



THE CITY OF DAYTONA BEACH
OFFICE OF THE PURCHASING AGENT

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Daytona Beach, Florida 32115-2451

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ADDENDUM NO. 5

DATE: April 3, 2020

PROJECT: ITB 20343
BETHUNE POINT WATER RECLAMATION FACILITY
GENERATOR REPLACEMENT

OPENING DATE: ~~April 15, 2020~~ April 22, 2020

This addendum is hereby incorporated into the Bid Documents for the project referenced above. The following items are clarifications, corrections, additions, deletions and/or revisions to and shall take precedence over the original documents. Additions are indicated by underlining, deletions are indicated by ~~strikethrough~~.

1. Only online submittals will be accepted. No paper bids either mailed or otherwise hand delivered will be accepted. To submit an online bid visit <http://www.codb.us/841/Purchasing> and click "public solicitation", click your desired bid, finally "Submit Bid" at the top of the page.
2. The due date/opening for this project has been changed from ~~April 15, 2020~~ to April 22, 2020.
3. Changes to Instructions to Bidders:

2. COMPLETING THE BID. In order for the Bid to be considered complete:

A. The Bid Proposal Letter, the Bid Schedule, and all other required Forms must be completed. All blank spaces must be completed filled with dark ink or via typing. ~~All corrections and erasures must be initialed by the party submitting the Bid on behalf of the Bidder.~~

B. All information/documentation that is required to be submitted by this solicitation must be provided in the manner indicated.

C. The Bidder is requested to submit only the Bid Proposal Letter and other Forms, documents, and information specifically required. Any extraneous documents or information submitted by the Bidder will be discarded. The Bidder be asked to sign a written contract only if the City awards a contract to Bidder.

D. Where the Bid Schedule only calls for unit prices ~~Unless Special Instructions are included in this solicitation specifically allowing for partial or lot-by-lot bids where the Bid Schedule only calls for unit prices,~~ the Bidder must provide quotes for all unit prices and extended unit prices (if any) as set forth in the Bid Schedule unless Special Instructions are included in this solicitation specifically allowing for partial or lot-by-lot bids. If this solicitation allows for partial or lot-by-lot bids,

the Bidder must comply with the Special Instructions in completing filling out the unit prices and extended unit prices set forth in the Bid Schedule.

E. The Bid Price (including unit prices and extended prices if applicable), must be stated in numerals.

~~F. If this solicitation requires unit prices and there is a conflict between the unit prices and the extended totals, the unit price will take precedence. Likewise, discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum.~~

G. The Bidder must not submit alternative bids unless this solicitation specifically authorizes alternate bids. If this solicitation specifically allows the submission of alternate bids, the Bidder must submit the standard and the alternative bid in order to be considered responsive.

H. The Bid may not contain qualifications or exceptions of any kinds.

I. All other submittal requirements stated herein must be met.

4. **REQUESTS FOR INTERPRETATIONS.** If the Bidder is in doubt as to the meaning of any of the Bid Documents or other Contract Documents included in this solicitation, the Bidder may submit a written request to the City for an interpretation, care of the Purchasing Agent at the address set forth in the Invitation for delivery of the completed bid or on-line through the Bid Platform. Such requests must be received **10 days** prior to bid opening in order to be considered. The City is not obligated to respond to such requests. Any clarification or interpretation issued by the City in the form of a written addendum or on-line response will be deemed to be a part of the Bid Documents.

No oral clarification or interpretation will be binding.

Questions may also be submitted online through the City's Bid Platform. Prospective bidders may ask questions which will be forwarded to the project manager. Any responses will be posted in the form of an addendum or replied to the public through the online Bid Platform. The bidder is responsible to view the online responses at the web site listed above before submitting their bid.

~~7. **BID ENVELOPE.** The Bid, including the Bid Proposal Letter, all other required Bid documents, and required bid security, must be returned in an opaque, sealed envelope. The envelope must display the name and address of the Bidder, the bid number and name of the bid/contract as set forth on the Invitation to Bid, and the date and time scheduled for bid opening. The envelope must be addressed to:~~

~~Purchasing Agent~~

~~City of Daytona Beach~~

~~Room 146~~

~~301 S. Ridgewood Avenue~~

~~Daytona Beach, FL 32114~~

7. **SUBMISSION OF ON-LINE BIDS.** The City will only accept on-line Bids for this solicitation through its Bid Platform. The City's only authorized Bid Platform is Vendor Registry, accessible through the City's website www.codb.us/841/Purchasing under the link to "Public Solicitation", then by selecting the proper bid and clicking "Submit Bid". No other forms of on-line bids will be

accepted. Any reference in this document to “sealed bids” is hereby replaced with “sealed on-line Bids”.

8. **AMENDMENT AND WITHDRAWAL OF BID.** The Bidder may amend or withdraw the Bid at any time prior to bid opening, ~~but only with prior written notice to the Purchasing Agent, submitted in the same manner as the Bid. The notice must be signed by a properly authorized agent of the Bidder.~~

Mere negligence on the part of the Bidder in preparing the Bid does not constitute a right to withdraw the Bid subsequent to bid opening.

~~Amendments may be made only through the submission of a complete Bid along with a written statement, signed by the same person who signed the Bid, that the submission is intended to fully replace the Bidder's earlier submission. The City is not required to honor an amendment that fails to comply with this Paragraph 10.~~

10. **BID OPENING.** Bid opening will be scheduled at the ~~location and on the~~ date and time specified by the Invitation for Bid, or by any applicable Bid Addenda or response that the City may issue. At bid opening, the City will open and record the Bid so long as it is proper and has been timely submitted. In recording the Bid the City will state the name of the Bidder and the Bid Price. The bid tabulation will be reviewed and verified by the Buyer after opening by the Purchasing Agent, or her designee.

The Bidder is solely responsible to ensure that the Bid is submitted on-line time and date stamped by the Purchasing Agent prior to bid opening date and time. Late bids will be rejected ~~and returned unopened. The Bidder may be present at bid opening but is not required to be present.~~

14. **BIDS AND PUBLIC RECORDS.** Sealed bids received by the City pursuant to this solicitation will be temporarily exempt from disclosure in accordance with Florida's Public Records Laws. Thereafter, bids will be open for inspection by any person pursuant to Public Records Law.

If the Bidder believes that the Bid or any portion thereof is permanently exempt from disclosure under the public records laws, the Bidder must state the grounds for this position in CAPITAL LETTERS on a cover sheet accompanying the sealed bid in a certified letter addressed to the Purchasing Agent and received at least 3 days prior to the Bid Opening-. The Bidder will be contacted prior to the opening of the Bid and a determination will be made as to whether or not it is exempt prior to opening. If a determination is made that it is not exempt from disclosure, the Bidder may withdraw the sealed bid.

16. **BID OPENING RESULTS.** The Bidder may secure information pertaining to bid opening results on the Purchasing Division webpage under the “Expired Solicitations” link and selecting “Documents” to view the Bid tabulation, by visiting the Purchasing Division Office Monday through Friday between 8:00 am and 3:00 pm, or by emailing a request to purchasing@codb.us. Copies of bid tabulation sheets will be furnished upon request and receipt of a valid email address or self-addressed stamped envelope.

4. Minimum Qualifications Clarifications: The requirement of 1.0 MW for the standby power capacity is not meant to be a single generator installation, but rather cumulative on a single job. As an example, the installation of two (2) 0.5 MW generators on a single project meets the minimum qualification requirement, assuming all other qualifications stipulations (i.e. operational continuity, time, etc.) are met.

5. **Specification Modifications:**

A. A revised Bid Schedule is posted on the City Website <http://www.codb.us/841/Purchasing> under Public Solicitations, choose this bid title, Addendum 5-Bid Schedule, and Section 01025: Measurement and Payment attached. Revisions are highlighted.

B. Please see revised Section 16080: Overcurrent Protective Device Coordination Study attached. Revisions are highlighted.

C. Please see revised Appendix B: Geotechnical Report. Most recent report dated 11/22/19 attached.

6. **Drawing Modifications:**

A. Please see revised Sheet C-101 attached. Revisions are highlighted by clouds.

B. Please see revised Sheets S-101 and S-301 attached. Revisions are highlighted by clouds.

7. **Questions and Answers:**

Q1: Page 4 of the ITB indicates a 10% Bid Bond is required. A Bid Bond Form was not provided. Please provide or confirm that an AIA A310 is acceptable.

A1: The A1A Bid Bond Form is acceptable.

Q2: Page 11 of the ITB defines Minority-Owned Business Enterprise as "a business which is certified as an MBE by the State of Florida Office of Supplier Diversity or other Florida public agency". The FL DOT states that a DBE certification" is separate and distinct from the State Minority, Women, and/or Service-Disabled Veteran Business Enterprises Program (MBE). The FL DOT website then refers to the Florida Department of management Services, Office of Supplier Diversity. Please clarify what Florida Public Agencies are acceptable.

A2: The City is gathering data on minority and women owned business participation (MBE and WBE), not Disadvantaged Business Enterprises (DBE). Certification by any public agency in the state that certified MWBE's is acceptable

Q3: The Submittal Checklist states that Attachment B – MWBE Contract participation – is "optional & voluntary", yet, the ITB states "Bidders are asked to submit Attachment B with the Bid, listing all MBE and WBE subcontractors and supplier selected to be awarded subcontracts or purchase orders by the Bidder if awarded the Contract". Please clarify, is attachment B due post bid submission?

A3: Attachment B is to be submitted with the bid, and PO's and subcontracts with the listed subs/suppliers provided after award (so only from the awarded bidder).

Q4: The Submittal Checklist states that Attachment C – Bidder Employment Levels – is "optional & voluntary", yet, Attachment C states "Bidders shall indicate the total number of full-time staff employed by the Bidder **at the time of bid opening**, the total number of full time women employees, and the total number of full time minority employees." Please clarify, is Attachment C due post of bid submission?

A4: Yes, requested with the bid.

Q5: Request Kohler be added to the approved generator manufacturers.

A5: Please refer to A13.

Q6: 16230 2.03 C. calls for 65 dBa at 21 feet this equates to a normal person conversation and is extremely costly. We recommend somewhere around 80 dBa which is normal city area noise level. This will reduce costs significantly.

A6: Please refer to A14.

Q7: Drawing E-603 shows the generators connecting to a common bus without isolation, should one unit fail anyone performing service on the down unit the line side of the unit breaker will be energized. We would recommend the common bus have isolation breakers for the generator to remove the potential for anyone working on energized equipment.

A7: Please refer to A15.

Q8: Should one unit fail is there a load shed scheme and how does that get controlled?

A8: Please refer A16.

Q9: Is ERMS required on the generators and gear?

A9: Please refer to A17.

Q10: ATS calls for NEMA 4x, however in this size they are typically only available in NEMA 3R (Stainless Steel)?

A10: Please refer to A18.

Q11: In regard to Minimum qualifications, would the City/Engineer accept 3 past projects that include Active Governmental Facilities (i.e: Branch Jails, EMS Facilities, etc) of equal size and scope? Not just Active Wastewater Treatment Facilities.

A11: Please refer to A19.

Q12: The specifications for the generator enclosure requires a 65 dBA rating at 23 feet sound levels. This is not economically feasible with the size of generator engine and HVHR enclosure of this size/type. It would require additional attenuation measures be installed within the enclosure and would significantly increase the footprint and cost. Please advise if 74dBA ratings at 23 feet is acceptable.

A12: Please refer to A6 above.

Q13: Request Kohler be added to the approved generator manufacturers.

A13: No objections. Kohler is an approved generator manufacturer.

Q14: 16230 2.03 C. calls for 65 dBa at 21 feet this equates to a normal person conversation and is extremely costly. We recommend somewhere around 80 dBa which is normal city area noise level. This will reduce costs significantly.

A14: The base bid will include an enclosure design for 65 dBa at 21 feet. The deductive alternate includes a reduction of sound attenuation requirement to 80 dBA and will be selected at the discretion of the City during construction. Please refer to Section 01025.

Q15: Drawing E-603 shows the generators connecting to a common bus without isolation, should one unit fail anyone performing service on the down unit the line side of the unit breaker will be energized. We would recommend the common bus have isolation breakers for the generator to remove the potential for anyone working on energized equipment.

A15: The design as shown on E-603 allows for isolation of each generator via the generator breakers inside the generator enclosures. Opening the generator breaker will

result in isolation of that generator so work can be performed. Only the load side of the generator breaker might be energized, the line side of the open generator breaker will not be energized. Adding isolation breakers at the common bus in MB3 enclosure will result in breakers in series, which would make it difficult to tell which breaker would open during a fault condition. This can be dangerous for maintenance personnel looking to clear the fault condition.

Q16: Should one (1) unit fail is there a load shed scheme and how does that get controlled?

A16: Automatic load shed will be implemented in the SCADA system through a separate project as designed by others. For the purposes of this project, loads will be balanced and shed manually as is currently done, but without requiring manual transfer in the existing switchgear to emergency power.

Q17: Is ERMS required on the generators and gear?

A17: Arc flash study requirements have been modified to include all new gear and existing main distribution gear. Please refer to Section 16080 attached. Per NEC 240.87, instantaneous trip setting is sufficient for arc energy reduction. ERMS is not required.

Q18: ATS calls for NEMA 4x, however in this size they are typically only available in NEMA 3R(Stainless Steel)?

A18: ATS panel shall be NEMA4X for protection against corrosive environment at the BPWRF.

Q19: In regard to minimum qualifications, would the City/Engineer accept 3 past projects that include Active Governmental Facilities (i.e: Branch Jails, EMS Facilities, etc) of equal size and scope? Not just Active Wastewater Treatment Facilities.

A19: This is acceptable. Active government facilities projects in which a power outage was not acceptable is preferred.

8. Page 18, "Noncollusion Affidavit of the Prime Bidder", and page 20-21, "Affidavit on Public Entity Crimes", and page 22, "Local Vendor Affidavit" are hereby REPLACED with modified "Noncollusion Affidavit of the Prime Bidder" and "Affidavit on Public Entity Crimes" and "Local Vendor Affidavit" eliminating the notary public requirement during the COVID-19 crisis to comply with online bidding requirements. Failure to include these and other required forms will render the Bid non-responsive and in eligible from consideration for award.
9. All other terms and conditions remain the same.

The Bidder shall acknowledge receipt of this addendum on the Bid Proposal Form.

The City of Daytona Beach
Kirk Zimmerman, CPPB
Buyer

Posted online at <https://www.codb/841.us>

ATTACHMENT A
NONCOLLUSION AFFIDAVIT OF PRIME BIDDER

I, _____, depose and state:

(1) I am, _____ Title _____ of _____ COMPANY _____,
the Bidder that has submitted the attached Bid;

(2) I am fully informed respecting the preparation and contents of the attached Bid and of all pertinent circumstances respecting such Bid;

(3) Such Bid is genuine and is not a collusive or sham Bid;

(4) Neither the said Bidder nor any of its officers, partners, owners, agent, representatives, employees or parties in interest, including this affiant, has in any way colluded, conspired, connived or agreed, directly or indirectly with any other Bidder, firm or person to submit a collusive or sham Bid in connection with the Contract for which the attached Bid has been submitted or to refrain from Bidding in connection with such Contract, or has in any manner, directly or indirectly, sought by agreement or collusion or communication or conference with any Bidder, firm or person to fix the price or prices or cost element of the Bid price or the Bid price of any other Bidder, or to secure through any collusion, conspiracy, connivance or unlawful agreement any advantage against the City of Daytona Beach, FL (Local Public Agency) or any person interested in the proposed Contract;

(5) The price or prices quoted in the attached Bid are fair and proper and are not tainted by any collusion, conspiracy, connivance or unlawful agreement on the part of the Bidder or any of its agents, representatives, owners, employees, or parties in interest, including this affiant.

VERIFICATION

Under penalties of perjury, I declare that I have read the foregoing Non-collusion Affidavit of Prime Bidder and that the facts stated in it are true.

Print Name

Signature

Date

ATTACHMENT B
SWORN STATEMENT PURSUANT TO SECTION 287.133(3)(a),
FLORIDA STATUTES, ON PUBLIC ENTITY CRIMES

1. This sworn statement is submitted to _____
(print name of the public entity)
by _____
(print individual's name and title)
for _____
(print name of entity submitting sworn statement)
whose business address is

and (if applicable) its Federal Employer Identification Number (FEIN) is _____

(If the entity has no FEIN, insert the Social Security Number of the individual signing this sworn statement above:

2. I understand that a “public entity crime” as defined in Paragraph 287.133(1)(g), Florida Statutes, means a violation of any state or federal law by a person with respect to and directly related to the transaction of business with any public entity or with an agency or political subdivision of any other state or of the United States, including, but not limited to, any bid or contract for goods or services, any lease for real property, or any contract for the construction or repair of a public building or public work, involving antitrust, fraud, theft, bribery, collusion, racketeering, conspiracy, or material misrepresentation.
3. I understand that "convicted" or "conviction" as defined In Paragraph 287.133(1)(b), Florida Statutes, means a finding of guilt or a conviction of a public entity crime, with or without an adjudication of guilt, in any federal or state trial court of record relating to charges brought by indictment or information after July 1, 1989, as a result of a jury verdict, nonjury trial, or entry of a plea of guilty or nolo contendere.
4. I understand that an “affiliate” as defined in Paragraph 287.133(1)(a), Florida Statutes means:
- (a) A predecessor or successor of a person convicted of a public entity crime, or

(b) An entity under the control of any natural person who is active in the management of the entity and who has been convicted of a public entity crime. The term "affiliate" includes those officers, directors, executives, partners, shareholders, employees, members, and agents who are active in the management of an affiliate. The ownership by one person of shares constituting a controlling interest in another person, or a pooling of equipment or income among persons when not for fair market value under an arm's length agreement, will be a prima facie case that one person controls another person. A person who knowingly enters into a joint venture with a person who has been convicted of a public entity crime in Florida during the preceding 36 months will be considered an affiliate.

5. I understand that a "person" as defined in Paragraph 287.133(l)(e), Florida Statutes, means any natural person or entity organized under the laws of any state or of the United States with the legal power to enter into a binding contract and which bids or applies to bid on contracts for the provision of goods or services let by a public entity, or which otherwise transacts or applies to transact business with a public entity. The term "person" includes those officers, directors, executives, partners, shareholders, employees, members, and agents who are active in management of an entity.

Based on information and belief, the statement which I have marked below is true in relation to the entity submitting this sworn statement. (*Indicate which statement applies.*)

_____ Neither the entity submitting this sworn statement, nor any of its officers, directors, executives, partners, shareholders, employees, members, or agents who are active in the management of the entity, nor any affiliate of the entity has been charged with and convicted of a public entity crime subsequent to July 1, 1989.

_____ The entity submitting this sworn statement, or one or more of its officers, directors, executives, partners, shareholders, employees, members, or agents who are active in the management of the entity, or an affiliate of the entity has been charged with and convicted of a public entity crime subsequent to July 1, 1989.

_____ The entity submitting this sworn statement, or one or more of its officers, directors, executives, partners, shareholders, employees, members, or agents who are active in the management of the entity, or an affiliate of the entity has been charged with and convicted of a public entity crime subsequent to July 1, 1989. However, there has been a subsequent proceeding before a Hearing Officer of the State of Florida, Division of Administrative Hearings and the Final Order entered by the Hearing Officer determined that it was not in the public interest to place the entity submitting this sworn statement on the convicted vendor list (*attach a copy of the final order.*)

I UNDERSTAND THAT THE SUBMISSION OF THIS FORM TO THE CONTRACTING OFFICER FOR THE PUBLIC ENTITY IDENTIFIED IN PARAGRAPH 1 (ONE) ABOVE IS FOR THAT PUBLIC ENTITY ONLY AND, THAT THIS FORM IS VALID THROUGH DECEMBER 31 OF THE CALENDAR YEAR IN WHICH IT IS FILED. I ALSO

UNDERSTAND THAT I AM REQUIRED TO INFORM THE PUBLIC ENTITY PRIOR TO ENTERING INTO A CONTRACT IN EXCESS OF THE THRESHOLD AMOUNT PROVIDED IN SECTION 287.017, FLORIDA STATUTES FOR CATEGORY TWO OF ANY CHANGE IN THE INFORMATION CONTAINED IN THIS FORM.

VERIFICATION

Under penalties of perjury, I declare that I have read the foregoing Sworn Statement Pursuant To Section 287.133(3)(A), Florida Statutes, On Public Entity Crimes and that the facts stated in it are true.

Print Name

Signature

Date

**ATTACHMENT C
LOCAL VENDOR AFFIDAVIT**

Complete and submit this form ONLY if you qualify for local preference as provided in the City of Daytona Beach Purchasing Code.

A copy of the Bidder's Daytona Beach Business Tax Receipt must be submitted with this Affidavit.

NAME OF BIDDER: _____

LOCAL BUSINESS ADDRESS *(street address being used to claim Local Preference, including zip code):*

The undersigned certifies under penalty of perjury each of the following:

The Local Business Address has continuously been used as a Permanent Place of Business with at least one full-time employee since _____.
(Insert date)

The Local Business Address has consistently offered or provided the goods or services being solicited by the City of Daytona Beach during the time referenced above.

The Local Business Address has not been established with the sole purpose of obtaining the advantages that may be granted pursuant to the Local Preference provisions of the City of Daytona Beach Purchasing Code.

VERIFICATION

Under penalties of perjury, I declare that I have read the foregoing Local Vendor Affidavit and that the facts stated in it are true.

Print Name

Signature

Date

The City of Daytona Beach reserves authority to require a copy of the corporate charter, corporate income tax filing return, and any other documents(s) to evaluate the Bidder's Local Preference claim.

- a. Measurement of various items for Demolition will not be made for payment and all items shall be included in the lump sum price.
- b. Payment for Demolition will be made at the Contract lump sum price for the item, which price and payment shall be full compensation for the all labor, materials, equipment services, testing, backfill, compaction, removal of debris from site, sod removal, transportation and appropriate disposal of all items not retained by Owner which generally includes, but is not limited to: electrical wiring, sidewalks, conduits, piping not associated with other line items and any additional demolition shown on the Drawings but not mentioned herein. Payment will be based on percentage of work completed during the pay period at time of pay application to the nearest 10% complete. The cumulative total shall not exceed the Lump Sum Bid Pay Item Amount.

5. New Generator, Enclosure, and Accessories (Bid Item No. 5)

- a. Measurement for the generator equipment and associated appurtenances to be paid for will be determined by the actual count of units delivered to the project site and accepted by the contractor.
- b. Payment for generator equipment will be made at the Contract lump sum price, which price shall be full compensation for all material and services required for the provision or modification of the generator equipment, fuel tank, paralleling equipment, **elevated platform and stairs around the generators**, site work including any backfill and compaction, signed and sealed equipment tie down details, signed and sealed wind load drawings and calculations, testing, inspections, finish grading and site restoration, sodding, utility protection, utility relocation if required, and all work and materials required to provide the complete project as shown in the project drawings, including transportation costs. **Base bid will include sound attenuating enclosure which reduces noise to less than 65 dB at 21 feet, and deductive alternative will include sound attenuating enclosure which reduces noise to 80 dB or less.**

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6. ~~12" Thick Concrete Pile Cap with Reinforcement and Accessories~~**Concrete Foundations** (Bid Item No. 6)

- a. Measurement for the concrete ~~pile cap and~~ **foundations**, associated reinforcement and accessories to be paid for will not be made for payment and all items shall be included in the lump sum price.
- b. Payment for the concrete pile **cap/foundation, thickened pad at each pile location, stair concrete pads, generator concrete pads and electrical equipment pad** will be made at the Contract ~~lump sum unit~~ price, which price shall be full compensation for all material and services required for the concrete **pads, reinforcement and accessories**,

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site work including any backfill and compaction, testing, inspections, finish grading and site restoration of the entire project site including but not limited to the installation of any drainage swales or conveyance measures as shown on the plans, sodding, utility protection, utility relocation if required, and all work and materials required to provide the complete project as shown in the project drawings, including transportation costs.

~~7. Concrete Foundation – Stair and Equipment Pads (Bid Item No. 6)~~

~~a. Measurement for the concrete equipment pads and associated appurtenances to be paid for will not be made for payment and all items shall be included in the lump sum price.~~

~~b. Payment for the concrete equipment pads will be made at the Contract unit price, which price shall be full compensation for all material and services required for the generators, electrical equipment and stair landing slabs, site work including any backfill and compaction, testing, inspections, finish grading and site restoration of the entire project site including but not limited to the installation of any drainage swales or conveyance measures as shown on the plans, sodding, utility protection, utility relocation if required, and all work and materials required to provide the complete project as shown in the project drawings, including transportation costs.~~

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8. 14" Diameter Auger-cast Concrete Piles with Reinforcement and Accessories (Bid Item No. 7)

a. Measurement for the concrete piles and associated reinforcement and accessories to be paid for will be **based on linear foot of concrete pile actually placed and satisfactorily installed as measured at the ground surface** based on each concrete pile satisfactorily installed and accepted by the Owner.

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b. Payment for the concrete piles will be made at the Contract unit price **per linear foot for the size and type installed**, which price shall be full compensation for all material and services required for the concrete piles, reinforcing steel, site work including any backfill and compaction, testing, inspections, and all work and materials required to install the piles as shown in the project drawings, including transportation costs.

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9. Access Platform, Stairs and Railing (Bid Item No. 8)

a. Measurement for the access platform, stairs, railing and associated appurtenances **will not be made for payment and all items shall be included in the lump sum price** will be based on each platform and associated appurtenances satisfactorily installed and accepted by

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the Owner.

- b. Payment for the access platform, stairs, railing and associated appurtenances will be made at the Contract **lump sum** unit price, which price shall be full compensation for all material and services required for the access platform, stairs, protective railings, all required appurtenances, structural plans and calculations by a licensed Florida Professional Engineer for all access platforms, stairs, and railings, site work including any backfill and compaction, testing, inspections, finish grading and site restoration of the entire project site including but not limited to the installation of any drainage swales or conveyance measures as shown on the plans, sodding, utility protection, utility relocation if required, and all work and materials required to provide the complete project as shown in the project drawings, including transportation costs.

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10. Equipment Installation (Bid Item No. 9)

- a. Measurement of Installing electrical equipment will be based on the installation to the nearest ten percent submitted by the contractor and approved by the Engineer.

- b. Measurement Payment for Installing will be made at the Contract lump sum price for the size and type installed, which price and payment shall be full compensation for installation **of the generator equipment, fuel tank, paralleling equipment, elevated platform, stairs around the generators** -in locations indicated on the Construction Drawings which includes all **other** equipment and all other work necessary to complete the installation as specified. Payment will be based on percentage of work completed during the pay period at time of pay application to the nearest 10% complete. The cumulative total shall not exceed the Lump Sum Bid Pay Item Amount.

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11. Testing of Electrical Equipment (Bid Item No. 10)

- a. Measurement of testing of electrical equipment will not be made for payment and all items shall be included in the lump sum price.
- b. Payment for all labor, equipment and material for all work necessary and required for testing of the electrical equipment shall include but not be limited to; provision of fuel, load bank equipment, test equipment, operational testing NETA testing, and all incidental work required to satisfactorily complete this item.

12. Florida Power and Light (FPL) Allowance (Bid Item No. 11)

- a. Measurement for Florida Power and Light (FPL) Allowance is for items not indicated on drawings but may be required based on access to the

SECTION 16080

OVERCURRENT PROTECTIVE DEVICE COORDINATION AND ARC-FLASH STUDY

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PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes computer-based, overcurrent protective device coordination studies to determine overcurrent protective devices and to determine overcurrent protective device settings for selective tripping. **Study will include all new gear and existing main distribution gear.**
- B. **Section includes a computer-based, arc-flash study to determine the arc-flash hazard distance and the incident energy to which personnel could be exposed during work on or near electrical equipment. Study will include all new gear and existing main distribution gear.**
- C. Include short circuit, power flow, protective coordination, and equipment evaluation. Run Preliminary study prior to ordering electric equipment.
- D. **Include arc flash study, arc flash incident energy mitigation recommendations and vinyl arc flash labels. Run prior to ordering electric equipment.**

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1.02 ACTION SUBMITTALS

- A. Product Data: For computer software program to be used for studies.
- B. Other Action Submittals: Submit the following after the approval of system protective devices submittals. Submittals shall be in digital form.

- 1. Coordination-study and arc-flash study input data, including completed computer program input data sheets.
- 2. Study and equipment evaluation reports.
- 3. Overcurrent protective device coordination study report; signed, dated, and sealed by a qualified professional engineer.
 - a. Submit study report for action prior to receiving final approval of the distribution equipment submittals. If formal completion of studies will cause delay in equipment manufacturing, obtain approval from Engineer for preliminary submittal of sufficient study data to ensure that the selection of devices and associated characteristics is satisfactory.

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4. Arc-flash study report; signed, dated, and sealed by a qualified professional engineer.

a. Submit study report for action prior to receiving final approval of the distribution equipment submittals. If formal completion of studies will cause delay in equipment manufacturing, obtain approval from Engineer for preliminary submittal of sufficient study data to ensure that the selection of devices and associated characteristics is satisfactory.

b. Submit sample arc flash label.

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1.03 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Coordination Study Specialist and Field Adjusting Agency.

A.B. Qualification Data: For Arc-Flash Study Specialist and Field Adjusting Agency.

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C. Product Certificates: For overcurrent protective device coordination study software, certifying compliance with IEEE 399.

B.D. Product Certificates: For arc-flash hazard analysis software, certifying compliance with IEEE 1584 and NFPA 70E.

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1.04 CLOSEOUT SUBMITTALS

1. Operation and Maintenance Data: For the overcurrent protective devices to include in emergency, operation, and maintenance manuals.

1. Include the following:

a. The following parts from the Protective Device Coordination Study Report:

- 1) One-line diagram.
- 2) Protective device coordination study.
- 3) Time-current coordination curves.

b. Power system data.

B. Operation and Maintenance Procedures: Provide maintenance procedures for use by Owner's personnel that comply with requirements in NFPA 70E.

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1.05 QUALITY ASSURANCE

A. Studies shall use computer programs that are distributed nationally and are in wide use. Software algorithms shall comply with requirements of standards and guides specified in this Section. Manual calculations are unacceptable.

B. Coordination Study **and Arc-Flash Study** Software Developer Qualifications: An entity that owns and markets computer software used for studies, having performed successful studies of similar magnitude on electrical distribution systems using similar devices. **5**

1. The computer program shall be developed under the charge of a licensed professional engineer who holds IEEE Computer Society's Certified Software Development Professional certification.

C. Coordination Study **and Arc-Flash Study** Specialist Qualifications: Professional engineer in charge of performing the studies, **analyzing the arc flash,** and documenting recommendations, licensed in the state where Project is located. All elements of the study shall be performed under the direct supervision and control of this professional engineer. **5**

D. Field Adjusting Agency Qualifications: An independent agency, with the experience and capability to adjust overcurrent devices and to conduct the testing indicated, that is a member company of the InterNational Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.

PART 2 - PRODUCTS

2.01 COMPUTER SOFTWARE DEVELOPERS

A. Software Developers: Subject to compliance with requirements, provide software by the following:

1. SKM Systems Analysis, Inc.
2. Equal product approved by Engineer.

B. Comply with IEEE 242, ~~and~~ IEEE 399, **IEEE 1584, and NFPA 70E.** **5**

C. Analytical features of device coordination study computer software program shall have the capability to calculate mandatory features as listed in IEEE 399.

D. Computer software program shall be capable of plotting and diagramming time-current-characteristic curves as part of its output. Computer software program shall report device settings and ratings of all overcurrent protective devices and shall demonstrate selective coordination by computer-generated, time-current coordination plots.

B. Examine Project overcurrent protective device submittals. Proceed with arc-flash study only after relevant equipment submittals have been assembled. Overcurrent protective devices that have not been submitted and approved prior to arc-flash study may not be used in study.

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~~1. Proceed with coordination study only after relevant equipment submittals have been assembled. Overcurrent protective devices that have not been submitted and approved prior to coordination study may not be used in study.~~

3.02 PROTECTIVE DEVICE COORDINATION STUDY

- A. Comply with IEEE 242 for calculating short-circuit currents and determining coordination time intervals.
- B. Comply with IEEE 399 for general study procedures.
- C. The study shall be based on the device characteristics supplied by device manufacturer.
- D. The extent of the electrical power system to be studied is indicated on Drawings.
- E. Begin analysis at the service, extending down to the system overcurrent protective devices as follows:
 - 1. To normal system low-voltage load buses where fault current is 10 kA or less.
 - 2. Exclude equipment rated 240-V ac or less when supplied by a single transformer rated less than 125 kVA.
- F. Study electrical distribution system from normal and alternate power sources throughout electrical distribution system for Project. Study all cases of system-switching configurations and alternate operations that could result in maximum fault conditions.
- G. The calculations shall include the ac fault-current decay from induction motors. The calculations shall also account for the fault-current dc decrement, to address the asymmetrical requirements of the interrupting equipment.
 - 1. For grounded systems, provide a bolted line-to-ground fault-current study for areas as defined for the three-phase bolted fault short-circuit study.
- H. Calculate short-circuit momentary and interrupting duties for a three-phase bolted fault and single line-to-ground fault at each of the following:
 - 1. Electric utility's supply termination point.
 - 2. Switchgear.

3. Low-voltage switchgear.
 4. Standby generators and automatic transfer switches.
- I. Protective Device Evaluation:
1. Evaluate equipment and protective devices and compare to short-circuit ratings.
 2. Adequacy of switchgear, motor-control centers, and panelboard bus bars to withstand short-circuit stresses.

3.03 ARC-FLASH HAZARD ANALYSIS

A. Comply with NFPA 70E and its Annex D for hazard analysis study.

Use the short-circuit study output and the field-verified settings of the overcurrent devices.

Calculate maximum and minimum contributions of fault-current size.

1. **The minimum calculation shall assume that the utility contribution is at a minimum and shall assume no motor load.**
2. **The maximum calculation shall assume a maximum contribution from the utility and shall assume motors to be operating under full-load conditions.**

Calculate the arc-flash protection boundary and incident energy at locations in the electrical distribution system where personnel could perform work on energized parts.

Include low-voltage equipment locations, except 240-V ac and 208-V ac systems fed from transformers less than 125 kVA.

Safe working distances shall be specified for calculated fault locations based on the calculated arc-flash boundary, considering incident energy of 1.2 cal/sq.cm.

Incident energy calculations shall consider the accumulation of energy over time when performing arc-flash calculations on buses with multiple sources. Iterative calculations shall take into account the changing current contributions, as the sources are interrupted or decremented with time. Fault contribution from motors shall be decremented as follows:

3. **Fault contribution from induction motors should not be considered beyond three to five cycles.**

Arc-flash computation shall include both line and load side of a circuit breaker as follows:

4. **When the circuit breaker is in a separate enclosure.**

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5. When the line terminals of the circuit breaker are separate from the work location.

Base arc-flash calculations on actual overcurrent protective device clearing time. Cap maximum clearing time at two seconds based on IEEE 1584, Section B.1.2.

Furnish and install arc flash hazard labels for all equipment covered by study.

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3.033.04 POWER SYSTEM DATA

- A. Obtain all data necessary for the conduct of the overcurrent protective device study.
 - 1. Verify completeness of data supplied in the one-line diagram on Drawings. Call discrepancies to the attention of Engineer.
 - 2. For new equipment, use characteristics submitted under the provisions of action submittals and information submittals for this Project.
 - 3. Coordinate with electrical utility as required to acquire information.
- B. Gather and tabulate the following input data to support coordination study. The list below is a guide.
 - 1. Product Data for overcurrent protective devices specified in other Sections and involved in overcurrent protective device coordination studies. Use equipment designation tags that are consistent with electrical distribution system diagrams, overcurrent protective device submittals, input and output data, and recommended device settings.
 - 2. Electrical power utility impedance at the service.
 - 3. Power sources and ties.
 - 4. Short-circuit current at each system bus, three phase and line-to-ground.
 - 5. Full-load current of all loads.
 - 6. Voltage level at each bus.
 - 7. For transformers, include kVA, primary and secondary voltages, connection type, impedance, X/R ratio, taps measured in percent, and phase shift.
 - 8. For circuit breakers and fuses, provide manufacturer and model designation. List type of breaker, type of trip and available range of settings, SCCR, current rating, and breaker settings.
 - 9. Maximum demands from service meters.
 - 10. Busway manufacturer and model designation, current rating, impedance, lengths, and conductor material.

11. Motor horsepower and NEMA MG 1 code letter designation.
12. Low-voltage cable sizes, lengths, number, conductor material, and conduit material (magnetic or nonmagnetic).
13. Field verify/collect data of existing protective devices required for overcurrent protection device study.
14. Data sheets to supplement electrical distribution system diagram, cross-referenced with tag numbers on diagram, showing the following:
 - Special load considerations, including starting inrush currents and frequent starting and stopping.
 - Ratings, types, and settings of utility company's overcurrent protective devices.
 - Special overcurrent protective device settings or types stipulated by utility company.
 - Time-current-characteristic curves of devices indicated to be coordinated.
 - Manufacturer, frame size, interrupting rating in amperes rms symmetrical, ampere or current sensor rating, long-time adjustment range, short-time adjustment range, and instantaneous adjustment range for circuit breakers.
 - Manufacturer and type, ampere-tap adjustment range, time-delay adjustment range, instantaneous attachment adjustment range, and current transformer ratio for overcurrent relays.
 - Panelboards, switchboards, motor-control center ampacity, and SCCR in amperes rms symmetrical.

3.043.05 FIELD ADJUSTING

- A. Adjust relay and protective device settings according to the recommended settings provided by the coordination study. Field adjustments shall be completed by the engineering service division of the equipment manufacturer under the Startup and Acceptance Testing contract portion.
- B. Make minor modifications to equipment as required to accomplish compliance with short-circuit and protective device coordination studies.
- C. Testing and adjusting shall be by a full-time employee of the Field Adjusting Agency, who holds NETA ETT Level III certification or NICET Electrical Power Testing Level III certification.
 1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.

Perform NETA tests and inspections for all adjustable overcurrent protective devices.

3.053.06 DEMONSTRATION

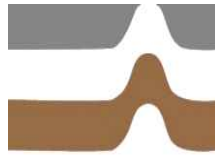
A. Engage the Coordination Study Specialist **and Arc-Flash Study Specialist** to train Owner's maintenance personnel in the following: **5**

1. Acquaint personnel in the fundamentals of operating the power system in normal and emergency modes.
2. Hand-out and explain the objectives of the coordination study, study descriptions, purpose, basis, and scope. Include case descriptions, definition of terms, and guide for interpreting the time-current coordination curves.
3. Adjust, operate, and maintain overcurrent protective device settings.

~~3.4.~~ **The potential arc-flash hazards associated with working on energized equipment and the significance of the arc-flash warning labels.** **5**

END OF SECTION

**Additional Subsurface Soil Exploration and
Geotechnical Engineering Evaluation
Proposed Generators
Bethune Point Wastewater Treatment Plant
Daytona Beach, Volusia County, Florida**



Ardaman & Associates, Inc.

CORPORATE HEADQUARTERS

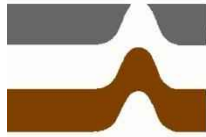
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Tetra Tech, Inc.
201 E. Pine Street, Suite 1000
Orlando, Florida 32801

Attention: Ms. Jennifer Ribotti, P.E.

Subject: Additional Subsurface Soil Exploration and
Geotechnical Engineering Evaluation
Proposed Generators
Bethune Point Wastewater Treatment Plant
Daytona Beach, Volusia County, Florida

Dear Ms. Ribotti:

As requested and authorized, we have completed additional subsurface soil exploration for the subject project. The purposes of performing this additional exploration were to further evaluate the general subsurface conditions within the proposed generator pad areas and to provide recommendations for site preparation and foundation support. This report documents our findings and presents our engineering recommendations.

Ardaman & Associates performed a subsurface soil exploration relative to the subject site in August 2019, the results of which were presented in our report dated August 30, 2019 (Ardaman & Associates File No. 19-6412). The results of our previous exploration have been incorporated into this report. The results of the previous exploration indicated that very soft clay is present at the proposed generator location to a depth on the order of 10 feet below the existing ground surface. To avoid the potential for unacceptable settlement of the generator foundation due to consolidation of the soft clay stratum, and in lieu of removal and replacement of the clay soils as discussed in our previously submitted report, the decision has been made to pile support the structures.

SITE LOCATION AND SITE DESCRIPTION

The site for the proposed generators is located at the Bethune Point Wastewater Treatment Plant at 1 Shady Place, Daytona Beach, Volusia County, Florida (Section 40, Township 15 South, Range 32 East). The general site location is shown superimposed on the Daytona Beach, Florida U.S.G.S. quadrangle map presented on Figure 1.

The site for the proposed generators currently consists of a relatively flat grassy area adjacent to an electrical building and paved parking/drive areas.

PROPOSED CONSTRUCTION AND GRADING

It is our understanding that the proposed development includes two generators each supported by concrete pads on pile foundations. The concrete pads are approximately 9 by 31 feet in “footprint” plan dimensions. The maximum total weight of each generator was provided by Tetra Tech and is approximately 75 kips. Based on the grading plan provided by Tetra Tech on August 23, 2019, no significant new fill is required to raise the generator pad areas to final elevation(s). If actual structure load or fill height exceed our assumptions, then the recommendations in this report may not be valid.

FIELD EXPLORATION PROGRAM

SPT Borings

The field exploration program included performing 2 Standard Penetration Test (SPT) borings in August, 2019 and 2 SPT borings in November, 2019. The SPT borings were advanced to depths of 20 and 40 feet below the ground surface using the methodology outlined in ASTM D-1586. A summary of this field procedure is included in Appendix I. Split-spoon soil samples recovered during performance of the borings were visually classified in the field and representative portions of the samples were transported to our laboratory in sealed sample jars.

The groundwater level at each of the boring locations was measured during drilling. The borings were backfilled with soil cuttings upon completion.

Test Locations

The approximate locations of the borings are schematically illustrated on a site plan shown on Figure 2. These locations were determined in the field by tape measuring distances from existing site features and should be considered accurate only to the degree implied by the method of measurement used.

LABORATORY PROGRAM

Representative soil samples obtained during our field sampling operation were packaged and transferred to our laboratory for further visual examination and classification. The soil samples were visually classified in general accordance with the Unified Soil Classification System (ASTM D-2488). The resulting soil descriptions are shown on the soil boring profiles presented on Figure 3.

GENERAL SUBSURFACE CONDITIONS

General Soil Profile

The results of the field exploration and laboratory programs are graphically summarized on the soil boring profiles presented on Figure 3. The stratification of the boring profiles represents our interpretation of the field boring logs and the results of laboratory examinations of the recovered samples. The stratification lines represent the approximate boundary between soil types. The actual transitions may be more gradual than implied.

The results of the borings indicate the following general soil profile:

Depth Below Ground Surface (feet)		Description
From	To	
0	12½	Very loose to loose fine sand (SP), fine sand with silt (SP-SM) and clayey fine sand (SC) with varying amounts of shell and very soft to medium stiff clay (CH)
12½	40	Medium dense to dense fine sand (SP) with varying amounts of shell fragments

The above soil profile is outlined in general terms only. Please refer to Figure 3 for soil profile details.

Groundwater Level

The groundwater level was measured in the boreholes during drilling. As shown on Figure 3, groundwater was encountered at depths that ranged from 2.8 to 3.5 feet below the existing ground surface on the dates indicated. Fluctuation in groundwater levels should be anticipated throughout the year primarily due to seasonal variations in rainfall and other factors that may vary from the time the borings were conducted.

ENGINEERING EVALUATION AND RECOMMENDATIONS

General

The results of our exploration indicate that very soft clay (Stratum No. 4 on Figure 3) is present at the proposed generator locations to a depth on the order of 10 feet below the existing ground surface. The soft clay has the potential for unacceptable settlement of the generator foundations if founded on shallow foundations. In addition, we understand that complete removal and replacement of the soft clay as discussed in our August 30, 2019 report is not deemed a desirable

option. Therefore, and as requested by the client, several pile support alternatives have been considered and evaluated for use at this site.

The following are our recommendations for foundation alternatives and overall site preparation which we feel are best suited for the proposed facility and existing soil conditions. The recommendations are made as a guide for the design engineer, parts of which should be incorporated into the project's specifications.

Stripping and Grubbing

The "footprints" of the proposed generator pads, plus a minimum margin of five feet, should be stripped of all surface vegetation, stumps, debris, organic topsoil or other deleterious materials, as encountered.

After stripping, the site should be grubbed or root-raked such that roots with a diameter greater than ½ inch, stumps, or small roots in a dense state, are completely removed. The actual depth(s) of stripping and grubbing must be determined by visual observation and judgment during the earthwork operation.

All existing foundations, slabs, asphalt, and any other underground structures should be removed from the proposed construction area. If pipes or any collapsible or leak prone utilities are not removed or completely filled (with grout or concrete), they might serve as conduits for subsurface erosion resulting in excessive settlements. Over-excavated areas resulting from the removal of underground structures and unsuitable materials should be backfilled in accordance with the fill soils section of this report. This excavation must not undermine the existing foundations. Provide shoring, bracing, and/or underpinning of existing foundations as necessary to protect from failure.

Proof-rolling

We recommend proof-rolling the cleared surface to locate any unforeseen soft areas or unsuitable surface or near-surface soils, to increase the density of the upper soils, and to prepare the existing surface for the addition of the fill soils (as required). Proof-rolling of the structure areas should consist of at least 10 passes of a compactor capable of achieving the density requirements described in the next paragraph. Each pass should overlap the preceding pass by 30 percent to achieve complete coverage. If deemed necessary, in areas that continue to "yield", remove all deleterious material and replace with clean, compacted sand backfill. The proof-rolling should occur after cutting and before filling.

A density equivalent to or greater than 95 percent of the modified Proctor (ASTM D-1557) maximum dry density value for a depth of 1 foot in the structure areas must be achieved beneath the stripped and grubbed ground surface. Additional passes and/or overexcavation and recompaction may be required if this minimum density requirement is not achieved. The soil moisture should be adjusted as necessary during compaction.

Due to the relatively high groundwater level at this site, proof-rolling may cause upward movement or “pumping” of the groundwater. However, we recommend that the existing surface be level and firm prior to the addition of fill soils. Proof-rolling with a front-end loader may help achieve the desired surface and compaction condition before adding the fill soils. The site should be dewatered as necessary. Depending on the time of year, a 12- to 18-inch layer of clean fine sand (SP) fill may be required prior to proof-rolling.

Care should be exercised to avoid damaging any neighboring structures while the compaction operation is underway. Prior to commencing compaction, occupants of adjacent structures should be notified and the existing condition (i.e. cracks) of the structures documented with photographs and survey (if deemed necessary). Compaction should cease if deemed detrimental to adjacent structures, and Ardaman & Associates should be notified immediately. Heavy vibratory compaction should not be used within 200 feet of existing structures.

Suitable Fill Material and Compaction of Fill Soils

If fill material is needed to restore existing grade after stripping, grubbing and proof-rolling, fill materials should be free of organic materials, such as roots and vegetation. We recommend using fill with less than 12 percent by dry weight of material passing the U.S. Standard No. 200 sieve size. The fine sand and fine sand with silt (Strata No. 1 and 2 without roots, as shown on Figure 3) are suitable for use as fill materials and, with proper moisture control, should densify using conventional compaction methods. Soils removed from below the water table will need time to dry and to moisture condition prior to compacting.

All structural fill should be placed in level lifts not to exceed 12 inches in uncompacted thickness. Each lift should be compacted to at least 95 percent of the modified Proctor (ASTM D-1557) maximum dry density value. The filling and compaction operations should continue in lifts until the desired elevation(s) is achieved. If hand-held compaction equipment is used, the lift thickness should be reduced to no more than 6 inches.

Foundation Support Alternatives for Proposed Generators

Foundation Support by Augered Cast-In-Place Piles (APG)

Augered piles create much less noise and fewer vibrations during construction than do driven piles, and are often selected where such factors are critical. Augered cast-in-place piles are made by rotating a continuous-flight, hollow-shaft auger into the ground to the specified pile depth, or until the specified refusal criteria is satisfied. Grout is then injected throughout the auger shaft, as the auger is being withdrawn, in such a way as to exert a positive upward grout pressure on the earth filled auger flights as well as a positive lateral pressure on the soil surrounding the grout filled pile hole. A spacer attached to a steel reinforcing rod is placed through the fresh concrete to verify that the hole has been maintained. Reinforcement must extend the full depth of the pile through which tension resistance is needed. However, deep reinforcement should consist of 1 or

2 bars clustered in the center of the pile. Steel reinforcement cages, if needed, should be limited in size and depth.

Pile capacity analyses were performed for 14-inch diameter augered cast-in-place piles. The results of our calculations are presented on the following table. We note that a factor of safety of 2 was applied to the ultimate compressive capacities when estimating the recommended maximum allowable capacities.

Shaft Diameter (Inches)	Pile Length (Feet)	Maximum Allowable Axial Load (tons)
14	20	15
	25	20
	30	23

Required tension forces have not been supplied to us at this time. However, allowable uplift capacities are anticipated to be around 50 percent of the allowable compressive pile capacities presented in the above table.

The calculated allowable capacities presented in the above tables are based on a factor of safety of 2 and are developed by skin friction along the length of the pile plus end bearing. A factor of safety of 2 is typically used when static load compression testing is performed to verify capacity. Minimum pile spacing should be 3.0 pile diameters from center to center of the piles in a group to prevent group interaction which could result in a loss of some of the capacity of an individual pile. Capacities must be verified in the field by actual load tests, and pile size and length adjusted, if necessary.

If this option is selected, we should consult with the design team to prepare a set of more detailed recommendations that will consider, among other things;

- Contractor qualifications
- Pile locations
- Test pile program
- Pile Integrity Testing (PIT)
- Grout requirements
- Installation procedures and tolerances
- Inspection requirements

Care should be taken to maintain the vertical and horizontal alignment of the piles. We recommend that the concrete grout used to form the piles reach a compressive strength of at least 5,000 psi in 28 days.

The lower five feet of the pile borehole should be double-reamed and double-pumped. That is, once the auger reaches the specified depth, the grout pumping should commence, and the auger should be retrieved at a height of 3 to 5 feet, and then reinserted to the bottom of the pile while the grout is being pumped. Once the auger is reinserted to the bottom of the pile, it may be retrieved slowly to the ground surface as the grout is being pumped.

The amount of concrete grout used to form each pile should be at least 1.2 times the theoretical pile volume. At a minimum, this calculated volume of grout is to be pumped per foot of pile as the auger is retrieved. The Contractor will need to install each pile such that an adequate cross section is maintained. Grout quantities established during the test pile program will need to be used during the production piles.

Piles should not be installed within 10 pile diameters, center to center, of a pile filled with grout that is less than 12 hours old or where the grout has not been verified to be hard. If grout heave occurs at a nearby pile, this distance must be increased to a sufficient distance so that the installation of adjacent piles does not affect grout set or pile geometry.

If grout pumping and/or auger retrieval operations are stopped at any time during the formation of a given pile, the borehole is to be reaugered and the pile formed anew. If the concrete level in any completed pile drops significantly (i.e., a sudden, large and atypical amount of grout drop occurs), the pile shall be rejected and replaced. If there is difficulty in placing the reinforcement steel in any pile, the pile shall be redrilled and replaced. All reinforcement steel should be fitted with spacers including a spacer at its lower tip to allow easier installation into the pile and assure its centering. Reinforcement must extend the full depth of the pile through which tension resistance is needed. However, deep reinforcement should consist of 1 or 2 bars clustered in the center of the pile. Steel reinforcement cages, if needed, should be limited in size and depth.

Any modification to these procedures is to be approved by the Geotechnical Engineer based on observations during pile installation.

We recommend conducting a minimum of one static load compression test in accordance with ASTM D-1143 (Quick Load Test Method) at a non-production pile location prior to commencing production pile installation to finalize the load capacity and pile length requirement. The test load should be at least twice the design load. The contractor should supply the load test set up and jacking equipment. Ardaman & Associates, Inc. will provide the gauges and reference beams and monitor pile vertical movements. The contractor's jack and pump must be calibrated just prior to the load test, by a certified laboratory and results of the calibration must be provided to Ardaman prior to the pile load test. The load test should be continuously monitored by an Ardaman geotechnical engineer or his/her representative.

Foundation Support for Existing Structures by Helical Anchors

Helical piers, or screw anchors, may be used to provide foundation support for the proposed generators. Helical piers, or screw anchors, consist of one or more plates formed into the shape of a helix or one pitch of a screw thread. The plate(s) is attached to a central shaft and installed by applying torque to the anchor and screwing it into the soil. These types of piles have the advantage that they can be installed with relatively small, compact equipment and without potentially problematic vibration.

We analyzed one depth of Type SS 175 square shaft helical pier manufactured by Chance, a division of Hubbell Power Systems. A data sheet for this type of pile is included in Appendix II for informational purposes. The calculations were performed using the computer program "HeliCAP", developed by Sailors Engineering Associates, Inc. The results of our analyses are presented on the following table.

Helical Pile Configuration	Installation Depth Below Ground Surface (feet)	Maximum Allowable Compressive Capacity (tons)	Minimum Required Installation Torque (ft-lbs)
Quad-Helix (8"/10"/12"/14" Diameter)	26 - 28	17½	8,800

The allowable capacity is based on a factor of safety of 2. Anchor spacing/depth should be in accordance with the manufacturer's recommendations as needed to achieve full capacity. Minimum horizontal spacing should be three times the largest helical plate size, center to center.

We note that due to the proximity of this site to a body of salt water (i.e., the Indian River), we recommend that, at a minimum, the helical piles be fully galvanized for corrosion protection. In addition, the pipe shaft portion of the piles should be filled with a non-shrink type grout.

Alternative pile lengths and configurations can be analyzed, if requested. The helical piers must be field tested to verify that the design compressive capacity has been achieved. Alternative comparable products may also be used.

We recommend performing a load test(s) on the helical piles. The load test(s) should be continuously monitored by an Ardaman geotechnical engineer or his/her representative.

Foundation Support by Driven Piles

The pile capacity has been estimated for a 14-inch square concrete pile. Static pile capacities were estimated utilizing SPT N-values from the borings. Specifically, the FDOT computer software, "FB-Deep Version 2.06" was used for the SPT borings, which is based on procedures developed by Dr. Schmertman, originally outlined in Research Bulletin No. 121-B, dated September 1967. The calculations incorporate a factor of safety of 2 for both side friction and mobilized end bearing.

Based on the calculations, we recommend the following design capacity:

Pile	Approximate Length	Maximum Allowable Axial Load (tons)
14-inch Square Concrete	20	30
	25	35
	30	40

The actual pile lengths and capacities may be higher or lower than estimated and will be determined during pile driving.

Required tension forces have not been supplied to us at this time. However, allowable uplift capacities are anticipated to be around 50 percent of the allowable compressive pile capacities presented in the above table.

To minimize the reduction of allowable compressive capacities for individual piles within a pile group, we recommend that the horizontal spacing of the piles in the individual pile cap be a minimum of 3 times the pile diameter. Should the pile spacing be less than 3 times the pile diameter, group reduction factors may become necessary. If this becomes apparent during design, we should be given the opportunity to review the pile arrangement to determine if group reduction factors are necessary.

It is noted that during pile driving, vibrations may cause settlement/displacement in existing nearby structures. Care should be exercised to avoid damaging any neighboring structures while the pile driving operation is underway. Prior to commencing compaction, occupants of adjacent structures should be notified and the existing condition (i.e., cracks) of the structures documented with photographs and survey. We also recommend that vibration monitoring be performed during pile driving. Monitoring can be stopped if data from the initial phases of pile driving indicate that vibration intensities are not an issue or at least well within tolerable limits.

The pile capacity presented above was estimated based on commonly used methods of analysis. The actual pile capacities may be higher or lower than estimated. A test pile program should be performed to assess pile driveability and refine foundation design parameters, final pile lengths and pile elevations at each location. We recommend that a minimum of 1 pile be instrumented with a Pile Driving Analyzer (PDA) and be driven for this project. The data will be used to evaluate hammer-driving system performance, pile stresses during driving, pile structural integrity, and calculation of pile static compressive and uplift capacities. The dynamic testing results will then be used in wave equation analysis to establish an optimum pile driving criteria to be employed in driving the production piles. Prior to test pile driving, hammer specification should be available to assess pile driving system suitability.

Piles should not be driven beyond practical refusal (20 blows per inch). Pile driving should be as continuous an operation as possible and should proceed without stopping over the last 10 feet of penetration. During driving, pile driving records should be kept for each pile detailing pertinent information such as the pile type, pile length, date driven and blow count per foot. The capacity of each pile should be reviewed based on its final tip elevation and driving record. We recommend that pile driving operations be continuously monitored by an Ardaman geotechnical engineer or his/her representative.

Dewatering

Based on the groundwater conditions encountered, the control of the groundwater may be required to achieve the necessary stripping and subsequent construction, backfilling, and compaction and pile installation requirements presented in the preceding sections. The requirement for control of groundwater should particularly be anticipated for footing and utility excavations. The actual method(s) of dewatering should be determined by the contractor. However, regardless of the method(s) used, we suggest drawing down the water table sufficiently, say 2 to 3 feet, below the bottom of any excavation or compaction surface to preclude "pumping" and/or compaction-related problems with the foundation soils.

QUALITY ASSURANCE

We recommend establishing a comprehensive quality assurance program to verify that all site preparation and foundation construction is conducted in accordance with the appropriate plans and specifications. Materials testing and inspection services should be provided by Ardaman & Associates.

As a minimum, an on-site engineering technician should monitor all stripping and grubbing to verify that deleterious materials have been removed. In-situ density tests should be conducted during filling activities and below all footings to verify that the required densities have been achieved. In-situ density values should be compared to laboratory Proctor moisture-density results for each of the different natural and fill soils encountered.

For the driven piles, augered cast-in-place piles and helical piers, Ardaman & Associates should provide full-time monitoring of the installation and load tests (as appropriate) conducted by the contractor.

Finally, we recommend inspecting and testing the construction materials for the foundations and other structural components.

CLOSURE

The analyses and recommendations submitted herein are based on the data obtained from the soil borings presented on Figure 3 and the provided loading conditions. This report does not reflect any variations which may occur adjacent to or between the borings. The nature and extent of the variations between the borings may not become evident until during construction. If variations then appear evident, it will be necessary to re-evaluate the recommendations presented in this report after performing on-site observations during the construction period and noting the characteristics of the variations.

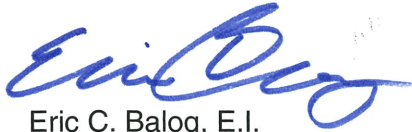
In the event any changes occur in the design, nature, or location of the proposed facility, we should review the applicability of conclusions and recommendations in this report. We recommend a general review of final design and specifications by our office to verify that earthwork and foundation recommendations are properly interpreted and implemented in the design specifications. Ardaman and Associates should attend the pre-bid and preconstruction meetings to verify that the bidders/contractor understand the recommendations contained in this report.

This study is based on a relatively shallow exploration and is not intended to be an evaluation for sinkhole potential. This study does not include an evaluation of the environmental (ecological or hazardous/toxic material related) condition of the site and subsurface.

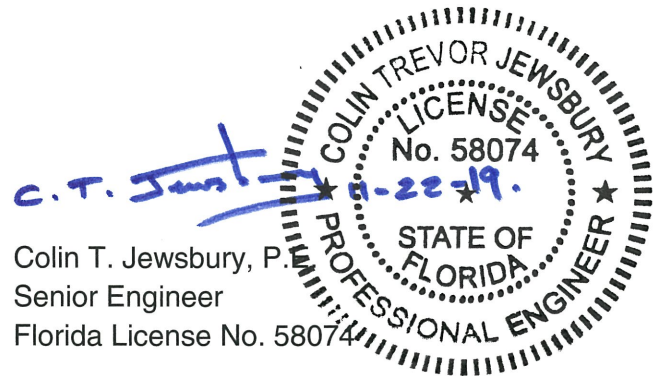
This report has been prepared for the exclusive use of Tetra Tech, Inc. in accordance with generally accepted geotechnical engineering practices for the purpose of the proposed generators located at the Bethune Point Wastewater Treatment Plant in Daytona Beach, Florida. No other warranty, expressed or implied, is made.

We are pleased to be of assistance to you on this phase of the project. When we may be of further service to you or should you have any questions, please contact us.

Very truly yours,
ARDAMAN & ASSOCIATES, INC.
Certificate of Authorization No. 5950

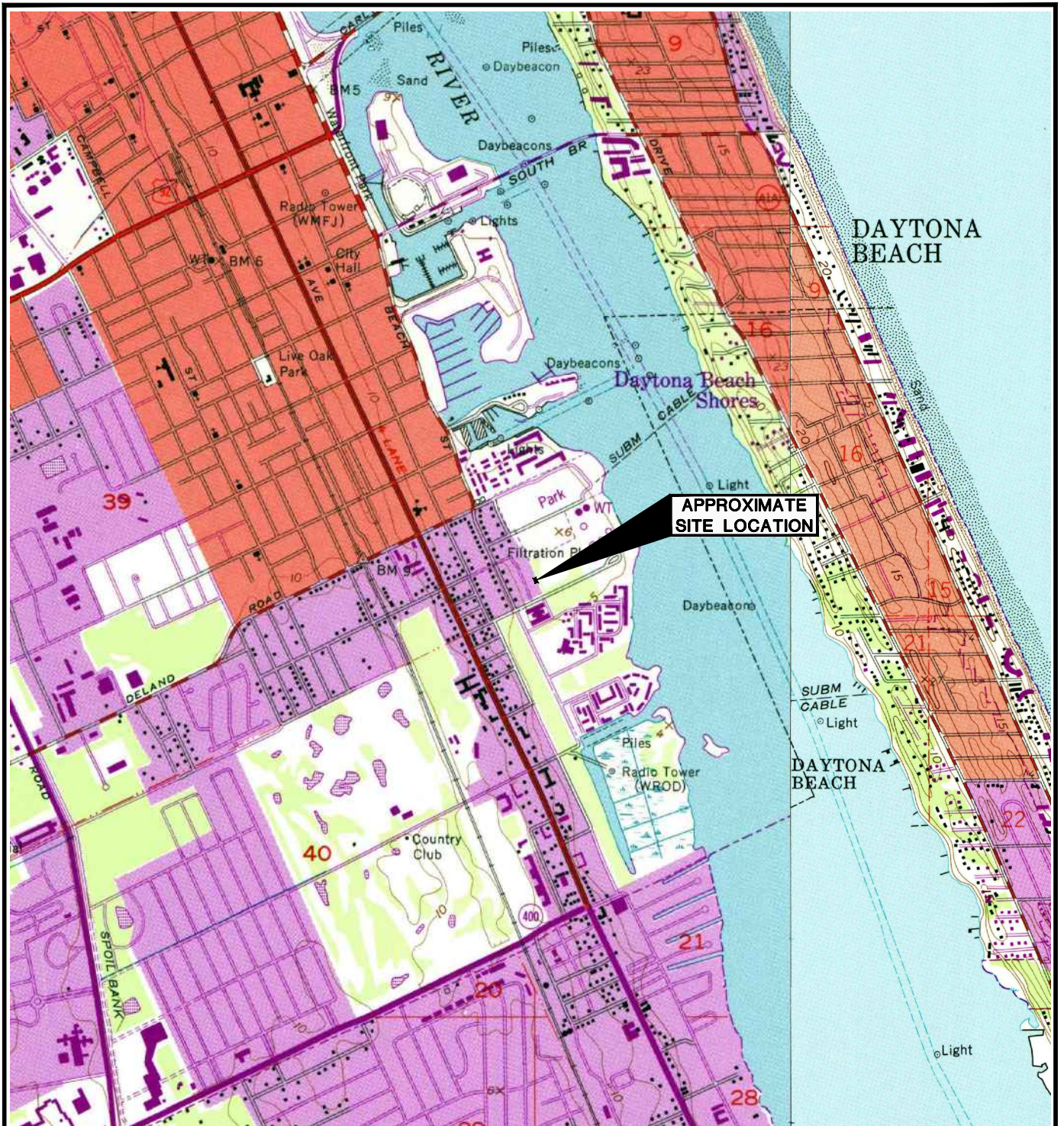


Eric C. Balog, E.I.
Assistant Project Engineer



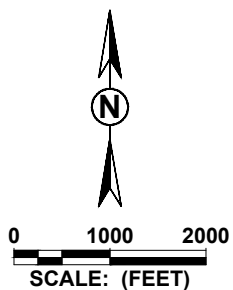
Colin T. Jewsbury, P.E.
Senior Engineer
Florida License No. 58074

ECB/CTJ/gb/nfm
19-6412 TT Bethune Point ASSE WWTP Daytona(Geo 2019)



SECTION 40
TOWNSHIP 15 SOUTH
RANGE 32 EAST

OBTAINED FROM U.S.G.S. QUAD MAP: DAYTONA BEACH, FLORIDA 1952
(PHOTOREVISED 1993)



SITE LOCATION MAP

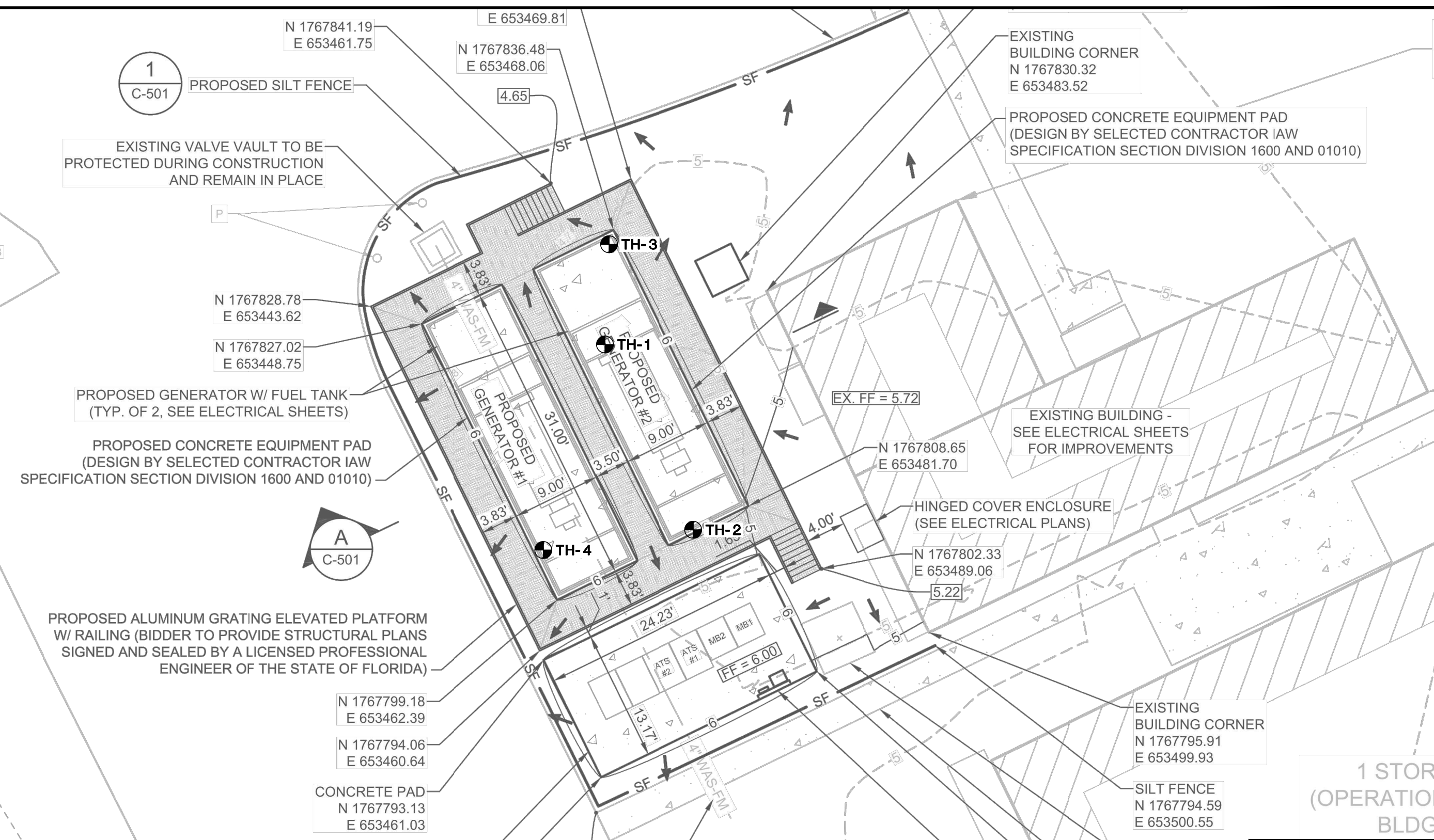
Ardaman & Associates, Inc.
Geotechnical, Environmental and
Materials Consultants

**ADDITIONAL SUBSURFACE SOIL EXPLORATION
PROPOSED GENERATORS
BETHUNE POINT
WASTEWATER TREATMENT PLANT
DAYTONA BEACH, VOLUSIA COUNTY, FLORIDA**

DRAWN BY: CD	CHECKED BY:	DATE: 11/11/19
FILE NO. 19-6412	APPROVED BY:	FIGURE: 1

T:\Orlando\19\19-6412\19641203.dwg 11/22/2019 2:50:08 PM, Chris.Drew

T:\Orlando\19\19-6412\19641204.dwg 11/22/2019 2:50:15 PM, Chris.Drew



1
C-501
PROPOSED SILT FENCE

A
C-501

EXISTING VALVE VAULT TO BE PROTECTED DURING CONSTRUCTION AND REMAIN IN PLACE

PROPOSED GENERATOR W/ FUEL TANK (TYP. OF 2, SEE ELECTRICAL SHEETS)

PROPOSED CONCRETE EQUIPMENT PAD (DESIGN BY SELECTED CONTRACTOR IAW SPECIFICATION SECTION DIVISION 1600 AND 01010)

PROPOSED ALUMINUM GRATING ELEVATED PLATFORM W/ RAILING (BIDDER TO PROVIDE STRUCTURAL PLANS SIGNED AND SEALED BY A LICENSED PROFESSIONAL ENGINEER OF THE STATE OF FLORIDA)

EXISTING BUILDING CORNER
N 1767830.32
E 653483.52

PROPOSED CONCRETE EQUIPMENT PAD (DESIGN BY SELECTED CONTRACTOR IAW SPECIFICATION SECTION DIVISION 1600 AND 01010)

EXISTING BUILDING - SEE ELECTRICAL SHEETS FOR IMPROVEMENTS

EXISTING BUILDING CORNER
N 1767795.91
E 653499.93

SILT FENCE
N 1767794.59
E 653500.55

1 STORY C (OPERATIONS BLDG 13)

LEGEND

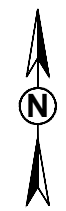
TH STANDARD PENETRATION TEST (SPT) BORING LOCATION
NOTE: THE BASE MAP FOR THE BORING LOCATION PLAN IS A SITE PLAN BY TETRA TECH, INC.

BORING LOCATION PLAN

Ardaman & Associates, Inc.
Geotechnical, Environmental and Materials Consultants

ADDITIONAL SUBSURFACE SOIL EXPLORATION PROPOSED GENERATORS
BETHUNE POINT
WASTEWATER TREATMENT PLANT
DAYTONA BEACH, VOLUSIA COUNTY, FLORIDA

DRAWN BY: CD CHECKED BY: DATE: 11/11/19
FILE NO. 19-6412 APPROVED BY: FIGURE: 2



0 5 10
SCALE: (FEET)

LEGEND

SOIL DESCRIPTIONS

- ① FINE SAND (SP)
- ② FINE SAND WITH SILT (SP-SM)
- ③ CLAYEY FINE SAND (SC)
- ④ CLAY (CH)
- ⑤ ORGANIC TOPSOIL

COLORS

- (A) LIGHT BROWN TO BROWN
- (B) LIGHT GRAY TO GRAY
- (C) DARK GRAY

TH STANDARD PENETRATION TEST (SPT) BORING

N STANDARD PENETRATION RESISTANCE IN BLOWS PER FOOT

NM NATURAL MOISTURE CONTENT IN PERCENT (ASTM D-2216)

-200 PERCENT PASSING NO. 200 SIEVE SIZE (PERCENT FINES)(ASTM D-1140)

LL LIQUID LIMIT (ASTM D-4318)

PL PLASTIC LIMIT (ASTM D-4318)

PI PLASTICITY INDEX (ASTM D-4318)

← PARTIAL LOSS OF DRILLING FLUID CIRCULATION

▼ GROUNDWATER LEVEL MEASURED ON DATE DRILLED

WOH SAMPLER ADVANCED BY STATIC WEIGHT OF HAMMER AND RODS ONLY

SP,SP-SM UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D-2487)

NOTES: 1. UPON COMPLETION OF EACH SPT BORING, THE BOREHOLE WAS BACKFILLED WITH SOIL CUTTINGS.

2. ALL SPT BORINGS WERE PERFORMED USING AN AUTOMATIC HAMMER TO THE BORING TERMINATION DEPTH. AUTOMATIC HAMMER N-VALUES MAY BE CONVERTED TO EQUIVALENT SAFETY HAMMER N-VALUES BY MULTIPLYING BY 1.24.

ENGINEERING CLASSIFICATION

I COHESIONLESS SOILS

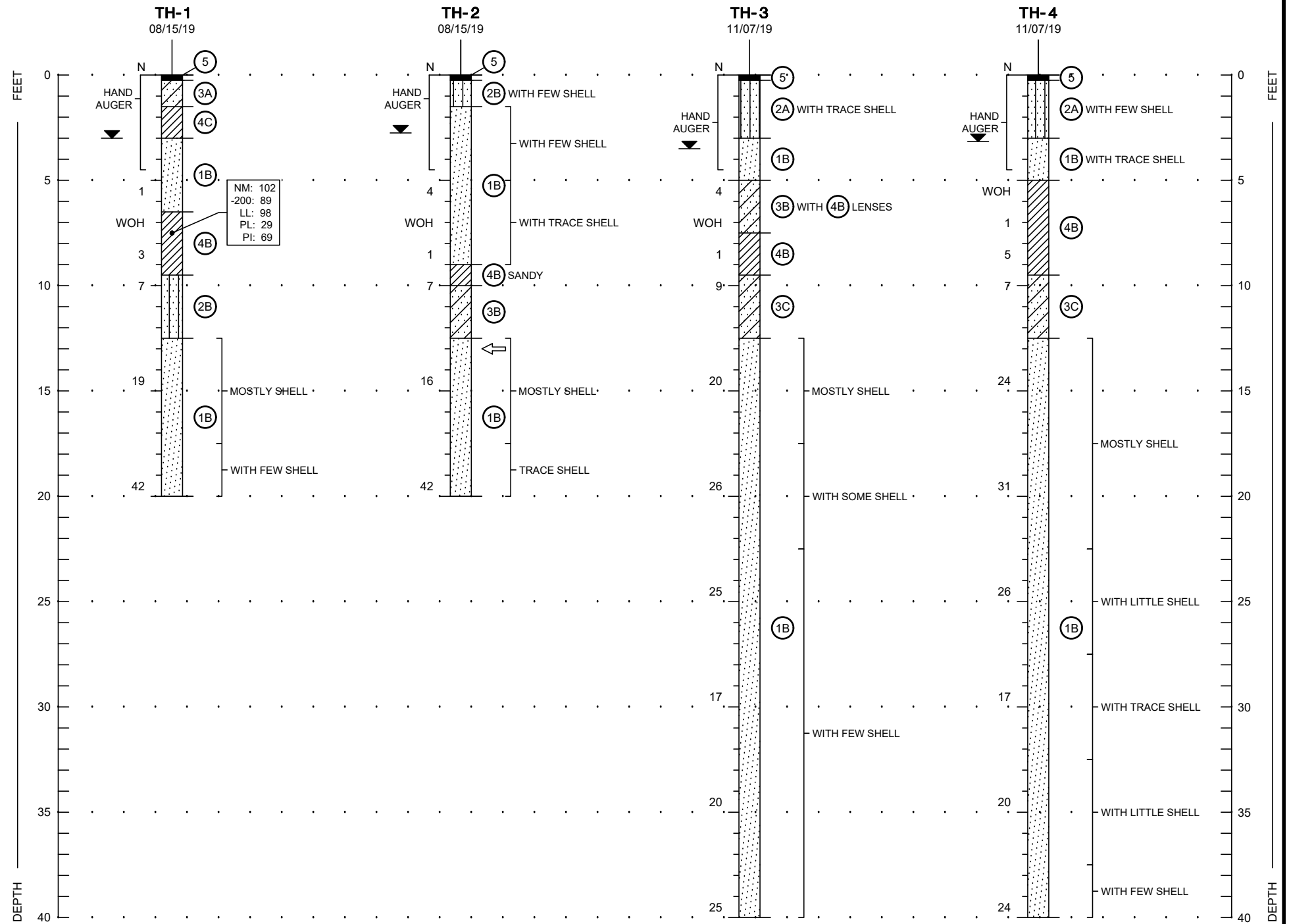
DESCRIPTION	BLOW COUNT "N"
VERY LOOSE	<4
LOOSE	4 TO 10
MEDIUM DENSE	10 TO 30
DENSE	30 TO 50
VERY DENSE	>50

II COHESIVE SOILS

DESCRIPTION	UNCONFINED COMPRESSIVE STRENGTH, QU, TSF	BLOW COUNT "N"
VERY SOFT	<1/4	<2
SOFT	1/4 TO 1/2	2 TO 4
MEDIUM STIFF	1/2 TO 1	4 TO 8
STIFF	1 TO 2	8 TO 15
VERY STIFF	2 TO 4	15 TO 30
HARD	>4	>30

WHILE THE BORINGS ARE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT THEIR RESPECTIVE LOCATIONS AND FOR THEIR RESPECTIVE VERTICAL REACHES, LOCAL VARIATIONS CHARACTERISTIC OF THE SUBSURFACE MATERIALS OF THE REGION ARE ANTICIPATED AND MAY BE ENCOUNTERED. THE BORING LOGS AND RELATED INFORMATION ARE BASED ON THE DRILLER'S LOGS AND VISUAL EXAMINATION OF SELECTED SAMPLES IN THE LABORATORY. THE DELINEATION BETWEEN SOIL TYPES SHOWN ON THE LOGS IS APPROXIMATE AND THE DESCRIPTION REPRESENTS OUR INTERPRETATION OF SUBSURFACE CONDITIONS AT THE DESIGNATED BORING LOCATIONS ON THE PARTICULAR DATE DRILLED.

GROUNDWATER ELEVATIONS SHOWN ON THE BORING LOGS REPRESENT GROUNDWATER SURFACES ENCOUNTERED ON THE DATES SHOWN. FLUCTUATIONS IN WATER TABLE LEVELS SHOULD BE ANTICIPATED THROUGHOUT THE YEAR.



SOIL BORING PROFILES

Ardaman & Associates, Inc.
Geotechnical, Environmental and
Materials Consultants

ADDITIONAL SUBSURFACE SOIL EXPLORATION
PROPOSED GENERATORS
BETHUNE POINT
WASTEWATER TREATMENT PLANT
DAYTONA BEACH, VOLUSIA COUNTY, FLORIDA

DRAWN BY: **CD** CHECKED BY: DATE: **11/11/19**
FILE NO. **19-6412** APPROVED BY: FIGURE: **3**

APPENDIX I

Standard Penetration Test Procedure

STANDARD PENETRATION TEST

The standard penetration test is a widely accepted test method of *in situ* testing of foundation soils (ASTM D 1586). A 2-foot long, 2-inch O.D. split-barrel sampler attached to the end of a string of drilling rods is driven 18 inches into the ground by successive blows of a 140-pound hammer freely dropping 30 inches. The number of blows needed for each 6 inches of penetration is recorded. The sum of the blows required for penetration of the second and third 6-inch increments of penetration constitutes the test result or N-value. After the test, the sampler is extracted from the ground and opened to allow visual examination and classification of the retained soil sample. The N-value has been empirically correlated with various soil properties allowing a conservative estimate of the behavior of soils under load.

The tests are usually performed at 5-foot intervals. The test holes are advanced to the test elevations by rotary drilling with a cutting bit, using circulating fluid to remove the cuttings and hold the fine grains in suspension. The circulating fluid, which is a bentonitic drilling mud, is also used to keep the hole open below the water table by maintaining an excess hydrostatic pressure inside the hole. In some soil deposits, particularly highly pervious ones, NX-size flush-coupled casing must be driven to just above the testing depth to keep the hole open and/or prevent the loss of circulating fluid.

Representative split-spoon samples from the soils are brought to our laboratory in air-tight jars for further evaluation and testing, if necessary. Samples not used in testing are stored for 30 days prior to being discarded.

APPENDIX II

Helical Pile Data Sheet

TYPE SS/RS COMBINATION HELICAL PILES

CHANCE® Helical Transition Coupler

Adapts Type SS to Type RS Pile Shafts

The Type SS/RS Combination Pile is used mainly in compression applications in areas where soft/loose soils are located above the bearing strata (hard/dense soils) for the helices. The Type RS material with its much greater section modulus will resist columnar buckling in the soft/loose soil. Its larger shaft diameter also provides for lateral load resistance. Due to its slender size, the Type SS material provides the means for the helix plates to penetrate deeper into hard/dense soil stratum than if the helical pile shaft was pipe shaft only. For a given helix configuration and same available installation energy (i.e. machine), a small displacement shaft will penetrate farther into a soil bearing strata than a large displacement shaft and will disturb less soil.

It is recommended that a CHANCE SS/RS Combination Helical Pile be used in all projects where pipe shaft is being used. The square shaft lead section will provide better load capacity and less settlement than a comparable straight pipe shaft pile.

The transition section (see Figure 7-38) adapts Type SS helical lead sections to Type RS plain extensions. Installation of this combination pile is the same as a standard helical pile. Table 7-5 provides the various standard transition couplers that are available along with their ratings. Special transition couplers, such as RS2875 to RS4500, are also available. Please contact your area CHANCE Distributor for availability and delivery times.



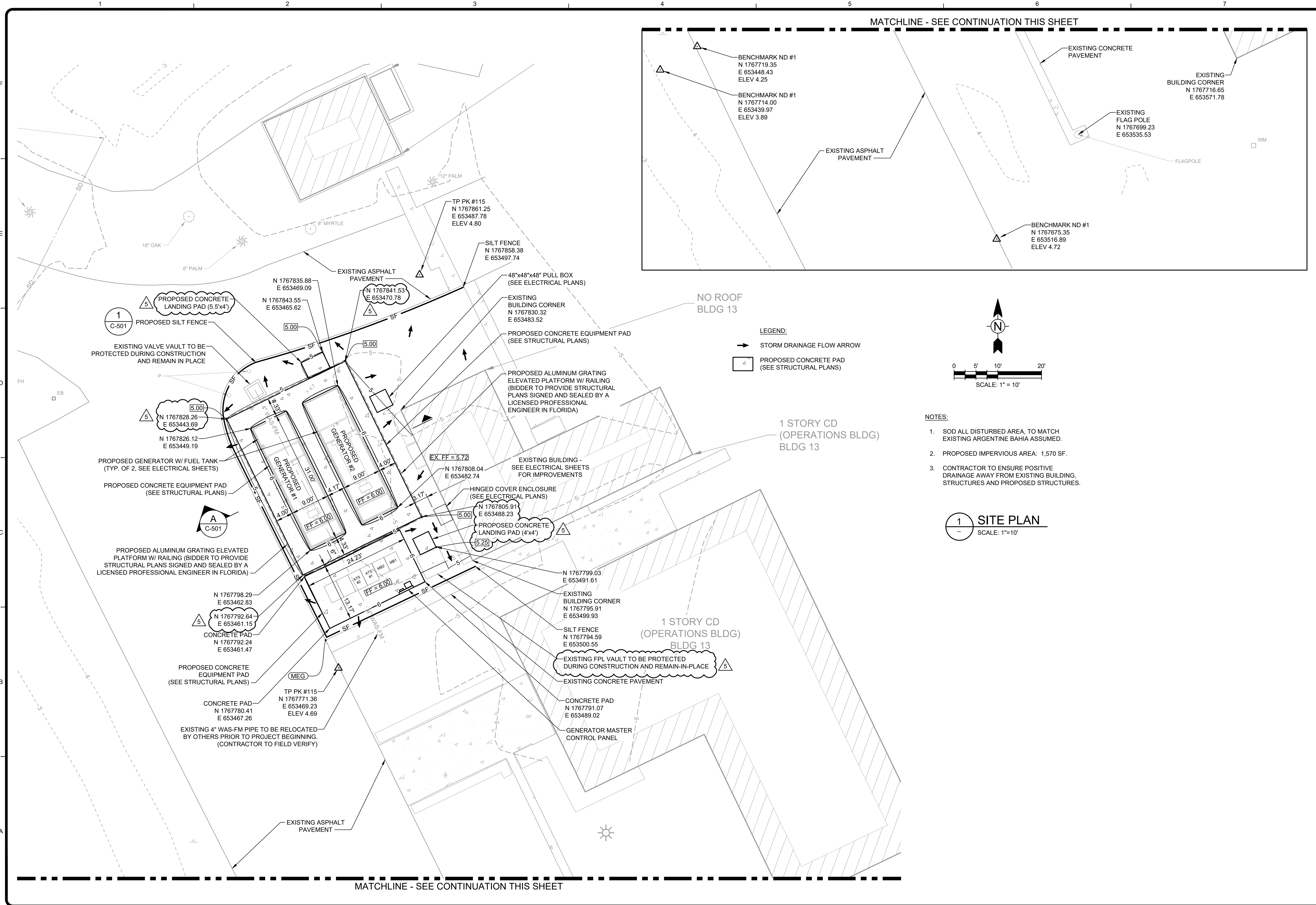
Pile Assembly with Transition Coupler
Figure 7-38

DRAWINGS & RATINGS

Table 7-5: Transition Couplers

CATALOG NUMBER	DESCRIPTION	TORQUE RATINGS	K_t
C1500896	SS5/SS150 square shaft to a RS2875.203 round shaft	5,500 ft-lb	9.5
C1500896	SS5/SS150 square shaft to a RS2875.276 round shaft	7,000 ft-lb	9.5
C1500895	SS175 square shaft to a RS3500.300 dia round shaft	10,500 ft-lb	8.5
C1500937	SS200 square shaft to a RS3500.300 dia round shaft	13,000 ft-lb	8.5
C1101443	SS200 square shaft to a RS4500 round shaft	16,000 ft-lb	7
C1101418	SS225 square shaft to a RS4500 round shaft	21,000 ft-lb	7
C1501365	SS175 square shaft to a RS2875.276 round shaft	8,000 ft-lb	9.5

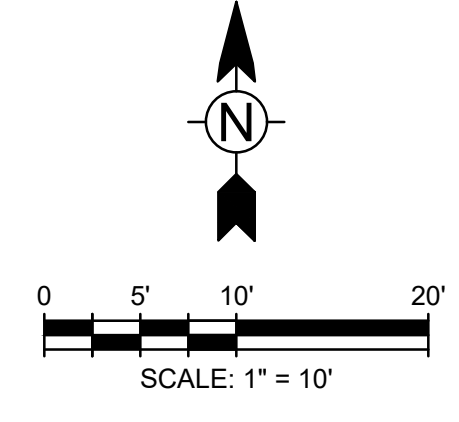
4/1/2020 10:45:59 AM - N:\TTS18\F52\PROJECTS\SIEMER\26561-18002\CAD\SHEETFILES\C-101 SITE PLAN.DWG - REYES, HECTOR



MATCHLINE - SEE CONTINUATION THIS SHEET

MATCHLINE - SEE CONTINUATION THIS SHEET

LEGEND:
→ STORM DRAINAGE FLOW ARROW
△ PROPOSED CONCRETE PAD (SEE STRUCTURAL PLANS)



- NOTES:**
- SOD ALL DISTURBED AREA, TO MATCH EXISTING ARGENTINE BAHIA ASSUMED.
 - PROPOSED IMPERVIOUS AREA: 1,570 SF.
 - CONTRACTOR TO ENSURE POSITIVE DRAINAGE AWAY FROM EXISTING BUILDING, STRUCTURES AND PROPOSED STRUCTURES.

1 SITE PLAN
SCALE: 1"=10'

TETRA TECH
ENGINEERING BUSINESS NO. 2429
www.tetra.tech.com
201 E. PINE STREET, SUITE 1000
ORLANDO, FLORIDA 32801
PHONE: (407) 839-3955 FAX: (407) 839-3790

Bill D. Reardon, P.E.
P.E. No. 04037, FL
201 East Pine Street, Suite 1000
Orlando, Florida 32801
Engineering Business No. 2429

DATE _____

BID SET

MARK	DATE	DESCRIPTION	BY	HR
5	03/20	PER ADDENDUM #5		

CITY OF DAYTONA BEACH
BETHUNE POINT WATER RECLAMATION FACILITY - GENERATOR REPLACEMENT
GEOMETRY AND GRADING PLAN

Project No.: 200-26561-18002
Designed By: BDR
Drawn By: RLM
Checked By:

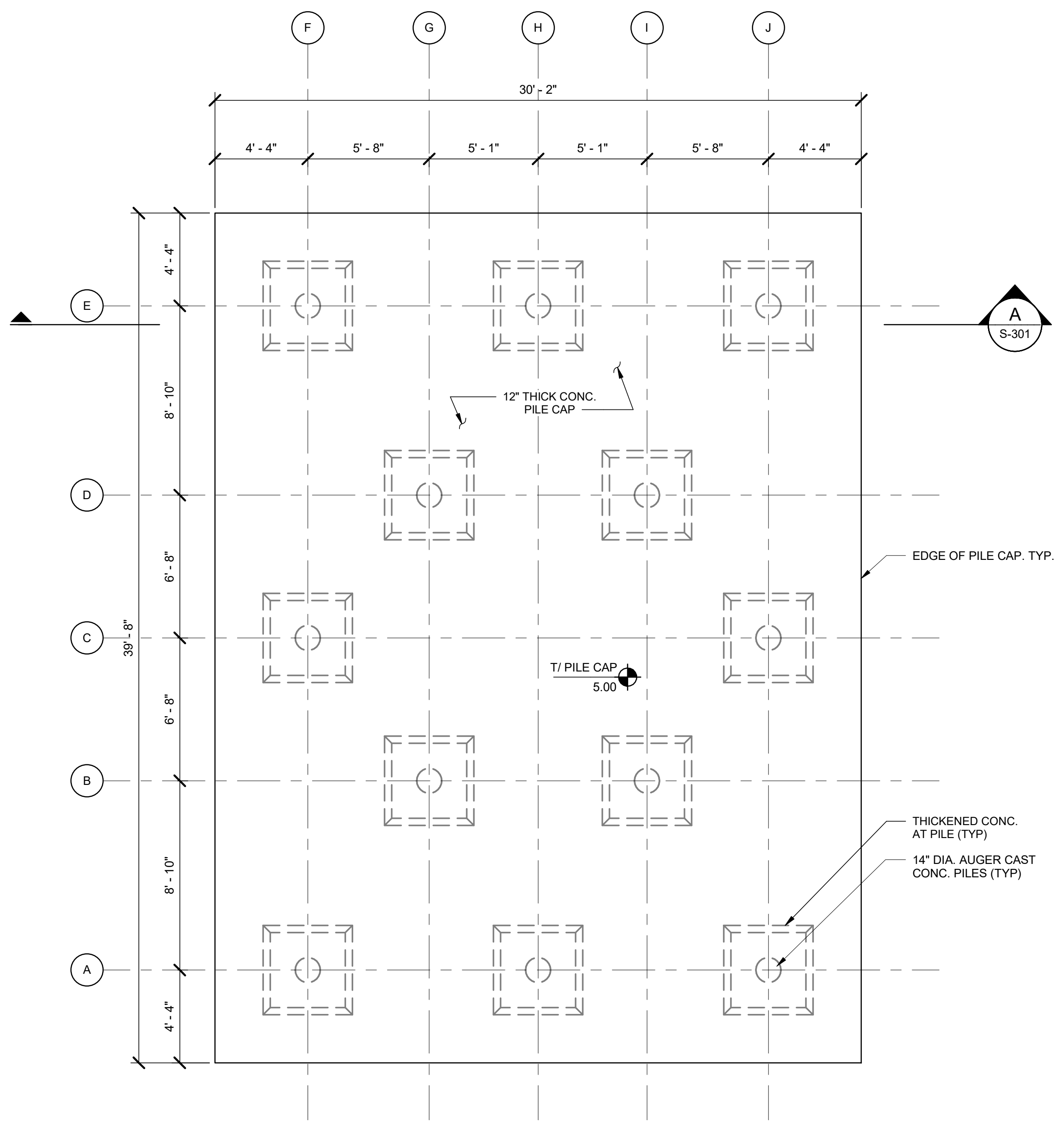
C-101
Sheet

Copyright: Tetra Tech

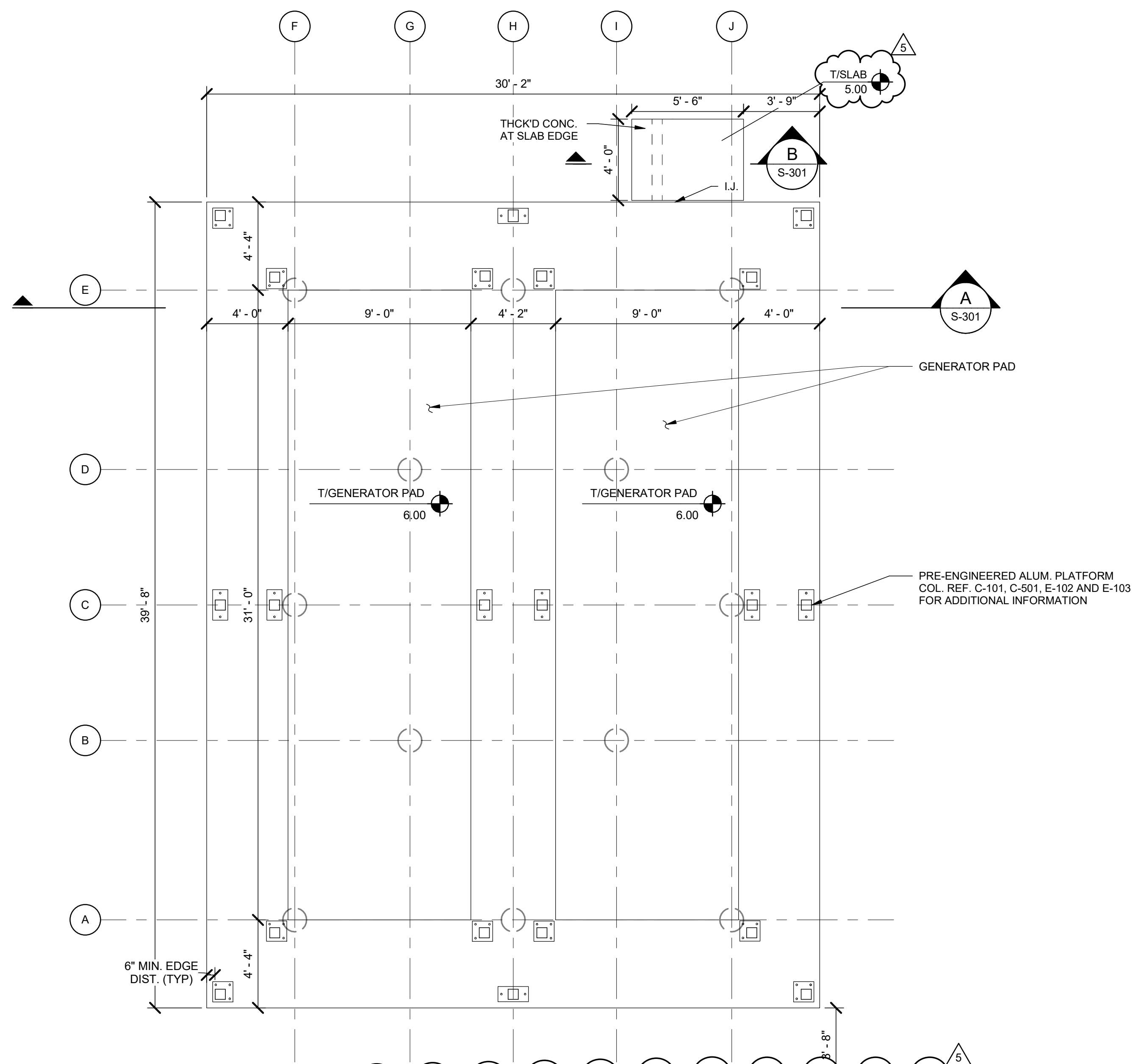
Bar Measures 1 inch

PLAN NOTES
 1. REFER TO S-001 AND S-002 FOR GENERAL NOTES
 2. REFER TO C-101 FOR THE STRUCTURE LOCATION ON SITE PLAN
 3. SUBGRADE SHALL BE COMPACTED TO 95% STANDARD PROCTOR (ASTM D 98) MAXIMUM DRY DENSITY
 4. GEOTECHNICAL ENGINEER SHALL CONFIRM IN WRITING SPECIFIED SOIL COMPACTION AND FILL REQUIREMENTS ARE MET.
 5. CONTRACTOR TO COORDINATE LOCATION AND SIZE OF GENERATOR ENCLOSURE AND BELLY FUEL TANK WITH EQUIPMENT MANUFACTURER PRIOR TO POURING CONCRETE.
 6. GENERATOR + ENCLURE + FUEL TANK = 74,000 LBS (MAX. ASSUMED FOR EACH GENERATOR) CONTRACTOR TO COORDINATE WEIGHT AND GENERATOR/ENCLOSURE AND FUEL TANK DIMENSIONS W/ EQUIPMENT MANUFACTURER PRIOR TO POURING SLAB AND NOTIFY ENGINEER IF THE WEIGHT EXCEEDS 74,000 LBS PER GENERATOR SYSTEM.
 7. GENERATORS SHALL BE MOUNTED TO EQUIP PADS W/ VIBRATION ISOLATORS TO REDUCE VIBRATION INTO THE FOUNDATIONS AND SOIL.

LEGEND:
 I.J. INDICATED ISOLATION JOINT REFER TO DETAIL ON S-501

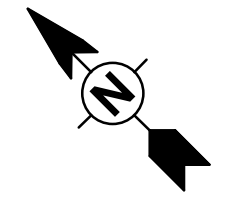
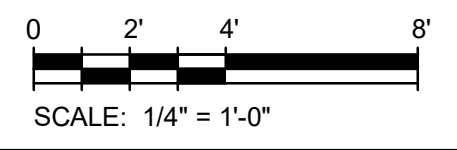
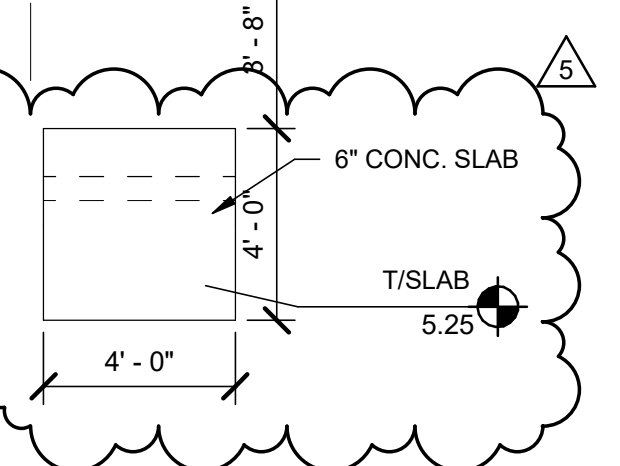


1 PILE CAP AND PILE PLAN
 S-301 SCALE: 1/4" = 1'-0"



NOTE:
 1. REFER TO C-101, E-102, AND DETAIL 1 ON S-301 FOR ELECTRICAL EQUIPMENT PAD.

2 GENERATOR PAD
 S-301 SCALE: 1/4" = 1'-0"



TETRA TECH
 ENGINEERING BUSINESS NO. 2429
 www.tetratech.com
 201 E. PINE STREET, SUITE 1000
 ORLANDO, FLORIDA 32801
 TEL: (407) 899-3965 FAX: (407) 899-3790

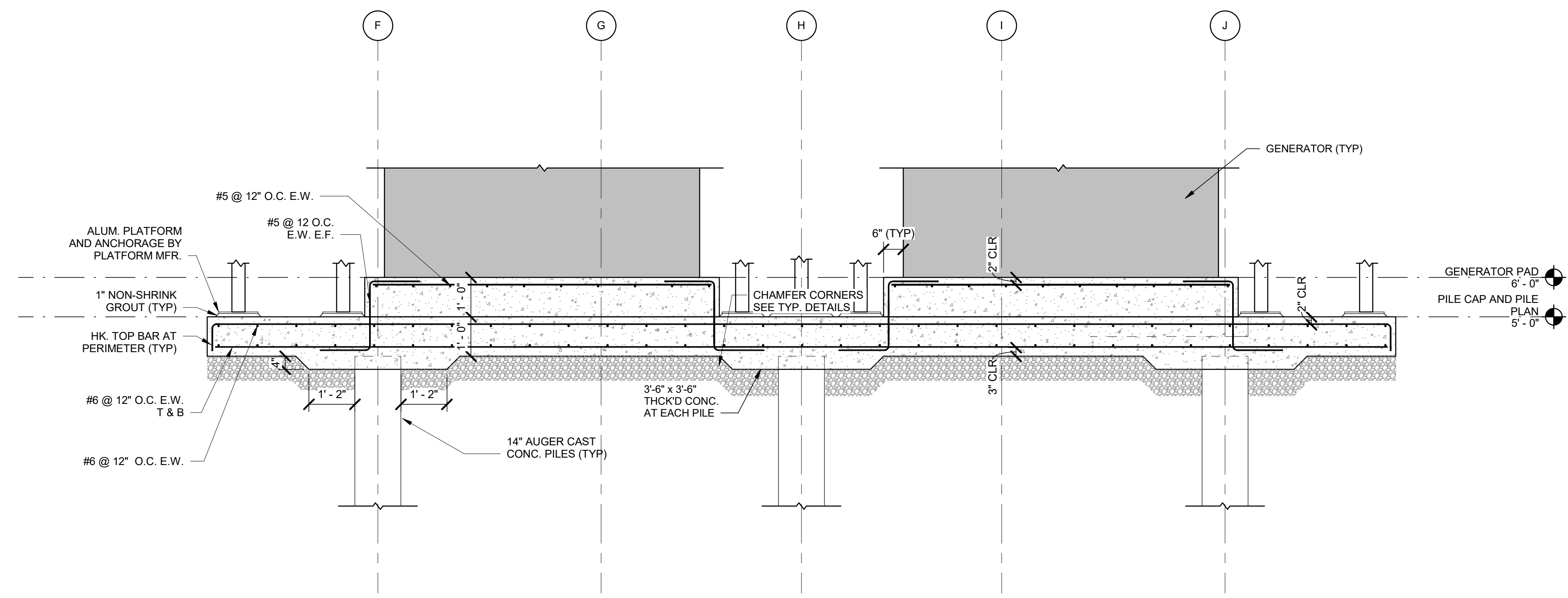
BID SET

MARK	DATE	DESCRIPTION	BY	SAJ
5	3/20	PER ADDENDUM NO. 5		

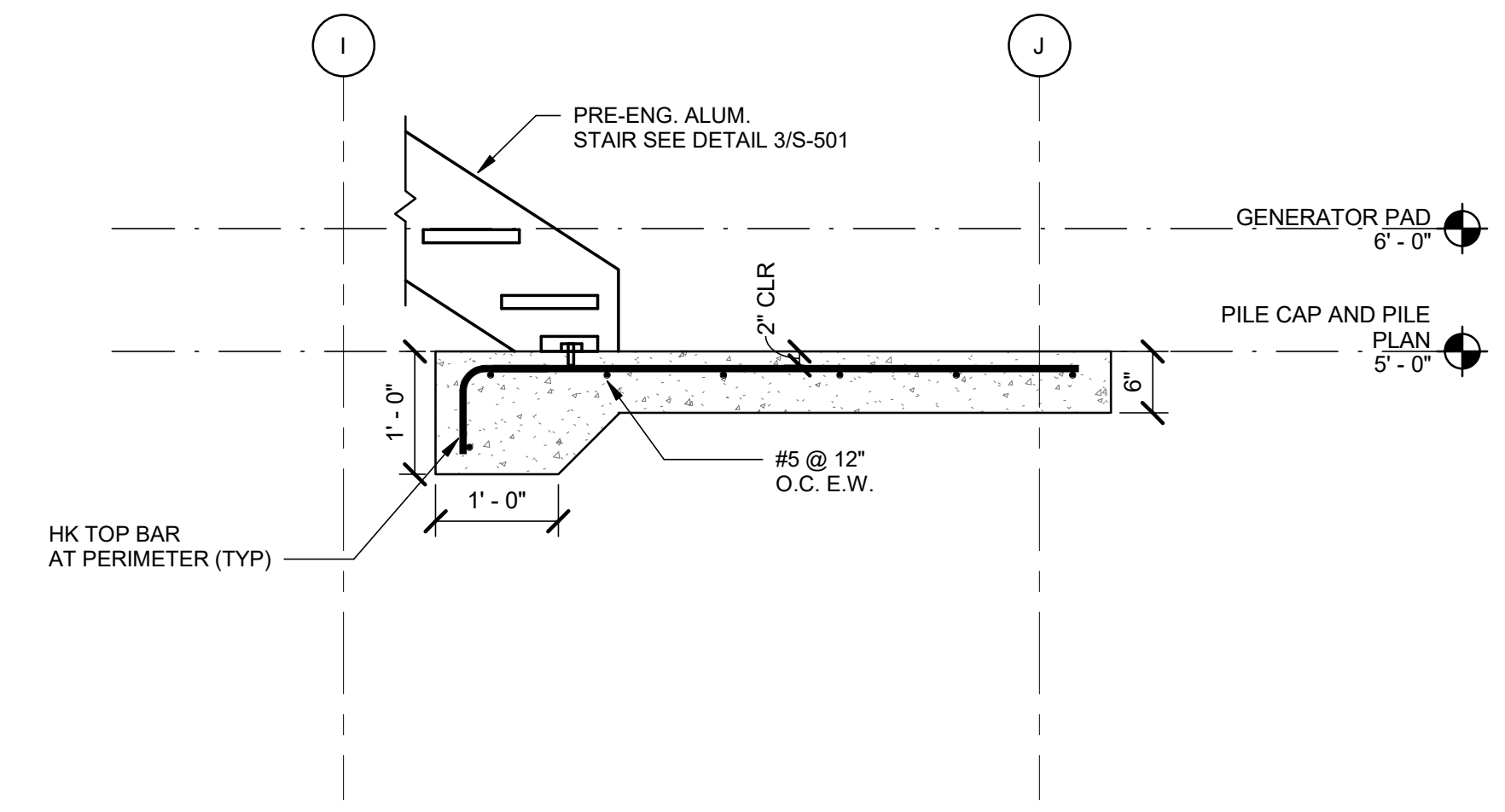
CITY OF DAYTONA BEACH
 BETHUNE POINT WASTE WATER TREATMENT PLANT
STRUCTURAL FOUNDATION PLAN

PROJ:	200-26561-18002
DESN:	TJW
DRWN:	TJW
CHKD:	JLB

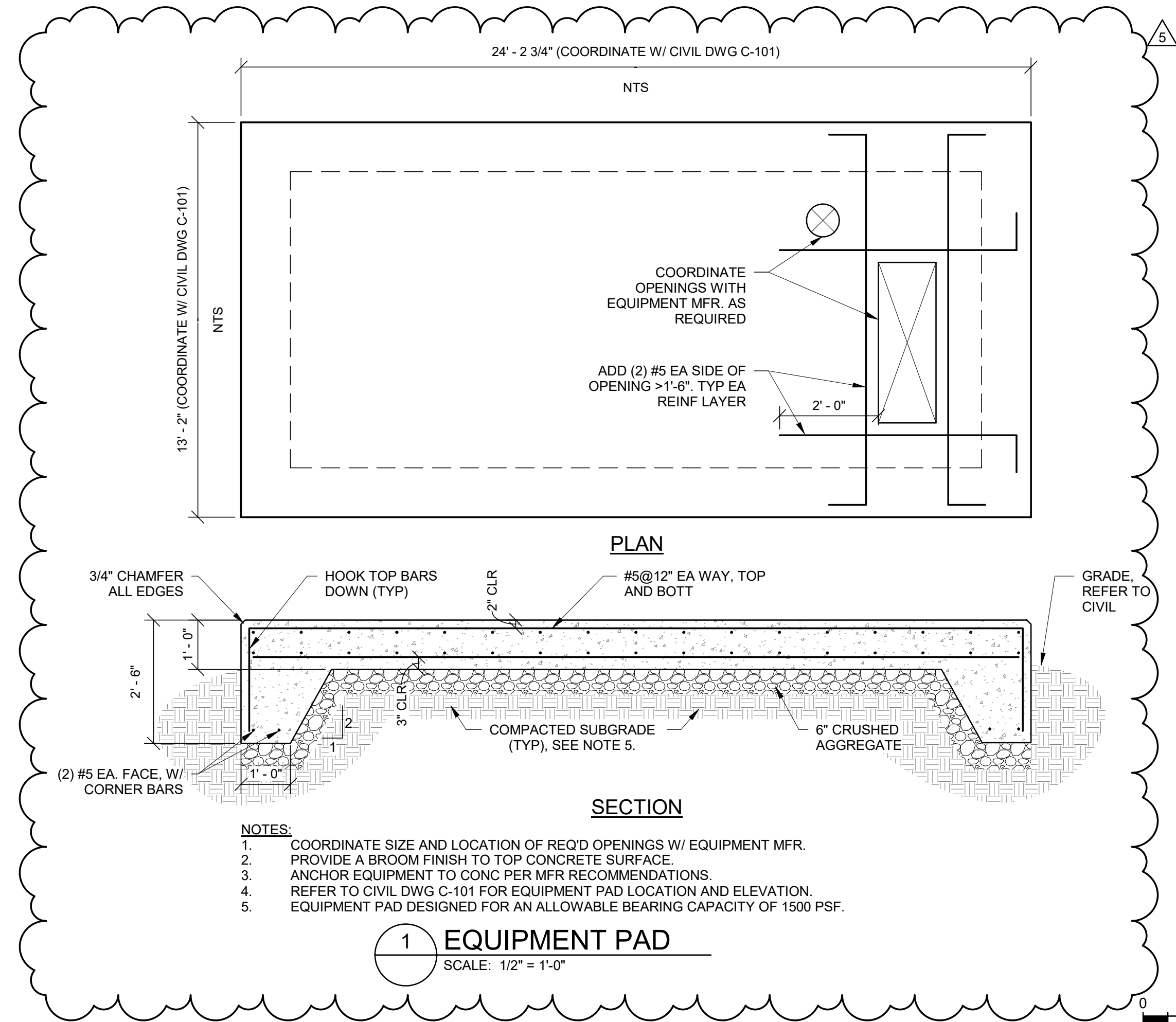
S-101



A SECTION
S-101 SCALE: 1/2" = 1'-0"

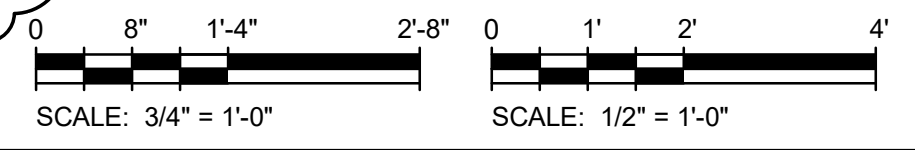


B SECTION
S-101 SCALE: 3/4" = 1'-0"



- NOTES:**
- COORDINATE SIZE AND LOCATION OF REQ'D OPENINGS W/ EQUIPMENT MFR.
 - PROVIDE A BROOM FINISH TO TOP CONCRETE SURFACE.
 - ANCHOR EQUIPMENT TO CONC PER MFR RECOMMENDATIONS.
 - REFER TO CIVIL DWG C-101 FOR EQUIPMENT PAD LOCATION AND ELEVATION.
 - EQUIPMENT PAD DESIGNED FOR AN ALLOWABLE BEARING CAPACITY OF 1500 PSF.

1 EQUIPMENT PAD
SCALE: 1/2" = 1'-0"



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201 E. PINE STREET, SUITE 1000
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TEL: (407) 899-3965 FAX: (407) 899-3790

BID SET

MARK	DATE	DESCRIPTION
5	3/20	PER ADDENDUM NO. 5

BY	SAJ

CITY OF DAYTONA BEACH
BETHUNE POINT WASTE WATER
TREATMENT PLANT
**STRUCTURAL
FOUNDATION SECTIONS**

PROJ:	200-26561-18002
DESN:	TJW
DRWN:	TJW
CHKD:	JLB

S-301