

## ADDENDUM # 1

March 30, 2016

### PROJECT

**Sewer Lift Station Replacements  
Bid No. #2016-09**

### OWNER

City of Carlsbad

### ENGINEER

Bohannon Huston Inc.

This addendum forms a part of the Contract Documents and modifies the original specifications and drawings dated March 11, 2016. Acknowledge receipt of this addendum in the space provided in the Bid Form. Failure to do so may subject the bidder to disqualification.

### **I. BIDDER'S QUESTIONS**

1. **Question:** For gravity inlet line specific locations, are we to communicate to the fiberglass manufacture about angle and elevation of inlets?

**Answer:** For Lift Stations of: Bataan, Hagerman, and Stevens contractor to field locate lift station inlet elevation, and angle. Contractor to provide that information to manufacturer for a factory installed inlet coupling. Lift station Pate and Hall inlet will be done in the field per manufacturer recommendations.

2. **Question:** Is lead abatement for existing lift stations required for disposal?

**Answer:** For painted metallic lift stations being demolished, Contractor shall include the cost of any lead paint analysis being required for local facility disposal. If it is determined that lead exists at a level requiring abatement prior to disposal, this will be a change in contract to be negotiated at that time.

3. **Question:** Will Xcel Energy charges for holding power poles be allowed within the Electric Service Modifications Allowance?

**Answer:** Yes

4. **Question:** List the Lift Stations that need factory installed invert.

**Answer:** Bataan, Hagerman and Stevens

5. **Question:** There is a dialer in each panel, but in the specification 02530 it mentions a SCADA system?

**Answer:** Each panel should only have an Autodialer – SCADA system not

required. Specification 02530 has been revised to correct this.

6. **Question:** The electrical schematic shows the transfer switch and the generator receptacle prior to the distribution panel; while the spec (02530-15) calls out the transfer switch, emergency and main circuit breakers, and generator receptacle in the pump control panel.

**Answer:** Contractor to provide generator receptacle per Detail 02-DE1 - Equipment Rack Elevation Detail. Specification 02530 has been revised to correct this.

7. **Question:** Due to the project advertising in the local bid rooms, such as the construction reporter, on March 17th is it possible to move the bid date back one week so the bidding contractors have the proper time to bid the project and put together a quality proposal?

**Answer:** Given the funding constraints to have this project under contract with a Notice to Proceed by June 1<sup>st</sup>, the bid date of April 1<sup>st</sup> must hold.

8. **Question:** Drawing LS5-E2, page 44 of 54, is contradictory. One line shows 5 hp motor however the electrical load summary shows the grinder having a 3 hp motor. Specification says 5 hp.

**Answer:** Grinder motor to be 5 horsepower. As noted on Spec. 11330 and One line diagram 01-LS5E2 drawing.

9. **Question:** Will Domestic Material be required for this project?

**Answer:** Made in America or Domestic Material will not be mandated for this project.

10. **Question:** Plan Sheet LS1-C6, Note #4 refers to Access Hatches see Specification 11310. Specification 11310 was not included in Bid Package. Is that the correct reference?

**Answer:** Plan Sheet LS1-C6, Note #4 shall be corrected to refer to Specification 02530.

11. **Question:** Plan Sheet LS1-C3, Profile appears to indicate that the 6" DI Force main will discharge from the Valve vault above Grade, is that correct?

**Answer:** Yes, that is correct.

12. **Question:** Plan Sheet LS1-C6, calls for SST piping and fittings in the valve vault. Since this is a Cast-In-Place Vault and not a prefabricated Vault, would DI fittings be acceptable?

**Answer:** No, all lift station need to be consistent with materials.

13. **Question:** Plan Sheet D-C3, Detail 1 is calling for 10" Tee and Spool, should this be 6"?

**Answer:** Yes, it shall be corrected to say 6"x6"x6" Tee.

14. **Question:** Plan Sheet D-C3, Detail 1, there is a callout for a 6" FL 45° immediately after the Expansion coupling, is that correct?

**Answer:** No, the note identifying a 6-inch flanged 45-degree bend shall be deleted.

15. **Question:** Plan Sheet D-C3, Detail 1, what size is the ARV? Detail shows a 2" NPT Tap, but 1" Drain?

**Answer:** ARV tap into FM tee is 2" NPT, ARV discharge outlet is 1" diameter stainless steel pipe then transition underground to 2" PVC drain per detail 01, Drawing D-C3.

16. **Question:** Plan sheet LS1-C3 and D-S2: C3 calls out the SAS FM as C900 PVC, while section A on D-S2 shows that same section as 6" Ductile Iron. Please clarify what type of pipe will be required?

**Answer:** Section A on drawing D-S2 shall say C-900 PVC for underground pipeline and ductile iron for aboveground pipeline.

17. **Question:** Detail 7/D-C3 Calls for an EJIW Open Grate Manhole Lid and Ring on the New Forcemain SAS Manhole. Is that correct?

**Answer:** No, the new sanitary sewer manhole to be installed at end of the Bataan LS force main shall be comprised of a solid manhole lid with ring, and be labeled "Sanitary Sewer".

18. **Question:** Plan Sheet LS1-C4, Note #7 calls for Forcemain Discharge to Manhole to be constructed per Detail 4/D-C3. This is a Standard Drop Manhole connection. Will these forcemain pipe fittings be required to be Restrained Ductile Iron Fittings?

**Answer:** Yes, all force main fittings shall be restrained.

19. **Question:** Plan Sheet LS1-C6, Section A calls for 12" SAS C900, while note #42 calls for 12" DWV. What type of pipe will be expected?

**Answer:** 12" SDR 35 PVC.

20. **Question:** Plan Sheet LS2-C3 Plan calls for 15" SAS, while note #40 calls for 8" SDR-35. What size is the Influent pipe supposed to be?

**Answer:** Pipe to be SDR-35 15" Diameter.

21. **Question:** Plan Sheet LS2-C2, Note #7 calls for a 4" Sch 80 Tee at Manhole Discharge. However this is C900 Pipe. Should it transition to Sch 80? Please Clarify.

**Answer:** A 4" C-900 PVC Tee is acceptable.

22. **Question:** Plan Sheet LS3-C3, note #39 calls for an Epoxy Lined Compression Coupling for Inlet SAS Pipe. Would a slip coupling work here as called out at other Lift stations? Is this a Reducer? What size is the Existing?

**Answer:** A 15" SDR 35 Slip Coupling shall be acceptable. Existing gravity pipe exiting manhole is 15" diameter.

23. **Question:** Plan Sheet LS3-C3, note #13 adds 60' of 6" C900 Waterline w/ a Fire Hydrant, will a 6" Gate Valve also be required?

**Answer:** Yes, a 6" resilient wedge mechanical joint gate valve with mechanical restraint will be required to be installed immediately adjacent to the fire hydrant, from a manufacturer approved list as described in City of Carlsbad Utility Standards.

24. **Question:** Plan Sheet LS3-C2, plan View 1 and 2 seem to have exchanged the SAS and the FM. In 1 the SAS is further North while in 2 the FM is further North. Is this correct? Are there fittings in the 1175 feet that would need to be accounted for?

**Answer:** Plan view 1 and 2 are correct. The existing forcemain apparently transitions to the south side of the sanitary sewer pipeline at some point between these two points. No additional fittings beyond that shown in these plan views are anticipated, as shown on Drawing LS3-C2.

25. **Question:** Plan Sheet LS4-C2, at FM Discharge to MH #649, Call out refers to 1/LS4-C3. But this does not detail the connection to this manhole. Please detail this connection to MH.

**Answer:** For connection to Manhole #649, delete detail callout to 1/LS4-C3, and delete Keyed Note #5 callout and replace with new Keyed Note #7 – Remove existing PVC forcemain to interior of manhole and install new C900 PVC forcemain to interior of station and install new 4-inch C900 Tee at termination point.

26. **Question:** Plan Sheet LS5-C3 Note 40 calls for 2" Water. All other sites have req'd a 1", will 1" connection work here also?

**Answer:** A 1" connection will be required at this location as well, delete reference to 2" connection.

27. **Question:** Detail 2/Sheet D-C1 implies that the City of Carlsbad is responsible for Domestic Water, from Connection to Main through the Meter and Box. Please confirm that the contractor will not need to provide nor install anything for the water service until after the meter and box.

**Answer:** Correct. All charges by the City of Carlsbad Utilities Department for these water service connections are to be applied to the Bid Item #10, 1" Water Service Connection Allowance.

28. **Question:** Spec 02713, 2.01, B, calls for DR14 Waterline, pressure class 200 psi. Would Dr-18 be acceptable (235 psi)?

**Answer:** No, only DR14 shall be allowed for water distribution. This Specification Part shall be corrected to state Pressure Class 305 PSI (DR14).

29. **Question:** Spec 02722, 2.01, E, calls for DR14 Force Main line, pressure class 200 psi. Would Dr-18 be acceptable (235 psi)?

**Answer:** Yes, DR18 shall be allowed for sanitary sewer forcemain. This Specification Part shall be corrected to state Pressure Class 235 PSI (DR18).

30. **Question:** Spec 03110 Schedule refers to Lift Stations not associated with this project. Please Update accordingly.

**Answer:** Delete Part 3.02.C altogether. Part 3.02.B shall be corrected to read as follows:

B. Pipe seals and sleeves for Bataan Lift Station:

1. 12" Diameter SAS Influent: Link Seal Model LS-325-S316-9 pipe seal with Century Line Pipe Sleeve Model CS-12-8.0.
2. 4" Diameter PVC Foul Air Piping:
  - a. Link Seal Model LS-475-S316-8 pipe seal with
  - b. Century Line Pipe Sleeve Model CS-8-8.0.
3. 2" Diameter PVC Odor Control System Drain Line:
  - a. Link Seal Model LS-300-S316-6 pipe seal with
  - b. Century Line Pipe Sleeve Model CS-4-8.0.
4. 6" Diameter D.I Force Main:
  - a. Link Seal Model LS-475-S316-10 pipe seal with
  - b. Century Line Pipe Sleeve Model CS-10-8.0 for wet well wall penetrations.
  - c. Century Line Pipe Sleeve Model CS-10-6.0 for valve vault wall penetrations.

5. 2" Diameter PVC Valve Vault Drain Line:
    - a. Link Seal Model LS-300-S316-6 pipe seal with
    - b. Century Line Pipe Sleeve Model CS-4-8.0
  6. Electrical Conduit Penetrations: Grout seal, no Link Seal required.
31. **Question:** Spec 15101, 2.02, G calls for 2" ARV on sewage service, while plan sheet LS1-C6, note #28 calls for ARV w/ 1" PVC AIR DRAIN LINE. Should this line be 2"? Or should the ARV be 1"?
- Answer:** The basis of design is a Val-Matic Wastewater Air Release Valve, Model 49A, with a 2" NPT inlet and a 1" NPT outlet.
32. **Question:** In the Valve Vault at the Bataan Lift station, plan sheet LS1-C6, there is some concern that the ARV will not fit vertically in the Vault. Please confirm.
- Answer:** The basis of design is a Val-Matic Wastewater Air Release Valve, Model 49A, with total dimension of 15" height, it appears this valve should properly fit.
33. **Question:** Spec 15101, 3.02, spare Parts calls for "One Flush Hydrant", since none are on the project shall this be disregarded? Will the other spare part items be required?
- Answer:** Yes, the spare yard hydrant and flush hydrant shall be deleted. The spare air relief valve is required.
34. **Question:** A note on sheet 15 states the three sided 5' x 5' vault is cast in place. A note on sheet 17 states it is precast. Please clarify which is required.
- Answer:** Keyed Note #3 on Drawing LS1-C6, Sheet 15 is to be corrected to state 5'x5' Pre-cast vault.
35. **Question:** After clarification of vault, please provide details such as wall & slab thicknesses, rebar layout, and method of attachment of walls & slab to existing wall.
- Answer:** The vault is to be provided per Section 03410 of the Technical Specifications and the inside dimensions provided on the plans.
36. **Question:** Does the new Bataan 8" deck slab require attachment to the existing walls and new vault? If so, please provide a detail.
- Answer:** To clarify the station lid deck is 12" thick not 8" thick. Delete plan dimension on lid thickness showing 8" thick. The attachment new Detail 7 clarifies the interface of the wall and lid. See attached Detail 7 / LS1-S1.

37. **Question:** Please provide bypass pumping flow requirements for each lift station.

**Answer:** The required pumping rate for each station is shown on each station's bypass plan within the Temporary Bypass Pumping Sequence Table.

38. **Question:** Please provide construction limits for the Hagerman & Pate Lift Stations to determine where engineered shoring is required.

**Answer:**

Hagerman LS: The construction limits are the city's Hagerman Street ROW width. Other overhead and underground utilities are in close proximity to the station location and will require a very close shoring system to the lift station structure to properly protect the nearby utilities shown. Contractor shall evaluate physical extent of shoring boundary necessary to accomplish the excavation, protect the existing utilities, and remain within the ROW boundary.

Pate LS: The construction limits are the city's 15' easement area beyond the City ROW line as shown on Plan 1, Sheet 35. Other overhead and underground utilities are in close proximity to the station location and will require a very close shoring system to the lift station structure to properly protect the utilities shown. Contractor shall evaluate physical extent of shoring boundary necessary to accomplish the excavation, protect the existing utilities, and remain within the ROW boundary.

39. **Question:** The profile on sheet 13 depicts the new force main connecting to a proposed manhole with an outside drop that is 20' deep. The note states to connect per detail 3 on sheet D-C3. This detail is for a regular connection to a manhole, not a 20' deep outside drop. Please clarify which connection is required while keeping in mind that installing a 20' deep manhole under overhead power lines would be nearly impossible due to shoring requirements and the size of equipment required. Would moving the overhead electric be considered relocating conflicting existing utilities since it is clearly a safety hazard? Please clarify.

**Answer:** Detail reference shall be corrected to Detail 4, Sheet D-C3. This is intended to be a forcemain drop connection. Adjacent utilities such as water and overhead electric will need to be supported in place, no relocations are expected to be allowed. The allowances are intended to be used for any charges by Xcel Energy for this task. Shoring and dewatering is expected to be required at this location for this new manhole construction.

40. **Question:** Please provide the TOW and BOW elevations for the CMU wall at the Hall LS.

**Answer:** Bottom of Wall: 3116.50', Top of Wall: 3124.50'

41. **Question:** Sheet 13 contains a bore under existing railroad tracks. Please provide the permit for this bore so the insurance and railroad flagger requirements can be reviewed and bid appropriately.

**Answer:** Contractor shall include within the bid \$1,250 for purchase of a Railroad insurance liability policy. The boring pits are beyond the 30-foot rail offset boundary that requires flagmen, therefore no costs for flagmen are anticipated.

42. **Question:** The profile on sheet 23 shows subgrade prep and new base course under what appears to be a new manhole, but a note does not exist stating to replace the manhole. Please clarify.

**Answer:** The manhole shown on the left side of Profile A, Drawing LS2-C3, Sheet 23 is an existing manhole to remain. Keyed notes pointing to the subgrade and base under this manhole shall be deleted and are not necessary.

43. **Question:** Detail 2 on sheet 45 states that the city will install water services from the main to just past the meter. Please confirm that this is correct and that the contractor is not providing or installing those portions.

**Answer:** Correct. All charges by the City of Carlsbad Utilities Department for these water service connections are to be applied to the Bid Item #10, 1" Water Service Connection Allowance.

44. **Question:** The concrete pads for the odor control equipment scale much larger than shown in detail 3 on sheet 45. Please confirm detail 3 dimensions are correct.

**Answer:** Concrete foundations for the odor control equipment is intended to be 3'-6"x3'-6"x1'-6" thick.

45. **Question:** Does the annular space between the existing wet wells and the new wet wells at Hagerman & Stevens receive any backfill? Please clarify.

**Answer:** Yes, this annular space is to be grout filled in four-foot lift levels maximum.

## II. TECHNICAL SPECIFICATIONS CORRECTIONS/MODIFICATIONS

1. Specification 01014 – Work Sequence: Add Part 1.01.B & C text as follows:

B. Bataan, Hagerman, and Stevens Lift Stations require the gravity inlet lines to be field located and the approach angles and inverts identified upon bypass and confirming existing conditions. If the inlets are below the basins manufacturers recommended minimum height inlet location, then the manufacture shall factory install the inlet connection to maintain the factory

warranty. This sequence of operation shall incorporate enough time for the Contractor to communicate to the fiberglass basin manufacture the angle and elevation of the gravity inlet(s). The manufacturer shall install the inlet hub within 5 working days and ship the basin to the project. The Contractor shall be responsible for maintaining the bypass pumping for an additional two weeks until the basin arrives and is installed for service.

C. Permit acquisition from BNSF Railway and NMDOT are in process for the Bataan Lift Station and are anticipated to be acquired by July 1, 2016. All work on Bataan Lift Station shall not commence until these permits are acquired. Owner shall extend contract period accordingly if permit acquisition substantially delays Contractor construction schedule.

2. Replace Specification 02530 with revised Specification 02530 attached to this addendum.

### III. CONSTRUCTION DRAWINGS CORRECTIONS/MODIFICATIONS

1. Replace Drawing No. G6, Sheet 6 with attached.
2. Pump Control Schematics – Drawing D-E5. Ultrasonic level transducer to be removed and is not needed.
3. Load summary 02-LS5-E2, comminutor motor rating shall read 5 HP.
4. Plan Sheet LS1-C6, Note # 4, 11, 12, & 13. Specification 11310 Shall read: **Specification 02530.**
5. Plan Sheet LS2-C3, Note # 5, 6, & 12. Specification 11310 Shall read: **Specification 02530.**
6. Plan Sheet LS3-C3, Note # 5, 6, & 12. Specification 11310 Shall read: **Specification 02530.**
7. Plan Sheet LS4-C3, Note # 5, 6, & 12. Specification 11310 Shall read: **Specification 02530.**
8. Plan Sheet LS3-C3, Note # 3, 5, 6, & 12. Specification 11310 Shall read: **Specification 02530.**
9. Detail 01 Drawing D-C3. Note referring to 10"x10"x10" Tee shall read: **6"x6"x6"**.
10. Detail 01 Drawing D-C3. Note referring to 45° Bend shall be deleted.
11. Detail 01 Drawing D-C3. Note referring to 2" air release valve shall include 2" bronze ball valve and 2" brass nipples for isolation at connection point.

12. Section A on Drawing D-S2 underground pipe shall be **6" C900 PVC**.
13. Drawing LS1-C6. Note #42 referring to influent pipe material shall be **12" SDR 35 PVC**.
14. Drawing LS1-C6. Drawing section A, text referring to influent pipe material shall say **12" SDR 35 PVC**.
15. Drawing LS2-C3. Note #42 text referring to diameter of influent SAS pipe shall read: **15" SDR 35 PVC**.
16. Drawing datum for ' HALL LIFT STATION PROJECT CONTROL' shall be #3 instead of #1.
17. Drawing LS4-C2. Detail call out for manhole connection shall be **Detail 04 Drawing DC-3**.
18. Drawing LS5-C3 Note #40 and Note #45 shall refer to 1" water service instead of 2".

#### **IV. ADDENDUM REVISED DOCUMENT ATTACHMENTS**

1. **REVISED** Specification 02530
2. Drawing G6, Sheet 6, **Revision 1**
3. Drawing LS1-C3, Sheet 12, **Revision 1**
4. Drawing LS1-C4, Sheet 13, **Revision 1**
5. **New Detail 7**, for Drawing LS1-S1, Sheet 17.

All bidders shall acknowledge receipt of this addendum in the appropriate location on the BID FORM.

Sincerely,  
Bohannon Huston, Inc.



Matthew R. Thompson, PE  
Senior Vice President

## SECTION 02530

### PRE-ENGINEERED SEWAGE LIFT STATION

#### PART 1 GENERAL

##### 1.01 WORK INCLUDED

- A. Prefabricated Fiberglass Reinforced Plastic (FRP) lift station structures for wet well and valve vault. The equipment shall be installed as shown on the plans, as recommended by the supplier, and in compliance with all OSHA, local, state, and federal codes and regulations.
- B. All interior pipe, valves, fittings, braces, connectors, and gaskets.
- C. Submersible pumps, bases, cabling, floats, and control panel.
- D. All structure access hatches, guide bars, and retrieval crane components.
- E. The Contractor shall provide all materials, equipment and labor necessary to install, test and place into service the pre-engineered fiberglass pump station as shown in the plans and described in this specification. The pre-engineered sewage lift station package, including submersible pumps, pump control, fiberglass structures, internal piping, accessories and auxiliary equipment shall be supplied by a single manufacturer representative and supplier.

##### 1.02 RELATED WORK

- A. Section 01340: Shop Drawings, Product Data, Samples
- B. Section 01600: Materials and Equipment
- C. Section 02220: Excavation and Backfilling
- D. Section 02500: Double Penetration Paving, Gravel Surfacing and Resurfacing
- E. Section 02722: Sanitary Sewerage Systems
- F. Section 02751: Process Piping
- G. Section 03300: Cast-in-Place Concrete

1.03 REFERENCES

- A. American Society for Testing and Materials (ASTM) D3753: Fiber-Reinforced Polyester Wetwells.

1.04 SUBMITTALS

- A. Section 01340: Shop Drawings and Product Data.

1.05 PROJECT SITE CONDITIONS

- A. Elevation: See Schedule.
- B. Inspect and verify that conditions are satisfactory before beginning work.
- C. Do not begin work until all unsatisfactory conditions are corrected.
- D. Beginning of work indicates acceptance of conditions.

1.06 WARRANTY

- A. In printed form and apply to all similar units
- B. Five years or 10,000 hours under municipal permanent installation policy to include parts and labor.
- C. Manufacturer's authorized warranty repair station within 200-mile radius of this installation; service station to have been appointed by the manufacturer at least three years prior to this project's Bid date to have service trucks with cranes for jobsite service and factory trained and certified service mechanics and technicians.
- D. Manufacturer shall certify repair facilities. Manufacturer's authorized repair station shall have \$100,000 minimum inventory of repair parts including O-rings, bearings, mechanical seals, motor stator, power cable, grommets, and fittings of the pumps to be supplied under this job.
- E. The aluminum access frames and covers shall carry a guarantee of 10 years against defects in material and/or workmanship.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

- A. FRP wet wells and FRP valve vaults shall be in accordance with these specifications and plans and shall be supplied by one of the following manufacturers:
  - 1. Xylem Flygt Inc.
  - 2. Approved equal.
- B. Submersible pumps shall be in accordance with these specifications and plans and shall be supplied by one of the following manufacturers:
  - 1. Xylem Flygt Inc.
  - 2. Approved equal.
- C. Accessories and auxiliary equipment shall be in accordance with these specifications and plans and shall be supplied by one of the following manufacturers:
  - 1. Xylem Flygt Inc.
  - 2. Halliday Products Inc.
  - 3. Thern Inc.
  - 4. Approved equal.
- D. Manufacturers requesting to be selected as an approved equal shall submit certified documentation including installation lists with phone numbers, equipment drawings, flow performance curves, electrical schematics and cut sheets, O&M draft showing compliance with these specifications a minimum of ten (10) days prior to bid opening. Selected equipment manufacturers shall be added to the list of approved manufacturers.
- E. Selected approved equal manufacturers shall conduct an onsite test within ten (10) days of installation demonstrating compliance with all areas of this specification

### 2.02 FRP LIFT STATION

- A. Summary  
The station cylinder shall be affixed to the station bottom such that the assembled components are structurally integrated, resulting in a watertight vessel which is capable of withstanding the full hydrostatic head from the exterior of the station while the station is completely empty.

- B. The cylinder shall be made of FRP using the filament winding process. A safety factor of two (2) on the minimum ultimate tensile strength of the laminate bottom shall be used in designing the basin and cylinder wall thicknesses for the station, taking into account all normally imposed loads arising from flotation, soil pressures, normal backfill, handling loads, operating loads and static loads imposed by equipment used in hoisting the pumps in and out of the station.
- C. The cylinder is a filament wound laminate constructed by saturating continuous strand glass roving in a controlled pattern over a corrosion resistant liner that is to be 110 mils minimum thickness. The roving's shall be applied uniformly throughout the entire length of the cylinder as required to provide adequate thickness for the mechanical loads of each application. The winding pattern shall be a combination of helical and hoop wraps and shall produce a dense laminate without non-reinforced resin pockets or air bridging between the rovings. The glass content of the structural laminate shall be 60% to 70% by weight.
- D. The station bottom is a 30% to 50% glass content, chop spray laminate, constructed by built-up layers of chop spray and woven roving applied along with a catalyzed isophthalic resin. Each layer shall be properly wetted out and rolled out so that it is free of air voids until the required wall thickness has been obtained.
- E. All inside surfaces shall be smooth and free of cracks and crazing. The inside surface will be pigmented or gel coated to a bright white finish. All surfaces other than those made in contact with the mold surface shall be coated with air-inhibited resin or gel coat; this includes any cut edges of laminate.
- F. The station shall be provided with one (1) anti-flotation flange located near the bottom of the station. This anti-flotation flange is an integral part of the station and is sufficient in design to withstand the forces acting upon the station due to the subsoil water pressure. Once the station is inserted into the hole, concrete ballast may be required depending on the station depth, as recommended by manufacturer. The combination of the flange and the loading of backfill material over the concrete shall provide adequate ballast against buoyancy under full hydrostatic head conditions.
  - 1. All hardware and fasteners used inside FRP wet well shall be made of stainless steel.
  - 2. Discharge piping inside of wet well shall be welded Stainless Steel – see Section 02751.

2.03 FRP VALVE VAULT

- A. Summary

The pre-engineered pump station shall have a valve vault that is separate from the pump station vessel. The valve vault shall be fabricated in a manner identical to the pump station and shall be large enough to allow entry for routine maintenance and inspection. The valve vault shall be equipped with an integral drain and check valve to facilitate drainage from the valve vault back into the pump station.

1. All hardware and fasteners used inside FRP valve vault shall be made of stainless steel.
2. Discharge piping inside of valve vault shall be welded Stainless Steel see Section 02751.

## 2.04 ACCESS ACCESSORIES

### A. Wet Well and Valve Vault Access Cover:

1. Materials: Structural aluminum cover and frame, unless otherwise scheduled.
2. Hardware:
  - a. Stainless Steel
  - b. Provide for a padlock.
3. Nut rail incorporated in frame.
4. Wet well frame shall include openings for removable pump cables.
5. 300 or as specified pounds per square foot rated, unless otherwise scheduled.
6. Size: Actual clear openings as recommended by pump manufacturer for the pumps being installed in wet well or as shown on Drawings.
7. The access cover's frame shall be securely placed, mounted above the pumps. Doors constructed of skid proof design, provided with stainless steel hinges and stainless steel fasteners. The doors open to 90 degrees and lock automatically in that position with a stainless steel positive locking arm and stainless steel release handle.
8. Doors are provided with a stainless steel lifting handle and stainless steel locking bar. The access covers for pumps are furnished with an attached nut rail for the upper guide bar brackets.
9. The station lid shall have an integral four-inch diameter stub-pipe connection for the purpose of venting the pump station. The inverted J-shaped vent pipe shall end at a point at least 3-foot above the elevation of the station cover. There shall also be an option for a second vent to accommodate positive ventilation of the wet well.
  - a. Pipe material as described on drawings.
10. The wet well access cover shall include the safe hatch feature or approved equal. The safe hatch shall be designed to combine covering of the hole per OSHA 1910.23 standard and shall include fall through protection and controlled confined space entry. Aluminum grating shall be designed to withstand a minimum live load of 300 pounds per square foot, and deflection shall not exceed 1/150<sup>th</sup> of the span. Aluminum

safety grate openings shall be 5” x 5”, which will allow for visual inspection of the pit and float adjustment, once the access hatch is open.

11. The safety grate opening arm will also be equipped with a controlled confined space entry locking device (lock provided by others). This locking device will prevent unauthorized entry to the confined space. Welding shall be in accordance with ANSI/AWS D1.290 Structural Welding Code for aluminum.
12. Design of the system must assure fall through protection is in place after the door has been closed, thereby protecting the next operator.
13. Manufacturer:
  - a. Halliday Products – [www.hallidayproducts.com](http://www.hallidayproducts.com)
  - b. Engineer approved equal.

B. Safety Grate:

1. Hinged and lockable aluminum grating panel installed beneath wet well access cover.
2. Aluminum “I” bar construction.
3. T-316 stainless steel hardware.
4. Spring loaded lifting handle.
5. Lockable with owner-supplied padlock.
6. 300 lbs. per sq. ft. load rating.
7. Hinged with automatic hold open arm to maintain upright position.
8. Stainless steel mounting hardware
9. Safety orange powder-coating finish
10. Manufacturer:
  - a. Halliday Products – [www.hallidayproducts.com](http://www.hallidayproducts.com)
  - b. Engineer approved equal.

C. Access ladder:

1. All Aluminum welded construction.
2. 1-3/8” Type “D” rung with flat slip resistant surface.
3. All mounting hardware and fasteners shall be made of stainless steel.
4. Wall mounted ladder.
5. Manufacturer:
  - a. Halliday Products – [www.hallidayproducts.com](http://www.hallidayproducts.com)
  - b. Engineer approved equal.

## 2.05 DESIGN DUTY REQUIREMENTS

- A. See Schedule within Section 3.08.

## 2.06 PUMP MATERIALS

- A. Volute, Impeller, Motor Housing, Discharge Elbow, and Other: Gray cast iron ASTM A-48 Class 35B, with smooth surfaces devoid of blow holes or other irregularities.
- B. Shaft:
  - 1. ANSI 431 stainless steel up to 100 HP
  - 2. ASTM A572, Grade 50 Carbon steel above 100 HP
  - 3. Stainless steel sleeves covering shafting constructed of lesser materials are not acceptable.
- C. Motor
  - 1. Rotor bars and short circuit rings: Aluminum
  - 2. Stator winding and lead insulation: Class H monomer free polyester resin.
- D. Mechanical Seal: Tandem seals with all seal faces to be solid sintered tungsten carbide featuring a nickel binder to cement tungsten-carbide particles together during sintering.
- E. Wear Ring: Required if C impeller scheduled
  - 1. Case wear ring: Nitrile rubber molded with steel ring insert.
  - 2. Impeller wear ring on 20 HP and larger pumps: ANSI 304 SS
- F. Cutters:
  - 1. Stationary Cutters- Hardened 316 "L" Stainless Steel
  - 2. Rotary Cutter- Chrome alloyed cast iron
- G. Exposed Nuts and Bolts: 304 stainless steel or brass and protected by a factory applied spray coating of acrylic dispersion zinc phosphate primer with a polyester resin paint finish.

## 2.07 PUMP CONSTRUCTION

- A. Water Tight Seatings: Nitrile rubber o-rings against machined surfaces
- B. Sealing of the pumping unit to the discharge connection elbow, guided by two guide bars extending from the top to the discharge connection, shall be accomplished by a simple linear downward motion of the pump.
- C. Cable Entry Design:
  - 1. Seal: Torque-free mechanical compression type with strain relief (epoxies, silicones or other secondary sealing not acceptable), single grommet type up to 100 HP and double grommet above 100 HP.

2. Junction chamber to be sealed from motor by a non-hydrscopic, feed through type terminal board and elastomer compression seal.

D. Pump Motor

1. Air filled, squirrel cage rotor, induction type, shell type design, housed in air-filled watertight chamber
2. Stator to be insulated by trickle impregnation to achieve a minimum 95% winding fill factor using monomer free, moisture resistant, polyester Class H resin rated for 180 C ( 356 F)and heat shrink fitted into the stator housing (designs requiring use of bolts, pins, or other fastening devices requiring penetration of stator housing are not allowed).
3. FM rated explosion proof if required by specified Area Classification
4. Sensors:
  - a. Equipment with winding over-temperature switch in each phase. Set to open at a maximum of 140 C.
  - b. Thermal switches set to open at 125C (260F) are embedded in the stator lead coils to monitor the temperature of each phase winding. These thermal switches are used in conjunction with and supplemental to external motor overload protection, and will be connected to the control panel. At 125C (260F) the thermal switches shall open, stop the motor and activate an alarm.
5. Combined service factor of 1.15 and rated for operation at 40C AMB.
6. Pump Motor: Connections between cable conductors and stator leads to be made with threaded compression type binding posts permanently affixed to terminal board. Connections via wire nuts or crimping devices are not allowed by this specification.
7. NEMA B design
8. The motor is inverter duty rated in accordance with NEMA MG1, Part 31.
9. The motor has a voltage tolerance of plus or minus 10%.

E. Motor Cooling System:

1. For pumps up to 10.5 HP: Provide thermal radiators integrally cast into stator housing.
2. For pumps larger than 10.5 HP: Provide cooling jacket to allow propylene glycol around motor housing.

F. Pump Shaft

1. Rotate in two permanently lubricated ball bearings for pump sizes up to 100 HP and three bearings above 100 HP.
  - a. Upper bearing to be single row deep groove ball bearing up to 100 HP and roller type above 100 HP.
  - b. Lower bearing to be a two-row angular contact ball bearing up to 100 HP and one roller and one angular contact roller bearing above 100 HP.

2. Completely isolated from pumped liquid
  3. Lower bearing shall contain a temperature sensor for monitoring on units larger than 100 HP.
  4. Pump and motor shaft are the same unit. The pump shaft is an extension of the motor shaft. Couplings are not acceptable and are not used.
- G. Minimum ABMA L10 Bearing Life: 50,000 hours at any point on head-capacity curve.
- H. Mechanical Seals:
1. Tandem mechanical shaft seal system consisting of two seal assemblies.
  2. The seals operate in a lubricant reservoir using FDA approved, non-toxic paraffin oil, that hydrodynamically lubricates the lapped seal faces at a constant rate.
  3. The lower, primary seal unit, located between the pump and the lubricant chamber, contains one stationary and one positively driven rotating ceramic ring.
  4. The upper, secondary seal unit, located between the lubricant chamber and the motor housing, contains one stationary carbon seal ring and one positively driven rotating ceramic seal ring.
  5. Each seal interface is held in contact by its own spring system.
  6. The seals require neither maintenance nor adjustment, nor depend on direction of rotation for sealing.
  7. The position of both mechanical seals depends on the shaft. Mounting of the lower mechanical seal on the impeller hub is not an acceptable method.
  8. The following seal types shall not be considered acceptable nor equal to the dual independent seal specified:
    - a. shaft seals without positively driven rotating members,
    - b. conventional double mechanical seals containing either a common single or double spring acting between the upper and lower seal faces.
  9. No system requiring a pressure differential to offset pressure and to effect sealing will be used.
  10. Each pump is provided with a lubricant chamber for the shaft sealing system.
  11. The lubricant chamber is designed to prevent overfilling and to provide lubricant expansion capacity.
  12. The drain and inspection plug, with positive anti-leak seal, will be easily accessible from the outside.
  13. The seal system does not rely upon the pumped media for lubrication.
  14. The motor shall be able to operate dry without damage while pumping under load.
- I. Impeller:
1. As Scheduled.

2. N-impeller: Dynamically balanced, semi-open, multi-vane, back-swept, non-clog with vanes of screw shaped leading edges, hard iron, self cleaning by shearing action from grooves in the volute.
  - a. N-type impeller material shall be of hard iron.
3. C-impeller: Double shrouded, non-clogging design with long throughlets without acute turns.
4. Grinder impeller: single shrouded design having a long throughlet without acute turns. The impellers shall be capable of handling fine slurry from the special cutters. Pump shall include special cutters to reduce sewage to a fine slurry - The stationary cutter shall consist of hardened 316 "L" stainless steel and the rotary cutter shall consist of chrome alloyed cast iron
5. Coating: Acrylic dispersion zinc phosphate primer or Alkyd resin primer.
6. Impellers will be capable of handling fine slurry from the special cutters and are taper collet fitted and retained with an Allen head bolt.

J. Volute:

1. As Scheduled.
2. N-impeller: Volute bottom design to be of sharp, spiral shaped grooves integrally cast into the suction side of the volute to provide shearing action from the movement of the leading edges of the impeller vanes. Clearances shall be adjustable for wear.
3. C-impeller: Volute to be of non-concentric design with smooth passage ways large enough to pass any solids entering the impeller.
4. Volutes shall be constructed from a single-piece gray cast iron, Class 35B.

K. Each pump to be equipped with submersible pump (power) cable:

1. Pump cable sized according to NEC and ICEA Standards.
2. Pump cable meets P-MSHA Approval
3. Pump cable shall have at least 3 power leads, a ground lead, and a ground check lead.
4. Pump cable to have oil-resistant, chloroprene rubber jacket.
5. Pump cable to be sufficient length to reach the junction box without the need of any splices.

L. Sliding guide bar bracket to be integral part of pump unit to guide on at least two rails. No portion of the pump or guidance system shall bear on sump floor.

M. Discharge pump/elbow connection seal to be metal to metal, diaphragm or o-ring type seals are not acceptable. Critical mating surfaces where watertight sealing is required are machined and fitted with Nitrile rubber O-rings. Fittings are the result of controlled compression of rubber O-rings in two planes and O-ring contact of four sides, without the requirement of a specific torque limit. Rectangular cross sectioned gaskets requiring specific torque limits to achieve

compression shall not be considered as adequate or equal. Secondary sealing compounds, elliptical O-rings, grease or other devices are not used.

- N. Bearings: The pump shaft rotates on two bearings. Motor bearings are permanently grease lubricated. Sleeve or single row lower bearings are not acceptable and are not used.

## 2.08 PUMP MOTOR PERFORMANCE

- A. Non-overloading throughout pump curve.
- B. Capable of fifteen evenly spaced starts per hour.
- C. Capable of running dry indefinitely without damage.
- D. Capable of continuous operation unsubmerged and continuous submergence without loss of watertight integrity to a depth of 65 feet.
- E. Motors for use in NEC/500/501, hazardous areas: FM, UL, or CSA listed for use in the area specified.
- F. Designed for continuous duty handling pumped media of 40C (104F).
- G. Motor horsepower is adequate so that each pump is non-overloading throughout the entire pump performance curve, from shut-off through run-out.
- H. Power cable is capable of continuous submergence underwater without loss of watertight integrity to a depth of 65 feet. Power cable shall be sized according to NEC and ICEA standards.

## 2.09 AUXILIARY EQUIPMENT

- A. Pump installation accessories required for proper installation and/or recommended by manufacturer to be supplied by pump manufacturer:
  1. 304 SS Upper and intermediate guide bar brackets.
  2. 304 SS Safety chain hook.
  3. 304 SS Cable holder.
  4. 304 SS Cable support grips for motor cables.
  5. Grip eye lifting system.
  6. Adequate length of 304 SS lifting chain with required shackles of adequate strength to permit raising and lowering of the pump.
  7. Guide bars shall be of 304 SS pipe, size 2-inch Schedule 40. The guide bars shall not support any portion of the weight of the pump.

8. Valve vault / meter vault access cover, if specified in schedule.
  9. Pump crane w/support mount as shown in Drawings.
  10. Hydraulic mix flush valve mounted on pump volute, if specified in schedule
  11. Discharge magnetic flow meter, if specified in schedule
- B. Grip Eye Lifting System: Each submersible pump shall be furnished with a pump lifting-chain positive recovery system consisting of the following components.
1. Stainless steel wire, of diameter to provide tensile strength capacity to support length of chain sling, connected to a short length (approximately ten links long) of high tensile strength proof-tested stainless steel chain sling of required capacity, connected to the lifting eye or lifting bail of the submersible pump, as scheduled.
  2. A forged "grip-eye" of wrought alloy steel, provided separately to connect to the end of the lifting cable or chain of the pump lifting device.
  3. Pumps are designed to automatically and firmly connect to the discharge connection, guided by two guide bars extending from the top of the station to the discharge connection with no need for personnel to enter the wet-well or the basin.
- C. Ball Check Valves: Furnish and install non-clog HDL Ball Check Valves in accordance with Section 15111.
- D. Plug valves: Furnish and install eccentric plug valves with manual lever actuator or approved equal in accordance with Section 15100.
- E. Furnish portable and adjustable pump crane as scheduled.
1. Stainless steel construction.
  2. Lifting capacity: as scheduled
  3. Provide stainless steel socket as identified on plans; verify that installation points match hook reach of crane assembly.
  4. Stainless steel cable and safety hook: as scheduled.
  5. Hook reach: as scheduled.
  6. Electric winch with 25-foot cord assembly.

## 2.10 LIFT STATION CONTROLS – DUPLEX PUMPS

- A. General
1. The pump control system shall be capable of operating two pumps rated as scheduled below, in a constant speed mode in order to convey sewage to the next gravity discharge point without causing a sewage over-flow wherever possible regardless of system demands.
  2. The control system shall be comprised of relay-based logic control with float inputs. The panel shall have the following:

- a. Two - Hand-off-auto selector switches
  - b. Two - Run pilot lights
  - c. 24V Power On pilot light
  - d. High Level Alarm pilot light
  - e. Alarm Silence push-button
  - f. Duplex Alternator
  - g. Lead Pump selector switch (1.2-Alt-2.1)
  - h. Provision for normally closed motor over-temperature contact connections from each pump motor
    - i. LED status indication pilot lights for each relay function
3. Level input from Four (4) Flygt Model ENM-10 floats for level control; Pumps Off , Lead Pump On, Lag Pump On, High Level Alarm

**B. Enclosure**

1. The described equipment shall be housed in a single NEMA 4 enclosure fabricated from painted steel. The enclosure size shall be approximately 36" high, 48" wide, 12" deep, wall mounted. Pilot and indicator devices shall be mounted on the hinged inner door.
2. The hinged inner door shall be provided fabricated from 5052-H32.080 marine alloy brushed aluminum. It shall be completely removable for ease of service and shall be held closed by at least (2) hand operated 1/4 turn fasteners.
3. Control circuit wiring inside the panel shall be (16) gauge minimum, type MTW or THW, rated for 300 volts. All power wiring shall be rated for 600 volts. Conductors shall be color coded in the same colors throughout the entire panel. Components having numerical or alphabetical references shall have all wiring similarly coded using a standard decal, which shall be placed on the insulation materials within the confines of the enclosure. The decals shall be placed at all wiring terminations for ease of wire identification.

**C. Controller Equipment Description**

1. Two - Q frame pump C/B sized per NEC, not less than 200% of FLA.
2. Two – Full Voltage Non Reversing starters w/ electronic overloads sized per NEMA recommendations.
3. Red beacon light on top of enclosure to activate on high level alarm status
4. Include lead/ lag alternator
5. Timer for delay on restart after power failure
6. Low voltage and phase loss monitor
7. Output contacts for auto-dialing of power failure, individual pump failure, float system operation, and high level alarm.
8. Lightning arrestor, and power supply located inside of the panel enclosure.
9. Anti-condensation heater with thermostat inside of panel, 100 watt
10. Panel mounted 15 amp, 120V GFI convenience outlet

11. Top mounted red flashing high water level alarm beacon
12. Pump run status lights for each pump
13. H-O-A switches for each pump
14. Run time meters for each pump
15. Terminal strip for power and control I/O.
16. Provide a time delay relay for the lag pump.

D. Pump Controller Operations

1. Pump-up or pump- down operation and pump inhibit on low level or high level shall be switch selectable within the controller.
2. The controller shall automatically alternate up to two (2) pumps in automatic operation. Alternation schemes shall include” First On First Off” (FOFO ), “Last On First Off” ( LOFO ) and manual operation 1-2, 2-1 and shall be selectable from the front panel of the controller.
3. A high-high float alarm shall be incorporated.

E. Inner Door Devices: The following devices shall be operable or viewed through the inner door to prevent operator exposure to live electrical current:

1. Hand-Off-Auto selector switches to override automatic mode control.
2. Neon indicator run lights.
3. Ground fault protected, 115V convenience receptacles.
4. Running time meters for each pump.
5. Pump circuit breakers for each pump.
6. Main circuit breaker, if required.
7. Manual Transfer with sliding bar mechanical interlock (includes main circuit breaker)
8. Moisture sensing pilot lights.
9. Motor over temperature pilot lights.

F. Circuit Breakers

1. All electrical circuits shall be protected by molded case circuit breakers.
2. Each pole of the breaker shall provide inverse time delay overload protection and instantaneous short circuit protection by means of a thermal magnetic element.
3. The breaker shall be operated by a toggle-type handle and shall have a quick make, quick break switching mechanism that is mechanically trip free from the handle.
4. Tripping due to overload or short circuit shall be clearly indicated by the handle automatically assuming a position midway between the manual “on” and “off” position.
5. Breakers shall be completely enclosed in a molded case and shall bear the UL label.
6. Short circuit interrupting duty (14 KAIC minimum) rating for all motor protection circuit breakers shall be applicable for operating conditions. Substitution of fuses to replace circuit breakers is not acceptable.

7. Circuit breakers shall be operable through the inner door to prevent exposing the operator to live power.

G. Motor Starters

1. All starters shall be full-voltage non-reversing NEMA rated (Size 1 minimum) and bear a UL label. IEC horsepower rated starters will not be accepted due to a reduced life expectancy.
2. The coil operating voltage shall be 120 volts AC 60 Hz.
3. All starters shall be complete with ambient compensated overload relays of the bi-metallic type.
4. The overload relays shall be equipped with an electrical isolated normally open contact to annunciate a motor overload condition.

H. Relays

1. Relay Type
  - a. Relays shall be of the square base plug in type with integral LED indicator lights.
  - b. All relays shall have a transparent polycarbonate dust cover to protect the contact surfaces from airborne dust and other contaminants.
  - c. All relays shall have DPDT or 4PDT contacts, as required. Relays shall be rated for continuous duty operation.
2. Relay Contacts
  - a. Relay contacts shall be of the plug-in type with LED indicators and rated for 10 amps at 300VAC.
  - b. Relay sockets shall have screw terminals with self-lifting clamps and terminal identification numbers located at each connection on the relay socket.

I. Pilot Light Indicators

1. The controller output indicator lights shall be of the long life, solid-state type with a built in ballast resistor and blocking diode for use with 24 VAC or VDC voltages.
2. Pilot lights shall be equipped with 3/16" quick connect terminals for ease of field replacement. Soldered terminals shall not be acceptable.
3. Other panel lights shall be neon rated for 125 VAC and shall be high brightness lamps with appropriate built-in resistors to assure long life and desired brightness.
4. The lamps shall be self-insulated and capable of operating for a minimum of 25,000 life hours.

J. Phase Monitor Relay

1. The three-phase monitor relay shall be connected to the incoming side of the power input terminals.
2. The unit shall have six LED indicators that annunciate the status of

incoming power and monitor loss of phase, phase reversal, under voltage, high voltage and phase imbalance.

3. It shall also include a memory that remembers the last 10 types of faults and the order in which they occurred.
4. A special user-friendly adjustment panel allows the operator to make adjustments to phase imbalance, low and high voltage trip points, individually adjustable trip and restart delays and offers a selectable restart setting.

K. Running Time Meter

1. A running time meter measuring hours and hundreds of an hour of operation up to 99999.9 shall be provided for each pump.
2. The time meter shall operate from the control voltage of the motor starter.
3. The meter shall incorporate quartz crystal electronics to ensure accurate time recording.
4. The hours shall be displayed with a reliable electro-mechanical wheel indicator to ensure a permanent record of total running time.

L. Lighting Arrestor/ Surge Arrestor

1. A lighting/surge arrestor shall be provided at the service entrance to the control panel.
2. The unit shall be of the solid-state type and be able to clamp in five (5) nanoseconds and absorb up to 25KA peak surge current during an occurrence.
3. The unit shall have a surge life expectancy of 10,000 occurrences at 200 amps.

M. Transformer

1. Transformers shall be rated.
2. Transformers shall be multi-tap, 208/240/480 Volt AC primary, 120/24 Volt AC secondary, dry type control power transformers and shall be designed and tested in accordance with the latest applicable standards of ANSI, IEEE and NEMA, and shall be UL listed.

N. Convenience Receptacle

1. A GFI receptacle shall be provided to protect against ground fault leakage and shock.
2. The unit shall have retractable ground pin and polarized blades for two (2) or three (3) wire receptacles.
3. The unit shall require a reset after any ground fault interruption.

O. Alarms

1. High and Low Level alarms shall be available with a silence push button.
2. On decreasing levels, the alarm condition will automatically reset when the level falls below the high level alarm setpoint.

3. On increasing level, the low level alarm shall automatically reset when the level rises above the low level alarm setpoint.
- P. Hand - Off - Automatic Switch
1. Standard HOA switches shall be supplied on the inner door for each pump.
  2. The switches shall have a minimum dielectric strength of 1000 volts and a minimum insulation resistance of 100 megaohms.
  3. The switches shall be AC rated.
- Q. Monitors
1. Seal Failure Relays
    - a. Seals Failure relays providing adjustable resistance sensing circuitry from 0 to 250,000 ohms for each pump shall be supplied.
    - b. Upon activation, the seal failure relay shall not shut down the pump but shall illuminate a red pilot light located on the inner door that shall correspond to the appropriate pump.
    - c. The moisture sensing probes shall be supplied and installed in the pumps by the pump manufacturer.
  2. Over Temperature Sensing Relays
    - a. Pump over temperature (manual reset) sensors located in the pump motor shall be supplied for each pump.
    - b. A red pilot light and reset push button for each pump motor shall be supplied and located on the inner door.
    - c. When activated, the appropriate pilot light shall illuminate and the associated pump shall not be allowed to run, even if the motor cools sufficiently, until the appropriate reset push-button has been reset.
- R. Equipment Identification
1. All electrical equipment shall be identified in accordance with these specifications.
  2. All identification labels, both within the enclosure and external, shall be laser-screened, laminated mylar.
  3. All control wiring shall be numbered on each termination.
  4. Screw-in type, engraved nameplates or laser-screened laminated mylar shall be provided to identify all individually mounted push-buttons, rocker switches, lights, meters, disconnect switches, circuit breakers, motor starters, transformers, relays, fuses, phase monitors, surge arrestors and any other equipment for which identification is required for eventual service or replacement. This includes the appropriate equipment within the cabinet. Embossed tape is not acceptable.
  5. A factory ID label shall be installed inside the outer door including the following information:
    - a. Factory Order Number

- b. Factory Ship Date
  - c. Supply Voltage, Phase and Frequency
  - d. Control Voltage
  - e. Electrical Wiring Diagram Number
  - f. Wire (number of incoming wires)
  - g. Motor HP and Full Load Current
  - 6. A warning label stating “DANGER - Disconnect all sources of power before opening door” shall be installed on the inner door.
  - 7. Control switches, indicators and all backpanel-mounted components shall be clearly labeled in accordance with the schematic ladder diagram.
- S. Level Floats
- 1. Mechanical switch with polypropylene plastic casing.
  - 2. PVC insulated cable of sufficient length to prevent splicing.

## 2.11 REMOTE MONITORING AND ALARM NOTIFICATION

- A. General
- 1. Provide cellular based lift station equipment monitor, analyzer, and controller as a packaged system (RTU system).
  - 2. System shall communicate on the Cellular GSM network.
  - 3. System shall provide web based historian and system access to Owner.

## 2.12 ANTENNAS

- A. The antenna for each location shall be selected based on the results of the cellular survey.
- B. All antenna shall be provided and installed by the Contractor as per recommendations from the manufacturer.
- 1. The Systems supplier shall be responsible for installation, set-up, adjustment and tuning of the antenna to provide optimal communications for the system.
  - 2. The antenna installation shall be external to the enclosure and shall be outdoors.
  - 3. The Systems supplier shall utilize the Crystal Ball™ built-in Radio Frequency signal meter during antenna installation to ensure that the antenna are installed for optimum signal reception.
- C. The Contractor shall ensure that the cellular Network system work is properly interfaced with equipment and other work not furnished by the Systems supplier.
- D. The Systems supplier shall install, make final connections to, adjust, test, and start-up the complete cellular Radio Network.

E. Hardware

1. Monitoring system shall include the following:
  - a. Weatherproof 4X 12 X 10 X 4” polycarbonate enclosure.
  - b. Intelligent key reader station
  - c. Operator Interface LCD display and keypad
  - d. Surge Arrestor.
  - e. Crystal Ball™ Remote Telemetry Unit.
  - f. Power supply, charger, backup battery and filter.
  - g. WINGS Cellular Modem.
  - h. Set of slip-on pump amp probes
  - i. 15VDC power supply
  - j. Crew on-site intelligent key
  - k. High gain phantom antenna

F. Programming

1. Program system to display the following parameters and trend in system historian:
  - a. Pump 1 running.
  - b. Pump 2 running.
  - c. Pump 1 in Auto.
  - d. Pump 2 in Auto.
  - e. Pump 1 fault (leak, overtemp, or overload).
  - f. Pump 2 fault (leak, overtemp, or overload).
  - g. Comminutor running (if applicable at site).
  - h. Comminutor fault (if applicable at site).
  - i. Pump 1 amps.
  - j. Pump 2 amps.
  - k. Station volts.
  - l. Phase loss/power fail.
  - m. Control relay outputs as directed by owner (maximum of four).
2. Ensure all necessary operations and administrative staff has access to system with their personal computers and smart phones.
3. Ensure all alarms reach destinations as directed by Owner. These shall include automated voice alarms, SMS text messages, and emails.

G. Contract

1. Provide two year paid contract.
2. Provide Owner with all contract related information.
3. Provide Owner with instructions for contract renewal.

## PART 3 EXECUTION

### 3.01 INSTALLATION

- A. FRP wet well and FRP vault valve shall be installed in accordance with supplier's installation instructions, and in accordance with all OSHA, local, state, and federal codes and regulations.

### 3.02 LEAK TESTING

- A. Each completed and assembled FRP wet well and FRP vault unit shall undergo the following factory tests at the manufacturer's plant prior to shipment:
  - 1. Minimum 3-point hydraulic performance test
  - 2. No-Leak seal integrity test

### 3.03 FIELD START-UP

- A. After installation, a pump station start-up shall be performed by the installing contractor under the supervision of the manufacturer's authorized representative. Field service shall be provided by an authorized, factory trained representative of the pump manufacturer. Services shall include, but not be limited to, inspection of the completed pump station installation to ensure that it has been performed in accordance with the manufacturer's instructions and recommendations, supervision of all field-testing and activation of the Pump Manufacturer's Warranty. The test shall demonstrate to the satisfaction of the Owner that the equipment meets all specified performance criteria, is properly installed and anchored, and operates smoothly without exceeding the full load amperage rating of the motor. The Contractor shall be responsible for coordinating the required field services with the Pump Manufacturer.

### 3.04 PUMP INSTALLATION

- A. Per Manufacturer's recommendations.
- B. Level, plumb, accurate alignment, leak-proof pump connection, easily removed without entering wet well as appropriate.
- C. No splices allowed in cable.

3.05 LEVEL FLOATS

- A. Suspend as shown on the Drawings.
- B. No splices allowed in cables.
- C. Set to levels shown on the Drawings.

3.06 FIELD TESTING AND STARTUP

- A. Qualified Field Service Representative is required.
- B. Present to check installation and operation.
- C. Provide 8 hours of training to Owner's personnel on operation and maintenance.
- D. Provide services of qualified personnel to inspect the completed installation, and furnish written report to Engineer certifying that equipment is properly installed, fully functional, ready for use, and is operating correctly.
- E. Assist contractor with start-up
- F. Comply with equipment testing requirements specified in Section 01650.

3.07 TRAINING

- A. A field training course shall be provided for operation and supervisory staff members. Field instruction shall cover items for successful operation contained in the operation & maintenance manuals.

3.08 SCHEDULE

- A. Bataan Lift Station:
  - 1. Wet Well
    - a. FRP (Fiber-Reinforced Polyester)
    - b. Diameter: 6'
    - c. Depth: 23'
    - d. Factory fabricated inlet penetration:
      - i. Inlet penetration and material: Gravity SAS SDR 35 PVC 12" Diameter.

- ii. Inlet penetration depth: 19'-7" from top of lid to pipe centerline – contractor to field verify angle and depth before placing fabrication order.
  - e. Field fabricated penetration:
    - i. 4" Sch. 40 PVC – Odor control suction pipe.
    - ii. 2" Sch. 40 PVC – Odor control drain.
    - iii. Two (2) 4" Stainless Steel – FM Discharge pipe
    - iv. 2" Sch. 40 PVC – Valve vault drain.
    - v. 2" Sch. 40 PVC – Bridge air release valve drain.
    - vi. Three (3) – 2 1/2" Nipple conduit for electrical cable.
- 2. Vault
  - a. Precast concrete.
  - b. Depth: 4'
  - c. Length x width: 5' x 5'
  - d. Field fabricated penetration:
    - i. Two (2) - 4" Stainless Steel Inlet
    - ii. One (1) – 4" Stainless Steel discharge
- 3. Pumps:
  - a. Site Elevation: Approximately 3,085 feet
  - b. Number of submersible pumps: Two (2).
  - c. Flygt Model NP-3127, Type MT
  - d. Curve Number: 438
  - e. Impeller diameter: 202 mm
  - f. Design operating point: 443.3 GPM at 48 feet TDH
  - g. Shutoff head: 70 feet
  - h. Motor: 10 HP, 1720 rpm, 230 VAC/ 3/ 60
  - i. Discharge elbow: 4-inches
  - j. Plug Valve: See Section 15111.
  - k. Ball Check Valve: See Section 15100.
  - l. Access doors with safe hatch safety grating or approved equal for OSHA fall through protection, Type: As shown in Drawings.
  - m. Controls: As specified in Part 2.
  - n. Floats: Number and elevations as shown on the Drawings
  - o. Pump retrieval system accessories: As specified in Part 2.

B. Hagerman Lift Station:

- 1. Wet Well
  - a. FRP (Fiber-Reinforced Polyester)
  - b. Diameter: 6'
  - c. Depth: 12.5'
  - d. Factory fabricated inlet penetration:
    - i. Inlet and Material: Gravity SAS SDR 35 PVC 8" Diameter.
    - ii. Inlet depth: 9'-10" from top of lid to pipe centerline – contractor to field verify angle and depth before placing fabrication order.

- e. Field fabricated penetration:
  - i. 4" Sch. 40 PVC – Odor control suction pipe.
  - ii. 2" Sch. 40 PVC – Odor control drain.
  - iii. Two (2) 4" Stainless Steel – FM Discharge pipe
  - iv. 2" Sch. 40 PVC – Valve vault drain.
  - v. Three (3) – 2 1/2" Nipple conduit for electrical cable.

2. Vault

- a. FRP (Fiber-Reinforced Polyester).
- b. Depth: 6'
- c. Diameter: 5'
- d. Field fabricated penetration:
  - i. Two (2) - 4" Stainless Steel Inlet
  - ii. One (1) – 4" Stainless Steel discharge

3. Pumps:

- a. Site Elevation: Approximately 3,100 feet
- b. Number of submersible pumps: Two (2).
- c. Flygt Model NP-3102, Type MT
- d. Curve Number: 465
- e. Impeller diameter: 152 mm
- f. Design operating point: 268 gpm at 25.7 feet TDH
- g. Shutoff head: 38 feet
- h. Motor: 5 HP, 1745 rpm, 230 VAC/ 3/ 60
- i. Discharge elbow: 4-inches
- j. Plug Valve: See Section 15111.
- k. Ball Check Valve: See Section 15100.
- l. Access doors with safe hatch safety grating or approved equal for OSHA fall through protection, Type: As shown in Drawings.
- m. Controls: As specified in Part 2.
- n. Floats: Number and elevations as shown on the Drawings
- o. Pump retrieval system accessories: As specified in Part 2.

C. Hall Lift Station:

1. Wet Well

- a. FRP (Fiber-Reinforced Polyester)
- b. Diameter: 6'
- c. Depth: 13'
- d. Factory fabricated inlet penetration:
  - i. Inlet and Material: Gravity SAS SDR 35 PVC 8" Diameter.
  - ii. Inlet depth: 10.64' from top of lid to pipe centerline – contractor to field verify angle and depth before placing fabrication order.
- e. Field fabricated penetration:
  - i. Two (2) 4" Sch. 40 PVC – Odor control suction pipe.

- ii. 2" Sch. 40 PVC – Odor control drain.
  - iii. 4" Stainless Steel – FM Discharge pipe
  - iv. 2" Sch. 40 PVC – Valve vault drain.
  - v. Three (3) – 2 1/2" Nipple conduit for electrical cable.
2. Vault
- a. FRP (Fiber-Reinforced Polyester).
  - b. Depth: 6'
  - c. Diameter: 5'
  - d. Field fabricated penetration:
    - i. Two (2) - 4" Stainless Steel Inlet
    - ii. One (1) – 4" Stainless Steel discharge
3. Pumps:
- a. Site Elevation: Approximately 3,105 feet
  - b. Number of submersible pumps: Two (2).
  - c. Flygt Model NP-3102, Type MT
  - d. Curve Number: 465
  - e. Impeller diameter: 152 mm
  - f. Design operating point: 248 gpm at 26.5 feet TDH
  - g. Shutoff head: 38 feet
  - h. Motor: 5 HP, 1745 rpm, 230 VAC/ 3/ 60
  - i. Discharge elbow: 4-inches
  - j. Plug Valve: See Section 15111.
  - k. Ball Check Valve: See Section 15100.
  - l. Access doors with safe hatch safety grating or approved equal for OSHA fall through protection, Type: As shown in Drawings.
  - m. Controls: As specified in Part 2.
  - n. Floats: Number and elevations as shown on the Drawings
  - o. Pump retrieval system accessories: As specified in Part 2.

D. Pate Lift Station:

- 1. Wet Well
  - a. FRP (Fiber-Reinforced Polyester)
  - b. Diameter: 6'
  - c. Depth: 16'
  - d. Factory fabricated inlet penetration:
    - i. Inlet and Material: Gravity SAS SDR 35 PVC 8" Diameter.
    - ii. Inlet depth: 12.6' from top of lid to pipe centerline – contractor to field verify angle and depth before placing fabrication order.
  - e. Field fabricated penetration:
    - i. 4" Sch. 40 PVC – Odor control suction pipe.
    - ii. 2" Sch. 40 PVC – Odor control drain.
    - iii. Two (2) 4" Stainless Steel – FM Discharge pipe
    - iv. 2" Sch. 40 PVC – Valve vault drain.
    - v. Three (3) – 2 1/2" Nipple conduit for electrical cable.

2. Vault
  - a. FRP (Fiber-Reinforced Polyester).
  - b. Depth: 6'
  - c. Diameter: 5'
  - d. Field fabricated penetration:
    - i. Two (2) - 4" Stainless Steel Inlet
    - ii. One (1) - 4" Stainless Steel discharge
3. Pumps:
  - a. Site Elevation: Approximately 3,133 feet
  - b. Number of submersible pumps: Two (2).
  - c. Flygt Model NP-3102, Type MT
  - d. Curve Number: 63-465-00-6050
  - e. Impeller diameter: 263 mm
  - f. Design operating point: 290 gpm at 24.7 feet TDH
  - g. Shutoff head: 38 feet
  - h. Motor: 5 HP, 1745 rpm, 230 VAC/ 3/ 60
  - i. Discharge elbow: 4-inches
  - j. Plug Valve: See Section 15111.
  - k. Ball Check Valve: See Section 15100.
  - l. Access doors with safe hatch safety grating or approved equal for OSHA fall through protection, Type: As shown in Drawings.
  - m. Controls: As specified in Part 2.
  - n. Floats: Number and elevations as shown on the Drawings
  - o. Pump retrieval system accessories: As specified in Part 2.

E. Stevens Lift Station:

1. Wet Well
  - a. FRP (Fiber-Reinforced Polyester)
  - b. Diameter: 6'
  - c. Depth: 20'
  - d. Factory fabricated inlet penetration:
    - i. Inlet and Material: Gravity SAS SDR 35 PVC 8" Diameter.
    - ii. Depth: 16.11' from top of lid to pipe centerline – contractor to field verify angle and depth before placing fabrication order.
  - e. Field fabricated penetration:
    - i. 4" Sch. 40 PVC – Odor control suction pipe.
    - ii. 2" Sch. 40 PVC – Odor control drain.
    - iii. Two (2) 4" Stainless Steel – FM Discharge pipe
    - iv. 2" Sch. 40 PVC – Valve vault drain.
    - v. Three (3) – 2 1/2" Nipple conduit for electrical cable
2. Vault
  - a. FRP (Fiber-Reinforced Polyester).
  - b. Depth: 6'
  - c. Diameter: 5'

- d. Field fabricated penetration:
  - i. Two (2) - 4" Stainless Steel Inlet
  - ii. One (1) - 4" Stainless Steel discharge
- 3. Stevens Lift Station Pumps:
  - a. Site Elevation: Approximately 3,090 feet
  - b. Number of submersible pumps: Two (2), three installed with one spare delivered to Owner.
  - c. Flygt Model NP-3102, Type MT
  - d. Curve Number: 465
  - e. Impeller diameter: 152 mm
  - f. Design operating point: 314 gpm at 23.7 feet TDH
  - g. Shutoff head: 38 feet
  - h. Motor: 5 HP, 1745 rpm, 230 VAC/ 3/ 60
  - i. Discharge elbow: 4-inches
  - j. Plug Valve: See Section 15111.
  - k. Ball Check Valve: See Section 15100.
  - l. Access doors with safe hatch safety grating or approved equal for OSHA fall through protection, Type: As shown in Drawings.
  - m. Controls: As specified in Part 2.
  - n. Floats: Number and elevations as shown on the Drawings
  - o. Pump retrieval system accessories: As specified in Part 2.
- F. Spare Pumps:
  - 1. Provide two (2) spare pumps for the whole project: One (1) for Bataan LS & one (1) for the other sites – Hagerman LS, Hall LS, Stevens LS, & Pate LS uses the same Pump model and rating.
  - 2. Bataan Lift Station:
    - a. Flygt Model NP-3127, Type MT
    - b. Curve Number: 438
    - c. Impeller diameter: 202 mm
    - d. Motor: 10 HP, 1720 rpm, 230 VAC/ 3/ 60
    - e. Discharge elbow: 4-inches
    - f. Deliver to owner.
  - 3. Other Lift Stations:
    - a. Flygt Model NP-3102, Type MT
    - b. Curve Number: 465
    - c. Impeller diameter: 152 mm
    - d. Motor: 5 HP, 1745 rpm, 230 VAC/ 3/ 60
    - e. Discharge elbow: 4-inches
    - f. Deliver to owner.
- G. Lift Station Portable Crane (One for the entire project)
  - 1. Thern, Series 5124 (SS or epoxy coat finish all material)
  - 2. Hook Reach: 28-60 inches
  - 3. Lifting Capacity: 2000 lbs

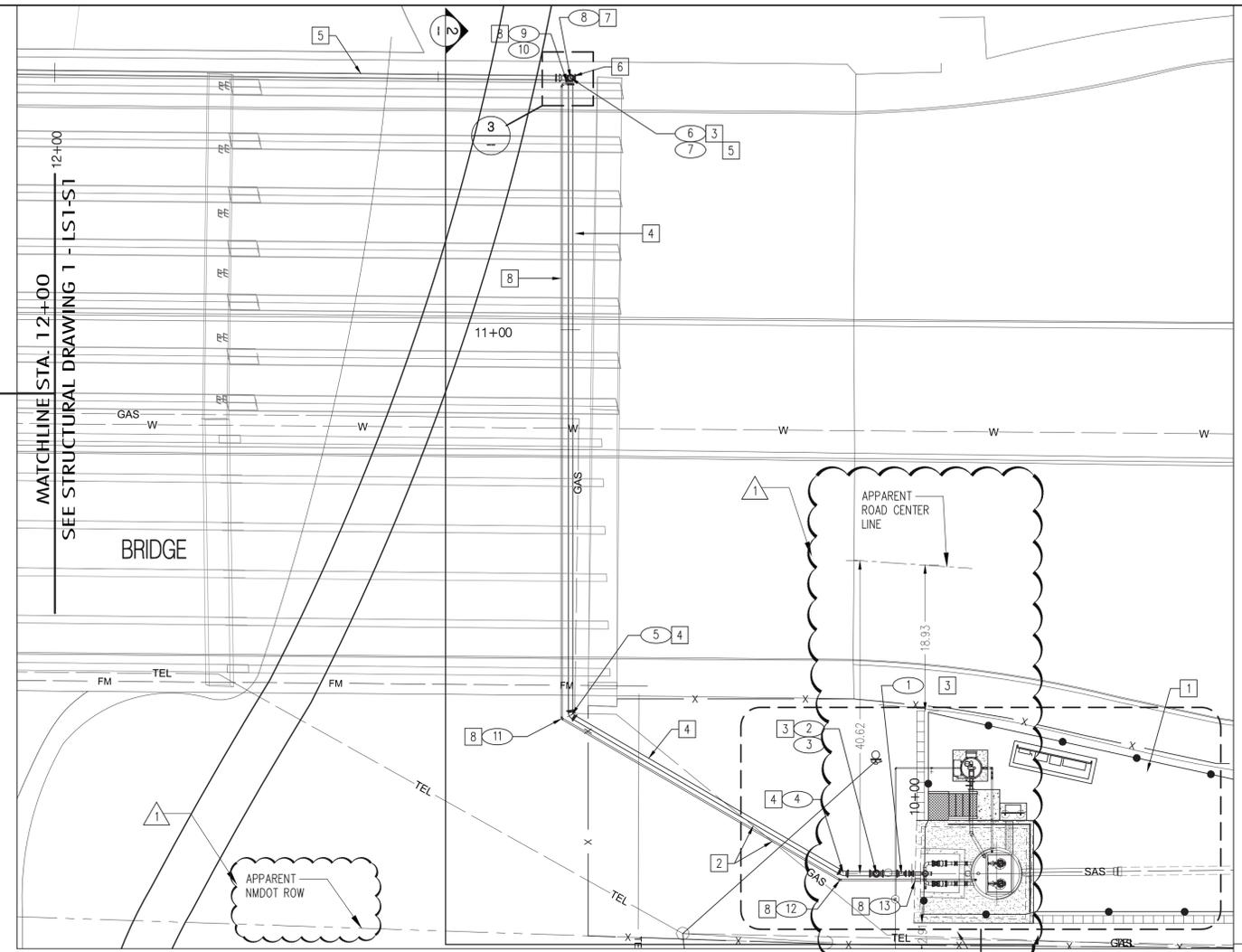
4. Thern model 4WP2-K electric winch
5. Socket Crane Base w/ removable Covers, as shown on Drawings
6. Wire Rope Assembly of 1/4" minimum diameter 304 stainless steel cable, painted lifting hook, and 304 stainless steel snap hook w/Cable Spool and Wire Rope Keeper, Cable Length: 45 Feet
7. Winch Motor: 120 VAC, 7 AMP, 400 RPM, 25-foot cord assembly

END OF SECTION



MATCHLINE STA. 15+00  
SEE DRAWING LS1-C4

MATCHLINE STA. 12+00  
SEE STRUCTURAL DRAWING 1 - LS1-S1



**CONSTRUCTION NOTES**

- CONTRACTOR STAGING AND STOCKPILE AREA SHALL REMAIN WITHIN BOUNDARIES OF CITY OF CARLSBAD PROPERTY AND CONSTRUCTION EASEMENT ACCESS TO ADJACENT PRIVATE PROPERTY SHALL BE MAINTAINED. PROVIDE 6' CHAIN LINK SECURITY FENCE AROUND CONSTRUCTION SITE.
- ALL EXISTING UTILITIES TO BE FIELD LOCATED, PROTECTED, AND SHORED AS NECESSARY DURING CONSTRUCTION.
- NEW 6" EPOXY LINED D.I. FITTING MUXMJ - ALL FITTINGS TO BE RESTRAINED. SEE PROFILE IN THIS DRAWING.
- INSTALL NEW 6" C900 PVC FORCE MAIN UNDERGROUND WITH A MINIMUM OF 4' OF COVER. SEE PROFILE IN THIS DRAWING.
- TRANSITION FROM PVC TO DUCTILE IRON AND INSTALL A 6" D.I. EPOXY LINED FORCE MAIN VERTICALLY. SEE STRUCTURAL DRAWINGS FOR FORCE MAIN BRIDGE DETAILS. ALL FITTINGS SHALL BE RESTRAINED.
- INSTALL A 6" D.I. EPOXY LINED TEE WITH BLIND FLANGE ON THE EAST SIDE OF TEE FOR CLEAN OUT AND FUTURE USES.
- INSTALL A NEW AIR RELIEF VALVE AND FORCE MAIN CLEAN OUT. SEE DETAIL 1 DWG D-C3.
- INSTALL A NEW 2" DWV PVC DRAIN AND CLEAN OUT TOWARDS THE LIFT STATION WITH A 1% SLOPE. SEE POINT TABLE IN THIS SHEET.
- INSTALL A NEW 6" D.I. EXPANSION FITTING TO ALLOW VERTICAL AND HORIZONTAL DEFLECTION.

**CALL BEFORE YOU DIG**  
FOR UTILITY LOCATES  
1-800-321-ALERT



ENGINEER'S SEAL

AS-BUILT INFORMATION

BENCH MARKS

03/28/2016 NMDOT ROW DISTANCE AND ROAD CENTER DISTANCE

NO. DATE

REMARKS

DESIGNED BY MMB

DRAWN BY LLM

CHECKED BY JMT

CONTRACTOR	DATE	WORK SHARED BY	DATE	INSPECTOR'S ACCEPTANCE BY	DATE	FIELD VERIFICATION BY	DATE	DRAWINGS CORRECTED BY	DATE

NO.	DATE	REVISIONS

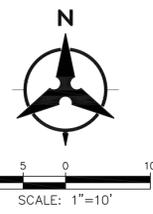
NO.	DATE	REVISIONS

NO.	DATE	REVISIONS

DESIGNED BY	DATE
MMB	03-11-16

DRAWN BY	DATE
LLM	03-11-16

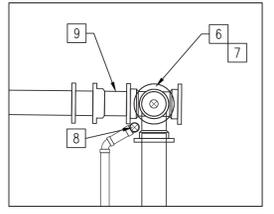
CHECKED BY	DATE
JMT	03-11-16



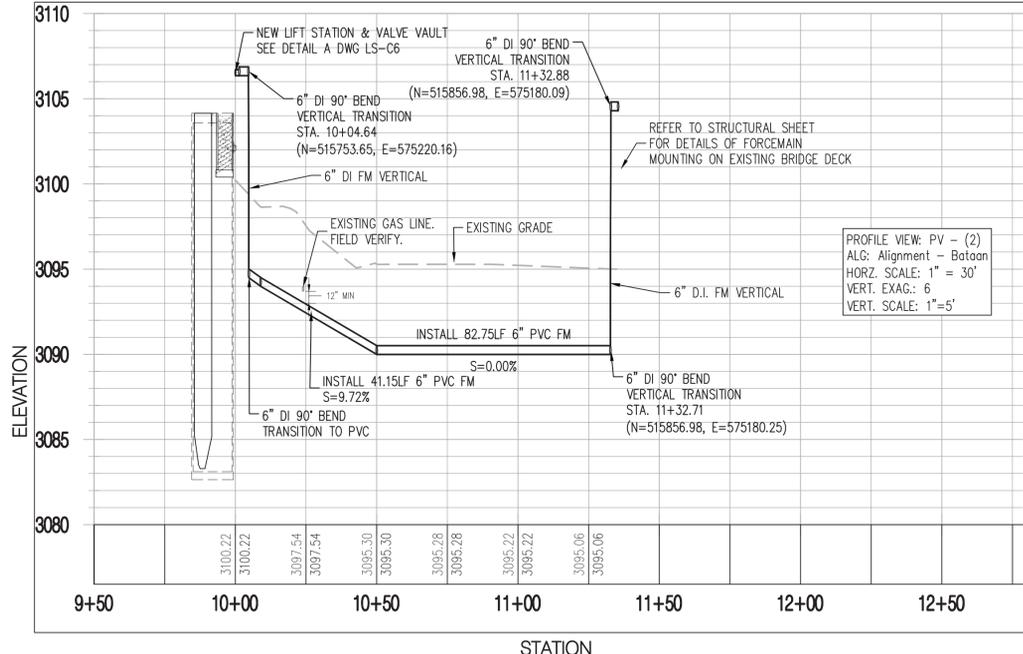
**POINT TABLE**

NO.	EASTING	NORTHING	STATION	ELEVATION	DESCRIPTION
1	575223.43	515753.66	10+01.36	3106.36'	4"x 6" RED. D.I. COUPLING
2	575220.16	515753.66	10+04.63	3106.36'	90 DEG D.I. BEND
3	575220.16	515753.66	10+04.63	3094.50'	90 DEG D.I. BEND
4	575215.84	515753.74	10+08.96	3094.00'	22 1/2 DEG D.I. BEND
5	575180.39	515774.28	10+49.98	3090.00'	45 + 22 1/2 DEG D.I. BEND
6	575180.25	515856.98	11+32.71	3090.00'	90 DEG D.I. BEND
7	575180.25	515856.98	11+32.71	3104.30'	90 DEG D.I. BEND
8	575178.46	515857.00	11+34.50	3104.50'	AIR VALVE TAP
9	575179.09	515857.73	11+33.88, 0.74' RT	3104.30'	1" PVC 90 DEG DRAIN BEND
10	575179.09	515857.73	11+33.88, 0.74' RT	3092.00'	1" PVC 90 DEG DRAIN BEND
11	575179.12	515773.80	10+50.20, -1.42' LT	3091.16'	1" PVC 60 DEG DRAIN BEND
12	575215.39	515752.85	10+09.17, -0.98' LT	3090.75'	1" PVC 30 DEG DRAIN BEND
13	575225.19	515752.74	09+99.96, -0.98' LT	3090.65'	1" CONCRETE PENETRATION DRAIN

1 BATAAN FORCEMAIN PLAN - EAST  
SCALE: 1"=10'



3 BATAAN FORCEMAIN EXPANDED VIEW  
SCALE: NTS



2 BATAAN FORCEMAIN PROFILE - EAST  
SCALE: 1"=30'

**PROJECT SURVEY CONTROL**

SURVEY STAKING CONTROL	DESCRIPTION	EASTING	NORTHING	ELEVATION
PROJECT BENCHMARK	BENCHMARK	574785.63	515780.03	3107.336
CONTROL POINT 1	SET NAIL IN HUB	574646.48	515869.56	3105.59
CONTROL POINT 2	REBAR	574688.01	515885.44	3105.94

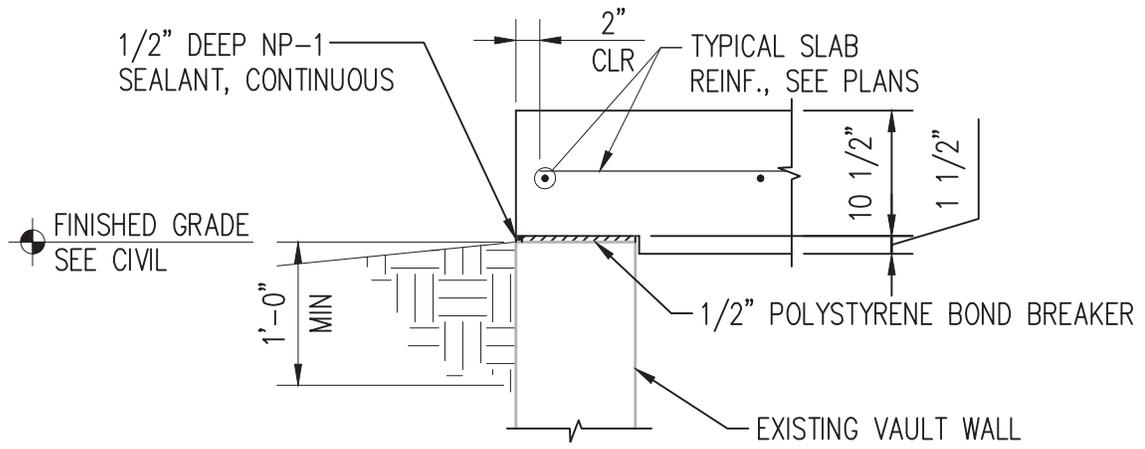
NOTICE OF EXTENDED PAYMENT PROVISION: THIS CONTRACT ALLOWS THE OWNERS TO MAKE PAYMENT WITHIN 45 DAYS AFTER SUBMISSION OF AN UNDISPUTED REQUEST FOR PAYMENT.



CITY OF CARLSBAD SEWER LIFT STATION REPLACEMENTS  
BATAAN LIFT STATION FORCEMAIN PLAN AND PROFILE - EAST

BHI PROJECT NO.	20150413	DWG NO.	LS1-C3	SHEET	12	OF	54
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7 WALL/LID INTERFACE DETAIL  
 - N.T.S.