIC SIGN
- WATER HOSE BIBB
- FIRE HYDRANT
- WATER LINE VALVE
- WATER METER
- YARD LIGHT
- BORE HOLE
- BASELINE
- PIPELINE
- OVERHEAD UTILITY
- UNDERGROUND POWER
- UNDERGROUND TELEPHONE CABLE
- BARBED WIRE FENCE
- WOOD FENCE
- CULVERT
- SANITARY SEWER / FORCE MAIN
- WATER LINE
- EDGE OF ASPHALT PAVEMENT
- EASEMENT LINE
- DITCH FLOWLINE PLAN
- DITCH FLOWLINE LEFT PROFILE
- DITCH FLOWLINE RIGHT PROFILE



SCHAUMBURG & POLK, INC.
BEAUMONT ★ HOUSTON ★ TYLER
8865 COLLEGE STREET
BEAUMONT, TEXAS 77707
409 . 866 . 0341

BOLIVAR PENINSULA SPECIAL UTILITY DISTRICT
WATER SYSTEM IMPROVEMENTS
TRANSISSION LINE PROJECT
TWDB DWSRF

PROPOSED 20" TRANSMISSION WATER LINE PLAN AND PROFILE
STA 384+50 TO STA 389+50

ENGINEER'S SEAL
THIS DOCUMENT IS BEING RELEASED FOR REVIEW UNDER THE AUTHORITY OF MARK MANN, P.E. TX. REG. 91891 FEBRUARY, 2010
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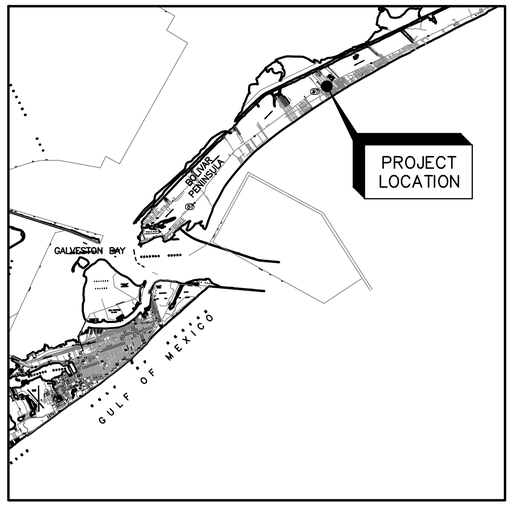
PROJECT NUMBER 7519.00	DRAWN BY KLC
SCALE 1"=20' H & 1"=2' V	CHECKED BY RB
DATE APRIL 2007	SHEET 17 OF 37

Feb 18, 2010 - 11:07am F:\Bolivar\7519-DWSRF\5010\dwg\Plans\Bpsud.dwg PP15

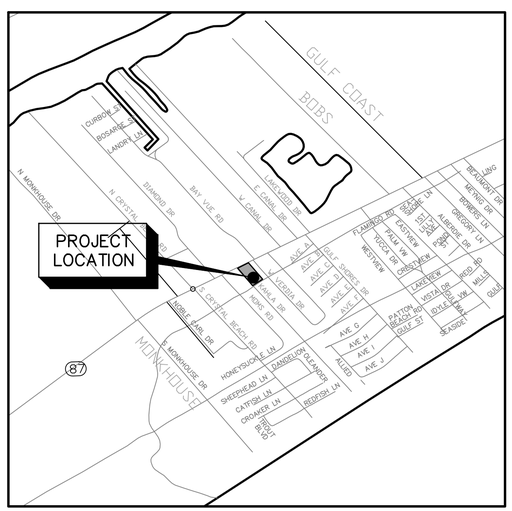
CONSTRUCTION PLANS FOR

BOLIVAR PENINSULA SPECIAL UTILITY DISTRICT (BPSUD)
ELEVATED WATER STORAGE TANK
GALVESTON COUNTY, TEXAS

AUGUST 2020
GLO CONTRACT NO. 10-5052-000-5028
GLO PROJECT NO. P017203-1A



LOCATION MAP
N.T.S.
KEYMAP 734D
GALVESTON COUNTY



VICINITY MAP
N.T.S.
BOLIVAR PENINSULA, TEXAS 77650

100% SUBMITTAL

COMMISSIONER'S COURT

MARK HENRY
COUNTY JUDGE

DARRELL APFFEL
PRECINCT 1

JOE GIUSTI
PRECINCT 2

STEPHEN D. HOLMES
PRECINCT 3

KEN CLARK
PRECINCT 4

STATE OF TEXAS
SYLVESTER JOHNSON, JR.
111505
LICENSED
PROFESSIONAL ENGINEER
9/3/2020

Texas PE Firm Reg. #F-929
575 N. Dairy Ashford, Suite 700, Houston, Texas 77079
T +1 281 589 7257 E usinfrastructure@rpsgroup.com

PROJECT No. 007517 (1068.002.001)

J:\1068.002.001\07.00 CADD\BPSUD Elevated Storage Tank Site Plan\02-Construction Drawings\007517.Cover.dwg Sep 02 2020

LEGEND

EXISTING TOPOGRAPHY

- CORE BORING
- MONUMENT
- PK NAIL
- IRON ROD
- IRON PIPE
- POWER POLE/TELE & ELEC POLE
- DOWN GUY/ANCHOR
- UNDERGROUND ELECTRICAL AS LOCATED
- ELECTRICAL PEDESTAL
- ELECTRICAL TRANSFORMER
- ELECTRICAL MANHOLE
- GROUND LIGHT
- TELEPHONE MANHOLE
- TELEPHONE/CABLE TV
- TELEPHONE MARKER SIGN
- GAS VALVE
- GAS METER
- GAS LINE MARKER SIGN
- CABLE PEDESTAL
- CABLE MARKER SIGN
- PIPELINE VENT
- PIPELINE MARKER SIGN
- WATER LINE MARKER
- SEWER LINE PIN FLAG
- TRAFFIC SIGNAL POLE
- TRAFFIC SIGNAL PULL BOX
- TRAFFIC SIGN
- STOP SIGN
- TREE
- BURIED CABLE MARKER
- SHRUB
- PEDESTAL C.A.T.V.
- SPRINKLER CONTROL BOX
- SPRINKLER VALVE BOX
- BOLLARD
- WOOD POST
- CABLE-TV
- BARBED WIRE FENCE
- CHAIN LINK FENCE
- WOOD FENCE
- WROUGHT FENCE
- FORCE MAIN
- GAS
- AERIAL POWER
- ABOVE/UNDER GROUND WATER PIPE
- PIPELINE
- TELEPHONE (AT&T PIN FLAG LINE)
- TREE LINE
- BUILDING
- BRICK FENCE

PLAN / EXISTING / PROPOSED

- RIGHT-OF-WAY
- EASEMENT LINE
- PROPERTY LINE
- DITCH HIGH BANK
- DITCH FLOW LINE
- CURB & GUTTER
- CENTERLINE
- EDGE OF ASPHALT PAVEMENT
- SWALE
- FIRE HYDRANT
- WATER VALVE
- WATER METER
- TAPPING SLEEVE & VALVE
- REDUCER
- WATER LINE 24" & SMALLER
- WATER LINE 30" & LARGER
- STORM SEWER MANHOLE
- TYPE "A" INLET
- GRATE INLET
- TYPE "BB" INLET
- TYPE "C1" INLET
- TYPE "C3" INLET
- CULVERT
- STORM SEWER 24" & SMALLER
- STORM SEWER 30" & LARGER
- SANITARY SEWER MANHOLE
- SANITARY SEWER CLEANOUT
- SANITARY SEWER STACK
- SANITARY SEWER 24" & SMALLER
- SANITARY SEWER 30" & LARGER
- WATER STORAGE TANK
- POINT OF INTERSECTION (PI)
- POINT OF CURVE (PC)
- POINT OF TANGENCY (PT)

GENERAL & CIVIL ABBREVIATIONS

APS	ADJUSTABLE PIPE SUPPORT	MH	MANHOLE
BC	BACK OF CURB	MIN	MINIMUM
℄	BASELINE	MISC	MISCELLANEOUS
BFV	BUTTERFLY VALVE	MJ	MECHANICAL JOINT
C/C	CENTER TO CENTER	NG	NATURAL GROUND
CARV	COMBINATION AIR RELIEF VALVE	NTS	NOT TO SCALE
℄/CL	CENTER LINE	OPNG	OPENING
CLR	CLEAR DISTANCE	PROP	PROPOSED
CO	CLEAN OUT	RED	REDUCER
CONC	CONCRETE	RCP	REINFORCED CONCRETE PIPE
CONT	CONTINUOUS	REF	REFERENCE
DIP	DUCTILE IRON PIPE	REQD	REQUIRED
DR	DRAIN	ROW	RIGHT OF WAY
EAP	EDGE OF ASPHALT	RT	RIGHT
ECP	EDGE OF CONCRETE PAVEMENT	SAN	SANITARY
ECC	ECCENTRIC	SB/BH	SOIL BORING/BORE HOLE
EL	ELEVATION	SHT	SHEET
EXIST	EXISTING	STA	SURVEY STATION
EXP	EXPANSION	STD	STANDARD
F	FLANGED	SIM	SIMILAR
FC	FRONT OF CURB	SPECS	SPECIFICATIONS
FG	FINISHED GRADE	STL	STEEL
FH	FIRE HYDRANT	STM	STORM
FM	FORCE MAIN	TCE	TEMPORARY CONSTRUCTION EASEMENT
FL	FLOW LINE	TOC	TOP OF CONCRETE
HMAC	HOT MIX ASPHALTIC CONCRETE	TOP	TOP OF PIPE
JT	JOINT	TG	TOP OF GRATE
LR	LONG RADIUS	THK	THICK
IE	INVERT ELEVATION	TP	TOP OF PAVEMENT
LT	LEFT	TYP	TYPICAL
MAX	MAXIMUM	UNO	UNLESS NOTED OTHERWISE
		VERT	VERTICAL
		W/	WITH
		WL	WATER LINE
		WLE	WATER LINE EASEMENT

DRAWING NO. / DRAWING NAME

GENERAL

G-1	COVER SHEET
G-2	DRAWING INDEX, LEGEND & ABBREVIATIONS
G-3	GENERAL NOTES

CIVIL

C-1	DEMOLITION PLAN
C-2	PROPOSED SITE PLAN
C-3	GRADING PLAN
C-4	STORM WATER POLLUTION PREVENTION PLAN
C-5	STORM WATER POLLUTION PREVENTION PLAN DETAILS
C-6	PROJECT SIGN DETAILS
C-7	WATERLINE DETAILS
C-8	MISCELLANEOUS DETAILS
C-9	PAVEMENT DETAILS
C-10	TRAFFIC CONTROL PLAN NOTES CHANNELIZING DEVICES AND BARRICADES
C-11	TRAFFIC CONTROL PLAN TYPICAL ONE LANE CLOSURE

MECHANICAL

M-1	ELEVATED STORAGE TANK – ELEVATION AND SECTION
M-2	ELEVATED STORAGE TANK – LOWER LEVEL PLAN AND DETAILS
M-3	ELEVATED STORAGE TANK – MEZZANINE LEVEL PLAN

ELECTRICAL

E-1	EXISTING SITE PLAN
E-2	PROPOSED SITE PLAN
E-3	ENLARGED PROPOSED SITE PLAN
E-4	ELEVATED STORAGE TANK GROUND PLAN
E-5	ELEVATED STORAGE TANK MEZZANINE FLOOR PLAN
E-6	ELEVATED STORAGE TANK SECTIONS
E-7	ONE LINE DIAGRAM
E-8	ELECTRICAL SCHEDULES
E-9	SCADA AND RADIO DIAGRAMS
E-10	ELECTRICAL DETAILS 1 OF 2
E-11	ELECTRICAL DETAILS 2 OF 2

RPS
Texas PE Firm Reg. #F-929
575 N.Dairy Ashford, Suite 700, Houston, Texas 77079
T +1 281 589 7257 E usinfrastructure@rpsgroup.com

TEXAS GENERAL LAND OFFICE

BPSUD Elevated Water Storage Tank

Bolivar Peninsula Special Utility District

SURVEY COMPANY:

HIGH TIDE LAND SURVEYING LLC.
975 LAZY LANE WEST
CRYSTAL BEACH, TX 77650
MAILING P.O. BOX 16142 GALVESTON, TX 77552

BENCHMARK:

NGS MARK HGCSD 64 PID AW6988 SITUATED ABOUT 7.5 MILES SOUTHWEST OF GILCHREST ABOUT 2.5 MILES NORTHEASE OF CRYSTAL BEACH ON THE BOLAVAR PENINSULA AND ON THE SOUTH SIDE OF STATE HIGHWAY 87 ELEVATION 5.1' FEET NAVD 88.

FLOODPLAIN:

THIS PROJECT LIES WITHIN THE 100 YEAR FLOOD PLAIN AS ESTABLISHED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY. ACCORDING TO THE FLOOD INSURANCE RATE MAP NUMBER 48167C0309G, EFFECTIVE DATE AUGUST 15, 2019. THIS MAP LIES WITHIN ZONE "AE" WITH A BASE FLOOD ELEVATION OF 13 FEET.

TO ARRANGE FOR LINES TO BE TURNED OFF OR MOVED, CALL ENTERGY AT 1-800-368-3749

NOTICE:

FOR YOUR SAFETY, YOU ARE REQUIRED BY TEXAS LAW TO CALL 811 AT LEAST 48 HOURS BEFORE YOU DIG SO THAT UNDERGROUND LINES CAN BE MARKED. THIS VERIFICATION DOES NOT FULFILL YOUR OBLIGATION TO CALL 811.

REV	DESCRIPTION	BY	DATE

STATE OF TEXAS
SYLVESTER JOHNSON, JR.
111505
LICENSED PROFESSIONAL ENGINEER
8/24/2020

DRAWING INDEX, LEGEND & ABBREVIATIONS

RPS Project No	007517 (1068.002.001)
Drawn By JAH	Checked By NMW
Scale NTS	Date AUGUST 2020
DWG No G-2	Sheet 2 Of 28

J:\1068.002.001\07.00 CADD\BPSUD Elevated Storage Tank Site Plan\02-Construction Drawings\007517.Drawing Index Sheet.dwg Aug 24 2020

GENERAL CONSTRUCTION NOTES

1. THERE WILL BE NO SEPARATE PAYMENT FOR WORK SHOWN ON THESE PLANS, UNLESS SPECIFICALLY ESTABLISHED IN THE BID SECTION OF THE CONTRACT DOCUMENTS. CONTRACTOR SHALL INCLUDE COST OF THIS WORK IN THE CONTRACT UNIT PRICE FOR ITEMS OF WHICH THIS WORK IS A COMPONENT OR INCIDENTAL.

2. CONTRACTOR SHALL VERIFY LOCATION AND ELEVATION OF EXISTING FACILITIES PRIOR TO CONSTRUCTION OF PROPOSED FACILITIES. ANY DAMAGE TO EXISTING FACILITIES, INCLUDING PUBLIC OR PRIVATE UTILITIES, INCURRED AS A RESULT OF CONSTRUCTION OPERATIONS SHALL BE REPAIRED BY THE CONTRACTOR AT HIS EXPENSE.

3. CONTRACTOR SHALL VERIFY LOCATION OF UNDERGROUND UTILITY LINES AND SHALL NOTIFY THE FOLLOWING AGENCIES 48 HOURS PRIOR TO EXCAVATING NEAR EXISTING FACILITIES: A.) BOLIVAR PENINSULA SPECIAL UTILITY DISTRICT AT 409-684-3515 B.) TEXAS ONE CALL SYSTEM AT 1-800-245-4545 C.) LONE STAR NOTIFICATION CENTER AT 713-223-4567 D.) TEXAS EXCAVATION SAFETY SYSTEM INC. AT 1-800-344-8377.

4. CONTRACTOR SHALL COMPLY WITH ALL FEDERAL, STATE, AND LOCAL LAWS AND ALL REGULATIONS OF UTILITY COMPANIES CONCERNING SAFETY AND HEALTH PRACTICES.

5. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL LABORATORY TESTING. SUBSEQUENT TESTING DUE TO FAILED DENSITIES SHALL BE AT CONTRACTOR'S EXPENSE. A COPY OF ALL TEST RESULTS SHALL BE SUBMITTED TO THE PROJECT MANAGER.

6. ALL AREAS DISTURBED BY CONSTRUCTION WHICH ARE NOT REPAVED OR OTHERWISE COVERED SHALL BE HYDRO-MULCH SEEDED.

7. CONTRACTOR SHALL REMOVE ALL MUD, DIRT AND DEBRIS DEPOSITED OR DROPPED ON EXISTING PAVEMENT DUE TO HIS CONSTRUCTION ACTIVITY DAILY. MATERIAL THAT IS HAZARDOUS TO TRAFFIC SHALL BE REMOVED IMMEDIATELY.

8. THESE PLANS DO NOT EXTEND TO OR INCLUDE DESIGNS OR SYSTEMS PERTAINING TO THE SAFETY OF THE CONTRACTOR OR ITS EMPLOYEES, AGENTS, OR REPRESENTATIVES IN THE PERFORMANCE OF THE WORK. THE SEAL OF THE REGISTERED PROFESSIONAL ENGINEER(S) HEREON DOES NOT EXTEND TO ANY SUCH SAFETY SYSTEMS THAT MAY NOW OR HEREAFTER BE INCORPORATED IN THESE PLANS. THE CONTRACTOR SHALL PREPARE OR OBTAIN THE APPROPRIATE SAFETY SYSTEM (S).

9. CONTRACTOR SHALL PROTECT ALL TREES ADJACENT TO WORK AREA. NO TREES OUTSIDE THE WORK AREA SHALL BE REMOVED OR DAMANGED WITHOUT PERMISSION OF OWNER.

10. CONTRACTOR SHALL GIVE NOTICE TO ALL AUTHORIZED INSPECTORS, SUPERINTENDENTS, OR PERSONS IN CHARGE OF PRIVATE AND PUBLIC UTILITIES OR RAILROADS AFFECTED BY HIS OPERATIONS PRIOR TO COMMENCEMENT OF WORK. CONTRACTOR SHALL OBTAIN ALL CONSTRUCTION PERMITS PRIOR TO STARTING CONSTRUCTION.

11. CONTRACTOR WILL OBTAIN ALL PERMITS REQUIRED BY GALVESTON COUNTY, TEXAS PRIOR TO STARTING CONSTRUCTION OF UTILITIES AND/OR CULVERTS WITHIN COUNTY ROAD RIGHTS-OF-WAY, IF APPLICABLE.

12. CONTRACTOR SHALL OBTAIN BUILDING PERMIT FROM GALVESTON COUNTY. CONTACT GALVESTON COUNTY PERMIT OFFICE AT (409) 770-5552.

13. CONTRACTOR SHALL NOTIFY JO BALL, GENERAL MANAGER, WITH THE BOLIVAR PENINSULA SPECIAL UTILITY DISTRICT AT LEAST 48 HOURS PRIOR TO START OF CONSTRUCTION AT (409) 684-3515.

WATER LINE CONSTRUCTION NOTES

1. CONTRACTOR SHALL CONTACT BOLIVAR PENINSULA SPECIAL UTILITY DISTRICT PRIOR TO MAKING ANY CONNECTION TO THE EXISTING WATER LINES OR ANYTIME A VALVE ON AN EXISTING WATER LINE IS TO BE OPENED OR CLOSED.

2. ALL WATER LINES TO HAVE A MINIMUM COVER OF 4' BELOW FINISHED GRADE. VARY FLOWLINE UNIFORMLY FROM DEPTH AND LOCATION SHOWN ON PLANS TO ACHIEVE REQUIRED COVER AND CLEARANCE.

3. ALL BURIED WATER LINE FITTINGS TO BE DUCTILE IRON MECHANICAL JOINT.

4. CONTRACTOR TO PROVIDE ADEQUATE CONCRETE THRUST BLOCKING TO WITHSTAND TEST PRESSURE. SEE THRUST BLOCK DETAILS.

5. WATER LINE, OUTSIDE OF PUBLIC STREET RIGHT-OF-WAY OR PUBLIC EASEMENTS, UNDER PAVEMENT OR WITHIN ONE (1) FOOT BACK OF ALL CURBS TO BE BACKFILLED WITH CEMENT STABILIZED SAND TO A POINT ONE (1) FOOT BELOW PAVEMENT. THE REMAINING BACKFILL TO BE MADE WITH COMPACTED SELECT MATERIAL.

6. WATER LINE INSTALLATION AND TESTING SHALL COMPLY WITH AWWA AND THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY REQUIREMENTS.

PRIVATE UTILITY NOTES

AT&T TEXAS/SWBT FACILITIES

1. THE LOCATIONS OF AT&T TEXAS/SWBT FACILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION BEFORE COMMENCING WORK. CONTRACTOR AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THIS FAILURE TO EXACTLY LOCATE AND PRESERVE THESE UNDERGROUND UTILITIES.

2. THE CONTRACTOR SHALL CALL 1-800-344-8377 (TEXAS 811) A MINIMUM OF 48 HOURS PRIOR TO CONSTRUCTION TO HAVE UNDERGROUND LINES FIELD LOCATED.

3. WHEN EXCAVATING WITHIN EIGHTEEN INCHES (18") OF THE INDICATED LOCATION OF AT&T TEXAS/SWBT FACILITIES, ALL EXCAVATIONS MUST BE ACCOMPLISHED USING NON-MECHANIZED EXCAVATION PROCEDURES. WHEN BORING, THE CONTRACTOR SHALL EXPOSE THE AT&T TEXAS/SWBT FACILITIES.

4. WHEN AT&T TEXAS/SWBT FACILITIES ARE EXPOSED, THE CONTRACTOR WILL PROVIDE SUPPORT TO PREVENT DAMAGE TO THE CONDUIT DUCTS OR CABLES. WHEN EXCAVATING NEAR TELEPHONE POLES THE CONTRACTOR SHALL BRACE THE POLE FOR SUPPORT.

5. THE PRESENCE OR ABSENCE OF AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES OR BURIED CABLE FACILITIES SHOWN ON THESE PLANS DOES NOT MEAN THAT THERE ARE NO DIRECT BURIED CABLES OR OTHER CABLES IN THE CONDUIT AREA.

6. PLEASE CONTACT THE AT&T TEXAS DAMAGE PREVENTION MANAGER ROOSEVELT LEE JR. AT (713) 567-4552 OR E-MAIL HIM AT ri7259@att.com, IF THERE ARE QUESTIONS ABOUT BORING OR EXCAVATING NEAR OUR AT&T TEXAS/SWBT FACILITIES.

ENTERGY

UNDERGROUND GAS FACILITIES

1. LOCATIONS OF ENTERGY MAIN LINES ARE SHOWN IN AN APPROXIMATE LOCATION ONLY. SERVICE LINES ARE USUALLY NOT SHOWN. OUR SIGNATURE ON THESE PLANS ONLY INDICATES THAT OUR FACILITIES ARE SHOWN IN APPROXIMATE LOCATION. IT DOES NOT IMPLY THAT A CONFLICT ANALYSIS HAS BEEN MADE. THE CONTRACTOR SHALL CONTACT THE UTILITY COORDINATING COMMITTEE AT (713) 223-4567 OR 1-800-669-8344 OR 811 A MINIMUM OF 48 HOURS PRIOR TO CONSTRUCTION TO HAVE MAIN AND SERVICE LINES FIELD LOCATED.

2. WHEN ENTERGY PIPE LINE MARKINGS ARE NOT VISIBLE, CALL (713) 945-8036 OR (713) 945-8037 (7:00 A.M. TO 4:30 P.M.) FOR STATUS OF LINE LOCATION REQUEST BEFORE EXCAVATION BEGINS.

3. WHEN EXCAVATING WITHIN EIGHTEEN INCHES (18") OF THE INDICATED LOCATION OF ENTERGY FACILITIES, ALL EXCAVATION MUST BE ACCOMPLISHED USING NON-MECHANIZED EXCAVATION PROCEDURES.

4. WHEN ENTERGY FACILITIES ARE EXPOSED, SUFFICIENT SUPPORT MUST BE PROVIDED TO THE FACILITIES TO PREVENT EXCESSIVE STRESS ON THE PIPING.

5. FOR EMERGENCIES REGARDING GAS LINES CALL (713) 659-3552 OR (713) 207-4200.

6. THE CONTRACTOR IS FULLY RESPONSIBLE FOR ANY DAMAGES CAUSED BY FAILURE TO EXACTLY LOCATE AND PRESERVE THESE UNDERGROUND FACILITIES.

OVERHEAD ELECTRICAL FACILITIES

1. OVERHEAD LINES MAY EXIST ON THE PROPERTY. THE LOCATION OF OVERHEAD LINES HAS NOT BEEN SHOWN ON THESE DRAWINGS AS THE LINES ARE CLEARLY VISIBLE, BUT YOU SHOULD LOCATE THEM PRIOR TO BEGINNING ANY CONSTRUCTION. TEXAS LAW, SECTION 752, HEALTH & SAFETY CODE, FORBIDS ACTIVITIES THAT OCCUR IN CLOSE PROXIMITY TO HIGH VOLTAGE LINES, SPECIFICALLY:

2. ANY ACTIVITY WHERE PERSON OR THINGS MAY COME WITHIN SIX (6) FEET OF LIVE OVERHEAD HIGH VOLTAGE LINES; AND

3. OPERATING A CRANE, DERRICK, POWER SHOVEL, DRILLING RIG, PILE DRIVER, HOISTING EQUIPMENT, OR SIMILAR APPARATUS WITHIN 10 FEET OF LIVE OVERHEAD HIGH VOLTAGE LINES.

4. PARTIES RESPONSIBLE FOR THE WORK, INCLUDING CONTRACTORS, ARE LEGALLY RESPONSIBLE FOR THE SAFETY OF CONSTRUCTION WORKERS UNDER THIS LAW. THIS LAW CARRIES BOTH CRIMINAL AND CIVIL LIABILITY. TO ARRANGE FOR LINES TO BE TURNED OFF OR REMOVED CALL ENTERGY AT (800) 368-3749.

5. ACTIVITIES ON OR ACROSS ENTERGY FEE OR EASEMENT PROPERTY

   NO APPROVAL TO USE, CROSS OR OCCUPY ENTERGY FEE OR EASEMENT PROPERTY IS GIVEN. IF YOU NEED TO USE ENTERGY PROPERTY, PLEASE CONTACT OUR SURVEYING & RIGHT OF WAY DIVISION AT (713) 207-6248 OR (713) 207-5769.

rps Texas PE Firm Reg. #F-929
575 N.Dairy Ashford, Suite 700, Houston, Texas 77079
T +1 281 589 7257 E usinfrastructure@rpsgroup.com

TEXAS GENERAL LAND OFFICE
BPSUD Elevated Water Storage Tank

Bolivar Peninsula Special Utility District

SURVEY COMPANY:

HIGH TIDE LAND SURVEYING LLC.
975 LAZY LANE WEST
CRYSTAL BEACH, TX 77650
MAILING P.O. BOX 16142 GALVESTON, TX 77552

BENCHMARK: ①

NGS MARK HGCSD 64 PID AW6988 SITUATED ABOUT 7.5 MILES SOUTHWEST OF GILCHREST ABOUT 2.5 MILES NORTHEASE OF CRYSTAL BEACH ON THE BOLAVAR PENINSULA AND ON THE SOUTH SIDE OF STATE HIGHWAY 87 ELEVATION 5.1' FEET NAVD 88.

FLOODPLAIN:

THIS PROJECT LIES WITHIN THE 100 YEAR FLOOD PLAIN AS ESTABLISHED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY. ACCORDING TO THE FLOOD INSURANCE RATE MAP NUMBER 48167C0309G, EFFECTIVE DATE AUGUST 15, 2019. THIS MAP LIES WITHIN ZONE "AE" WITH A BASE FLOOD ELEVATION OF 13 FEET.

TO ARRANGE FOR LINES TO BE TURNED OFF OR MOVED, CALL ENTERGY AT 1-800-368-3749

NOTICE:

FOR YOUR SAFETY, YOU ARE REQUIRED BY TEXAS LAW TO CALL 811 AT LEAST 48 HOURS BEFORE YOU DIG SO THAT UNDERGROUND LINES CAN BE MARKED. THIS VERIFICATION DOES NOT FULFILL YOUR OBLIGATION TO CALL 811.

REV	DESCRIPTION	BY	DATE

STATE OF TEXAS
SYLVESTER JOHNSON, JR.
111505
LICENSED
PROFESSIONAL ENGINEER
9/3/2020

GENERAL NOTES

RPS Project No 007517 (1068.002.001)	
Drawn By JAH	Checked By MRM
Scale NTS	Date AUGUST 2020
DWG No G-3	Sheet 3 Of 28

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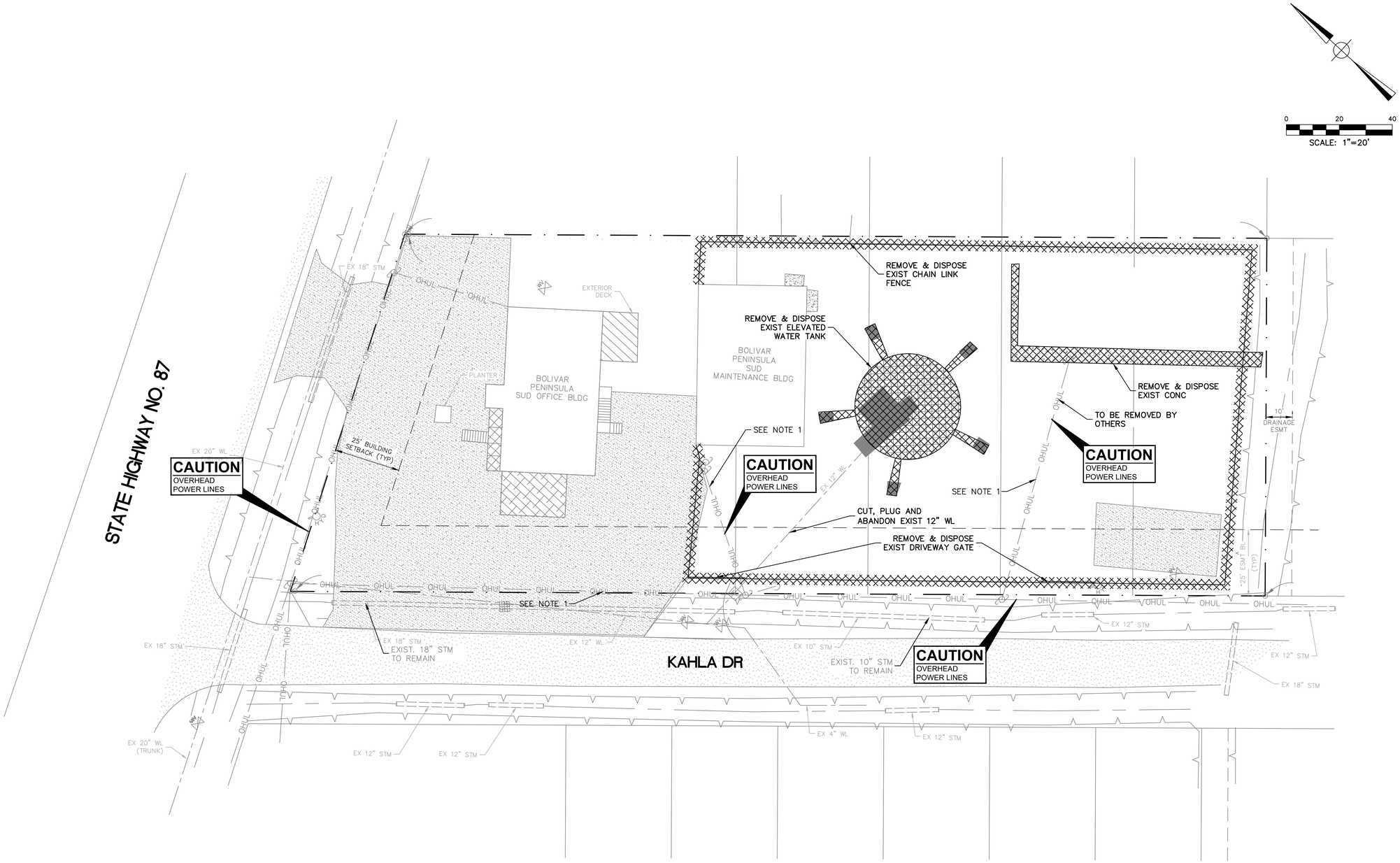

LEGEND:

- REMOVE & DISPOSE EXIST
- EXISTING CONCRETE PAVEMENT
- EXISTING CONCRETE ROADWAY

NOTES:

1. CONTRACTOR SHALL COORDINATE WITH ENTERGY (1-800-368-3749) ON DE-ENGERGIZATING OR RELOCATING OVERHEAD POWER POLES AND POWER LINES AS REQUIRED FOR SITE WORK.

RPS
Texas PE Firm Reg. #F-929
575 N.Dairy Ashford, Suite 700, Houston, Texas 77079
T +1 281 589 7257 E usinfrastructure@rpsgroup.com

TEXAS GENERAL LAND OFFICE

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Bolivar Peninsula Special Utility District

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975 LAZY LANE WEST
CRYSTAL BEACH, TX 77650
MAILING P.O. BOX 16142 GALVESTON, TX 77552

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REV	DESCRIPTION	BY	DATE

STATE OF TEXAS
SYLVESTER JOHNSON, JR.
111505
LICENSED PROFESSIONAL ENGINEER
8/24/2020

DEMOLITION PLAN

RPS Project No 007517 (1068.002.001)	
Drawn By JAH	Checked By MRM
Scale 1"=20'	Date AUGUST 2020
DWG No C-1	Sheet 4 Of 28

J:\1068.002.001\07.00 CADD\BPSUD Elevated Storage Tank Site Plan\02-Construction Drawings\007517.Demolition Plan.dwg Aug 24 2020

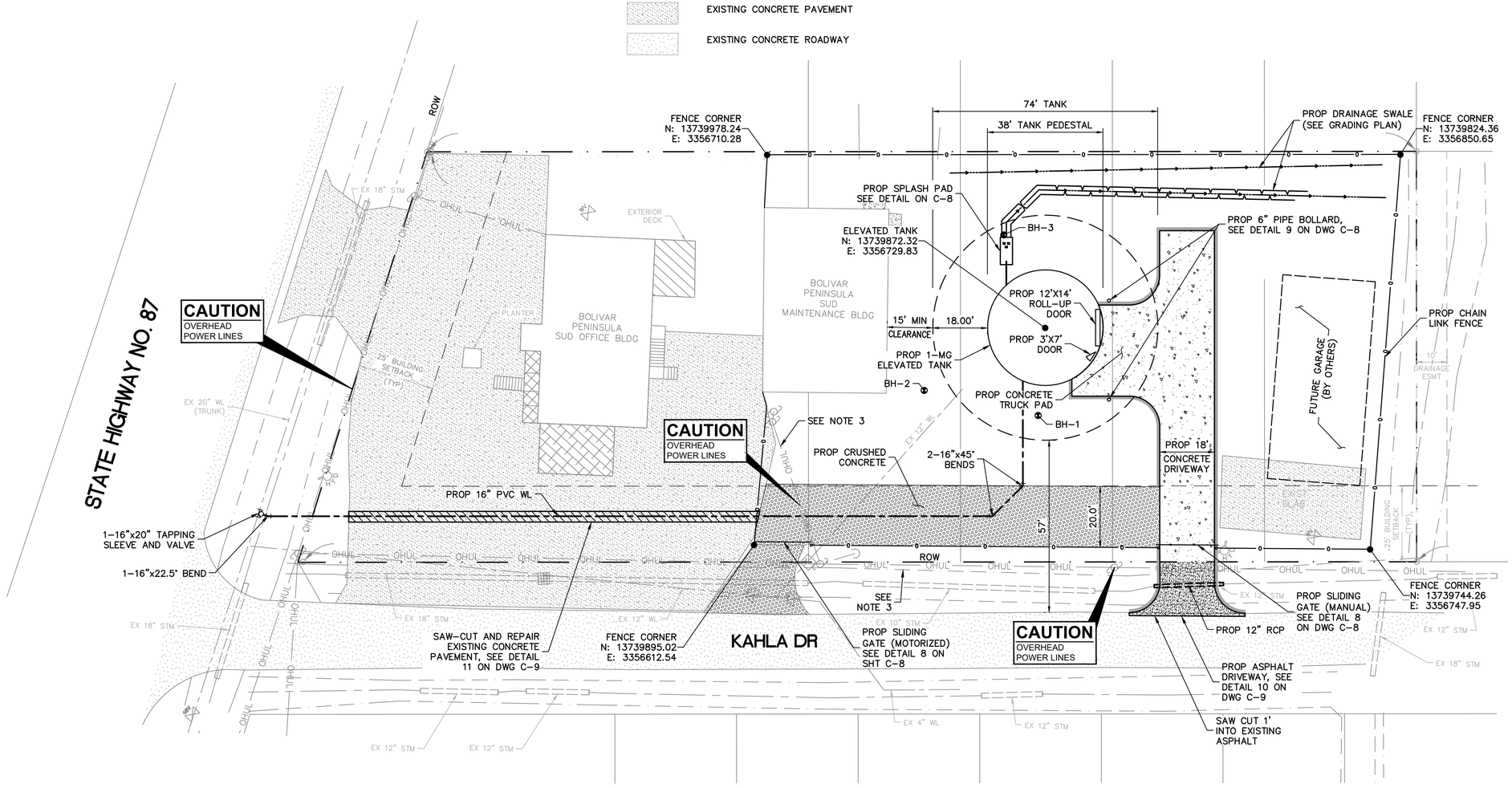
LEGEND:

- PROPERTY LINE
- PROPOSED CHAIN LINK FENCE
- PROPOSED SWALE
- PROPOSED DRIVEWAY
  5" PORTLAND CEMENT CONCRETE (PCC)
  6" LIME/FLYASH TREATED SUBGRADE
- PROPOSED DRIVEWAY
  2" ASPHALTIC CONCRETE
  8" CRUSHED CONCRETE BASE MATERIAL
  6" LIME/FLYASH TREATED SUBGRADE
- PAVEMENT REPAIR
- SOD (1' OFFSET FROM PAVEMENT)
- PROPOSED CRUSHED CONCRETE
- EXISTING CONCRETE PAVEMENT
- EXISTING CONCRETE ROADWAY

NOTES:

1. COORDINATES FOR STRUCTURES ARE LOCATED ON THE OUTSIDE CORNER OF CONCRETE SLAB.
2. COORDINATES FOR CIRCULAR STRUCTURES ARE LOCATED ON THE OUTSIDE OF THE STRUCTURE.
3. CONTRACTOR SHALL COORDINATE WITH ENTERGY (1-800-368-3749) ON DE-ENGERGIZATING OR RELOCATING OVERHEAD POWER POLES AND POWER LINES AS REQUIRED FOR SITE WORK.
4. CONTRACTOR TO HYDROSEED ALL AREAS DISTURBED FROM SITE WORK.

0 20 40
SCALE: 1"=20'



BORE HOLE TABLE (BH) ⊕			
POINT	ELEVATION	NORTHING	EASTING
1	6.40	13739854.63	3356706.96
2	6.81	13739887.88	3356687.81
3	7.28	13739903.01	3356743.24

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T +1 281 589 7257 E usinfrastructure@rpsgroup.com

TEXAS GENERAL LAND OFFICE

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Bolivar Peninsula Special Utility District

SURVEY COMPANY:

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975 LAZY LANE WEST
CRYSTAL BEACH, TX 77650
MAILING P.O. BOX 16142 GALVESTON, TX 77552

BENCHMARK:

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REV	DESCRIPTION	BY	DATE

STATE OF TEXAS
SYLVESTER JOHNSON, JR.
111505
LICENSED PROFESSIONAL ENGINEER
9/3/2020

PROPOSED SITE PLAN

RPS Project No 007517 (1068.002.001)	
Drawn By JAH	Checked By MRM
Scale 1"=20'	Date AUGUST 2020
DWG No C-2	Sheet 5 Of 28

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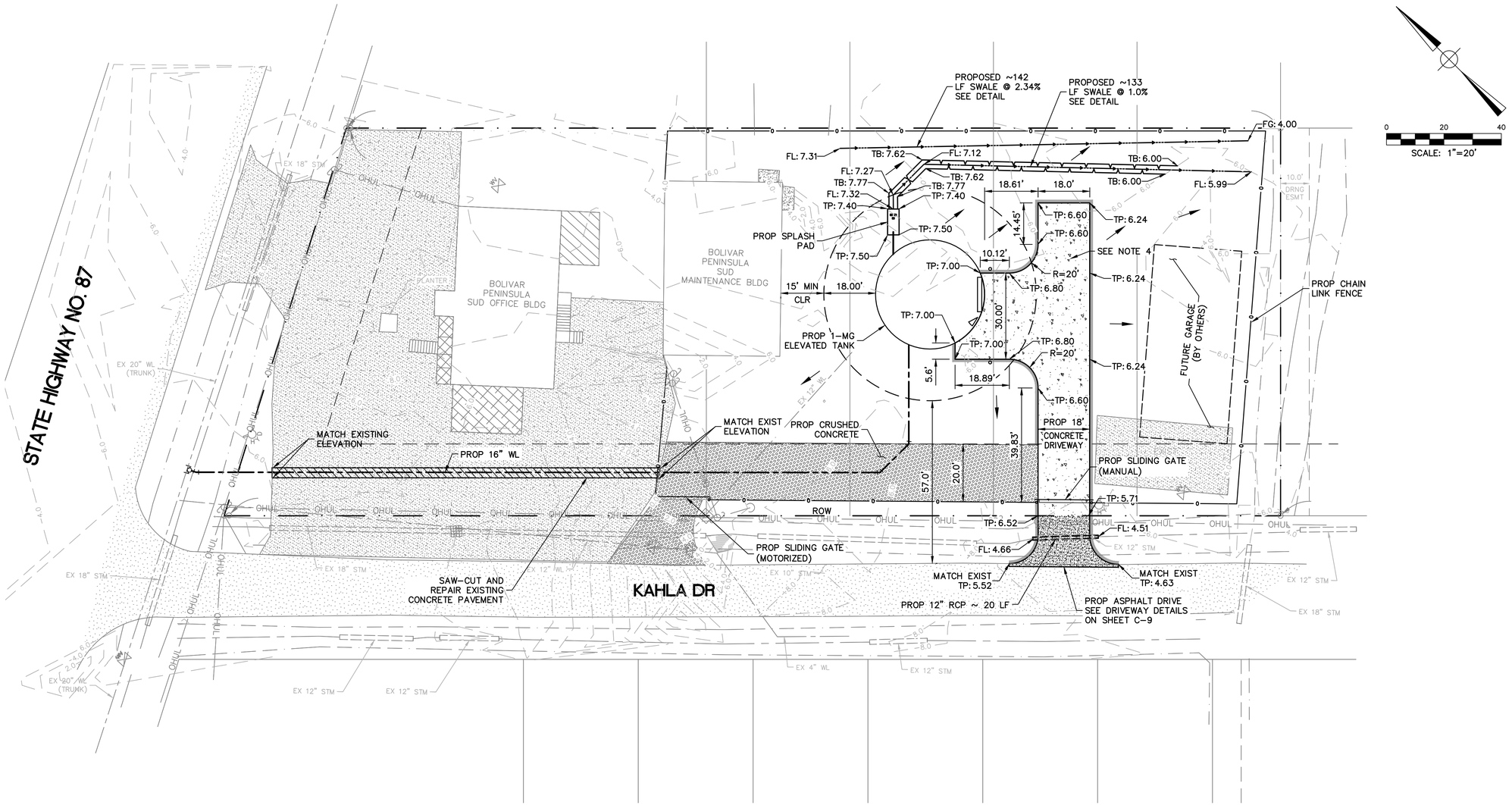
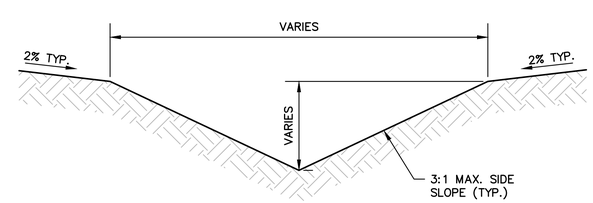


NOTES:

1. GRADE AREAS AROUND FOUNDATION PADS TO DRAIN AWAY FROM THE STRUCTURE.
2. CONTRACTOR TO RESTORE ALL AREAS DISTURBED FROM WORK.
3. CONTRACTOR TO GRADE REMAINING GRAVEL LOT AS NECESSARY TO PROVIDE POSITIVE DRAINAGE.
4. CONTRACTOR SHALL COORDINATE WITH ENTERGY (1-800-368-3749) ON DE-ENGERGIZATING OR RELOCATING OVERHEAD POWER POLES AND POWER LINES AS REQUIRED FOR SITE WORK.

LEGEND:

- PROPERTY LINE
- PROPOSED CHAIN LINK FENCE
- PROPOSED SWALE
- GRADE SLOPE ARROWS
- PROPOSED DRIVEWAY 7" PORTLAND CEMENT CONCRETE (PCC) 6" LIME TREATED SUBGRADE
- PROPOSED DRIVEWAY 2" ASPHALTIC CONCRETE 8" CRUSHED CONCRETE BASE MATERIAL 6" LIME/FLYASH TREATED SUBGRADE
- PAVEMENT REPAIR
- SOD (1' OFFSET FROM PAVEMENT)
- PROPOSED CRUSHED CONCRETE
- EXISTING CONCRETE PAVEMENT
- EXISTING CONCRETE ROADWAY



SWALE
N.T.S.

RPS
Texas PE Firm Reg. #F-929
575 N.Dairy Ashford, Suite 700, Houston, Texas 77079
T +1 281 589 7257 E usinfrastructure@rpsgroup.com

TEXAS GENERAL LAND OFFICE

BPSUD Elevated Water Storage Tank

Bolivar Peninsula Special Utility District

SURVEY COMPANY:

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975 LAZY LANE WEST
CRYSTAL BEACH, TX 77650
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BENCHMARK:

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REV	DESCRIPTION	BY	DATE

STATE OF TEXAS
SYLVESTER JOHNSON, JR.
111505
LICENSED
PROFESSIONAL ENGINEER
8/24/2020

GRADING PLAN

RPS Project No	007517 (1068.002.001)		
Drawn By	JAH	Checked By	MRM
Scale	1"=20'	Date	AUGUST 2020
DWG No	C-3	Sheet 6	Of 28

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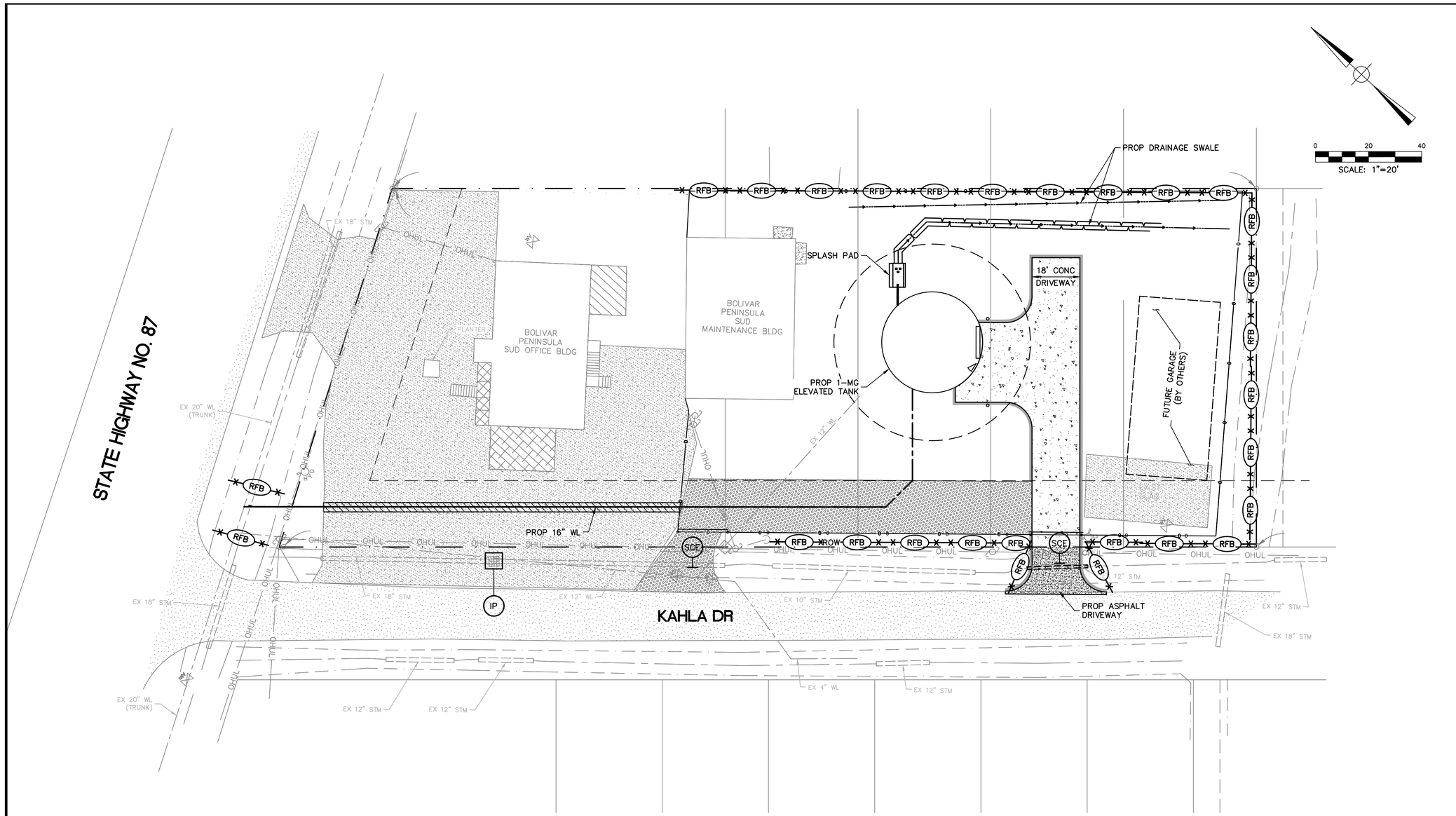

NOTES

1. SEE DRAWING C-8 FOR STORM WATER POLLUTION PREVENTION DETAILS.
2. CONTRACTOR SHALL PROVIDE STABILIZED STAGING/PARKING AREA.
3. MAINTENANCE AND INSPECTION OF EROSION/SEDIMENT CONTROL DEVICES SHALL BE PROVIDED PER SPECIFICATION SECTIONS 01566, 01568, 01569, 01571.

LEGEND:

SCE	STABILIZED CONSTRUCTION EXIT
RFB	REINFORCED FILTER FABRIC BARRIER
IP	INLET PROTECTION BARRIER

RPS
Texas PE Firm Reg. #F-929
575 N.Dairy Ashford, Suite 700, Houston, Texas 77079
T +1 281 589 7257 E usinfrastructure@rpsgroup.com

TEXAS GENERAL LAND OFFICE

BPSUD Elevated Water Storage Tank

Bolivar Peninsula Special Utility District

SURVEY COMPANY:

HIGH TIDE LAND SURVEYING LLC.
975 LAZY LANE WEST
CRYSTAL BEACH, TX 77650
MAILING P.O. BOX 16142 GALVESTON, TX 77552

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NOTICE:

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REV	DESCRIPTION	BY	DATE

STATE OF TEXAS
SYLVESTER JOHNSON, JR.
111505
LICENSED PROFESSIONAL ENGINEER
8/24/2020

STORM WATER POLLUTION PREVENTION PLAN

RPS Project No 007517 (1068.002.001)	
Drawn By JAH	Checked By MRM
Scale 1"=20'	Date AUGUST 2020
DWG No C-4	Sheet 7 Of 28

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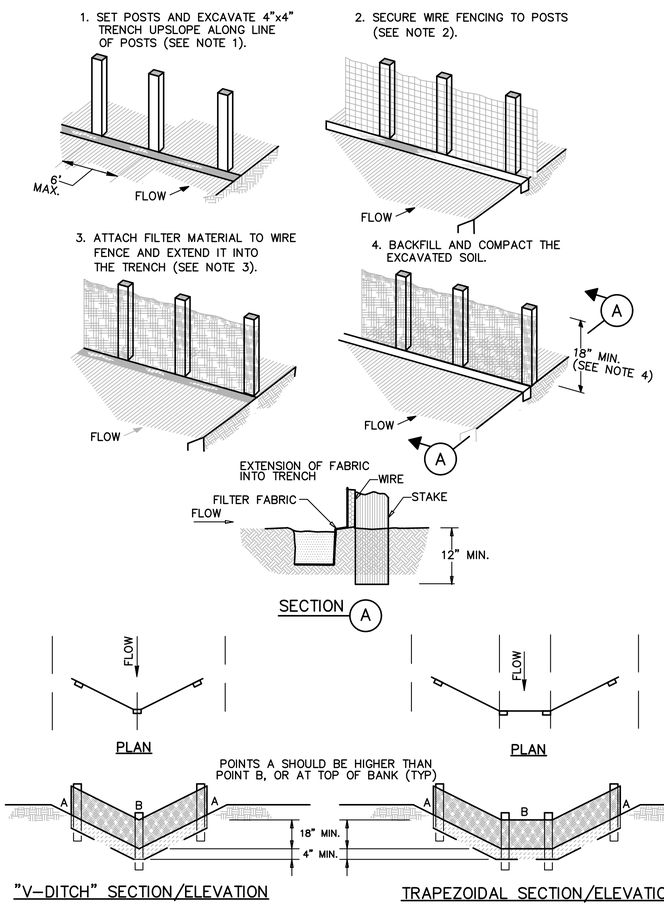

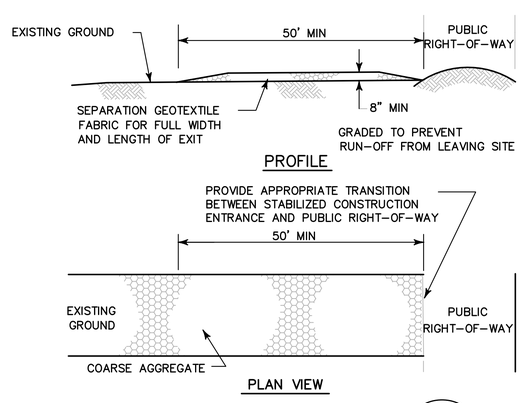

STABILIZED CONSTRUCTION EXIT

SCE
SYMBOL

CONSTRUCTION NOTES:

1. LENGTH SHALL BE AS SHOWN ON THE CONSTRUCTION DRAWINGS, BUT NOT LESS THAN 50 FEET.
2. THICKNESS SHALL BE NOT LESS THAN 8 INCHES.
3. WIDTH SHALL BE NOT LESS THAN FULL WIDTH OF ALL POINTS OF INGRESS OR EGRESS.
4. STABILIZATION FOR OTHER AREAS SHALL HAVE THE SAME AGGREGATE THICKNESS AND WIDTH REQUIREMENTS AS THE STABILIZED CONSTRUCTION EXIT, UNLESS OTHERWISE SHOWN ON THE CONSTRUCTION DRAWINGS.
5. STABILIZED AREA MAY BE WIDENED OR LENGTHENED TO ACCOMMODATE A TRUCK WASHING AREA. AN OUTLET SEDIMENT TRAP MUST BE PROVIDED FOR THE TRUCK WASHING AREA.
6. STABILIZED CONSTRUCTION EXIT SHALL BE MAINTAINED FREE OF SEDIMENT FOR THE DURATION OF THE PROJECT.

NOTES:

1. SET 2 INCH BY 2 INCH WOODEN STAKES SPACED A MAX. OF 6 FEET APART AND EMBEDDED A MIN. OF 12 INCHES.
2. WOVEN WIRE FENCE TO BE FASTENED SECURELY TO FENCE POSTS WITH STAPLES.
3. FILTER CLOTH TO BE FASTENED SECURELY TO WOVEN WIRE FENCE, WITH TIES SPACED EVERY 24 INCHES AT TOP AND MIDSECTION.
4. MINIMUM HEIGHT OF FILTER SHOULD BE 18 INCHES AND A MAXIMUM OF 36 INCHES ABOVE NATURAL GROUND.
5. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVERLAPPED 6 INCHES AT THE POSTS, AND FOLDED.

REINFORCED FILTER FABRIC BARRIER

×— RFB — ×
SYMBOL

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TEXAS GENERAL LAND OFFICE

BPSUD Elevated Water Storage Tank

Bolivar Peninsula Special Utility District

SURVEY COMPANY:

HIGH TIDE LAND SURVEYING LLC.
975 LAZY LANE WEST
CRYSTAL BEACH, TX 77650
MAILING P.O. BOX 16142 GALVESTON, TX 77552

BENCHMARK: ①

NGS MARK HGCSD 64 PID AW6988 SITUATED ABOUT 7.5 MILES SOUTHWEST OF GILCHREST ABOUT 2.5 MILES NORTHEASE OF CRYSTAL BEACH ON THE BOLAVAR PENINSULA AND ON THE SOUTH SIDE OF STATE HIGHWAY 87 ELEVATION 5.1' FEET NAVD 88.

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NOTICE:

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REV	DESCRIPTION	BY	DATE

STATE OF TEXAS
SYLVESTER JOHNSON, JR.
111505
LICENSED PROFESSIONAL ENGINEER
8/24/2020

STORM WATER POLLUTION PERVENTION PLAN DETAILS

RPS Project No 007517 (1068.002.001)	
Drawn By JAH	Checked By NMW
Scale NTS	Date AUGUST 2020
DWG No C-5	Sheet 8 Of 28

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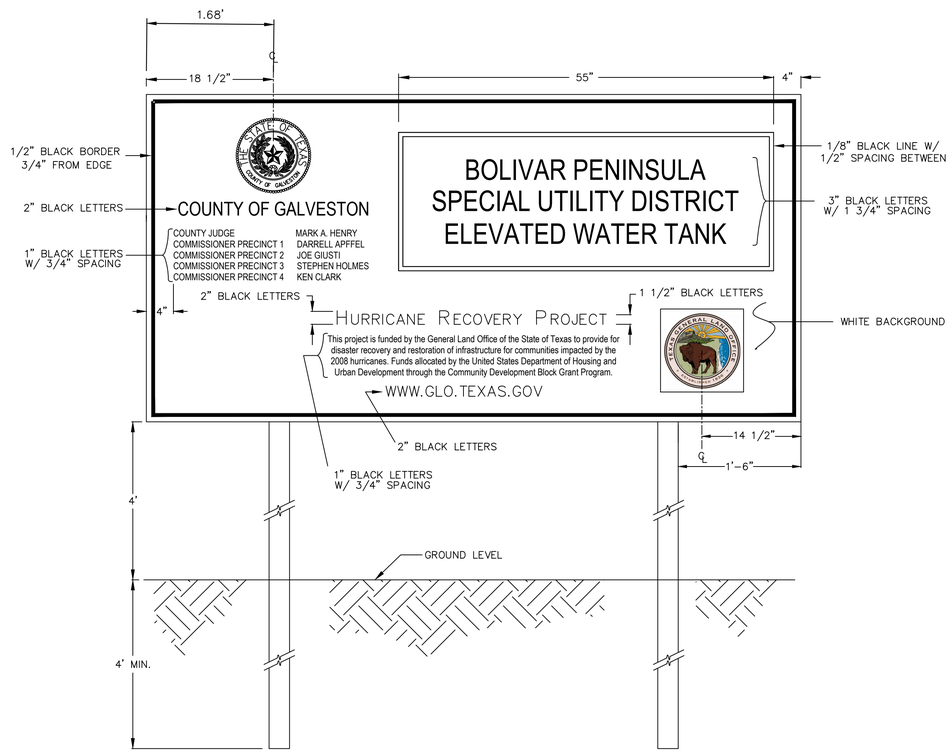
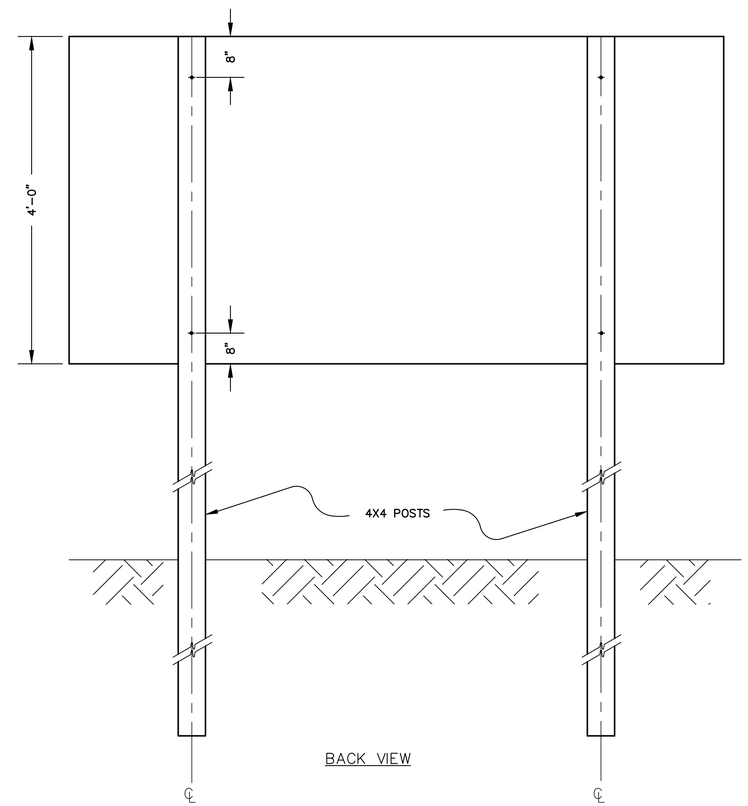


FRONT VIEW



BACK VIEW

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T +1 281 589 7257 E usinfrastructure@rpsgroup.com

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LICENSED PROFESSIONAL ENGINEER
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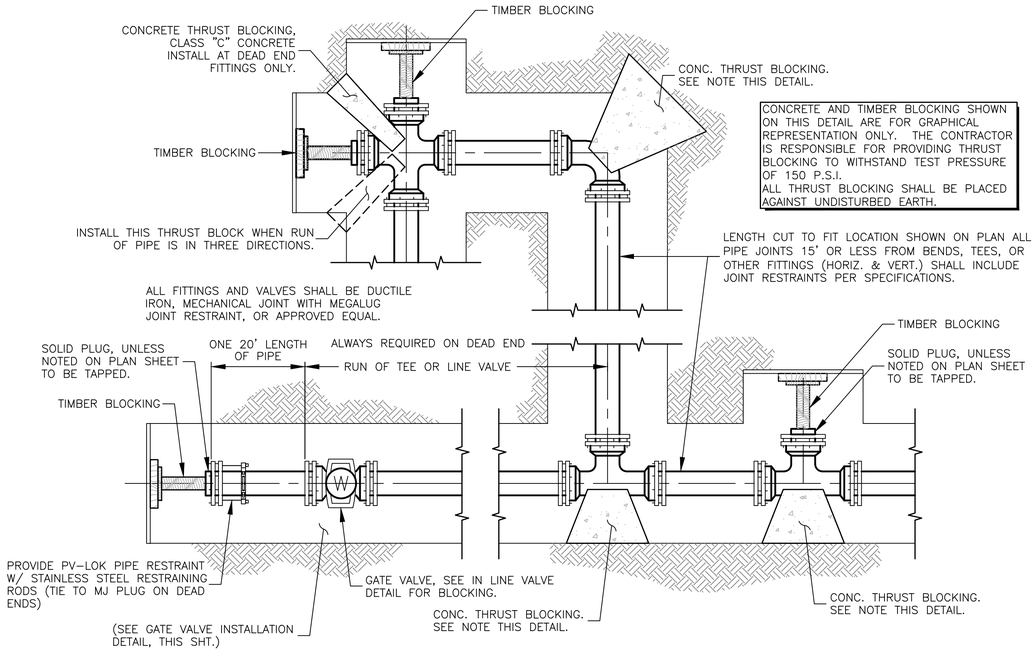
PROJECT SIGN DETAILS

RPS Project No 007517 (1068.002.001)	
Drawn By JAH	Checked By NMW
Scale NTS	Date AUGUST 2020
DWG No C-6	Sheet 9 Of 28

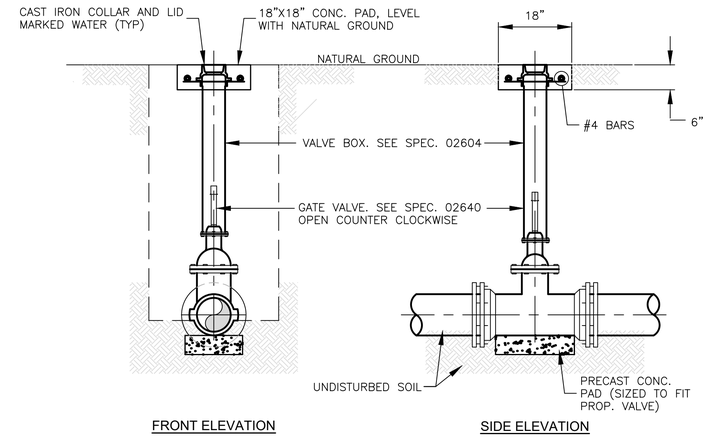
J:\1068.002.001\07.00 CADD\BPSUD Elevated Storage Tank Site Plan\02-Construction Drawings\007517.Project Sign.dwg Aug 24 2020



CONCRETE AND TIMBER BLOCKING SHOWN ON THIS DETAIL ARE FOR GRAPHICAL REPRESENTATION ONLY. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING THRUST BLOCKING TO WITHSTAND TEST PRESSURE OF 150 P.S.I.
ALL THRUST BLOCKING SHALL BE PLACED AGAINST UNDISTURBED EARTH.

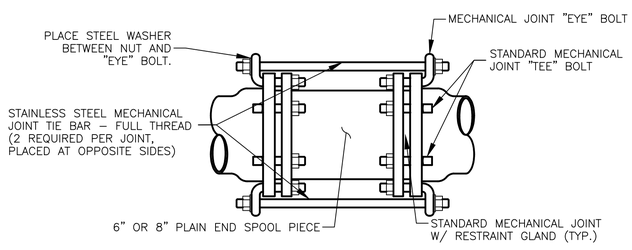
FITTING ASSEMBLY & THRUST BLOCK DETAIL

DETAIL 1
N.T.S.



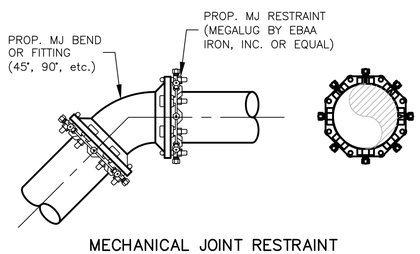
GATE VALVE INSTALLATION DETAIL

DETAIL 2
N.T.S.



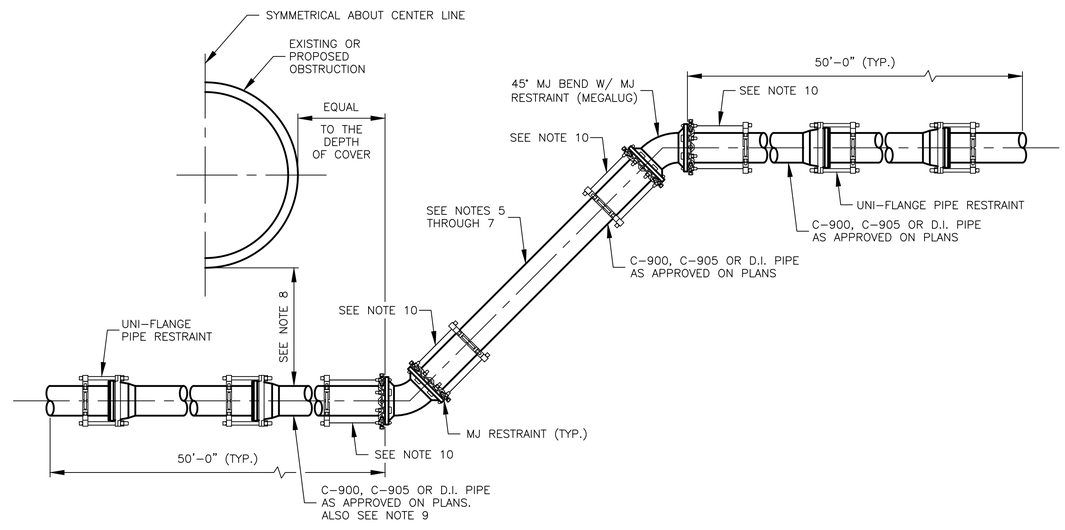
MECHANICAL RESTRAINT W/ RESTRAINING RODS

DETAIL 3
N.T.S.



MECHANICAL JOINT RESTRAINT

DETAIL 4
N.T.S.



NOTES:

1. WHEN ALTERING EXISTING LINES RESTRAIN ANY EXISTING JOINTS EXPOSED BY CONSTRUCTION BEFORE OR AFTER PROPOSED FITTINGS WITH UNI-FLANGE BELL AND SPIGOT PIPE RESTRAINT.
2. RESTRAIN ALL JOINTS WITHIN 50 FEET OF PROPOSED FITTINGS.
3. APPROPRIATE BEDDING AND BACKFILL SHALL BE IN ACCORDANCE WITH THE DETAILS AND DESIGN STANDARDS.
4. USE APPROPRIATE SERIES MODEL RESTRAINT FOR PIPE MATERIAL.
5. WHERE POSSIBLE THERE SHOULD BE NO PIPE JOINTS WITHIN THE VERTICAL OR HORIZONTAL RUN OF THE OFFSET (WHEN AND WHERE APPROVED SEE NOTE 6 AND 7).
6. IF A PIPE JOINT IS REQUIRED WITHIN THE VERTICAL OFFSET IT SHALL BE RESTRAINED WITH UNI-FLANGE BELL AND SPIGOT TYPE RESTRAINT.
7. WHEN DEPTH OF OFFSET REQUIRES MORE THAN A STANDARD LENGTH OF PIPE NO SEGMENT SHALL BE LESS THAN 5' IN LENGTH.
8. THE MINIMUM CLEARANCE SHALL BE DETERMINED BY THE AMOUNT OF BEDDING AND BACKFILL REQUIRED BY THE PROSPECTIVE PIPE AND THEIR USAGE. SEE THE BEDDING AND BACKFILL DETAILS FOR DIMENSIONS.
9. A SOLID CONTINUOUS JOINT OF PIPE SHALL BE USED AT ALL TIMES FOR THE HORIZONTAL SECTION OF THE OFFSET.
10. INSTALL STAINLESS STEEL RESTRAINING RODS FROM 45° MJ BEND TO ADJACENT MJ FITTING OR VALVE. IF NO FITTING OR VALVE EXISTS, INSTALL PV-LOK PIPE RESTRAINT OR APPROVED EQUAL.

RESTRAINED MECHANICAL JOINT VERTICAL OFFSET

DETAIL 5
N.T.S.

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LICENSED PROFESSIONAL ENGINEER
8/24/2020

WATERLINE DETAILS

RPS Project No 007517 (1068.002.001)	
Drawn By JAH	Checked By NMW
Scale NTS	Date AUGUST 2020
DWG No C-7	Sheet 10 Of 28

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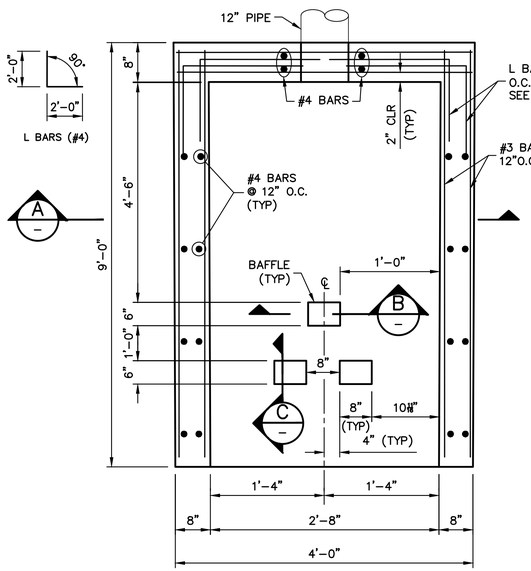
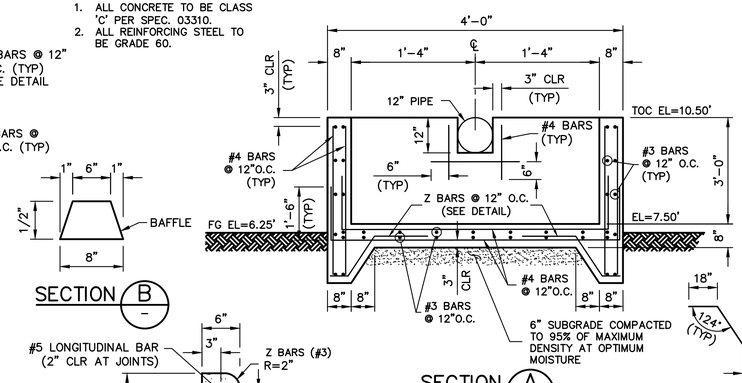
NOTES:
1. ALL CONCRETE TO BE CLASS 'C' PER SPEC. 03310.
2. ALL REINFORCING STEEL TO BE GRADE 60.

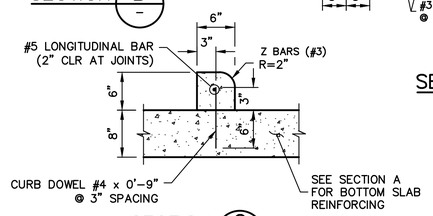


PLAN



SECTION A

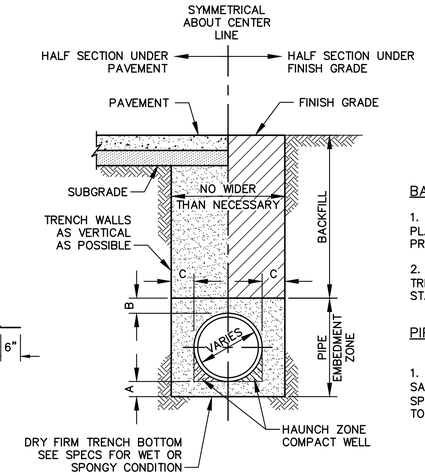
SECTION B



SECTION C

CONCRETE SPLASH PAD

DETAIL 6
NTS



BURIED PIPE INSTALLATION

DETAIL 7
NTS

DIMENSIONAL REQUIREMENTS

PIPE SIZE	A	B	C
20" AND SMALLER	6"	6"	9"
21" THRU 48"	6"	6"	12"
54" THRU 66"	9"	12"	15"
72" AND LARGER	12"	18"	15"

MATERIAL REQUIREMENTS

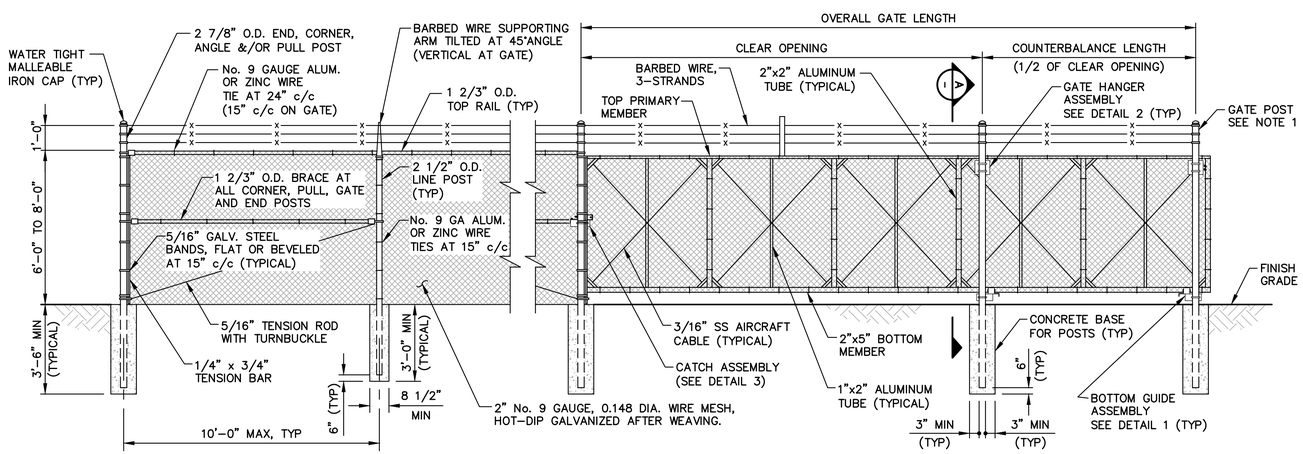
BACKFILL

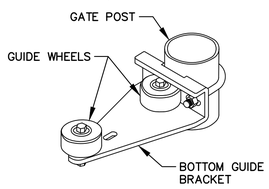
1. IN PAVED AREAS, USE CEMENT STABILIZED SAND, PLACE IN 6" LIFTS AND COMPACT TO 95% STANDARD PROCTOR DENSITY.

2. IN UNPAVED AREAS, USE SOIL EXCAVATED FROM TRENCH, PLACE IN 6" LIFTS AND COMPACT TO 85% STANDARD PROCTOR DENSITY.

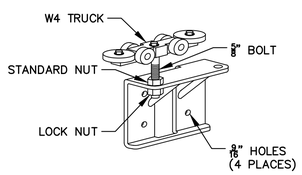
PIPE EMBEDMENT ZONE

1. FOR WATER LINES, USE WELL (DENSELY) GRADED SAND/GRAVEL MIX OR COURSE SOIL (SEE SPECIFICATIONS). PLACE IN 6" LIFTS AND COMPACT TO 95% STANDARD PROCTOR DENSITY.

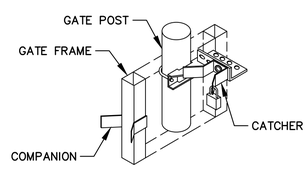




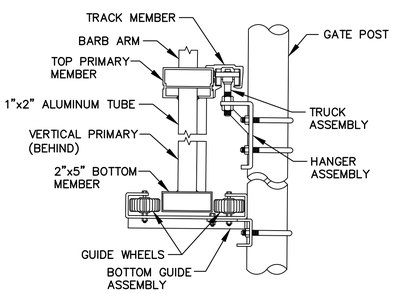
BOTTOM GUIDE ASSEMBLY 1



GATE HANGER ASSEMBLY 2



CATCH ASSEMBLY 3

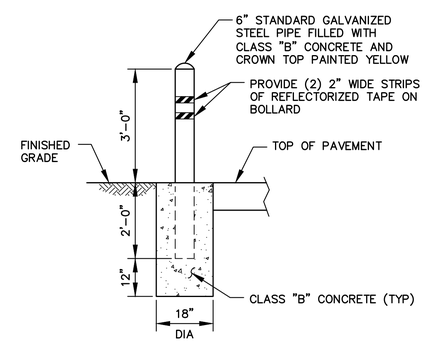


ASSEMBLY SECTION A

NOTES:
1. OUTSIDE DIAMETER OF GATE POSTS VARY ACCORDING TO LEAF WIDTH:
   6' OR LESS = 2 7/8" O.D.
   13' OR LESS = 4" O.D.
   18' OR LESS = 6 5/8" O.D.
   OVER 18' = 8 5/8" O.D.

CHAIN LINK FENCE WITH SLIDE GATE

DETAIL 8
NTS



BOLLARD

DETAIL 9
NTS

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LICENSED PROFESSIONAL ENGINEER
8/24/2020

MISCELLANEOUS DETAILS

RPS Project No 007517 (1068.002.001)	
Drawn By JAH	Checked By NMW
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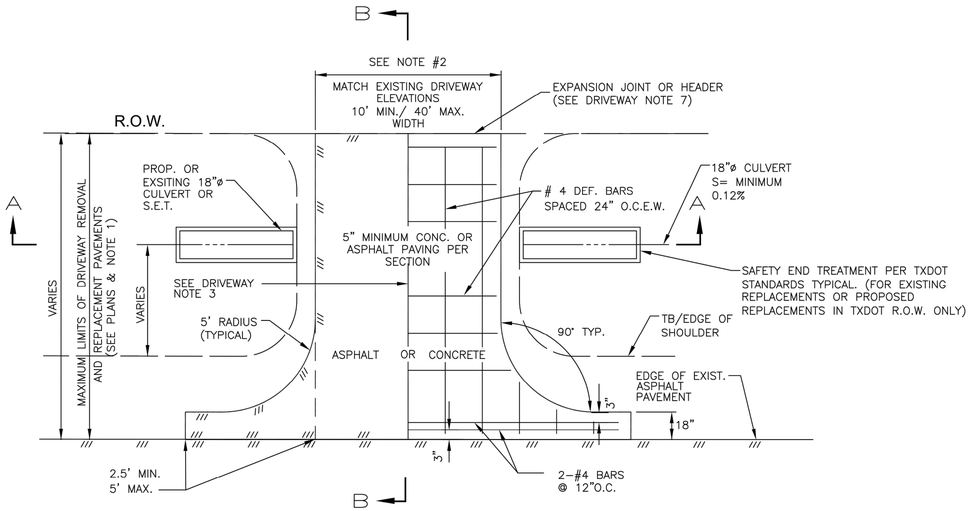
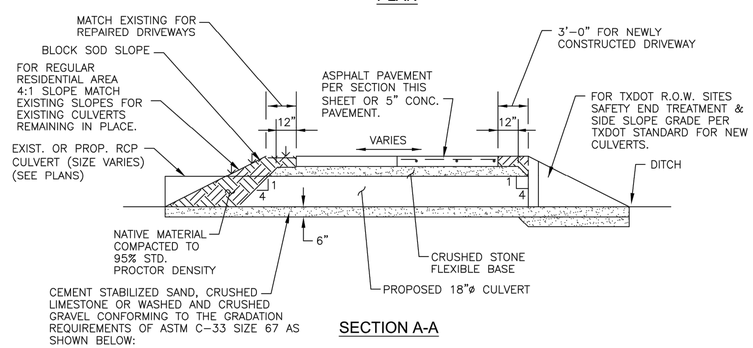
DWG No C-8	Sheet 11 Of 28

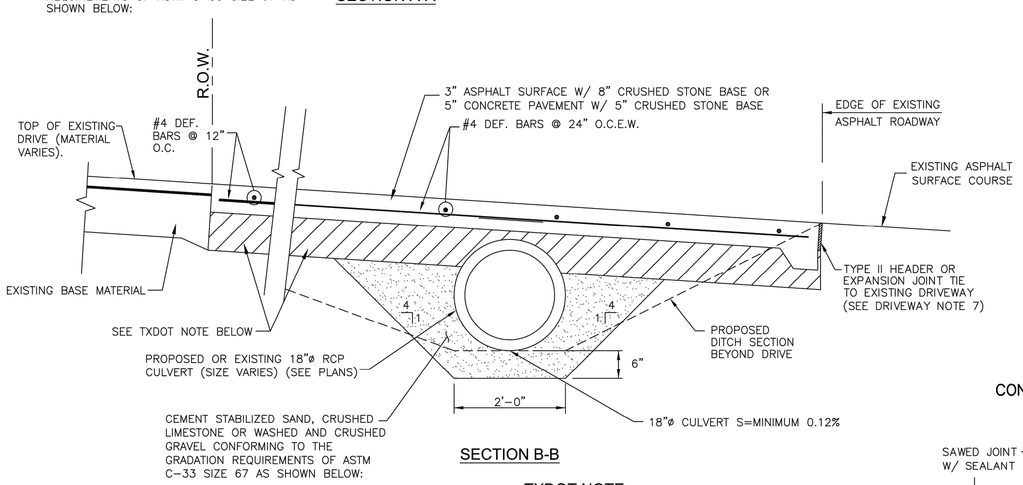
J:\1068.002.001\07.00 CADD\BPSUD Elevated Storage Tank Site Plan\02-Construction Drawings\007517.Waterline Details.dwg Aug 24 2020



PLAN



SECTION A-A



SECTION B-B

PASSING	1 INCH SIEVE	100%
PASSING	¾ INCH SIEVE	90 – 100%
PASSING	⅜ INCH SIEVE	20 – 55%
PASSING	NO. 4 SIEVE	0 – 10%
PASSING	NO. 8 SIEVE	0 – 5%

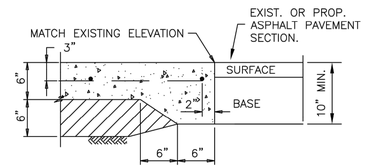
TXDOT NOTE:

6" MINIMUM CONRETE AND ANY ASPHALT DRIVEWAYS TO BE REPAIRED/REPLACED IN TXDOT RIGHT-OF-WAY SHALL MATCH EXISTING TXDOT PAVEMENT SECTION. BASE MATERIAL FOR ASPHALT DRIVEWAYS SHALL BE CRUSHED LIMESTONE. CRUSHED RECYCLED CONCRETE IS NOT ACCEPTABLE TO TXDOT.

CONCRETE OR ASPHALT DRIVEWAY DETAIL

DETAIL 10

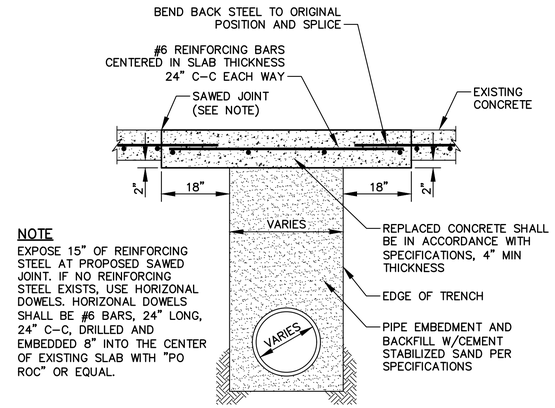
NTS



CONCRETE TO ASPHALT TYPE II PAVING HEADER

DETAIL 11

NTS



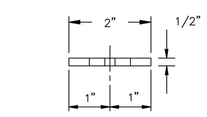
NOTE

EXPOSE 15" OF REINFORCING STEEL AT PROPOSED SAWED JOINT. IF NO REINFORCING STEEL EXISTS, USE HORIZONAL DOWELS. HORIZONAL DOWELS SHALL BE #6 BARS, 24" LONG, 24" C-C, DRILLED AND EMBEDDED 8" INTO THE CENTER OF EXISTING SLAB WITH "PO ROC" OR EQUAL.

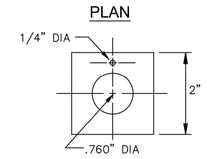
CONCRETE DRIVEWAY REPAIR

DETAIL 12

NTS



PLAN

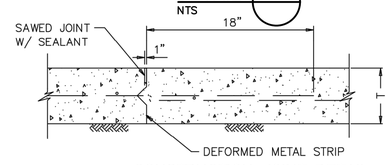


ELEVATION

CONCRETE OR ASPHALT DRIVEWAY DETAIL

DETAIL 13

NTS



CONSTRUCTION JOINT DETAIL

DETAIL 14

NTS

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LICENSED
PROFESSIONAL ENGINEER
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DRIVEWAY DETIALS

RPS Project No 007517 (1068.002.001)	
Drawn By JAH	Checked By NMW
Scale N.T.S.	Date AUGUST 2020
DWG No C-9	Sheet 12 Of 28

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GENERAL NOTES

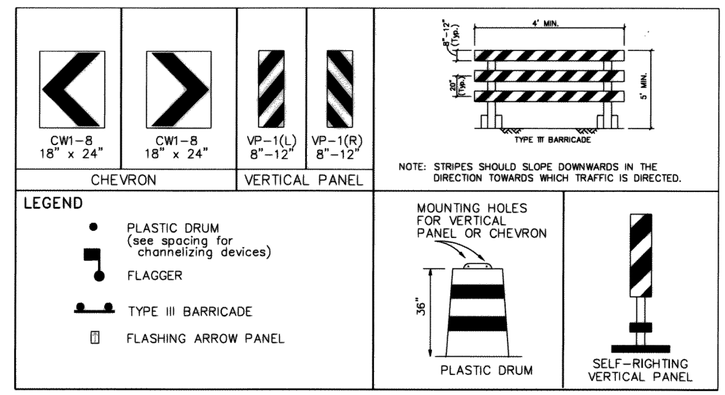
1. The Contractor shall provide and install traffic control devices in conformance with Part VI of Texas Manual on Uniform Traffic Control Devices (TMUTCD) latest edition with revisions during the entire construction period.
2. All signs and traffic control devices shall conform to the latest version of the TMUTCD.
3. No lanes shall be closed during the hours of 7:00 AM to 9:00 AM and 4:00 PM to 6:00 PM Monday thru Friday without approval of the City Traffic Engineer.
4. No work shall be performed in residential areas from 7:00 PM to 7:00 AM.
5. Contractor shall maintain approved number of thru lanes of traffic in each direction during construction working hours. Traffic control plans shall include one-way and/or detour plans.
6. Contractor shall maintain traffic lanes and detours according to traffic control plans during working hours.
7. Contractor shall cover open pavement excavations for minor utility work with anchored steel plates during non-working hours, and open lanes for normal traffic flow when feasible.
8. If the Contractor chooses to use a different method of "Traffic Control Plans" during the construction than what is outlined in the contract drawings, the Contractor shall be responsible to prepare and submit an alternate set of traffic control plans to the City of Houston Project Manager for approval ten working days prior to implementation. These plans shall be drawn to scale on reproducible mylars and shall be sealed by a Licensed Engineer in the State of Texas. Traffic Operations Division representative approval is required to accept the proposed changes.
9. Contractor shall secure lane/sidewalk closure permits from Traffic Operations Division (Mobility Permit Section at http://www.gims.houstontx.gov/portalWS/MainPortal.aspx) before implementing the traffic control plan. The application must be submitted at least ten business days prior to the implementation of the traffic control plan and/or beginning construction work. The contractor shall provide traffic control plans, construction sequencing, and schedule with the application.
10. Contractor shall have approved traffic control plan and permit at the job site for inspection at all times.
11. During pavement surface restoration projects; the Contractor shall not open closed lanes until the pavement surface has cured enough to allow vehicular traffic according to City of Houston Standard Specifications.
12. The Contractor is responsible for scheduling and coordinating all construction activities with stake holders in the vicinity including emergency response agencies such as Houston Police Department, Houston Fire Department, and Metropolitan Transit Authority.
13. Contractor shall be responsible for issuing all work directives to all sub-contractors, utility companies, and all other entities performing construction work associated with the project.
14. Nothing in these notes or plans shall relieve the Contractor of the responsibility for job site conditions during the course of construction of the project; including safety of all modes of transportation, persons, and property, and that this requirement shall apply continuously and not be limited to working hours.
15. The Traffic Operation Division (Mobility Permits Group) per the direction of the City Traffic Engineer have the right to demand the installation of additional traffic control devices or modifications to these plans and notes, as deemed necessary to promote the safe and orderly flow of traffic and pedestrians through the construction work zone. The Contractor shall comply with these additional requests or modifications with due diligence.
16. All existing traffic control signs and pavement markings shall be maintained in visible locations during construction unless prior written approval is obtained from City of Houston Project Manager. The Contractor shall restore or replace (at the discretion of the City Traffic Engineer) any pavement marking or signing damaged during construction operations, including Raised Pavement Markers (RPMs) and chip seal markers.
17. When entering or leaving roadways carrying public traffic, the Contractor's equipment, whether empty or loaded shall in all cases yield to public traffic with assistance by Contractor provided certified flagger/peace officer.
18. Access to driveways adjacent to the construction work zone shall be maintained at all times as much as possible. Additional cones delineators may be required to delineate the driveway access route through the construction work zone. A minimum of one travel lane shall be maintained across the driveways, unless prior written approval is obtained from City of Houston Project Manager.
19. Spillage resulting from hauling operations along or across any public traveled way shall be removed immediately by the Contractor.
20. The Contractor shall submit an application for temporary parking restrictions if there are parking meters located at the proposed lane closures from Parking Management Division (832-393-8690) at least ten business days before implementation of lane closures. In addition, temporary no parking signs shall be posted 24 hours prior to commencement of work.
21. Additional off duty police officers/flaggers may be requested to direct traffic when lanes are blocked at the discretion of the City Project Manager even if they are not specifically identified on the project plans.
22. The Contractor shall replace within 72 hours, all traffic signal loop detectors damaged during construction.
23. In general, a solar powered flashing arrow board shall be required on all major thoroughfare lane closures. Exceptions to flashing arrow boards and/or implementation on residential lane closures shall be approved by the City Traffic Engineer.
24. Approved traffic control plan shall be in place before starting any excavation.

SPACING FOR CHANNELIZING DEVICES

A. Plastic drums on merging taper @ 30' c - c with chevron sign @ 60' c - c and warning lights for overnight closure.
B. Plastic drums on downstream taper @ 30' c - c (return taper and barricade are optional and divided roadway section)
C. Plastic drums on radii @ 35' c -c.
D. Plastic drums on tangent @ 35' c - c with vertical panel at 70' c - c and approved warning light @ 70' c - c (for overnight closure).
E. Plastic drums in front of construction zone @ 20' c - c with vertical panel at 40' c - c and approved warning light @ 40' c - c (for overnight closure).
F. Concrete Traffic Barrier (CTB) or Low Profile Concrete Traffic Barrier (LPCTB) with approved reflectors @ 10' c - c if pavement drop is greater than 1 foot.
G. Plastic drums w/Guard rail mounted.
H. Self- Righting vertical panel spacing.
   - 4 lanes to 2 lanes undivided roadway section @ 20' c - c.
   - 4 lanes divided roadway to one side two way roadway @ 20' c - c.
   - Left lane and right lane storage bays @ 15' c - c.

I. Spacing shown on traffic control shall supersede the above spacing.
J. Spacing may be adjusted to provide driveways, intersections and /or median openings.

CHANNELIZATION AND BARRICADES



TYPICAL SIGN SPACING, TAPER LENGTHS, AND SUGGESTED SPACING OF CHANNELIZATION DEVICES						
		Min. Desirable Taper Length "L"			Suggested Maximum Spacing Of Device	
Posted Speed (mph)	Sign Spacing "X"	10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent
30	120'	150'	165'	180'	30'	60' – 75'
35	160'	205'	225'	245'	35'	70' – 90'
40	240'	265'	295'	320'	40'	80' – 100'
45	320'	450'	495'	540'	45'	90' – 110'
50	400'	500'	550'	600'	50'	100' – 125'
55	500'	550'	605'	660'	55'	110' – 140'

Length for Buffers	
Posted Speed (mph)	Length in Feet (B)
20	40
25	60
30	90
35	120
40	155
45	195
50	240
55	295
60	350
65	410
70	475

RPS
Texas PE Firm Reg. #F-929
575 N.Dairy Ashford, Suite 700, Houston, Texas 77079
T +1 281 589 7257 E usinfrastructure@rpsgroup.com

TEXAS GENERAL LAND OFFICE
BPSUD Elevated Water Storage Tank

Bolivar Peninsula Special Utility District

SURVEY COMPANY:
HIGH TIDE LAND SURVEYING LLC.
975 LAZY LANE WEST
CRYSTAL BEACH, TX 77650
MAILING P.O. BOX 16142 GALVESTON, TX 77552

BENCHMARK:
NGS MARK HGCSD 64 PID AW6988 SITUATED ABOUT 7.5 MILES SOUTHWEST OF GILCHREST ABOUT 2.5 MILES NORTHEASE OF CRYSTAL BEACH ON THE BOLAVAR PENINSULA AND ON THE SOUTH SIDE OF STATE HIGHWAY 87 ELEVATION 5.1' FEET NAVD 88.

FLOODPLAIN:
THIS PROJECT LIES WITHIN THE 100 YEAR FLOOD PLAIN AS ESTABLISHED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY. ACCORDING TO THE FLOOD INSURANCE RATE MAP NUMBER 48167C0309G, EFFECTIVE DATE AUGUST 15, 2019. THIS MAP LIES WITHIN ZONE "AE" WITH A BASE FLOOD ELEVATION OF 13 FEET.

TO ARRANGE FOR LINES TO BE TURNED OFF OR MOVED, CALL ENTERGY AT 1-800-368-3749
NOTICE:
FOR YOUR SAFETY, YOU ARE REQUIRED BY TEXAS LAW TO CALL 811 AT LEAST 48 HOURS BEFORE YOU DIG SO THAT UNDERGROUND LINES CAN BE MARKED. THIS VERIFICATION DOES NOT FULFILL YOUR OBLIGATION TO CALL 811.

REV	DESCRIPTION	BY	DATE

STATE OF TEXAS
SYLVESTER JOHNSON, JR.
111505
LICENSED
PROFESSIONAL ENGINEER
8/24/2020

TRAFFIC CONTROL PLAN NOTES
CHANNELIZING DEVICES
AND BARRICADES

RPS Project No 007517 (1068.002.001)	
Drawn By JAH	Checked By NMW
Scale NTS	Date AUGUST 2020
DWG No C-10	Sheet 13 Of 28

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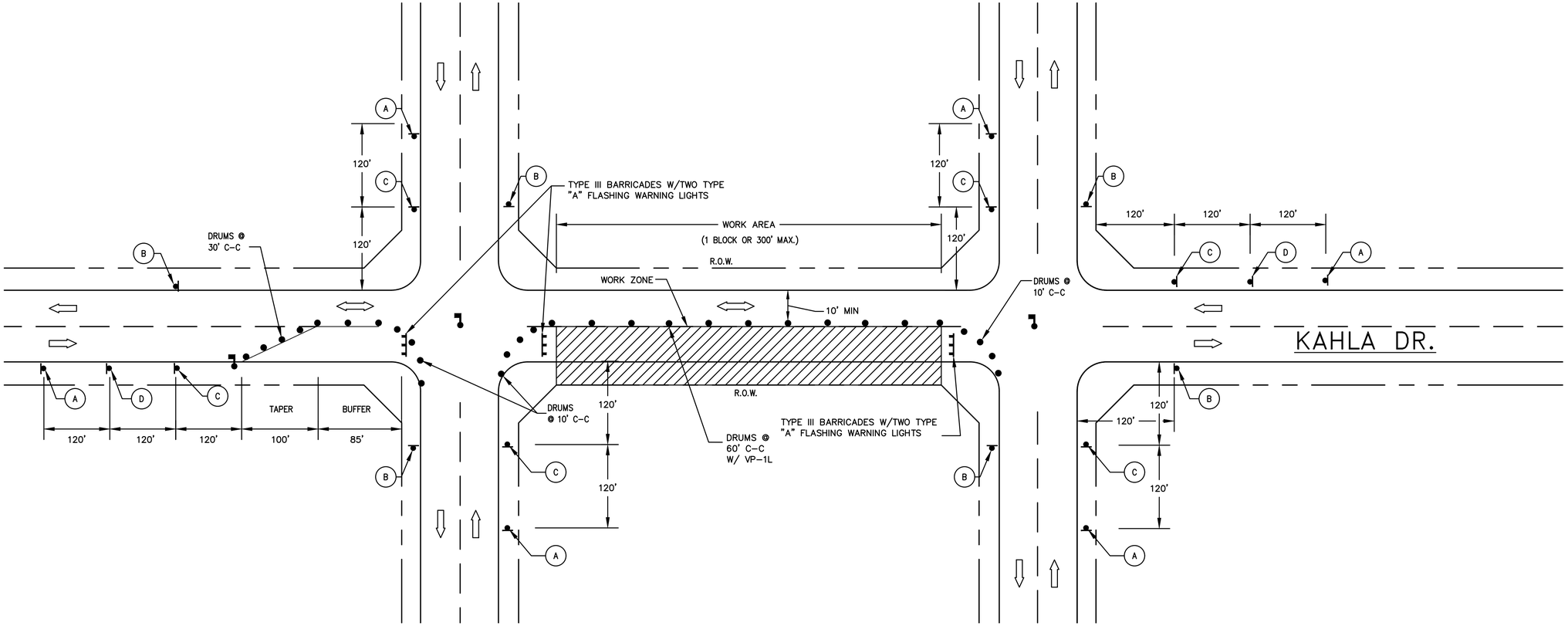
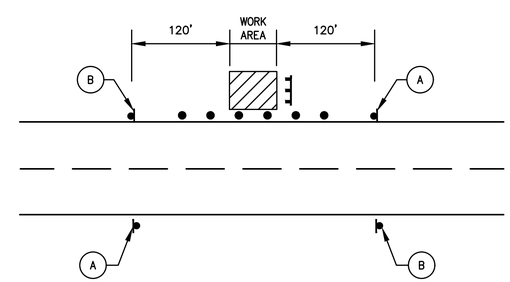


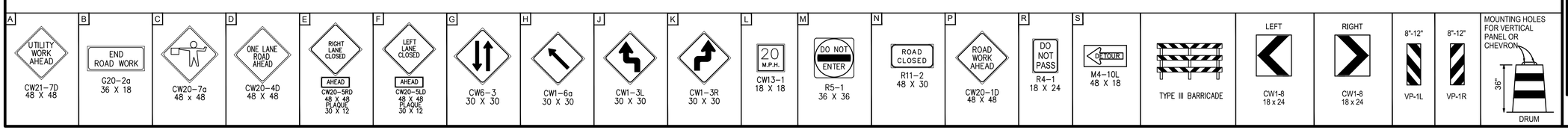
TYPICAL ONE LANE CLOSURE PLAN
TWO WAY FLAGGING OPERATION
(DURING DAYTIME WORKING HOURS ONLY)

LEGEND

- WORK ZONE
- PLASTIC DRUM (see spacing for channelizing devices)
- TYPE III BARRICADE W/TWO TYPE "A" FLASHING WARNING LIGHTS
- FLASHING ARROW PANEL
- SIGN ON POST
- TRAFFIC FLOW DIRECTION
- TUBULAR MARKER
- FLAGGER



TYPICAL APPLICATION–MINOR OPERATION, WORK OFF SIDE OF ROAD



RPS
Texas PE Firm Reg. #F-929
575 N.Dairy Ashford, Suite 700, Houston, Texas 77079
T +1 281 589 7257 E usinfrastructure@rpsgroup.com

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REV	DESCRIPTION	BY	DATE

STATE OF TEXAS
SYLVESTER JOHNSON, JR.
111505
LICENSED PROFESSIONAL ENGINEER
8/24/2020

TRAFFIC CONTROL PLAN
TYPICAL ONE LANE CLOSURE

RPS Project No 007517 (1068.002.001)	
Drawn By JAH	Checked By NMW
Scale NTS	Date AUGUST 2020
DWG No C–11	Sheet 14 Of 28

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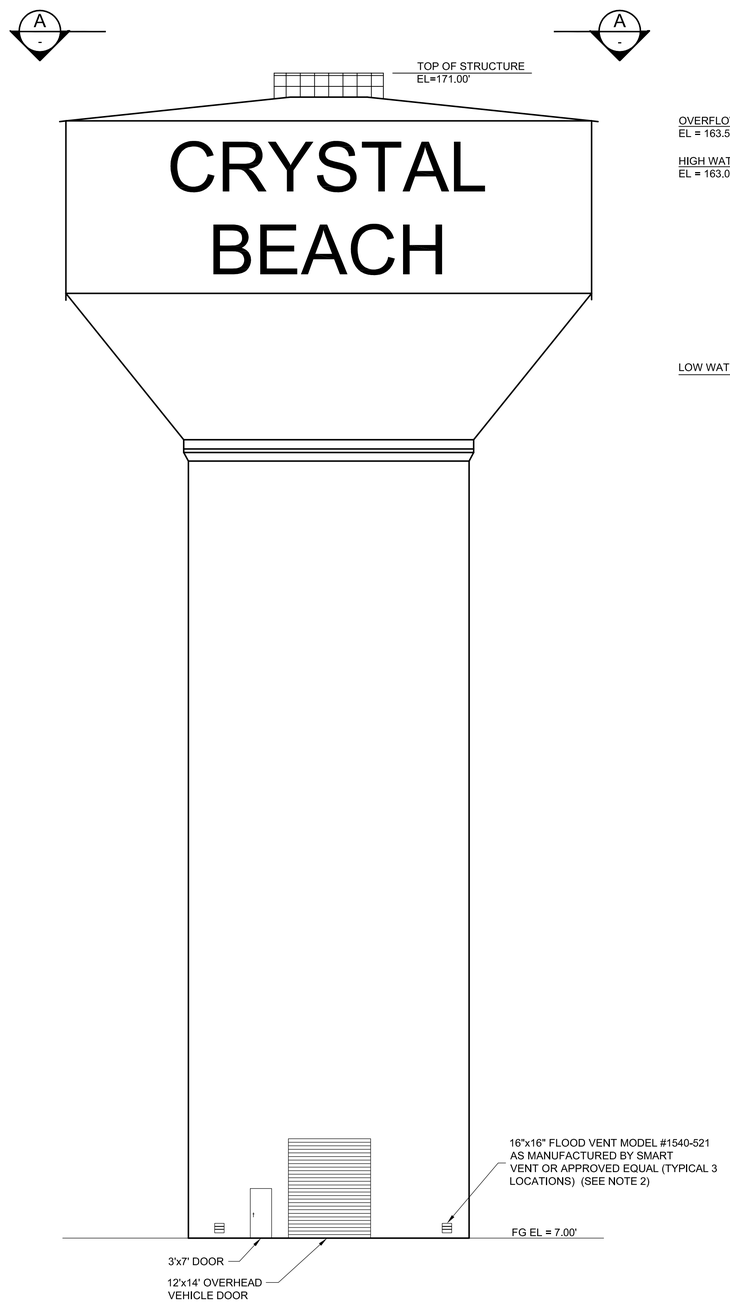

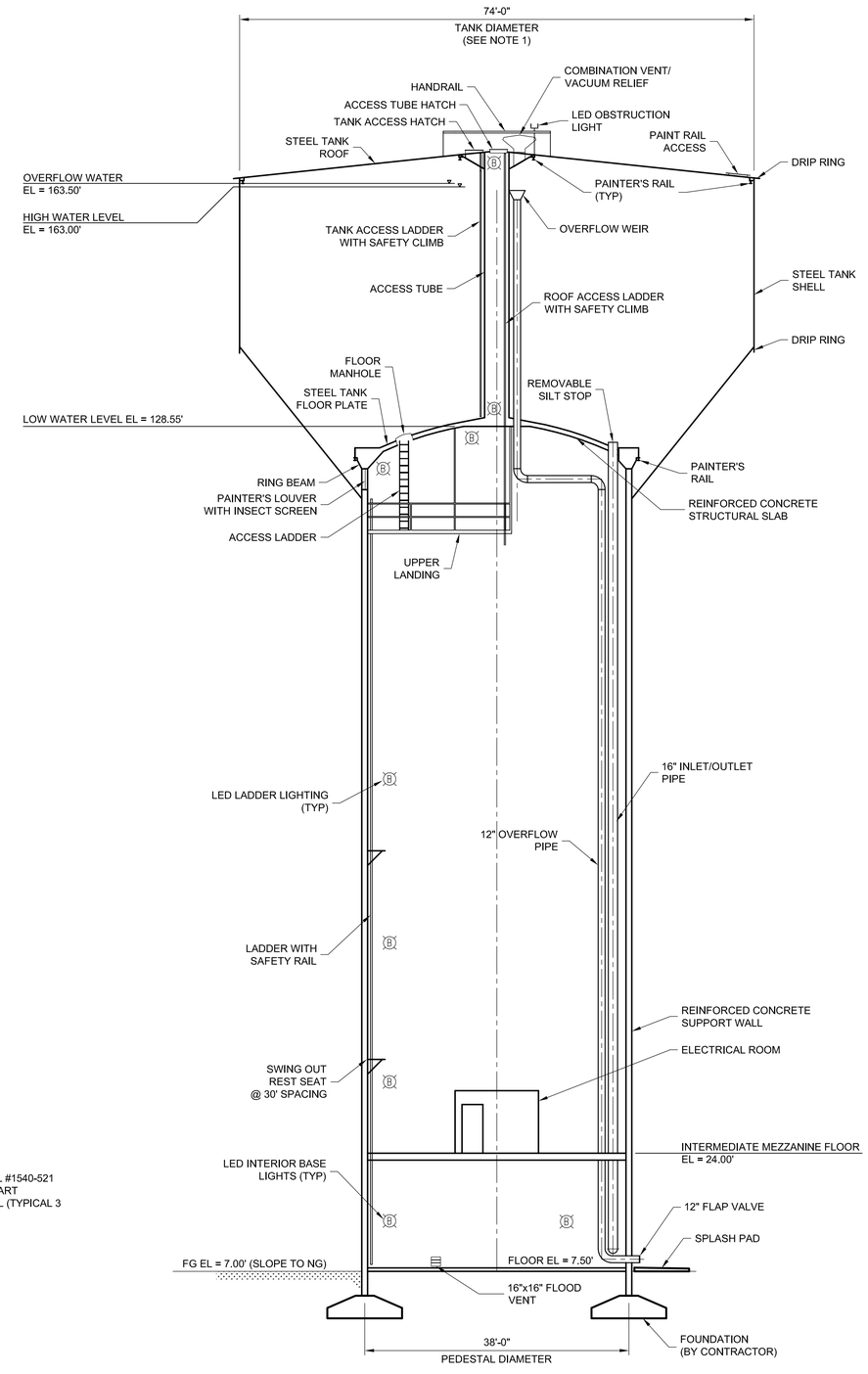

SECTION A
3/32"=1'-0"

NOTES:

1. SEE SPECIFICATION SECTION 11501 FOR DETAILS ON THE REQUIRED SOLAR POWERED STORAGE TANK MIXING SYSTEM.

2. FLOOD VENTS SHALL PROVIDE A MINIMUM TOTAL OPENING OF 1,150 SQUARE INCHES IN ACCORDANCE WITH TITLE 44 CFR 60.3(C)(5). INSTALL PER FLOOD VENT MANUFACTURER RECOMMENDATIONS.

rps
Texas PE Firm Reg. #F-929
575 N Dairy Ashford, Suite 700, Houston, Texas 77079
T +1 281 589 7257 E usinfrastructure@rpsgroup.com

TEXAS GENERAL LAND OFFICE

BPSUD Elevated Water Storage Tank

Bolivar Peninsula Special Utility District

ARDURRA
2032 Buffalo Terrace
Houston, TX 77019
Tel: (346) 666-5130
TBPE Firm Registration No. F-17004

BENCHMARK: ①

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REV	DESCRIPTION	BY	DATE

STATE OF TEXAS
CHRISTOPHER M. MUNSON
121374
LICENSED
PROFESSIONAL ENGINEER
08/21/2020

ELEVATED STORAGE TANK
ELEVATION AND SECTION

RPS Project No 007517 / 1068.002.001	
Drawn By DYB	Checked By CMM
Scale AS NOTED	Date AUGUST 2020
DWG No M-1	Sheet 15 Of 28

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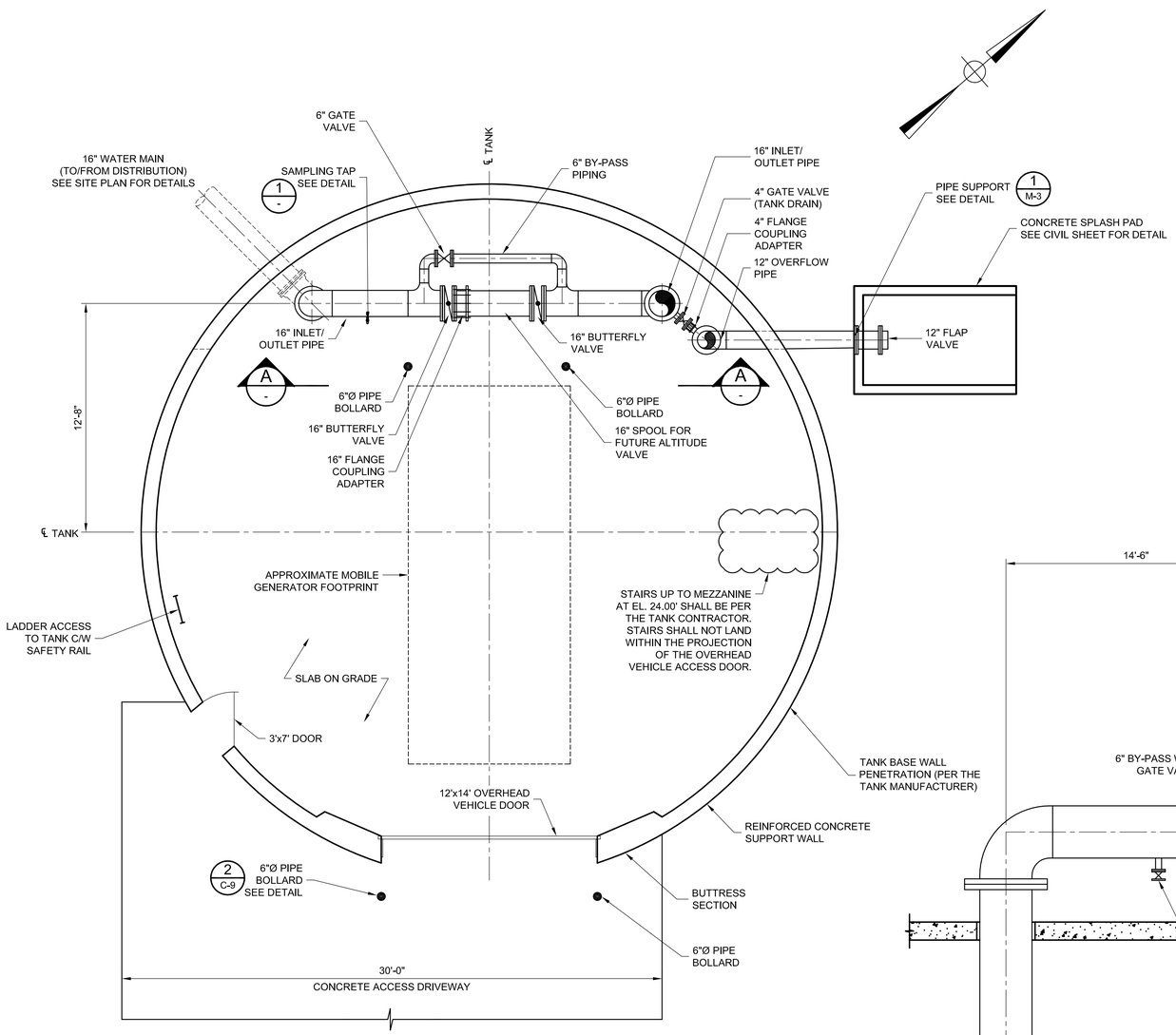
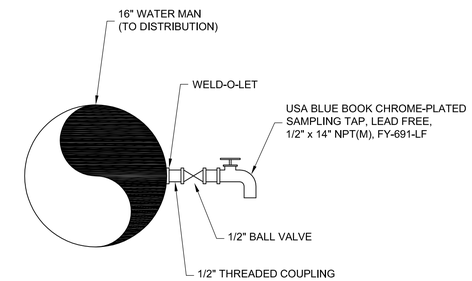


LOWER LEVEL

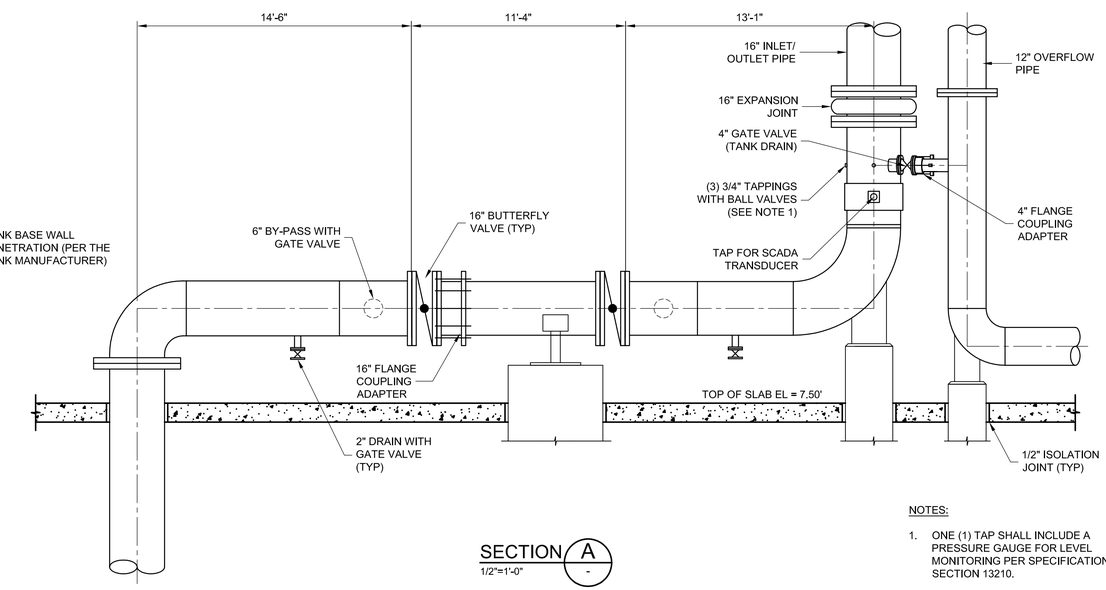
PLAN

1/4" = 1'-0"



SAMPLING TAP

DETAIL 1 -



SECTION A -

1/2"=1'-0"

NOTES:

1. ONE (1) TAP SHALL INCLUDE A PRESSURE GAUGE FOR LEVEL MONITORING PER SPECIFICATION SECTION 13210.

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Texas PE Firm Reg. #F-929

575 N.Dairy Ashford, Suite 700, Houston, Texas 77079

T +1 281 589 7257 E usinfrastructure@rpsgroup.com

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Bolivar Peninsula Special Utility District

ARDURRA

2032 Buffalo Terrace
Houston, TX 77019
Tel: (346) 666-5130
TBPE Firm Registration No. F-17004

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REV	DESCRIPTION	BY	DATE

STATE OF TEXAS
CHRISTOPHER M. MUNSON
121374
LICENSED
PROFESSIONAL ENGINEER

08/21/2020

ELEVATED STORAGE TANK
LOWER LEVEL PLAN
AND DETAILS

RPS Project No 007517 / 1068.002.001	
Drawn By DYB	Checked By CMM
Scale AS NOTED	Date AUGUST 2020
DWG No M-2	Sheet 16 Of 28

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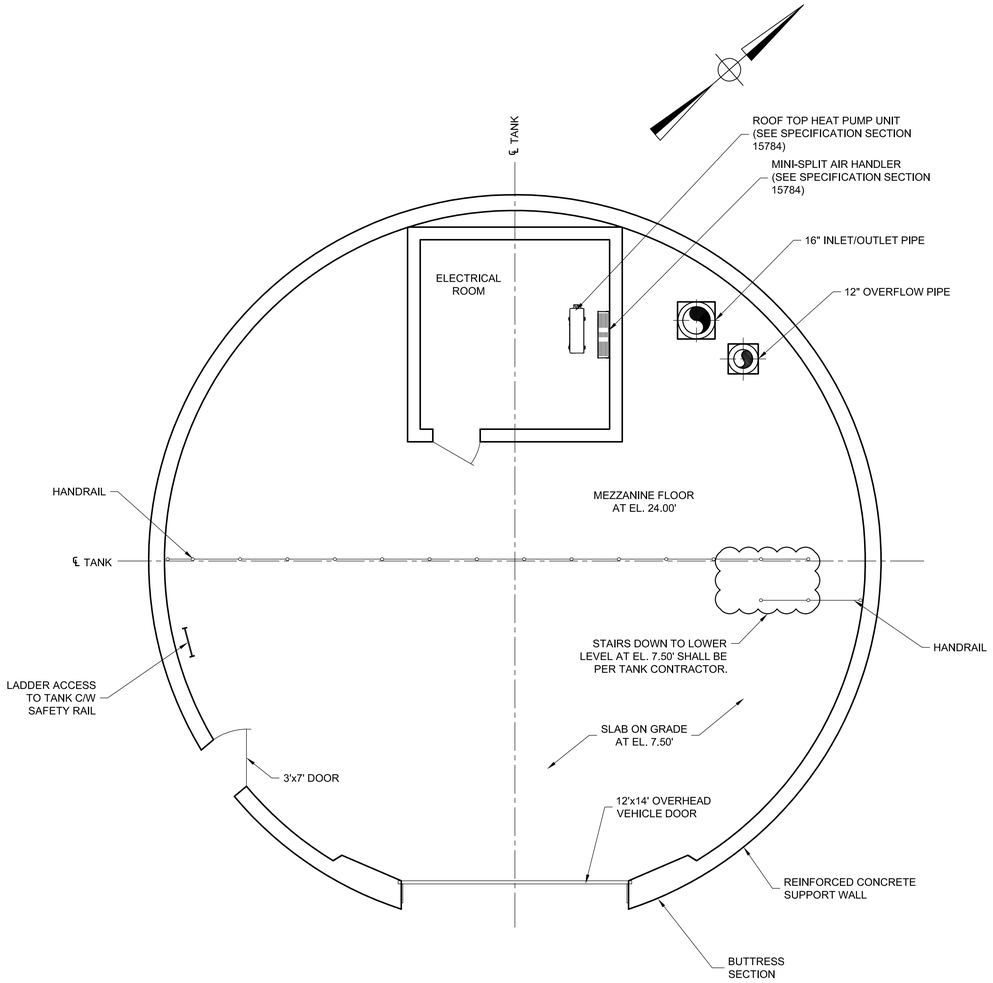
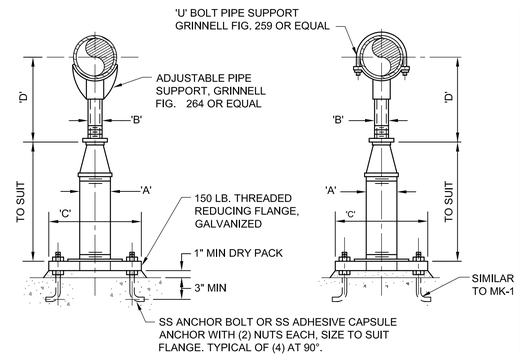


MEZZANINE LEVEL @ EL. 24.00'

PLAN

1/4" = 1'-0"



EX-1 EX-2

ADJUSTABLE PIPE SUPPORT (APPROXIMATE DIMENSION IN INCHES)

PIPE DIA	"A"	"B"	"C"	"D" (MIN)	"D" (MAX)
2 1/2"	2 1/2"	1 1/2"	9"	8"	11 1/2"
3"	2 1/2"	1 1/2"	9"	8 1/4"	11 3/4"
3 1/2"	2 1/2"	1 1/2"	9"	8 1/4"	12"
4"	3"	2 1/2"	9"	10 1/4"	14"
6"	3"	2 1/2"	9"	11 5/8"	15 1/4"
8"	3"	2 1/2"	9"	13 5/8"	16 1/2"
10"	3"	2 1/2"	9"	14 5/8"	18 1/4"
12"	3"	2 1/2"	9"	15 5/8"	19 3/4"
14"	4"	3"	11"	18 5/8"	20 3/4"
16"	4"	3"	11"	19 7/8"	22 1/4"
18"	6"	3 1/2"	13 1/2"	21 1/4"	24"
20"	6"	3 1/2"	13 1/2"	23 1/4"	25 1/2"
24"	6"	4"	13 1/2"	26 1/2"	28 1/4"
30"	6"	4"	13 1/2"	29 5/8"	31 1/2"
32"	6"	4"	13 1/2"	30 5/8"	32 3/4"
36"	6"	4"	13 1/2"	32 5/8"	34 3/4"

NOTES:

1. UNDER VALVES, METERS, OR OTHER SPECIAL APPURTENANCES A FABRICATED SUPPORT PIECE MAY BE UTILIZED AS ACCEPTABLE TO ENGINEER.
2. WHERE SHOWN UNDER PIPE OR VALVE FLANGE, PROVIDE FLANGE CRADLE SUPPORT BY MATERIAL RESOURCES OR ENGINEER APPROVED EQUAL.
3. HOT DIP GALVANIZE AFTER FABRICATION AND TOUCH-UP WITH COLD GALVANIZING COMPOUND AFTER INSTALLATION.
4. PROVIDE STAINLESS STEEL UNITS AS INDICATED BY NOTE ON SPECIFIC DRAWING.

ADJUSTABLE PIPE SUPPORT

DETAIL 1 / M-2

NOT TO SCALE

rps
Texas PE Firm Reg. #F-929
575 N Dairy Ashford, Suite 700, Houston, Texas 77079
T +1 281 589 7257 E usinfrastructure@rpsgroup.com

TEXAS GENERAL LAND OFFICE

BPSUD Elevated Water Storage Tank

Bolivar Peninsula Special Utility District

ARDURRA
2032 Buffalo Terrace
Houston, TX 77019
Tel: (346) 666-5130
TBPE Firm Registration No. F-17004

BENCHMARK:

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FLOODPLAIN:

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REV	DESCRIPTION	BY	DATE

STATE OF TEXAS
CHRISTOPHER M. MUNSON
121374
LICENSED
PROFESSIONAL ENGINEER
08/21/2020

ELEVATED STORAGE TANK
MEZZANINE LEVEL PLAN

RPS Project No 007517 / 1068.002.001	
Drawn By DYB	Checked By CMM
Scale AS NOTED	Date AUGUST 2020
DWG No M-3	Sheet 17 Of 28

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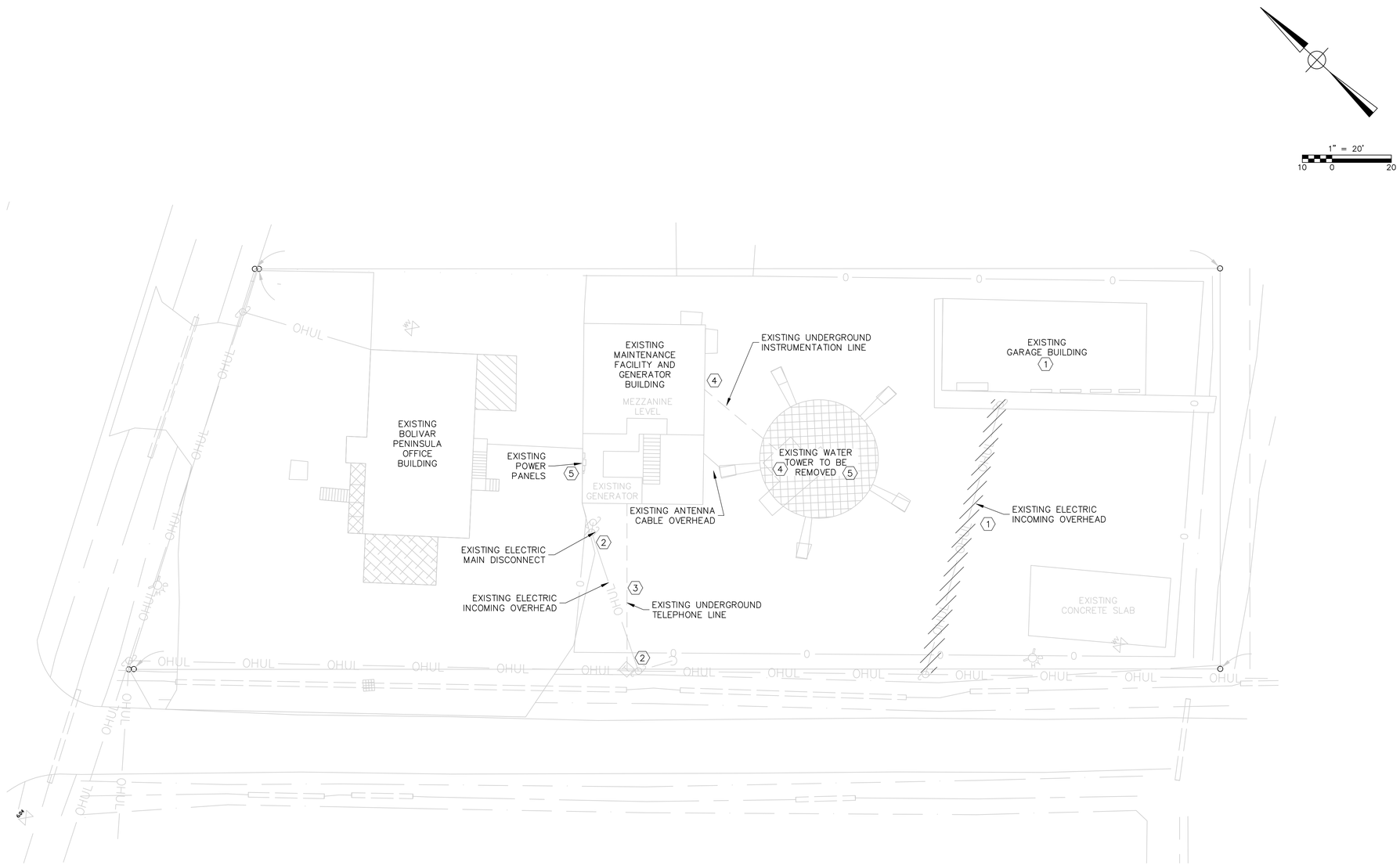


GENERAL NOTES:

A. CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS REQUIRED TO PROTECT THE EXISTING FACILITIES FROM DAMAGE. ANY DAMAGE TO EXISTING FACILITIES INCURRED AS A RESULT OF CONSTRUCTION SHALL BE CORRECTED BY THE CONTRACTOR AT THE CONTRACTORS EXPENSE.

B. CONTRACTOR SHALL GIVE WRITTEN NOTICE TO THE BPSUD CONSTRUCTION REPRESENTATIVE PRIOR TO COMMENCEMENT OF WORK.

C. THE INFORMATION CONTAINED IN THIS PLAN SET, WITH REGARD TO EXISTING FACILITIES, IS BASED ON RECORD DRAWINGS AND INFORMATION COLLECTED. ITS ACCURACY IS NOT GUARANTEED AND ITS USE IN NO WAY RELIEVES THE CONTRACTOR OF ANY RESPONSIBILITY FOR LOSS DUE TO INACCURACIES.

D. CONTRACTOR TO VERIFY ALL EXISTING DIMENSIONS PRIOR TO PREPARING SUBMITTALS.

ELECTRICAL TASKS NOTES:

1. THE PRIMARY ELECTRICAL TASK IS TO REMOVE EXISTING ELECTRICAL, INSTRUMENTATION, COMMUNICATIONS AND SCADA RELATED ELEMENTS FROM THE EXISTING WATER TOWER. CAREFULLY REMOVE ALL INSTRUMENTS, DEVICES, CABLES, ANTENNAS, ETC AND PROVIDE TO THE OWNER FOR FIRST RIGHT OF REFUSAL.

2. REPLACE THE EXISTING WATER TOWER WITH A NEW TOWER INCLUDING BUT NOT LIMITED TO POWER, SCADA NETWORK CONNECTION, GROUNDING, PRESSURE TRANSMITTER, FULLY EQUIPPED MEZZANINE LEVEL ELECTRICAL ROOM, RADIO SYSTEMS, SOLAR MIXER AND LIGHTING PACKAGE.

EXISTING SITE PLAN

1" = 20'-0"

KEYED NOTES:

1. THE GARAGE BUILDING IS TO BE REMOVED UNDER ANOTHER CONTRACT. THE ELECTRICAL CONTRACTOR FOR THIS PROJECT SHALL COORDINATE WITH ENTERGY TO ENSURE THE OVERHEAD POWER LINE INDICATED IS REMOVED PRIOR TO STARTING THIS PROJECT.

2. THE EXISTING MAINTENANCE SHOP OVERHEAD POWER LINE IS TO BE PROVIDED 24" LONG SAFETY RIBBON STREAMERS, EVERY 36", FROM END TO END. TIE AND SECURE A YELLOW STRIPPED PLASTIC RIBBON, WITH DUCT TAPE, TO THE UTILITY SERVICE DROP FOR VISUAL INDICATION OF THE OVERHEAD LINE LOCATION. MAINTAIN THE STREAMERS THROUGHOUT THE PROPOSED WATER TOWER CONSTRUCTION.

3. BE AWARE OF THE UNDERGROUND TELEPHONE LINE. A NEW WATER CONNECTION WILL BE INSTALLED CROSSING IT. IT IS SUSPECTED OTHER UNKNOWN LINES EXIST ON THE SITE.

4. COORDINATE WITH CLIFFORD HOWARD AT BPSUD TO REMOVE THE PRESSURE INSTRUMENT FROM THE EXISTING PIPING, REMOVE INSTRUMENT CABLE FROM CONDUIT AND COIL AT SHOP WALL, OUTSIDE OF THE LB. EXISTING CONDUIT UP TO SCADA EQUIPMENT MAY BE UTILIZED FOR NEW CABLES AND CONDUCTORS. REMOVE PVC CONDUIT FROM BELOW LB TO EXISTING TANK PIPING.

5. ANTENNA CABLES ARE TO BE DISCONNECTED AND REMOVED FROM THE TOWER. OBSTRUCTION LIGHTS ARE TO BE DISCONNECTED FROM POWER PANEL, LOCATED IN THE MAINTENANCE SHOP ON THE MEZZANINE LEVEL, REMOVE CONDUCTORS FROM BREAKER. EXACT ROUTE OF THE OBSTRUCTION LIGHT POWER FEEDER, TO BE REMOVED, IS NOT KNOWN.

LEGEND FROM SURVEY

Underground Electrical as Located	Telephone Box	Sewer Line Pin Flag
Blue Point Marks on Ground	Waterline Marker	Chain Link Fence
AT&T Pin Flag Line	Ground Light	Barb-Wire Fence
Above Ground Pipe	Power Pole	Boundary Line
Concrete	Overhead Power	Building Line (Cents)
	Down Guy	Elevation (Typ.)
	Water Valve	

rps
Texas PE Firm Reg. #F-929
575 N.Dairy Ashford, Suite 700, Houston, Texas 77079
T +1 281 589 7257 E usinfrastructure@rpsgroup.com

TEXAS GENERAL LAND OFFICE

BPSUD Elevated Water Storage Tank

Bolivar Peninsula Special Utility District

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
Consulting Engineers & Project Managers
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BENCHMARK:

NGS MARK HGCSD 64 PID AW6988 SITUATED ABOUT 7.5 MILES SOUTHWEST OF GILCHREST ABOUT 2.5 MILES NORTHEASE OF CRYSTAL BEACH ON THE BOLAVAR PENINSULA AND ON THE SOUTH SIDE OF STATE HIGHWAY 87 ELEVATION 5.1' FEET NAVD 88.

FLOODPLAIN:

THIS PROJECT LIES WITHIN THE 100 YEAR FLOOD PLAIN AS ESTABLISHED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY. ACCORDING TO THE FLOOD INSURANCE RATE MAP NUMBER 48167C0309G, EFFECTIVE DATE AUGUST 15, 2019. THIS MAP LIES WITHIN ZONE "AE" WITH A BASE FLOOD ELEVATION OF 13 FEET.

TO ARRANGE FOR LINES TO BE TURNED OFF OR MOVED, CALL ENTERGY AT 1-800-368-3749

NOTICE:

FOR YOUR SAFETY, YOU ARE REQUIRED BY TEXAS LAW TO CALL 811 AT LEAST 48 HOURS BEFORE YOU DIG SO THAT UNDERGROUND LINES CAN BE MARKED. THIS VERIFICATION DOES NOT FULFILL YOUR OBLIGATION TO CALL 811.

REV	DESCRIPTION	BY	DATE

STATE OF TEXAS
WADE A HUBBLE
121581
LICENSED PROFESSIONAL ENGINEER
Wade A. Hubble
Kalluri Group, INC.
Texas Registered Engineering Firm F-665

EXISTING SITE PLAN

RPS Project No 007517 / 1068.002.001	
Drawn By	Checked By
Scale 1"=20'	Date AUGUST 2020
DWG No E-1	Sheet 18 Of 28

L:\Active projects\4119-RPS (BPSUD EST)\Drawings\E-1 Existing Site Plan.dwg, 9/3/2020 10:12:20 AM, DWG To PDF.pc3
L:\Active projects\4119-RPS (BPSUD EST)\Drawings\E-1 Existing Site Plan.dwg Sep 03 2020

GENERAL MATERIALS NOTES:

A. UNDERGROUND CONDUIT FOR DUCT BANK SHALL BE PVC SCHEDULE 40. SEE DETAILS AND SPECIFICATIONS FOR COMPLETE DUCT BANK REQUIREMENTS.

B. EXPOSED CONDUIT INSIDE MAINTENANCE SHOP AND ELEVATED STORAGE SHALL BE RIGID ALUMINUM, WITH FORM 9 ALUMINUM FITTINGS AND CONDULETS. ALL ENCLOSURE ENTRANCE FITTINGS SHALL BE COPPER FREE ALUMINUM MYERS TYPE HUBS. BOXES SHALL BE FORM 9 ALUMINUM OR NEMA 4X, 316 STAINLESS STEEL, ALL PER SPECIFICATIONS.

C. SEALTITE (FLEXIBLE LIQUID TIGHT CONDUIT) SHALL BE ALUMINUM METALLIC TYPE. SMALL SIZE SEALTITE CONNECTORS SHALL BE 316 STAINLESS STEEL, SEE SPECIFICATION 16111 FOR SIZE TO MATERIAL REQUIREMENTS.

D. ALUMINUM GROUND LUGS ARE NOT ACCEPTABLE. PROVIDE COPPER OR SILICONE BRONZE LUGS ATTACHED WITH 316 STAINLESS STEEL HARDWARE UTILIZING ANTI-OXIDATION COMPOUND.

E. PROVIDE PHASE AND CONDUCTOR IDENTIFICATION IN COMPLIANCE WITH SPECIFICATION 16195 AND NEC.

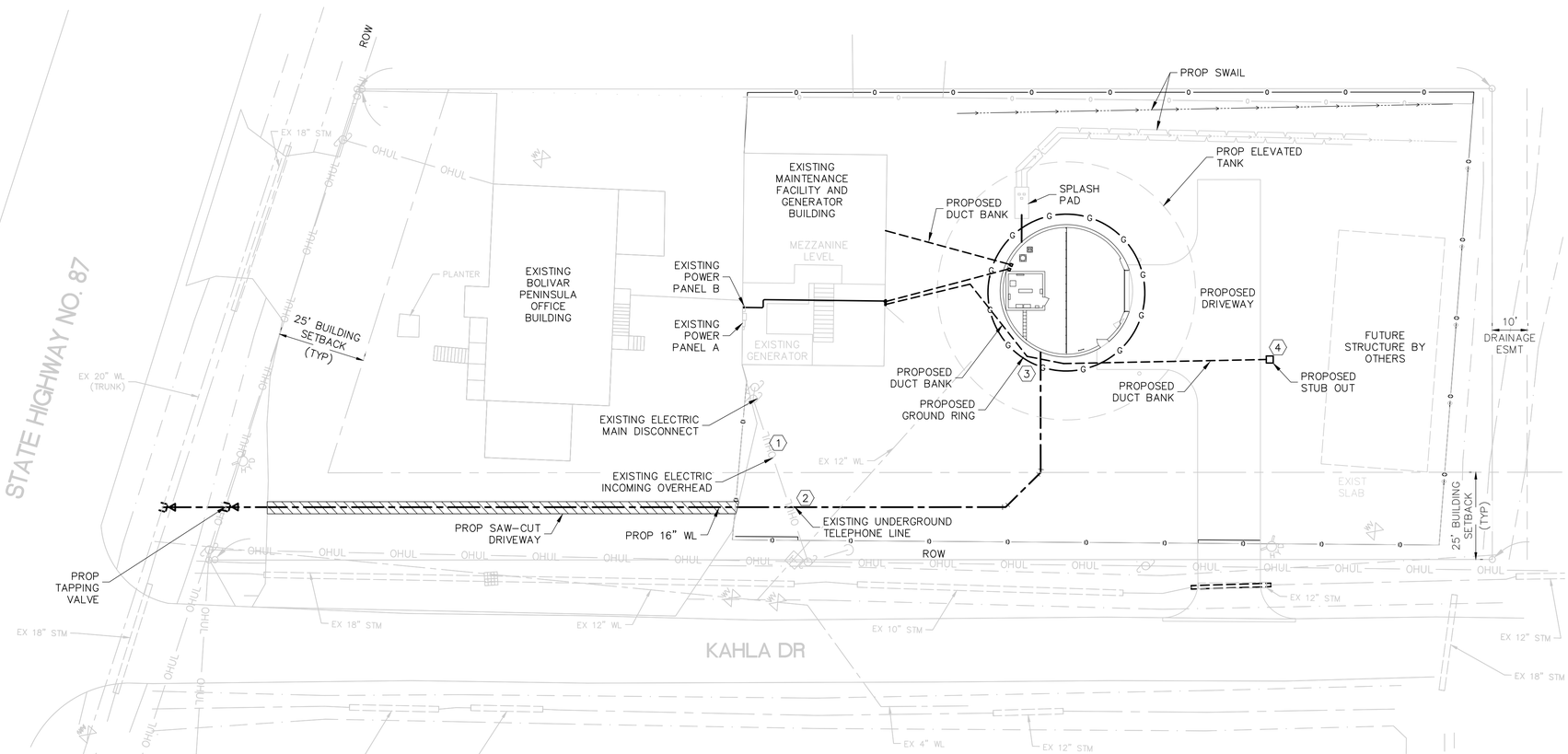
F. ANTI-OXIDATION COMPOUND SHALL BE PROVIDE ON ALL LUG, TWISTED AND COMPRESSION CONNECTIONS.

G. LIGHT FIXTURES ARE DESCRIBED IN THE DRAWING NOTES. ALL LIGHT FIXTURE INSTALLATION HARDWARE SHALL BE 316 STAINLESS STEEL.

H. NOT ALL OF THE CONDUITS AND CONDUCTORS REQUIRED ARE ILLUSTRATED. NOTES, SCHEDULES AND SPECIFICATION REQUIRE ADDITIONAL ASPECTS OF THE PROJECT.

I. CONTRACTOR IS REQUIRED TO COORDINATE AND PROVIDE COMPLETELY INTEGRATED WORKING SYSTEMS.

1" = 20'
10 0 20



GENERAL NOTES:

A. THIS DRAWING IS PROVIDED TO ILLUSTRATE THE OVERALL SITE PLAN, ELEVATED WATER STORAGE TANK SIZE AND ALL TRADES WORK. SEE ENLARGED SITE PLAN FOR ADDITIONAL DETAIL.

B. CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS REQUIRED TO PROTECT THE EXISTING FACILITIES FROM DAMAGE. ANY DAMAGE TO EXISTING FACILITIES INCURRED AS A RESULT OF CONSTRUCTION SHALL BE CORRECTED BY THE CONTRACTOR AT THE CONTRACTORS EXPENSE.

C. CONTRACTOR SHALL GIVE WRITTEN NOTICE TO THE BPSUD CONSTRUCTION REPRESENTATIVE PRIOR TO COMMENCEMENT OF WORK.

D. THE INFORMATION CONTAINED IN THIS PLAN SET, WITH REGARD TO EXISTING FACILITIES, IS BASED ON RECORD DRAWINGS AND INFORMATION COLLECTED. ITS ACCURACY IS NOT GUARANTEED AND ITS USE IN NO WAY RELIEVES THE CONTRACTOR OF ANY RESPONSIBILITY FOR LOSS DUE TO INACCURACIES.

E. CONTRACTOR TO VERIFY ALL EXISTING DIMENSIONS PRIOR TO PREPARING SUBMITTALS.

ELECTRICAL SITE TASKS NOTES:

1. PROVIDE DUCT BANK TO THE PROPOSED WATER TOWER FOR POWER, FUTURE POWER FOR THE REPLACEMENT GARAGE, SECURITY AND SCADA CONNECTIONS.

2. A BARE COPPER GROUND RING IS REQUIRED AROUND THE BASE.

PROPOSED SITE PLAN
1" = 20'-0"

KEYED NOTES:

1. THE EXISTING MAINTENANCE SHOP OVERHEAD POWER LINE IS TO BE PROVIDED 24" LONG SAFETY RIBBON STREAMERS, EVERY 36", FROM END TO END. TIE AND SECURE A YELLOW STRIPPED PLASTIC RIBBON, WITH DUCT TAPE, TO THE UTILITY SERVICE DROP FOR VISUAL INDICATION OF THE OVERHEAD LINE LOCATION. MAINTAIN THE STREAMERS THROUGHOUT THE PROPOSED WATER TOWER CONSTRUCTION.

2. BE AWARE OF THE UNDERGROUND TELEPHONE LINE, COORDINATE NEW WATER INSTALLATION WITH EXISTING TELEPHONE LINE CROSSING IT. IT IS SUSPECTED OTHER UNKNOWN LINES EXIST ON THE SITE.

3. COORDINATE NEW DUCT BANK AND GROUND RING INSTALLATION DEPTHS WITH PROPOSED WATER LINE.

4. STUB OUT CONDUIT, IN DUCT BANK, FOR REPLACEMENT GARAGE POWER FEEDER. PROVIDE A 24"X24" CONCRETE MARKER, WITH TOP AT GRADE, FOR EASE OF LOCATING STUB OUT.

RPS
Texas PE Firm Reg. #F-929
575 N.Dairy Ashford, Suite 700, Houston, Texas 77079
T +1 281 589 7257 E usinfrastructure@rpsgroup.com

TEXAS GENERAL LAND OFFICE

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Bolivar Peninsula Special Utility District

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
Consulting Engineers & Project Managers
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BENCHMARK:

NGS MARK HGCSD 64 PID AW6988 SITUATED ABOUT 7.5 MILES SOUTHWEST OF GILCHREST ABOUT 2.5 MILES NORTHEASE OF CRYSTAL BEACH ON THE BOLAVAR PENINSULA AND ON THE SOUTH SIDE OF STATE HIGHWAY 87 ELEVATION 5.1' FEET NAVD 88.

FLOODPLAIN:

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TO ARRANGE FOR LINES TO BE TURNED OFF OR MOVED, CALL ENTERGY AT 1-800-368-3749

NOTICE:

FOR YOUR SAFETY, YOU ARE REQUIRED BY TEXAS LAW TO CALL 811 AT LEAST 48 HOURS BEFORE YOU DIG SO THAT UNDERGROUND LINES CAN BE MARKED. THIS VERIFICATION DOES NOT FULFILL YOUR OBLIGATION TO CALL 811.

REV	DESCRIPTION	BY	DATE

STATE OF TEXAS
WADE A HUBBLE
121581
LICENSED
PROFESSIONAL ENGINEER
Wade A. Hubble
Kalluri Group, INC.
Texas Registered Engineering Firm F-665

PROPOSED SITE PLAN

RPS Project No 007517 / 1068.002.001	
Drawn By AT	Checked By SJ
Scale 1"=20'	Date AUGUST 2020
DWG No E-2	Sheet 19 Of 28

L:\Active projects\4119-RPS (BPSUD ES1)\Drawings\E-2 Proposed Site Plan.dwg Aug 21 2020

GENERAL MATERIALS NOTES:

A. UNDERGROUND CONDUIT FOR DUCT BANK SHALL BE PVC SCHEDULE 40. SEE DETAILS AND SPECIFICATIONS FOR COMPLETE DUCT BANK REQUIREMENTS.

B. EXPOSED CONDUIT INSIDE MAINTENANCE SHOP AND ELEVATED STORAGE SHALL BE RIGID ALUMINUM, WITH FORM 9 ALUMINUM FITTINGS AND CONDULETS. ALL ENCLOSURE ENTRANCE FITTINGS SHALL BE COPPER FREE ALUMINUM MYERS TYPE HUBS. BOXES SHALL BE FORM 9 ALUMINUM OR NEMA 4X, 316 STAINLESS STEEL, ALL PER SPECIFICATIONS.

C. SEALTITE (FLEXIBLE LIQUID TIGHT CONDUIT) SHALL BE ALUMINUM METALLIC TYPE. SMALL SIZE SEALTITE CONNECTORS SHALL BE 316 STAINLESS STEEL, SEE SPECIFICATION 16111 FOR SIZE TO MATERIAL REQUIREMENTS.

D. ALUMINUM GROUND LUGS ARE NOT ACCEPTABLE. PROVIDE COPPER OR SILICONE BRONZE LUGS ATTACHED WITH 316 STAINLESS STEEL HARDWARE UTILIZING ANTI-OXIDATION COMPOUND.

E. PROVIDE PHASE AND CONDUCTOR IDENTIFICATION IN COMPLIANCE WITH SPECIFICATION 16195 AND NEC.

F. ANTI-OXIDATION COMPOUND SHALL BE PROVIDE ON ALL LUG, TWISTED AND COMPRESSION CONNECTIONS.

G. LIGHT FIXTURES ARE DESCRIBED IN THE DRAWING NOTES. ALL LIGHT FIXTURE INSTALLATION HARDWARE SHALL BE 316 STAINLESS STEEL.

H. NOT ALL OF THE CONDUITS AND CONDUCTORS REQUIRED ARE ILLUSTRATED. NOTES, SCHEDULES AND SPECIFICATION REQUIRE ADDITIONAL ASPECTS OF THE PROJECT.

I. CONTRACTOR IS REQUIRED TO COORDINATE AND PROVIDE COMPLETELY INTEGRATED WORKING SYSTEMS.

1" = 20'
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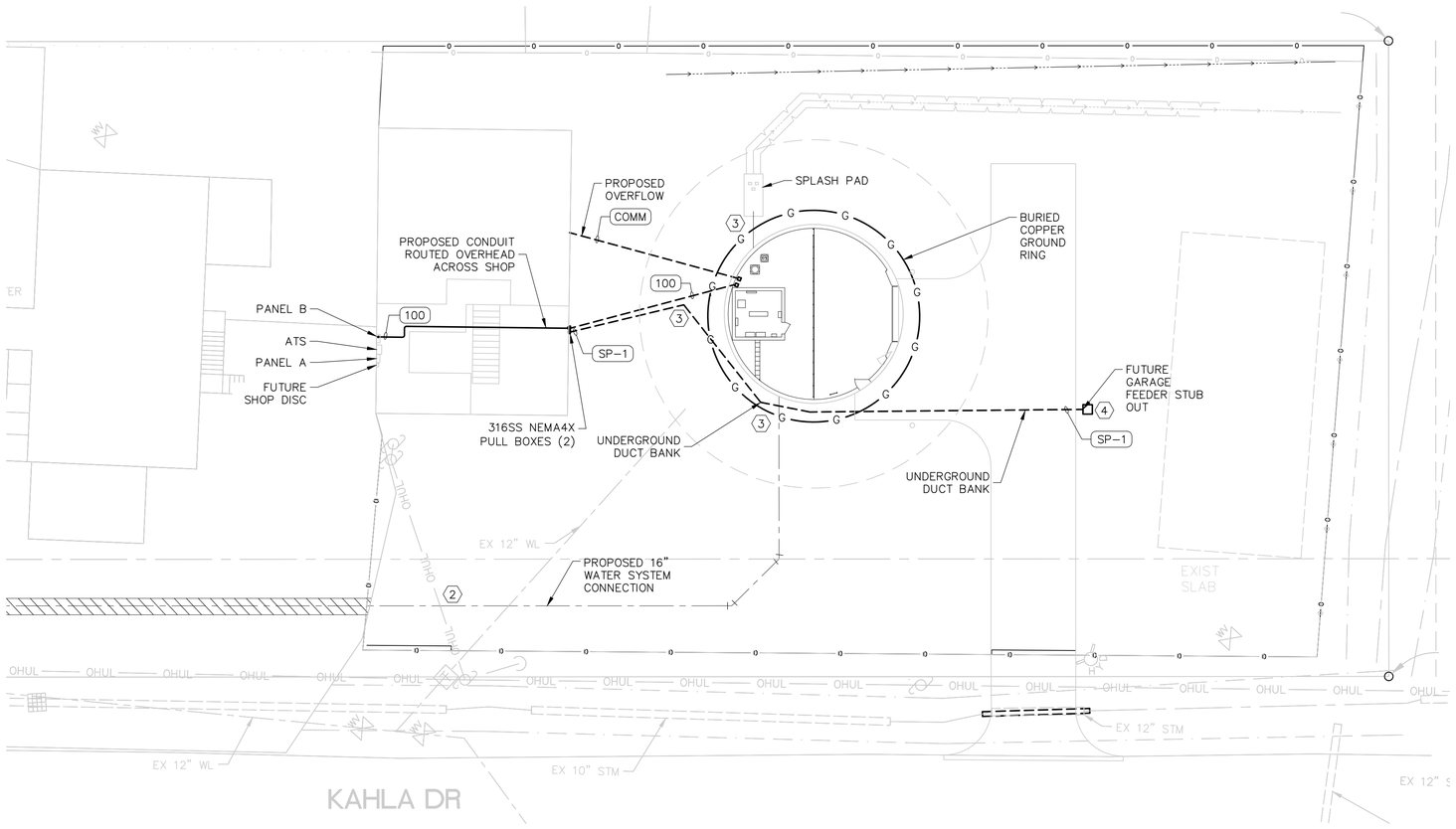

GENERAL NOTES:

A. THIS DRAWING IS PROVIDED TO ILLUSTRATE THE ELECTRICAL SITE PLAN, AND ELEVATED WATER STORAGE TANK CONNECTIONS. SEE ENLARGED ELEVATED STORAGE TANK PLANS FOR ADDITIONAL DETAIL.

B. CONTRACTOR SHALL TAKE CARE TO READ ALL SPECIFICATIONS TO ENSURE MATERIALS AND METHODS USED ARE ACCEPTABLE.

C. CONTRACTOR SHALL SUBMIT ALL MATERIALS AND INSTALL ONLY AFTER ACCEPTANCE.

D. AN "AS BUILT" RED LINE PLAN SET, WITH ALL CHANGES, SHALL BE MAINTAINED AND PROVIDED FOR RECORD DRAWING CREATION. CONTRACTOR SHALL PROVIDE DIMENSIONS FOR UNDERGROUND FACILITIES INSTALLED.

ELECTRICAL SITE TASKS NOTES:

1. PROVIDE DUCT BANK, A MINIMUM OF 24" BELOW GRADE TO TOP OF CONCRETE, TO THE PROPOSED WATER TOWER FOR POWER, FUTURE POWER FOR THE REPLACEMENT GARAGE, SECURITY AND SCADA CONNECTIONS.

2. BARE COPPER 4/0 AWG GROUND RING IS REQUIRED AROUND THE BASE. INSTALL GROUND RING 36" FROM TANK PEDESTAL AT 24" BELOW GRADE.

ENLARGED PROPOSED SITE PLAN

1" = 20'-0"

KEYED NOTES:

1. THE EXISTING MAINTENANCE SHOP OVERHEAD POWER LINE IS TO BE PROVIDED 24" LONG SAFETY RIBBON STREAMERS, EVERY 36", FROM END TO END. TIE AND SECURE A YELLOW STRIPPED PLASTIC RIBBON, WITH DUCT TAPE, TO THE UTILITY SERVICE DROP FOR VISUAL INDICATION OF THE OVERHEAD LINE LOCATION. MAINTAIN THE STREAMERS THROUGHOUT THE PROPOSED WATER TOWER CONSTRUCTION.

2. BE AWARE OF THE UNDERGROUND TELEPHONE LINE, COORDINATE NEW WATER INSTALLATION WITH EXISTING TELEPHONE LINE CROSSING IT. IT IS SUSPECTED OTHER UNKNOWN LINES EXIST ON THE SITE.

3. COORDINATE NEW DUCT BANK AND GROUND RING INSTALLATION DEPTHS WITH PROPOSED WATER LINE.

4. STUB OUT CONDUIT 2 FOOT PASSED DRIVEWAY, IN DUCT BANK, FOR REPLACEMENT GARAGE POWER FEEDER. PROVIDE A 24"X24" CONCRETE MARKER, WITH TOP AT GRADE, FOR EASE OF LOCATING STUB OUT.

RPS
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T +1 281 589 7257 E usinfrastructure@rpsgroup.com

TEXAS GENERAL LAND OFFICE

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Phone: (713)-365-9288

BENCHMARK:

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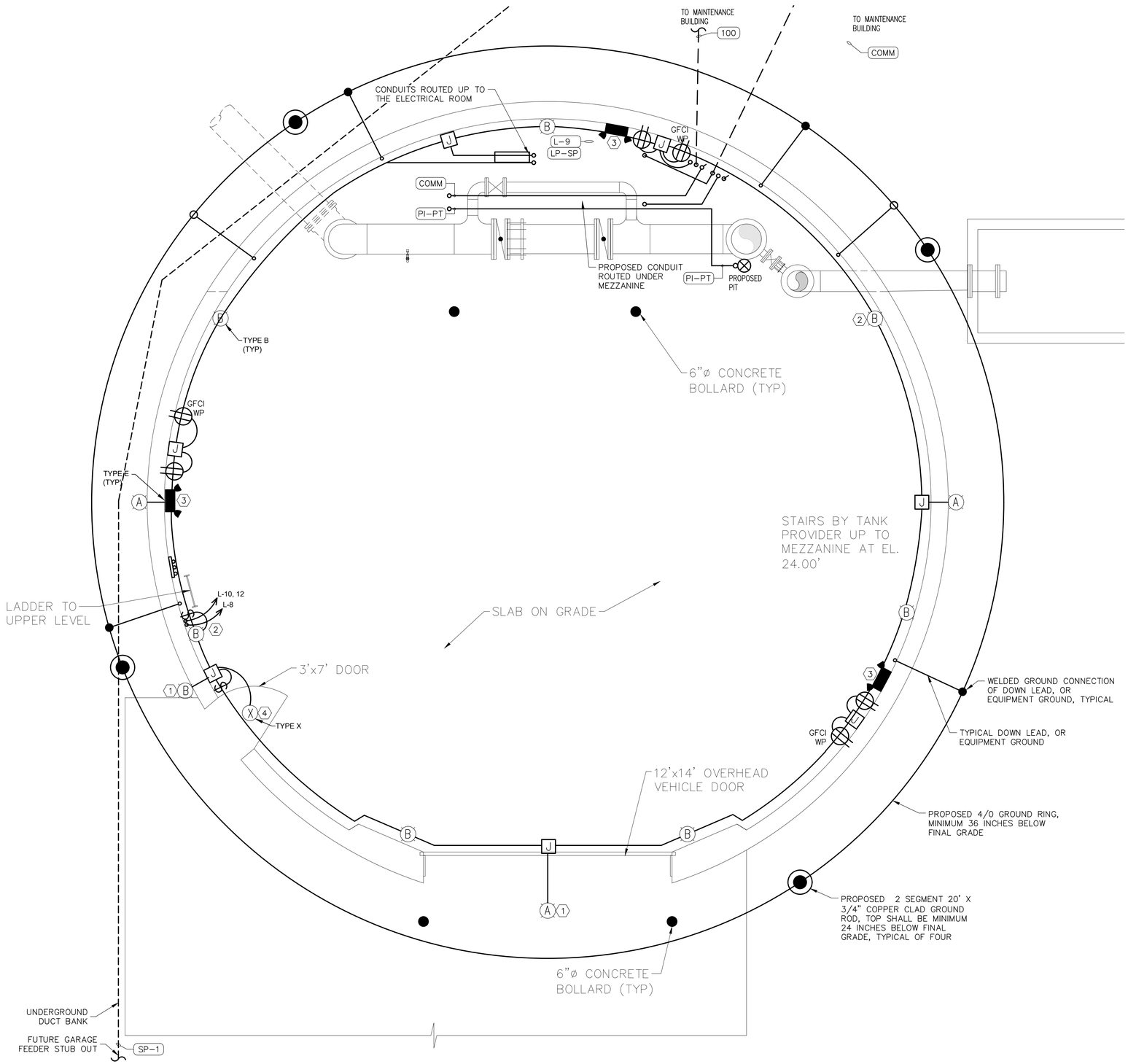
REV	DESCRIPTION	BY	DATE

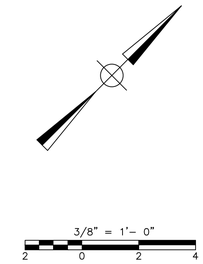
STATE OF TEXAS
WADE A HUBBLE
121581
LICENSED
PROFESSIONAL ENGINEER
AUG 21 2020
Wade A. Hubble
Kalluri Group, Inc.
Texas Registered Engineering Firm F-665

ENLARGED PROPOSED SITE PLAN

RPS Project No	007517 / 1068.002.001		
Drawn By	AT	Checked By	SJ
Scale 1"=20'		Date	AUGUST 2020
DWG No	E-3	Sheet 20	Of 28

L:\Active projects\4119-RPS (BPSUD EST)\Drawings\E-3 Enlarged Proposed Site Plan.dwg Aug 21 2020





NOTES:

TYPE A FIXTURES SHALL BE INSTALLED AT 15'-0" ABOVE BASE OF EST MINIMUM, INSTALL 2'-0" MINIMUM ABOVE OVERHEAD DOOR OPENING.

1 TYPE B ON GROUND LEVEL SHALL BE; WALL MOUNTED 8'-0" ABOVE FINISH FLOOR, WEATHER TIGHT FIXTURE, USING AN A19 BASE LED LAMP, WITH CAST ALUMINUM HOUSING, GUARD, AND POLYCARBONATE LENSE. LOWER LEVEL AND
2 MEZZANINE FIXTURES SHALL BE ON SWITCH AT THE DOOR. LADDER AND UPPER LEVEL LIGHTS SHALL BE ON THE SWITCH AT BOTTOM OF THE LADDER.

TYPE E FIXTURE SHALL BE, WALL MOUNTED EMERGENCY FIXTURE WITH 90 MINUTE BACKUP BATTERY. LITHONIA NO. ELT16-H, WITH MOUNTING SHELF, AND 3'-0"
3 LONG CORD WITH PLUG. INSTALL RECEPTACLES AT 8'-0" ABOVE FLOOR AND ADJACENT TO FIXTURE FOR PLUG CONNECTION.

TYPE X FIXTURE. LED EXIT LIGHT, LITHONIA NO. LE-S-W-1-R-120-ELNSD.

4

GENERAL NOTES:

A. UNDERGROUND CONDUIT FOR DUCT BANK SHALL BE PVC SCHEDULE 40.

B. EXPOSED CONDUIT INDOORS SHALL BE RIGID ALUMINUM, WITH FORM 9 ALUMINUM FITTINGS. ROUTE CONDUIT AROUND EST INTERIOR WALL ABOVE 10'-0" MINIMUM HEIGHT.

C. ALL ANCHORS, SUPPORTS, STRAPS AND HARDWARE SHALL BE 316 STAINLESS STEEL.

D. COORDINATE UNDER SLAB CONDUIT WITH OTHER UNDER SLAB FACILITIES. INSTALL UNDER SLAB CONDUIT BELOW TOP LAYER OF REBAR WITH THREE INCHES MINIMUM BETWEEN CONDUITS, IN PARALLEL RUNS OR RISERS.

rps
Texas PE Firm Reg. #F-929
575 N.Dairy Ashford, Suite 700, Houston, Texas 77079
T +1 281 589 7257 E usinfrastructure@rpsgroup.com

TEXAS GENERAL LAND OFFICE

BPSUD Elevated Water Storage Tank

Bolivar Peninsula Special Utility District

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
Consulting Engineers & Project Managers
16300 Katy Freeway, Suite 172
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Phone: (713)-365-9288

BENCHMARK:

NGS MARK HGCSD 64 PID AW6988 SITUATED ABOUT 7.5 MILES SOUTHWEST OF GILCHREST ABOUT 2.5 MILES NORTHEASE OF CRYSTAL BEACH ON THE BOLAVAR PENINSULA AND ON THE SOUTH SIDE OF STATE HIGHWAY 87 ELEVATION 5.1' FEET NAVD 88.

FLOODPLAIN:

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REV	DESCRIPTION	BY	DATE

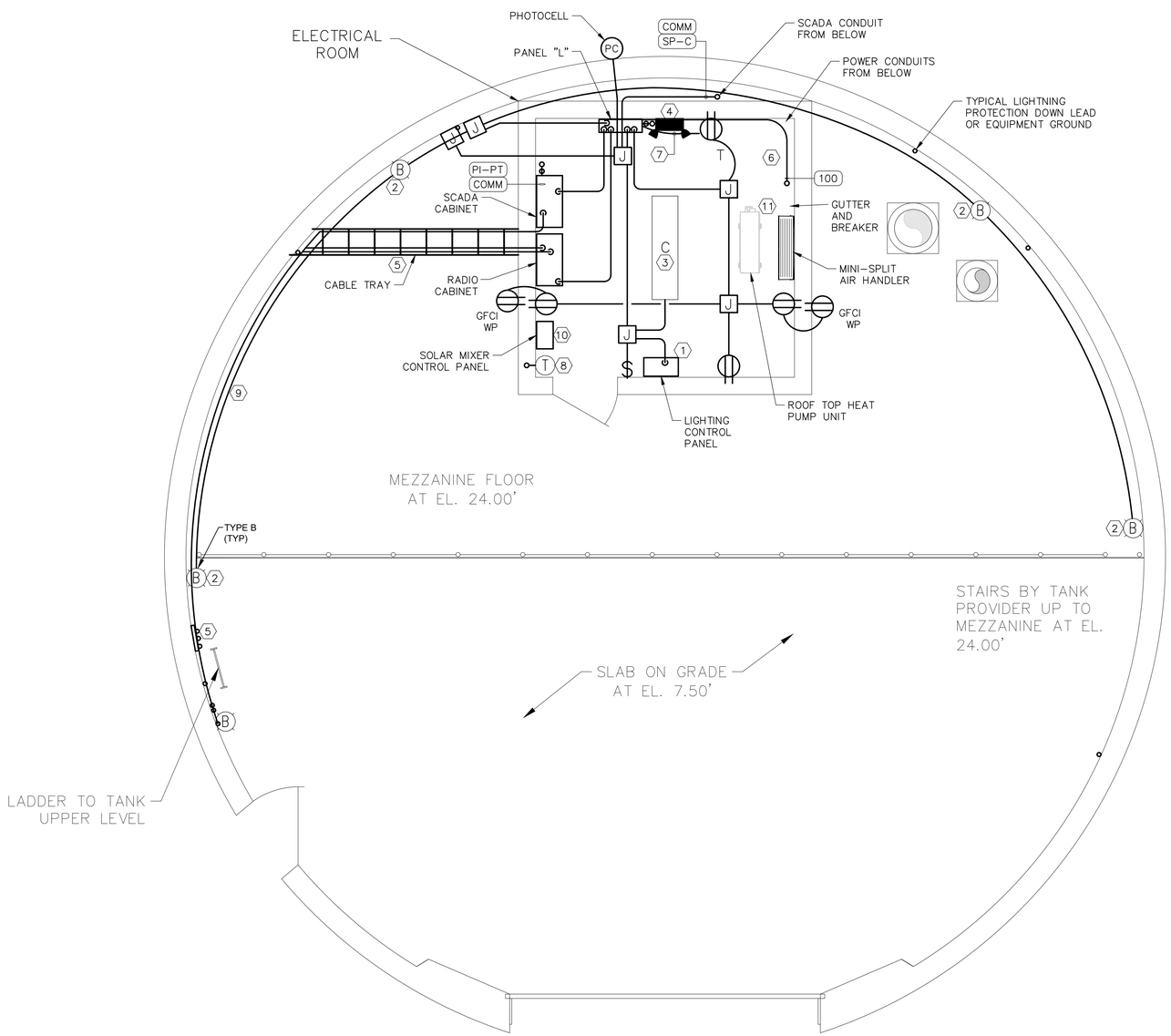
STATE OF TEXAS
WADE A HUBBLE
121581
LICENSED
PROFESSIONAL ENGINEER
AUG 21, 2020

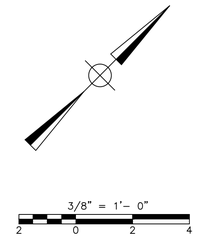
Wade A. Hubble
Kalluri Group, Inc.
Texas Registered Engineering Firm F-665

ELEVATED STORAGE TANK GROUND PLAN

RPS Project No 007517 / 1068.002.001	
Drawn By	Checked By
Scale 3/8"=1'-0"	Date AUGUST 2020
DWG No E-4	Sheet 21 Of 28

L:\Active projects\4119 - RPS (BPSUD EST)\Drawings\E-4 EST Ground FL Power and Lighting Plan.dwg Aug 21, 2020





NOTES:

1. PROVIDE NEMA 3R HINGED DOOR CABINET WITH TWO HAND/OFF/AUTOMATIC SWITCHES, A TORK MODEL DIN101B TIME CLOCK, EATON CN-35 LIGHTING CONTACTORS (WITH TWO SPARE CONTACTS MINIMUM) FOR LIGHTING CONTROL. INSTALL CONTROL COMPONENTS ON SUB PANEL AND PROVIDE ALL TERMINAL BLOCKS (FOR LINE AND FIELD TERMINATIONS, WIRE NUTS ARE NOT ACCEPTABLE). COORDINATE TIME CLOCK SETTINGS WITH PROJECT MANAGER.
2. TYPE B SHALL BE WALL MOUNTED 8'-0" ABOVE FLOOR, WEATHER TIGHT FIXTURE, A19 BASE LED LAMP, WITH CAST ALUMINUM HOUSING, GUARD, AND POLYCARBONATE LENSE. LOWER AND MEZZANINE LEVEL FIXTURES SHALL BE ON SWITCH AT THE DOOR. LADDER AND UPPER LEVEL LIGHTS SHALL BE ON SWITCH AT BOTTOM OF THE LADDER.
3. TYPE C SHALL BE 4 FOOT INDUSTRIAL SURFACE MOUNTED LED FIXTURE, WITH 20% MINIMUM UPLIGHT.
4. TYPE E FIXTURE SHALL BE, WALL MOUNTED EMERGENCY FIXTURE WITH 90 MINUTE BACKUP BATTERY. LITHONIA NO. ELT16-H, WITH MOUNTING SHELF, AND 3'-0" LONG CORD WITH PLUG. INSTALL RECEPTACLES AT 8'-0" ABOVE FLOOR AND ADJACENT TO FIXTURE FOR PLUG CONNECTION.
5. ROUTE ANTENNA CABLES ON CABLE TRAY FROM ROOM TO EST WALL. CONTINUE AROUND PEDESTAL WALL WITH CABLES INSTALLED ON VERTICAL 316 STAINLESS STEEL STRUT FASTENED WITH PVC STRAPS AND 316 STAINLESS HARDWARE TO LADDER. FOR VERTICAL RISER ACCESS LOCATE ANTENNA CABLES ON STRUT ADJACENT TO THE LADDER, SEE DETAILS.
6. PROVIDE NEMA 1 WIREWAY AND ENCLOSED BREAKER MOUNTED ON WALL. ROUTE CONDUIT TO TRANSFORMER FOR A MAXIMUM OF 3' SEALTIGHT CONNECTION.
7. PROVIDE CONDUIT FROM PANEL "L" TO TRANSFORMER MOUNTED ON WALL. ROUTE CONDUIT TO TRANSFORMER FOR A MAXIMUM OF 3' SEALTIGHT CONNECTION.
8. PROVIDE CONDUIT, IN WALL BOX AND PULL STRING FOR THERMOSTAT. COORDINATE THERMOSTAT LOCATIONS WITH HVAC AND INSTALL AT LOCAL CODE REQUIRED ELEVATION.
9. CONDUITS AND CABLES CAN SHARE A SINGLE VERTICALLY MOUNTED 316 STAINLESS STEEL STRUT, SEE DETAILS FOR SUPPORT.
10. SOLAR MIXER CONTROL PANEL PROVIDED BY TANK MANUFACTURER. COORDINATE INSTALLATION AND PROVIDE REQUIRED SUPPORT AND PROVISIONS.
11. COORDINATE ROOF TOP HEAT PUMP UNIT REQUIREMENTS WITH PROPOSED HVAC VENDOR, PRIOR TO BID, TO INCLUDE ALL REQUIRED PROVISIONS. PROVIDE SERVICE DISCONNECT IN ACCORDANCE WITH NEC, AS RELATED TO THE PROPOSED UNIT.

GENERAL NOTES:

A. EXPOSED CONDUIT INDOORS SHALL BE RIGID ALUMINUM, WITH BOXES IN FORM 9 ALUMINUM OR NEMA 4X 316 STAINLESS STEEL.

B. CONTRACTOR SHALL COORDINATE BETWEEN SUBCONTRACTORS AND REQUIRED VENDORS TO ENSURE EQUIPMENT LAYOUT AND INSTALLATION ARE COMPLEMENTARY WITH EACH OTHER.

C. DISCONNECT AND CONNECTIONS TO ROOF TOP HVAC UNIT NOT SHOWN FOR CLARITY.

FOR CLARITY NOT ALL CONDUIT REQUIRED IS ILLUSTRATED ON THIS SHEET. SEE SCHEDULES AND ONE LINE DRAWING FOR ALL CIRCUITS REQUIRED.

rps
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BENCHMARK: ①

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NOTICE:

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REV	DESCRIPTION	BY	DATE

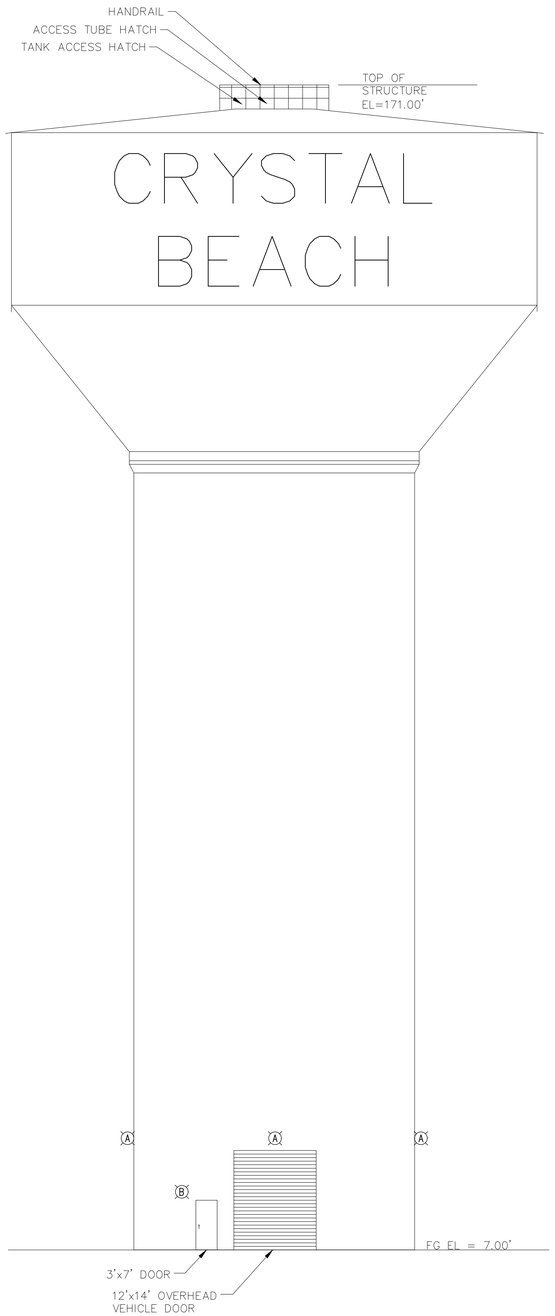
STATE OF TEXAS
WADE A HUBBLE
121581
LICENSED
PROFESSIONAL ENGINEER
AUG 21 2020

Wade A. Hubble
Kalluri Group, INC.
Texas Registered Engineering Firm F-665

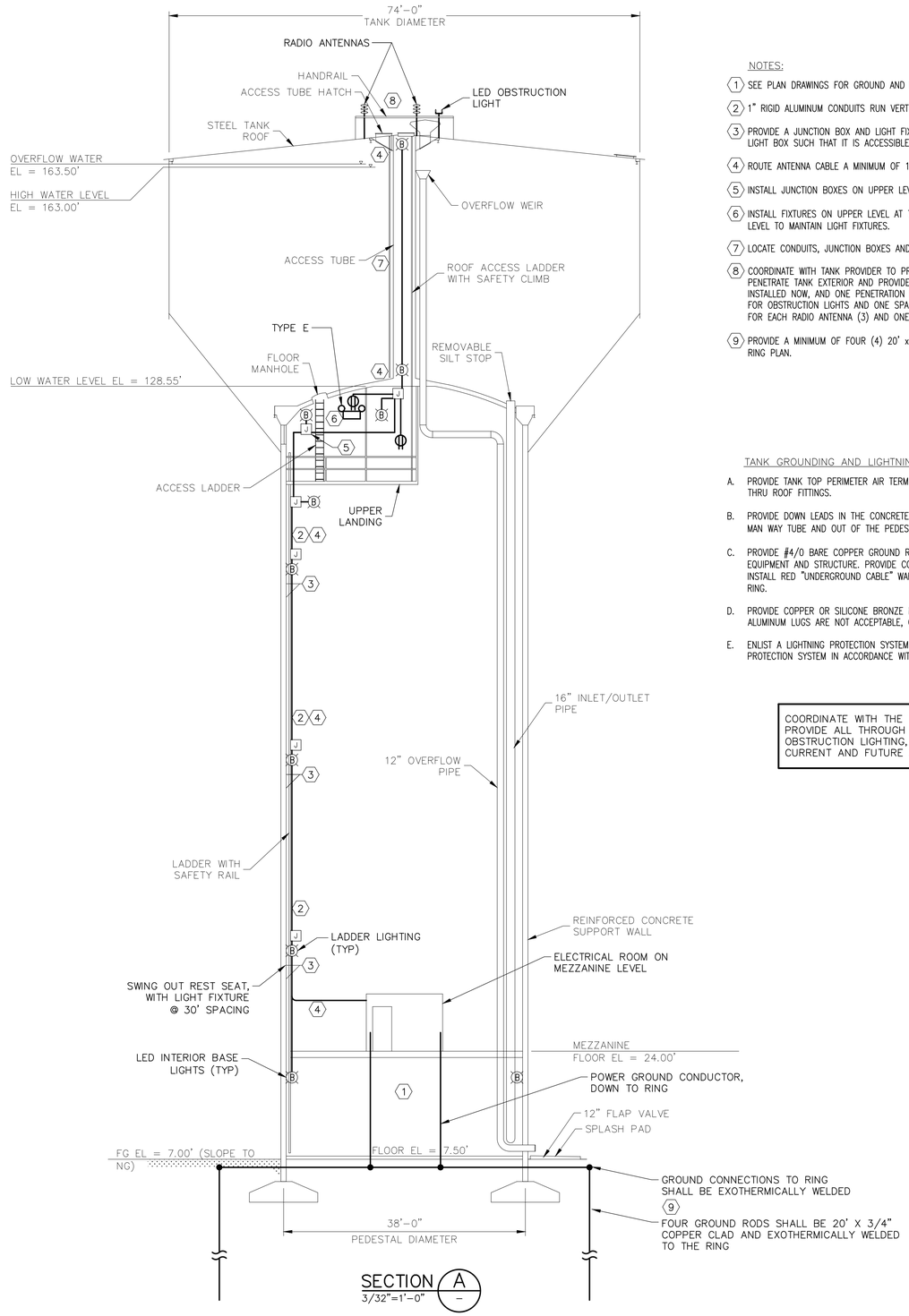
ELEVATED STORAGE TANK
MEZZANINE FLOOR PLAN

RPS Project No 007517 / 1068.002.001	
Drawn By	Checked By
Scale 3/8"=1'-0"	Date AUGUST 2020
DWG No E-5	Sheet 22 Of 28

L:\Active projects\419-RPS (BPSUD EST)\Drawings\E-5 EST Mezzanine FL Power and Lighting Plan.dwg Aug 21 2020



ELEVATION
3/32"=1'-0"



SECTION A
3/32"=1'-0"

NOTES:

1. SEE PLAN DRAWINGS FOR GROUND AND MEZZANINE LEVEL INFORMATION.
2. 1" RIGID ALUMINUM CONDUITS RUN VERTICAL SUPPORTED ON 316 STAINLESS STEEL STRUT.
3. PROVIDE A JUNCTION BOX AND LIGHT FIXTURE AT EACH FOLD AWAY SEAT LOCATION. INSTALL JUNCTION AND LIGHT BOX SUCH THAT IT IS ACCESSIBLE FROM THE SEAT.
4. ROUTE ANTENNA CABLE A MINIMUM OF 12" AWAY FROM OTHER RISERS.
5. INSTALL JUNCTION BOXES ON UPPER LEVEL AT 60" ABOVE LANDING.
6. INSTALL FIXTURES ON UPPER LEVEL AT 78" ABOVE LANDING. LADDER SHALL NOT BE REQUIRED ON UPPER LEVEL TO MAINTAIN LIGHT FIXTURES.
7. LOCATE CONDUITS, JUNCTION BOXES AND FIXTURES IN TUBE SUCH THAT THEY DO NOT IMPEDE LADDER ASCENT.
8. COORDINATE WITH TANK PROVIDER TO PROVIDE LIGHTNING PROTECTION DOWN LEADS. FOR CONDUITS TO PENETRATE TANK EXTERIOR AND PROVIDE SUPPORT FOR COMPONENTS. PROVISIONS FOR TWO ANTENNAS, BEING INSTALLED NOW, AND ONE PENETRATION IS REQUIRED FOR A FUTURE RADIO SYSTEM ANTENNA. ONE PENETRATION FOR OBSTRUCTION LIGHTS AND ONE SPARE PENETRATION ARE ALSO REQUIRED. A GROUNDING PAD IS REQUIRED FOR EACH RADIO ANTENNA (3) AND ONE FOR THE OBSTRUCTION LIGHTS.
9. PROVIDE A MINIMUM OF FOUR (4) 20' x 3/4" COPPER CLAD GROUND RODS. SEE DRAWING E-3 FOR GROUND RING PLAN.

TANK GROUNDING AND LIGHTNING PROTECTION NOTES:

A. PROVIDE TANK TOP PERIMETER AIR TERMINALS, ANTENNAS, HAND RAIL BONDING AND DOWN LEAD THRU ROOF FITTINGS.

B. PROVIDE DOWN LEADS IN THE CONCRETE STRUCTURE OR 1 1/2"" PVC CONDUIT ROUTED DOWN THE MAN WAY TUBE AND OUT OF THE PEDESTAL STRUCTURE 2'-0" BELOW GRADE.

C. PROVIDE #4/0 BARE COPPER GROUND RING, 36" BELOW GRADE, WITH GROUND RODS AND TAPS FOR EQUIPMENT AND STRUCTURE. PROVIDE CONNECTIONS TO GROUND RING WITH EXOTHERMIC WELDS. INSTALL RED "UNDERGROUND CABLE" WARNING TAPE 12 INCHES BELOW GRADE, ABOVE BARE GROUND RING.

D. PROVIDE COPPER OR SILICONE BRONZE MECHANICAL LUGS AT ELECTRICAL EQUIPMENT EMCLOSURES, ALUMINUM LUGS ARE NOT ACCEPTABLE, CONNECTION HARDWARE SHALL BE 316 STAINLESS STEEL.

E. ENLIST A LIGHTNING PROTECTION SYSTEM DESIGNER AND INSTALLER TO PROVIDE LIGHTNING PROTECTION SYSTEM IN ACCORDANCE WITH NFPA 780.

COORDINATE WITH THE TANK MANUFACTURER TO PROVIDE ALL THROUGH ROOF FITTINGS FOR MIXER, OBSTRUCTION LIGHTING, LIGHTNING PROTECTION, CURRENT AND FUTURE ANTENNAS, AND GROUNDING

3/32" = 1'- 0"
8 0 8 16

rps
Texas PE Firm Reg. #F-929
575 N.Dairy Ashford, Suite 700, Houston, Texas 77079
T +1 281 589 7257 E usinfrastructure@rpsgroup.com

TEXAS GENERAL LAND OFFICE

BPSUD Elevated Water Storage Tank

Bolivar Peninsula Special Utility District

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
Consulting Engineers & Project Managers
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BENCHMARK:

NGS MARK HGCSD 64 PID AW6988 SITUATED ABOUT 7.5 MILES SOUTHWEST OF GILCHREST ABOUT 2.5 MILES NORTHEASE OF CRYSTAL BEACH ON THE BOLAVAR PENINSULA AND ON THE SOUTH SIDE OF STATE HIGHWAY 87 ELEVATION 5.1' FEET NAVD 88.

FLOODPLAIN:

THIS PROJECT LIES WITHIN THE 100 YEAR FLOOD PLAIN AS ESTABLISHED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY. ACCORDING TO THE FLOOD INSURANCE RATE MAP NUMBER 48167C0309G, EFFECTIVE DATE AUGUST 15, 2019. THIS MAP LIES WITHIN ZONE "AE" WITH A BASE FLOOD ELEVATION OF 13 FEET.

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Aug 21 2020
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Texas Registered Engineering Firm F-665

ELEVATED STORAGE TANK SECTIONS

RPS Project No 007517 / 1068.002.001	
Drawn By	Checked By
Scale 3/32"=1'-0"	Date AUGUST 2020
DWG No E-6	Sheet 23 Of 28

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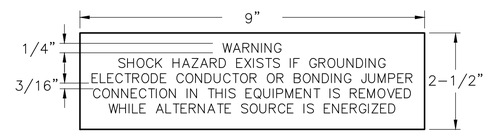
SERVICE LOAD ANALYSIS
240V, 1PH, 3W

	KVA
EXISTING LOAD	
PANEL A	299.3
PANEL B	37.5
	15
ADDED LOAD	
EST PANEL L	25
SUB TOTAL	376.5
25% LARGEST MOTOR LOAD = 45 AMPS	37.4
TOTAL LOAD	413.9

413.9 KVA AT 480V, 3 PHASE = 513.2 AMPS
2 SETS OF 350 KCMIL CABLE HAS A RATING OF 620 AMPS.
THE SERVICE IS ADEQUATE.

NOTE:
TWO PUMP MOTORS ARE SERVICE DUTY AT ANY TIME, ONE PUMP IS STANDBY.
ALL PUMPS ARE ON SOLID STATE SOFT STARTERS

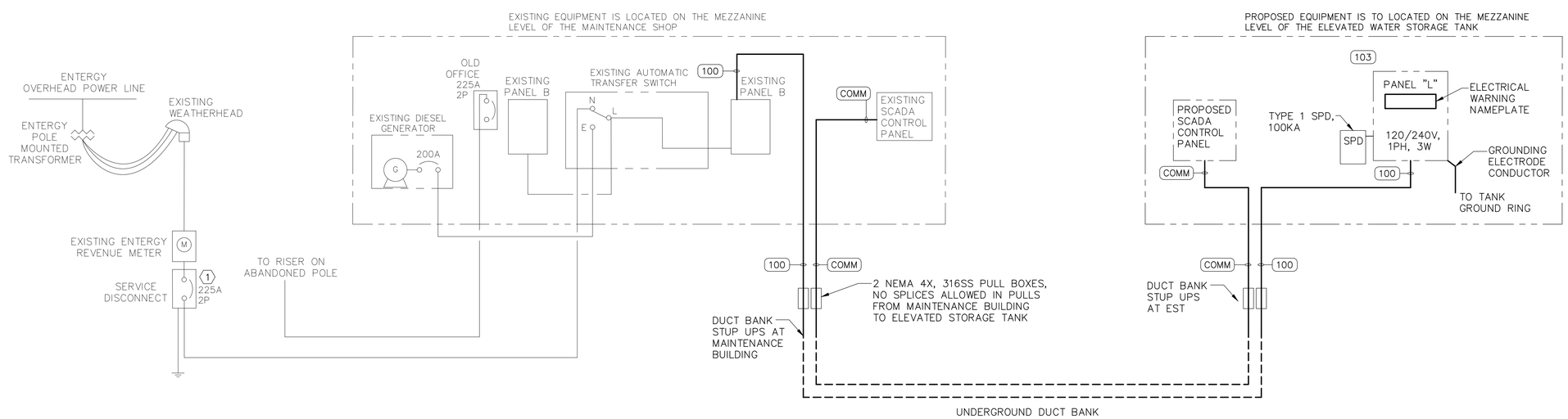
ELECTRICAL "WARNING" NAMEPLATE



1/16" THICK PHENOLIC NAMEPLATE–RED WITH WHITE LETTERS. CENTER ENGRAVING AND ANCHOR TO ENCLOSURE WITH 316 SS SELF TAPPING SCREWS. APPLY SILICON SEALER INSIDE DOOR AT SCREW PENETRATION TO SEAL SCREWS.

NOTES:

(1) REPLACE EXISTING MAIN SERVICE ENCLOSED CIRCUIT BREAKER. CONTRACTOR SHALL COORDINATE THE OUTAGE WITH ENTERGY AND BPSUD PROJECT MANAGER.



ONE LINE DIAGRAM
NTS

rps
Texas PE Firm Reg. #F-929
575 N.Dairy Ashford, Suite 700, Houston, Texas 77079
T +1 281 589 7257 E usinfrastructure@rpsgroup.com

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ONE LINE DIAGRAM

RPS Project No 007517 / 1068.002.001	
Drawn By	Checked By
Scale N.T.S.	Date AUGUST 2020
DWG No E-7	Sheet 24 Of 28

L:\Active projects\4119-RPS (BPSUD EST)\Drawings\E-7 EST Electrical One Line Diagram.dwg Aug 21 2020

EXISTING POWER PANEL "A"
LOCATED IN MAINTENANCE BUILDING ON SECOND LEVEL

PANEL "A"

BUS AMPS 225 MLO ✓
VOLTS 120/240V
PHASE 1 WIRE 3 SN ✓
WIRE SIZE 2/0
AIC 10KA

CKT. DESCRIPTION	LOAD	BKR.	A	B	BKR.	LOAD	CKT. DESCRIPTION
NORTH AREA LIGHT	75	20	1	2	20	180	SHED
SPACE			3	4	20		SPARE
DOWN STAIRS LIGHTS	110	20	5	6	20	100	LIGHTS
SHOP LIGHTS	80	20	7	8	20	110	LIGHTS
SPARE		20	9	10	20		SPARE
SPACE			11	12	20	75	OUTSIDE LIGHTS
GENERATOR BLOCK HEATER			13	14	20		SPARE
CLIFF'S OFFICE			15	16	20	360	RECEPTACLES
SPACE			17	18	20	100	SCADA CONTROL PANEL
AIR COMPRESSOR	2780	40	19	20	20	360	RECEPTACLES
	2780		21	22	20	180	COUNTER RECEPTACLE
WELDING MACHINE	3240	50	23	24			SPACE
	3240		25	26	30	2160	ELECTRIC HEATER
WATER HEATER	800	30	27	28		2160	
	800		29	30	40	1610	CONDENSING UNIT
SPACE			31	32		1610	
	13,905					9,005	

N

TOTAL = 22,910 VA

EXISTING POWER PANEL "B"
LOCATED IN MAINTENANCE BUILDING ON SECOND LEVEL

PANEL "B"

BUS AMPS 225 MLO ✓
VOLTS 120/240V
PHASE 1 WIRE 3 SN ✓
WIRE SIZE 2/0
AIC 10KA

CKT. DESCRIPTION	LOAD	BKR.	A	B	BKR.	LOAD	CKT. DESCRIPTION
RECEPTACLES	360	20	1	2	20	1400	ICE MACHINE
RECEPTACLES	360	20	3	4	20	300	REFRIDGERATOR
RECEPTACLES	360	20	5	6	20	360	RECEPTACLES
RECEPTACLES	360	20	7	8	20	360	RECEPTACLES
DRYER	2200	40	9	10	20	1000	ELECTRIC HEATER
	2200		11	12		1000	
SPACE			13	14			SPACE
SPACE			15	16			SPACE
SPACE			17	18			SPACE
SPACE			19	20			SPACE
SPACE			21	22			SPACE
SPACE			23	24			SPACE
SPACE			25	26			SPACE
SPACE			27	28			SPACE
(1) EST – PANEL L FEEDER	4950	60	29	30			SPACE
	4215		31	32			SPACE
	5,840					4,420	

N

TOTAL = 10,260 VA

NOTES:

(1) PROVIDE A NEW 60 AMP FEEDER BREAKER FOR THE EST PANEL L. VERIFY EXACT EATON CIRCUIT BREAKER MODEL REQUIRED FOR EXISTING PANEL.

PROPOSED POWER PANEL "L"
LOCATED ON MEZZANINE LEVEL INSIDE EST

PANEL "L"

BUS AMPS 150 MLO
MAIN BRKR. AMPS 60 WIRE SIZE 2/0
VOLTS 120/240V AIC 10KA
PHASE 1 WIRE 3 SN ✓

NOTES
1. BREAKERS 1P/20A UNLESS MARKED OTHERWISE
2. SURFACE MOUNT ON RACK
3. NEMA 4X, 316 SS ENCLOSURE

60

CKT. DESCRIPTION	WIRE	LOAD	BKR.	A	B	BKR.	LOAD	WIRE	CKT. DESCRIPTION
RADIO CABINET UPS	12	900	20	1	2	20	900	12	SCADA PANEL UPS
RADIO CABINET RECEPTACLE	12	300	20	3	4	20	300	12	SCADA CABINET RECEPTACLE
EST OUTDOOR WALL PACK LIGHTS	12	240	20	5	6	20	100	12	LIGHTING CONTROLS
INDOOR FLOOR LIGHTING	12	150	20	7	8	20	435	12	UPPER LVL LIGHTS & RECEPTACLES
SPARE			20	9	10	20	280	12	LADDER AND TUBE LIGHTS
SPARE			20	11	12	20	200	12	OBSTRUCTION LIGHTS
SPARE			20	13	14	20			SPARE
SPARE			20	15	16	20			SPARE
HVAC CONDENSING UNIT	10	1680	30	17	18	30	1000		HVAC EVAPORATION UNIT
	10	1680		19	20		1000		
SURGE PROTECTIVE DEVICE	–	–	30	21	22	30			SPARE
	–	–		23	24				
		4,950					4,215		

N

TOTAL = 9,165 VA

CONDUIT AND CABLE SCHEDULE

TAG	DESCRIPTION	VOLTAGE	ROUTING FROM	ROUTING TO	VIA	CONDUIT & WIRE SIZES
100	ELEVATED STORAGE TANK (EST) FEEDER	240V	EXISTING DISTRIBUTION PANELBOARD	WIREWAY ON EST MEZZANINE LEVEL	UNDERGROUND DUCT BANK	1 1/4"C, WITH 2–#4 AWG, #4 AWG NEUTRAL, #6 GROUND
SP–1	FUTURE GARAGE FEEDER DUCT	–	POWER PULL BOX AT MAINTENANCE BUILDING	POWER PULL BOX INSIDE ELEVATED STORAGE TANK	UNDERGROUND PVC DUCT BANK	2"C, WITH JET LINE
COMM	SCADA CONNECTION	–	EXISTING SCADA CONTROL PANEL	PROPOSED SCADA CONTROL PANEL	UNDERGROUND PVC DUCT BANK	2"C, WITH 2–CAT 6, 2–#16 TSP, #10 GROUND
DS–S	EST SECURITY DOOR SWITCH	–	PROPOSED SCADA CONTROL PANEL	DOOR SWITCH	EXPOSED RIGID ALUMINUM CONDUIT	1"C, WITH 2 #14, #10 GROUND
PI–PT	PRESSURE TRANSMITTER	–	PRESSURE TRANSMITTER	PROPOSED SCADA CONTROL PANEL	EXPOSED RIGID ALUMINUM CONDUIT	1"C, WITH 2 #14, #10 GROUND

RPS
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ELECTRICAL SCHEDULES

RPS Project No 007517 / 1068.002.001	
Drawn By	Checked By
Scale N.T.S.	Date AUGUST 2020
DWG No E-8	Sheet 25 Of 28

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SCADA NOTES:

A. PROVIDE NEMA 12 STEEL ENCLOSURES WITH 3 POINT LATCH AND LOCKABLE HASP. SIZE ENCLOSURE AS REQUIRED FOR STANDARDS COMPLIANCE.

B. PROVIDE PLC, INSTALLATION, PROGRAMING, TESTING AND COMMISSIONING OF SCADA SYSTEM. PROVIDE AN AB–1500 SCADA PLC WITH ALL REQUIRED I/O, INCLUDING BUT NOT LIMITED TO AN ANALOG INPUT CARD.

C. PROVIDE TWO 1 PAIR ETHERNET FIBER CONVERTERS TO 4 PORT COPPER RJ45 SWITCHES.

D. PROVIDE TWO 19 INCH WALL SHELF AND 900VA MINIMUM UPS UNITS, APC OR APPROVED EQUAL, INSTALL UPS UNITS OUTSIDE CONTROL PANELS. PROVIDE 24VDC POWER SUPPLY SIZED ACCORDING TO PROPOSED EQUIPMENT.

E. PROVIDE ALL 24VDC AND 120VAC RELAYS, FUSE BLOCKS, TERMINAL BLOCKS, PANDUIT WIREWAY, AND ANCILLARY COMPONENTS TO COMPLETE A WORKING SYSTEM.

F. COORDINATE WITH BPSUD OPERATIONS TO PROVIDE THE CURRENT VERSION OF TWO MDS ETHERNET RADIOS, YAGI ANTENNAS, POLYPHASE COAX SURGE PROTECTORS AND ALL MOUNTING HARDWARE. ESTABLISH, TEST, AND COMMISSION RADIO COMMUNICATIONS FOR BOTH SYSTEMS. CONNECT RADIOS TO ANTENNA WITH LMR 600 COAX CABLE PROVIDED WITH FACTORY N–TYPE MALE CONNEXCTORS, NO SPLICES ARE ALLOWED IN THE CABLE. PROVIDE NON METALLIC CABLE CLAMPS SPECIFIC TO THE APPLICATION.

G. PROVIDE ONE ENDRESS HAUSER PMC 71 PSI TRANSMITTERS (1/2 INCH NPT), TWO TO BE INSTALLED WITH ALL CALIBRATION, TESTING, AND COMMISSIONING.

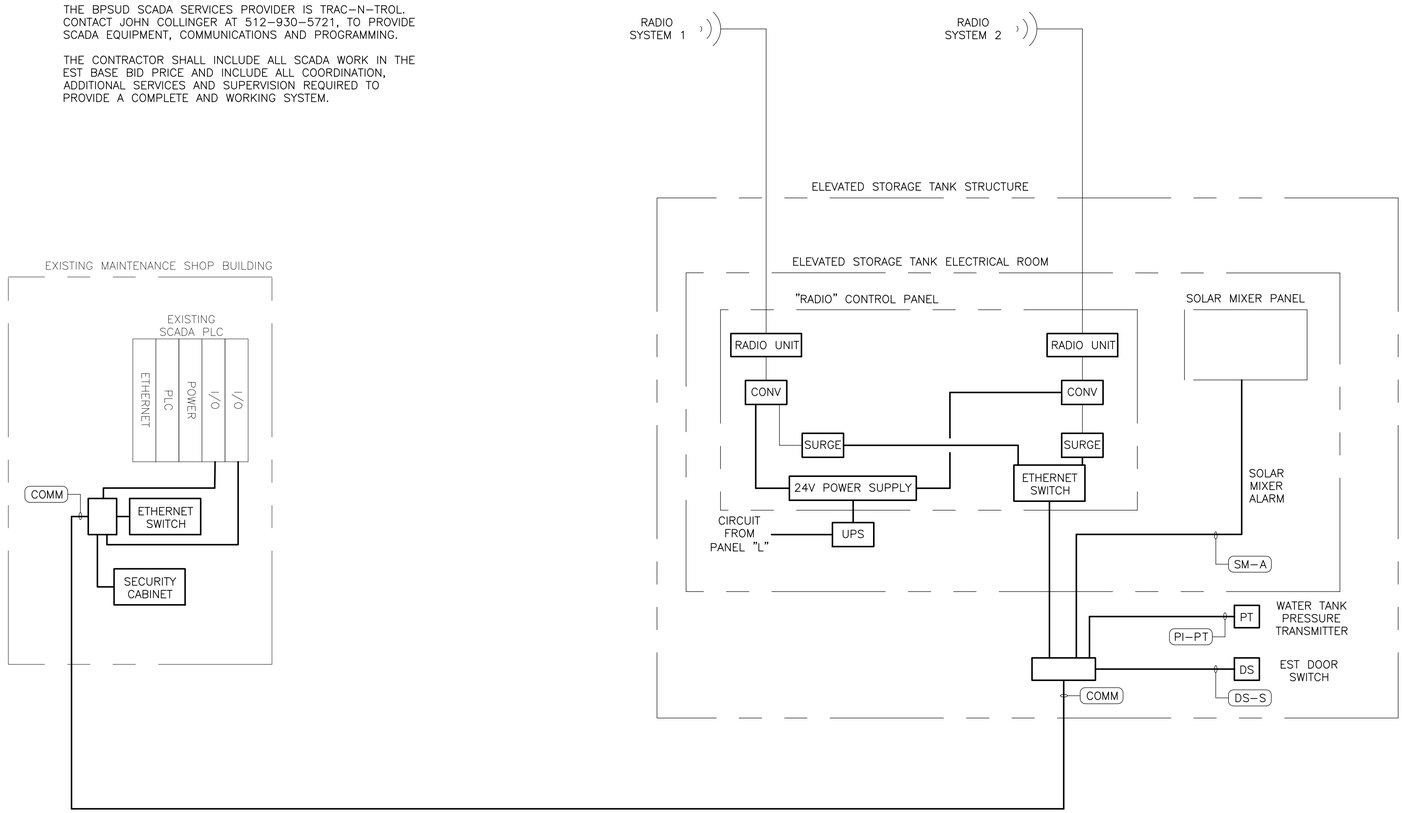
H. CONTRACTOR SHALL COORDINATE WITH TANK VENDOR TO SUPPLY A COMPLETE SOLAR MIXER SYSTEM WITH INSTALLATION, TRAINING AND WARRANTY.

I. CONTRACTOR SHALL PROVIDE SCADA, RADIO AND MIXER SYSTEM SUBMITTALS INCLUDING CABINET LAYOUT DRAWINGS, BILL OF MATERIALS, WIRING DIAGRAMS, CUT SHEETS OF ALL COMPONENTS. O&M MANUALS SHALL BE PROVIDED PRIOR TO TRAINING, 4 HOURS OF ONSITE TRAINING SHALL BE INCLUDED PER SYSTEM.

SCADA SYSTEM

THE BPSUD SCADA SERVICES PROVIDER IS TRAC–N–TROL. CONTACT JOHN COLLINGER AT 512–930–5721, TO PROVIDE SCADA EQUIPMENT, COMMUNICATIONS AND PROGRAMMING.

THE CONTRACTOR SHALL INCLUDE ALL SCADA WORK IN THE EST BASE BID PRICE AND INCLUDE ALL COORDINATION, ADDITIONAL SERVICES AND SUPERVISION REQUIRED TO PROVIDE A COMPLETE AND WORKING SYSTEM.



SCADA AND RADIO SIMPLIFIED DIAGRAM

NTS

RPS
Texas PE Firm Reg. #F-929
575 N.Dairy Ashford, Suite 700, Houston, Texas 77079
T +1 281 589 7257 E usinfrastructure@rpsgroup.com

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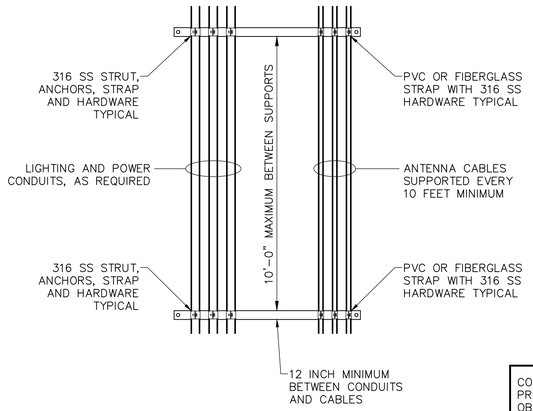
SCADA AND RADIO DIAGRAMS

RPS Project No	007517 / 1068.002.001		
Drawn By		Checked By	
Scale	NTS	Date	AUGUST 2020
DWG No	E–9	Sheet 26	Of 28

L:\Active projects\4119–RPS (BPSUD EST)\Drawings\E–9 SCADA Diagram.dwg Aug 21 2020



EST RISER SUPPORTS

DETAIL 1 / –

NTS

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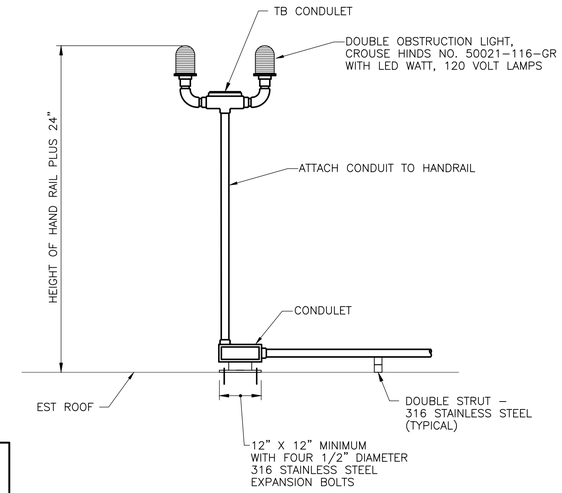
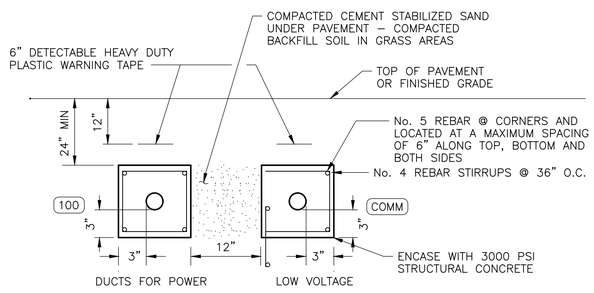


EST OBSTRUCTION LIGHTS

DETAIL 2 / –

NTS



DUCT BANK INSTALLATION

DETAIL 3 / –

NTS

rps
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TO ARRANGE FOR LINES TO BE TURNED OFF OR MOVED, CALL ENTERGY AT 1-800-368-3749

NOTICE:

FOR YOUR SAFETY, YOU ARE REQUIRED BY TEXAS LAW TO CALL 811 AT LEAST 48 HOURS BEFORE YOU DIG SO THAT UNDERGROUND LINES CAN BE MARKED. THIS VERIFICATION DOES NOT FULFILL YOUR OBLIGATION TO CALL 811.

REV	DESCRIPTION	BY	DATE

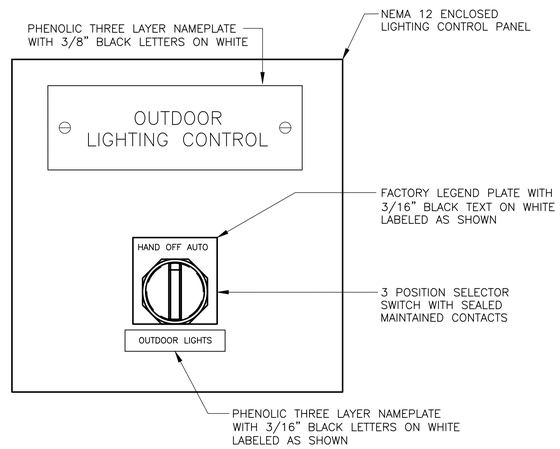
STATE OF TEXAS
WADE A HUBBLE
121581
LICENSED
PROFESSIONAL ENGINEER
AUG 21 2020

Wade A. Hubble
Kalluri Group, INC.
Texas Registered Engineering Firm F-665

DETAILS 1 OF 2

RPS Project No	007517 / 1068.002.001		
Drawn By		Checked By	
Scale	NTS	Date	AUGUST 2020
DWG No	E-10	Sheet 27	Of 28

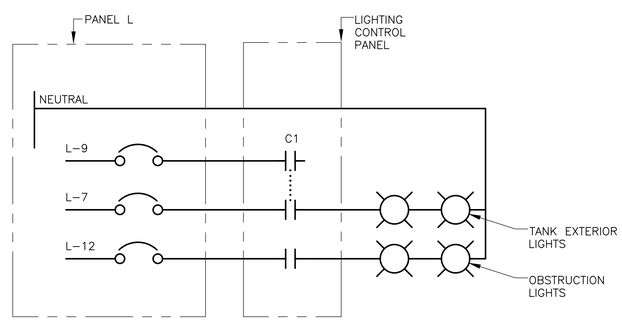
L:\Active projects\4119-RPS (BPSUD ES1)\Drawings\E-10 Details 1 of 2.dwg Aug 21 2020



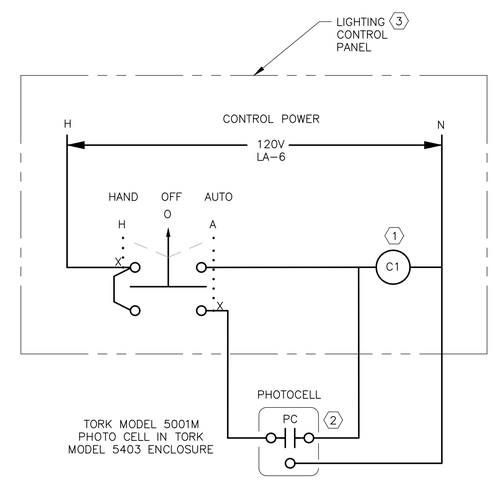
LIGHTING CONTROL PANEL LAYOUT

NOTES:

1. PROVIDE EATON "CN35 SERIES" (OR EQUAL) ELECTRICALLY HELD LIGHTING CONTACTOR, WITH MINIMUM OF TWO SPARE CONTACTS PER CONTACTOR.
2. PROVIDE PHOTOCELL ABOVE ROOF LINE LOCATED WITH NORTHERN EXPOSURE AND PROVEN FUNCTIONAL FOR SUNSET TO SUNRISE OPERATION.
3. INSTALL COMPONENTS ON SUB PANEL AND PROVIDE FIELD WIRING TERMINALS, RAIL MOUNTED, AND RATED FOR 30 AMP. PROVIDE TERMINAL POINTS FOR ALL CONDUCTORS PASSING THROUGH LIGHTING CONTROL PANEL. PANEL WIRING SHOP DRAWING SHALL BE SUBMITTED FOR ENGINEER APPROVAL AND A PERMANENT COPY OF APPROVED DRAWING SHALL BE PROVIDE IN POCKET INSIDE ON PANEL DOOR.
4. PROVIDE TWO LITHONIA "DXF3 LED 6 P1 50K NSP MVOLT" FIXTURES, WITH TENON ADAPTORS FOR POLE LIGHTS.



LIGHTING POWER WIRING SCHEMATIC



LIGHTING CONTROL WIRING DIAGRAM

EST LIGHTING CONTROL

DETAIL 2

NTS –

RPS
Texas PE Firm Reg. #F-929
575 N.Dairy Ashford, Suite 700, Houston, Texas 77079
T +1 281 589 7257 E usinfrastructure@rpsgroup.com

TEXAS GENERAL LAND OFFICE

BPSUD Elevated Water Storage Tank

Bolivar Peninsula Special Utility District

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
Consulting Engineers & Project Managers
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BENCHMARK:

NGS MARK HGCSD 64 PID AW6988 SITUATED ABOUT 7.5 MILES SOUTHWEST OF GILCHREST ABOUT 2.5 MILES NORTHEASE OF CRYSTAL BEACH ON THE BOLAVAR PENINSULA AND ON THE SOUTH SIDE OF STATE HIGHWAY 87 ELEVATION 5.1' FEET NAVD 88.

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DETAILS 2 OF 2

RPS Project No	007517 / 1068.002.001		
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DWG No	E-11	Sheet 28	Of 28

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