ADDENDUM # 1

November 5, 2021

PROJECT

Bataan Lift Station Renovation
Bid No. 2021-09

OWNER
City of Carlsbad

ENGINEER
Bohannan Huston Inc.

This addendum forms a part of the Contract Documents and modifies the original specifications and drawings dated October 2021. Acknowledge receipt of this addendum in the space provided in the Bid Form. Failure to do so may subject the bidder to disqualification.

I. GENERAL CLARIFICATIONS

1. We recognize the difficulties in today's materials supply constraints and will extend the contract timeframe by 60 calendar days for Substantial Completion to be 180 days.

2. As shown on Bid Form Article 2.01 - Bidders Acknowledgements, the Bid will remain subject to acceptance for 60 days after the bid opening. All equipment and materials pricing must be held for that duration.

3. The Work Sequence has been modified within Technical Specification 01011 – Summary of Work, to formally define a specific work sequence. Due to the poor condition of the existing force main crossing the bridge structure, the Owner has requested that the new force main be constructed first, and that any existing lift station bypass be connected to that new force main upon its completion before demolition commences on the existing lift station.

II. PRE-BID MEETING QUESTIONS

1. Question: Where are the bids to be delivered?

Answer: The contractor bids are to be delivered to the Water Department, 1502 W. Stevens St Carlsbad NM 88220, same date and time as identified in the Information for Bidders.

2. **Question:** When is the expected Bid Award date anticipated?

   Answer: A mid-December award date is anticipated.

3. **Question:** Is the bypass pumping flow rate identified?

   Answer: Yes, on Drawing C-400, Sheet 6 of 29, within the Temporary Bypass Pumping Sequence lists a pump system with a minimum of 400 gpm capacity to be used. It was also clarified that this pumping system with any on-site power generation must have sound abatement measures implemented. A commercial motel facility exists 100 feet southeast of the planned bypass manhole location. Any planned bypass equipment shall be restricted to maintaining a maximum of 45 dba at the commercial building perimeter at all times.

4. **Question:** Is dewatering anticipated?

   Answer: Yes, dewatering is anticipated to be needed for the new manhole and force main construction. The approximate level highlighted on Drawing C-900, Sheet 11 of 29, is shown as 3,087'. This level was obtained in April 2015 as part of the geotechnical investigation. This area is hydraulically similar throughout the year due to the controlled Lower Tansil Lake level.

5. **Question:** Do we have the old NMDOT bridge foundation plan drawings?

   Answer: We do not have the NMDOT Record drawings for the bridge structures, and anticipate the force main alignment will not intrude on those foundations.

6. **Question:** Will the City be able to drain the lake for force main installation?

   Answer: No, the Lower Tansil Lake level at this location will remain at the maintained level throughout the year. Contractor should recognize this installation complication and provide equipment for force main installation as necessary to enable construction to be properly completed.

III. BHITRACKER BIDDER'S QUESTIONS

1. **Question:** Will American Made Material be required for this project?

   Answer: No, this project is not federally funded.

2. **Question:** Detail 7/Sheet C-1400 calls for an "OPEN GRATE" Manhole Cover. Is this correct? Will both the SD Manhole shown on sheet C-800 and the SAS shown on C-900 both be "Open Grate"?

   Answer: All Storm Drain and Sanitary Sewer Manhole covers shall meet AASHTO M 306-05 (OR LATEST PUBLICATION) H-20 LOADING and shall be solid 2-hole vented covers with the correct annotation across per the City of Carlsbad's standards. See revised sheet C-1400R

3. **Question:** Section A Sheet C-900, calls for 12" SAS C900 pipe, while Key Note #42 calls for 12" DWV SAS Pipe, furthermore Spec 02722, 2.01, B calls for SDR-35. Please clarify the type of SAS Pipe required in this location.

   Answer: All Gravity sewer main shall meet ASTM D3034 Standard Specification for PVC Sewer Pipe and Fittings, the new 12-inch diameter pipe shall be SDR-35. See revised sheet C-900R.

4. **Question:** Spec 15240, 2.04, A&B: specs mention DI fittings per C-153, but a clause is added "(except for lay length)" Does this mean that "Compact Bodied Fittings per C-153 are NOT acceptable, and that MJ Fittings must be per C-110?

   Answer: The exception language will be deleted. Ductile Iron Mechanical Joint fittings must comply with AWWA C-153 with no modifications.

5. **Question:** Spec 15240, 3.09, B, calls for "All ductile iron fittings and pipe shall have "Flex-Ring" or "TR Flex" restraint type joints (or approved equal)", This implies that standard MJ fittings are NOT acceptable. Is that correct? Will only "Flex-Ring" or "TR Flex" Fittings be acceptable?

   Answer: This pipe schedule will be modified to provide clarity, and included in the Technical Specifications Correction/Modifications below.

6. **Question:** Spec 15240, 3.09, B, calls for "All ductile iron fittings and pipe shall have "Flex-Ring" or "TR Flex" restraint type joints (or approved equal)", This implies that standard MJ fittings are NOT acceptable. Is that correct? Will only "Flex-Ring" or "TR Flex" Fittings be acceptable?

   Answer: Duplicate question, see answer 5 of this Addendum.

7. **Question:** Detail 1/C-1400 calls for 10" Spool & Tee, should that be 6"?

   Answer: This has been corrected to show a new 6" spool & 6" x 6" x 6" epoxy lined tee with stainless steel bolts. See C-1400R for revisions.

8. **Question:** Spec 15240, 3.09, B, calls for "All ductile iron fittings and pipe shall have "Flex-Ring" or "TR Flex" restraint type joints (or approved equal)", while on sheet C-700 Profile Note "STA 15+56 – 16+24. ALL JOINTS FROM CASING TO HAVE HARNESS RESTRAINTS." Is ALL Buried DIP is to be TR-FLEX and Thus Restrained? Or are Harness Restraints to be added to Bell and Spigot DIP per the included Restraint Tables (C-1300)?

   Answer: This text will be edited for clarity. All buried ductile iron pipe with push-in joints are to have TR Flex restraint joints. The insertion of the ductile iron pipe within the casing shall continue to exhibit TR Flex restraint joints on any push-on joints within the casing as well, and will not need to convert to a harness style restraint.

9. **Question:** Detail 4/C-1400: Drop MH Detail, shall the related Fittings be MJ w/ P401 Lining or PVC?

   Answer: All Ductile Iron Fittings on the drop manhole are to be Protecto 401 epoxy lined (or approved equivalent) and have EBAA Iron mechanical restraints.

10. **Question:** Spec 02722, 2.01, A, 3, a, iii – Calls for the Coating of DIP "Above Ground (exposed to air): Red Primer". While Spec 15240, 3.05, A – Call to "Provide exterior asphaltic coating on buried pipe or exposed to atmosphere". Please clarify the expected exterior Coating of Exposed DIP.

    Answer: Technical Specification 02722 will be modified to delete Part 2.01.A in its entirety. All pertinent ductile iron pipe information is provided within Specification 15240.

11. **Question:** I am submitting the attached approval package on behalf of Ecoverde. They are an odor control equipment supplier based out of Phoenix, AZ, and have many local installations throughout the southwest. We are a predominant name in the Odor control sector of the water and wastewater industry. We are capable of meeting the specifications and have outlined our scope and materials in comparison to the specified odor control equipment. Please advise if Ecoverde will be approved to bid this project to contractors. If you have any questions, please do not hesitate to contact me directly at 610-406-2309 or reach out to my email at dbertschman@goblesampson.com Thanks, Dan Bertschman Goble Sampson NM 610-406-2309.

Answer: This product has been evaluated and is Approved as an acceptable substitute product.

12. **Question:** IMS would like to request that substantial completion and final completion be extended by an additional 60 days each? The timeframe provided is aggressive given current shortages and shipping delays. We would request additional time to ensure adequate time for preparation of design submittal, engineer review time, fabrication time, shipment to site, installation and start-up activities. Note that current material shortages have caused longer lead time for procurement and fabrication of equipment.

Answer: An additional 60 calendar days has been granted, and modified within the Agreement language highlighted below.

13. **Question:** IMS would like to request that substantial completion and final completion be extended by an additional 60 days each? The timeframe provided is aggressive given current shortages and shipping delays. We would request additional time to ensure adequate time for preparation of design submittal, engineer review time, fabrication time, shipment to site, installation and start-up activities. Note that current material shortages have caused longer lead time for procurement and fabrication of equipment.

Answer: Duplicate question, please see response in question 12.

IV. CONTRACT DOCUMENTS CORRECTIONS/MODIFICATIONS

1. **C-111 Advertisement for Bids**; Amend bid delivery location from the office of the City Hall Room 116, 101 N. Halagueno, Carlsbad NM 88221 and change to the office of the **Water Department, 1502 W. Stevens St Carlsbad NM 88220, date and time remains unchanged**.

2. **C-525 – Agreement between Owner and Contractor;** Amend Paragraph 4.02.A to read as follows: **The Work will be substantially complete within 180 days after the date when the Contract Times commence to run as provided in Paragraph 4.01 of the General Conditions, and completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions within 210 days after the date when the Contract Times commence to run**.

3. **C-800 Supplementary Conditions**; Amend paragraph 5.03C to read as follows: **The following reports of explorations and tests of subsurface conditions at or adjacent to the Site are known to Owner:**
   1. **Report dated** *[April 30, 2015, prepared by Terracon Consultants, Inc., Las Cruces, NM., entitled: "Geotechnical Engineering Report", consisting of 48 pages.]* **The Technical Data contained in such report upon whose accuracy Contractor may rely are those indicated in the definition of Technical Data in the General Conditions. Geotechnical Report is attached.**

V. TECHNICAL SPECIFICATIONS CORRECTIONS/MODIFICATIONS

1. **Specification 01011 – Summary of Work:** Modify Part 1.07.B – Work Sequence and Scheduling Constraints, as follows:

B. Work **must be accomplished** with the following considerations:

a. Erect all traffic control requirements as stated within the traffic control plans and notifications to NMDOT and BNSF.
b. Complete new force main construction work prior to bypass pump installation.
c. Install temporary bypass system to bypass existing lift station and connect to new force main.
d. Initiate demolition of the existing lift station and force main, and proceed with new lift station construction.
e. All shutdowns shall be coordinated with Utility Owner.
f. All tie-ins to existing wastewater pipes shall be coordinated Utility Owner. All tie-ins will require notice of outage when necessary.
g. Outages typically require a three-week advance notice.
h. Outage cannot be interrupted for more than a period as determined by Owner to be acceptable.

2. **Specification 02722 – Sanitary Sewerage Systems:** Delete Part 2.01.A in its entirety.

3. **Specification 15240 – Ductile Iron Pipe Sewer Force Main Service:** Modify Part 2.04.B to remove text "(except for laying length)".

4. **Specification 15240 – Ductile Iron Pipe Sewer Force Main Service:** Modify Part 3.09 - Pipe Schedule as follows:

3.09 PIPE SCHEDULE

a. Normal system operating pressure: 50 psi or less

b. All buried ductile iron pipe, and pipe within horizontal bore casings shall have "Flex-Ring" or "TR Flex" restraint type joints (or approved equal) furnished complete with all necessary accessories.

c. All buried ductile iron pipe fittings are to be Mechanical Joint C110 ductile iron fittings with EBAA Iron mechanical restraint.

d. All valve connections below ground shall be mechanical joint with EBAA Iron mechanical restraint devices.

e. All horizontal above-grade ductile iron pipe to be mounted on the NMDOT bridge crossing shall be have "Flex-Ring" or "TR Flex" restraint type joints fittings, or flanged type joints per AWWA C115.

f. All vertical above-grade ductile iron pipe and AWWA C110 fittings shall be flanged type joints.

g. Pipe Class

1. All pipe 24 inches and smaller: Class 350
2. All pipes 30 inches and larger: Class 250

VI. CONSTRUCTION DRAWINGS CORRECTIONS/MODIFICATIONS

1. **Drawing C-500-R1**: Revised elevation data and corrected station depth dimensions.

2. **Drawing C-800-R1**: Revised elevation data.

3. **Drawing C-900-R1**: Revised elevation data and corrected station depth dimensions.

4. **Drawing C-1400-R1**: Revised manhole details and force main details.

5. **Drawing E-400-R1**: Deleted submersible cable junction box and associated raised concrete pad; Moved location of pole mount light fixture adjacent to southeast corner of wet well structure; Lengthened depth of shade structure; Revised keyed note 4.

6. **Drawing E-500-R1**: Deleted submersible cable junction box from one line diagram.

7. **Drawing E-600-R1:** Revised lift station wet well detail to show conduit routing to control panel and deletion of submersible cable junction box; Revised equipment rack detail to show addition of conduit seals entering control panel.

8. **Drawing E-700-R1**: Revised equipment rack detail to lengthen depth of shade structure; Deleted submersible cable junction box details; Reordered details.

VII. ATTACHMENTS

1. April 2015 Geotechnical Engineering Report
2. Revised Drawing C-500-R1
3. Revised Drawing C-800-R1
4. Revised Drawing C-900-R1
5. Revised Drawing C-1400-R1
6. Revised Drawing E-400-R1
7. Revised Drawing E-500-R1
8. Revised Drawing E-600-R1
9. Revised Drawing E-700-R1

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

Sincerely,
Bohannan Huston, Inc.

Matthew Thompson PE
Senior Vice President

Geotechnical Engineering Report

Carlsbad Lift Stations

Various Locations

Carlsbad, New Mexico

April 30, 2015

Terracon Project No. 68155025

Prepared for:

Bohannan Huston, Inc.
Las Cruces, New Mexico

Prepared by:

Terracon Consultants, Inc.
Las Cruces, New Mexico

EXECUTIVE SUMMARY

A geotechnical exploration has been performed for the Carlsbad Lift Stations to be located in Carlsbad, New Mexico. Terracon's geotechnical scope of work included the advancement of a single test boring at each of the 5 replacement lift station locations to approximate depths of 8 to 25 feet below ground surface (bgs). Auger refusal due to very dense gravels or cobbles was encountered at a depth of about 8 feet bgs in the boring for the Hall Lift Station.

Based on the information obtained from our subsurface exploration, the sites are suitable for development of the proposed projects. The following geotechnical considerations were identified:

- **Pate Lift Station**: The site soils generally consisted of silty sand with varying amounts of gravel from the surface to the total explored depth of about 20 feet bgs. Groundwater was not encountered in the test boring at the time of drilling.
- **Hagerman Lift Station**: The site soils generally consisted of silt with sand and silty sand from the surface to the total explored depth of about 20 feet bgs. Groundwater was encountered at a depth of about 16 feet bgs in the test boring at the time of drilling.
- **Stevens Lift Station**: The site soils generally consisted of clayey sand from the surface to a depth of about 5 feet bgs. The upper soils were underlain by lean clay with sand to a depth of about 20 feet bgs. The clay soils were underlain by poorly graded gravel with silt and sand to the total explored depth of 25 feet bgs. Groundwater was encountered at a depth of about 15 feet bgs in the test boring at the time of drilling.
- **Bataan Lift Station**: The site soils generally consisted of sandy lean clay from the surface to a depth of about 5 feet bgs. The upper soils were underlain by silty sand to a depth of about 15 feet bgs that was underlain by lean clay to a depth of about 20 feet bgs. These soils were underlain by clayey gravel to the total explored depth of 25 feet bgs. Groundwater was encountered at a depth of about 15 feet bgs in the test boring at the time of drilling.
- **Hall Lift Station**: The site soils generally consisted of silty gravel with sand from the surface to the total explored depth of about 8 feet bgs. Auger refusal due to very dense gravels or cobbles was encountered at the 8 foot depth. Groundwater was not encountered in the test boring at the time of drilling.
- The lift stations of this project may be supported by a ribbed mat or waffle slab foundation bearing on prepared native soils or engineered fill. The on-site soils at each appear suitable for use as engineered fill beneath foundations.

This geotechnical executive summary should be used in conjunction with the entire report for design and/or construction purposes. It should be recognized that specific details were not included or fully developed in this section, and the report must be read in its entirety for a comprehensive understanding of the items contained herein. The section titled **GENERAL COMMENTS** should be read for an understanding of the report limitations.

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Terracon

April 30, 2015

Bohannan Huston, Inc.
425 South Telshor Boulevard., Suite C-103
Las Cruces, NM 88011-7237

Attn: Matthew R. Thompson, P.E., Vice President
P: 575.532.8670
E: mthompso@bhinc.com

Re: Geotechnical Engineering Report
Carlsbad Lift Stations
Various Locations
Carlsbad, New Mexico
Terracon Project No. 68155025

Dear Mr. Thompson;

Terracon Consultants, Inc. (Terracon) has completed the geotechnical engineering services for the above referenced project. These services were performed in general accordance with our proposal number P6814-296G dated October 14, 2015. This geotechnical engineering report presents the results of the subsurface exploration and provides geotechnical recommendations concerning earthwork and the design and construction of foundations for the proposed project.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report, or if we may be of further service, please contact us.

Sincerely,
Terracon Consultants, Inc.

JAMES D. COSPER, II
NEW MEXICO
14477
4-30-15
REGISTERED PROFESSIONAL ENGINEER

Daniel Balderrama
Staff Professional

J. Dan Cosper, P.E.
Senior Associate

Copies to: Addressee (1 via email, 3 via mail)

GEOTECHNICAL ENGINEERING REPORT
CARLSBAD LIFT STATIONS
VARIOUS LOCATIONS
CARLSBAD, NEW MEXICO
Terracon Project No. 68155025
April 30, 2015

1.0 INTRODUCTION

This report presents the results of our geotechnical engineering services performed for the Carlsbad Lift Stations to be located in Carlsbad, New Mexico. Terracon's geotechnical scope of work included the advancement of a single test boring at each of the 5 replacement lift station locations to approximate depths of 8 to 25 feet below ground surface (bgs). Auger refusal due to very dense gravels or cobbles was encountered at a depth of about 8 feet bgs in the boring for the Hall Lift Station. Logs of the borings along with Site Location Plan and Boring Location Plans are included in Appendix A of this report.

The purpose of these services is to provide information and geotechnical engineering recommendations relative to:

- subsurface soil conditions
- earthwork
- seismic considerations
- groundwater conditions
- foundation design and construction

2.0 PROJECT INFORMATION

2.1 Project Description

Item	Description
Site layout	Refer to the Site Location Plan and Boring Location Plans (Exhibits A-1 thru A-6, respectively)
Structure	The project will consist of replacing the existing lift stations (5). Existing invert depths are as follows: Pate Lift Station: 15', Hagerman Lift Station: 15', Stevens Lift Station: 20', Bataan Lift Station: 20', and Hall Lift Station: 25'.
Building construction	Cast-in-place concrete walls supported by a ribbed mat or waffle slab
Finished floor elevation	15-25 feet invert depth
Maximum loads	1,500 pounds per square foot imposed loading (assumed)

Maximum allowable settlement	1 inch (assumed)

2.2 Site Location and Description

Item	Description
Location	Various project locations all in Carlsbad, New Mexico
Existing site features	Lift Stations at each location to be replaced
Current ground cover	Native subgrade at each location
Existing topography	Relatively flat at each location

3.0 SUBSURFACE CONDITIONS

3.1 Typical Subsurface Profile

Specific conditions encountered at the boring locations are indicated on the individual boring logs. Stratification boundaries on the boring logs represent the approximate location of changes in soil types; in-situ, the transition between materials may be gradual. Details can be found on the boring logs included in Appendix A of this report. Based on the results of the borings, subsurface conditions on the project site can be generalized as follows:

Pate Lift Station (Boring B-1):

Description	Approximate Depth to Bottom of Stratum	Material Encountered	Consistency/Density
Stratum 1	20	Silty Sand with varying amounts of gravel and varying degrees of carbonate cementation	Very Dense

Hagerman Lift Station (Boring B-2):

Description	Approximate Depth to Bottom of Stratum	Material Encountered	Consistency/Density
Stratum 1	20	Silt with Sand and Silty Sand	Medium Stiff to Hard/Medium Dense

Stevens Lift Station (Boring B-3):

Description	Approximate Depth to Bottom of Stratum	Material Encountered	Consistency/Density
Stratum 1	5	Clayey Sand	Loose

Description	Approximate Depth to Bottom of Stratum	Material Encountered	Consistency/Density
Stratum 2	20	Lean Clay with Sand	Very Soft to Very Stiff
Stratum 3	25	Poorly Graded Gravel with Silt and Sand	Very Dense

Bataan Lift Station (Boring B-4):

Description	Approximate Depth to Bottom of Stratum	Material Encountered	Consistency/Density
Stratum 1	5	Sandy Lean Clay	Medium Stiff
Stratum 2	15	Silty Sand	Very Loose to Loose
Stratum 3	20	Lean Clay	Medium Stiff
Stratum 4	25	Clayey Gravel	Very Dense

Hall Lift Station (Boring B-5):

Description	Approximate Depth to Bottom of Stratum	Material Encountered	Consistency/Density
Stratum 1	8*	Silty Gravel with Sand	Dense to Auger Refusal

*Auger refusal encountered at 8 feet bgs due to very dense gravels or cobbles

Laboratory tests were conducted on selected soil samples and the test results are presented in Appendix B. Laboratory test results indicate that the foundation bearing soils at each location should exhibit low compressibility potentials at in-situ moisture contents. The soils are not anticipated to have a tendency for hydro-compaction when elevated in moisture content. The soils should not exhibit expansion under a surcharge load of 1,000 psf.

3.2 Groundwater

Groundwater was not observed in the test borings for the Pate and Hall Lift Stations at the time of field exploration. Groundwater was observed at depths of 15 and 16 feet bgs in the test borings for Hagerman, Stevens and Bataan Lift Stations at the time of field exploration. These observations represent groundwater conditions at the time of the field exploration and may not be indicative of other times, or at other locations. Groundwater conditions can change with varying seasonal and weather conditions, and other factors.

Fluctuations in groundwater levels can best be determined by implementation of a groundwater monitoring plan. Such a plan would include installation of groundwater monitoring wells, and periodic measurement of groundwater levels over a sufficient period of time.

The possibility of groundwater fluctuations should be considered when developing design and construction plans for the project. Qualified contractors should be retained to design and implement temporary dewatering systems.

4.0 RECOMMENDATIONS FOR DESIGN AND CONSTRUCTION

4.1 Geotechnical Considerations

The sites appear suitable for the proposed construction based upon geotechnical conditions encountered in the test borings. Difficult excavations (throughout the excavation depths for Pate and Hall Lift Stations, foundation bearing elevation for Stevens and Bataan Lift Stations) due to very dense carbonate indurated soils or gravels/cobbles (Hall Lift Station) will require particular attention in the design and construction. Shallow auger refusal was encountered at a depth of about 8 feet bgs at the Hall Lift Station due to very dense gravel/cobbles.

Shallow groundwater will require particular attention in the design and construction of the Hagerman, Stevens and Bataan Lift Stations. Excavations for these lift stations will penetrate these wet, granular deposits. Dewatering equipment, likely including well points for each of these underground lift station excavations, and flattened or braced excavations should be anticipated during construction.

Based on the geotechnical engineering analyses, subsurface exploration and laboratory test results, Terracon recommends that each of the proposed lift stations be supported by a ribbed mat or waffle slab bearing on prepared native soils or engineered fill. The subsurface soils and bearing conditions should be verified at each location prior to or during construction.

Geotechnical engineering recommendations for foundation systems and other earth connected phases of the project are outlined below. The recommendations contained in this report are based upon the results of field and laboratory testing (which are presented in Appendices A and B), engineering analyses, and our current understanding of the proposed project.

4.2 Earthwork

The following presents recommendations for site preparation, excavation, subgrade preparation and placement of engineered fills on the project. The recommendations presented for design and construction of earth supported elements including foundations are contingent upon following the recommendations outlined in this section. All grading for the lift stations should incorporate the limits plus a minimum pad extension of 3 feet beyond the proposed lift station wall perimeters.

Earthwork on the projects should be observed and evaluated by Terracon. The evaluation of earthwork should include observation and testing of engineered fill, subgrade preparation, foundation bearing soils, and other geotechnical conditions exposed during the construction of the projects.

4.2.1 Site Preparation

Although evidence of fills or underground facilities such as septic tanks, cesspools, basements, and utilities was not observed during the site reconnaissance, such features could be encountered during construction. If unexpected fills or underground facilities are encountered, such features should be removed and the excavation thoroughly cleaned prior to backfill placement and/or construction.

4.2.2 Excavation

Pate Lift Station: Very dense soils will likely require heavy duty equipment or additional effort to advance excavations (approximately 15 feet bgs) required for the project. Very dense cemented soils were encountered from the surface to the total explored depth of 20 feet bgs.

Hagerman Lift Station: It is anticipated that excavations advanced to the foundation bearing depth for the proposed construction can be accomplished with conventional earthmoving equipment.

Terracon understands that the proposed slab for the lift station will be founded at a depth of approximately 15 feet beneath the existing site grade. Based on the soil boring information, the groundwater level observed at the site is approximately 16 feet below grade. In Terracon's opinion, the lift station slab and walls should be designed to resist all hydrostatic uplift and lateral earth pressures corresponding to the highest anticipated water level. Terracon recommends that the walls and slab be water proofed and that water stops be provided at all joints. Therefore, no perimeter or underslab drainage would be required for this design. Based on the groundwater levels observed in the boring, we recommend that the design water table elevation be established at 10 feet below the existing ground surface to allow for some fluctuation and increase in the current water level.

A qualified contractor should be chosen to review the data contained in this report for design and implementation of the temporary dewatering system and excavation slopes per OSHA or sheetpile walls.

After dewatering, on-site soils may pump or become unstable or unworkable at high water contents. Workability may be improved by scarifying and drying. Overexcavation of wet zones and replacement with granular materials may be necessary. Lightweight excavation equipment may be required to reduce subgrade pumping.

Stevens and Bataan Lift Stations: It is anticipated that shallow excavations (about 20 feet or less) for the proposed construction can be accomplished with conventional earthmoving equipment. Very dense gravels will likely require heavy duty equipment or additional effort to advance deeper excavations (beyond a depth of about 20 feet bgs) required for the project.

Terracon understands that the proposed slab for the lift station will be founded at a depth of approximately 20 feet beneath the existing site grade. Based on the soil boring information, the groundwater level observed at the site is approximately 15 feet below grade. In Terracon's opinion, the lift station slab and walls should be designed to resist all hydrostatic uplift and lateral earth pressures corresponding to the highest anticipated water level. Terracon recommends that the walls and slab be water proofed and that water stops be provided at all joints. Therefore, no perimeter or underslab drainage would be required for this design. Based on the groundwater levels observed in the boring, we recommend that the design water table elevation be established at 10 feet below the existing ground surface to allow for some fluctuation and increase in the current water level.

A qualified contractor should be chosen to review the data contained in this report for design and implementation of the temporary dewatering system and excavation slopes per OSHA or sheetpile walls.

After dewatering, on-site soils may pump or become unstable or unworkable at high water contents. Workability may be improved by scarifying and drying. Overexcavation of wet zones and replacement with granular materials may be necessary. Lightweight excavation equipment may be required to reduce subgrade pumping.

Hall Lift Station: It is anticipated that shallow excavations (about 5 feet or less) for the proposed construction can be accomplished with conventional earthmoving equipment. Very dense gravels/cobbles and/or cemented soils (although not encountered in our boring, but may exist beyond the depth of auger refusal that occurred at a depth of 8 feet bgs) will likely require heavy duty equipment or additional effort to advance deeper excavations (approximately 25 feet bgs) required for the project. Excavations penetrating the very dense gravels/cobbles and/or cemented soils may require the use of specialized heavy-duty equipment, together with drilling and blasting to facilitate rock break-up and removal.

Excavations deeper than 15 feet bgs are anticipated at each site. The individual contractor(s) is responsible for designing and constructing stable, temporary excavations as required to maintain stability of both the excavation sides and bottom. Excavations should be sloped or shored in the interest of safety following local, and federal regulations, including current OSHA excavation and trench safety standards.

4.2.3 Subgrade Preparation

Exposed areas which will receive fill, once properly cleared and benched where necessary, should be scarified to a minimum depth of 10 inches, conditioned to near optimum moisture content, and compacted. The above recommendation does not apply if the over-excavated surface exposes very dense carbonate indurated soils, and/or gravels/cobbles. In such cases, the over-excavated surface can be proof-rolled to the satisfaction of the geotechnical engineer.

4.2.4 Fill Materials and Placement

All fill materials should be inorganic soils free of vegetation, debris, and fragments larger than six inches in size. Pea gravel or other similar non-cementitious, poorly-graded materials should not be used as fill or backfill without the prior approval of the geotechnical engineer.

Approved on-site soils or imported materials may be used as fill material for the following:

- general site grading
- foundation areas
- exterior slab areas
- foundation backfill

Imported or on-site soils for use as fill material within proposed lift station footprints should conform to low volume change materials as indicated in the following specifications:

Gradation	**Percent Finer by Weight (ASTM C 136)**
6"	100
3”	70-100
No. 4 Sieve	50-100
No. 200 Sieve	50 max

- Liquid Limit .... 30 (max)
- Plasticity Index .... 15 (max)

Engineered fill should be placed and compacted in horizontal lifts, using equipment and procedures that will produce recommended moisture contents and densities throughout the lift. Fill lifts should not exceed ten inches loose thickness.

4.2.5 Compaction Requirements

Recommended compaction and moisture content criteria for engineered fill materials are as follows:

Material Type and Location	Per the Modified Proctor Test (ASTM D 1557)		
	Minimum Compaction Requirement (%)	Range of Moisture Contents for Compaction	
		Minimum	Maximum
Approved on-site or approved imported fill soils:			
Beneath foundations:	95	-2%	+2%
Miscellaneous backfill:	95	-3%	+3%

4.2.6 Grading and Drainage

Positive drainage should be provided during construction and maintained throughout the life of the project. Infiltration of water into utility trenches or foundation excavations should be prevented during construction. Surface features which could retain water in areas adjacent to the lift stations should be sealed or eliminated. We recommend that protective slopes be provided with a minimum grade of approximately 5 percent for at least 10 feet from each lift station perimeter. Backfill against foundations and in utility trenches should be well compacted and free of all construction debris to reduce the possibility of moisture infiltration.

4.2.7 Corrosion Potential

Results of corrosivity testing are provided in Appendix B. The results of soluble sulfate testing for **Pate, Stevens, Bataan and Hall Lift Stations** indicate that ASTM Type I or II Portland cement should be suitable for concrete on and below grade for the projects. The results of soluble sulfate testing for **Hagerman Lift Station** indicates that ASTM Type V (Sulfate Resistant Cement) Portland cement should be used for concrete on and below grade for the project.

Laboratory test results indicate that on-site soils have a pH values ranging from 8.7 to 9.2 and minimum resistivity values ranging from 272 to 2,619 ohm-centimeters. The pH and minimum resistivity values should be used to determine potential corrosive characteristics of the on-site soils with respect to contact with the steel pipe materials that will be used for project construction. Values for pH and minimum resisitivity are commonly used to help evaluate the corrosion potential of the soil with respect to buried metal such as metal utility pipes. This and other information is typically analyzed by a corrosion specialist to determine site specific recommendations. For specific recommendations regarding soil corrosivity, we recommend a corrosion specialist be consulted.

4.3 Foundation Recommendations

Each of the lift stations can be supported by a ribbed mat or waffle slab foundation bearing on prepared native soils or engineered fill. Design recommendations for foundation for the proposed structure and related structural elements are presented in the following paragraphs.

4.3.1 Design Recommendations

Description	Value
Foundation Type	Ribbed Mat or Waffle Slab
Structures	Lift Stations
Bearing Material	Minimum of 10 inches of prepared native soils, or engineered fill
Allowable Bearing Pressure	**Pate, Stevens, Bataan and Hall**: 3,000 psf **Hagerman**: 2,000 psf
Modulus of subgrade reaction	**Pate**: 150 pounds per square inch per inch (psi/in) **Hagerman**: 100 psi/in **Stevens, Bataan, and Hall**: 250 psi/in
Total Estimated Settlement	1 inch or less
Estimated Differential Settlement	1/2 inch

Temporary dewatering will be required during construction of the foundations for the **Hagerman, Stevens and Bataan** lift stations. Groundwater levels should be maintained at least 2 feet below the design footing elevation to reduce disturbance during construction. Compacting wet and disturbed soils should be avoided. In order to help provide a stable working platform during foundation construction, it may be beneficial to place approximately 24 inches of clean, coarse granular material in the bottom of the foundation excavation.

The slabs for **Hagerman, Stevens and Bataan** lift stations should be designed for hydrostatic uplift forces (approximately 315 psf due to 5 feet of groundwater at Hagerman, 625 psf due to 10 feet of groundwater at Stevens and Bataan). Terracon estimates that total settlement of the lift stations will be on the order of 1 inch. Differential settlement is estimated to be less than ½ inch. These estimates are based on static loading conditions. If vibrating pump equipment is used, total settlement could exceed these values. Vibration dampers could be used to reduce the effect on foundations.

Foundations should be proportioned to reduce differential foundation movement. Proportioning on the basis of equal total settlement is recommended. Additional foundation movements could occur if water from any source infiltrates the foundation soils; therefore, proper drainage should be provided in the final design and during construction.

Foundations should be reinforced as necessary to reduce the potential for distress caused by differential foundation movement.

Foundation excavations should be observed by the geotechnical engineer. If the soil conditions encountered differ significantly from those presented in this report, supplemental recommendations will be required.

4.3.2 Construction Considerations

Engineered fill to bring the site to grade or compacted native soils is recommended below the footings. The engineered fill (if necessary) should be conditioned to near optimum moisture content and compacted. Difficult excavations are anticipated for this sites due to the very dense carbonate indurated soils encountered in the borings. Heavy duty or specialized equipment will be necessary to advance excavations.

Backfills of about 15 to 25 feet are anticipated at the sites. The total settlement of the backfill material, placed and prepared as recommended previously, is estimated to be about 2 to 3 inches. This should be taken into consideration when designing adjacent flatwork bearing on the backfill zone.

4.4 Seismic Considerations

Pate Lift Station:

Description	Value
2009 International Building Code Site Classification (IBC) [1]	C[2]
Site Latitude	32.43549
Site Longitude	-104.25305
Spectral Response Accelerations SMs and SM1 **SMs = FaSs and SM1 = FvS1** **Site Class C - Fa = 1.20, Fv = 1.69**	
SM_S Spectral Acceleration for a Short Period (0.2 sec)	0.208g
SM1 Spectral Acceleration for a 1-Second Period	0.081g
SDs = 2/3 x SMs and SD1 = 2/3 x SM1	
SD_S Spectral Acceleration for a Short Period (0.2 sec)	0.139g
SD1 Spectral Acceleration for a 1-Second Period	0.054g

[1] Note: In general accordance with the *2009 International Building Code,* Table 1613.5.2. IBC Site Class is based on the average characteristics of the upper 100 feet of the subsurface profile.

[2] Note: The 2009 International Building Code (IBC) requires a site soil profile determination extending to a depth of 100 feet for seismic site classification. The current scope does not include the required 100 foot soil profile determination. The boring extending to a maximum depth of 20 feet, and this seismic site class definition considers that dense soil may be encountered below the maximum depth of the subsurface exploration. Additional exploration to deeper depths would be required to confirm the conditions below the current depth of exploration.

Hagerman Lift Station:

Description	Value
2009 International Building Code Site Classification (IBC) [1]	D[2]

Site Latitude	32.42499
Site Longitude	-104.22556
Spectral Response Accelerations SMs and SM1 **SMs = FaSs and SM1 = FvS1** **Site Class D - Fa = 1.6 , Fv = 2.42**	
SM_S Spectral Acceleration for a Short Period (0.2 sec)	0.279g
SM1 Spectral Acceleration for a 1-Second Period	0.114g
SDs = 2/3 x SMs and SD1 = 2/3 x SM1	
SD_S Spectral Acceleration for a Short Period (0.2 sec)	0.186g
SD1 Spectral Acceleration for a 1-Second Period	0.076g

[1] Note: In general accordance with the *2009 International Building Code,* Table 1613.5.2. IBC Site Class is based on the average characteristics of the upper 100 feet of the subsurface profile.

[2] Note: The 2009 International Building Code (IBC) requires a site soil profile determination extending to a depth of 100 feet for seismic site classification. The current scope does not include the required 100 foot soil profile determination. The boring extending to a maximum depth of 20 feet, and this seismic site class definition considers that dense soil may be encountered below the maximum depth of the subsurface exploration. Additional exploration to deeper depths would be required to confirm the conditions below the current depth of exploration.

Stevens Lift Station:

Description	Value
2009 International Building Code Site Classification (IBC) [1]	C[2]
Site Latitude	32.42147
Site Longitude	-104.22562
Spectral Response Accelerations SMs and SM1 **SMs = FaSs and SM1 = FvS1** **Site Class C – Fa = 1.2, Fv = 1.72**	
SM_S Spectral Acceleration for a Short Period (0.2 sec)	0.209g
SM1 Spectral Acceleration for a 1-Second Period	0.081g
SDs = 2/3 x SMs and SD1 = 2/3 x SM1	
SD_S Spectral Acceleration for a Short Period (0.2 sec)	0.139g
SD1 Spectral Acceleration for a 1-Second Period	0.054g

[1] Note: In general accordance with the *2009 International Building Code,* Table 1613.5.2. IBC Site Class is based on the average characteristics of the upper 100 feet of the subsurface profile.

[2] Note: The 2009 International Building Code (IBC) requires a site soil profile determination extending to a depth of 100 feet for seismic site classification. The current scope does not include the required 100 foot soil profile determination. The boring extending to a maximum depth of 25 feet, and this seismic site class definition considers that dense soil may be encountered below the maximum depth of the subsurface exploration. Additional exploration to deeper depths would be required to confirm the conditions below the current depth of exploration.

Bataan Lift Station:

Description	Value
2009 International Building Code Site Classification (IBC) [1]	C[2]
Site Latitude	32.41774
Site Longitude	-104.22341
Spectral Response Accelerations SMs and SM1 **SMs = FaSs and SM1 = FvS1** **Site Class C - Fa = 1.2, Fv = 1.7**	
SM_S Spectral Acceleration for a Short Period (0.2 sec)	0.209g
SM1 Spectral Acceleration for a 1-Second Period	0.081g
SDs = 2/3 x SMs and SD1 = 2/3 x SM1	
SD_S Spectral Acceleration for a Short Period (0.2 sec)	0.140g
SD1 Spectral Acceleration for a 1-Second Period	0.054g

[1] Note: In general accordance with the *2009 International Building Code,* Table 1613.5.2. IBC Site Class is based on the average characteristics of the upper 100 feet of the subsurface profile.

[2] Note: The 2009 International Building Code (IBC) requires a site soil profile determination extending to a depth of 100 feet for seismic site classification. The current scope does not include the required 100 foot soil profile determination. The boring extending to a maximum depth of 25 feet, and this seismic site class definition considers that dense soil may be encountered below the maximum depth of the subsurface exploration. Additional exploration to deeper depths would be required to confirm the conditions below the current depth of exploration.

Hall Lift Station:

Description	Value
2009 International Building Code Site Classification (IBC) [1]	C[2]
Site Latitude	32.39639
Site Longitude	-104.21299
Spectral Response Accelerations SMs and SM1 **SMs = FaSs and SM1 = FvS1** **Site Class C - Fa = 1.21, Fv = 1.70**	
SM_S Spectral Acceleration for a Short Period (0.2 sec)	0.210g
SM1 Spectral Acceleration for a 1-Second Period	0.080g
SDs = 2/3 x SMs and SD1 = 2/3 x SM1	
SD_S Spectral Acceleration for a Short Period (0.2 sec)	0.140g
SD1 Spectral Acceleration for a 1-Second Period	0.054g

[1] Note: In general accordance with the *2009 International Building Code,* Table 1613.5.2. IBC Site Class is based on the average characteristics of the upper 100 feet of the subsurface profile.

[2] Note: The 2009 International Building Code (IBC) requires a site soil profile determination extending to a depth of 100 feet for seismic site classification. The current scope does not include the required 100 foot soil profile determination. The boring extending to a maximum depth of 8 feet, and this seismic site class definition considers that dense soil may be encountered below the maximum depth of the subsurface exploration. Additional exploration to deeper depths would be required to confirm the conditions below the current depth of exploration.

4.5 Lateral Earth Pressures

Pate Lift Station:

For soils above any free water surface, recommended equivalent fluid pressures for unrestrained foundation elements when using on-site silty sand soils as backfill are:

- Active ....35 psf/ft
- Passive ....420 psf/ft
- Coefficient of base friction 0.35*

  *The coefficient of base friction should be reduced to 0.23 when used in conjunction with passive pressure.

Where the design includes restrained elements, the following equivalent fluid pressures are recommended:

- At rest ....55 psf/ft

Fill against foundations should be compacted to densities specified in the Earthwork section of this report. Compaction of each lift adjacent to walls should be accomplished with hand-operated tampers or other lightweight compactors. Overcompaction may cause excessive lateral earth pressures which could result in wall movement.

The walls should be regarded as relatively unyielding, and as such should be designed for the at-rest condition to resist lateral pressures due to the backfill material and any surcharge loads adjacent to the walls. Allowance should be made for surcharge loads adjacent to the walls and within a zone defined by a slope of 1H:1V extending upwards from the base of the wall to the ground surface. Surcharge loads should include any traffic and sidewalk loads or construction loads.

Hagerman Lift Station:

For soils above any free water surface, recommended equivalent fluid pressures for unrestrained foundation elements when using on-site silt with sand soils as backfill are:

- Active...34 psf/ft
- Passive..378 psf/ft
- Coefficient of base friction...0.30*

  *The coefficient of base friction should be reduced to 0.20 when used in conjunction with passive pressure.

Where the design includes restrained elements, the following equivalent fluid pressures are recommended:

- At rest...54 psf/ft

Fill against foundations should be compacted to densities specified in the Earthwork section of this report. Compaction of each lift adjacent to walls should be accomplished with hand-operated tampers or other lightweight compactors. Overcompaction may cause excessive lateral earth pressures which could result in wall movement.

The walls should be regarded as relatively unyielding, and as such should be designed for the at-rest condition to resist lateral pressures due to the backfill material and any surcharge loads adjacent to the walls. We recommend that a linearly increasing lateral earth pressure of 97 psf per foot depth be used in computing lateral earth pressures. As mentioned previously, this value assumes the design water level elevation to be 10 feet below the existing ground surface. Allowance should be made for surcharge loads adjacent to the walls and within a zone defined by a slope of 1H:1V extending upwards from the base of the wall to the ground surface. Surcharge loads should include any traffic and sidewalk loads or construction loads.

Stevens Lift Station:
For soils above any free water surface, recommended equivalent fluid pressures for unrestrained foundation elements when using on-site lean clay with sand soils as backfill are:

- Active...43 psf/ft
- Passive..342 psf/ft
- Coefficient of base friction...0.25*

*The coefficient of base friction should be reduced to 0.17 when used in conjunction with passive pressure.

Where the design includes restrained elements, the following equivalent fluid pressures are recommended:

- At rest .... 63 psf/ft

Fill against foundations should be compacted to densities specified in the Earthwork section of this report. Compaction of each lift adjacent to walls should be accomplished with hand-operated tampers or other lightweight compactors. Overcompaction may cause excessive lateral earth pressures which could result in wall movement.

The walls should be regarded as relatively unyielding, and as such should be designed for the at-rest condition to resist lateral pressures due to the backfill material and any surcharge loads adjacent to the walls. We recommend that a linearly increasing lateral earth pressure of 106 psf per foot depth be used in computing lateral earth pressures. As mentioned previously, this value assumes the design water level elevation to be 10 feet below the existing ground surface. Allowance should be made for surcharge loads adjacent to the walls and within a zone defined by a slope of 1H:1V extending upwards from the base of the wall to the ground surface. Surcharge loads should include any traffic and sidewalk loads or construction loads.

Bataan Lift Station:
For soils above any free water surface, recommended equivalent fluid pressures for unrestrained foundation elements when using on-site silty sand soils as backfill are:

- Active .... 35 psf/ft
- Passive .... 420 psf/ft
- Coefficient of base friction 0.35*

*The coefficient of base friction should be reduced to 0.23 when used in conjunction with passive pressure.

Where the design includes restrained elements, the following equivalent fluid pressures are recommended:

- At rest .... 55 psf/ft

Fill against foundations should be compacted to densities specified in the Earthwork section of this report. Compaction of each lift adjacent to walls should be accomplished with hand-operated tampers or other lightweight compactors. Overcompaction may cause excessive lateral earth pressures which could result in wall movement.

The walls should be regarded as relatively unyielding, and as such should be designed for the at-rest condition to resist lateral pressures due to the backfill material and any surcharge loads adjacent to the walls. We recommend that a linearly increasing lateral earth pressure of 98 psf per foot depth be used in computing lateral earth pressures. As mentioned previously, this value assumes the design water level elevation to be 10 feet below the existing ground surface. Allowance should be made for surcharge loads adjacent to the walls and within a zone defined by a slope of 1H:1V extending upwards from the base of the wall to the ground surface. Surcharge loads should include any traffic and sidewalk loads or construction loads.

Hall Lift Station:
For soils above any free water surface, recommended equivalent fluid pressures for unrestrained foundation elements when using on-site silty gravel with sand soils as backfill are:

- Active..35 psf/ft
- Passive ....440 psf/ft
- Coefficient of base friction...0.35*

  *The coefficient of base friction should be reduced to 0.23 when used in conjunction with passive pressure.

Where the design includes restrained elements, the following equivalent fluid pressures are recommended:

- At rest ....55 psf/ft

Fill against foundations should be compacted to densities specified in the Earthwork section of this report. Compaction of each lift adjacent to walls should be accomplished with hand-operated tampers or other lightweight compactors. Overcompaction may cause excessive lateral earth pressures which could result in wall movement.

The walls should be regarded as relatively unyielding, and as such should be designed for the at-rest condition to resist lateral pressures due to the backfill material and any surcharge loads adjacent to the walls. Allowance should be made for surcharge loads adjacent to the walls and within a zone defined by a slope of 1H:1V extending upwards from the base of the wall to the ground surface. Surcharge loads should include any traffic and sidewalk loads or construction loads.

5.0 GENERAL COMMENTS

Terracon should be retained to review the final design plans and specifications so comments can be made regarding interpretation and implementation of our geotechnical recommendations in the design and specifications. Terracon also should be retained to provide observation and testing services during grading, excavation, foundation construction and other earth-related construction phases of the project.

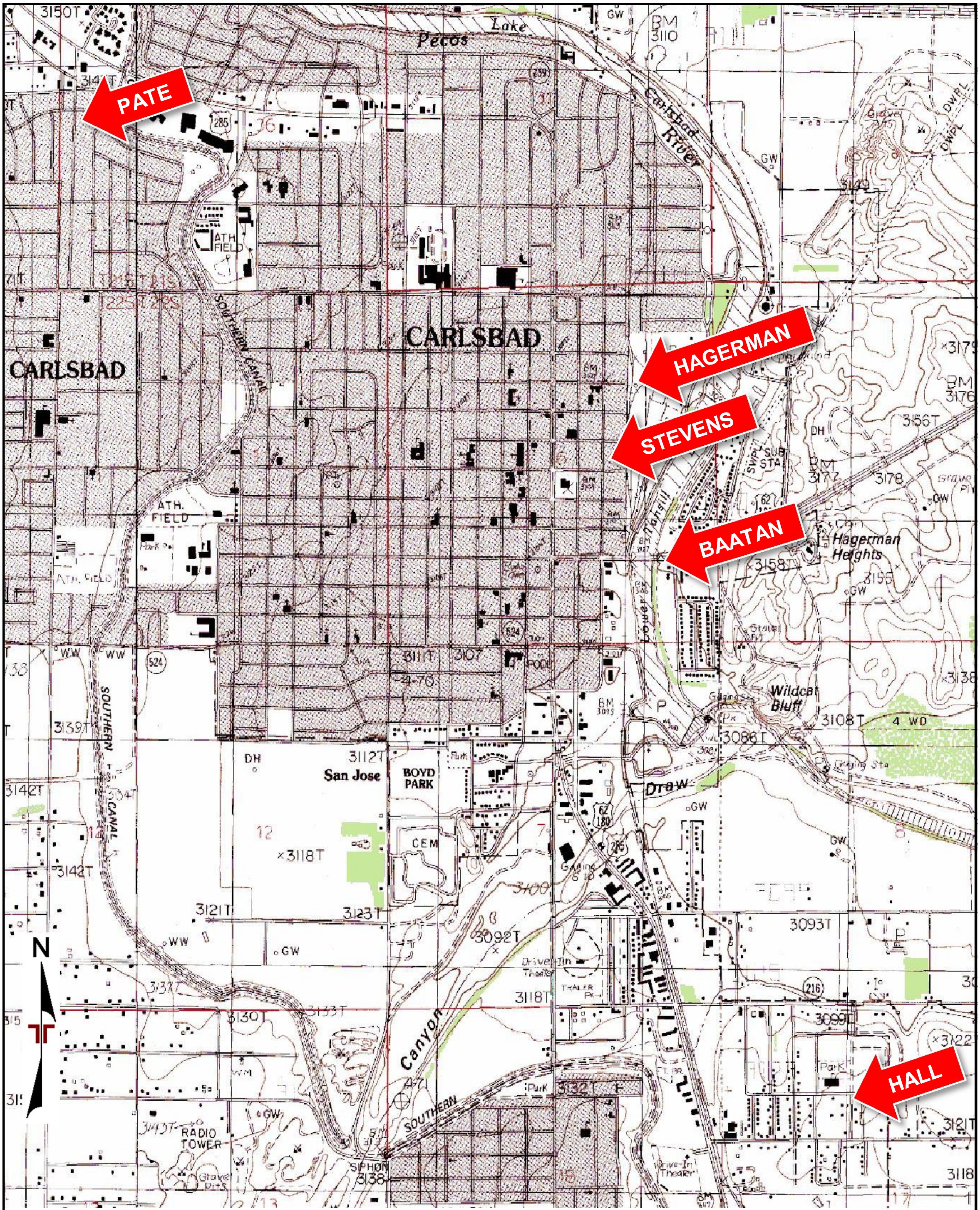
The analysis and recommendations presented in this report are based upon the data obtained from the borings performed at the indicated locations and from other information discussed in this report. This report does not reflect variations that may occur between borings, across the site, or due to the modifying effects of construction or weather. The nature and extent of such variations may not become evident until during or after construction. If variations appear, we should be immediately notified so that further evaluation and supplemental recommendations can be provided.

The scope of services for this project does not include either specifically or by implication any environmental or biological (e.g., mold, fungi, bacteria) assessment of the site or identification or prevention of pollutants, hazardous materials or conditions. If the owner is concerned about the potential for such contamination or pollution, other studies should be undertaken.

This report has been prepared for the exclusive use of our client for specific application to the project discussed and has been prepared in accordance with generally accepted geotechnical engineering practices. No warranties, either express or implied, are intended or made. Site safety, excavation support, and dewatering requirements are the responsibility of others. In the event that changes in the nature, design, or location of the project as outlined in this report are planned, the conclusions and recommendations contained in this report shall not be considered valid unless Terracon reviews the changes and either verifies or modifies the conclusions of this report in writing.

APPENDIX A

FIELD EXPLORATION



TOPOGRAPHIC MAP IMAGE COURTESY OF THE U.S. GEOLOGICAL SURVEY
QUADRANGLES INCLUDE: CARLSBAD WEST, NM (1/1/1985) and CARLSBAD EAST, NM (1/1/1985).

Project Manager: DB	Project No. 68155025	Terracon	SITE LOCATION PLAN	Exhibit
Drawn by: DF	Scale: 1"=24,000 SF	1640 Hickory Loop, Suite 105	Carlsbad Lift Stations	A-1
Checked by: DB	File Name: LIFT STATIONS	Las Cruces, NM 88005	Various	
Approved by: JDC	Date: 4/03/2015		Carlsbad, NM	

DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

⊗ Approximate Boring Location

AERIAL PHOTOGRAPHY PROVIDED BY MICROSOFT BING MAPS

Project Manager: DB	Project No. 68155025-P	Terracon	BORING LOCATION PLAN	Exhibit
Drawn by: DF	Scale: AS SHOWN	1640 Hickory Loop, Suite 105	Carlsbad Lift Stations	A-2
Checked by: DB	File Name: PATE	Las Cruces, NM 88005	Pate	
Approved by: JDC	Date: 4/03/2015		Carlsbad, NM	

DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

⊗ Approximate Boring Location

AERIAL PHOTOGRAPHY PROVIDED BY MICROSOFT BING MAPS

Project Manager: DB	Project No. 68155025	Terracon	BORING LOCATION PLAN	Exhibit
Drawn by: DF	Scale: AS SHOWN	1640 Hickory Loop, Suite 105	Carlsbad Lift Stations	A-3
Checked by: DB	File Name: HAGERMAN	Las Cruces, NM 88005	**Hagerman**	
Approved by: JDC	Date: 4/03/2015		**Carlsbad, NM**	

DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

⊗ Approximate Boring Location

AERIAL PHOTOGRAPHY PROVIDED BY MICROSOFT BING MAPS

Project Manager: DB	Project No. 68155025	Terracon 1640 Hickory Loop, Suite 105 Las Cruces, NM 88005	BORING LOCATION PLAN	Exhibit
Drawn by: DF	Scale: AS SHOWN		Carlsbad Lift Stations **Stevens** **Carlsbad, NM**	A-4
Checked by: DB	File Name: STEVENS			
Approved by: JDC	Date: 4/03/2015			

DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

⊗ Approximate Boring Location

AERIAL PHOTOGRAPHY PROVIDED BY MICROSOFT BING MAPS

Project Manager: DB	Project No. 68155025	Terracon	BORING LOCATION PLAN	Exhibit
Drawn by: DF	Scale: AS SHOWN		Carlsbad Lift Stations	A-5
Checked by: DB	File Name: BAATAN	1640 Hickory Loop, Suite 105	**Bataan**	
Approved by: JDC	Date: 4/03/2015	Las Cruces, NM 88005	**Carlsbad, NM**	

DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

⊗ Approximate Boring Location

AERIAL PHOTOGRAPHY PROVIDED BY MICROSOFT BING MAPS

Project Manager: DB	Project No. 68155025	Terracon	BORING LOCATION PLAN	Exhibit
Drawn by: DF	Scale: AS SHOWN	1640 Hickory Loop, Suite 105	Carlsbad Lift Stations	A-6
Checked by: DB	File Name: HALL	Las Cruces, NM 88005	**Hall**	
Approved by: JDC	Date: 4/03/2015		**Carlsbad, NM**	

Field Exploration Description

A single test boring was drilled at each of the sites on March 16 and 17, 2015. The borings were drilled to depths ranging from approximately 8 to 25 feet below the ground surface at the approximate location shown on the attached Site Location Plan and Boring Location Plans, Exhibits A-1 thru A-6, respectively. The test borings were located as follows:

Borings	Location	Depth (feet)
B-1	Pate Lift Station	20
B-2	Hagerman Lift Station	20
B-3	Stevens Lift Station	25
B-4	Bataan Lift Station	25
B-5	Hall Lift Station	8*

*Auger refusal encountered at depth of 8 feet due to very dense gravel/cobbles

The test borings were advanced with a truck-mounted CME-75 drill rig utilizing 8-inch diameter hollow-stem augers.

The borings were located in the field by using the proposed site plan and an aerial photograph of the site, and measuring from existing property lines. The accuracy of boring locations should only be assumed to the level implied by the method used.

A lithologic log of each boring was recorded by the field engineer during the drilling operations. At selected intervals, samples of the subsurface materials were taken by driving split-spoon or ring-barrel samplers. Bulk samples of subsurface materials were also obtained.

Penetration resistance measurements were obtained by driving the split-spoon and ring-barrel samplers into the subsurface materials with a 140-pound automatic hammer falling 30 inches. The penetration resistance value is a useful index in estimating the consistency or relative density of materials encountered.

A CME automatic SPT hammer was used to advance the split-barrel sampler in the borings performed at the sites. The effect of the automatic hammer's efficiency has been considered in the interpretation and analysis of the subsurface information for this report.

Groundwater conditions were evaluated in each boring at the time of site exploration.

BORING LOG NO. B-1

PROJECT: CARSLBAD LIFT STATIONS

CLIENT: CITY OF CARLSBAD CARLSBAD, NEW MEXICO

SITE: PATE STREET CARLSBAD, NEW MEXICO

LOCATION See Exhibit A-2

Latitude: 32.43549° Longitude: -104.25305°

Approximate Surface Elev: 3137 (Ft.) +/-

DEPTH	Description	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	SILTY SAND (SM), trace gravel, light brown to white, very dense, carbonate indurated									
					X	41-50/2"				
			5		X	50/5"				
			10		X	11-35-35 N=70	4		NP	33
			15		X	50/5"				
20.0	**SILTY SAND WITH GRAVEL (SM)**, light brown to white, very dense, carbonate indurated	3117+/-	20		X	50/5"	6		NP	45
21.5		3115.5+/-								

Boring Terminated at 21.5 Feet

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
HOLLOW STEM AUGER

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Terracon
1640 Hickory Loop, Suite 105
Las Cruces, New Mexico

Boring Started: 3/17/2015	Boring Completed: 3/17/2015
Drill Rig: CME 75	Driller: ENVIRO-DRILL
Project No.: 68155025-P	Exhibit: A-4

BORING LOG NO. B-2

PROJECT: CARSLBAD LIFT STATIONS

CLIENT: CITY OF CARLSBAD CARLSBAD, NEW MEXICO

SITE: HAGERMAN STREET CARLSBAD, NEW MEXICO

LOCATION See Exhibit A-2

Latitude: 32.42499° Longitude: -104.22556°

Approximate Surface Elev: 3110 (Ft.) +/-

DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
SILT WITH SAND (ML), brown, medium stiff									
				X	1-2-3 N=5				
		5			3-4				
very stiff		10		X	4-10-12 N=22	14		NP	72
hard		15		X	7-15-23 N=38				
water bearing at 16'			▽						
20.0	3090+/-	20							
SILTY SAND (SM), light brown, medium dense				X	11-12-14 N=26	21		NP	39
21.5	3088.5+/-								

Boring Terminated at 21.5 Feet

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
HOLLOW STEM AUGER

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

▽ *water bearing at 16'*

Terracon
1640 Hickory Loop, Suite 105
Las Cruces, New Mexico

Boring Started: 3/16/2015	Boring Completed: 3/16/2015
Drill Rig: CME 75	Driller: ENVIRO-DRILL
Project No.: 68155025-HAG	Exhibit: A-9

BORING LOG NO. B-3

PROJECT: CARSLBAD LIFT STATIONS

**CLIENT: CITY OF CARLSBAD
CARLSBAD, NEW MEXICO**

**SITE: E. STEVENS STREET
CARLSBAD, NEW MEXICO**

LOCATION See Exhibit A-2

Latitude: 32.42147° Longitude: -104.22562°

Approximate Surface Elev: 3116 (Ft.) +/-

DEPTH	Description	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	CLAYEY SAND (SC), light brown to red, loose				X	2-2-3 N=5				
5.0		3111+/-	5			3-3-6/0"				
	LEAN CLAY WITH SAND (CL), white, medium stiff									
	trace gravel, light brown, very soft		10		X	1-0-0 N=0	27		25-17-8	73
	very stiff, water bearing at 15'		15	▽	X	3-5-11 N=16				
20.0		3096+/-	20							
	POORLY GRADED GRAVEL WITH SILT AND SAND (GP-GM), light brown, very dense				X	15-26-28 N=54	8		NP	10
26.5		3089.5+/-	25		X	15-28-35 N=63				
	Boring Terminated at 26.5 Feet									

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
HOLLOW STEM AUGER

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

▽ *water bearing at 15'*

Terracon
1640 Hickory Loop, Suite 105
Las Cruces, New Mexico

Boring Started: 3/16/2015

Boring Completed: 3/16/2015

Drill Rig: CME 75

Driller: ENVIRO-DRILL

Project No.: 68155025-S

Exhibit: A-10

BORING LOG NO. B-4

PROJECT: CARSLBAD LIFT STATIONS

**CLIENT: CITY OF CARLSBAD
CARLSBAD, NEW MEXICO**

**SITE: BATAAN STREET
CARLSBAD, NEW MEXICO**

LOCATION See Exhibit A-2

Latitude: 32.41774° Longitude: -104.22341°

Approximate Surface Elev: 3102 (Ft.) +/-

DEPTH	Description	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	SANDY LEAN CLAY (CL), brown, medium stiff								
					5-4-3 N=7				
5.0		3097+/-	5		3-7				
	SILTY SAND (SM), brown, loose								
	very loose		10		2-1-1 N=2	18		NP	36
15.0		3087+/-	15	▽					
	LEAN CLAY (CL), brown, medium stiff, water bearing at 15'				1-3-3 N=6	24		29-17-12	90
20.0		3082+/-	20		50/5"				
	CLAYEY GRAVEL (GC), light brown to white, very dense								
			25		50/2"				
26.5		3075.5+/-							
	Boring Terminated at 26.5 Feet								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
HOLLOW STEM AUGER

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

▽ *water bearing at 15'*

Terracon
1640 Hickory Loop, Suite 105
Las Cruces, New Mexico

Boring Started: 3/16/2015	Boring Completed: 3/16/2015
Drill Rig: CME 75	Driller: ENVIRO-DRILL
Project No.: 68155025-B	Exhibit: A-11

BORING LOG NO. B-5

PROJECT: CARSLBAD LIFT STATIONS

CLIENT: CITY OF CARLSBAD CARLSBAD, NEW MEXICO

SITE: HALL STREET CARLSBAD, NEW MEXICO

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 32.39639° Longitude: -104.21299° Approximate Surface Elev: 3121 (Ft.) +/- DEPTH / ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	SILTY GRAVEL WITH SAND (GM), brown, dense								
					21-18-13 N=31	4		NP	20
	very dense	5			50/5"				
	8.0 3113+/-								
	Auger refusal due to very dense gravel or cobbles at 8 Feet								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
HOLLOW STEM AUGER

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Terracon
1640 Hickory Loop, Suite 105
Las Cruces, New Mexico

Boring Started: 3/17/2015	Boring Completed: 3/17/2015
Drill Rig: CME 75	Driller: ENVIRO-DRILL
Project No.: 68155025-HALL	Exhibit: A-12

GENERAL NOTES

DESCRIPTION OF SYMBOLS AND ABBREVIATIONS

SAMPLING

- Auger
- Split Spoon
- Shelby Tube
- Macro Core
- Ring Sampler
- Rock Core
- Grab Sample
- No Recovery

WATER LEVEL

- Water Initially Encountered
- Water Level After a Specified Period of Time
- Water Level After a Specified Period of Time

Water levels indicated on the soil boring logs are the levels measured in the borehole at the times indicated. Groundwater level variations will occur over time. In low permeability soils, accurate determination of groundwater levels is not possible with short term water level observations.

FIELD TESTS

(HP)	Hand Penetrometer
(T)	Torvane
(b/f)	Standard Penetration Test (blows per foot)
(PID)	Photo-Ionization Detector
(OVA)	Organic Vapor Analyzer

DESCRIPTIVE SOIL CLASSIFICATION

Soil classification is based on the Unified Soil Classification System. Coarse Grained Soils have more than 50% of their dry weight retained on a #200 sieve; their principal descriptors are: boulders, cobbles, gravel or sand. Fine Grained Soils have less than 50% of their dry weight retained on a #200 sieve; they are principally described as clays if they are plastic, and silts if they are slightly plastic or non-plastic. Major constituents may be added as modifiers and minor constituents may be added according to the relative proportions based on grain size. In addition to gradation, coarse-grained soils are defined on the basis of their in-place relative density and fine-grained soils on the basis of their consistency.

LOCATION AND ELEVATION NOTES

Unless otherwise noted, Latitude and Longitude are approximately determined using a hand-held GPS device. The accuracy of such devices is variable. Surface elevation data annotated with +/- indicates that no actual topographical survey was conducted to confirm the surface elevation. Instead, the surface elevation was approximately determined from topographic maps of the area.

STRENGTH TERMS

RELATIVE DENSITY OF COARSE-GRAINED SOILS (More than 50% retained on No. 200 sieve.) Density determined by Standard Penetration Resistance Includes gravels, sands and silts.			CONSISTENCY OF FINE-GRAINED SOILS (50% or more passing the No. 200 sieve.) Consistency determined by laboratory shear strength testing, field visual-manual procedures or standard penetration resistance			
Descriptive Term (Density)	**Standard Penetration or N-Value Blows/Ft.**	**Ring Sampler Blows/Ft.**	**Descriptive Term (Consistency)**	**Unconfined Compressive Strength, Qu, psf**	**Standard Penetration or N-Value Blows/Ft.**	**Ring Sampler Blows/Ft.**
Very Loose	0 - 3	0 - 6	Very Soft	less than 500	0 - 1	< 3
Loose	4 - 9	7 - 18	Soft	500 to 1,000	2 - 4	3 - 4
Medium Dense	10 - 29	19 - 58	Medium-Stiff	1,000 to 2,000	4 - 8	5 - 9
Dense	30 - 50	59 - 98	Stiff	2,000 to 4,000	8 - 15	10 - 18
Very Dense	> 50	≥ 99	Very Stiff	4,000 to 8,000	15 - 30	19 - 42
			Hard	> 8,000	> 30	> 42

RELATIVE PROPORTIONS OF SAND AND GRAVEL

Descriptive Term(s) of other constituents	Percent of Dry Weight
Trace	< 15
With	15 - 29
Modifier	> 30

GRAIN SIZE TERMINOLOGY

Major Component of Sample	Particle Size
Boulders	Over 12 in. (300 mm)
Cobbles	12 in. to 3 in. (300mm to 75mm)
Gravel	3 in. to #4 sieve (75mm to 4.75 mm)
Sand	#4 to #200 sieve (4.75mm to 0.075mm
Silt or Clay	Passing #200 sieve (0.075mm)

RELATIVE PROPORTIONS OF FINES

Descriptive Term(s) of other constituents	Percent of Dry Weight
Trace	< 5
With	5 - 12
Modifier	> 12

PLASTICITY DESCRIPTION

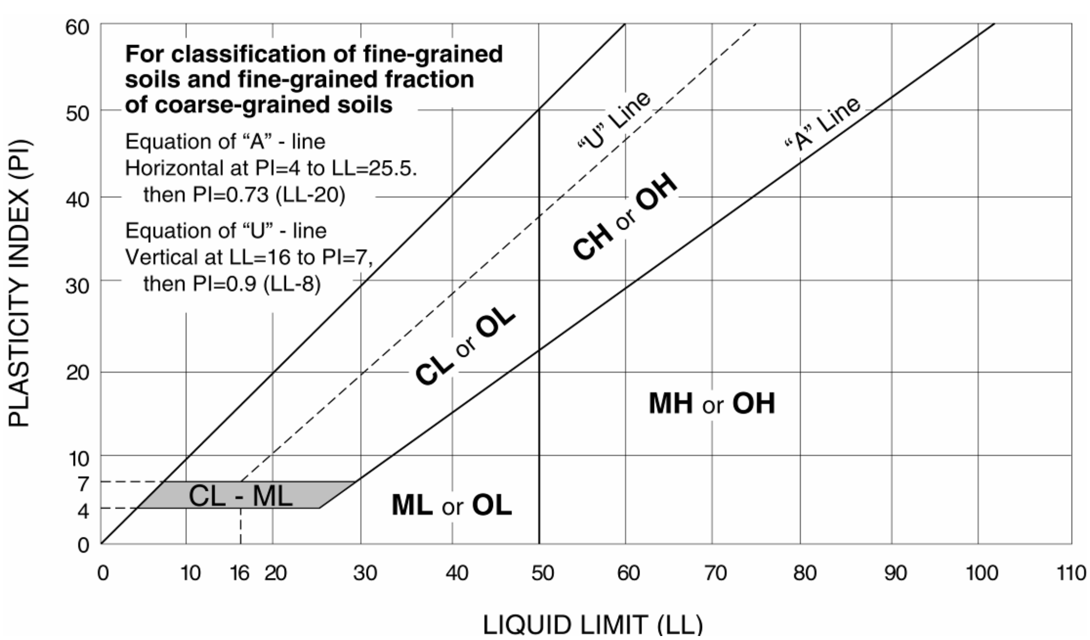
Term	Plasticity Index
Non-plastic	0
Low	1 - 10
Medium	11 - 30
High	> 30

Terracon

UNIFIED SOIL CLASSIFICATION SYSTEM

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests [A]					Soil Classification: Group Symbol	Soil Classification: Group Name [B]
Coarse Grained Soils: More than 50% retained on No. 200 sieve	**Gravels:** More than 50% of coarse fraction retained on No. 4 sieve	**Clean Gravels:** Less than 5% fines [C]	$Cu \geq 4$ and $1 \leq Cc \leq 3$ [E]		GW	Well-graded gravel [F]
			$Cu < 4$ and/or $1 > Cc > 3$ [E]		GP	Poorly graded gravel [F]
		Gravels with Fines: More than 12% fines [C]	Fines classify as ML or MH		GM	Silty gravel [F,G,H]
			Fines classify as CL or CH		GC	Clayey gravel [F,G,H]
	Sands: 50% or more of coarse fraction passes No. 4 sieve	**Clean Sands:** Less than 5% fines [D]	$Cu \geq 6$ and $1 \leq Cc \leq 3$ [E]		SW	Well-graded sand [I]
			$Cu < 6$ and/or $1 > Cc > 3$ [E]		SP	Poorly graded sand [I]
		Sands with Fines: More than 12% fines [D]	Fines classify as ML or MH		SM	Silty sand [G,H,I]
			Fines classify as CL or CH		SC	Clayey sand [G,H,I]
Fine-Grained Soils: 50% or more passes the No. 200 sieve	**Silts and Clays:** Liquid limit less than 50	**Inorganic:**	$PI > 7$ and plots on or above "A" line [J]		CL	Lean clay [K,L,M]
			$PI < 4$ or plots below "A" line [J]		ML	Silt [K,L,M]
		Organic:	Liquid limit - oven dried	< 0.75	OL	Organic clay [K,L,M,N]
			Liquid limit - not dried			Organic silt [K,L,M,O]
	Silts and Clays: Liquid limit 50 or more	**Inorganic:**	PI plots on or above "A" line		CH	Fat clay [K,L,M]
			PI plots below "A" line		MH	Elastic Silt [K,L,M]
		Organic:	Liquid limit - oven dried	< 0.75	OH	Organic clay [K,L,M,P]
			Liquid limit - not dried			Organic silt [K,L,M,Q]
Highly organic soils:	Primarily organic matter, dark in color, and organic odor				PT	Peat

[A] Based on the material passing the 3-inch (75-mm) sieve
[B] If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.
[C] Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.
[D] Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay
[E] $Cu = D_{60}/D_{10} \qquad Cc = \dfrac{(D_{30})^2}{D_{10} \times D_{60}}$
[F] If soil contains $\geq$ 15% sand, add "with sand" to group name.
[G] If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.
[H] If fines are organic, add "with organic fines" to group name.
[I] If soil contains $\geq$ 15% gravel, add "with gravel" to group name.
[J] If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.
[K] If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel," whichever is predominant.
[L] If soil contains $\geq$ 30% plus No. 200 predominantly sand, add "sandy" to group name.
[M] If soil contains $\geq$ 30% plus No. 200, predominantly gravel, add "gravelly" to group name.
[N] $PI \geq 4$ and plots on or above "A" line.
[O] $PI < 4$ or plots below "A" line.
[P] PI plots on or above "A" line.
[Q] PI plots below "A" line.



APPENDIX B

LABORATORY TESTING

Laboratory Testing

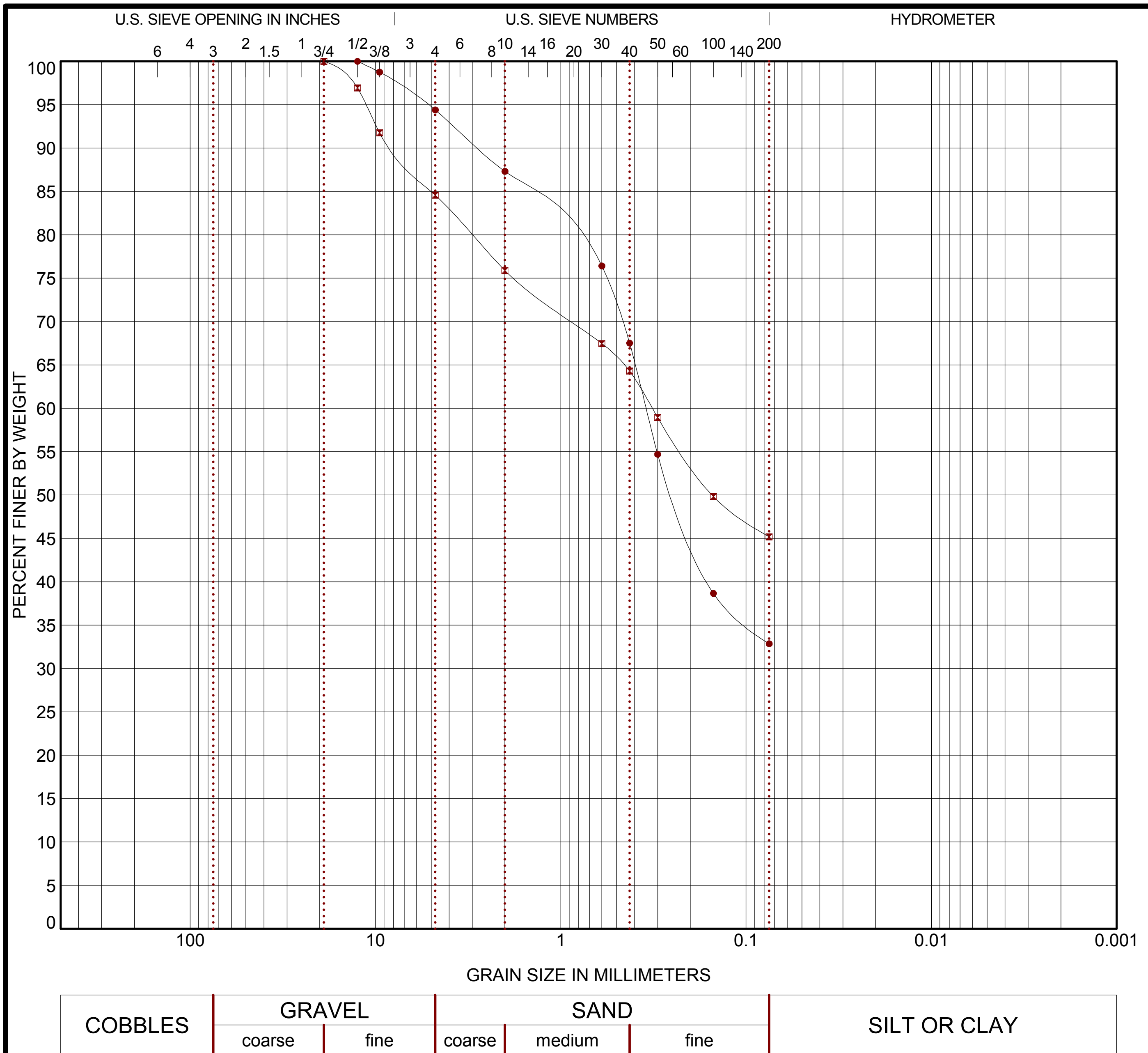
Soil samples were tested in the laboratory to measure their grain size distribution, and natural water content. The test results are provided on the boring logs included in Appendix A and individually in Appendix B.

Descriptive classifications of the soils indicated on the boring logs are in accordance with the enclosed General Notes and the Unified Soil Classification System. Also shown are estimated Unified Soil Classification Symbols. A brief description of this classification system is attached to this report in Appendix C. All classification was by visual/manual procedures, (ASTM D2487). Selected samples were further classified using the results of Atterberg limit testing, (ASTM D4318). The Atterberg limit test results are also provided on the boring logs.

Procedural standards noted above are for reference to methodology in general. In some cases, variations to methods are applied as a result of local practice or professional judgment.

GRAIN SIZE DISTRIBUTION

ASTM D422



	Boring ID	Depth	USCS Classification	LL	PL	PI	Cc	Cu
●	B-1	10 - 11.5	SILTY SAND(SM)	NP	NP	NP		
⧗	B-1	20 - 20.42	SILTY SAND with GRAVEL(SM)	NP	NP	NP		

	Boring ID	Depth	D_{100}	D_{60}	D_{30}	D_{10}	%Gravel	%Sand	%Silt	%Clay
●	B-1	10 - 11.5	12.5	0.346			5.6	61.5	32.9	
⧗	B-1	20 - 20.42	19	0.321			15.4	39.4	45.2	

PROJECT: CARSLBAD LIFT STATIONS

SITE: PATE STREET
CARLSBAD, NEW MEXICO

Terracon
1640 Hickory Loop, Suite 105
Las Cruces, New Mexico

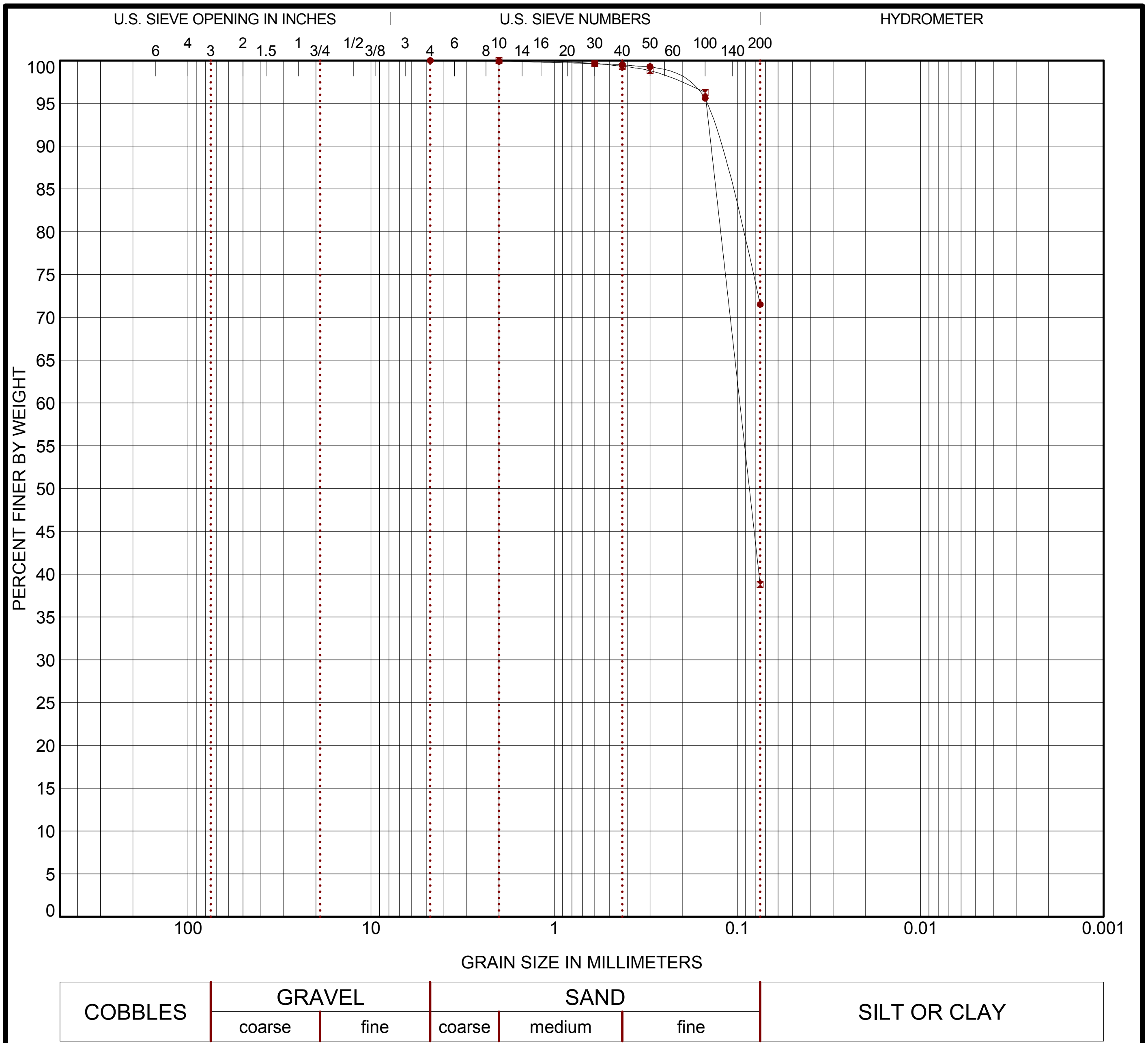
PROJECT NUMBER: 68155025-P

CLIENT: CITY OF CARLSBAD
CARLSBAD, NEW MEXICO

EXHIBIT: B-2

GRAIN SIZE DISTRIBUTION

ASTM D422



	Boring ID	Depth	USCS Classification	LL	PL	PI	Cc	Cu
●	B-2	10 - 11.5	SILT with SAND(ML)	NP	NP	NP		
⧗	B-2	20 - 21.5	SILTY SAND(SM)	NP	NP	NP		

	Boring ID	Depth	D_{100}	D_{60}	D_{30}	D_{10}	%Gravel	%Sand	%Silt	%Clay
●	B-2	10 - 11.5	4.75				0.0	28.5	71.5	
⧗	B-2	20 - 21.5	2	0.097			0.0	61.2	38.8	

PROJECT: CARSLBAD LIFT STATIONS

SITE: HAGERMAN STREET
CARLSBAD, NEW MEXICO

Terracon
1640 Hickory Loop, Suite 105
Las Cruces, New Mexico

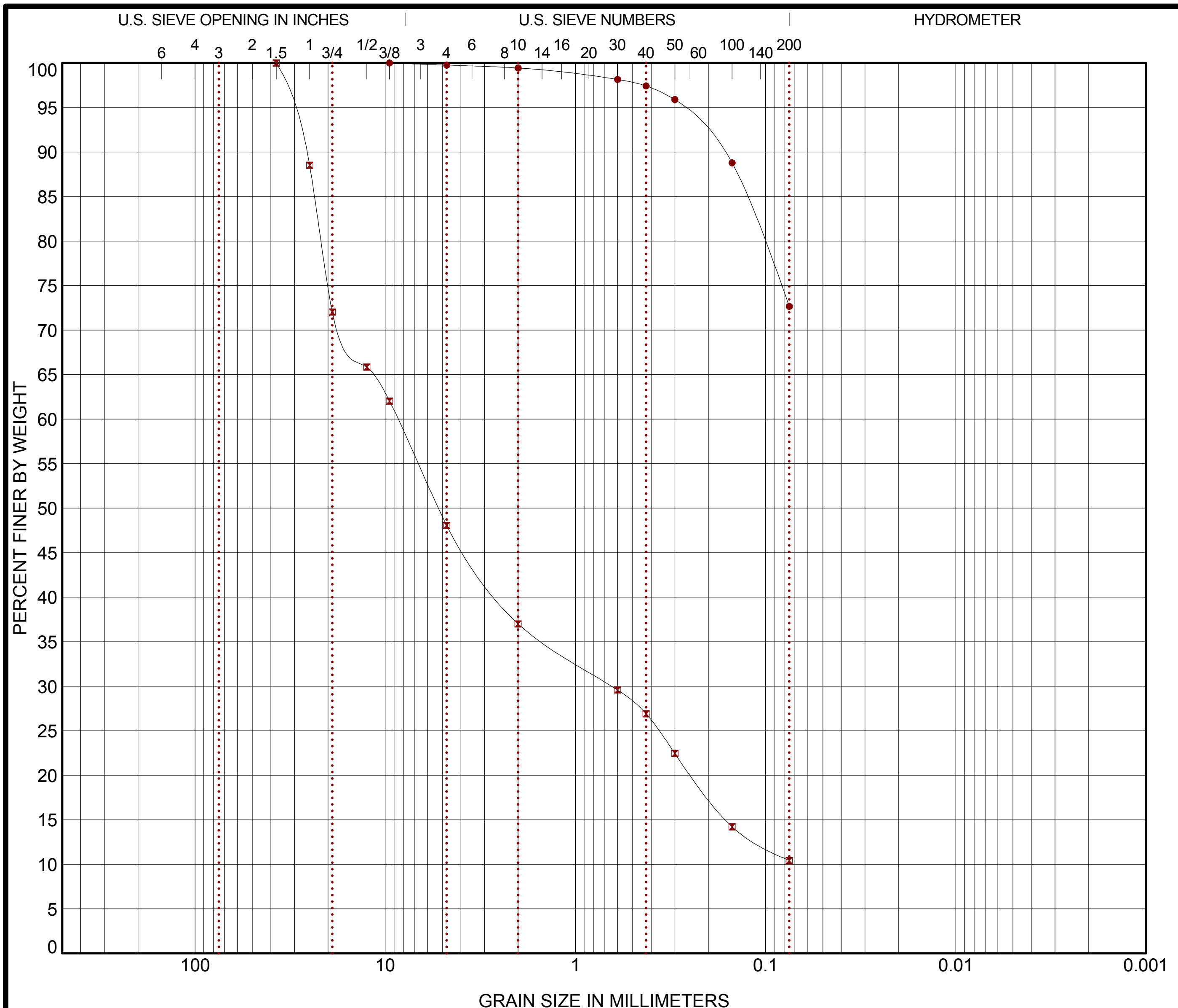
PROJECT NUMBER: 68155025-HAG

CLIENT: CITY OF CARLSBAD
CARLSBAD, NEW MEXICO

EXHIBIT: B-3

GRAIN SIZE DISTRIBUTION

ASTM D422



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Boring ID	Depth	USCS Classification	LL	PL	PI	Cc	Cu
●	B-3	10 - 11.5	LEAN CLAY with SAND(CL)	25	17	8		
⧗	B-3	20 - 21.5	POORLY GRADED GRAVEL with SILT and SAND(GP-GM)	NP	NP	NP	0.69	123.70

	Boring ID	Depth	D_{100}	D_{60}	D_{30}	D_{10}	%Gravel	%Sand	%Silt	%Clay
●	B-3	10 - 11.5	9.5				0.2	27.1	72.7	
⧗	B-3	20 - 21.5	37.5	8.585	0.643		51.9	37.6	10.4	

PROJECT: CARSLBAD LIFT STATIONS

SITE: E. STEVENS STREET
CARLSBAD, NEW MEXICO

Terracon
1640 Hickory Loop, Suite 105
Las Cruces, New Mexico

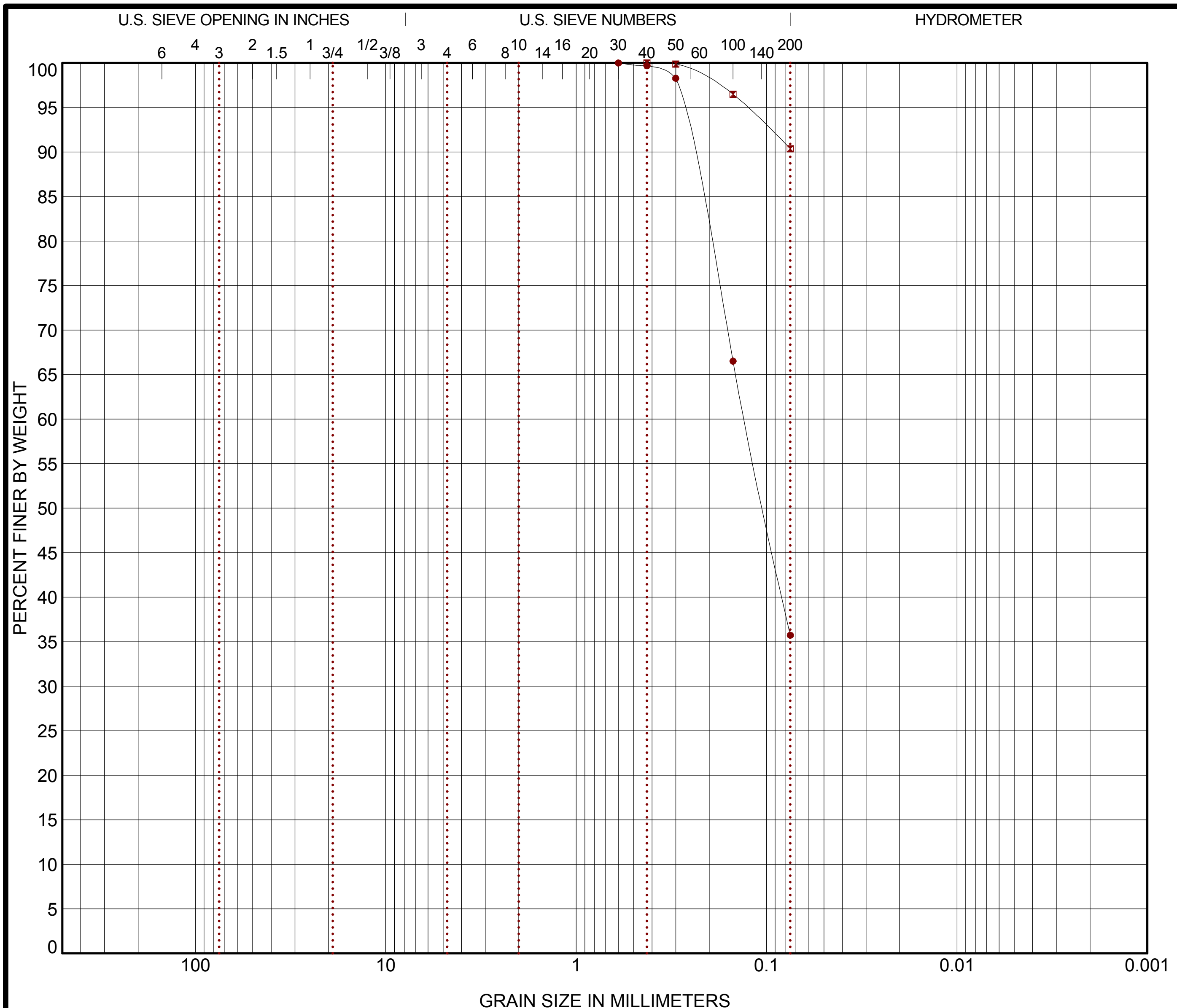
PROJECT NUMBER: 68155025-S

CLIENT: CITY OF CARLSBAD
CARLSBAD, NEW MEXICO

EXHIBIT: B-4

GRAIN SIZE DISTRIBUTION

ASTM D422



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Boring ID	Depth	USCS Classification	LL	PL	PI	Cc	Cu
●	B-4	10 - 11.5	SILTY SAND(SM)	NP	NP	NP		
⧗	B-4	15 - 16.5	LEAN CLAY(CL)	29	17	12		

	Boring ID	Depth	D_{100}	D_{60}	D_{30}	D_{10}	%Gravel	%Sand	%Silt	%Clay
●	B-4	10 - 11.5	0.6	0.13			0.0	64.3	35.7	
⧗	B-4	15 - 16.5	0.425				0.0	9.6	90.4	

PROJECT: CARSLBAD LIFT STATIONS

SITE: BATAAN STREET
CARLSBAD, NEW MEXICO

Terracon
1640 Hickory Loop, Suite 105
Las Cruces, New Mexico

PROJECT NUMBER: 68155025-B

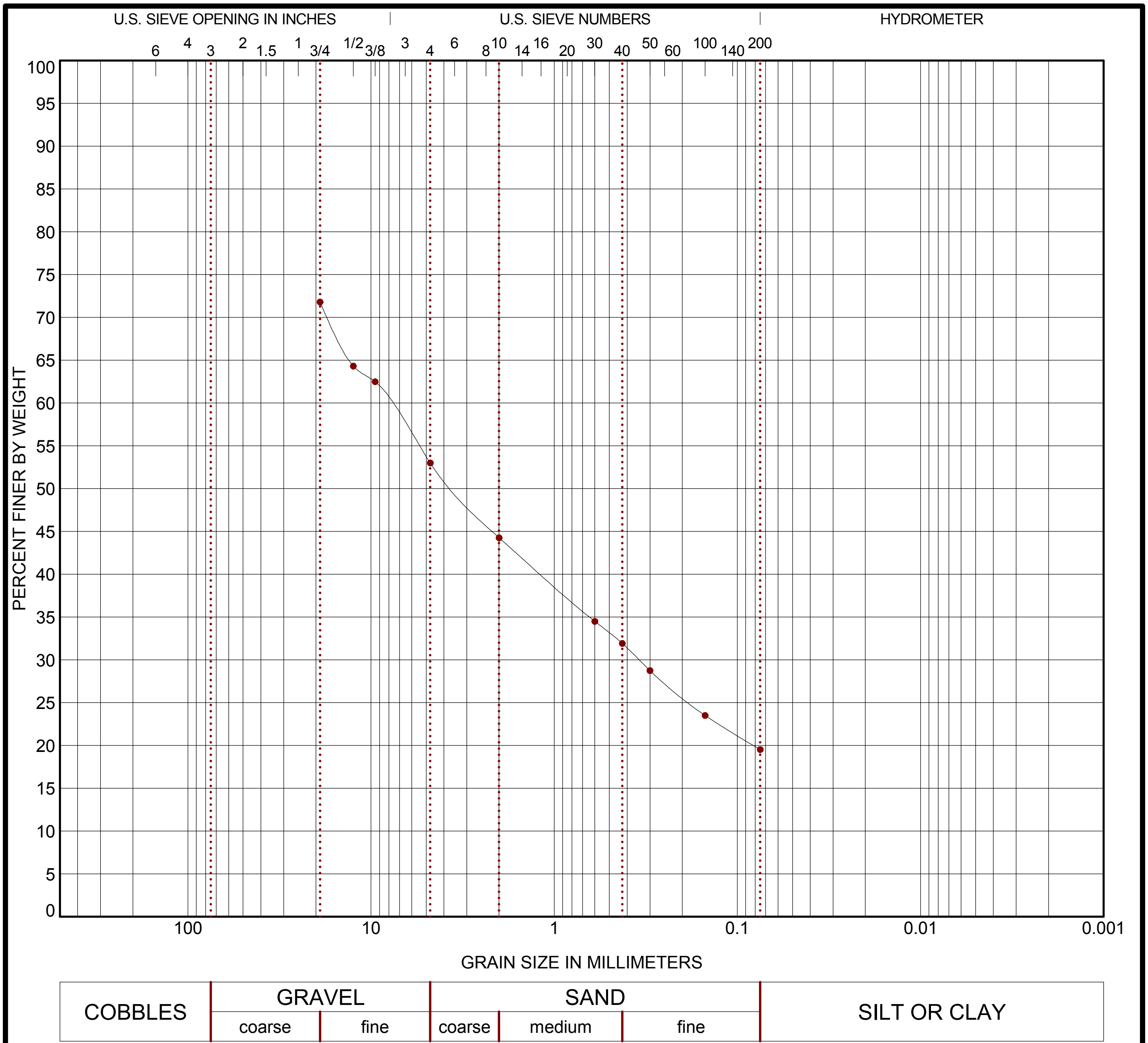
CLIENT: CITY OF CARLSBAD
CARLSBAD, NEW MEXICO

EXHIBIT: B-5

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: USCS-2 68155025-BAATAN.GPJ TERRACON2012.GDT 4/30/15

GRAIN SIZE DISTRIBUTION

ASTM D422



	Boring ID	Depth	USCS Classification	LL	PL	PI	Cc	Cu
●	B-5	2.5 - 4	SILTY GRAVEL with SAND(GM)	NP	NP	NP		

	Boring ID	Depth	D_{100}	D_{60}	D_{30}	D_{10}	%Gravel	%Sand	%Silt	%Clay
●	B-5	2.5 - 4	19	7.923	0.344		18.8	33.5	19.5	

PROJECT: CARSLBAD LIFT STATIONS

SITE: HALL STREET
CARLSBAD, NEW MEXICO

Terracon
1640 Hickory Loop, Suite 105
Las Cruces, New Mexico

PROJECT NUMBER: 68155025-HALL

CLIENT: CITY OF CARLSBAD
CARLSBAD, NEW MEXICO

EXHIBIT: B-6

CHEMICAL LABORATORY TEST REPORT

Project Number: 68155025-P
Service Date: 04/04/15
Report Date: 04/06/15
Task:

Terracon
750 Pilot Road, Suite F
Las Vegas, Nevada 89119
(702) 597-9393

Client

Project

Carlsbad Lift Station - Pate

Sample Submitted By: Terracon (68) **Date Received:** 4/4/2015 Lab No.: 15-0214

Results of Resistivity Analysis

Sample Number	
Sample Location	B-1
Sample Depth (ft.)	2.5
pH Analysis, AWWA 4500 H	9.13
Water Soluble Sulfate (SO4), AWWA 4500 E (mg/kg)	770
Resistivity, ASTM G-57, (ohm-cm)	640

Analyzed By: [signature]
Kurt D. Ergun
Chemist

CHEMICAL LABORATORY TEST REPORT

Project Number: 68155025-H
Service Date: 04/04/15
Report Date: 04/06/15
Task:

Terracon
750 Pilot Road, Suite F
Las Vegas, Nevada 89119
(702) 597-9393

Client

Project

Carlsbad Lift Station - Hagerman

Sample Submitted By: Terracon (68) **Date Received:** 4/4/2015 Lab No.: 15-0214

Results of Resistivity Analysis

Sample Number	
Sample Location	B-1
Sample Depth (ft.)	2.5
pH Analysis, AWWA 4500 H	8.69
Water Soluble Sulfate (SO4), AWWA 4500 E (mg/kg)	3273
Resistivity, ASTM G-57, (ohm-cm)	272

Analyzed By: Kurt D. Ergun

Kurt D. Ergun
Chemist

CHEMICAL LABORATORY TEST REPORT

Project Number: 68155025-S
Service Date: 04/04/15
Report Date: 04/06/15
Task:

750 Pilot Road, Suite F
Las Vegas, Nevada 89119
(702) 597-9393

Client

Project

Carlsbad Lift Station -Stevens

Sample Submitted By: Terracon (68) **Date Received:** 4/4/2015 Lab No.: 15-0214

Results of Resistivity Analysis

Sample Number	
Sample Location	B-1
Sample Depth (ft.)	2.5
pH Analysis, AWWA 4500 H	9.06
Water Soluble Sulfate (SO4), AWWA 4500 E (mg/kg)	303
Resistivity, ASTM G-57, (ohm-cm)	640

Analyzed By:

Kurt D. Ergun
Chemist

CHEMICAL LABORATORY TEST REPORT

Project Number: 68155025-B
Service Date: 04/04/15
Report Date: 04/06/15
Task:

Terracon
750 Pilot Road, Suite F
Las Vegas, Nevada 89119
(702) 597-9393

Client

Project

Carlsbad Lift Station

Bataan Lift Station

Sample Submitted By: Terracon (68) **Date Received:** 4/4/2015 Lab No.: 15-0214

Results of Resistivity Analysis

Sample Number	
Sample Location	B-1
Sample Depth (ft.)	2.5
pH Analysis, AWWA 4500 H	8.45
Water Soluble Sulfate (SO4), AWWA 4500 E (mg/kg)	2063
Resistivity, ASTM G-57, (ohm-cm)	504

Analyzed By: Kurt D. Ergun
Kurt D. Ergun
Chemist

CHEMICAL LABORATORY TEST REPORT

Project Number: 68155025-H
Service Date: 04/04/15
Report Date: 04/06/15
Task:

Terracon
750 Pilot Road, Suite F
Las Vegas, Nevada 89119
(702) 597-9393

Client

Project

Carlsbad Lift Station - Hall

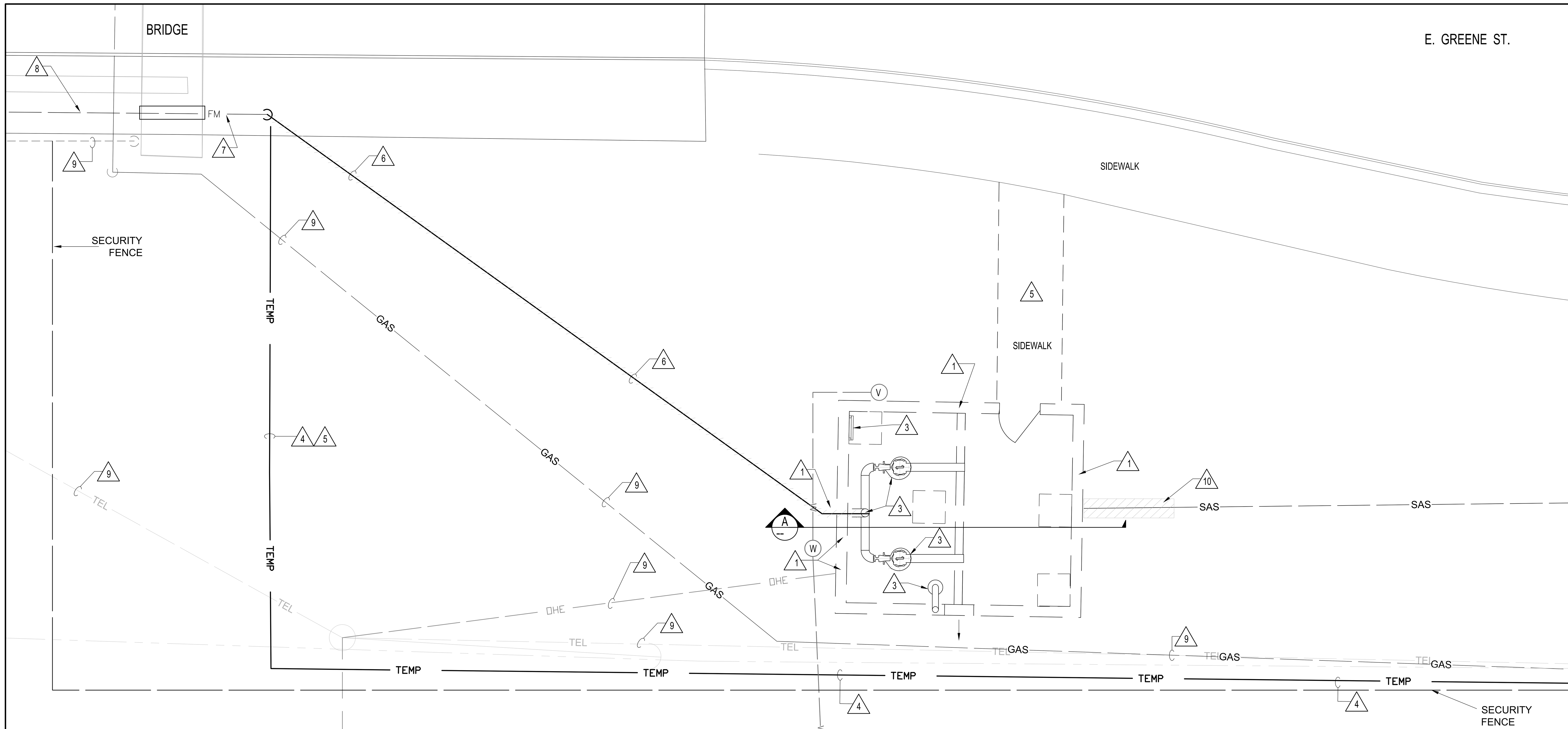
Sample Submitted By: Terracon (68) **Date Received:** 4/4/2015 Lab No.: 15-0214

Results of Resistivity Analysis

Sample Number	
Sample Location	B-1
Sample Depth (ft.)	8.0
pH Analysis, AWWA 4500 H	9.24
Water Soluble Sulfate (SO4), AWWA 4500 E (mg/kg)	91
Resistivity, ASTM G-57, (ohm-cm)	2619

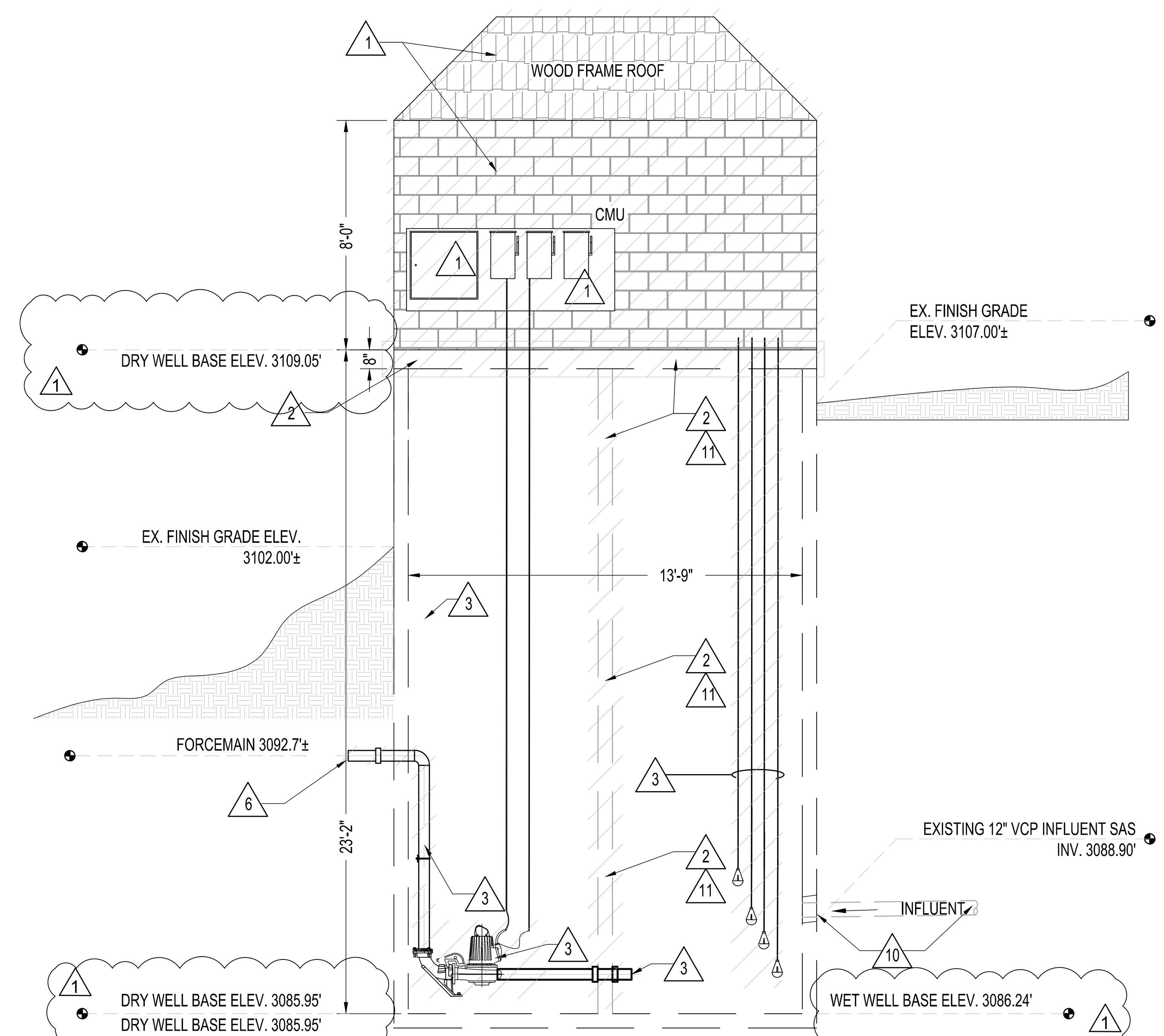
Analyzed By: [signature]

Kurt D. Ergun
Chemist



1 C-500 BATAAN LIFT STATION ENLARGED DEMOLITION PLAN
SCALE: 1/4" =1'

SCALE: 1"=4'



A BATAAN LIFT STATION PROFILE
SCALE: 1/4" =1'

DEMOLITION NOTES

1. EXISTING CMU BLOCK BUILDING TO BE DEMOLISHED. DEMOLISH BUILDING TO THE NEW TOP OF WELL ELEVATION. COORDINATE WITH OTHER DISCIPLINES FOR DEMOLITION.
2. DEMOLISH TOP FLOOR FINISH AND INTERIOR WALL. CONTRACTOR TO INSTALL NEW STRUCTURAL BRACES PER STRUCTURAL DRAWINGS AND INSTRUCTIONS. PROTECT FROM WEATHER AND EXTERNAL ELEMENTS. IN ADDITION, CONTRACTOR TO PROTECT AREA WITH A CHIN LINK FENCE TO AVOID UNWANTED PERSONNEL FALLING INTO VOID SPACE. EXISTING LIFT STATION (VOID SPACE) TO BE USED FOR NEW FRP LIFT STATION AND PRECAST VALVE VAULT.
3. REMOVE ALL PUMPS, VALVES, FLOATS, PIPES, AND ANY OTHER ITEMS ATTACHED TO THE INTERIOR WALLS TO ACCOMMODATE NEW EQUIPMENT.
4. BYPASS 6" FLEX PE PIPE. SEE BYPASS NOTES ON DWG C-400.
5. EXISTING ENTRANCE CONCRETE SIDE WALK TO BE REMOVED.
6. EXISTING UNDERGROUND PORTION OF FORCE MAIN FROM LIFT STATION TO SOUTH EAST BRIDGE ABUTMENT TO BE REMOVED.
7. EXISTING FORCEMAIN PORTION FROM SOUTH EAST ABUTMENT TO DISCHARGE MANHOLE TO BE FLUSHED, CAPPED, AND ABANDONED IN PLACE.
8. EXISTING FORCEMAIN ANCHORS AND BRIDGE DRILLED HOLES TO BE ABANDONED IN PLACE WITH FORCE MAIN.
9. GAS PIPE AND OTHER UTILITIES TO BE PROTECTED DURING CONSTRUCTION - COORDINATE WITH UTILITIES FOR LOCATION BEFORE DIGGING AND FOLLOW UTILITIES PROTECTION STANDARDS.
10. PORTION OF EXISTING INFLUENT SAS LINE TO BE REPLACED. EXISTING INFLUENT PENETRATION INTO THE STATION TO BE REUSED - COORDINATE WITH NEW WORK.
11. SEE DEMOLITION SEQUENCE ON STRUCTURAL DRAWINGS S-200.

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

ENGINEER'S SEAL
MATTHEW R. THOMPSON
NEW MEXICO
13868
REGISTERED PROFESSIONAL ENGINEER
11-5-2021

AS-BUILT INFORMATION

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

BENCH MARKS

NO.	DATE	REMARKS	BY
1	11-05-21	ADDENDUM 1	

DESIGNED BY JCS	REVISIONS	DATE 1/7/2021
DRAWN BY JCS	DESIGN	DATE 1/7/2021
CHECKED BY MRT		DATE 1/7/2021

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

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CARLSBAD

CITY OF CARLSBAD
BATAAN LIFT STATION RENOVATION
BATAAN LIFT STATION DEMOLITION PLAN

BHI PROJECT NO.	DWG NO.	SHEET	OF
20210255	C-500R	07	29

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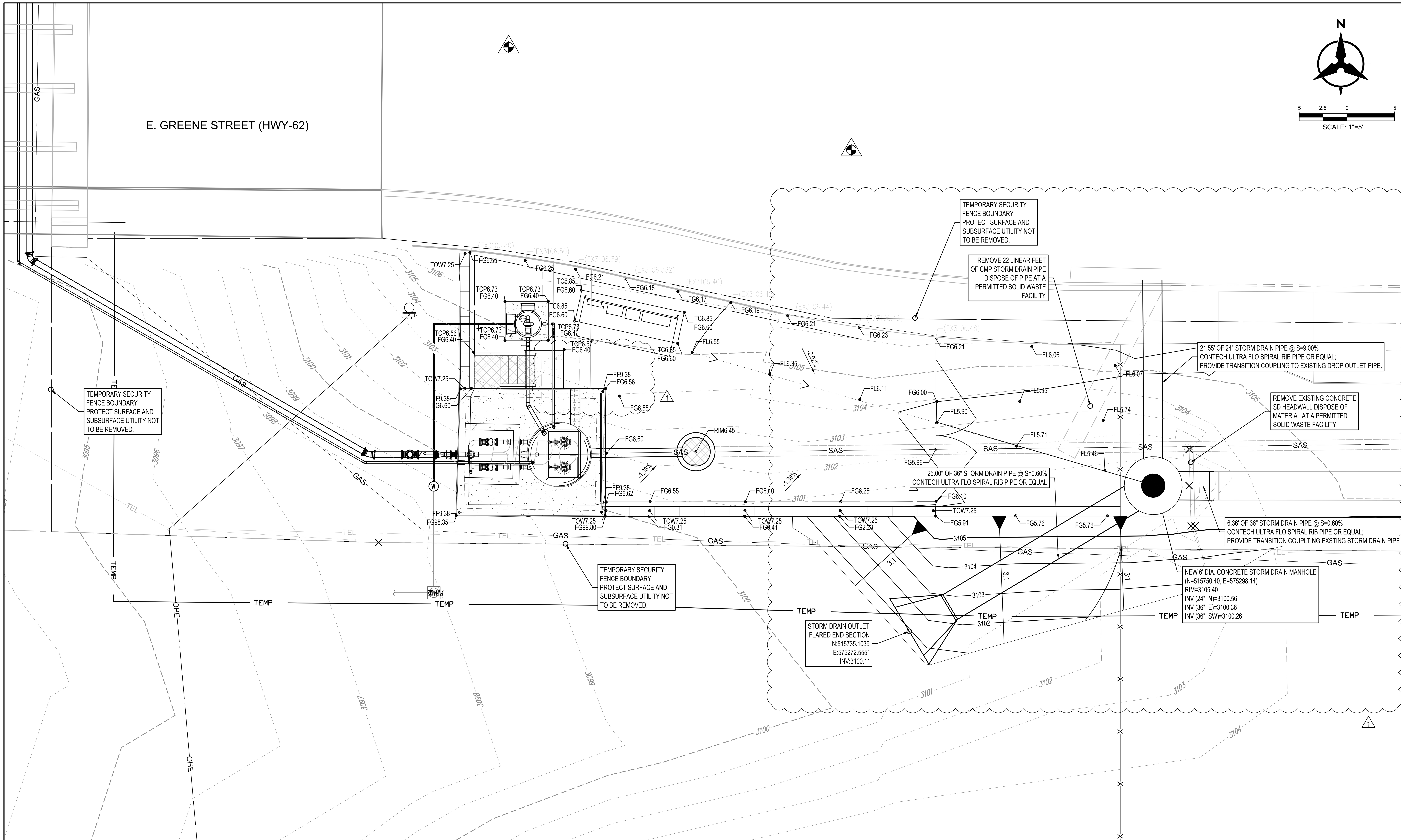

1 GRADING AND DRAINAGE PLAN
SCALE: 1" =5'

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MATTHEW R. THOMPSON
NEW MEXICO
13868
REGISTERED PROFESSIONAL ENGINEER
11-5-2021

AS-BUILT INFORMATION

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

BENCH MARKS

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BATAAN LIFT STATION GRADING PLAN

BHI PROJECT NO.	DWG NO.	SHEET	OF
20210255	C-800R	10	29

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

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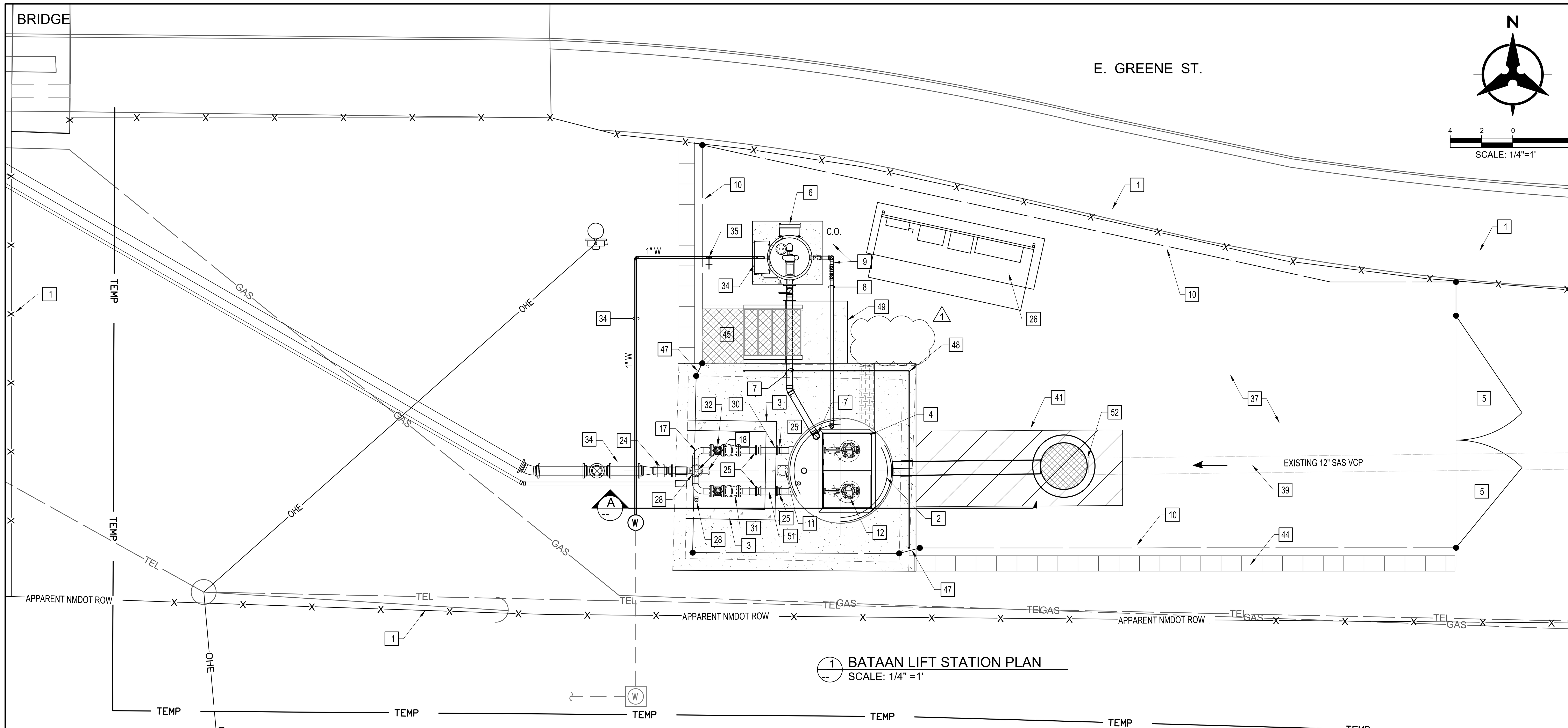
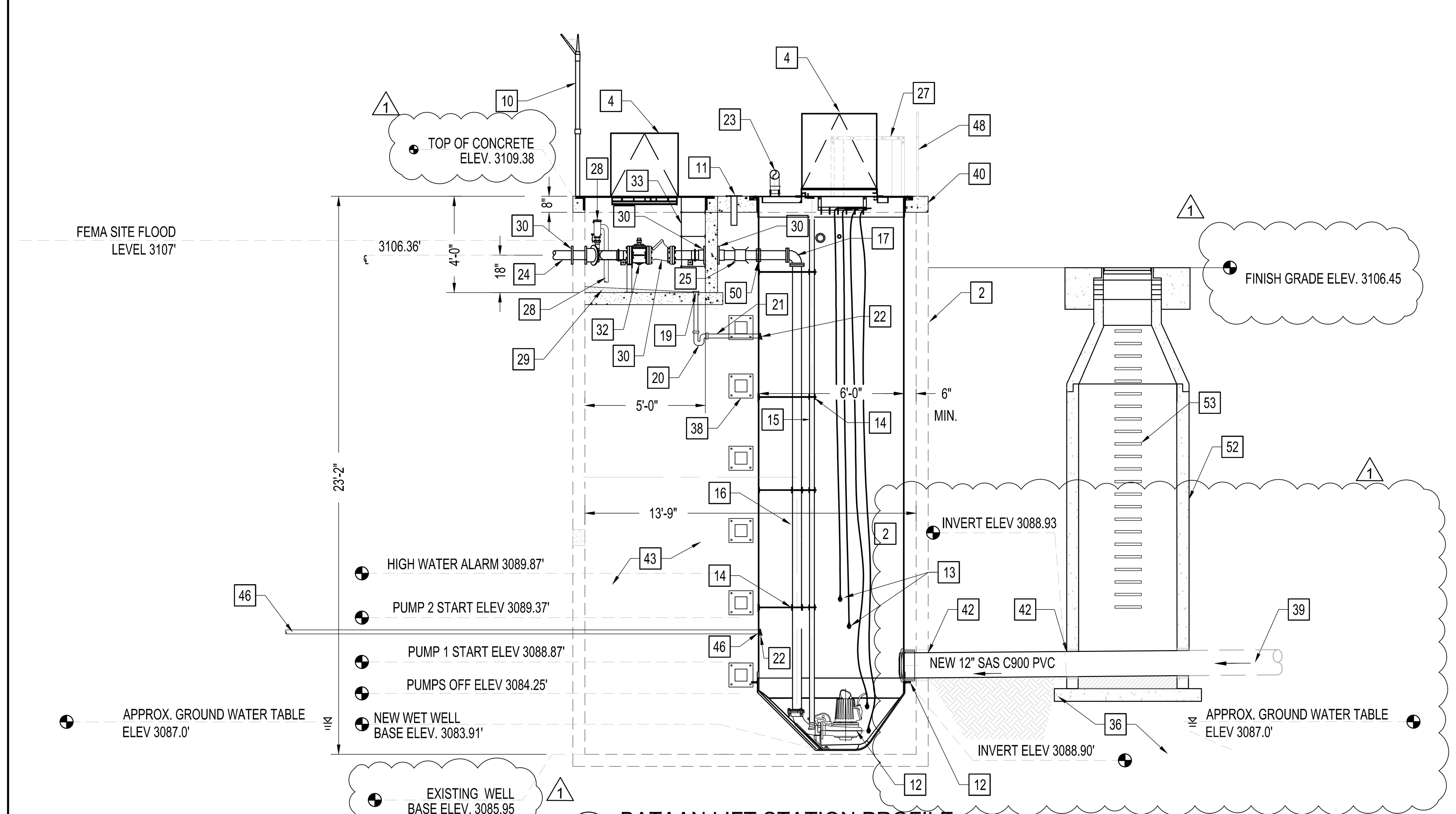


1 BATAAN LIFT STATION PLAN
SCALE: 1/4" =1'



A BATAAN LIFT STATION PROFILE
SCALE: 1/4" =1'

CONSTRUCTION NOTES

1. CONTRACTOR TO PROTECT CONSTRUCTION SITE AND TEMPORARY BYPASS PIPE AT ALL TIMES WITH AN 8' HIGH CONSTRUCTION FENCE WITHIN PROPERTY LIMITS.
2. INSTALL NEW 6' DIAMETER FIBERGLASS PREFABRICATED WET WELL INSTALLED INSIDE EXISTING CONCRETE LIFT STATION, SEE SPEC. 02601 AND STRUCTURAL DRAWINGS.
3. NEW 5' SQUARE CAST IN PLACE CONCRETE VALVE VAULT, SEE SPEC. 03300 AND STRUCTURAL DRAWINGS.
4. NEW WET WELL AND VALVE VAULT ACCESS HATCHES. SEE SPECIFICATION 11310. SEE STRUCTURAL DRAWINGS FOR MINIMUM CLEAR OPENING SIZES. PROVIDE "SAFE HATCH" GRATING WITH WET WELL ACCESS HATCH.
5. NEW 16' WIDE VEHICLE ACCESS GATE. SEE DETAIL 1 DWG C-1100.
6. NEW ODOR CONTROL SYSTEM, INTEGRITY MUNICIPAL SYSTEM I-BOX® 30, OR ENGINEER APPROVED EQUAL. SEE DETAIL 3 DWG C-1100 AND SPEC. 11258.
7. NEW 4" DIAMETER SCH 80 PVC FOUL GAS VENTILATION PIPING INSTALLED AT 3% SLOPE TOWARD STATION. CONTRACTOR SHALL PROVIDE ALL NECESSARY PVC FITTINGS FOR PIPING CONNECTION FROM WET WELL TO ODOR CONTROL UNIT. CONTRACTOR SHALL CORE EXISTING CONCRETE WALL AS NECESSARY
8. NEW 2" DIAMETER PVC ODOR CONTROL UNIT DRAIN LINE INSTALLED AT 3% SLOPE TOWARD MANHOLE. SEE PLAN VIEW FOR CORRECT ORIENTATION. CONTRACTOR SHALL PROVIDE ALL NECESSARY PVC FITTINGS FOR PIPING CONNECTION FROM WET WELL TO ODOR CONTROL UNIT.
9. INSTALL A NEW 2" SCH 80 PVC P-TRAP WITH PVC TEE AND CLEAN OUT. SEE DETAIL 4 DWG C-1100.
10. INSTALL 6' HIGH CHAIN LINK SECURITY FENCE WITH 3-STRAND BARBED WIRE TOP. SEE DETAIL 6, DWG C-1100.
11. CAST-IN-PLACE, STAINLESS STEEL EMBED SOCKET BASE FOR PORTABLE DAVIT CRANE WITH REMOVABLE, MANUFACTURER PROVIDED, COVER PLATE. PROVIDE DAVIT CRANE WITH ELECTRIC WINCH PER SPEC. 11310. FIELD LOCATE SO CRANE REACHES PUMPS.
12. TWO FLYGT SUBMERSIBLE PUMPS WITH MIX FLUSH VALVES, DISCHARGE BASES STAINLESS STEEL ANCHOR BOLTS PER MANUFACTURER'S RECOMMENDATION. SEE SCHEDULE, SPEC. 11310.
13. NEW FLOAT WATER LEVEL CONTROLLERS. PROVIDE TOTAL OF FOUR FLOATS. SET FLOATS TO ELEVATIONS SHOWN ON DRAWING. SEE SPECIFICATION 11310.
14. PROVIDE INTERMEDIATE STAINLESS STEEL BRACKET SUPPORT PER PUMP MANUFACTURER'S RECOMMENDATIONS.
15. INSTALL 2" DIAMETER STAINLESS STEEL, SCHEDULE 40 PIPE FOR PUMP RETRIEVAL GUIDE (TYPICAL 2 PER PUMP) AND PIPE TERMINATION BRACKETS TO UPPER LID NUT RAIL.
16. 4" DIAMETER, STAINLESS STEEL PIPE SPOOL WITH WELDED FLANGES.
17. 4" DIAMETER, STAINLESS STEEL 90° BEND, FLxFL WITH STAINLESS STEEL BOLTS.
18. INSTALL A 4" DIAMETER, STAINLESS STEEL CROSS WELDED WITH A 1' LONG FLANGED 4" SST PIPE SPOOL WITH BLIND FLANGE FOR CLEAN OUT CONNECTION.
19. INSTALL A 2" DIAMETER SST FLOOR DRAIN, CAST-IN-PLACE THROUGH VALVE VAULT FLOOR.
20. INSTALL A 2" DIAMETER PVC DWV P-TRAP.
21. INSTALL A 2" DIAMETER PVC DWV SCH. 40 PIPE SPOOL.
22. INSTALL A 2" DIAMETER PVC BACKWATER VALVE.
23. 4" DIAMETER, SCH. 10 STAINLESS STEEL AIR VENT, WELDED GOOSENECK WITH STAINLESS STEEL INSECT SCREEN WELDED TO OUTLET, CONSTRUCTED INTEGRAL TO WET WELL LID.
24. INSTALL EPOXY LINED DI FORCE MAIN - SEE DRAWING C-600 FOR FORCE MAIN DETAIL AND PROFILE. ALL FITTINGS SHALL BE RESTRAINED.
25. INSTALL 4" MECHANICAL COMPRESSION COUPLING WITH RESTRAINT.
26. NEW PUMP CONTROL PANEL WITH STAINLESS STEEL SHADE AND ELECTRIC SERVICE. SEE ELECTRICAL SHEETS FOR DETAILS.
27. NOT USED. (1)
28. INSTALL NEW AIR RELEASE VALVE ON TOP OF SST CROSS INSIDE VAULT VALVE. DIRECT A NEW 1" DIAMETER PVC AIR DRAIN LINE TO DISCHARGE DIRECTLY TO THE VAULT VALVE FLOOR. CONTRACTOR SHALL PROVIDE ALL NECESSARY PVC FITTINGS TO COMPLETE PIPE CONNECTIONS.
29. GROUT VALVE VAULT FLOOR TO SLOPE TO DRAIN.
30. INSTALL MECHANICAL LINK-SEAL PIPE SEAL COUPLING THROUGH CONCRETE WALL. SEE SPEC. TYPICAL ALL PIPE PENETRATIONS THROUGH CONCRETE.
31. 4" DIAMETER FLYGT BALL CHECK VALVE, EPOXY COATED BODY WITH STAINLESS STEEL BOLTS. SEE SPEC. 15111.
32. 4" DIAMETER RESILIENT WEDGE SEWAGE RATED ECCENTRIC PLUG VALVE WITH SQUARE OPERATOR, EPOXY COATED WITH STAINLESS STEEL BOLTS. SEE SPEC. 15100.
33. INSTALL NEW ALUMINUM LADDER FOR VALVE VAULT.
34. INTERCEPT EXISTING WATER SERVICE AND EXTEND A NEW 1" DIAMETER PVC WATER SERVICE LINE, WITH 24" OF COVER, FOR ODOR CONTROL EQUIPMENT AND HOSE BIB.
35. INSTALL NEW 1" FROST PROOF YARD HYDRANT. SEE DETAIL 8 DWG C-1200.
36. COMPACTED SUBGRADE TO ACHIEVE 90% OF ASTM D-1557 DENSITY, SEE STRUCTURAL DRAWINGS AND DETAILS.
37. NEW BASE COURSE SURFACE WITHIN CHAINLINK FENCE, SEE GRADING PLAN DWG C-800.
38. RETAIN STEEL BRACKETS FROM INTERIOR DEMOLITION, SEE STRUCTURAL DRAWINGS FOR INSTALLATION SEQUENCE AND DETAILS.
39. EXISTING 12"Ø GRAVITY SAS VITRIFIED CLAY PIPE - ESTIMATED SLOPE OF 0.3%. (1)
40. INSTALL NEW 8" CONCRETE LIFT STATION LID PER STRUCTURAL DRAWINGS.
41. DIG A NEW 5' WIDE TRENCH MINIMUM AND SHORE AS NECESSARY TO EXPOSE EXISTING 12"Ø SAS VCP; CUT PIPE AND CREATE A NEW POINT OF CONNECTION FOR NEW PVC SAS PIPE THROUGH EXISTING CONCRETE WALL.
42. INSTALL NEW 12"Ø DWV SAS PVC PIPE - ROUTE PIPE THROUGH EXISTING OR ENLARGED CONCRETE PENETRATION AND MADE PROPER WATER TIGHT CONNECTIONS TO NEW FRP WET WELL AND MANHOLE. IN ADDITION, GROUT STATION'S AND MANHOLE CONCRETE PIPE PENETRATION. TEST CONNECTIONS, BACKFILL AND COMPACT TO GRADE.
43. FILL STATION'S VOID SPACE WITH LIGHT CONCRETE FILL PER STRUCTURAL DRAWINGS.
44. NEW 12" CAST RETAINING CONCRETE WALL. SEE STRUCTURAL DRAWINGS.
45. NEW ALUMINUM FABRICATED APPROACH STAIRWAY WITH HANDRAILS.
46. AIR VALVE 2" DWC PVC DRAIN PIPE FROM FORCEMAIN AIR RELEASE AIR VALVE LOCATED AT NORTH EAST OF BRIDGE. DRAIN PIPE ROUTE AT 1% SLOPE WITH AN APPROXIMATE INVERT OF 3090.60' AT THE WET WELL. SEE DRAWING C-700 FOR ADDITIONAL INFORMATION.
47. TRANSITION CHAINLINK FENCE ON SINGLE POST FOR 36" GRADE SEPARATION.
48. INSTALL 42" HIGH REMOVABLE ALUMINUM SAFETY HANDRAIL WITH FOOTPLATE ATTACHMENTS ANCHORED TO LID WITH EPOXY SET SST ANCHOR BOLTS.
49. INSTALL 4x 4'x 4" THICK CONCRETE LANDING PAD WITH 10x10x10 WWM REINFORCEMENT AND CHAMFERED EDGES AT FINISHED GRADE.
50. INSTALL WATER TIGHT FIBERGLASS-TO-PIPE TRANSITION COUPLING PER MANUFACTURER INSTRUCTIONS.
51. CONCRETE CAST-IN-PLACE PIPE SPOOL PROVIDED BY CONTRACTOR.
52. INSTALL MANHOLE PER DETAIL 5 DETAIL C3. CONTRACTOR TO PLAN FOR DE-WATERING.
53. INSTALL MANHOLE LADDER PER DETAIL 6 C3. CONTRACTOR TO EPOXY ANCHOR BOLTS INTO HANHOLE

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MATTHEW R. THOMPSON
NEW MEXICO
13868
REGISTERED PROFESSIONAL ENGINEER
11-5-2021

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BATAAN LIFT STATION PLAN AND PROFILE

BHI PROJECT NO.	DWG NO.	SHEET	OF
20210255	C-900R	11	29

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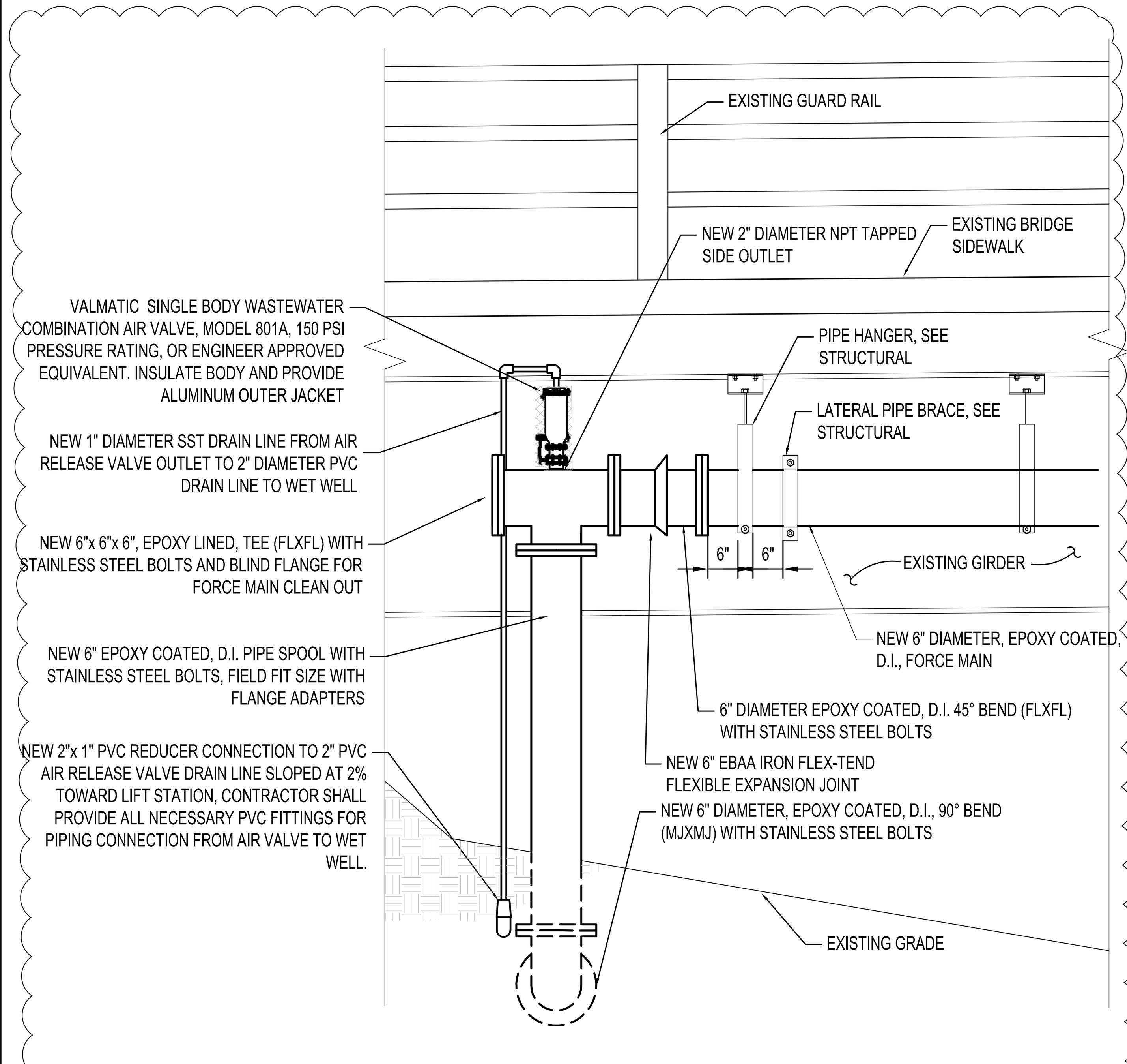
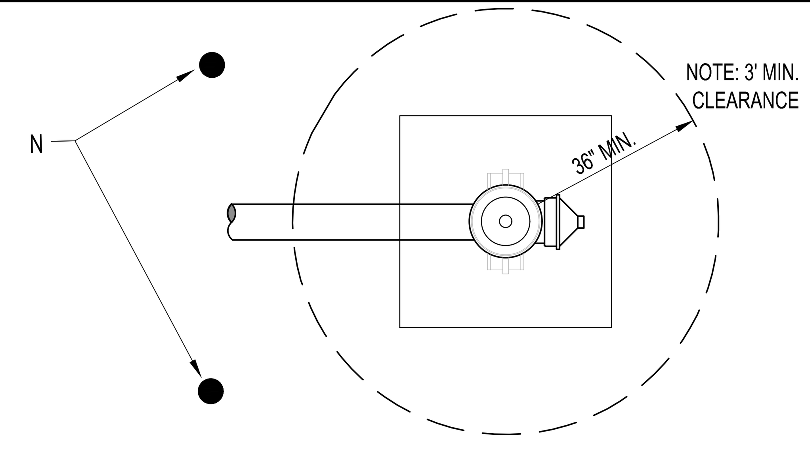
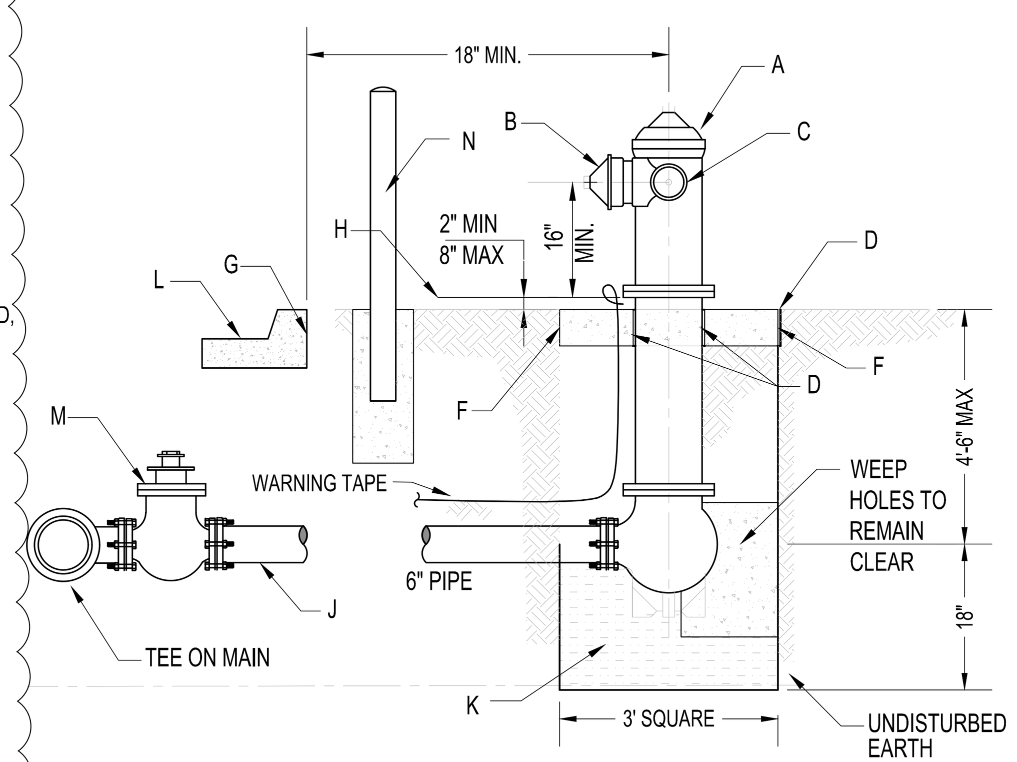


1 AIR RELEASE VALVE/FORCE MAIN CONNECTION DETAIL
SCALE: 1/2" = 1'-0"



FIRE HYDRANT PLAN



FIRE HYDRANT PROFILE

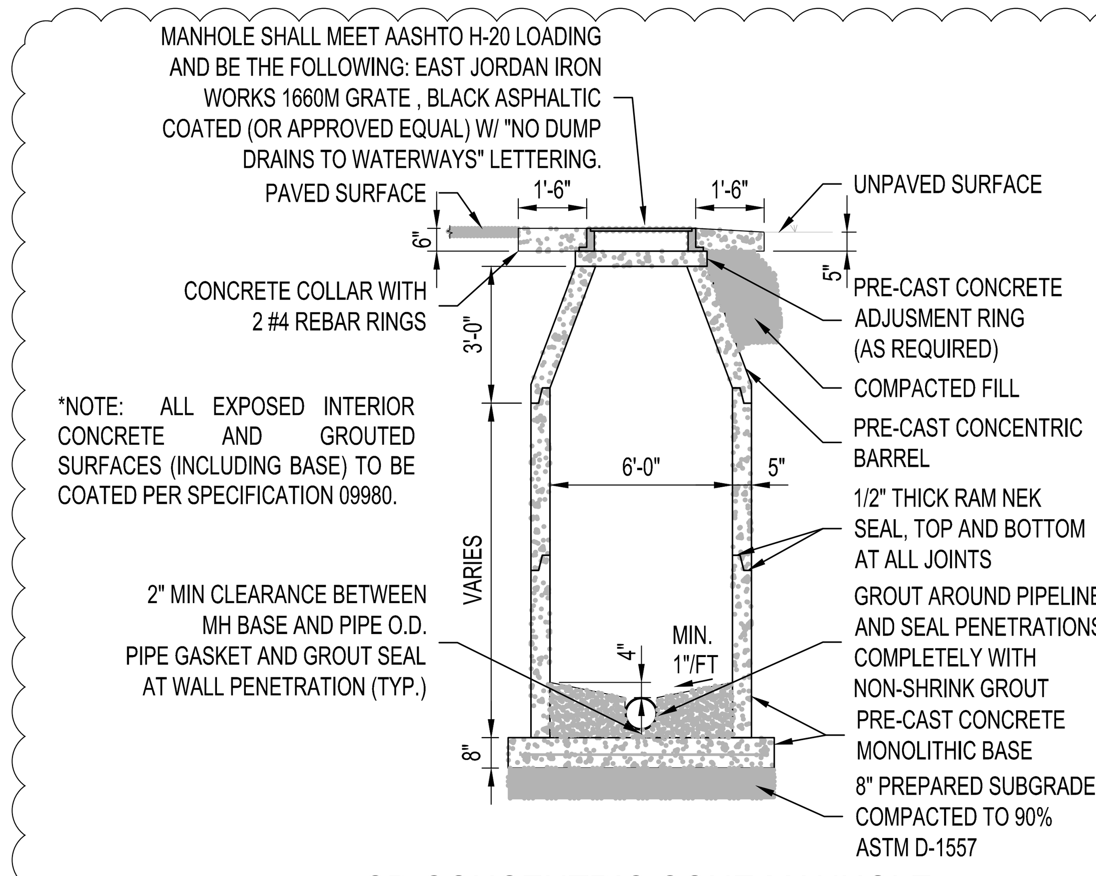
2 FIRE HYDRANT DETAIL
NOT TO SCALE

GENERAL NOTES:

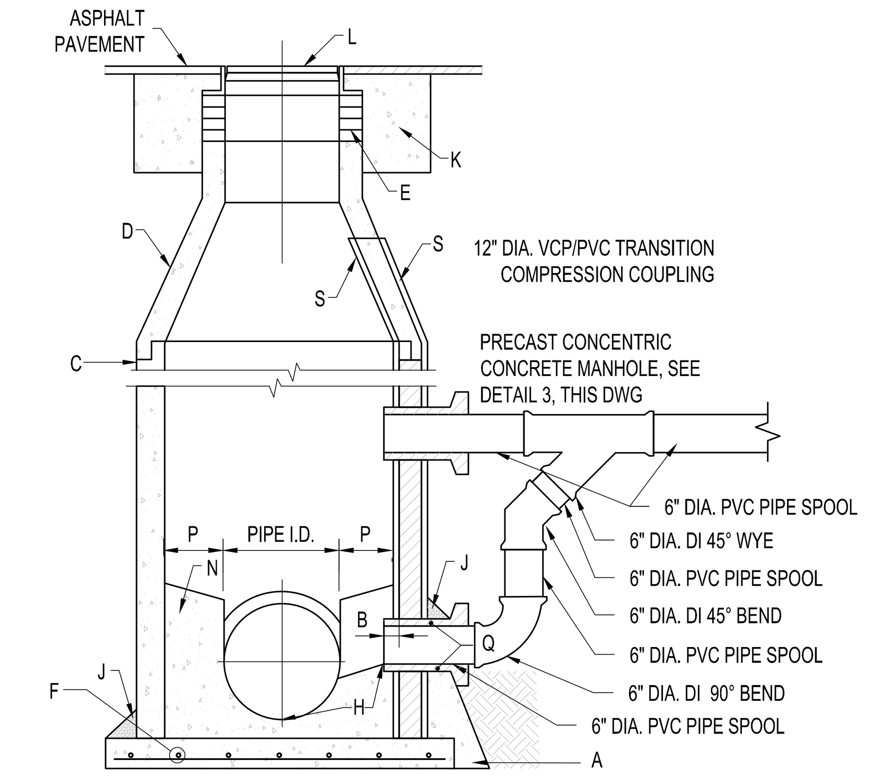
1. NO OBSTRUCTIONS WILL BE PERMITTED WITHIN 3'-0" OF FIRE HYDRANT.
2. HYDRANT LEG SHALL BE VALVED, IN ARTERIAL STREETS LOCATED IN COMMERCIAL AREAS.
3. CONTRACTOR SHALL BE RESPONSIBLE FOR SETTING TOP OF FIRE HYDRANT TO THE CONTROLLED ELEVATION LINE.
4. SEE PLANS FOR THE HYDRANT LOCATION.
5. WHEN NEW OR EXISTING SIDEWALK ABUTS CURB, RECONSTRUCT SIDEWALK TO MATCH EXISTING.
6. PUMPER NOZZLE TO BE SET FACING THE TRAVELED WAY, UNLESS OTHERWISE NOTED ON PLANS.
7. HYDRANT INSTALLED IN SIDEWALK AREAS SHALL MAINTAIN A MIN. 36-INCH CLEAR PEDESTRIAN PATH PER ASA STANDARDS.

CONSTRUCTION NOTES:

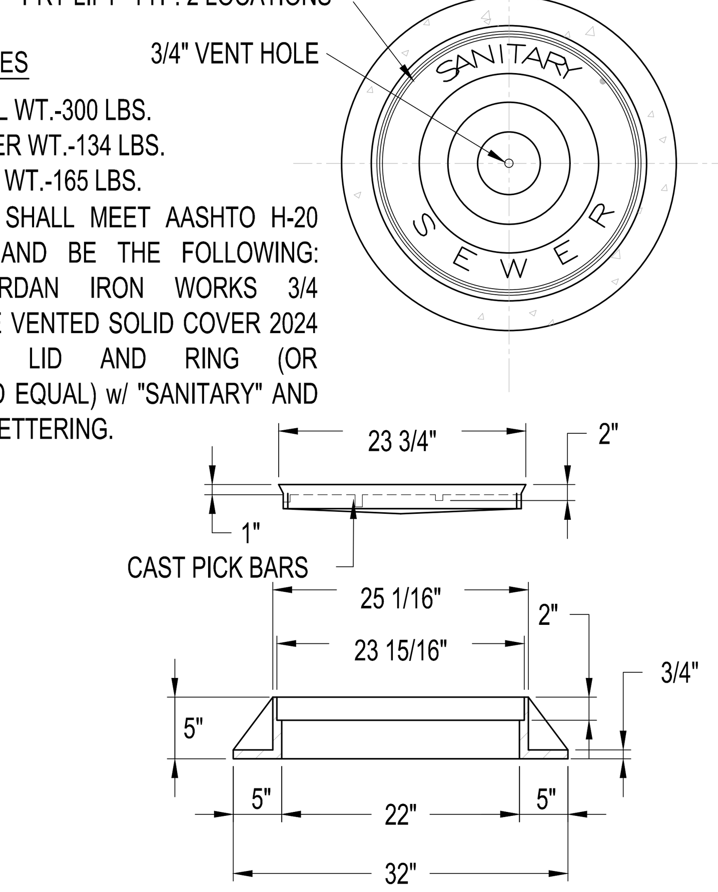
A. FIRE HYDRANT PER SPECIFICATIONS AND PAINTED "CHROME YELLOW"
B. PUMPER NOZZLE, 4-1/2"
C. HOSE NOZZLE, 2-1/2"
D. 1/2" EXPANSION MATERIAL
E. MATCH SIDEWALK SLOPE OR SLOPE 1/4" PER FT.
F. 3'x3'x6" CONCRETE SQUARE PAD, TO BE CONSTRUCTED AROUND FIRE HYDRANT'S CENTER LINE WHEN NOT LOCATED WITHIN SIDEWALK OR CONCRETE AREA. CONCRETE PER SEC. 003300 EXTERIOR CONCRETE, 4000 PSI @ 28 DAYS.
G. BACK OF CURB
H. CONTROLLED ELEVATION LINE, LEVEL IN ALL DIRECTIONS
J. USE OF RESTRAINED JOINTS IS MANDATORY. ALL FIRE HYDRANT LEG PIPING AND FITTINGS INCLUDING TEE ON MAIN SHALL BE RESTRAINED JOINTS.
K. GRAVEL DRAIN POCKET, COVER TOP SURFACE WITH TAR PAPER, ASTM C33, NO 57 GRAVEL.
L. STANDARD CURB AND GUTTER, FOR OTHER TYPES OF G AND G, OR WHERE C AND G ARE EXISTING, PLACEMENT OF HYDRANT REQUIRES SPECIAL DESIGN.
M. A VALVE REQUIRED, VALVE WILL BE CONNECTED AT TEE AT MAIN.
N. 6" STEEL PIPE BOLLARDS, SEE DETAIL 6, DWG D-C1.



8 SD CONCENTRIC CONE MANHOLE
NOT TO SCALE



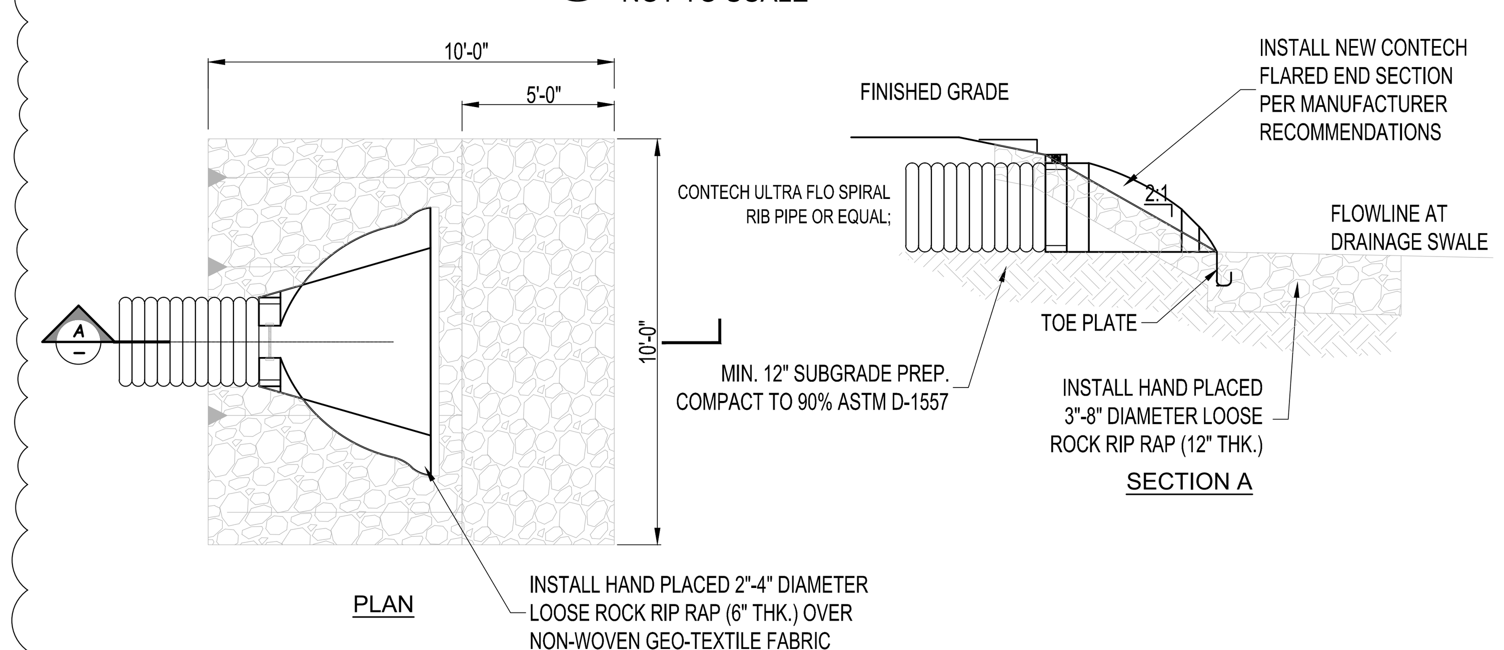
4 DROP INLET MANHOLE CONNECTION DETAIL
NOT TO SCALE



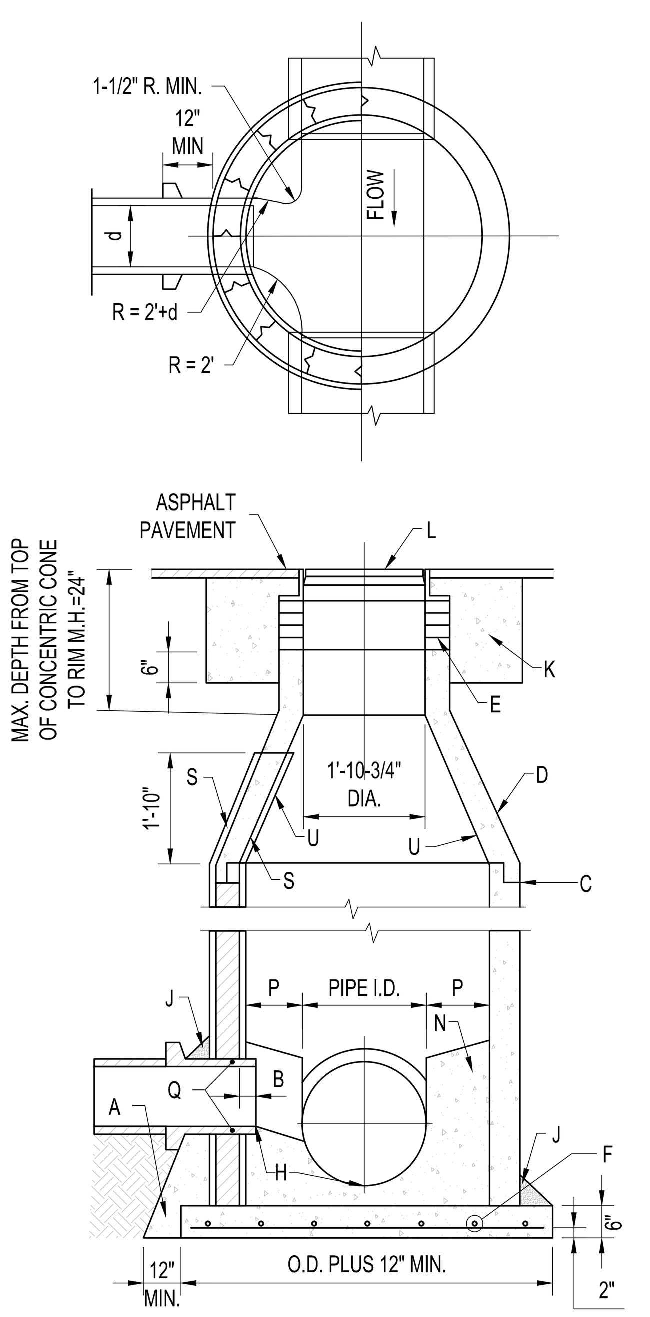
NOTES

MIN TOTAL WT.-300 LBS.
MIN. COVER WT.-134 LBS.
MIN. RING WT.-165 LBS.
MANHOLE SHALL MEET AASHTO H-20 LOADING AND BE THE FOLLOWING: EAST JORDAN IRON WORKS 3/4 INCH-HOLE VENTED SOLID COVER 2024 MANHOLE LID AND RING (OR APPROVED EQUAL) w/ "SANITARY" AND "SEWER" LETTERING.

7 MANHOLE RIM AND COVER DETAIL
NOT TO SCALE



8 CULVERT END SECTION DETAIL
NOT TO SCALE



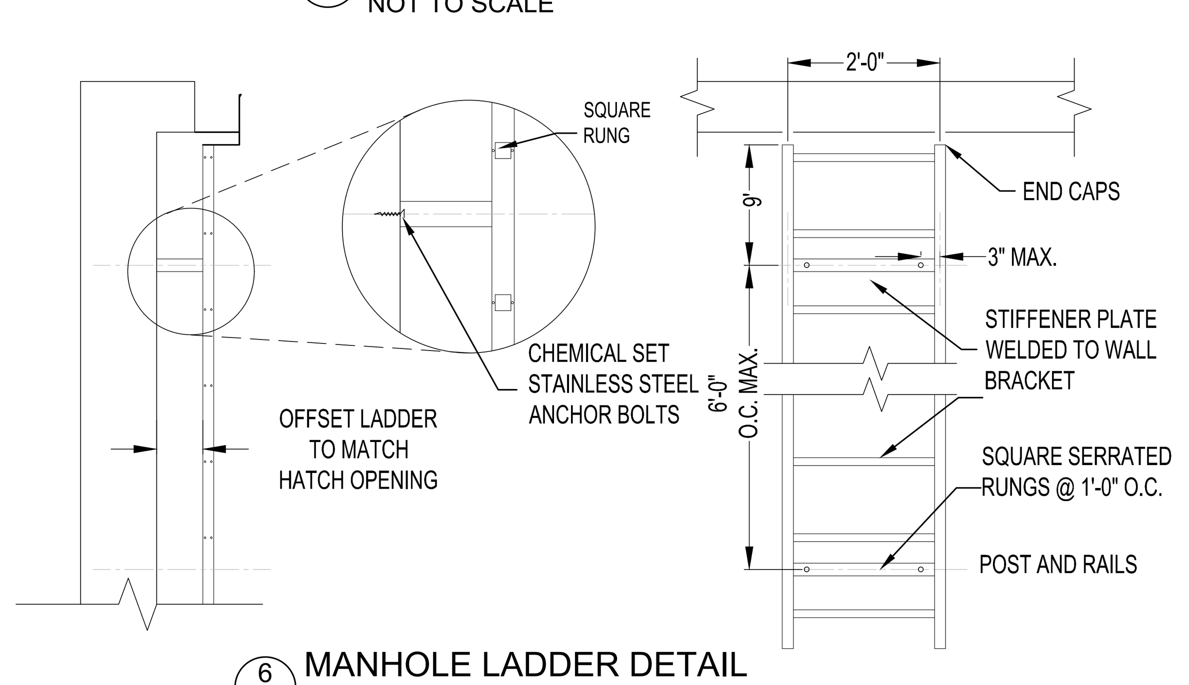
GENERAL NOTES:

1. TYPE E M.H. NOT TO BE USED FOR DEPTHS LESS THAN 6'-0" MEASURED FROM INV. TO RIM.
2. M.H. GREATER THAN 18'-0" IN DEPTH SHALL BE OF PRECAST CONCRETE SECTIONS ONLY.
3. DESIGN APPLIES TO 4'-0" AND 6'-0" I.D. MANHOLES.
4. USE NON-SHRINK GROUT FOR JOINTS, FILLETS AND PIPE PENETRATIONS.
5. COMPACT ALL BACKFILL AROUND M.H. TO 95%.
6. POSITION M.H. OPENING OVER THE UPSTREAM SIDE OF MAIN LINE.

CONSTRUCTION NOTES:

A. CONCRETE PIPE SUPPORTS SHALL EXTEND OUTSIDE OF M.H. TO BELL OF FIRST JOINT AND SHALL CRADLE PIPE TO SPRING LINE.
B. PIPE PENETRATION INTO MANHOLE SHALL BE FLUSH TO 2" MAX. MEASURED AT SPRING LINE OF PIPE.
C. EXTRUDED SEALING TAPE AT ALL JOINTS (1/2" THICK RAM NECK OR EQUAL, TYPICAL AT TOP AND BOTTOM AND ALL JOINTS.
D. PRE-CAST CONCRETE MANHOLE.
E. USE MAX. OF 4 COURSES GR. MS BRICK ON UNPAVED STREET FOR FUTURE ADJ. OF FRAME TO PAVEMENT GRADE. PLASTER INSIDE WITH 1/2" MORTAR.
F. BASE TO BE POURED IN PLACE USING #4 BARS AT 6" O.C. EA. WAY FOR M.H. DEPTH OF 16'-0" OR GREATER. #4 BARS AT 12" O.C. EA. WAY FOR M.H. LESS THAN 16' DEEP.
H. INV. ELEV OF STUB OR LATERAL AS SHOWN ON PLANS.
J. 6" GROUT FILLET ON UPPER HALF OF PIPE AND AROUND BASE.
K. USE 5' x 5' CONCRETE PAD IN ALL AREAS.
L. M.H. FRAME AND COVER, SEE DETAIL.
M. CONCRETE FILL, 3000 PSI
N. SLOPE 1" PER FT. FROM PIPE CROWN
P. SHELF TO BE 9" WIDE MIN.
Q. APPROVED WATERSTOP TO BE WITH TYPE OF PIPE. CONCRETE GROUT PENETRATION TO SEAL AS REQUIRED.
S. EMO (IN PAVED AREAS)
T. IN UNPAVED AREA SET FRAME TO GRADE AND SLOPE TOP OF PAD.
U. EPOXY LINER ON ALL EXPOSED SURFACES.

5 SAS STANDARD CONCENTRIC CONE MANHOLE DETAIL
NOT TO SCALE



6 MANHOLE LADDER DETAIL
NOT TO SCALE

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AS-BUILT INFORMATION

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CIVIL DETAILS 3

BHI PROJECT NO.	DWG NO.	SHEET	OF
20210255	C-1400R	16	29

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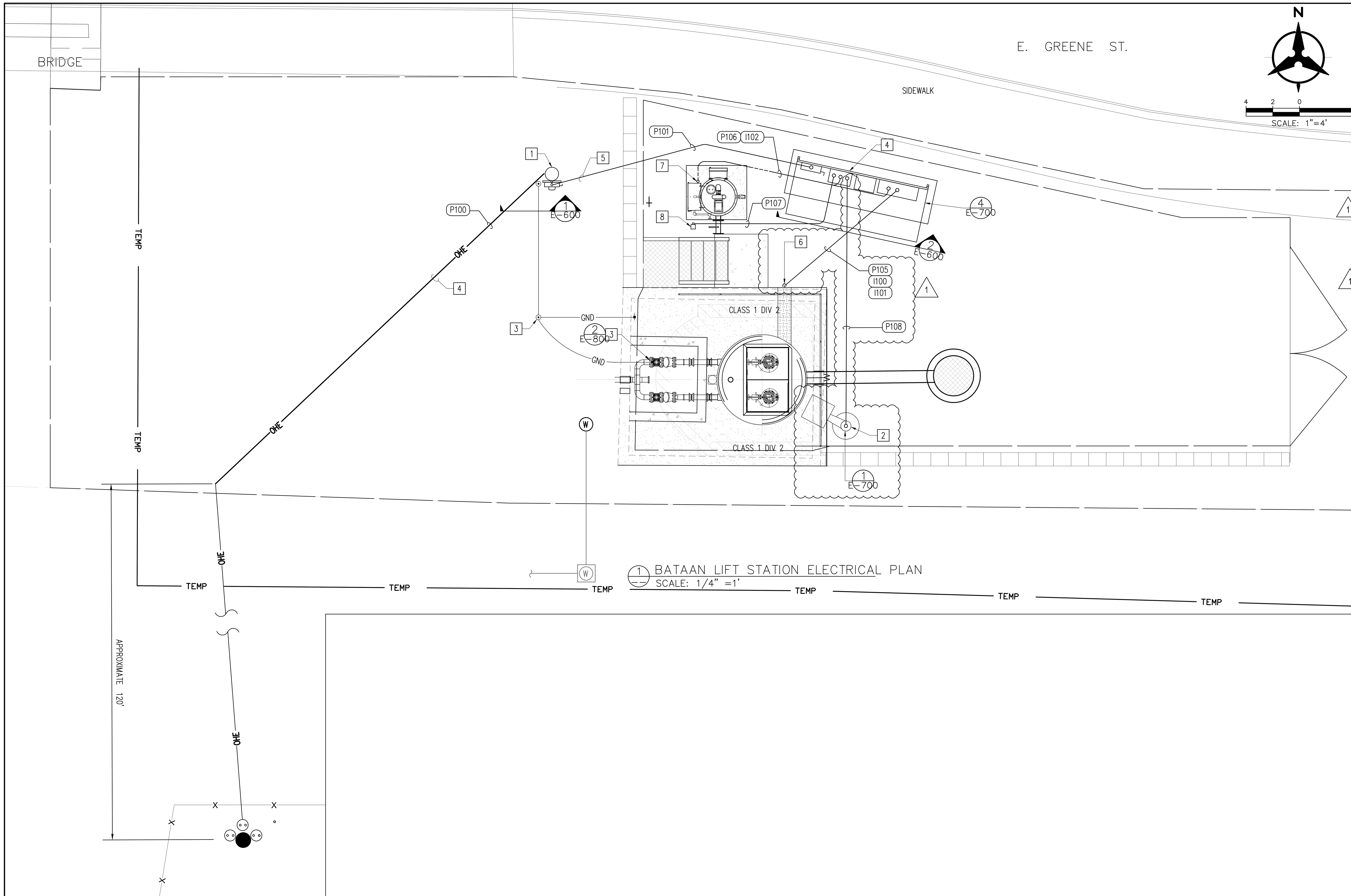

① BATAAN LIFT STATION ELECTRICAL PLAN
SCALE: 1/4" =1'

CONSTRUCTION NOTES

1. INSTALL NEW CLASS 6 METER POLE WITH SECONDARY RISER AND WEATHERHEAD AND SERVICE EQUIPMENT. FIELD LOCATE FINAL LOCATION OF METER POLE AND COORDINATE WITH LOCAL ELECTRIC UTILITY FOR LOCATION APPROVAL.
2. INSTALL POLE MOUNTED LIGHT FIXTURE AND FOUNDATION PER DETAIL. ADJUST FIXTURE SO AREA OF GREATEST LUMINOUS INTENSITY IS AT THE CENTER OF WET WELL. INSTALL EXTERIOR RATED SWITCH AND BOX COVER ON EQUIPMENT RACK WITH LABEL "FLOODLIGHT".
3. INSTALL TWO 3/4"x10' CU CLAD STEEL GROUND RODS SEPARATED BY 10' MINIMUM. BOND TO FOUNDATION REINFORCING STEEL AND DI PIPE FLANGE WITH 2 AWG CU.
4. COORDINATE OVERHEAD SECONDARY CONDUCTOR FROM UTILITY TRANSFORMER POLE WITH ELECTRIC UTILITY.
5. INSTALL CONDUIT AND CONDUCTORS AT 24" BFG MIN WITH RED METALLIC WARNING TAPE AT 12" BFG FROM MAIN DISCONNECT SWITCH TO EQUIPMENT RACK.
6. TRANSITION FROM FACTORY CABLE IN TROUGH TO CABLE IN BURIED CONDUIT WITH "LB" CONDUIT BODIES MOUNTED TO CONCRETE WALL OF WET WELL. FOR DETAIL, SEE DRAWING E-600, DETAIL 3.
7. RISE CONDUITS THROUGH CONCRETE FOUNDATION AND CONNECT ODOR CONTROL UNIT CONTROL PANEL TO POWER FROM PPA. CONNECT CONTROL CONDUCTORS TO AUTODIALER RTU FOR MONITORING. COORDINATE WITH MANUFACTURER AND INSTALL ALL CONDUIT, FIELD WIRING AND ASSOCIATED LOOSE APPURTENANCES NECESSARY FOR CORRECT OPERATION.
8. INSTALL NEMA 4X HEAT TRACE POWER CONNECTION BOX WITH AND DISCONNECT SWITCH ON SST POST ADJACENT TO ODOR CONTROL SKID. INSTALL HEAT TRACE ON ALL EXPOSED WATER LINES AND COVER WITH FOAM INSULATION AND PRE-FORME3D ALUMINUM PIPE JACKETS. INSTALL END SEAL KIT ON HEAT TRACE. FIELD VERIFY LOCATION OF PIPING AND INSTALL DISCONNECT WITHIN 6" OF BEGINNING OF HEAT TRACE.

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REVISIONS
DESIGN

DESIGNED BY	JCS	DATE 03-11-16
DRAWN BY	JCS	DATE 03-11-16
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CITY OF CARLSBAD
BATAAN LIFT STATION RENOVATION
BATAAN LIFT STATION ELECTRICAL PLAN

BHI PROJECT NO.	DWG NO.	SHEET	OF
20210255	E-400-R1	25	29

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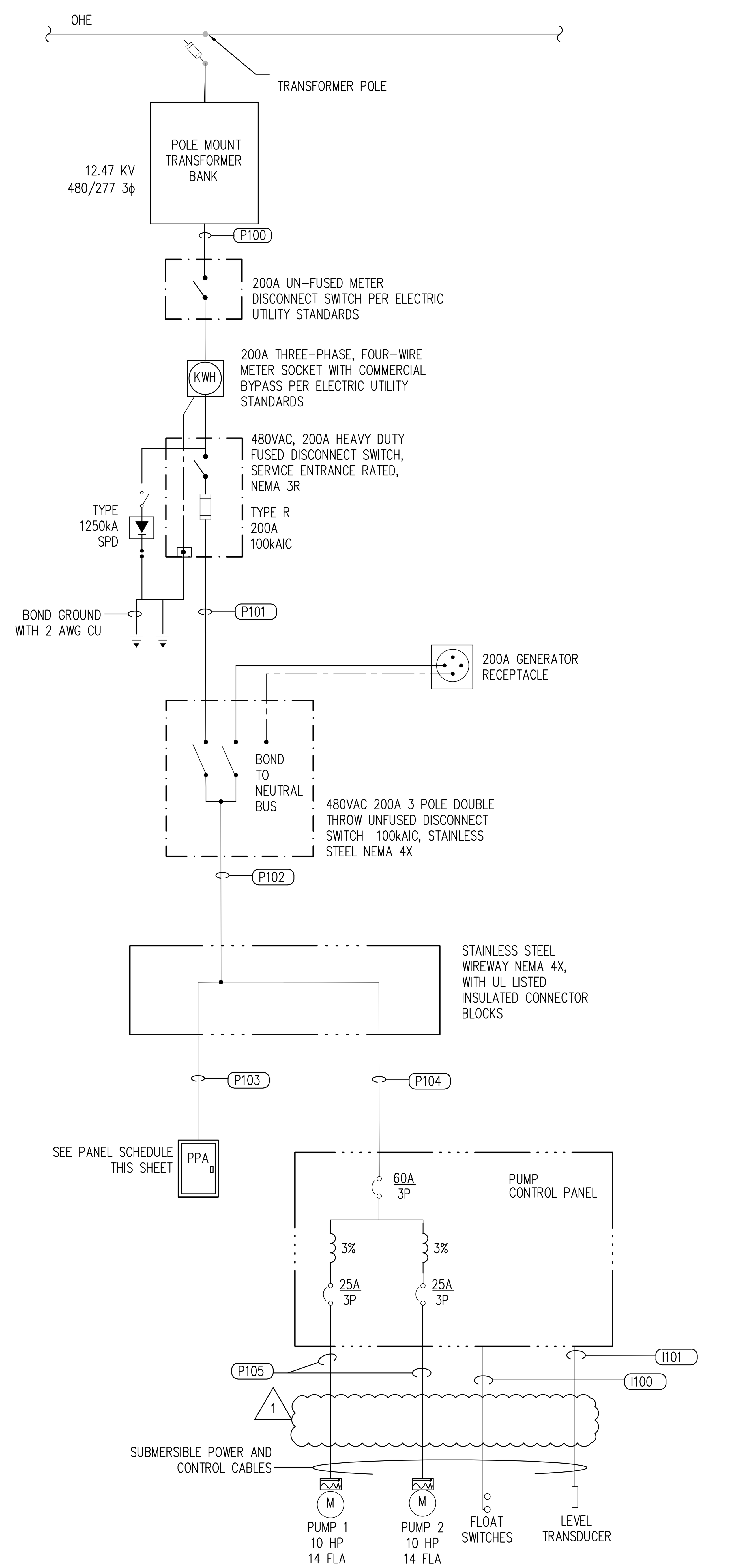
Fri, 5-Nov-2021 - 4:46:pm, Plotted by: JSANDOVAL



1 BATAAN LIFT STATION ELECTRICAL ONE LINE DIAGRAM
NTS

ELECTRICAL SERVICE LOAD SUMMARY CITY of CARLSBAD BATAAN LIFT STATION 1/6/2021			
480/277 VOLT, 3 PHASE CONNECTED LOAD	**HP**	**FLA**	**KVA**
LIFT STATION PUMP #1	10.0	14.0	11.6
LIFT STATION PUMP #2	10.0	14.0	11.6
120/240 VOLT, 1 PHASE CONNECTED LOAD			
ODOR CONTROL BLOWER	1.0	8.0	1.9
HEAT TRACE		12.5	1.5
WINCH/CRANE	1.0	16.0	1.9
GENERAL RECEPTACLE		15.0	1.8
LIGHTING		0.5	0.1
TOTAL CONNECTED LOAD		**59.0**	**27.0**
DEMAND LOAD SUMMARY:	**CONNECTED (KVA)**	**ESTIMATED DEMAND (%)**	**ESTIMATED DEMAND (KVA)**
#REF!			
LIFT STATION PUMP #1	11.6	100%	12
LIFT STATION PUMP #2	11.6	100%	12
ODOR CONTROL BLOWER	1.9	100%	2
HEAT TRACE	1.5	100%	2
WINCH/CRANE	1.9	0%	0
GENERAL RECEPTACLE	1.8	100%	2
LIGHTING	0.1	100%	1
LARGEST MOTOR ADDER	11.6	25%	3
FEEDER RATING:		KVA =	34.0
		AMPS =	41
		VOLTS =	480/277

2 BATAAN LIFT STATION ELECTRICAL LOAD SUMMARY
NTS

POINT TO POINT SHORT CIRCUIT CALCULATIONS		
Project ID :20210255	**Date - 01/05/21**	
City of Carlsbad Bataan Lift Station	**Three Phase System**	
(Assumes infinite primary fault current available) **Power Co. Transformer (T1) =**		
Transformer KVA >>	45	3-Phase Transformer
Transformer Impedance (%Z) =>>	1.200	
Voltage (line to line) >>	480	
Transformer full load amps =	54	
Calculated Available Fault current from system =		
Motor Contribution >>	112	
Known Available Fault Current at transformer lugs>>	11,824	
Available Fault Current =	**11,936**	
Fault Point 1	Point 1 >> Description >>	Main Disconnect Switch
Distance from Transformer T1 to Main Disconnect Switch >>	25	
Conductor size >>	4/0	
No. of conductors per phase >>	1	
(C)u.or (A)l.wire + (M)agnetic or (N)on-magnetic conduit >>	CN	Copper Conductors, Non-Magnetic Conduit
Available Fault Current at Point No. 1 =	**4,515**	**MINIMUM EQUIPMENT RATING 14 KAIC**

3 BATAAN LIFT STATION FAULT CURRENT ANALYSIS
NTS

Panel PPA — **BATAAN LIFT STATION**

RATINGS: **480V - 240/120 VAC Transformer - Panelboard Assembly, 10 kVA Rated, NEMA 4X, Primary MCB Rated 18 kAIC, Bolt on Branch CBs, CU Windings, CU Panelboard Chassis and Bussing, Integral SPD, UL Listed**

CIRCUIT#	DESCRIPTION	CB SIZE	VA	PHASE A	PHASE B	VA	CB SIZE	DESCRIPTION	CIRCUIT#
1	SPD	30A/2P	0	180		180	20A/1P	GENERAL RECEPTACLE	2
3		***	0		1000	1000	20A/1P	HEAT TRACE	4
5	ODOR CONTROL UNIT	30A/2P	1200	1400		200	20A/1P	LIGHTING	6
7		***	1200		3200	2000	30A/1P	CRANE RECEPTACLE	8
9	SPARE	20A/1P	0	0		0	20A/1P	SPARE	10
11	SPARE	20A/1P	0		0	0	20A/1P	SPARE	12
13	SPARE	20A/1P	0	0		0	20A/1P	SPARE	12
15	SPARE	20A/1P	0		0	0	20A/1P	SPARE	12
17	SPARE	20A/1P	0	0		0	20A/1P	SPARE	18
	Phase Connected Load			1580	4200				
	Total Connected Load				**5780**				
	Feeder Voltage				**240**				
	Feeder Phase Amps				**24**				

5 BATAAN LIFT STATION ELECTRICAL PANEL SCHEDULE
NTS

CONDUIT/CONDUCTOR SCHEDULE				
TAG	**CONDUIT SIZE**	**CONDUCTOR**	**SOURCE**	**DESTINATION**
P100	2-1/2"	4#3/0	UTILITY POINT OF CONNECTION	SERVICE DISCONNECT
P101	2-1/2"	4#3/0, 1#6G	SERVICE DISCONNECT	TRANSFER SWITCH
P102	2-1/2"	4#3/0, 1#6G	TRANSFER SWITCH	WIREWAY
P103	3/4"	3#10, 1#10G	WIREWAY	PPA
P104	1"	3#6, 6#G	WIREWAY	PUMP CONTROL PANEL
P105	2"	SHIELDED PUMP CABLE	PUMP CONTROL PANEL	PUMP J-BOX
	2"	SHIELDED PUMP CABLE	PUMP CONTROL PANEL	PUMP J-BOX
P106	3/4"	2#10, 1#10G	PPA	ODOR CONTROL UNIT
P107	3/4"	2#12, 1#12G	PPA	HEAT TRACE J-BOX
P108	3/4"	2#12, 1#12G	PPA	FLOOD LIGHT
I100	3/4"	4#14, 1#14G	PUMP CONTROL PANEL	PUMP J-BOX
I101	3/4"	1#16 TWSH	PUMP CONTROL PANEL	PUMP J-BOX
I102	3/4"	8#14, 1#14G	ODOR CONTROL UNIT	PUMP CONTROL PANEL

6 BATAAN LIFT STATION CONDUIT SCHEDULE
NTS

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

ENGINEER'S SEAL
MATTHEW R. THOMPSON
NEW MEXICO
13868
REGISTERED PROFESSIONAL ENGINEER
11-5-2021

AS-BUILT INFORMATION
CONTRACTOR DATE
WORK STAKED BY DATE
INSPECTOR'S ACCEPTANCE BY DATE
FIELD VERIFICATION BY DATE
DRAWINGS CORRECTED BY DATE

BENCH MARKS

NO.	DATE	REMARKS	BY
1	11/4/21	JUNCTION BOX REMOVAL	

REVISIONS
DESIGN

DESIGNED BY JCS DATE 03-11-16
DRAWN BY JCS DATE 03-11-16
CHECKED BY MRT DATE 03-11-16

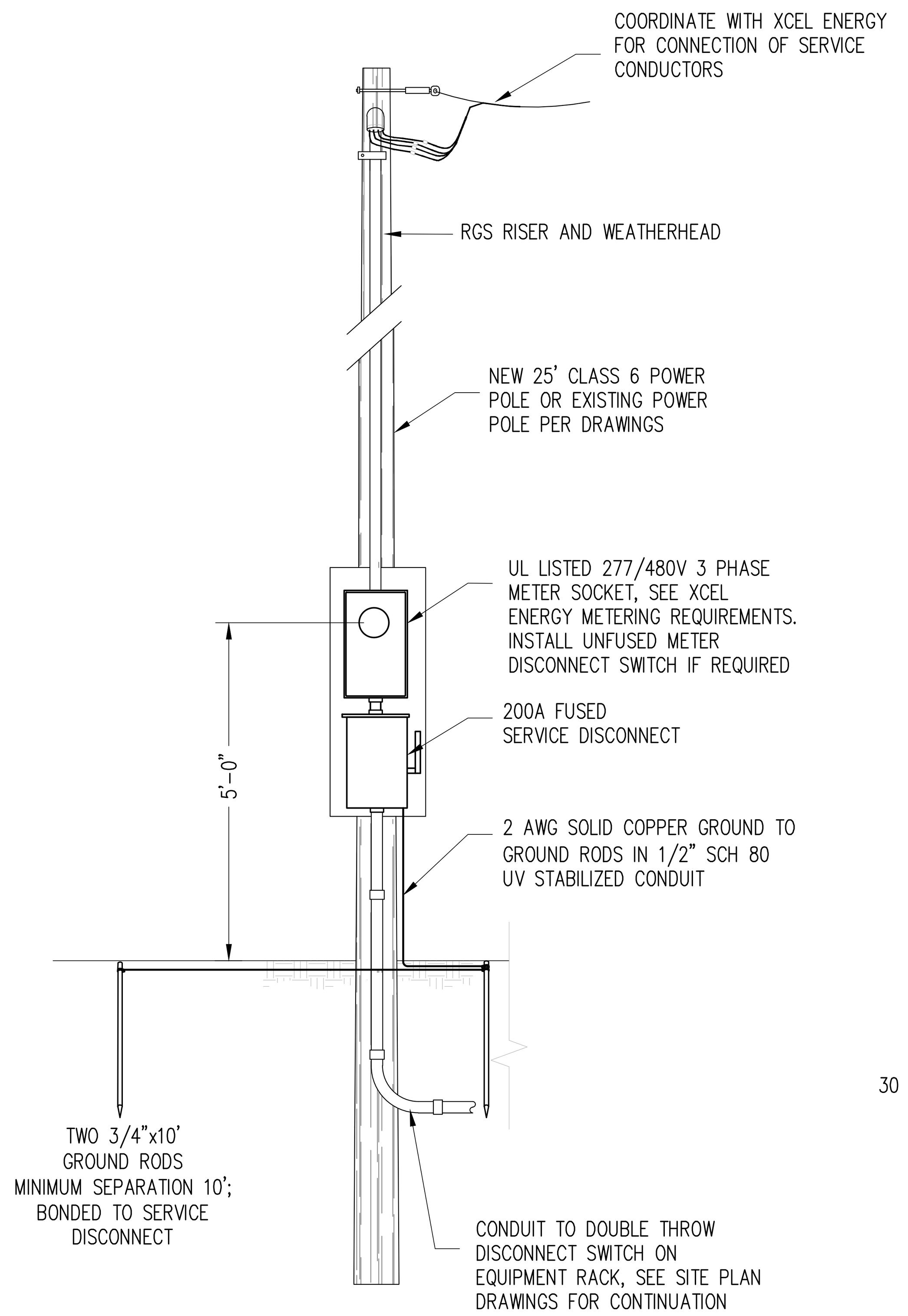
NOTICE OF EXTENDED PAYMENT PROVISION: THIS CONTRACT ALLOWS THE OWNERS TO MAKE PAYMENT WITHIN 45 DAYS AFTER SUBMISSION OF AN UNDISPUTED REQUEST FOR PAYMENT

Bohannan Huston
www.bhinc.com 800.877.5332

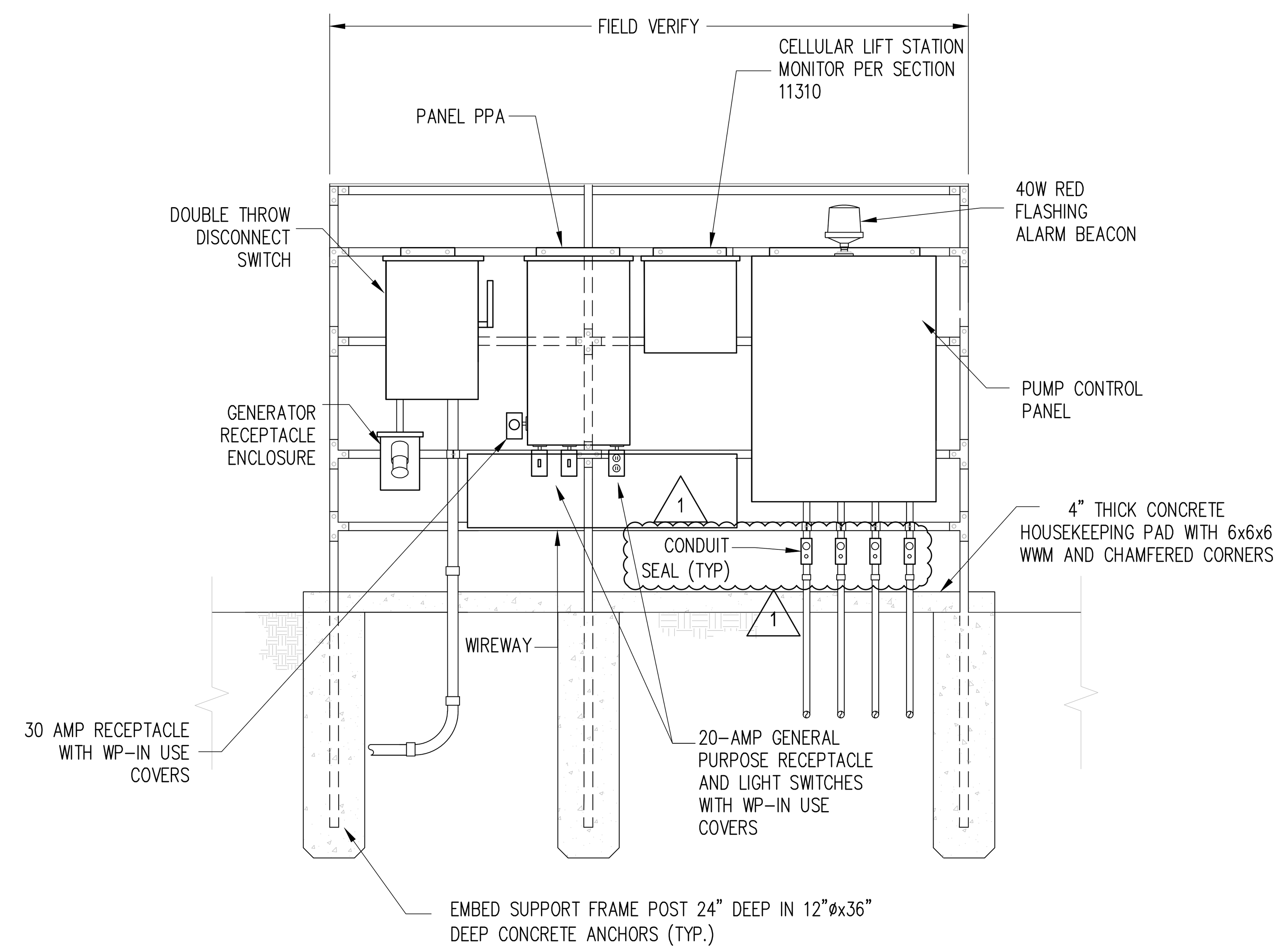
CARLSBAD

CITY OF CARLSBAD
BATAAN LIFT STATION RENOVATION
BATAAN LIFT STATION ELECTRICAL ONE LINE AND SCHEDULES

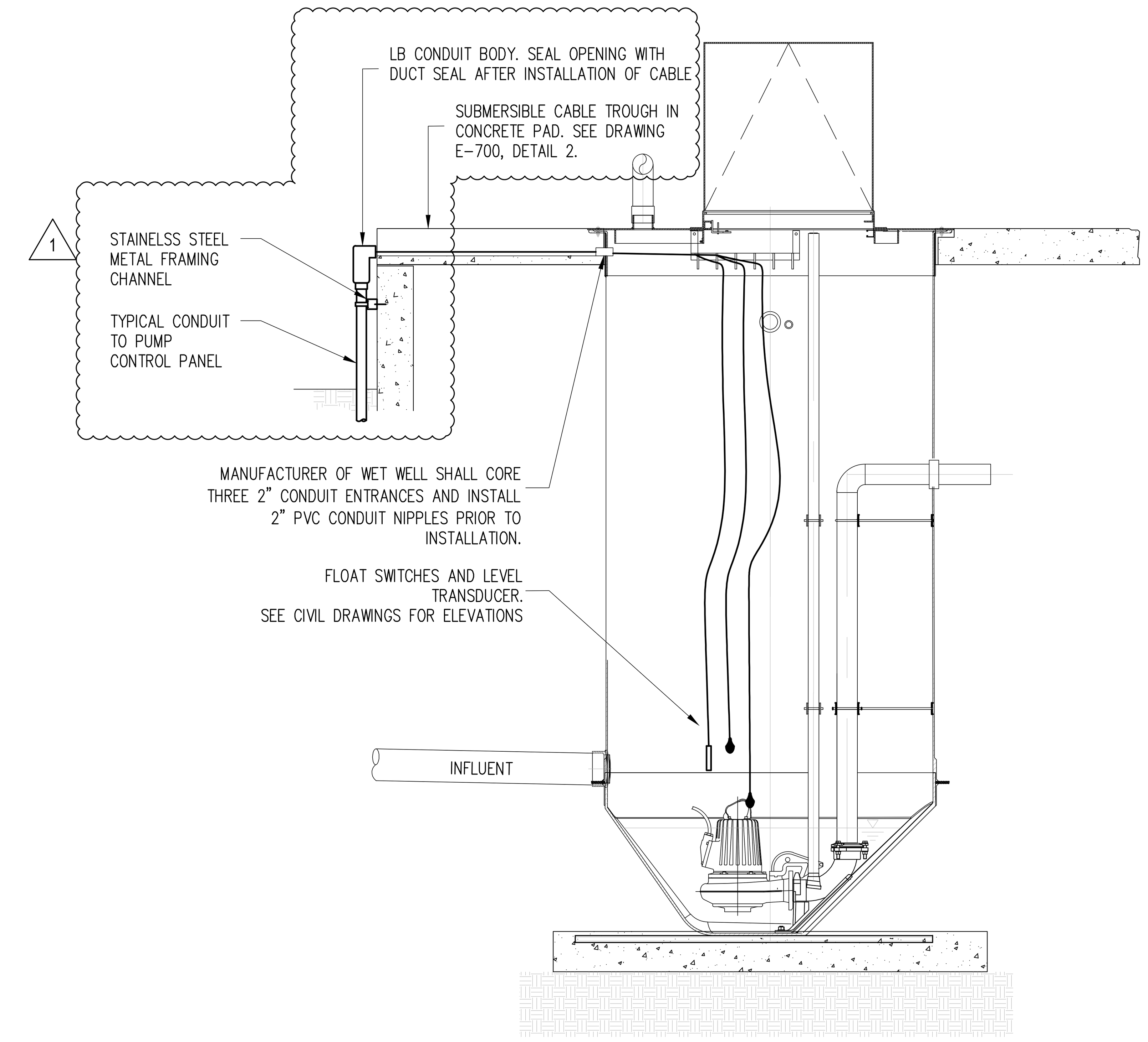
BHI PROJECT NO. 20210255
DWG NO. E-500-R1
SHEET 26 OF 29



1 METER POLE DETAIL
NOT TO SCALE



2 EQUIPMENT RACK ELEVATION DETAIL
NOT TO SCALE



3 LIFT STATION WET WELL DETAIL
NOT TO SCALE

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FOR UTILITY LOCATES
1-800-321-ALERT

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11-5-2021

AS-BUILT INFORMATION

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

BENCH MARKS

NO.	DATE	REMARKS	BY
1	11/4/21	JUNCTION BOX REMOVAL / ADD OF CONDUIT SEALS	

REVISIONS

DESIGN

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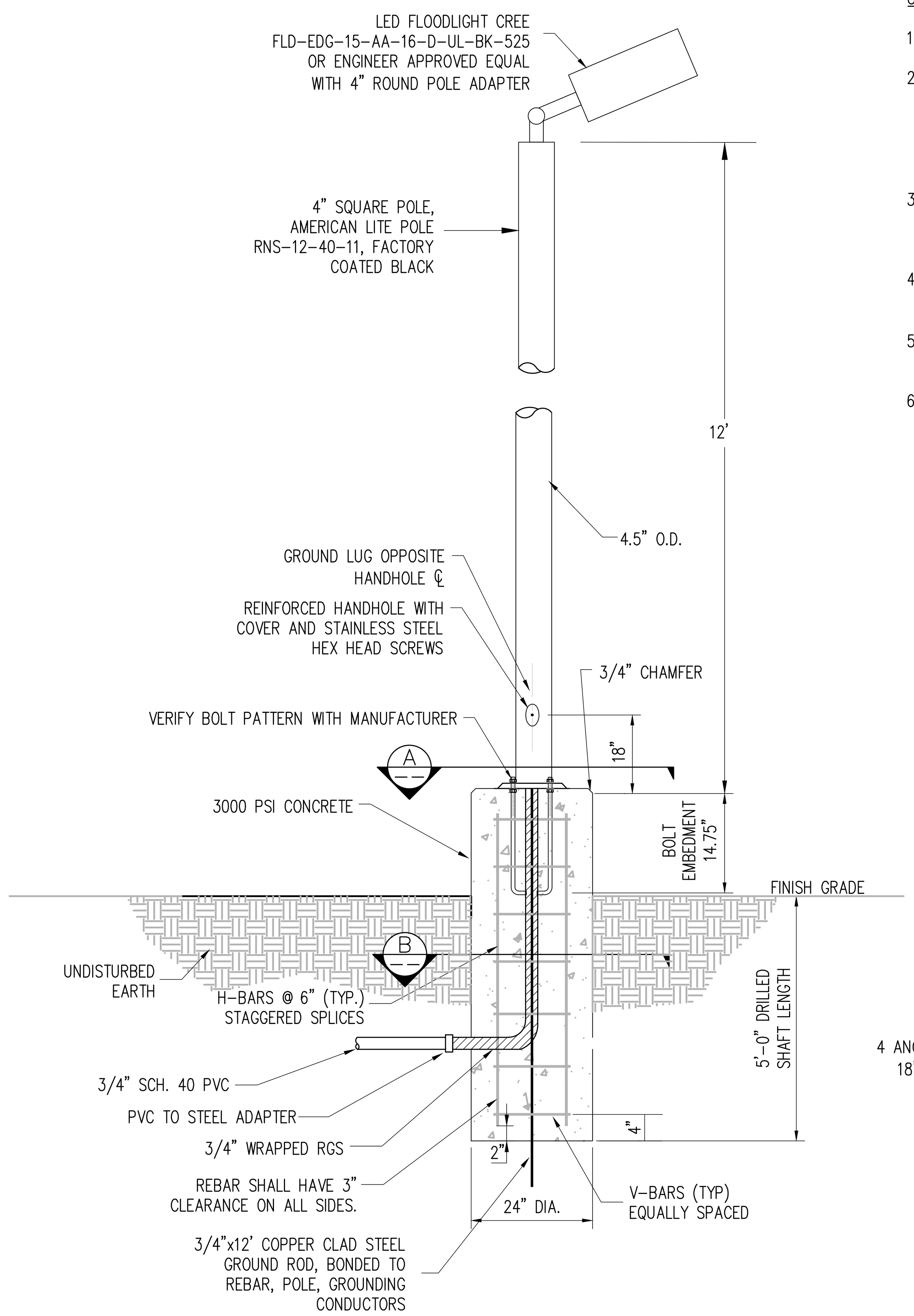
CARLSBAD

CITY OF CARLSBAD
BATAAN LIFT STATION RENOVATION
ELECTRICAL DETAILS 1

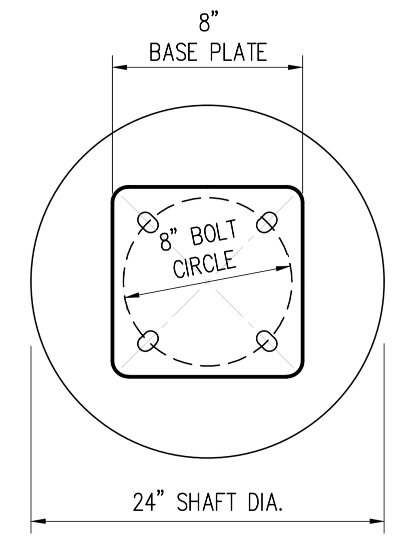
BHI PROJECT NO.	DWG NO.	SHEET	OF
20210255	E-600-R1	27	29

GENERAL NOTES:

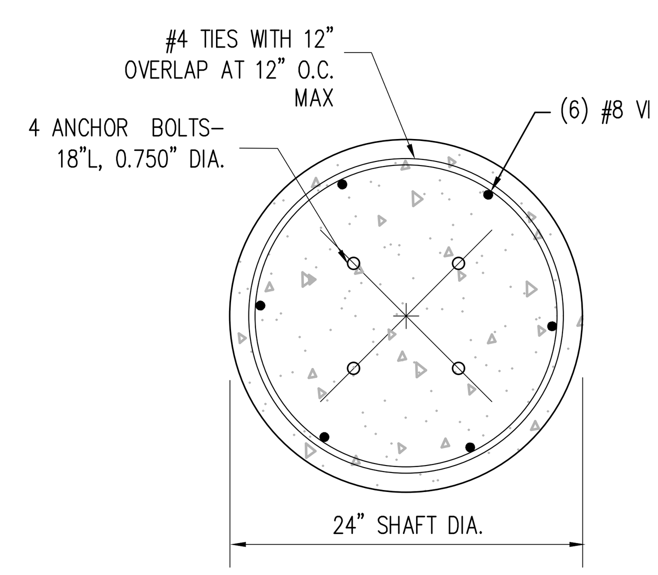
1. ALL HARDWARE TO BE GALVANIZED TO ASTM A153.
2. INTERIOR AND EXTERIOR POLE ASSEMBLY TO BE EITHER GALVANIZED PER ASTM A123 AND/OR POWDER COAT FINISHED AND WRAPPED. ALL WELDING TO CONFORM TO AWS D1.1 MOST RECENT EDITION.
3. POLE DESIGN WIND SPEEDS ARE FOR 90 MPH WIND SPEED INCLUDING 1.3 GUST FACTOR WITH LUMINAIRE SIZE OF 2.0 FT. SQ. E.P.A. AND 52 POUNDS.
4. DESIGNS ARE BASED AGAINST COMMERCIAL GRADE STANDARDS.
5. INSTALLATION OF POLES/LUMINAIRIES TO CONFORM TO MANUFACTURERS INSTALLATION INSTRUCTIONS.
6. AREAS OF GREATEST LUMINOUS INTENSITY SHALL BE MEASURED AT GROUND LEVEL AS GREATER THAN 60 FOOT CANDLES



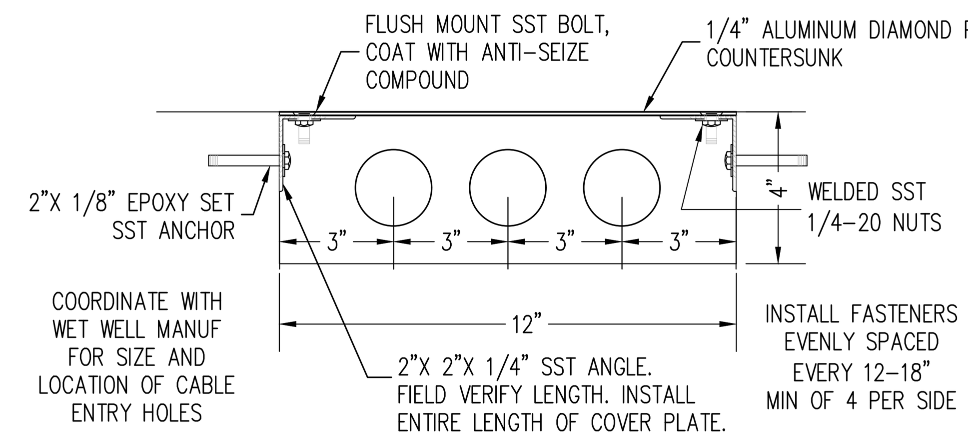
1 LIGHT FIXTURE MOUNTING DETAIL
– NOT TO SCALE



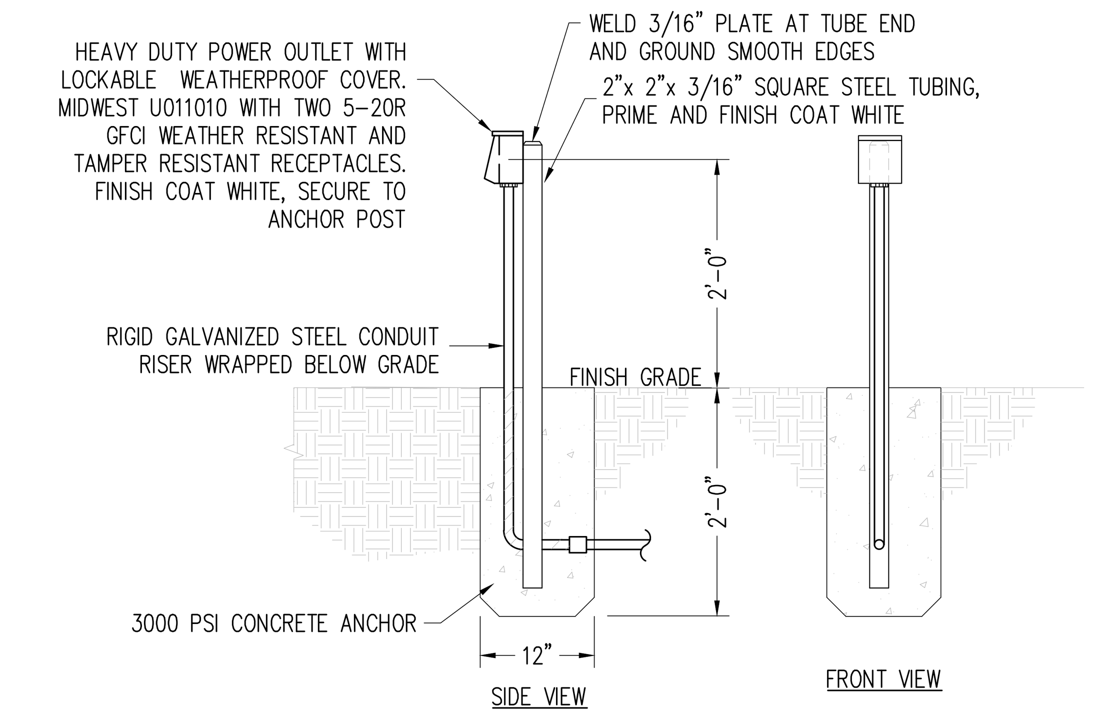
SECTION A



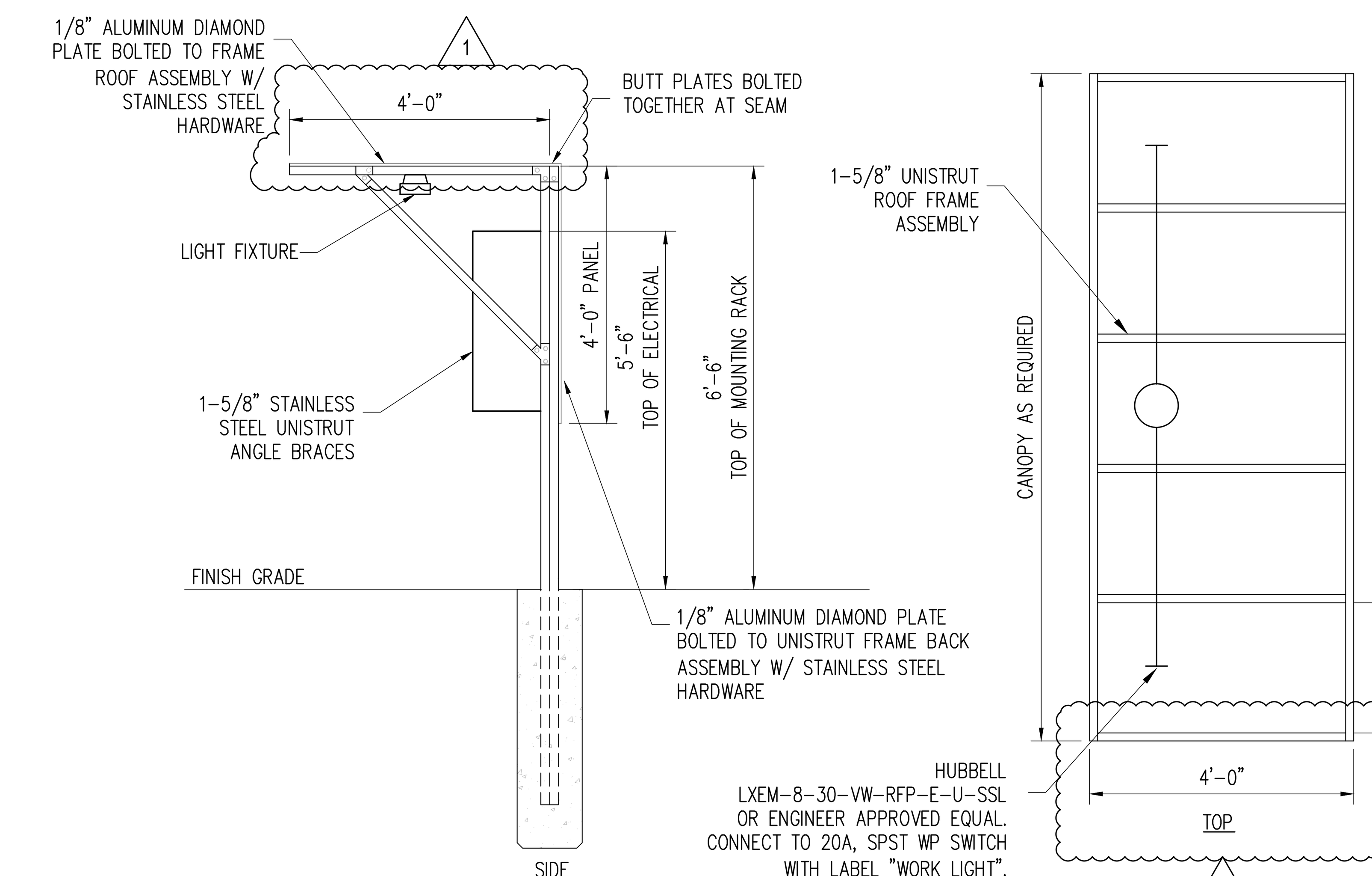
SECTION B



2 SUBMERSIBLE CABLE TROUGH DETAIL
– NOT TO SCALE



3 HEAT TRACE POWER CONNECTION DETAIL
– NOT TO SCALE



4 EQUIPMENT RACK DETAIL
– SCALE: 1/2" = 1'-0"

1

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BENCH MARKS

REVISIONS

NO.	DATE	REMARKS	BY
1	11/4/21	DETAIL DELETIONS / SHADE COVER CHANGES	

DESIGN

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DRAWN BY	JCS	DATE 03-11-16
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CARLSBAD

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BATAAN LIFT STATION RENOVATION
ELECTRICAL DETAILS 2

BHI PROJECT NO.	DWG NO.	SHEET	OF
20210255	E-700-R1	28	29

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