



**INVITATION FOR BID  
IFB # 15-1058-DS**

**Southeast Water Reclamation Facility (SEWRF) Septage / Grease Receiving  
Station Project**

Manatee County, a political subdivision of the State of Florida, (hereinafter "Owner") will receive sealed bids from individuals, corporations, partnerships, and other legal entities organized under the laws of the State of Florida or authorized to conduct business in the State of Florida.

**NON-MANDATORY INFORMATION CONFERENCE**

In order to ensure all prospective bidders have sufficient information and understanding of Owner's needs, an Information Conference will be held at: **10:00 AM on May 13, 2015** at the **Lena Road Landfill** located at **3331 Lena Road, Bradenton, FL 34211**. The **site visit will commence immediately after the conclusion of the Information Conference**. Attendance is not mandatory, but is highly encouraged.

**DEADLINE FOR CLARIFICATION REQUESTS:**      **3:00 PM on June 9, 2015**

Reference Bid Article A.06

**BID OPENING TIME AND DATE DUE:**      **3:00 PM on June 19, 2015**

**FOR INFORMATION CONTACT:**

Donna M. Stevens, Contract Specialist  
(941) 749-3045

[donna.stevens@mymanatee.org](mailto:donna.stevens@mymanatee.org)

Manatee County Financial Management Department  
Purchasing Division

AUTHORIZED FOR RELEASE: DWW

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**Title of Specification:**

Contract Documents and Technical Specifications for Southeast Water Reclamation Facility (SEWRF) dated April 2015 prepared by Cardno.....662 pages

**Permit**

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Contract Change Order (dated 11/10/2014).....	2 pages
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**SECTION A**  
**INFORMATION TO BIDDERS**

**A.01 OPENING LOCATION**

Sealed bids will be **publicly opened** at the **Manatee County Purchasing Division, 1112 Manatee Avenue West, Suite 803, Bradenton, Florida 34205** in the presence of Owner officials at the time and date stated, or soon thereafter. All bidders or their representatives are invited to attend the sealed bid opening.

Any bids received after the stated time and date will not be considered. It shall be the sole responsibility of the bidder to have their bid **delivered to the Manatee County Purchasing Division** for receipt on or before the stated time and date. Bidder shall be solely and strictly responsible for its timely delivery to the Purchasing Division. Bids delayed by mail, courier, or bids delayed for any other reason, shall not be considered, shall not be opened at the public opening, and arrangements shall be made for their return at the bidder's request and expense.

**A.02 SEALED & MARKED**

Bids shall be submitted in **duplicate, one original (marked Original) and one copy (marked Copy)** of your **signed bid** shall be submitted in one **sealed** package, clearly marked on the outside "**Sealed Bid #15-1058-DS, Southeast Water Reclamation Facility (SEWRF) Septage / Grease Receiving Station Project**" along with your company name.

For your convenience, a mailing label is provided with this Invitation for Bid (IFB) package. Or, you may address the package as follows:

Manatee County Purchasing Division  
1112 Manatee Avenue West, Suite 803  
Bradenton, Florida 34205  
Sealed Bid # \_\_\_\_\_, Title \_\_\_\_\_

All blank spaces on the bid form must be filled in as noted with amounts extended and totaled and no changes shall be made in the wording of the forms or in the items thereupon. In the event a change is made in your submittal, the bidder shall write its initials by the change. Any bid may be rejected which contains any omissions, alterations, irregularities of any kind, or which shall in any manner fail to conform to the requirements of this IFB.

A bid made by an individual, either in his/her own or proper person or under a trade or firm name, shall be executed under the individual's signature. If made by a partnership, the bid shall be executed by two or more of the general partners. If made by a corporation, the bid shall be executed by its President or other legally authorized corporate officer or agent.

**A.03 SECURING BID DOCUMENTS**

IFB's and related documents are available on <http://www.mymanatee.org/purchasing> for download in a portable document format (.PDF) file by clicking on "Bids and Proposals" from the Purchasing Division's web page. You may view and print these files using Adobe Reader software. If necessary, you may download a free copy of Adobe Reader from the link provided on the "Bids and Proposals" page.

Additionally, Manatee County collaborates with the Manatee Chamber of Commerce by announcing solicitation opportunities to the Chamber which are then passed to its members.

Manatee County may also use DemandStar to distribute bids. On the DemandStar website, <http://www.DemandStar.com>, click on the tab titled "My DemandStar" for more information regarding this service. Participation in the DemandStar system is not a requirement for doing business with Manatee County.

Complete copies of the IFB and all related documents are available for public inspection at the Manatee County Purchasing Division, 1112 Manatee Avenue West, Suite 803, Bradenton, FL 34205, or by calling (941) 749-3014. Appointments are encouraged. Documents are available between the hours of 9:00 AM and 4:00 PM Monday through Friday, with the exception of holidays. A complete set of the IFB documents must be used in preparing bids. Owner assumes no responsibility for errors and misinterpretations resulting from the use of incomplete sets of bid documents.

**A.04 EXAMINATION OF BID DOCUMENTS AND SITE(S)**

It is the responsibility of each bidder before submitting a bid, to (a) examine the IFB documents thoroughly; (b) visit the Project Site(s) to become familiar with local conditions that may affect cost, progress, performance, or furnishing of the Work; (c) consider federal, state, and local codes, laws, and regulations that may affect costs, progress, performance, or furnishing of the Work; (d) study and carefully correlate bidder's observations with the IFB documents; and (e) notify Owner of all conflicts, errors, or discrepancies in the IFB documents.

Each bidder may, at bidder's own expense, make or obtain any additional examinations, investigations, explorations, tests and studies, and obtain any additional information and data which pertain to the physical conditions at or contiguous to the Project Site(s) or otherwise which may affect cost, progress, performance or furnishing of the Work and which bidder deems necessary to determine his bid for performing and furnishing the Work in accordance with the time, price and other terms and conditions of the IFB documents. Owner will provide each bidder access to the site(s) to conduct such explorations and tests.

Bidder shall fill all holes, clean up and restore the Project Site(s) to its former condition upon completion of such explorations. The lands upon which the Work is to be performed, rights-of-way and easements for access thereto, and other lands designated for use by successful bidder in performing the Work are identified in the IFB documents.

All additional lands and access thereto required for temporary construction facilities or storage of materials and equipment are to be provided by successful bidder. Easements for permanent structures or permanent changes in existing structures are to be obtained and paid for by Owner unless otherwise provided in the IFB documents.

Inspection of the Project Site(s) is **a requirement** to be considered for award of this bid. Prior to submitting a bid, each bidder shall examine the Project Site(s) and all conditions thereon fully familiarizing themselves with the full scope of the Work. Failure to become familiar with Project Site conditions will in no way relieve the successful bidder from the necessity of furnishing any materials or performing any Work that is required to complete the Project in accordance with the Project Plans and Specifications. Bidder shall acknowledge inspection of the Project Site(s) on his/her signed, submitted Bid Form.

**A.05 MODIFICATION OF BID DOCUMENTS**

If a bidder wishes to recommend changes to the IFB documents, the bidder shall furnish, in writing, data and information necessary to aid Owner in evaluating the request to modify the IFB documents. Owner is not obligated to make any changes to the IFB documents. Unless an addendum is issued, the IFB documents shall remain unaltered. **Bidders must fully comply with the IFB documents in their entirety.**

**A.06 CLARIFICATION & ADDENDA**

Each bidder shall examine all IFB documents and shall judge all matters relating to their adequacy and accuracy. Any inquiries, suggestions or requests concerning interpretation, clarification or additional information pertaining to this IFB shall be made through the Manatee County Purchasing Division. Owner shall not be responsible for oral interpretations given by any Owner employee, representative, or others.

**3:00 PM on June 9, 2015** shall be the deadline to submit to the Purchasing Division, in writing, all inquiries, suggestions, or requests concerning interpretation, clarification or additional information pertaining to this IFB.

This deadline has been established to maintain fair treatment of all potential bidders, while maintaining progression of the Work.

If any addenda are issued to this IFB, Owner will post the documents on the Purchasing Division's web page at <http://www.mymanatee.org/purchasing>, and then by clicking on "Bids and Proposals". If the original solicitation was broadcast via DemandStar, the addenda will also be broadcast on the DemandStar distribution system to "Planholders" on this web service.

The issuance of a written addendum is the only official method whereby interpretation, clarification or additional information can be given.



It shall be the **responsibility of each bidder, prior to submitting a bid**, to contact the Purchasing Division (see contact information on the cover page) to **determine if any addenda were issued** and to make such addenda a part of their bid.

**A.07 LOBBYING**

After the issuance of any IFB, prospective bidders or their agents, representatives or persons acting at the request of such bidder shall not contact, communicate with or discuss any matter relating to the IFB with any officer, agent or employee of Manatee County other than the Purchasing Official or the contact identified in this IFB, pursuant to the Manatee County Code of Laws. This prohibition includes copying such persons on all written communication, including email correspondence. This requirement begins with the issuance of an IFB and ends upon execution of the final Agreement or when the IFB has been cancelled. Violators of this prohibition shall be subject to sanctions as provided in the Manatee County Code of Laws.

**A.08 UNBALANCED BIDDING PROHIBITED**

Owner recognizes that large and/or complex projects will often result in a variety of methods, sources, and prices. However, where in the opinion of Owner such variation does not appear to be justified, given bid requirements and industry and market conditions, the bid will be presumed to be unbalanced. Examples of unbalanced bids will include:

- a. Bids showing omissions, alterations of form, additions not specified, or required conditional or unauthorized alternate bids.
- b. Bids quoting prices that substantially deviate, either higher or lower, from those included in the bids of competitive bidders for the same line item unit costs.
- c. Bids where the unit costs offered are in excess of or below reasonable cost analysis values.

In the event Owner determines that a bid is presumed unbalanced, it will request the opportunity to and reserves the right to, review all source quotes, bids, price lists, letters of intent, etc., which the bidder obtained and upon which the bidder relied upon to develop its bid. Owner reserves the right to reject as nonresponsive any presumptive unbalanced bids where the bidder is unable to demonstrate the validity and/or necessity of the unbalanced unit costs.

**A.09 FRONT LOADING OF BID PRICING PROHIBITED**

Prices offered for performance and/or acquisition activities which occur early in the Project Schedule, such as mobilization; clearing and grubbing; or maintenance of traffic; that are substantially higher than pricing of competitive bidders within the same portion of the Project Schedule, will be presumed to be front loaded. Front loaded bids could reasonably appear to be an attempt to obtain unjustified early payments creating a risk of insufficient incentive for the bidder to complete the Work or otherwise creating an appearance of an undercapitalized bidder.

In the event Owner determines that a bid is presumed to be front loaded, it will request the opportunity to, and reserves the right to, review all source quotes, bids, price lists, letters of intent, etc., which the bidder obtained and upon which the bidder relied upon to develop the pricing or acquisition timing for these bid items. Owner reserves the right to reject as nonresponsive any presumptive front loaded bids where the bidder is unable to demonstrate the validity and/or necessity of the front loaded costs.

**A.10 WITHDRAWAL OF BIDS**

Bidders may withdraw bids as follows:

- a. Mistakes discovered before the public bid opening may be withdrawn by written notice from the bidder submitting the bid. This request must be received in the Purchasing Division prior to the time set for delivery and opening of the bids. A copy of the request shall be retained and the unopened bid returned to the bidder; or
- b. After the bids are opened or a selection has been determined, but before an Agreement is signed, a bidder alleging a material mistake of fact may be permitted to withdraw their bid if:
  1. The mistake is clearly evident in the solicitation document; or
  2. Bidder submits evidence which clearly and convincingly demonstrates that a mistake was made. Request to withdraw a bid must be in writing and approved by the Purchasing Official.

**A.11 IRREVOCABLE OFFER**

Any bid may be withdrawn up until the time and date set for opening of the bid. Any bid not so withdrawn shall, upon opening, constitute an irrevocable offer for a period of ninety (90) days to sell to Manatee County the goods or services set forth in the attached IFB until one or more of the bids have been duly accepted by Owner.

**A.12 BID EXPENSES**

All expenses for making bids to Owner are to be borne by the bidder.

**A.13 RESERVED RIGHTS**

Owner reserves the right to accept or reject any and/or all bids, to waive irregularities and technicalities, and to request resubmission. Also, Owner reserves the right to accept all or any part of the bid and to increase or decrease quantities to meet additional or reduced requirements of Owner. Any sole response received by the first submission date may or may not be rejected by Owner depending on available competition and current needs of Owner. For all items combined, the bid of the lowest, responsive, responsible bidder will be accepted, unless all bids are rejected.

The lowest, responsible bidder shall mean that bidder who makes the lowest bid to sell goods and/or services of a quality which meets or exceeds the quality of goods and/or services set forth in the IFB documents or otherwise required by Owner.

To be responsive, a bidder shall submit a bid which conforms in all material respects to the requirements set forth in the IFB.

To be a responsible bidder, the bidder shall have the capability in all respects to perform fully the bid requirements, and the tenacity, perseverance, experience, integrity, reliability, capacity, facilities, equipment, and credit which will assure good faith performance.

Also, Owner reserves the right to make such investigation as it deems necessary to determine the ability of any bidder to furnish the service requested. Information Owner deems necessary to make this determination shall be provided by the bidder. Such information may include, but shall not be limited to current financial statements, verification of availability of equipment and personnel, and past performance records.

**A.14 APPLICABLE LAWS**

Bidder must be authorized to transact business in the State of Florida. All applicable laws and regulations of the State of Florida and ordinances and regulations of Manatee County will apply to any resulting Agreement. Any involvement with the Manatee County Purchasing Division shall be in accordance with the Manatee County Purchasing Ordinance as amended.

**A.15 COLLUSION**

By submitting a bid to this IFB, bidder certifies that it has not divulged, discussed or compared its bid with any other bidder, and has not colluded with any other bidder or parties to this bid whatsoever. Also, bidder certifies, and in the case of a joint bid each party thereto certifies as to their own organization, that in connection with this bid:

- a. any prices and/or cost data submitted have been arrived at independently, without consultation, communication, or agreement, for the purpose of restricting competition, as to any matter relating to such prices and/or cost data, with any other bidder or with any competitor;
- b. any prices and/or cost data quoted for this bid have not been knowingly disclosed by the bidder and will not knowingly be disclosed by the bidder, prior to the scheduled opening, directly or indirectly to any other bidder or to any competitor;
- c. no attempt has been made or will be made by the bidder to induce any other person or firm to submit or not to submit a bid for the purpose of restricting competition;
- d. the only person or persons interested in this bid, principal or principals is/are named therein and that no person other than therein mentioned has any interest in this bid or in the resulting Agreement to be entered into; and

- e. no person or agency has been employed or retained to solicit or secure the resulting Agreement upon an agreement or understanding or a commission, percentage, brokerage, or contingent fee except bona fide employees or established commercial agencies maintained by bidder for purpose of doing business.

**A.16 CODE OF ETHICS**

With respect to this bid, if any bidder violates, directly or indirectly, the ethics provisions of the Manatee County Purchasing Ordinance and/or Florida criminal or civil laws related to public procurement, including but not limited to Chapter 112, Part III, Code of Ethics for Public Officers and Employees, Florida Statutes, such bidder will be disqualified from eligibility to perform the Work described in this IFB, and may also be disqualified from furnishing future goods or services to, and from submitting any future bids to supply goods or services to, Manatee County.

By submitting a bid, the bidder represents to Owner that all statements made and materials submitted are truthful, with no relevant facts withheld. If a bidder is determined to have been untruthful in their bid or any related presentation, such bidder will be disqualified from eligibility to perform the Work described in this IFB, and may also be disqualified from furnishing future goods or services to, and from submitting any future bids to supply goods or services to, Manatee County.

**A.17 PUBLIC CONTRACTING AND ENVIRONMENTAL CRIMES**

A person or affiliate who has been placed on the convicted vendor list following a conviction for a public entity crime, as that term is defined in Section 287.133, Florida Statutes, may not submit a bid to provide any goods or services to a public entity; may not submit a bid with a public entity for the construction or repair of a public building or public work; may not submit bids on leases of real property to a public entity; may not be awarded or perform Work as a contractor, supplier, Subcontractor, or consultant under an agreement with any public entity; and may not transact business with any public entity in excess of the threshold amount provided in Section 287.017, Florida Statutes, for CATEGORY TWO for a period of thirty-six (36) months following the date of being placed on the convicted list.

In addition, the Manatee County Code of Laws prohibits the award of any bid to any person or entity who/which has, within the past five (5) years, been convicted of, or admitted to in court or sworn to under oath, a public entity crime or of any environmental law that, in the reasonable opinion of the Purchasing Official, establishes reasonable grounds to believe the person or business entity will not conduct business in a responsible matter.

To ensure compliance with the foregoing, the Code requires all persons or entities desiring to do business with Owner to execute and file with the Purchasing Official an affidavit, executed under the pain and penalties of perjury, confirming that person, entity and any person(s) affiliated with the entity, does not have such a record and is therefore eligible to seek and be awarded business with Owner. In the case of a business entity other than a partnership or a corporation, such affidavit shall be executed by an

authorized agent of the entity. In the case of a partnership, such affidavit shall be executed by the general partner(s). A Public Contracting and Environmental Crimes Certification form is attached herein for this purpose.

**A.18 BID FORMS**

Bids must be submitted on the provided forms, although additional pages may be attached. **Bidders must fully complete all pages of the Bid Forms. Bid Forms must be executed by an authorized signatory who has the legal authority to make the bid and bind the company. Bidders must fully comply with all requirements of this IFB in its entirety.** Failure to comply shall result in bidder being deemed nonresponsive.

**A.19 AGREEMENT FORMS**

The Agreement resulting from the Acceptance of a bid shall be in the form of the Agreement stated in this IFB, which is attached herein.

A written notice confirming award or recommendation thereof will be forwarded to the successful bidder accompanied by the required number of unsigned counterparts of the Agreement. Within ten (10) days thereafter, successful bidder shall sign and deliver the required number of counterparts of the Agreement with any other required documents to Owner. (Note: Agreement must be approved in accordance with Chapter 2-26 of the Manatee County Code of Laws and the Administrative Standards and Procedures Manual approved by the County Administrator).

**A.20 LEGAL NAME**

Bids shall clearly indicate the legal name, address and telephone number of the bidder on the Bid Form. Bid Forms shall be signed above the typed or printed name and title of the signer. The signer must have the authority to bind the bidder to the submitted bid.

When bidder is a partnership, the Bid Form shall be signed in the name of the firm and by all partners required under the terms of the partnership agreement. When a corporation is a bidder, the authorized corporate officers shall sign.

Bidders who are corporations or limited partnerships shall provide a certified copy of their permit to transact business in the State of Florida, preferably along with the Bid Form, or within forty-eight (48) hours after request by Owner.

When submitting a bid as a joint venture, it must have filed paper documents with the Division of Profession's Construction Industry Licensing Board prior to submitting a bid.

**A.21 DISCOUNTS**

Any and all discounts must be incorporated in the prices contained in the bid and not shown separately. The prices indicated on the Bid Form shall be the prices used in determining award.

**A.22 TAXES**

Manatee County is exempt from Federal Excise and State Sales Taxes. (F.E.T. Cert. No. 59-78-0089K; Florida Sales Tax Exempt Cert. No. 85-8012622206C-6); therefore, the bidder is prohibited from delineating a separate line item in his bid for any sales or service taxes. Nothing herein shall affect the bidder's normal tax liability.

**A.23 DESCRIPTIVE INFORMATION**

Unless otherwise specifically provided in the IFB documents, all equipment, materials and articles provided shall be new and of the most suitable grade for the purpose intended. Unless otherwise specifically provided in the IFB documents, reference to any equipment, material, article or patented process, by trade name, brand name, make or catalog number, shall be regarded as establishing a standard of quality and shall not be construed as limiting competition.

**A.24 AUTHORIZED PRODUCT REPRESENTATION**

The bidder, by virtue of submitting the name and specifications of a manufacturer's product, will be required to furnish the named manufacturer's product. Failure to perform accordingly may, in Owner's sole discretion, be deemed a material breach of the resulting Agreement, and shall constitute grounds for Owner's immediate termination of the resulting Agreement.

**A.25 ROYALTIES AND PATENTS**

The successful bidder shall pay all royalties and license fees for equipment or processes in conjunction with the equipment and/or services being furnished. Successful bidder shall defend all suits or claims for infringement of any patent, trademark or copyright, and shall save Owner harmless from loss on account thereof, including costs and attorney's fees.

**A.26 AMERICANS WITH DISABILITIES ACT**

Owner does not discriminate upon the basis of any individual's disability status. This non-discrimination policy involves every aspect of Owner's functions including one's access to, participation, employment, or treatment in its programs or activities. Anyone requiring **reasonable accommodation** for an Information Conference or Bid Opening should contact the person named on the cover page of this IFB document at least twenty-four (24) hours in advance of either activity.

**A.27 EQUAL EMPLOYMENT OPPORTUNITY CLAUSE**

In accordance with the provisions of Title VI of the Civil Rights Act of 1964 and Title 15, Part 8 of the Code of Federal Regulations, Owner hereby notifies all bidders that they will affirmatively ensure minority business enterprises will be afforded full opportunity to participate in response to this advertisement and will not be discriminated against on the grounds of race, color or national origin in consideration for bid award.

**A.28 MBE/DBE**

The State of Florida Office of Supplier Diversity provides the certification process and the database for identifying certified MBE/DBE firms. This service may be directly accessed at: <http://www.osd.dms.state.fl.us/iframe.htm>. If you have any questions regarding this State service, please contact their office at (850) 487-0915.

**A.29 MATHEMATICAL ERRORS**

In the event of multiplication/extension error(s), the unit price shall prevail. In the event of addition error(s) the extension totals will prevail. In the event the dollar amount for contract contingency is omitted, it will be added to the total price of the bid. All bids shall be reviewed mathematically and corrected, if necessary, using these standards, prior to additional evaluation.

**A.30 SUBCONTRACTORS, SUPPLIERS AND OTHERS**

The identity of Subcontractors, suppliers, and other persons and organizations (including those who are to furnish the principal items of material and equipment) may be requested by Owner for each bid item from any of the bidders; and the bidder shall respond within five (5) days after the date of such request. Such list shall be accompanied by an experience statement with pertinent information regarding similar Work and other evidence of qualification for each such Subcontractor, supplier, persons or organization if requested by Owner. If Owner, after due investigation, has reasonable objection to any proposed Subcontractor, supplier, other person or organization, Owner may, before the notice of intent to award is given, request the successful bidder to submit an acceptable substitute without an increase in Contract Sum or Contract Time.

If successful bidder declines to make any such substitution, Owner may award the resulting Agreement to the next lowest qualified bidder that proposes to use acceptable Subcontractors, suppliers, and other persons who Owner does not make written objection to. Successful bidder shall not be required to employ any Subcontractor, supplier, other person or organization who successful bidder has reasonable objection to.

Subcontractors shall be bound by the terms and conditions of the resulting Agreement insofar as it applies to their Work, but this shall not relieve the successful bidder from the full responsibility to Owner for the proper completion of all Work to be executed under the resulting Agreement.

**A.31 DISCLOSURE**

Upon receipt, all inquiries and responses to inquiries related to this IFB become "Public Records", and shall be subject to public disclosure consistent with Florida Statutes, Chapter 119.

Bids become subject to disclosure thirty (30) days after the opening or if a notice of intent to award decision is made earlier than this time as provided by Florida Statutes § 119.071(1)(b). No announcement or review of the bid shall be conducted at the public bid opening.

Based on the above, Owner will receive bids at the time and date stated and will make public at the opening the names of the business entities of all that submitted a bid and any amount presented as a total offer without any verification of the mathematics or the completeness of the bid.

If Owner rejects all bids and concurrently notices its intent to reissue the solicitation, the rejected bids are exempt from public disclosure until such time as Owner provides notice of an intended decision concerning the reissued solicitation or until Owner withdraws the reissued solicitation. A bid is not exempt for longer than twelve (12) months after the initial notice rejecting all bids.

Pursuant to Section 119.0701, Florida Statutes, in any Agreement entered into by Owner wherein the successful bidder is acting on behalf of Owner, successful bidder must:

- a. Keep and maintain public records that ordinarily and necessarily would be required by Owner in order to perform the service.
- b. Provide the public with access to public records on the same terms and conditions that Owner would provide and at a cost that does not exceed the cost provided in Florida Statutes, Chapter 119, or as otherwise provided by law.
- c. Ensure that public records that are exempt or confidential and exempt from public records disclosure requirements are not disclosed except as authorized by law.
- d. Meet all requirements for retaining public records and transfer, at no cost, to Owner all public records in possession of successful bidder upon termination of the awarded Agreement and/or PO and destroy any duplicate public records that are exempt or confidential from public records disclosure requirements. All records stored electronically must be provided to Owner in a format that is compatible with Owner's information technology systems.

### **A.32 LOCAL PREFERENCE**

Local business is defined as a business legally authorized to engage in the sale of the goods and/or services to be procured, and which certifies within its bid that for at least six (6) months prior to the announcement of the solicitation of bids it has maintained a



physical place of business in Manatee, Desoto, Hardee, Hillsborough, Pinellas or Sarasota County with at least one full-time employee at that location.

Local preference shall not apply to the following categories of Agreements:

1. Purchases or Agreements which are funded, in whole or in part, by a governmental or other funding entity, where the terms and conditions of receipt of the funds prohibit the preference.
2. Any bid announcement which specifically provides that the general local preference policies set forth in this section are suspended due to the unique nature of the goods or services sought, the existence of an emergency as found by either the County Commission or County Administrator, or where such suspension is, in the opinion of the County Attorney, required by law.

To qualify for local preference under this section, **a local business must certify to Owner** by completing an **"Affidavit as to Local Business Form"**, which is available for download at [www.mymanatee.org/vendor](http://www.mymanatee.org/vendor). Click on "Affidavit for Local Business" to access and print the form. Complete, notarize, and mail the notarized original to the following address: Manatee County Purchasing Division, 1112 Manatee Avenue West, Suite 803, Bradenton, FL 34205.

It is the responsibility of the bidder to ensure accuracy of the Affidavit as to Local Business and notify Owner of any changes affecting same.

### **A.33 VENDOR REGISTRATION**

Registering your business with Manatee County will enhance our opportunities to identify sources for goods and services, plus identify local businesses. This information is used for soliciting quotations up to \$250,000.00 and for competitive solicitations of larger purchases.

Our staff can assist you with your registration as needed. Our office hours are 8:00 A.M. to 5:00 P.M., Monday through Friday on regular business days. Please call (941) 749-3014 if you wish to have a Purchasing staff member assist you.

**Quick steps to registration:**                      **[www.mymanatee.org/purchasing](http://www.mymanatee.org/purchasing)**

A link to Vendor Registration is listed on the Purchasing Division's web page under "Register as a Vendor". Click on "Vendor Registration Form" for on-line input.

Registration is not mandatory; however, by taking the time to register, you are helping Owner to provide timely notification of quotation, bid and proposal opportunities to your business.

**A.34 BE GREEN**

All bidders are encouraged to use as many **environmentally preferable** "green" products, materials, supplies, etc. as possible in order to promote a safe and healthy environment. **Environmentally preferable are products or services that have a reduced adverse effect on the environment.** Where all other evaluative factors, including local preference policies, are otherwise equal, such policies and practices will be a determinative factor in the award decision.

Provide detail of your organization's initiative and its ability to meet the goal of environmental sustainability.

**A.35 ePAYABLES**

Manatee County and Clerk of the Circuit Court have partnered to offer the ePayables program, which allows payments to be made to vendors via credit cards. The Clerk will issue a unique credit card number to each vendor; the card has a zero balance until payments have been authorized.

After goods are delivered or services rendered, vendors submit invoices to the remit to address on the purchase order according to the current process. When payments are authorized, an email notification is sent to the vendor. The email notification includes the invoice number(s), invoice date(s), and amount of payment. There is no cost for vendors to participate in this program; however, there may be a charge by the company that processes your credit card transactions.

If you are interested in participating in this program, please complete the ePayables Application attached herein and return the completed form via email to Ms. Lori Bryan, Supervisor at [lori.bryan@manateeclerk.com](mailto:lori.bryan@manateeclerk.com).

**NOTE: ANY OR ALL STATEMENTS CONTAINED IN THE FOLLOWING SECTIONS: SCOPE OF WORK, BID SUMMARY, CONSTRUCTION AGREEMENT FOR STIPULATED SUM, AND GENERAL CONDITIONS OF THE CONSTRUCTION AGREEMENT, WHICH VARY FROM THE INFORMATION TO BIDDERS, SHALL HAVE PRECEDENCE.**

**END OF SECTION A**

SECTION B  
SCOPE OF WORK

**B.01 SCOPE OF WORK**

The Work included in this Bid consists of furnishing, delivering and installing all materials, equipment, incidentals and services, including labor for the construction of the Manatee County Southeast Water Reclamation Septage/Grease Receiving Station located at 3331 Lena Road in Bradenton, Florida.

The Work generally includes, but is necessarily limited to:

1. Excavation, compaction, demolition, clearing and grubbing, and earthwork at the location of the proposed Work.
2. Construction of cast-in-place concrete and asphalt pavement.
3. Construction of stormwater facilities including a stormwater drainage retention pond.
4. Above-ground grease storage tank and an above-ground Septage storage tank.
5. Construction of grease and Septage receiving stations including all associated processing equipment, pumping stations, electrical work, and yard piping.

During construction, provisions shall be made to allow continuous operation of the existing treatment facility at all times.

All Work shall be done as described in the Specifications and as shown on the drawings, complete, tested and ready for operation.

The successful Bidder shall furnish all shop drawings, working drawings, labor, materials, equipment, tools, services and incidentals which is reasonably and properly inferable and necessary for the proper completion of the Work, whether specifically indicated in the Bid Documents or not.

The successful Bidder shall perform the Work complete, in place and ready for continuous service and shall include any repairs, replacements, and / or restoration required as a result of damages caused prior to acceptance by the County.

**B.02 COMPLETION OF WORK**

The Work will be completed and ready for final inspection within the specified calendar days from the date the Contract Time commences to run. Two bids shall be considered, **Bid "A" based on 480 calendar days** and **Bid "B" based on 360 calendar days**. Owner has the sole authority to select the bid based on the completion time which is in the best interest of Owner. **Only one award shall be made.**

**B.03 LIQUIDATED DAMAGES**

If the successful bidder fails to achieve Substantial Completion of the Work within the Contract Time and as otherwise required by the Contract Documents, the Owner shall be entitled to retain or recover from the successful bidder, as liquidated damages and not as a penalty, the sum of **\$1,000.00** per calendar day, commencing upon the first day following expiration of the Contract Time and continuing until the actual date of Substantial Completion. Such liquidated damages are hereby agreed to be a reasonable estimate of damages the Owner will incur as a result of delayed completion of the Work. The Owner may deduct liquidated damages as described in this paragraph from any unpaid amounts then or thereafter due the successful bidder under this Agreement. Any liquidated damages not so deducted from any unpaid amounts due the successful bidder shall be payable to the Owner at the demand of the Owner, together with interest from the date of the demand at the maximum allowable rate.

**B.04 CONTRACT CONTINGENCY WORK**

Contract contingency is a monetary allowance used solely at Owner's discretion to handle unexpected conditions as required to satisfactorily complete the Work in accordance with the IFB documents. A Field Directive must be issued by an authorized Owner representative to authorize use of contract contingency funds.

The percentage for contract contingency is listed on the Bid Form. Bidder shall enter the dollar amount for contract contingency based on the percentage of the total base bid. The total contract award will include contract contingency.

Appropriate uses of contract contingency include increases to existing bid item quantities that do not change the initial scope of Work, which may be directed by staff; modification items not originally bid which were unforeseen yet necessary during the Work to provide a safe, complete Project and that do not change the initial scope of Work; and unanticipated conflicts and/or design changes required during construction which are necessary to provide a safe, complete Project and that do not change the initial scope of Work.

Inappropriate uses of contract contingency include anything that changes the initial scope of Work, including the Contract Sum and Contract Time, and adding bid items not previously contemplated that change the initial scope of Work.

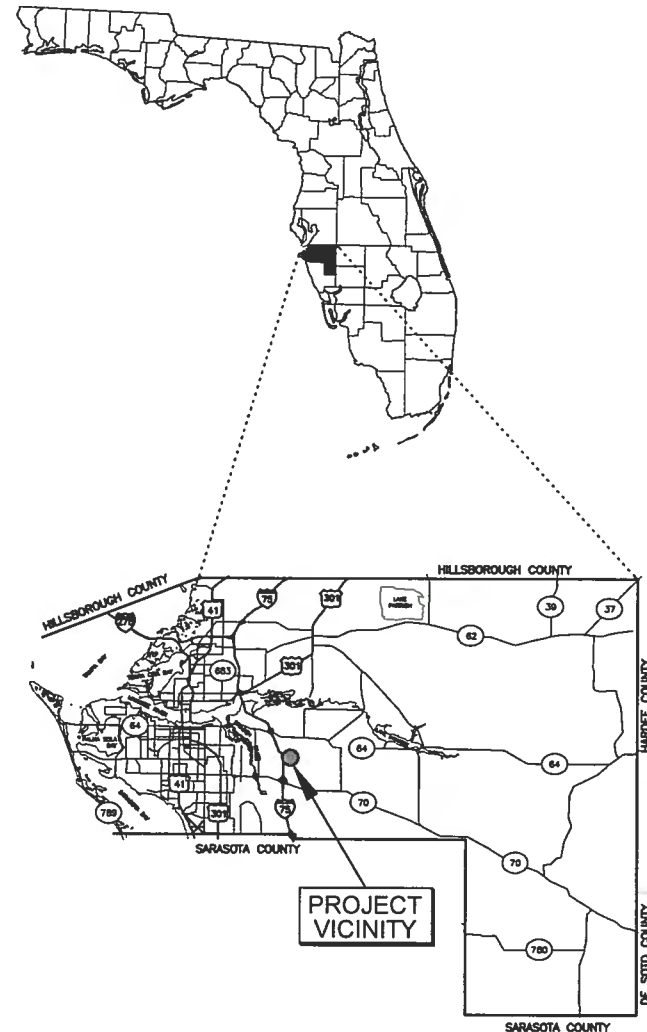
**END OF SECTION B**

# CONTRACT DRAWINGS

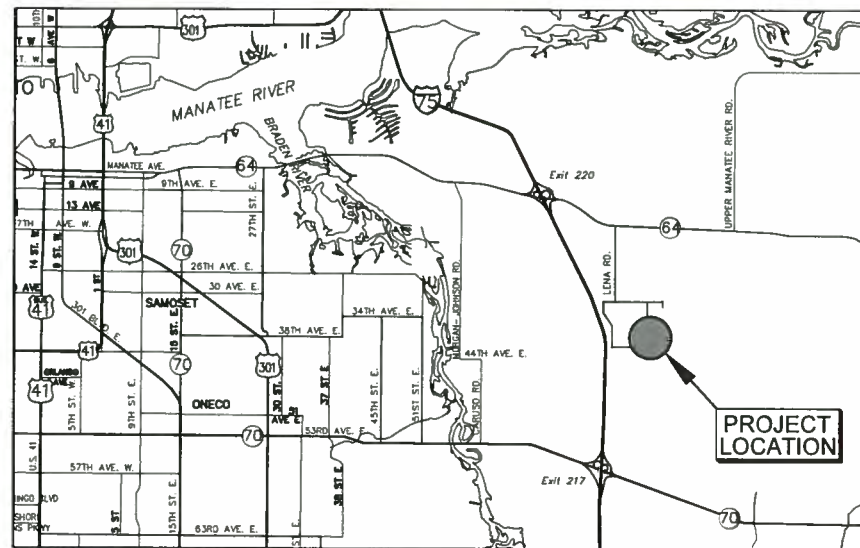
# SOUTHEAST WATER RECLAMATION FACILITY (SEWRF) SEPTAGE/ GREASE RECEIVING STATION

## MANATEE COUNTY, FLORIDA

COUNTY PROJECT No. 6083480



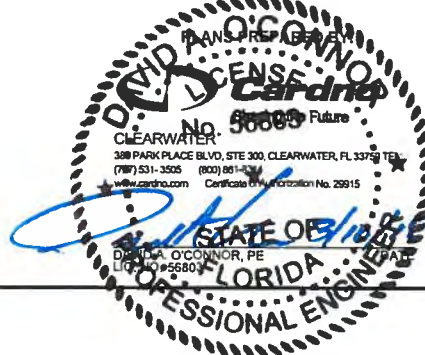
**VICINITY MAP**  
NOT TO SCALE



**LOCATION MAP**

NOT TO SCALE

3331 LENA ROAD BRADENTON, FLORIDA 34206  
SECTION 1, TOWNSHIP 35-S, RANGE 18-E  
PARCEL: 567110051  
MANATEE COUNTY, FLORIDA



ELECTRICAL PLANS  
PREPARED BY:



STRUCTURAL PLANS  
PREPARED BY:



114 W. FIRST STREET, SUITE 230  
SANFORD, FLORIDA 32771  
PHONE: (407) 322-0500 FAX: (407) 322-0023



PROJECT NO:  
00193-009-02  
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G-1

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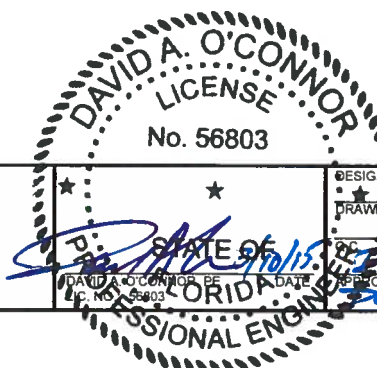
NO.	DESCRIPTION	BY	DATE

**SEWRF  
SEPTAGE/ GREASE  
RECEIVING STATION**



**MANATEE COUNTY**  
DEPARTMENT OF PUBLIC WORKS  
UTILITIES DEPARTMENT  
4410 66th Street West Bradenton, Florida 34210  
(941) 792-8611

**Cardno**  
Shaping the Future  
CLEARWATER  
390 PARK PLACE BLVD, STE 300, CLEARWATER, FL 33759 TEL:  
(772) 531-3505 (800) 861-0314  
www.cardno.com Certificate of Authorization No. 29915



DESIGNED	DOC
DRAWN	ALS
CHECKED	ALS
APPROVED	ALS

**SHEET INDEX**

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**GENERAL NOTES**

- MATERIALS USED IN THE CONSTRUCTION OF THIS PROJECT SHALL BE NEW AND CONFORM TO THE MANATEE COUNTY DEPARTMENT OF PUBLIC WORKS UTILITIES DEPARTMENT AND THE LATEST LOCAL JURISDICTION STANDARDS, UNLESS OTHERWISE NOTED.
- WHERE REFERENCED STANDARDS CONFLICT, OR WHERE THERE ARE DISCREPANCIES BETWEEN THE PROJECT MANUAL (TECH SPECS) AND CONTRACT DRAWINGS, THE MORE STRINGENT STANDARD SHALL APPLY.
- THE CONTRACTOR SHALL CALL "SUNSHINE STATE ONE CALL 811" A MINIMUM OF 2-DAYS AND A MAXIMUM OF 5-DAYS PRIOR TO START OF CONSTRUCTION.
- THE CONTRACTOR SHALL CONTACT THE ENGINEER OF RECORD AT (727) 639-5567 IMMEDIATELY ON ANY CONFLICTS ARISING DURING CONSTRUCTION.
- ALL WORK PERFORMED SHALL COMPLY WITH THE REGULATIONS AND ORDINANCES OF THE VARIOUS GOVERNMENTAL AGENCIES HAVING JURISDICTION OVER THE WORK.
- THESE DRAWINGS DO NOT INCLUDE NECESSARY COMPONENTS FOR CONSTRUCTION SAFETY AND THE CONTRACTOR IS SOLELY RESPONSIBLE FOR THE CONSTRUCTION SAFETY. SPECIAL PRECAUTIONS MAY BE REQUIRED IN THE VICINITY OF POWER LINES AND OTHER UTILITIES.
- IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO CONTROL AND PREVENT EROSION AND THE TRANSPORTATION OF SEDIMENT TO SURFACE DRAINS AND OUTFALLS.
- ALL SECTION CORNERS OR PROPERTY CORNERS DISLOCATED OR DISTURBED BY THE CONSTRUCTION ACTIVITIES SHALL BE RESET BY A REGISTERED LAND SURVEYOR AT THE CONTRACTORS EXPENSE.
- UNLESS SHOWN OTHERWISE, FINAL GRADE IS TO GENERALLY BE THE SAME AS EXISTING GRADE. ALL DISTURBED LANDSCAPED AND/OR GRASSED AREAS SHALL BE RESTORED IN-KIND.
- ALL SODDING, SEEDING AND MULCHING SHALL INCLUDE WATERING AND FERTILIZATION AND CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING THESE AREAS UP TO AND INCLUDING THE INITIAL MOWING.
- ALL VOIDS AFTER PLACEMENT OF SOD SHALL BE FILLED WITH PREPARED SOIL MIX. THE SOD SHALL BE ROLLED TO MEET THE PROPOSED GRADES, SOD PLACED ON SLOPES (3:1 OR STEEPER) SHALL BE PEGGED.
- ALL EXCESS SOIL RESULTING FROM CONSTRUCTION ACTIVITIES THAT IS NOT CLAIMED BY THE OWNER SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND PROPERLY DISPOSED OF OFFSITE BY THE CONTRACTOR.
- AREAS OF EXPOSED EARTH RESULTING FROM CONSTRUCTION SHALL BE SODDED IN KIND UNLESS OTHERWISE NOTED ON PLANS.
- THE LOWEST PIPE SHALL BE INSTALLED FIRST WHERE UTILITIES CROSS.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR TESTING OF ALL MAINS IN ACCORDANCE WITH CURRENT STANDARDS OF LOCAL JURISDICTION. CONTRACTOR SHALL NOTIFY THE LOCAL JURISDICTION AND THE OWNER OR HIS AUTHORIZED REPRESENTATIVE AT LEAST 48 HOURS IN ADVANCE OF PERFORMING TESTS.
- THE CONTRACTOR SHALL PROVIDE ALL SHEETING, SHORING AND BRACING REQUIRED TO PROTECT ADJACENT STRUCTURES AND TO MINIMIZE TRENCH WIDTH. WHERE A SEPARATE PAY ITEM IS NOT PROVIDED, THE COST OF ALL SHEETING AND BRACING REQUIRED SHALL BE INCLUDED IN THE CONTRACT PRICE FOR THE ITEM OF WORK FOR WHICH SHEETING, SHORING AND BRACING IS ANTICIPATED TO BE REQUIRED IN ACCORDANCE WITH "TRENCH SAFETY ACT".
- ALL CONCRETE SHALL HAVE A MINIMUM ULTIMATE COMPRESSIVE STRENGTH OF 3,000 PSI (28 DAY STRENGTH), UNLESS OTHERWISE NOTED ON DRAWINGS. ACCESS DRIVES SHALL MEET H - 20 TRAFFIC LOADING REQUIREMENTS.
- LOCATIONS, ELEVATIONS AND DIMENSIONS OF EXISTING UTILITIES, STRUCTURES AND OTHER FEATURES ARE SHOWN ACCORDING TO THE BEST INFORMATION AVAILABLE AT THE TIME OF THE PREPARATION OF THESE PLANS, BUT DO NOT PURPORT TO BE ABSOLUTELY CORRECT. THE CONTRACTOR SHALL VERIFY THE LOCATION, ELEVATIONS AND DIMENSIONS OF ALL EXISTING UTILITIES, STRUCTURES AND OTHER FEATURES AFFECTING HIS WORK PRIOR TO CONSTRUCTION.
- THE CONTRACTOR SHALL VERIFY IN THE FIELD THE LOCATION AND ELEVATION OF ALL EXISTING UTILITY CONNECTION POINTS PRIOR TO STARTING CONSTRUCTION AND SHALL IMMEDIATELY NOTIFY THE ENGINEER AND OWNER OF ANY DISCREPANCIES FOUND.
- ALL POTABLE, FIRE AND IRRIGATION SYSTEM COMPONENTS SHALL REMAIN OPERATIONAL DURING CONSTRUCTION. THE CONTRACTOR SHALL REPAIR ANY DAMAGE TO THESE SYSTEMS IMMEDIATELY.
- THE CONTRACTOR SHALL ENSURE THAT EXCAVATIONS ARE FREE OF DEBRIS AND ORGANIC MATERIAL PRIOR TO BACKFILLING.

- THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING A NPDES NOI PERMIT FROM EPA, AS WELL AS PREPARING AND MAINTAINING A STORMWATER POLLUTION PREVENTION PLAN FOR BOTH ON-SITE AND OFF-SITE IMPROVEMENTS. THE CONTRACTOR SHALL BECOME FAMILIAR WITH AND COMPLY WITH ALL REQUIREMENTS OF THE EPA NPDES PERMIT FOR THIS PROJECT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY STORMWATER DISCHARGE PERMIT AND/OR DEWATERING PLAN, AND SHALL BE RESPONSIBLE TO COMPLY WITH ALL CONDITIONS SET FORTH IN THE PERMIT.
- THE CONTRACTOR SHALL TAKE ALL REASONABLE MEANS TO ELIMINATE THE TRANSPORT OF DUST FROM THE PROJECT SITE. SPECIAL MEASURES, SUCH AS PERIODICALLY APPLYING WATER TO THE WORK SITE TO PREVENT DUST SHALL BE INCORPORATED INTO THE CONTRACTORS WORK PLAN.
- MAINTAIN ACCESS TO AND OPERATION OF ALL EXISTING PLANT OPERATIONS UNTIL NEW OPERATIONS HAVE BEEN ACCEPTED BY OWNER AND ENGINEER.
- SURVEY PREPARED BY:  
HYATT SURVEY SERVICES, INC.  
11007 8TH AVENUE EAST, BRADENTON, FLORIDA 34212  
(941) 748.4693
- GEOTECHNICAL INVESTIGATION PREPARED BY:  
MC SQUARED, INC. (MC2)  
5808-A BRECKENRIDGE PARKWAY, TAMPA, FLORIDA 33610  
(813) 623.3399
- VERTICAL AND HORIZONTAL CLEARANCES FOR WATER, SEWER, FORCE MAIN, AND RECLAIMED WATER MAINS SHALL MEET FDEP MINIMUM SEPARATION.
- ALL PLANT SERVICE WATER SPIGOTS (HOSE BIBS, IRRIGATION SYSTEM) SHALL HAVE APPROPRIATE SAFETY PLACARDS.
- UNLESS OTHERWISE NOTES, ALL STAINLESS STEEL SHALL BE TYPE 316L.
- THE CONTRACTOR IS SOLELY RESPONSIBLE FOR SAFEKEEPING OF EQUIPMENT AND MATERIALS LEFT ON-SITE DURING CONSTRUCTION
- PIPE DEFLECTION AT THE JOINTS SHALL NOT EXCEED 75% OF MANUFACTURER'S RECOMMENDATION.
- THE CONTRACTOR SHALL EXCAVATE TO CONFIRM THE LOCATIONS OF EXISTING UTILITIES ADJACENT TO OR CROSSING PROPOSED LINEWORK BEFORE STARTING CONSTRUCTION.
- ALL BELOW GROUND DUCTILE IRON PIPE SHALL BE ENCASED IN A POLYETHYLENE WRAP IN ACCORDANCE WITH AWWA C105.
- ALL EXISTING FENCE DISTURBED DURING CONSTRUCTION SHALL BE REPAIRED OR REPLACED AND REINSTALLED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER UNLESS SHOWN TO BE REMOVED ON CONSTRUCTION PLANS.
- OTHER CONSTRUCTION PROJECTS MAY BE ONGOING AT THE FACILITY DURING THE TIME OF THIS PROJECT. THE CONTRACTOR SHALL COOPERATE WITH OTHER CONTRACTORS THAT MAY BE ON SITE. THE CONTRACTOR SHALL COORDINATE ALL WORK THROUGH THE PLANT SUPERINTENDENT.
- THE CONTRACTOR SHALL RECEIVE A DESIGNATED AREA FOR STORAGE OF MATERIALS. THE CONTRACTOR IS ULTIMATELY RESPONSIBLE FOR THE SECURITY AND SAFEKEEPING OF CONTRACTOR'S OWN TOOLS AND PROJECT MATERIALS STORED ON SITE.
- THE CONTRACTOR SHALL MAINTAIN ON-SITE ONE FULL-SIZE SET OF CONTRACT DRAWINGS RED-LINED TO DOCUMENT CONFIRMATION OF ALL PROPOSED WORK AND ANY DEVIATIONS FROM PROPOSED WORK. THESE RED-LINED DRAWINGS SHALL BE MADE AVAILABLE TO OWNER AND ENGINEER UPON REQUEST.
- THE CONTRACTOR SHALL PROVIDE CERTIFIED "AS-BUILT" DRAWINGS, SIGNED AND SEALED BY A PROFESSIONAL LAND SURVEYOR. THE RECORD DRAWINGS SHALL SHOW CONFIRMATION OF ALL PROPOSED WORK AND ANY DEVIATIONS FROM THE PROPOSED WORK. THE CONTRACTOR SHALL PROVIDE FIVE HARD COPIES AND ONE ELECTRONIC AUTOCAD COPY OF THE "AS-BUILT" DRAWINGS TO THE ENGINEER.

**SURVEY NOTES**

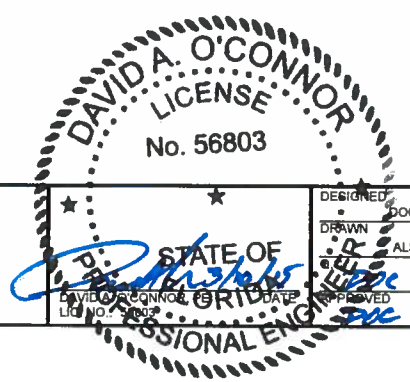
- THIS IS NOT A BOUNDARY SURVEY.
- THE SURVEY IS REFERENCED TO A PROJECTION OF THE FLORIDA STATE PLANE COORDINATE SYSTEM (WEST ZONE NAD 1983/2007 ADJUSTMENT).
- ALL ELEVATIONS REFER TO NATIONAL GEODETIC VERTICAL DATUM OF 1929 (NGVD 29).
- THE FOLLOWING BENCHMARK WAS RECOVERED AND UTILIZED FOR THIS SURVEY: RAILROAD SPIKE IN THE NE SIDE OF A POWER POLE WITH A PK NAIL AND MANATEE COUNTY BM DISK ABOVE IT, 45± WEST OF SW CORNER PHASE 1 LENA LANDFILL (NGVD 1929 ELEVATION 38.671'). FOR CONVERSION TO NAVD 1988 ELEVATIONS, A VALUE OF (-0.96') SHOULD BE APPLIED. THIS VALUE WAS DERIVED USING CORPSCON 6 AND IS APPROXIMATE.
- SITE LIES WITHIN FLOOD ZONES "A" AND "X" AS SCALED FROM THE FEDERAL EMERGENCY MANAGEMENT AGENCY FLOOD INSURANCE RATE MAP: COMMUNITY PANEL NUMBER 120153 0352 C DATED JULY 15, 1992. SUBJECT TO FIELD VERIFICATION.
- THIS SURVEY IS SUBJECT TO PERTINENT EASEMENTS, RIGHTS-OF-WAY AND RESTRICTIONS OF RECORD, IF ANY.

**HORIZONTAL/VERTICAL CONTROL**

DESIGNATION (SEE PLAN)	NORTHING	EASTING	ELEVATION
BM # 200 (PKND LB 7203)	1139596.539	510507.125	37.66'
BM # 204 (PKND LB 7203)	1139279.956	510481.022	35.81'
BM # 208 (PKND LB 7203)	1139366.878	511102.444	37.17'

NO.	DESCRIPTION	BY	DATE

**SEWRF  
SEPTAGE/ GREASE  
RECEIVING STATION**



DESIGNED	DOC
DRAWN	ALS
CHECKED	ALS
APPROVED	ALS

**GENERAL NOTES**

PROJECT NO:	00193-009-02
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**GENERAL ABBREVIATIONS**

@	AT	JT.	JOINT
AC	ACRES	LG.	LONG
AC	ASPHALTIC CONCRETE	LN.	LANE
ABD	ABANDONED	LP	LIGHT POLE
AL./ALUM.	ALUMINUM	MAX.	MAXIMUM
ANCH.	ANCHOR	MB	MAILBOX
APPROX.	APPROXIMATE	MCC	MOTOR CONTROL CENTER
ASPH	ASPHALT	MES	MITERED END SECTION
AVE.	AVENUE	MON.	MONUMENT
BLDG.	BUILDING	NG	NATURAL GROUND
BLVD.	BOULEVARD	N.T.S.	NOT TO SCALE
BM	BENCHMARK	NO.	NUMBER
BOT./BOTT.	BOTTOM	Ø	DIAMETER / PHASE
C	CHANNEL	OPNG.	OPENING
C.	CONDUIT	PKND	PK NAIL W/ DISK
C.B.	CATCH BASIN	PLCS.	PLACES
CHKR	CHECKERED	POT	POTABLE
CIR.	CIRCLE	PP	POWER POLE
CLF	CHAIN LINK FENCE	PROP.	PROPOSED
CL	CENTERLINE	P.V.	PLUG VALVE
CM	CORRUGATED METAL PIPE	PVMT	PAVEMENT
COL.	COLUMN	R.	RADIUS / RISER / RELAY
CONN.	CONNECTOR / CONNECTION	RCP	REINFORCED CONCRETE PIPE
CONC.	CONCRETE	REF.	REFERENCE
C.P.	CONTROL PANEL	REINF.	REINFORCED / REINFORCING
CU.	COPPER	REQD	REQUIRED
D.	DEEP / DRAIN	RESTR.	RESTRAINED
DBL.	DOUBLE	RFH	RECLAIM FIRE HYDRANT
DHW.	DESIGN HIGH WATER	RW; R/W	RIGHT-OF-WAY
DISCH.	DISCHARGE	SAN.	SANITARY
DLW.	DESIGN LOW WATER	SEC.	SECTION
DN.	DOWN	SGL	SINGLE
DR.	DRIVE	SPRK	SPRINKLER
DRWY	DRIVEWAY	SQ.	SQUARE
E.W.	EACH WAY	SN	SIGN
EA.	EACH	ST.	STREET
EL./ELEV.	ELEVATION	STL	STEEL
ELEC.	ELECTRICAL CONDUIT	S.U.E.	SUBSURFACE UTILITY ENGINEERING
ETC.	AND SO FORTH	SW/SWK	SIDEWALK
EXIST.	EXISTING	SYM.	SYMMETRICAL
EXP.	EXPANSION	TOB	TOP OF BANK (DITCH)
FF.	FOOT	T.&B.	TOP & BOTTOM
FT.	FINISHED FLOOR	TEL	TELEPHONE
FTG.	FOOTING	TEMP.	TEMPORARY
GALV.	GALVANIZED	THK	THICK
GDRL	GUARDRAIL	TOS	TOE OF SLOPE (DITCH)
GEN	GENERATOR	TYP.	TYPICAL
GI	GRATED INLET	UG	UNDERGROUND GAS
GPM	GALLONS PER MINUTE	UP	UTILITY POLE
GRTG.	GRATING	UT	UNDERGROUND TELEPHONE
GRND	GROUND	VERT.	VERTICAL
G.S.	GALVANIZED STEEL	W	WIDE FLANGE / WIDE / WATT / WATER
GR/GRD.	GRADE	W/	WITH
GWP	GUY WIRE POLE	W/L	WATER LINE
HDWALL	HEADWALL	W.L.	WATER LEVEL
H.R.	HANDRAIL	WM	WATER MAIN
HWH	HOT WATER HEATER	W.M.	WATER METER
I.E.	INVERT ELEVATION	W.P.	WEATHER PROOF
IN.	INCH	W.S.	WALL SLEEVE / WATER STOP / WATER SERVICE
INV.	INVERT		
IP	IRON PIPE		
IR	IRON ROD		
J.B.	JUNCTION BOX		

**FLOW ABBREVIATIONS**

AD	AIR DUCT
AL	ALUM
BE	BURIED ELECTRIC
BW	BACKWASH
CA	COMPRESSED AIR
CLE	CLARIFIER EFFLUENT
CL2G	CHLORINE GAS
CL2S	CHLORINE SOLUTION
DR	DRAIN
FBW	SAND FILTER BACKWASH
FE	SAND FILTER EFFLUENT
FEO	FLOW EQUALIZATION
FM	FORCE MAIN
GR	GRIT
HW	HOT WATER
IRR	IRRIGATION
LC	LEACHATE COLLECTION
MHE	MANHOLE ELECTRIC
ML	MIXED LIQUOR
OF	OVERFLOW
OF P	OVERFLOW POLYMER
PO	POLYMER
PDFM	PLANT DRAIN FORCE MAIN
PSW	PLANT SERVICE WATER
PW	POTABLE WATER
RAS	RETURN ACTIVATED SLUDGE
RCW	RECLAIMED WATER
REJ	REJECT
RML	RECIRCULATED MIXED LIQUOR
RW	RECLAIMED WATER
SAM	SAMPLE
SC	SCUM
STORM	STORMWATER COLLECTION
SPW	STORAGE POND WATER
SS	SANITARY SEWER
SW	SPRAY WATER
SWW	SANITARY WATER VALVE
TS	THICKENED SLUDGE
UN	UNDERDRAIN
UNK	UNKNOWN
WAS	WASTE ACTIVATED SLUDGE
WW	WASTEWATER

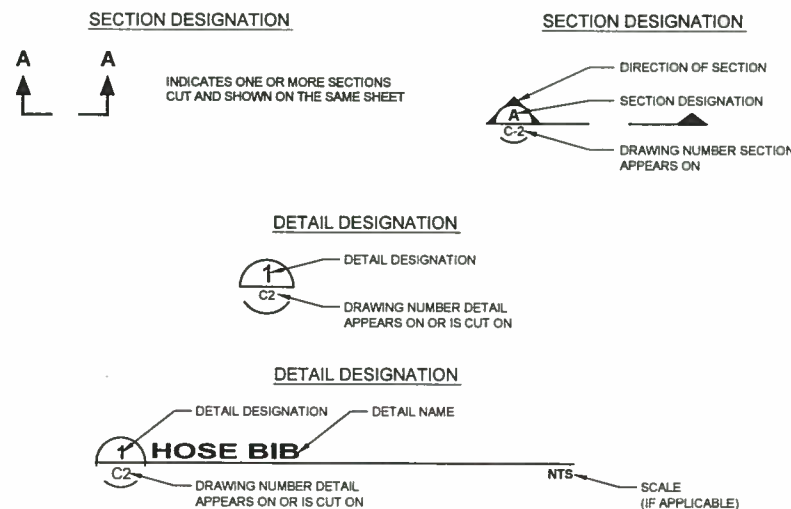
**PIPING ABBREVIATIONS**

ABD	ABANDONED
CO	CLEANOUT
CORP	CORPORATION
CV	CHECK VALVE
DI	DUCTILE IRON
DIA	DIAMETER
DIP	DUCTILE IRON PIPE
ELEC	ELECTRICAL
EXIST	EXISTING
FH	FIRE HYDRANT
FL	FLANGED
GV	GATE VALVE
HB	HOSE BIBB
HDPE	HIGH DENSITY POLYETHYLENE
MH	MANHOLE
MJ	MECHANICAL JOINT
PE	PLAIN END
PS	PUMP STATION
PVC	POLYVINYLCHLORIDE
RED	REDUCER
SCH	SCHEDULE
SS	STAINLESS STEEL
TBR	TO BE REMOVED
UE	UNDERGROUND ELECTRIC
V	VALVE
VERT	VERTICAL

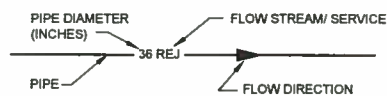
**LEGEND**

EXISTING		PROPOSED
	PIPELINE	
	GATE VALVE	
	BUTTERFLY VALVE	
	BALL VALVE	
	PLUG VALVE	
	REDUCER	
	AIR RELEASE VALVE	
	GAS VALVE	
	MANHOLE	
	CATCH BASIN	
	FIRE HYDRANT	
	TOP OR TOE OF BANK	
	CHAIN LINK FENCE	
	RW OR PROPERTY LINE	
	PIPING, STRUCTURES OR EQUIPMENT TO BE REMOVED	
	BENCHMARK	
	FIRE HYDRANT	
	LIGHT POLE	
	VALVE	
	SANITARY WATER VALVE	
	RECLAIMED WATER METER	
	SANITARY MANHOLE	
	ELECTRIC MANHOLE	
	BOLLARD	
	POWER POLE	
	UTILITY RISER	
	IRRIGATION HEAD	
	S.U.E. TEST HOLE LOCATION	
	CONCRETE PAVEMENT	
	CONCRETE PAD	
	PAINTED STRIPING	
	PROPOSED GRADE	
	SURFACE FLOW ARROW	
	STRUCTURE COLUMN	
	SILT FENCE	
	YARD HYDRANT	
	HOSE RACK	

**DRAFTING LEGEND**



**PIPE IDENTIFICATION**



Pipe Material Number	Pipe Material Abbreviation
-1	DI
-2	PVC



NOTE:  
THE LEGEND LISTED REPRESENT A COMPREHENSIVE STANDARD GUIDE INTENDED FOR GENERAL USE. THEREFORE, NOT ALL OF THE SYMBOLS AND ABBREVIATIONS CONTAINED ON THIS SHEET ARE NECESSARILY USED ON THIS PARTICULAR CONTRACT.

NO.	DESCRIPTION	BY	DATE

**SEWRF  
SEPTAGE/ GREASE  
RECEIVING STATION**

**MANATEE COUNTY**  
DEPARTMENT OF PUBLIC WORKS  
UTILITIES DEPARTMENT  
4410 66th Street West Bradenton, Florida 34210  
(941) 792-8811

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380 PARK PLACE BLVD, STE 300, CLEARWATER, FL 33759 TEL:  
(727) 531-3505 (800) 861-4314  
www.cardno.com Certificate of Authorization No. 29915

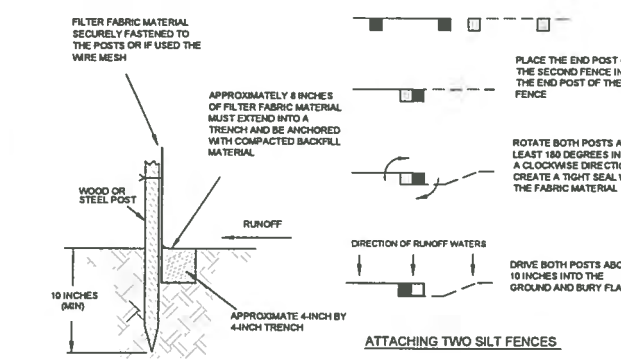
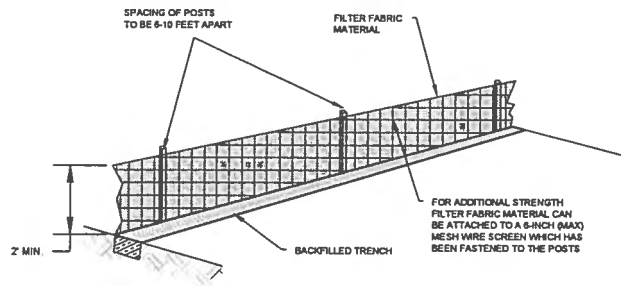
**DAVID A. O'CONNOR**  
LICENSE  
No. 56803  
STATE OF FLORIDA  
PROFESSIONAL ENGINEER

DESIGNED: DDC  
DRAWN: DDC  
CHECKED: DDC  
APPROVED: DDC

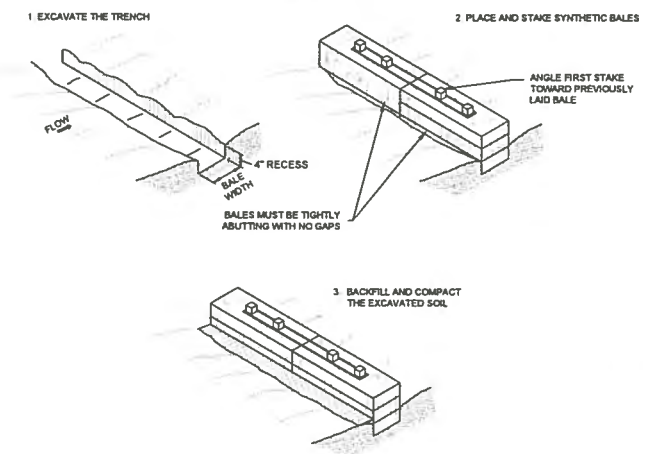
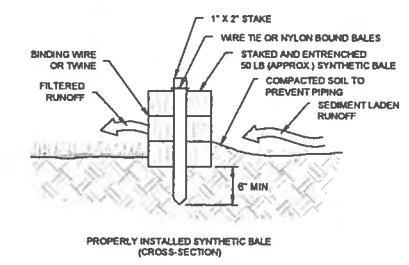
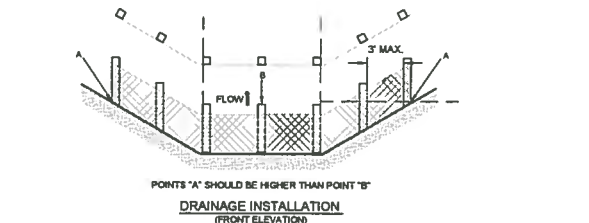
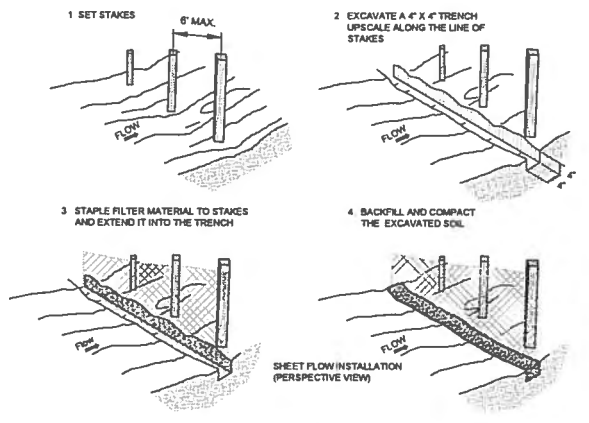
**LEGEND AND ABBREVIATIONS**

PROJECT NO:  
00193-009-02  
DATE:  
MARCH 2015  
SHEET NO:  
G-4

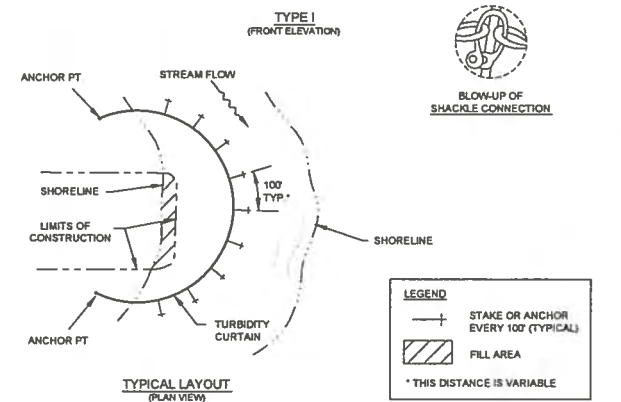
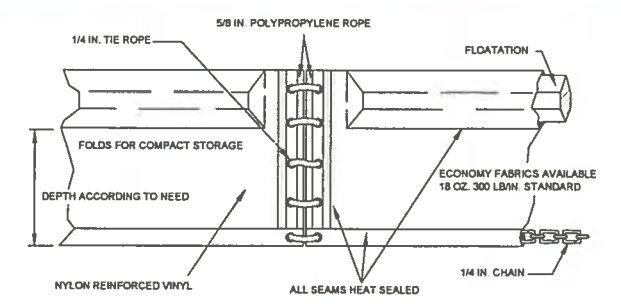




**INSTALLING A FILTER FABRIC SILT FENCE**  
NOT TO SCALE



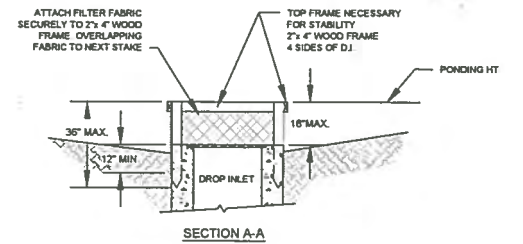
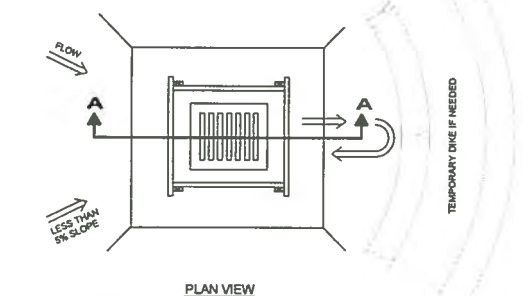
**TEMPORARY SYNTHETIC BALE SEDIMENT BARRIER**  
NOT TO SCALE



**TEMPORARY FLOATING TURBIDITY BARRIER**  
NOT TO SCALE

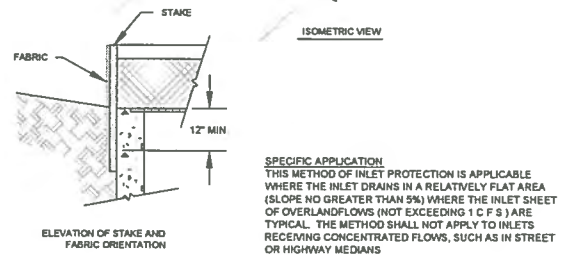
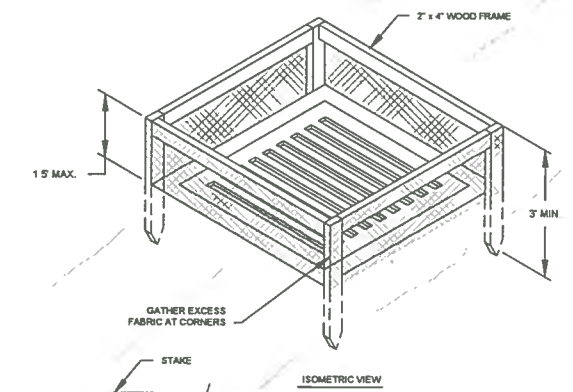
**EROSION CONTROL NOTES**

1. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO CONTROL AND PREVENT EROSION AND THE TRANSPORTATION OF SEDIMENT TO SURFACE DRAINS AND OUTFALLS.
2. THE CONTRACTOR SHALL PROVIDE SILT BARRIERS TO CONTROL EROSION AND SEDIMENTATION FROM TAKING PLACE OUTSIDE THE LIMITS OF THE PROJECT. THE SILT BARRIERS SHALL BE PLACED IN ACCORDANCE WITH THE REQUIREMENTS OF FDOT INDEX NO. 102, 103 AND 104 OR AS DIRECTED BY THE CITY ENGINEER.
3. REQUIRED EROSION CONTROL MEASURES SHALL REMAIN INTACT THROUGHOUT CONSTRUCTION. FAILURE TO INSTALL OR PROPERLY MAINTAIN REQUIRED EROSION CONTROL WILL RESULT IN ENFORCEMENT ACTION WHICH MAY INCLUDE CITATIONS AS PROVIDED BY APPLICABLE LOCAL ORDINANCE AND CHAPTERS 40D-4 AND 40D-40, F.A.C. INITIATION OF CIVIL PENALTY PROCEDURES PURSUANT TO SECTION 373.129, F.A.C. CAN RESULT IN A PENALTY NOT TO EXCEED \$10,000 PER OFFENSE WITH EACH DATE DURING WHICH SUCH VIOLATION OCCURS CONSTITUTING A SEPARATE OFFENSE.
4. ALL WORK PERFORMED SHALL COMPLY WITH THE REGULATIONS AND ORDINANCES OF THE VARIOUS GOVERNMENTAL AGENCIES HAVING JURISDICTION OVER THE WORK.
5. CONTRACTOR SHALL CONSTRUCT TURBIDITY BARRIERS APPROXIMATELY 25 FEET DOWNSTREAM OF END SECTIONS AT POND LOCATIONS SHOWN ON PLAN SHEETS. CONTRACTOR TO INSPECT AND MAINTAIN EACH TURBIDITY BARRIER DAILY.
6. CONTRACTOR MAY USE OTHER ACCEPTABLE EROSION CONTROL DEVICES AROUND INLETS AS APPROVED BY THE ENGINEER.

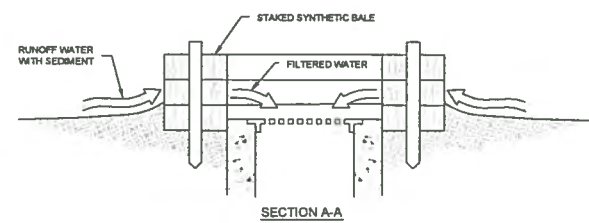
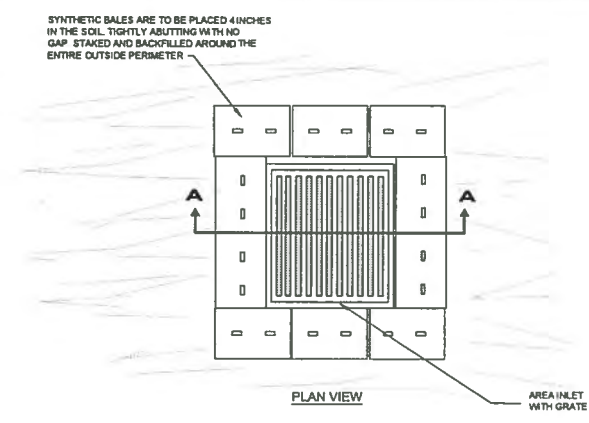


- NOTES:
1. DROP INLET SEDIMENT BARRIERS ARE TO BE USED FOR SMALL, NEARLY LEVEL DRAINAGE AREAS (LESS THAN 5%)
  2. USE 2" x 4" WOOD OR EQUIVALENT METAL STAKES (3 FT MIN LENGTH)
  3. INSTALL 2" x 4" WOOD TOP FRAME TO INSURE STABILITY
  4. THE TOP OF THE FRAME (PONDING HEIGHT) MUST BE WELL BELOW THE GROUND ELEVATION DOWNSLOPE TO PREVENT RUNOFF FROM BYPASSING THE INLET. A TEMPORARY DIKE MAY BE NECESSARY ON THE DOWNSLOPE SIDE OF THE STRUCTURE

**TEMPORARY SEDIMENT BARRIER AT DROP INLET**  
NOT TO SCALE



**SPECIFIC APPLICATION**  
THIS METHOD OF INLET PROTECTION IS APPLICABLE WHERE THE INLET DRAINS IN A RELATIVELY FLAT AREA (SLOPE NO GREATER THAN 5%) WHERE THE INLET SHEET OF OVERLAND FLOWS (NOT EXCEEDING 1 CFS) ARE TYPICAL. THE METHOD SHALL NOT APPLY TO INLETS RECEIVING CONCENTRATED FLOWS, SUCH AS IN STREET OR HIGHWAY MEDIANS



THIS METHOD OF INLET PROTECTION IS APPLICABLE WHERE THE INLET DRAINS A RELATIVELY FLAT AREA (SLOPE NO GREATER THAN 5%) WHERE SHEET OR OVERLAND FLOWS (NOT EXCEEDING 0.5 CFS) ARE TYPICAL. THE METHOD SHALL NOT APPLY TO INLETS RECEIVING CONCENTRATED FLOWS, SUCH AS STREET OR HIGHWAY MEDIANS

**TEMPORARY SYNTHETIC BALE SEDIMENT BARRIER AT STORM DRAIN DROP INLET**  
NOT TO SCALE

NO.	DESCRIPTION	BY	DATE

**SEWRP  
SEPTAGE/ GREASE  
RECEIVING STATION**

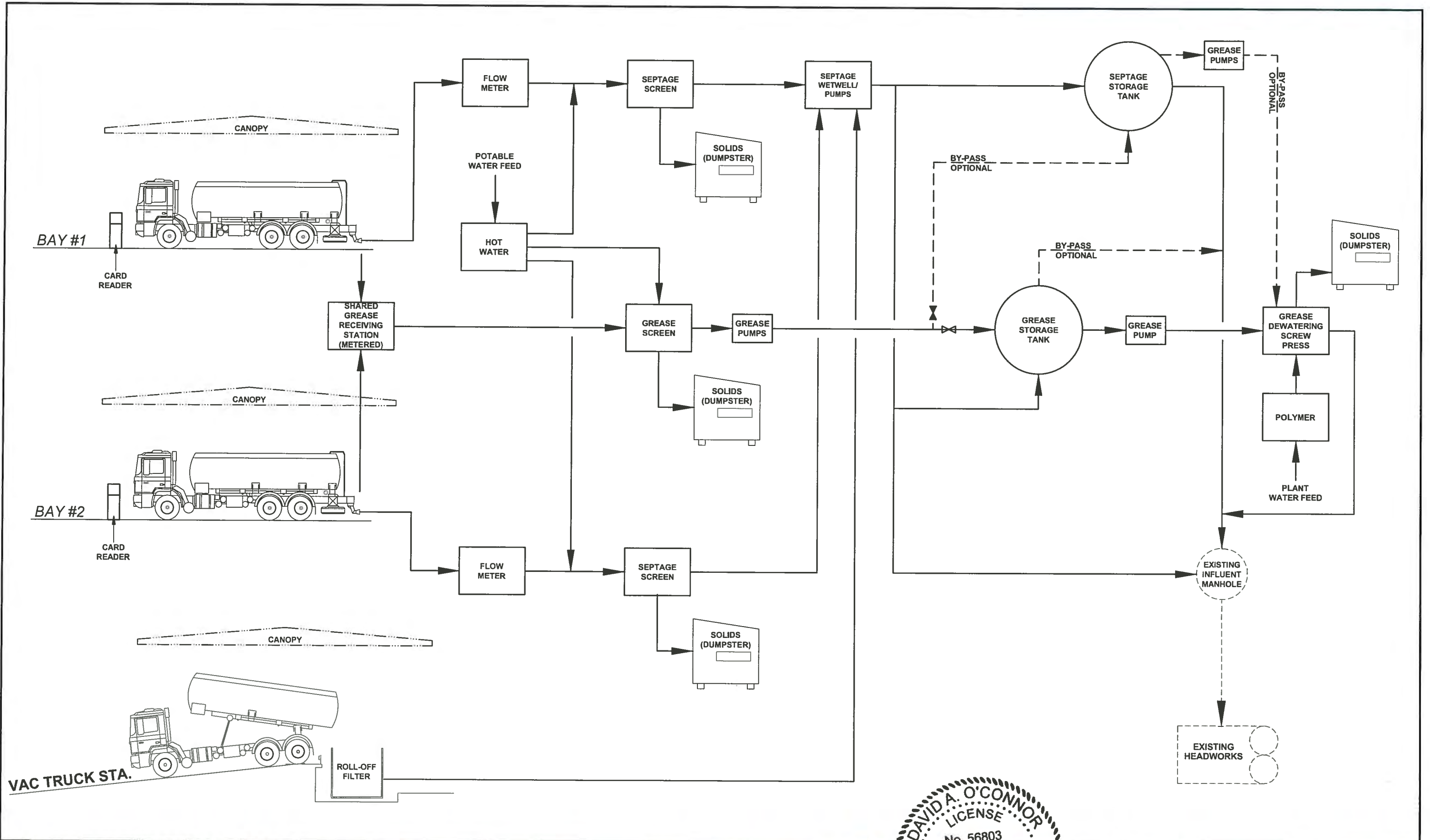
**MANATEE COUNTY**  
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UTILITIES DEPARTMENT  
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www.cardno.com Certificate of Authorization No. 29915

DAVID A. O'CONNOR  
Professional Engineer  
No. 56803  
STATE OF FLORIDA  
DESIGNED: DOC  
DRAWN: [Signature]  
CHECKED: Q.C.  
APPROVED: [Signature]


**EROSION CONTROL  
DETAILS AND NOTES**

PROJECT NO:  
00193-009-02  
DATE:  
MARCH 2015  
SHEET NO:  
G-5

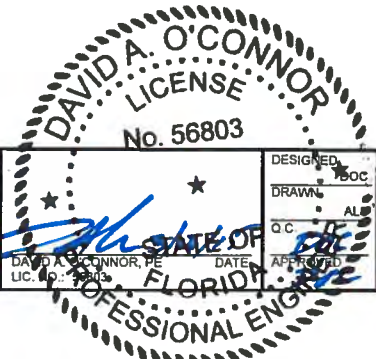


NO.	DESCRIPTION	BY	DATE

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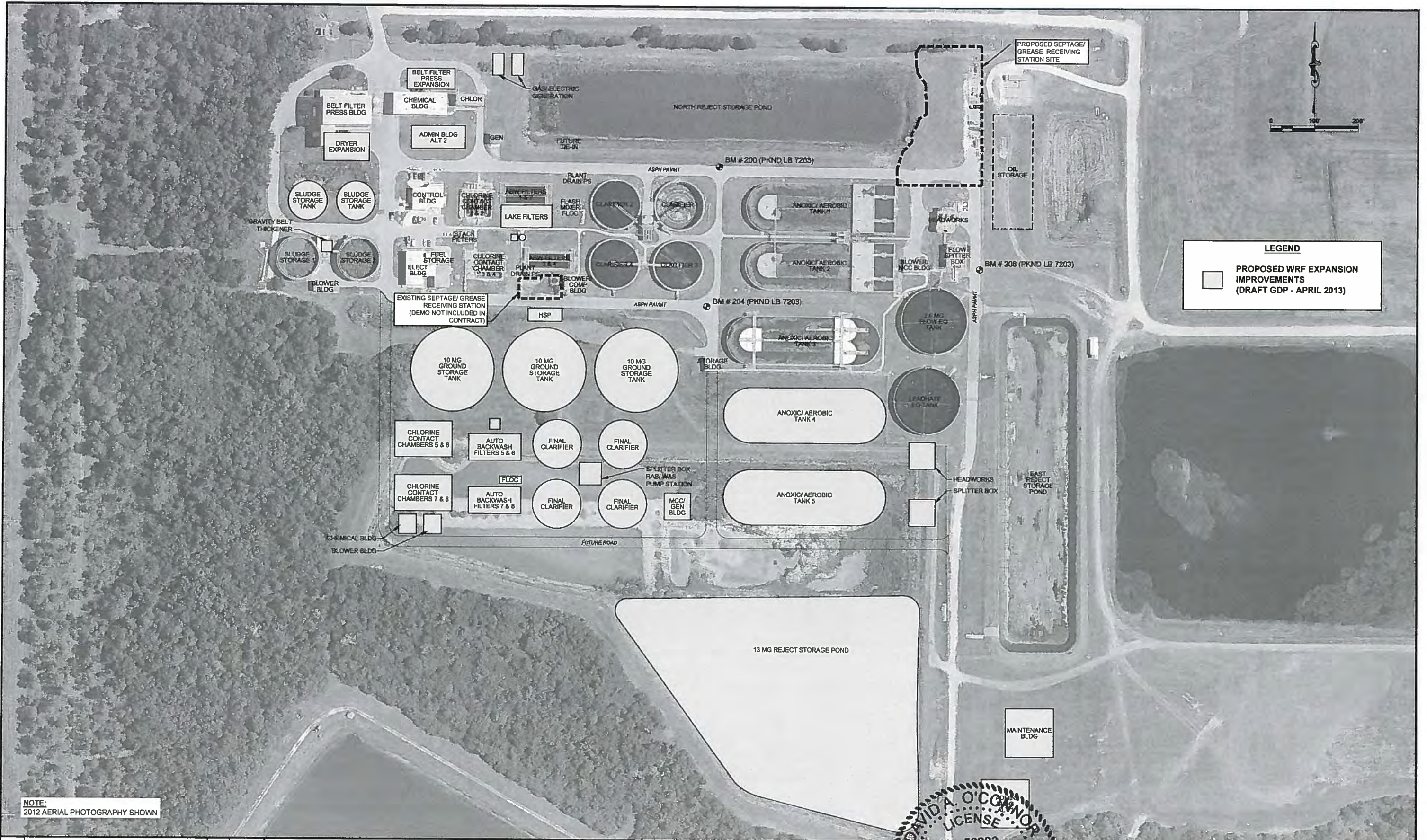

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 DAVID A. O'CONNOR  
 LICENSE  
 No. 56803  
 STATE OF FLORIDA  
 PROFESSIONAL ENGINEER

**PROCESS SCHEMATIC**

PROJECT NO:	00193-009-02
DATE:	MARCH 2015
SHEET NO:	G-6

FILE: J:\00193\009\02\ACAD\dwg\Sheets\PROCESS SCHEMATIC.dwg LAST SAVED: Tue, 02/10/15 6:01p PLOTTED: Tue, 03/10/15 3:15p BY: Dave Stevely



**LEGEND**

□ PROPOSED WRF EXPANSION IMPROVEMENTS (DRAFT GDP - APRIL 2013)

NOTE:  
2012 AERIAL PHOTOGRAPHY SHOWN

NO.	DESCRIPTION	BY	DATE

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RECEIVING STATION**

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DEPARTMENT OF PUBLIC WORKS  
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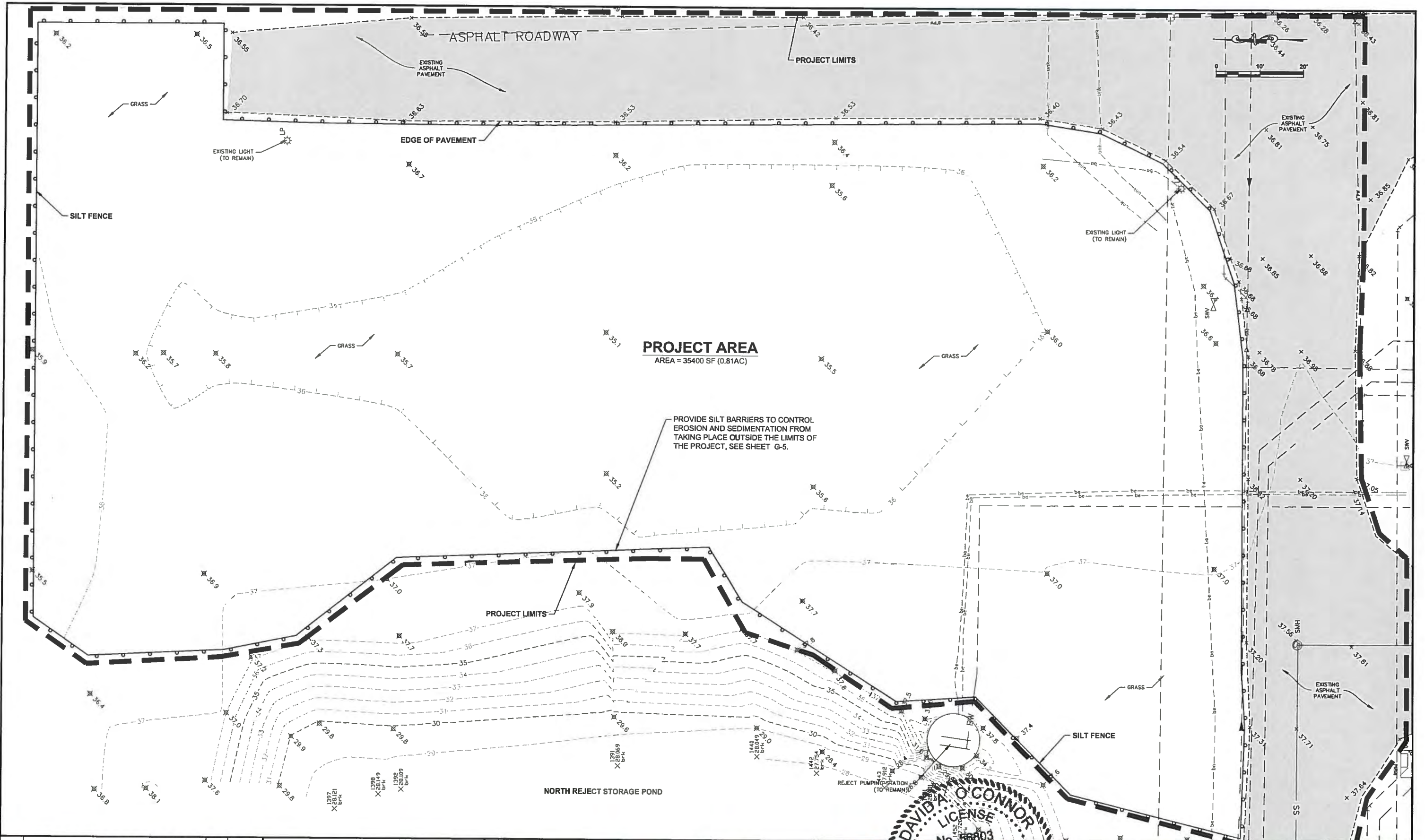
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DAVID A. O'CONNOR  
LICENSE  
No. 56893  
DESIGNED DOC  
DRAWN ALS  
APPROVED  
PROFESSIONAL ENGINEER  
FLORIDA

**OVERALL PROJECT AREA**

PROJECT NO:  
00193-009-02  
DATE:  
MARCH 2015  
SHEET NO:  
G-7

FILE: J:\00193\00193009\02\ACAD\dwg\Sheets\OVERALL PROJECT AREA.dwg LAST SAVED: Mon, 03/02/15 10:05:06 PLOTTED: Tue, 03/10/15 3:16p BY: Dave Shively



**PROJECT AREA**  
 AREA = 35400 SF (0.81AC)

PROVIDE SILT BARRIERS TO CONTROL EROSION AND SEDIMENTATION FROM TAKING PLACE OUTSIDE THE LIMITS OF THE PROJECT, SEE SHEET G-5.

NO.	DESCRIPTION	BY	DATE

**SEWRF  
 SEPTAGE/ GREASE  
 RECEIVING STATION**

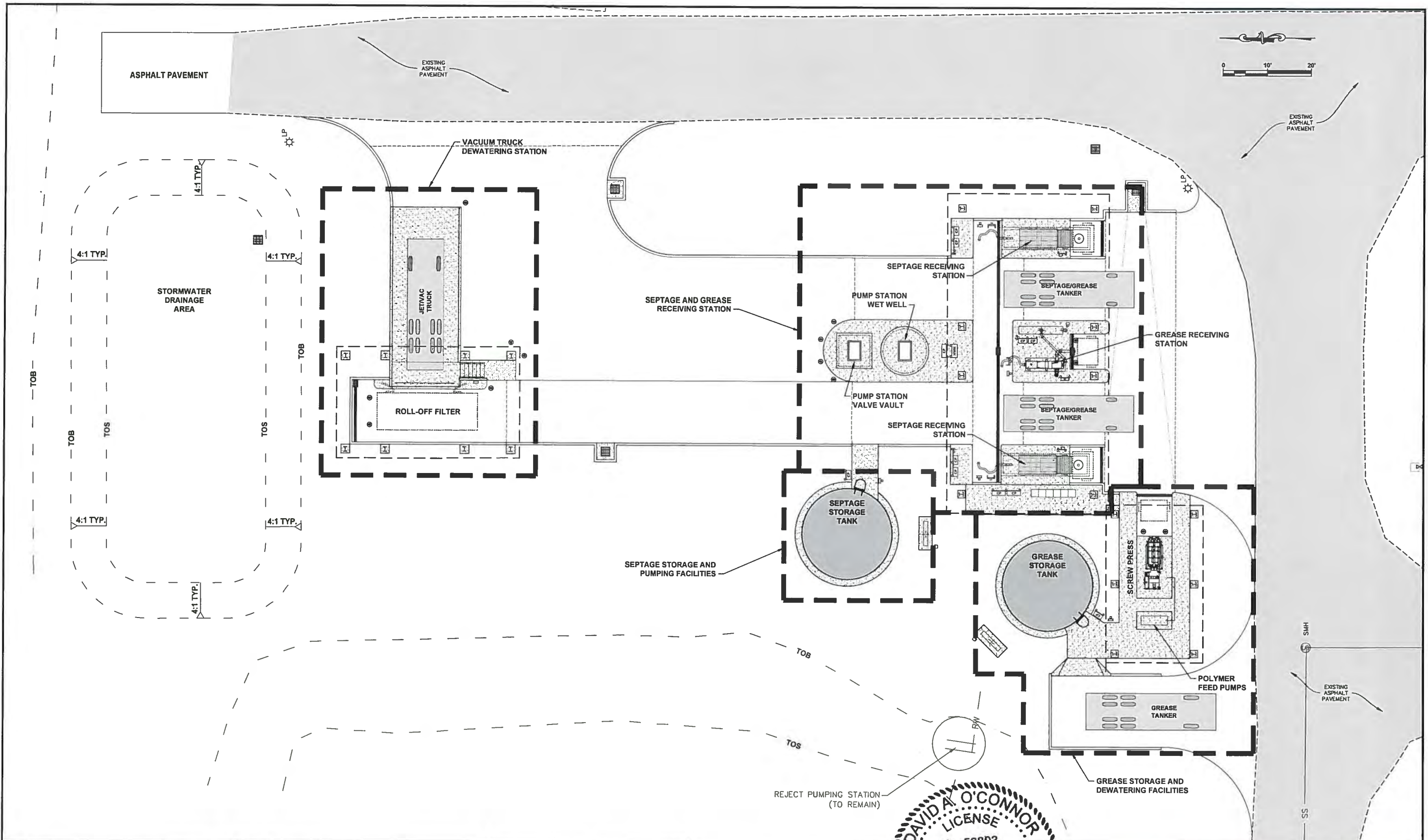
**MANATEE COUNTY**  
 DEPARTMENT OF PUBLIC WORKS  
 UTILITIES DEPARTMENT  
 4410 66th Street West Bradenton, Florida 34210  
 (941) 792-8811

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 380 PARK PLACE BLVD, STE 300, CLEARWATER, FL 33759 TEL:  
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 www.cardno.com Certificate of Authorization No. 25915

DESIGNED: **DAVID O'CONNOR**  
 DRAWN: **DAVID O'CONNOR**  
 DATE: **APRIL 2015**  
 LICENSE NO. **36803**  
**FLORIDA PROFESSIONAL ENGINEER**

**EXISTING SITE AND ERROSION  
 CONTROL PLAN**

PROJECT NO:  
 00193-009-02  
 DATE:  
 MARCH 2015  
 SHEET NO:  
**C-1**

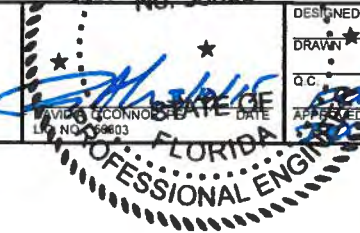


NO	DESCRIPTION	BY	DATE

**SEWRF  
SEPTAGE/ GREASE  
RECEIVING STATION**


**MANATEE COUNTY**  
 DEPARTMENT OF PUBLIC WORKS  
 UTILITIES DEPARTMENT  
 4410 66th Street West Bradenton, Florida 34210  
 (941) 792-8811

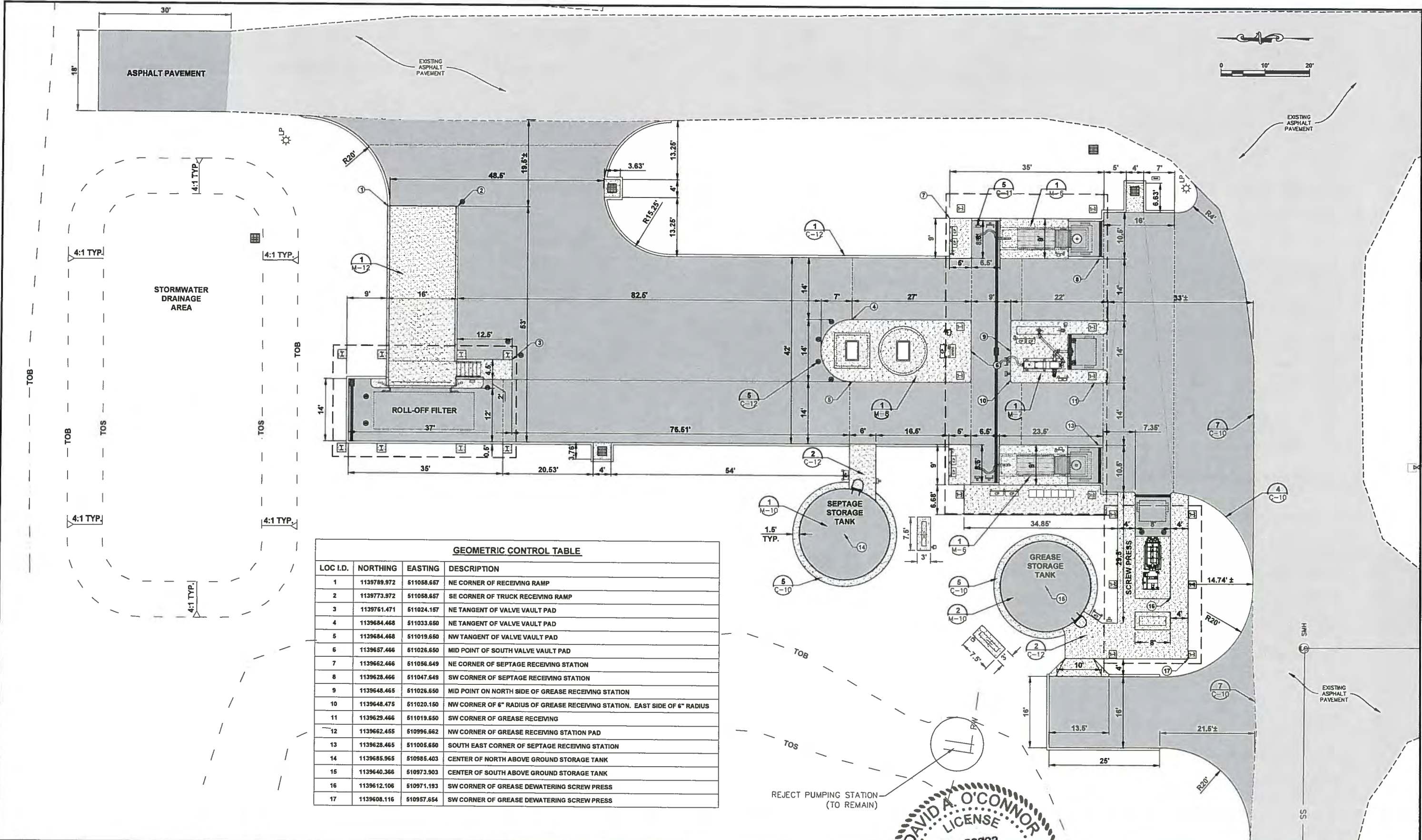

**Cardno**  
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 (727) 531-3505 (800) 891-8314  
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**DAVID A. O'CONNOR**  
 LICENSE  
 No. 56803  
 PROFESSIONAL ENGINEER  
 STATE OF FLORIDA

**SITE LAYOUT AND FACILITIES PAY  
ITEMS PLAN**

PROJECT NO:	00193-009-02
DATE:	MARCH 2015
SHEET NO:	C-2

FILE: J:\0018100193009\02\ACAD\dwg\Sheets\PLAN SHEETS.dwg LAST SAVED: Tue, 03/10/15 3:11p PLOTTED: Tue, 03/10/15 3:17p BY: Dave Stewey



**GEOMETRIC CONTROL TABLE**

LOC I.D.	NORTHING	EASTING	DESCRIPTION
1	1139789.972	511058.667	NE CORNER OF RECEIVING RAMP
2	1139773.972	511058.667	SE CORNER OF TRUCK RECEIVING RAMP
3	1139761.471	511024.157	NE TANGENT OF VALVE VAULT PAD
4	1139684.468	511033.650	NE TANGENT OF VALVE VAULT PAD
5	1139684.468	511019.650	NW TANGENT OF VALVE VAULT PAD
6	1139657.466	511026.650	MID POINT OF SOUTH VALVE VAULT PAD
7	1139662.466	511056.649	NE CORNER OF SEPTAGE RECEIVING STATION
8	1139628.466	511047.649	SW CORNER OF SEPTAGE RECEIVING STATION
9	1139648.465	511026.650	MID POINT ON NORTH SIDE OF GREASE RECEIVING STATION
10	1139648.475	511020.150	NW CORNER OF 6" RADIUS OF GREASE RECEIVING STATION, EAST SIDE OF 6" RADIUS
11	1139629.466	511019.650	SW CORNER OF GREASE RECEIVING
12	1139662.465	510996.662	NW CORNER OF GREASE RECEIVING STATION PAD
13	1139628.465	511005.660	SOUTH EAST CORNER OF SEPTAGE RECEIVING STATION
14	1139685.965	510985.403	CENTER OF NORTH ABOVE GROUND STORAGE TANK
15	1139640.366	510973.903	CENTER OF SOUTH ABOVE GROUND STORAGE TANK
16	1139612.106	510971.193	SW CORNER OF GREASE DEWATERING SCREW PRESS
17	1139608.116	510957.654	SW CORNER OF GREASE DEWATERING SCREW PRESS

NO.	DESCRIPTION	BY	DATE

**SEWRF  
SEPTAGE/ GREASE  
RECEIVING STATION**

**MANATEE COUNTY**  
DEPARTMENT OF PUBLIC WORKS  
UTILITIES DEPARTMENT  
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(941) 792-8811

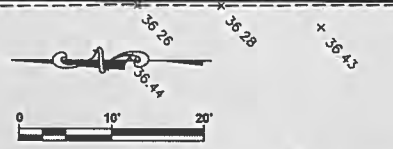
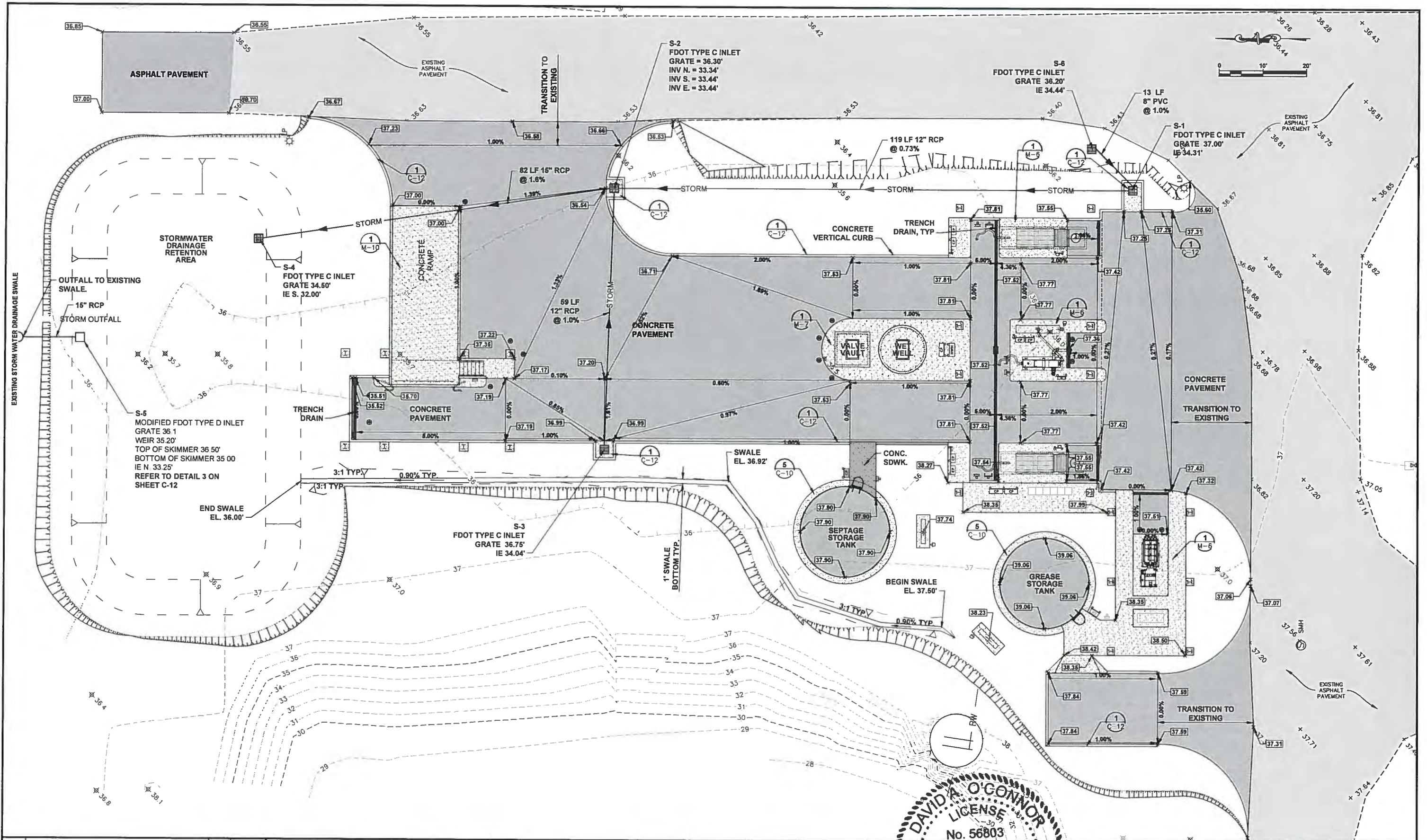
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**DAVID A. O'CONNOR**  
LICENSE  
No. 56803  
FLORIDA  
PROFESSIONAL ENGINEER

**PROPOSED SITE PLAN**

PROJECT NO:	00193-009-02
DATE:	MARCH 2015
SHEET NO:	C-3

FILE: J:\001\0000163009\02\CAD\dwg\Sheets\PLAN SHEETS.dwg LAST SAVED: Tue 03/10/15 3:11p PLOTTED: Tue 03/10/15 3:17p BY: Dave Swelby



NO	DESCRIPTION	BY	DATE

**SEWRF  
SEPTAGE/ GREASE  
RECEIVING STATION**


**MANATEE COUNTY**  
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 UTILITIES DEPARTMENT  
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 (941) 792-8811

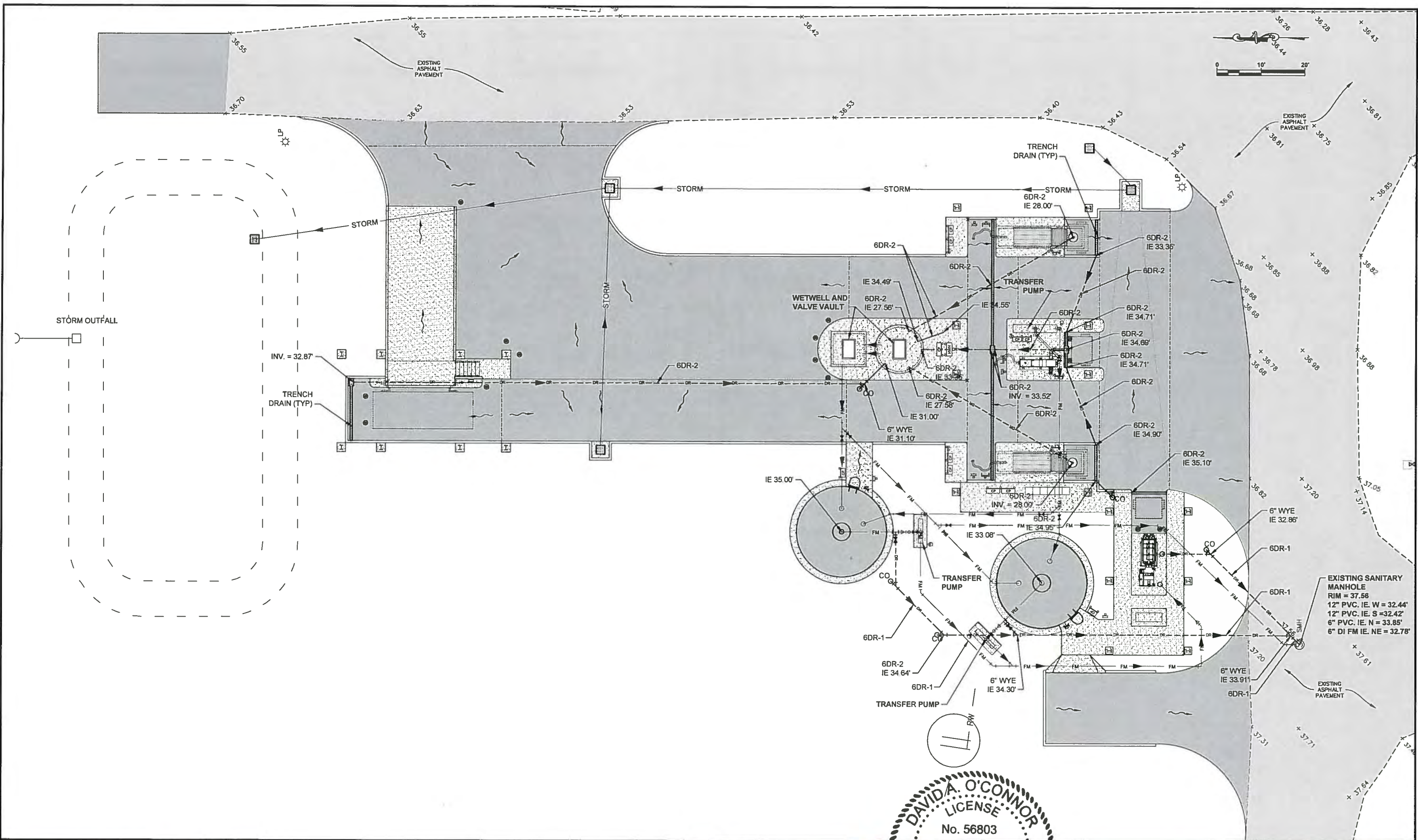

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 www.cardno.com Certificate of Authorization No. 29915


**DAVID A. O'CONNOR**  
 LICENSE  
 No. 56803  
 PROFESSIONAL ENGINEER

**PAVING AND GRADING PLAN**

PROJECT NO:	00193-009-02
DATE:	MARCH 2015
SHEET NO:	C-4

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**DAVIDA O'CONNOR**  
 LICENSE  
 No. 56803  
 STATE OF FLORIDA  
 PROFESSIONAL ENGINEER

NO.	DESCRIPTION	BY	DATE

**SEWRF  
 SEPTAGE/ GREASE  
 RECEIVING STATION**

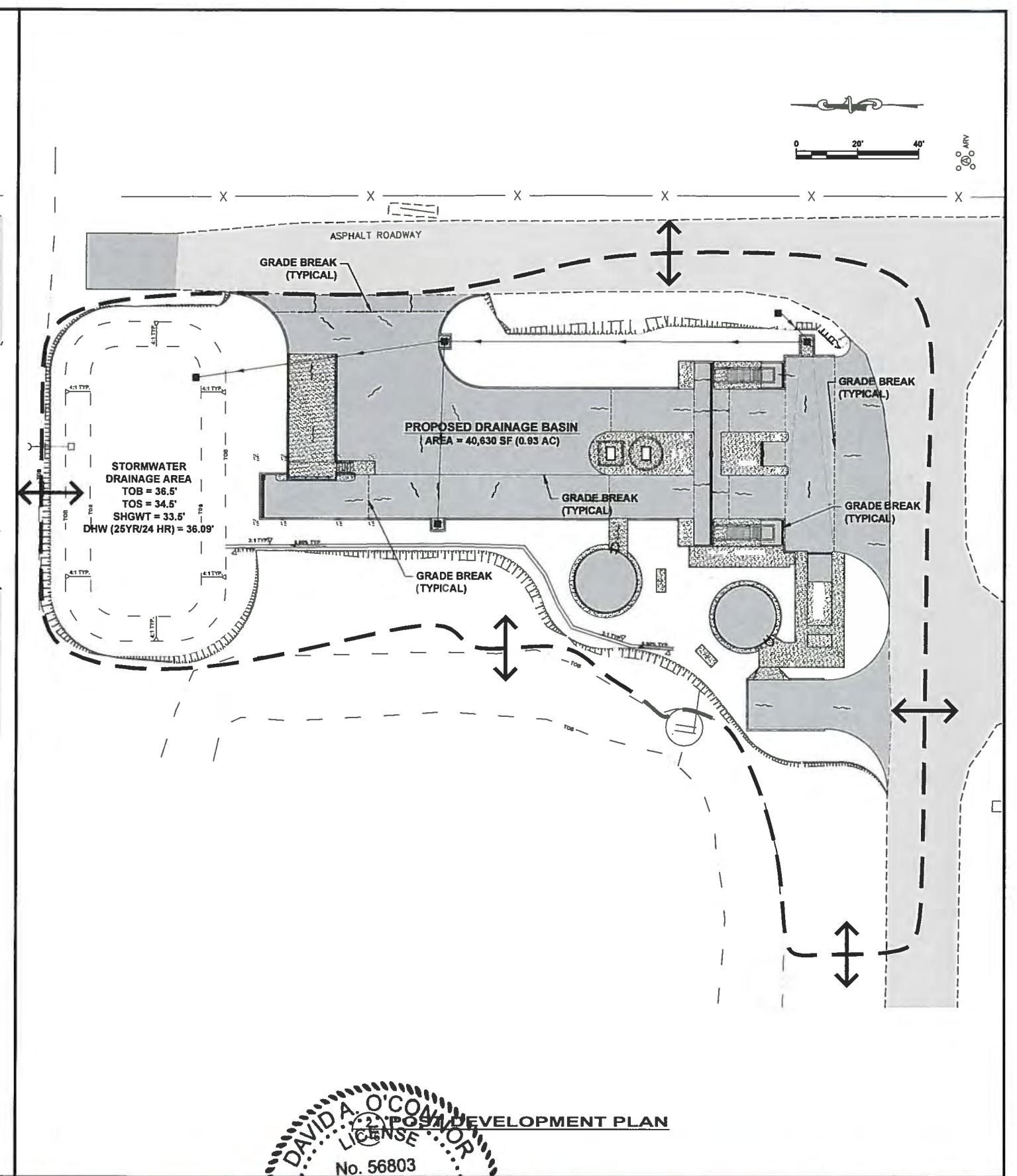
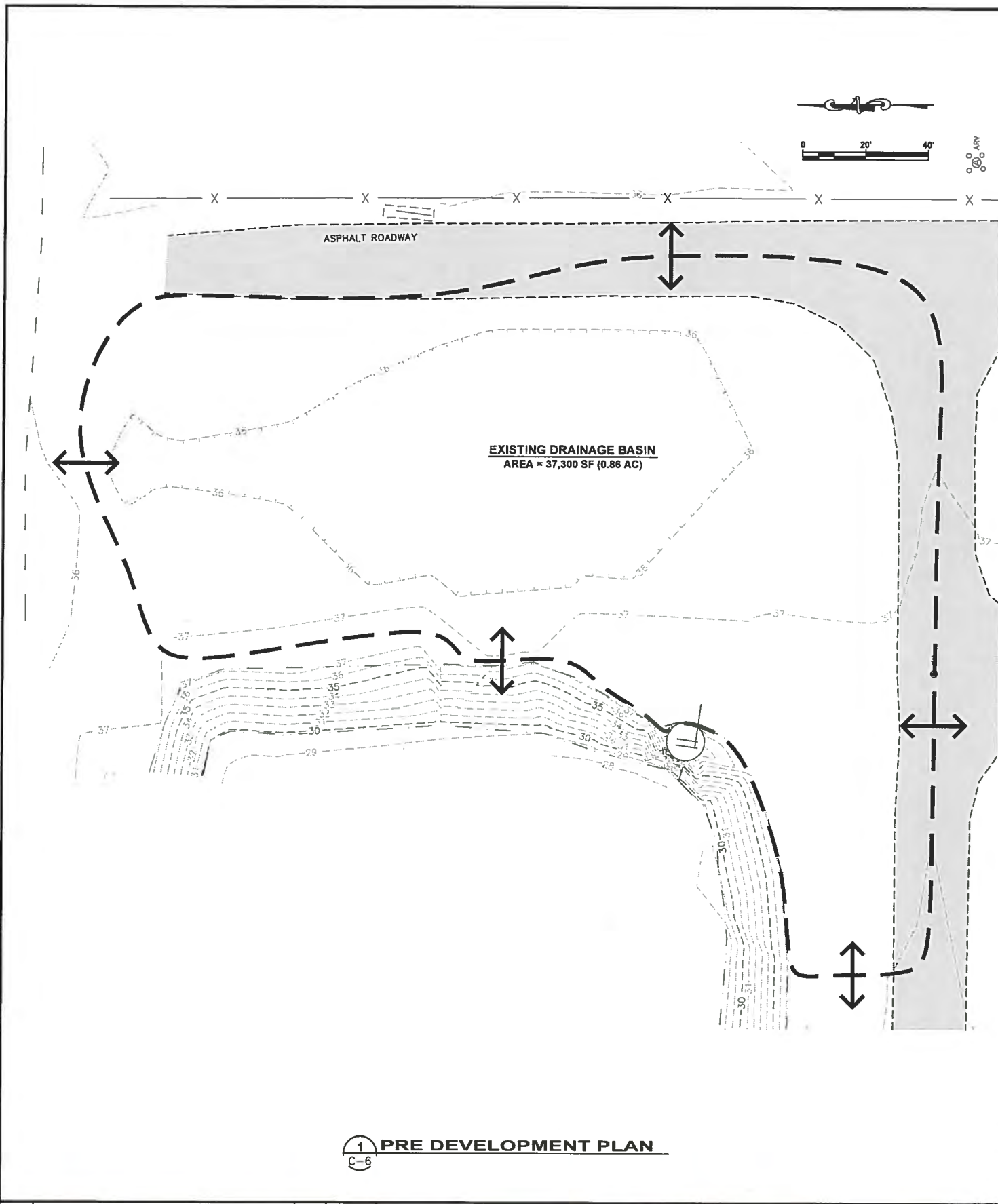
**MANATEE COUNTY**  
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 UTILITIES DEPARTMENT  
 4410 66th Street West Bradenton, Florida 34210  
 (941) 792-8811

  
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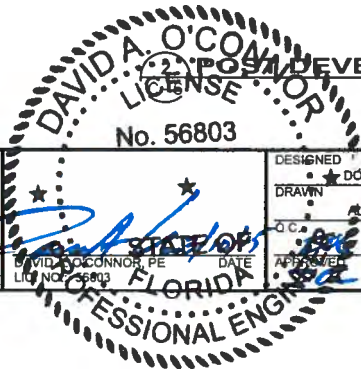
**PLANT DRAIN PIPING PLAN**

PROJECT NO:  
 00193-009-02  
 DATE:  
 MARCH 2015  
 SHEET NO:  
**C-5**





1 PRE DEVELOPMENT PLAN  
C-6



NO.	DESCRIPTION	BY	DATE

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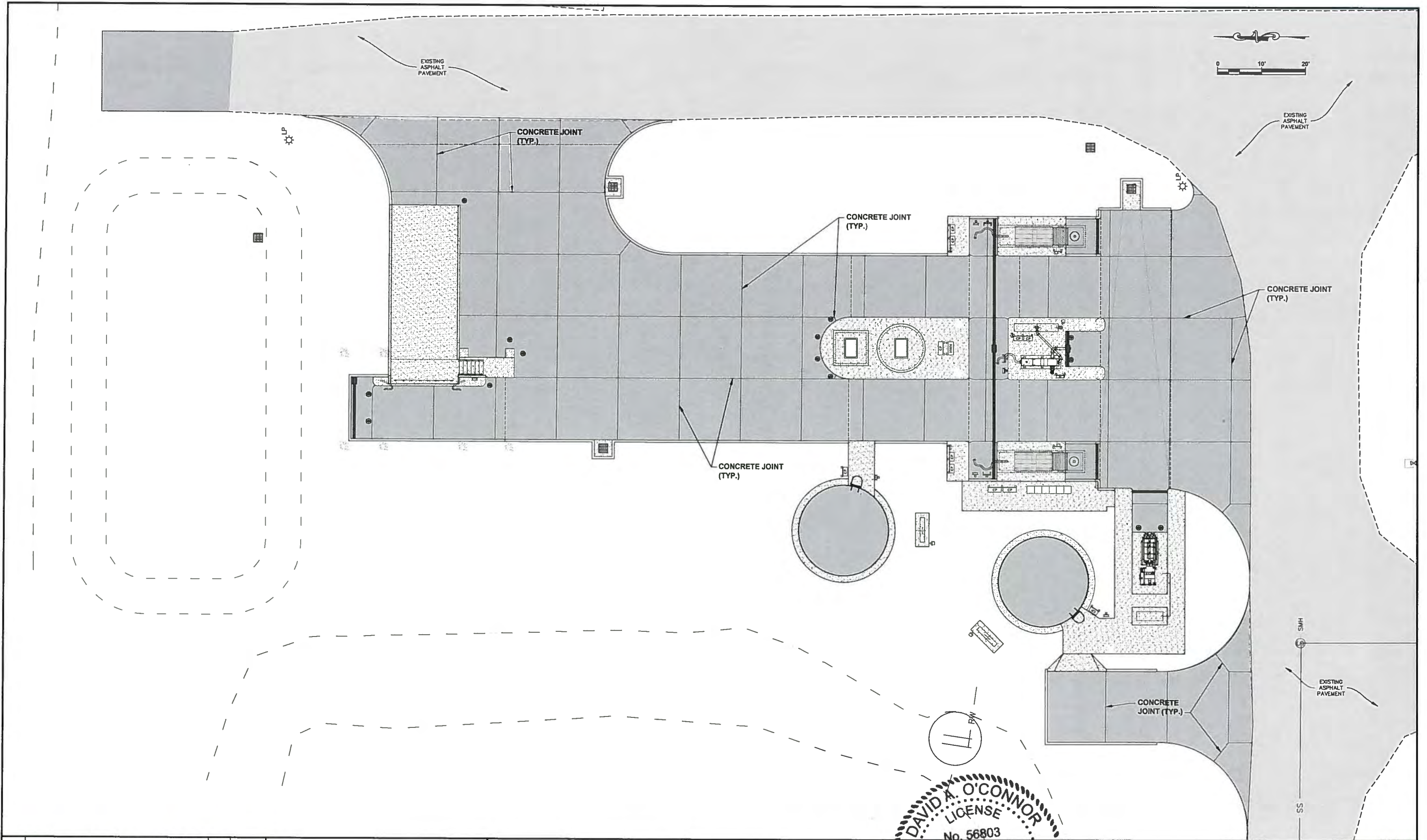
**Cardno**  
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(727) 531-3505 (800) 861-8314  
www.cardno.com Certificate of Authorization No. 29915

DESIGNED: DOC  
DRAWN: AS  
DATE: 3/11/15  
APPROVED: [Signature]

**SITE DRAINAGE BASINS**

PROJECT NO:  
00193-009-02  
DATE:  
MARCH 2015  
SHEET NO:  
C-6

FILE: J:\00193\00193009\02\ACA\dwg\Sheets\PLAN SHEETS.dwg LAST SAVED: Tue, 03/10/15 3:11p PLOTTED: Tue, 03/10/15 3:18p BY: Dave Shively



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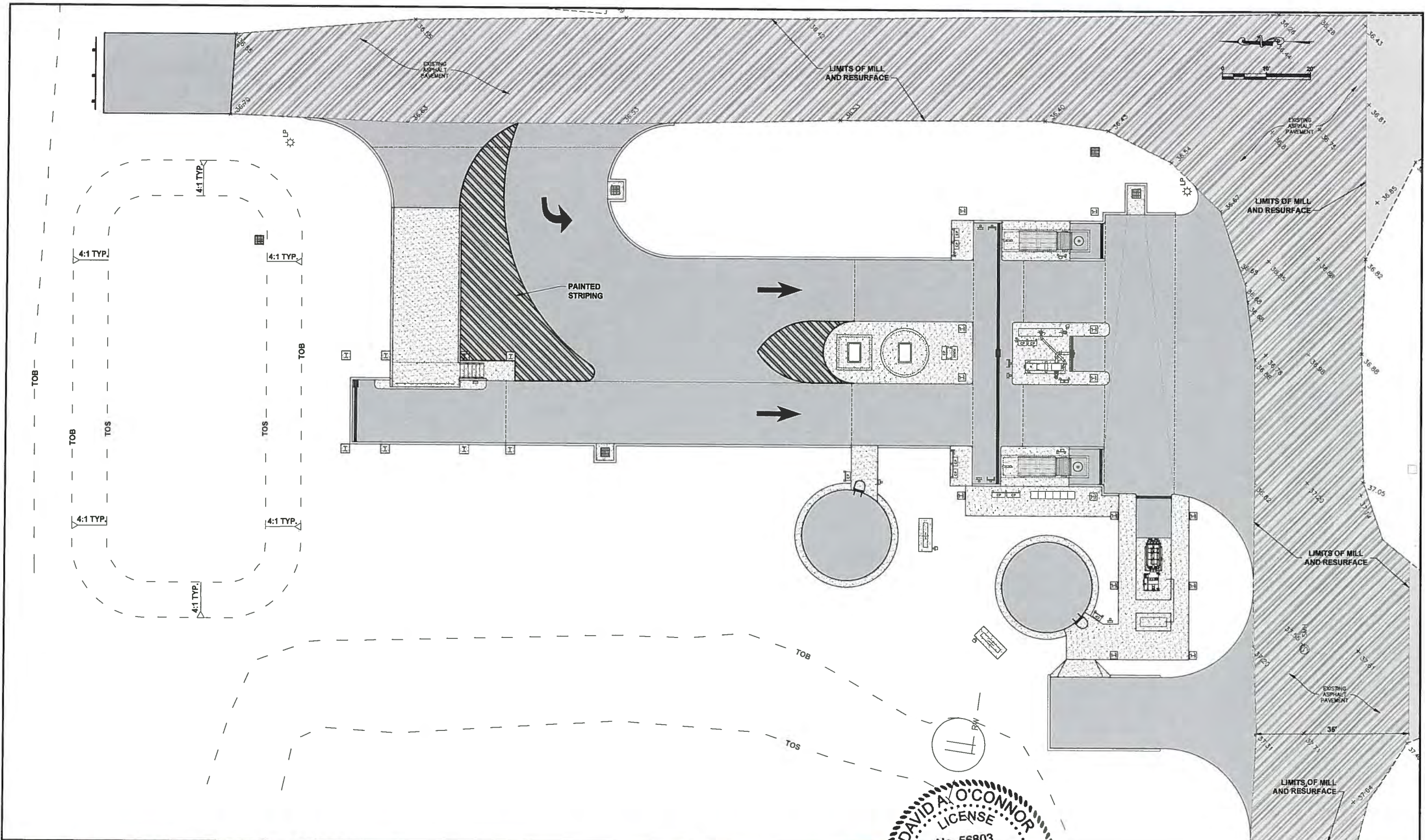

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 LICENSE  
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**CONCRETE CONSTRUCTION JOINT  
PLAN**

PROJECT NO:	00193-009-02
DATE:	MARCH 2015
SHEET NO:	C-7

FILE: J:\00193\00193009\02\ACAD\dwg\Sheets\PLAN SHEETS.dwg LAST SAVED: Tue, 03/10/15 3:11p PLOTTED: Tue, 03/10/15 3:16p BY: Dave Shively



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**DAVID A. O'CONNOR**  
 LICENSE  
 No. 56803  
 STATE OF  
 FLORIDA  
 PROFESSIONAL ENGINEER

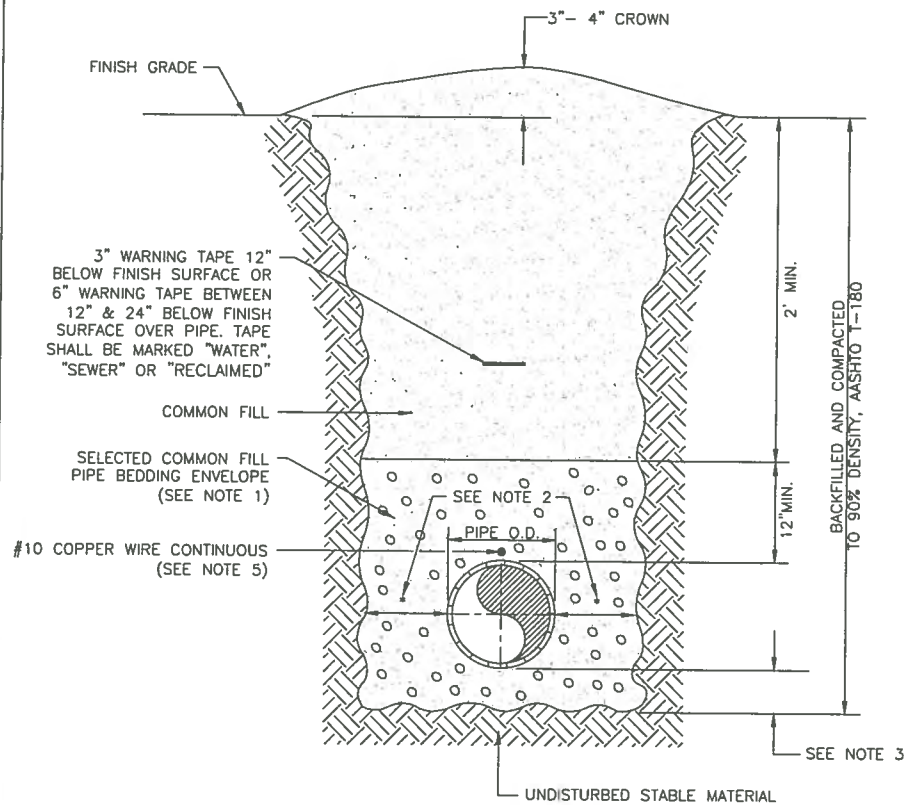
**PAVMENT REPLACEMENT,  
MARKINGS AND SIGNAGE PLAN**

PROJECT NO:	00193-009-02
DATE:	MARCH 2015
SHEET NO:	C-8

FILE: J:\00193\00193009\02\ACAD\dwg\Sheets\PLAN SHEETS.dwg LAST SAVED: Tue, 03/10/15 3:11p PLOTTED: Tue, 03/10/15 3:18p BY: Dave Shively

**NOTES:**

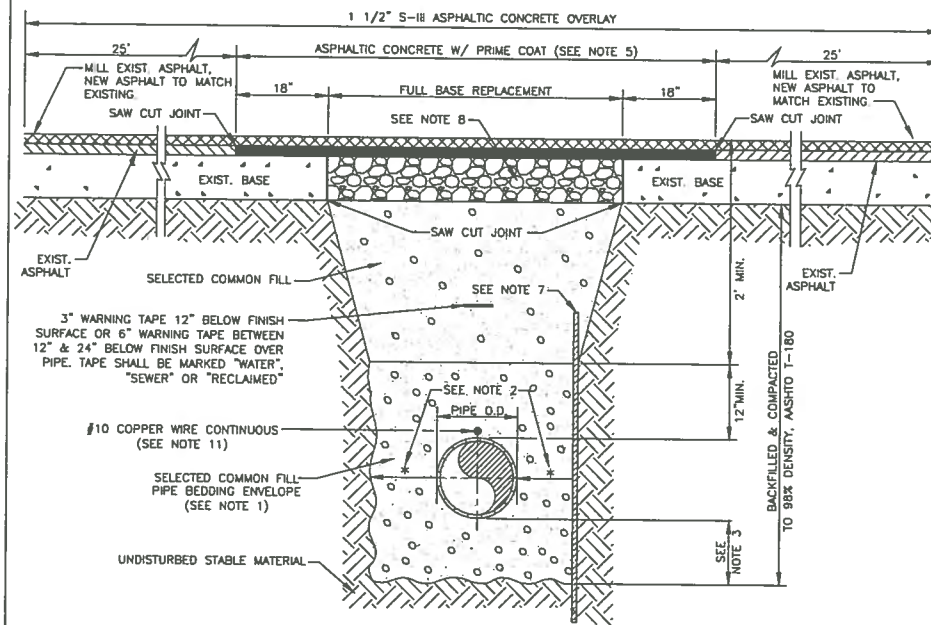
1. USE OF TYPE A-2 AND A-3 PIPE BEDDING TO BE DETERMINED IN THE FIELD BY THE ENGINEER.
2. PROVIDE ADEQUATE CLEARANCE TO PLACE AND COMPACT STAGE 1 BEDDING MATERIAL IN TRENCH AREA BELOW PIPE SPRINGLINE. PIPE EMBEDMENT MUST BE COMPACTED OUT TO THE TRENCH WALL OR 2.5 TIMES THE PIPE OD, WHICHEVER IS LESS.
3. TYPICALLY 4" TO 6".
4. PIPE INSTALLATION SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S WRITTEN INSTRUCTIONS.
5. TRACER WIRE NOT REQUIRED FOR GRAVITY SEWERS.



<b>MANATEE COUNTY</b> PUBLIC WORKS DEPARTMENT		TRENCH WITH UNIMPROVED SURFACE TYPE A-1 PIPE BEDDING	UG-11
REV. BY WRT/KE	DATE 03/11	MAY 10, 2011 DATE OF APPROVAL	PAGE 111

**NOTES:**

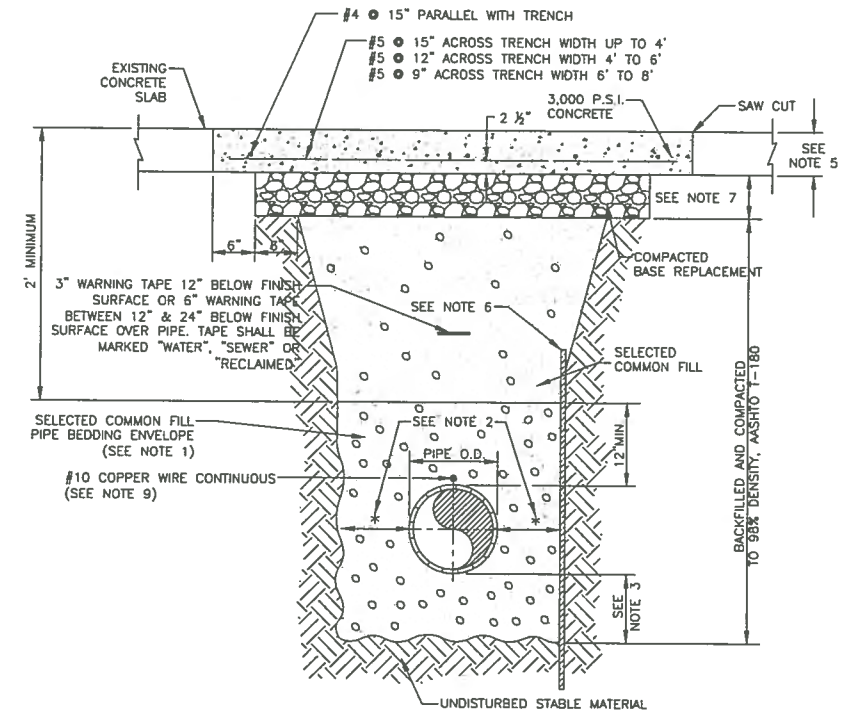
1. USE OF TYPE A-2 AND A-3 PIPE BEDDING TO BE DETERMINED IN THE FIELD BY THE ENGINEER.
2. PROVIDE ADEQUATE CLEARANCE TO PLACE AND COMPACT STAGE 1 BEDDING MATERIAL IN TRENCH AREA BELOW PIPE SPRINGLINE. PIPE EMBEDMENT MUST BE COMPACTED OUT TO THE TRENCH WALL OR 2.5 TIMES THE PIPE OD, WHICHEVER IS LESS.
3. TYPICALLY 4" TO 6".
4. PIPE INSTALLATION SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S WRITTEN INSTRUCTIONS.
5. ASPHALTIC CONCRETE STRUCTURE COURSE WITH PRIME COAT SHALL BE THE SAME DEPTH AND TYPE AS EXISTING OR A MINIMUM OF 1 1/4 INCH, WHICHEVER IS GREATER.
6. MILL 25' BACK FROM TRENCH SAW CUT. ADJUST MILLING PER INDIVIDUAL SITE TO NOT IMPACT BASE. BUTT JOINT TO EXIST ASPHALT. FINAL OVERLAY LIMITS ARE FROM EDGE OF PAVEMENT TO EDGE OF PAVEMENT. FINAL OVERLAY TO MATCH EXISTING WITH NO DISCERNABLE "BUMP" AT JOINT. MILLING LIMITS THAT IMPACT INTERSECTION SHALL BE ADDRESSED ON A CASE BY CASE BASIS AND APPROVED BY MANATEE COUNTY.
7. SHEETING ORDERED LEFT IN PLACE TO BE CUT OFF 24" BELOW FINISHED GRADE OR 12" BELOW SUBGRADE.
8. BASE SHALL BE 8" MINIMUM THICKNESS CRUSHED CONCRETE.
9. TEMPORARY PATCHES WILL BE INSTALLED TO PROVIDE A SMOOTH ALL WEATHER SURFACE AT ALL TIMES. PERMANENT REPLACEMENT TO BE MADE AS SOON AS POSSIBLE.
10. RESTORE SIGNAGE & MARKING WITH THERMOPLASTIC PER FOOT STANDARDS, LATEST EDITION.
11. TRACER WIRE NOT REQUIRED FOR GRAVITY SEWERS.
12. NOTES 5. THRU 10. ARE MINIMUM REQUIREMENTS FOR A TRENCH IN A ROAD. REFER TO LATEST EDITION OF MANATEE COUNTY HIGHWAY AND TRAFFIC STANDARDS FOR ADDITIONAL REQUIREMENTS.



<b>MANATEE COUNTY</b> PUBLIC WORKS DEPARTMENT		TRENCH WITH ASPHALT PAVEMENT SURFACE TYPE A-1 PIPE BEDDING	UG-12
REV. BY WRT/KE	DATE 03/11	MAY 10, 2011 DATE OF APPROVAL	PAGE 112

**NOTES:**

1. USE OF TYPE A-2 AND A-3 PIPE BEDDING TO BE DETERMINED IN THE FIELD BY THE ENGINEER.
2. PROVIDE ADEQUATE CLEARANCE TO PLACE AND COMPACT STAGE 1 BEDDING MATERIAL IN TRENCH AREA BELOW PIPE SPRINGLINE. PIPE EMBEDMENT MUST BE COMPACTED OUT TO THE TRENCH WALL OR 2.5 TIMES THE PIPE OD, WHICHEVER IS LESS.
3. TYPICALLY 4" TO 6".
4. PIPE INSTALLATION SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S WRITTEN INSTRUCTIONS.
5. THICKNESS TO MATCH EXISTING OR BE 8" MINIMUM, WHICHEVER IS GREATER.
6. SHEETING ORDERED LEFT IN PLACE TO BE CUT OFF 24" BELOW FINISHED GRADE OR 12" BELOW SUBGRADE.
7. BASE SHALL BE 8" MINIMUM THICKNESS CRUSHED CONCRETE.
8. TEMPORARY PATCHES WILL BE INSTALLED TO PROVIDE A SMOOTH ALL WEATHER SURFACE AT ALL TIMES. PERMANENT REPLACEMENT TO BE MADE AS SOON AS POSSIBLE.
9. TRACER WIRE NOT REQUIRED FOR GRAVITY SEWERS.
10. NOTES 5. THRU 8. ARE MINIMUM REQUIREMENTS. REFER TO MANATEE COUNTY HIGHWAY AND TRAFFIC STANDARDS FOR ADDITIONAL REQUIREMENTS.



<b>MANATEE COUNTY</b> PUBLIC WORKS DEPARTMENT		TRENCH WITH CONCRETE PAVEMENT SURFACE TYPE A-1 PIPE BEDDING	UG-13
REV. BY CLB/BR	DATE 11/10	MAY 10, 2011 DATE OF APPROVAL	PAGE 113

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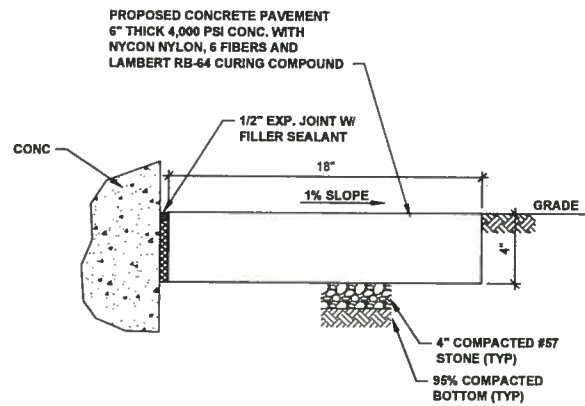
**MANATEE COUNTY**  
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4410 66th Street West Bradenton, Florida 34210  
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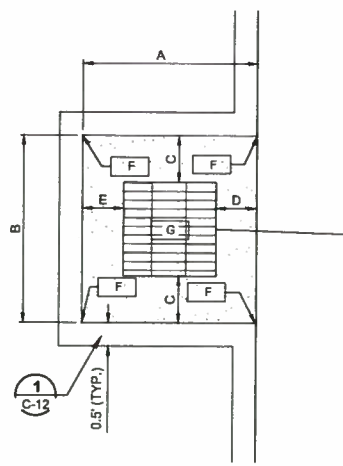
**DAVID A. O'CONNOR**  
LICENSE  
No. 56803  
DESIGNED  
DRAWN  
CHECKED  
APPROVED  
FLORIDA PROFESSIONAL ENGINEER

**CIVIL DETAILS (1)**

PROJECT NO: 00193-009-02
DATE: MARCH 2015
SHEET NO: C-9

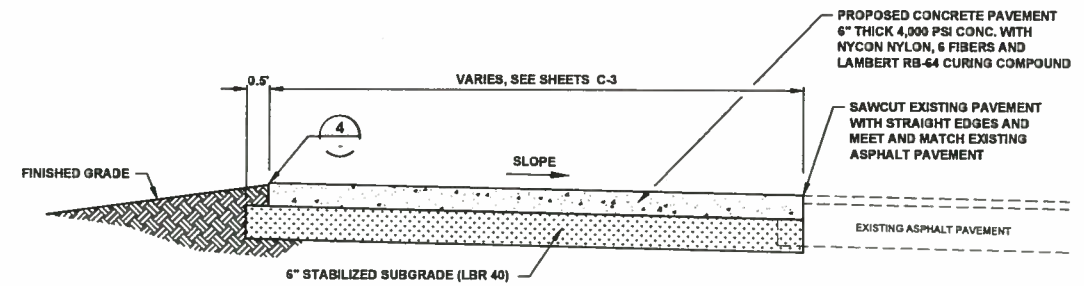


1 LANDSCAPE APRON DETAIL  
C-3 NTS

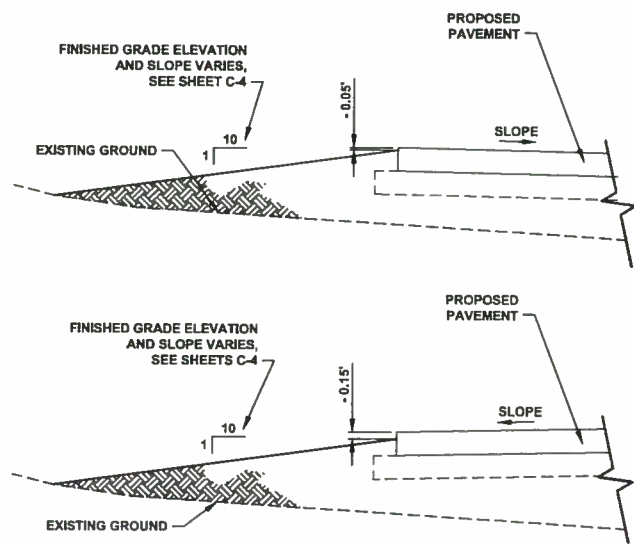


STRUCTURE DIMENSIONS & ELEVATIONS		
S-2	S-3	S-6
A 3.76'	3.63'	6.63'
B 4.00'	4.00'	4.00'
C 1.00'	1.00'	1.00'
D 0.88'	0.75'	3.75'
E 0.88'	0.88'	0.88'
F 36.99'	36.55'	37.25'
G 36.75'	36.30'	37.00'

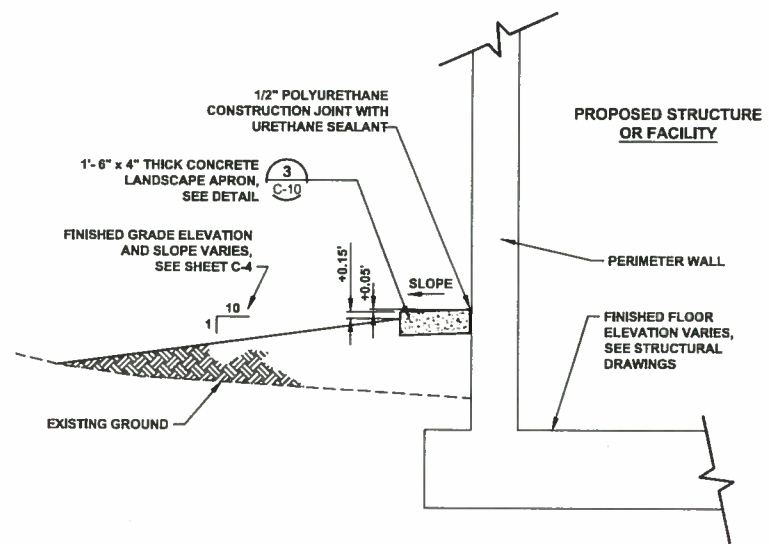
2 DRAINAGE STRUCTURE DIMENSIONS AND ELEVATIONS  
C-12 NTS



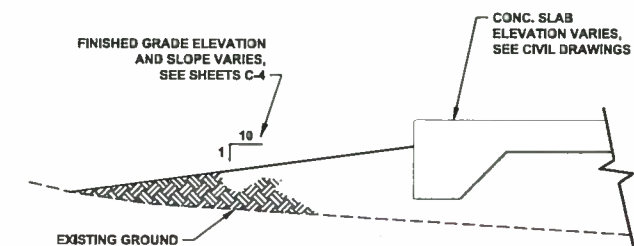
3 PROPOSED CONCRETE PAVEMENT DETAIL  
C-3 NTS



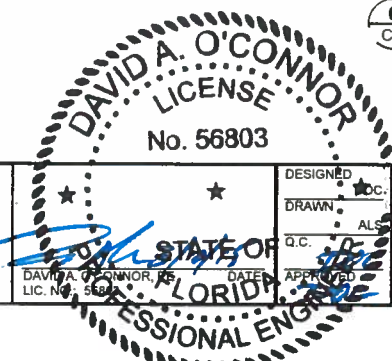
4 GRADING AT PROPOSED CONC. PAVEMENT DETAIL  
C-3



5 GRADING AT STRUCTURES DETAIL  
C-3



6 GRADING AT CONCRETE SLAB DETAIL  
C-3



NO.	DESCRIPTION	BY	DATE

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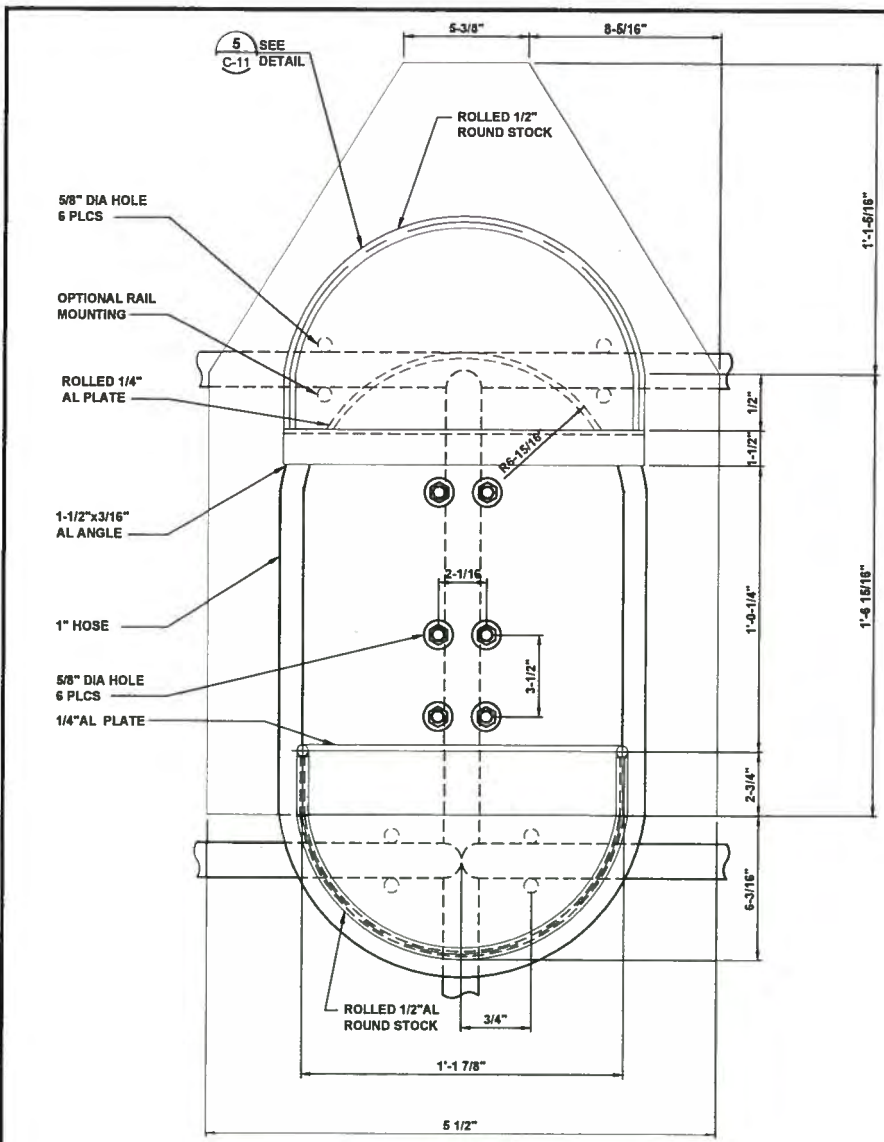
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DESIGNED BY: DC  
DRAWN BY: ALS  
DATE:  

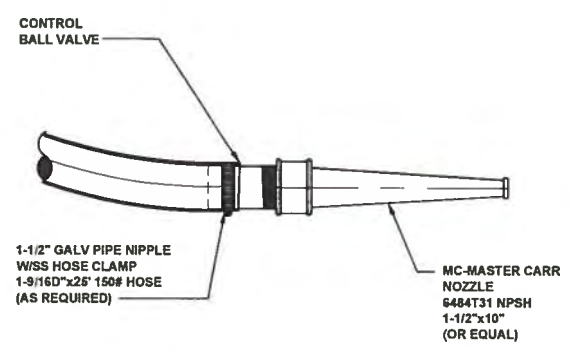
**CIVIL DETAILS (2)**

PROJECT NO:  
00193-009-02  
DATE:  
MARCH 2015  
SHEET NO:  
C-10

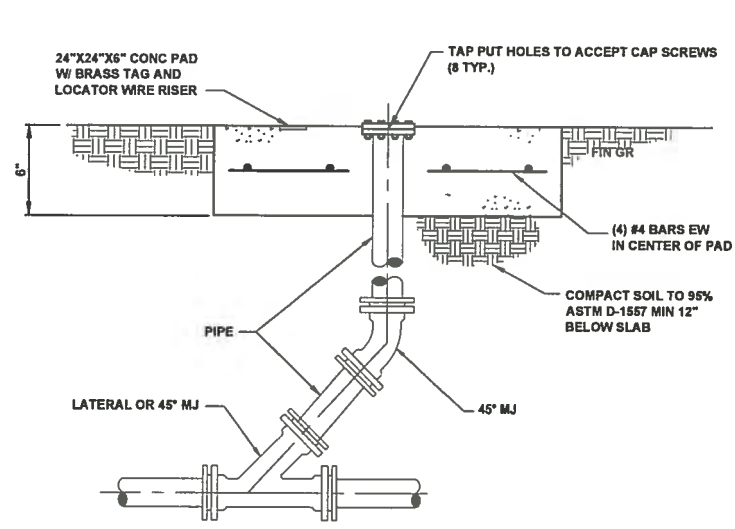
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1 TYPICAL PSW RAIL MOUNTED RACK DETAIL NTS

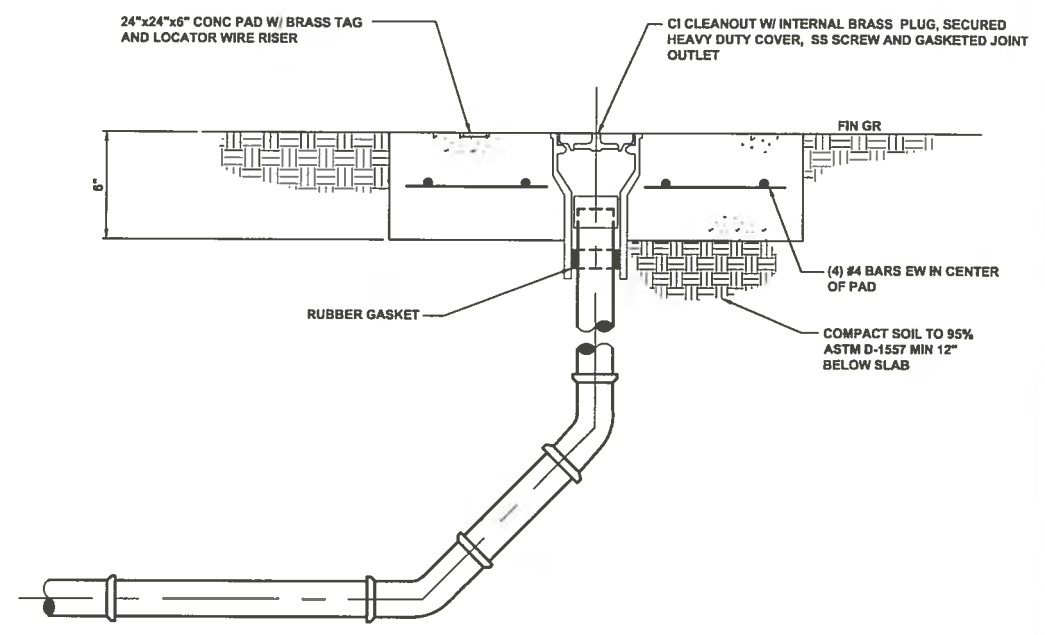


4 TYPICAL NOZZLE DETAIL NTS

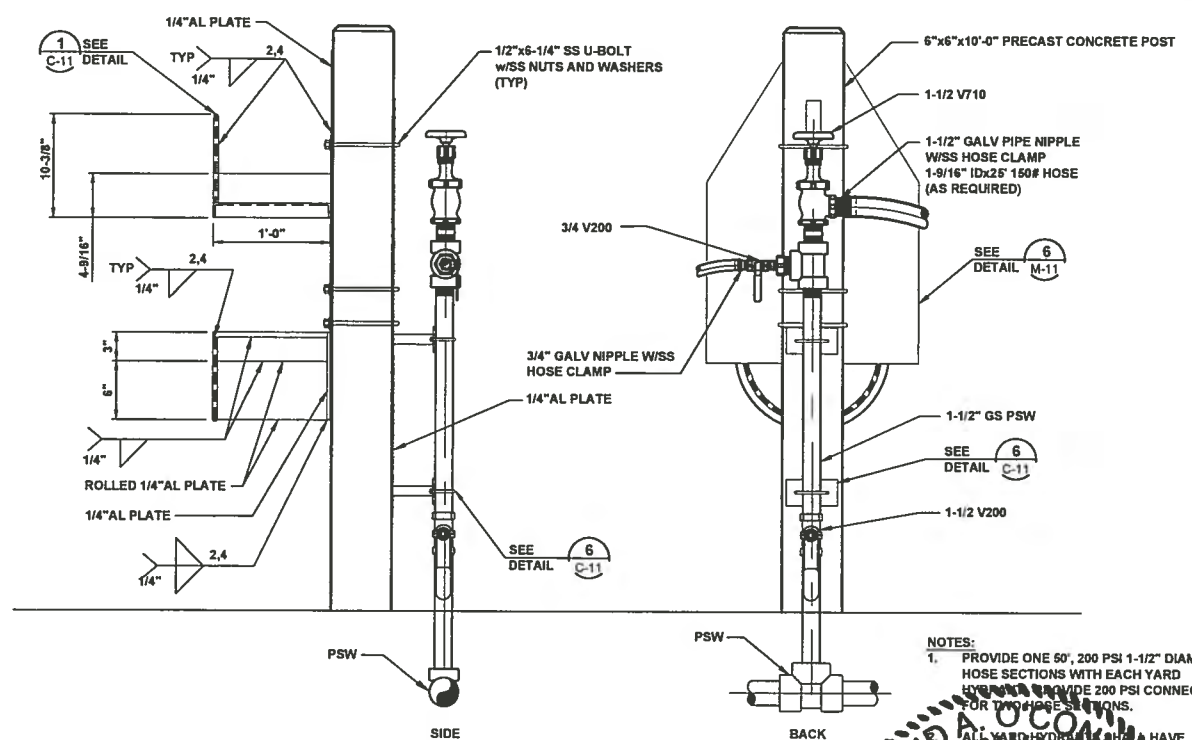


- NOTES:
1. PROVIDE PIPE RESTRAINTS AS NEEDED.
  2. TOP FLANGE SHALL BE PAINTED YELLOW. ONE STAINLESS STEEL TAG MEASURING 1 1/2\"/>

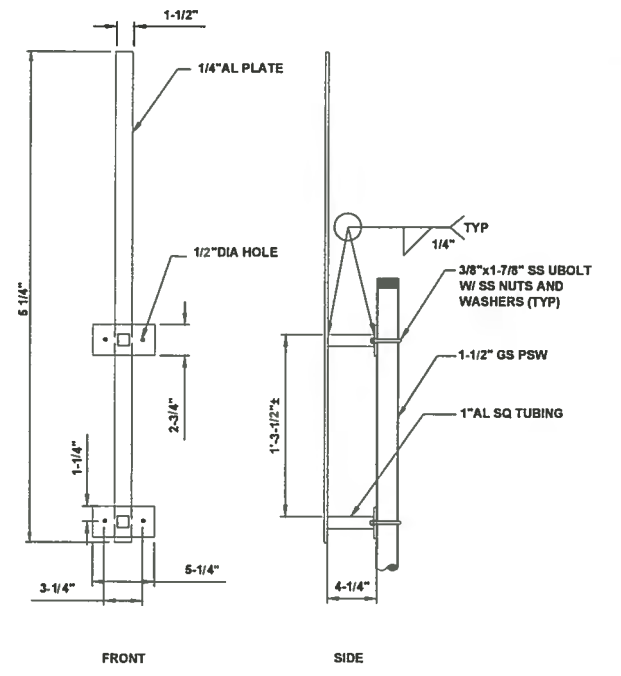
2 PRESSURIZED CLEANOUT DETAIL NTS



3 GRAVITY CLEANOUT DETAIL NTS



5 TYPICAL YARD HYDRANT AND RACK DETAIL NTS



6 TYPICAL YARD HYDRANT BRACKET MOUNTING DETAIL NTS

NOTES:

1. PROVIDE ONE 50', 200 PSI 1-1/2\"/>

ALL WARD HYDRANTS SHALL HAVE "WARNING SIGN STATE 'NOT POTABLE WATER - DO NOT DRINK'"

DAVID A. O'CONNOR  
 LICENSED PROFESSIONAL ENGINEER  
 No. 56803

NO.	DESCRIPTION	BY	DATE

**SEWRF  
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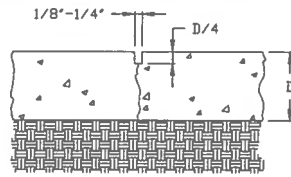
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DESIGNED: [Signature]  
 DRAWN: [Signature]  
 Q.C.: [Signature]  
 DATE: [Signature]  
 APPROVED: [Signature]  
 LIC. No. 56803

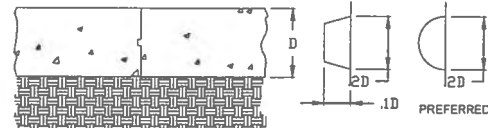
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PROJECT NO:  
00193-009-02  
 DATE:  
MARCH 2015  
 SHEET NO:  
C-11



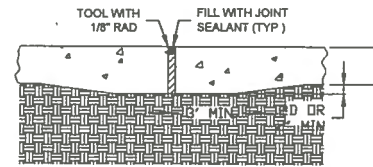
**TYPE 'A' UNDOWELED CONTRACTION (CONTROL) JOINT**  
NTS

UNDOWELED TRANSVERSE CONTRACTION OR LONGITUDINAL JOINT, SAWED OR PRE-MOLDED. DO NOT DOWEL PAVEMENTS LESS THAN 7" THICK.



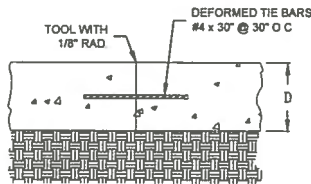
**TYPE 'C' CONSTRUCTION JOINT**  
NTS

LONGITUDINAL KEYWAY CONSTRUCTION JOINT FOR PAVEMENT 6 INCHES OR GREATER. TYPE C-1 STRAIGHT BUTT TYPE JOINT USED FOR PAVEMENTS LESS THAN 6 INCHES.



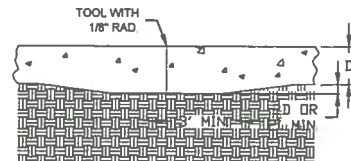
**TYPE 'D' BUTT JOINT**  
NTS

ISOLATION JOINT FOR PAVEMENTS LESS THAN 8" THICK.



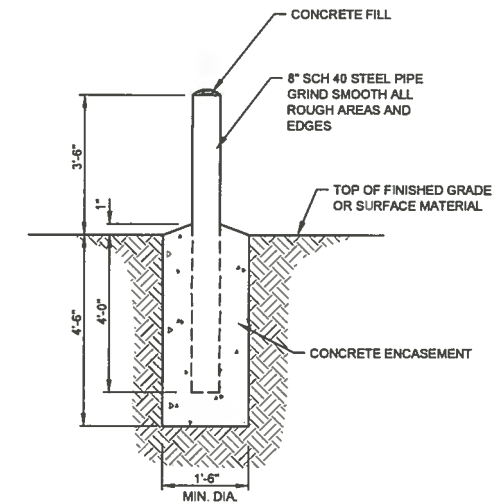
**TYPE 'B' TIED JOINT**  
NTS

TIED LONGITUDINAL CONSTRUCTION OR CONTRACTION JOINT WHERE REQUIRED. NOTE: DO NOT TIE MORE THAN THREE LANES TOGETHER.



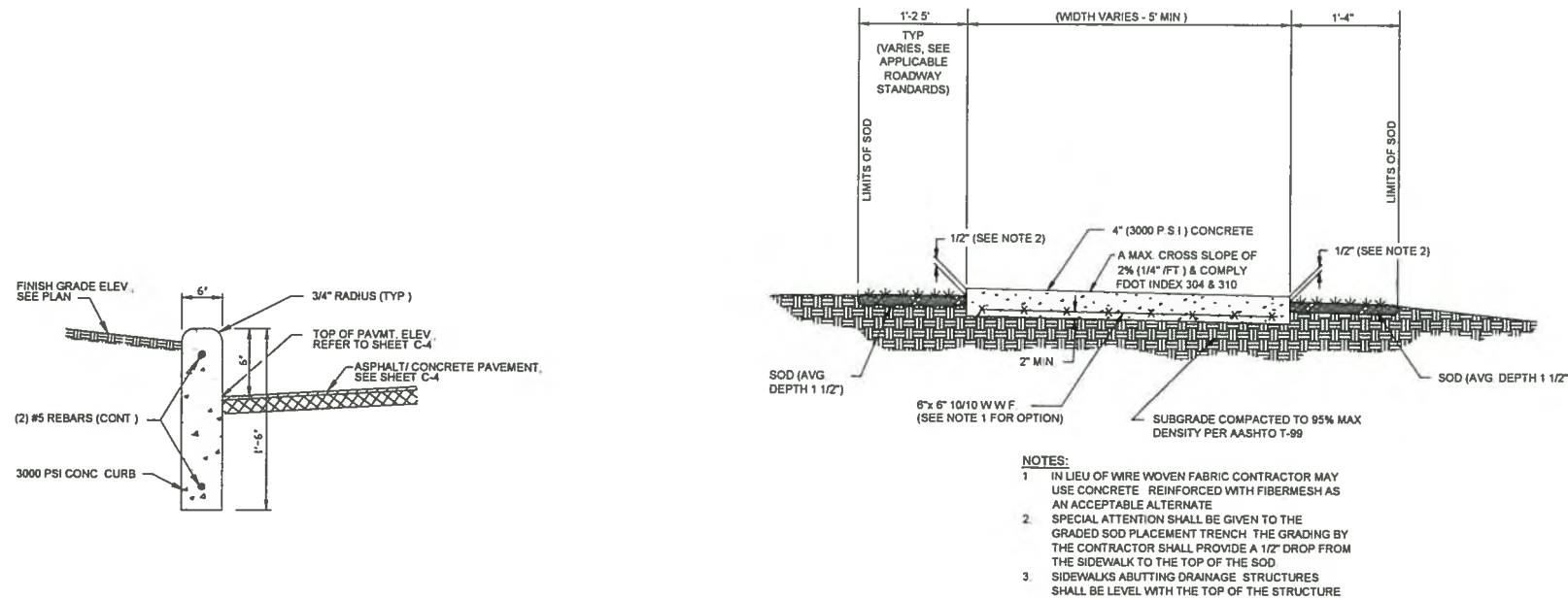
**TYPE 'C-1' BUTT JOINT**  
NTS

IN LIEU OF THICKENING EDGES, OVERALL PAVEMENT THICKNESS MAY BE INCREASED AS FOLLOWS: 8 INCHES OR LESS, ADD 0.5 INCH; MORE THAN 8 INCHES, ADD 1 INCH.

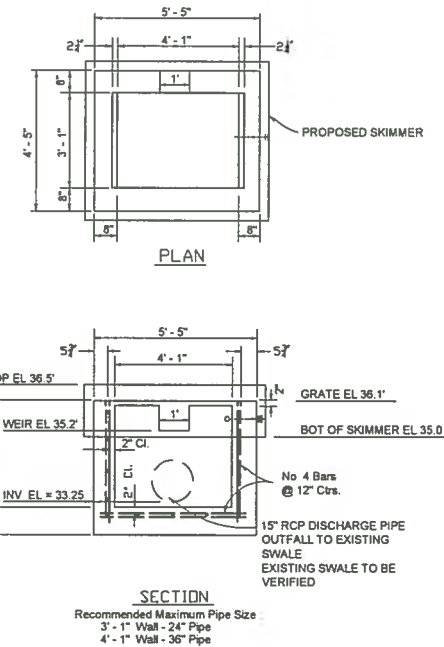


**5 TYPICAL BOLLARD DETAIL**  
NTS

**4 CONCRETE JOINT DETAIL**  
NTS



- NOTES:**
1. IN LIEU OF WIRE WOVEN FABRIC CONTRACTOR MAY USE CONCRETE REINFORCED WITH FIBERMESH AS AN ACCEPTABLE ALTERNATE.
  2. SPECIAL ATTENTION SHALL BE GIVEN TO THE GRADED SOD PLACEMENT TRENCH. THE GRADING BY THE CONTRACTOR SHALL PROVIDE A 1/2" DROP FROM THE SIDEWALK TO THE TOP OF THE SOD.
  3. SIDEWALKS ABUTTING DRAINAGE STRUCTURES SHALL BE LEVEL WITH THE TOP OF THE STRUCTURE.



**5 TYPICAL BOLLARD DETAIL**  
NTS

**1 CONCRETE VERTICAL CURB DETAIL**  
NTS

**2 CONCRETE SIDEWALK DETAIL**  
NTS

NO.	DESCRIPTION	BY	DATE

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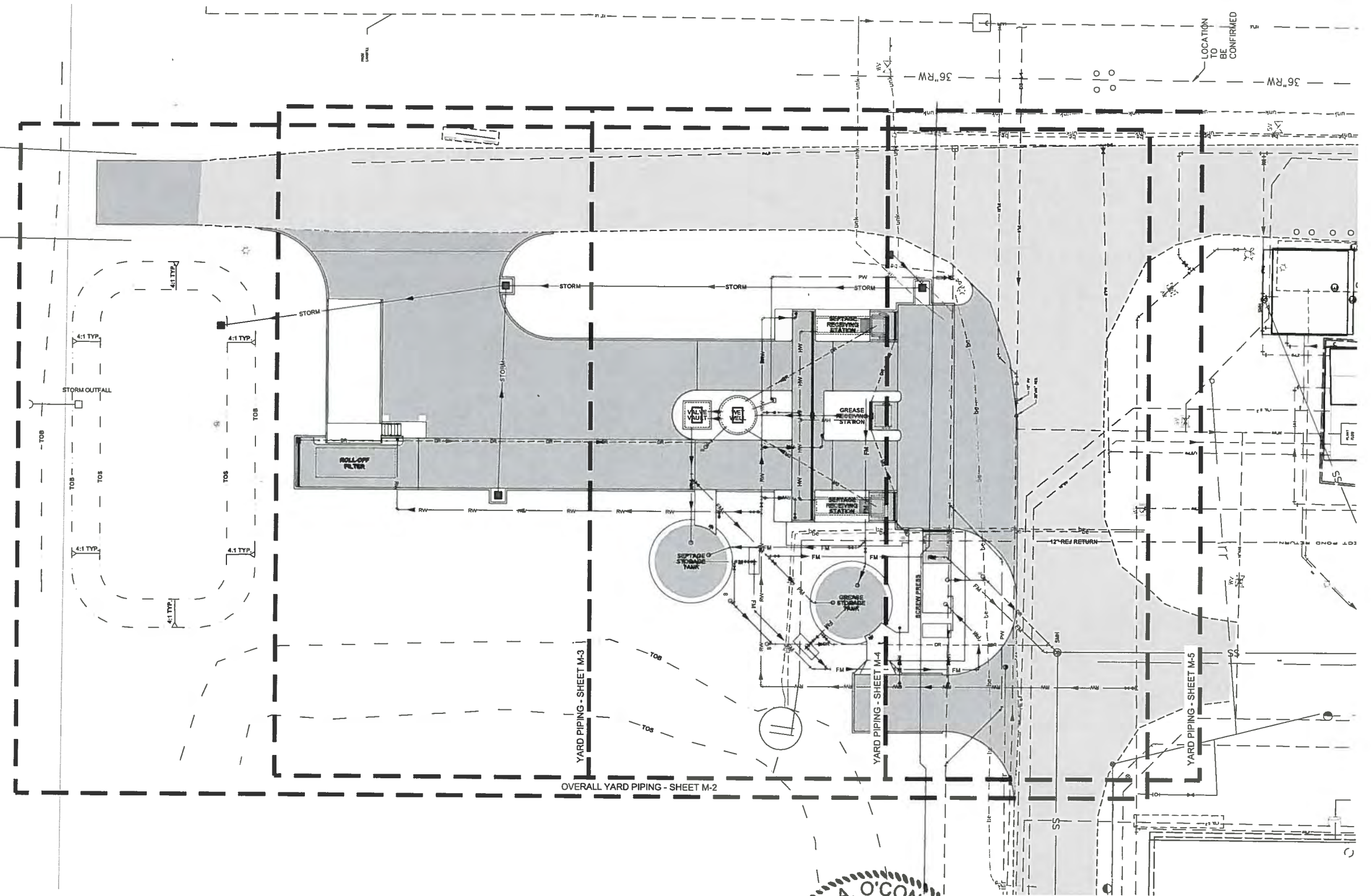
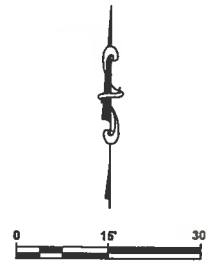
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**DAVID A. O'CONNOR**  
LICENSE  
No. 56803  
FLORIDA PROFESSIONAL ENGINEER

DESIGNED BY: DOC  
DRAWN BY: ALB  
CHECKED BY: JLB  
APPROVED BY: JLB

**CIVIL DETAILS (4)**

PROJECT NO:  
00193-009-02  
DATE:  
MARCH 2015  
SHEET NO:  
C-12

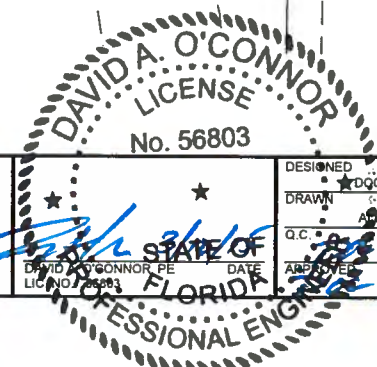


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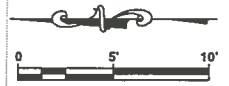
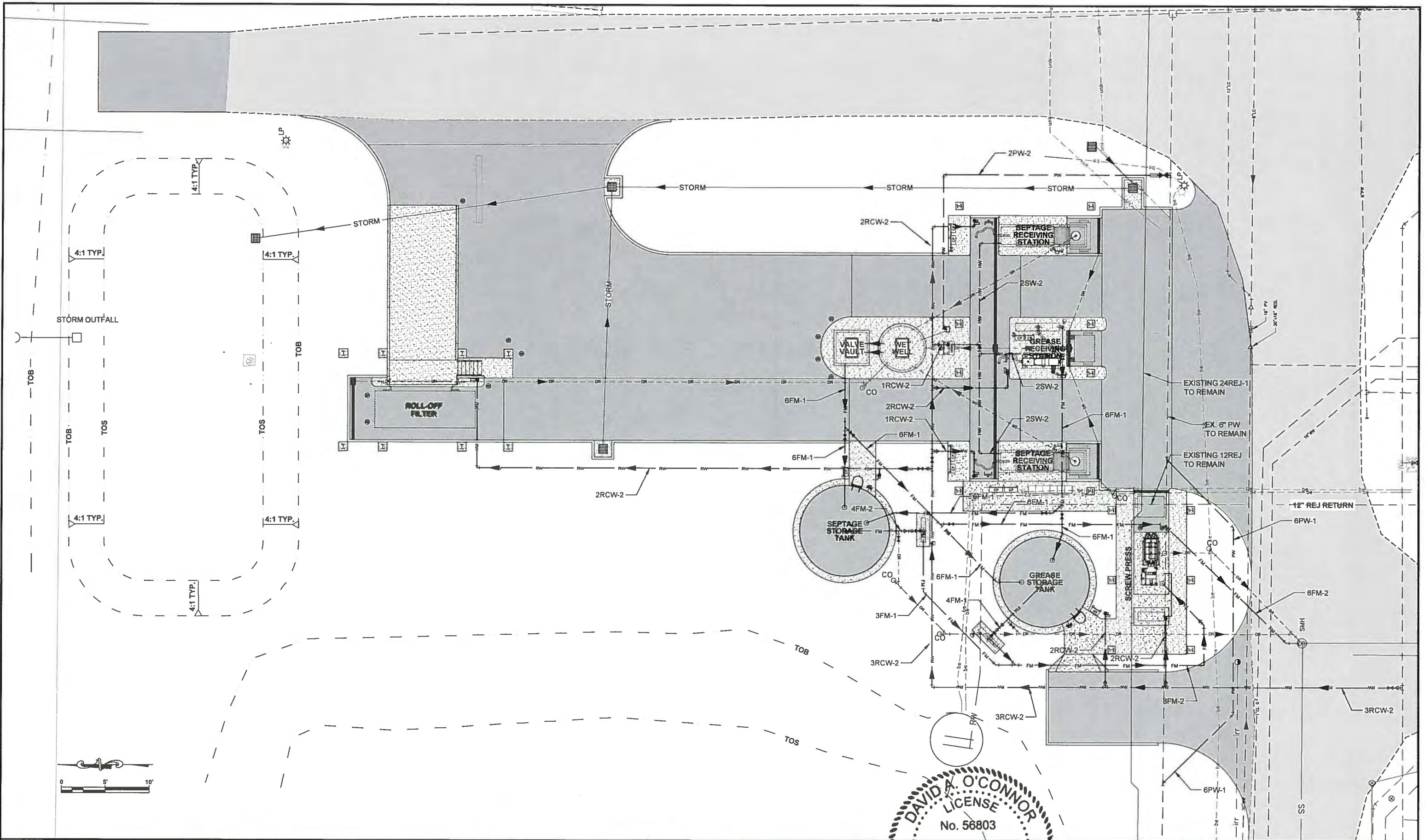
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DRAWN: AC  
Q.C.: AB  
DATE: 03/10/15  
APP. BY: DQC

**YARD PIPING KEY SHEET**

PROJECT NO:  
00193-009-02  
DATE:  
MARCH 2015  
SHEET NO:  
M-1

FILE: J:\00193\00193009\02\ACAD\dwg\Sheets\PLAN SHEETS-YARD PIPING.dwg LAST SAVED: Tue, 03/10/15 1:16p PLOTTED: Tue, 03/10/15 3:20p BY: Dave Shwey





DAVID A. O'CONNOR  
 LICENSE  
 No. 56803  
 STATE OF FLORIDA  
 PROFESSIONAL ENGINEER

NO.	DESCRIPTION	BY	DATE

**SEWRF  
 SEPTAGE/ GREASE  
 RECEIVING STATION**

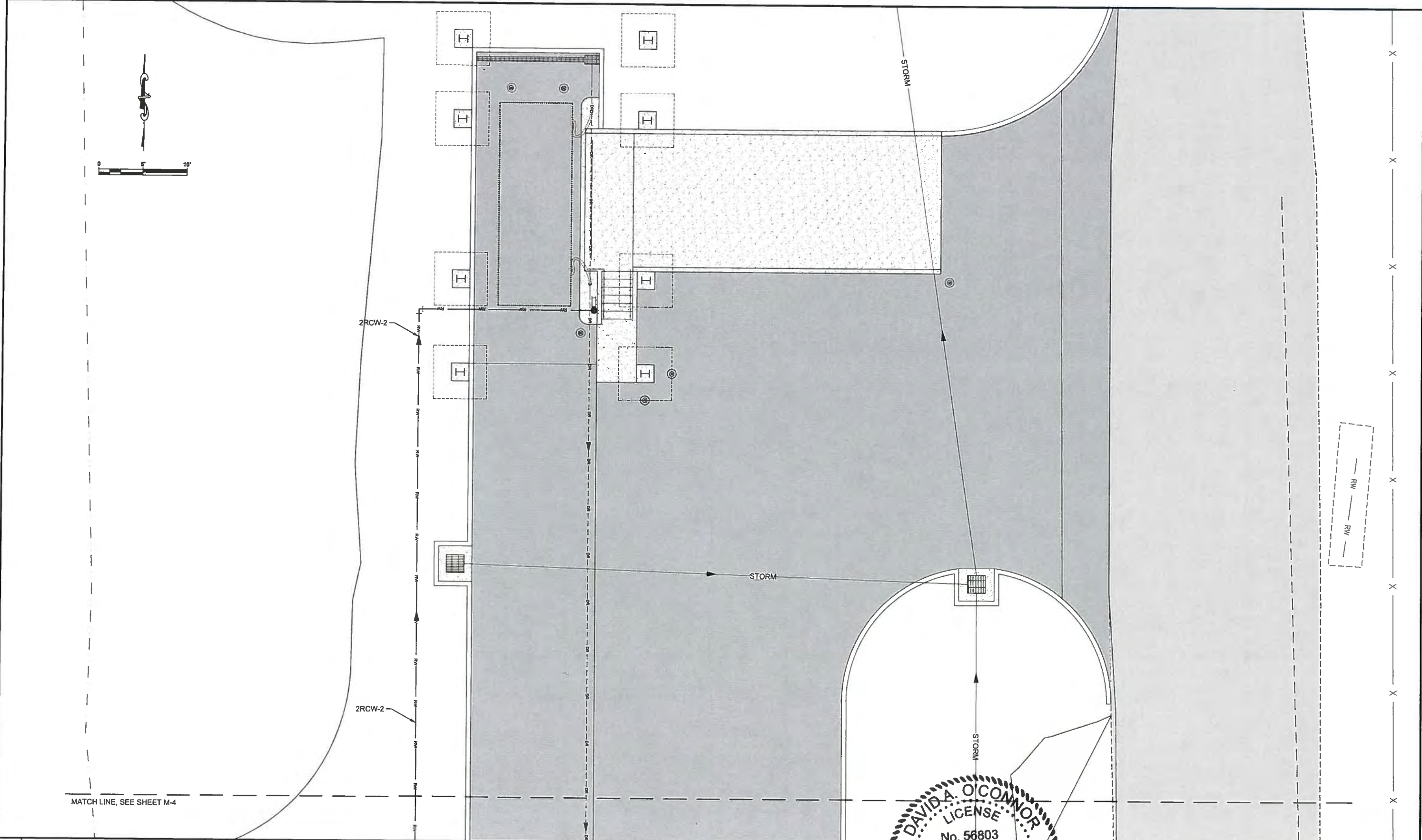
**MANATEE COUNTY**  
 DEPARTMENT OF PUBLIC WORKS  
 UTILITIES DEPARTMENT  
 4410 66th Street West Bradenton, Florida 34210  
 (941) 792-8811

**Cardno**  
 Shaping the Future  
 CLEARWATER  
 380 PARK PLACE BLVD, STE 300, CLEARWATER, FL 33759 TEL:  
 (727) 531-3305 (800) 961-4314  
 www.cardno.com Certificate of Authorization No. 29915

DESIGNED BY: DDC  
 DRAWN BY: JLS  
 CHECKED BY: JLS  
 DATE: 3/15/15

**OVER ALL YARD PIPING**

PROJECT NO:  
 00193-009-02  
 DATE:  
 MARCH 2015  
 SHEET NO:  
**M-2**

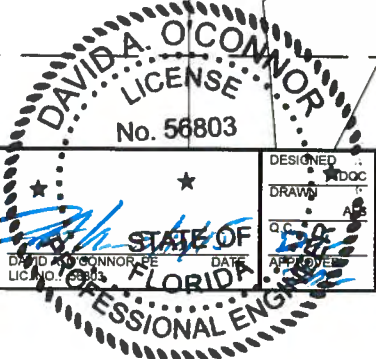


NO.	DESCRIPTION	BY	DATE

**SEWRF  
SEPTAGE/ GREASE  
RECEIVING STATION**


**MANATEE COUNTY**  
 DEPARTMENT OF PUBLIC WORKS  
 UTILITIES DEPARTMENT  
 4410 66th Street West Bradenton, Florida 34210  
 (941) 792-8811

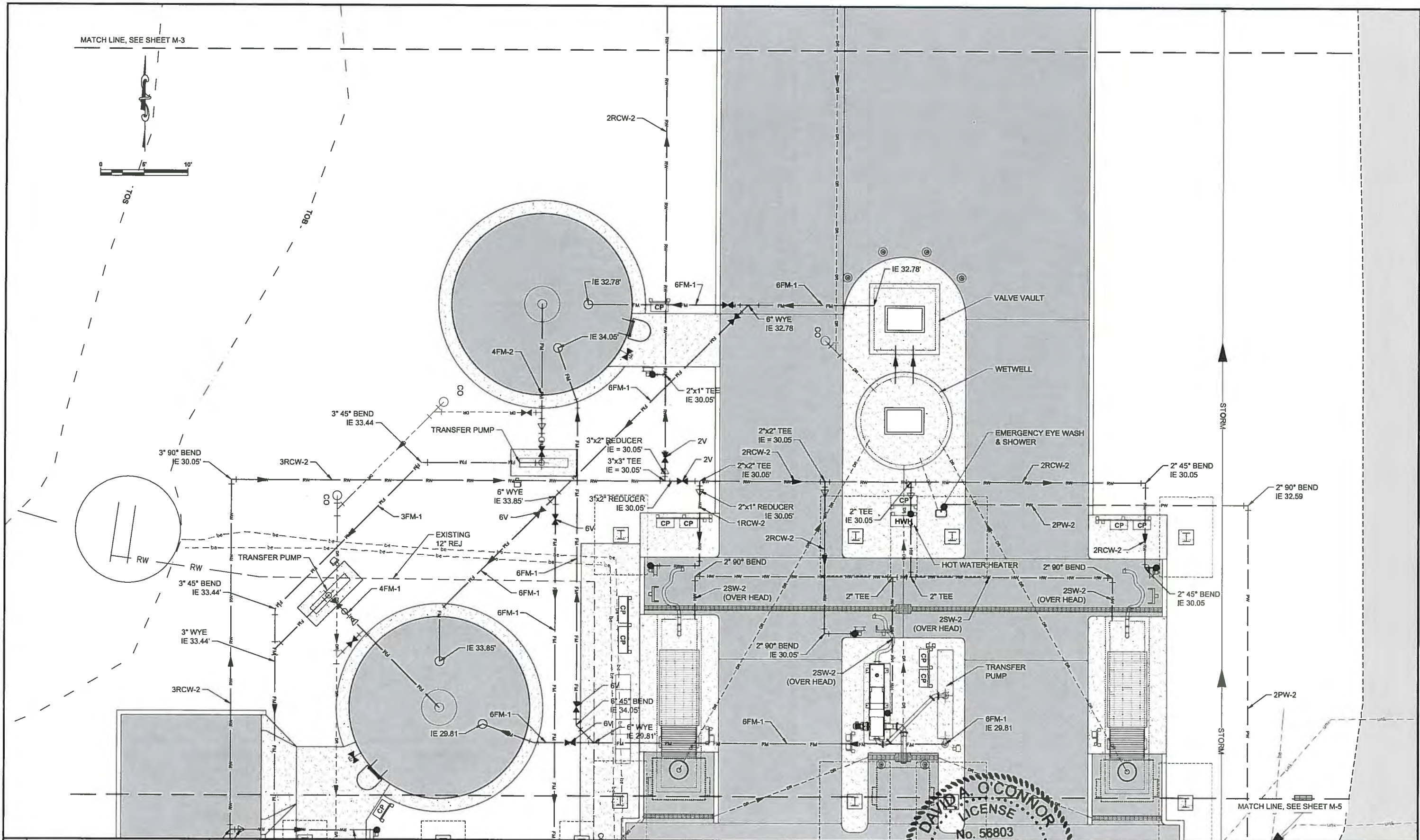

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 360 PARK PLACE BLVD, STE 300, CLEARWATER, FL 33759 TEL:  
 (727) 531-3505 (800) 861-4314  
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 DAVID O'CONNOR  
 LICENSE  
 No. 56803  
 STATE OF FLORIDA  
 PROFESSIONAL ENGINEER

**YARD PIPING (1)**

PROJECT NO:	00193-009-02
DATE:	MARCH 2015
SHEET NO:	M-3

FILE: J:\00193\00193009\02\ACAD\dwg\Sheets\PLAN SHEETS-YARD PIPING.dwg LAST SAVED: Tue, 03/10/15-1:16p PLOTTED: Tue, 03/10/15-3:21p BY: Dave Shively

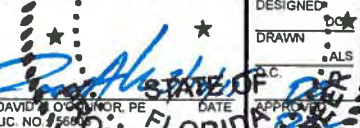


NO	DESCRIPTION	BY	DATE

**SEWRF  
SEPTAGE/ GREASE  
RECEIVING STATION**


**MANATEE COUNTY**  
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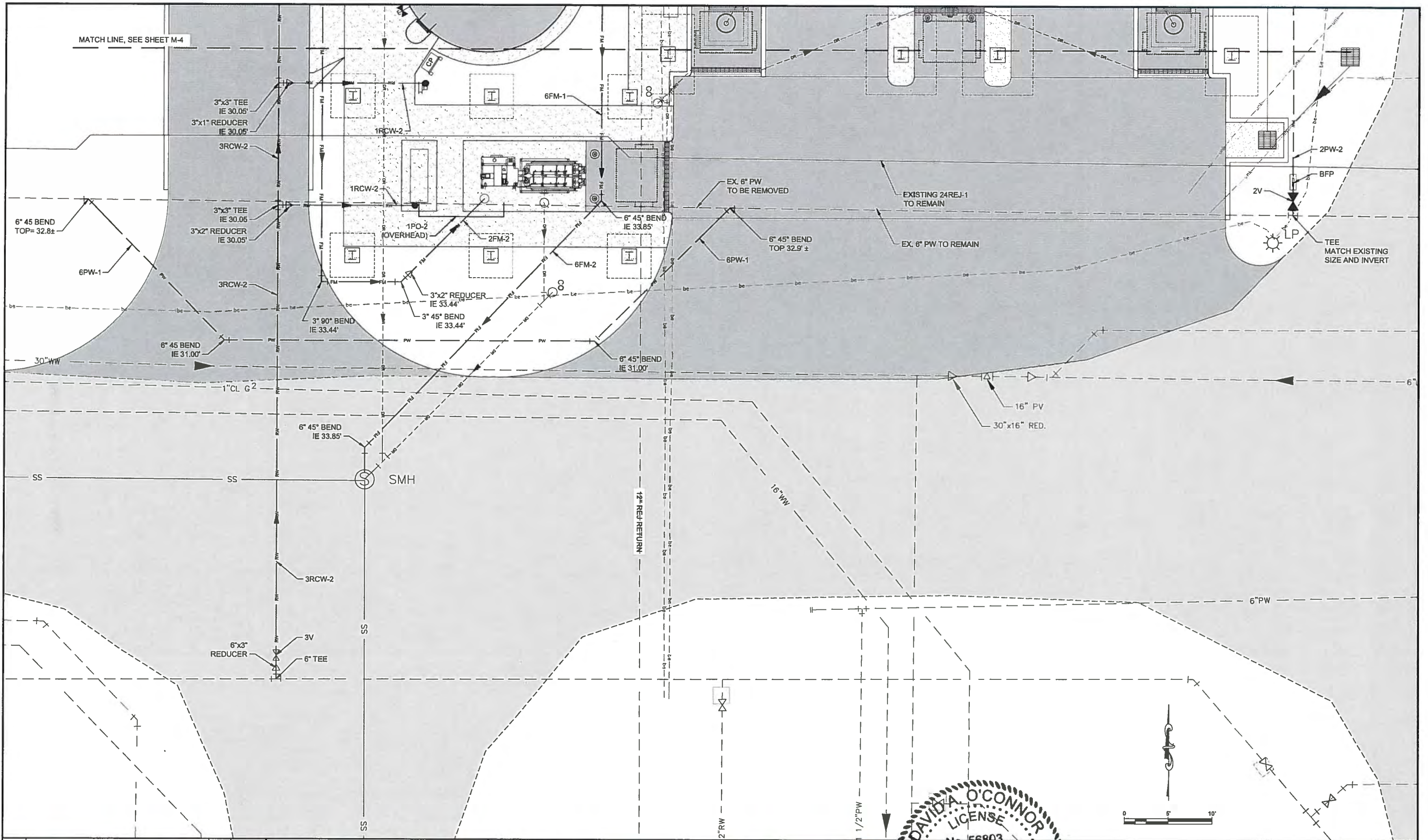

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**DAVID A. O'CONNOR**  
 LICENSE  
 No. 56803  
 STATE OF FLORIDA  
 PROFESSIONAL ENGINEER

**YARD PIPING (2)**

PROJECT NO:	00193-009-02
DATE:	MARCH 2015
SHEET NO:	M-4

FILE J:\00193\00193009\02\CAD\dwg\Sheets\PLAN SHEETS-YARD PIPING.dwg LAST SAVED: Tue, 03/10/15 1:16p PLOTTED: Tue, 03/10/15 3:21p BY: Dave Shively

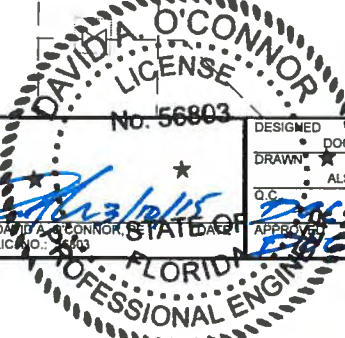


NO.	DESCRIPTION	BY	DATE

**SEWRF  
SEPTAGE/ GREASE  
RECEIVING STATION**


**MANATEE COUNTY**  
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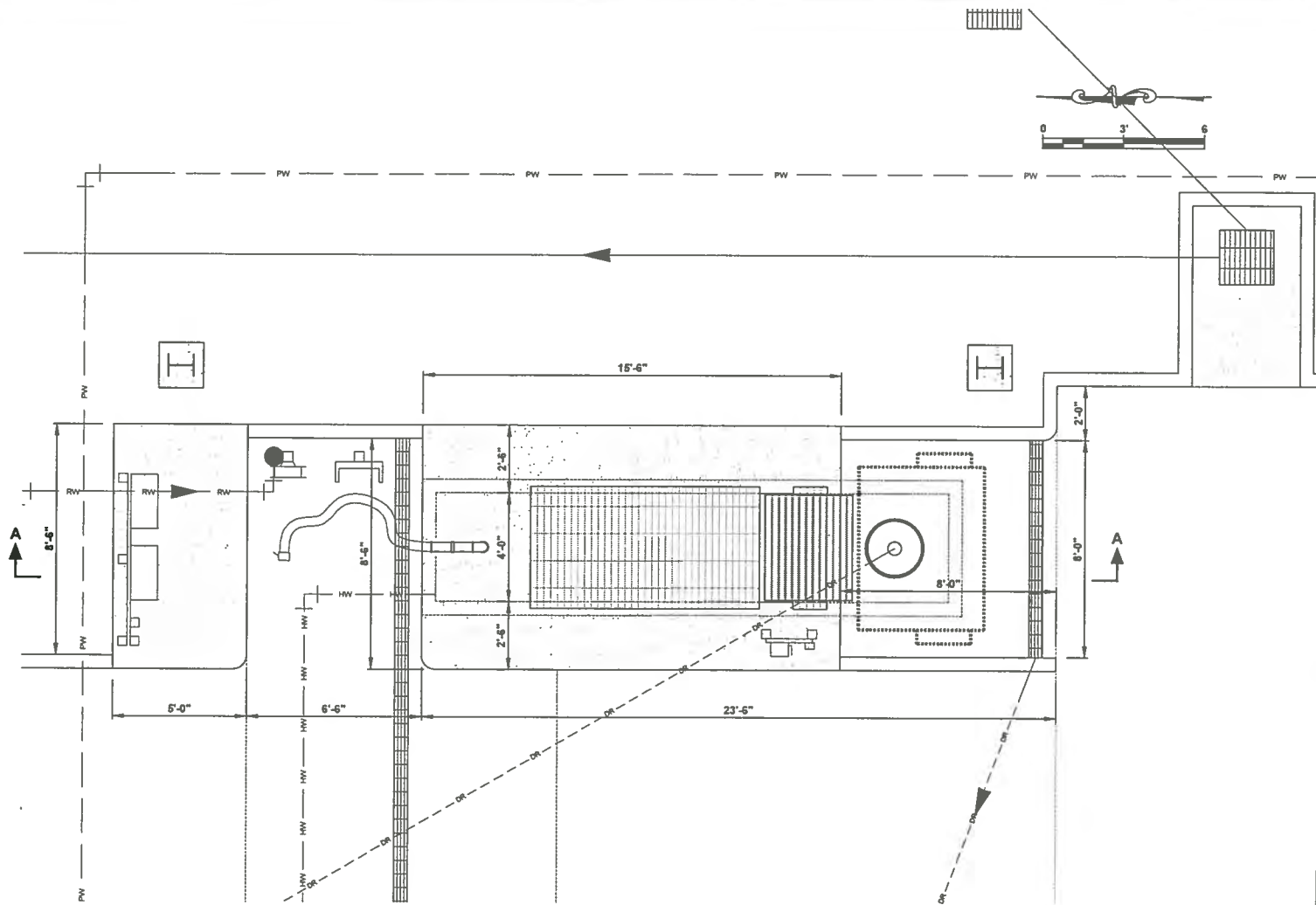

**Cardno**  
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 DAVID A. O'CONNOR  
 LICENSE No. 56803  
 STATE OF FLORIDA  
 PROFESSIONAL ENGINEER

**YARD PIPING (3)**

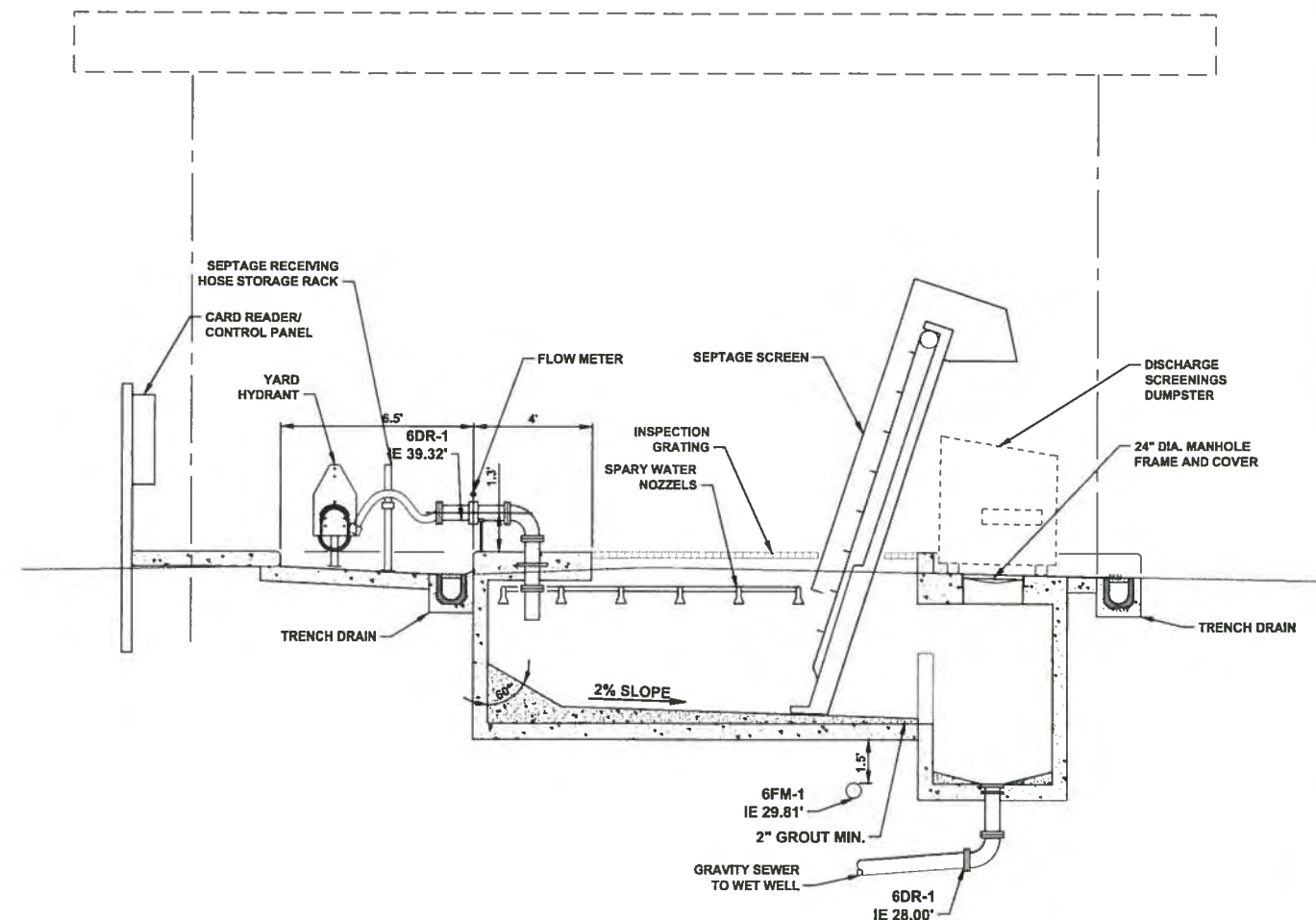
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DATE:	MARCH 2015
SHEET NO:	M-5

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**1 PLAN VIEW**  
C-3 SCALE AS SHOWN

NOTE:  
1. WESTERLY SEPTAGE RECEIVING STATION SIMILAR.



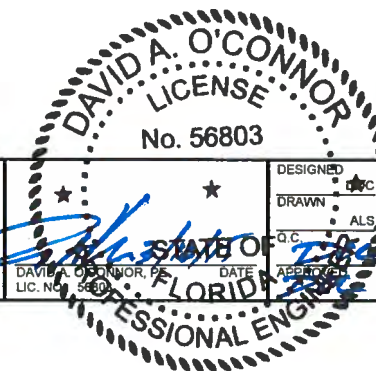
**SECTION A-A**  
NOTE:  
1. WESTERLY SEPTAGE RECEIVING STATION SIMILAR. NTS

NO.	DESCRIPTION	BY	DATE

**SEWRF  
SEPTAGE/ GREASE  
RECEIVING STATION**

**MANATEE COUNTY**  
DEPARTMENT OF PUBLIC WORKS  
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4410 66th Street West Bradenton, Florida 34210  
(941) 792-8811

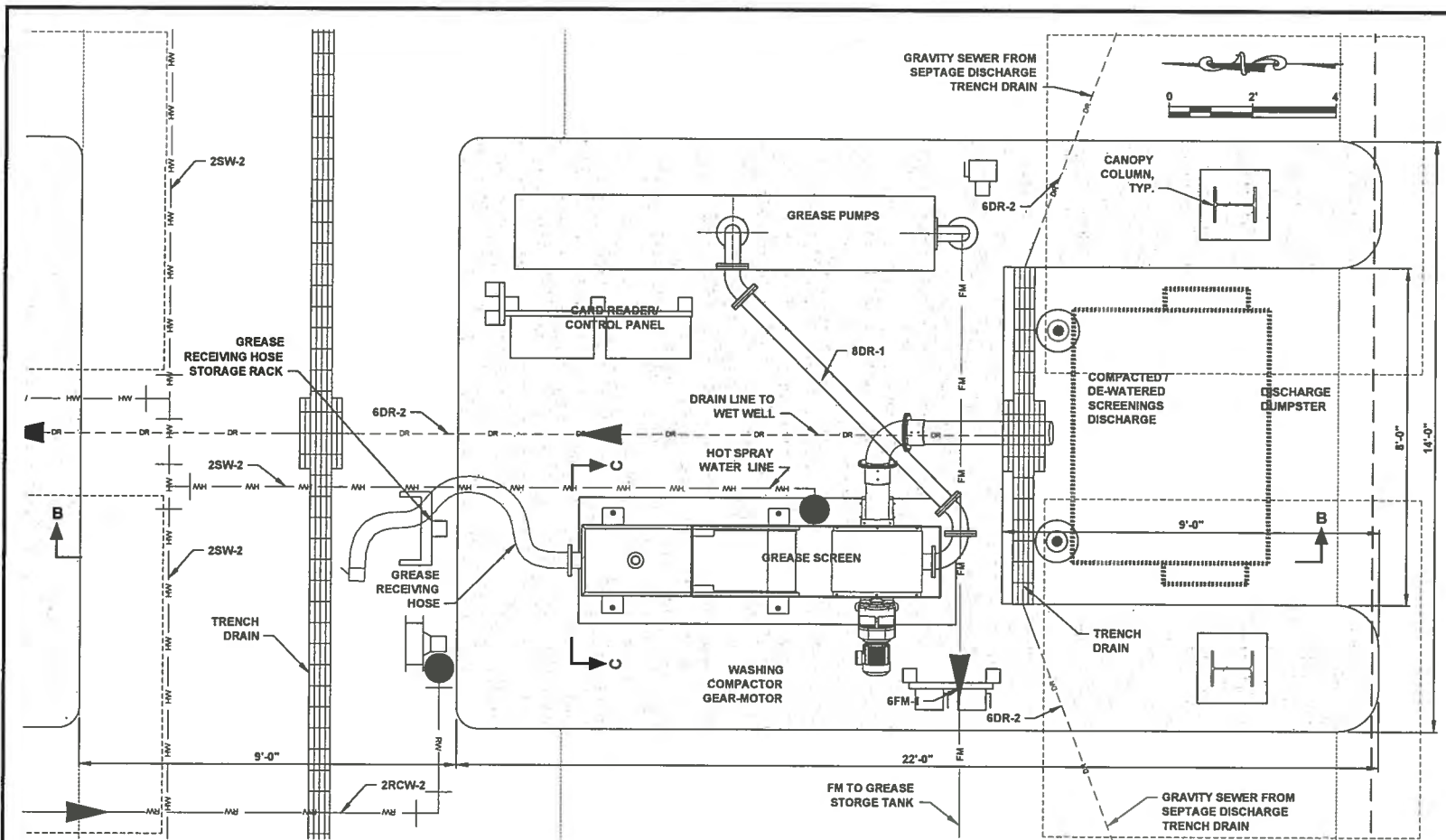
**Cardno**  
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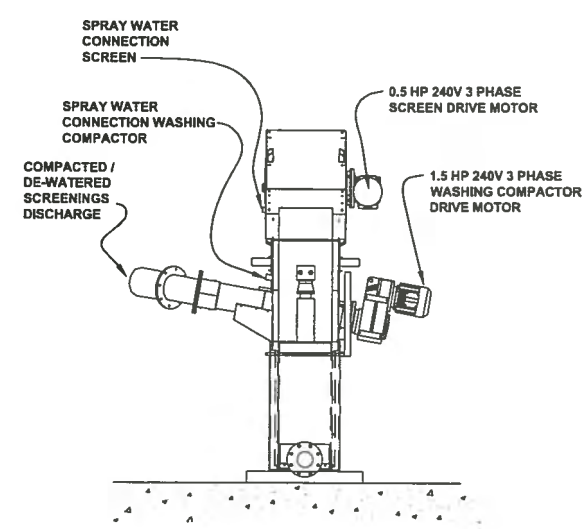
DESIGNED: [Signature]  
DRAWN: ALS  
DATE: [Signature]  
APPROVED: [Signature]

**SEPTAGE RECEIVING STATION  
PLAN AND SECTION**

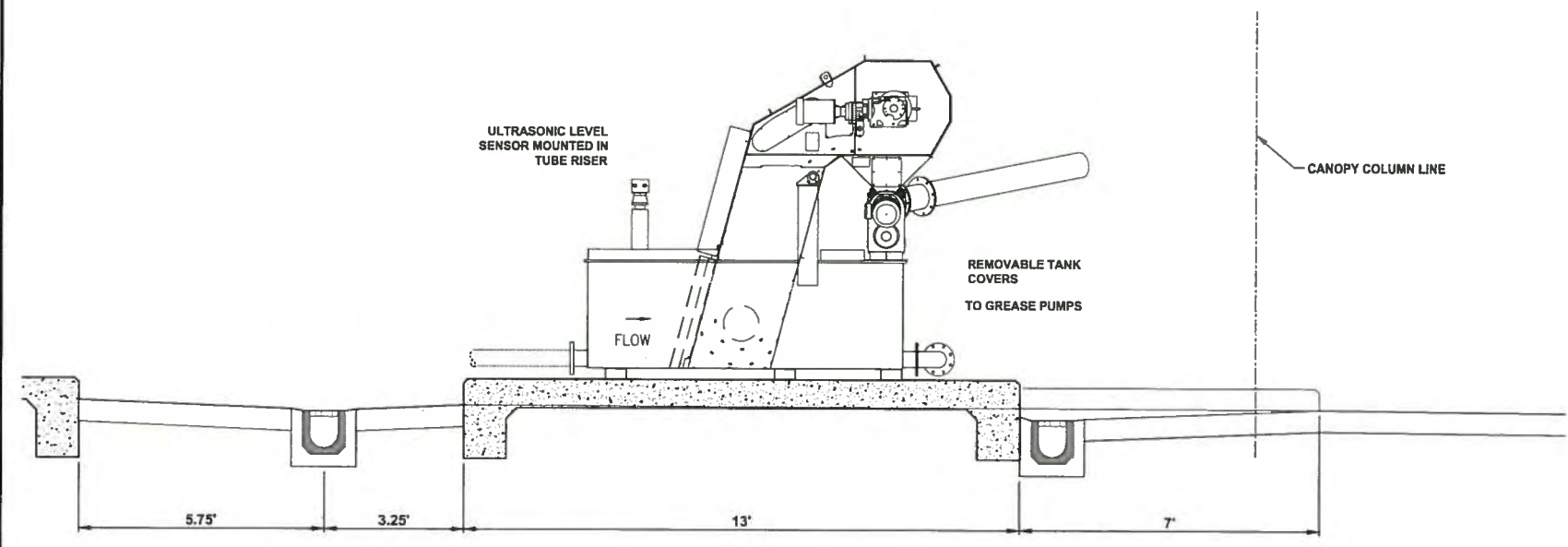
PROJECT NO:  
00193-009-02  
DATE:  
MARCH 2015  
SHEET NO:  
M-6



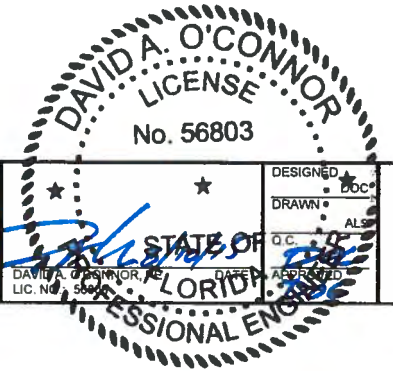
1 PLAN VIEW  
C-3 SCALE AS SHOWN



SECTION C-C  
NTS



SECTION B-B  
NTS



NO.	DESCRIPTION	BY	DATE

**SEWRF  
SEPTAGE/ GREASE  
RECEIVING STATION**

**MANATEE COUNTY**  
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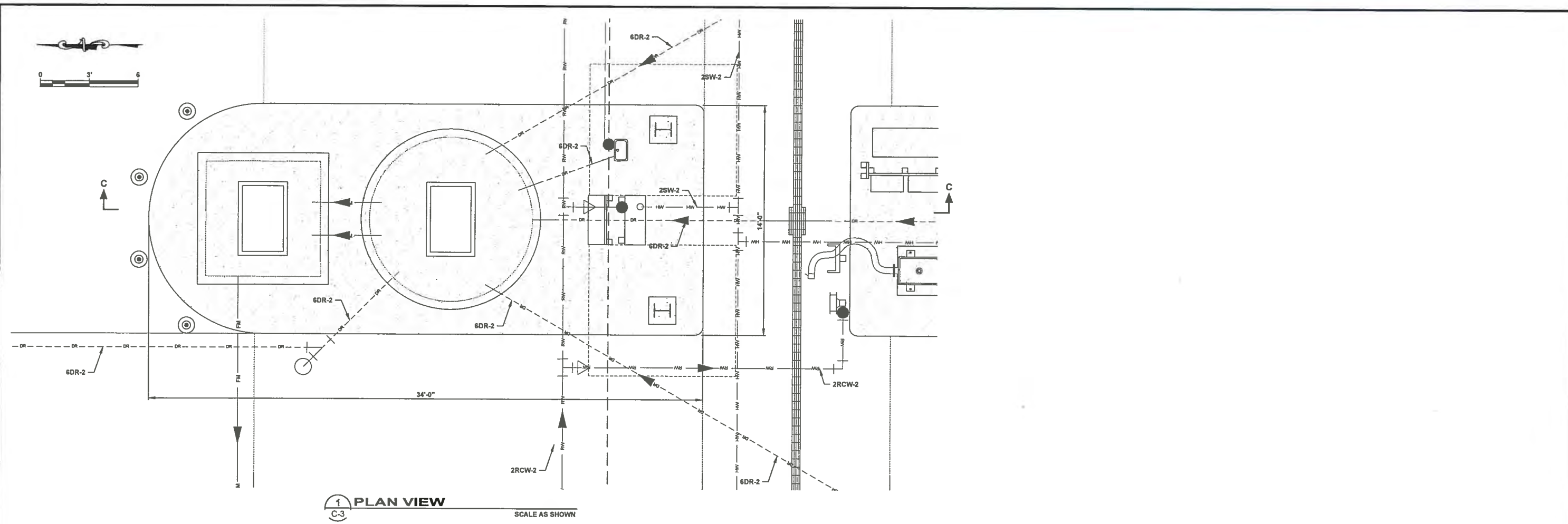
**Cardno**  
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DESIGNED	DCC
DRAWN	ALS
CHECKED	ALS
DATE	APPROVED

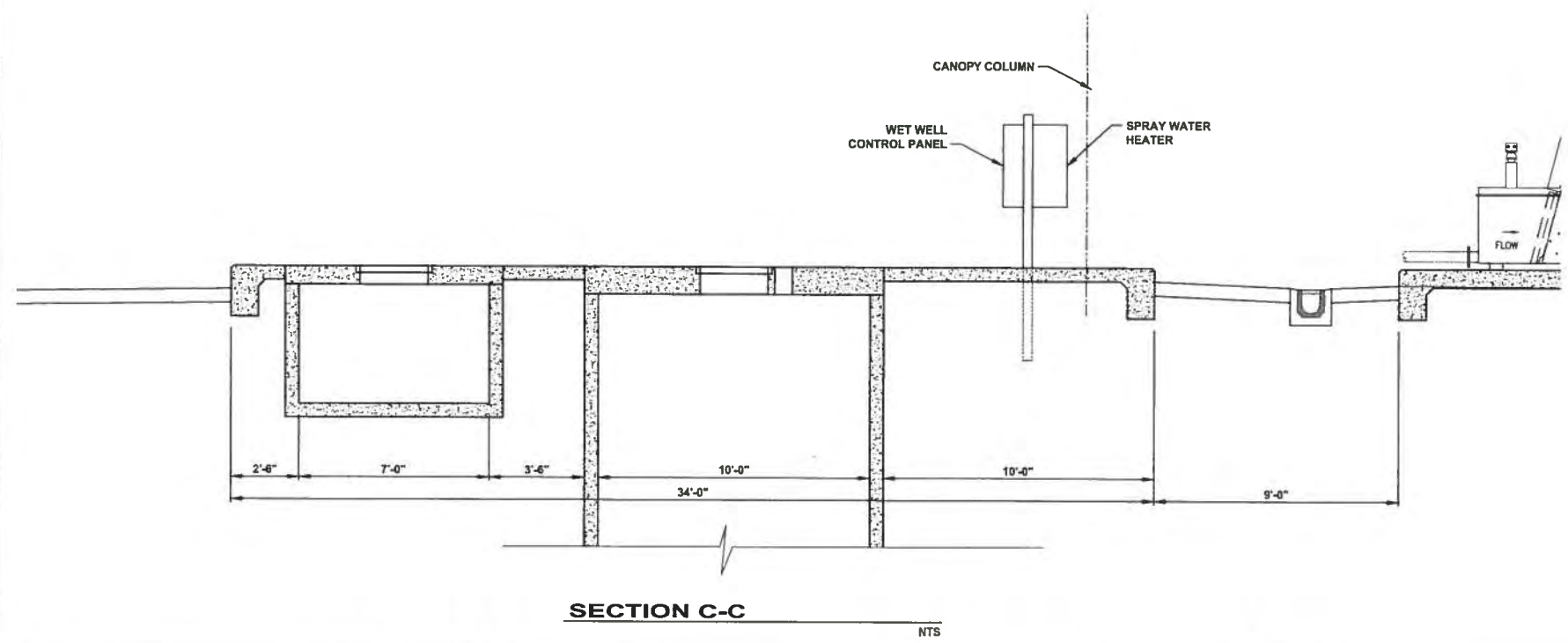
**GREASE RECEIVING STATION  
PLAN AND SECTION**

PROJECT NO:	00193-009-02
DATE:	MARCH 2015
SHEET NO:	M-7

FILE: J:\0018300183009\02\ACAD\dwg\Sheets\PLAN AND SECTION.dwg LAST SAVED: Tue, 03/10/15 3:13p PLOTTED: Tue, 03/10/15 3:22p BY: Dave Shewly



1 PLAN VIEW  
C-3 SCALE AS SHOWN



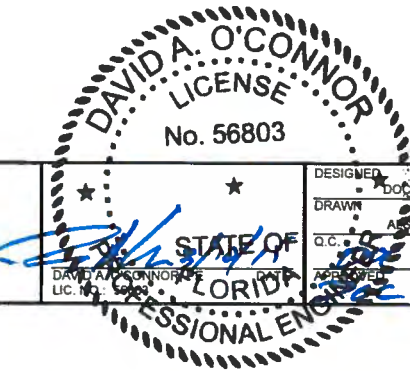
SECTION C-C  
NTS

NO	DESCRIPTION	BY	DATE

**SEWRF  
SEPTAGE/ GREASE  
RECEIVING STATION**

**MANATEE COUNTY**  
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4410 66th Street West Bradenton, Florida 34210  
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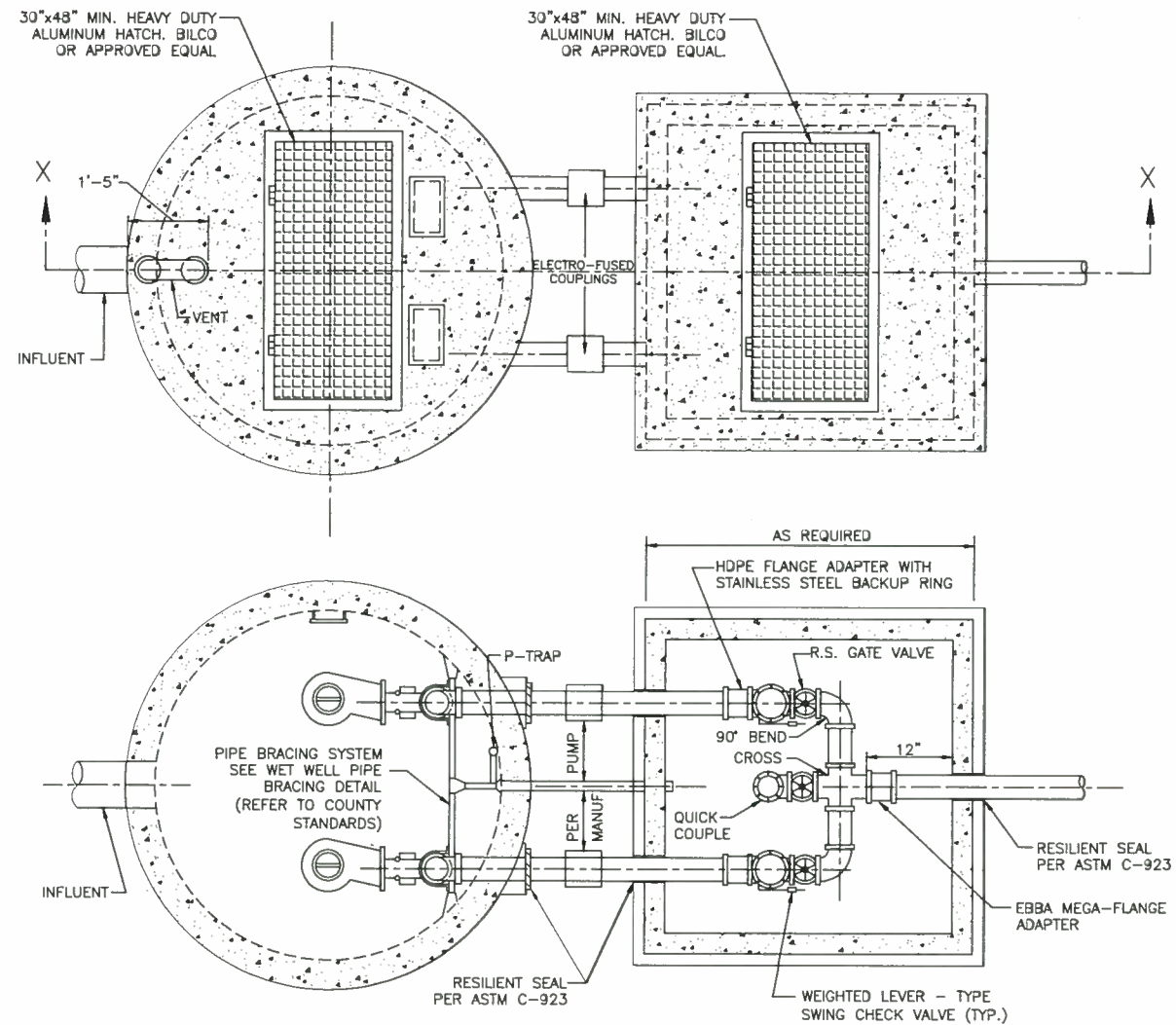
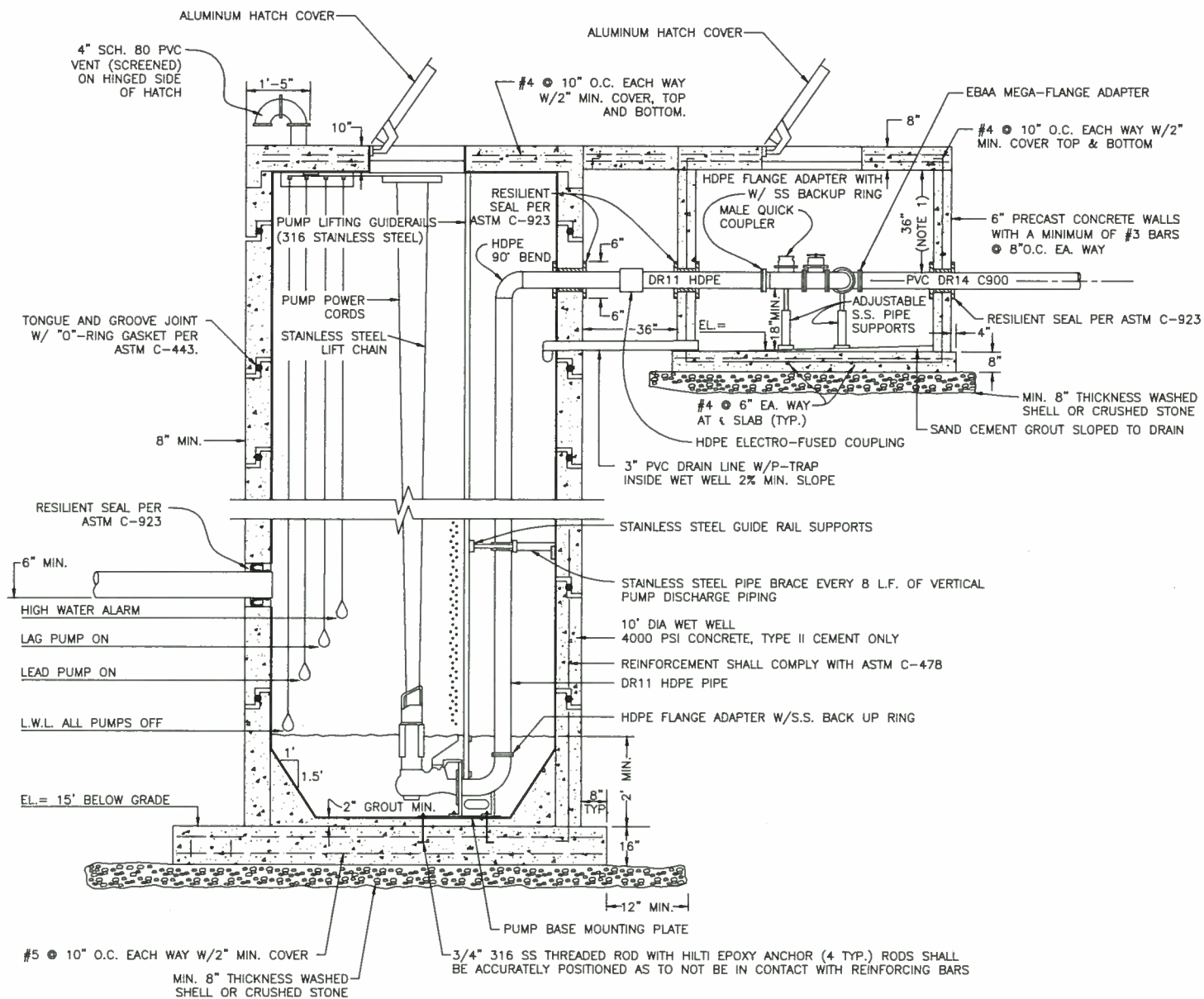
**Cardno**  
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**WET WELL AND VALVE VAULT  
PLAN AND SECTION**

PROJECT NO:  
00193-009-02  
DATE:  
MARCH 2015  
SHEET NO:  
M-8

FILE: J:\00193\00193009\02ACAD\dwg\Sheets\PLAN AND SECTION.dwg LAST SAVED: Tue, 03/10/15-3:13p PLOTTED: Tue, 03/10/15-3:23p BY: Dave Shively



**1 PUMPING STATION DETAIL**  
NTS

NOTE: SEE PLAN SHEETS FOR ORIENTATION.



NO.	DESCRIPTION	BY	DATE

**SEWRP  
SEPTAGE/ GREASE  
RECEIVING STATION**

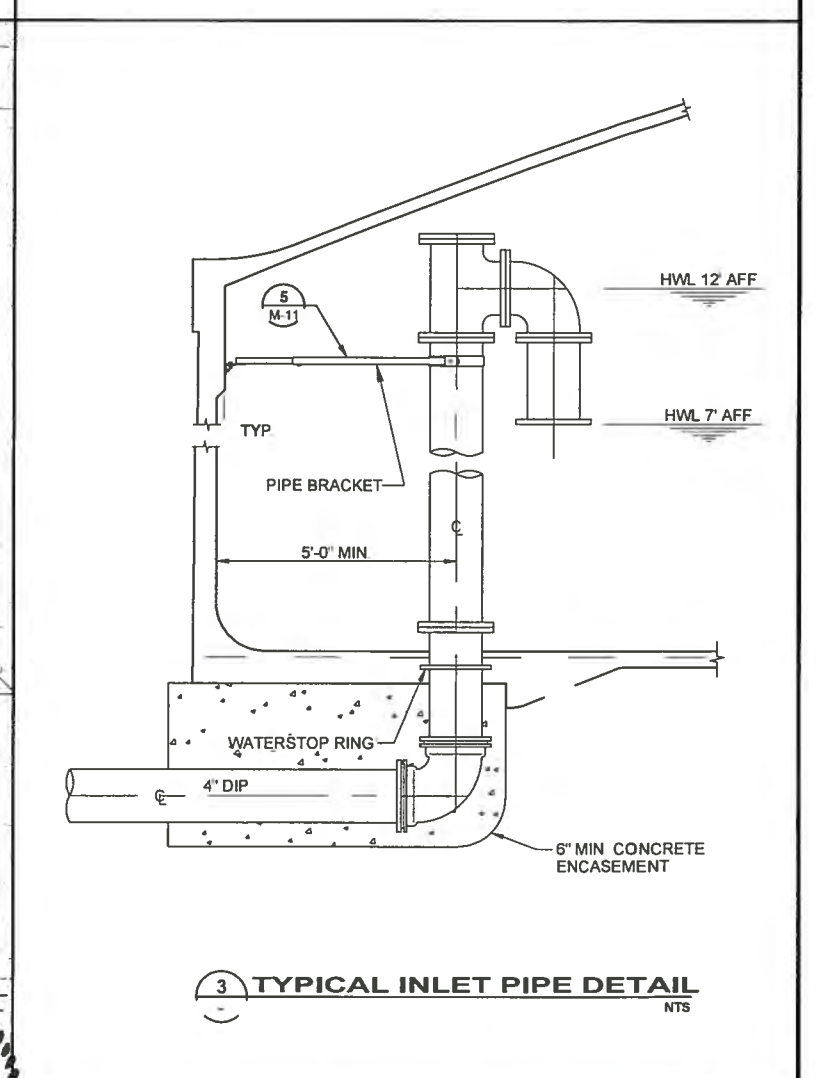
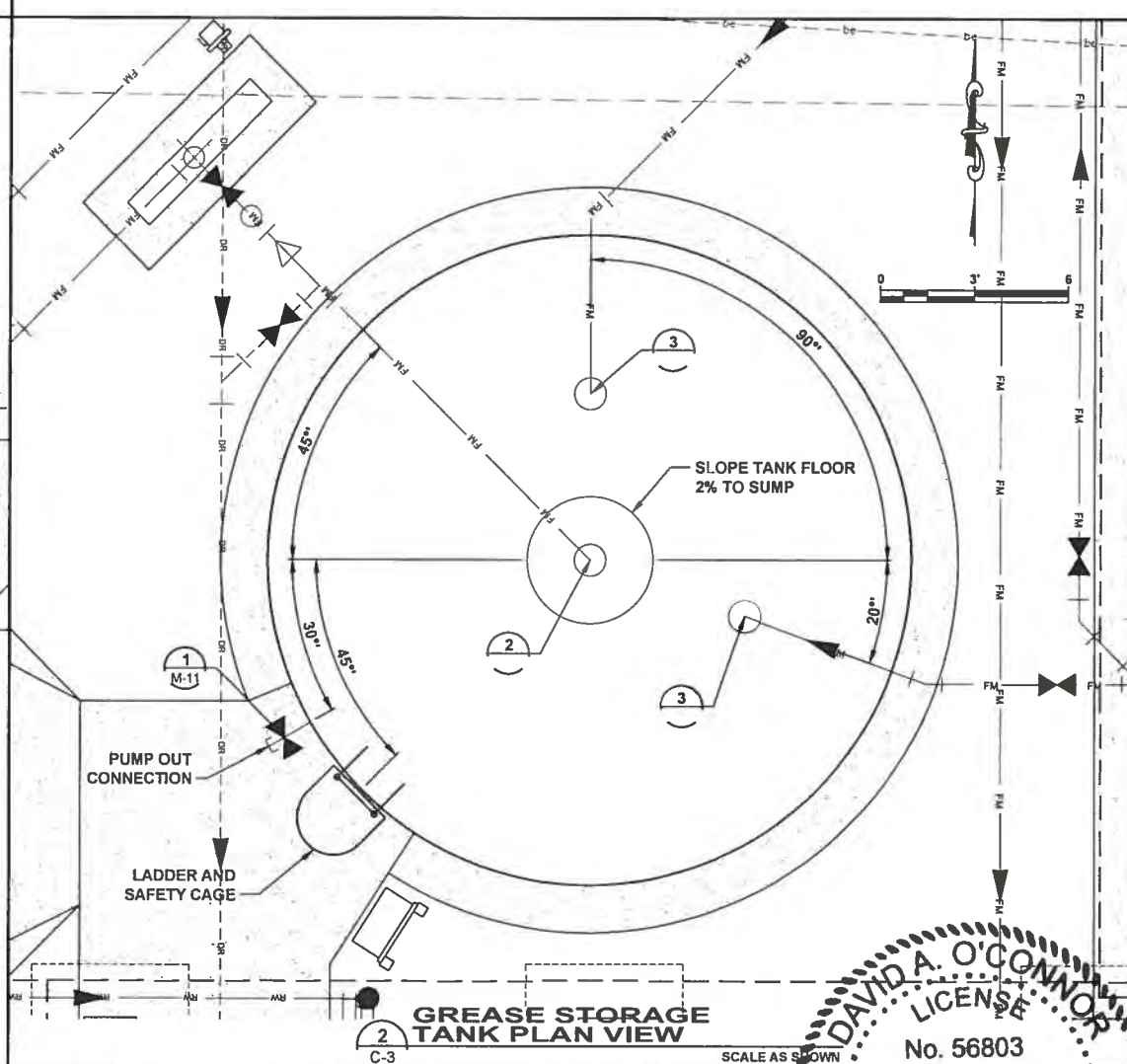
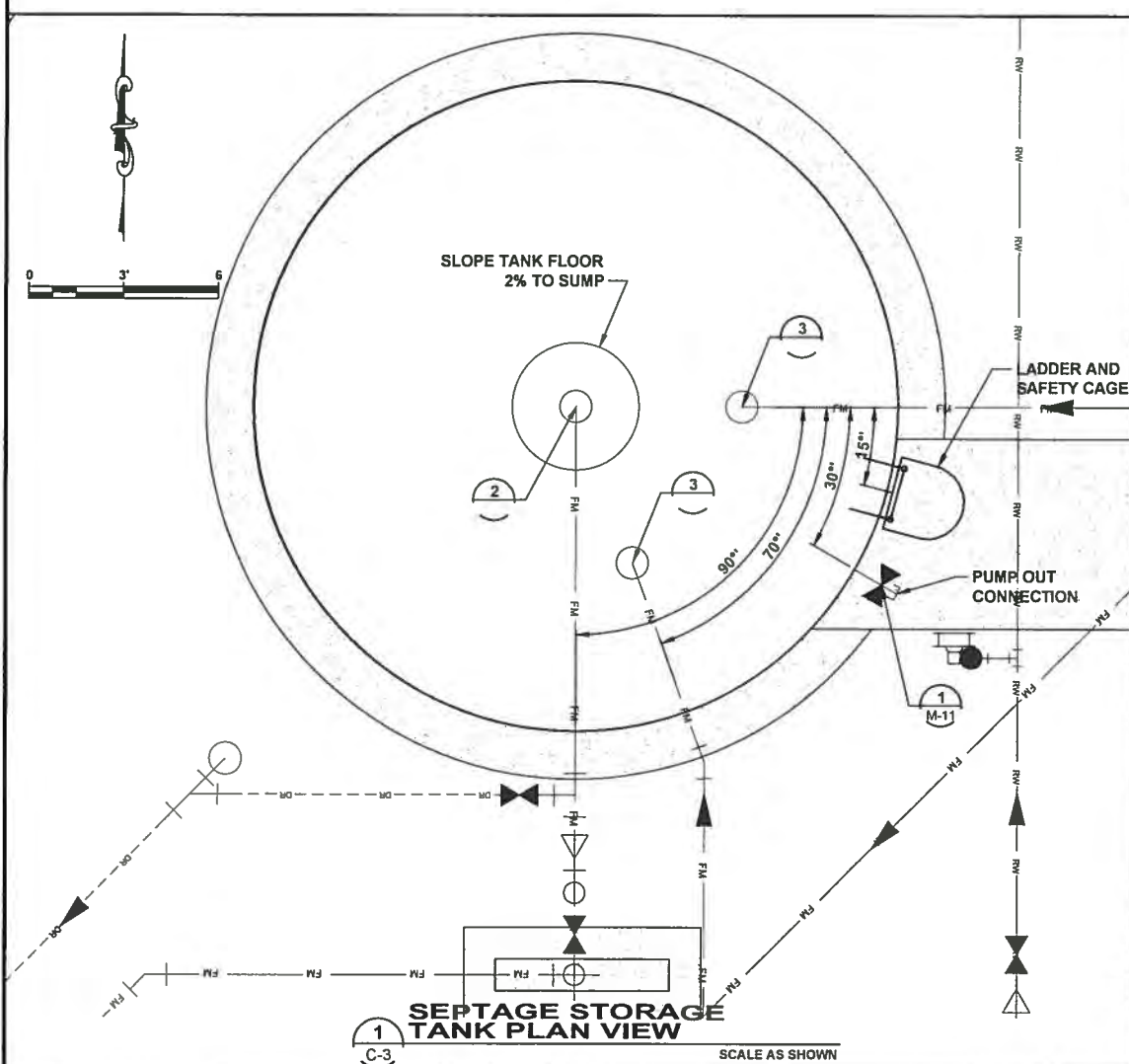
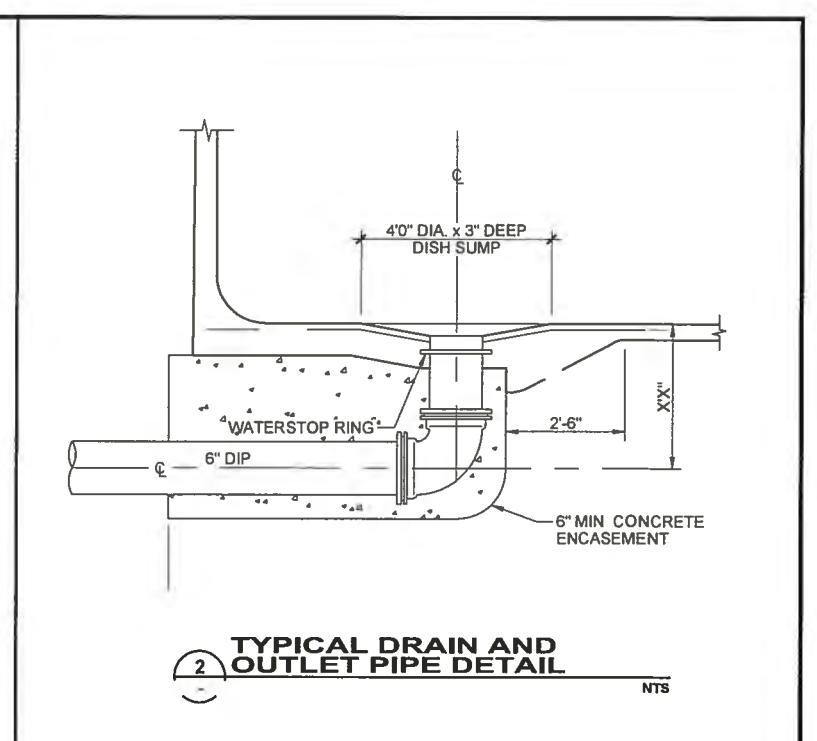
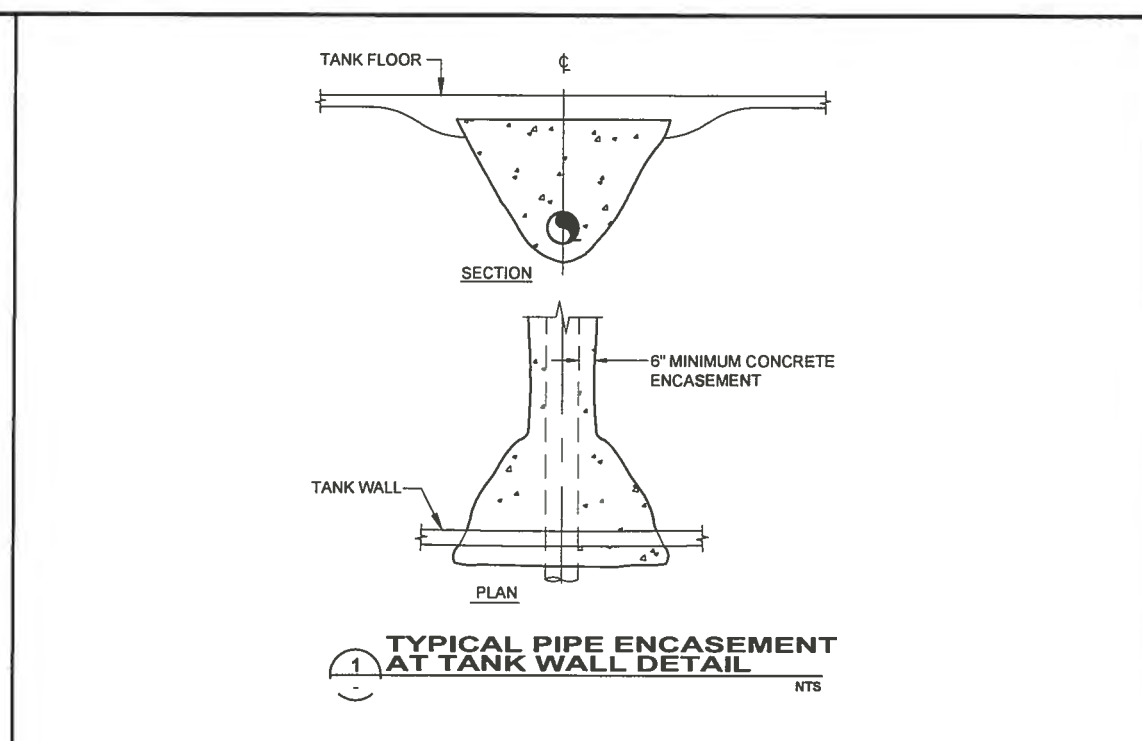
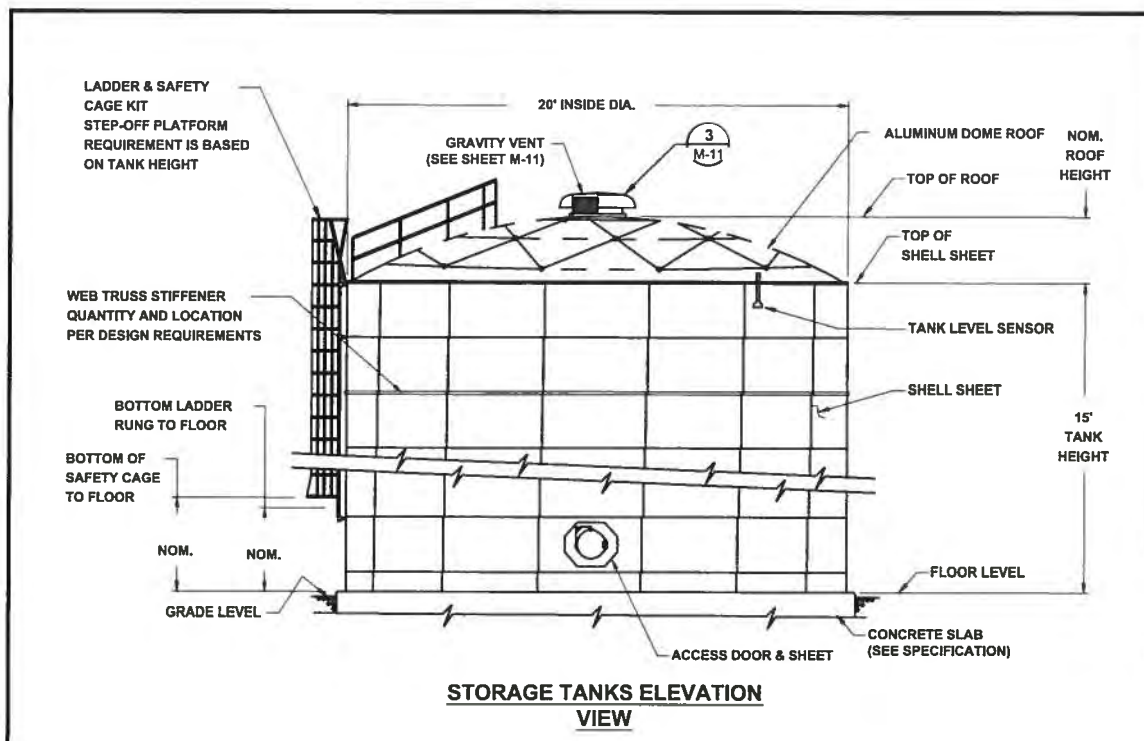
**MANATEE COUNTY**  
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UTILITIES DEPARTMENT  
4410 66th Street West Bradenton, Florida 34210  
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**PUMP STATION DETAILS**

PROJECT NO:  
00193-009-02  
DATE:  
MARCH 2015  
SHEET NO:  
**M-9**





NO	DESCRIPTION	BY	DATE

**SEWRF  
SEPTAGE/ GREASE  
RECEIVING STATION**

**MANATEE COUNTY**  
DEPARTMENT OF PUBLIC WORKS  
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4410 66th Street West Bradenton, Florida 34210  
(941) 792-8811

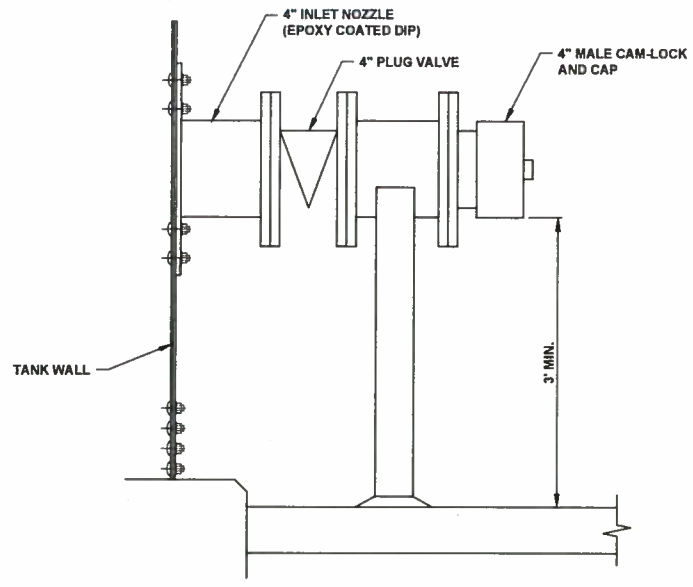
**Cardno**  
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380 PARK PLACE BLVD, STE 300, CLEARWATER, FL 33759 TEL:  
(727) 531-3525 (800) 861-8314  
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DESIGNED: [Signature]  
DRAWN: [Signature]  
CHECKED: [Signature]  
APPROVED: [Signature]  
**DAVID A. O'CONNOR**  
LICENSED PROFESSIONAL ENGINEER  
No. 56803  
STATE OF FLORIDA  
LIC. NO. 56803

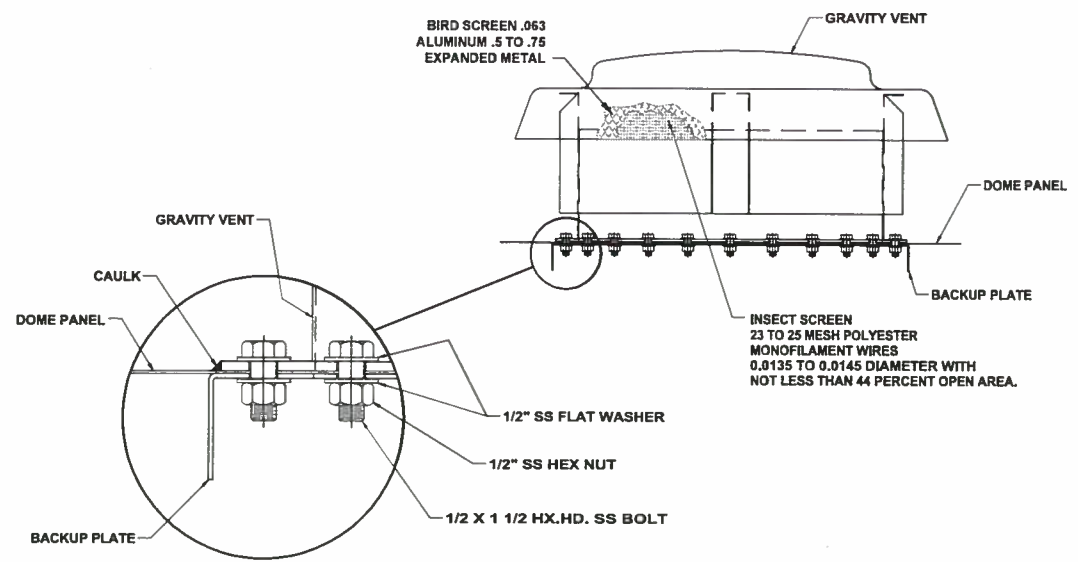
**STORAGE TANKS ELEVATION AND CONNECTION DETAILS**

PROJECT NO: 00193-009-02  
DATE: MARCH 2015  
SHEET NO: **M-10**

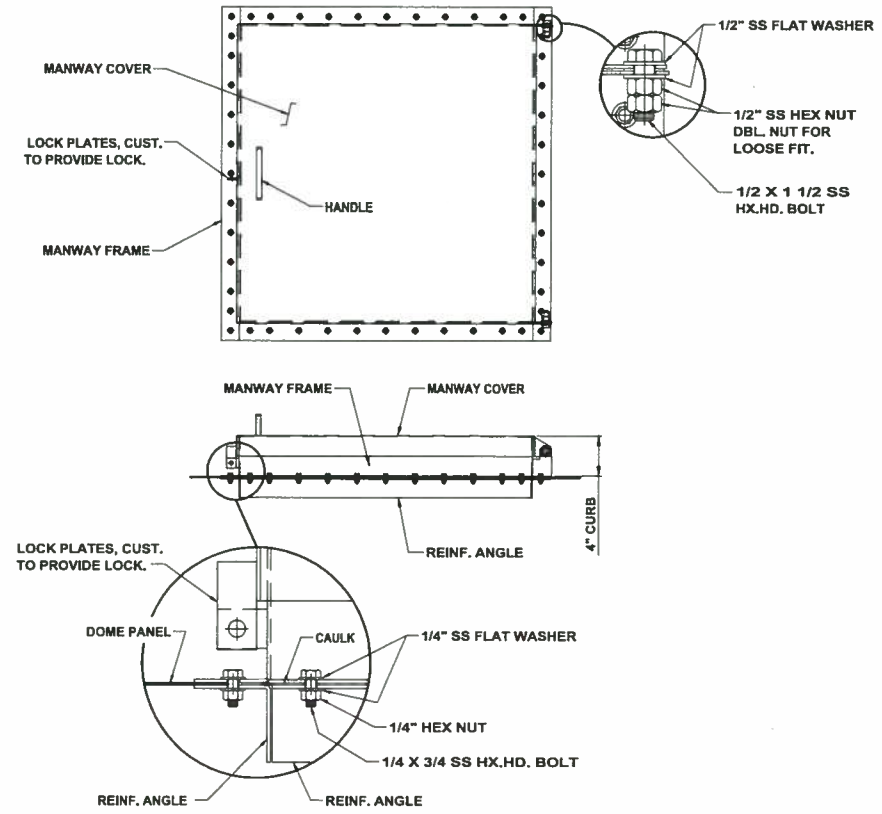
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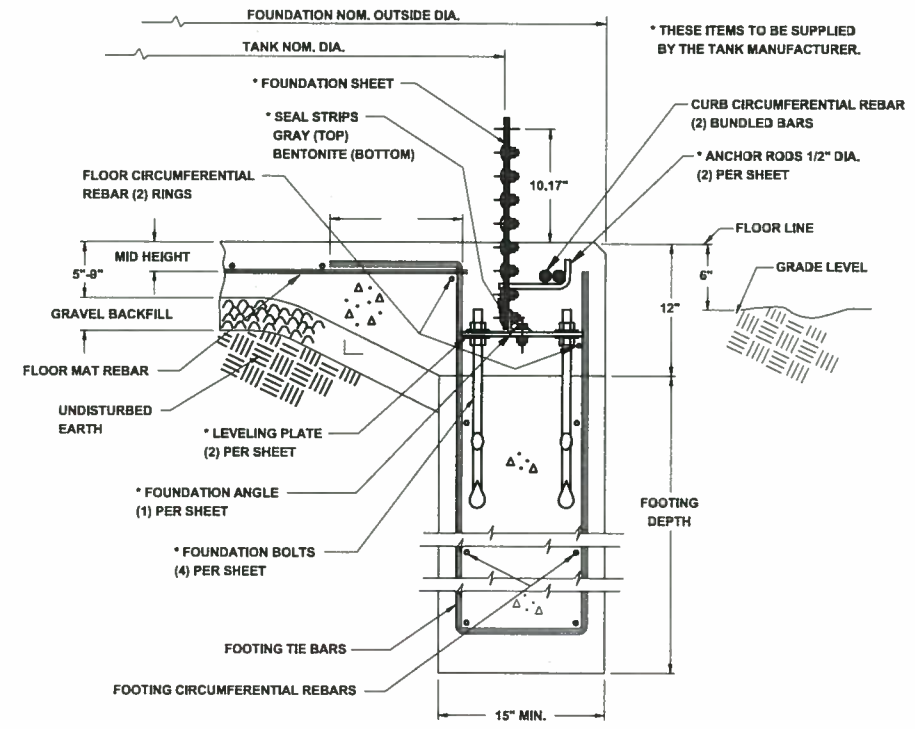
1 TYPICAL PUMP OUT CONNECTION DETAIL NTS



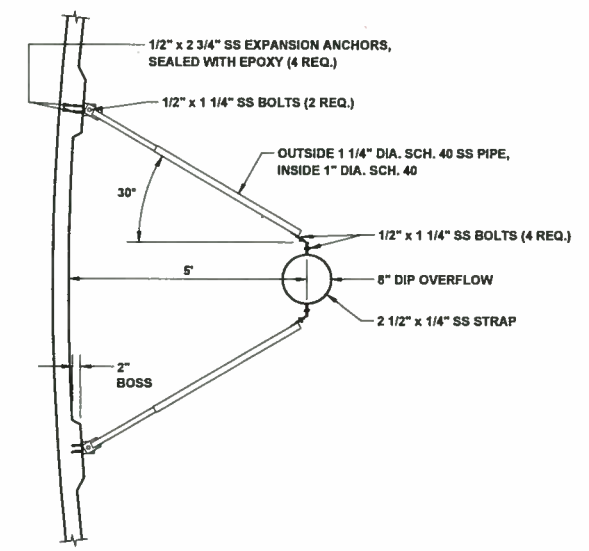
3 24" GRAVITY VENT ASSEMBLY NTS



2 30" SQUARE ALUMINUM MANWAY NTS



4 TYPICAL SECTION THROUGH TANK FOOTING NTS



5 PIPE BRACKET NTS

NO.	DESCRIPTION	BY	DATE

**SEWRP  
SEPTAGE/ GREASE  
RECEIVING STATION**

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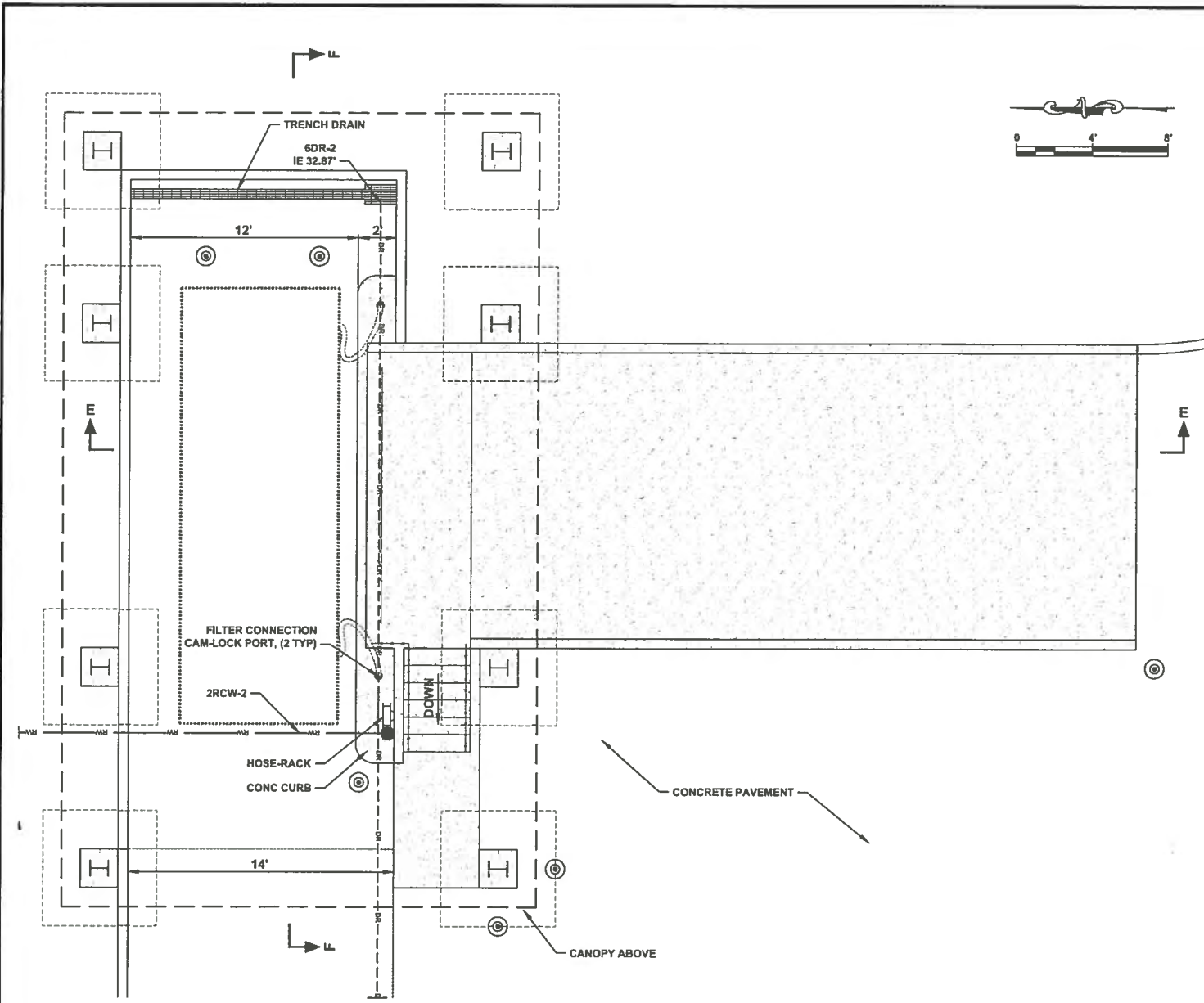
**DAVID A. O'CONNOR**  
LICENSE  
No. 56803  
STATE OF FLORIDA  
PROFESSIONAL ENGINEER

DESIGNER	DOC
DRAWN	MS
CHECKED	MS
APPROVED	MS

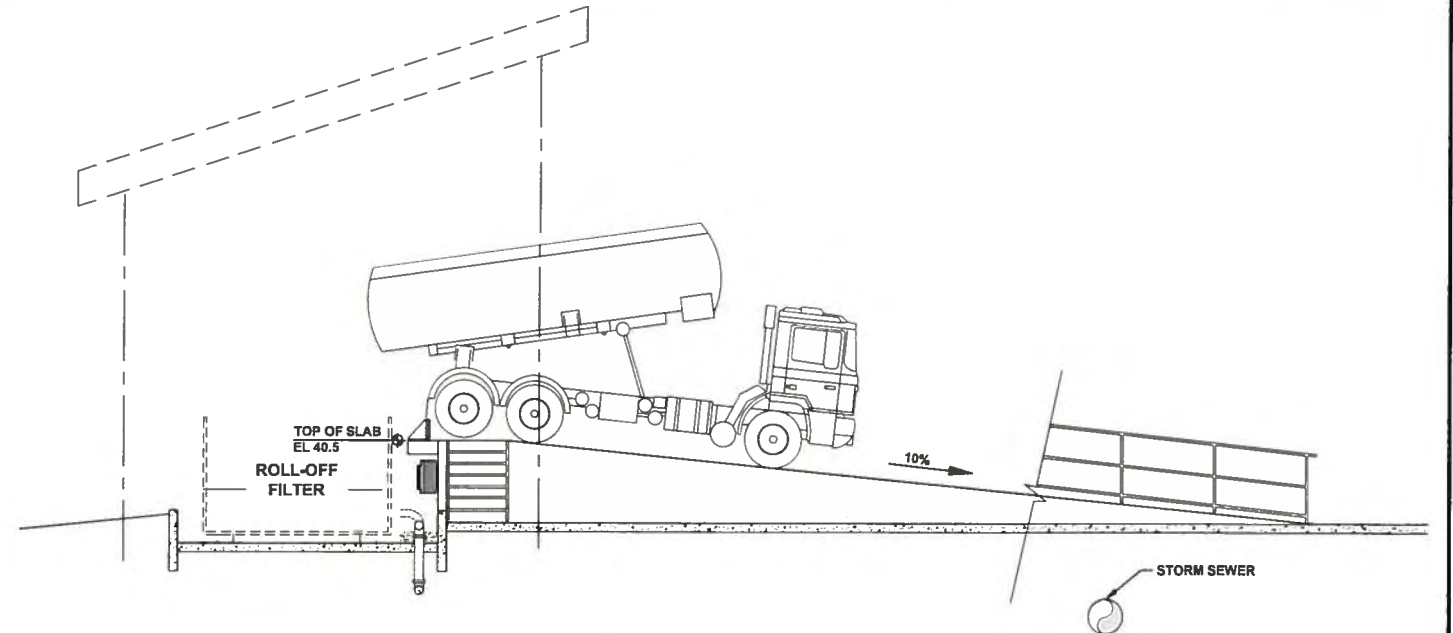
**STORAGE TANK DETAILS**

PROJECT NO:	00193-009-02
DATE:	MARCH 2015
SHEET NO:	M-11

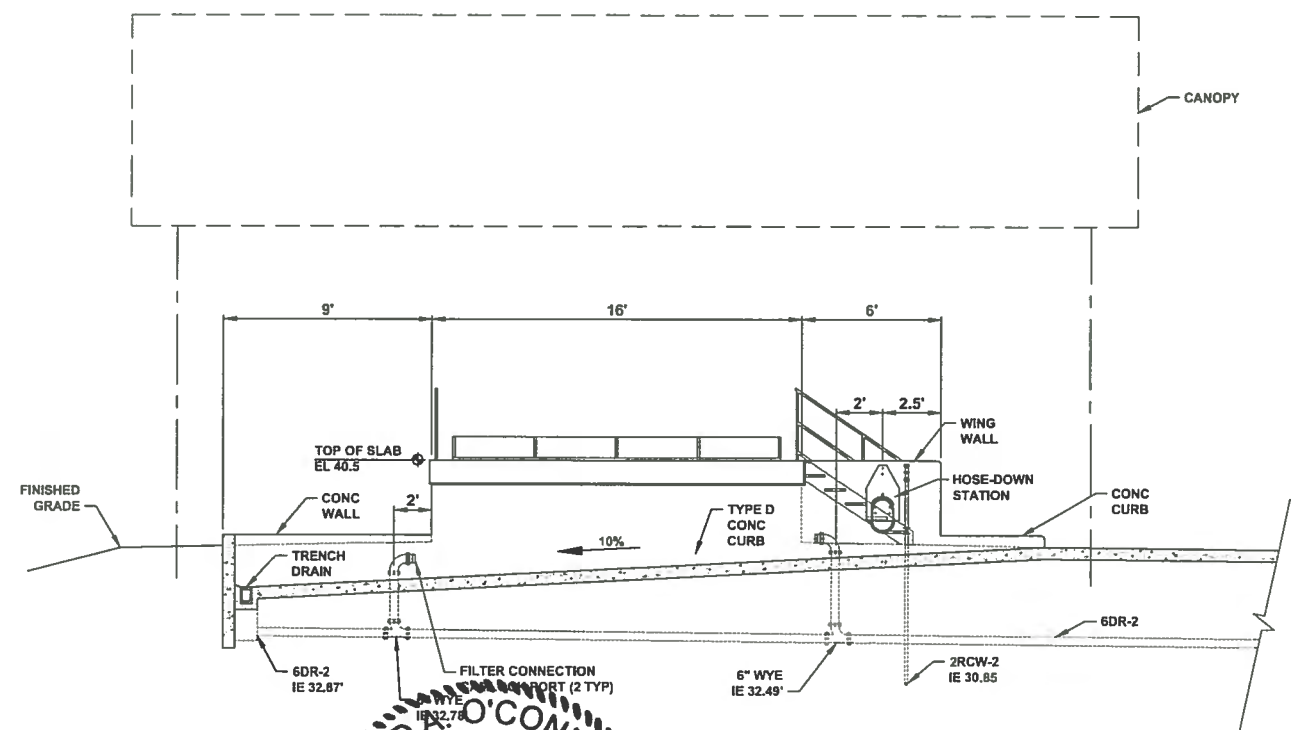
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**1 PLAN VIEW**  
C-3 SCALE AS SHOWN



**SECTION E-E**  
NTS



**DAVID A. O'CONNOR**  
LICENSED PROFESSIONAL ENGINEER  
No. 56803  
STATE OF FLORIDA  
DESIGNED BY  
DRAWN BY  
CHECKED BY  
DATE: 3/11/15

**SECTION F-F**  
NTS

NO.	DESCRIPTION	BY	DATE

**SEWRF  
SEPTAGE/ GREASE  
RECEIVING STATION**

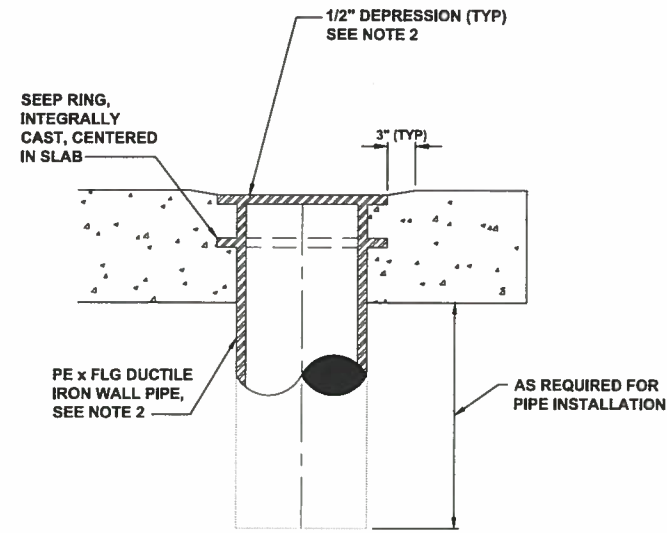
**MANATEE COUNTY**  
DEPARTMENT OF PUBLIC WORKS  
UTILITIES DEPARTMENT  
4410 66th Street West Bradenton, Florida 34210  
(941) 792-8811

**Cardno**  
Shaping the Future  
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**VACUUM TRUCK RECEIVING RAMP  
PLAN AND SECTIONS**

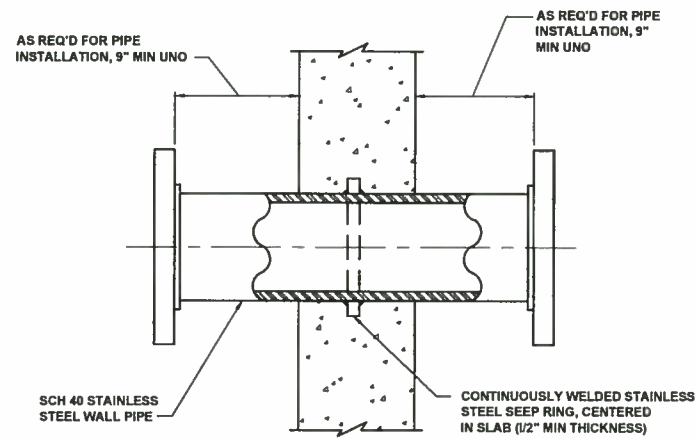
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00193-009-02  
DATE:  
MARCH 2015  
SHEET NO:  
**M-12**

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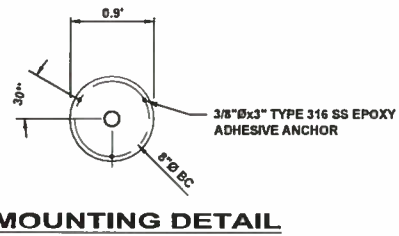
- NOTES:**
1. COAT FLOOR PIPE WITH SPECIFIED PAINT SYSTEM PRIOR TO CONCRETE PLACEMENT.
  2. DRILL AND TAP FLANGE TO RECEIVE THREADED BOLTS.

**1**  
**TYPICAL FLOOR PIPES (FLUSH MOUNTED) DETAIL**  
NTS

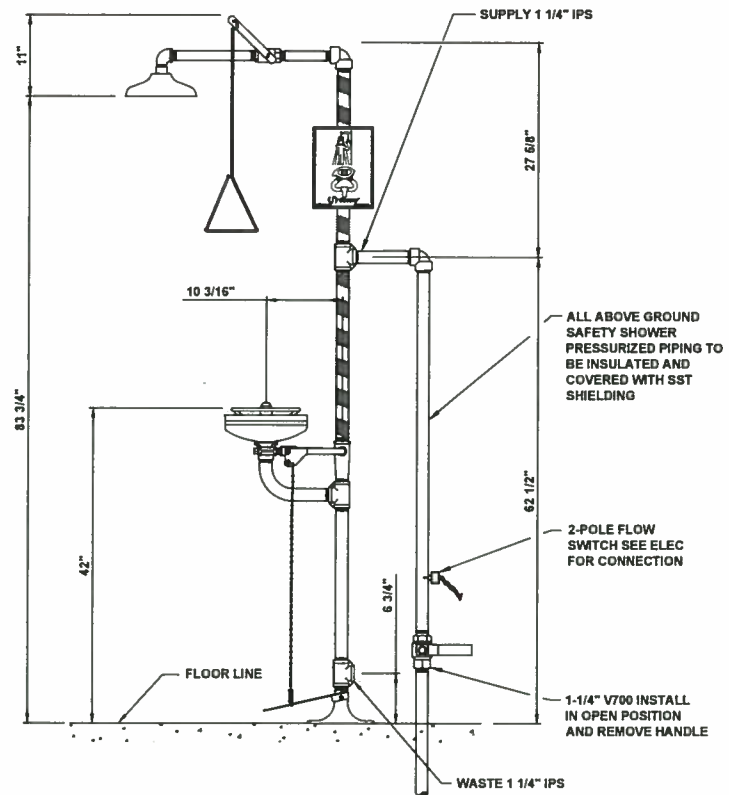


- NOTE:**
1. COAT WALL PIPE WITH SPECIFIED PAINT SYSTEM PRIOR TO CONCRETE PLACEMENT.

**2**  
**TYPICAL STAINLESS STEEL WALL PIPE DETAIL**  
NTS



**MOUNTING DETAIL**



- NOTES:**
1. DIMENSIONS MAY VARY 1/2"±.
  2. SS-1 EMERGENCY SHOWER AND EYE WASH STATIONS SHALL BE HAWS MODEL 8336 (OR EQUAL). ALL ASSOCIATED PIPING SHALL BE SCH 80 PVC UNO.
  3. SS-2 EMERGENCY SHOWER AND EYE WASH STATIONS SHALL BE HAWS MODEL 8300CRP. ALL ASSOCIATED PIPING SHALL BE SCH 40 GS UNO.
  4. MOUNTING PER MANUFACTURER'S RECOMMENDATIONS.
  5. PROVIDE 3/4" THICK (NOMINAL) NON-SHRINK NON-METALLIC EPOXY GROUT AS NECESSARY TO PROVIDE LEVEL/ PLUMB INSTALLATION.

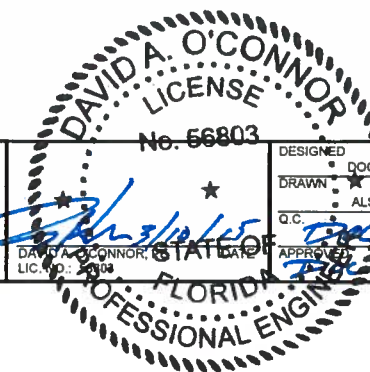
**3**  
**EMERGENCY SHOWER AND EYEWASH DETAIL**  
NTS

NO.	DESCRIPTION	BY	DATE

**SEWRF  
SEPTAGE/ GREASE  
RECEIVING STATION**

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UTILITIES DEPARTMENT  
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**MECHANICAL STANDARD DETAILS**

PROJECT NO:  
00193-009-02  
DATE:  
MARCH 2015  
SHEET NO:  
M-13

# GENERAL STRUCTURAL NOTES

## DESIGN CRITERIA

**CODES:**  
 2010 FLORIDA BUILDING CODE  
 REINFORCED CONCRETE:  
 WATER RETAINING STRUCTURES: ACI 350-06 "CODE REQUIREMENTS FOR ENVIRONMENTAL ENGINEERING CONCRETE STRUCTURES"  
 ALL OTHER STRUCTURES: ACI 318 "BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE"  
 STRUCTURAL STEEL: AISC MANUAL OF STEEL CONSTRUCTION 13TH EDITION  
 THE ALUMINUM ASSOCIATION, ALUMINUM DESIGN MANUAL 2005

## DESIGN LIVE LOADS:

- PROCESS RELATED STRUCTURES  
 WALKWAYS, STAIRWAYS AND LANDINGS 100 PSF  
 ELEVATED SLABS 200 PSF  
 PROCESS SLABS ON GRADE 300 PSF, UNO  
 - CANOPY STRUCTURES  
 ROOF 20 PSF  
 SUPERIMPOSED DEADLOADS:  
 - CANOPY ROOF 5 PSF  
 - FLOORS AS NOTED

## WIND LOADS:

- ULTIMATE DESIGN WIND SPEED,  $V_{ult}$  (3-SECOND GUST) 155 MPH  
 - NOMINAL DESIGN WIND SPEED,  $V_{50}$  120 MPH  
 - RISK CATEGORY III  
 - EXPOSURE CATEGORY C  
 - DESIGN PRESSURES: PER ASCE 7-10

SEPTAGE/GREASE RECEIVING CANOPY:  
 - ENCLOSURE CLASSIFICATION OPEN  
 - INTERNAL PRESSURE COEFFICIENT,  $GCPi$   $\pm 0.0$

ROLL-OFF FILTER CANOPY:  
 - ENCLOSURE CLASSIFICATION OPEN  
 - INTERNAL PRESSURE COEFFICIENT,  $GCPi$   $\pm 0.00$

SCREW PRESS CANOPY:  
 - ENCLOSURE CLASSIFICATION OPEN  
 - INTERNAL PRESSURE COEFFICIENT,  $GCPi$   $\pm 0.00$

## FOUNDATIONS

- ALLOWABLE BEARING PRESSURE FOR SPREAD FOOTINGS OVER SUBSURFACE PREPARED AS PER SPECIFICATIONS : 1500 PSF

## GEOTECHNICAL REPORT

- GEOTECHNICAL REPORT BY ANY INTERPRETATION OF THE CONTENTS OF THE GEOTECHNICAL REPORT IS THE RESPONSIBILITY OF THE CONTRACTOR.

## FLOTATION CONSIDERATION

STRUCTURES WERE DESIGNED TO BE NON-BUOYANT AFTER THEY ARE PLACED INTO OPERATION. THEREFOR THE STRUCTURES MAY BE BUOYANT DURING CONSTRUCTION. GENERAL CONTRACTOR SHALL PROTECT ALL STRUCTURES FROM FLOTATION DURING CONSTRUCTION REGARDLESS OF GROUND WATER LEVELS UNTIL STRUCTURES ARE PLACED INTO OPERATION.

## GENERAL CONDITIONS

ALL STRUCTURAL DRAWINGS SHALL BE USED IN CONJUNCTION WITH THE MECHANICAL, CIVIL, ARCHITECTURAL, ELECTRICAL, HVAC AND SHOP DRAWINGS AND SPECIFICATIONS.

THE CONTRACTOR SHALL REVIEW AND VERIFY DIMENSIONS SHOWN IN ALL PLANS AND REVIEW ALL FIELD CONDITIONS THAT MAY AFFECT THE INSTALLATION OF THE FACILITY. SHOULD DISCREPANCIES APPEAR, THE CONTRACTOR SHALL NOTIFY THE ENGINEER IN WRITING TO OBTAIN ENGINEER'S CLARIFICATION BEFORE COMMENCING WITH THE WORK.

FOR ALL ITEMS EMBEDDED IN OR PASSED THROUGH CONCRETE, THE CONTRACTOR SHALL INITIALLY REFER TO MECHANICAL, HEATING, AND VENTILATION DRAWINGS FOR TYPE, SIZE, LOCATION, AND SPECIAL INSTALLATION REQUIREMENTS FOR THESE ITEMS.

THE CONTRACTOR SHALL TAKE ANY AND ALL NECESSARY MEASURES TO PROTECT EXISTING STRUCTURES FROM DAMAGE WHEN WORKING IN AND AROUND EXISTING STRUCTURES PERFORMING WORK SUCH AS DEMOLITION, FOUNDATION EXCAVATION, AND OTHERS.

SIZE AND LOCATION OF EQUIPMENT PADS AND ANCHOR BOLTS SHALL BE PER EQUIPMENT MANUFACTURERS REQUIREMENTS.

ANY EQUIPMENT THAT MAY INDUCE VIBRATION TO THE STRUCTURE SHALL BE ADEQUATELY ISOLATED FROM THE STRUCTURES.

ALL DETAILS AND SECTIONS SHOWN ON THE DRAWINGS ARE INTENDED TO BE TYPICAL AND SHALL BE CONSTRUED TO APPLY TO ANY SIMILAR SITUATION ELSEWHERE ON THE PROJECT, EXCEPT WHERE A DIFFERENT DETAIL IS SHOWN.

STANDARD DETAILS APPLY TO ALL SIMILAR SITUATIONS ON THE PROJECT EXCEPT WHERE A DIFFERENT DETAIL IS SHOWN.

## REINFORCING STEEL

REINFORCEMENT SHALL CONFORM TO ASTM A615, GRADE 60 REQUIREMENTS. WELDED WIRE FABRIC, ASTM A185. ALL ACCESSORIES SHALL BE IN CONFORMANCE WITH ACI 315 REQUIREMENTS. REINFORCING STEEL SHALL HAVE THE FOLLOWING CLEAR COVER UNLESS OTHERWISE NOTED:

- CONCRETE CAST AGAINST EARTH 3"
- FORMED SURFACES IN CONTACT WITH SOIL, SEWAGE, WATER OR EXPOSED TO WEATHER 2"
- FORMED SURFACES NOT EXPOSED TO WEATHER OR IN CONTACT WITH SOIL:
  - SLABS, WALLS, AND JOIST 3/4"
  - BEAMS AND COLUMNS 11/2"

LAP SPLICES SHALL BE AS SHOWN ON THE DRAWINGS. FOR LAP SPLICES NOT SHOWN ON THE DRAWINGS, THE CONTRACTOR SHALL OBTAIN ENGINEERS APPROVAL.

THE CONTRACTOR SHALL PREPARE PLACING DRAWINGS AND SCHEDULES IN CONFORMANCE WITH ACI 315 REQUIREMENTS.

UNLESS OTHERWISE NOTED, THE MINIMUM REINFORCING FOR ALL CONCRETE WALL AND SLABS SHALL BE AS FOLLOWS:

THICKNESS	MINIMUM REINFORCING					
	6"	8"	10"	12"-16"	18"-22"	24"
REINF. EACH WAY	#4AT12"	#5AT12"	#4AT12"	#5AT12"	#6AT12"	#7AT12"
LOCATION	CENTER	CENTER	EF	EF	EF	EF

## PRE-ENGINEERED METAL BUILDING

FURNISH ALL LABOR, MATERIALS, EQUIPMENT AND INCIDENTALS REQUIRED TO DESIGN, FABRICATE, DELIVER TO JOB SITE AND ERECT THE PRE-ENGINEERED METAL BUILDING AS SHOWN ON THE DRAWINGS.

SUBMIT TO THE ENGINEER COMPLETE PLANS SHOWING SUPERSTRUCTURE COLUMN LINES SET TO COORDINATE WITH CONCRETE DIMENSIONS SHOWN. INDICATE ANCHOR BOLT SIZE AND LOCATIONS AND FOUNDATION REACTIONS IN KIPS AT ALL COLUMNS.

SUBMIT LETTER AND CALCULATIONS SIGNED AND SEALED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF FLORIDA CERTIFYING THAT THE STRUCTURAL FRAMING AND COVERING PANELS PROPOSED MEET THE DESIGN CRITERIA.

PRIOR TO FOUNDATION CONSTRUCTION, PRE-ENGINEERED METAL BUILDING SUBMITTAL MUST BE APPROVED. CONSTRUCTION DETAILS MAY BE VARIED TO SUITE MANUFACTURER'S STANDARD DESIGN.

### DESIGN CRITERIA:

ROOF DEAD LOAD: SELF WEIGHT  
 SUPERIMPOSED DEAD LOAD: 8 PSF  
 ROOF LIVE LOAD: 20 PSF

ALL BUILDING COLUMNS SHALL BE DESIGNED AS "PIN" CONNECTED. COLUMN ENDS SHALL NOT TRANSFER MOMENTS TO FOUNDATION.

COLUMN AND BASE PLATE SIZE SHALL ALLOW FOR A MINIMUM ANCHOR BOLT DISTANCE OF 8" TO ANY VERTICAL EDGE OF CONCRETE UNLESS SPECIFICALLY APPROVED BY ENGINEER. THE MINIMUM ANCHOR ROD EMBEDMENT DEPTH IS 1'-0".

### MANUFACTURERS:

BUTLER MANUFACTURING COMPANY, KANSAS CITY, MISSOURI; VARCO PRUDEN BUILDINGS, MEMPHIS, TENNESSEE; OR EQUAL

### MATERIALS:

FRAMING - PRIMARY AND SECONDARY FRAMING SHALL CONSIST OF SHOP FABRICATED WELDED UP PLATE SECTION COLUMNS AND ROOF BEAMS COMPLETE WITH NECESSARY SPLICE, BASE, CAP, COMPRESSION, AND STIFFENER PLATES WITH BOLT CONNECTION HOLES FOR FIELD ASSEMBLY. PURLINS AND GIRTS SHALL BE 8-IN MIN. DEEP "Z" SECTIONS. EAVE STRUTS SHALL BE 8-IN MIN. DEEP "C" SECTIONS. LATERAL BRACING SHALL BE DESIGNED BY THE BUILDING MANUFACTURER. ALL BOLTS FOR STRUCTURAL FRAMING CONNECTIONS SHALL BE HIGH STRENGTH BOLTS CONFORMING TO ASTM A325.

WALL SYSTEM - EXTERIOR WALL PANELS SHALL BE BUTLERIB PANELS AS FURNISHED BY BUTLER MANUFACTURING COMPANY OR EQUAL. PANEL MATERIAL SHALL BE ASTM A446, GRADE C, 26 GAUGE GALVANIZED STEEL G90 COATING CONFORMING TO ASTM A525. FURNISH EXTERIOR AND INTERIOR TRIM AS REQUIRED FOR ALL DOORS, FLASHINGS, CLOSURES.

ROOF SYSTEM - THE BUILDING ROOF PANELS SHALL BE PRECISION ROLL FORMED MR-20 PANELS AS FURNISHED BY BUTLER MANUFACTURING COMPANY OR EQUAL. PANEL MATERIAL AS SPECIFIED SHALL BE 20 GAUGE GALVANIZED STEEL (80,000 PSI YIELD) G90 COATING CONFORMING TO ASTM A525. GUTTERS, DOWNSPOUTS AND TRIM PIECES ARE TO BE STANDARD PRODUCTS INSTALLED PER THE MANUFACTURER'S INSTRUCTIONS.

FASTENERS - FASTENERS FOR WALL AND ROOF SYSTEM SHALL BE HOT DIPPED GALVANIZED AND FURNISHED WITH AN INTEGRAL GALVANIZED STEEL-BACKED NEOPRENE WASHER. ALL EXPOSED FASTENERS SHALL BE PREPAINTED TO MATCH WALL COLOR.

ANCHOR BOLTS - ANCHOR BOLTS SHALL BE F1554 GRADE 36 HOT DIPPED GALV. HEAVY HEX HEADED. ANCHOR BOLTS SHALL BE DESIGNED BY THE BUILDING MANUFACTURER AND FURNISHED BY THE CONTRACTOR.

### PAINTING:

ALL STRUCTURAL STEEL SHALL BE SHOP PREPARED AND FIELD PAINTED PRIOR TO ERECTION. PRIOR TO PAINTING, ALL STEEL SHALL BE CLEANED OF LOOSE RUST, LOOSE MILL SCALE, DIRT AND OTHER FOREIGN MATERIAL. SEE SPECIFICATION.

PAINT COLOR TO BE APPROVED BY THE OWNER.

## CONCRETE

ALL MATERIALS AND METHODS OF CONSTRUCTION SHALL BE IN ACCORDANCE WITH ACI 318 REQUIREMENTS (LATEST EDITION)

ALL CONCRETE SHALL BE AIR-ENTRAINED WITH 4000 PSI COMPRESSIVE STRENGTH AT 28 DAYS UNLESS OTHERWISE NOTED.

WATER REDUCING AGENT SHALL BE IN ACCORDANCE WITH ASTM C494

ALL CONCRETE SURFACES EXPOSED TO AIR, UNLESS OTHERWISE NOTED IN SPECIFICATIONS, SHALL BE TREATED WITH AN APPROPRIATE CURING COMPOUND AS SOON AS CEMENT FINISHING IS COMPLETED OR FORMS ARE REMOVED.

ALL EXPOSED CORNERS SHALL HAVE A MINIMUM CHAMFER OF 3/4" UNLESS OTHERWISE NOTED.

THE CONTRACTOR SHALL OBTAIN ENGINEER'S APPROVAL FOR THE LOCATIONS OF CONSTRUCTION JOINTS THAT ARE NOT SHOWN ON THE DRAWINGS.

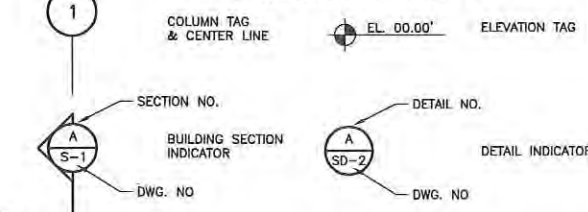
## ABBREVIATIONS

STRUCTURAL ABBREVIATIONS APPLY TO "S" SHEETS ONLY

AL, ALU, ALUM	ALUMINUM	EL	ELEVATIONS	MAT'L	MATERIAL	SPCS	SPECIFICATIONS
ADDT'L	ADDITIONAL	EW	EACH WAY	MAX	MAXIMUM	SS	STAINLESS STEEL
BLD	BUILDING	EXP	EXPANSION	MIN	MINIMUM	STD	STANDARD
BOT	BOTTOM	FE	FIRE EXTINGUISHER	MO	MASONRY OPENING	STL	STEEL
CJ	CONTROL JOINT	FF	FAR FACE	MISC	MISCELLANEDUS	REINF	REINFORCEMENT
CMU	CONCRETE MASONRY UNIT	FRP	FIBER REINFORCED PLASTIC	NTS	NOT TO SCALE	TB	TIE BEAM
CONST JT	CONSTRUCTION JOINT	FTG	FOOTING	OC	ON CENTER	T&B	TOP AND BOTTOM
CONT	CONTINUOUS	HORIZ	HORIZONTAL	PLF	POUNDS PER LINEAR FOOT	T/STRUCTURE	TOP OF STRUCTURE
DIA	DIAMETER	HP	HIGH POINT	PT	PRESSURE TREATED	TYP	TYPICAL
DO	DITTO	ID	INSIDE DIAMETER	PROJ	PROJECTION	UNO	UNLESS NOTED OTHERWISE
DWG	DRAWING	JT	JOINT	PSF	POUNDS PER SQUARE FOOT	VERT	VERTICAL
EF	EACH FACE	LP	LOW POINT	PSI	POUNDS PER SQUARE INCH	WWF	WELDED WIRE FABRIC
EJ	EXPANSION JOINT	MANUF	MANUFACTURER	SJ	SAWCUT JOINT		

## SYMBOLS

SYMBOLS APPLY TO "S" SHEETS ONLY



**ENGINEERING TECHNOLOGIES, INC.**  
 3551 W. LAKE MARY BLVD., SUITE 210  
 LAKE MARY, FL 32746  
 PHONE: (407) 322-0500  
 ET PROJECT NO. - 12-233

### SEWRF SEPTAGE/ GREASE RECEIVING STATION

**MANATEE COUNTY**  
 DEPARTMENT OF PUBLIC WORKS  
 UTILITIES DEPARTMENT  
 4410 66th Street West Bradenton, Florida 34210  
 (941) 792-8811

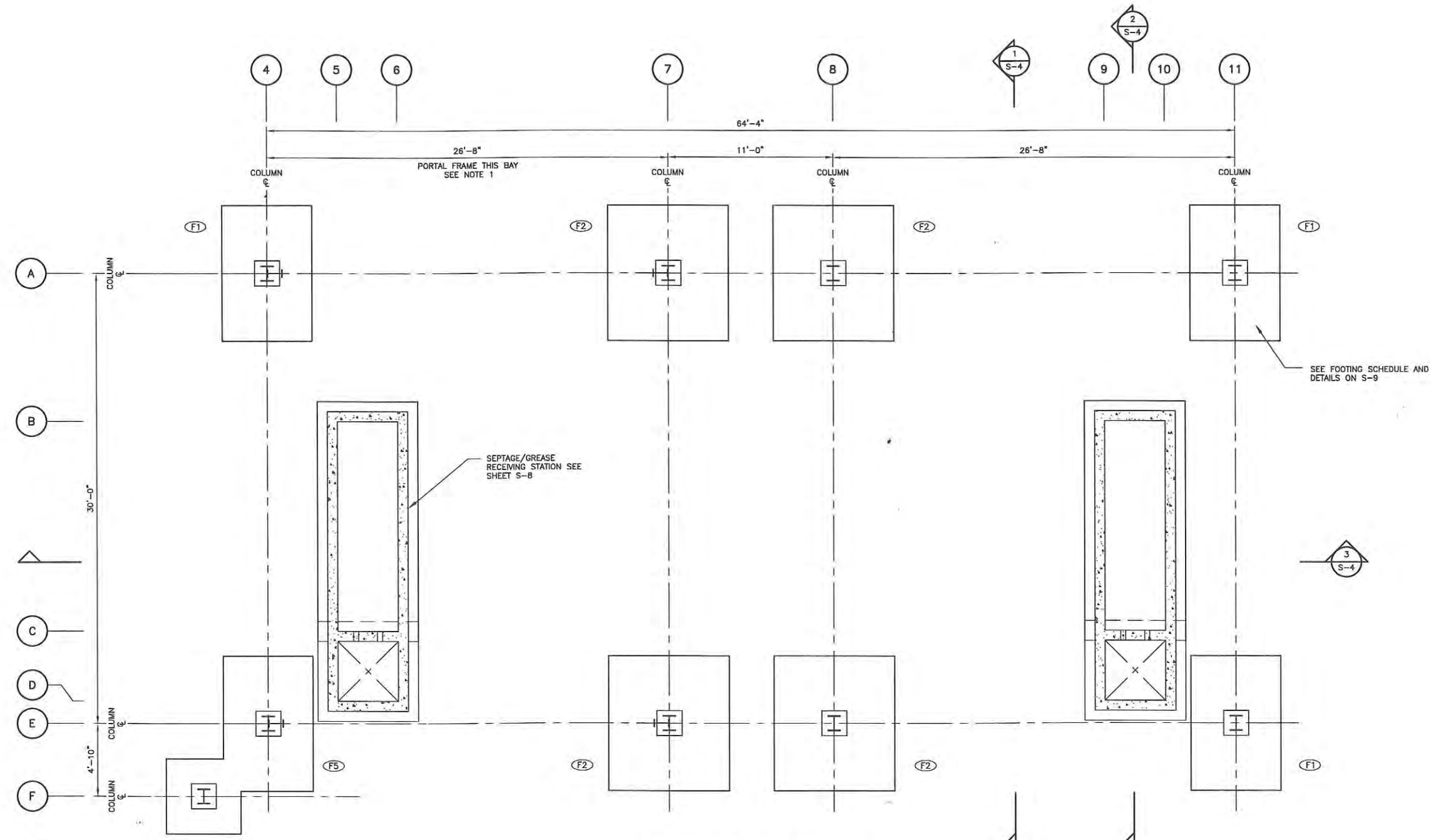
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 TEL: (727) 531-2925 (800) 861-8314  
 WWW.GARDNO.COM Certificate of Authorization No. 29015

JOHN VINCENT SOBCZAK  
 LICENSE  
 No. 71407  
 STATE OF FLORIDA  
 PROFESSIONAL ENGINEER  
 JOHN SOBCZAK P.E.  
 P.C. NO. 71407

DESIGNED	JS
DRAWN	JS
C.C.	BE
DATE	
APPROVED	JS

### GENERAL STRUCTURAL NOTES

PROJECT NO:	00193-009-02
DATE:	MARCH 2015
SHEET NO:	S-1



SEE FOOTING SCHEDULE AND DETAILS ON S-9

SEPTAGE/GREASE RECEIVING STATION SEE SHEET S-8

SEPTAGE/GREASE STATION FOUNDATION  
**PLAN**  
 1/4"=1'-0"

NOTES:  
 1. SPECIALTY ENGINEER TO PROVIDE PORTAL FRAME LATERAL BRACING BY MEANS THAT DOES NOT REQUIRE TWO SEPARATE BASE PLATES ON COLUMN PEDESTAL.

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NO.	DESCRIPTION	BY	DATE

**SEWRF  
 SEPTAGE/ GREASE  
 RECEIVING STATION**

**MANATEE COUNTY**  
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 UTILITIES DEPARTMENT  
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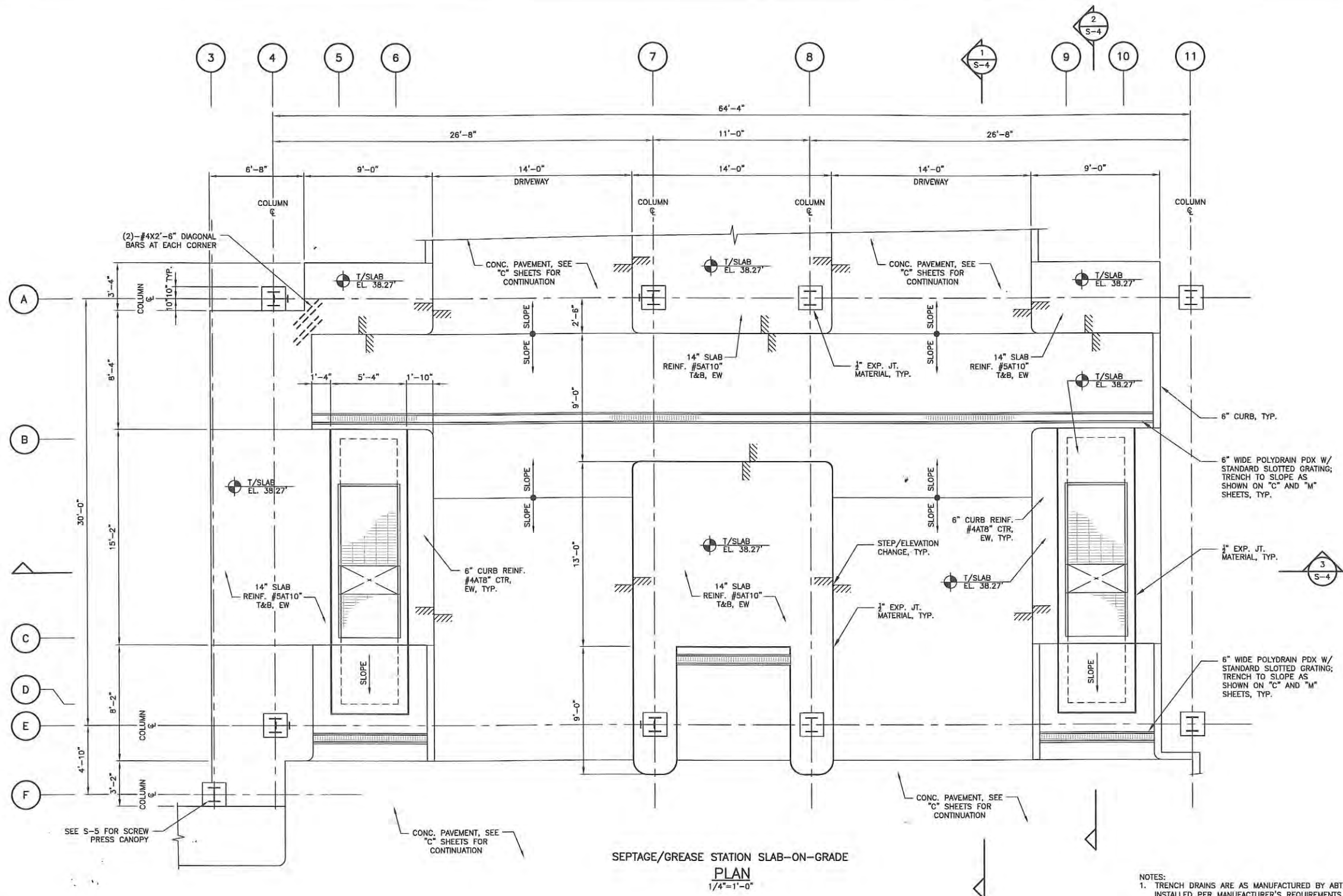
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 DRAWN J9  
 CHECKED BE  
 APPROVED JS

**SEPTAGE/GREASE STATION  
 CANOPY FOUNDATION PLAN**

PROJECT NO:  
 00193-009-02  
 DATE:  
 MARCH 2015  
 SHEET NO:  
**S-2**



SEPTAGE/GREASE STATION SLAB-ON-GRADE  
 PLAN  
 1/4"=1'-0"

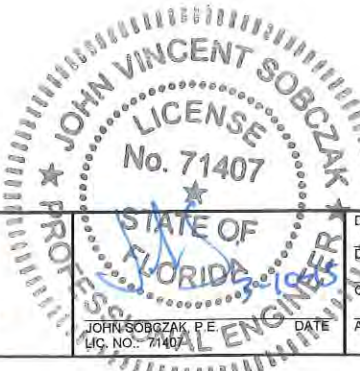
NOTES:  
 1. TRENCH DRAINS ARE AS MANUFACTURED BY ABT, INC. TRENCH DRAIN SHALL BE INSTALLED PER MANUFACTURER'S REQUIREMENTS. COORDINATE DEPTH AND SLOPES OF TRENCH DRAINS W/ "M" SHEETS.

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**SEWRF  
 SEPTAGE/ GREASE  
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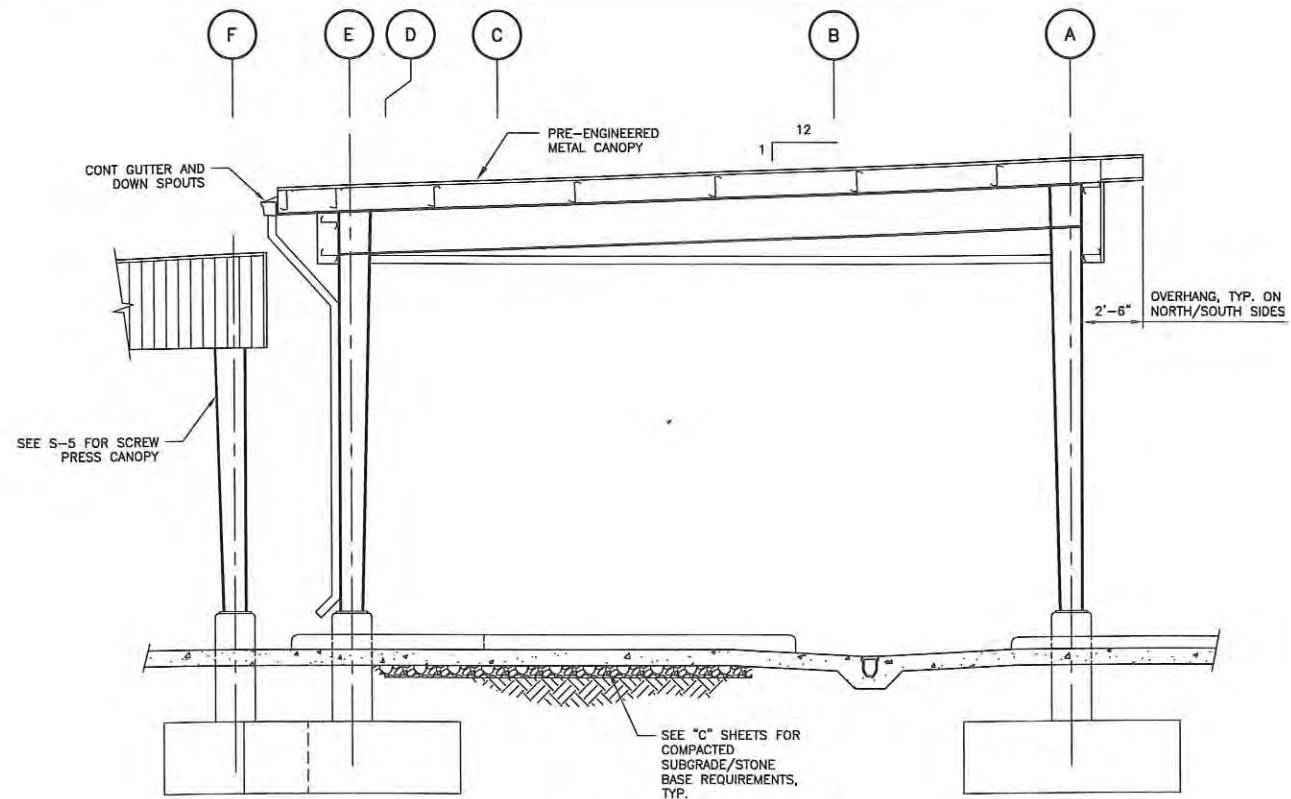


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 O.C. BE  
 APPROVED JS

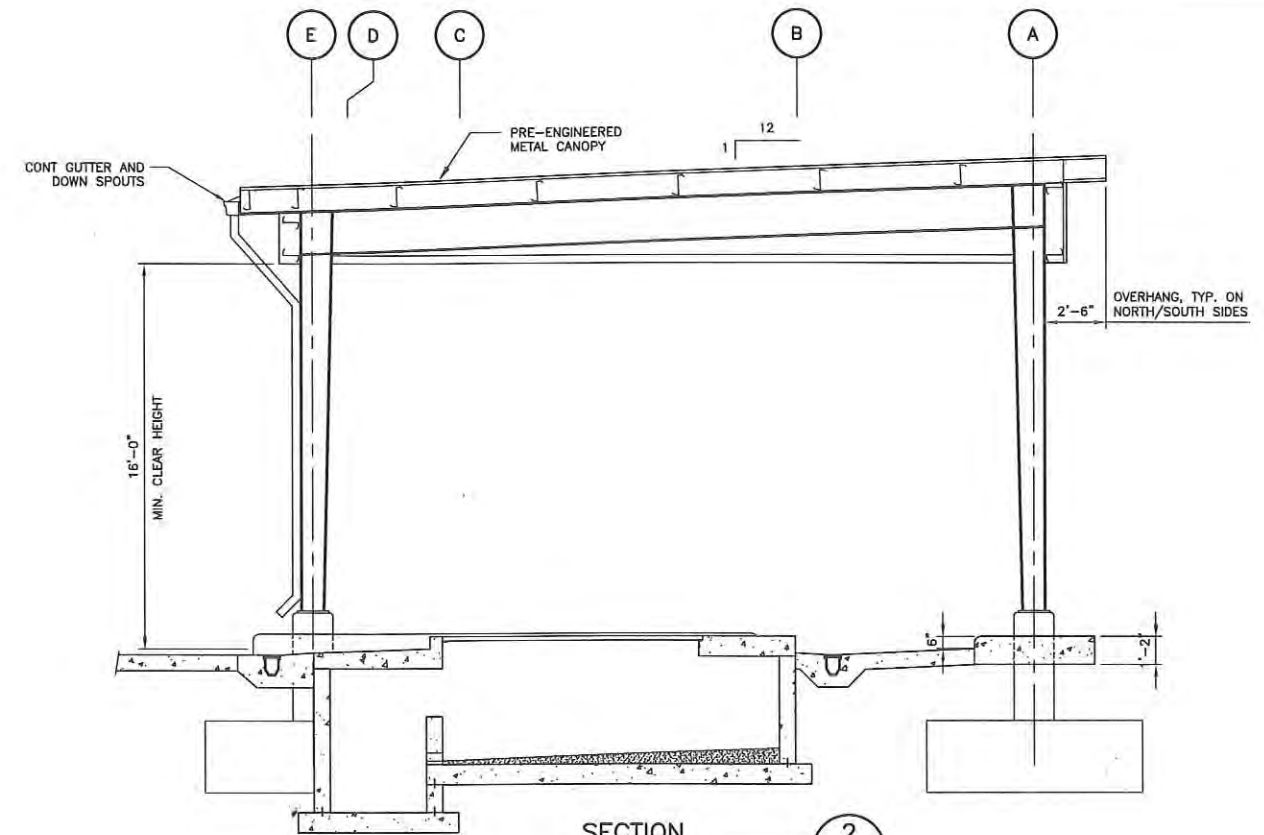
**SEPTAGE/GREASE STATION  
 CANOPY SLAB-ON-GRADE PLAN**

PROJECT NO:  
 00193-009-02  
 DATE:  
 MARCH 2015  
 SHEET NO:  
**S-3**

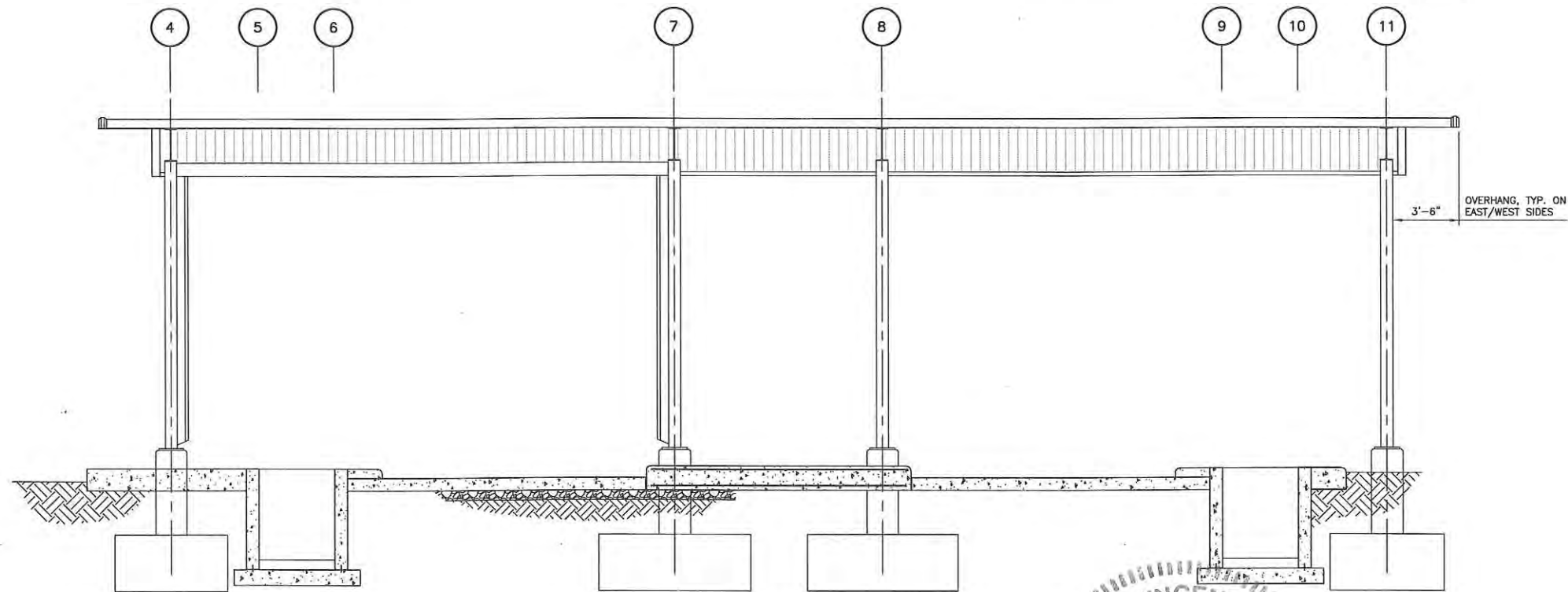
NO.	DESCRIPTION	BY	DATE



SECTION 1  
1/4"=1'-0"  
S-2



SECTION 2  
1/4"=1'-0"  
S-2



SECTION 3  
1/4"=1'-0"  
S-2

**ENGINEERING TECHNOLOGIES, INC.**

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**SEWRF  
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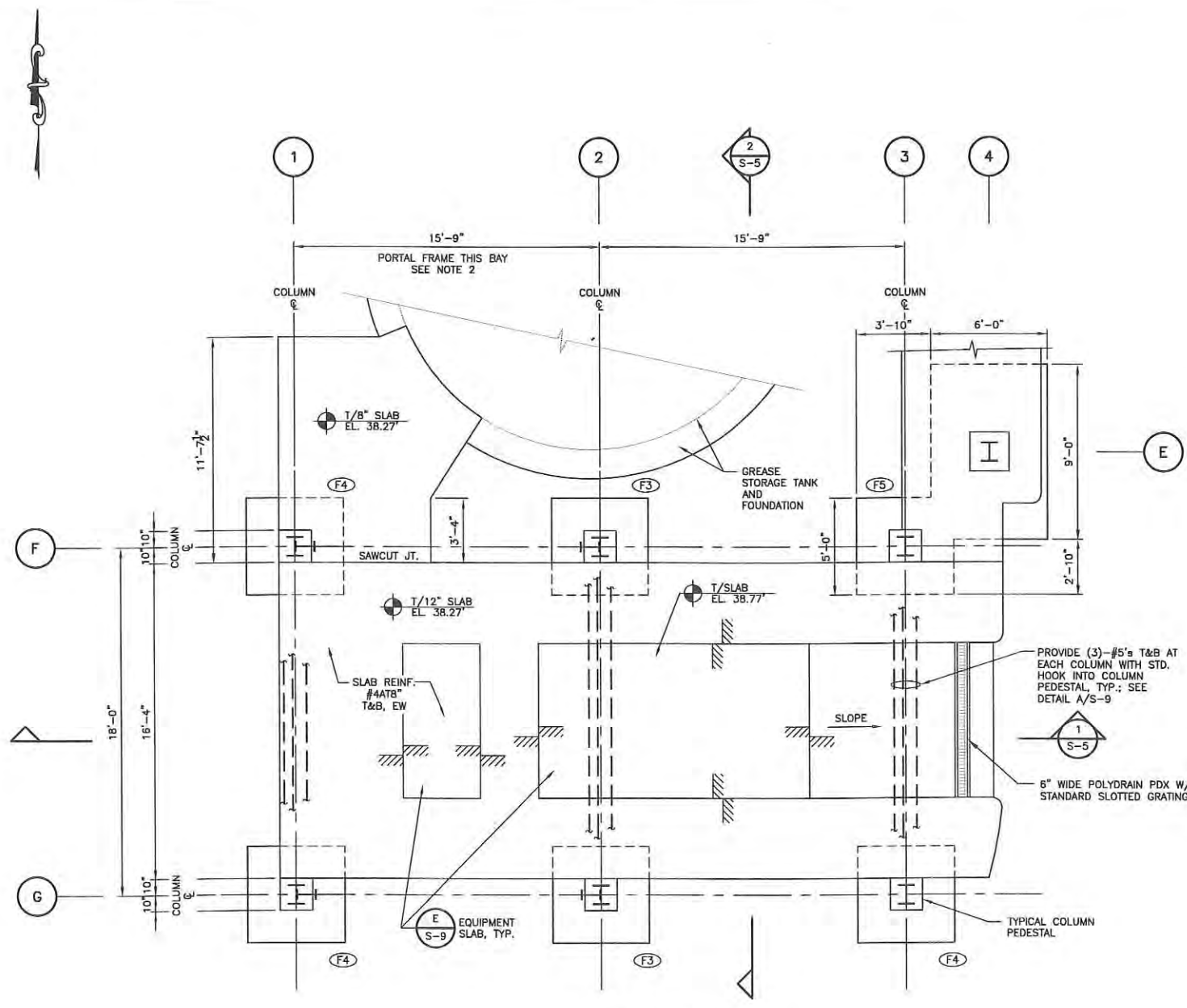
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DRAWN J9  
Q.C. BE  
APPROVED JS

**SEPTAGE/GREASE STATION  
CANOPY SECTIONS**

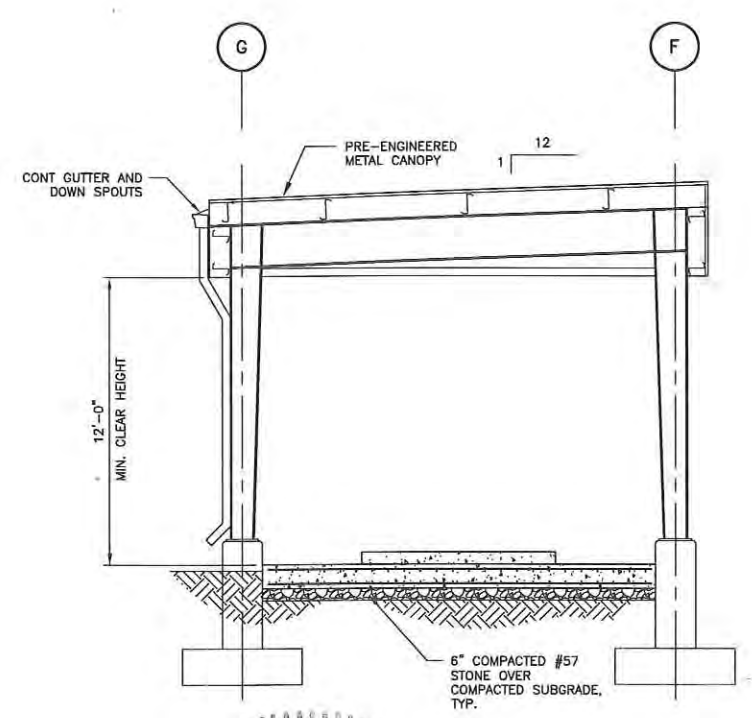
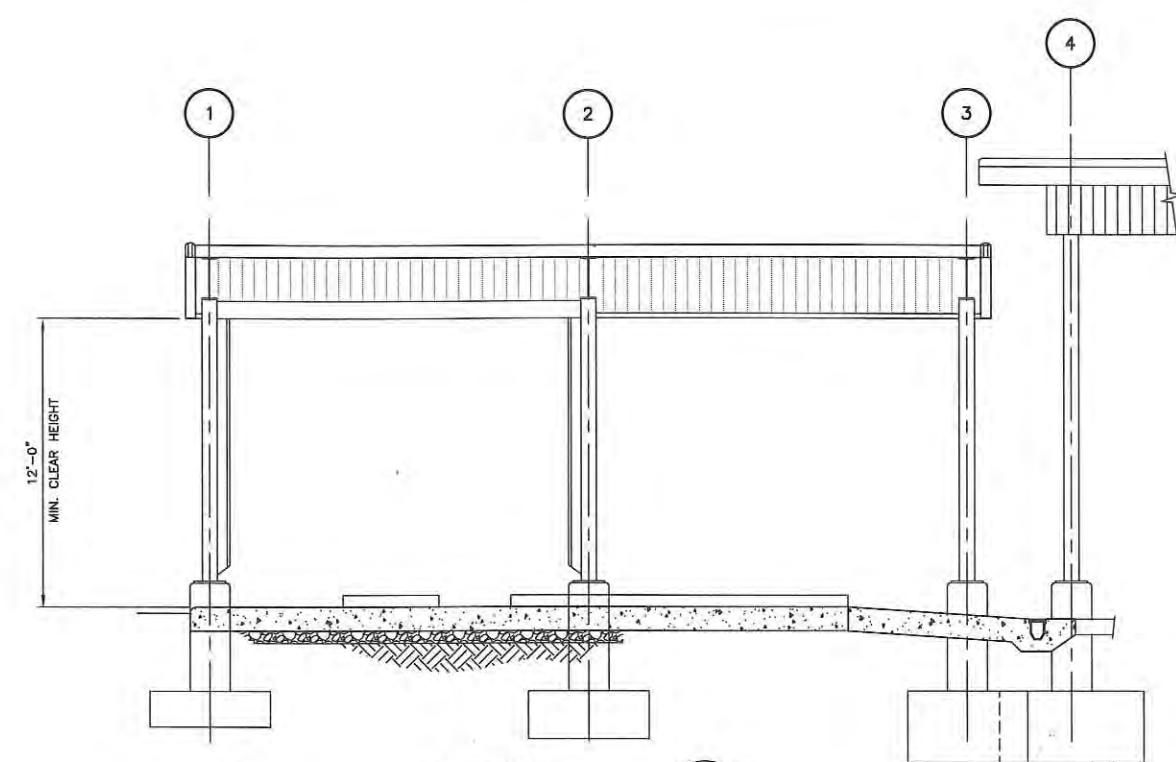
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00193-009-02  
DATE:  
MARCH 2015  
SHEET NO:  
S-4

NO.	DESCRIPTION	BY	DATE





- NOTES:
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  2. SPECIALTY ENGINEER TO PROVIDE PORTAL FRAME LATERAL BRACING BY MEANS THAT DOES NOT REQUIRE TWO SEPARATE BASE PLATES ON COLUMN PEDESTAL.

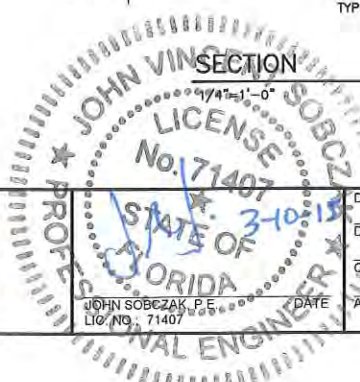


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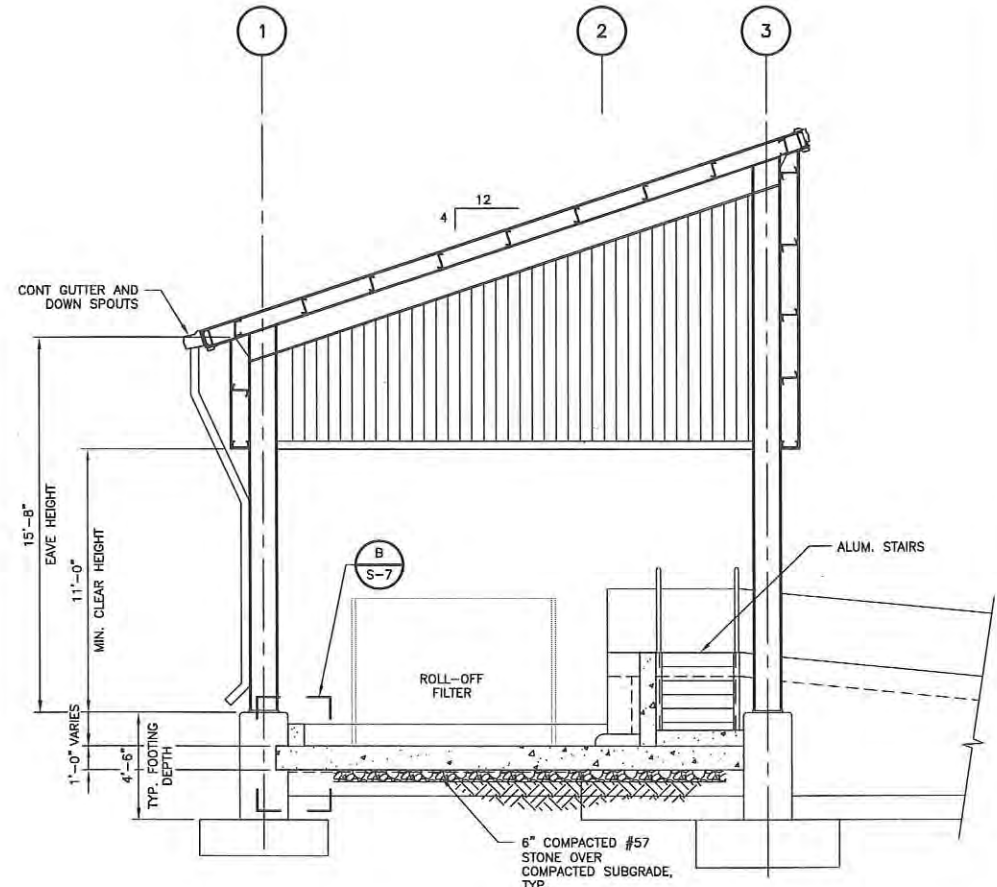
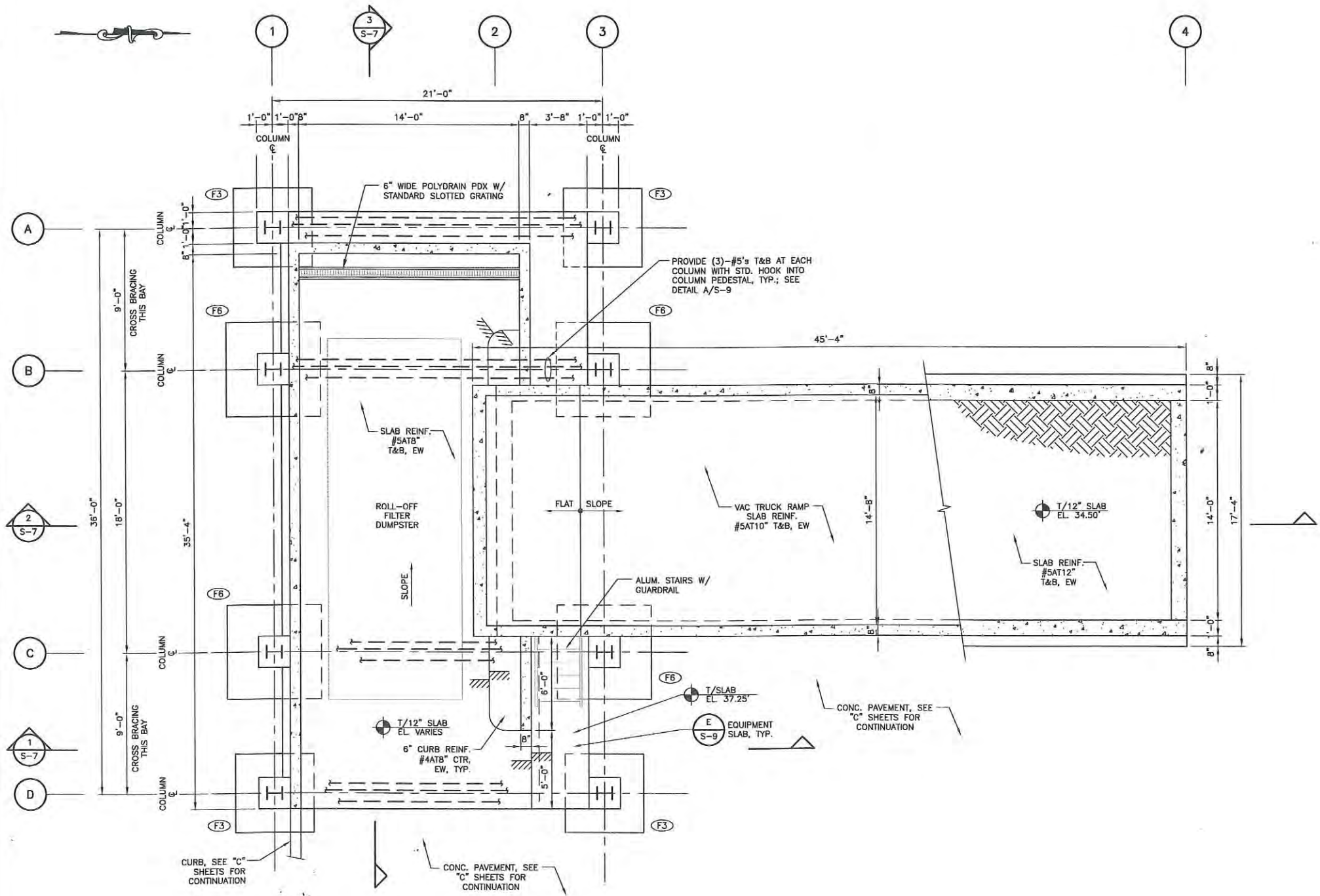


DESIGNED	J9
DRAWN	J9
Q.C.	BE
DATE	APPROVED
	JS

**SCREW PRESS CANOPY  
PLAN AND SECTIONS**

PROJECT NO:  
00193-009-02  
 DATE:  
MARCH 2015  
 SHEET NO:  
S-5

NO.	DESCRIPTION	BY	DATE



ROLL-OFF FILTER FOUNDATION  
**PLAN**  
 1/4"=1'-0"

**SECTION**  
 1  
 1/4"=1'-0"

**ENGINEERING TECHNOLOGIES, INC.**  
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 LAKE MARY, FL 32746  
 PHONE: (407) 322-0500  
 ET PROJECT NO. - 12-233

**SEWRf  
 SEPTAGE/ GREASE  
 RECEIVING STATION**

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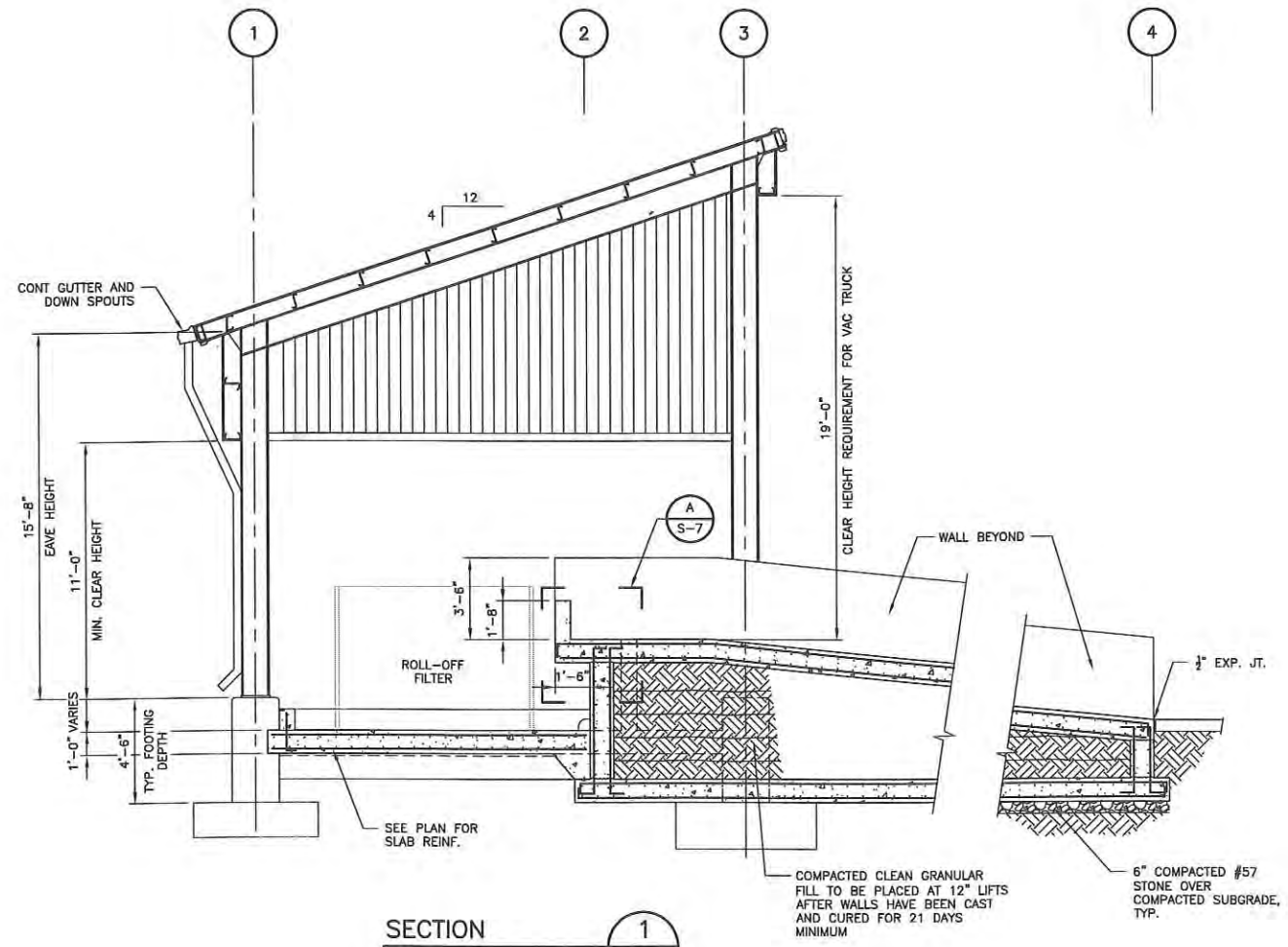


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 O.C. BE  
 APPROVED JS

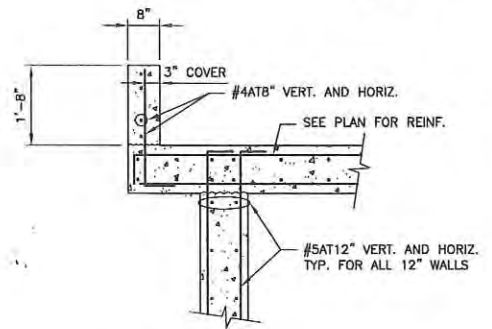
**ROLL-OFF FILTER CANOPY  
 PLAN AND SECTION**

PROJECT NO:  
 00193-009-02  
 DATE:  
 MARCH 2015  
 SHEET NO:  
**S-6**

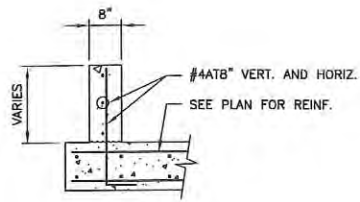
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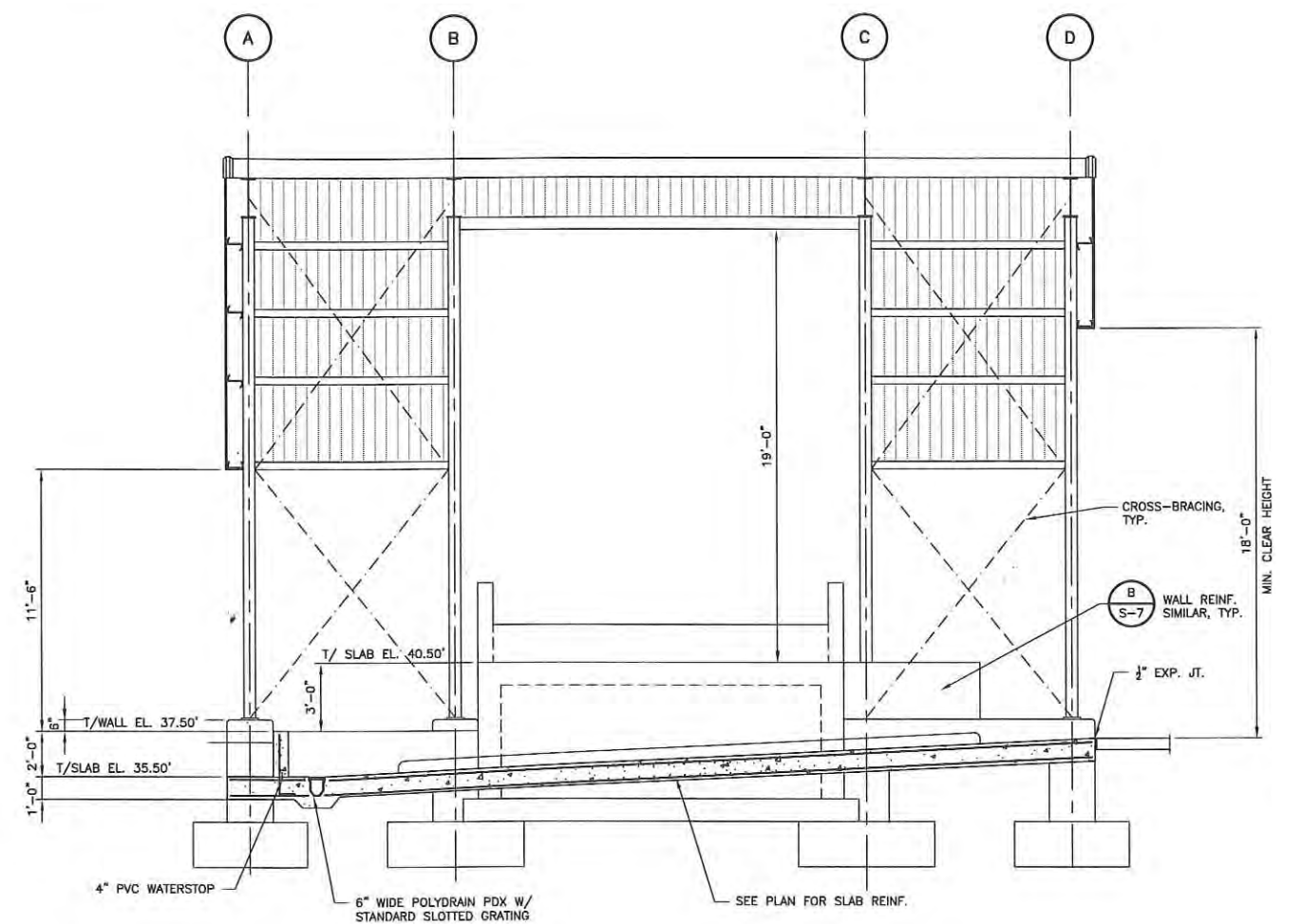
SECTION 1  
1/4"=1'-0"  
S-6



DETAIL A  
3/4"=1'-0"  
S-7



DETAIL B  
3/4"=1'-0"  
S-7



SECTION 3  
1/4"=1'-0"  
S-6

**ENGINEERING TECHNOLOGIES, INC.**  
3551 W. LAKE MARY BLVD., SUITE 210  
LAKE MARY, FL 32746  
PHONE: (407) 322-0500  
ET PROJECT NO. - 12-233

**SEWRF SEPTAGE/ GREASE RECEIVING STATION**

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300 PARK PLACE BLVD, STE 300, CLEARWATER, FL 33759  
TEL: (727) 531-2505 (800) 881-6314  
www.cardno.com Certificate of Authorization No. 28915

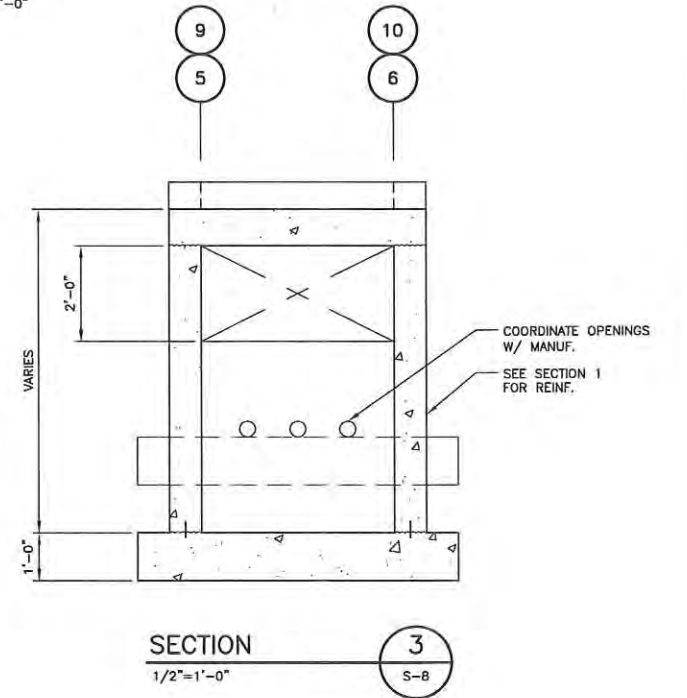
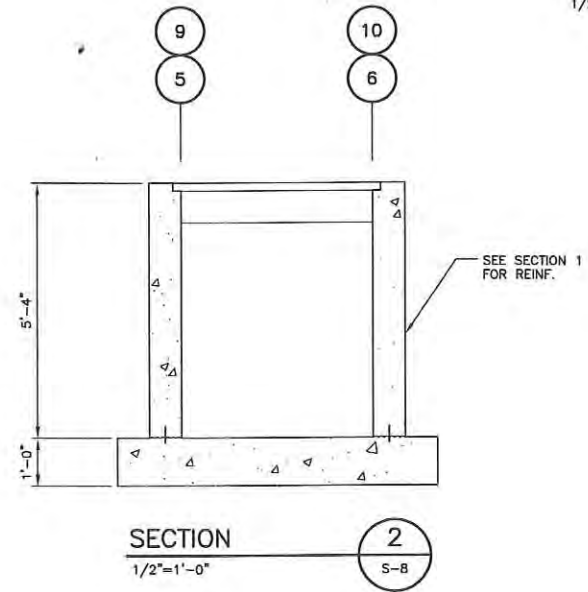
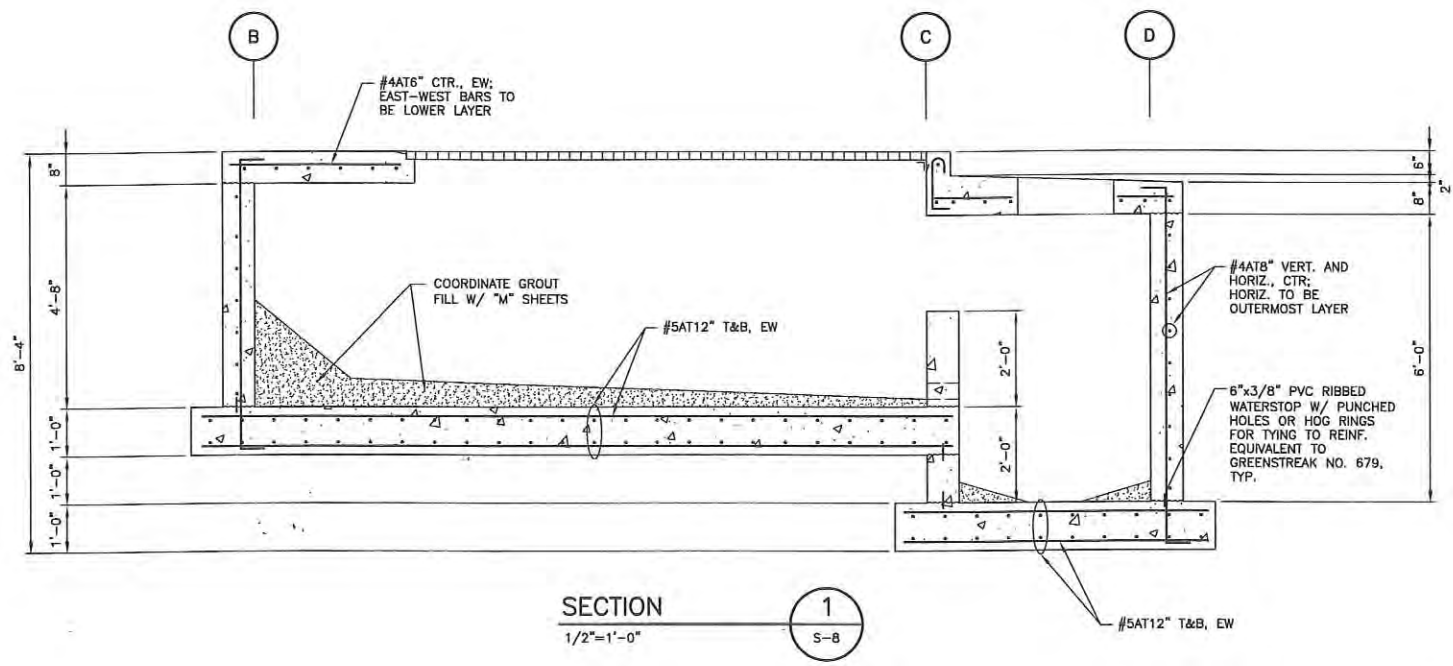
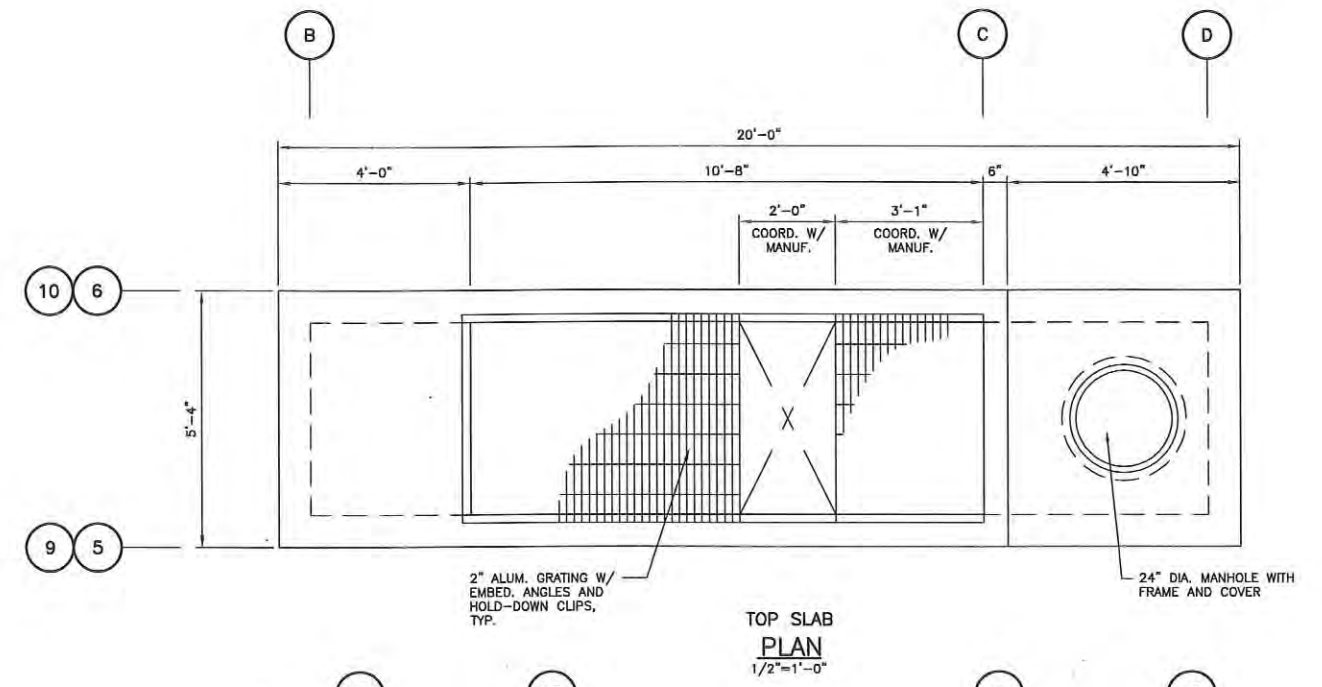
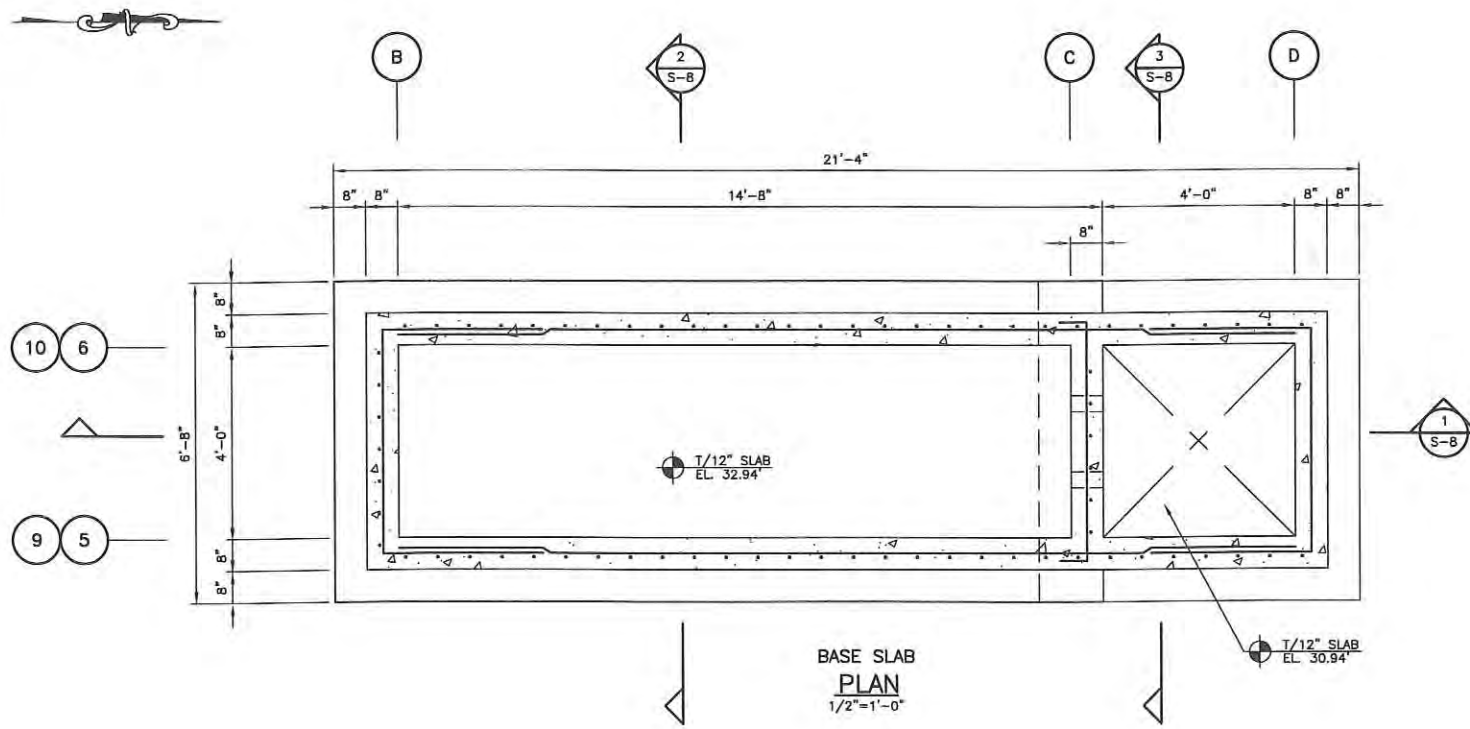
JOHN VINCENT SOBCZAK  
LICENSE No. 71407  
STATE OF FLORIDA  
PROFESSIONAL ENGINEER  
JOHN SOBCZAK, P.E.  
LIC. NO.: 71407

DESIGNED JS  
DRAWN JS  
O.C. BE  
APPROVED JS

**ROLL-OFF FILTER CANOPY SECTIONS AND DETAILS**

PROJECT NO: 00193-009-02  
DATE: MARCH 2015  
SHEET NO: S-7

NO.	DESCRIPTION	BY	DATE

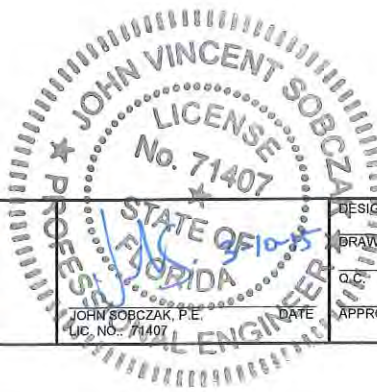


**ENGINEERING TECHNOLOGIES, INC.**  
3551 W. LAKE MARY BLVD., SUITE 210  
LAKE MARY, FL 32746  
PHONE: (407) 322-0500  
ET PROJECT NO. 12-233

**SEWRF SEPTAGE/ GREASE RECEIVING STATION**

**MANATEE COUNTY**  
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UTILITIES DEPARTMENT  
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DESIGNED	JS
DRAWN	JS
QC	BE
DATE	APPROVED
DATE	JS

**SEPTAGE/GREASE RECEIVING STATION PLANS AND SECTIONS**

PROJECT NO:  
00193-009-02  
DATE:  
MARCH 2015  
SHEET NO:  
**S-8**

NO.	DESCRIPTION	BY	DATE

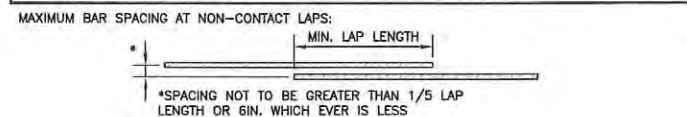
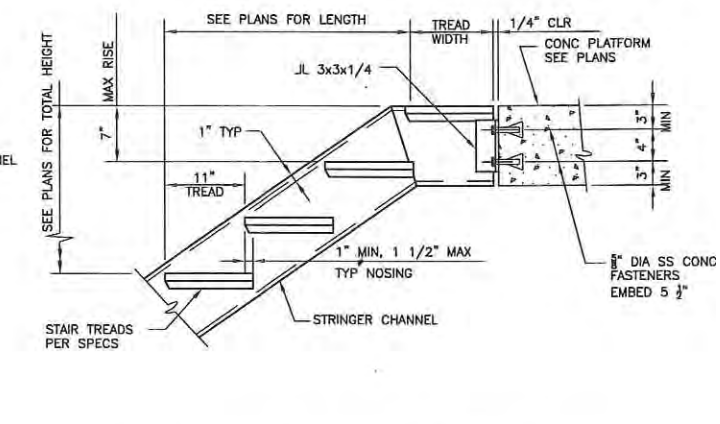
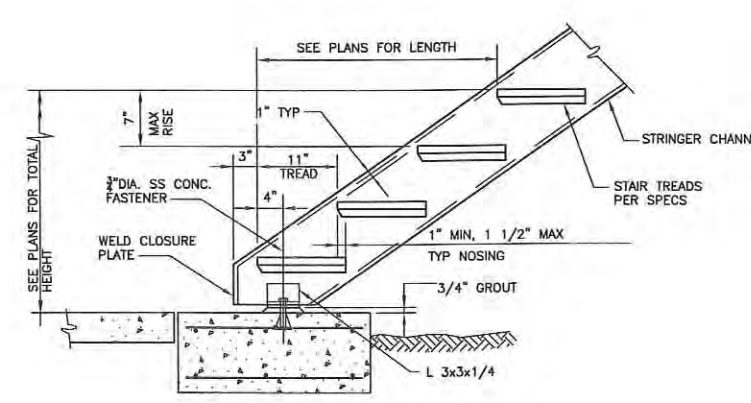
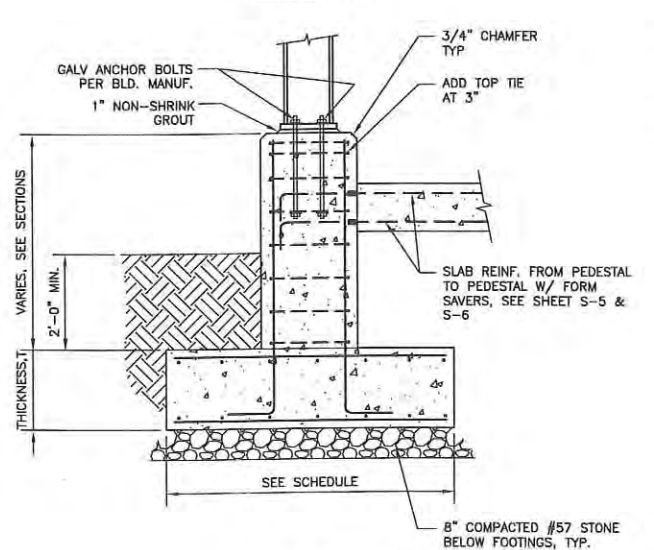
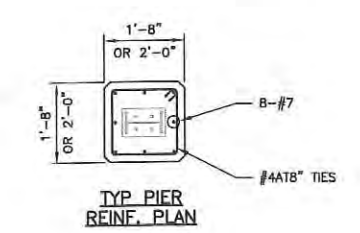
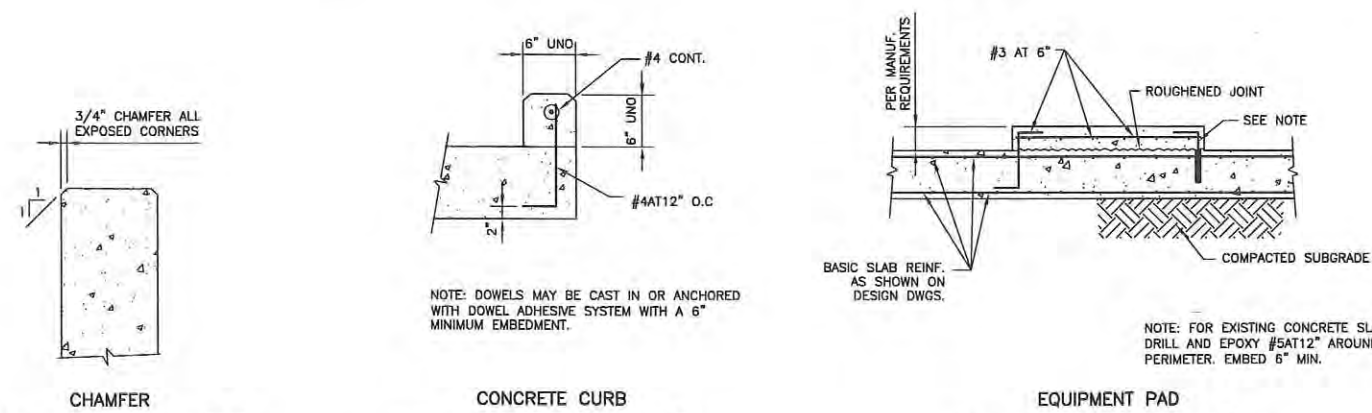
**INDIVIDUAL FOOTING SCHEDULE**

FOOTING	FOOTING				REINFORCEMENT	REMARKS
	LENGTH	WIDTH	THICKNESS	PIER DEPTH		
F-1	9'-0"	6'-0"	3'-0"	4'-6"	#7AT8" T&B, EW	
F-2	9'-0"	8'-0"	3'-0"	4'-6"	#7AT8" T&B, EW	
F-3	5'-0"	5'-0"	2'-0"	4'-6"	#7AT12" T&B, EW	
F-4	5'-0"	5'-0"	1'-6"	4'-6"	#7AT12" T&B, EW	
F-5	SEE PLAN	SEE PLAN	3'-0"	4'-6"	#7AT8" T&B, EW	COMBINED FOOTING
F-6	6'-0"	6'-0"	2'-0"	4'-6"	#7AT12" T&B, EW	

**REBAR MINIMUM TENSION DEVELOPMENT & LAP LENGTHS**  
CONCRETE STRENGTH  $f'_c = 4,000$  PSI OR GREATER

BAR SIZE	DEVELOPMENT LENGTH, $l_d$		LAP LENGTH (CLASS B SPLICE)		BAR SIZE
	TOP BARS	OTHER BARS	TOP BARS	OTHER BARS	
#3	1'-7"	1'-3"	2'-0"	1'-7"	#3
#4	2'-1"	1'-7"	2'-8"	2'-0"	#4
#5	2'-7"	2'-0"	3'-4"	2'-7"	#5
#6	3'-1"	2'-4"	4'-0"	3'-1"	#6
#7	4'-5"	3'-6"	5'-10"	4'-6"	#7
#8	5'-2"	3'-11"	6'-8"	5'-2"	#8
#9	5'-10"	4'-6"	7'-6"	5'-10"	#9
#10	6'-6"	5'-0"	8'-6"	6'-6"	#10
#11	7'-3"	5'-7"	9'-6"	7'-3"	#11

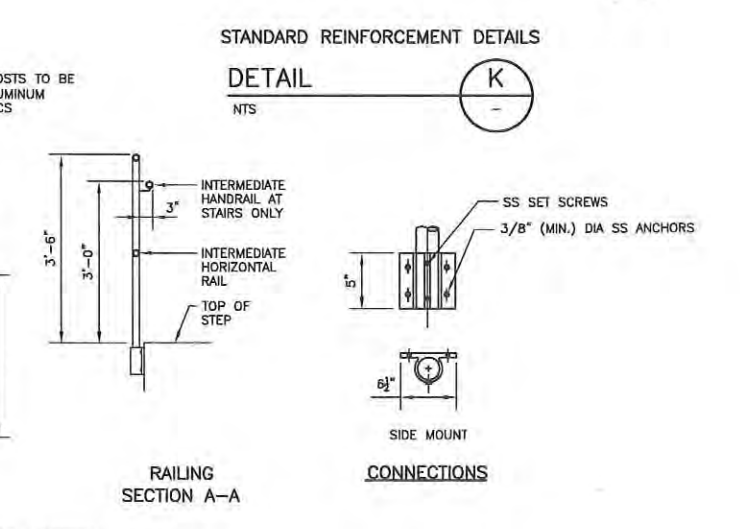
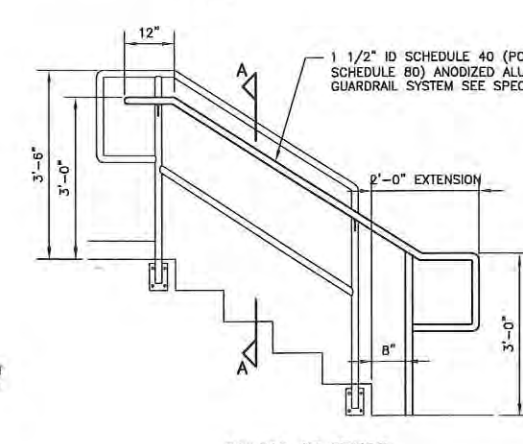
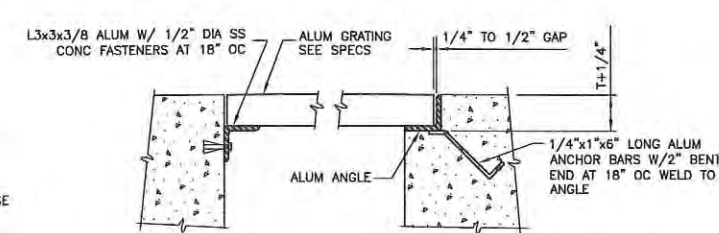
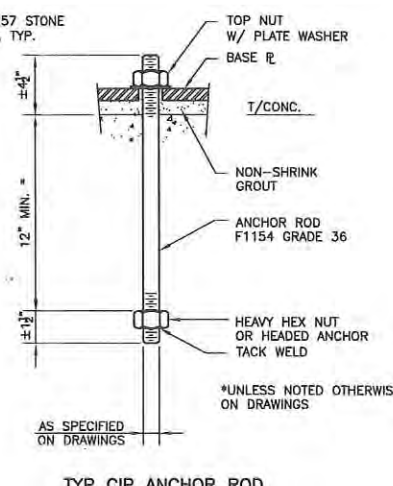
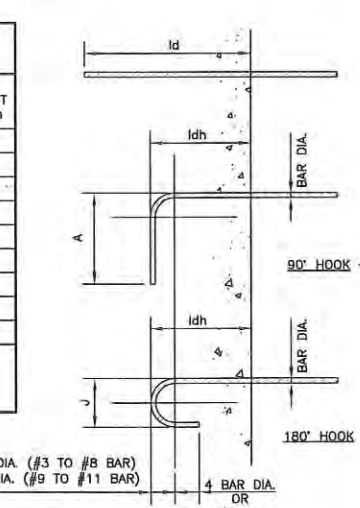
NOTES:  
1. GRADE 60 UNCOATED REINFORCEMENT  
2. SPLICE LENGTHS GIVEN ABOVE ARE TO BE USED UNLESS NOTED OTHERWISE ON DESIGN DRAWINGS.



**STANDARD HOOK DEVELOPMENT LENGTH**

BAR SIZE	90° STD HOOK "A"	180° STD HOOK "J"	DEVELOPMENT LENGTH, $l_{dh}$
#3	6"	3"	6"
#4	8"	4"	7"
#5	10"	5"	9"
#6	1'-0"	6"	10"
#7	1'-2"	7"	1'-0"
#8	1'-4"	8"	1'-2"
#9	1'-7"	11 1/2"	1'-3"
#10	1'-10"	1'-1 1/2"	1'-5"
#11	2'-0"	1'-2 1/2"	1'-7"

\*FOR STD HOOK BAR GEOMETRY NOT SHOWN REFER TO MINIMUM ACI REQUIREMENTS



**ENGINEERING TECHNOLOGIES, INC.**  
3551 W. LAKE MARY BLVD., SUITE 210  
LAKE MARY, FL 32746  
PHONE: (407) 322-0500  
ET PROJECT NO. - 12-233

NO.	DESCRIPTION	BY	DATE

**SEWRF SEPTAGE/GREASE RECEIVING STATION**

**MANATEE COUNTY**  
DEPARTMENT OF PUBLIC WORKS  
UTILITIES DEPARTMENT  
4410 66th Street West Bradenton, Florida 34210  
(941) 792-8811

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CLEARWATER  
380 PARK PLACE BLVD, STE 300, CLEARWATER, FL 33769  
TEL: (727) 531-3305 (800) 861-8314  
www.cardno.com Certificate of Authorization No. 28915

**PROFESSIONAL ENGINEER**  
JOHN VINCENT SOBczAK  
LICENSE No. 71407  
STATE OF FLORIDA  
JOHN SOBczAK, P.E.  
LIC. NO. 71407

DESIGNED JS  
DRAWN JS  
Q.C. BE  
DATE APPROVED JS  
**STRUCTURAL DETAILS**  
PROJECT NO: 00193-009-02  
DATE: MARCH 2015  
SHEET NO: S-9

- CONDUIT RUN EXPOSED
- CONDUIT RUN CONCEALED UNDERGROUND
- CONDUIT RUN CONCEALED IN FLOOR OR SLAB
- G — GROUNDING ELECTRODE CONDUCTOR
- E — CONDUIT STUB OUT AND CAP
- ⊙ — GROUND ROD
- — JUNCTION BOX
- JUNCTION BOX WITH FLEXIBLE CONNECTION

480V  
15 KVA, 1\*  
120/240V

TRANSFORMER, 480V INDICATED PRIMARY VOLTAGE, 120/240V INDICATES SECONDARY VOLTAGE, 15 KVA REPRESENTS POWER RATING, AND 1\* INDICATES SINGLE PHASE (THREE PHASE IF NOT INDICATED)

3P  
30A

THERMAL MAGNETIC CIRCUIT BREAKER WITH NUMBER OF POLES AND AMPERE RATING

COMBINATION MAGNETIC STARTER WITH CONTROL POWER TRANSFORMER (SIZED FOR LOAD). LETTERS INDICATE TYPE:

- N — NON-REVERSING
- R — REVERSING
- 2S — TWO-SPEED
- C — CONTACTOR
- SS — SOLID STATE SOFT START

XXX	XXX DEVICE	DESCRIPTION
HLS	HIGH LEVEL SWITCH	HIGH LEVEL SWITCH
HOA	HAND-OFF-AUTO	HAND-OFF-AUTO
LD	LEAK DETECTION	LEAK DETECTION
LLS	LOW LEVEL SWITCH	LOW LEVEL SWITCH
LOR	LOCAL-OFF-REMOTE	LOCAL-OFF-REMOTE
PB	PUSH BUTTON	PUSH BUTTON
RTU	REMOTE TERMINAL UNIT	REMOTE TERMINAL UNIT
SS	SOFT STARTER	SOFT STARTER
SS/B	SOFT START OR BYPASS	SOFT START OR BYPASS
TS	TEMPERATURE SWITCH	TEMPERATURE SWITCH
TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSOR	TRANSIENT VOLTAGE SURGE SUPPRESSOR
ZS	POSITION SENSOR (LIMIT SWITCH)	POSITION SENSOR (LIMIT SWITCH)

FUSE

MOTOR

THERMAL OVERLOAD

- UTILITY METER
- TRANSFER SWITCH
- ELECTRIC PANELBOARD
- DISCONNECT OR SAFETY SWITCH

NEW CLASS 1, DIVISION 2 HPS LIGHTING FIXTURE. REFER TO FIXTURE SCHEDULE.

- SINGLE POLE SWITCH, 20A, 120/277V. MOUNT 44" AFF OR AS NOTED.
- 3-WAY SWITCH, 20A, 120/277V. MOUNT 44" AFF OR AS NOTED.
- DUPLEX RECEPTACLE, 20A 125VAC. MOUNT 18" AFF OR AS NOTED.
- LB CONDUIT BODY/FITTING.
- HOME RUN TO PANELBOARD. CIRCUIT(S) AS INDICATED.
- JUNCTION BOX.

WIRES INDICATED AS FOLLOWS:

- TWO WIRES:
- THREE WIRES:
- FOUR WIRES ETC.:
- NEUTRAL WIRE
- ISOLATED GROUND WIRE

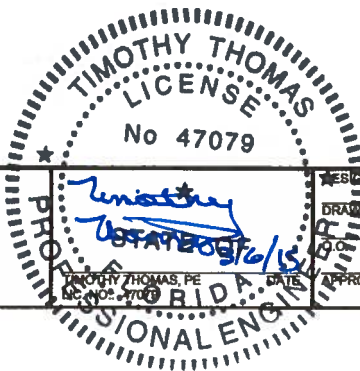
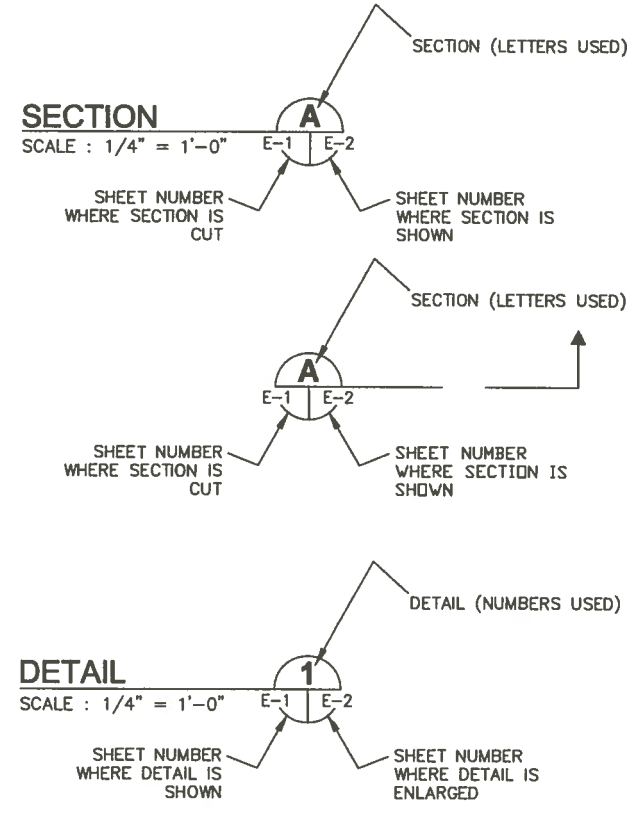
OVDE 2-#12 THWN CU IN 1/2" C. UNLESS OTHERWISE NOTED, AND GROUND WIRE (NOT INDICATED) IN ALL POWER AND LIGHTING RACEWAYS.

- FIELD WIRING
- FLOAT SWITCH. OPENS ON LOW LEVEL.
- FLOAT SWITCH. CLOSES ON LOW LEVEL.
- NORMALLY OPEN (N.O.) CONTACT
- NORMALLY CLOSED (N.C.) CONTACT
- FUSE
- GROUND CONNECTION
- INDICATING PILOT LIGHT LETTER INDICATES COLOR OF LENS
- DISCONNECT OR TOGGLE SWITCH
- NORMALLY OPEN MOMENTARY CIRCUIT CLOSING PUSH-BUTTON SWITCH SPRING OPEN. NUMBER OF ELECTRICAL CONTACTS ON SWITCH SHOWN ON CONTROL SCHEMATIC
- NORMALLY CLOSED MOMENTARY CIRCUIT OPENING PUSH-BUTTON SWITCH SPRING CLOSE. NUMBER OF ELECTRICAL CONTACTS ON SWITCH SHOWN ON CONTROL SCHEMATIC
- LIMIT SWITCH NORMALLY CLOSED CONTACT CONTACT OPENS WHEN ACTUATED
- TORQUE SWITCH NORMALLY CLOSED CONTACT CONTACT OPENS WHEN ACTUATED
- PUMP THERMAL SENSOR

ABBREVIATIONS:

A	AMPS
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
C	CONDUIT
EX	EXISTING
ELEC	ELECTRICAL
EXP	EXPLOSION PROOF
GFI	GROUND FAULT INTERRUPTER
GND	GROUNDING CONDUCTOR
HP	HORSEPOWER
HZ	HERTZ
IG	ISOLATED GROUND
KVA	KILOVOLT AMPERES
KW	KILOWATTS
MAX	MAXIMUM
MIN	MINIMUM
N/A	NOT APPLICABLE
PH	PHASE
RECP	RECEPTACLE
RPM	REVOLUTIONS PER MINUTE
RTU	REMOTE TERMINAL UNIT
SPD	SURGE PROTECTION DEVICE
TYP	TYPICAL
V	VOLTS
WP	WEATHERPROOF

EXAMPLE OF SECTION CUT AND DETAIL



NO.	DESCRIPTION	BY	DATE

SEWRF SEPTAGE/ GREASE RECEIVING STATION

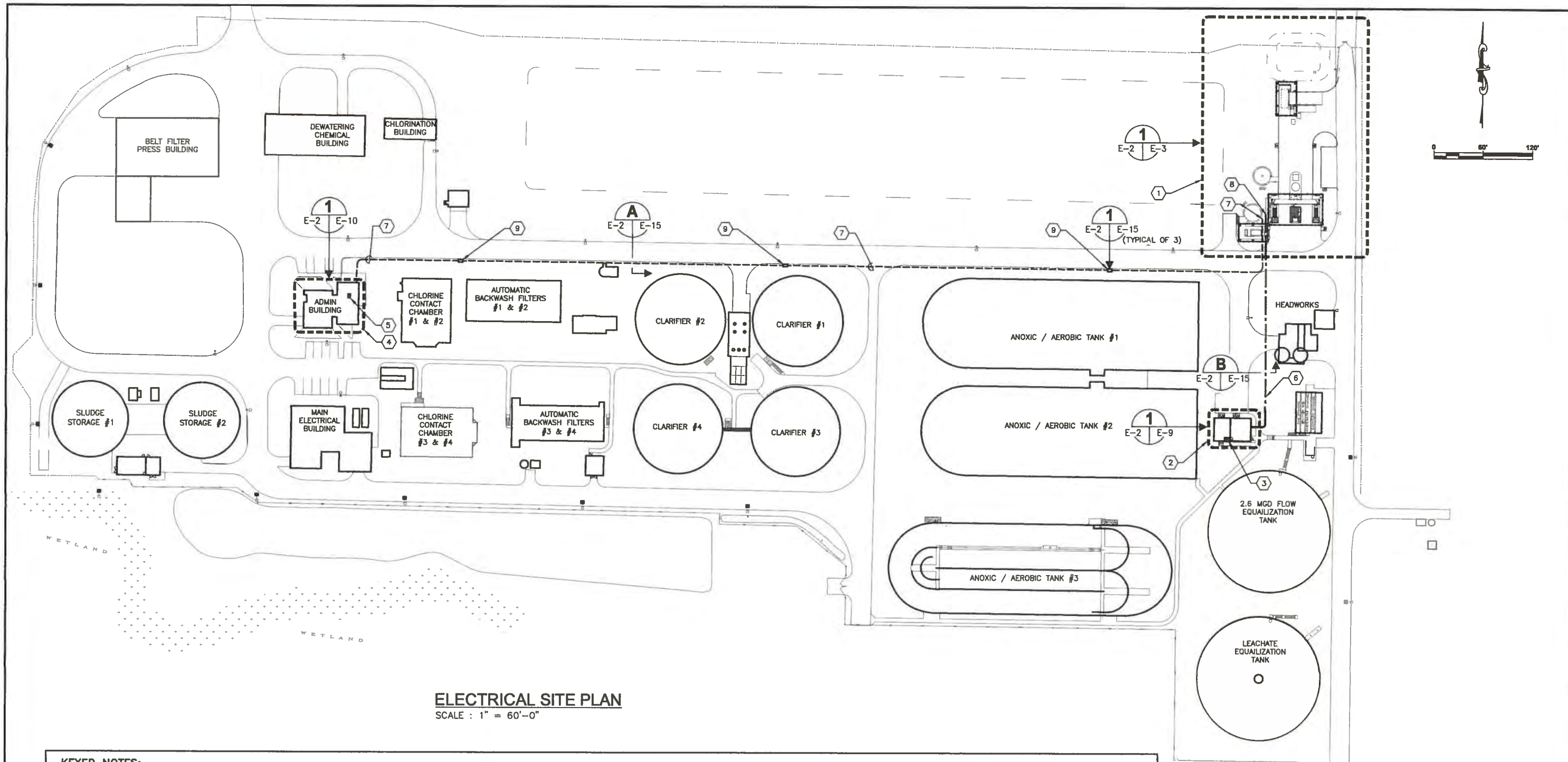
**MANATEE COUNTY**  
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UTILITIES DEPARTMENT  
4410 68th Street West Bradenton, Florida 34210  
(941) 782-8811

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DESIGNED	TDT
DRAWN	EAK
CHECKED	
APPROVED	

ELECTRICAL LEGEND AND ABBREVIATIONS

PROJECT NO:  
00183-009-02  
DATE:  
JANUARY 2015  
SHEET NO:  
E-1



**ELECTRICAL SITE PLAN**  
SCALE : 1" = 60'-0"

- KEYED NOTES:**
- ① NEW SEPTAGE / GREASE RECEIVING STATIONS. REFER TO PLAN DETAIL ON SHEET E-3 FOR NEW WORK REQUIRED.
  - ② EXISTING MCC/BLOWER BUILDING NO. 2. REFER TO PLAN DETAIL ON SHEET E-9 FOR NEW WORK REQUIRED.
  - ③ EXISTING SCADA PANEL 2, LOCATED IN MCC/BLOWER BUILDING NO. 2.
  - ④ EXISTING ADMINISTRATION BUILDING. REFER TO PLAN DETAIL ON SHEET E-10 FOR NEW WORK REQUIRED.
  - ⑤ EXISTING PIC PLC, LOCATED IN CONSOLE OF CONTROL ROOM.
  - ⑥ NEW DUCTBANK TO BE INSTALLED FOR SEPTAGE RECEIVING STATION 480V POWER FEEDER AND FIBER OPTIC COMMUNICATIONS CABLE BETWEEN NEW SEPTAGE PLC CONTROL CABINET AND EXISTING SCADA PANEL 2. REFER TO SHEET E-9 FOR DETAILS.
  - ⑦ NEW DUCTBANK TO BE INSTALLED FOR SEPTAGE RECEIVING STATION INTERCOM COMMUNICATIONS CABLE AND CAMERA/HAULER ACCES FIBER OPTIC CABLE. REFER TO SHEET E-10 FOR DETAILS.
  - ⑧ NEW DUCTBANK TO BE INSTALLED FOR SEPTAGE RECEIVING STATION 480V POWER FEEDER AND FIBER OPTIC COMMUNICATIONS CABLE BETWEEN NEW SEPTAGE PLC CONTROL CABINET AND EXISTING SCADA PANEL 2. REFER TO SHEET E-3 FOR DETAILS.
  - ⑨ NEW INTERCOM/FIBER OPTIC HANDHOLE. REFER TO TYPICAL DETAIL ON SHEET E-15.

- GENERAL NOTES:**
1. CONDUIT AND DUCTBANK RUNS MAY BE FIELD ROUTED TO AVOID EXISTING UTILITIES AND UNDERGROUND PIPING. CONTRACTOR SHALL REFERENCE SEWRF RECORD DRAWINGS AND COORDINATE WITH MANATEE COUNTY.

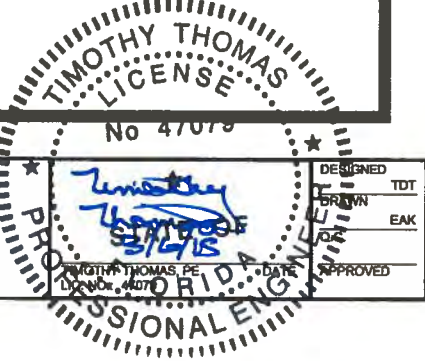


NO.	DESCRIPTION	BY	DATE

**SEWRF  
SEPTAGE/ GREASE  
RECEIVING STATION**

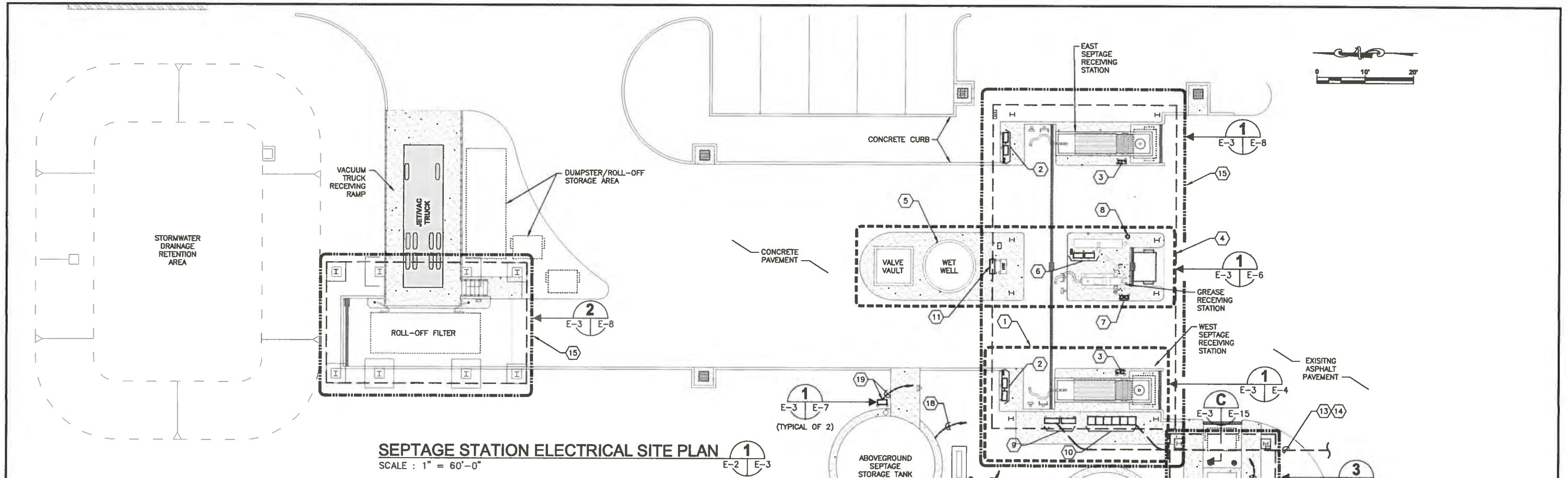
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DEPARTMENT OF PUBLIC WORKS  
UTILITIES DEPARTMENT  
4410 68th Street West Bradenton, Florida 34210  
(941) 782-8811

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**ELECTRICAL SITE PLAN**

PROJECT NO:  
00193-009-02  
DATE:  
JANUARY 2015  
SHEET NO:  
E-2



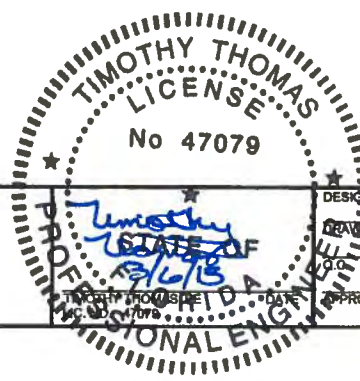
**SEPTAGE STATION ELECTRICAL SITE PLAN** 1  
SCALE : 1" = 60'-0" E-2 E-3

**KEYED NOTES:**

- |   |  |
|---|--|
| <p>1 NEW 'WEST' SEPTAGE RECEIVING STATION. REFER TO PLAN DETAIL ON SHEET E-4 FOR NEW WORK REQUIRED.</p> <p>2 NEW SEPTAGE RECEIVING STATION EQUIPMENT RACK CONTAINING HAULER ACCESS CONTROL PANEL, RAKE CONTROL PANEL, INTERCOM AND LIGHT SWITCH.</p> <p>3 NEW RAKE MOTOR DISCONNECT AND RAKE HOA CONTROLS.</p> <p>4 NEW GREASE RECEIVING STATION. REFER TO PLAN DETAIL ON SHEET E-6 FOR NEW WORK REQUIRED.</p> <p>5 NEW PUMP STATION. REFER TO PLAN DETAIL ON SHEET E-6 FOR NEW WORK REQUIRED.</p> <p>6 NEW GREASE RECEIVING STATION EQUIPMENT RACK CONTAINING HAULER ACCESS CONTROL PANEL, SCREEN COMPACTOR CONTROL PANEL, INTERCOM AND LIGHT SWITCH.</p> <p>7 NEW SCREEN AND COMPACTOR MOTOR DISCONNECTS.</p> <p>8 NEW GREASE PUMP MOTOR DISCONNECT.</p> <p>9 NEW PLC CONTROL CABINET AND FIBER OPTIC PATCH PANEL. REFER ALSO TO ELEVATION 'A' ON SHEET E-4.</p> <p>10 NEW SEPTAGE RECEIVING STATION MOTOR CONTROL CENTER (MCC-SEP). REFER ALSO TO ELEVATION 'A' ON SHEET E-11.</p> <p>11 NEW PUMP STATION CONTROL PANEL. REFER TO SHEET E-6.</p> <p>12 REFER TO SHEET E-8 FOR CANOPY LIGHTING FIXTURE LAYOUT AND CAMERA PLACEMENT.</p> <p>13 CONTRACTOR TO PROVIDE AND INSTALL NEW DUCTBANK TO CONTROL BUILDING FOR NEW INTERCOM WIRING AND NEW FIBER OPTIC CABLE. REFER ALSO TO SHEET E-2.</p> <p>14 CONTRACTOR TO PROVIDE AND INSTALL NEW DUCTBANK TO MCC/BLOWER BUILDING No. 2 FOR 480V, 3<math>\phi</math> POWER FEEDER AND NEW FIBER OPTIC CABLE. REFER ALSO TO SHEET E-2.</p> <p>15 REFER TO SHEET E-8 FOR CANOPY LIGHTING FIXTURE LAYOUT.</p> | <p>16 PROVIDE AND INSTALL 600V, 100A, 3-POLE, NON-FUSED DISCONNECT IN NEMA 4X SS ENCLOSURE FOR TRANSFER PUMP LOCAL DISCONNECTING MEANS. THE DISCONNECT SHALL BE PROVIDED WITH AUXILIARY CONTACTS TO DISCONNECT THE MOTOR HEATER AND THERMAL SWITCH CIRCUITS WHEN THE SWITCH DISCONNECTS THE MOTOR PHASE CONDUCTORS.</p> <p>17 PROVIDE AND INSTALL NEW TRANSFER PUMP 480V FEEDER. 3-#6 THWN CU + 1-#8 THWN CU GND + 4-#12 THWN CU (MOTOR HEATER/THERMALS) IN 1" C. TO MCC-SEP. PROVIDE FLEXIBLE SEALTITE CONNECTION TO TRANSFER PUMP MOTOR.</p> <p>18 PROVIDE AND INSTALL 600V, 30A, 3-POLE, NON-FUSED DISCONNECT IN NEMA 4X SS ENCLOSURE FOR GREASE TANK MIXER DISCONNECTING MEANS. MOUNT DISCONNECT AT TOP OF TANK, ADJACENT TO MIXER MOTOR. COORDINATE MIXER LOCATION WITH MECHANICAL DRAWINGS. ALSO PROVIDE AND INSTALL NEW GREASE TANK MIXER 480V FEEDER. 3-#12 THWN CU + 1-#12 THWN CU GND IN 3/4" C. TO MCC-SEP.</p> <p>19 PROVIDE AND INSTALL NEW TANK LEVEL REMOTE ELECTRONICS (COORDINATE EXACT LOCATION WITH MECHANICAL DRAWINGS). REFER ALSO TO DETAIL ON SHEET E-7. PROVIDE AND INSTALL 2/C-#18 TWISTED SHIELDED (BELDEN 8760). IN 3/4" C. TO PLC CONTROL CABINET FOR 4-20 mA TANK LEVEL SIGNAL.</p> <p>20 PROVIDE AND INSTALL NEW DEWATERING PRESS CONTROL PANEL 480V FEEDER. 3-#12 THWN CU + 1-#12 THWN CU GND 3/4" C. TO MCC-SEP. COORDINATE EXACT LOCATION WITH DEWATERING EQUIPMENT SUPPLIER. CONTRACTOR SHALL ALSO PROVIDE AND INSTALL THREE (3) : 2/C-#18 TWISTED SHIELDED CABLES (BELDEN 8760) IN 1-1/4" C. TO MCC-SEP FOR TRANSFER PUMP No. 1, TRANSFER PUMP No. 2 AND GREASE PUMP 4-20 mA VFD PACING SIGNALS. PROVIDE AND INSTALL 12-#12 + 1-#12 GND IN 3/4" C. TO MCC-SEP FOR VFD START/STOP SIGNALS (6 SPARES). PROVIDE AND INSTALL 16-#12 THWN CU + 1-#12 THWN CU GND IN 3/4" C. TO PLC CONTROL CABINET FOR DEWATERING SCADA SIGNALS (2-#12 DEWATERING SYSTEM RUNNING, 2-#12 DEWATERING ALARM, 2-#12 POLYMER SYSTEM RUNNING, 2-#12 POLYMER SYSTEM ALARM, AND HIGH TANK ALARM TO DEWATERING SYSTEM (6 SPARES).</p> <p>21 PROVIDE AND INSTALL POLYMER FEED PUMP CONTROL PANEL 480V FEEDER, START/STOP SIGNALS, AND 4-20 mA FLOW PACING SIGNAL FROM DEWATERING PRESS CONTROL PANEL TO POLYMER FEED PUMP CONTROL PANEL. COORDINATE REQUIREMENTS WITH DEWATERING PRESS SUPPLIER.</p> |
|---|--|

**GENERAL NOTES :**

1. NOT ALL CONDUIT/CONDUCTORS SHOWN FOR CLARITY. REFERENCE OTHER SHEETS AS REQUIRED.



NO.	DESCRIPTION	BY	DATE

**SEWRF  
SEPTAGE/ GREASE  
RECEIVING STATION**

**MANATEE COUNTY**  
DEPARTMENT OF PUBLIC WORKS  
UTILITIES DEPARTMENT  
4410 68th Street West Bradenton, Florida 34210  
(941) 792-8811

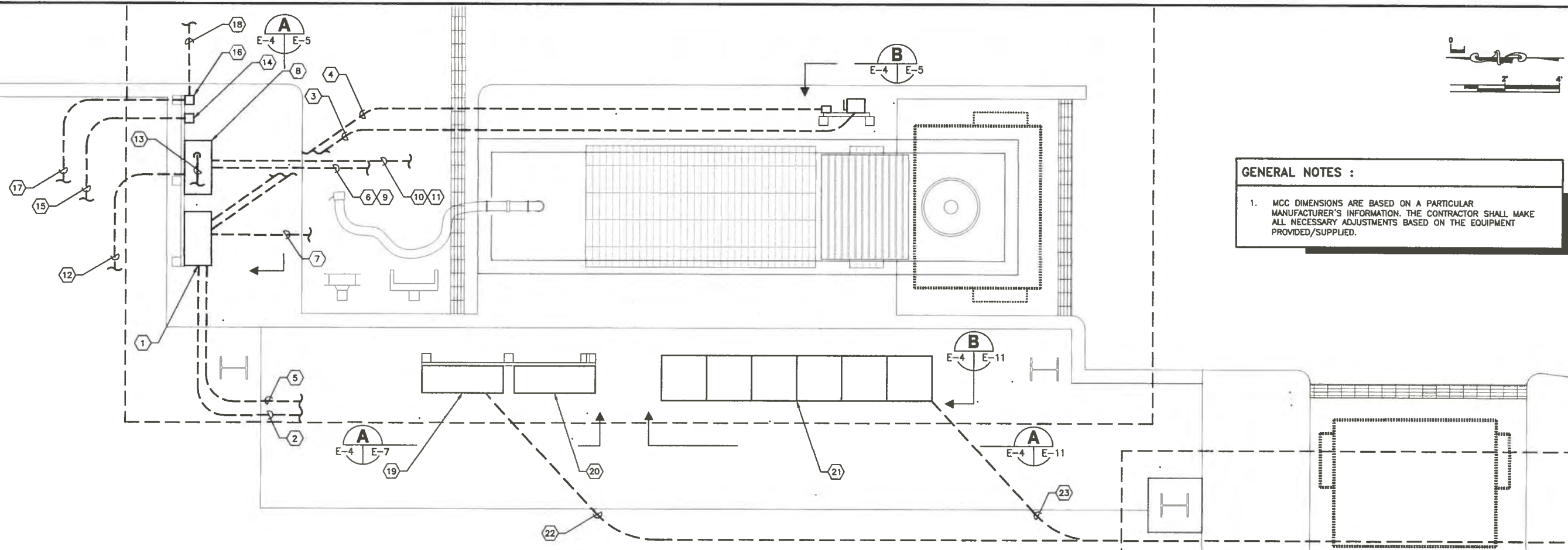
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DESIGNED TDT  
DRAWN EAK  
CHECKED J.C.O.  
APPROVED

**SEPTAGE RECEIVING ELECTRICAL  
SITE PLAN**

PROJECT NO:  
00193-009-02  
DATE:  
DECEMBER 2014  
SHEET NO:  
E-3





**GENERAL NOTES :**

- MCC DIMENSIONS ARE BASED ON A PARTICULAR MANUFACTURER'S INFORMATION. THE CONTRACTOR SHALL MAKE ALL NECESSARY ADJUSTMENTS BASED ON THE EQUIPMENT PROVIDED/SUPPLIED.

**WEST SEPTAGE RECEIVING STATION ELECTRICAL PLAN**

SCALE : 1" = 2'-0"

1  
E-3 E-4

**NOTE :**  
WEST SEPTAGE RECEIVING STATION AND EAST SEPTAGE RECEIVING STATION ELECTRICAL PLANS ARE SIMILAR, ONLY MIRRORED PER LOCATION.

**KEYED NOTES:**

- 1 SEPTAGE RECEIVING STATION RAKE CONTROL PANEL. CONTROL PANEL TO BE PROVIDED BY RAKE MANUFACTURER.
- 2 PROVIDE AND INSTALL 3-#12 + 1-#12 GND IN 3/4"C. FROM RAKE CONTROL PANEL TO NEW SEPTAGE MOTOR CONTROL CENTER (MCC-SEP) FOR RAKE CONTROL PANEL 480V POWER.
- 3 PROVIDE AND INSTALL 3-#12 + 1-#12 GND IN 3/4"C. FROM RAKE CONTROL PANEL TO RAKE DISCONNECT FOR RAKE 480V POWER.
- 4 PROVIDE AND INSTALL 8-#14 + 1-#14 GND IN 3/4"C. FROM PB STATION TO RAKE CONTROL PANEL. CONTRACTOR TO VERIFY CONDUCTOR QUANTITIES WITH RAKE MANUFACTURER.
- 5 PROVIDE AND INSTALL 12-#12 + 1-#12 GND IN 3/4"C. FROM RAKE CONTROL PANEL TO NEW PLC CONTROL CABINET FOR RAKE FAULT, RAKE RUNNING AND pH ALARM SCADA SIGNALS (6 SPARE).
- 6 PROVIDE AND INSTALL pH SENSOR CABLE IN 3/4"C. CABLE REQUIREMENTS FOR pH SENSOR BY RAKE CONTROL PANEL MANUFACTURER. COORDINATE EXACT CONDUIT LOCATION WITH RAKE MANUFACTURER.
- 7 PROVIDE AND INSTALL 2-#12 + 1-#12 GND IN 3/4"C. FROM RAKE CONTROL PANEL TO SPRAY WATER SOLENOID VALVE FOR 120V SOLENOID POWER. COORDINATE EXACT CONDUIT LOCATION WITH RAKE MANUFACTURER.
- 8 PROVIDE AND INSTALL NEW SEPTAGE RECEIVING STATION HAULER ACCESS CONTROL PANEL.
- 9 PROVIDE AND INSTALL 2/C-#18 TWISTED SHIELDED CABLE IN 3/4"C. FROM HAULER ACCESS CONTROL PANEL TO SEPTAGE STATION FLOW METER FOR FLOW METER 4-20mA FLOW SIGNAL. COORDINATE EXACT CONDUIT LOCATION WITH RAKE MANUFACTURER.
- 10 PROVIDE AND INSTALL 2-#12 + 1-#12 GND IN 3/4"C. FROM HAULER ACCESS CONTROL PANEL TO SEPTAGE STATION FLOW METER FOR 120V METER POWER. COORDINATE EXACT CONDUIT LOCATION WITH RAKE MANUFACTURER.
- 11 PROVIDE AND INSTALL 2-#12 + 1-#12 GND IN 3/4"C. FROM HAULER ACCESS CONTROL PANEL TO CONTROL SEPTAGE STATION CONTROL VALVE. COORDINATE EXACT CONDUIT LOCATION WITH RAKE MANUFACTURER.
- 12 PROVIDE AND INSTALL 2-#12 + 1-#12 GND IN 3/4"C. FROM HAULER ACCESS CONTROL PANEL TO NEW SEPTAGE RECEIVING STATION TO PANELBOARD 'LPS' FOR ACCESS CONTROL PANEL 120V POWER.
- 13 PROVIDE AND INSTALL ETHERNET CAT 5e CABLE IN 1"C. FROM HAULER ACCESS CONTROL PANEL TO NEW FIBER OPTIC PATCH PANEL. ROUTE CONDUIT ABOVEGROUND.
- 14 PROVIDE AND INSTALL NEW INTERCOM STATION. STATION SHALL BE STAINLESS STEEL (AIPHONE LE-SS) WITH STAINLESS STEEL JUNCTION BOX (AIPHONE SBX-2G).
- 15 PROVIDE AND INSTALL 2/C-#18 SHIELDED CABLE, AIPHONE WIRE #821802, IN 3/4"C. FROM INTERCOM TO FIBER OPTIC PATCH PANEL.
- 16 PROVIDE AND INSTALL 120V, 15A, SINGLE-POLE SWITCH IN WEATHERPROOF FS BOX FOR WEST SEPTAGE RECEIVING STATION LIGHT CONTROL. PROVIDE AND INSTALL SINGLE-GANG WEATHERPROOF SWITCH COVER. BELL #5121-0.
- 17 PROVIDE AND INSTALL 2-#12 + 1-#12 GND IN 3/4"C. FROM LIGHT SWITCH TO PANELBOARD 'LPS' FOR WEST SEPTAGE RECEIVING STATION LIGHTING 120V POWER.
- 18 PROVIDE AND INSTALL 2-#12 + 1-#12 GND IN 3/4"C. FROM LIGHT SWITCH TO NEW SEPTAGE RECEIVING STATION LIGHTING FIXTURES. CONTRACTOR TO FIELD ROUTE CONDUIT AS REQUIRED.
- 19 PROVIDE AND INSTALL NEW FIBER OPTIC PATCH PANEL. REFER TO ELEVATION ON SHEET E-7.
- 20 PROVIDE AND INSTALL NEW PLC CONTROL CABINET. REFER TO ELEVATION ON SHEET E-7.
- 21 PROVIDE AND INSTALL NEW MOTOR CONTROL CENTER, MCC-SEP. REFER TO ELEVATION ON SHEET E-11.
- 22 CONTRACTOR TO PROVIDE AND INSTALL NEW DUCTBANK TO CONTROL BUILDING FOR NEW INTERCOM WIRING AND NEW FIBER OPTIC CABLE. REFER ALSO TO SHEET E-2.
- 23 CONTRACTOR TO PROVIDE AND INSTALL NEW DUCTBANK TO MCC/BLOWER BUILDING No. 2 FOR 480V 3P POWER FEEDER AND NEW FIBER OPTIC CABLE. REFER ALSO TO SHEET E-2.

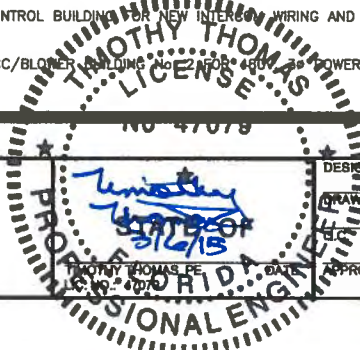


NO.	DESCRIPTION	BY	DATE

**SEWRF SEPTAGE/ GREASE RECEIVING STATION**

**MANATEE COUNTY**  
DEPARTMENT OF PUBLIC WORKS  
UTILITIES DEPARTMENT  
4410 68th Street West Bradenton, Florida 34210  
(841) 782-8811

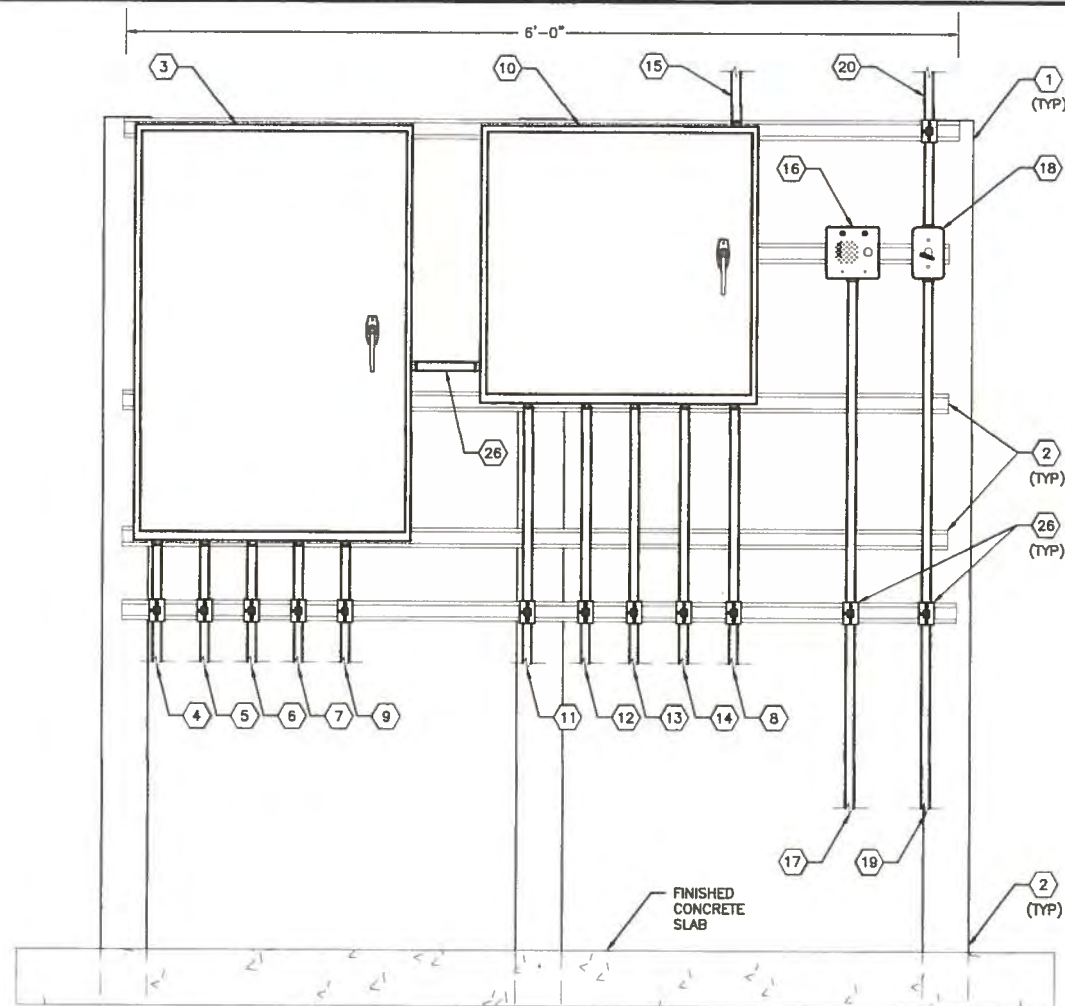
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DESIGNED TDT  
DRAWN EAK  
CHECKED ETC  
APPROVED

**WEST SEPTAGE RECEIVING STATION ELECTRICAL PLAN**

PROJECT NO: 00183-009-02  
DATE: DECEMBER 2014  
SHEET NO: E-4

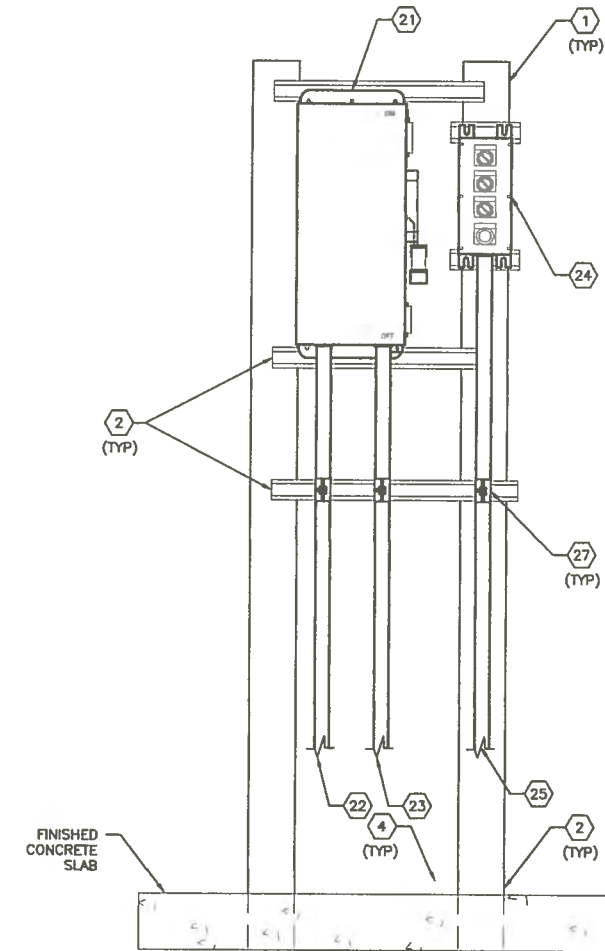


**SEPTAGE RECEIVING STATION  
EQUIPMENT ELEVATION**

SCALE : N.T.S.

**A**  
E-4 E-5

**NOTE :**  
EAST SEPTAGE RECEIVING STATION EQUIPMENT RACK AND GREASE RECEIVING STATION EQUIPMENT RACKS ARE SIMILAR, WITH ONLY ADJUSTMENTS TO EQUIPMENT LAYOUT.



**SEPTAGE RECEIVING STATION  
RAKE EQUIPMENT ELEVATION**

SCALE : N.T.S.

**B**  
E-4 E-5



**KEYED NOTES:**

<p>1 PROVIDE AND INSTALL 4" SQUARE, 9'-0" LONG CONCRETE POST. POST TO BE EMBEDDED A MINIMUM OF 3'-0" INTO CONCRETE SLAB.</p> <p>2 PROVIDE AND INSTALL 1-5/8" X 1-5/8" 316 STAINLESS STEEL UNISTRUT. ALL MOUNTING HARDWARE SHALL BE 316 STAINLESS STEEL UNISTRUT BOLTS SHALL BE INSTALLED THROUGH CONCRETE POST.</p> <p>3 SEPTAGE RECEIVING STATION RAKE CONTROL PANEL. CONTROL PANEL TO BE PROVIDED BY RAKE MANUFACTURER.</p> <p>4 PROVIDE AND INSTALL 3-#12 + 1-#12 GND IN 3/4"C. FROM RAKE CONTROL PANEL TO NEW SEPTAGE MOTOR CONTROL CENTER (MCC-SEP) FOR RAKE CONTROL PANEL 480V POWER.</p> <p>5 PROVIDE AND INSTALL 3-#12 + 1-#12 GND IN 3/4"C. FROM RAKE CONTROL PANEL TO RAKE DISCONNECT FOR RAKE 480V POWER.</p> <p>6 PROVIDE AND INSTALL 8-#14 + 1-#14 GND IN 3/4"C. FROM PB STATION TO BAR SCREEN CONTROL PANEL. CONTRACTOR TO VERIFY CONDUCTOR QUANTITIES WITH RAKE MANUFACTURER.</p> <p>7 PROVIDE AND INSTALL 12-#12 + 1-#12 GND IN 3/4"C. FROM RAKE CONTROL PANEL TO NEW PLC CONTROL CABINET FOR RAKE FAULT, RAKE RUNNING AND pH ALARM SCADA SIGNALS (6 SPARE).</p> <p>8 PROVIDE AND INSTALL pH SENSOR CABLE IN 3/4"C. CABLE REQUIREMENTS FOR pH SENSOR BY RAKE CONTROL PANEL MANUFACTURER.</p> <p>9 PROVIDE AND INSTALL 2-#12 + 1-#12 GND IN 3/4"C. FROM RAKE CONTROL PANEL TO SPRAY WATER SOLENOID VALVE FOR 120V SOLENOID POWER.</p>	<p>10 PROVIDE AND INSTALL NEW SEPTAGE RECEIVING STATION HAULER ACCESS CONTROL PANEL.</p> <p>11 PROVIDE AND INSTALL 2/C-#18 TWISTED SHIELDED CABLE IN 3/4"C. FROM HAULER ACCESS CONTROL PANEL TO SEPTAGE STATION FLOW METER FOR FLOW METER 4-20mA FLOW SIGNAL.</p> <p>12 PROVIDE AND INSTALL 2-#12 + 1-#12 GND IN 3/4"C. FROM HAULER ACCESS CONTROL PANEL TO SEPTAGE STATION FLOW METER FOR 120V METER POWER. COORDINATE EXACT CONDUIT LOCATION WITH RAKE MANUFACTURER.</p> <p>13 PROVIDE AND INSTALL 2-#12 + 1-#12 GND IN 3/4"C. FROM HAULER ACCESS CONTROL PANEL TO CONTROL SEPTAGE STATION CONTROL VALVE.</p> <p>14 PROVIDE AND INSTALL 2-#12 + 1-#12 GND IN 3/4"C. FROM HAULER ACCESS CONTROL PANEL TO NEW SEPTAGE RECEIVING STATION TO PANELBOARD "LPS" FOR ACCESS CONTROL PANEL 120V POWER.</p> <p>15 PROVIDE AND INSTALL ETHERNET CAT 5e CABLE IN 1"C. FROM HAULER ACCESS CONTROL PANEL TO NEW FIBER OPTIC PATCH PANEL. ROUTE CONDUIT ABOVEGROUND.</p> <p>16 PROVIDE AND INSTALL NEW INTERCOM STATION. STATION SHALL BE STAINLESS STEEL (AIPHONE LE-SS) WITH STAINLESS STEEL JUNCTION BOX (AIPHONE SBX-2G).</p> <p>17 PROVIDE AND INSTALL 2/C-#18 SHIELDED CABLE, AIPHONE WIRE #821802, IN 3/4"C. FROM INTERCOM TO FIBER OPTIC PATCH PANEL.</p> <p>18 PROVIDE AND INSTALL 120V, 15A, SINGLE-POLE SWITCH IN WEATHERPROOF FS BOX FOR WEST SEPTAGE RECEIVING STATION LIGHT CONTROL. PROVIDE AND INSTALL SINGLE-GANG WEATHERPROOF SWITCH COVER. BELL #5121-0.</p>	<p>19 PROVIDE AND INSTALL 2-#12 + 1-#12 GND IN 3/4"C. FROM LIGHT SWITCH TO PANELBOARD "LPS" FOR WEST SEPTAGE RECEIVING STATION LIGHTING 120V POWER. (TYPICAL FOR EAST SEPTAGE AND GREASE STATION).</p> <p>20 PROVIDE AND INSTALL 2-#12 + 1-#12 GND IN 3/4"C. FROM LIGHT SWITCH TO NEW SEPTAGE RECEIVING STATION LIGHTING FIXTURES. CONTRACTOR TO FIELD ROUTE CONDUIT AS REQUIRED.</p> <p>21 PROVIDE AND INSTALL 30A, 600V, 3-POLE NON-FUSED DISCONNECT IN NEMA 4X SS ENCLOSURE FOR BAR SCREEN DRIVE DISCONNECTING MEANS. DISCONNECT SHALL BE PROVIDED WITH INTERLOCKED AUXILIARY CONTACT FOR MANUFACTURER'S RAKE OVERTEMP CIRCUIT. COORDINATE AUXILIARY CONTACT RATING REQUIREMENTS WITH BAR SCREEN SYSTEM MANUFACTURER.</p> <p>22 PROVIDE AND INSTALL 3-#12 + 1-#12 GND IN 3/4"C. TO RAKE CONTROL PANEL FOR DRIVE MOTOR 480V POWER.</p> <p>23 PROVIDE AND INSTALL 3-#12 + 1-#12 GND IN 3/4"C. TO RAKE MOTOR. PROVIDE FLEXIBLE SEALTITE CONNECTION TO MOTOR.</p> <p>24 RAKE LOCAL PUSHBUTTON STATION. SUPPLIED BY MANUFACTURER, INSTALLED BY CONTRACTOR.</p> <p>25 PROVIDE AND INSTALL 8-#14 + 1-#14 GND IN 3/4"C. FROM PB STATION TO RAKE CONTROL PANEL. CONTRACTOR TO VERIFY CONDUCTOR QUANTITIES WITH RAKE MANUFACTURER.</p> <p>26 PROVIDE AND INSTALL 4-#12 + 1-#12 GND IN 3/4"C. FROM HAULER ACCESS CONTROL PANEL TO RAKE CONTROL PANEL FOR PERMISSIVE SIGNAL AND pH ALARM.</p> <p>27 PROVIDE AND INSTALL STAINLESS STEEL CONDUIT CLAMPS AND HARDWARE.</p>
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NO.	DESCRIPTION	BY	DATE

**SEWRF  
SEPTAGE/ GREASE  
RECEIVING STATION**

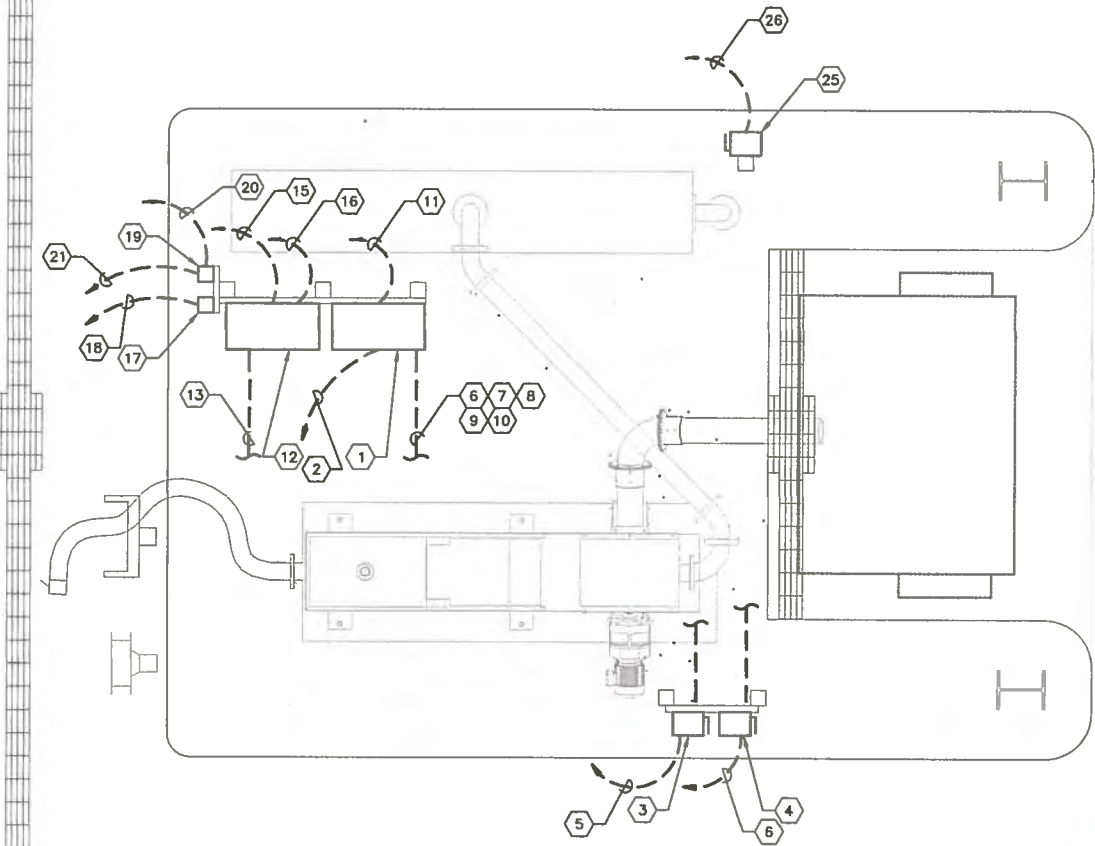
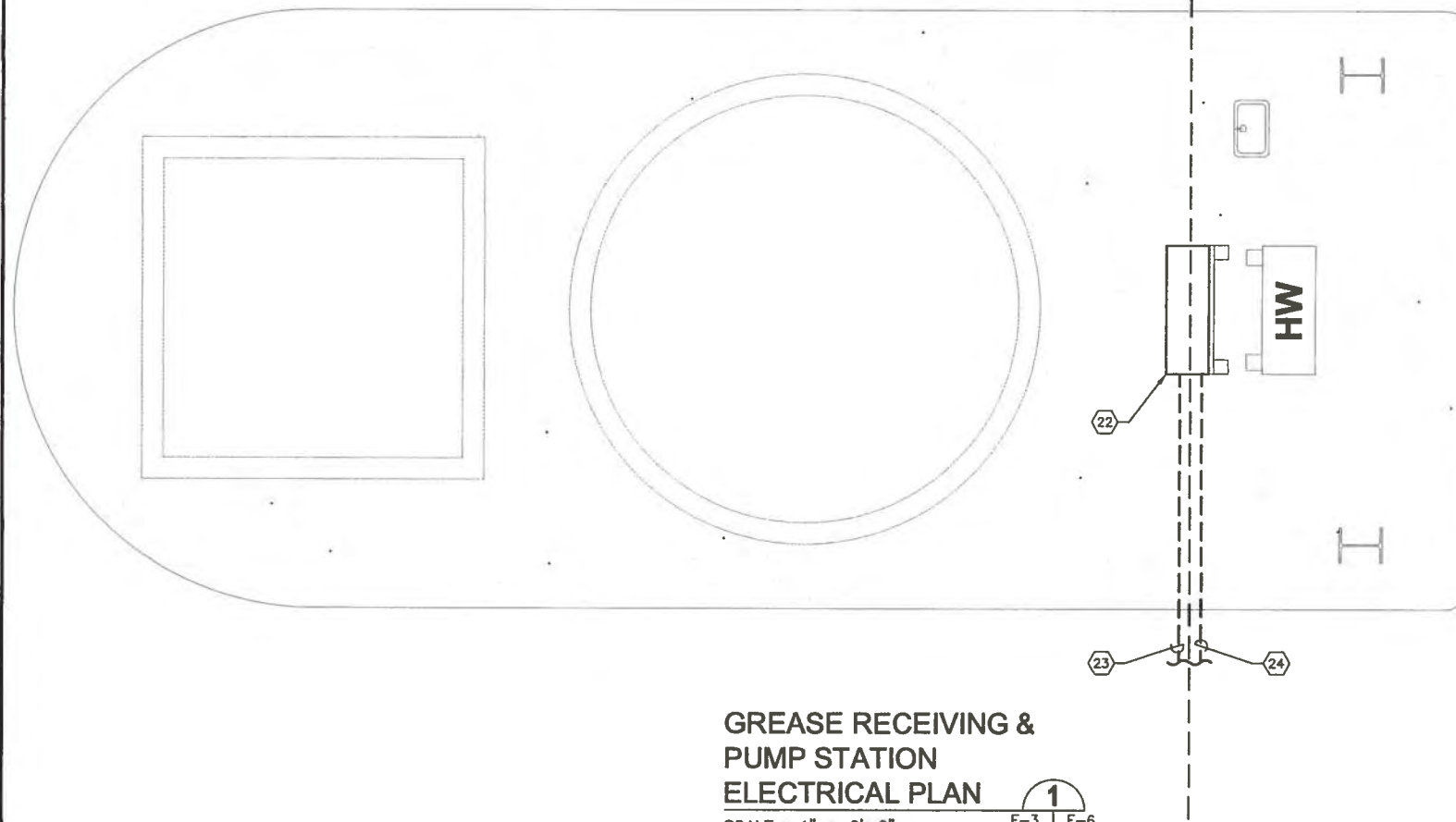
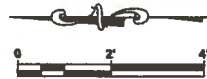
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DESIGNED TDT  
DRAWN EAK  
CHECKED BJC  
APPROVED  
TIMOTHY H. HARRIS  
Professional Engineer  
No. 47079

**WEST SEPTAGE RECEIVING  
STATION EQUIPMENT ELEVATIONS**

PROJECT NO:  
00193-009-02  
DATE:  
DECEMBER 2014  
SHEET NO:  
E-5



**GREASE RECEIVING & PUMP STATION ELECTRICAL PLAN**

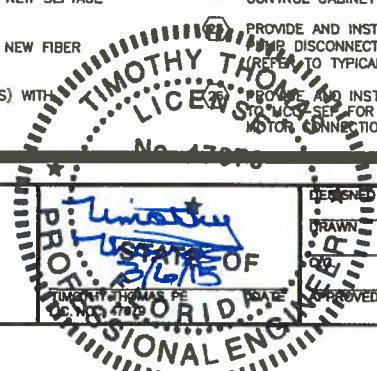
SCALE : 1" = 2'-0"

1  
E-3 | E-6



**KEYED NOTES:**

- ① GREASE RECEIVING STATION CONTROL PANEL. CONTROL PANEL TO BE PROVIDED BY MANUFACTURER.
- ② PROVIDE AND INSTALL 3-#12 + 1-#12 GND IN 3/4". FROM SCREEN/COMPACTOR CONTROL PANEL TO MOTOR CONTROL CENTER (MCC-SEP) FOR SCREEN/COMPACTOR CONTROL PANEL 480V POWER.
- ③ PROVIDE AND INSTALL 30A, 600V, 3-POLE NON-FUSED DISCONNECT IN NEMA 4X SS ENCLOSURE FOR SCREEN DRIVE DISCONNECTING MEANS. DISCONNECT SHALL BE PROVIDED WITH INTERLOCKED AUXILIARY CONTACT FOR MANUFACTURER'S SCREEN OVERTEMP CIRCUIT. COORDINATE AUXILIARY CONTACT RATING REQUIREMENTS WITH SCREEN SYSTEM MANUFACTURER.
- ④ PROVIDE AND INSTALL 30A, 600V, 3-POLE NON-FUSED DISCONNECT IN NEMA 4X SS ENCLOSURE FOR COMPACTOR DISCONNECTING MEANS. DISCONNECT SHALL BE PROVIDED WITH INTERLOCKED AUXILIARY CONTACT FOR MANUFACTURER'S COMPACTOR OVERTEMP CIRCUIT. COORDINATE AUXILIARY CONTACT RATING REQUIREMENTS WITH COMPACTOR SYSTEM MANUFACTURER.
- ⑤ PROVIDE AND INSTALL 3-#12 + 2-#12 (MOTOR THERMOSTAT) + 1-#12 GND IN 3/4". FROM SCREEN DISCONNECT TO CONTROL PANEL. PROVIDE FLEXIBLE SEALTITE CONNECTION TO MOTOR.
- ⑥ PROVIDE AND INSTALL 3-#12 + 2-#12 (MOTOR THERMOSTAT) + 1-#12 GND IN 3/4". FROM COMPACTOR DISCONNECT TO CONTROL PANEL. PROVIDE FLEXIBLE SEALTITE CONNECTION TO MOTOR.
- ⑦ PROVIDE AND INSTALL pH SENSOR CABLE IN 3/4". CABLE REQUIREMENTS FOR pH SENSOR BY SCREEN/COMPACTOR CONTROL PANEL MANUFACTURER. COORDINATE EXACT CONDUIT LOCATION WITH SCREEN/COMPACTOR MANUFACTURER.
- ⑧ PROVIDE AND INSTALL ULTRASONIC LEVEL SENSOR CABLE IN 3/4". CABLE REQUIREMENTS FOR ULTRASONIC LEVEL SENSOR BY SCREEN/COMPACTOR CONTROL PANEL MANUFACTURER. COORDINATE EXACT CONDUIT LOCATION WITH SCREEN/COMPACTOR MANUFACTURER.
- ⑨ PROVIDE AND INSTALL 2-#12 + 1-#12 GND IN 3/4". FROM SCREEN/COMPACTOR CONTROL PANEL TO COLD WATER WATER SOLENOID VALVE FOR 120V SOLENOID POWER. COORDINATE EXACT CONDUIT LOCATION WITH SCREEN/COMPACTOR MANUFACTURER.
- ⑩ PROVIDE AND INSTALL 2-#12 + 1-#12 GND IN 3/4". FROM SCREEN/COMPACTOR CONTROL PANEL TO HOT WATER SPRAY SOLENOID VALVE FOR 120V SOLENOID POWER. COORDINATE EXACT CONDUIT LOCATION WITH SCREEN/COMPACTOR MANUFACTURER.
- ⑪ PROVIDE AND INSTALL 16-#12 + 1-#12 GND IN 3/4". FROM SCREEN/COMPACTOR CONTROL PANEL TO NEW PLC CONTROL CABINET FOR SCREEN RUNNING, COMPACTOR RUNNING, SCREEN TROUBLE, COMPACTOR TROUBLE AND pH ALARM SCADA SIGNALS (6 SPARE).
- ⑫ PROVIDE AND INSTALL NEW GREASE RECEIVING STATION HAULER ACCESS CONTROL PANEL.
- ⑬ PROVIDE AND INSTALL 2/C-#18 TWISTED SHIELDED CABLE IN 3/4". FROM HAULER ACCESS CONTROL PANEL TO GREASE STATION FLOW METER.
- ⑭ PROVIDE AND INSTALL 2-#12 + 1-#12 GND IN 3/4". FROM HAULER ACCESS CONTROL PANEL TO CONTROL GREASE STATION CONTROL VALVE.
- ⑮ PROVIDE AND INSTALL 2-#12 + 1-#12 GND IN 3/4". FROM HAULER ACCESS CONTROL PANEL TO NEW SEPTAGE RECEIVING STATION TO PANELBOARD 'LPS' FOR ACCESS CONTROL PANEL 120V POWER.
- ⑯ PROVIDE AND INSTALL ETHERNET CAT 5e CABLE IN 1". FROM HAULER ACCESS CONTROL PANEL TO NEW FIBER OPTIC PATCH PANEL.
- ⑰ PROVIDE AND INSTALL NEW INTERCOM STATION. STATION SHALL BE STAINLESS STEEL (AIPHONE LE-SS) WITH STAINLESS STEEL JUNCTION BOX (AIPHONE SBX-2G).
- ⑱ PROVIDE AND INSTALL 2/C-#18 SHIELDED CABLE, AIPHONE WIRE #821802, IN 3/4". FROM INTERCOM TO FIBER OPTIC PATCH PANEL.
- ⑲ PROVIDE AND INSTALL 120V, 15A, SINGLE-POLE SWITCH IN WEATHERPROOF FS BOX FOR GREASE RECEIVING STATION LIGHT CONTROL. PROVIDE AND INSTALL SINGLE-GANG WEATHERPROOF SWITCH COVER. BELL #5121-0.
- ⑳ PROVIDE AND INSTALL 2-#12 + 1-#12 GND IN 3/4". FROM LIGHT SWITCH TO PANELBOARD 'LPS' FOR GREASE RECEIVING STATION LIGHTING 120V POWER.
- ㉑ PROVIDE AND INSTALL 2-#12 + 1-#12 GND IN 3/4". FROM LIGHT SWITCH TO NEW GREASE RECEIVING STATION LIGHTING FIXTURES. CONTRACTOR TO FIELD ROUTE CONDUIT AS REQUIRED.
- ㉒ PUMPING STATION CONTROL STATION. REFER TO SPECIFICATION 11305 FOR REQUIREMENTS. MOUNT ON 4" SQUARE CONCRETE POSTS WITH 1-5/8" STAINLESS STEEL UNISTRUT (REFER TO TYPICAL CABINET MOUNTING DETAILS ON SHEET E-5).
- ㉓ PROVIDE AND INSTALL 3-#4 THWN CU + 1-#8 THWN CU GND IN 1-1/4". FROM NEW PUMP STATION CONTROL PANEL TO MCC-SEP FOR CONTROL PANEL 480V FEEDER.
- ㉔ PROVIDE AND INSTALL 4-#12 + 1-#12 GND IN 3/4". FROM NEW PUMP STATION CONTROL PANEL TO NEW PLC CONTROL CABINET FOR WET WELL HIGH LEVEL SCADA ALARM AND GREASE STORAGE TANK PERMISSIVE.
- ㉕ PROVIDE AND INSTALL 30A, 600V, 3-POLE NON-FUSED DISCONNECT IN NEMA 4X SS ENCLOSURE FOR GREASE PUMP DISCONNECTING MEANS. MOUNT ON 4" SQUARE CONCRETE POST WITH 1-5/8" STAINLESS STEEL UNISTRUT (REFER TO TYPICAL DISCONNECT MOUNTING DETAIL ON SHEET E-5).
- ㉖ PROVIDE AND INSTALL 3-#12 THWN CU + 1-#12 THWN CU GND IN 3/4". FROM NEW GREASE PUMP DISCONNECT TO MCC-SEP FOR GREASE PUMP 480V FEEDER. PROVIDE FLEXIBLE SEALTITE CONNECTION TO MOTOR. COORDINATE EXACT CONDUIT LOCATION WITH GREASE PUMP SUPPLIER.



NO.	DESCRIPTION	BY	DATE

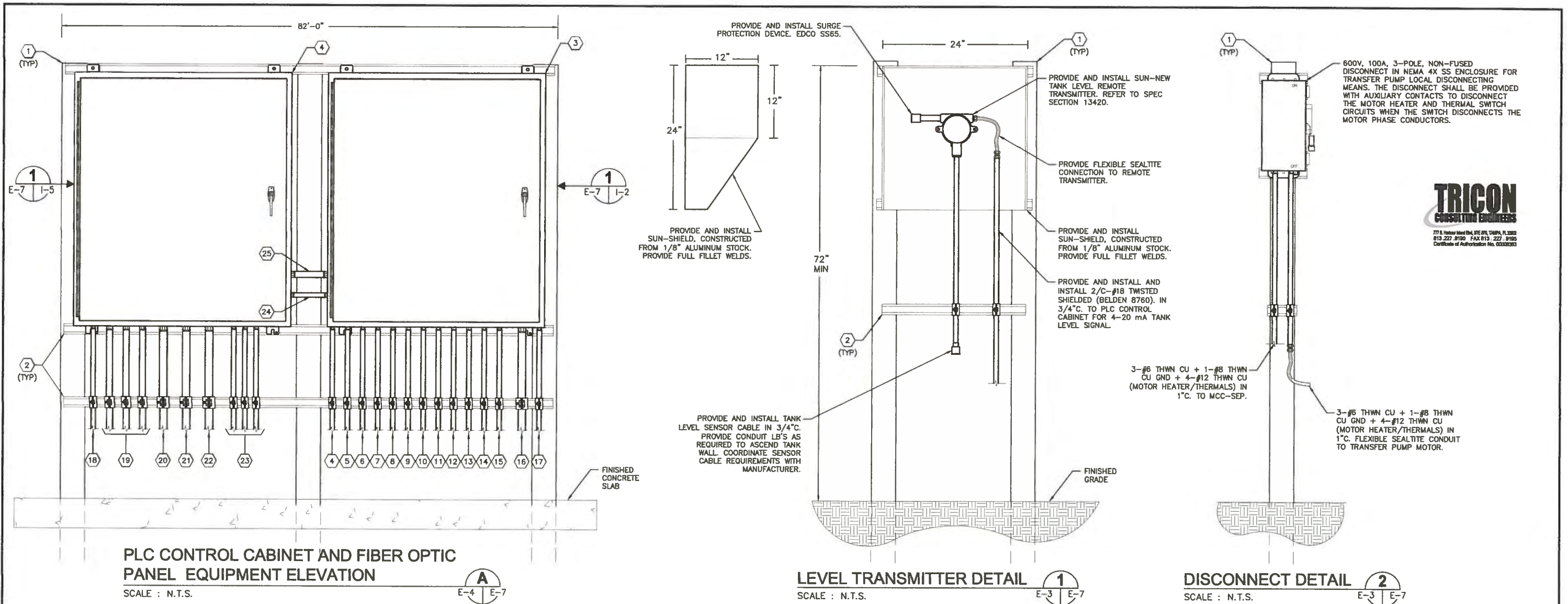
**SEWRF SEPTAGE/ GREASE RECEIVING STATION**

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UTILITIES DEPARTMENT  
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**GREASE RECEIVING SEPTAGE LIST STATION ELECTRICAL SITE PLAN**

PROJECT NO:  
00193-009-02  
DATE:  
DECEMBER 2014  
SHEET NO:  
E-6



**KEYED NOTES:**

- 1 PROVIDE AND INSTALL 4" SQUARE, 9'-0" LONG CONCRETE POST. POST TO BE EMBEDDED A MINIMUM OF 3'-0" INTO CONCRETE SLAB.
- 2 PROVIDE AND INSTALL 1-5/8" X 1-5/8" 316 STAINLESS STEEL UNISTRUT. ALL MOUNTING HARDWARE SHALL BE 316 STAINLESS STEEL. UNISTRUT BOLTS SHALL BE INSTALLED THROUGH CONCRETE POST.
- 3 PROVIDE AND INSTALL NEW PLC CONTROL CABINET. REFER TO SHEET I-2 FOR DETAILS.
- 4 PROVIDE AND INSTALL 12-#12 + 1-#12 GND IN 3/4"C. TO EAST RAKE CONTROL PANEL FOR RAKE FAULT, RAKE RUNNING AND pH ALARM SCADA SIGNALS (6 SPARE).
- 5 PROVIDE AND INSTALL 12-#12 + 1-#12 GND IN 3/4"C. TO WEST RAKE CONTROL PANEL FOR RAKE FAULT, RAKE RUNNING AND pH ALARM SCADA SIGNALS (6 SPARE).
- 6 PROVIDE AND INSTALL 16-#12 + 1-#12 GND IN 3/4"C. TO SCREEN/COMPACTOR CONTROL PANEL FOR SCREEN RUNNING, COMPACTOR RUNNING, SCREEN TROUBLE, COMPACTOR TROUBLE AND pH ALARM SCADA SIGNALS (6 SPARE).
- 7 PROVIDE AND INSTALL 4-#12 + 1-#12 GND IN 3/4"C. TO NEW PUMP STATION CONTROL PANEL FOR FOR WET WELL HIGH LEVEL SCADA ALARM AND SEPTAGE AND GREASE STORAGE TANK PERMISSIVE.
- 8 PROVIDE AND INSTALL 2/C-#18 TWISTED SHIELDED CABLE (BELDEN 8760) IN 3/4"C. TO SEPTAGE STORAGE TANK LEVEL TRANSMITTER.
- 9 PROVIDE AND INSTALL 2/C-#18 TWISTED SHIELDED CABLE (BELDEN 8760) IN 3/4"C. TO GREASE STORAGE TANK LEVEL TRANSMITTER.
- 10 PROVIDE AND INSTALL 12-#12 THWN CU + 1-#12 THWN CU GND IN 3/4" CONDUIT TO MCC-SEP FOR TRANSFER PUMP No. 1 SCADA SIGNALS (2-#12 VFD RUNNING, 2-#12 VFD FAULT, 2-#12 VFD IN HAND, 2-#12 VFD IN AUTO, 4 SPARES).
- 11 PROVIDE AND INSTALL 12-#12 THWN CU + 1-#12 THWN CU GND IN 3/4" CONDUIT TO MCC-SEP FOR TRANSFER PUMP No. 2 SCADA SIGNALS (2-#12 VFD RUNNING, 2-#12 VFD FAULT, 2-#12 VFD IN HAND, 2-#12 VFD IN AUTO, 4 SPARES).
- 12 PROVIDE AND INSTALL 12-#12 THWN CU + 1-#12 THWN CU GND IN 3/4" CONDUIT TO MCC-SEP FOR GREASE PUMP SCADA SIGNALS (2-#12 VFD RUNNING, 2-#12 VFD FAULT, 2-#12 VFD IN HAND, 2-#12 VFD IN AUTO, 4 SPARES).
- 13 PROVIDE AND INSTALL 12-#12 THWN CU + 1-#12 THWN CU GND IN 3/4" C. TO DEWATERING SCREW PRESS CONTROL CABINET (2-#12 DEWATERING SYSTEM RUNNING, 2-#12 DEWATERING ALARM, 2-#12 POLYMER SYSTEM RUNNING, 2-#12 POLYMER SYSTEM ALARM, 4 SPARES).
- 14 PROVIDE AND INSTALL 2-#12 THWN CU + 1-#12 THWN CU GND IN 3/4" C. TO MCC-SEP FOR SEPTAGE STORAGE TANK MIXER RUNNING SIGNAL.
- 15 PROVIDE AND INSTALL 3-#12 + 1-#12 GND IN 3/4"C. TO NEW PANELBOARD 'LPS' (IN MCC-SEP) FOR PLC CONTROL CABINET 120V POWER (CIRCUITS LPS-7 AND LPS-9).
- 16 PROVIDE AND INSTALL THREE (3) : 2/C-#18 TWISTED SHIELDED CABLES (BELDEN 8760) IN 1-1/4" CONDUIT TO MCC-SEP FOR TRANSFER PUMP No. 1, TRANSFER PUMP No.2 AND GREASE PUMP VFD 4-20mA SPEED REFERENCE SIGNALS.
- 17 PROVIDE AND INSTALL 2-#12 + 1-#12 GND IN 3/4"C. TO NEW PANELBOARD 'LPS' (IN MCC-SEP) FOR PLC CONTROL CABINET 120V POWER.
- 18 PROVIDE AND INSTALL 2-#12 + 1-#12 GND IN 3/4"C. TO NEW PANELBOARD 'LPS' (IN MCC-SEP) FOR FIBER OPTIC PATCH PANEL 120V POWER.
- 19 PROVIDE AND INSTALL ETHERNET CAT 5e CABLE IN 1"C. TO EAST SEPTAGE HAULER ACCESS CONTROL PANEL, ETHERNET CAT 5e CABLE IN 1"C. TO WEST SEPTAGE HAULER ACCESS CONTROL PANEL AND ETHERNET CAT 5e CABLE IN 1"C. TO GREASE HAULER ACCESS CONTROL PANEL.
- 20 PROVIDE AND INSTALL NEW 6 COUNT, 62.5/125um, TIGHT BUFFER MULTIMODE FIBER OPTIC CABLE IN 1-1/4"C. TO EXISTING ADMINISTRATION BUILDING. REFER ALSO TO SHEET E-2.
- 21 PROVIDE AND INSTALL NEW 6 COUNT, 62.5/125um, TIGHT BUFFER MULTIMODE FIBER OPTIC CABLE IN 1-1/4"C. TO EXISTING MCC/BLOWER BUILDING NO. 2. REFER ALSO TO SHEET E-2.
- 22 PROVIDE AND INSTALL NEW INTERCOM COMMUNICATIONS IN 1-1/4"C. TO EXISTING ADMINISTRATION BUILDING. REFER ALSO TO SHEET E-2.
- 23 PROVIDE AND INSTALL 2/C-#18 SHIELDED CABLE, AIPHONE WIRE #821802, IN 3/4"C. FROM FIBER OPTIC PATCH PANEL TO INTERCOMS AT WEST SEPTAGE, EAST SEPTAGE AND GREASE STATIONS.
- 24 PROVIDE AND INSTALL 4-#12 + 1-#12 GND IN 3/4"C. FOR FIBER OPTIC PATCH PANEL UPS MONITORING. REFER ALSO TO SHEETS I-2 AND I-3.
- 25 PROVIDE AND INSTALL 1"C. FOR FIBER OPTIC PATCH CORDS.

NO.	DESCRIPTION	BY	DATE

**SEWRF  
SEPTAGE/ GREASE  
RECEIVING STATION**

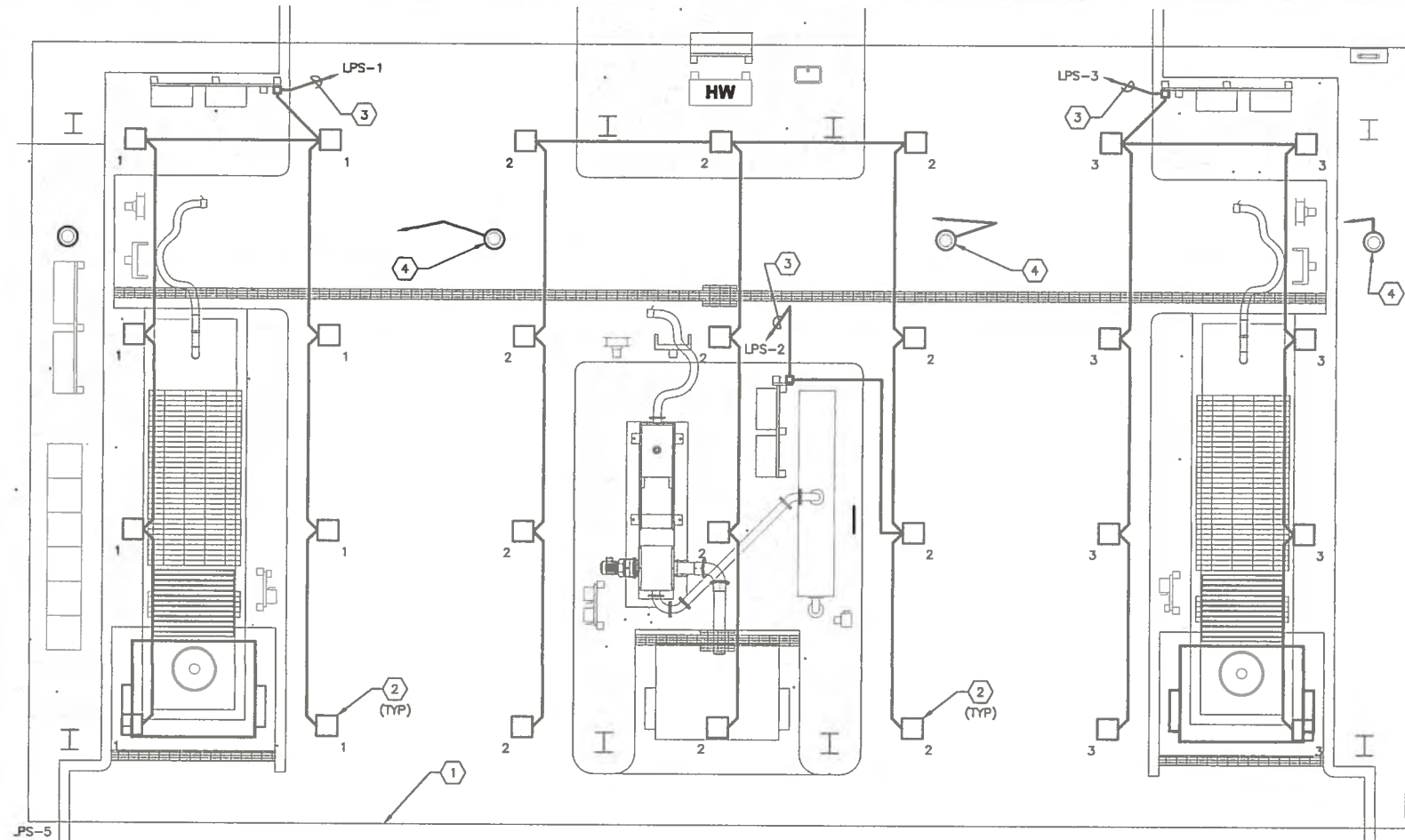
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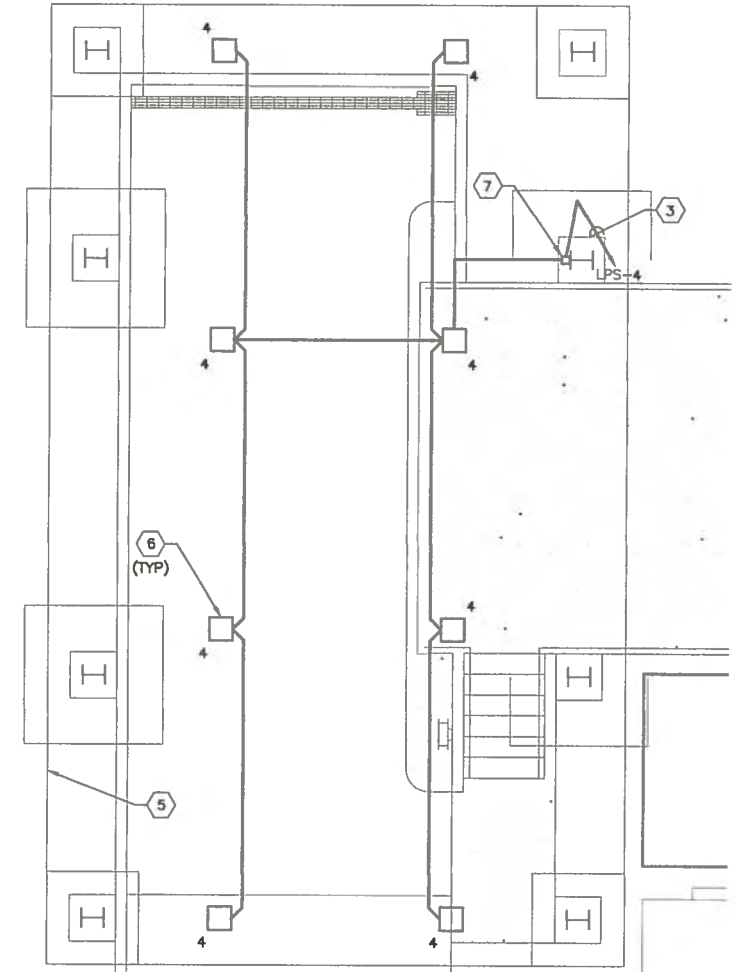
**TIMOTHY THOMAS**  
PROFESSIONAL ENGINEER  
No 47079  
FLORIDA  
APPROVED

**SEPTAGE RECEIVING STATION  
ELECTRICAL EQUIPMENT DIAGRAM**

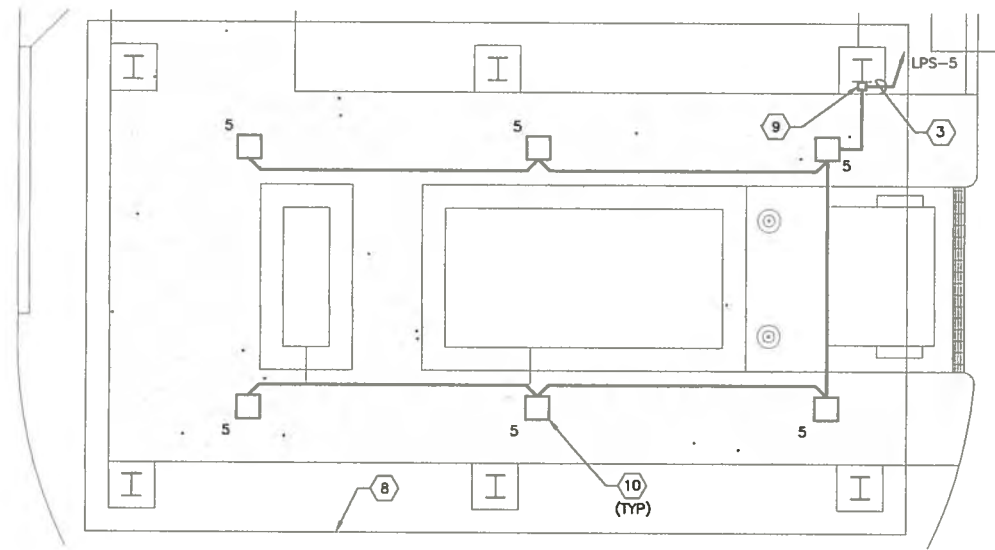
PROJECT NO:  
00193-009-02  
DATE:  
DECEMBER 2014  
SHEET NO:  
E-7



**SEPTAGE AND GREASE RECEIVING STATION LIGHTING PLAN**  
 SCALE : 1" = 2'-0"  
 1  
 E-3 | E-8

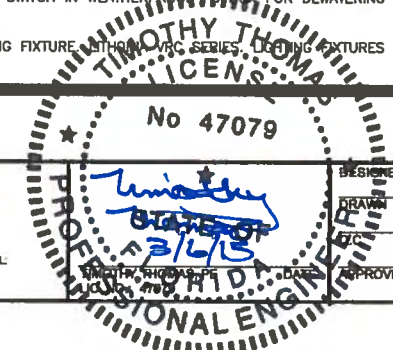


**VACUUM TRUCK RECEIVING RAMP LIGHTING PLAN**  
 SCALE : 1" = 2'-0"  
 2  
 E-3 | E-8



**DEWATERING LIGHTING PLAN**  
 SCALE : 1" = 2'-0"  
 3  
 E-3 | E-8

- KEYED NOTES:**
- ① EDGE OF SEPTAGE/GREASE RECEIVING STATION CANOPY.
  - ② PROVIDE AND INSTALL NEW LED CANOPY LIGHTING FIXTURE. LITHONIA VRC SERIES. LIGHTING FIXTURES TO BE INSTALLED 16'-0" ABOVE FINISHED GRADE.
  - ③ PROVIDE AND INSTALL 2-#12 + 1-#12 GND IN 3/4"C. TO NEW PANELBOARD 'LPS' (IN MCC-SEP) FOR 120V LIGHTING CIRCUIT.
  - ④ INSTALL NEW IP CAMERA. CAMERAS TO BE SPECIFIED AND PROVIDED BY MANATEE COUNTY. COORDINATE CAMERA REQUIREMENTS WITH MANATEE COUNTY.
  - ⑤ EDGE OF VACUUM TRUCK RECEIVING STATION CANOPY.
  - ⑥ PROVIDE AND INSTALL NEW LED CANOPY LIGHTING FIXTURE. LITHONIA VRC SERIES. LIGHTING FIXTURES TO BE INSTALLED 12'-0" ABOVE TRUCK RECEIVING STATION.
  - ⑦ PROVIDE AND INSTALL 120V, 15A, SINGLE-POLE SWITCH IN WEATHERPROOF FS BOX FOR VACUUM TRUCK RECEIVING STATION LIGHT CONTROL. PROVIDE AND INSTALL SINGLE-GANG WEATHERPROOF SWITCH COVER. BELL #5121-0.
  - ⑧ EDGE OF DEWATERING STATION CANOPY.
  - ⑨ PROVIDE AND INSTALL 120V, 15A, SINGLE-POLE SWITCH IN WEATHERPROOF FS BOX FOR DEWATERING STATION LIGHT CONTROL. PROVIDE AND INSTALL SINGLE-GANG WEATHERPROOF SWITCH COVER. BELL #5121-0.
  - ⑩ PROVIDE AND INSTALL NEW LED CANOPY LIGHTING FIXTURE. LITHONIA VRC SERIES. LIGHTING FIXTURES TO BE INSTALLED 12'-0" ABOVE DEWATERING FINISHED FLOOR.



NO.	DESCRIPTION	BY	DATE

**SEWRF SEPTAGE/ GREASE RECEIVING STATION**

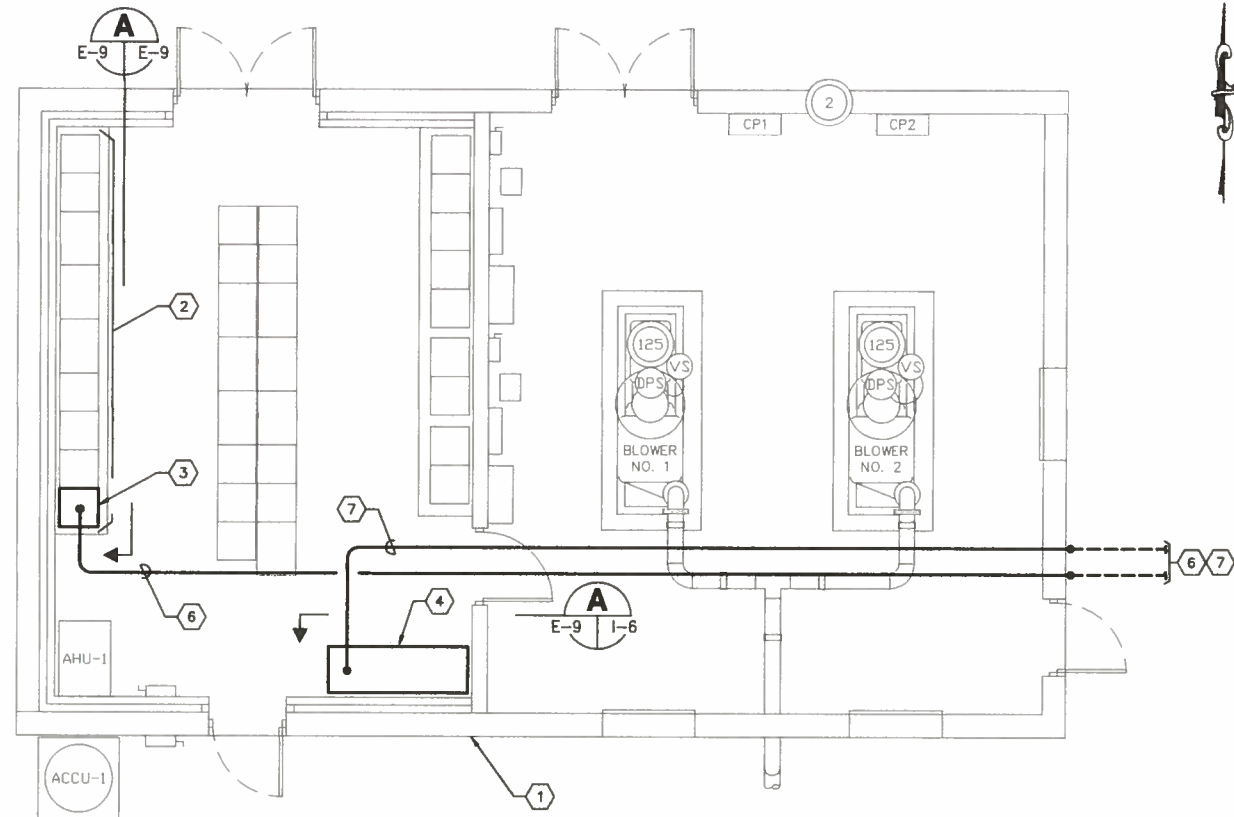
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**SEPTAGE RECEIVING AND VACUUM TRUCK RACK LIGHTING PLAN**

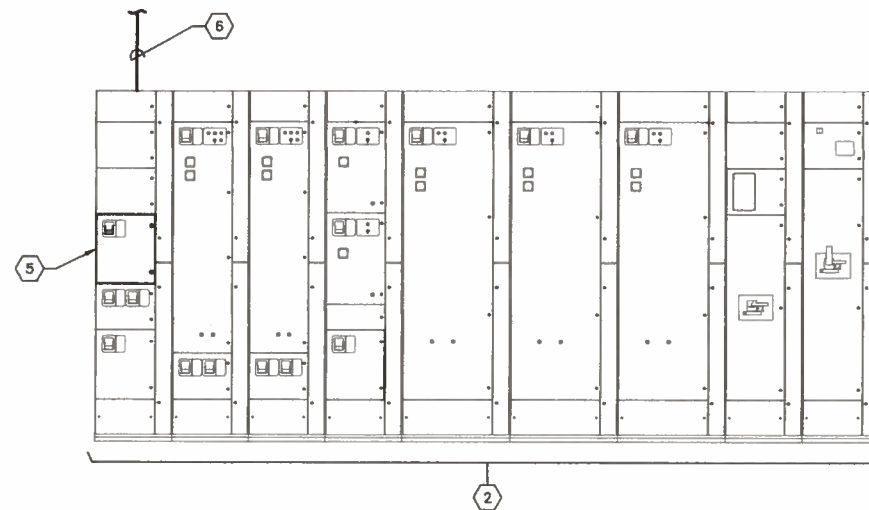
PROJECT NO:  
 00193-009-02  
 DATE:  
 JANUARY 2015  
 SHEET NO:  
 E-8



**MCC/BLOWER BUILDING No. 2  
FLOOR PLAN**

SCALE : 1/4" = 1'-0"

1  
E-2 | E-9



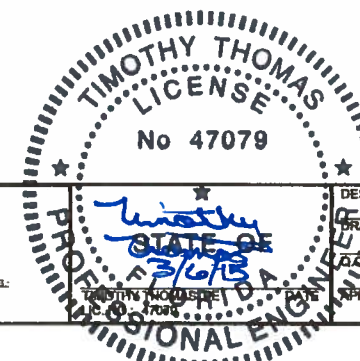
**MCC-1 ELEVATION**

SCALE : N.T.S.

A  
E-9 | E-9

**KEYED NOTES:**

- ① EXISTING MCC/BLOWER BUILDING NO. 2.
- ② EXISTING MOTOR CONTROL CENTER (MCC-1). MCC-1 IS A CUTLER-HAMMER FREEDOM 2100 UNIT.
- ③ EXISTING SPARE CUBICLES IN MCC-1. REFER TO MCC-1 ELEVATION ON THIS SHEET.
- ④ EXISTING SCADA PANEL 2. REFER TO SHEET I-4 FOR DETAILS.
- ⑤ EXISTING 18" SPARE CUBICLE IN MCC-1. CONTRACTOR SHALL PROVIDE NEW 3-POLE, 480V, 200A CIRCUIT BREAKER TO FEED THE NEW SEPTAGE RECEIVING STATION. CONTRACTOR SHALL PROVIDE ALL ACCESSORIES AS NECESSARY INCLUDING, BUT NOT LIMITED TO : NEW DOOR, NEW THROUGH-DOOR CIRCUIT BREAKER OPERATOR, NEW BUCKET, STABS, ETC.
- ⑥ PROVIDE AND INSTALL 3-#3/0 THWN CU + 1-#6 THWN CU GND IN 2"C. TO THE NEW SEPTAGE STATION. REFER ALSO TO SHEETS E-2 AND E-12.
- ⑦ PROVIDE AND INSTALL NEW 6 COUNT, 62.5/125um, TIGHT BUFFER MULTIMODE FIBER OPTIC CABLE IN 1-1/4"C. TO THE NEW SEPTAGE STATION. REFER ALSO TO SHEET E-2.



NO.	DESCRIPTION	BY	DATE

**SEWRF  
SEPTAGE/ GREASE  
RECEIVING STATION**



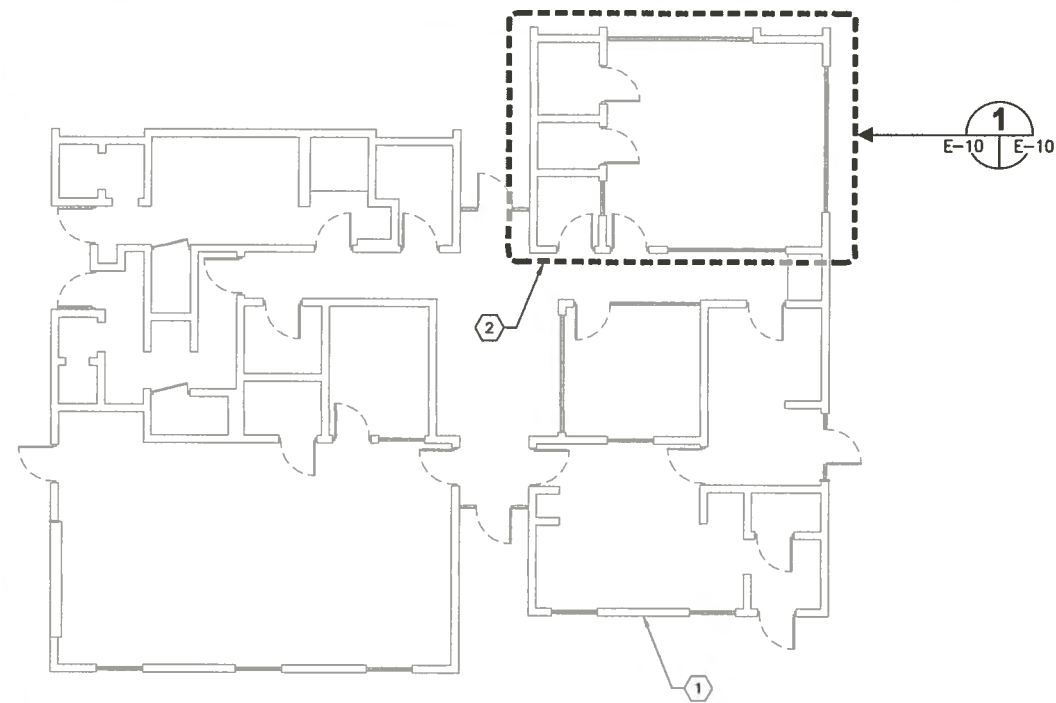
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**MCC-BLOWER BUILDING NO. 2  
FLOOR PLAN**

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00193-009-02  
DATE:  
JANUARY 2015  
SHEET NO:  
E-9



**ADMINISTRATION BUILDING  
FLOOR PLAN**

SCALE : N.T.S.

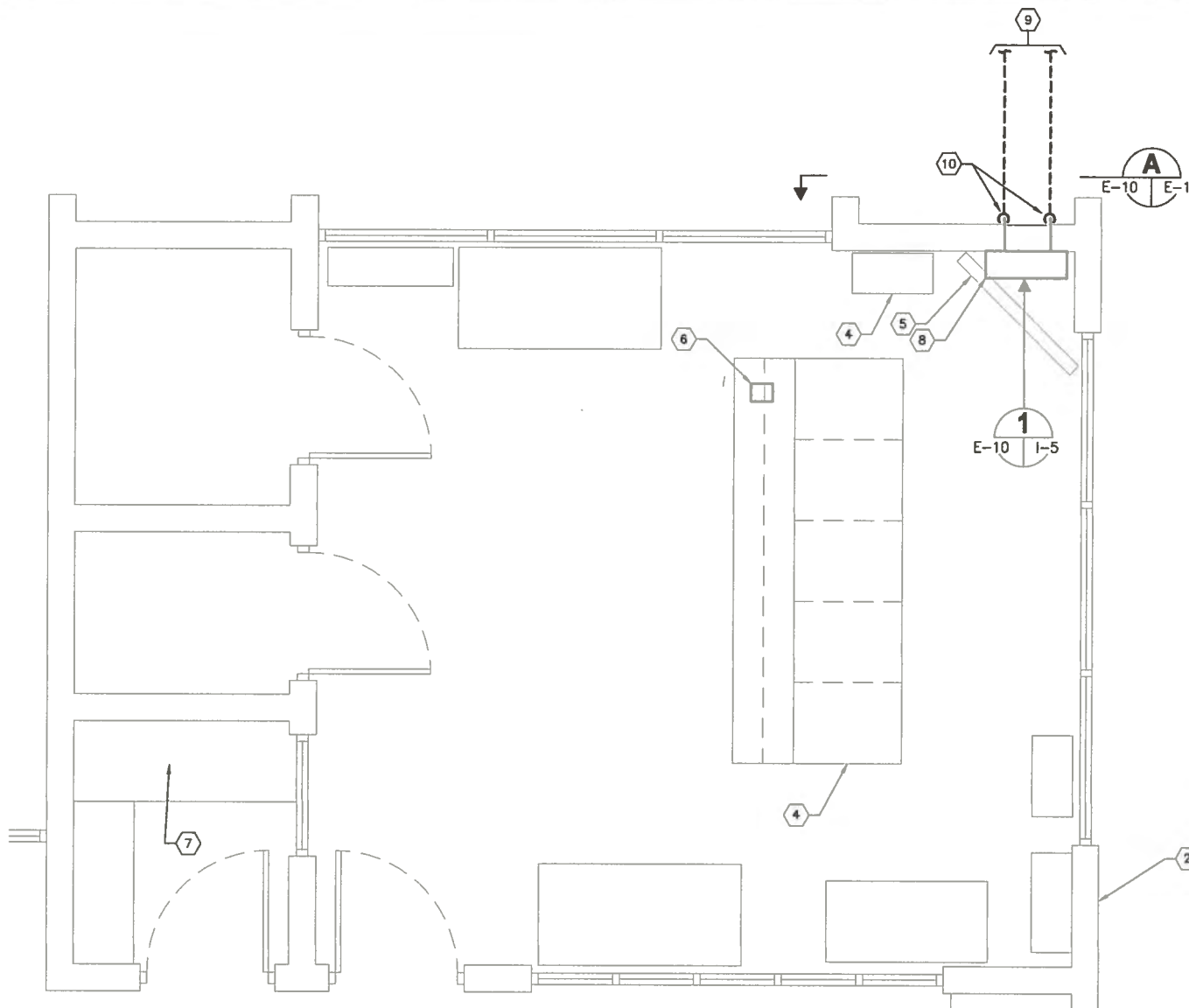
1  
E-2 | E-10



**EXTERIOR ELEVATION**

SCALE : N.T.S.

A  
E-10 | E-10



**CONTROL ROOM FLOOR PLAN**

SCALE : 1/2" = 1'-0".

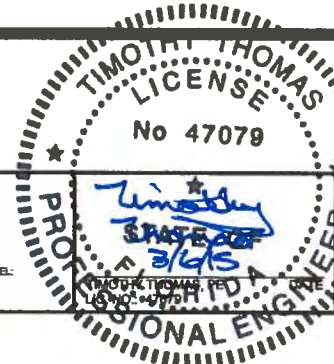
1  
E-10 | E-10

**KEYED NOTES:**

- 1 EXISTING ADMINISTRATION BUILDING.
- 2 EXISTING CONTROL ROOM WITHIN ADMINISTRATION BUILDING.
- 3 EXISTING CONSOLE CONTAINING SCADA COMPUTERS, PIC PLC, FIBER OPTIC CABLE PATH PANEL, ETC.
- 4 EXISTING DATA FLOW SYSTEM (DFS) EQUIPMENT.
- 5 EXISTING TV MONITOR AND VCR.
- 6 PROPOSED LOCATION OF NEW INTERCOM MASTER STATION.
- 7 PROPOSED LOCATION FOR NEW HAULER ACCESS PERSONAL COMPUTER (PC).
- 8 PROVIDE AND INSTALL NEW ADMINISTRATION BUILDING FIBER OPTIC PANEL. REFER TO DETAILS ON SHEET I-5. INSTALL FIBER PANEL BELOW EXISTING MONITOR. FIELD ADJUST DUE TO EXISTING CONDITIONS AS REQUIRED.
- 9 NEW DUCTBANK TO BE INSTALLED FOR SEPTAGE RECEIVING STATION INTERCOM COMMUNICATIONS CABLE AND CAMERA/HAULER ACCESS FIBER OPTIC CABLE. REFER ALSO TO SHEET E-2.
- 10 PROVIDE LONG RADIUS SWEEP FOR CONDUIT CONTAINING NEW CAMERA/HAULER ACCESS FIBER OPTIC CABLE. PROVIDE INTERCOM CONDUIT WITH LB FITTING.
- 11 CONTRACTOR TO RESTORE BED AND PAVERS TO ORIGINAL CONDITION AFTER CONDUIT INSTALLATION.



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NO.	DESCRIPTION	BY	DATE

**SEWRF  
SEPTAGE/ GREASE  
RECEIVING STATION**

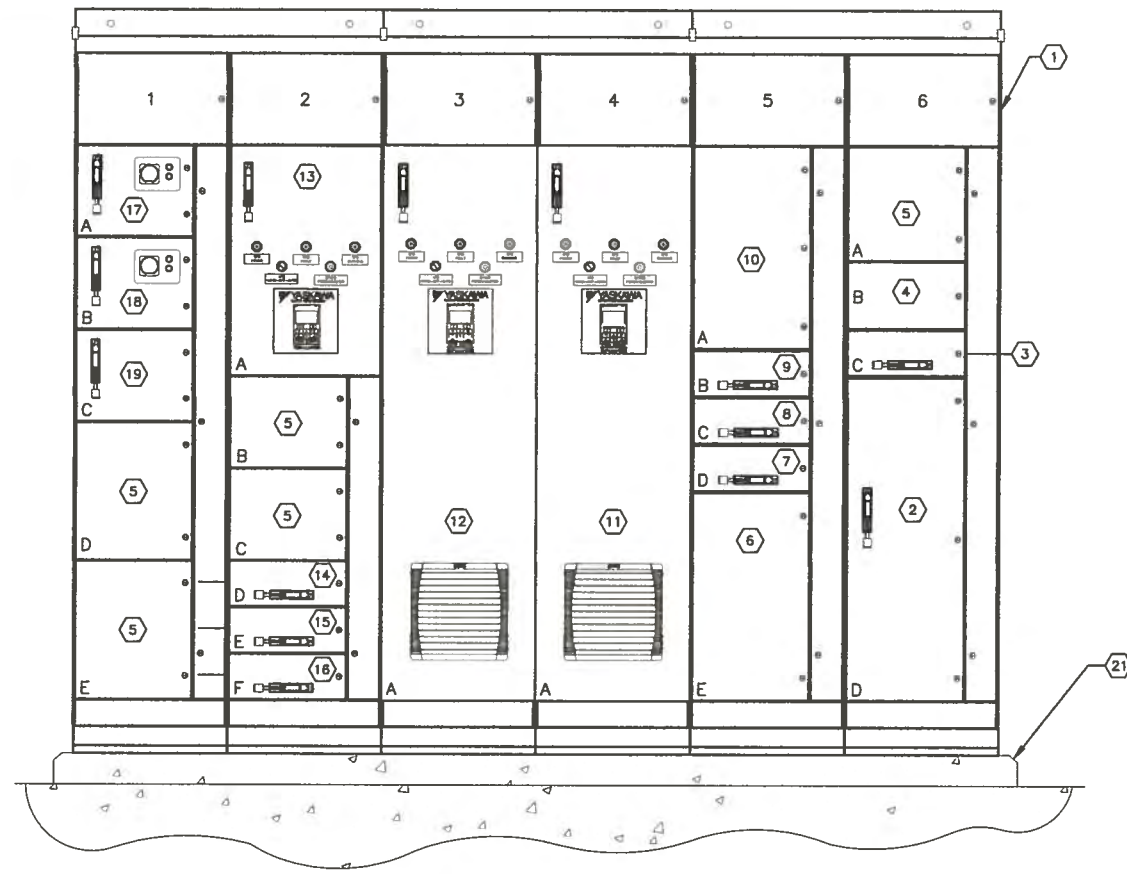
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**SEPTAGE RECEIVING STATION  
ADMINISTRATION BUILDING FLOOR  
PLAN**

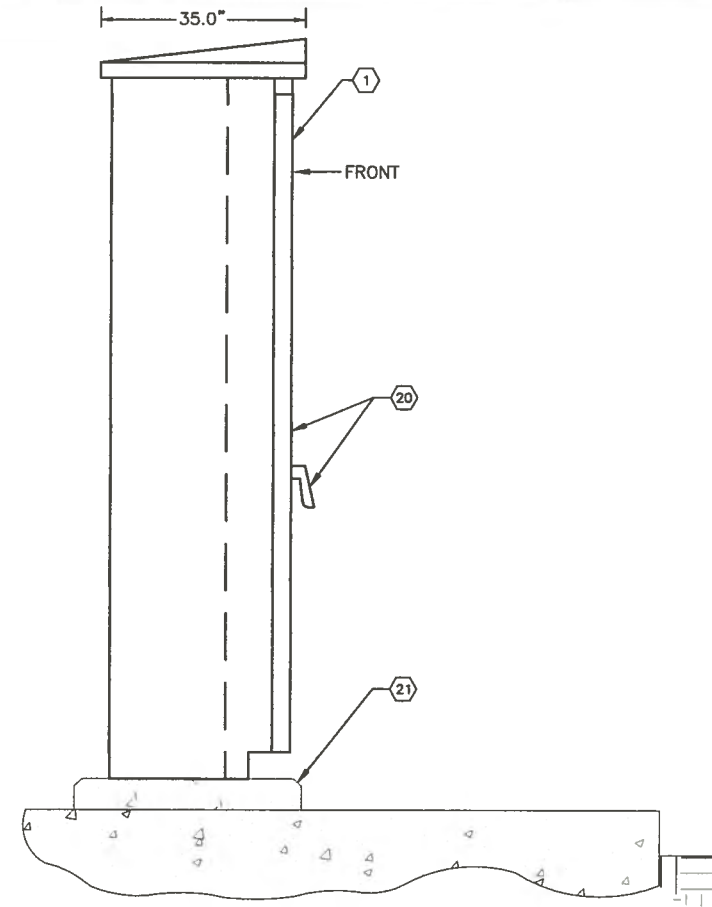
PROJECT NO:  
00193-009-02  
DATE:  
JANUARY 2015  
SHEET NO:  
E-10



SEPTAGE AND GREASE  
RECEIVING STATION  
MCC FRONT ELEVATION

SCALE : 1" = 2'-0"

NOTE : MCC SHOWN WITH OUTER ENCLOSURE  
DOORS REMOVED



SEPTAGE AND GREASE  
RECEIVING STATION  
MCC SIDE ELEVATION

SCALE : 1" = 2'-0"

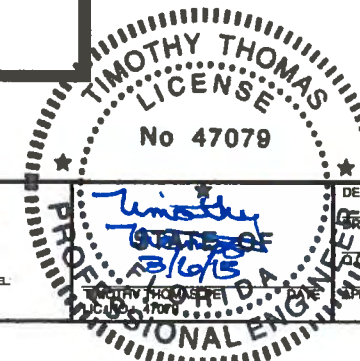
KEYED NOTES:

- ① NEW SEPTAGE RECEIVING STATION MOTOR CONTROL CENTER MCC IN NEMA 3R ENCLOSURE. REFER ALSO TO ONE-LINE DIAGRAM ON SHEET E-12.
- ② 200A, 480V, 3-POLE MAIN CIRCUIT BREAKER.
- ③ 30A, 480V, 3-POLE CIRCUIT BREAKER FOR SURGE PROTECTION DEVICE (SPD).
- ④ SURGE PROTECTION DEVICE (SPD).
- ⑤ SPACE
- ⑥ 15 KVA, 3ø, 480V-120/208V TRANSFORMER.
- ⑦ 40A, 480V, 3-POLE CIRCUIT BREAKER FOR 15 KVA TRANSFORMER.
- ⑧ 20A, 480V, 3-POLE CIRCUIT BREAKER FOR NEW EAST SEPTAGE STATION CONTROL PANEL.
- ⑨ 20A, 480V, 3-POLE CIRCUIT BREAKER FOR NEW WEST SEPTAGE STATION CONTROL PANEL.
- ⑩ NEW 120/208V, 3ø, 4-WIRE PANELBOARD WITH 100A M.C.B. PANELBOARD DESIGNATION 'LPS'. REFER TO SHEET E-XX FOR SCHEDULE.

- ⑪ NEW 40 HP, 480V, VFD FOR NEW TRANSFER PUMP No. 1.
- ⑫ NEW 40 HP, 480V, VFD FOR NEW TRANSFER PUMP No. 2.
- ⑬ NEW 7.5 HP, 480V, VFD FOR NEW GREASE PUMP.
- ⑭ SPARE 20A, 480V, 3-POLE CIRCUIT BREAKER.
- ⑮ 20A, 480V, 3-POLE CIRCUIT BREAKER FOR DEWATERING PRESS CONTROL PANEL.
- ⑯ 20A, 480V, 3-POLE CIRCUIT BREAKER FOR NEW GREASE STATION CONTROL PANEL.
- ⑰ STARTER FOR NEW GREASE TANK MIXER No. 1.
- ⑱ STARTER FOR NEW GREASE TANK MIXER No. 2.
- ⑲ 70A, 480V, 3-POLE CIRCUIT BREAKER FOR NEW WET WELL CONTROL PANEL.
- ⑳ PROVIDE GASKETED RAIN TIGHT DOOR WITH LOCKING HANDLE.
- ㉑ PROVIDE 4" CONCRETE HOUSKEEPING PAD WITH CHAMFERED EDGES.

GENERAL NOTES :

- 1. MCC DIMENSIONS ARE BASED ON A PARTICULAR MANUFACTURER'S INFORMATION. THE CONTRACTOR SHALL MAKE ALL NECESSARY ADJUSTMENTS BASED ON THE EQUIPMENT PROVIDED/SUPPLIED.



NO.	DESCRIPTION	BY	DATE

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SEPTAGE/ GREASE  
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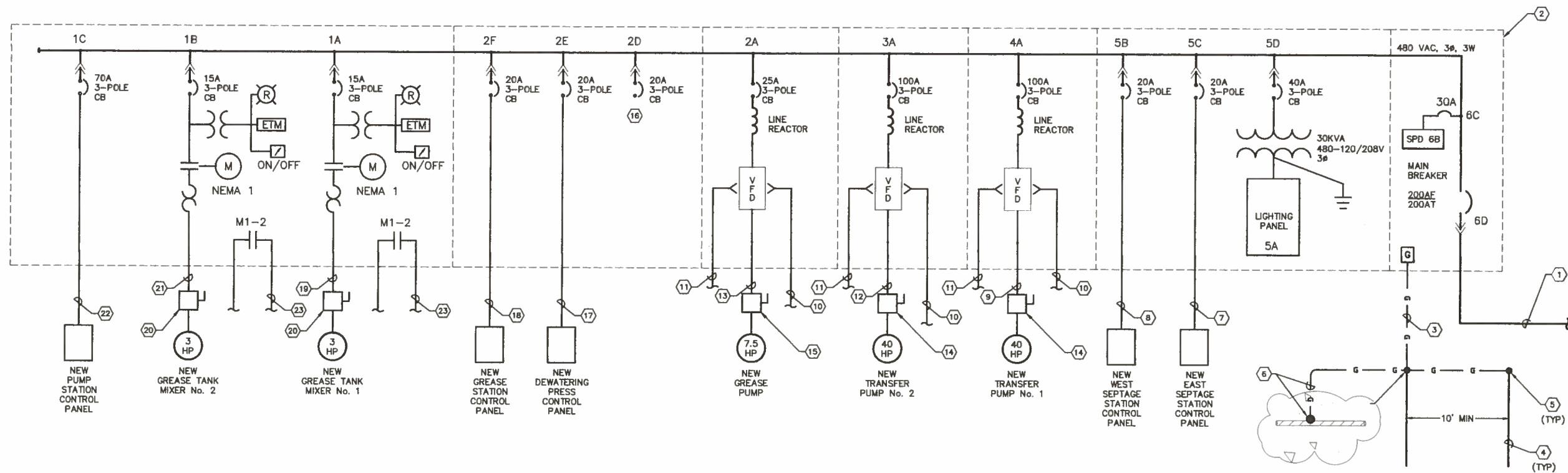
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SEPTAGE RECEIVING STATION MCC  
ELEVATION

PROJECT NO:  
00193-009-02  
DATE:  
JANUARY 2015  
SHEET NO:  
E-11



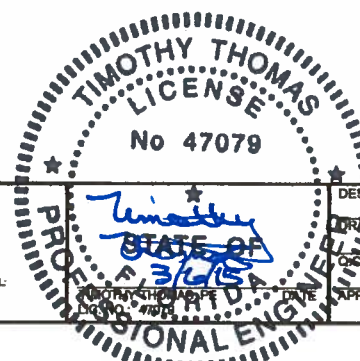


**SEPTAGE RECEIVING STATION ONE LINE DIAGRAM**

SCALE : N.T.S.

**KEYED NOTES:**

- ① PROVIDE AND INSTALL NEW SEPTAGE RECEIVING STATION MOTOR CONTROL FEEDER. 3-#3/0 THWN CU + 1-#6 THWN CU GND IN 2" C. REFER ALSO TO SHEETS E-2 AND E-9.
- ② PROVIDE AND INSTALL NEW SEPTAGE RECEIVING STATION MOTOR CONTROL CENTER ('MCC-SEP').
- ③ PROVIDE AND INSTALL #1 BARE CU GROUNDING ELECTRODE CONDUCTOR IN 1-1/2" C..
- ④ PROVIDE AND INSTALL 5/8" X 20'-0" GROUNDING ELECTRODE.
- ⑤ PROVIDE AND INSTALL EXOTHERMIC WELDS.
- ⑧ PROVIDE AND INSTALL #1 BARE CU GROUNDING CONDUCTOR AND EXOTHERMICALLY WELD TO REBAR IN NEW SEPTAGE STATION CONCRETE SLAB.
- ⑦ PROVIDE AND INSTALL NEW EAST SEPTAGE STATION CONTROL PANEL FEEDER. 3-#12 THWN CU + 1-#12 THWN CU GND IN 3/4"C.
- ⑧ PROVIDE AND INSTALL NEW WEST SEPTAGE STATION CONTROL PANEL FEEDER. 3-#12 THWN CU + 1-#12 THWN CU GND IN 3/4"C.
- ⑨ PROVIDE AND INSTALL NEW TRANSFER PUMP No. 1 FEEDER. 3-#6 THWN CU + 1-#8 THWN CU GND + 4-#12 THWN CU (MOTOR HEATER/THERMALS) IN 1"C.
- ⑩ PROVIDE AND INSTALL 2-#12 THWN CU + 1-#12 THWN CU GND IN 3/4" CONDUIT TO NEW DEWATERING CONTROL CABINET FOR VFD RUN SIGNAL. ALSO PROVIDE AND INSTALL 2/C-#18 TWISTED SHIELDED CABLE (BELDEN 8760) IN 1-1/4" CONDUIT TO NEW DEWATERING CONTROL CABINET FOR VFD 4-20mA SPEED CONTROL.
- ⑪ PROVIDE AND INSTALL 12-#12 THWN CU + 1-#12 THWN CU GND IN 3/4" CONDUIT TO NEW PLC CONTROL CABINET FOR (2-#12 VFD RUNNING, 2-#12 VFD FAULT, 2-#12 VFD IN HAND, 2-#12 VFD IN AUTO, 4 SPARES). ALSO PROVIDE AND INSTALL 2/C-#18 TWISTED SHIELDED CABLE (BELDEN 8760) IN 1-1/4" CONDUIT TO NEW PLC CONTROL CABINET FOR VFD 4-20mA SPEED REFERENCE SIGNAL.
- ⑫ PROVIDE AND INSTALL NEW TRANSFER PUMP No. 2 FEEDER. 3-#6 THWN CU + 1-#8 THWN CU GND + 4-#12 THWN CU (MOTOR HEATER/THERMALS) IN 1"C.
- ⑬ PROVIDE AND INSTALL NEW GREASE PUMP FEEDER. 3-#12 THWN CU + 1-#12 THWN CU GND IN 3/4"C.
- ⑭ PROVIDE AND INSTALL 600V, 60A, 3-POLE, NON-FUSED DISCONNECT IN NEMA 4X SS ENCLOSURE FOR TRANSFER PUMP LOCAL DISCONNECTING MEANS. THE DISCONNECT SHALL BE PROVIDED WITH AUXILIARY CONTACTS TO DISCONNECT THE MOTOR HEATER AND THERMAL SWITCH CIRCUITS WHEN THE SWITCH DISCONNECTS THE MOTOR PHASE CONDUCTORS.
- ⑮ PROVIDE AND INSTALL 600V, 30A, 3-POLE, NON-FUSED DISCONNECT IN NEMA 4X SS ENCLOSURE FOR GREASE PUMP LOCAL DISCONNECTING MEANS.
- ⑯ SPARE CIRCUIT BREAKER.
- ⑰ PROVIDE AND INSTALL NEW DEWATERING PRESS CONTROL PANEL FEEDER. 3-#12 THWN CU + 1-#12 THWN CU GND IN 3/4"C.
- ⑱ PROVIDE AND INSTALL NEW GREASE STATION CONTROL PANEL FEEDER. 3-#12 THWN CU + 1-#12 THWN CU GND IN 3/4"C.
- ⑲ PROVIDE AND INSTALL NEW GREASE TANK MIXER No. 1 FEEDER. 3-#12 THWN CU + 1-#12 THWN CU GND IN 3/4"C.
- ⑳ PROVIDE AND INSTALL 600V, 30A, 3-POLE, NON-FUSED DISCONNECT IN NEMA 4X SS ENCLOSURE FOR GREASE TANK MIXER DISCONNECTING MEANS. MOUNT DISCONNECT AT TOP OF TANK, ADJACENT TO MIXER MOTOR.
- ㉑ PROVIDE AND INSTALL NEW GREASE TANK MIXER No. 2 FEEDER. 3-#12 THWN CU + 1-#12 THWN CU GND IN 3/4"C.
- ㉒ PROVIDE AND INSTALL NEW PUMP STATION CONTROL PANEL FEEDER. 3-#4 THWN CU + 1-#8 THWN CU GND IN 1-1/4"C.
- ㉓ PROVIDE AND INSTALL 2-#12 THWN CU + 1-#12 THWN CU GND IN 3/4" C. TO PLC CONTROL CABINET FOR GREASE STORAGE TANK MIXER OR SEPTAGE STORAGE TANK MIXER RUNNING SIGNAL.



NO.	DESCRIPTION	BY	DATE

**SEWRF  
SEPTAGE/ GREASE  
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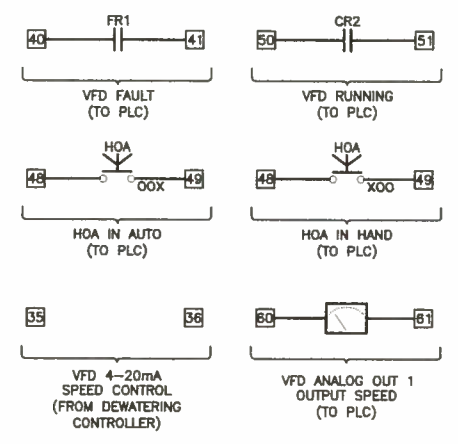
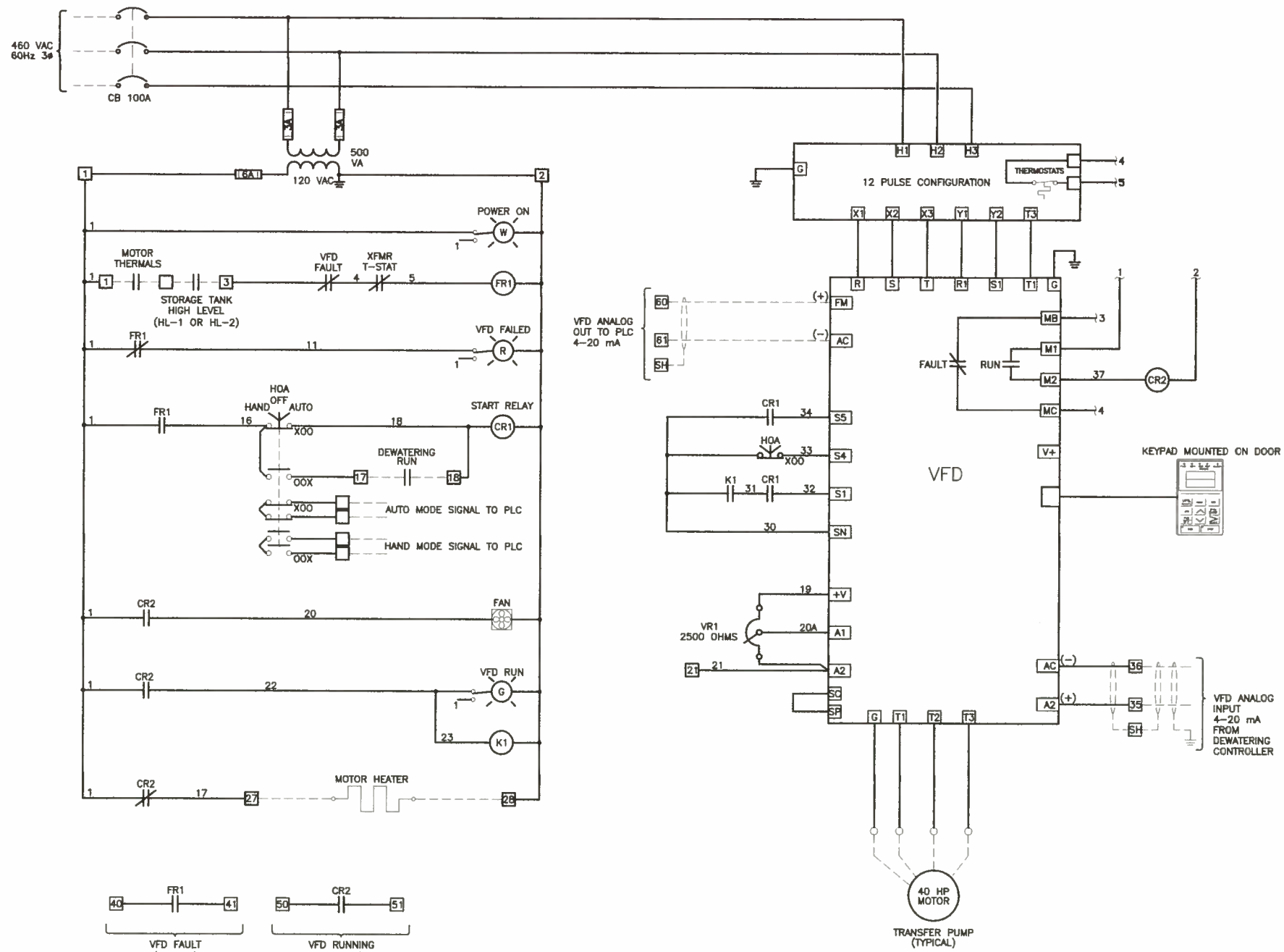
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**SEPTAGE RECEIVING STATION ONE  
LINE DIAGRAM**

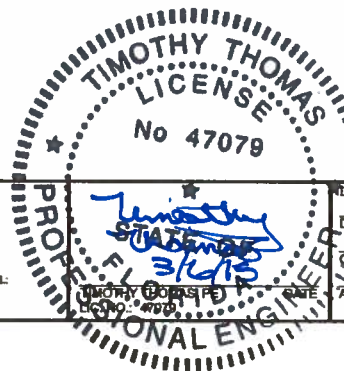
PROJECT NO:  
00193-009-02  
DATE:  
JANUARY 2015  
SHEET NO:  
E-12

**GENERAL NOTES :**

1. NEW SEPTAGE RECEIVING STATION MOTOR CONTROL CENTER MCC IN NEMA 3R ENCLOSURE. REFER ALSO TO ONE-LINE DIAGRAM ON SHEET E-12.



**TYPICAL TRANSFER PUMP WIRING SCHEMATIC**  
SCALE : N.T.S.



NO.	DESCRIPTION	BY	DATE

**SEWRF  
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RECEIVING STATION**

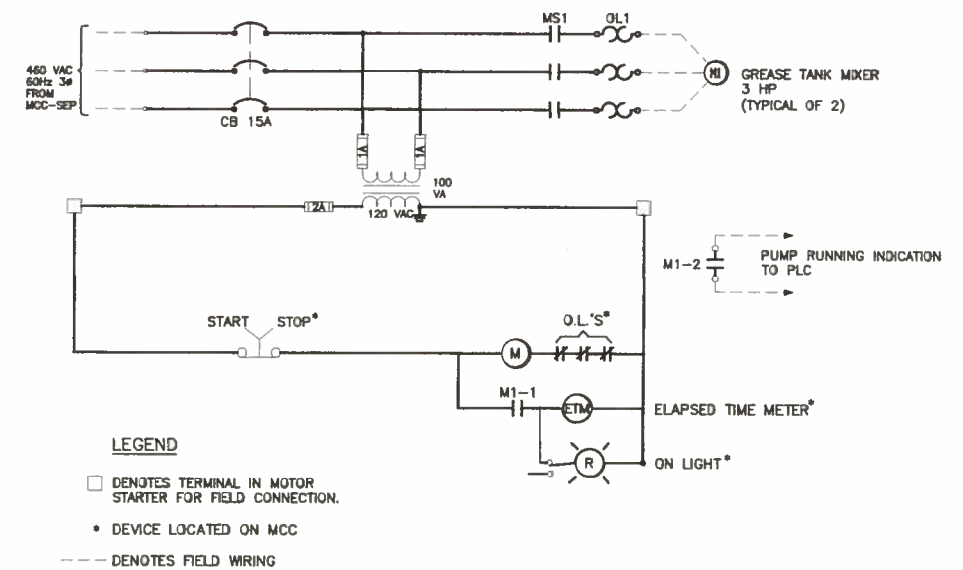
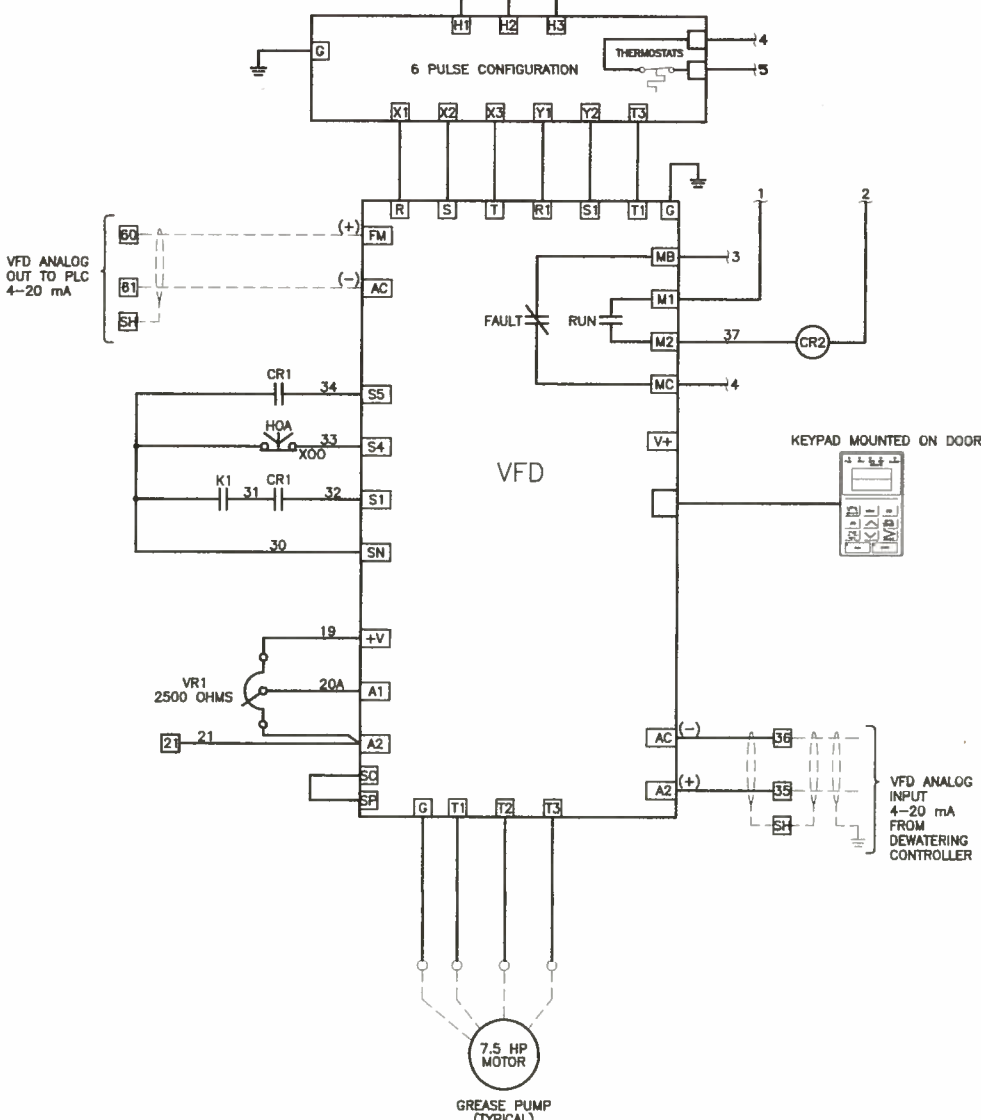
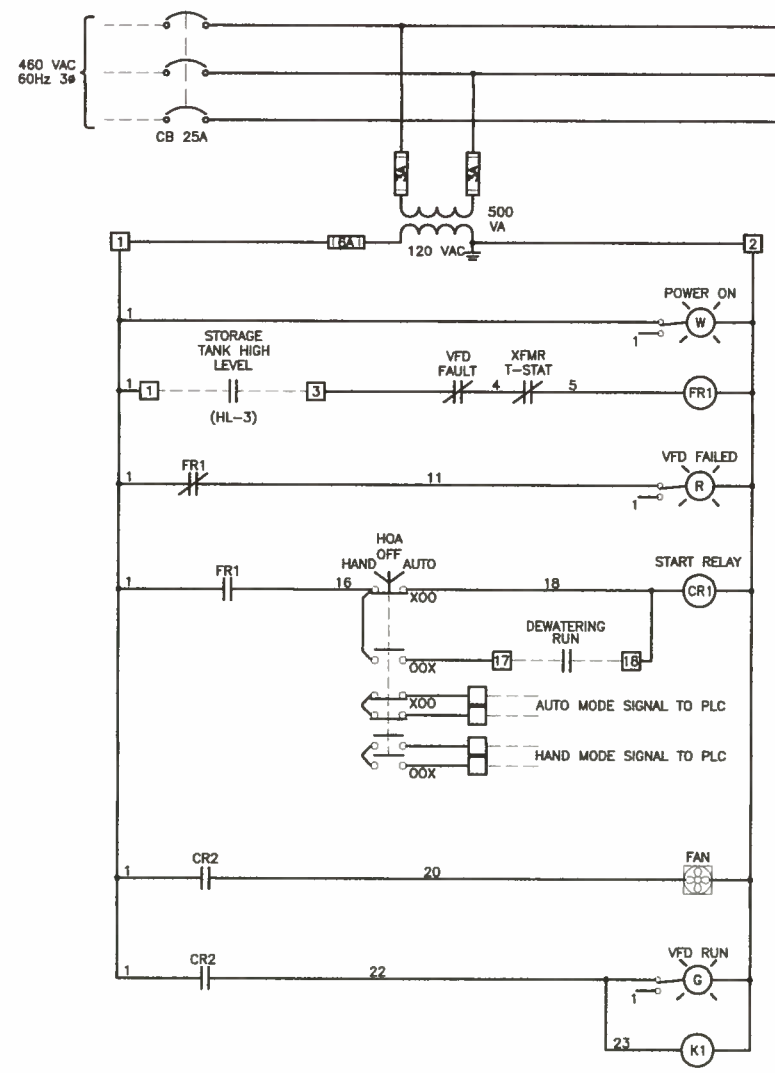
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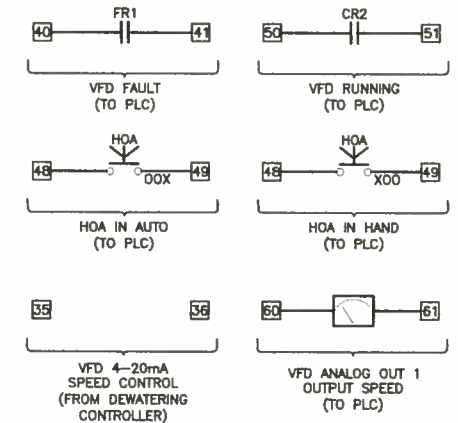
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**SEPTAGE RECEIVING STATION  
TYPICAL TRANSFER PUMP WIRING  
SCHEMATIC**

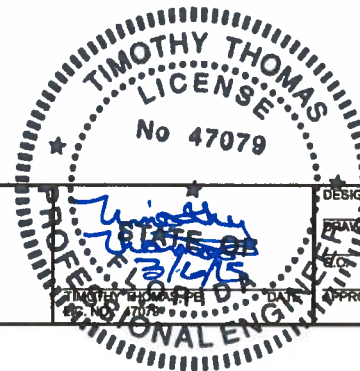
PROJECT NO:  
00193-009-02  
DATE:  
JANUARY 2015  
SHEET NO:  
E-13



**TYPICAL GREASE TANK MIXER WIRING SCHEMATIC**  
SCALE : N.T.S.



**GREASE PUMP WIRING SCHEMATIC**  
SCALE : N.T.S.



NO.	DESCRIPTION	BY	DATE

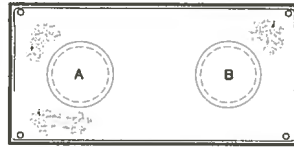
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SEPTAGE/ GREASE  
RECEIVING STATION**

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**SEPTAGE RECEIVING STATION  
GREASE PUMP AND MIXER WIRING  
SCHEMATIC**

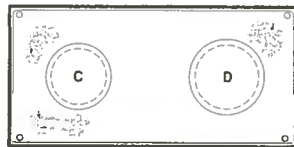
PROJECT NO:  
00183-009-02  
DATE:  
JANUARY 2015  
SHEET NO:  
E-14



**DUCTBANK SECTION 'A'** **A**  
SCALE : N.T.S. E-2 | E-15

**DUCTBANK 'A' SCHEDULE :**

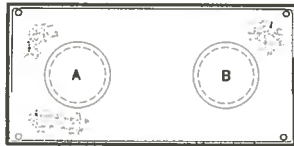
- A. 1-1/4" C. WITH 6-COUNT FIBER OPTIC CABLE.
- B. 1-1/4" C. WITH 4/C-#16 INTERCOM CABLE.



**DUCTBANK SECTION 'B'** **B**  
SCALE : N.T.S. E-2 | E-15

**DUCTBANK 'B' SCHEDULE :**

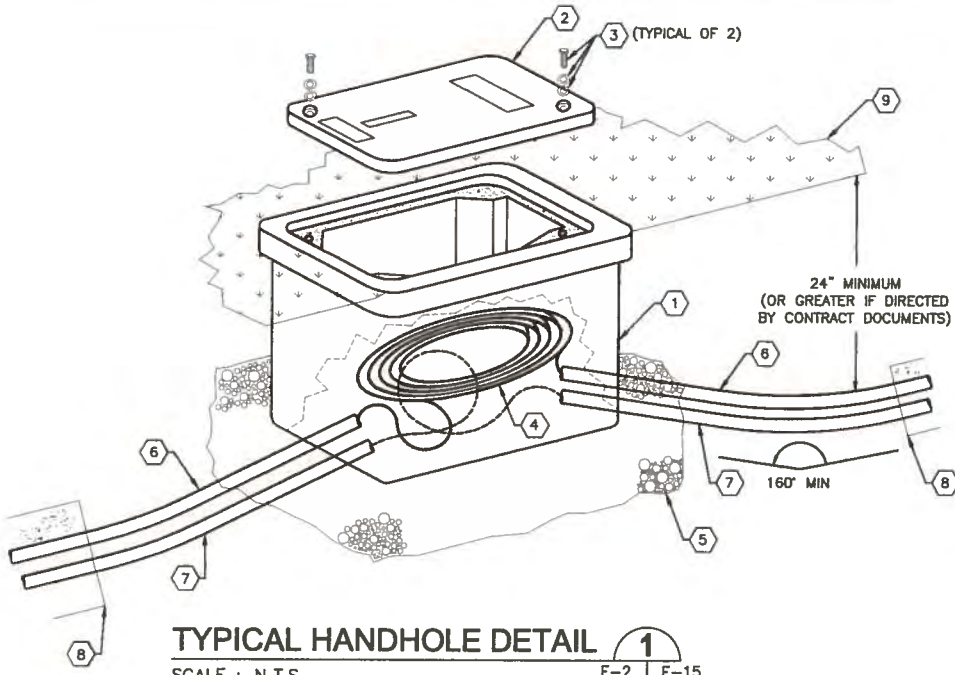
- C. 1-1/4" C. WITH 6-COUNT FIBER OPTIC CABLE.
- D. 2" C. WITH 3-3/0 THWN CU + 1-#6 THWN CU GND.



**DUCTBANK SECTION 'C'** **C**  
SCALE : N.T.S. E-3 | E-15

**DUCTBANK 'C' SCHEDULE :**

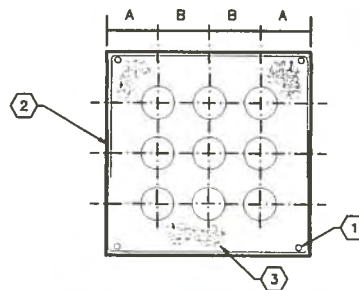
- A. 1-1/4" C. WITH 6-COUNT FIBER OPTIC CABLE.
- B. 1-1/4" C. WITH 4/C-#16 INTERCOM CABLE.
- C. 1-1/4" C. WITH 6-COUNT FIBER OPTIC CABLE.
- D. 2" C. WITH 3-3/0 THWN CU + 1-#6 THWN CU GND.



**TYPICAL HANDHOLE DETAIL** **1**  
SCALE : N.T.S. E-2 | E-15

**HANDHOLE NOTES:**

- 1 24" x 36" x 30" FIBER-REINFORCED POLYMER CONCRETE HANDHOLE. REFER ALSO TO SPECIFICATIONS.
- 2 "HH" TRAFFIC-RATED LID. PROVIDE RECESSED IDENTIFICATION MARKING OF "FIBER OPTIC" PERMANENTLY INDENTED IN THE COVER. LID SHALL BE PROVIDED WITH NON-SKID SURFACE.
- 3 STAINLESS STEEL BOLTS AND ASSOCIATED HARDWARE. BOLTS SHALL BE A MINIMUM OF 5/8".
- 4 PROVIDE A MINIMUM OF 10 FEET OF SLACK FIBER OPTIC CABLE.
- 5 PROVIDE A BED OF PEA ROCK GRAVEL (6" MINIMUM DEPTH, 3" MINIMUM EXTERIOR OF HANDHOLE) INSIDE THE BOTTOM OF THE HANDHOLE.
- 6 1-1/4" CONDUIT WITH 6-COUNT FIBER OPTIC CABLE. CONDUIT SHALL ENTER THE HANDHOLE AS NEAR TO HORIZONTAL AS POSSIBLE. NO 90° CONDUIT SWEEPS SHALL BE ALLOWED. FIBER OPTIC CABLE SHALL PASS STRAIGHT THROUGH HANDHOLE WITH MINIMAL OR NO BENDING EXCEPT FOR PLACING OF SLACK COILS IN THE HANDHOLE. THE MANUFACTURER'S MINIMUM BEND RADIUS SHALL BE MAINTAINED AT ALL TIMES.
- 7 1-1/4" CONDUIT WITH INTERCOM COMMUNICATIONS CABLE. BENDING RESTRICTIONS AND SLACK REQUIREMENTS OF INTERCOM CABLE DO NOT APPLY TO THE INTERCOM CABLE, BUT CONDUIT INSTALLATION SHALL BE SIMILAR FOR CONSISTENCY.
- 8 TERMINATE DUCTBANK PRIOR TO HANDHOLE TO ALLOW FOR CONDUIT SWEEP INTO HANDHOLE.
- 9 FINISHED GRADE.



**KEYED NOTES:**

- 1 #4 REBARS (TYPICAL)
- 2 #4 HOOP AT 24" O.C.
- 3 CONCRETE ENCASMENT.

**DUCTBANK CONDUIT SPACING DIMENSION SCHEDULE**

COND SIZE	DIM 'A'	DIMENSION 'B'	
		1-1/4"	2"
1-1/4"	3-3/4"	3-3/8"	3-5/8"
2"	4"	3-5/8"	4"

**GENERAL NOTES :**

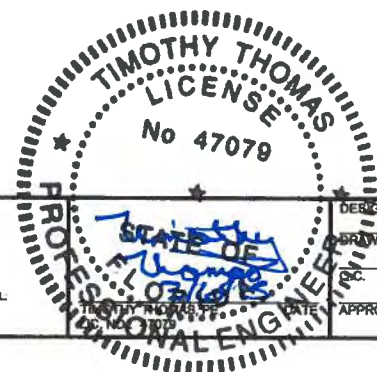
- 1. DUCTBANK SHALL BE INSTALLED AT A MINIMUM OF 24" BELOW FINISHED GRADE.
- 2. CONCRETE SHALL BE 3000 PSI MINIMUM COMPRESSION STRENGTH.
- 3. DUCTBANKS MAY BE REARRANGED FOR CONVENIENCE OF EGRESS.

**EXISTING PANEL SCHEDULE**

PANEL 'LPS' : SQUARE D CO. ; 120/208 VOLTS, 3Ø, 4W ; 100 AMP MAIN ; 42K AIC RATING ; INSTALLED IN MCC ; TYPE NQOB ; CIRCUIT BREAKER ; TOP AT 5'-6" AFT

EQUIPMENT SERVED	CIRCUIT BREAKER			KVA/PHASE			CIRC. NO.	CIRC. NO.	KVA/PHASE			CIRCUIT BREAKER			EQUIPMENT SERVED
	POLE	AMPS	FRAME	A	B	C			A	B	C	POLE	AMPS	FRAME	
WEST SEPTAGE LIGHTING	1	20	QOB	0.5			1	2	0.8			1	20	QOB	GREASE CANOPY LIGHTING
EAST SEPTAGE LIGHTING	1	20	QOB		0.5		3	4		0.5		1	20	QOB	VACUUM TRUCK LIGHTING
DEWATERING CANOPY LIGHTING	1	20	QOB			0.4	5	6			0.5	1	20	QOB	WEST SEPTAGE HAULER ACCESS
PLC CONTROL CABINET	1	20	QOB	0.5			7	8	0.5			1	20	QOB	GREASE HAULER ACCESS
PLC CONTROL CABINET	1	20	QOB			0.3	9	10		0.5		1	20	QOB	EAST SEPTAGE HAULER ACCESS
PLC CONTROL CABINET	1	20	QOB			0.3	11	12				1	20	QOB	SPARE
SPACE							13	14				1	20	QOB	SPARE
SPACE							15	16				1	20	QOB	SPARE
SPACE							17	18				1	20	QOB	SPARE
SPACE							19	20							SPACE
SPACE							21	22							SPACE
SPACE							23	24							SPACE
SPACE							25	26							SPACE
SPACE							27	28							SPACE
SPACE							29	30							SPACE
SUB-TOTAL KVA				11.7	10.3	10.2				3.4	7.0	3.5			

TOTAL CONNECTED LOAD = 46.1 KVA      TOTAL DEMAND LOAD = 46.1 KVA



NO.	DESCRIPTION	BY	DATE

**SEWRF SEPTAGE/ GREASE RECEIVING STATION**

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**SEPTAGE RECEIVING STATION DETAILS AND PANEL SCHEDULE**

PROJECT NO: 00193-009-02  
DATE: JANUARY 2015  
SHEET NO: E-15

FUNCTION SYMBOL SCHEDULE

IDENTIFICATION LETTERS				
FIRST LETTER	MEASURED OR INITIATING VARIABLE		SUCCEEDING LETTERS	
	MEASURED OR INITIATING VARIABLE	MODIFIER	READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION
A	ANALYSIS		ALARM	
B	BURNER, COMBUSTION		PROGRAMMER	
C	CONDUCTIVITY			CONTROL
D	DENSITY	DIFFERENTIAL		CLOSED
E	VOLTAGE		SENSOR (PRIMARY ELEMENT)	
F	FLOW RATE	RATIO (FRACTION)		
G	GAGING		GLASS VIEWING DEVICE	
H	HAND			HIGH
I	CURRENT (ELECTRICAL)		INDICATE	
J	POWER	SCAN		
K	TIME, TIME SCHEDULE	TIME RATE OF CHANGE		CONTROL STATION
L	LEVEL		LIGHT (PILOT)	LOW
M	MOTOR	MOMENTARY		MIDDLE, INTERMEDIATE
N	VIBRATION		IGNITOR	ISOLATOR
O	OPERATION	OFFSET	ORIFICE, RESTRICTION	OPEN
P	PRESSURE, VACUUM		POINT (TEST) CONNECTION	
Q	QUANTITY, EVENT	INTEGRATE, TOTALIZE	INTEGRATE	
R	RADIATION		RECORD, PRINT	
S	SPEED, FREQUENCY	SAFETY		SWITCH
T	TEMPERATURE			TRANSMIT
U	MULTIVARIABLE	TREND	MULTIFUNCTION	MULTIFUNCTION
V	VISCOSITY	VACUUM		VALVE, DAMPER, LOUVER, GATE
W	WEIGHT, FORCE, TORQUE		WELL	
X	UNCLASSIFIED		UNCLASSIFIED	UNCLASSIFIED
Y			RELAY, COMPUTE, CONVERT	
Z	POSITION		FINAL CONTROL ELEMENT	UNCLASSIFIED

LINE DESIGNATIONS

INSTRUMENTATION SIGNAL — — — —  
 ELECTRICAL POWER — — — —  
 DATA LINK —D—D—  
 RADIO LINK —R—R—  
 FIBER OPTIC DATA —F—F—

MISCELLANEOUS NOTATIONS

S/D = SHUTDOWN  
 O/R = OVERRIDE  
 MCS = MASTER CONTROL STATION  
 VFD = VARIABLE FREQUENCY DRIVE  
 PCC = PROCESS CONTROL CABINET  
 LCP = LOCAL CONTROL PANEL  
 ES = ELECTRICAL SUPPLY (120VAC)

CONTROLLER NOTATION

PV = PROCESS VARIABLE INPUT  
 SP = SET POINT INPUT  
 C = CONTROL OUTPUT

EQUIPMENT NOTATION

B = BLOWER OR FAN  
 E = ENGINE  
 G = GENERATOR  
 F = FILTER  
 GS = GRINDER/SCREEN  
 K = COMPRESSOR  
 H = HOIST  
 ME = MECHANICAL EQUIPMENT  
 MX = MIXER  
 P = PUMP  
 T = TANK OR SUMP

INPUT/OUTPUT NOTATIONS

AI = ANALOG INPUT  
 AO = ANALOG OUTPUT  
 DI = DISCRETE INPUT  
 DO = DISCRETE OUTPUT

HAND SWITCH NOTATION

HOA = HAND-OFF-AUTO  
 S/S = START/STOP  
 SEL = SELECTOR  
 O/C = OPEN/CLOSE  
 O/O = ON/OFF  
 LOS = LOCKOUT-START  
 LOR = LOCAL-OFF-REMOTE  
 OAC = OPEN-AUTO CLOSE  
 CAO = CLOSED-AUTO OPEN

VALVE DESIGNATIONS

MOV = MOTOR OPERATED VALVE

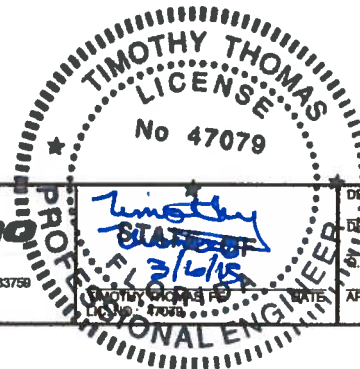
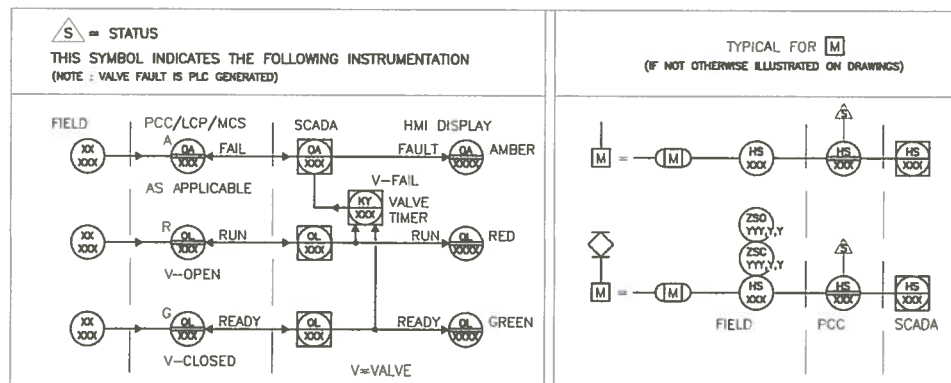
GENERAL ABBREVIATIONS

SCADA = SUPERVISORY CONTROL AND DATA ACQUISITION.  
 PLC = PROGRAMMABLE LOGIC CONTROL  
 SA = SURGE SUPPRESSOR DEVICE

◇ INTERLOCK  
 1-3 CONTINUATION OF SIGNAL OR DATA TO/FROM SHEET NUMBER INDICATED

BASIC SYMBOLS

SINGLE FUNCTION	MULTIPLE FUNCTION	DESCRIPTION
○	○○	FIELD MOUNTED INSTRUMENT OR DEVICE
⊖	⊖⊖	FRONT OF PANEL MOUNTED INSTRUMENT ON LCP, PCC, MCS, OR VFD
⊕	⊕⊕	REAR OF PANEL MOUNTED INSTRUMENT ON LCP, PCC, MCS, OR VFD
⊖	⊖⊖	FRONT OF PANEL MOUNTED INSTRUMENT ON MAIN PANEL
⊕	⊕⊕	REAR OF PANEL MOUNTED INSTRUMENT ON MAIN PANEL
□	□□	PLC AND/OR COMPUTER SOFTWARE COMPONENT (OPERATOR ACCESSIBLE UNDER NORMAL CONDITIONS) OR
□	□□	PLC AND/OR COMPUTER GENERATED COMPONENT (NOT OPERATOR ACCESSIBLE UNDER NORMAL CONDITIONS)
RTU	RTU RTU	DATA FLOW SYSTEMS RTU INPUT/OUTPUT



NO.	DESCRIPTION	BY	DATE

**SEWRP  
 SEPTAGE/ GREASE  
 RECEIVING STATION**

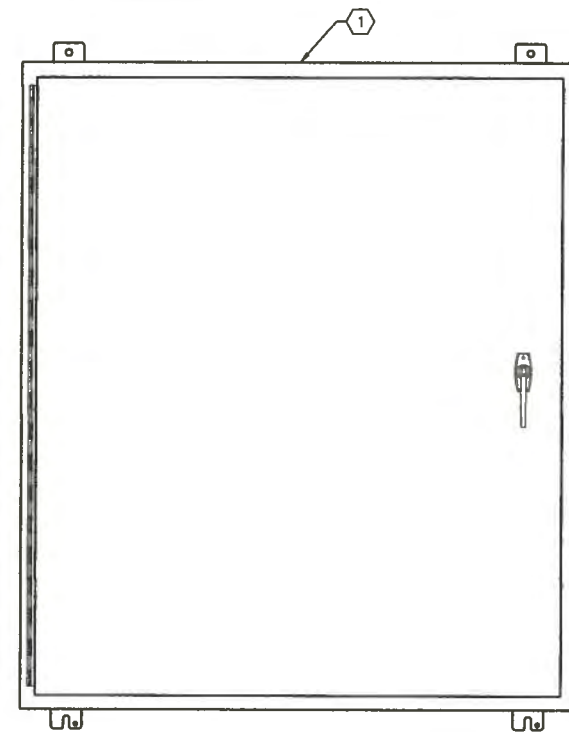
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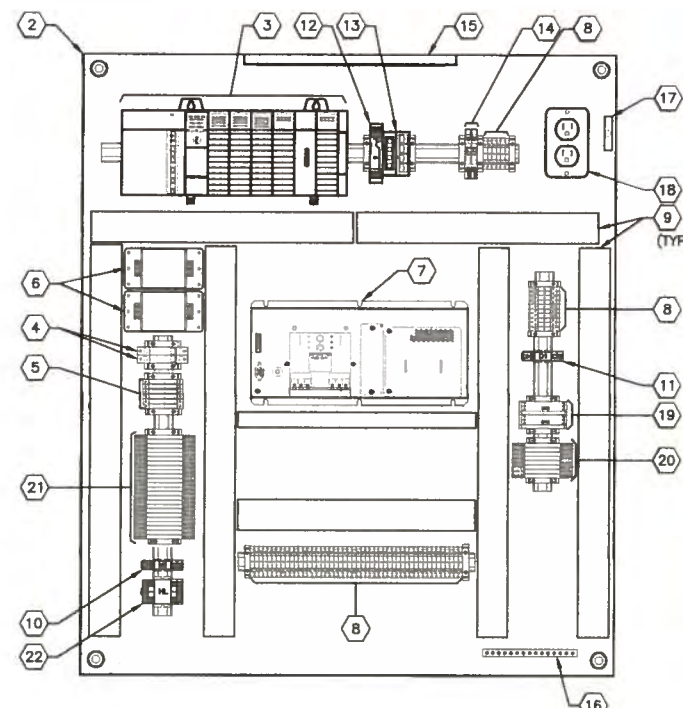
DESIGNED TDT  
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 APPROVED

**INSTRUMENTATION AND  
 CONTROLS LEGEND**

PROJECT NO:  
 00183-009-02  
 DATE:  
 DECEMBER 2014  
 SHEET NO:  
 I-1



EXTERIOR LAYOUT



BACKPANEL LAYOUT

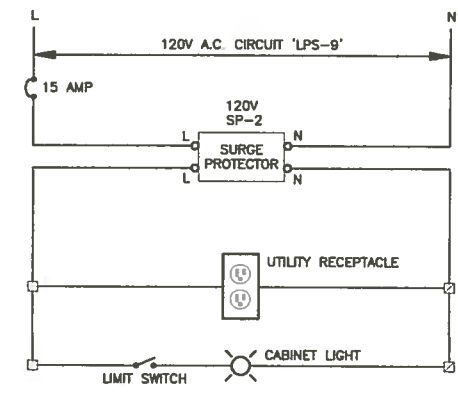
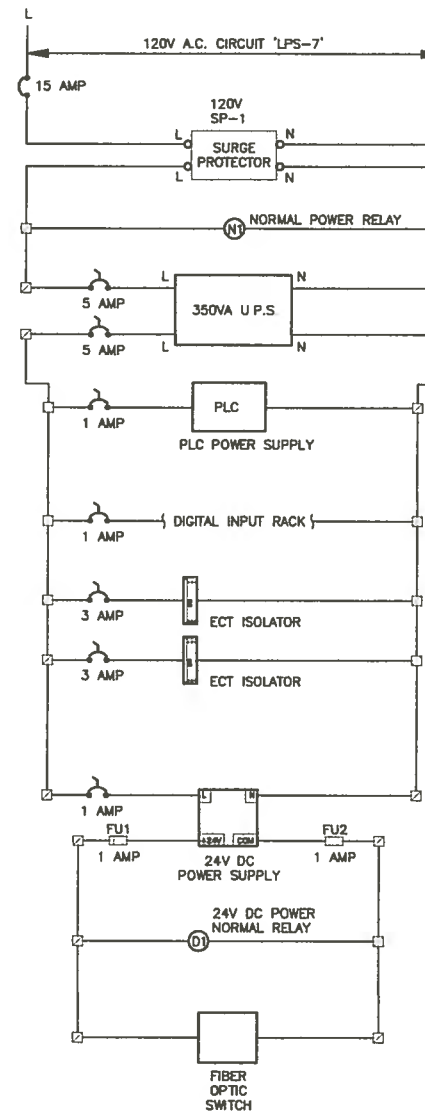
**SEPTAGE RECEIVING STATION  
PLC CONTROL CABINET ELEVATION**

SCALE : N.T.S.

1  
E-7 I-2

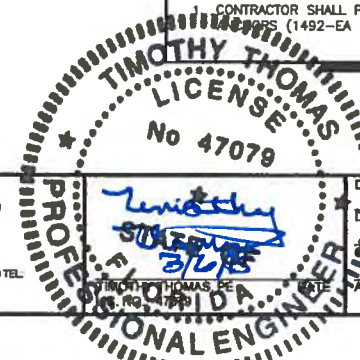
**KEYED NOTES:**

- 1 PROVIDE AND INSTALL 42" X 36" X 12", 316 STAINLESS STEEL ENCLOSURE. INCLUDE BACKPANEL, PAD-LOCKABLE 3-POINT LATCH, DEADFRONT INTERIOR DOOR AND DOOR-STOP KIT.
- 2 PROVIDE AND INSTALL CONTROL CABINET 42" X 36" BACKPANEL.
- 3 PROVIDE ALLEN-BRADLEY PLC, PROCESSOR: 1747-L552; THREE (3) A/C INPUT MODULES: 1746-IA16; A/C OUTPUT MODULE: 1746-OB8; ANALOG INPUT MODULE: 1746-NIB; POWER SUPPLY: 1746-P2; 7-SLOT RACK: 1746-A7; BLANK FILLER: 1746-N2.
- 4 PROVIDE AND INSTALL 120V CIRCUIT BREAKERS. 15 AMPERE SQUARE-D QOU115 AS REQUIRED.
- 5 PROVIDE AND INSTALL 120V, THERMAL CIRCUIT BREAKERS. REFER TO POWER WIRING DIAGRAM FOR QUANTITY/SIZE. ALL THERMAL CIRCUIT BREAKERS SHALL BE PHOENIX CONTACT TCP TYPE.
- 6 PROVIDE AND INSTALL 120V SURGE PROTECTION DEVICE. EDCO HSP121BT-1RU.
- 7 PROVIDE AND INSTALL 350VA UPS, ALLEN BRADLEY 1609-S350NS WITH DRY CONTACT I/O COMMUNICATION CABLE, ALLEN BRADLEY 1609-SDC1. DRY CONTACT CABLE TO PROVIDE UPS ON BATTERY POWER AND UPS LOW BATTERY SIGNAL TO 1769-IA16 CARD (REFER TO DISCRETE INPUT CARD WIRING DIAGRAM ON SHEET 1-3).
- 8 PROVIDE AND INSTALL DIN-RAIL MOUNTED TERMINAL BLOCKS, ALLEN-BRADLEY 1492-W10.
- 9 PROVIDE AND INSTALL 2"x2" PANDUIT (OR EQUAL) WIRING SYSTEM WITH COVERS.
- 10 PROVIDE AND INSTALL SQUARE-D 8501 R SERIES RELAY. SINGLE-POLE, 120V AC COIL FOR NORMAL AC POWER LOSS SIGNAL. PROVIDE RELAY BASE AND HOLD DOWN SPRING FOR RELAY PROVIDED.
- 11 PROVIDE AND INSTALL SQUARE-D 8501 R SERIES RELAY. SINGLE-POLE, 24V DC COIL FOR 24V DC POWER LOSS SIGNAL. PROVIDE RELAY BASE AND HOLD DOWN SPRING FOR RELAY PROVIDED.
- 12 PROVIDE AND INSTALL 120VAC INPUT/24VDC OUTPUT, 240W POWER SUPPLY. PHOENIX CONTACT MINI-PS-100-240AC/24DC/1.
- 13 PROVIDE AND INSTALL FIBER OPTIC SWITCH. PHOENIX CONTACT 2832658.
- 14 PROVIDE AND INSTALL FUSE TERMINAL BLOCKS FOR DC POWER SUPPLY. PHOENIX CONTACT UK TYPE AS REQUIRED.
- 15 PROVIDE AND INSTALL 120V, BW, CABINET LIGHT. PRESCOLITE UCS12-1-08-PH-120-WSW. PROVIDE F8T5/CW LAMP AND BRACKET TO MOUNT FIXTURE TO BACKPANEL.
- 16 PROVIDE AND INSTALL EQUIPMENT GROUND ASSEMBLY.
- 17 PROVIDE AND INSTALL LIMIT SWITCH FOR CABINET LIGHT. CUTLER HAMMER E47BCC06.
- 18 PROVIDE AND INSTALL UTILITY DUPLEX GFI RECEPTACLE, HUBBELL, GFR5352IA OR EQUAL.
- 19 PROVIDE AND INSTALL SIGNAL ISOLATOR/LOOP POWER UNITS. MOORE INDUSTRIES TYPE ECT, WITH 2-WIRE TRANSMITTER EXCITATION OPTION FOR PRESSURE TRANSMITTER LOOP POWER.
- 20 PROVIDE AND INSTALL ANALOG SURGE PROTECTION DEVICES AS REQUIRED. MTL CATALOG # SD32.
- 21 PROVIDE AND INSTALL DIGITAL SURGE PROTECTION DEVICES AS REQUIRED. MTL CATALOG # SD150X.
- 22 PROVIDE AND INSTALL SQUARE-D 8501 R SERIES RELAY. 4-POLE, 120V AC COIL FOR HIGH TANK ALARM INTERLOCKS. PROVIDE RELAY BASE AND HOLD DOWN SPRING FOR RELAY PROVIDED.



**PLC CONTROL CABINET  
POWER WIRING DIAGRAM**

**GENERAL NOTES:**  
CONTRACTOR SHALL PROVIDE ALLEN-BRADLEY END BARRIERS (1492-EBL16) AND END BARRIERS (1492-EA 35) AS REQUIRED.



NO.	DESCRIPTION	BY	DATE

**SEWRF  
SEPTAGE/ GREASE  
RECEIVING STATION**

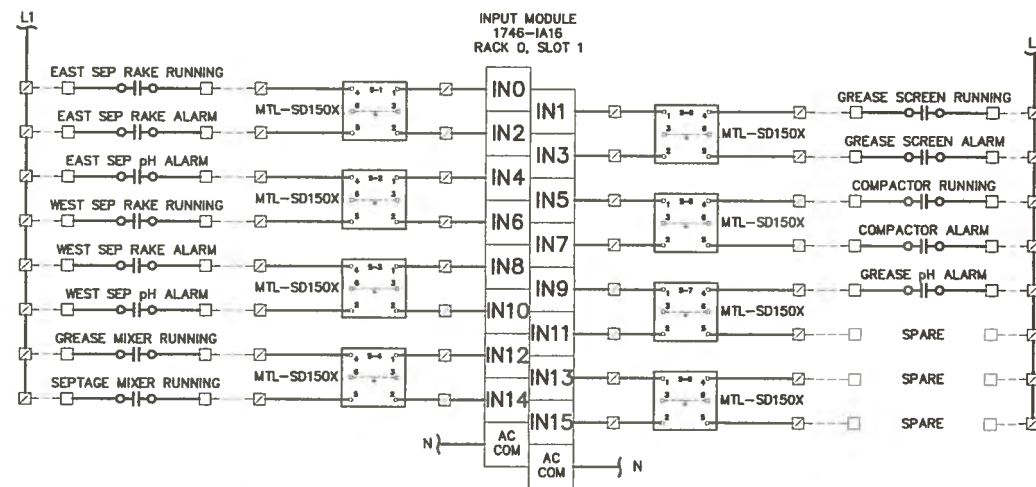
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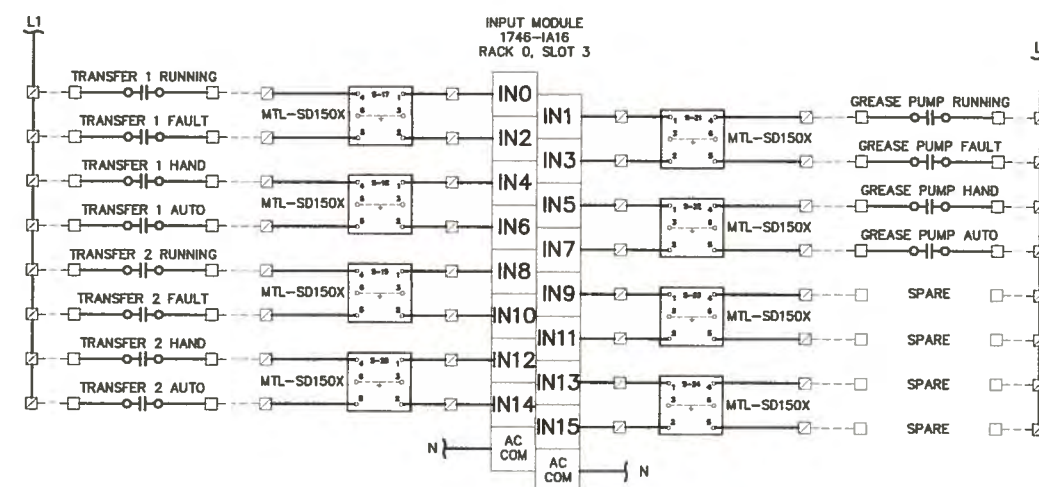
DESIGNED TDT  
DRAWN EAK  
CHECKED  
APPROVED

**SEPTAGE STATION PLC CONTROL  
CABINET DETAILS**

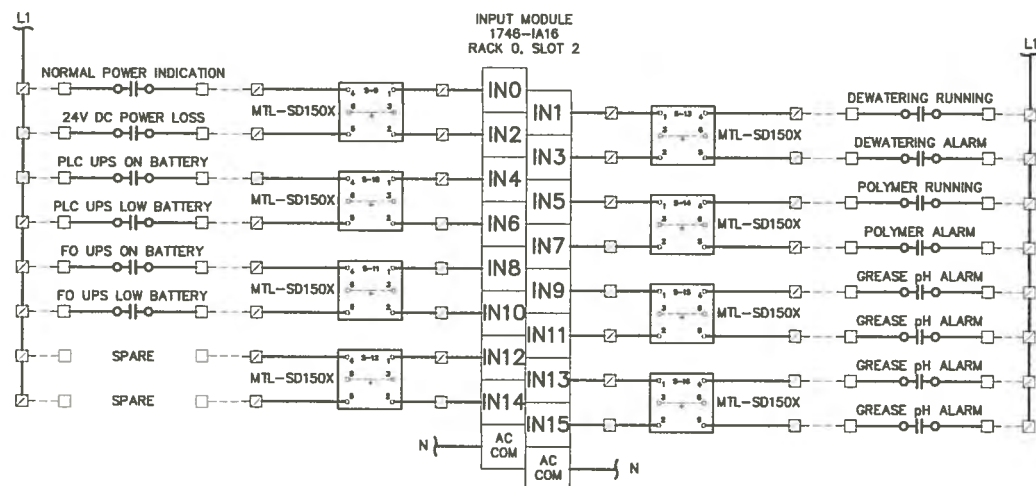
PROJECT NO:  
00193-009-02  
DATE:  
DECEMBER 2014  
SHEET NO:  
1-2



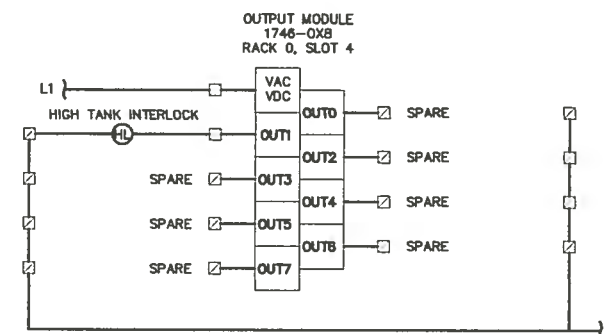
PLC - DISCRETE INPUT CARD WIRING DIAGRAM



PLC - DISCRETE INPUT CARD WIRING DIAGRAM



PLC - DISCRETE INPUT CARD WIRING DIAGRAM



PLC - DISCRETE OUTPUT CARD WIRING DIAGRAM

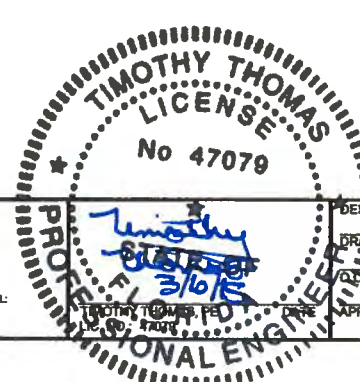


NO.	DESCRIPTION	BY	DATE

**SEWRF  
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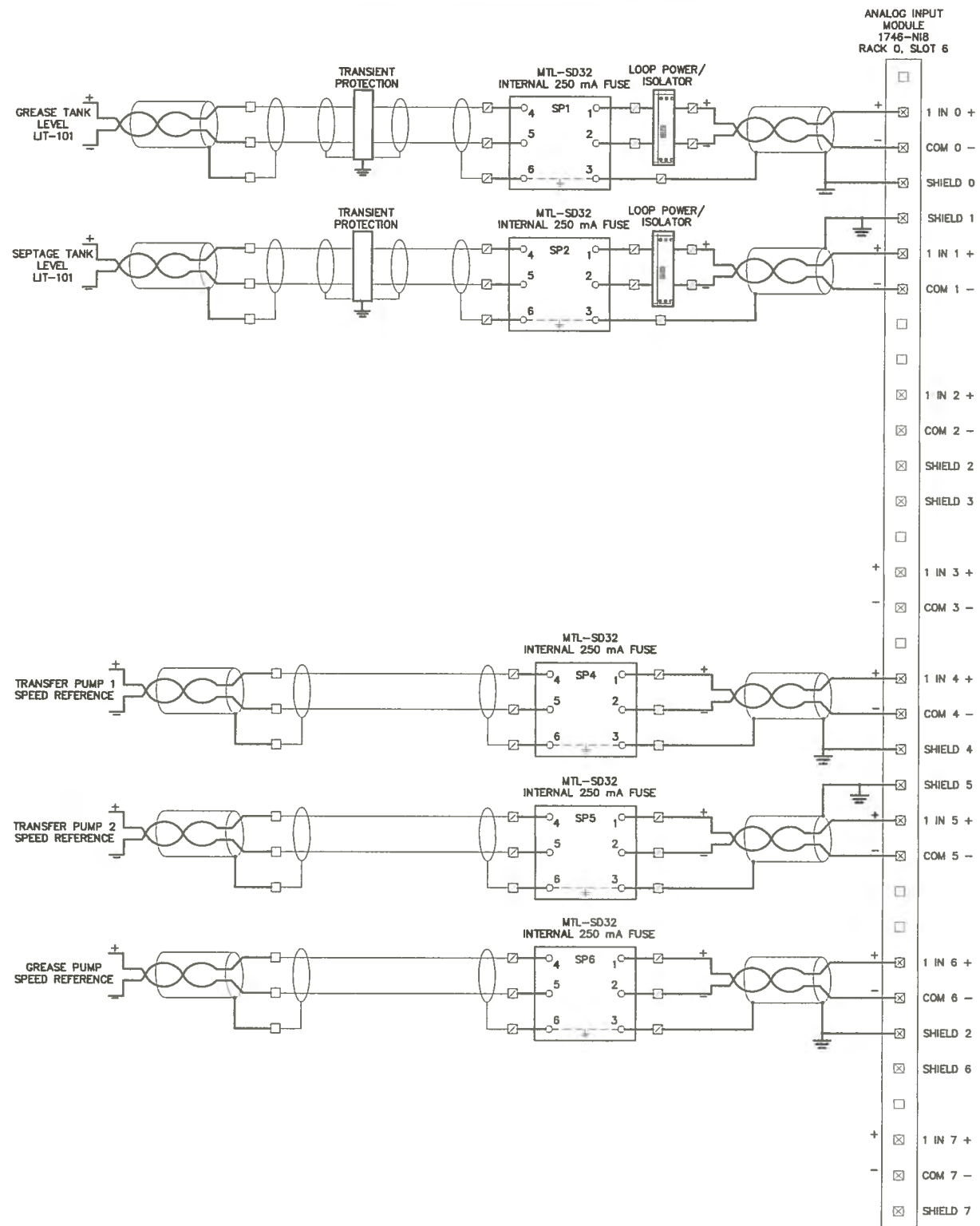
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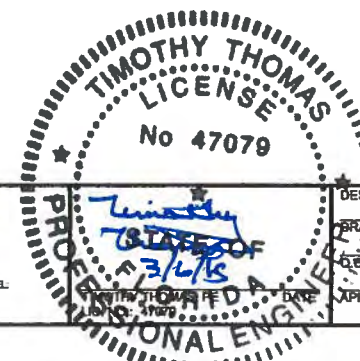
DESIGNED TDT  
DRAWN EAK  
CHECKED  
APPROVED

**SEPTAGE STATION PLC CONTROL  
CABINET DISCRETE WIRING  
DIAGRAMS**

PROJECT NO:  
00193-009-02  
DATE:  
DECEMBER 2014  
SHEET NO:  
I-3



PLC - ANALOG INPUT CARD WIRING DIAGRAM



**SEWRF  
SEPTAGE/ GREASE  
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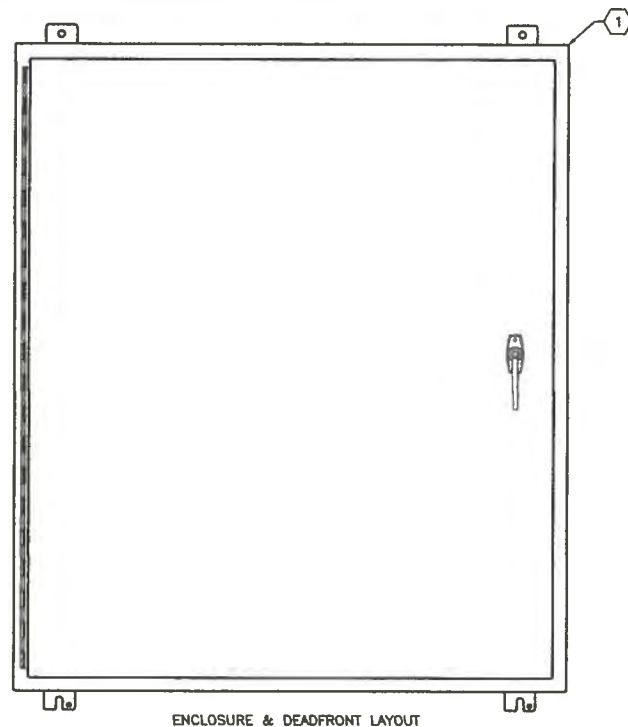
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**SEPTAGE STATION PLC CONTROL  
CABINET ANALOG WIRING  
DIAGRAMS**

PROJECT NO:  
00193-009-02  
DATE:  
DECEMBER 2014  
SHEET NO:  
1-4

NO.	DESCRIPTION	BY	DATE

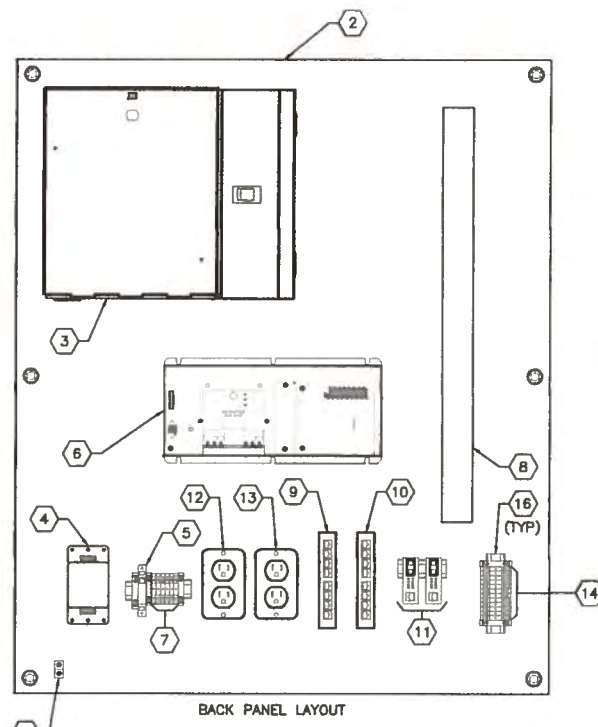




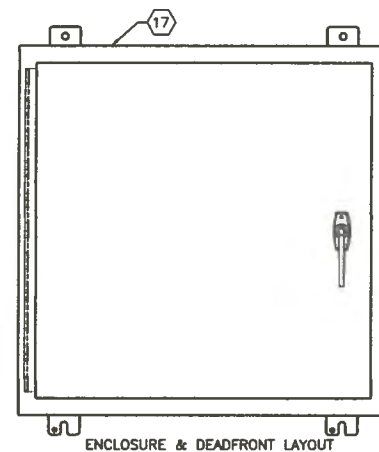
ENCLOSURE & DEADFRONT LAYOUT

**SEPTAGE RECEIVING STATION  
FIBER OPTIC CABINET ELEVATION**

SCALE : N.T.S.



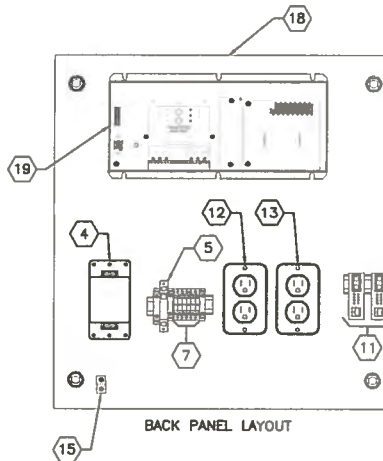
BACK PANEL LAYOUT



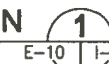
ENCLOSURE & DEADFRONT LAYOUT

**ADMINISTRATION BUILDING  
FIBER OPTIC CABINET ELEVATION**

SCALE : N.T.S.



BACK PANEL LAYOUT

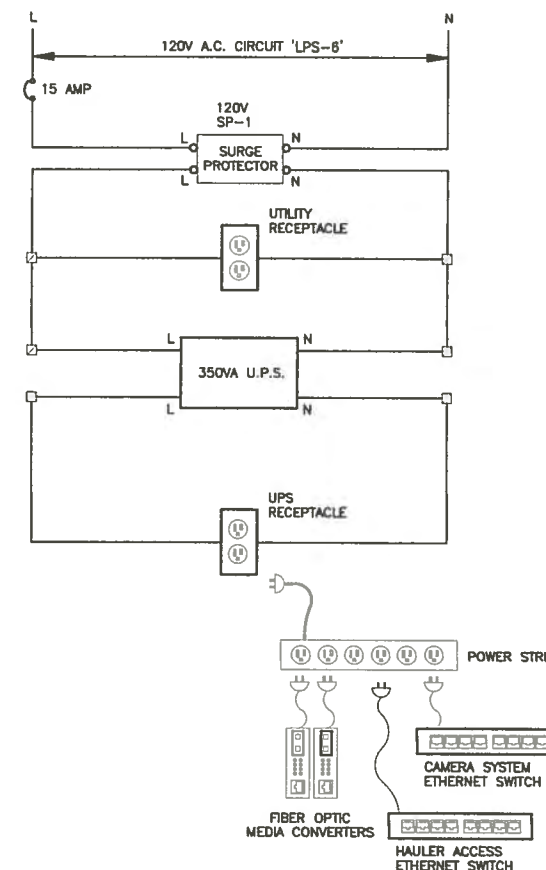


**KEYED NOTES:**

- |   |  |
|---|--|
| <p>1 PROVIDE AND INSTALL 42" X 36" X 12", 316 STAINLESS STEEL ENCLOSURE. INCLUDE BACKPANEL, PAD-LOCKABLE 3-POINT LATCH, DEADFRONT INTERIOR DOOR AND DOOR-STOP KIT.</p> <p>2 PROVIDE AND INSTALL CONTROL CABINET 42" X 36" BACKPANEL.</p> <p>3 PROVIDE WALL MOUNT CONNECTOR AND SPLICE HOUSING SIZED TO ACCOMMODATE FIBER OPTIC CABLE AND FIBER COUNT. CORNING WCH-02P OR APPROVED EQUAL. PROVIDE SPLICE TRAYS, SPLICE TRAY HOLDERS, STRAIN RELIEF KIT AND ALL REQUIRED ACCESSORIES.</p> <p>4 PROVIDE AND INSTALL 120V SURGE PROTECTION DEVICE. EDCO HSP121BT-1RU.</p> <p>5 PROVIDE AND INSTALL 120V CIRCUIT BREAKER. 15 AMPERE SQUARE-D QOU115.</p> <p>6 PROVIDE AND INSTALL 350VA UPS, ALLEN BRADLEY 1609-S350NS WITH DRY CONTACT I/O COMMUNICATION CABLE, ALLEN BRADLEY 1609-SDC1. DRY CONTACT CABLE TO PROVIDE UPS ON BATTERY POWER AND UPS LOW BATTERY SIGNAL TO 1769-IA16 CARD (INPUTS 6 AND 8, REFER TO DISCRETE INPUT CARD WIRING DIAGRAM ON SHEET I-3).</p> <p>7 PROVIDE AND INSTALL DIN-RAIL MOUNTED TERMINAL BLOCKS, ALLEN-BRADLEY 1492-W10.</p> <p>8 PROVIDE AND INSTALL 2"X2" PANDUIT (OR EQUAL) WIRING SYSTEM WITH COVERS.</p> <p>9 PROVIDE AND INSTALL 8-PORT ETHERNET SWITCH. NETGEAR FS108 FOR CAMERA SYSTEM.</p> | <p>10 PROVIDE AND INSTALL 8-PORT ETHERNET SWITCH. NETGEAR FS108 FOR HAULER ACCESS SYSTEM.</p> <p>11 PROVIDE AND INSTALL FIBER OPTIC MEDIA CONVERTERS FOR HAULER ACCESS AND CAMERA SYSTEMS.</p> <p>12 PROVIDE AND INSTALL UTILITY DUPLEX GFI RECEPTACLE, HUBBELL, GFR5352IA OR EQUAL FOR UPS OUTPUT.</p> <p>13 PROVIDE AND INSTALL UTILITY DUPLEX GFI RECEPTACLE, HUBBELL, GFR5352IA OR EQUAL FOR UTILITY RECEPTACLE.</p> <p>14 PROVIDE AND INSTALL DIN-RAIL MOUNTED TERMINAL BLOCKS, ALLEN-BRADLEY 1492-W10 FOR INTERCOM SYSTEM WIRING.</p> <p>15 PROVIDE EQUIPMENT GROUND LUG.</p> <p>16 PROVIDE ALUMINUM DIN-RAIL.</p> <p>17 PROVIDE AND INSTALL 24" X 24" X 8", 316 STAINLESS STEEL ENCLOSURE. INCLUDE BACKPANEL, PAD-LOCKABLE 3-POINT LATCH, DEADFRONT INTERIOR DOOR AND DOOR-STOP KIT.</p> <p>18 PROVIDE AND INSTALL CONTROL CABINET 24" X 24" BACKPANEL.</p> <p>19 PROVIDE AND INSTALL 350VA UPS, ALLEN BRADLEY 1609-S350NS WITH NO MONITORING REQUIREMENTS.</p> |
|---|--|

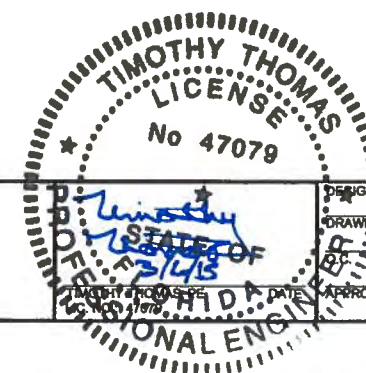
**GENERAL NOTES:**

1. CONTRACTOR SHALL PROVIDE ALLEN-BRADLEY END BARRIERS (1492-EBL16) AND END ANCHORS (1492-EA 35) AS REQUIRED.



**SEPTAGE RECEIVING STATION  
FIBER OPTIC CABINET  
WIRING SCHEMATIC**

NOTE :  
THE WIRING SCHEMATIC FOR THE ADMINISTRATION BUILDING FIBER OPTIC CABINET IS SIMILAR, WITHOUT THE REQUIREMENT FOR ETHERNET SWITCHES.



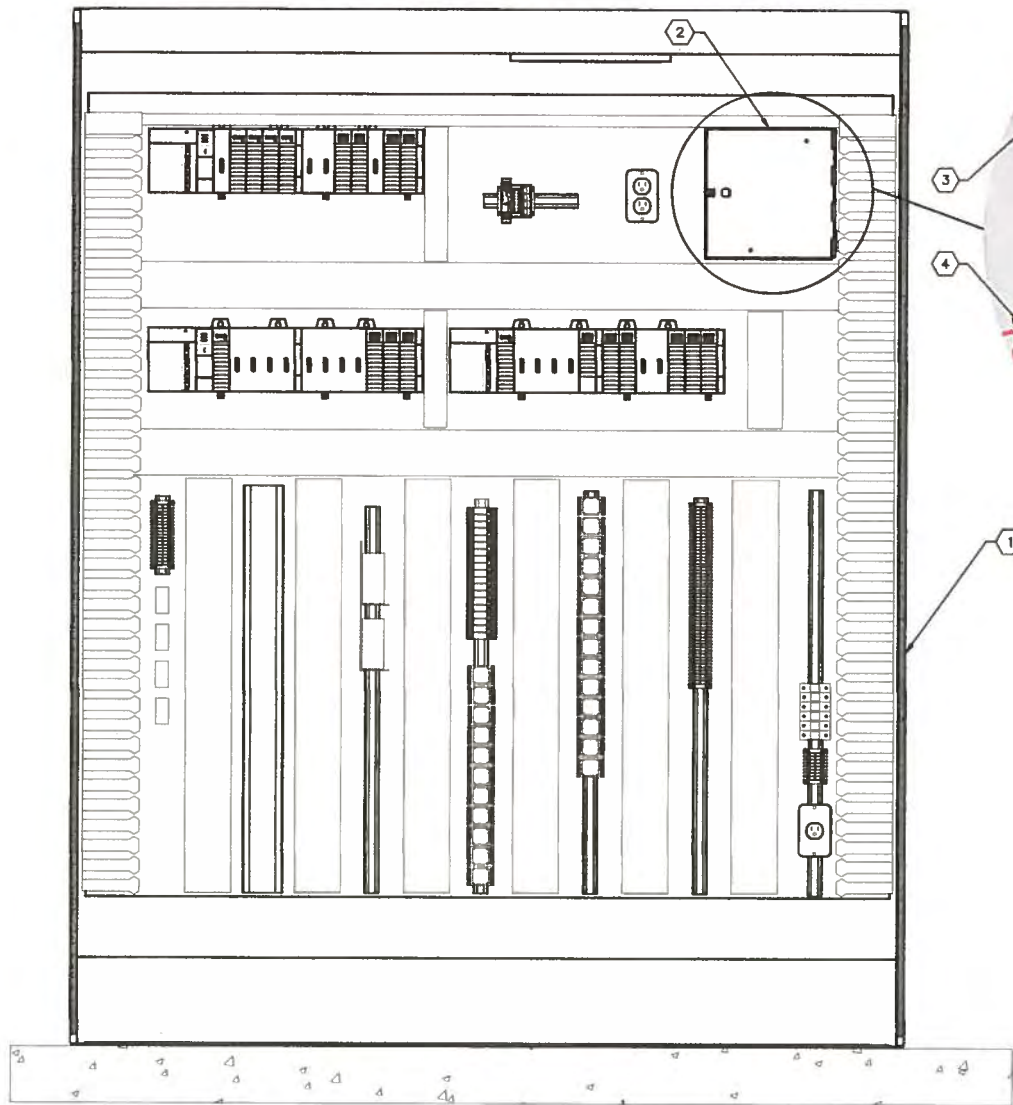
DESIGNED TDT  
DRAWN EAK  
DATE  
APPROVED

**SEPTAGE STATION AND ADMIN  
FIBER OPTIC CABINET DETAILS**

PROJECT NO:  
00193-009-02  
DATE:  
DECEMBER 2014  
SHEET NO:  
I-5

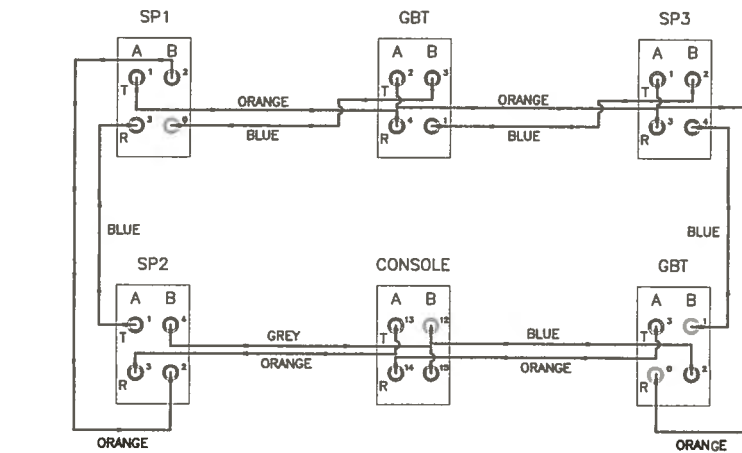
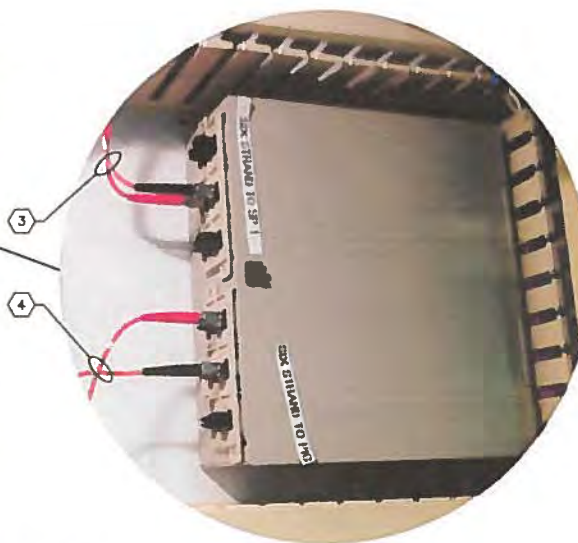
NO.	DESCRIPTION	BY	DATE

**SEWRF  
SEPTAGE/ GREASE  
RECEIVING STATION**

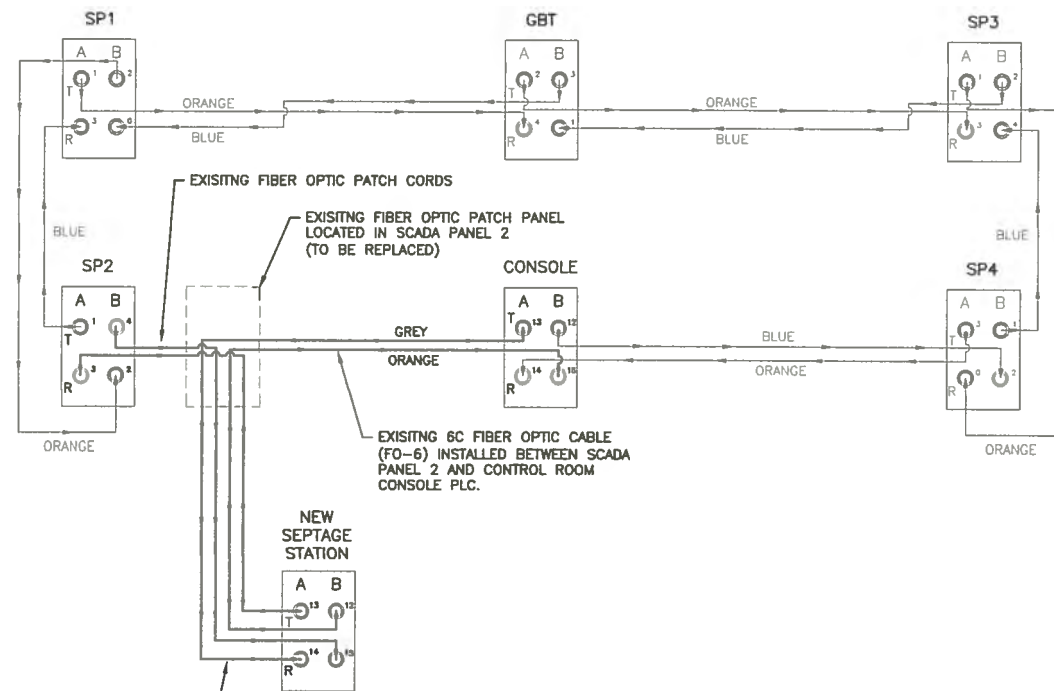


**SCADA PANEL 2 ELEVATION**

SCALE : N.T.S.



**EXISTING SOUTHEAST REGIONAL WRF  
SCADA SYSTEM FIBER OPTIC NETWORK CONFIGURATION**

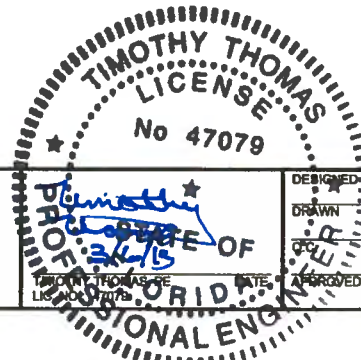


NEW 12C FIBER OPTIC CABLE TO BE  
INSTALLED BETWEEN SCADA PANEL 2  
AND NEW SEPTAGE RECEIVING STATION

**PROPOSED SOUTHEAST REGIONAL WRF  
SCADA SYSTEM FIBER OPTIC NETWORK CONFIGURATION**

**KEYED NOTES:**

- ① EXISTING SCADA PANEL 2, LOCATED IN THE MMC/BLOWER BUILDING NO. 2.
- ② THE CONTRACTOR SHALL REMOVE THE EXISTING PATCH PANEL AND INSTALL A NEW CORNING WALL-MOUNTABLE INTERCONNECT CENTER (WIC), LANDSCAPE TYPE, CORNING PART NUMBER WIC-02P. THE NEW WIC SHALL ACCOMMODATE TWO (2) CORNING CCH CONNECTOR PANELS. THE CONNECTOR PANELS SHALL CONSIST OF TWO (2) CORNING CLOSET CONNECTOR HOUSING (CCH) PANELS, EACH TO BE PIGTAILED, WITH ST COMPATIBLE CONNECTORS, SIMPLEX, 12 FIBER, 62.5 μm MULTIMODE (OM1). CORNING PART NUMBER CCH-CP12-5T-P03KH.
- ③ EXISTING PATCH CORDS CONNECTING 2 FIBERS FROM EXISTING 6 COUNT FIBER OPTIC CABLE INSTALLED BETWEEN SCADA PANEL 2 AND SCADA PANEL 1 (FO-5). REFER ALSO TO FIBER OPTIC NETWORK CONFIGURATIONS ON THIS SHEET.
- ④ EXISTING PATCH CORDS CONNECTING 2 FIBERS FROM EXISTING 6 COUNT FIBER OPTIC CABLE INSTALLED BETWEEN SCADA PANEL 2 AND CONSOLE PLC (FO-5). REFER ALSO TO FIBER OPTIC NETWORK CONFIGURATIONS ON THIS SHEET.



NO.	DESCRIPTION	BY	DATE

**SEWRF  
SEPTAGE/ GREASE  
RECEIVING STATION**



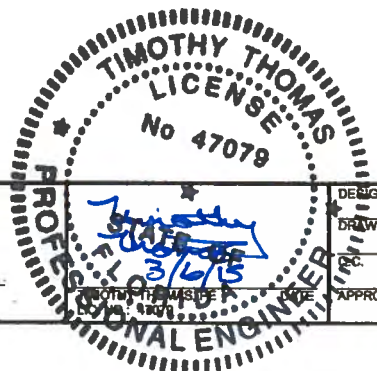
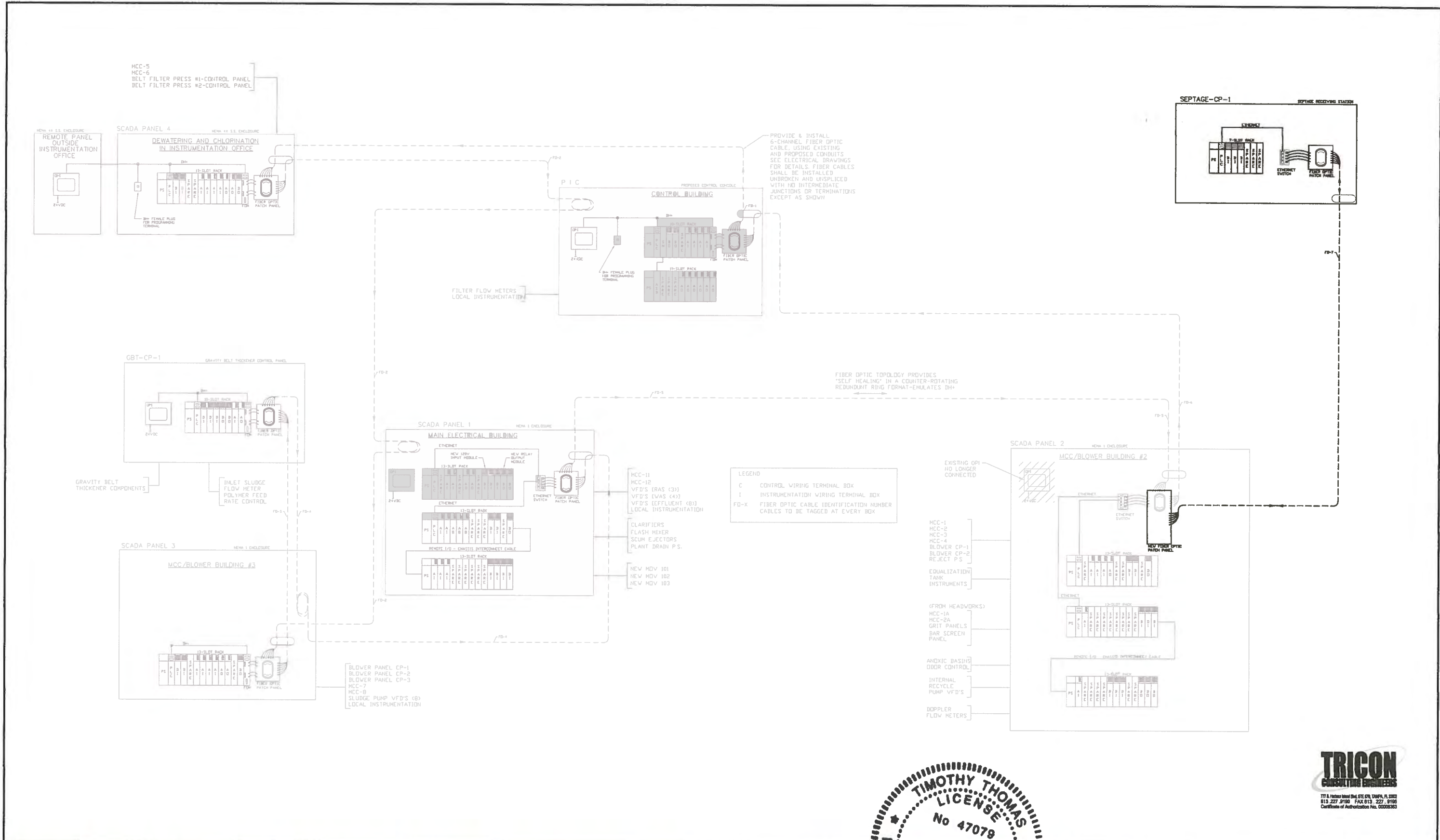
**MANATEE COUNTY**  
DEPARTMENT OF PUBLIC WORKS  
UTILITIES DEPARTMENT  
4410 66th Street West Bradenton, Florida 34210  
(941) 782-8811

**Cardno**  
Shaping the Future  
CLEARWATER  
380 PARK PLACE (BLVD), STE 300, CLEARWATER, FL 33759 TEL:  
(727) 851-3025 (800) 881-8314  
www.cardno.com Certificate of Authorization No. 25915

DESIGNED: TDT  
DRAWN: LEAK  
CHECKED: [Signature]  
DATE: [Blank]  
APPROVED: [Signature]

**SCADA PANEL 2 CONTROL  
CABINET DETAILS**

PROJECT NO:  
00183-009-02  
DATE:  
DECEMBER 2014  
SHEET NO:  
1-6



NO.	DESCRIPTION	BY	DATE

**SEWRF  
SEPTAGE/ GREASE  
RECEIVING STATION**

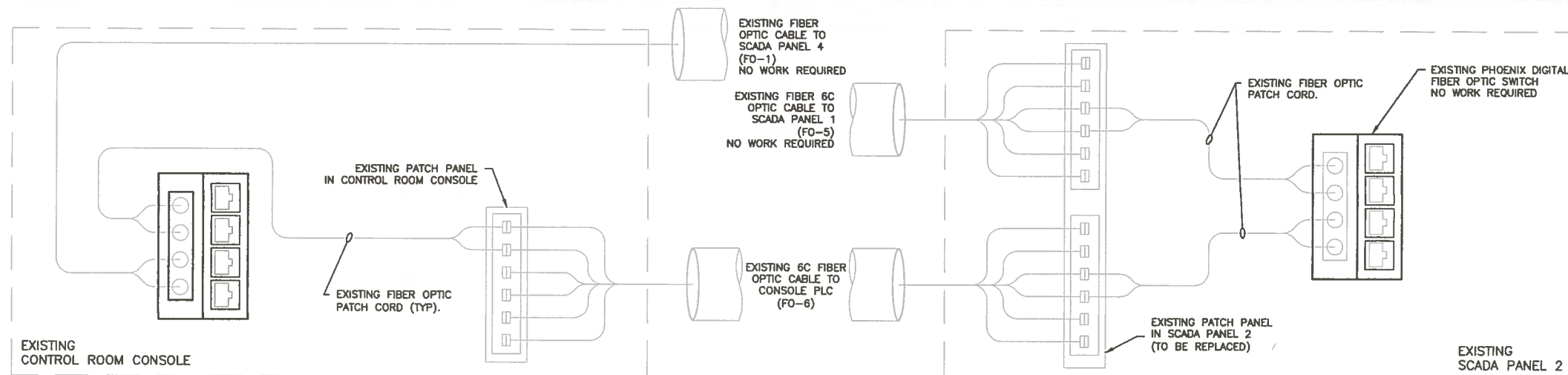
**MANATEE COUNTY**  
DEPARTMENT OF PUBLIC WORKS  
UTILITIES DEPARTMENT  
4410 68th Street West Bradenton, Florida 34210  
(941) 792-8611

**Cardno**  
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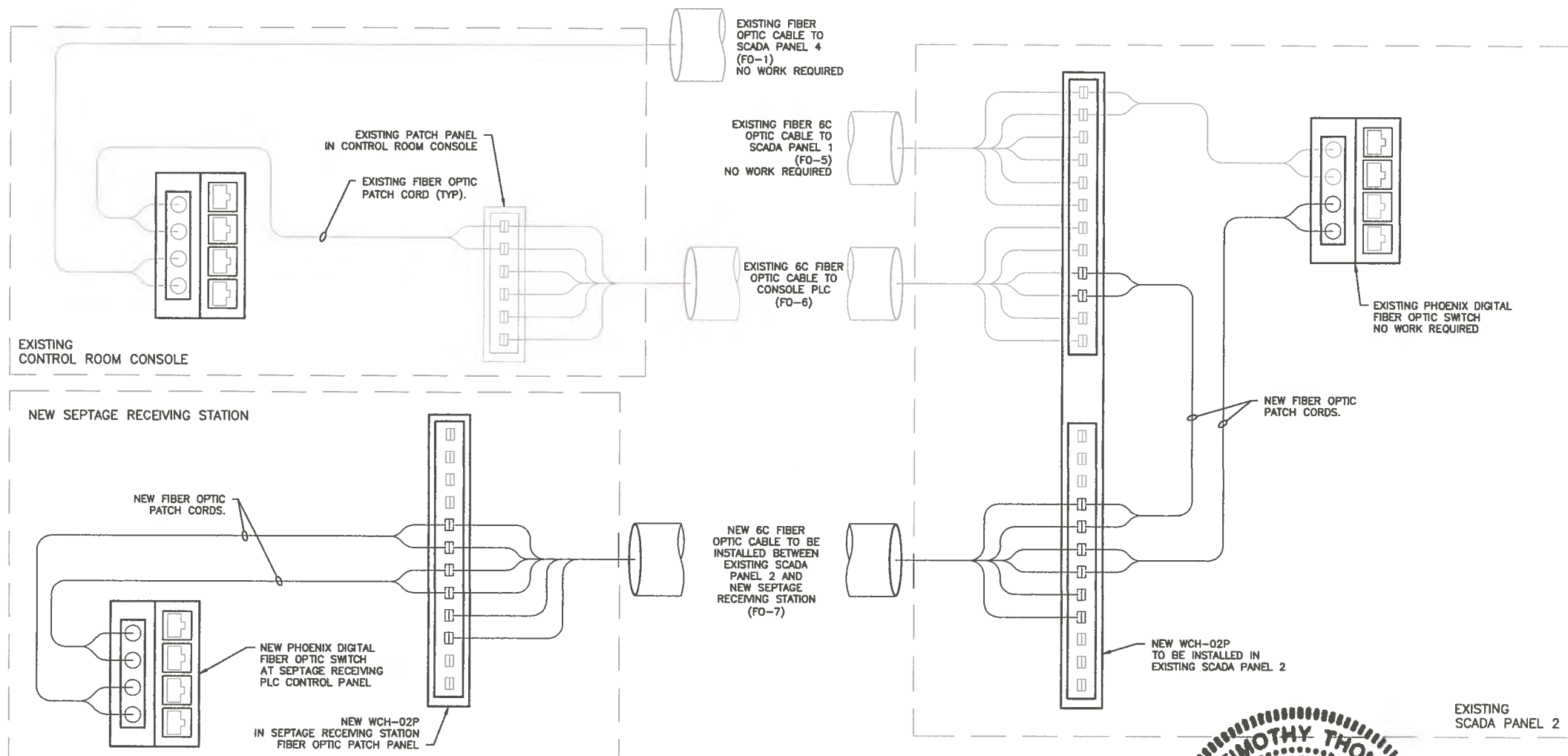
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DRAWN	EAK
APPROVED	

**PROPOSED SCADA SYSTEM FIBER  
OPTIC COMMUNICATION  
TOPOLOGY**

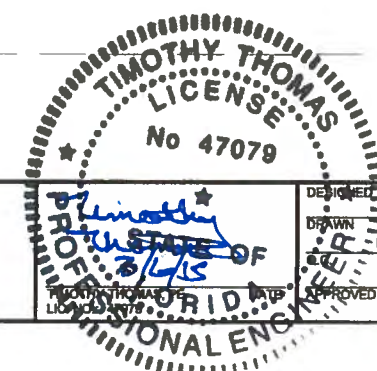
PROJECT NO:  
00183-009-02  
DATE:  
DECEMBER 2014  
SHEET NO:  
I-7



**EXISTING SCADA PANEL 2 - CONSOLE PLC  
FIBER OPTIC CONNECTION DIAGRAM**



**PROPOSED SCADA PANEL 2 - CONSOLE PLC  
FIBER OPTIC CONNECTION DIAGRAM**



NO.	DESCRIPTION	BY	DATE

**SEWRF  
SEPTAGE/ GREASE  
RECEIVING STATION**

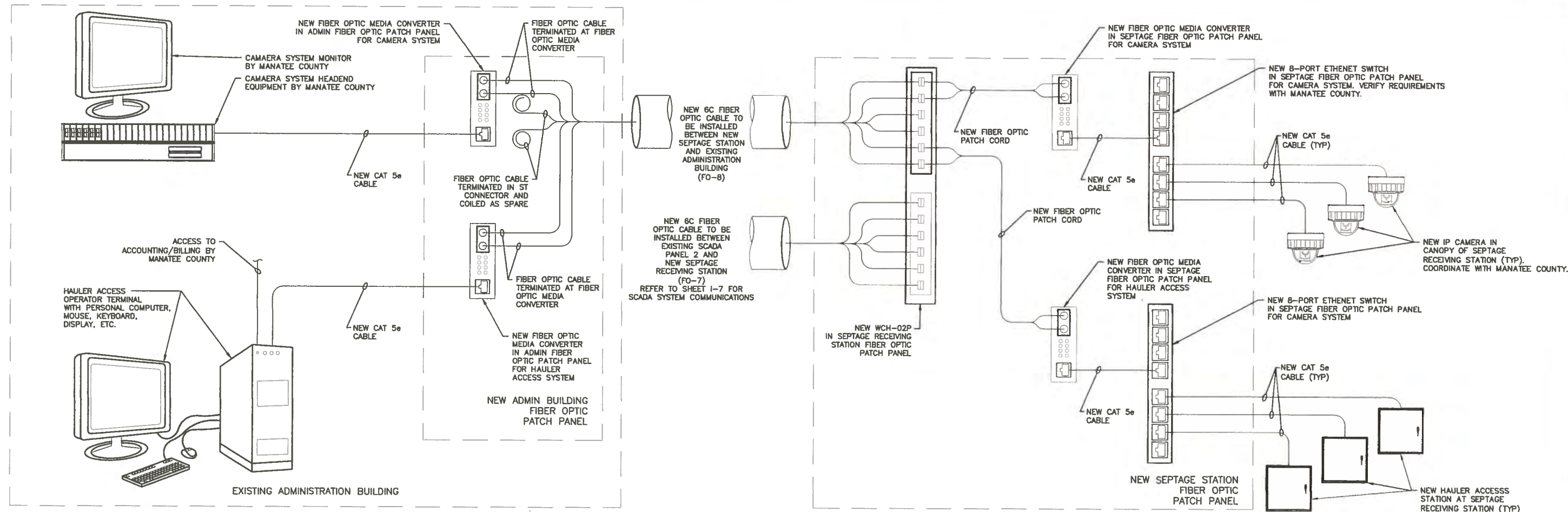
**MANATEE COUNTY**  
DEPARTMENT OF PUBLIC WORKS  
UTILITIES DEPARTMENT  
4410 68th Street West Bradenton, Florida 34210  
(941) 792-8611

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(727) 534-3305 (800) 891-0314  
www.cardno.com Certificate of Authorization No. 28915

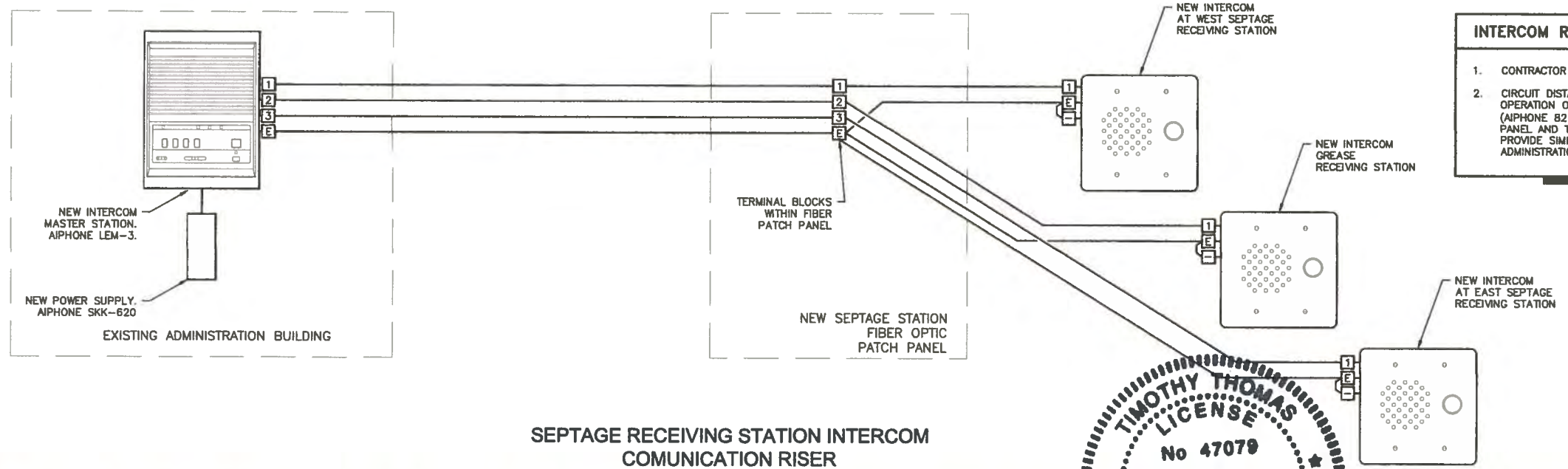
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CHECKED: EAK  
APPROVED: EAK

**FIBER OPTIC CONNECTION  
DIAGRAMS**

PROJECT NO:  
00193-009-02  
DATE:  
DECEMBER 2014  
SHEET NO:  
1-8

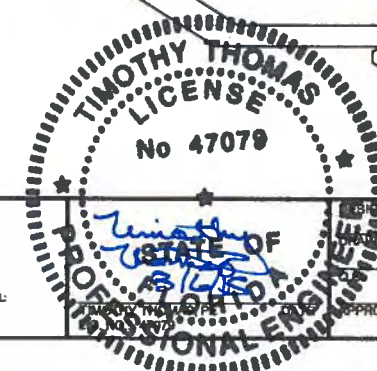


**CAMERA - HAULER ACCESS SYSTEMS FIBER OPTIC CONNECTION DIAGRAM**



- INTERCOM RISER NOTES :**
- CONTRACTOR SHALL VERIFY WIRING SCHEMATIC WITH MANUFACTURER.
  - CIRCUIT DISTANCE IS ESTIMATED AS 1,440 FEET. TO INSURE PROPER OPERATION OF THE INTERCOM SYSTEM, AIPHONE 18 GAUGE COPPER (AIPHONE B21B02) SHALL BE INSTALLED BETWEEN THE FIBER PATCH PANEL AND THE INDIVIDUAL INTERCOMS. THE CONTRACTOR SHALL PROVIDE SIMILAR, AIPHONE 16 GAUGE 4 CONDUCTOR CABLE BETWEEN ADMINISTRATION BUILDING AND SEPTAGE RECEIVING STATION.

**SEPTAGE RECEIVING STATION INTERCOM COMMUNICATION RISER**



<p><b>SEWRF SEPTAGE/ GREASE RECEIVING STATION</b></p>		<p><b>MANATEE COUNTY</b> DEPARTMENT OF PUBLIC WORKS UTILITIES DEPARTMENT 4410 60th Street West Bradenton, Florida 34210 (941) 792-8611</p>	<p><b>Cardno</b> Shaping the Future CLEARWATER 380 PARK PLACE BLVD. STE. 300, CLEARWATER, FL 33709 TEL: (727) 531-3505 (800) 851-4214 www.cardno.com Certificate of Authorization No. 28015</p>	<p>PROJECT NO: 00183-009-02 DATE: DECEMBER 2014 SHEET NO: I-9</p>
NO.	DESCRIPTION	BY	DATE	

# CONTRACT DOCUMENTS AND TECHNICAL SPECIFICATIONS

for

## Southeast Water Reclamation Facility (SEWRF) Septage/Grease Receiving Station

Prepared for:



1022 26th Avenue East  
Bradenton, FL 34208-3926

Prepared by:



380 Park Place Blvd., Suite 300  
Clearwater, FL 33759

April 2015

# GENERAL REQUIREMENTS AND TECHNICAL SPECIFICATIONS

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**Division 04 Masonry**

Not Used

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05500 Miscellaneous Metal

**Division 06 Woods and Plastics**

Not Used

**Division 07 Thermal and Moisture Protection**

Not Used

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Not Used

**Division 09 Finishes**

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Not Used

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Not Used

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Not Used

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SECTION 01005  
GENERAL REQUIREMENTS

PART 1 GENERAL

1.01 SCOPE AND INTENT

A. Description

1. The work to be done consists of the furnishing of all labor, materials and equipment, and the performance of all work included in this Contract. The summary of the work is presented in Section 01010.

B. Work Included

1. The Contractor shall furnish all labor, superintendence, materials, plant, power, light, heat, fuel, water, tools, appliances, equipment, supplies, and other means of construction necessary or proper for performing and completing the work. Building Department Permit Fees have been paid by Owner. Contractor shall update the Building Department Permit with Contractor's information. The Contractor shall obtain and pay for all other required permits. The Contractor shall perform and complete the work in the manner best calculated to promote rapid construction consistent with safety of life and property and to the satisfaction of the Engineer, and in strict accordance with the Contract Documents. The Contractor shall clean up the work and maintain it during and after construction, until accepted, and shall do all work and pay all costs incidental thereto. The Contractor shall repair or restore all structures and property that may be damaged or disturbed during performance of the work.
2. The cost of incidental work described in these General Requirements, for which there are no specific Contract Items, shall be considered as part of the general cost of doing the work and shall be included in the prices for the various Contract Items. No additional payment will be made therefore.
3. The Contractor shall provide and maintain such modern plant, tools, and equipment as may be necessary, in the opinion of the Engineer, to perform in a satisfactory and acceptable manner all the work required by this Contract. Only equipment of established reputation and proven efficiency shall be used. The Contractor shall be solely responsible for the adequacy of their workmanship, materials and equipment, prior approval of the Engineer notwithstanding.

C. Public Utility Installations and Structures

1. Public utility installations and structures shall be understood to include all

poles, tracks, pipes, wires, conduits, house service connections, vaults, manholes and all other appurtenances and facilities pertaining thereto whether owned or controlled by the Owner, other governmental bodies or privately owned by individuals, firms or corporations, used to serve the public with transportation, traffic control, gas, electricity, telephone, sewerage, drainage, water or other public or private property which may be affected by the work shall be deemed included hereunder.

2. The Contract Documents contain data relative to existing public utility installations and structures above and below the ground surface. These data are not guaranteed as to their completeness or accuracy and it is the responsibility of the Contractor to make his own investigations to inform himself fully of the character, condition and extent of all such installations and structures as may be encountered and as may affect the construction operations.
3. The Contractor shall protect all public utility installations and structures from damage during the work. Access across any buried public utility installation or structures shall be made only in such locations and by means approved by the Engineer. The Contractor shall so arrange his operations as to avoid any damage to these facilities. All required protective devices and construction shall be provided by the Contractor at his expense. All existing public utilities damaged by the Contractor which are shown on the Plans or have been located in the field by the utility shall be repaired by the Contractor, at his expense, as directed by the Engineer. No separate payment shall be made for such protection or repairs to public utility installations or structures.
4. Public utility installations or structures owned or controlled by the Owner or other governmental body which are shown on the Drawings to be removed, relocated, replaced or rebuilt by the Contractor shall be considered as a part of the general cost of doing the work and shall be included in the prices bid for the various contract items. No separate payment shall be made therefore.
5. Where public utility installations or structures owned or controlled by the Owner or other governmental body are encountered during the course of the work, and are not indicated on the Drawings or in the Specifications, and when, in the opinion of the Engineer, removal, relocation, replacement or rebuilding is necessary to complete the work under this Contract, such work shall be accomplished by the utility having jurisdiction, or such work may be ordered, in writing by the Engineer, for the Contractor to accomplish. If such work is accomplished by the utility having jurisdiction it will be carried out expeditiously and the Contractor shall give full cooperation to permit the utility to complete the removal, relocation, replacement or rebuilding as required. If such work is accomplished by the Contractor, it will be in accordance with the General Conditions and Supplemental Conditions.

6. All Owner and other governmental utility departments and other owners of public utilities which may be affected by the work will be informed in writing by Engineer within two weeks after the execution of the Contract or Contracts covering the work. Such notice will set out, in general, and direct attention to the responsibilities of the Owner and other governmental utility departments and other owners of public utilities for such installations and structures as may be affected by the work and will be accompanied by one set of Drawings and Specifications covering the work under such Contract or Contracts.
7. In addition to the general notice given by the Engineer, the Contractor shall give written notice to Owner and other governmental utility departments and other owners of public utilities of the location of his proposed construction operations, at least forty-eight hours in advance of breaking ground in any area or on any unit of the work. This can be accomplished by making the appropriate contact with the Sunshine State One-Call of Florida, Inc. (1-800-432-4770).
8. The maintenance, repair, removal, relocation or rebuilding of public utility installations and structures, when accomplished by the Contractor as herein provided, shall be done by methods approved by the Engineer.

## 1.02 DRAWINGS AND SPECIFICATIONS

### A. Drawings

1. The Drawings referred to in the Contract Documents bear the general project name and number as shown in the Notice to Bidders (Advertisement).
2. When obtaining data and information from the Drawings, figures shall be used in preference to scaled dimensions, and large scale drawings in preference to small scale drawings.

### B. Copies Furnished to Contractor

1. After the Contract has been executed, the Contractor will be furnished with three sets of paper prints, the same size as the original drawings, of each sheet of the Drawings and three copies of the Specifications. Additional copies of the Drawings and Specifications, when requested, may be furnished to the Contractor at cost of reproduction.
2. The Contractor shall furnish each of the subcontractors, manufacturers, and material suppliers such copies of the Contract Documents as may be required for their work.

C. Supplementary Drawings

1. When, in the opinion of the Engineer, it becomes necessary to explain more fully the work to be done or to illustrate the work further or to show any changes which may be required, drawings known as Supplementary Drawings, with specifications pertaining thereto, will be prepared by the Engineer and five paper prints thereof will be given to the Contractor.

D. Contractor to Check Drawings and Data

1. Contractor shall verify all dimensions, quantities and details shown on the Drawings, Supplementary Drawings, Schedules, Specifications or other data received from the Engineer, and shall notify him of all errors, omissions, conflicts, and discrepancies found therein. Failure to discover or correct errors, conflicts or discrepancies shall not relieve the Contractor of full responsibility for unsatisfactory work, faulty construction or improper operation resulting therefrom nor from rectifying such conditions at his own expense. The Contractor will not be allowed to take advantage of any errors or omissions, as full instructions will be furnished by the Engineer, should such errors or omissions be discovered. All schedules are given for the convenience of the Engineer and the Contractor and are not guaranteed to be complete. The Contractor shall assume all responsibility for the making of estimates of the size, kind, and quality of materials and equipment included in work to be done under the Contract.

E. Specifications

1. The Technical Specifications consist of three parts: General, Products and Execution. The General Section contains General Requirements which govern the work. Products and Execution modify and supplement these by detailed requirements for the work and shall always govern whenever there appears to be a conflict.

F. Intent

1. All work called for in the Specifications applicable to this Contract, but not shown on the Drawings in their present form, or vice versa, shall be of like effect as if shown or mentioned in both. Work not specified in either the Drawings or in the Specifications, but involved in carrying out their intent or in the complete and proper execution of the work, is required and shall be performed by the Contractor as though it were specifically delineated or described.
2. The apparent silence of the Specifications as to any detail, or the apparent omission from them of a detailed description concerning any

work to be done and materials to be furnished, shall be regarded as meaning that only the best general practice is to prevail and that only material and workmanship of the best quality is to be used, and interpretation of these Specifications shall be made upon that basis.

3. The inclusion of the Related Requirements (or work specified elsewhere) in the General part of the specifications is only for the convenience of the Contractor, and shall not be interpreted as a complete list of related Specification Sections.

## 1.03 MATERIALS

### A. Manufacturer

1. The names of proposed manufacturers, material, suppliers and dealers who are to furnish materials shall be submitted to the Engineer for approval. Such approval must be obtained before shop drawings will be checked. No manufacturer will be approved for any materials to be furnished under this Contract unless he shall be of good reputation and have a plant of ample capacity. The Contractor shall, upon the request of the Engineer, be required to submit evidence that he has manufactured a similar product to the one specified and that it has been previously used for a like purpose for a sufficient length of time to demonstrate its satisfactory performance.
2. All transactions with the manufacturers or subcontractors shall be through the Contractor, unless the Contractor shall request, in writing to the Engineer, that the manufacturer or subcontractor deal directly with the Engineer. Any such transactions shall not in any way release the Contractor from his full responsibility under this Contract.
3. Any two or more pieces of material or equipment of the same kind, type or classification, and being used for identical types of service, shall be made by the same manufacturer.

### B. Delivery

1. The Contractor shall deliver materials in ample quantities to insure the most speedy and uninterrupted progress of the work so as to complete the work within the allotted time. The Contractor shall also coordinate deliveries in order to avoid delay in, or impediment of, the progress of the work of any related Contractor.

## 1.04 INSPECTION AND TESTING

### A. General

1. Inspection and testing of materials will be performed by the Owner unless

otherwise specified.

2. For tests specified to be made by the Contractor, the testing personnel shall make the necessary inspections and tests and the reports thereof shall be in such form as will facilitate checking to determine compliance with the Contract Documents. Five copies of the reports shall be submitted and authoritative certification thereof must be furnished to the Engineer as a prerequisite for the acceptance of any material or equipment.
3. If, in the making of any test of any materials, it is ascertained by the Engineer that the material or equipment does not comply with the Contract, the Contractor will be notified thereof and he will be directed to refrain from delivering said materials or to remove it promptly from the site or from the work and replace it with acceptable material, without cost to the Owner.

#### B. Costs

1. All inspection and testing of materials furnished under this Contract will be performed by the Owner or duly authorized inspection engineers or inspection bureaus without cost to the Contractor, unless otherwise expressly specified.
2. Materials submitted by the Contractor as the equivalent to those specifically named in the Contract may be tested by the Owner for compliance. The Contractor shall reimburse the Owner for the expenditures incurred in making such tests on materials which are rejected for non-compliance.

#### C. Inspection of Materials

1. The Contractor shall give notice in writing to the Engineer, sufficiently in advance of his intention to commence the manufacture or preparation of materials especially manufactured or prepared for use in or as part of the permanent construction. Such notices shall contain a request for inspection, the date of commencement and the expected date of completion of the manufacture or preparation of materials. Upon receipt of such notice, the Engineer will arrange to have a representative present at such times during the manufacture as may be necessary to inspect the materials or he will notify the Contractor that the inspection will be made at a point other than the point of manufacture, or he will notify the Contractor that inspection will be waived. The Contractor must comply with these provisions before shipping any material. Such inspection shall not release the Contractor from the responsibility for furnishing materials meeting the requirements of the Contract Documents.

#### D. Certificate of Manufacture



1. When inspection is waived or when the Engineer so requires, the Contractor shall furnish to him authoritative evidence in the form of Certificates of Manufacture that the materials to be used in the work have been manufactured and tested in conformity with the Contract Documents. These certificates shall be notarized and shall include copies of the results of physical tests and chemical analyses, where necessary, that have been made directly on the product or on similar products of the manufacturer.

E. Final Field Tests

1. Upon completion of the work and prior to final payment, all materials installed under this Contract shall be subjected to acceptance tests as specified or required to prove compliance with the Contract Documents.
2. The Contractor shall furnish labor, fuel, energy, water and all other materials, equipment and instruments necessary for all acceptance tests, at no additional cost to the Owner. The Furnishing Supplier shall assist in the final field tests as applicable.

F. Failure of Tests

1. Any defects in the materials or their failure to meet the tests, guarantees or requirements of the Contract Documents shall be promptly corrected by the Contractor by replacements or otherwise. The decision of the Engineer as to whether or not the Contractor has fulfilled his obligations under the Contract shall be final and conclusive. If the Contractor fails to make these corrections or if the improved materials, when tested, shall again fail to meet the guarantees or specified requirements, the Owner, notwithstanding its partial payment for work, and materials, may reject the materials and may order the Contractor to remove them from the site at his own expense.
2. In case the Owner rejects any materials, then the Contractor shall replace the rejected materials within a reasonable time. If he fails to do so, the Owner may, after the expiration of a period of thirty (30) calendar days after giving him notice in writing, proceed to replace such rejected materials, and the cost thereof shall be deducted from any compensation due or which may become due the Contractor under his Contract.

G. Final Inspection

1. During such final inspections, the work shall be clean and free from water. In no case will the final estimate be prepared until the Contractor has complied with all requirements set forth and the Engineer has made his final inspection of the entire work and is satisfied that the entire work

is properly and satisfactorily constructed in accordance with the requirements of the Contract Documents.

## 1.05 TEMPORARY STRUCTURES

### A. Temporary Fences

1. If, during the course of the work, it is necessary to remove or disturb any fence or part thereof, the Contractor shall, at his own expense, provide a suitable temporary fence which shall be maintained until the permanent fence is replaced. The necessity for providing a temporary fence may only be waived in whole or in part by obtaining written permission from the Engineer.

### B. Responsibility for Temporary Structures

1. In accepting the Contract, the Contractor assumes full responsibility for the sufficiency and safety of all temporary structures or work and for any damage which may result from their failure or their improper construction, maintenance or operation and will indemnify and save harmless the Owner from all claims, suits or actions and damages or costs of every description arising by reason of failure to comply with the above provisions.

## 1.06 SAFETY

### A. Accident Prevention

1. Precautions shall be exercised at all times for the protection of person and property. The safety provisions of applicable laws, building and construction codes shall be observed. The Contractor shall comply with the U.S. Department of Labor Safety and Health Regulations for construction promulgated under the Occupational Safety and Health Act of 1970 (PL 91-596), and under Section 107 of the contract Work Hours and Safety Standards Act (PL-54), except where state and local safety standards exceed the federal requirements and except where state safety standards have been approved by the Secretary of Labor in accordance with provisions of the Occupational Safety and Health Act, shall be complied with.

### B. First Aid

1. The Contractor shall keep upon the site, at each location where work is in progress, a completely equipped first aid kit and shall provide ready access thereto at all times when people are employed on the work.

## 1.07 LINES AND GRADES

### A. Grade

1. All work under this Contract shall be constructed in accordance with the lines and grades shown on the Drawings, or as approved by the Engineer. The full responsibility for keeping alignment and grade shall rest upon the Contractor.
2. The Engineer has established bench marks and base line controlling points as shown on the drawings. Reference marks for lines and grades as the work progresses will be located in such a manner by the Contractor as to cause as little inconvenience to the prosecution of the work as possible. The Contractor shall so place excavation and other materials as to cause no inconvenience in the use of the reference marks provided. The Contractor shall remove any obstructions placed by him contrary to this provision.

### B. Surveys

1. The Contractor shall furnish and maintain, at his own expense, stakes and other such materials, and give such assistance, including qualified helpers, as may be required by the Engineer for setting reference marks. The Contractor shall check such reference marks by such means as he may deem necessary and, before using them, shall call the Engineer's attention to any inaccuracies. The Contractor shall, at his own expense, establish all working or construction lines and grades as required from the reference marks set by the Engineer, and shall be solely responsible for the accuracy thereof.

### C. Safeguarding Marks

1. Contractor shall safeguard all points, stakes, grade marks, monuments and bench marks made or established on the work, bear the cost of reestablishing them if disturbed, and bear the entire expense of rectifying work improperly installed due to not maintaining or protecting or to removing without authorization such established points, stakes and marks.
2. The Contractor shall safeguard all existing and known property corners, monuments and marks adjacent to but not related to the work and, if required, shall bear the cost of reestablishing them if disturbed or destroyed.

### D. Datum Plane

1. All elevations indicated or specified refer to the Mean Sea Level Datum of the National Geodetic Vertical Datum of 1929.

## 1.08 ADJACENT STRUCTURES AND LANDSCAPING

### A. Responsibility

1. The Contractor shall also be entirely responsible and liable for all damage or injury as a result of his operations to all other adjacent public and private property, structures of any kind and appurtenances thereto met with during the progress of the work. The cost of protection, replacement in their original locations and conditions or payment of damages for injuries to such adjacent public and private property and structures affected by the work, whether or not shown on the Drawings, and the removal, relocation and reconstruction of such items called for on the Drawings or specified shall be included in the various Contract Items and no separate payments will be made therefore. Where such public and private property, structures of any kind and appurtenances thereto are not shown on the Drawings and when, in the opinion to avoid interference with the work, payment therefore will be made as provided for in the General Conditions.
2. Contractor is expressly advised that the protection of buildings, structures, tunnels, tanks, pipelines, etc. and related work adjacent and in the vicinity of his operations, wherever they may be, is solely his responsibility. Conditional inspection of buildings or structures in the immediate vicinity of the project which may reasonably be expected to be affected by the Work shall be performed by and be the responsibility of the Contractor.
3. Contractor shall, before starting operations, make an examination of the interior and exterior of the adjacent structures, buildings, facilities, pools, etc., and record by notes, measurements, photographs, etc., conditions which might be aggravated by open excavation and construction. Repairs or replacement of all conditions disturbed by the construction shall be made to the satisfaction of the Owner and to the satisfaction of the Engineer. This does not preclude conforming to the requirements of the insurance underwriters. Copies of surveys, photographs, reports, etc., shall be given to the Engineer.
4. Prior to the beginning of any excavations the Contractor shall advise the Engineer of all buildings or structures on which he intends to perform work or which performance of the project work will affect.

### B. Protection of Trees

1. All trees and shrubs shall be adequately protected by the Contractor with boxes and otherwise and in accordance with ordinances governing the protection of trees. No excavated materials shall be placed so as to injure such trees or shrubs. Trees or shrubs destroyed by negligence of

the Contractor or its employees shall be replaced by him with new stock of similar size and age, at the proper season and at the sole expense of the Contractor.

2. Beneath trees or other surface structures, where possible, pipelines may be built in short tunnels, backfilled with excavated materials, except as otherwise specified, or the trees or structures carefully supported and protected from damage.
3. The Owner may order the Contractor, for the convenience of the Owner, to remove trees along the line or trench excavation. If so ordered the Owner will obtain any permits required for removal of trees. Such tree removal ordered shall be paid for at a cost acceptable to the Owner.

C. Lawn Areas

1. Lawn areas shall be left in as good condition as before the starting of the work. Where sod is to be removed, it shall be carefully removed, and later replaced, or the area where sod has been removed shall be restored with new sod in the manner described in these specifications.

D. Restoration of Fences

1. Any fence, or part thereof, that is damaged or removed during the course of the work shall be replaced or repaired by the Contractor and shall be left in as good a condition as before the starting of the work. The manner in which the fence is repaired or replaced and the materials used in such work shall be subject to the approval of the Engineer. The cost of all labor, materials, equipment, and work for the replacement or repair of any fence shall be deemed included in the appropriate Contract Item or items, or if no specific Item is provided therefore, as part of the overhead cost of the work, and no additional payment will be made therefore.

1.09 PROTECTION OF WORK AND PUBLIC

A. Barriers and Lights

1. During the prosecution of the work, the Contractor shall put up and maintain at all times such barriers and lights as will effectually prevent accidents. The Contractor shall provide suitable barricades, red lights, "danger" or "caution" or "street closed" signs and watchmen at all places where the work causes obstructions to the normal traffic or constitutes in any way a hazard to the public, in accordance with state and local requirements.

B. Smoke Prevention

1. The Contractor shall use hard coal, coke, oil or gas as fuel for equipment

generating steam. A strict compliance with ordinances regulating the production and emission of smoke will be required. No open fires will be permitted.

C. Noise

1. The Contractor shall eliminate noise to as great an extent as practicable at all times. Air compressing plants shall be equipped with silencers and the exhaust of all gasoline motors or other power equipment shall be provided with mufflers. In the vicinity of hospitals and schools, special care shall be used to avoid noise or other nuisances. The Contractor shall strictly observe all local regulations and ordinances covering noise control.
2. Except in the event of an emergency, no work shall be done between the hours of 7:00 PM and 7:00 AM, or on Saturdays and Sundays. If the proper and efficient prosecution of the work requires operations during excluded times, the written permission of the Engineer shall be obtained before starting such items of the work.

D. Access to Public Services

1. Neither the materials excavated nor the materials or plant used in the construction of the work shall be so placed as to prevent free access to all fire hydrants, valves or manholes.

E. Dust Prevention

1. The Contractor shall prevent dust nuisance from his operations or from traffic by keeping the roads and/or construction areas sprinkled with water at all times.

1.10 CUTTING AND PATCHING

- A. The Contractor shall do all cutting, fitting or patching of his portion of the work that may be required to make the several parts thereof join and coordinate in a manner satisfactory to the Engineer and in accordance with the Drawings and Specifications. The work must be done by competent workmen skilled in the trade required by the restoration.

1.11 CLEANING

A. During Construction

1. During construction of the work, the Contractor shall, at all times, keep the site of the work and adjacent premises as free from material, debris and rubbish as is practicable and shall remove the same from any portion of the site if, in the opinion of the Engineer, such material, debris, or

rubbish constitutes a nuisance or is objectionable.

2. The Contractor shall remove from the site all of his surplus materials and temporary structures when no further need therefore develops.
3. The Contractor shall be responsible and liable for all spillage and incur all associated costs including, but not limited to, costs related to repair and maintenance resulting from damages thereof.

B. Final Cleaning

1. At the conclusion of the work, all erection plant, tools, temporary structures and materials belonging to the Contractor shall be promptly taken away, and he shall remove and promptly dispose of all water, dirt, rubbish or any other foreign substances.
2. The Contractor shall thoroughly clean all materials installed by him and shall deliver such materials undamaged and in a clean condition.

1.12 MISCELLANEOUS

A. Protection against Siltation and Bank Erosion

1. The Contractor shall arrange his operations to minimize siltation and bank erosion on construction sites and on existing or proposed water courses and drainage ditches.
2. The Contractor, at his own expense, shall remove any siltation deposits and correct any erosion problems as directed by the Engineer which results from his construction operations.

B. Protection of Wetland Areas

1. The Contractor shall properly dispose of all surplus material, including soil, in accordance with Local, State and Federal regulations. Under no circumstances shall surplus material be disposed of in wetland areas as defined by the Florida Department of Environmental Protection.

C. Existing Facilities

1. The work shall be so conducted to maintain existing facilities in operation insofar as is possible. Requirements and schedules of operations for maintaining existing facilities in service during construction shall be as described in these Specifications.

D. Use of Chemicals

1. All chemicals used during project construction or furnished for project

operation, whether herbicide, pesticide, disinfectant, polymer, reactant, or of other classification, must show approval of either EPA or USDA. Use of all such chemicals and disposal of residues shall be in strict conformance with instructions.

E. Cooperation with Other Contractors and Forces

1. During progress of work under this Contract, it may be necessary for other contractors and persons employed by the Owner to work in or about the site. The Owner reserves the right to put such other contractors to work and to afford such access to the site of the work to be performed hereunder at such times as the Owner deems proper. The Contractor shall not impede or interfere with the work of such other contractors engaged in or about the work and shall so arrange and conduct his work that such other contractors may complete their work at the earliest date possible.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION



SECTION 01010  
SUMMARY OF WORK

PART 1 GENERAL

1.01 LOCATION OF WORK

- A. All of the work of this Contract is located at the Manatee County Southeast Water Reclamation Facility (SEWRF) as shown on the Drawings.

1.02 WORK TO BE DONE

- A. The Contractor shall furnish all labor, materials, equipment, tools, services and incidentals to complete all work required by these Specifications and as shown on the Drawings.
- B. The Contractor shall perform the work complete, in place, and ready for continuous service, and shall include repairs, testing, permits, cleanup, replacements and restoration required as a result of damages caused during this construction.
- C. All materials, equipment, skills, tools and labor which is reasonably and properly inferable and necessary for the proper completion of the work in a substantial manner and in compliance with the requirements stated or implied by these Specifications or Drawings shall be furnished and installed by the Contractor without additional compensation, whether specifically indicated in the Contract Documents or not.
- D. The Contractor shall comply with all municipal, county, state, federal, and other codes which are applicable to the proposed construction work.

1.03 SCOPE OF WORK

- A. The Work included in this Bid consists of furnishing, delivering and installing all materials, equipment, incidentals and services, including labor for the construction of the Manatee County Southeast Water Reclamation Septage/Grease Receiving Station located at 3331 Lena Road in Bradenton, Florida.
- B. The Work generally includes, but is not necessarily limited to
  - 1. Excavation, compaction, demolition, clearing and grubbing, and earthwork at the location of the proposed Work.
  - 2. Construction of cast-in-place concrete and asphalt pavement
  - 3. Construction of stormwater facilities including a stormwater drainage retention pond.
  - 4. Above-ground grease storage tank and an above-ground septage

- storage tank.
- 5. Construction of grease and septage receiving stations including all associated processing equipment, pumping stations, electrical work, and yard piping.

- B. During construction, provisions shall be made to allow continuous operation of the existing treatment facility at all times.
- D. All work shall be done as described in the Specifications and as shown on the Drawings, complete, tested and ready for operation.

#### 1.04 SUBSTANTIAL COMPLETION

- A. The work, or any separable parts thereof, identified herein shall be deemed Substantially Completed at such time that all incidental requirements necessary to enable the Owner to continuously and successfully utilize the work or separable part thereof, for the purposes of which it is intended are completed. Substantial completion includes all improvements as specified in the contract documents including finish grading, clean-up, and testing of the new facilities.

#### 1.05 WORK SEQUENCE

- A. All work to be done under this Contract shall be done with minimum interference to the existing utility systems and adjacent land uses. The Contractor shall coordinate his work with the Owner such that the facilities are maintained to the maximum extent possible.
- B. Construct Work in stages to accommodate the Owner's use of the premises during the construction period; coordinate the construction schedule and operations with the Owner's Representative.
- C. Construct the Work in stages to provide for public convenience.
- D. The Contractor shall maintain flow in to the existing wastewater plant at all times.
- E. The Contractor shall not allow liquid to enter any new pipe until the new portions have been accepted by the Owner and all new pipe has been tested successfully for leakage.

#### 1.06 CONSTRUCTION AREAS

- A. Contractor shall limit his use of the construction areas for Work and for storage, to allow for:
  - 1. Work by subcontractors employed by the Contractor.

2. Owner use.
  3. Public use.
- B. Coordinate use of work site under direction of Engineer.
  - C. Assume full responsibility for the protection and safekeeping of Products under this Contract, stored on the site.
  - D. Move any stored Products, under Contractor's control which interfere with operations of the Owner or Subcontractor.
  - E. Obtain and pay for the use of additional storage or work areas needed for operations.

1.07 OWNER OCCUPANCY

- A. Owner will have full access to and use of all existing utilities during the entire period of construction for the conduct of his normal operations. Cooperate with Owner's Representative in all construction operations to minimize conflict, and to facilitate Owner usage.
- B. Contractor shall at all times conduct his operations as to insure the least inconvenience to the general public.

1.08 DISCREPANCY BETWEEN DRAWINGS AND SPECIFICATIONS

- A. In case of any discrepancy between the Drawings and Specifications, the more stringent requirements shall apply. The Contractor will not be held responsible for the discovery of such discrepancy, but any work done on the item involved after such discovery, and prior to authorization by the Engineer, will be done at the Contractor's risk and expense.

1.09 PRE-CONSTRUCTION CONFERENCE

- A. After the execution of the Agreement, a joint meeting shall be held with representatives of the Contractor and major subcontractors, the Engineer, the Owner, and other invited parties or government agencies which may be affected by or have jurisdiction over the Project.
- B. This meeting is intended to introduce the various key personnel from each organization and discuss the Contract Documents, the start of construction, order of work, labor and legal requirements, insurance requirements, names of major subcontractors, method of payment, shop drawing requirements, protection of existing facilities and other pertinent items associated with the Project. If requested, the Contractor shall bring to this conference six (6) copies of a proposed work schedule.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01015  
CONTROL OF WORK

PART 1 GENERAL

1.01 WORK PROGRESS

- A. The Contractor shall provide equipment which will be efficient, appropriate and large enough to secure a satisfactory quality of work and a rate of progress which will insure the completion of the work within the time stipulated in the Proposal. If at any time such facilities appear to the Engineer to be inefficient, inappropriate, or insufficient for securing the quality of work required or for producing the rate of progress aforesaid, he may order the Contractor to increase the facilities equipment, and the Contractor shall conform to such order. Failure of the Engineer to give such order shall in no way relieve the Contractor of his obligations to secure the quality of the work and rate of progress required.

1.02 PRIVATE LAND

- A. The Contractor shall not enter or occupy private land outside of easements, except by written permission of the property owner.

1.03 WORK LOCATIONS

- A. Work shall be located substantially as indicated on the Drawings, but the Engineer reserves the right to make such modifications in locations as may be found desirable to avoid interference with existing structures or for other reasons. Where fittings are noted on the Drawings, such notation is for the Contractor's convenience and does not relieve him from laying and jointing different or additional items where required.

1.04 OPEN EXCAVATIONS

- A. All open excavations shall be adequately safeguarded by providing temporary barricades, caution signs, lights and other means to prevent accidents to persons, and damage to property. The length of open trench will be controlled by the particular surrounding conditions, but shall always be confined to limits not endangering existing facilities. It is the Contractor's responsibility to provide the required temporary structural support for open excavation.
- B. The Contractor shall take precautions to prevent injury to the public due to open trenches. All trenches, excavated material, equipment, or other obstacles which could be dangerous to the public shall be well lighted at night.

## 1.05 TEST PITS

- A. Test pits for the purpose of locating underground pipeline or structures in advance of the construction shall be excavated and backfilled by the Contractor so as not to create a hazardous area. Test pits shall be backfilled immediately after their purpose has been satisfied and the surface restored and maintained in a manner satisfactory to the Engineer.

## 1.06 CARE AND PROTECTION OF PROPERTY

- A. The Contractor shall be responsible for the preservation of all public and private property, and shall use every precaution necessary to prevent damage thereto. If any direct or indirect damage is done to public or private property by or on account of any act, omission, neglect, or misconduct in the execution of the work on the part of the Contractor, such property shall be restored by the Contractor, at his expense, to a condition similar or equal to that existing before the damage was done, or the Contractor shall make good the damage in other manner acceptable to the Engineer.
- B. All sidewalks which are disturbed by the Contractor's operations shall be restored to their original condition by the use of similar or comparable materials. All curbing shall be restored in a condition equal to the original construction and in accordance with the best modern practice.
- C. Along the location of this work all fences, walks, bushes, trees, shrubbery, and other physical features shall be protected and restored in a thoroughly workmanlike manner. Fences and other features removed by the Contractor shall be replaced in the location indicated by the Engineer as soon as conditions permit. All grass areas beyond the limits of construction which have been damaged by the Contractor shall be regarded and sodded.
- D. Trees close to the work shall be boxed or otherwise protected against injury. The Contractor shall trim all branches that are liable to damage because of his operations, but in no case shall any tree be cut or removed without prior notification of the tree warden. All injuries to bark, trunk, limbs, and roots of trees shall be repaired by dressing, cutting, and painting according to approved methods, using only approved tools and materials.
- E. The protection, removal, and replacement of existing physical features along the line of work shall be a part of the work under the Contract, and all costs in connection therewith shall be included in the unit and/or lump sum prices established under the items in the Schedule of Prices.

## 1.07 PROTECTION AND RELOCATION OF EXISTING STRUCTURES AND UTILITIES

- A. The Contractor shall assume full responsibility for the protection of all buildings, structures, and utilities, public or private, including, but not limited to swimming pools, poles, signs, services to buildings, utilities in the street, gas pipes, water pipes, hydrants, sewers, drains, and electric and telephone cables, whether or not they are shown on the Drawings. The Contractor shall carefully support and protect all such structures and utilities from injury of any kind. Any damage resulting from the Contractor's operations shall be repaired by him at his expense.
- B. The Contractor shall bear full responsibility for obtaining all locations of underground structures and utilities (including existing electric, telephone cables, cable TV, gas, drain lines, and sewers, etc.). Services to all buildings shall be maintained and all costs or charges resulting from damage thereto shall be paid by the Contractor.

#### 1.08 DISTRIBUTION SYSTEMS AND SERVICES

- A. The Contractor shall interrupt water, telephone, Cable TV, sewer, gas, or other related utility services and disrupt the normal functioning of the system as little as possible. He shall notify the Engineer well in advance of any requirement for dewatering, isolating, or relocating a section of a utility, so that necessary arrangements may be made with the appropriate agency.
- B. If it appears that utility service will be interrupted for an extended period, the Engineer may order the Contractor to provide temporary service lines. Inconvenience of the users shall be the minimum, consistent with the existing conditions. The safety and integrity of the system is of prime importance in scheduling work.

#### 1.09 PROTECTION OF CONSTRUCTION AND EQUIPMENT

- A. All newly constructed work shall be carefully protected from injury in any way. No wheeling or walking or placing of heavy loads on it shall be allowed and all portions injured shall be reconstructed by the Contractor at his own expense.
- B. All structures shall be protected in a manner approved by the Engineer. Should any of the floors or other parts of the structures become heaved, cracked, or otherwise damaged, all such damaged portions of the work shall be completely repaired and made good by the Contractor at his own expense and to the satisfaction of the Engineer. If, in the final inspection of the Work, any defects, faults, or omissions are found, the Contractor shall cause the same to be repaired or removed and replaced by proper materials and workmanship without extra compensation for the materials and labor required. Further, the Contractor shall be fully responsible for the satisfactory maintenance and repair of the construction and other work undertaken herein, for at least the guarantee period described in the Contract.

- C. Further, the Contractor shall take all necessary precautions to prevent damage to any structure due to water pressure during and after construction and until such structure is accepted and taken over by the Owner.

#### 1.10 WATER FOR CONSTRUCTION PURPOSES

- A. In locations where public water supply is available, the Contractor may purchase metered water for construction purposes.
- B. The express approval of the Water Department shall be obtained before water is used. All valves and hydrants shall be operated only under the supervision of the Water Department's personnel.

#### 1.11 MAINTENANCE OF FLOW

- A. The Contractor shall at their own cost, provide for the flow of sewers, drains, and water courses interrupted during the progress of the work, and shall immediately cart away and remove all offensive matter and dispose at an appropriate facility. The entire procedure of maintaining existing flow shall be fully discussed with the Engineer well in advance of the interruption of any flow.

#### 1.12 COOPERATION WITHIN THIS CONTRACT

- A. All firms or persons authorized to perform any work under this Contract shall cooperate with the Contractor and his subcontractors or trades, and shall assist in incorporating the work of other trades where necessary or required.
- B. Cutting and patching, drilling and fitting shall be carried out where required by the trade or subcontractor having jurisdiction, unless otherwise indicated herein or approved by the Engineer.

#### 1.13 CLEANUP

- A. During the course of the work, the Contractor shall keep the site operations in as clean and neat a condition as is possible. The Contractor shall dispose of all residue resulting from the construction work and, at the conclusion of the work, and shall remove and haul away any surplus excavation, existing pipe and appurtenances removed by the Contractor, broken pavement, lumber, equipment, temporary structures, and any other refuse remaining from the construction operation, and shall leave the entire site of the work in a neat and orderly condition.

#### 1.14 SEQUENCE OF OPERATIONS

- A. The work designated to be performed under this Contract shall be coordinated in such manner that there shall be a minimum of interference with traffic and existing utilities. Existing water, sewer, gas, electric and communications shall



not be interrupted without prior arrangements having been made with the management of the utility involved.

- B. Backfilling, compacting, and clean-up work on any individual road shall be continuously prosecuted concurrently to the point that ingress and egress to roadways and private property can be maintained.
- C. During the period required for construction under this Contract, it will be necessary that any existing sanitary sewers and/or water lines be maintained in operation. The Contractor shall prepare and submit to the Owner and the Engineer a schedule of operations for approval.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01030  
SPECIAL PROJECT PROCEDURES

PART 1 GENERAL

1.01 WORKMANSHIP, MATERIAL AND EQUIPMENT

- A. When a particular product is specified or called for, it is intended and shall be understood that the proposal tendered by the Contractor included those products in his bid. Should the Contractor desire equal to those specified, the Contractor shall furnish information as described in the General Conditions and Supplemental Conditions. The alternate product or products submitted by the Contractor shall meet the requirements of the specifications and shall, in all respects, be equal to the products specified by name herein.
- B. All apparatus, mechanism, equipment, machinery and manufactured articles for incorporation into the Work shall be the new and unused standard products of recognized reputable manufacturers.
- C. All materials entering into the work shall be tested as specified. Unless waived in writing by the Engineer, all field tests shall be made in the presence of the Engineer or his authorized representative. When such a waiver is issued, sworn statement in duplicate of the tests made and the results thereof shall be furnished to the Engineer by the Contractor or manufacturer. Costs of all tests and trials specified hereto, other than laboratory tests, and with the exception of the Engineer's expenses shall be borne by the Contractor and shall be included in the Contract price.
- D. All workmanship and materials shall be of the highest quality. The materials shall be the product of manufacturers who are experienced and skilled in the field with an established record of research and development. No material will be considered unless the manufacturer has designed and manufactured material of comparable type and size for at least five (5) years.
- E. Contractor must provide his own disposal of excavation that he removes from the site.

1.02 CONNECTIONS TO EXISTING SYSTEMS

- A. For connection to existing lines, to which piping of this Contract must connect, the following work shall be performed:
  - 1. Schedule connection work so it does not interfere with the operation of the existing pipe system.

2. Expose buried lines to verify or determine location, type, materials, and diameter of existing pipe.
  3. Furnish and install appropriate piping, fittings, and specials and make proper connections.
- B. The Contractor shall perform all work necessary to locate, excavate and prepare for connections to the terminus of the existing systems all as shown on the Drawings. The cost for this work and for the actual connection to the existing systems shall be included in the bid price for the project and shall not result in any additional cost to the Owner.

### 1.03 EXISTING UNDERGROUND PIPING, STRUCTURES, AND UTILITIES

- A. The attention of the Contractor is drawn to the fact that during excavation, the possibility exists of the Contractor encountering various water, gas, telephone, electrical, or other utility lines not shown on the Drawings. The Contractor shall exercise extreme care before and during excavation to locate and flag these lines so as to avoid damage to the existing lines. Should damage occur to an existing line, the Contractor shall repair the line at no cost to the Owner.
- B. It is the responsibility of the Contractor to ensure that all utility or other poles, the stability of which may be endangered by the close proximity of excavation, are temporarily stayed in position while work proceeds in the vicinity of the pole and that utility or other companies concerned be given reasonable advance notice of any such excavation by the Contractor.
- C. The locations are shown without express or implied representation, assurance, or guarantee that they are complete or correct or that they represent a true picture of underground piping to be encountered.
- D. The existing piping and utilities that interfere with new construction shall be rerouted as shown, specified, or required. Before any piping and utilities not shown on the Drawings are disturbed, the Contractor shall notify the Engineer of the location of the pipeline or utility and shall reroute or relocate the pipeline or utility as directed.
- E. The Contractor shall exercise care in any excavation to locate all existing piping and utilities. All utilities which do not interfere with complete work shall be carefully protected against damage. Any existing utilities damaged in any way by the Contractor shall be restored or replaced by the Contractor at his expense as directed by the Engineer.

#### 1.04 PROVISIONS FOR CONTROL OF EROSION

- A. Sufficient precautions shall be taken during construction to minimize the run-off of polluting substances such as silt, clay, fuels, oils, bitumens, calcium chloride, or other polluting materials harmful to humans, fish, or other life, into the supplies and surface waters of the state. Control measures must be adequate to assure that turbidity in the receiving water will not be increased more than 10 nephelometric turbidity units (NTU), or as otherwise required by the state or other controlling body, in water used for public water supply or fish unless limits have been established for the particular water. In surface water used for other purposes, the turbidity must not exceed 29 NTU unless otherwise permitted. Special precautions shall be taken in the use of construction equipment to prevent operations which promote erosion.

#### 1.06 ON SITE STORAGE

- A. The Contractor's attention is invited to special storage requirements and possible charges for noncompliance of on-site storage requirements for materials and equipment as specified in Section 01600.

#### 1.07 STORM PREPAREDNESS PLAN

- A. Within 10 days of the date of Notice to Proceed, the Contractor shall submit to the Engineer and Owner a Storm Preparedness Plan. The plan should outline the necessary measures which the Contractor proposes to perform at no additional cost to the Owner in case of a storm warning.
- B. In the event of inclement weather, or whenever Engineer shall direct; Contractor shall, and shall cause subcontractors to protect carefully the Work and materials against damage or injury from the weather. If, in the opinion of Engineer, any portion of Work or materials shall have been damaged or injured by reason of failure on the part of the Contractor or subcontractors to so protect the Work, such Work and materials shall be removed and replaced at the expense of Contractor.

#### 1.08 WARRANTIES

- A. All material supplied under these Specifications shall be warranted by the Contractor and the material manufacturers for a period of one (1) year, unless a longer period of time is specified. Warranty period shall commence on the date of final acceptance by the Owner.
- B. The material shall be warranted to be free from defects in workmanship and design. If any part of the material should fail during the warranty period, it shall be replaced by the Contractor at no expense to the Owner.

- C. The manufacturer's warranty period shall run concurrently with the Contractor's warranty or guarantee period. No exception to this provision shall be allowed. The Contractor shall be responsible for obtaining warranties in accordance with Section 01740 from each of the respective supplier or manufacturers for all the material specified.
- D. In the event that the manufacturer is unwilling to provide a one-year warranty commencing at the time of Owner acceptance, the Contractor shall obtain from the manufacturer a two (2) year warranty starting at the time of material delivery to the job site. This two-year warranty shall not relieve the Contractor of the one-year warranty starting at the time of Owner acceptance of the material.
- E. Provide material warranties in accordance with Section 01740. The Contractor's one year warranty or guarantee period shall be part of the project performance bond.

#### 1.09 WATERTIGHTNESS

- A. Special precautions shall be taken in the curing of concrete to reduce concrete cracking as called for in Division 3 of the specifications. Procedure and manner in which any leaks are repaired must meet the approval of the Engineer. All costs associated with the testing and repair of leaks shall be at the expense of the Contractor.

#### 1.10 CONSTRUCTION CONDITIONS

- A. The Contractor shall strictly adhere to the specific requirements of the governmental unit(s) or agency(ies) having jurisdiction over the work. Wherever there is a difference in the requirements of a jurisdictional body and these Specifications, the more stringent shall apply.

#### 1.11 PUBLIC NUISANCE

- A. The Contractor shall not create a public nuisance including but not limited to encroachment on adjacent lands, flooding of adjacent lands, or excessive noise.
- B. No construction activities shall be permitted between the hours of 7:00 p.m. and 7:00 a.m., Monday through Friday, and all day Saturday and Sunday, that produce noise exceeding 45 dBA, measured at the nearest property line of an adjacent residential area. Construction equipment that must be operated near a residentially zoned area on a 24-hour per day basis (i.e., pumps, well tips, generators, etc.) shall be shielded by an acoustical enclosure unless the unshielded noise level is less than 45 dBA, measured at the closest adjacent residentially zoned property line. (Ord. No. 74-11, § 4(b), 10-15-74). At no additional cost to the Owner, the Owner reserves the right to direct the Contractor to leave the enclosure on the equipment on a 24-hour per day basis.

Levels at the equipment shall not exceed 85 dBA at the equipment at any time. Sound levels in excess of these values are sufficient cause to have the work halted until equipment can be quieted to these levels. Work stoppage by the Engineer or county for excessive noise shall not relieve the Contractor of the other portions of this specification including, but not limited to contract time and contract price.

- C. No extra charge may be made for time lost due to work stoppage resulting from the creation of a public nuisance.

#### 1.12 SUSPENSION OF WORK DUE TO WEATHER

- A. During inclement weather, all work which might be damaged or rendered inferior by such weather conditions shall be suspended. The orders and decisions of the Owner as to suspensions shall be final and binding. The ability to issue such an order shall not be interpreted as a requirement to do so. During suspension of the work from any cause, the work shall be suitably covered and protected so as to preserve it from injury by the weather or otherwise; and, if the Engineer shall so direct, the rubbish and surplus materials shall be removed.

#### 1.13 RELOCATIONS

- A. The Contractor shall be responsible for the relocation of structures, including but not limited to light poles, signs, sign poles, fences, piping, conduits, drains, and sewer service lateral connections that interfere with the positioning of the work as set out on the Drawings. The cost of all such relocations shall be included in the bid, and no additional payment will be made.

#### 1.14 PERMITS

- A. Upon notice of award, the Contractor shall immediately apply for all applicable permits not previously obtained by the Owner to do the work from the appropriate governmental agency or agencies. No work shall commence until all applicable permits have been obtained and copies delivered to the Engineer. The costs for obtaining all permits shall be borne by the Contractor. The Contractor shall also comply with the requirements of the permits.
- B. The Contractor shall prepare and submit a "Notice of Intent to Use Generic Permit for Stormwater Discharge from Construction Activities that Disturb One or More Acres of Land" to the Florida Department of Environmental Protection (FDEP). The Contractor shall monitor the site at all times and take appropriate action to prevent erosion, including the use of Best Management Practices (BMPs). No pumping of ground or surface water shall be performed without approval from the Water Management District. Following completion of construction, Contractor shall prepare and submit a "Notice of Termination of

Generic Permit Coverage” to FDEP. Payment for this item shall be included under the pay item for Mobilization.

#### 1.15 PUMPING

- A. The Contractor is required to maintain flow in the existing utilities during construction at all times. The Contractor, with his own equipment, shall do all pumping necessary to maintain adequate flow without by pass or spill or overflow of stormwater in violation of federal, state, and local requirements.
- B. The Contractor with his own equipment shall do all pumping necessary to prevent flotation of any part of the structures during construction operations.

#### 1.16 FIELD OFFICES

- A. The Contractor shall be responsible for securing field office and equipment/spoil areas and assume full liabilities for the use of such areas.

#### 1.17 OWNER OCCUPANCY AND OPERATION OF COMPLETED FACILITIES

- A. It is assumed that portions of the work will be completed prior to completion of the entire work. Upon completion of construction of a section of the work, if the Owner, at its sole discretion, desires to accept the section of work, the Contractor will be issued a dated certificate of completion and acceptance for that section of work. The Owner will assume ownership of the individual section on that date and the one-year guaranty period shall commence on that date. The Owner has the option of not accepting any individual completed section, but accepting the entire work as a whole when it is completed and tested.

#### 1.18 NOTIFICATION OF WORK ON EXISTING FACILITIES

- A. Before commencing work on any of the existing structures or equipment, the Contractor shall notify the Engineer, in writing, at least 10 calendar days in advance of the date he proposes to commence such work.

#### 1.19 CARE AND PROTECTION OF PROPERTY

- A. The Contractor shall be responsible for the preservation of all public and private property, and shall use every precaution necessary to prevent damage thereto. If any direct or indirect damage is done to public or private property by or on account of any act, omission, neglect, or misconduct in the execution of the work on the part of the Contractor, such property shall be restored by the Contractor, at his expense, to a condition similar or equal to that existing before the damage was done, or he shall make good the damage in other manner acceptable to the Owner or property owner.

- B. Along the location of this work all fences, walks, bushes, trees, shrubbery, and other physical features shall be protected and restored in a thoroughly workmanlike manner. Fences and other features removed by the Contractor shall be replaced in the locations on the drawings or approved by the Engineer as soon as conditions permit. All grass areas beyond the limits of construction which have been damaged by the Contractor shall be regraded and sodded, as soon as conditions permit.
- C. Trees close to the work shall be boxed or otherwise protected against injury. The Contractor shall trim all branches that are liable to damage because of his operations, but in no case shall any tree be cut or removed without proper notification of the Owner. All injuries to bark, trunk, limbs, and roots of trees shall be repaired by dressing, cutting, and painting according to approved methods, using only approved tools and materials.
- D. The protection, removal, and replacement of existing physical features along the line of work shall be a part of the work under the Contract, and all costs in connection therewith shall be included in the unit and/or lump sum prices established under the items in the Schedule of Prices.
- E. Should any tree, shrub or plant that has been removed and replanted die within 12 months from the time that it was replanted or disturbed, it shall be replaced in kind and size by the Contractor at his expense.

1.20 PROTECTION AND RELOCATION OF EXISTING STRUCTURES AND UTILITIES

- A. The Contractor shall assume full responsibility for the protection of all buildings, structures, and utilities, public or private, including but not limited to swimming pools, poles, signs, services to buildings, gas pipes, water pipes, hydrants, sewers, drains, TV cable and electric and telephone cables, whether or not they are shown on the Drawings. The Contractor shall carefully support and protect all such structures and utilities from injury of any kind. Any damage resulting from the Contractor's operations shall be repaired by him at his expense.
- B. The Contractor shall bear full responsibility for obtaining all locations of underground structures and utilities (including existing water services, electric, telephone, TV/cable, drain lines, and sewers). Services to building shall be maintained and all costs or charges for repair resulting from damage thereto shall be paid by the Contractor.

1.21 DISTRIBUTION SYSTEMS AND SERVICES

- A. The Contractor shall interrupt water, electric, telephone, TV cable, sewer, gas, or other related utility services and disrupt the normal functioning of the system as little as possible. He shall notify the appropriate agency well in advance of



any requirement for dewatering, isolation, or relocating a section of a utility, so that necessary arrangements may be made.

- B. If it appears that utility service will be interrupted for an extended period, the Contractor shall provide temporary service lines. Inconvenience of the users shall be kept to a minimum, consistent with the existing conditions. The safety and integrity of the system is of prime importance in scheduling work.

#### 1.22 PROVISIONS FOR THE CONTROL OF DUST

- A. Sufficient precautions shall be taken during construction to minimize the amount of dust created. Wetting down the site may be required or as directed by the Engineer to prevent dust as a result of vehicular traffic.

#### 1.23 HISTORICAL OR ARCHAEOLOGICAL ARTIFACTS

- A. If historical or archaeological artifacts, such as Indian canoes, are discovered at any time within the project site, the Contractor shall immediately notify the Engineer.

#### 1.24 RESPONSIBILITY FOR AFTER SETTLEMENT

- A. Any depression which may develop in backfilled areas from settlement within one year after the work is fully completed and accepted shall be the responsibility of the Contractor. The Contractor shall, at his own expense, perform the necessary reconditioning or restoration work to bring such depressed areas to proper grade and to a condition acceptable to the Engineer, all in accordance with the guarantee provisions of the General Conditions and Supplemental Conditions.

#### 1.25 EXISTING FACILITIES

- A. The Contractor shall protect all existing facilities which are shown on the Drawings or located in the field during the course of the work. When approved by the Engineer, relocation or special maintenance of facilities during construction will be permitted. Disruption of service shall be kept to a minimum.
- B. Facilities which are damaged by negligence of the Contractor shall be replaced by the Contractor to such limits as directed by the Engineer. Materials used for such replacements shall be similar to those used in the existing facility and shall conform to these specifications for the construction of storm sewers.
- C. The cost of protecting, replacing, relocating and maintaining storm sewerage facilities shall be included in the various Contract Items and no separate payment will be made therefore, unless otherwise specified in other Contract Items.

- D. The maintenance and guarantee provisions of the Agreement shall also apply to all replacements of damaged or relocated storm sewerage facilities accomplished by the Contractor.

#### 1.26 PERMIT REVIEW

- A. The Contractor shall review permit general conditions for construction and be aware of all requirements as specified in the permit, and shall maintain all records and other information as required. The Contractor shall comply with the terms and conditions of the permit, whether by himself or others.

#### 1.27 SURFACE RESTORATION

- A. The Contractor shall repair all ground surfaces damaged during construction. Any bushes, flowers, gardens, within the limits of easements shall be repaired or replaced by the Contractor. The cost of such ground surface repair shall be included in the various unit price or lump sum Contract Items and no separate payment will be made therefore.
- B. Existing concrete pipe culverts and other pipes damaged by the Contractor during the construction work shall be removed from the site and replaced with new pipe culverts of similar type and size. New pipes shall meet the applicable requirements of Florida Department of Transportation and Owner specifications; and as specified herein. No separate payment will be made for replacement of damaged pipes.
- C. To avoid confusion and potential disagreement, the following minimum restoration schedule is to be incorporated into the Contractor's construction activities. The Engineer reserves the option to revise this schedule as may be necessary in particular circumstances.

1. Debris Removal: Debris from construction activity such as broken concrete, culvert pipes, miscellaneous piping, trees, shrubbery, etc. shall be immediately removed from the site.

#### 1.28 RELEASING FACILITIES FOR USE

- A. Acceptance or use by the Owner of any portion of the facilities prior to final acceptance shall not relieve the Contractor of any responsibilities, regarding such facilities, included in the Contract.

#### PART 2 PRODUCTS (NOT USED)

#### PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01040  
PROJECT COORDINATION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. This Section specifies administrative and supervisory requirements necessary for Project coordination including, but not necessarily limited to:
1. Coordination.
  2. Administrative and supervisory personnel.
  3. Cleaning and protection.
- B. The Pre-construction Conference, progress meetings, pre-installation conferences and special coordination meetings are included in Section 01200, "Project Meetings". Requirements for the Contractor's Schedule are included in Section 01310, "Construction Schedules".

1.02 COORDINATION

- A. Coordination.
1. The Contractor shall be solely responsible for the coordination of the work and shall devote such attention thereto and apply such skills and expertise as necessary to perform the work, including but not limited to the means, methods, sequences, and procedures of construction including assurance of safety at the construction site. The Divisions and Sections of the specifications and the identifications of any drawings shall not control the Contractor in dividing or coordinating the work among subcontractors or suppliers, or delineating the work to be performed by any trade. Coordinate construction activities included under various Sections of these Specifications to assure efficient and orderly installation of each part of the work. Coordinate construction operations included under different Sections of the Specifications that are dependent upon each other for proper installation, connection, and operation.
  2. Where installation of one part of the work is dependent on installation of other components, schedule construction activities in the sequence required to obtain the best results.
  3. Where availability of space is limited, coordinate installation of different components to assure maximum accessibility for required

maintenance, service and repair. Make adequate provisions to accommodate items scheduled for later installation.

4. Where necessary, prepare memoranda for distribution to each party involved outlining special procedures required for coordination. Include such items as required notices, reports, and attendance at meetings. Prepare similar memoranda for the Owner and separate Contractors where coordination of their work is required.
5. The Contractor shall cooperate fully with the Owner, Engineer and/or Resident Project Representative during the prosecution of the work.

B. Coordination with Existing Plant Operations.

1. The Contractor must schedule his work so as to maintain the required degree of operating service to meet permit conditions at all times.
2. When the work shall interface directly with an existing on-line facility, the Contractor shall give 7 days written notice to the Resident Project Representative prior to beginning the work. The written notice shall detail the work to be done, the interface with the on-line system and the precautionary measures to be taken.
3. The Contractor shall have sole responsibility, including financial liability, for interruption of service caused by the work done, and for compliance to existing Operating permits including, but not limited to, SWFWMD and F DEP Operating permits which are impacted by the work done, during this construction project.

C. Coordination with Other Utilities.

The Contractor shall coordinate all work interfaces with utility owners for all related work including but not limited to electrical, water, sewer, and communication utilities. The Contractor shall pay all charges of utility owners for connections to the work unless stated otherwise in the Contract Documents, and shall properly connect and schedule the work with the utilities to avoid delays.

D. Administrative Procedures.

Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and ensure orderly progress of the work. Such administrative activities include, but are not limited to, the following:

1. Preparation of schedules.
2. Installation and removal of temporary facilities
3. Delivery and processing of submittals.
4. Progress meetings.
5. Project Close-out activities.
6. Coordination with other construction contracts.

### 1.03 SUBMITTALS

#### A. Coordination Drawings

1. Prepare and submit coordination Drawings where close and careful coordination is required for installation of products and materials fabricated off-site by separate entities, and where limited space availability necessitates maximum utilization of space for efficient installation of different components.
2. Show the interrelationship of components shown on separate Shop Drawings.
3. Indicate required installation sequences.
4. Comply with requirements contained in Section 01300, "Submittals."

END OF SECTION

SECTION 01045  
CUTTING AND PATCHING

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Contractor shall be responsible for all cutting, fitting and patching, including attendant excavation and backfill, required to complete the Work or to:
1. Make its several parts fit together properly.
  2. Uncover portions of the Work to provide for installation of ill-timed work.
  3. Remove and replace defective work.
  4. Remove and replace work not conforming to requirements of Contract Documents.
  5. Remove samples of installed work as specified for testing.

1.02 SUBMITTALS

- A. Submit a written request to the Engineer well in advance of executing any cutting or alteration which affects:
1. Work of the Owner or any subcontractor.
  2. Structural value or integrity of any element of the Project or work.
  3. Integrity or effectiveness of weather-exposed or moisture-resistant elements or systems.
  3. Efficiency, operational life, maintenance or safety of operational elements.
  5. Visual qualities of sight-exposed elements.
- B. Request shall include:
1. Identification of the work.
  2. Description of affected work.
  3. The necessity for cutting, alteration or excavation.
  4. Effect on work of Owner or any separate contractor, or on structural or weatherproof integrity of work.

5. Description of proposed work:
    - a. Scope of cutting, patching, alteration, or excavation.
    - b. Trades who will execute the work.
    - c. Products proposed to be used.
    - d. Extent of refinishing to be done.
  6. Alternatives to cutting and patching.
  7. Cost proposal, when applicable.
  8. Written permission of any separate contractor whose work will be affected.
- C. Submit written notice to the Engineer designating the date and the time the work will be uncovered.

## PART 2 PRODUCTS

### 2.01 MATERIALS

- A. Comply with specifications and standards for each specific product involved.

## PART 3 EXECUTION

### 3.01 INSPECTION

- A. Inspect existing conditions of Project, including elements subject to damage or to movement during cutting and patching.
- B. After uncovering work, inspect conditions affecting installation of Products, or performance of work.
- C. Report unsatisfactory or questionable conditions to the Engineer in writing; do not proceed with work until the Engineer has provided further instructions.

### 3.02 PREPARATION

- A. Provide adequate temporary support as necessary to assure structural value or integrity of affected portion of Work.
- B. Provide devices and methods to protect other portions of Project from damage.
- C. Provide protection from elements for that portion of the Project which may be exposed by cutting and patching work, and maintain excavations free from



water.

3.03 PERFORMANCE

- A. Execute cutting and demolition by methods which will prevent damage to other work, and will provide proper surfaces to receive installation of repairs.
- B. Execute excavating and backfilling by methods which will prevent settlement or damage to other work.
- C. Execute fitting and adjustment of products to provide a finished installation to comply with specified products, functions, tolerances and finishes.
- D. Restore work which has been cut or removed; install new products to provide completed Work in accord with requirements of Contract Documents.
- E. Fit work airtight to pipes, sleeves, ducts, conduit and other penetrations through surfaces.
- F. Refinish entire surfaces as necessary to provide an even finish to match adjacent finishes.

END OF SECTION

SECTION 01050  
FIELD ENGINEERING AND SURVEYING

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

- A. The Contractor shall provide and pay for field engineering services required for the Project.
  - 1. Survey work required in execution of Project.
  - 2. Civil, structural or other professional engineering services specified, or required to execute Contractor's construction methods.
  
- B. The Contractor shall retain the services of a registered land surveyor licensed in the State of Florida in order to accomplish the following:
  - 1. Identify existing control points and property line corner stakes indicated on the Drawings, as required.
  - 2. Verify all proposed structure locations.
  - 3. Maintain an accurate location of all buried piping 2 inches in diameter and larger.
  
- C. The method of field staking for the construction of the work shall be at the option of the Contractor. The Owner shall provide the engineering surveys to establish reference points which in his judgment are necessary to enable the Contractor to proceed with his work. The Contractor shall be responsible for obtaining, from the Owner, the recorded legal descriptions of easements prior to commencing work in each easement.
  
- D. The accuracy of any method of staking shall be the responsibility of the Contractor. All engineering for vertical and horizontal control shall be the responsibility of the Contractor.
  
- E. The Contractor shall be held responsible for the preservation of all stakes and marks. If any stakes or marks are carelessly or willfully disturbed by the Contractor or others, the Contractor shall not proceed with any work until such points, marks, lines, and elevations have been reestablished for the prosecution of the work.

1.02 QUALIFICATIONS OF SURVEYOR OR ENGINEER

- A. Registered professional engineer or land surveyor of the discipline required for the specific service on the Project shall be currently licensed in the State of Florida.

### 1.03 SURVEY REFERENCE POINTS

- A. Existing basic horizontal and vertical control points for the Project are those designated on Drawings.
- B. Locate and protect control points prior to starting site work, and preserve all permanent reference monuments during construction.
  - 1. Make no changes or relocations without prior written notice to the Engineer.
  - 2. Report to the Engineer when any reference point is lost or destroyed, or requires relocation because of necessary changes in grades or locations.
  - 3. Require surveyor to correctly replace project control points which may be lost or destroyed.
    - a. Establish replacements based on original survey control.

### 1.04 PROJECT SURVEY REQUIREMENTS

- A. Establish a minimum of one permanent bench mark on site, referenced to data established by survey control points.
  - 1. Record locations, with horizontal and vertical data, on Project Record Documents.
- B. Establish lines and levels, locate and lay out, by instrumentation and similar appropriate means:
  - 1. Site improvements.
    - a. Stakes for grading, fill and topsoil placement.
    - b. Utility slopes and invert elevations.
  - 2. Batter boards for structures.
  - 3. Structure foundation.
- C. From time to time, verify layouts by same methods.
- D. The Contractor shall furnish the Engineer "cut sheets" for all lines showing plan grade, center line grade, center line cut, offset grade, and offset cut prior to excavation. The review of the "cut-sheets" by the Engineer does not relieve the Contractor of the responsibility for any errors therein or of proper line and grade in the prosecution of the work.
- E. The Contractor shall also show all appropriate right-of-way and easements lines, and property corners.
- F. All existing benchmarks shall be verified at the end of construction.
- G. All new headwalls for culverts and concrete structures shall have a

benchmark established with a X cut in the concrete on a brass disc set in the concrete. Both horizontal and vertical control shall be provided.

#### 1.05 RECORDS

- A. Maintain a complete, accurate log of all control and survey work as it progresses.
- B. Update the Project Record Drawings on a monthly basis based on the work performed during the month ending at the pay request as a condition for approval of monthly progress payment requests.
- C. Maintain an accurate record of piping changes, revisions, and modifications.

#### 1.06 SUBMITTALS

- A. Submit name, address, and photocopy of Florida Professional Registration of registered land surveyor or professional engineer to the Engineer.
- B. Submit certificate signed by a Florida licensed engineer or land surveyor certifying that elevations and locations of improvements are in conformance, or non-conformance, with Contract Documents.
- C. At the end of the project, and prior to final completion or Owner occupancy, submit four sets of certified drawings with complete AutoCAD files (signed and sealed by the registered land surveyor) of the items listed below. These drawings shall be included with, and made a part of, the project record documents.
  - 1. Certified site survey at 1" = 20' scale on 24" x 36" bond and a computer disk in version 2011 of AutoCAD, indicating the structure corners, paved areas, culvert inlets, and location of all above ground structures at each site. The Engineer shall furnish the Contractor electronic AutoCAD files for information only upon receipt of a written request.
  - 2. Provide at a minimum, elevations of structure bottoms, all culvert invert elevations, top of water pipe elevation at connection points, tops of bank and/or retaining walls and channel inverts every 50 feet on station.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01110  
ENVIRONMENTAL PROTECTION PROCEDURES

PART GENERAL

1.01 SCOPE OF WORK

- A. The work covered by this Section consists of furnishing all labor, materials and equipment and performing all work required for the prevention of environmental pollution in conformance with applicable laws and regulations, during and as the result of construction operations under this Contract. For the purpose of this Specification, environmental pollution is defined as the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances of importance to human life; affect other species of importance to man; or degrade the utility of the environment for aesthetic and/or recreational purposes; or violate any applicable environmental regulations.
- B. The control of environmental pollution requires consideration of air, water and land, and involves management of noise, odor, and solid waste, as well as other pollutants.
- C. Schedule and conduct all work in a manner that will minimize the erosion of soils in the area of the work. Provide erosion control measures such as diversion channels, sedimentation or filtration systems, berms, staked hay bales, seeding, mulching or other special surface treatments as are required by regulatory authorities to prevent silting and muddying of streams, rivers, canals, impoundments, lakes, etc. All erosion control measures shall be in place in an area prior to any construction activity in that area.
- D. These Specifications are intended to ensure that construction is achieved with a minimum of disturbance to the existing ecological balance between a water resource and its surroundings. These are general guidelines. It is the Contractor's responsibility to determine the specific construction techniques to meet these guidelines.

1.02 APPLICABLE REGULATIONS

- A. Comply with all applicable federal, state and local laws and regulations concerning environmental pollution control and abatement.

1.03 NOTIFICATIONS

- A. The Owner through the Engineer will notify the Contractor in writing immediately following identification of any non-compliance with the foregoing provisions or of any environmentally objectionable acts and corrective action

to be taken. State or local agencies responsible for verification of certain aspects of the environmental protection requirements will notify the Contractor in writing, through the Engineer, of any non-compliance with state or local requirements. The Contractor shall, after receipt of such notice from the Engineer or from the regulatory agency through the Engineer, immediately take corrective action. Such notice, when delivered to the Contractor or his authorized representative at the site of the work, shall be deemed sufficient for the purpose. If the Contractor fails or refuses to comply promptly, the Owner may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to any such stop orders shall be made the subject of a claim for extension of time or for excess costs or damages by the Contractor unless it is later determined that the Contractor was in compliance.

#### 1.04 IMPLEMENTATION

- A. Prior to commencement of the work, meet with the Engineer and Owner to develop mutual understandings relative to compliance with this provision.
- B. Remove temporary environmental control features, when approved by the Owner, and incorporate permanent control features into the project at the earliest practicable time.

#### PART 2 PRODUCTS (NOT USED)

#### PART 3 EXECUTION

##### 3.01 EROSION CONTROL

- A. Provide positive means of erosion control such as shallow ditches around construction to carry off surface water. Erosion control measures, such as siltation basins, hay check dams, mulching, jute netting and other equivalent techniques, shall be used as appropriate. Flow of surface water into excavated areas shall be prevented. Ditches around construction area shall also be used to carry away water resulting from dewatering of excavated areas. At the completion of the work, ditches shall be backfilled and the ground surface restored to original condition.

##### 3.02 PROTECTION OF LAND RESOURCES

- A. Land resources within the project boundaries and outside the limits of permanent works shall be restored to a condition, after completion of construction that will appear to be natural and not detract from the appearance of the project. Confine all construction activities to areas shown on the Drawings.

- B. Outside of areas requiring earthwork for the construction of the new facilities, the Contractor shall not deface, injure, or destroy trees or shrubs, nor remove or cut them without prior approval. No ropes, cables, or guys shall be fastened to or attached to any existing nearby trees for anchorage unless specifically authorized by the Engineer or Owner. Where such special emergency use is permitted, first wrap the trunk with a sufficient thickness of burlap or rags over which softwood cleats shall be tied before any rope, cable, or wire is placed. The Contractor shall in any event be responsible for any damage resulting from such use.
- C. Where trees may possibly be defaced, bruised, injured, or otherwise damaged by the Contractor's equipment, dumping or other operations, protect such trees by placing boards, planks, or poles around them. Monuments and markers shall be protected similarly before beginning operations near them.
- D. Any trees or other landscape feature scarred or damaged by the Contractor's equipment or operations shall be restored as nearly as possible to its original condition. The Owner and Engineer will decide what method of restoration shall be used and whether damaged trees shall be treated and healed or removed and disposed of.

All scars made on trees by equipment, construction operations, or by the removal of limbs larger than 1 inch in diameter shall be coated as soon as possible with an approved tree wound dressing. All trimming or pruning shall be performed in an approved manner by experienced workmen with saws or pruning shears. Tree trimming with axes will not be permitted.

Climbing ropes shall be used where necessary for safety. Trees that are to remain, either within or outside established clearing limits, that are subsequently damaged by the Contractor and are beyond saving in the opinion of a certified nurseryman, shall be immediately removed and replaced in kind and maintained until growth is assured.

- E. The locations of the Contractor's storage, and other construction buildings, required temporarily in the performance of the work, shall be cleared portions of the job site or areas to be cleared as shown on the Drawings and shall require written concurrence of the Owner. The preservation of the landscape shall be an imperative consideration in the selection of all sites and in the construction of buildings. Drawings showing storage facilities shall be submitted for approval of the Engineer.
- F. If the Contractor proposes to construct temporary roads or embankments and excavations for work areas, the following shall be submitted by the Contractor for approval by the Engineer at least ten days prior to scheduled start of such temporary work.

1. A layout of all temporary roads, excavations and embankments to be constructed within the work area.
  2. Details of temporary road construction.
  3. Drawings and cross sections of proposed embankments and their foundations, including a description of proposed materials.
  4. A landscaping drawing showing the proposed restoration of the area. Removal of any trees and shrubs outside the limits of existing clearing areas shall be indicated. The drawing shall also indicate location of required guard posts or barriers required to control vehicular traffic passing close to trees and shrubs to be maintained undamaged. The drawing shall provide for the obliteration of construction scars as such and shall provide for a natural appearing final condition of the area. Modification of the Contractor's approved drawings shall be made only with the written concurrence of the Owner. No unauthorized road construction, excavation or embankment construction including disposal areas will be permitted.
- G. Remove all signs of temporary construction facilities such as haul roads, work areas, structures, foundations of temporary structures, stockpiles of excess of waste materials, or any other vestiges of construction as requested by the Engineer. It is anticipated that excavation, filling and paving of roadways will be required to restore the area to near natural conditions that will permit the growth of vegetation thereon. The disturbed areas shall be prepared and sodded as described in Section 02485.
- H. All debris and excess material will be disposed of outside wetland or floodplain areas in an environmentally sound manner.

### 3.03 PROTECTION OF AIR QUALITY

- A. Burning. The use of burning at the project site for the disposal of refuse and debris is prohibited.
- B. Dust Control. The Contractor will be required to maintain all excavations, embankment, stockpiles, access roads, waste areas, borrow areas, and all other work areas within or without the project boundaries free from dust which could cause the standards for air pollution to be exceeded, and which would cause a hazard or nuisance to others.
- C. An approved method of stabilization consisting of sprinkling or other similar methods will be permitted to control dust. The use of petroleum products is prohibited. The use of chlorides may be permitted with concurrence from the appropriate regulatory authority, with documentation provided from specific agency forwarded to the Engineer.



- D. Sprinkling, must be repeated at such intervals as to keep all parts of the disturbed area at least damp at all times, and the Contractor must have sufficient competent equipment on the job to accomplish this if sprinkling is used. Dust control shall be performed as the work proceeds and whenever a dust nuisance or hazard occurs.

### 3.05 MAINTENANCE OF POLLUTION CONTROL FACILITIES DURING CONSTRUCTION

- A. During the life of this Contract, maintain all facilities constructed for pollution control as long as the operations creating the particular pollutant are being carried out or until the material concerned has become stabilized to the extent that pollution is no longer being created. All pollution control devices shall be inspected regularly, to ensure they are operating correctly.

### 3.06 NOISE CONTROL

- A. The Contractor shall make every effort to minimize noises caused by his operations. Equipment shall be equipped with silencers or mufflers designed to operate with the least possible noise in compliance with local state and federal regulations.
- B. The Contractor's attention is invited to related requirements pertaining to public nuisance specified in Section 01030.

END OF SECTION

SECTION 01150  
MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.01 SCOPE

- A. The scope of this section of the Contract Documents is to further define the items included in each Bid Item in the Bid Form section of the Contract Documents. Payment will be made based on the specified items included in the description in this section for each bid item.
- B. All contract prices included in the Bid Form section will be full compensation for all shop drawings, working drawings, labor, materials, tools, equipment and incidentals necessary to complete the construction as shown on the Drawings and/or as specified in the Contract Documents to be performed under this Contract. Actual quantities of each item bid on a unit price basis will be determined upon completion of the construction in the manner set up for each item in this section of the Specifications. Payment for all items listed in the Bid Form will constitute full compensation for all work shown and/or specified to be performed under this Contract.

1.02 ESTIMATED QUANTITIES

The quantities shown are approximate and are given only as a basis of calculation upon which the award of the Contract is to be made. The County does not assume any responsibility for the final quantities, nor shall the Contractor claim misunderstanding because of such estimate of quantities. Final payment will be made only for satisfactorily completed quantity of each item.

1.03 WORK OUTSIDE AUTHORIZED LIMITS

No payment will be made for work constructed outside the authorized limits of work.

1.04 MEASUREMENT STANDARDS

Unless otherwise specified for the particular items involved, all measurements of distance shall be taken horizontally or vertically.

1.05 AREA MEASUREMENTS

In the measurement of items to be paid for on the basis of area of finished work, the lengths and/or widths to be used in the calculations shall be the final dimensions measured along the surface of the completed work within the neat lines shown or designated.

## 1.06 LUMP SUM ITEMS

Where payment for items is shown to be paid for on a lump sum basis, no separate payment will be made for any item of work required to complete the lump sum items. Lump sum contracts shall be complete, tested and fully operable prior to request for final payment. Contractor may be required to provide a break-down of the lump sum totals.

## 1.07 UNIT PRICE ITEM

Separate payment will be made for the items of work described herein and listed on the Bid Form. Any related work not specifically listed, but required for satisfactory completion of the work shall be considered to be included in the scope of the appropriate listed work items.

No separate payment will be made for the following items and the cost of such work shall be included in the applicable pay items of work. Final payments shall not be requested by the Contractor or made by the County until as-built (record) drawings have been submitted and approved by the County.

1. Shop Drawings, Working Drawings.
2. Clearing, grubbing and grading except as hereinafter specified.
3. Trench excavation, including necessary pavement removal and rock removal, except as otherwise specified.
4. Dewatering and disposal of surplus water.
5. Structural fill, backfill, and grading.
6. Replacement of unpaved roadways, and shrubbery plots.
7. Cleanup and miscellaneous work.
8. Foundation and borrow materials, except as hereinafter specified.
9. Testing and placing system in operation.
10. Any material and equipment required to be installed and utilized for the tests.
11. Pipe, structures, pavement replacement, asphalt and shell driveways and/or appurtenances included within the limits of lump sum work, unless otherwise shown.
12. Maintaining the existing quality of service during construction.
13. Maintaining or detouring of traffic.
14. Appurtenant work as required for a complete and operable system.
15. Seeding and hydromulching.
16. As-built Record Drawings.

1.08 BID ITEM NO. 1 - MOBILIZATION

Measurement and payment for this Bid Item shall include full compensation for the required 100 per cent (100%) Performance Bond, 100 Percent (100%) Payment Bond, all required insurance for the project and the Contractor's mobilization and demobilization costs as shown in the Bid Form. Mobilization includes, but it not limited to: preparation and movement of personnel, equipment, supplies and incidentals such as safety and sanitary supplies/ facilities

Payment for mobilization shall not exceed 10 per cent (10%) of the total Contract cost unless the Contractor can prove to the County that his actual mobilization cost exceeds 10 percent (10%).

Partial payments for this Bid Item will be made in accordance with the following schedule:

Percent of Original Contract Amount:	Percent Allowable Payment of Mobilization/Demobilization Bid Item Price:
5	25
10	35
25	45
50	50
75	75
100	100

These payments will be subject to the standard retainage provided in the Contract. Payment of the retainage will be made after completion of the work and demobilization.

1.09 BID ITEM NO. 2 – SEPTAGE AND GREASE RECEIVING STATION

A. Description: Payment for this item shall include all costs to furnish all labor, materials, equipment, spare parts, operation and maintenance manuals, training, and incidentals required for the complete construction of the septage / grease receiving station at the Southeast WRF. This item shall include but not be limited to clearing; sheeting, shoring and bracing; dewatering, excavation; backfill, compaction, installation of septage and grease screens, dumpsters, grating, magnetic flow meters, piping, spray water system, tankless hot water system, concrete channels, concrete manholes, trench drains, metal canopy, concrete slabs and equipment pads, hoses, yard hydrants, painting, and all other work and miscellaneous equipment. All work and equipment needed for a complete and functional system which is not specifically included in another bid item shall be furnished and installed under this bid item.

- B. Measurement: The quantity to be paid for under this item shall be measured as one lump sum.
- C. Payment: Payment shall be made at the lump sum price, and includes furnishing all equipment, labor, materials and performing all necessary work and incidental operations to construct a fully operable and complete septage / grease receiving station as shown on the Drawings.

#### 1.10 BID ITEM NO. 3 – GREASE DEWATERING SCREW PRESS

- A. Description: Payment for this item shall include all costs to furnish all labor, materials, equipment, spare parts, operation and maintenance manuals, training, and incidentals required for the complete construction of the grease dewatering screw press at the Southeast WRF. This item shall include but not be limited to clearing; sheeting, shoring and bracing; dewatering, excavation; backfill, compaction, installation of volute dewatering press, polymer feed equipment, polymer storage totes, polymer feed platform, progressive cavity transfer pumps, magnetic flow meter, concrete pads, trench drains, and all other work and miscellaneous equipment. All work and equipment needed for a complete and functional system which is not specifically included in another bid item shall be furnished and installed under this bid item.
- B. Measurement: The quantity to be paid for under this item shall be measured as one lump sum.
- C. Payment: Payment shall be made at the lump sum price, and includes furnishing all equipment, labor, materials and performing all necessary work and incidental operations to construct a fully operable and complete dewatering screw press and polymer system as shown on the Drawings.

#### 1.11 BID ITEM NO. 4 – VACUUM TRUCK RECEIVING AREA

- A. Description: This bid item describes measurement and payment for construction of the vacuum truck receiving area complete.
- B. Measurement: The quantity to be paid for under this item shall be measured as one lump sum.
- C. Payment: Payment for the lift station will be made at the lump sum price and shall include all labor, equipment, and incidentals required for the construction of the vacuum truck receiving area complete including clearing; sheeting, shoring and bracing; dewatering, excavation; backfill, compaction, installation of roll-off filter, concrete slabs, concrete ramp, curb, metal canopy, aluminum stairs, cam-lock, trench drain, site work, and all other work and equipment required for a full, operable, and complete vacuum truck receiving area as shown on the Drawings and as specified herein.

## 1.12 BID ITEM NO. 5 – LIFT STATION

- A. Description: This bid item describes measurement and payment for construction of the lift station associated with the septage / grease receiving station complete.
- B. Measurement: The quantity to be paid for under this item shall be measured as one lump sum.
- C. Payment: Payment for the lift station will be made at the lump sum price and shall include all labor, equipment, and incidentals required for the construction of the lift station complete per Manatee County standards as shown in the Contract Documents. Payment shall include clearing; sheeting, shoring and bracing; dewatering, excavation; backfill, compaction, trenching, bedding and backfill; compaction and testing; protection and adjusting of existing above ground and underground utilities; disposal of soil; hydrostatic testing; flushing, pigging, cleaning, erosion and sedimentation control; protection of culverts and drainage facilities, construction of the new lift station complete with concrete wet well, protective liner, submersible chopper pumps ( 2), floats, rails, piping, valves, valve vault, fittings, restraints, adapters, pipe supports, bypass assembly, hatches, concrete slabs, site work, water service connection and backflow preventer, eyewash station, cleaning and testing, all restoration including but not limited to sidewalks, curbs, asphalt, sod, etc; and all other work and equipment required for a full, operable, and complete lift station installation as shown on the Drawings and as specified herein.

## 1.13 BID ITEM NO. 6 – GLASS FUSED TO STEEL STORAGE TANKS

- A. Description: This bid item describes measurement and payment for construction of two (2) glass-fused-to-steel wastewater storage tanks.
- B. Measurement: The quantity to be paid for under this item shall be measured as one lump sum.
- C. Payment: Payment for the storage tanks will be made at the lump sum price and shall include all labor, materials, equipment, and incidentals required for the fabrication and erection of the two glass-fused-to-steel wastewater storage tanks complete including clearing; sheeting, shoring and bracing; dewatering, excavation; backfill, compaction, testing; disposal of soil; concrete foundation and footer, factory coated bolted steel tank assembly, geodesic aluminum roof, aluminum gravity vent assembly, aluminum ladder and safety cage, steel platform, guardrails, manways, cathodic protection, piping connections, level sensors, cleaning and testing, all restoration including but not limited to sidewalks, curbs, asphalt, sod, etc; and all other work and equipment required for two (2) fully operable and complete glass-fused-to-steel storage tank installations as shown on the Drawings and as specified herein.

#### 1.14 BID ITEM NO. 7 – YARD PIPING

- A. Description: This item shall include but not be limited to furnishing and installing pipe and fittings of the size and material indicated on the Drawings. This item includes all necessary labor, equipment and materials for the furnishing, laying of the pipe, construction stakeout, installing and maintaining silt fence, erosion control, clearing and grubbing, fittings, joint restraint, maintenance of traffic, dewatering, compaction, pipe bedding, backfilling, sheeting, tracer wire, poly wrap, clamps, harnessing, supports, hangers, plugs and caps, adapters, excavation of all material encountered including rock, bedding, backfill, site grading, seeding and mulching, replacement of grass, sod, pavement, driveways, sidewalks, and other surface materials not specifically designated in the Bid, clean-up, line flushing, pressure testing, connections to existing pipes, and painting of the exterior surfaces.
- B. Measurement: The quantity to be paid for under this item shall be measured as one lump sum.
- C. Payment: Payment will be made at the lump sum price, with a percentage of the lump sum being paid periodically based on the percentage of the total construction completed, and includes furnishing all equipment, labor, materials and performing all necessary work and incidental operations to furnish and install fully operable and complete yard piping as specified herein.

#### 1.15 BID ITEM NO. 8 – SITE IMPROVEMENTS

- A. Description: This item shall include but not be limited to furnishing and installing miscellaneous site improvements including grading, site drainage and associated , concrete paving, asphalt pavement, pavement striping, concrete sidewalk, concrete curb, landscaping, and sod.
- B. Measurement: The quantity to be paid for under this item shall be measured as one lump sum.
- C. Payment: Payment will be made at the lump sum price, with a percentage of the lump sum being paid periodically based on the percentage of the total construction completed, and includes furnishing all equipment, labor, materials and performing all necessary work and incidental operations to furnish and install fully operable and complete site improvements as specified herein.

#### 1.16 BID ITEM NO. 9 – ELECTRICAL AND INSTRUMENTATION

- A. Description: This item shall include but not be limited to furnishing all labor, materials, equipment, instrumentation, controls, spare parts, and incidentals required for a complete and functional sewage/grease receiving system

including all electrical equipment, panels, electrical panelboards, cabinets, PLCs, circuit breakers, transformers, disconnects, variable frequency drives, starters, wiring, conduit, switches, fiber optic cable, intercom system, grounding, lighting, connections to electrically operated equipment, tie in to existing plant SCADA system, installation of new electrical equipment in the MCC / Blower Building No. 2, programming, testing and start-up, and any other miscellaneous equipment needed for a complete electrical/instrumentation installation. Any electrical work or equipment which is not specifically included in another bid item shall be furnished and installed under this Pay item.

- B. Measurement: The quantity to be paid for under this item shall be measured as one lump sum.
- C. Payment: Payment will be made at the lump sum price, with a percentage of the lump sum being paid periodically based on the percentage of the total construction completed, and includes furnishing all equipment, labor, materials and performing all necessary work and incidental operations to furnish and install fully operable and complete electrical and control systems for the septage / grease receiving station.

#### 1.22 BID ITEM NO. 10 - OWNER'S CONTINGENCY

- A. Description: The work covered by this item consists of unforeseen items of work not included in other bid items but necessary for accomplishing the work and shall apply only to extra work or additional items over and above those specified or shown on the plans. The cost of this additional work shall be agreed upon in writing and approved by the Owner or his authorized representative prior to starting this additional work. The value of the work shall be based on unit prices or similar bid items called for in the proposal.
- B. Measurement: The quantities of unspecified work to be paid under this item shall be measured in place, completed and accepted.
- C. Payment: The Owner has calculated this item on the Bid Form, and has established the item total to be used in calculating the total Base Bid. This item will be treated as a contingency, against which the Owner at his discretion may direct additional work required during the course of the project to facilitate the project. The additional work shall be agreed upon in writing and approved by the Owner. The final project change order shall include all additional costs approved under the contingency.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)



END OF SECTION

SECTION 01152  
APPLICATIONS FOR PAYMENT

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. The Contractor shall submit Applications for Payment to the Engineer in accordance with the schedule established by Conditions of the Contract and Agreement between Owner and Contractor.
- B. The accepted Schedule of Values, Section 01370, shall be used as the basis for the Contractor's Application for Payment.

1.02 RELATED REQUIREMENTS

- A. The Contract Documents include, but are not limited to, the following related requirements:
  - 1. Section 00800: Supplemental Conditions
  - 2. Section 01050: Field Engineering and Surveying.
  - 3. Section 01153: Change Order Procedures.
  - 4. Section 01300: Shop Drawings, Submittals and Samples.
  - 5. Section 01310: Construction Schedules.
  - 6. Section 01370: Schedule of Values.
  - 7. Section 01380: Construction Photographic Record.
  - 8. Section 01700: Contract Closeout.
  - 9. Section 01720: Project Record Documents.
  - 10. Section 02999: Miscellaneous Work and Cleanup.

1.03 FORMAT AND DATA REQUIRED

- A. Submit applications in automated format approved by the Owner, with itemized data typed on 8-1/2 inch x 11 inch white paper continuation sheets.
- B. Provide itemized data on continuation sheet:
  - 1. Format, schedules, line items and values: Those of the Schedule of Values accepted by the Engineer.
- C. Provide construction photographs in accordance with Sections 01380.
- D. Provide a detailed map with drawings or sketches showing areas surveyed, constructed and restored within each period.
- E. Provide accurate red-lined or surveyed as-built drawings of the work completed that corresponds with the effort being requested for payment.

Where specification locations or elevations are shown on the Contract Drawings, the Contractor shall indicate by highlighting the information that the facilities were constructed as shown, or the information shall be struck through with surveyed information included beside the strikeout. All changes from Contract Drawings shall be indicated in red ink.

#### 1.04 PREPARATION OF APPLICATION FOR EACH PROGRESS PAYMENT

##### A. Application Form:

1. Fill in required information, including that for Change Orders executed prior to date of submittal of application.
2. Fill in summary of dollar values to agree with respective totals indicated on continuation sheets.
3. Execute certification with signature of a responsible officer of Contract firm.

##### B. Continuation Sheets:

1. Fill in total list of all scheduled component items of Work, with item number and scheduled dollar value for each item.
2. Fill in dollar value in each column for each scheduled line item when work has been performed or products stored.
  - a. Round off values to nearest dollar, or as specified for Schedule of Values.
3. List each Change Order executed prior to date of submission, at the end of the continuation sheets.
  - a. List by Change Order Number, and description, as for an original component item of work.
4. To receive approval for payment on component material stored on site, submit copies of the original invoices with the application for payment. Paid invoices for paid stored materials must be submitted with the next application payment. If not included, the stored material payment will be deducted from the next payment.

#### 1.05 SUBSTANTIATING DATA FOR PROGRESS PAYMENTS

- A. When the Owner or the Engineer requires substantiating data, Contractor shall submit suitable information, with a cover letter identifying:

1. Project.
  2. Application number and date.
  3. Detailed list of enclosures.
  4. For stored products:
    - a. Item number and identification as shown on application.
    - b. Description of specific material.
- B. Submit one copy of data and cover letter for each copy of application.
- C. As a prerequisite for payment, Contractor is to submit a " Surety Acknowledgment of Payment Request" letter showing amount of progress payment that the Contractor is requesting.
- D. The Contractor is to maintain an updated set of drawings to be used as record drawings in accordance with Section 01720. As a prerequisite for monthly progress payments, the Contractor is to exhibit the updated record drawings for review by the Owner and the Engineer.
- E. Contractor shall maintain an updated construction schedule in accordance with Section 01310. As a prerequisite for monthly progress payments, Contractor shall submit the updated construction schedule with the applications for progress payments. If the Contractor fails to submit the required updated schedule within the time prescribed, the Engineer may withhold approval of progress payment estimates until such a time as the Contractor submits the required updated schedule.

#### 1.06 PREPARATION OF APPLICATION FOR FINAL PAYMENT

- A. Fill in Application form as specified for progress payments.
- B. Use continuation sheet for presenting the final statement of accounting as specified in Section 01700 - Contract Closeout.
- C. Submit all Project Record Documents in accordance with Section 01050 and 01720.

#### 1.07 SUBMITTAL PROCEDURE

- A. Prior to the formal submittal of the Application for Payment, Contractor's field superintendent shall markup a pencil copy of the Schedule of Values, review and agree upon the actual quantities installed and incorporated into the Work, including stored materials, with the on-site resident project representative.
- B. Submit Applications for Payment to the Engineer at the times stipulated in the Agreement.
- C. Number: One original Application for Payment.

- D. Once the Engineer believes the Application of Payment complete and correct, he will transmit certificate for payment to Owner, with copy to Contractor.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01153  
CHANGE ORDER PROCEDURES

PART 1        GENERAL

1.01        REQUIREMENTS INCLUDED

- A. Promptly implement Change Order procedures.
  - 1. Provide full written data required to evaluate changes.
  - 2. Maintain detailed records of work done on a time and material/force account basis.
  - 3. Provide full documentation to Engineer on request.
- B. Designate in writing the member of Contractor's organization:
  - 1. Who is authorized to accept changes in the work.
  - 2. Who is responsible for informing others in the Contractor's employ of the authorization of changes in the work.
- C. Owner will designate in writing the person who is authorized to execute Change Orders.

1.02        DEFINITIONS

- A. Change Order: See General Conditions.
- B. Work Change Directive: See General Conditions.

1.03        PRELIMINARY PROCEDURES

- A. Owner and Engineer may initiate changes by submitting a Work Change Directive to the Contractor. Request will include:
  - 1. Detailed description of the change, products, and location of the change in the Project.
  - 2. Supplementary or revised Drawings and Specifications.
  - 3. The projected time span for making the change, and a specific statement as to whether overtime work is or is not authorized.
  - 4. A specific period of time during which the requested price will be considered valid
- B. Contractor may initiate changes by submitting a written notice to the Engineer, containing:
  - 1. Description of the proposed changes.

2. Statement of the reason for making the changes.
3. Statement of the effect on the Contract Sum and the Contract Time.
4. Statement of the effect on the work of separate contractors.
5. Documentation supporting any change in Contract Sum or Contract Time, as appropriate.

1.04 CONSTRUCTION CHANGE AUTHORIZATION

- A. Work Change Directive will describe changes in the Work, both additions and deletions, with attachments of revised Contract Documents to define details of the change and will designate the method of determining any change in the Contract Sum and any change in Contract Time.
- B. Owner and Engineer will sign and date the Work Change Directive as authorization for the Contractor to proceed with the changes.

1.05 DOCUMENTATION OF PROPOSALS AND CLAIMS

- A. Support each quotation for a lump sum proposal, and each unit price that has not previously been established, with sufficient substantiating data to allow the Engineer to evaluate the quotation.
- B. On request, provide additional data to support time and cost computations:
  1. Labor required.
  2. Equipment required.
  3. Products required.
    - a. Recommended source of purchase and unit cost.
    - b. Quantities required.
  4. Taxes, insurance, and bonds.
  5. Credit for work deleted from Contract, similarly documented.
  6. Overhead and profit.
  7. Justification for any change in Contract Time, shall be supported in the construction schedule.
- C. Support each claim for additional costs, and for work done on a time-and-material/force account basis, with documentation as required for a lump sum proposal, plus additional information:
  1. Name of the Owner's authorized agent who ordered the work and date of the order.
  2. Dates and times work was performed and by whom.
  3. Time record, summary of hours worked, and hourly rates paid.
  4. Receipts and invoices for:
    - a. Equipment used, listing dates, and times of use.
    - b. Products used, listing of quantities.

c. Subcontracts.

1.06 PREPARATION OF CHANGE ORDERS

- A. Engineer will prepare each Change Order.
- B. Form: As supplied by the Engineer.
- C. Change Order will describe changes in the work, both additions and deletions, with attachments of revised Contract Documents to define details of the change.
- D. Change Order will provide an accounting of the adjustment in the Contract Sum and in the Contract Time.

1.07 LUMP SUM/FIXED PRICE CHANGE ORDER

- A. Engineer initiates the form, including a description of the changes involved and attachments based upon documents and proposals submitted by Contractor, or requests from Owner, or both.
- B. Once Engineer has completed and signed the form, all copies should be sent to Contractor for approval. After approval by Contractor, all copies should be sent to Owner for approval. Owner will sign and date the approved change order as authorization for Contractor to proceed with the changes. Engineer should make distribution of executed copies.

1.08 UNIT PRICE CHANGE ORDER

- A. Content of Change Orders will be based on either:
  - 1. Engineer's definition of the scope of the required changes.
  - 2. Contractor's Proposal for a change, as recommended by Engineer.
  - 3. Survey of complete work.
- B. The amounts of the unit prices to be:
  - 1. Those stated in the Agreement.
  - 2. Those mutually agreed upon between Owner and Contractor.
- C. When quantities of each of the items affected by the Change Order can be determined prior to start of the work:
  - 1. Owner and Engineer will sign and date a Work Change Directive as authorization for Contractor to proceed with the changes.
- D. When quantities of the items cannot be determined prior to start of the work:



1. Engineer or Owner will issue a Work Change Directive directing the Contractor to proceed with the change on the basis of unit prices, and the Engineer will cite the applicable unit prices.
2. Upon completion of the change, the Engineer will determine the cost of such work based on the unit prices and quantities used. Contractor shall submit documentation to establish the number of units of each item and any claims for a change in Contract Time.
3. Engineer will sign and date the Change Order to establish the change in Contract Sum and in Contract Time.
4. Contractor will sign and date the Change Order to indicate their agreement with the terms therein.
5. Owner will then sign the change order.

1.09 TIME AND MATERIAL/FORCE ACCOUNT CHANGE ORDER /  
CONSTRUCTION CHANGE AUTHORIZATION

- A. Engineer and Owner will issue a Work Change Directive directing Contractor to proceed with the changes.
- B. Upon completion of the change, the Contractor shall submit itemized accounting and supporting data as provided in the Article "Documentation of Proposals and Claims" of this Section. Accompanying this document shall be daily item sheets. These sheets shall be signed by the Owner's representative and the Contractor.
- C. Engineer will determine the allowable cost of such work, as provided in General Conditions and Supplementary Conditions.
- D. Engineer will sign and date the Change Order to establish the change in Contract Sum and in Contract Time.
- E. Contractor will sign and date the Change Order to indicate agreement therewith.
- F. Owner will then sign the Change Order.

1.10 CORRELATION WITH CONTRACTOR'S SUBMITTALS

- A. Not greater than monthly revise Schedule of Values and Request for Payment forms to record each change as a separate item of work and to record the adjusted Contract Sum.

- B. Not greater than monthly revise the Construction Schedule to reflect each change in Contract Time.
- C. Revise sub-schedules to show changes for other items of work affected by the changes.
- D. Upon completion of work under a Change Order, enter pertinent changes in Record Documents.

PART 2        PRODUCTS (NOT USED)

PART 3        EXECUTION (NOT USED)

END OF SECTION

SECTION 01200  
PROJECT MEETINGS

PART 1        GENERAL

1.01        REQUIREMENTS INCLUDED

- A. The Engineer shall schedule and administer a pre-construction meeting, periodic progress meetings, and specially called meetings throughout the progress of the work. The Engineer shall:
  - 1. Prepare agenda for meetings. The Contractor is required to prepare both updated and forecasted monthly look-ahead schedules at the periodic progress meetings.
  - 2. Make physical arrangements for meetings.
  - 3. Preside at meetings.
  - 4. Record the minutes; include significant proceedings and decisions.
  - 5. Reproduce and distribute copies of minutes within five working days after each meeting:
    - a. To participants in the meeting.
    - b. To parties affected by decisions made at the meeting.
- B. Representatives of contractors, subcontractors and suppliers attending meetings shall be qualified and authorized to act on behalf of the entity each represents.
- C. The Contractor shall attend meetings to ascertain that work is expedited consistent with Contract Documents and construction schedules.

1.02        PRE-CONSTRUCTION MEETING

- A. Schedule a preconstruction meeting no later than 20 days after the effective date of the Agreement.
- B. Location:    Project Location
- C. Attendance:
  - 1. Owner's Representative.
  - 2. Engineer and their professional consultants.
  - 3. Resident Project Representative.
  - 4. Contractor's Superintendent.
  - 5. Major Subcontractors.
  - 6. Utilities
  - 7. Others as appropriate.
- D. Suggested Agenda:
  - 1. Distribution and discussion of:

- a. List of major subcontractors and suppliers.
- b. Projected Construction Schedules.
- 2. Critical work sequencing.
- 3. Project Coordination.
  - a. Designation of responsible personnel.
- 4. Procedures and processing of:
  - a. Field decisions.
  - b. Proposal requests.
  - c. Submittals.
  - d. Change Orders.
  - e. Applications for Payment.
- 5. Adequacy of distribution of Contract Documents.
- 6. Procedures for maintaining Record Documents.
- 7. Use of premises:
  - a. Office, work and storage areas.
  - b. Owner's requirements.
- 8. Construction facilities, controls and construction aids.
- 9. Temporary utilities.
- 10. Housekeeping procedures.
- 11. Check of required Bond and Insurance certifications.
- 12. Liquidated damages.
- 13. Request for a weekly job meeting for all involved.
- 14. Equal Opportunity Requirements.
- 15. Laboratory testing of material requirements.

### 1.03 PROGRESS MEETINGS

- A. Schedule regular periodic meetings. The progress meetings will be held every 30 days or less with the first meeting 30 days after the pre-construction meeting or 30 days or less after the date of Notice to Proceed.
- B. Hold called meetings as required by progress of the work.
- C. Location of the meetings: Project office of Contractor or Engineer.
- D. Attendance:
  - 1. Engineer, and his professional consultants as needed.
  - 2. Contractor.
  - 3. Subcontractors as appropriate to the agenda.
  - 4. Suppliers as appropriate to the agenda.
  - 5. Others as appropriate.

E. Suggested Agenda:

1. Review, approval of minutes of previous meeting.
2. Review of work progress since previous meeting.
3. Field observations, problems, and conflicts.
4. Problems that impede Construction Schedule.
5. Review of off-site fabrication, delivery schedules.
6. Corrective measures and procedures to regain projected schedule.
7. Revisions to Construction Schedule.
8. Progress, schedule, during succeeding work period.
9. Coordination of schedules.
10. Review submittal schedules; expedite as required.
11. Maintenance of quality standards.
12. Pending changes and substitutions.
13. Review proposed changes for:
  - a. Effect on Construction Schedule and on completion date.
  - b. Effect on other contracts of the Project.
14. Other business.
15. Construction schedule.

F. The Contractor is to attend progress meetings and is to study previous meeting minutes and current agenda items, in order to be prepared to discuss pertinent topics such as deliveries of materials, progress of the work, etc.

G. The Contractor is to provide a written report of work progress since the previous meeting and work to be performed during the next 30 days along with a current submittal log at each progress meeting in accordance with Section 01300.

PART 2            PRODUCTS (NOT USED)

PART 3            EXECUTION (NOT USED)

END OF SECTION

SECTION 01300  
SHOP DRAWINGS, SUBMITTALS AND SAMPLES

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. The Contractor shall submit to the Engineer for review such working drawings, shop drawings, test reports and data on materials (hereinafter in this Section called data), and material samples (hereinafter in this Section called samples) as are required for the proper control of work, including but not limited to those working drawings, shop drawings, data and samples for materials specified elsewhere in the Specifications and in the Contract Drawings.
- B. CONTRACTOR shall prepare a complete listing of all submittals required for the project noting the number of each submittal and the date each submittal is to be submitted. CONTRACTOR shall identify submittals that are time critical to completion of the project. The listing shall be submitted within ten (10) days following the Award of Contract and shall be a prerequisite to the first partial payment.
  - 1. Consult with ENGINEER for preparation of submittal register.
- C. The Contractor shall note that there are specific submittal requirements in other sections of these Specifications.
- D. The Contractor is to maintain an accurate updated submittal log and will bring this log to each scheduled progress meeting with the Owner and the Engineer. This log should include the following items in this order:
  - 1. Submittal-Description and File Number assigned.
  - 2. Date to Engineer.
  - 3. Date returned to Contractor (from Engineer).
  - 4. Status of Submittal
    - a. No Exceptions Taken
    - b. No Exceptions Taken with Noted Corrections
    - c. Revise and Resubmit
    - d. Rejected
    - e. Submit Specified Item
  - 5. Date of Resubmittal and Return (as applicable).
  - 6. Date material released (for fabrication).
  - 7. Projected date of fabrication.
  - 8. Projected date of delivery to site.

## 1.02 SHOP DRAWINGS

- A. When used in the Contract Documents, the term "shop drawings" shall be considered to mean Contractor's plans for material and equipment that become an integral part of the Project. These drawings shall be complete and detailed. Shop drawings shall consist of fabrication, erection and setting drawings and schedule drawings, manufacturer's scale drawings, bills of material, and inspection and test reports and certifications as applicable to the Work.
- B. All details on shop drawings submitted for approval shall show clearly the elevations of the various parts to the main members and lines of the structure and/or equipment, and where correct fabrication of the work depends upon field measurements, such measurements shall be made and noted on the shop drawings before being submitted for approval.
- C. See Shop Drawing Schedule requirements in subparagraph 1.07 CONTRACTOR'S RESPONSIBILITY below.

## 1.03 PRODUCT DATA

- A. Product data as specified in individual sections, include, but are not necessarily limited to, standard prepared data for manufactured products (sometimes referred to as catalog data), such as the manufacturer's product specification and installation instructions, availability of colors and patterns, manufacturer's printed statements of compliances and applicability, roughing-in diagrams and templates, catalog cuts, product photographs, production or quality control inspection and test reports and certifications, mill reports, product operating and maintenance instructions and recommended spare-parts listing storage instructions, and printed product warranties, as applicable to the work.

## 1.04 WORKING DRAWINGS

- A. When used in the Contract Documents, the term "working drawings" shall be considered to mean the Contractor's plans for temporary structures such as temporary bulkheads, support of open cut excavation, support of utilities, ground water control systems, forming and falsework; for underpinning; and for such other work as may be required for construction but does not become an integral part of the Project.
- B. Working drawings shall be signed and sealed by a registered Professional Engineer, currently licensed to practice in the state of Florida and shall convey, or be accompanied by, calculations or other sufficient information to

completely explain the structure, machine, or system described and its intended manner of use. Prior to commencing such work, working drawings must have been reviewed without specific exceptions by the Engineer. Such review will be for general conformance and will not relieve the Contractor in any way from his responsibility with regard to the fulfillment of the terms of the Contract. All risks of error are assumed by the Contractor; the Owner and Engineer shall have no responsibility therefore.

#### 1.05 SAMPLES

- A. The Contractor shall furnish, for the approval of the Engineer, samples required by the Contract Documents or requested by the Engineer. Samples shall be delivered to the Engineer as specified or directed and in quantities and sizes as specified. A minimum of two samples of each item shall be submitted unless otherwise specified. The Contractor shall pre-pay all shipping charges on samples. Materials for which samples are required shall not be used in work until approved by the Engineer.
- B. Samples specified in individual sections, include, but are not necessarily limited to, physical examples of the work such as sections of manufactured or fabricated work, small cuts or containers of materials, complete units of repetitively-used products, color/texture/pattern swatches and range sets, specimens for coordination of visual effect, graphic symbols, and units of work to be used by the Engineer or Owner for independent inspection and testing, as applicable to the Work.
- C. The Contractor shall prepare a transmittal letter in triplicate for each shipment of samples. The Contractor shall enclose a copy of this letter with the shipment and send a copy of this letter to the Engineer. Approval of a sample shall be only for the characteristics or use named in such approval and shall not be construed to change or modify any Contract requirements.
- D. Approved samples not destroyed in testing shall be sent to the Engineer or stored at the site of the work. Approved samples of the hardware in good condition will be marked for identification and may be used in the work. Materials and equipment incorporated in work shall match the approved samples. Samples that fail testing or are not approved will be returned to the Contractor at his expense, if so requested at time of submission.

#### 1.06 SUBMITTAL REQUIREMENTS

- A. The Contractor shall review and submit with reasonable promptness and in such sequence as shown on the Shop Drawing Submittal Schedule all shop drawings, product data, working drawings and samples required by the Contract Documents so as cause no delay in the Contract Work or in the Work of the Owner or any separate contractor



- B. The Contractor shall submit one (1) electronic set in pdf format of shop drawings to the Engineer. The Engineer will review the submittal and return to the Contractor one (1) electronic set of marked-up reproducible with appropriate review comments.
- C. All electronic submittals shall be made via email (up to 10 MB) or to the Engineer's ftp site (over 10 MB).
- D. Shop drawings, product data, working drawings and samples shall be furnished with the following information:
1. Number and title of the drawing.
  2. Date of drawing or revision.
  3. Name of project building or facility.
  4. Name of contractor, subcontractor, and manufacturer submitting drawing.
  5. Clear identification of contents, location of the work, and the sheet numbers where the product is found in the contract drawings.
  6. Contractor Certification Statement.
  7. Submittal Identification Number.
  8. Contract Drawing Number Reference.
- E. In accordance with subparagraph 1.07 A below, each shop drawing, working drawing, sample, and catalog data submitted by the Contractor shall have affixed to it the following Certification Statement, signed by the Contractor: "Certification Statement: By this submittal, I hereby represent that I have determined and verified all field measurements, field construction criteria, materials, dimensions, catalog numbers, and similar data and I have checked and coordinated each item with other applicable approved shop drawings and all contract requirements."
- F. The Contractor shall submit a copy of each submittal transmittal sheet (for shop drawings, product data, working drawings and samples) to the Resident Project Representative simultaneously with the Contractor's submission of said drawings, data, samples or manual packages to the Engineer.
- G. All items specified are not necessarily intended to be a manufacturer's standard product. Variations from specified items will be considered on an "or equal" basis. If submittals show variations from Contract requirements because of standard shop practice or for other reasons, the Contractor shall describe such variations in his letter of transmittal and on the shop drawings along with notification of his intent to seek contract adjustment. If acceptable, proper adjustment in the Contract shall be implemented where appropriate. If the Contractor fails to describe such variations he shall not be relieved of the responsibility for executing the work in accordance with the Contract, even though such drawings have been reviewed. Variations submitted but not

described may be cause for rejection. Any variations initiated by the Contractor will not be considered as an addition to the scope of work unless specifically noted and then approved as such in writing by the Engineer.

- H. Data on materials and equipment shall include materials and equipment lists giving, for each item thereon, the name and location of the supplier or manufacturer, trade name, catalog reference, material, size, finish, and all other pertinent data.
- I. For all material furnished, the Contractor shall provide a list including the material name, and address and telephone number of the manufacturer's representative and service company so that service and/or spare parts can be readily obtained.
- J. All manufacturers or equipment suppliers who propose to furnish equipment or products under Divisions 11, 12, 13, 14 and 15 shall submit an installation list to the Engineer along with the required shop drawings. The installation list shall include all installations where identical equipment has been installed and has been in operation for a period of at least one (1) year.
- K. The Contractor shall use the color "green" to make his remarks on the Submittals. Only the Engineer will utilize the color "red" in marking submittals.
- L. Before final payment is made, the Contractor shall furnish to Engineer one (1) set of shop drawings as described in Section 01720. These shop drawings shall be in conformance with the approved documents and should show any field conditions that may affect their accuracy.

#### 1.07 CONTRACTOR'S RESPONSIBILITY

- A. It is the duty of the Contractor to check, and coordinate with the work of all trades, all drawings, data, schedules and samples prepared by or for him before submitting them to the Engineer for review. Each and every copy of any drawing or data sheet larger than 11"x17" shall bear Contractor's stamp showing that they have been so checked and approved. Drawings or data sheets 11"x17" and smaller shall be bound together in an orderly fashion and bear the Contractor's stamp on the cover sheet. The cover sheet shall fully describe the packaged data and include a list of all sheet numbers within the package. Shop drawings submitted to the Engineer without the Contractor's stamp will be returned to the Contractor, without review at the Engineer's option, for conformance with this requirement.
- B. The Contractor shall review shop drawings, product data, and samples prior to submission to determine and verify the following:
  - 1. Field measurements.

2. Field construction criteria.
  3. Manufacturer's catalog numbers and similar data.
  4. Conformance with Specifications.
- C. Shop drawings shall indicate any deviations in the submittal from the requirements of the Contract Documents.
- D. At a time decided upon at the preconstruction meeting the Contractor shall furnish the Engineer a Shop Drawing schedule fixing the respective dates for the initial submission of shop and working drawings, the beginning of manufacture, testing and installation of materials, supplies and equipment. This schedule shall be provided as a separate entity and indicate those submittals that are critical to the progress schedule. The Contractor shall prepare and transmit each submittal sufficiently in advance of performing the related work or other applicable activities, or within the time specified in the individual work sections of the Specifications, so that the installation will not be delayed by processing times including disapproval and resubmittal (if required), coordination with other submittals, testing, purchasing, fabrication, delivery, and similar sequenced activities. No extension of time will be authorized because of the Contractor's failure to transmit complete and acceptable submittals sufficiently in advance of the Work.
- E. The Contractor shall not begin any work affected by a submittal that has been returned and stamped "Revise and resubmit" or "Rejected". Before starting this work all revisions must be corrected by the Contractor. After resubmittal they will be reviewed and returned to him by the Engineer.
- F. The Contractor shall submit to the Engineer all shop drawings and data sufficiently in advance of construction requirements to provide no less than twenty-one (21) calendar days for review from the time the Engineer receives them. No less than thirty (30) calendar days will be required for major equipment or shop drawings that require review by more than one (1) engineering discipline.
- G. The Contractor shall be responsible for and bear all cost of damages that may result from the ordering of any material or from proceeding with any part of work prior to the review and approval by Engineer of the necessary shop drawings.
- H. All shop drawings, product data, working drawings and samples submitted by subcontractors for approval shall be sent directly to the Contractor for checking. The Contractor shall be responsible for their submission according to the approved shop drawing schedule so as to prevent delays in delivery of materials and project completion.

- I. The Contractor shall check all subcontractors' shop drawings, product data, working drawings and samples regarding measurements, size of members, materials, and details to satisfy himself that they are in conformance to the Contract Documents. Shop drawings found to be inaccurate or otherwise in error shall be returned to the subcontractors for correction before submission to the Engineer.
- J. Requests for Information (RFI) shall be submitted on a standard form provided by the Engineer. RFIs shall indicate their importance to the timely completion of the project. RFIs will be processed as a shop drawing unless there is an urgent need for immediate response.

1.08 ENGINEER'S REVIEW OF SHOP DRAWINGS, PRODUCT DATA, WORKING DRAWINGS AND SAMPLES

- A. The Engineer's review is for general conformance with the design concept and contract drawings. Markings or comments shall not be construed as relieving the Contractor from compliance with the contract plans and specifications or from departures therefrom. The Contractor remains responsible for details and accuracy, for coordinating the work with all other associated work and trades, for selecting fabrication processes, methods or techniques of assembly, and for performing work in a safe manner.
- B. The review of shop drawings, data, and samples will be general. They shall not be construed:
  - 1. as permitting any departure from the Contract requirements;
  - 2. as relieving the Contractor of responsibility for any errors, including details, dimensions, and materials;
  - 3. as approving departures from details furnished by the Engineer, except as otherwise provided herein.
- C. If the shop drawings, data or samples as submitted describe variations per Subparagraph 1.06H above, and show a departure from the Contract requirements which Engineer finds to be in the interest of the Owner and to be so minor as not to involve a change in Contract Price or time for performance, the Engineer may return the reviewed drawings without noting an exception.
- D. Resubmittals will be handled in the same manner as first submittals. On resubmittals, the Contractor shall direct specific attention, in writing on the letter of transmittal and on resubmitted shop drawings by use of revision triangles or other similar methods, to revisions other than the corrections requested by the Engineer on previous submissions. Any such revisions which are not clearly identified shall be made at the risk of the Contractor. The

Contractor shall make corrections to any work done because of this type revision that is not in accordance to the Contract Documents as may be required by the Engineer.

- E. If the Contractor considers any correction indicated on the shop drawings to constitute a change to the Contract Documents, the Contractor shall give written notice thereof to the Engineer at least seven (7) working days prior to release for manufacture.
- F. The Engineer will review a submittal/resubmittal a maximum of two (2) times after which cost of review will be borne by the Contractor. The cost of engineering shall be equal to the Engineer's charges to the Owner under the terms of the Engineer's agreement with the Owner.
- G. When the shop drawings have been completed to the satisfaction of the Engineer, the Contractor shall carry out the construction in accordance therewith and shall make no further changes therein except upon written instructions from the Engineer.
- H. Partial submittals may not be reviewed. The Engineer will be the only judge as to the completeness of a submittal. Submittals not complete will be returned to the Contractor, and will be considered "Not Approved" until resubmitted. The Engineer may at his option provide a list or mark the submittal directing the Contractor to the areas that are incomplete.

#### 1.09 PROFESSIONAL ENGINEER (PE) CERTIFICATION FORM

- A. If specifically required in other Sections of these Specifications, the Contractor shall submit a PE Certification for each item required, in the form attached to this Section, completely filled in and stamped.

#### PART 2 PRODUCTS (NOT USED)

#### PART 3 EXECUTION (NOT USED)

END OF SECTION

PE CERTIFICATION FORM

The undersigned hereby certifies that he/she is a Professional Engineer registered in the (State) of Florida and that he/she has been employed by (Name of Contractor)

\_\_\_\_\_ to design \_\_\_\_\_ in accordance with Specification Section \_\_\_\_\_ for the \_\_\_\_\_ (Owner) – **Manatee County SEWRF**

**Septage/Grease Receiving Station.** The undersigned further certifies that he/she has performed the design of the \_\_\_\_\_, that said design is in conformance with all applicable local, state and federal codes, rules, and regulations, and that his/her signature and PE seal have been affixed to all calculations and drawings used in, and resulting from, the design.

The undersigned hereby agrees to make all original design drawings and calculations available to the Owner or Owner's representative with seven (7) days following written request therefore by the Owner.

\_\_\_\_\_  
P.E. Name

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Address

\_\_\_\_\_  
Contractor's Name

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Title

\_\_\_\_\_  
Address

SECTION 01310  
CONSTRUCTION SCHEDULES

PART 1 GENERAL

1.01 GENERAL

Construction under this contract must be coordinated with the Owner and Engineer and accomplished in a logical order to maintain existing facilities and to allow construction to be completed within the time allowed by Contract Documents.

1.02 The Contractor shall be responsible for developing its own schedule logic with specified durations, manpower and cost data, however all information must be acceptable and compatible with the Owner's Master Schedule, and all target, completion and milestone dates generated, must be acceptable to the Owner

1.03 CONSTRUCTION SCHEDULING GENERAL PROVISIONS

- A. No work shall be done between 7:00 P.M. and 7:00 A.M. nor on Saturdays or Sundays or legal holidays without the written permission of the Owner. However, emergency work may be done without prior permission.
- B. Night work may be established by the Contractor as regular procedure with the written permission of the Owner. Permission must be obtained at least 48 hours prior to the date when night work will occur. Such permission, however, may be revoked at any time by the Owner if the Contractor fails to maintain adequate equipment and supervision for the proper execution and control of the work at night.
- C. Due to potential health hazards and requirements of the State of Florida and the U.S. Environmental Protection Agency, the existing facilities must be maintained in operation.
- D. The Contractor shall be fully responsible for providing all temporary piping, plumbing, electrical hook-ups, heating, ventilating, air conditioning, lighting, temporary structure, or whatever is required to maintain the existing facility operations to meet all permitting requirements. All details of temporary piping and temporary construction are not necessarily shown on the Drawings or covered in the Specifications.
- E. The Contractor shall have the capability of preparing and utilizing the specified CPM scheduling technique. A statement of CPM capability shall be submitted in writing to the Engineer within ten calendar days of Notice of Award of the contract and will verify that either the Contractor's organization has "in-house capability" qualified to use the technique or that the Contractor employs a consultant who is so qualified. "Capability" shall be verified by description of the construction projects to which the Contractor or his consultant has

successfully applied the CPM scheduling technique which shall include at least two (2) projects valued at least half the bid price of this project and at least one project which was controlled throughout the duration of the project by means of systematic use and updating of a computer-based CPM schedule. The submittal shall include the name of the individual on the Contractor's staff who will be responsible for the CPM schedule and for providing the required updating information.

#### 1.04 PROGRESS OF THE WORK

- A. The work shall be executed with such progress as may be required to prevent any delay to the general completion of the work. The work shall be executed at such times and in or on such parts of the project, and with such forces, materials and equipment to assure completion of the work in the time established by the Contract.

### PART 2 PROGRESS SCHEDULE SUBMITTALS

#### 2.01 GENERAL REQUIREMENTS

- A. As required under Articles 2, 6, and 14 of the General Conditions and Supplemental Conditions, the Contractor shall submit a critical path schedule as described herein.
- B. The critical path schedule requirement will consist of base and status progress schedules, monthly progress status reports (Monthly Status Reports), a start-up schedule, an as-built schedule report, and revisions to the schedules and analyses as prescribed. The planning, scheduling, management, and execution of the work is the sole responsibility of the Contractor. The progress schedule requirement is established to allow Engineer to review Contractor's planning, scheduling, management and execution of the work; to assist Engineer in evaluating work progress and make progress payments; to allow other Contractors to cooperate and coordinate their activities with those of the Contractor; and to provide Owner with information about "construction schedule" and "cumulative outlay schedule" to be forwarded to FDEP, or other funding agencies, if applicable.
- C. Engineer's review of the schedule submittals shall not relieve Contractor from responsibility for any deviations from the Contract Documents unless Contractor has in writing called Engineer's attention to such deviations at the time of submission and Engineer has given written concurrence to the specific deviations, nor shall any concurrence by Engineer relieve Contractor from responsibility for errors and omissions in the submittals. Concurrence of the CPM Activity Network by the Engineer is advisory only and shall not relieve the Contractor of responsibility for accomplishing the work within the Contract completion date(s).



- D. The concurred base schedule, shall have legal status as long as it is used by Contractor for planning, organizing, directing, managing, and executing the work in accordance with the Contract Documents. Legal status will further imply that Contractor will use the schedule to report progress and, further, that Contractor and Owner will use the schedule for determining delay(s) in achieving the contract date(s) stipulated in the Agreement subject to the requirements of this section of the General Requirements.
- E. Engineer will, upon receipt and review of each schedule submittal, either indicate in writing a recommendation of concurrence and present the submittal to Owner, or return the submittal to Contractor indicating in writing Engineer's reasons for refusing to recommend concurrence. In the latter case, Contractor will be required to make the necessary corrections and resubmit. If Contractor fails to provide submittals as required, the Contractor will be deemed not to have provided a basis upon which progress may be evaluated, which may constitute reasons for refusing to recommend progress payments.
- F. Engineer's review of the schedule submittals shall be only for conformance with the information given in the Contract Documents and shall not extend to the means, methods, sequences and techniques or procedures of construction or to safety precautions or programs incident thereto. Engineer's review of the schedule submittals will be predicated on a Contractor's stamp of approval signed off by Contractor and those subcontractors and suppliers performing work under an appropriate agreement with Contractor. Contractor's stamp of approval on any schedule submittal shall constitute a representation to Owner and Engineer that Contractor has either determined or verified all data on the submittal, or assumes full responsibility for doing so, and that Contractor and his subcontractors and suppliers, have reviewed and coordinated the sequences shown in the submittal with the requirements of the work under the Contract Documents.

## 2.02 FORM OF SCHEDULES

- A. Prepare schedules in the form of a horizontal bar chart diagram. The diagram shall be time-scaled and sequenced by work areas. Horizontal time scale shall identify the first workday of each week.
- B. Activities shall be at least as detailed as the Bid Form. Activity durations shall be in whole working days. In addition, activity man-days shall be shown for each activity or alternatively, tabulated in an accompanying report.
- C. Diagrams shall be neat and legible and submitted on sheets at least 11 inches by 17 inches suitable for reproduction. Scale and spacing shall allow space for notations and future revisions.
- D. A CD providing the diagrams and reports shall be furnished for each submittal.

## 2.03 CONTENT OF SCHEDULES

- A. Each monthly schedule shall be based on data as of the last day of the current pay period.
- B. Description for each activity shall be brief but convey the scope of work described.
- C. Activities shall identify all items of work that must be accomplished to achieve substantial completion, such as items pertaining to Contractor's installation and testing activities; items pertaining to the approval of regulatory agencies; Contractor's time required for submittals, fabrication and deliveries; the time required by Engineer to review all submittals as set forth in the Contract Documents; items of work required of Owner to support pre-operational, startup and final testing; time required for the relocation of utilities. Activities shall also identify interface milestones with the work of other Contractors performing work under separate contracts with Owner.
  - 1. Where work is to be performed under this contract concurrently with and/or contingent upon work performed on the same facilities or area under other contracts, the Contractor's schedule shall be coordinated with the schedules of the other contracts. The Contractor shall obtain the schedules of the other appropriate contacts for the preparation and updating of his schedule and shall make the required changes in his schedule when indicated by changes in corresponding schedules.
- D. Schedules shall show the complete sequence of construction by activities. Date for beginning and completion of each activity shall be indicated as well as projected percentage of completion for each activity as of the first day of each month.
- E. Submittals schedule for shop drawing review, product data, and samples shall show the date of Contractor submittal and the date approved submittals will be required by the Engineer, consistent with the time frames established in the Specifications.
- F. For Contract Change orders granting time extensions, the impact on the Contract date(s) shall equal the calendar-day total time extension specified for the applicable work in the Contract change order.
- G. For actual delays, add activities prior to each delayed activity on the appropriate critical path(s). Data on the added activities of this type shall portray all steps leading to the delay, and shall further include the following: separate activity identification, activity description indicating cause of the delay, activity duration consistent with whichever set of dates below applies, the actual start and finish dates of the delay or, if the delay is not finished, the actual start date and estimated completion date.

- H. For potential delays, add an activity prior to each potentially delayed activity on the appropriate critical path(s). Data for added activities of this type shall include all alternatives available to mitigate the delay including acceleration alternatives, and further show the following: separate activity identification, activity description indicating cause of the potential delay, and activity duration equal to zero work days.
- I. The contract completion time will be adjusted only for causes specified in this contract. In the event the Contractor requests an extension of any contract completion date, he shall furnish such justification and supporting evidence as the Engineer may deem necessary for a determination as to whether the Contractor is entitled to an extension of time under the provision of this contract. Engineer will, after receipt of such justification and supporting evidence make findings of fact and will advise the Contractor in writing thereof. If the Engineer finds that the Contractor is entitled to any extension of any contract completion date under the provision of this contract, the Engineer's determination as to the total number of days extension shall be based upon the currently concurred schedule and on all data relevant to the extension. Such data shall be included in the next monthly updating of the schedule. The Contractor acknowledges and agrees that actual delays in the activities which, according to the schedule, do not affect any contract completion date shown by the critical path in the schedule and do not have any effect on the contract completion date or dates, and therefore, will not be the basis for a change therein.
- J. From time to time, it may be necessary for the contract schedule and/or completion time to be adjusted by the Engineer to reflect the effects of job condition, weather, technical difficulties, strikes, excusable delays on the part of the Owner or his representatives, and other unforeseeable conditions which may indicate schedule adjustments and/or completion time extension. Under such conditions, the Contractor shall reschedule the work and/or contract completion time to reflect the changed conditions and the Contractor shall revise his schedule accordingly. No additional compensation shall be made to the Contractor for such schedule changes except for excusable overall contract time extension beyond the actual completion of all unaffected work in the contract, in which case the Contractor shall take all possible action to minimize any time extension and any additional cost to the Owner. It is specifically pointed out that the use of available float time in the schedule may be used by the Owner as defined by the Engineer, as well as by the Contractor. Float time is defined as the amount of time between the early start date, and the late start date, or the early finish date and the late finish date, of any of the activities in the schedule.
- K. The Owner controls the float time in the concurred schedule, and, therefore, without obligation to extend either the overall completion date or any intermediate completion dates set out in the schedule, the Owner may initiate changes to the contract work that absorb float time only. Owner-initiated changes that affect the critical path on the approved schedule shall be the sole

grounds for extending (or contracting) said completion dates. Contractor-initiated changes that encroach on the float time identified in the concurred schedule may be accomplished with the Owner's concurrence. Such changes, however, shall give way to Owner-initiated changes competing for the same float time.

## 2.04 SUPPORTING NARRATIVE

- A. Status and Scheduling reports identified below shall contain a narrative to document the project status, to explain the basis of Contractor's determination of durations, describe the contract conditions and restraints incorporated into the schedule, and provide an analysis pertaining to potential problems and practical steps to mitigate them.
- B. The narrative shall specifically include:
1. Actual completion dates for activities completed during the report period, and actual start dates for activities commenced during the report period.
  2. Anticipated start dates for activities scheduled to commence during the following report period.
  3. Changes in the duration of any activity and minor logic changes.
  4. The progress along the critical path in terms of days ahead or behind the Contract Date.
  5. If the Monthly Status Report indicates an avoidable delay to the Contract Completion date or interim completion dates as specified in the Agreement, Contractor shall identify the problem, cause and the activities affected and provide an explanation of the proposed corrective action to meet the milestone dates involved or to mitigate further delays.
  6. If the delay is thought to be unavoidable, the Contractor shall identify the problem, cause, duration, specific activities affected and logic restraints of each activity.
  7. The narrative shall, in addition, also discuss all change order activities whether included or not in the revised/current schedule of legal status. Newly introduced change order work activities, and the CPM path(s) that they affect, must be specifically identified. All Change Order work activities added to the schedule shall conform with the sequencing and Contract Time requirements of the applicable Change Order.
  8. Original Contract date(s) shall not be changed except by Contract Change Order. A revision, as specified in Subparagraph 2.09 below, need not be submitted when the foregoing situations arise unless required by Engineer. Review of a report containing added activities will not be

construed to be concurrence with the duration or restraints for such added activities; instead the corresponding data as ultimately incorporated into the applicable Contract Change Order shall govern.

9. Should Engineer require additional data, this information shall be supplied by Contractor within 10 calendar days.
- C. Progress under the concurred CPM schedule shall be evaluated monthly by the Contractor and the Engineer. Once each month, at a time mutually agreed upon, the Contractor and the Engineer shall hold a Construction Progress Meeting at a location designated by the Engineer. This meeting shall be attended by the Contractor's highest ranking field manager and scheduler, if requested by the Engineer, the designated home office project managers or officers. Similar representatives of the Contractor's mechanical and electrical subcontractors as well as any other subcontractors or suppliers designated by the Engineer, shall also attend the meetings. At the meetings all matters relating to job progress will be discussed, and commitments made will be considered as binding. Not less than seven calendar days prior to each monthly construction progress meeting, the Contractor and Engineer shall meet at the job site and jointly evaluate the status of each activity on which work has started or is due to start based on the preceding monthly CPM schedule.

## 2.05 SUBMITTALS

- A. Contractor shall submit Base and Status Progress Schedules as identified in the Instructions to Bidders, General Conditions and Supplemental Conditions, monthly status reports, a start-up schedule, and an as-built schedule report all as specified herein.
- B. No payments for mobilization will be processed thru the Owner until the Base Schedule for the project has been concurred with by the Engineer.
- C. All schedules, including base and preliminary status, shall be in conformance with Subparagraphs 2.01, 2.02, and 2.03 above. The lack or failure to submit a properly concurred base or status update schedule to the Owner will be sufficient reason by the Engineer to decline recommendation of any progress payments, including percentages for mobilization payments.
- D. The progress schedule discussed in Article 2.07 of the General Conditions shall be the first monthly status report and as such shall be in conformance with all applicable specifications contained herein.
- E. Monthly Status Report submittals shall include five color copies of a time-scaled (days after notice to proceed) diagram showing all contract activities; five copies of network logic tabular reports by activity, early and late start, total float, successor/predecessor and supporting narrative. The detailed

base schedule shall use the notice to proceed as the data date. The schedule, if concurred with by Owner pursuant to Subparagraph 2.01(E) above, shall be the work plan to be used by the Contractor for planning, scheduling, managing, and executing the work.

- F. The schedule diagram shall be formatted in accordance with Subparagraph 2.02 above. The diagram shall include (1) all detailed activities included in the preliminary and base schedule submittals, (2) calendar days prior to substantial completion, (3) summary activities for the next or remaining 60 days. The critical path activities shall be identified, including critical paths for interim dates, if applicable.
- G. Contractor shall submit monthly progress schedules with each month's application for payment. Engineer will review schedules and return review copy within 20 days after receipt. If required, Contractor shall resubmit within 7 days after return of review copy.
- H. Contractor shall submit the number of monthly status reports that the Contractor requires, plus five copies that will be retained by the Engineer.

## 2.06 MONTHLY STATUS REPORTS

- A. Contractor shall submit five copies of detailed schedule status reports on a monthly basis with the Application for Payment. The first such status report shall be submitted with the first Application for Payment and include data as of the last day of the pay period. The Monthly Report shall include a revised copy of the latest detailed schedule of legal status, tabular reports and a supporting narrative including up dated information as described in Subparagraph 2.04 above. The Monthly Report will be reviewed by Engineer and Contractor at a monthly schedule meeting, and Contractor will address Engineer's comments on the subsequent monthly report. Monthly status reports shall be the basis for evaluating Contractor's progress.
- B. The revised diagram shall show, for the latest detailed schedule of legal status, percentages of completion for all activities, actual start and finish dates, and remaining durations, as appropriate. Activities not previously included in the latest detailed schedule of legal status shall be added, except that contractual dates will not be changed except by change order. Review of a revised diagram by Engineer will not be construed to constitute concurrence with the time frames, duration, or sequencing for such added activities; instead the corresponding data as ultimately incorporated into an appropriate Change Order shall govern.

## 2.07 STARTUP SCHEDULE

- A. At least 90 calendar days prior to the date of substantial completion, Contractor shall submit a time-scaled (days after notice to proceed) diagram detailing the work to take place in the period between 60 days prior to substantial completion and substantial completion, together with a supporting narrative. Engineer shall have 20 calendar days after receipt of the submittal to respond. Upon receipt of Engineer's comments, Contractor shall make the necessary revisions and submit the revised schedule within 10 calendar days. The resubmittal, if concurred with by Owner, shall be the Work Plan to be used by Contractor for planning, managing, scheduling and executing the remaining work leading to substantial completion.
- B. The time-scaled diagram shall use the latest schedule of legal status for those activities completed ahead of the last 60 calendar days prior to substantial completion, and detailed activities for the remaining 60-day period within the time frames outlined in the latest schedule of legal status.
- C. Contractor will be required to continue the requirement for monthly reports, as outlined in Article 2.05 above. In preparing this report, Contractor must assure that the schedule is consistent with the progress noted in the startup schedule.

## 2.08 AS-BUILT SCHEDULE

- A. After substantial completion but prior to final payment, Contractor shall submit an as-built schedule report and time-scaled as-built diagram. The documents shall reflect all as-built critical paths. The diagrams shall be prepared in accordance with Subparagraphs 2.02 and 2.03 above, in addition to the following:
  - 1. All Contract activities, including all added activities, shall be shown.
  - 2. Activity durations shall be the actual number of separate workdays during which work was performed on the activity.
  - 3. Contract milestone completions shall be plotted on the date of the Substantial Completion Reports.

## 2.09 REVISIONS

- A. All revised Schedule Submittals shall be made in the same form and detail as the initial submittal and shall be accompanied by an explanation of the reasons for such revisions, all of which shall be subject to review by Engineer and concurrence by Owner. The revision shall incorporate all previously made changes to reflect current as-built conditions. Minor changes to the approved submittal may be approved at monthly meetings; a minor change is not considered a revision in the context of this paragraph.
- B. A revised schedule submittal shall be submitted for review, when required by Engineer, for one of the following reasons:

1. Owner or Engineer directs a change that affects the date(s) specified in the Agreement or alters the length of a critical path.
  2. Contractor elects to change any sequence of activities so as to affect a critical path of the current schedule documents.
- C. If, prior to agreement on an equitable adjustment to the Contract time, Engineer requires revisions to the schedule in order to evaluate planned progress, Contractor shall provide an interim revised submittal for review with change effect(s) incorporated as directed. Interim revisions to the documents which are recommended to the Owner for concurrence will be incorporated in the next Monthly Status Report.

PART 3 EXECUTION (NOT USED)

END OF SECTION



SECTION 01370  
SCHEDULE OF VALUES

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Submit to the Engineer a Final Schedule of Values allocated to the various portions of the Work, within 10 days after the Effective date of the Agreement.
- B. Upon request of the Engineer, support the values with data which will substantiate their correctness.
- C. Refine the Schedule of Values to reflect the requirements of the General Conditions and Supplemental Conditions. The final Schedule of Values shall be used only as the basis for the Contractor's Applications for Payment.

1.02 FORM AND CONTENT OF SCHEDULE OF VALUES

- A. Contractor's standard forms or automated printouts will be considered for approval by the Engineer upon Contractor's request. Identify schedule with:
  - 1. Title of Contract and location.
  - 2. Engineer and Contract numbers.
  - 3. Name and Address of Contractor.
  - 4. Contract designation.
  - 5. Date of submission.
- B. Schedule shall list the installed value of the component parts of the Work in sufficient detail to serve as a basis for computing values for progress payments during construction.
- C. Identify each line item with the number and title of the respective major section of the specifications.
- D. For each major line item list sub-values of major products or operations under the item.
- E. For the various portions of the Work:
  - 1. Each item shall include a directly proportional amount of the Contractor's overhead and profit.
  - 2. For items on which progress payments will be requested for stored materials, break down the value into:

- a. The cost of the materials, delivered and unloaded, with taxes paid.  
Paid invoices are required for materials upon request by the Engineer.
  - b. The total installed value.
- F. Follow the Bid Form Schedule of Prices as the format for listing component items for pipelines.
- G. The sum of all lump sum values listed in the schedule shall equal the total Contract Sum.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01380  
CONSTRUCTION PHOTOGRAPHIC RECORD

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Employ a competent photographer to take construction record photographs during course of the work.

1.02 PHOTOGRAPHY REQUIRED

- A. Provide photographs taken on cutoff date for each scheduled Application for Payment.
- B. Provide photographs taken at each major stage of construction.

1.03 COST OF PHOTOGRAPHY

- A. The Contractor shall pay costs for specified photography. Parties requiring additional photography or prints will pay photographer directly.

PART 2 - PRODUCTS

2.01 PHOTO FORMAT

- A. File Type: .jpg on CD
- B. CD information:
  - 1. Name of project.
  - 2. Orientation of view.
  - 3. Date and time

PART 3 - EXECUTION

3.01 TECHNIQUE

- A. Factual presentation.
- B. Correct exposure and focus.
- C. High resolution and sharpness.

D. Maximum depth-of-field.

E. Minimum distortion.

### 3.02 VIEWS REQUIRED

A. Photograph from locations to adequately illustrate condition of construction and state of progress.

B. At successive periods of photography, take at least one photograph from the same overall view as previously. Consult with Engineer at each period of photography for instructions concerning views required.

### 3.03 DELIVERY OF PRINTS

A. Deliver prints to the Engineer to accompany each Application for Payment.

B. Distribution of prints as soon as processed is anticipated to be as follows:

1. Owner (one CD ROM).

2. Engineer (two (2) CD ROMs).

3. Project Record File (one set of prints from CD ROM to be stored by Contractor on-site in a notebook).

C. No construction shall start until pre construction photographs are completed and submitted to the Engineer. Deliver prints to Engineer to accompany each Application for Payment.

END OF SECTION

SECTION 01410  
TESTING AND TESTING LABORATORY SERVICES

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Owner will approve the laboratory for the services of an Independent Testing Laboratory to perform all materials and equipment testing specifically indicated on the Contract Documents or specified in the Specifications and may at any other time elect to have materials and equipment tested for conformity with the Contract Documents. Contractor shall cooperate with the laboratory to facilitate the execution of its required services

1.02 RELATED WORK

- A. Section 01300: Shop Drawings, Submittals and Samples.
- B. Section 01310: Construction Schedules

1.03 LIMITATIONS OF AUTHORITY OF TESTING LABORATORY

- A. Laboratory is not authorized to:
  - 1. Release, revoke, alter or enlarge on requirements of Contract Documents.
  - 2. Approve or accept any portion of the Work.
  - 3. Perform any duties of the Contractor.

1.04 CONTRACTOR'S RESPONSIBILITIES

- A. Cooperate with laboratory personnel, provide access to Work.
- B. Secure and deliver to the laboratory adequate quantities of representational samples of materials proposed to be used and which require testing.
- C. Provide to the laboratory the preliminary design mix proposed to be used for concrete, and other materials mixes which require control by the testing laboratory.
- D. Materials and equipment used in the performance of work under this Contract area subject to inspection and testing at the point of manufacture or fabrication. Standard specifications for quality and workmanship are indicated in the Contract Documents. The Engineer may require the Contractor to provide statements or certificates from the manufacturers and fabricators that the materials and equipment provided by them are manufactured or fabricated

in full accordance with the standard specifications for quality and workmanship indicated in the Contract Documents. All costs of this testing and providing statements and certificates shall be a subsidiary obligation of the Contractor, and no extra charge to the Owner shall be allowed on account of such testing and certification.

- E. Furnish incidental labor and facilities:
  - 1. To provide access to Work to be tested.
  - 2. To obtain and handle samples at the Project site or at the source of the product to be tested.
  - 3. To facilitate inspections and tests.
  - 4. For storage and curing of test samples.
- F. Notify laboratory sufficiently in advance (minimum of 48 hours) of operations to allow for laboratory assignment of personnel and scheduling of tests.
  - 1. When tests or inspections cannot be performed after such notice, reimburse Owner for laboratory personnel and travel expenses incurred due to Contractor's negligence.
- G. Employ and pay for the services of the same or a separate, equally qualified independent testing laboratory to perform additional inspections, sampling and testing required for the Contractor's convenience and as approved by the Engineer.
- H. All tests required by the Specifications to be performed by an independent laboratory shall be made by a County approved laboratory. Certified test results of all specified tests shall be submitted in duplicated to the Engineer. The samples furnished and the cost for the laboratory services shall be at the expense of the Contractor and included in the prices bid for the associated work.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01510  
TEMPORARY UTILITIES

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Furnish, install and maintain temporary utilities required for construction, remove on completion of Work.

1.02 REQUIREMENTS OF REGULATORY AGENCIES

- A. Comply with National Electric Code.
- B. Comply with federal, state and local codes and regulations and with utility company requirements.
- C. Comply with County Health Department Regulations.

PART 2 PRODUCTS

2.01 MATERIALS, GENERAL

- A. Materials may be new or used, but must be adequate in capacity for the required usage, must not create unsafe conditions, and must not violate requirements of applicable codes and standards.

2.02 TEMPORARY ELECTRICITY AND LIGHTING

- A. Comply with Section 01511 for temporary electricity.
- B. Arrange with utility company and Owner to provide service required for temporary lighting, and pay all costs for service and for power used in the construction, testing and trial operation prior to final acceptance of the work by the Owner. Provide adequate artificial lighting for all areas of work when natural light is not adequate for work, and for areas accessible to the public.

2.03 TEMPORARY HEAT AND VENTILATION

- A. Provide temporary heat and ventilation as required to maintain adequate environmental conditions to facilitate progress of the Work.
- B. Provide adequate forced ventilation of enclosed areas for curing of installed materials, to disperse humidity, and to prevent hazardous accumulations of dust, fumes, vapors or gases.

- C. Portable heaters shall be standard approved units complete with controls.
- D. Pay all costs of installation, maintenance, operation and removal, and for fuel consumed.
- E. Provide connections to existing facilities, extend and supplement with temporary units as required to comply with requirements. Pay all costs of installation, maintenance, operation and removal.

#### 2.04 TEMPORARY WATER

- A. Contractor shall provide and pay for all required water for construction and consumptive purposes.
- B. Install at each and every connection to the Owner water supply a backflow preventer meeting the requirements of ASA A40.6, latest revision. Contractor shall be required to meter all water used.

#### 2.05 TEMPORARY SANITARY FACILITIES

- A. Provide sanitary facilities in compliance with laws and regulations.
- B. Service, clean and maintain facilities and enclosures.

### PART 3 EXECUTION

#### 3.01 GENERAL

- A. Maintain and operate systems to assure continuous service.
- B. Modify and extend systems as work progress requires.

#### 3.02 REMOVAL

- A. Completely remove temporary materials and equipment when their use is no longer required as determined by the Engineer.
- B. Clean and repair damage caused by temporary installations or use of temporary facilities.

END OF SECTION



SECTION 01511  
TEMPORARY ELECTRICITY

PART 1 -- GENERAL

1.01 DESCRIPTION

- A. General CONTRACTOR shall provide temporary electrical service during the Project. At minimum, provide temporary electrical service through Substantial Completion of the entire Project and removal of temporary Site offices.
- B. Cost of electricity used for the Project, including cost of electricity for start-up and testing, shall be paid by General CONTRACTOR.
- C. Power source for temporary electrical service is available from Progress Energy Florida, Inc. Point of connection to power source shall be coordinated with Progress Energy Florida, Inc.
- D. Limits of Temporary Power Service:
  - 1. Provide and maintain temporary electrical service so that electricity can be obtained at all locations within work areas shown on Drawings using extension of no more than 100 feet.
  - 2. Temporary service required beyond specified limits shall be provided by contractor requiring such power, who shall furnish their own portable generator or other means of temporary electrical service.
  - 3. Each contractor using temporary electrical service shall provide their own extension cords, drop lights, power tools, other small devices, and distribution system.
- E. Work hours are specified in the Conditions of the Contract. If another contractor requires temporary electrical service at times other than specified above, they shall notify General CONTRACTOR, who shall provide required service. General CONTRACTOR will make a reasonable charge to contractor requiring additional service.
- F. Continuously provide electrical power to construction Site offices.
- G. Unless existing equipment is specified as being taken temporarily out of service to accommodate portions of the Project, provide temporary electrical power to maintain continuous operation of existing facilities during change over of electrical equipment.

H. Restrictions:

1. Existing Systems: Cannot be modified, extended or used for temporary electrical service.
2. Obtain OWNER's permission to use electricity from existing system.
3. Permanent System Provided Under the Project: Obtain OWNER's written permission for using permanent electrical system provided under the Project, indicating conditions of use.

## PART 2 -- PRODUCTS

### 2.01 TEMPORARY SERVICE REQUIRED

- A. Materials and equipment used for temporary electric service may be new or used, and shall be in first-class, fully serviceable condition. Temporary electrical service shall not create unsafe conditions. Conform to Laws and Regulations and requirements of electrical utility.
- B. Size of Temporary Electrical Service:
1. Temporary electrical service is required for lighting, power tools, construction Site offices, and similar usages. Electric space heaters, dewatering pumps and equipment, and large welding machines are not included in required temporary electrical service.
  2. Temporary electrical system shall be 240/120-volt, single-phase, 60 Hertz, with sufficient capacity to provide service for construction use by all trades and with the following minimum facilities:
    - a. 250 ampere frame with 250 ampere trip primary circuit breaker.
    - b. Two-pole safety switch, and 240/ 120-volt, single-phase, three-wire distribution panel.
- C. Provide at least one power center on each floor, as required.
- D. Provide each electrical outlet with circuit breaker protection and comply with ground fault protection per requirements of NEC Article 406, Receptacles, Cord Connectors, and Attachment Plugs, and UL 943, Standard for Ground-Fault Circuit-Interrupters.

## PART 3 -- EXECUTION

### 3.01 INSTALLATION

- A. Install temporary electrical service in neat, orderly manner. Temporary electrical service shall be structurally and electrically sound throughout.
- B. Modify temporary electrical service and rearrange wiring as Project progress requires.
- C. Locate all temporary electrical facilities to avoid interfering with the Work, hoisting, materials handling, storage, traffic areas, existing operable facilities and work under other contracts.
- D. CONTRACTOR is responsible for and shall return to original condition those portions of permanent electrical system used in completing the Work.

### 3.02 USE

- A. Properly supervise use of temporary electrical service. Enforce conformance with Laws and Regulations and safe practices, and prevent abuse of services.

### 3.03 REMOVAL

- A. Completely remove materials and equipment associated with temporary electrical service when temporary electrical service is no longer required.
- B. Repair damage caused by temporary electrical service and its removal and restore Site to specified condition; if restoration of damaged areas is not specified, restore to pre-construction condition.

END OF SECTION

SECTION 01580  
PROJECT IDENTIFICATION AND SIGNS

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Furnish, install and maintain County project identification signs.
- B. Remove signs on completion of construction.
- C. Allow no other signs to be displayed except for traffic control and safety.

1.02 PROJECT IDENTIFICATION SIGN (COUNTY)

- A. One painted sign, of not less than 32 square feet (3 square meters) area, with painted graphic content to include:
  - 1. Title of Project.
  - 2. Name of County.
  - 3. Names and titles of authorities as directed by County.
  - 4. Prime Contractor.
- B. Graphic design, style of lettering and colors: As approved by the County.
- C. Erect on the site at a lighted location of high public visibility, adjacent to main entrance to site, as approved by the County

1.03 INFORMATIONAL SIGNS

- A. Painted signs with painted lettering, or standard products.
  - 1. Size of signs and lettering: as required by regulatory agencies, or as appropriate to usage.
  - 2. Colors: as required by regulatory agencies, otherwise of uniform colors throughout project.
- B. Erect at appropriate locations to provide required information.

1.04 QUALITY ASSURANCE

- A. Sign Painter: Professional experience in type of work required.
- B. Finishes, Painting: Adequate to resist weathering and fading for scheduled construction period.

## PART 2 PRODUCTS

### 2.01 SIGN MATERIALS

- A. Structure and Framing: May be new or used, wood or metal, in sound condition structurally adequate to work and suitable for specified finish.
- B. Sign Surfaces: Exterior softwood plywood with medium density overlay, standard large sizes to minimize joints.
  - 1. Thickness: As required by standards to span framing members, to provide even, smooth surface without waves or buckles.
- C. Rough Hardware: Galvanized.
- D. Paint: Exterior quality, as specified in the Contract Documents.

## PART 3 EXECUTION

### 3.01 PROJECT IDENTIFICATION SIGN

- A. Paint exposed surface or supports, framing and surface material; one coat of primer and one coat of exterior paint.
- B. Paint graphics in styles, size and colors selected.

### 3.02 MAINTENANCE

The Contractor shall maintain signs and supports in a neat, clean condition; repair damages to structures, framing or sign.

### 3.03 REMOVAL

The Contractor shall remove signs, framing, supports and foundations at completion of project.

END OF SECTION

SECTION 01590  
FIELD OFFICES

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Furnish, install and maintain one temporary field office for the Contractor and one temporary field office for the Resident Project Representative (RPR) during entire construction period (at a minimum, from Notice to Proceed to the date of Final Completion).
- B. Furnish, install and maintain storage and work sheds needed for construction.
- C. At completion of work, remove field offices, sheds and contents.

1.02 OTHER REQUIREMENTS

- A. Prior to installation of offices, consult with the Engineer and Owner on location, access and related facilities. The office shall be located at the project site unless otherwise approved by the Engineer.

1.03 REQUIREMENTS FOR FACILITIES

- A. Construction:
  - 1. Structurally sound, weathertight, with floors raised above ground.
  - 2. Temperature transmission resistance: Compatible with occupancy and storage requirements.
  - 3. At Contractor's option, portable or mobile buildings may be used.
    - a. Mobile trailers, when used, shall be modified for office use.
    - b. Do not use mobile trailers for living quarters.
- B. Office and Facilities:
  - 1. Size: As required for general use and to provide space for project meetings, including a minimum office space of 250 square feet with a secure entry and one keyed file cabinet, two desks, two office chairs and two conference tables for use by the Owner/Engineer's RPR.
  - 2. Lighting and temperature control:
    - a. Lighting: 50 foot-candles at desk top height.
    - b. Exterior lighting at entrance door.
    - c. Automatic heating and mechanical cooling equipment to maintain comfort conditions.
  - 3. Racks and files for Project Record Documents.

4. Photocopy/Scanner Machine: Capable of 8.5x11 and 11x17, black and white and color.
  5. Two 6-foot conference tables and 16 folding chairs sufficient for progress meeting attendees.
  6. Other furnishings: Contractor's option.
  7. One 10-inch (250 mm) outdoor-type thermometer and rain gauge.
  8. Bottled water service within the field office.
  9. Functional restroom facilities within the field office.
  10. One dedicated phone line and internet access (dedicated and wireless) for Engineer.
  11. Janitorial service.
- C. The Contractor shall make all provisions and pay all installations and other costs for the construction office in order to provide water, sewer, telephone service (local and long distance), power service and exterior lights.

#### 1.04 USE OF PERMANENT FACILITIES

- A. Permanent facilities shall not be used for field offices or for storage.

### PART 2 PRODUCTS

#### 2.01 MATERIALS, EQUIPMENT, FURNISHINGS

- A. May be new or used, but must be serviceable, adequate for required purpose, and must not violate applicable codes or regulations.

### PART 3 EXECUTION

#### 3.01 PREPARATION

- A. Fill and grade sites for temporary structures to provide surface drainage.

#### 3.02 INSTALLATION

- A. Construct temporary field offices on proper foundations, provide connections for utility services.

1. Secure portable or mobile buildings when used.
2. Provide steps and landings at entrance doors.
3. Provide hurricane tie-downs.

- B. Mount thermometer at convenient outside location, not in direct sunlight.

- C. Locate construction office facilities at the location approved by the Owner within the work site.

3.03 MAINTENANCE AND CLEANING

- A. Provide daily maintenance and cleaning for field offices, furnishings, equipment and services.

3.04 REMOVAL

- A. Remove temporary field offices, contents and services at a time when no longer needed by Contractor and RPR.
- B. Remove foundations and debris; grade site to required elevations and clean the areas.

END OF SECTION



SECTION 01600  
MATERIAL AND EQUIPMENT

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. Material and equipment incorporated into the Work:

1. Conform to applicable specifications and standards.
2. Comply with size, make, type and quality specified, or as specifically approved in writing by the Engineer.
3. Manufactured and Fabricated Products:
  - a. Design, fabricate and assemble in accord with the best engineering and shop practices.
  - b. Manufacture like parts of duplicate units to standard sizes and gauges, to be interchangeable.
  - c. Two or more items of the same kind shall be identical, by the same manufacturer.
  - d. Products shall be suitable for service conditions.
  - e. Equipment capacities, sizes and dimensions shown or specified shall be adhered to unless variations are specifically approved in writing.
  - f. Furnish resident project representative (RPR) a copy of all product delivery tickets.
4. Do not use material or equipment for any purpose other than that for which it is designed or is specified.

1.02 APPROVAL OF MATERIALS

- A. Only new materials and equipment shall be incorporated in the work. All materials and equipment furnished by the Contractor shall be subject to the inspection and approval of the Engineer. No material shall be delivered to the work without prior approval of the Engineer.
- B. Within 30 days after the effective date of the Agreement, the Contractor shall submit to the Engineer, data relating to materials and equipment he proposes to furnish for the work. Such data shall be in sufficient detail to enable the

Engineer to identify the particular product and to form an opinion as to its conformity to the specifications. The data shall comply with Subparagraph 1.06 below.

- C. Facilities and labor for handling and inspection of all materials and equipment shall be furnished by the Contractor. If the Engineer requires, either prior to beginning or during the progress of the work, the Contractor shall submit samples of materials for such special tests as may be necessary to demonstrate that they conform to the specifications. Such samples shall be furnished, stored, packed, and shipped as directed at the Contractor's expense. Except as otherwise noted, the Owner will make arrangements for and pay for the tests.
- D. The Contractor shall submit data and samples sufficiently early to permit consideration and approval before materials are necessary for incorporation in the work. Any delay of approval resulting from the Contractor's failure to submit samples or data promptly shall not be used as a basis of claim against the Owner or the Engineer.
- E. The materials and equipment used on the work shall correspond to the approved samples or other data.

#### 1.03 MANUFACTURER'S INSTRUCTIONS FOR INSTALLATION

- A. When Contract Documents require that installation of work shall comply with manufacturer's printed instructions, obtain and distribute copies of such instructions to parties involved in the installation, including five (5) copies to the Engineer.
  - 1. Maintain one set of complete instructions at the job site during installation and until completion.
- B. Handle, install, connect, clean, condition and adjust products in strict accordance with such instructions and in conformity with specified requirements.
  - 1. Should job conditions or specified requirements conflict with manufacturer's instructions, consult with Engineer for further instructions.
  - 2. Do not proceed with work without clear instructions.
- C. Perform work in accord with manufacturer's instructions. Do not omit any preparatory step or installation procedure unless specifically modified or exempted by Contract Documents.

#### 1.04 TRANSPORTATION AND HANDLING

- A. Arrange deliveries of Products in accordance with construction schedules, coordinate to avoid conflict with work and conditions at the site.
  - 1. Deliver Products in undamaged condition, in manufacturer's original containers or packaging, with identifying labels intact and legible.
  - 2. Immediately on delivery, inspect shipments to assure compliance with requirements of Contract Documents and approved submittals, and that Products are properly protected and undamaged.
- B. Provide equipment and personnel to handle Products by methods to prevent soiling or damage to Products or packaging.

1.05 STORAGE AND PROTECTION

- A. Comply with Section 01620 for proper delivery, storage and protection of equipment and materials.

1.06 SUBSTITUTIONS AND PRODUCT OPTIONS

- A. Comply with Section 01630 for product options and substitutions.

1.07 SPECIAL TOOLS

- A. Manufacturers of material shall furnish any special tools required for normal adjustment, operations and maintenance, together with instructions for their use. The Contractor shall preserve and deliver to the Owner these tools and instructions in good order no later than upon completion of the Contract.

1.08 WARRANTY

- A. For all material, submit a warranty from the material manufacturer as specified in Section 01740. The manufacturer's warranty period shall be concurrent with the Contractor's for one (1) year after the time of substantial completion.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01620  
DELIVERY, STORAGE AND PROTECTION

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. All materials to be incorporated in the work shall be handled and stored by the Contractor before, and after shipment in a manner to prevent warping, twisting, bending, breaking, chipping, rusting, and any injury, theft or damage of any kind whatsoever to the material or equipment.
- B. Provide secure storage and protection for products to be incorporated into the Work, and maintenance and protection for products after installation and until completion of the Work.
- C. All materials which, in the opinion of the Engineer, have become so damaged as to be unfit for the use intended or specified shall be promptly removed from the site of the work, and the Contractor shall receive no compensation for the damaged material or its removal.
- D. The Contractor shall be responsible for all material and supplies sold and delivered to the Owner under this Contract until final inspection of the work and acceptance thereof by the Owner. In the event any such material and supplies are lost, stolen, damaged, or destroyed prior to final inspection and acceptance, the Contractor shall replace same without additional cost to the Owner.
- E. Should the Contractor fail to take proper action on storage and handling of equipment supplied under this Contract within seven days after written notice to do so has been given, the Owner retains the right to correct all deficiencies noted in previously transmitted written notice and deduct the cost associated with these corrections from the Contractor's Contract. These costs may be comprised of expenditures for labor, equipment usage, administrative, clerical, engineering and any other costs as associated with making the necessary corrections.

1.02 STORAGE

- A. Store products immediately on delivery, and protect until installed in the Work.
  - 1. Store in accord with manufacturer's instructions, with seals and labels intact and legible.
- B. Store Products subject to damage by elements in substantial weathertight enclosures.

1. Maintain temperatures within ranges required by manufacturer's instructions.
2. Provide humidity control for sensitive products, as required by manufacturer's instructions.
3. Store unpacked products on shelves, in bins or in neat piles, accessible for inspection.

C. Exterior Storage

1. Provide substantial platforms, blocking or skids to support fabricated products above ground, prevent soiling or staining.
  - a. Cover products, subject to discoloration or deterioration from exposure to the elements, with impervious sheet coverings. Provide adequate ventilation to avoid condensation.
2. Store loose granular materials on solid surfaces such as paved areas, or provide plywood or sheet materials to prevent mixing with foreign matter.
  - a. Provide surface drainage to prevent flow or ponding of rainwater.
  - b. Prevent mixing of refuse or chemically injurious materials or liquids.

D. Cement sand and lime shall be stored under a roof and off the ground and shall be kept completely dry at all times. All miscellaneous steel, and reinforcing steel shall be stored off the ground or otherwise to prevent accumulations of dirt or grease, and in a position to prevent accumulations of standing water and to minimize rusting. Precast concrete sections shall be handled and stored in a manner to prevent accumulations of dirt, standing water, staining, chipping or cracking. Brick, block and similar masonry products shall be handled and stored in a manner to reduce breakage, chipping, cracking, and spilling to a minimum.

E. Arrange storage in manner to provide easy access for inspection.

### 1.03 MAINTENANCE OF STORAGE

- A. Maintain periodic system of inspection of stored products on scheduled basis to assure that:
1. State of storage facilities is adequate to provide required conditions.
  2. Required environmental conditions are maintained on continuing basis.
  3. Surfaces of product exposed to elements are not adversely affected.

- a. Any weathering of products, coatings and finishes is acceptable under requirements of Contract Documents.

#### 1.04 PROTECTION AFTER INSTALLATION

- A. Provide protection of installed products to prevent damage from subsequent operations. Remove when no longer needed, prior to completion of Work.
- B. Control traffic to prevent damage to material and surfaces.
- C. Provide coverings to protect finished surfaces from damage.
  - 1. Cover projections, wall corners, and jambs, sills and soffits of openings, in areas used for traffic and for passage of products in subsequent work.
  - 2. Protect finished floors and stairs from dirt and damage:
    - a. In areas subject to foot traffic, secure heavy paper, sheet goods, or other materials in place.
    - b. For movement of heavy products, lay planking or similar materials in place.
    - c. For storage of products, lay tight wood sheathing in place.
- D. Waterproofed and roofing surfaces.
  - 1. Prohibit use of surfaces for traffic of any kind, and for storage of any products.
  - 2. When some activity must take place in order to carry out the Contract, obtain recommendations of installer for protection of surface.
    - a. Install recommended protection, remove on completion of that activity.
    - b. Restrict use of adjacent unprotected areas.
- E. Lawns and Landscaping.
  - 1. Prohibit traffic of any kind across planted lawn and landscaped areas.

#### PART 2 PRODUCTS (NOT USED)

#### PART 3 EXECUTION (NOT USED)

END OF SECTION



SECTION 01700  
CONTRACT CLOSEOUT

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Comply with requirements stated in General Conditions, Supplemental Conditions, and in Specifications for administrative procedures in closing out the Work.

1.02 SUBSTANTIAL COMPLETION

- A. When Contractor considers the Work is substantially complete, he shall submit to the Engineer:
  - 1. A written notice that the Work, or designated portion thereof, is substantially complete.
  - 2. A list of items to be completed or corrected.
- B. Within a reasonable time after receipt of such notice, the Engineer will make an inspection to determine the status of completion.
- C. Should the Engineer determine that the Work is not substantially complete:
  - 1. The Engineer will promptly notify the Contractor in writing, giving the reasons therefore.
  - 2. Contractor shall remedy the deficiencies in the Work, and send a second written notice of substantial completion to the Engineer.
  - 3. The Engineer will re-inspect the Work.
- D. When the Engineer finds that the Work is substantially complete, he will:
  - 1. Prepare and deliver to Owner a tentative Certificate of Substantial Completion on NSPE Form 1910-8-D with a tentative list of items to be completed or corrected before final payment.
  - 3. After consideration of any objections made by the Owner as provided in Conditions of the Contract, and when the Engineer considers the Work substantially complete, he will execute and deliver to the Owner and the Contractor a definite Certificate of Substantial Completion with a revised tentative list of items to be completed or corrected.

### 1.03 FINAL INSPECTION

- A. When Contractor considers the Work is complete, he shall submit written certification that:
  - 1. Contract Documents have been reviewed.
  - 2. Work has been inspected for compliance with Contract Documents.
  - 3. Work has been completed in accordance with Contract Documents.
  - 4. Equipment and systems have been tested in the presence of the Owner's representative and are operational.
  - 5. Work is completed and ready for final inspection.
- B. The Engineer will make an inspection to verify the status of completion with reasonable promptness after receipt of such certification.
- C. Should the Engineer consider that the Work is incomplete or defective:
  - 1. The Engineer will promptly notify the Contractor in writing, listing the incomplete or defective work.
  - 2. Contractor shall take immediate steps to remedy the stated deficiencies, and send a second written certification to the Engineer that the Work is complete.
  - 3. The Engineer will reinspect the Work.
- D. When the Engineer finds that the Work is acceptable under the Contract Documents, he shall request the Contractor to make closeout submittals.

### 1.04 REINSPECTION FEES

- A. Should the Engineer perform reinspections due to failure of the Work to comply with the claims of status of completion made by the Contractor:
  - 1. Owner will compensate the Engineer for such additional services.
  - 2. Owner will deduct the amount of such compensation from the final payment to the Contractor.

### 1.05 CONTRACTOR'S CLOSEOUT SUBMITTALS TO ENGINEER

- A. Evidence of compliance with requirements of governing authorities.

- B. Project Record Documents: Requirements of Section 01720.
- C. Warranties and Bonds: Requirements of Section 01740.
- D. Keys and Keying Schedule.
- E. Evidence of Payment and Release of Liens: Requirements of General and Supplemental Conditions.
- F. Certificate of Insurance for Products and Completed Operations.
- G. Contractor's Release of Owner form (attached to the end of this section).
- H. Contractor's Certification of Final Payment form (attached to the end of this section).
- I. Consent of Surety Company to Final Payment form (attached to the end of this section).

#### 1.06 FINAL ADJUSTMENT OF ACCOUNTS

- A. Submit a final statement of accounting to the Engineer.
- B. Statement shall reflect all adjustments to the Contract Sum:
  - 1. The original Contract Sum.
  - 2. Additions and deductions resulting from:
    - a. Previous Change Orders.
    - b. Unit Prices.
    - c. Deductions for uncorrected Work.
    - d. Penalties and Bonuses.
    - e. Deductions for liquidated damages.
    - f. Deductions for re-inspection payments.
    - g. Other adjustments.
  - 3. Total Contract Sum, as adjusted.
  - 4. Previous payments.
  - 5. Sum remaining due.
- B. Engineer will prepare a final Change Order, reflecting approved adjustments to the Contract Sum which were not previously made by Change Orders.

1.07 FINAL APPLICATION FOR PAYMENT

- A. Contractor shall submit the final Application for Payment in accordance with procedures and requirements stated in the General Conditions and Supplemental Conditions.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01710  
CLEANING

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Execute cleaning, during progress of the Work, and at completion of Work.

1.02 DISPOSAL REQUIREMENTS

- A. Conduct cleaning and disposal operations to comply with codes, ordinances, regulations, and anti-pollution laws.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 DURING CONSTRUCTION

- A. Execute daily cleaning to keep the Work, the site and adjacent properties free from accumulations of waste materials, rubbish and windblown debris, resulting from construction operations.
- B. Provide onsite containers for the collection of waste materials, debris and rubbish. All waste materials including containers, food debris and other miscellaneous materials must be disposed of daily in onsite containers.
- C. Remove waste materials, debris and rubbish from the site periodically and dispose of at legal disposal areas away from the site.

3.02 NEW TANK CLEANING

- A. After construction is completed, the interior of the tank shall be completely hosed out and cleaned of all dirt and loose material.
- B. Contractor shall thoroughly remove all accumulated bottom sediment and debris from all tanks.
- C. All accumulated bottom sediment and debris shall be removed in a manner that does not compromise the tank integrity and/or coating system.

3.03 FINAL CLEANING

- A. Employ workmen for final cleaning.

- B. Remove grease, mastic, adhesives, dust, dirt, stains, fingerprints, labels, and other foreign materials from sight-exposed interior and exterior surfaces.
- C. Broom clean exterior paved surfaces; rake clean other surfaces of the grounds.
- D. Prior to final completion, or Owner occupancy, Contractor shall conduct an inspection of sight-exposed interior and exterior surfaces, and all work areas, to verify that the entire Work is clean.

END OF SECTION

SECTION 01720  
PROJECT RECORD DOCUMENTS

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Maintain at the site for the Owner one record copy of:
  - 1. Drawings.
  - 2. Specifications.
  - 3. Addenda.
  - 4. Change Orders and other Modifications to the Contract.
  - 5. Engineer's Field Orders or written instructions.
  - 6. Approved Shop Drawings, Working Drawings and Samples.
  - 7. Field Test records.
  - 8. Construction photographs.
  - 9. Detailed Progress Schedule.

1.02 MAINTENANCE OF DOCUMENTS AND SAMPLES

- A. Store documents and samples in Contractor's office apart from documents used for construction.
- B. File documents and samples in accordance with CSI format.
- C. Maintain documents in a clean, dry, legible, condition and in good order. Do not use record documents for construction purposes.
- D. Make documents and samples available at all times for inspection by the Engineer.
- E. As a prerequisite for monthly progress payments, the Contractor is to exhibit the currently updated "record documents" for review by the Engineer and Owner.

1.03 MARKING DEVICES

- A. Provide felt tip marking pens for recording information in the color red.

1.04 RECORDING

- A. Label each document "PROJECT RECORD" in neat large printed letters.
- B. Record information concurrently with construction progress.

1. Do not conceal any work until required information is recorded.
- C. Drawings; Legibly mark to record actual construction:
1. Elevations of various structure elements in relation to grade.
  2. All new underground piping with elevations and dimensions shown at 50-foot intervals and/ or any change in alignment (horizontal or vertical). Changes to piping location. Horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements. Actual installed pipe material, class, etc.
  3. Location of internal utilities and appurtenances concealed in the construction, referenced to visible and accessible features of the structure.
  4. Field changes of dimension and detail.
  5. Changes made by Field Order or by Change Order.
  6. Details not on original contract drawings.
  7. Piping relocations.
- D. Specifications and Addenda; Legibly mark each Section to record:
1. Manufacturer, trade name, catalog number, and Supplier of each Product and item of material actually installed.
  2. Changes made by Field Order or by Change Order.

#### 1.05 SUBMITTAL

- A. At Contract closeout, deliver Record Documents to Engineer for review for the Owner.
- B. Accompany submittal with transmittal letter in duplicate, containing:
1. Date.
  2. Project title and number.
  3. Contractor's name and address.
  4. Title and number of each Record Document.
  5. Signature of Contractor or his authorized representative.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION



SECTION 01740  
WARRANTIES AND BONDS

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Compile specified warranties and bonds, as in Articles 5 and 13 of the General Conditions and Supplemental Conditions.
- B. Co-execute submittals when so specified.
- C. Review submittals to verify compliance with Contract Documents.
- D. Submit to the Engineer for review and transmittal to Owner.

1.02 SUBMITTAL REQUIREMENTS

- A. Assemble warranties, bonds and service and maintenance contracts, executed by each of the respective manufacturers, suppliers, and subcontractors.
- B. Number of original signed copies required. Three each.
- C. Table of Contents. Neatly typed in orderly sequence. Provide complete information for each item.
  - 1. Product or work item.
  - 2. Firm, with name of principal, address and telephone number.
  - 3. Scope.
  - 4. Date of beginning warranty, bond or service and maintenance contract.
  - 5. Duration of warranty, bond or service maintenance contract.
  - 6. Provide information for Owner's personnel:
    - a. Proper procedure in case of failure.
    - b. Instances which might affect the validity of warranty or bond.
  - 7. Contractor, name of responsible principal, address and telephone number.

1.03 FORM OF SUBMITTALS

- A. Prepare in duplicate packets.

B. Format:

1. Size 8 -1/2-inches x 11 -inches, punch sheets for standard 3 -post binder.
  - a. Fold larger sheets to fit into binders.
2. Front cover and side cover: Identify each packet with typed or printed title "WARRANTIES AND BONDS." List:
  - a. Name of Owner
  - b. Title of Project.
  - c. Name of Contractor.
  - d. Name of Engineer.
  - e. Construction Start Date (month:year)
  - f. Construction Completion Date (month:year)

C. Binders: Commercial quality, three-post binder, with durable and cleanable plastic covers and maximum post width of 2-inches.

#### 1.04 WARRANTY SUBMITTAL REQUIREMENTS

A. For all material, submit a warranty from the material manufacturer. The manufacturer's warranty period shall be concurrent with the Contractor's for at least one (1) year, unless otherwise specified in other Sections, commencing at the time of substantial completion.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01751  
STARTING AND PLACING EQUIPMENT INTO OPERATION

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Provide material and labor required to perform start-up of each respective item of equipment and system. Start-up shall include: adjustment and balance procedures. Provide information and assistance required, cooperate with test, adjust and balance services.
- B. Comply strictly with specified procedures in starting up mechanical systems.
- C. Provide Factory Service Representative to check equipment and certify to its proper installation prior to start-up and during start-up and testing.
- D. The Engineer and Owner must be notified, in writing, 72 hours prior to any start-up or testing of any equipment.

1.02 RELATED REQUIREMENTS

- A. Each Specification Section as Applicable.

1.03 START-UP PROCEDURES

- A. Bearings:
  - 1. Inspect for cleanliness, clean and remove foreign materials.
  - 2. Verify alignment.
  - 3. Replace defective bearings, and those which run rough or noisy.
  - 4. Grease as necessary, and in accord with manufacturer's recommendations.
- B. Drives:
  - 1. Adjust tension in V-belt drives, and adjust varipitch sheaves and drives for proper equipment speed.
  - 2. Adjust drives for alignment of sheaves and V-belts.
  - 3. Clean, remove foreign materials before starting operation.

C. Motors:

1. Check each motor for amperage comparison to nameplate value.
2. Correct conditions which produce excessive current flow, and which exist due to equipment malfunction.

D. Pumps:

1. Check mechanical seals for cleanliness and adjustment before running pump.
2. Inspect shaft sleeves for scoring.
3. Inspect mechanical faces, chambers, and seal rings, replace if defective.
4. Verify that piping system is free of dirt and scale before circulating liquid through the pump.
5. Verify correct pump rotation.

E. Control Valves:

1. Inspect both hand and automatic control valves, clean bonnets and stems.
2. Tighten packing glands to assure no leakage, but permit valve stems to operate without galling.
3. Replace packing in valves to retain maximum adjustment after system is judged complete.
4. Replace packing on any valve which continues to leak.
5. Remove and repair bonnets which leak.
6. Coat packing gland threads and valve stems with a surface preparation of "Moly-Cote", "Fel-Pro", or equal after cleaning.
7. Verify that control valve seats are free from foreign material, and are properly positioned for intended service.

F. Tighten flanges after system has been placed in operation. Replace flange gaskets which show any sign of leakage after tightening.

G. Inspect screwed joints for leakage.

1. Promptly remake each joint which appears to be faulty, do not wait for rust to form.
  2. Clean threads on both parts, apply compound and remake joints.
- H. After systems has been placed in operation, clean strainers, dirt pockets, orifices, valve seats and headers in fluid systems, to assure being free of foreign materials.
- I. Open air vents, remove operation elements. Clean thoroughly, replace internal parts and put back into operation.
- J. Set and calibrate draft gauges of air filters and other equipment.
- K. Inspect fan wheels for clearance and balance. Provide factory-authorized personnel for adjustment when needed.
- L. Check each electrical control circuit to assure that operation complies with specifications and requirements to provide desired performance.
- M. Inspect each pressure gauge and thermometer for calibration. Replace items which are defaced, broken, or which read incorrectly.
- N. Repair damaged insulation.
- O. Vent gases trapped in any part of systems. Verify that liquids are drained from all parts of gas or air systems.
- P. Check piping for leaks at every joint, and at every screwed, flanged, or welded connection, using "Leak-Tek" or other approved compound.

## PART 2 - PRODUCTS (NOT USED)

## PART 3 - EXECUTION

### 3.01 START UP PLAN

- A. The plan shall include but not necessarily be limited to:
1. Procedures for inspection of systems, equipment, instrumentation and controls to be carried out prior to their being energized;
  2. Submit a start-up plan for each individual piece of equipment and each system to the Engineer for approval.

3. Schedule for on-site inspections, supervision of installation and start-up by manufacturer's personnel.
4. List of equipment and controls for which a manufacturer's certificate of proper installation shall be submitted prior to energizing.
5. Sequence of start-up of each system.

END OF SECTION

SECTION 01780  
OPERATIONS AND MAINTENANCE MANUALS

PART 1        GENERAL

1.01   SCOPE OF WORK

The Contractor shall do the following:

- A.    Compile product data and related information appropriate for the Owner's maintenance and operation of products furnished under the Contract.
  - 1.    Prepare operating and maintenance data as specified in this Section and as referenced in other pertinent sections of the Specifications. The data presented in the O&M Manuals shall be specifically related to this Contract and application.
  - 2.    Incorporate maintenance and operation data furnished by the Owner, if any.
- B.    Furnish all labor, equipment, materials, and all other items to supply and deliver to the Engineer O&M Manuals for the Work in accordance with the requirements of this Section.
- C.    Provide O&M Manuals for all equipment, including instrumentation, electrical, and process control system equipment and software for the entire Facility.

1.02   RELATED WORK

- A.    Section 01005: General Requirements.
- B.    Section 01720: Project Record Documents.

1.03   SUBMITTALS

The Contractor shall submit shop drawings in accordance with Section 01300, Shop Drawings, Submittals and Samples:

- A.    Manuals which, in general, shall have two levels: a facilities-wide systems level and an individual-component level.

1. The facilities-wide systems level shall do the following:
  - a. Describe the facilities-wide systems, including diagrams.
  - b. Explain start-up, shutdown, normal operations, and malfunctions of the facilities-wide systems.
  - c. Tabulate a lubrication schedule for the facilities-wide systems.
  - d. Describe preventive maintenance checking procedures for the facilities-wide systems.
  - e. Include a cross-reference to all individual component manuals.
  
2. The individual-component level shall contain the following:
  - a. Storage requirements.
  - b. Installation instructions.
  - c. Alignment instructions and tolerances.
  - d. Operating instructions.
  - e. Troubleshooting instructions.
  - f. Lubrication requirements.
  - g. Maintenance instructions.
  - h. Parts list.
  - i. Recommended spare parts list and how to obtain same.

B. Format:

1. Size: 8 1/2 x 11 inch (21.59 x 27.94 cm).
2. White paper: 20-lb (9.072 kg) minimum.
3. Text: Manufacturer's printed data or neatly word-processed.
4. Drawings:
  - a. Provide reinforced, punched binder tab, bind in with text.
  - b. Reduce larger drawings and fold to size of text pages but not larger than 11 x 17 inch (27.94 x 43.18 cm).



- c. Place all drawings at the end of each Section and drawing shall be printed on one side only.
5. Provide a blank page for each separate product or each piece of operation equipment.
  - a. Provide a word-processed description of the product and major component parts of equipment.
  - b. Provide indexed tabs.
6. Cover: Identify each volume with typed or printed title, "OPERATION AND MAINTENANCE INSTRUCTIONS," listing the following:
  - a. Title of Project.
  - b. Identity of separate structure as applicable.
  - c. Identity of general subject matter covered in the manual.

C. Media

1. Original word-processed CD shall be delivered to the Engineer.
2. All word processing must be done using the latest version of Microsoft Word or as directed by the Engineer.
3. All drawings except control system configuration drawings must be submitted on CD using AutoCAD.

D. Binders

1. Filled to not more than 75-percent capacity.
2. When multiple binders are used, arrange the data into related consistent groupings.

E. The Contractor shall submit the following:

1. Equipment Manuals. Five copies of the O&M Instruction Manual for each piece of equipment shall be submitted to the Engineer with delivery of the equipment. O&M manuals will not include the manufacturer's test results and Record specifications.

2. Systems O&M Manuals. Five copies of the systems O&M Manuals, bound and indexed and submitted to the Engineer no later than 60 days before the Facility's Phase I start-up. Systems O&M Manuals will be complete except for field results and refinements added as result of demonstrations.
  3. Final O&M Manuals. Five copies of the Final Equipment and Systems O&M Manuals, bound and indexed and submitted to the Engineer before the Substantial Completion under this Contract.
  4. The cost of these Manuals submitted shall be included in the total Contract Price. Copies supplied under Item "2" will not be included under Item "3".
- F. Any modifications required after final O&M submission shall be made to the manuals by issuance of addenda in the form of change pages to the manual. The addenda will identify where the new data are to be inserted, what data are to be removed, and new index sheets as necessary and list of shop drawings and submittals.

#### 1.04 WORK SEQUENCE (NOT USED)

#### 1.05 REFERENCE STANDARDS

- A. Florida Administrative Code, 62-555.350, "Operation and Maintenance of Public Water Systems."

#### 1.06 QUALITY ASSURANCE

- A. Data shall be prepared by personnel:
  1. Trained and experienced in maintaining and operating the described products.
  2. Familiar with requirements of this Section.
  3. Skilled as a technical writer to the extent required to communicate essential data.
  4. Skilled as a draftsman competent to prepare required drawings.

#### 1.07 WARRANTIES (NOT USED)

1.08 DELIVERY, STORAGE, AND HANDLING (NOT USED)

1.09 QUALIFICATIONS (NOT USED)

1.10 CONTENTS, EACH VOLUME

- A. Neatly word-processed table of contents for each volume, arranged in systematic order, to include the following:
1. Contractor, name of responsible principal, address, fax number, and telephone number.
  2. A list of each product required to be included, indexed to content of the volume.
  3. A list with each product, name, address, fax number, and telephone number of the following:
    - a. Subcontractor or installer.
    - b. A list of each product to be included, indexed to content of the volume.
    - c. Identify area of responsibility of each subcontractor or installer, if more than one.
    - d. Local source of supply for parts and replacement.
    - e. Manufacturer.
  4. Identify each product by product name and other identifying symbols as set forth in the Contract Documents.
- B. Product Data
1. Include only those sheets that are pertinent to the specific product.
  2. Annotate each sheet to achieve the following:
    - a. Clearly identify the specific product or part installed.
    - b. Clearly identify data applicable information.
    - c. Delete references to inapplicable information.

C. Drawings

1. Supplement product data with drawings as necessary to illustrate the following clearly:
  - a. Relations of component parts of equipment and systems.
  - b. Control and flow diagrams.
  - c. Owner Tag Numbers.
2. Coordinate drawings with information in Record Documents to ensure correct illustration of completed installation.
3. Do not use Record Documents as maintenance drawings.

D. Written text as required to supplement product data for the particular installation:

1. Organize in consistent format under separate headings for different procedures.
2. Provide a logical sequence of instructions for each procedure.
3. Describe how the complete system is to operate.

E. Copy of pertinent information related to warranty, bond, and service Contract issued.

1. Provide information sheet for Owner's personnel with the following information:
  - a. Proper procedures in event of failure.
  - b. Instances that might affect the validity of warranties or bonds.

F. Training manuals used in training courses will become part of this Manual.

## 1.11 MANUAL FOR MATERIALS AND FINISHES

A. Content, for architectural products, applied materials, and finishes:

1. Manufacturer's data, giving full information on products.

- a. Catalog number, size, composition.
  - b. Color and texture designations.
  - c. Information required for re-ordering special-manufactured products.
2. Instructions for care and maintenance.
    - a. Manufacturer's recommendation for types of cleaning agents and methods.
    - b. Cautions against cleaning agents and methods that are detrimental to product.
    - c. Recommended schedule for cleaning and maintenance.
- B. Content, for moisture-protected and weather-exposed products:
1. Manufacturer's data, giving full information on products.
    - a. Applicable standards.
    - b. Chemical composition.
    - c. Details of installation.
  2. Instructions for inspection, maintenance, and repair.
- C. Additional requirements for maintenance data as required by other Sections of the Specifications.

## 1.12 MANUAL FOR EQUIPMENT AND SYSTEMS

- A. Content, for each electrical, mechanical, instrumentation, and communication system, as appropriate:
1. A table identifying each piece of equipment, each associated control or instrument, the location of the control or instrument, and the function of the control or instrument.
  2. A description of the system and its component parts.

- a. Function, normal operating characteristics, and limiting conditions for the system, the sub-system, and the component parts.
  - b. Performance curves, engineering data, and tests.
  - c. Complete nomenclature and commercial numbers of replaceable parts.
3. Circuit directories of panel boards.
  - a. Electrical service.
  - b. Controls.
  - c. Communications.
4. As-installed color-coded wiring diagrams.
5. Instrument loop diagrams showing the path that a control or instrumentation signal takes from its origin to the action it takes.
  - a. An electrical schematic for each item.
  - b. A chart listing the controls/instruments in a loop identifying the equipment's abbreviated symbol, a description of the symbol, design criteria, process flow, quantity supplied, and manufacturer's model and serial number.
6. Operating procedures.
  - a. Routine and normal operating instructions.
  - b. Sequences required.
  - c. Special operating instructions.
7. Maintenance procedures.
  - a. Routine operations.
  - b. Guide to "trouble-shooting."

- c. Disassembly, repair, and re-assembly.
    - d. Alignment, adjustment, and checking.
  - 8. The manufacturer's printed operating and maintenance instructions.
  - 9. A list of the original manufacturer's spare parts, manufacturer's current prices, and recommended quantities to be maintained in storage.
  - 10. Other data as required under pertinent sections of the Specifications.
  - 11. Abnormal and emergency operations.
    - a. Potential overloads.
    - b. Procedures for equipment breakdown.
    - c. Action to be taken in a power outage.
    - d. Identity of alarms by equipment location and action to correct.
    - e. Equipment safety features, requirements, and potential hazards.
  - 12. Programming manuals for programmable devices including list of standard programming.
- B. Content, for each unit of equipment and system, as appropriate:
  - 1. Description of unit and component parts.
    - a. Function, normal operating characteristics, and limiting conditions.
    - b. Performance curves, engineering data, and tests.
    - c. Complete nomenclature and commercial number of replaceable parts.

- d. Model number and name plate data for each piece of equipment.
  - e. Assembly drawings.
  - f. List of all special tools required to service equipment and/or systems including where the tools are stored.
2. Operating procedures.
- a. Start-up, break-in, routine, and normal operating instructions.
  - b. Regulation, control, stopping, shut-down, and emergency instructions.
  - c. Summer and winter operating instructions.
  - d. Special operating instructions.
  - e. Control settings and ranges.
3. Maintenance Procedures.
- a. Type and frequency of preventive maintenance activities required for each piece of equipment.
  - b. Guide to "trouble-shooting."
  - c. Disassembly, repair, and re-assembly.
  - d. Alignment, adjusting, and checking.
4. Servicing and lubrication schedule.
- a. List of lubricants required.
  - b. Period between lubrications.
5. Manufacturer's printed operating and maintenance instructions.  
(This is not to be a generalized catalog of the entire product line.)
6. Description of sequence of operation.



7. The original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
    - a. Predicted life of parts subject to wear.
    - b. Items recommended to be stocked as spare parts.
  8. As-installed control diagrams.
  9. Each Contractor's coordination drawings.
  10. List of the original manufacturer's spare parts, manufacturer's current prices, and recommended quantities to be maintained in storage.
  11. Other data as required under pertinent sections of the Specifications.
  12. Charts of equipment, instrument, and valve tag numbers with location and function.
    - a. Reference drawing which shows equipment, instrument, or valve location.
    - b. Manufacturer's model and serial number.
    - c. Valve actuator type (manual, hydraulic, electric, or pneumatic).
  13. Local services (process water and air, drains, HVAC, natural gas and steam).
- C. The Contractor shall prepare and include additional data when the need for such data becomes apparent during instruction of the Owner's personnel.
- D. Additional Requirements for O&M Data required by Sections of Specifications.

## PART 2 PRODUCTS

### 2.01 O&M MANUALS

- A. Binders: The manuals shall be supplied in binders that are the same as those provided in Paragraph 1.03 D. above.
- B. Electronic Version: Word-processed portions of the manuals shall also be provided on CD or DVD. The electronic version manuals must be capable of being read, edited, and printed with Microsoft Word or that which is congruent file format with word processing in Document Control at the time of the transmittal of documents. The format will be provided to the Contractor upon request. All drawings shall be generated using personal computer and plotter with the software package program from AutoCAD.

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01800  
SEQUENCE OF CONSTRUCTION

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. The existing facility will be maintained in continuous operation by the Owner at all times during the entire construction period. The Contractor shall schedule and conduct his work such that it will not impede any treatment process, create potential hazards to operating equipment and/or personnel, reduce the quality of the plant effluent, or cause odor or other nuisance.
- B. The Contractor shall schedule his operations to conform to the requirements specified in this Section and shall include in his construction schedule all events which will impact operation of the existing treatment facilities.
- C. The Owner will continue to operate the treatment facilities during the construction period. The Contractor shall fully cooperate with the Owner, coordinate the construction schedule with the Owner and Engineer, and provide the necessary labor, equipment, and materials to prevent interruption to flow and treatment. The Owner and Engineer reserve the right to modify or expand the schedule during construction to meet prevailing conditions.
- D. The Contractor shall not make any alterations to affect operation of the treatment facility without giving two weeks prior written notice to the Owner and Engineer requesting authorization to proceed. Except as noted herein, the Owner will perform all operation of existing valves or equipment.
- E. Operation of valves or equipment by the Owner may be limited on specific occasions because of process limitations or unavailability of personnel. Delays caused by such limitations shall be expected and shall not be the basis for claim of extra costs by the Contractor.
- F. The work specified in this Section shall be accomplished at such times that will be convenient to the Owner. Overtime work by the Contractor to conform to these requirements shall be considered as normal procedure

under this Contract, and the Contractor shall make no claim for extra compensation as a result of this overtime work.

- G. The Contractor shall submit to the Engineer a detailed sequence of construction to complete the work while maintaining plant operation. Any deviations in the Contractor's proposed sequence of construction shall be identified by the Contractor and approved by the Engineer and Owner prior to conducting the work.
- H. The Contractor shall furnish all temporary materials and equipment that may be required to complete the work of this Contract.

## 1.02 RELATED WORK

- A. Section 01300: Shop Drawings, Submittals and Samples.
- B. Section 01310: Construction Schedules

## 1.03 SUBMITTALS

The Contractor shall submit shop drawings in accordance with Section 01300, Shop Drawings, Submittals and Samples.

- A. Submit a complete description of procedures to maintain plant operation to supplement the construction schedule developed. The description shall include step-by-step procedures, required duration, and specific procedures required to be performed by the Owner's personnel.
- B. Submit complete plans of temporary systems required as part of this contract to maintain plant operations. The plans shall clearly delineate the intended location of these items and the Contractor's proposed method for phasing from existing to temporary to completed facilities.

## 1.04 WORK SEQUENCE (NOT USED)

## 1.05 REFERENCE STANDARDS (NOT USED)

## 1.06 QUALITY ASSURANCE (NOT USED)

## 1.07 WARRANTIES (NOT USED)

## 1.08 DELIVERY, STORAGE, AND HANDLING (NOT USED)

## 1.09 QUALIFICATIONS (NOT USED)

## 1.10 REGULAR WORK HOURS

- A. The Contractor shall conduct work between 7:00 a.m. and 7:00 p.m. Monday through Friday, which is defined as regular work hours. The Contractor shall not conduct work on Saturdays, Sundays, legal holidays, or holidays observed by the Owner. Work conducted outside of the regular work hours shall be permitted with the written permission of the Owner. However, emergency work during these hours may be done without prior permission.

## 1.11 MAINTAIN OPERATIONS

- A. It is required that the degree of treatment during construction be equal to or exceed the degree of treatment required for effluent limits listed in the FDEP Wastewater Facilities Construction Permit. Bypassing of unit treatment operations or reduced levels of treatment will not be permitted.
- B. The Contractor shall be fully responsible for providing all temporary pumping, piping and yard piping, fuels, lubricants, chemicals, plumbing, electrical hook-ups and power, heating, ventilating, air conditioning, lighting, temporary structures, or whatever is required to maintain wastewater treatment operations. All details of temporary piping and temporary construction are not shown in the Drawings or covered in the Specifications. However, this does not relieve the Contractor of the responsibility to maintain provisions for the Owner to provide sewage treatment.

## 1.12 COORDINATION

- A. The Contractor shall cooperate in the coordination of his activities in a manner that will provide the least interference with the Owner's operations and other contractors and utility companies working in the area, and in the interfacing and connection of the separate elements of the overall project work.
- B. If any difficulty or dispute should arise in the coordination of activities, the problem shall be brought immediately to the attention of the Engineer.
- C. All Contractors and subcontractors working on this site are subject to this requirement for cooperation, and all shall abide by the Engineer's decision.

in resolving project coordination problems without additional cost to the Owner.

- D. The FDEP and/or the Owner may require modifications or alterations to the sequence of construction specified herein below. The Contractor shall cooperate with the Owner and regulatory agencies to the maximum extent possible.

### 1.13 SHUTDOWN AND TIE-INS OF EXISTING OPERATIONS OR UTILITIES

- A. Continuous operation of the Owner's existing plant, and each treatment facility that comprises it, the collection system, and each treatment facility that comprises it is of critical importance.
- B. Whenever the Contractor must add to or modify an existing facility, he is responsible to schedule the work with the Engineer at least 30 days prior to initiation of the work. Work shall not proceed without written approval from the Owner. The Contractor shall isolate facilities with existing operable valves, gates, or temporary plugs or line stops; drain and hose clean the tanks. Initial and additional draining and cleaning shall be scheduled at least 10 calendar days prior to initiation of the work.
- C. Connections to existing services or utilities or other work that requires the temporary shutdown of any existing operations or utilities shall be planned in detail with appropriate scheduling of the work and coordinated with the Owner and Engineer. The approved schedule for shutdown or restart shall be indicated on the Contractor's Progress Schedule, and 5-day advance notice shall be given in order that the Owner and Engineer may witness the shutdown, tie-in, and startup. Communication connections to existing septage station and the laboratory/administration building are used for monitoring and billing purposes. All work associated with replacement of the fiber optic cable, security cameras, control & operation of the station shall be planned in detail with appropriate scheduling of the work and coordinated with the Owner and Engineer. The approved schedule for shutdown or restart shall not be more than 48 hours. A 5-day advance notice shall be given to the Owner and Engineer prior to any shutdowns, tie-ins, or startup of the new connections.
- D. All materials and equipment (including emergency equipment) necessary to expedite the tie-in shall be on hand prior to the shutdown of existing services or utilities.

- E. It may be necessary to do certain parts of the construction work outside normal working hours in order to avoid undesirable conditions. The Contractor shall do this work at such times and at no additional cost to the Owner. Do not make connections between existing work and new work until necessary inspections, reviews, and tests, as required, have been completed on the new work and it is found to conform in all respects to the requirements of the Contract Documents.
- F. Piping equipment removals and modifications, or electrical tie-ins requiring shutdown of flow to the plant shall be limited to 1:00 a.m. to 5:00 a.m. (4 hours) as approved by the Engineer and Owner.
- G. All piping shown to cross existing roads in the same area shall be laid one time so that disruptions to plant access is minimized.
- H. Interconnecting piping, utilities, and structures that are required to incorporate existing treatment systems, structures, or facilities with new treatment systems, structures, or facilities shall be performed at one time so that disruptions to wastewater treatment operations is minimized.

#### 1.14 PROGRESS OF THE WORK

- A. The work shall be started within the time period stated in the Bid Form, and the work shall be executed to prevent any delay to the general completion of the project.
- B. The work shall be executed at such times and in or on such parts of the project, and with such forces, materials, and equipment to assure completion of the work in the time established by the Contract.
- C. If the Contractor for his convenience and at his own expense should desire to carry on his work outside the regular hours described in Paragraph 1.10 Regular Work Hours, he shall submit written notice to the Engineer and shall allow ample time for satisfactory arrangements to be made for observing the work in progress. The Contractor shall pay the expenses for extra work observation required of the Engineer for the work outside regular work hours. The Contractor shall provide sufficient work lighting and any other necessary safety precautions for the different parts of the project as required to comply with all applicable federal and state regulations and with the approval of the Owner.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION



SECTION 02100  
SITE PREPARATION

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. This section covers clearing, grubbing, and stripping along the construction site, complete as specified herein.
- B. The Contractor shall clear and grub all of the area within the limits of construction or as required, which includes but is not limited to utility easements. The width of the area to be cleared shall be approved by the Owner or Engineer prior to the beginning of any clearing.
- C. The Contractor's attention is directed to any Soil Erosion and Sediment Control Ordinances in force by the County and Florida Department of Transportation. The Contractor shall comply with all applicable sections of these ordinances.
- D. A preconstruction topographic survey shall be submitted to the Owner for review prior to construction.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 CLEARING

- A. The surface of the ground, for the area to be cleared and grubbed shall be completely cleared of all timber, marked trees, brush, stumps, roots, grass, weeds, rubbish, and all other objectionable obstructions resting on or protruding through the surface of the ground. However, those trees which are designated by the Owner or Engineer shall be preserved as hereinafter specified. Clearing operations shall be conducted so as to prevent damage to existing structures and installations, and to those under construction, so as to provide for the safety of employees and others.

3.02 GRUBBING

- A. Grubbing shall consist of the complete removal of all stumps, roots larger than 1½ inches in diameter, matted roots, brush, timber, logs, and any other organic or metallic debris not suitable for foundation purposes, resting on, under or protruding through the surface of the ground to a

depth of 18 inches below the subgrade. All depressions excavated below the original ground surface for or by the removal of such objects, shall be refilled with suitable materials and compacted to a density conforming to the surrounding ground surface.

### 3.03 STRIPPING

- A. In areas so designated, topsoil shall be stockpiled. Topsoil so stockpiled shall be protected until it is placed as specified. Any topsoil remaining after all work is in place shall be disposed of by the Contractor.

### 3.04 DISPOSAL OF CLEARED AND GRUBBED MATERIAL

- A. The Contractor shall dispose of all material and debris from the clearing and grubbing operation by hauling such material and debris away to an approved disposal facility. Disposal by burning and burial will not be permitted. The cost of disposal (including hauling) of cleared and grubbed material and debris shall be considered a subsidiary obligation of the Contractor; the cost of which shall be included in the contract price.
- B. If the land owner desires the timber or small trees, the Contractor shall cut and neatly pile it in 4 ft lengths for removal by the land owner; otherwise, the Contractor shall dispose of it by hauling it away from the project site.

### 3.05 PRESERVATION OF PUBLIC PROPERTY

- A. The appropriate paragraphs of Articles 3.05, 3.06, and 3.07 of these Specifications shall apply to the preservation and restoration of public lands, parks, rights-of-way, easements, and all other damaged areas.

### 3.06 EXCAVATED MATERIALS UNSUITABLE FOR CONVENTIONAL DISPOSAL

- A. It will be the CONTRACTORS responsibility to properly dispose of materials unsuitable for conventional disposal offsite. The cost of disposal shall be included in the base bid.

END OF SECTION

SECTION 02201  
EARTHWORK AND CONCRETE ENGINEERING,  
TESTING & INSPECTION SERVICES

PART 1 - GENERAL

1.00 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplemental Conditions and Division 1 Specification sections, Geotechnical report (Soils report), and Owner specifications/standards apply to work of this section.

1.01 DESCRIPTION

- A. The Earthwork and Concrete Engineering, Testing and Inspection Service shall be contracted directly to the General Contractor.
- B. The extent of Earthwork and Concrete Engineering, Testing and Inspection Service is specified in this Specification section.

1.02 QUALIFICATIONS

- A. Earthwork and Concrete Engineering, Testing and Inspection Services: The Earthwork and Concrete Engineering, Testing and Inspection Services shall meet the requirements of ASTM D3740 Standard Practice for Evaluation of Agencies Engaged in the Testing and/or Inspection of Soil and Rock as used in Engineering Design and Construction. The firm and engineers shall be prequalified by the FDOT, Army Corps of Engineers, AASHTO or other recognized agency, in the appropriate classifications for design and testing services. The firm that provided services during design may provide services to the contractor during construction, if appropriately qualified. The Geotechnical Engineering Services shall be provided by the same firm providing Material Engineering Lab Services described below.

- B. ASTM E329 requires that the Material Engineering Lab (MEL):

Provide personnel who are under the direction of a registered professional engineer (herein after called the Geotechnical engineer) charged with engineering experience in inspection and testing of construction materials.

Provide Laboratory personnel and field technicians having at least 3 years experience performing tests on construction materials.

Shall have its equipment inspected at intervals of not more than 3 years by AASHTO Materials and Reference Laboratory, Cement and Concrete

Reference Laboratory of the National Bureau of Standards, or the American Association for Laboratory Accreditation (AALA).

Provide nondestructive testing, if required, meeting the requirements of ASTM E543 Standard Practice for Determining the Qualifications for Nondestructive Testing Agencies.

C. Developing a Testing Program:

The Geotechnical Engineer shall develop a testing program designed to meet the requirements of the specifications and references and in compliance with National, State and local codes and regulations. This testing program shall be submitted to the owner for review in the same manner as a shop drawing. Once reviewed, the Geotechnical engineer will be responsible for monitoring construction in accordance with the testing program.

The Geotechnical Engineer shall study the plans, soils report and specifications, and become knowledgeable of soil bearing capacity and fill placement requirements.

The Geotechnical Engineer shall verify natural soils subgrade bearing values for footings in accordance with soils report. If the Geotechnical engineer does not agree with the recommendations of the geotechnical engineer, the geotechnical engineer shall submit an alternative method. If the method recommended results in a change in cost or time, the contractor shall accompany the alternative method with a change order.

D. Limitations of Authority: Unless specific exceptions are established by written instructions issued by Owner's Representative:

Do not authorize deviations from the Contract Documents.  
Do not enter into the area of responsibility of the Contractor.  
Do not expedite the Work for the Contractor.

## PART 2 - PRODUCTS

A. Not Applicable

## PART 3 - EXECUTION

### 3.00 General Duties

- A. Contractor shall employ and pay for the services of a Materials Engineering Lab (MEL), including the Geotechnical Engineer, to perform specified Earthwork and Concrete Engineering, Testing & Inspection Services. The cost for the Professional Engineering Services required by this section shall be included in the appropriate unit cost for items requiring testing. Pre-construction services of the MEL shall be

part of the Contractor's Mobilization fee. Ten per cent of the Contractor's mobilization fee will be payable after the testing program is accepted.

- B. The MEL shall cooperate with the Contractor as required to facilitate testing services.
- C. The MEL shall verify that all phases of the project, as specified, shall be tested or inspected in compliance with the Contract Documents. The Contractor is required to schedule and perform all testing.
- D. Employment of the MEL does not relieve the Contractor or his subcontractors of the obligation to perform all work in accordance with the Contract Documents.
- E. The Geotechnical Engineer shall assist the Contractor in understanding the intent of the Contract Documents. The Geotechnical shall review concrete mix designs, asphalt mix designs, base, sub base, stabilized subgrade and all other materials required for earthwork, paving, building foundations, footings etc.
- F. Preconstruction Conference -- The Geotechnical Engineer shall attend the preconstruction conference.
- G. Additional Information: The MEL shall obtain from the Owner additional details or information if, and when, required for proper execution of the Work. The MEL will become thoroughly knowledgeable with standards and specifications.
- H. Contractor's Suggestions: The MEL will review and evaluate suggestions or recommendations which may be submitted by Contractor and forward them with recommendations to the Owner.
- I. Codes, Regulations and Standards: The MEL's testing shall be in accordance with pertinent codes and regulations and with selected standards of the American Society for Testing and Materials (ASTM). Where no testing requirements are described but the Owner determines that testing is required, the Owner may require testing to be performed under current recognized testing procedures.
- J. Construction Schedule: The MEL will be alert to the construction schedule and to conditions which may cause delay in completion, and report same to Engineer and Owner.
- K. Disputes: Should a dispute occur at any time, the MEL will immediately report to Engineer and Owner the nature of the dispute, the parties involved and whether or not it was resolved.
- L. Rejection of Work: If a situation arises during construction which, in the MEL inspector's view, requires the Work to be recommended for rejection, report such situation immediately to the Engineer and Owner.

- M. Testing and Inspection Frequencies: The MEL shall perform all tests in accordance with the testing program . If Full time inspections are required, those cost of those inspections shall be included in the various bid items.
- N. Interpretation: The MEL shall interpret test results for the Engineer and Owner, and will develop a remediation plan for any failed tests.
- O. Additional Tests: The MEL will make additional tests when test results indicate specified characteristics have not been attained, as directed by Owner. Contractor shall pay for such tests conducted, and any other additional testing as may be required, when unacceptable characteristic is verified.

### 3.01 TESTING AND INSPECTION

- A. Types and Frequencies: The minimum testing and inspecting for quality control during Earthwork shall include the following:
- B. Perform one Optimum Moisture - Maximum Density Curve: (Proctor ASTM-D698 or modified proctor ASTM-D 1557) for each type soil encountered or imported.
- C. Footing Subgrade: Geotechnical Engineers shall examine each footing excavation to verify required design bearing capacities. Verification and approval of each footing subgrade may be based on comparison of each subgrade with geotechnical investigation.
- D. Perform Field Density Test: ( Nuclear ASTM-D2922 or Sand Cone ASTM D1556) at frequency per layer of fill or backfill placed in lift depths as specified.

Building Slab Subgrade: Make at least one field density test of subgrade for every 2,500 square feet of paved area or building slab (min. two tests). In each compacted fill layer, make one field density test for every 2,500 square feet of overlying building slab or paved area (minimum two tests).

Foundation Wall Backfill: Take at least one (1) field density test per lift on each side of each 50 lineal ft. of backfilled wall (min. two tests per wall).

- E. For fill under pavements buildings and other areas of site which will require solid support of the soil: Perform Coarse and Fine Sieve Analysis for material finer than #200 sieve. Wash material through a #200 sieve. Frequency shall be sufficient to detect changes in borrow material and excavated material. Material not meeting specifications shall not be used.
- F. Perform Atterberg Limit Test as required.
- G. Perform tests and inspections of bituminous materials meeting ASTM D3666

Standard Practice for Evaluation of Inspection and Testing Agencies for Bituminous Paving Materials as required.

- H. Concrete Slump: ASTM C 143; one test for each set of compressive strength test specimens.
- I. Concrete Air Content: (Only required where freeze-thaw will affect the concrete) ASTM C 231; one test for each set of compressive strength test specimens.
- J. Concrete Compression Test Specimen: ASTM C 31; one set of 4 standard cylinders for each compressive strength test; unless otherwise directed.
- K. Concrete Compressive Strength Tests: ASTM C 39; one set for each 50 cu. yds. or fraction thereof, of each concrete class placed in any one day or for each 5,000 sq. ft. of surface area placed; one specimen tested at 7 days, 2 specimens tested at 28 days, and one specimen retained in reserve for later testing if required.
- L. Concrete Quantity: When total quantity of a given class of concrete is less than 50 cu. yds., strength test may be waived by Engineer if, in his judgment, adequate evidence of satisfactory strength is provided.
- M. Procedure:
  - 1. The MEL will review the plans and project specifications of Section 03300 to determine strength requirements, and all special requirements for transporting, placing and finishing as well as water-cement ratio, slump, entrained air content, types and proportion of aggregates and cement.
  - 2. The MEL will review the Contractor's proposed Portland Cement concrete mix designs previously approved by the Engineer of Record for each class of concrete required by the project specifications.
  - 3. Sample concrete and prepare test cylinders (beams when required) in accordance with procedures specified.
  - 4. Sample concrete to verify proper slump and air entrainment.
  - 5. Cast, transport, store and cure cylinders (and beams) as required.
  - 6. Test concrete cylinder for compressive strength at specified date.
  - 7. Test concrete beam for flexural characteristics as required.
  - 8. While on the job for testing purposes, observe placement procedures

for; segregation, workability, consistency, uniformity, cold joints, displacement of reinforcing or forms, and proper support of embedded items or anchor bolts. Report problems noted to Owner's Representative and Engineer.

N. Soil Test Reports:

1. Test results shall be reported in writing on same day that tests are made.
2. The MEL shall promptly process and distribute all required copies of test reports and related instructions to insure all necessary testing, retesting or replacement of materials are performed with the least possible delay to progress of the work. Submit copies of each report to the following:
  - a. Engineer (one copy)
  - b. Owner's Representative (two copies)
  - c. Contractor (a minimum of two copies, with one copy to be maintained on site)
3. The reports shall include:
  - a. Date issued
  - b. Project title and number
  - c. Materials Engineering Laboratory, name, address and telephone number
  - d. Name of laboratory inspector
  - e. Location of sample or test on the project
  - f. Type of inspection or test
  - g. Date and time of sampling and/or inspection
  - h. Record of temperature and weather conditions
  - i. Date of tests
  - j. Results of tests and compliance with Contract Documents
  - k. Notification of Geotechnical Engineer if the test does not comply

O. Concrete Test Reports:

1. Failing Test results shall be reported in writing within 24 hours from the day that tests are made.
2. The MEL shall promptly process and distribute all required copies of test reports and related instructions to insure all necessary testing, retesting or replacement of materials are performed with the least possible delay to progress of the work. Submit copies of each report to the following:



- a. Engineer (one copy)
- b. Owner's Project Manager (two copies)
- c. Contractor (a minimum of two copies, with one copy to be maintained on site)

3. The reports shall include:

- a. Date issued
- b. Project title and number
- c. Materials Engineering Laboratory, name, address and telephone number
- d. Name of laboratory inspector
- e. Location of sample or test on the project
- f. Type of inspection or test
- g. Date and time of sampling and/or inspection
- h. Record of temperature and weather conditions
- i. Date of tests
- j. Location of concrete batch in structure
- k. Concrete type and class
- l. Concrete mix proportions and materials
- m. Design compressive strength at 28 days
- n. Compressive breaking strength and type of break for both 7-day tests and 28-day tests
- o. Results of tests and compliance with the Contract Documents.

3.02 DRILLED PIERS (If Applicable)

- A. Geotechnical Engineer shall:
- B. Review plans and project specifications to determine soil bearing values, concrete material specifications, elevations at bottom and top, tolerances, and placement methods.
- C. Provide full time inspector during placement operations.
- D. Obtain all specified concrete test cylinders and perform other related concrete test as outlined in project specifications and as noted.
- E. Verify total linear footage of each pier by pier size, variation of shaft from plumb, rebar placement, bearing strata, water seepage and dewatering control. Include a recap of total pier footage by pier size with each report.
- F. Verify bottom of shaft has been placed in suitable soils consistent with the drilled shaft design.

END OF SECTION

SECTION 02220  
STRUCTURAL EXCAVATION, BACKFILL & COMPACTION

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. This Section includes, except as elsewhere provided, excavation, filling, compaction and grading under and around cast in place structures, precast structures, and concrete channel lining to the subgrades and grades indicated on the Drawings.
- B. Supplemental Foundation and Site Preparation Notes may be indicated on the Structural Drawings.
- C. The Engineer and/or Owner shall have no responsibility or authority over the construction contractor's means, methods or techniques of construction, nor for construction site safety or safety programs incident to the construction contractor's work.

1.02 RELATED WORK

- A. Certificate of Compliance with the Florida Trench Safety Act.
- B. Site Preparation is included in Section 02100.

1.03 QUALITY ASSURANCE

- A. Codes and Standards:
  - 1. Perform excavation work in compliance with applicable requirements of governing authorities having jurisdiction.
- B. Testing and Inspection Service:
  - 1. The Owner will engage soil testing and inspection service for quality control testing during earthwork operations.
- C. All excavation, trenching, and related sheeting, bracing etc. shall conform to the requirements of the Florida Trench Safety Act (C5/5B 2626) which incorporates by reference, OSHA's excavation safety standards, (29 CFR 1926.650 Subpart P).

1.04 JOB CONDITIONS

- A. The Contractor shall examine the site and review the available test

borings or undertake his own soil borings prior to submitting his bid, taking into consideration all conditions that may affect his work. The Owner and Engineer will not assume responsibility for variations of subsoil quality or conditions at locations other than places shown and at the time the investigation was made. Boring log data is available for examination at the office of the Engineer.

- B. Existing Utilities: Locate existing underground utilities in the areas of work. If utilities are to remain in place, provide adequate means of protection during earthwork operations.
1. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult the Engineer and the owner of such piping or utility immediately for directions.
  2. Cooperate with owner and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.
  3. Demolish and completely remove from site existing underground utilities indicated on the Drawings to be removed.
- C. Protection of Persons and Property: Barricade open excavations occurring as part of this work and post with warning lights. Operate warning lights as recommended by authorities having jurisdiction.
1. Protect structures, utilities, sidewalks, curbs, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations.
  2. Provide barricades with warning lights and temporary safety or angle fencing around any open excavations exposed overnight.

## 1.05 PROTECTION

### A. Sheeting and Bracing in Excavations:

1. In connection with the construction of below grade structures, the Contractor shall construct, brace, and maintain cofferdams consisting of sheeting and bracing as required to support the sides of excavations, to prevent any movement which could in any way diminish the width of the excavation below that necessary for proper construction, and to protect adjacent structures, existing yard piping and/or foundation material from disturbance, undermining, or other damage. Care shall be taken to prevent voids outside of the sheeting, but if voids are formed they shall be immediately filled and rammed.

2. All sheeting and bracing not left in place shall be carefully removed in such a manner as not to endanger the construction or other structures, utilities, existing piping, or property. Unless otherwise approved or indicated on the Drawings or in the Specifications, all sheeting and bracing shall be removed after completion of the substructure, care being taken not to disturb or otherwise injure the finished masonry. All voids left or caused by withdrawal of sheeting shall be immediately refilled with sand by ramming with tools especially adapted to that purpose, by watering or otherwise as may be directed.
3. The right of the Engineer to order sheeting and bracing left in place shall not be construed as creating any obligation on his part to issue such orders, and his failure to exercise his right to do so shall not relieve the Contractor from liability for damages to persons or property occurring from or upon the Work occasioned by negligence or otherwise, growing out of a failure on the part of the Contractor to leave in place sufficient sheeting and bracing to prevent any caving or moving of the ground. Sheeting left in place shall be shown on the Contractor's as-built (record) drawings.
4. The Contractor shall construct the cofferdams and sheeting outside the neat lines of the foundation unless indicated otherwise. Sheeting shall be plumb and securely braced and tied in position. Sheeting, bracing, and cofferdams shall be adequate to withstand all pressures to which the structure will be subjected. Pumping, bracing, and other work within the cofferdam shall be done in a manner to avoid disturbing any construction of the masonry enclosed. Any movement or bulging which may occur shall be corrected by the Contractor at his own expense so as to provide the necessary clearances and dimensions.
5. Drawings of the cofferdams and design computations shall be submitted to the Engineer for review, and construction shall not be started until such drawings are reviewed. However, review of these drawings shall not relieve the Contractor of the responsibility for the cofferdam. The drawings and computations shall be prepared and stamped by a Registered Professional Engineer in the State of Florida and shall be in sufficient detail to disclose the method of operation for each of the various stages of construction, if required, for the completion of the substructures.

**B. Dewatering, Drainage and Flotation:**

1. Construct and place all concrete work, structural fill, bedding rock, and limerock base course in-the-dry. In addition, make the final 24 inches of excavation for this work in-the-dry, and not until the water level is a minimum of 12 inches below proposed bottom of excavation.
2. At all times during construction, provide and maintain proper equipment and facilities to remove promptly, and dispose of properly,

all water entering excavations and keep such excavations dry so as to obtain a satisfactory undisturbed subgrade foundation condition until the fill and structure to be built thereon have been completed to such extent that they will not be floated or otherwise damaged by allowing water levels to return to natural elevations.

3. Dewatering shall at all times be conducted in such a manner as to preserve the natural undisturbed bearing capacity of the subgrade soils at proposed bottom of excavation.
4. Wellpoints may be required for predrainage of the soils prior to final excavation for some of the deeper in-ground structures, and for maintaining the lowered groundwater level until construction has been completed to such an extent that the structure or fill will not be floated or otherwise damaged. Wellpoints shall be surrounded by suitable filter sand and no fines shall be removed by pumping. Pumping from wellpoints shall be continuous and standby pumps shall be provided.
5. The Contractor shall furnish all materials and equipment and perform all work required to install and maintain the drainage systems he proposes for handling groundwater and surface water encountered during construction of structures and compacted fills.
6. If requested by the Engineer, the Contractor's proposed method of dewatering shall include a minimum of two operating groundwater observation wells at each structure to be used to determine the water level during construction of the structure. Locations of the observation wells shall be at structures as approved by the Engineer prior to their installation. The observation wells shall be extended to 6 inches above finished grade, capped with screw-on caps protected by 24" x 24" wide concrete base, and left in place at the completion of this Project.
7. Continuous pumping will be required as long as water levels are required to be below natural levels.
8. Contractor shall secure and pay for all permits required for site dewatering.
9. Fill well point holes from bottom to top immediately upon abandonment with FDOT No. 89 gradation stone or flowable fill meeting requirements of FDOT specification Section 145.

## 1.06 SUBMITTALS

- A. Furnish the Engineer, for approval, a representative sample of fill material obtained from onsite sources weighing approximately 50 pounds, at least ten (10) calendar days prior to the date of anticipated use of such material.
- B. For each material obtained from other than onsite sources, notify the Engineer of the source of the material and shall furnish the Engineer, for

approval, a representative sample weighing approximately 50 pounds, at least ten (10) calendar days prior to the date of anticipated use of such material.

## PART 2 - PRODUCTS

### 2.01 MATERIALS

#### A. General:

1. Materials for use as base, fill and backfill shall be as described below.
  - a. Satisfactory soil materials are defined as those complying with American Association of State Highway and Transportation Officials (AASHTO) M- 145, soil classification Groups A-1, A-2-4, A-2-5 and A-3.
  - b. Unsatisfactory soil materials are those defined in AASHTO M- 145 soil classification Groups A-2-6, A-2-7, A-4, A-5, A-6, and A-7 along with peat and other highly organic soils.
2. Materials shall be furnished as required from off site sources and hauled to the site.

#### B. Structural Fill:

1. Structural fill material shall be satisfactory soil material consisting of a minimum of 95 percent clean medium to fine grain sized quartz sand, free of organic, deleterious and/or compressible material. Rock in excess of 2-1/2 inches in diameter shall not be used in the fill material. Amount of material passing No. 200 sieve shall not exceed 5 percent.

#### C. Crusher-Run Gravel:

1. The impervious aggregate base, crusher-run gravel, subbase, or shoulder course materials shall be of uniform quality throughout. The material retained on the No. 10 sieve shall be composed of aggregate meeting the requirements for Class A or B coarse aggregate, except the percent of soft fragments allowed shall be as shown in the requirements below. To be used only if requested by Contractor and approved by Engineer.
2. The impervious aggregate may be produced from an approved quarry source, or bank or pit deposit, which will yield a satisfactory mixture conforming to all requirements of these specifications after it has been crushed or processed as a part of the mining operations, or the material may be furnished in two sizes of such gradation that when

combined in the central mix plant the resultant mixture shall conform to the required specifications. Impervious aggregate base, subbase or shoulder material shall conform to the following requirements:

<b>Gradation</b>	<b>Percent by Weight Passing Each Sieve</b>
1 1/2 " Sieve	100
3/4" Sieve	60 - 100
No. 10 Sieve	30 - 65
No. 60 Sieve	8-35
No. 200 Sieve	5-20

Tests on Material Passing No. 10 Sieve  
Volume Change, Percent 0-18

Test on Material Retained on 3/8 Sieve  
Soft Fragments, Percent 0-30

Method of Tests shall be in accordance with the following:

Gradation	AASHTO:	T27
Volume Change	GHD:	6
Soft Fragments	AASHTO:	T189

**D. Limerock Base Course:**

1. Limerock shall not contain cherty or other extremely hard pieces, or lumps, or balls or pockets of sand material in sufficient quantity as to be detrimental to the proper bonding, finishing or strength of the limerock base.
2. Gradation and Size Limits:
  - a. At least 97% (by weight) of the material shall pass a 3-1/2 inch sieve and the material shall be graded uniformly down to dust. The fine material shall consist of dust of fracture. All crushing or breaking up which might be necessary in order to meet such size requirements shall be done before the material is in place

**E. Select Common Fill:**

1. Select common fill material shall be satisfactory soil material containing no more than 15 percent by weight finer than No. 200 mesh sieve. It shall be free from organic matter, muck, marl, and rock exceeding 2-1/2 inches in diameter. Select common fill shall not contain broken concrete, masonry, rubble or other similar materials.

2. Material falling within the above specification, encountered during the excavation, may be stored in segregated stockpiles for reuse. All material which, in the opinion of the Engineer, is not suitable for reuse shall be spoiled as specified herein for disposal of unsuitable materials.

F. Bedding Rock:

1. Bedding rock shall be washed and graded limerock. This material shall be graded to meet FDOT No. 57 rock gradation requirements.

G. Geotextile Fabric

1. Geotextile fabric shall be used in the Work as shown on the Drawings or as directed by the Engineer. Samples of fabric and specifications shall be submitted to the Engineer according to Section 01300 - Shop Drawings.
2. The fabric shall be woven and nonwoven and consisting only of polymeric filaments or yarns such as polypropylene, polyethylene, or polyvinylidene chloride formed into a stable network such that the filaments or yarns retain their relative position. Nonwoven fabric shall be as manufactured by Trievira, Mirafi 140 N or approved equal.

H. Geogrid

1. Shall be installed according to the manufacturer's recommendations and as shown on the Drawings and shall be as manufactured by Tensar Corporation, Mirafi 140 N or approved equal.
2. Shall be installed on lifts of compacted, dewatered and stabilized areas shown on the Drawings.
3. A submittal of the installation and layout shall be in accordance with Section 01300 - Shop Drawings.

I. Underdrain System

1. All coarse aggregate shall be granitic rock or hard river rock that is sound, hard, durable, clean, resistant to weathering and shall be free of overburden, spoil, shale, limestone and organic material. The rock shall be free of deleterious materials such as flat, elongated, friable, decomposed, or micaceous pieces. Broken pieces of concrete, asphalt, or brick are not acceptable.
2. Granite rock or hard river rock for the underdrain system shall be FDOT Size No. 57 rock, of Section 901 of FDOT standard specification and conform to ASTM C33.



3. Inspection and Acceptance - Materials offered as gravels shall be subject to inspection at the source(s) and upon delivery at the site. The Owner and its Engineers reserve the right of acceptance or rejection upon delivery at the site or during progress of the work. A certification from the source of rock describing source locations, compliance with FDOT requirements for No. 4 stone, ASTM C33 and gradation should accompany submittals.
4. If the above specific gravel is not available locally, it must be imported.

J. Underdrain Pipe

1. Non-perforated pipe materials shall be used to convey groundwater from the underdrain system to weepholes in the new concrete channel sections.
2. The underdrain pipe shall be perforated 60 degrees from the bottom of the pipe on both sides uniformly spaced.
3. The underdrain piping shall be backfilled with gravel as specified in 2.01-I above.

## PART 3 - EXECUTION

### 3.01 INSPECTION

- A. Examine the areas and conditions under which excavating, filling, and grading are to be performed. Do not proceed with the Work until unsatisfactory conditions have been corrected.
- B. Examine and accept existing grade of walks, pavements and steps prior to commencement of work and report to Engineer if elevations of existing subgrade vary from elevations shown on Drawings.

### 3.02 EXCAVATION

- A. Excavation consists of removal and disposal of material encountered when establishing required grade elevations and in accordance with the "Foundation and Site Preparation" notes shown in the structural drawings.
- B. Excavation Classifications: The following classifications of excavation will be made when unanticipated rock excavation or unclassified excavation is encountered in the work. Do not perform such work until material to be excavated has been cross-sectioned and classified by Engineer or specialized geotechnical consultant.
  1. Authorized earth excavation includes removal and disposal of pavements and other obstructions visible on ground surface,

underground structures and utilities indicated to be demolished and removed, material of any classification indicated in soil boring data on subsurface conditions, and other materials encountered that are not classified as rock excavation or unauthorized excavation.

2. Unauthorized excavation consists of removal of material beyond the limits needed to establish required grade and subgrade elevations without specific approval of Engineer. Unauthorized excavation, as well as remedial work approved by the Engineer shall be at the Contractor's expense.
  - a. Under footings, foundation bases, or retaining walls, fill unauthorized excavation by extending the indicated bottom elevation of the footing or base to the excavation bottom, without altering required top elevation. Lean (un-reinforced) concrete fill may be used to bring bottom elevations to proper position, when acceptable to Engineer. Reinforcement shall be placed as needed or approved by the Engineer.
  - b. Elsewhere, backfill and compact unauthorized excavations as specified for authorized excavations of same classification, unless otherwise approved by Engineer.

C. Additional Excavation:

1. When excavation has reached required subgrade elevations, notify the Engineer who will contact a specialized geotechnical consultant and make an inspection of conditions.
2. If unsuitable bearing materials are encountered at the required subgrade elevations, carry excavations deeper and replace the excavated material as approved by the Engineer.
3. Removal of unsuitable material and its replacement as approved beyond the authorized limits will be paid on the basis of contract conditions relative to changes in work. The authorized limits as used in this section shall mean up to 2 feet below the bottom slab elevation of all structures.

D. Stability of Excavations:

1. Slope sides of excavations to comply with local codes and ordinances having jurisdiction or as shown on the Drawings. Shore and brace where sloping is not possible because of space restrictions or stability of material excavated.
2. Maintain sides and slopes of excavations in a safe condition until completion of backfilling.

E. Shoring and Bracing:

1. Provide materials for shoring and bracing, such as sheet piling, uprights, stringers and cross-braces, in good serviceable condition.
2. Establish requirements for trench shoring and bracing to comply with local codes and authorities having jurisdiction.
3. Maintain shoring and bracing in excavations regardless of time period excavations will be open. Carry down shoring and bracing as excavation progresses.

F. Dewatering:

1. Prevent surface water and subsurface or ground water from flowing into excavations and from flooding project site and surrounding areas. Maintain groundwater level a minimum of 12-inches below excavation level.
2. Do not allow water to accumulate in excavations. Remove water to prevent softening of foundation bottoms, undercutting footings, and soil changes detrimental to stability of subgrades and foundations. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations.
3. Convey water removed from excavations and rain water to collecting or run-off areas. Establish and maintain temporary drainage ditches and other diversions outside excavation limits for each structure. Do not use trench excavations as temporary drainage ditches.
4. While dewatering for new construction in the vicinity of existing structures, depletion of the groundwater level underneath these existing structures may cause settlement. To avoid this settlement, the groundwater level under these structures shall be maintained by appropriate methods of construction. The Contractor shall engage a Geotechnical Engineer registered in the State of Florida, to design the dewatering systems for all structures and pipelines. The Contractor shall submit to the Engineer for review a conceptual plan for dewatering systems prior to commencing work. The dewatering system installed shall be in conformity with the conceptual plan, and certification of this shall be provided by the Professional Engineer. The Professional Engineer shall be required to monitor the performance of the dewatering systems during the progress of the work and require such modifications as may be required to assure that the systems are performing satisfactorily.

5. The Contractor shall construct and place all pipelines, concrete work, structural fill, screened gravel and gravel base course, in-the-dry. For purposes of this Contract, "in-the-dry" is defined as minus 4 to plus 2 percent of the optimum moisture content of the soil.

G. Material Storage:

1. Stockpile satisfactory excavated materials where directed, until required for backfill or fill. Place, grade, and shape stockpiles for proper drainage.
2. Locate and retain soil materials away from edge of excavations.
3. Dispose of excess soil material and waste materials as herein specified.

H. Excavation for Structures:

1. Conform to elevations and dimensions shown within a tolerance of plus or minus 0.10 feet, and extending a sufficient distance from footings and foundations to permit placing and removal of concrete formwork, installation of services, other construction, and for inspection, or as shown on the Drawings.
2. In excavating for footings and foundations, take care not to disturb bottom of excavation. Excavate by hand to final grade just before concrete reinforcement is placed. Trim bottoms to required lines and grades to leave solid base to receive concrete.
3. Do not excavate to the bearing levels designated on the drawings until surface compaction is completed

I. Cold Weather Protection:

1. Protect excavation bottoms against freezing when atmospheric temperature is less than 35 degrees F.

### 3.03 BACKFILL AND FILL

A. General:

1. Place material in layers to required subgrade elevations, for each area classification listed below.
2. Structural fill shall be used below spread footing foundations, slab-on-grade floors, and other structures and as backfill within three feet of the below grade portion of structures.

3. FDOT No. 57 stone, as approved by the Engineer, shall be used under and around drainage sumps.
  4. Limerock base course shall be used under roadways, parking areas, walks and floor paving. Limerock base course may be used by the Contractor at other similar locations if approved by the Engineer or indicated on the Drawings.
  5. Select common fill shall be used at all other locations.
  6. Bedding rock shall be used for pipe bedding, under and around manhole bases and at other locations indicated on the Drawings or approved by the Engineer.
- B. Backfill excavations as promptly as work permits, but not until completion of the following:
1. Acceptance by Engineer of construction below finish grade including, where applicable, dampproofing, waterproofing and perimeter insulation.
  2. Inspection, testing approval and recording locations of underground utilities.
  3. Removal of concrete formwork.
  4. Removal of shoring and bracing, and backfilling of voids with satisfactory materials.
  5. Removal of trash and debris.
  6. Permanent or temporary horizontal bracing is in place on horizontally supported walls. Layout and location of bracing shall consider loads of the structure as well as the effects of the soil and groundwater.
- C. Ground Surface Preparation:
1. Remove vegetation, debris, unsatisfactory soil materials, obstructions and deleterious materials from ground surface prior to placement of fills. Plow strip, or break-up sloped surfaces steeper than 1 vertical to 4 horizontal so that fill materials will bond with existing surface.
  2. When existing ground surface has a density less than that specified under "Compaction" for the particular area classification, break up the ground surface, pulverize, moisture-condition to the optimum moisture content, and compact to required depth and percentage of maximum density.
- D. Fill Placement:

1. Material placed in fill areas under and around structures shall be deposited within the lines and to the grades shown on the Drawings or as directed by the Engineer, making due allowance for settlement of the material. Backfill shall be carried up evenly on all walls of an individual structure simultaneously with no more than a two-foot elevation variation allowed. Fills shall be placed only on properly prepared surfaces which have been inspected and approved by the Engineer.
2. Fill material can be obtained from cut areas within the construction project site. If sufficient satisfactory soil material is not available from excavation on site, the Contractor shall provide fill material as may be required from off-site sources at no additional cost to the Owner.
3. Fills shall be brought up in substantially level lifts throughout the site, starting in the deepest portion of the fill. The entire surface of the work shall be maintained free from ruts, and in such condition that construction equipment can readily travel over any section. Fills shall not be placed on surfaces that are muddy, frozen, or against concrete structures until they have attained sufficient strength.
4. Fills shall be dumped and spread in layers by a bulldozer or other approved method. During the process of dumping and spreading, all roots, debris and stones greater in size than specified under "Materials", shall be removed from the fill areas, and the Contractor shall assign a sufficient number of men to this work to ensure satisfactory compliance with these requirements.
5. If the compacted surface of any layer of material is determined to be too smooth to bond properly with the succeeding layer, it shall be loosened by harrowing or by another approved method before the succeeding layer is placed.
6. All fill materials shall be placed and compacted "in-the-dry." The Contractor shall dewater excavated areas as required to perform the work and in such a manner as to preserve the undisturbed state of the natural inorganic soils.

### 3.04 COMPACTION

#### A. General:

1. Control soil compaction during construction providing minimum percentage of density specified on the structural drawings for each area classification. It shall be the Contractor's responsibility to notify the Engineer in writing that penetration tests can be performed. Written notice from the Contractor shall precede completion of compaction operations by at least two working days.

B. Percentage of Maximum Density Requirements:

1. Compact soil to not less than the following percentages of maximum dry density in accordance with AASHTO T-180.
  - a. Underneath structures, foundations and footings and 5 feet-0 inches around perimeter of structures, footings or foundations, compact top 12 inches of subgrade and each layer of backfill or fill material at 95 percent maximum dry density.
  - b. In building slabs and footing, compact top 12 inches of subgrade and each layer of backfill or fill material at 95 percent maximum dry density.
  - c. In lawn and unpaved areas, compact top 6 inches of subgrade and each layer of backfill or fill material to 90 percent maximum density.
  - d. In walkways, compact top 6 inches of subgrade at 98 percent maximum dry density.
  - e. In pavement and steps, compact top 6 inches of subgrade at 98 percent maximum dry density.
  - f. Beneath and/or behind (including over-excavated areas for dewatering systems and tree/vegetation and demolition removals) the concrete sidewalks and foundations to 95 percent maximum dry density in lift thicknesses stated in the following paragraphs. This compaction is required prior to the placement of the geotextile fabric.
2. Moisture content of soil shall be within 2 percent of the optimum.
3. If over-excavation occurs for items 1a through 1f, the soil beneath the subgrade shall be compacted as required for structural fill, or as determined by the Engineer.

C. Moisture Control:

1. Where subgrade or layer of soil material must be moisture conditioned before compaction, uniformly apply clean water to surface of subgrade, or layer of soil material, to prevent free water appearing on surface during or subsequent to compaction operations.
2. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density.
3. Soil material that has been removed because it is too wet to permit compaction but is otherwise satisfactory may be stockpiled or spread and allowed to dry. Assist drying by discing, harrowing or pulverizing until moisture content is reduced to a satisfactory value.

D. Structural fill shall be placed in layers not more than 9 inches loose depth

for material compacted by heavy compaction equipment. Each layer shall be compacted by a minimum of six coverages with the equipment described below, to at least 95 per cent of maximum dry density as determined by AASHTO-T-180. Incidental compaction due to traffic by construction equipment will not be credited toward the required minimum coverages.

- E. Select common fill consisting of other than structural fill shall be placed and compacted in a manner similar to that described above for structural fill, with the following exceptions:
  - 1. Layer thickness prior to compaction may be increased to 12 inches in open areas.
  - 2. Select common fill, except dike fill, required below water level in peat excavation areas may be placed as one lift, in-the-wet, to an elevation of one foot above the water level at the time of filling.
- F. Compaction of the fill by such means shall be to the same degree of compaction as obtained by rubber-tired or vibratory roller equipment, and the Engineer may make the necessary tests to determine the amount of compactive effort necessary to obtain equal compaction. Large compaction equipment shall not be used within 5 feet of walls. Compaction equipment is subject to approval by the Engineer.
- G. Place fill material in layers not more than 6 inches loose depth for material compacted by hand-operated tampers. Use manually operated sled-type vibratory compactors next to structures and confined areas not accessible to heavy mechanical compaction equipment.
- H. If the Engineer shall determine that added moisture is required, water shall be applied by sprinkler tanks or other sprinkler systems, which will ensure uniform distribution of the water over the area to be treated, and give complete and accurate control of the amount of water to be used. If too much water is added, the area shall be permitted to dry before compaction is continued.
- I. The Contractor shall supply all hoses, piping, valves, sprinklers, pumps, sprinkler tanks, hauling equipment and all other materials and equipment necessary to place the water in the fill in the manner specified.
- J. Backfill and compaction requirements for pipelines, beams, sideslopes and footers shall be in accordance with the details indicated on the Drawings and FDOT Standard Specification for Road and Bridge Construction and Design Standards (Latest Editions).



### 3.05 GRADING

#### A. General:

1. Uniformly grade fill areas within limits of project including adjacent transition areas. Smooth finished surface within specified tolerances, compact with uniform levels or slopes between points where elevations are shown, or between such points and existing grades. No soft spots or uncompacted areas will be allowed in the work.

#### B. Grading Outside Building Lines:

1. Grade areas adjacent to building lines, as shown on the Drawings, to drain away from structures and to prevent ponding. Finish surfaces free from irregular surface changes, and as follows:
  - a. Finish lawn or unpaved areas to within not more than 0.10 feet above or below the required elevation.
  - b. Shape surface of areas under walks to line, grade and cross-section, with finish surface not more than 0.15 feet above the required subgrade and not below surrounding grade to avoid ponding water from runoff.

#### C. Grading Surface of Fill Under Building Slabs:

1. Grade smooth and even, free of voids, compacted as specified, and to required elevation. Provide final grades within a tolerance of 1/2-inch when tested with a 10foot straightedge.

#### D. Stones or rock fragments larger than 2 -1/2 inches in their greatest dimension will not be permitted in the top 6 inches of subgrade line of all dike, fills or embankments.

#### E. All cut and fill slopes shall be uniformly dressed to the slope, cross-section and alignment shown on the Drawings, or as approved by the Engineer to prevent ponding water on driveways, walkways or against structures.

#### F. During grading, protect all buried valve extensions and covers, sprinklers and any other mechanical or structural object protruding from below grade.

### 3.06 EARTH EMBANKMENTS

- A. All organic materials, including muck, peat and topsoil, shall be removed from areas that will be reinforced with geotextile materials. The natural

subgrade shall then be compacted by suitable mechanical compaction equipment. The Engineer will waive this requirement, if, in his opinion, the subgrade will be rendered unstable by such compaction, The prepared subgrade shall be inspected and approved by the Engineer prior to the placement of structural fill.

- B. Suitable fills shall be placed in layers 12-inches thick measured before compaction. Each layer shall be compacted to at least 95 percent of the maximum dry density as determined by AASHTO T-180.

### 3.07 FIELD QUALITY CONTROL

#### A. Quality Control Testing During Construction:

1. Allow testing service to inspect and approve subgrades and fill layers before further construction work is performed.
2. Compaction efforts and/or subsequent construction activities will not be allowed to continue until the compaction test results are acknowledged by the Engineer. The Engineer shall receive a copy of the testing agency's daily compaction report as well as a copy of the final compaction test report.
3. If in the opinion of the Engineer, based on testing service reports and inspection, subgrade or fills which have been placed are below the specified density, the Contractor shall provide additional compaction and testing at no additional expense to the Owner.

### 3.08 MAINTENANCE

#### A. Protection of Graded Areas:

1. Protect newly graded areas from traffic and erosion. Keep free of trash and debris.
2. Repair and re-establish grades in settled, eroded and rutted areas to specified tolerances.

#### B. Reconditioning Compacted Areas:

1. Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, reshape and compact to required
2. density prior to further construction.

### 3.09 DISPOSAL OF SURPLUS AND UNSUITABLE MATERIAL

- A. All surplus and/or unsuitable excavated material shall be removed from the site and disposed. Any permit required for the hauling and disposing of this material beyond the owner's property shall be obtained prior to commencing hauling operations.
  
- B. Suitable excavated material may be used for fill if it meets the specifications for satisfactory material and is approved by the Engineer. Excavated material so approved may be neatly stockpiled at the site where designated by the Engineer provided there is an area available where it will not interfere with the operation of the facility and not inconvenience traffic or adjoining property owners.

END OF SECTION

SECTION 02221  
TRENCHING, BEDDING, AND BACKFILL FOR PIPE

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The Contractor shall furnish all labor, materials, equipment, and incidentals necessary to perform all excavation (unclassified), backfill, fill, grading and slope protection required to complete the piping work shown on the Drawings and specified herein. The work shall include, but not necessarily be limited to: manholes, vaults, duct conduit, pipe, and roadways and paving; all backfilling, fill and required borrow; grading; disposal of surplus and unsuitable materials; and all related work such as sheeting, bracing, and water handling.

1.02 RELATED REQUIREMENTS

- A. The Contract Documents include, but are not limited to, the following related requirements:
1. Certificate of Compliance with the Florida Trench Safety Act.
  2. Site Preparation is included in Section 02100.
  3. Structural Excavation Backfill & Compaction is included in Section 02220.
  4. Excavation Below Normal Grade and Crushed Stone Refill is included in Section 02223.

1.03 TRENCH PROTECTION

- A. All excavation, trenching and related sheeting, bracing, etc., shall conform to the requirement of the Florida Trench Safety Act (C5/5B2626) which incorporates by references, OSHA's excavation safety standards (29 CFR 1926.650 subpart P).
- B. Sheeting and Bracing in Excavations:
1. In connection with construction of below grade structures, the Contractor shall construct, brace, and maintain cofferdams consisting of sheeting and bracing as required to support the sides of excavations, to prevent any movement which could in any way diminish the width of the excavation below that necessary for

proper construction, and to protect adjacent structures, existing yard piping and /or foundation material from disturbance, undermining, or other damage. Care shall be taken to prevent voids outside of the sheeting, but if voids are formed they shall be immediately filled and rammed.

2. For trench sheeting for pipes, no sheeting is to be withdrawn if driven below mid-diameter of any pipe, and no wood sheeting shall be cut off at a level lower than 1 foot above the top of any pipe unless otherwise instructed by the Engineer. If during the progress of the work the Engineer decides that additional wood sheeting should be left in place, he may instruct the Contractor in writing. If steel sheeting is used for trench sheeting, removal shall be as specified above, unless written approval is given for an alternate method of removal.
3. All sheeting and bracing not left in place shall be carefully removed in such a manner as not to endanger the construction or other structures, utilities, existing piping, or property. Unless otherwise approved or indicated on the Drawings or in the Specifications, all sheeting and bracing shall be removed after completion of the substructure, care being taken not to disturb or otherwise injure the finished masonry. All voids left or caused by withdrawal of sheeting shall be immediately refilled with sand by ramming with tools especially adapted to that purpose, by watering or otherwise as may be required.
4. The right of the Engineer to instruct sheeting and bracing left in place shall not be construed as creating any obligation on his part to issue such instructions, and his failure to exercise his right to do so shall not relieve the Contractor from liability for damages to persons or property occurring from or on the work occasioned by negligence or otherwise, growing out of a failure on the part of the Contractor to leave in place sufficient sheeting and bracing to prevent any caving or moving of the ground.

C. Dewatering, Drainage and Flotation:

1. The Contractor shall construct and place all pipelines, concrete work, structural fill, screened gravel and gravel base course in-the-dry. All trenches and excavations are to be kept dry and free from water at all times when work is in progress and at no time is water to run through the pipeline(s) or structure excavations. The Contractor shall maintain the water level a minimum of one foot

below proposed bottom of excavation. For purposes of this Contract, "in-the-dry" is defined as within plus or minus 2 percentage points of the optimum moisture content of the soil.

2. The Contractor shall, at all times during construction, provide and maintain proper equipment and facilities to remove promptly and dispose of properly all water entering excavations and keep such excavations dry so as to obtain a satisfactory undisturbed subgrade foundation condition until the fill, structure, or pipes to be built thereon have been completed to such extent that they will not be floated or otherwise damaged by allowing water levels to return to natural elevations.
3. Pipe and masonry shall not be laid in water or submerged within 24 hours after being placed. Water shall not flow over new masonry within four (4) days after placement.
4. In no event shall water rise to cause unbalanced pressure on structures until the concrete or mortar has set at least 24 hours. The Contractor shall prevent flotation of the pipe promptly placing backfill.
5. Dewatering shall at all times be conducted in such a manner as to preserve the natural undisturbed bearing capacity of the subgrade soils at proposed bottom of excavation.
6. Wellpoints may be required for predrainage of the soils prior to final excavation for some of the deeper in-ground structures, or piping, and for maintaining the lowered groundwater level until construction has been completed to such an extent that the structure, pipeline, or fill will not be floated or otherwise damaged. Wellpoints shall be surrounded by suitable filter sand and no fines shall be removed by pumping. Pumping from wellpoints shall be continuous and standby pumps shall be provided. Once abandoned, wellpoint holes shall immediately be backfilled with FDOT No. 89 stone from bottom to top or flowable fill meeting the requirements of FDOT Section 145, or as approved by the Engineer.
7. The Contractor shall furnish all materials and equipment and perform all work required to install and maintain the drainage systems he proposes for handling groundwater and surface water encountered during construction of structures, pipelines, and compacted fills.
8. The Contractor shall provide for the disposal of the water removed from the excavation in such manner as shall not cause injury to public health or private or public property or to any portion of the work completed or in progress, to the surface of the streets, or cause any impediment to the reasonable use of the site by other contractors.

9. If requested by the Engineer, the Contractor's proposed method of dewatering shall include a minimum of two operating groundwater observation wells at each pump station structure and one (1) observation well at each manhole to be used to determine the water level during construction of the structure. Locations of the observation wells shall be at structures and along pipelines as approved by the Engineer prior to their installation. The observation wells shall be extended to 6-inches above finished grade, capped with screw-on caps protected by 24" x 24" wide concrete base, and left in place at the completion of this Project.
10. The Contractor shall engage a Geotechnical Engineer registered in the State of Florida, to design the dewatering systems for all structures and pipelines. The Contractor shall submit to the Engineer for review and comment a conceptual plan for dewatering systems prior to commencing work. The dewatering system installed shall be in conformity with the conceptual plan, and certification of this shall be provided by the Professional Engineer. The Professional Engineer shall be required to monitor the performance of the dewatering systems during the progress of the work and require such modifications as may be required to assure that the systems are performing satisfactorily.
11. As part of his request for review of a dewatering system, the Contractor shall demonstrate the adequacy of the proposed system and wellpoint filter sand by means of a test installation. Discharge waters shall be clear, with no visible soil particles in a one quart sample.
12. During backfilling and construction, water levels shall be measured in observation wells located as approved by the Engineer.
13. Continuous pumping will be required as long as water levels are required to be below natural levels.
14. In the event that it is found that the water in a trench cannot be lowered by industry standards, i.e., well points and pumps; and if it is recognized by the Contractor that it is not feasible to dewater the trench, an alternate construction method may be proposed. The Contractor shall dewater the trench for a minimum of ten (10) calendar days prior to submitting any alternate method of dewatering which shall exhaust all standard means of dewatering. Complete details, specifications, manufacturer's descriptive literature, installation lists and any other pertinent data regarding the alternate method(s) shall be submitted as an alternate by the Contractor to the Engineer for review within ten (10) days of the time that the Contractor anticipates using such alternate method.
15. The alternate method may be used, so long as the work is performed in a manner which, in the opinion of the Engineer and

Owner, conforms to the method and procedure as set forth in the information supplied by the Contractor in his original application for use of an alternate method. The Engineer may revoke the alternate method if at any time, in his opinion, the work is not conforming to any applicable portion of these specifications. All alternate methods proposed for dewatering shall be at the contractor's expense.

#### 1.04 JOB CONDITIONS

- A. The Contractor shall examine the site and review the available test borings or undertake his own soil borings prior to submitting his bid, taking into consideration all conditions that may affect his work. The Owner and Engineer will not assume responsibility for variations of sub-soil quality or conditions at locations other than places shown and at the time the investigation was made. Boring log data and soil samples are available for examination after signing a release at the office of the Engineer.
- B. Existing Utilities: Locate existing underground utilities in the areas of work. If utilities are to remain in place, provide adequate means of protection during earthwork operations.
1. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult the Engineer and the Owner of such piping or utility immediately for directions.
  2. Cooperate with Owner and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.
  3. Demolish and completely remove from site existing underground utilities indicated on the Drawings to be removed.
- C. Protection of Persons and Property: Barricade open excavations occurring as part of this work and post with warning lights. Operate warning lights as recommended by authorities having jurisdiction.
1. Protect structures, utilities, sidewalks, curbs, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations.
  2. Provide barricades with warning lights and temporary safety orange fencing around any open excavations exposed overnight.

#### 1.05 SUBMITTALS



- A. Furnish the Engineer, for approval, a representative sample of fill material obtained from onsite sources weighing approximately 50 pounds, at least 7 calendar days prior to the date of anticipated use of such material.
- B. For each material obtained from other than onsite sources, the Contractor shall notify the Engineer of the source of the material and shall furnish the Engineer, for approval, a representative sample weighing approximately 50 pounds, at least 7 calendar days prior to the date of anticipated use of such material.

## PART 2 - PRODUCTS

### 2.01 MATERIALS

#### A. General:

- 1. Materials for use as base, fill and backfills shall be as described below.
  - a. Satisfactory soil materials are defined as those complying with American Association of State Highway and Transportation Officials (AASHTO) M-145, soil classification Groups A-1, A-2-4, A-2-5 and A-3.
  - b. Unsatisfactory soil materials are those defined in AASHTO M-145 soil classification Groups A-2-6, A-2-7, A-4, A-5, A-6, and A-7 along with peat and other highly organic soils.
- 2. Materials shall be furnished as required from off site sources and hauled to the site

#### B. Select Common Fill:

- 1. Select common fill materials shall be satisfactory soil material containing no more than 15 percent by weight finer than No. 200 mesh sieve. It shall be free from organic matter, muck, marl, and rock exceeding 2-1/2 inches in diameter. Select common fill shall not contain broken concrete, masonry, rubble or other similar materials.
- 2. Material falling within the above specification, encountered during the excavation, may be stored in segregated stockpiles for reuse. All material which, in the opinion of the Engineer, is not suitable for reuse shall be spoiled as specified herein for disposal of unsuitable materials.

- C. Bedding Rock:
  - 1. Bedding rock shall be FDOT No. 57, gradation washed and graded limerock or shell.
- D. Geotextile Fabric
  - 1. Geotextile fabric shall be used in pipe trenches or as directed by the Engineer. Geotextile fabric shall be 140N as manufactured by Mirafi or equal.

## PART 3 - EXECUTION

### 3.01 GENERAL

- A. All excavation, backfill and grading necessary to complete the work shall be made by the Contractor and the cost thereof shall be included in the contract price.
- B. Material shall be furnished as required from off site sources and hauled to the site.
- C. The Contractor shall take all the necessary precautions to maintain the work area in a safe and workable condition.
- D. The Contractor shall protect his work at all times by flagging, marking, lighting and barricading. It shall also be the Contractor's responsibility to preserve and protect all existing above and underground structures, pipe lines, conduits, cables, drains or utilities at the time he encounters them. Failure of the Drawings to show the existence of these obstructions shall not relieve the Contractor from this responsibility. The cost of repair of any damage which occurs to these obstructions during or as a result of construction shall be borne by the Contractor without additional cost to the Owner.

### 3.02 TRENCH EXCAVATION AND BEDDING

- A. Excavation for all trenches required for the installation of pipes and electrical ducts shall be made to the depths indicated on the Drawings. Excavate trench to provide a minimum of 36-inch clear cover over the pipe bell unless otherwise noted on the Drawings. Excavate in such manner and to such widths as will give suitable room for laying the pipe or installing the ducts within the trenches, for bracing and supporting and for pumping and drainage facilities. The trench width at the top of the pipe

shall not exceed the allowable as determined by the depth of cut and indicated on the Drawings.

- B. Rock shall be removed to a minimum 4 or 6 inches clearance around the bottom and sides of all the pipe or ducts being laid as shown on the Drawings.
- C. The bottom of the excavations shall be firm and dry and in all respects acceptable to the Engineer. Excavate unsatisfactory soil material from the bottom of the trench to a depth determined by the Engineer and replace with rock bedding.
- D. Where pipe or ducts are to be laid in bedding or encased in concrete the trench may be excavated by machinery to, or just below, the designated subgrade provided that the material remaining in the bottom of the trench is no more than slightly disturbed.
- E. Where the pipes or ducts are to be laid directly on the trench bottom the lower part of the trenches shall not be excavated to the trench bottom by machinery. The last of the material being excavated shall be done manually in such a manner that will give a flat bottom true to grade so that pipe or duct can be evenly and uniformly supported along its entire length on undisturbed material or bedding rock. Bell holes shall be made as required manually so that there is no bearing surface on the bells and pipes are supported along the barrel only.
- F. Pipe bedding shall be placed in the trench to the proposed elevation of the centerline of the pipe prior to any pipe laying. This bedding shall not be used under any circumstances as a drain for groundwater. The Contractor shall take all precautions necessary to maintain the bedding in a compacted state and to prevent washing, erosion or loosening of this bed.

### 3.03 PIPE INTERFERENCES AND ENCASEMENT

- A. The Contractor shall abide by the following schedule of criteria concerning interferences with other utilities. In no case shall there be less than 0.5 feet between any two pipe lines or between pipe lines and structures. Concrete encasement shall be provided in accordance with the typical detail as shown on the Drawings.

### 3.04 BACKFILLING

- A. Backfilling over pipes shall begin as soon as practicable after the pipe has been laid, jointed, and inspected and the trench filled with suitable bedding material.

- B. Backfilling over ducts shall begin not less than three days after placing concrete encasement.
- C. All backfilling shall be prosecuted expeditiously and as detailed on the Drawings.
- D. Any space remaining between the pipe and sides of the trench shall be packed full by hand shovel with selected earth, free from stones having a diameter greater than 1-1/2 inches and thoroughly compacted with a tamper as fast as placed, up to a level of one foot above the top of the pipe. Compact to 95 percent maximum density per AASHTO T-180 in layers not to exceed 4 inches up to the centerline of the pipe from the trench bottom and in layers not to exceed 6 inches from the pipe centerline to 12 inches above the pipe.
- E. The filling shall be carried up evenly on both sides with at least one man tamping for each man shoveling material into the trench.
- F. The remainder of the trench above the compacted backfill, as just described above, shall be filled and thoroughly compacted with select common fill with mechanical equipment. Compact select common fill in 6-inch layers to 95 percent maximum density per AASHTO T-180.
- G. In locations where pipes pass through building walls, the Contractor shall take the following precautions to consolidate the refill up to an elevation of at least 1 foot above the bottom of the pipes:
  - 1. Place structural fill in such areas for a distance of not less than 3 feet either side of the centerline of the pipe in level layers not exceeding 6 inches in depth.
  - 2. Wet each layer to the extent required and thoroughly compact each layer with a power tamper.

### 3.05 GRADING

- A. Grading shall be performed at such places as are indicated on the Drawings, to the lines, grades, and elevations shown or as approved by the Engineer and shall be made in such a manner that the requirements for formation of embankments can be followed. All unacceptable material encountered, of whatever nature within the limits indicated, shall be removed and disposed of as required. During the process of excavation, the grade shall be maintained in such condition that it will be well drained at all times. Temporary drains and drainage ditches shall be installed to intercept or divert surface water which may affect the prosecution or condition of the work.

- B. If at the time of excavation it is not possible to place any material in its proper section of the permanent structure, it shall be stockpiled in an approved area for later use. No extras will be considered for the stockpiling or double handling of excavated material.
- C. Stones or rock fragments larger than 1 -1/2 inches in their greatest dimensions will not be permitted in the top 12-inches of the subgrade line of all dikes, fills or embankments.
- D. All fill slopes shall be uniformly dressed to the slope, cross-section and alignment shown on the Drawings, or as approved in writing by the Engineer.
- E. In cuts, all loose or protruding rocks on the back slopes shall be barred loose or otherwise removed to line or finished grade of slope. All cut and fill slopes shall be uniformly dressed to the slope, cross-section and alignment shown on the Drawings or as approved in writing by the Engineer.

### 3.06 PIPELINE MARKING TAPE

- A. All ductile iron (DI) pipelines, including all service connections, shall have identification marking tape. All ductile iron pipelines marking tape shall be non-detectable type, but shall have all of the design features as specified herein. For pipe sizes smaller than 12-inches, a single 2-inch wide stripe along the top of the pipe shall be provided.
- B. The tape shall be as manufactured by Thor Enterprises or equal. The polyethylene tape shall meet the requirements of ASTM D 1248, Type I, Class A, Grade E-1 for polyethylene plastics molding and extrusion materials. The tape shall have a minimum tensile strength of 1750 psi, a minimum elongation of 250 percent, not less than 50 gauge solid aluminum core and a minimal thickness of 5 mils. The tape shall be composed of 2 mil clear film reverse - printed laminated to aluminum, foil-laminated to 2 mil clear film and reverse-printed. Minimum total thickness 4 mils.
- C. The tape for gravity sewer pipes shall have a fade-resistant color throughout conforming to the American Public Works Association and Utility Location Coordination Council Color coding. The continuous warning message shall be repeated every 16 to 36 inches in lettering no less than 2 inches high.

1. For example, the message for Dig gravity sanitary sewer pipe including service connections installed in a reaso f earthen cover only, shall be fade-resistant green color and shall be as follows:

CAUTION: BURIED GRAVITY SANITARY SEWER LINE BELOW

2. Minimum marking tape widths shall be as follows:

Pipe Inside Diameter. Inches	Minimum Tape Width. Inches	No. of Tape Strips
Less Than 6	4	1
Less Than 6 through 12	4	1
14-20	4	2
24 & Larger	4	3

- D. The Contractor shall submit typical samples of the printed marking tape to the Engineer for approval prior to installation (minimum length to show repeat of message).
- E. The marking tape shall be placed in the trench backfill directly above and centered over the pipeline. The marking tape shall be installed 12 inches above the top of the pipe. The Contractor shall exercise care to prevent damage to the polyethylene tape when placing the remaining backfill.
- F. Where the pipeline passes through in a manhole, vault or other underground structure, the polyethylene marking tape shall be placed on top of that portion of the pipeline, located inside the structure and shall be secured to the pipeline with adhesive tape.
- G. Openings for air valves and similar appurtenances shall be provided by making an X-shaped cut in the polyethylene and temporarily folding back the film. After the polyethylene is installed over the appurtenance, the slack shall be taped securely to the appurtenance and the cut in the polyethylene shall be repaired with adhesive tape.

END OF SECTION

SECTION 02223  
EXCAVATION BELOW NORMAL GRADE AND CRUSHED STONE REFILL

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. If in the opinion of the Engineer or shown on the Drawings, the material at or below the normal grade of the bottom of the trench is unsuitable for structure foundation, it shall be removed to the depth approved by the Engineer or shown on the Drawings and replaced by crushed stone.
- B. Crushed stone pipe bedding is not included in the scope of work under this section.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Crushed stone shall be as specified in Sections 02220.

PART 3 EXECUTION

3.01 EXCAVATION AND DRAINAGE

- A. Whatever the nature of unstable material encountered or the groundwater conditions, trench dewatering shall be complete and effective.
- B. If the Contractor excavates below grade through error or for his own convenience, or through failure to properly dewater the trench, or disturbs the subgrade before dewatering is sufficiently complete, he may be directed by the Engineer to excavate below grade as set forth in the preceding paragraph, in which case the work of excavating below grade and furnishing and placing the refill materials shall be performed at the Contractor's own expense.

3.02 REFILL

- A. If the material at the level of trench bottom consists of fine sand, sand and silt or soft earth, the subgrade materials shall be removed to the extent directed by the Engineer and the excavation refilled with crushed stone.

END OF SECTION

SECTION 02260  
FINISH GRADING

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Finish grade sub-soil.
- B. Cut out areas to receive stabilizing base course materials for paving and sidewalks.
- C. Place, finish grade and compact top soil.

1.02 PROTECTION

- A. Prevent damage to existing fencing, trees, landscaping, natural features, bench marks, pavement and utility lines. Correct damage at no cost to the Owner.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Topsoil: Friable loam free from subsoil, roots, grass, excessive amount of weeds, stones, and foreign matter; acidity range ( pH) of 5.5 to 7.5; containing a minimum of 4 percent and a maximum of 25 percent organic matter. Use topsoil stockpiles on site if conforming to these requirements.

PART 3 - EXECUTION

3.01 SUB-SOIL PREPARATION

- A. Rough grade sub-soil systematically to allow for a maximum amount of natural settlement and compaction. Eliminate uneven areas and low spots. Remove debris, roots, branches, stones, etc. Remove sub-soil which has been contaminated with petroleum products.
- B. Cut out areas to sub-grade elevation, which are to receive stabilizing base for paving and sidewalks.
- C. Bring sub-soil to required levels, profiles and contours. Make changes in grade gradual. Blend slopes into level areas. Contractor shall utilize a box blade to ensure smooth land surfaces and contouring.



- D. Slope grade away from building minimum 2 inches in 10 feet unless indicated otherwise on the Drawings.
- E. Cultivate sub-grade to a depth of 3 inches, where topsoil is to be placed. Repeat cultivation in areas where equipment, used for hauling and spreading topsoil, has compacted sub-soil.

### 3.02 PLACING TOPSOIL

- A. Place topsoil in areas where seeding, sodding and planting is to be performed. Place to the following minimum depths, up to finished grade elevations.
  - 1. 6 inches for seeded areas.
  - 2. 4-1/2 inches for sodded areas.
  - 3. 24 inches for shrub beds.
  - 4. 18 inches for flower beds.
- B. Use topsoil in relatively dry state. Place during dry weather.
- C. Fine grade topsoil eliminating rough and low areas to ensure positive drainage.
- D. Maintain levels, profiles and contours of sub-grades.
- E. Remove stone, roots, grass, weeds, debris, and other foreign material while spreading.
- F. Manually spread topsoil around trees, plants, building, to prevent damage which may be caused by grading equipment.
- G. Lightly compact placed topsoil.

### 3.03 SURPLUS MATERIAL

- A. Remove surplus sub-soil and topsoil from site.
- B. Leave stockpile areas and entire job site clean and raked, ready to receive landscaping.

END OF SECTION

SECTION 02276  
TEMPORARY EROSION AND SEDIMENTATION CONTROL

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The Contractor shall furnish all labor, materials, equipment, and incidentals necessary to perform all installation, maintenance, removal, and area cleanup related to sedimentation control work as shown on the Drawings and as specified herein or as required to prevent the transport of silt or sediment outside the limits of construction. The work shall include, but not necessarily be limited to, installation of temporary access ways and staging areas, silt fences, temporary seeding, turbidity barriers, sediment removal and disposal, device maintenance, removal of temporary devices, temporary mulching, and final cleanup.

1.02 RELATED WORK (REQUIREMENTS)

- A. The Contract Documents shall include, but are not limited to, the following related requirements.
1. Environmental Protection is included in Section 01110.
  2. Sodding is included in Section 02485.

1.03 SUBMITTALS

- A. Within 10 days after award of Contract, the Contractor shall submit to the Engineer for approval, technical product literature for all commercial products to be used for sedimentation and erosion control.

1.04 QUALITY ASSURANCE

- A. The Contractor shall be responsible for the timely installation and maintenance of all sedimentation control devices necessary to prevent the movement of sediment from the construction site to off-site areas or into the stream or wetland system or preservation/conservation areas via surface runoff or underground drainage systems. Measures in addition to those shown on the Drawings necessary to prevent the movement of sediment outside the limits of construction shall be installed, maintained, removed, and cleaned up at the expense of the Contractor. No additional charges to the Owner will be considered.

- B. Sedimentation and erosion control measures shall conform to the Best Management Practices outlined in the Drawings and in the Florida Development Manual.

## PART 2 - PRODUCTS

### 2.01 MATERIALS

#### A. Silt Fence

1. Wood or steel posts shall be a minimum of 42-inch in length, 2-inch by 4-inch by 1/4 inch angle post (steel) with self-fastening tabs and a 5-inch by 4-inch (nominal) steel anchor plate at bottom.
2. Welded wire fabric shall be 20 gauge minimum poultry mesh.
3. Silt fence fabric shall be a woven, polypropylene, ultraviolet resistant material such as Mirafi 100X as manufactured by Mirafi, Inc., Charlotte, NC or equal.
4. Attachment for securing silt fence fabric to wood posts shall be stabled 2 feet O.C. to 2 feet by 4-foot cross member, or with self-fastening tabs (steel).
5. Prefabricated commercial silt fence may be substituted for built-in-field fence. Pre-fabricated silt fence shall be "Environfence" as manufactured by Mirafi Inc., Charlotte, NC or equal.

#### B. Floating Turbidity Barriers

1. Turbidity barriers meeting FDOT Type II (Index 103) requirements shall be provided. Staked turbidity barriers may be used at specific locations as approved by the Engineer. Turbidity barriers shall be capable of functioning properly for flow conditions up to a 5 year/24 hour storm event. Turbidity barriers shall be constructed of 18 oz. nylon reinforced PVC or polypropylene material, all portions which will be exposed to direct sunlight shall be ultraviolet resistant. All metal components shall be corrosion resistant. Woven materials may be acceptable for installations where high flow conditions may exist during storm events. Turbidity barriers shall be "Mark II", or "PC-2" as manufactured by American Boom & Barrier Corporation, Cape Canaveral, FL or equal.

- C. Latex acrylic copolymer, such as Soil Sealant with coalescing agent as manufactured by Soil Stabilization Co., Merced, CA or approved equivalent shall be used as straw mulch tackifier.

- D. An asphalt tackifier may be used in place of a latex acrylic copolymer with prior written approval from the Engineer.
- E. Temporary Sod: This work shall consist of furnishing and placing sod in accordance with Section 02485 within areas designated by the Engineer, in order to temporarily control erosion. If the sod is determined to be of a temporary nature, at the discretion of the Engineer the requirements for fertilizer and lime may be eliminated. The sods shall be kept in a moist condition in order to insure growth.
- F. Temporary Grassing: Certain areas of Grassing may be designated by the Engineer as temporary erosion control features. The Engineer may determine that permanent type grass seed shall be omitted from Grassing and the specified rate of spread for fertilizer used in conjunction with grassing operations be reduced when such work is designated as a temporary erosion control feature.
- G. Erosion control matting shall be installed as shown on the drawings or as approved. Erosion control matting shall be North American Green P300 or equal.
- H. Excelsior matting shall be installed as shown on the drawings or as approved. Excelsior matting shall be North American Green SC ISO or equal.
- I. Fabric formed concrete erosion protections shall be Armorform as manufactured by Nicolon, or equal. Material shall correspond to the 4-inch thick Uniform Section Mat (USM), or equal.

## PART 3 - EXECUTION

### 3.01 LOCATION OF SEDIMENT/EROSION CONTROL AND TURBIDITY BARRIERS

- A. At a minimum, sediment/erosion control and turbidity barriers shall be installed at all locations shown on the plans.
- B. Sediment/erosion control shall be installed at 300 foot intervals along all swales and ditches constructed and around all installed drainage structures prior to placement of sod.
- C. Sediment/erosion control shall be installed along all limits of construction in all locations which are within 50 feet of a wetland or preservation area. Sediment and erosion control devices shall extend the entire length of the area within 50 feet of the wetland boundary and continue following the 50 foot wetland buffer until device is at least 50 feet outside of limits of construction. Wetlands shall be all vegetative communities considered to

be jurisdictional by one or more of the following agencies: Southwest Florida Water Management District, Florida Department of Environmental Protection, and the U.S. Army Corps of Engineers.

- D. Sediment control or turbidity barriers shall be installed along the upstream side of all littoral zones within stormwater ponds. Sediment control or turbidity barriers shall be installed along the open water side of all littoral zones in borrow areas in which excavation is being conducted.
- E. Contractor shall provide additional sediment/erosion control and turbidity barriers as needed to control the transport of silt and sediments outside of the limits of construction. Turbidity barriers shall be installed upstream and downstream in the channel during all construction activities.
- F. Sediment/erosion controls shall be installed around the base of all soil stockpile areas. All non-working faces of soil stockpiles, which will be in place longer than three months shall be seeded.
- G. Sediment/erosion control devices shall be installed along the perimeter of all staging areas.
- H. Sediment/erosion control devices shall be installed around all donor wetlands when earthmoving, other than relocating wetlands, is conducted with 50 feet of the Donor Wetland. The sediment and erosion control device shall be placed at least 30 feet outside of the wetland boundary.
- I. Sediment/erosion control for all construction activities which take place within an existing Jurisdictional Wetland (SWFWMD, FDEP, and/or ACOE), which will only be partially impacted by construction shall have double sediment/erosion control barriers. The separation between the double barriers shall be at least 10 feet, but no greater than 20 feet.
- J. All disturbed areas, greater than 10,000 square feet, in which construction activities have stopped and are not anticipated to resume for a period of three months or longer shall be seeded, within five days of stoppage of construction, in accordance with the seeding requirements in Section 02410.
- K. All disturbed areas, greater than 10,000 square feet, in which construction activities have been stopped and are not anticipated to resume for a period of 21 days, but not longer than three months shall be temporarily mulched, within five days of stoppage of construction in accordance with Paragraph 3.04.

### 3.02 INSTALLATION

#### A. Silt Fence Installation

1. Silt fences shall be positioned as specified indicated on the Drawings and as necessary to prevent movement of sediment produced by construction activities outside of the limits of construction.
2. Dig trench approximately 6-inches wide and 6-inches deep along proposed fence lines.
3. Drive stakes, 3 feet on center (maximum) at back edge of trenches. Stakes shall be driven 18-inches (minimum) into ground.
4. Hang 4 by 4 woven wire mesh on posts, setting bottom of wire in bottom of trench. Secure wire to wood posts with staples or steel posts with selffastening tabs.
5. Hang filter fabric on wire carrying to bottom of trench with about 4-inches of fabric laid across bottom of trench. Stretch fabric fairly taut along fence length and secure with staples 2-feet O.C. both ways.
6. Backfill trench with excavated material and tamp.
7. Install pre-fabricated silt fence according to manufacturer's instructions.

#### B. Inlet Protection

1. Inlet protection shall be installed for all catch basins, drop inlets, drop structures, inlets to drainage pipes, or other structures as indicated on plans.
2. A 5-foot strip of sod shall be laid surrounding the perimeter each structure.
3. A silt fence barrier shall be installed around the perimeter of the sodded area.

### 3.03 MAINTENANCE AND INSPECTIONS

#### A. Inspections

1. Contractor shall make a visual inspection of all sedimentation and erosion control devices (including turbidity barriers) once per week and promptly after every rainstorm. If such inspection reveals that additional measures are needed to prevent movement of sediment to areas outside the limits of construction. Contractor shall promptly install additional devices as needed. Sediment controls in need of maintenance shall be repaired promptly.

2. Contractor shall keep a log of all inspections indicating the following:
  - a. Date and time of inspection
  - b. Inspector
  - c. Amount of rainfall
  - d. Erosion and sediment control devices inspected  
Conditions of sediment and erosion control devices  
Repairs needed
  - e. Date repair is completed

#### B. Device Maintenance

1. Silt Fences
  - a. Remove accumulated sediment once it builds up to one-half of the height of the fabric.
  - b. Replace damaged fabric, or patch with a 2-ft minimum overlap.
  - c. Make other repairs as necessary to ensure that the fence is filtering all runoff directed to the fence.
2. Inlet Protection
  - a. Remove accumulated sediment once it builds up to one-half of the height of the barrier.
  - b. Remove all sediment accumulated within the barrier and replaced damaged sod.
  - c. Make other repairs as necessary to ensure that the inlet protection device is operating properly.
3. Turbidity Barriers
  - a. Turbidity barriers shall be inspected on a daily basis.
  - b. Replace damaged fabric, or patch with a 2-foot minimum overlap.
  - c. Make other repairs as necessary to ensure barriers are effectively maintaining turbidity levels outside of the barrier within limits specified in Section 01110.

### 3.04 TEMPORARY MULCHING

- A. Apply temporary mulch to areas where rough grading has been completed but final grading is not anticipated to be begun within 21 days of the completion of rough grading. If construction activities are not planned to resume for three months or longer, the temporary seeding requirements shall be followed.

- B. Straw mulch shall be applied at rate of 2,000 lbs/acre and tackified with latex acrylic copolymer at a rate of 1 gallon/1000 feet diluted in a ratio of 30 parts water to 1 part latex acrylic copolymer mix.
- C. After temporary mulching, traffic should be kept to a minimum, except for designated temporary access roads.

### 3.05 REMOVAL AND FINAL CLEANUP

- A. Once the site has been fully stabilized against erosion, remove sediment control devices and all accumulated silt. Dispose of silt and waste materials in proper manner. Regrade all areas disturbed during this process and stabilize against erosion with surfacing materials as indicated on the Drawings or specified herein.

END OF SECTION



## SECTION 02310 DEWATERING

### PART 1- GENERAL

#### 1.01 WORK INCLUDED

This section covers the requirements for dewatering work as may be required as a part of new construction or renovation.

#### 1.02 RELATED WORK

- A. The General and Supplemental Conditions of these specifications are a part of this section as if incorporated herein.
- B. Other related specification sections contained herein are listed below:
  - 1. Section 02220, Structural Excavation, Backfill and Compaction
  - 2. Section 02221, Trenching, Bedding, and Backfill for Pipe

#### 1.03 PRE-BID INSPECTION AND TESTING

- A. The Contractor is advised that site soil borings, if provided, may indicate groundwater levels below the levels which may occur in response to normal, seasonal, extreme, or prolonged rainfall. The Contractor is further advised that site soil borings may not necessarily be representative of soil conditions encountered elsewhere on the job site, other than at the specific boring locations.
- B. Prior to bidding, the Contractor shall perform a detailed site inspection and, if desired, obtain the Owner's permission to perform site-specific testing, as he deems necessary, to obtain all required information relative to project dewatering requirements.
- C. The Contractor shall include as part of his Bid, the total cost of all surface and subsurface dewatering as required to construct the project in complete compliance with the drawings and specifications.
- D. At least 10 days prior to the commencement of any dewatering activity, the Contractor shall submit to the Engineer, for record purposes only, a detailed description of the proposed dewatering system. This plan shall include design computations, layout, type, spacing of dewatering devices, number and size of pumps, and other equipment with a description of the installation and operating procedures. The dewatering plan shall address discharge path and prevention of erosion and sedimentation.

## 1.04 QUALIFICATIONS OF WORKMEN

- A. At least one person shall be provided who shall be present at all times during the execution of this portion of the work and who shall be thoroughly familiar with the dewatering system being installed, the referenced standards, the requirements of this work, and who shall direct all work performed under this section.
- B. It shall be the responsibility of the Contractor to determine the water level at the time prior to beginning excavation and construction.

## PART 2- PRODUCTS (NOT USED)

## PART 3- EXECUTION

### 3.01 DEWATERING SYSTEM

- A. The dewatering system shall be adequate to pre-drain the soils to be excavated to the extent that the piezometric water level in the construction area is a minimum of 24 inches below the bottom of the excavation or trench, side slopes of excavations, or bottom of the footings at all times, or as otherwise required to obtain the specified compaction and installation conditions.
- B. In the event of layered soils, the hydrostatic head in the zone below the subgrade elevation shall be relieved to prevent uplift.
- C. Unless otherwise noted and prior to any excavating below or within 24 inches above the groundwater level, a dewatering system shall be placed into operation to lower water levels to the extent specified previously, and then shall be operated continuously 24 hours per day, 7 days a week, until work has been completed to the satisfaction of the Owner and Engineer.
- D. Where used, well points shall be installed in an approved manner and in sufficient numbers to provide the necessary removal of water as stated previously. Well points and header piping shall be installed in such a manner that traffic on public thoroughfares and site access roads will not be impeded.
- E. The Contractor shall be solely responsible for the arrangement, location, and depths of the dewatering system necessary to accomplish the specified work. The dewatering system shall stay in full operation until excavations and trenches have been backfilled and compacted.

- F. To prevent excessive noise, exhaust from all pumps and engines shall be silenced and muffled.
- G. Wellpoint pump discharges shall be controlled to prevent erosion, undermining, and all other damage, and be piped to approved locations.
- H. The Contractor shall comply with any and all applicable regulations and permitting requirements concerning groundwater pumpage and discharge.
- I. The Contractor shall perform all dewatering work in strict compliance with all applicable regulations and project permits.
- J. Excavations shall be kept free from water during the placing of concrete and for 36 hours thereafter, or until concrete forms are removed.

### 3.02 OBSERVATION WELLS

- A. The Contractor shall install observation wells as may be required to record accurate water levels.
- B. The Contractor shall be responsible for maintaining all observation wells and observing and recording the elevation of the piezometric water levels daily.
- C. Wells damaged or destroyed shall be replaced at no additional cost to the Owner.

### 3.03 CLEANUP

- A. Upon completion of the dewatering work, the Contractor shall remove all equipment and leave the project site in a neat, clean, and acceptable condition, satisfactory to the Owner and Engineer. Wellpoint holes and excavations shall be adequately backfilled and compacted to prevent settlement.

END OF SECTION

SECTION 02357  
STEEL SHEET PILING

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. The Contractor shall furnish and install steel sheet piles as the Contractor deems necessary to construct the Work described in these specifications and as shown on the Drawings.

1.02 SUBMITTALS

- A. Steel sheet piling layout shall be submitted in accordance with Section 01300.
- B. The Contractor shall submit the procedures, in writing, that will be used to achieve the alignment of the steel sheet piling for the applicable tolerances and indicated on the Drawings.

PRODUCTS

1.03 MATERIALS

- A. Steel Sheet Piles
  - 1. Steel sheet piles shall conform to ASTM A328. Steel pile sections shall be the continuously interlocking deep arch equal to PLZ27. The section modulus per linear foot shall not be less than 3.02 cubic inches per linear foot of wall and the weight shall be not less than 22.6 pounds per square foot of wall. Sheet pile sections shall be not less than 0.335-inches thick.

EXECUTION

1.04 INSTALLATION

- A. Prior to setting, the sheet piles shall be thoroughly cleaned and inspected for defects and for proper interlock dimensions. The Contractor shall provide a tool for checking the interlock dimensions.
- B. Each sheet pile shall have sufficient clearance in the interlocks to slide, under its own weight, in the interlock of the sheet pile previously placed during [lie setting operation until the top of existing ground is reached by

the tip of the sliding pile. In no case during the setting operation shall a vibratory or drive hammer be used to force the interlock of a pile into the interlock of an adjacent pile.

- C. Before driving is started, check the sheet piles for position and alignment. Vertical alignment of each sheet pile shall be not more than 1/8-inch per foot from the vertical in all directions. Provide a plumb line or other device for checking vertical alignment.
- D. Drive sheet piles in rotating stages such that the tip of any sheet pile is not more than 5 feet below the tip of any adjacent sheet pile nor more than 8 feet below the tip of any other sheet pile in the bulkhead.
- E. Use a suitable driving head to keep information of the driving end to a minimum. If any sheet pile is driven out of interlock, it shall be removed and replaced at the Contractor's sole expense.
- F. Piles shall be driven or vibrated in having sufficient energy to achieve the required penetration; however, the means and methods selected by the Contractor shall be to prevent damage to any nearby structures.
- G. Obstructions encountered before the specified penetration for the piles is obtained shall be removed. Damaged piling or one with faulty alignment shall be withdrawn and new piling driven properly in its place, The cost of such additional work shall be considered as part of the pile driving and shall be borne by the Contractor,
- H. Cut the tops of the sheet piles on a true line with a tolerance of plus or minus 1/2-inch by burning or other suitable method that will not damage the pile.

END OF SECTION

SECTION 02485  
SODDING

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. Furnish all labor, materials, and equipment necessary to satisfactorily return all construction areas to their original conditions as shown on the drawings or as directed by the Engineer.
- B. Work includes furnishing and placing sod, fertilizer, planting, watering, and maintenance until acceptance by the Engineer.
- C. The work shall include sodding of construction and disturbed areas.

1.02 QUALITY ASSURANCE

- A. Requirements
  - 1. It is the intent of this specification that the Contractor is obliged to deliver a satisfactory stand of grass as specified. If necessary, the Contractor shall repeat any or all of the work, including grading, fertilizing, watering, and sodding at no additional cost to the Owner until a satisfactory stand is obtained.
- B. Satisfactory Stand
  - 1. For purposes of grassing, a satisfactory stand of grass is herein defined as a full lawn cover over areas to be sodded, with grass free of weeds, alive and growing, leaving no bare spots larger than  $\frac{3}{4}$  square yard within a radius of 10 feet.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Fertilizer
  - 1. Fertilizer shall be a complete fertilizer, the elements of which are derived from organic sources. Fertilizer shall be a standard product complying with State and Federal fertilizer laws.

2. Percentages of nitrogen, phosphorus and potash shall be 8% nitrogen, 8% phosphorus and 8% potash by weight. At least 50% of the total nitrogen shall contain no less than 3% water-insoluble nitrogen.
3. Fertilizer shall be delivered to the site, mixed as specified, in the original unopened, standard size bags showing weight, analysis and name of manufacturer. Containers shall bear the manufacturer's guaranteed statement of analysis, or a manufacturer's certificate of compliance covering analysis shall be furnished to the Engineer. Store fertilizer in a weatherproof place and in such a manner that it will be kept dry and its effectiveness will not be impaired.
4. Superphosphate shall be composed of finely ground phosphate rock as commonly used for agricultural purposes containing not less than 20% available phosphoric acid.

#### B. Sodding

1. Sod shall be the same as existed prior to construction or as approved by the Engineer of firm texture having a compacted growth and good root development as approved.
2. Sod shall be certified to meet Florida State Plant Board specifications, absolutely true to varietal type, and free from weeds or other objectionable vegetation, fungus, insects and disease of any kind.
3. Before being cut and lifted the sod shall have been mowed 3 times with the final mowing not more than a week before cutting into uniform dimensions.

#### C. Topsoil

1. Topsoil stockpiled during excavation may be used. If additional topsoil is required to replace topsoil removed during construction. It shall be obtained off site at no additional cost to the Owner. Topsoil shall be fertile, natural surface soil, capable of producing all trees, plants, and grassing specified herein.

#### D. Water

1. It is the Contractor's responsibility to supply all water to the site, as required during sodding operations and through the maintenance period and until the work is accepted. The Contractor shall make whatever arrangements may be necessary to ensure an adequate supply of water to meet the needs for his work. He shall also

furnish all necessary hose, equipment, attachments, and accessories for the adequate irrigation of lawns and planted areas as may be required. Water shall be suitable for irrigation and free from ingredients harmful to plant life.

## PART 3 - EXECUTION

### 3.01 INSTALLATION

#### A. Time of Sodding

1. When the trench backfill has stabilized sufficiently, the Contractor shall commence work on lawns and grassed areas, including fine grading as required.

#### B. Soil Placement

1. Lawn areas shall be plowed to a depth of 6-inches, depressions filled, sticks and rubbish removed. Following subgrade preparation, top soil shall be spaced evenly 4-1/2-inches thick over all lawn and planting areas; prepare surface by raking or other means so as to establish smooth lawn. Apply 20 pounds of 12-3-6 fertilizer per 1,000 square feet.

#### C. Finish Grading

1. Areas to be sodded shall be finish graded, raked and debris removed, soft spots and uneven grades shall be eliminated; the Engineer shall approve the finish grade of all areas to be seeded or sodded prior to application of sod.

#### D. Protection

1. Sodded areas shall be protected against the traffic or other use by placing warning signs or erecting barricades as necessary. Any areas damaged prior to actual acceptance by the Owner shall be repaired by the Contractor as directed by the Engineer.

### 3.02 LAWN BED PREPARATION

- A. Areas to be sodded shall be cleared of all rough grass, weeds, and debris, and the ground brought to an even grade as approved.

- B. The soil shall then be thoroughly tilled to a minimum 8-inch depth.



- C. Superphosphate at a rate for bidding purposes of 5 pounds per 1000 square foot and complete fertilizer at a rate for bidding purposes of 16 pounds per 1000 square foot shall be evenly distributed over entire area and cross-disced in to a depth of 4-6 inches.
- D. The areas shall then be brought to proper grade, free of sticks, stones, or other foreign matter over 1-inch in diameter or dimension. The surface shall conform to finish grade, less the thickness of sod, free of water-retaining depressions, the soil friable and of uniformly firm texture.

### 3.03 SOD HANDLING AND INSTALLATION

- A. During delivery, prior to planting, and during the planting of the lawn areas, the sod panels at all times be protected from excessive drying and unnecessary exposure of the roots to the sun. All sod shall be stacked during construction and planting so as not to be damaged by sweating or excessive heat and moisture.
- B. After completion of soil conditioning as specified above, sod panels shall be laid tightly together so as to make a solid sodded lawn area. On mounds and other slopes, the long dimension of the sod shall be laid perpendicular to the slope. Immediately following sod laying the lawn areas shall be rolled with a lawn roller customarily used for such purposes, and then thoroughly watered.
- C. Bring the sod edge in a neat, clean manner to the edge of all paving and shrub areas. Top dressing with approved, clean, weed free, sand may be required at no additional cost to the Owner if deemed necessary by the Engineer.
- D. Sod placed on slopes greater than 4:1 shall be pinned.

### 3.04 CLEANUP

- A. Soil, mulch, seed, or similar materials spilled onto paved areas shall be removed promptly, keeping those areas as clean as possible at all times. Upon completion of sodding operations, all excess soil, stones, and debris remaining shall be removed from the construction areas.

### 3.05 LANDSCAPE MAINTENANCE

- A. Any existing landscape items damaged or altered during construction by the Contractor shall be restored or replaced as directed by the Engineer.

- B. Maintain landscape work for a period of 90 days immediately following complete installation of work or until Owner accepts project. Watering, weeding, cultivating, restoration of grade, mowing and trimming grass, protection from insects and diseases, fertilizing and similar operations as needed to ensure normal growth and good health for live plant material shall be the responsibility of the Contractor and at no additional cost to the Owner. Sodded areas shall receive no less than 1.5 inches of water per week.

### 3.06 REPAIRS TO LAWN AREAS DISTURBED BY CONTRACTOR'S OPERATIONS

- A. Lawn areas planted under this Contract and all lawn areas damaged by the Contractor's operations shall be repaired at once by proper soil preparation, fertilizing, and resodding, in accordance with these Specifications.

### 3.07 CARETAKING

- A. The Contractor shall maintain all sodded areas in a good, healthy, moist condition by watering, regrading, weeding, fertilizing, and cutting until final acceptance of the work by the Engineer.

### 3.08 GUARANTEE PERIOD AND FINAL ACCEPTANCE

- A. All sodded areas shall be guaranteed by the Contractor for not less than one (1) full year from the time of final acceptance.
- B. At the end of the guarantee period, inspection will be made by the Engineer upon written requests submitted by the Contractor at least ten (10) days before the anticipated date. Lawn areas not demonstrating satisfactory stands as outlined above, as determined by the Engineer, shall be renovated, resodded, and maintained meeting all requirements as specified herein.
- C. After all necessary corrective work has been completed, the Engineer shall certify in writing the final acceptance of the lawns.

END OF SECTION

SECTION 02575  
PAVEMENT REPAIR AND RESTORATION

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. Furnish all labor, materials, equipment, and incidentals required and remove and replace pavements over trenches excavated for installation of pipe lines as shown on the Drawings and/or specified herein.
- B. This Section does not include the construction of new roadway surfaces or the complete restoration of existing pavements.
- C. The Contractor shall resurface the entire roadway to the same width as the removed roadway after the pipeline has been installed, tested and approved by the Engineer. Roadway resurfacing details shall be as shown in the drawings.

1.02 GENERAL

- A. Refer to Sections 01380 relative to photographs required prior to construction.
- B. All damage, as a result of work under this Project, done to existing structures, pavement, driveways, paved areas, curbs and gutters, sidewalks, shrubbery, grass, trees, utility poles, utility pipe lines, conduits, drains, catch basins, swales, ditches, signs, flagstones, or stabilized areas or driveways and including all obstructions not specifically named herein, shall be repaired in a manner satisfactory to the Engineer. Bid prices shall include the furnishing of all labor, materials, equipment, and incidentals necessary for the cutting, repair, and restoration of the damaged areas unless pay items for specific types of repair are included in the Bid Form.
- C. The Contractor shall keep the surface of the backfilled area of excavation in a safe condition and level with the remaining pavement until the pavement is restored in the manner specified herein. All surface irregularities that are dangerous or obstructive to traffic are to be removed. The repairs shall conform to Owner or State requirements for pavement repair and as described herein.
- D. All materials and workmanship shall be first class and nothing herein shall be construed as to relieve the Contractor from this responsibility. The Owner reserves the right to require soil bearing or loading tests or materials tests, should the adequacy of the foundation or the quality of

materials used be questionable. Costs of these tests shall be borne by the Owner, if found acceptable; the costs of all failed tests shall be borne by the Contractor.

- E. All street and road repairs shall be made in accordance with the details indicated on the Drawings and in accordance with the applicable requirements of these Specifications and meeting the approval of affected City, County and State agencies.

## 1.02 QUALITY ASSURANCE

- A. Applicable provisions of the Florida Department of Transportation "Standard Specifications for Road and Bridge Construction", latest edition, and Supplemental Specifications hereunder govern the work under this Section. Florida Department of Transportation will hereafter be referred to as FDOT.

## PART 2 - PRODUCTS

### 2.01 MATERIALS

- A. All materials utilized in flexible base pavement and base course shall be as specified in the Florida Department of Transportation "Standard Specifications for Road and Bridge Construction," latest edition.

## PART 3 - EXECUTION

### 3.01 CUTTING PAVEMENT

- A. Contractor shall cut and remove pavement as necessary for installing the new pipelines and appurtenances and for making connections to existing pipelines.
- B. Before removing pavement, the pavement shall be marked for cuts nearly paralleling pipe lines and existing street lines. Asphalt pavement shall be cut along the markings with a jackhammer, rotary saw or other suitable tool.
- C. No pavements shall be machine pulled until completely broken and separated along the marked cuts.
- D. The pavement adjacent to pipe line trenches shall neither be disturbed nor damaged. If the adjacent pavement is disturbed or damaged, irrespective of cause, the Contractor shall remove the damaged pavement and shall replace it at his own expense.

### 3.02 GENERAL RESTORATION

- A. The restoration of all existing street paving, driveways, bike paths, etc., shall be restored by the Contractor and shall be replaced or rebuilt using the same type of construction as was in the original. The Contractor shall be responsible for restoring all such work, including subgrade and base courses where present. The Contractor shall obtain and pay for at his own expense such local or other governmental permits as may be necessary for the opening of streets and shall satisfy himself as to any requirements other than those herein set forth which may affect the type, quality and manner of carrying on the restoration of surfaces by reason of jurisdiction of such governmental bodies.
- B. Unless directed otherwise, where the entire roadway width is to be replaced, the Contractor shall provide a 1-inch thick asphaltic concrete wearing surface over the pipeline excavation after backfilling and satisfactory testing has been completed and approved by Owner/Engineer. The Contractor shall provide the permanent replacement over all residential streets, side streets and boulevards of 2-inch thick bituminous overlay paving over the entire roadway width no sooner than 90 calendar days after the initial 1-inch thick bituminous pavement has been placed or at any time thereafter previous to the date of Completion of the Project, but completion will not occur until all permanent replacement of all pavement has been completed, tested and approved by the Engineer, and satisfactory testing of the pipeline has been approved by the Engineer.
- C. All pipeline and specific restoration work shall be completed, tested and ready for operation by the substantial completion date. All permanent pavement replacement shall be completed by the final completion date.
- D. In all cases, the Contractor will be required to maintain, without additional compensation, all permanent replacement of street paving, done by him under this Contract until accepted by the Owner, including the removal and replacement of such work wherever surface depressions or underlying cavities result from settlement of trench backfill.
- E. Contractor shall do all the final resurfacing or repaving of streets or roads, over the excavations that he has made and he shall be responsible for relaying paving surfaces of roadbed that have failed or been damaged, at any time prior to acceptance by Owner on account of work done by him and he shall resurface or repave over any tunnel jacking, or boring excavation that shall settle or break the surface, to the satisfaction of Owner and at the Contractor's sole expense. Backfilling of trenches and the preparation of subgrades shall conform to the applicable requirements of Sections 02220 and 02221.

- F. All repaving or resurfacing shall be done in accordance with Florida Department of Transportation Specifications, to which the following requirement of trench backfill will be added: Where pipeline construction crossed paved areas such as streets, the top

### 3.03 ADJUSTING EXISTING STRUCTURES

- A. Existing manholes, inlets, valve boxes, et c., within the limits of the proposed work, which do not conform to the finished grade of the proposed pavement or the finished grade designated on the Drawings for such structure shall be cut down or extended and made to conform to the new grade. The materials and construction methods for this work shall be approved by the Engineer.

### 3.04 MISCELLANEOUS RESTORATION

- A. Sidewalks cut or damaged by construction shall be restored in full sections or blocks to a minimum thickness of four inches. Concrete curb or curb gutters shall be restored to the existing height and cross section in full sections or lengths between joints. Concrete shall be as specified on the Drawings. Grassed yards, shoulders and parkways shall be restored to match the existing sections with grass seed or sod of a type matching the existing grass.

### 3.05 CLEANUP

- A. After all repair and restoration or paving has been completed, all excess asphalt, dirt, and other debris shall be removed from the roadways. All existing storm sewers and inlets shall be checked and cleaned of any construction debris.

END OF SECTION

SECTION 02999  
MISCELLANEOUS WORK AND CLEANUP

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. This Section includes operations which cannot be specified in detail as separate items but can be sufficiently described as to the kind and extent of work involved. The Contractor shall furnish all labor, materials, equipment and incidentals to complete the work under this Section.
  
- B. The work of this Section includes, but is not limited to, the following.
  - 1. Restoring of sidewalks, driveways, curbing and gutters, fences and guard rails.
  - 2. Crossing utilities.
  - 3. Relocation of existing water lines, low pressure gas lines, telephone lines, electric lines, cable TV lines and storm drains as necessary, all as shown on the Drawings.
  - 4. Restoring easements and rights of way.
  - 5. Cleaning up.
  - 6. Incidental work.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Materials required for this Section shall be of at least the same type and quality as materials that are to be restored. Where possible, the Contractor shall reuse existing materials that are removed and then replaced, with the exception of paving.

PART 3 - EXECUTION

3.01 RESTORING OF CURBING, FENCES, AND GUARD RAILS

- A. Existing curbing shall be protected. If necessary, curbing shall be removed from joint to joint and replaced after backfilling. Curbing which is damaged during construction shall be replaced with curbing of equal quality and dimension.
  
- B. At several locations it may be necessary for the Contractor to remove,

store and replace existing fences and guard rails during construction. Only the sections directed by the Engineer shall be removed. If any section of fence is damaged due to the Contractor's negligence, it shall be replaced with fencing equal to or better than that damaged, and the work shall be satisfactory to the Engineer.

- C. Guard rails in the vicinity of the work shall be protected from damage. If damaged, guard rails shall be replaced in condition equal to that existing before construction began.

### 3.02 CROSSING UTILITIES

- A. This item shall include any extra work required in crossing culverts, water courses, drains, water mains, and other utilities, including all sheeting and bracing, extra excavation and backfill, or any other work required for the crossing, whether or not shown on the Drawings.

### 3.03 RELOCATIONS OF EXISTING GAS LINES, TELEPHONE LINES, ELECTRIC LINES, AND CABLE TV LINES

- A. The Contractor shall notify the proper authority of the utility involved when relocation of these lines is required. The Contractor shall coordinate all work by the utility so that the progress of construction will not be hampered.

### 3.04 RESTORING THE EASEMENTS AND RIGHTS-OF-WAY

- A. Portions of the construction occur in easements through private property. The Contractor shall be responsible for all damage to private property due to his operations. He shall protect from injury all walls, fences, cultivated shrubbery, pavement, underground facilities, such as water pipe, or other utilities which may be encountered along the easement. If removal and replacement are required, it shall be done in a workmanlike manner so that the replacement is equivalent to that which existed prior to construction.
- B. Existing lawn surfaces damaged by construction shall be regraded and resodded or reseeded, These areas shall be maintained until all work under this Contract has been completed and accepted.

### 3.05 CLEANING UP

- A. The Contractor shall remove all construction material, excess excavation, buildings, equipment and other debris remaining on the job as a result of construction operations and shall render the site of the work in a neat and



orderly condition.

### 3.06 INCIDENTAL WORK

- A. Do all incidental work not otherwise specified, but obviously necessary for the proper completion of the contract as specified and as shown on the Drawings.

END OF SECTION

## SECTION 03100

### CONCRETE FORMWORK

#### PART 1 - GENERAL

##### 1.01 SCOPE OF WORK

- A. Furnish all labor, materials, equipment and incidentals required and cut, remove, repair or otherwise modify parts of existing concrete structures or appurtenances as shown on the Drawings and as specified herein. Work under this Section shall also include bonding new concrete to existing concrete.
- B. Secure to forms as required or set for embedment as required, all miscellaneous metal items, sleeves, reglets, anchor bolts, inserts and other items furnished under other Sections and required to be cast into concrete, or approved in advance by the Engineer.

##### 1.02 RELATED WORK

- A. Concrete Reinforcement is included in Section 03200.
- B. Concrete Joints and Joint Accessories are included in Section 03250
- C. Cast-in-Place Concrete is included in Section 03300.
- D. Grout is included in Section 03600.

##### 1.03 SUBMITTALS

- A. Submit to the Engineer, in accordance with Section 01300, shop drawings and product data showing materials of construction and details of installation for:
  - 1. Form release agent
  - 2. Form ties
- B. Samples
  - 1. Demonstrate to the Engineer on a designated area of the concrete substructure exterior surface that the form release agent will not adversely affect concrete surfaces to be painted, coated or otherwise finished and will not affect the forming materials.
- C. Certificates
  - 1. Certify that form release agent is suitable for use in contact with potable water after 30 days (non-toxic and free of taste and odor).

## 1.04 REFERENCE STANDARDS

- A. American Concrete Institute (ACI)
  - 1. ACI 301 - Standard Specification for Structural Concrete
  - 2. ACI 318 - Building Code Requirements for Reinforced Concrete
  - 3. ACI 347 - Formwork for Concrete
- B. American Plywood Association (APA)
  - 1. Material grades and designations as specified
- C. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

## 1.05 SYSTEM DESCRIPTION

- A. General: Architectural Concrete is wall, slab, beam or column concrete which will have surfaces exposed to view in the finished work. It includes similar exposed surfaces in water containment structures from the top of walls to 2-ft below the normal water surface in open tanks and basins.
- B. Formwork shall be designed and erected in accordance with the requirements of ACI 301 and ACI 318 and as recommended in ACI 347 and shall comply with all applicable regulations and codes. The designs shall consider any special requirements due to the use of plasticized and/ or retarded set concrete.

## PART 2 - PRODUCTS

### 2.01 GENERAL

- A. The usage of a manufacturer's name and model or catalog number is for the purpose of establishing the standard of quality and general configurations desired.

### 2.02 MATERIALS

- A. Forms for cast-in-place concrete shall be made of wood, metal, or other approved material. Construct wood forms of sound lumber or plywood of suitable dimensions and free from knotholes and loose knots. Where used for exposed surfaces, dress and match boards. Sand plywood smooth and fit adjacent panels with tight joints. Metal forms may be used when approved by the Engineer and shall be of an appropriate type for the class of work involved. All forms shall be designed and constructed to provide a flat, uniform concrete surface requiring minimal finishing or repairs.

B. Wall Forms

1. Forms for all exposed exterior and interior concrete walls shall be "Plyform" exterior grade plywood panels manufactured in compliance with the APA and bearing the trademark of that group, or equal acceptable to the Engineer. Provide B grade or better veneer on all faces to be placed against concrete during forming. The class of material and grades of interior plies shall be of sufficient strength and stiffness to provide a flat, uniform concrete surface requiring minimal finishing and grinding.
2. All joints or gaps in forms shall be taped, gasketed, plugged, and/or caulked with an approved material so that the joint will remain watertight and will withstand placing pressures without bulging.

C. Rustication strips shall be at the location and shall conform to the details shown on the Drawings. Moldings for chamfers and rustications shall be milled and planed smooth. Rustications and corner strips shall be of a nonabsorbent material, compatible with the form surface and fully sealed on all sides to prohibit the loss of paste or water between the two surfaces.

D. Form Release Agent

1. Coat all forming surfaces in contact with concrete using an effective, non-staining, non-residual, water based, bond-breaking form coating unless otherwise noted. Form release agents used in potable water containment structures shall be suitable for use in contact with potable water and shall be non-toxic and free of taste or odor and meet the requirements of NSF/ANSI Standard 61. Form release agent shall be Farm Fresh by Unitex or approved equal.

E. Form Ties

1. Form ties encased in concrete other than those specified in the following paragraphs shall be designed so that, after removal of the projecting part, no metal shall remain within 1-1/2-in of the face of the concrete. The part of the tie to be removed shall be at least 1/2-in diameter or be provided with a wood or metal cone at least 1/2-in diameter and 1-1/2-in long. Form ties in concrete exposed to view shall be the cone-washer type.
2. Form ties for exposed exterior and interior walls shall be as specified in the preceding paragraph except that the cones shall be of approved wood or plastic.
3. Flat bar ties for panel forms, if used, shall have plastic or rubber inserts having a minimum depth of 1-1/2-in and sufficient dimensions to permit proper patching of the tie hole.

4. Ties for liquid containment structures shall have an integral waterstop that is tightly welded to the tie.
5. Common wire shall not be used for form ties.
6. Alternate form ties consisting of tapered through-bolts at least 1-in in diameter at smallest end or through-bolts that utilize a removable tapered sleeve of the same minimum size may be used at the Contractor's option. Obtain Engineer's acceptance of system and spacing of ties prior to ordering or purchase of forming. Clean, fill and seal form tie hole with non-shrink cement grout. A vinyl plug shall be inserted into the hole to serve as a waterstop. The Contractor shall be responsible for water-tightness of the form ties and any repairs needed.

## PART 3 - EXECUTION

### 3.01 GENERAL

- A. Forms shall be used for all cast-in-place concrete including sides of footings. Forms shall be constructed and placed so that the resulting concrete will be of the shape, lines, dimensions and appearance indicated on the Drawings.
- B. Forms for walls shall have removable panels at the bottom for cleaning, inspection and joint surface preparation. Forms for walls of considerable height shall have closable intermediate inspection ports. Tremies and hoppers for placing concrete shall be used to allow concrete inspection, to prevent segregation and to prevent the accumulation of hardened concrete on the forms above the fresh concrete.
- C. Molding, bevels, or other types of chamfer strips shall be placed to produce block outs, rustications, or chamfers as shown on the Drawings or as specified herein. Chamfer strips shall be provided at horizontal and vertical projecting corners to produce a 3/4-in chamfer. Rectangular or trapezoidal moldings shall be placed in locations requiring sealants where specified or shown on the Drawings. Sizes of moldings shall conform to the sealants manufacturer's recommendations.
- D. Forms shall be sufficiently rigid to withstand construction loads and vibration and to prevent displacement or sagging between supports. Construct forms so that the concrete will not be damaged by their removal. The Contractor shall be entirely responsible for the adequacy of the forming system.
- E. Before form material is re-used, all surfaces to be in contact with concrete shall be thoroughly cleaned, all damaged places repaired, all projecting nails withdrawn and all protrusions smoothed. Reuse of wooden forms for other than rough finish will be permitted only if a "like new" condition of the form is maintained.

### 3.02 FORM TOLERANCES

- A. Forms shall be surfaced, designed and constructed in accordance with the recommendations of ACI 347 and shall meet the following additional requirements for the specified finishes.
1. Formed Surface Exposed to View: Edges of all form panels in contact with concrete shall be flush within 1/16-in and forms for plane surfaces shall be such that the concrete will be plane within 3/16-in in 4-ft. Forms shall be tight to prevent the passage of mortar, water and grout. The maximum deviation of the finish wall surface at any point shall not exceed 1/4-in from the intended surface as shown on the Drawings. Form panels shall be arranged symmetrically and in an orderly manner to minimize the number of seams.
  2. Formed surfaces not exposed to view or buried shall meet requirements of Class "C" Surface in ACI 347.
  3. Formed rough surfaces including mass concrete, pipe encasement, electrical duct encasement and other similar installations shall have no minimum requirements for surface smoothness and surface deflections. The overall dimensions of the concrete shall be plus or minus 1-in.

### 3.03 FORM PREPARATION

- A. Wood forms in contact with the concrete shall be coated with an effective release agent prior to form installation.
- B. Steel forms shall be thoroughly cleaned and mill scale and other ferrous deposits shall be sandblasted or otherwise removed from the contact surface for all forms, except those utilized for surfaces receiving a rough finish. All forms shall have the contact surfaces coated with a release agent.

### 3.04 REMOVAL OF FORMS

- A. The Contractor shall be responsible for all damage resulting from removal of forms. Forms and shoring for structural slabs or beams shall remain in place in accordance with ACI 301 and ACI 347. Form removal shall conform to the requirements specified in Section 03300 and a curing compound applied.

### 3.05 INSPECTION

- A. The Engineer on site shall be notified when the forms are complete and ready for inspection at least 6 hours prior to the proposed concrete placement.

- B. Failure of the forms to comply with the requirements specified herein or to produce concrete complying with requirements of Section 03300 shall be grounds for rejection of that portion of the concrete work. Rejected work shall be repaired or replaced as directed by the Engineer at no additional cost to the Owner. Such repair or replacement shall be subject to the requirements of this Section and approval of the Engineer.

END OF SECTION

## SECTION 03200

### CONCRETE REINFORCEMENT

#### PART 1 - GENERAL

##### 1.01 SCOPE OF WORK

- A. Furnish all labor, materials, equipment and incidentals required and install all concrete reinforcement complete as shown on the Drawings and as specified herein.
- B. Furnish only all deformed steel reinforcement required to be entirely built into concrete masonry unit construction.

##### 1.02 RELATED WORK

- A. Concrete Formwork is included in Section 03100.
- B. Cast-in-place Concrete is included in Section 03300.

##### 1.03 SUBMITTALS

- A. Submit to the Engineer, in accordance with Section 01300, shop drawings and product data showing materials of construction and details of installation for:
  - 1. Reinforcing steel. Placement drawings shall conform to the recommendations of ACI 315. All reinforcement in a concrete placement shall be included on a single placement drawing or cross referenced to the pertinent main placement drawing. The main drawing shall include the additional reinforcement (around openings, at corners, etc) shown on the standard details sheets. Bars to have special coatings and/or to be of special steel or special yield strength are to be clearly identified. For all cast-in-place concrete tanks, retaining walls, building stem walls, wall sections shall be included in the drawings.
  - 2. Bar bending details. The bars shall be referenced to the same identification marks shown on the placement drawings.
  - 3. Schedule of all placements to contain synthetic reinforcing fibers. The amount of fibers per cubic yard to be used for each of the placements shall be noted on the schedule. The name of the manufacturer of the fibers and the product data shall be included with the submittal.
- B. Submit Test Reports, in accordance with Section 01300, of each of the following items.



1. Certified copy of mill test on each steel proposed for use showing the physical properties of the steel and the chemical analysis.
2. Welder's certification. The certification shall be in accordance with AWS D1.4 when welding of reinforcement required.

#### 1.04 REFERENCE STANDARDS

##### A. American Society for Testing and Materials (ASTM)

1. ASTM A82 - Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
2. ASTM A184 - Standard Specification for Fabricated Deformed Steel Bar Mats for Concrete Reinforcement.
3. ASTM A185 - Standard Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement
4. ASTM A496 - Standard Specification for Steel Wire, Deformed, for Concrete Reinforcement
5. ASTM A497 - Standard Specification for Steel Welded Wire Fabric, Deformed, for Concrete Reinforcement
6. ASTM A615 - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
7. ASTM A616 - Standard Specification for Rail-Steel Deformed and Plain Bars for Concrete Reinforcement
8. ASTM A617 - Standard Specification for Axle-Steel Deformed and Plain Bars for Concrete Reinforcement
9. ASTM A706 - Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement.
10. ASTM A767 - Standard Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement
11. ASTM A775 - Standard Specification for Epoxy-Coated Reinforcing Steel Bars.
12. ASTM A884 - Standard Specification for Epoxy-Coated Steel Wire and Welded Wire Fabric for Reinforcement.
13. ASTM A934 - Standard Specification for Epoxy-Coated Prefabricated Steel Reinforcing Bars.

- B. American Concrete Institute (ACI)
  - 1. ACI 301 - Standard Specification for Structural Concrete
  - 2. ACI 315 - Details and Detailing of Concrete Reinforcement.
  - 3. ACI 318 - Building Code Requirements for Structural Concrete
  - 4. ACI SP-66 - ACI Detailing Manual
- C. Concrete Reinforcing Steel Institute (CRSI)
  - 1. Manual of Standard Practice
- D. American Welding Society (AWS)
  - 1. AWS D1.4 - Structural Welding Code Reinforcing Steel
- E. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

#### 1.05 QUALITY ASSURANCE

- A. Provide services of a manufacturer's representative, with at least 2 years experience in the use of the reinforcing fibers for a preconstruction meeting and assistance during the first placement of the material.

#### 1.06 DELIVERY, HANDLING AND STORAGE

- A. Reinforcing steel shall be substantially free from mill scale, rust, dirt, grease, or other foreign matter.
- B. Reinforcing steel shall be shipped and stored with bars of the same size and shape fastened in bundles with durable tags, marked in a legible manner with waterproof markings showing the same "mark" designations as those shown on the submitted Placing Drawings.
- C. Reinforcing steel shall be stored off the ground and kept free from dirt, oil, or other injurious contaminants.

### PART 2 - PRODUCTS

#### 2.01 MATERIALS

- A. Materials shall be new, of domestic manufacture and shall comply with the following material specifications.
- B. Deformed Concrete Reinforcing Bars: ASTM A615, Grade 60 deformed bars.

- C. Concrete Reinforcing Bars required on the Drawings to be Welded: ASTM A706.
- D. Welded Steel Wire Fabric: ASTM A185. Provide in flat sheets.
- E. Welded Deformed Steel Wire Fabric: ASTM A497.
- F. Welded Plain Bar Mats: ASTM A704 and ASTM A615 Grade 60 plain bars.
- G. Fabricated Deformed Steel Bar Mats: ASTM A184 and ASTM A615 Grade 60 deformed bars.
- H. The following alternate materials are allowed:
  - 1. ASTM A615 Grade 60 may be used for ASTM A706 provided the following requirements are satisfied:
    - a. The actual yield strength of the reinforcing steel based on mill tests shall not exceed the specified yield strength by more than 18,000 psi. Retests shall not exceed this value by more than an additional 3000 psi.
    - b. The ratio of the actual ultimate tensile strength to the actual tensile yield strength of the reinforcement shall not be less than 1.25.
    - c. The carbon equivalency (CE) of bars shall be 0.55 or less.
- I. Reinforcing Steel Accessories
  - 1. Plastic Protected Bar Supports: CRSI Bar Support Specifications, Class 1 - Maximum Protection.
  - 2. Stainless Steel Protected Bar Supports: CRSI Bar Support Specifications, Class 2 - Moderate Protection.
  - 3. Precast Concrete Block Bar Supports: CRSI Bar Support Specifications, Precast Blocks. Blocks shall have equal or greater strength than the surrounding concrete.
  - 4. Steel Protected Bar Supports: #4 Steel Chairs with plastic or rubber tips.
- J. Tie Wire
  - 1. Tie Wires for Reinforcement shall be 16-gauge or heavier, black annealed wire or stranded wire.
- K. Mechanical reinforcing steel butt splices shall be positive connecting taper threaded type employing a hexagonal coupler such as Lenton rebar splices as manufactured by Erico Products Inc., Solon, OH or equal. They shall meet

all ACI 318 Building Code requirements. Bar ends must be taper threaded with coupler manufacturer's bar threader to ensure proper taper and thread engagement. Bar couplers shall be torqued to manufacturer's recommended value.

1. Unless otherwise noted on the Drawings, mechanical tension splices shall be designed to produce a splice strength in tension or compression of not less than 125 percent of the ASTM specified minimum yield strength of the rebar.
2. Compression type mechanical splices shall provide concentric bearing from one bar to the other bar and shall be capable of developing the ultimate strength of the rebar in compression.

#### L. Fiber Reinforcement

1. Synthetic reinforcing fiber for concrete shall be 100 percent polypropylene collated, fibrillated fibers as manufactured by Propex Concrete Systems Chattanooga, TN - Propex or equal. Fiber length and quantity for the concrete mix shall be in strict compliance with the manufacturer's recommendations as approved by the Engineer.

### 2.02 FABRICATION

- A. Fabrication of reinforcement shall be in compliance with the CRSI Manual of Standard Practice.
- B. Bars shall be cold bent. Bars shall not be straightened or rebent.
- C. Bars shall be bent around a revolving collar having a diameter of not less than that recommended by the ACI 318.
- D. Bar ends that are to be butt spliced, placed through limited diameter holes in metal, or threaded, shall have the applicable end(s) saw-cut. Such ends shall terminate in flat surfaces within 1-1/2 degrees of a right angle to the axis of the bar.

## PART 3 - EXECUTION

### 3.01 INSTALLATION

- A. Surface condition, bending, spacing and tolerances of placement of reinforcement shall comply with the CRSI Manual of Standard Practice. The Contractor shall be solely responsible for providing an adequate number of bars and maintaining the spacing and clearances shown on the Drawings.
- B. Except as otherwise indicated on the Drawings, the minimum concrete cover of reinforcement shall be as follows:
  1. Concrete cast against and permanently exposed to earth: 3-in

2. Concrete exposed to soil, water, sewage, sludge and/or weather: 2-in (Including bottom cover of slabs over water or sewage)
  3. Concrete not exposed to soil, water, sewage, sludge and/or weather:
    - a. Slabs ( top and bottom cover), walls, joists, shells and folded plate members – 3/4-in
    - b. Beams and columns ( principal reinforcement, ties, spirals and stirrups) - 1-1/2-in
- C. Reinforcement which will be exposed for a considerable length of time after being placed shall be coated with a heavy coat of neat cement slurry.
- D. No reinforcing steel bars shall be welded either during fabrication or erection unless specifically shown on the Drawings or specified herein, or unless prior written approval has been obtained from the Engineer. All bars that have been welded, including tack welds, without such approval shall be immediately removed from the work. When welding of reinforcement is approved or called for, it shall comply with AWS D1.4.
- E. Reinforcing steel interfering with the location of other reinforcing steel, conduits or embedded items, may be moved within the specified tolerances or one bar diameter, whichever is greater. Greater displacement of bars to avoid interference shall only be made with the approval of the Engineer. Do not cut reinforcement to install inserts, conduits, mechanical openings or other items without the prior approval of the Engineer.
- F. Securely support and tie reinforcing steel to prevent movement during concrete placement. Secure dowels in place before placing concrete.
- G. Reinforcing steel bars shall not be field bent except where shown on the Drawings or specifically authorized in writing by the Engineer. If authorized, bars shall be cold-bent around the standard diameter spool specified in the CRSI. Do not heat bars. Closely inspect the reinforcing steel for breaks. If the reinforcing steel is damaged, replace, Cadweld or otherwise repair as directed by the Engineer. Do not bend reinforcement after it is embedded in concrete unless specifically shown otherwise on the Drawings.

### 3.02 REINFORCEMENT AROUND OPENINGS

- A. Unless specific additional reinforcement around openings is shown on the Drawings, provide additional reinforcing steel on each side of the opening equivalent to one half of the cross-sectional area of the reinforcing steel interrupted by an opening. The bars shall have sufficient length to develop bond at each end beyond the opening or penetration.

### 3.03 SPLICING OF REINFORCEMENT

- A. Splices designated as compression splices on the Drawings, unless otherwise noted, shall be 30 bar diameters, but not less than 12-in. The lap

splice length for column vertical bars shall be based on the bar size in the column above.

- B. Tension lap splices shall be provided at all laps in compliance with ACI 318. Splices in adjacent bars shall be staggered. Class A splices may be used when 50 percent or less of the bars are spliced within the required lap length. Class B splices shall be used at all other locations.
- C. Splicing of reinforcing steel in concrete elements noted to be "tension members" on the Drawings shall be avoided whenever possible. However, if required for constructability, splices in the reinforcement subject to direct tension shall be welded to develop, in tension, at least 125 percent of the specified yield strength of the bar. Splices in adjacent bars shall be offset the distance of a Class B splice.
- D. Install wire fabric in as long lengths as practicable. Wire fabric from rolls shall be rolled flat and firmly held in place. Splices in welded wire fabric shall be lapped in accordance with the requirements of ACI-318 but not less than 12-in. The spliced fabrics shall be tied together with wire ties spaced not more than 24-in on center and laced with wire of the same diameter as the welded wire fabric. Do not position laps midway between supporting beams, or directly over beams of continuous structures. Offset splices in adjacent widths to prevent continuous splices.
- E. Mechanical reinforcing steel splicers shall be used only where shown on the Drawings. Splices in adjacent bars shall be offset by at least 30 bar diameters. Mechanical reinforcing splices are only to be used for special splice and dowel conditions approved by the Engineer.

### 3.04 ACCESSORIES

- A. Determine, provide and install accessories such as chairs, chair bars and the like in sufficient quantities and strength to adequately support the reinforcement and prevent its displacement during the erection of the reinforcement and the placement of concrete.
- B. Use precast concrete blocks where the reinforcing steel is to be supported over soil.
- C. Stainless steel bar supports or steel chairs with stainless steel tips shall be used where the chairs are set on forms for a concrete surface that will be exposed to weather, high humidity, or liquid (including bottom of slabs over liquid containing areas). Use of galvanized or plastic tipped metal chairs is permissible in all other locations unless otherwise noted on the Drawings or specified herein.
- D. Alternate methods of supporting top steel in slabs, such as steel channels supported on the bottom steel or vertical reinforcing steel fastened to the bottom and top mats, may be used if approved by the Engineer.

### 3.05 INSPECTION

- A. In no case shall any reinforcing steel be covered with concrete until the installation of the reinforcement, including the size, spacing and position of the reinforcement has been observed by the Engineer and the Engineer's release to proceed with the concreting has been obtained. The Engineer shall be given ample prior notice of the readiness of placed reinforcement for observation. The forms shall be kept open until the Engineer has finished his/her observations of the reinforcing steel.

END OF SECTION

## SECTION 03250

### CONCRETE JOINTS AND JOINT ACCESSORIES

#### PART 1 - GENERAL

##### 1.01 SCOPE OF WORK

- A. Furnish all labor, materials, equipment and incidentals required and install accessories for concrete joints as shown on the Drawings and as specified herein.

##### 1.02 RELATED WORK

- A. Concrete Formwork is included in Section 03100.
- B. Concrete Reinforcement is included in Section 03200.
- C. Cast-In-Place Concrete is included in Section 03300.
- D. Concrete Finishes are included in Section 03350.
- E. Grout is included in Section 03600.

##### 1.03 SUBMITTALS

- A. Submit to the Engineer, in accordance with Section 01300, shop drawings and product data. Submittals shall include at least the following:
  - 1. Standard Waterstops: Product data including catalogue cut, technical data, storage requirements, splicing methods and conformity to ASTM standards.
  - 2. Special Waterstops: Product data including catalogue cut, technical data, location of use, storage requirements, splicing methods, installation instructions and conformity to ASTM standards.
  - 3. Premolded joint fillers: Product data including catalogue cut, technical data, storage requirements, installation requirements, location of use and conformity to ASTM standards.
  - 4. Bond breaker: Product data including catalogue cut, technical data, storage requirements, installation requirements, location of use and conformity to ASTM standards.
  - 5. Expansion joint dowels: Product data on the complete assembly including dowels, coatings, lubricants, spacers, sleeves, expansion caps, installation requirements and conformity to ASTM standards.



6. Compressible joint filler: Product data including catalogue cut, technical data, storage requirements, installation requirements, location of use and conformity to ASTM standards.
7. Bonding agents: Product data including catalogue cut, technical data, storage requirements, product life, application requirements and conformity to ASTM standards.

B. Certifications

1. Certification that all materials used within the joint system is compatible with each other.
2. Certifications that materials used in the construction of joints are suitable for use in contact with potable water 30 days after installation.

1.04 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM)

1. ASTM A 675 - Standard Specification for Steel Bars, Carbon, Hot-Wrought, Special Quality, Mechanical Properties.
2. ASTM C 881 - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete.
3. ASTM C 1059 - Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete.
4. ASTM D 1751 - Standard Specification for Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction. (Nonextruding and Resilient Bituminous Types).
5. ASTM D 1752 - Standard Specification for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.

B. U.S. Army Corps of Engineers (CRD).

1. CRD C572 - Specification for Polyvinylchloride Waterstops.

C. Federal Specifications

1. FS SS-S-210A - Sealing Compound for Expansion Joints.

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

## PART 2 - PRODUCTS

### 2.01 GENERAL

- A. The use of manufacturer's name and model or catalog number is for the purpose of establishing the standard of quality and general configuration desired.
- B. All materials used together in a given joint (bond breakers, backer rods, joint fillers, sealants, etc) shall be compatible with one another. Coordinate selection of suppliers and products to ensure compatibility. Under no circumstances shall asphaltic bond breakers or joint fillers be used in joints receiving sealant.
- C. All chemical sealant type waterstops shall be products specifically manufactured for the purpose for which they will be used and the products shall have been successfully used on similar structures for more than five years.

### 2.02 MATERIALS

#### A. Standard Waterstops

- 1. PVC Waterstops - The waterstop shall be made by extruding elastomeric plastic compound with virgin polyvinylchloride as the basic resins. The compound shall contain no reprocessed materials. Minimum tensile strength of waterstop shall be 1750 psi. The waterstop shall conform to CRD-C572. The waterstop shall be Greenstreak Group, Inc. model No. 679 or approved equal for construction joints. The waterstop shall be Greenstreak Group Inc. model No.732 or approved equal for control joints and Greenstreak Group Inc. Model No. 738 for expansion joints. Provide grommets or pre-punched holes spaced at 12 inches on center along length of waterstop.
- 2. Factory Fabrications: Provide factory made waterstop fabrications for all changes of direction, transitions, and intersections, leaving only straight butt joints of sufficient length for splicing in the field.

#### B. Special Waterstops

- 1. Base Seal PVC Waterstop - The waterstop shall be made by extruding elastomeric plastic compound with virgin polyvinylchloride as the basic resins. The compound shall contain no reprocessed materials. Minimum tensile strength of waterstop shall be 1750 psi. The waterstop shall conform to CRD-C572. Waterstops shall be style 925 for expansion joints, style 928 for control joints, and style 927 for construction joints by Greenstreak Plastic Products, St. Louis, MO or equal.

2. Preformed adhesive waterstops - The waterstop shall be a rope type preformed plastic waterstop meeting the requirements of Federal Specification S S-S-210A. The rope shall have a cross-section of approximately one square inch unless otherwise specified or shown on the Drawings. The waterstop shall be Synko-Flex waterstop as manufactured by Synko-Flex Products of Houston, TX, Lockstop by Greenstreak Group Inc., or equal. Primer for the material shall be as recommended by the waterstop manufacturer.
- C. Premolded Joint Filler
1. Premolded joint filler - Structures. Self-expanding cork, premolded joint filler shall conform to ASTM D1752, Type III. The thickness shall be 3/4-in unless shown otherwise on the Drawings.
  2. Premolded joint filler - sidewalk and roadway concrete pavements or where fiber joint filler is specifically noted on the Drawings. The joint filler shall be asphalt-impregnated fiber board conforming to ASTM D1751. The thickness shall be 3/4-in unless otherwise shown on the Drawings.
- D. Bond Breaker
1. Bond breaker tape shall be an adhesive-backed glazed butyl or polyethylene tape which will satisfactorily adhere to the premolded joint filler or concrete surface as required. The tape shall be the same width as the joint.
  2. Except where tape is specifically called for on the drawings, bond breaker for concrete shall be either bond breaker tape or a nonstaining type bond prevention coating such as Williams Tilt-up Compound by Williams Distributors Inc.; Silcoseal 77, by SCA Construction Supply Division, Superior Concrete Accessories or equal.
- E. Expansion Joint Dowels
1. Dowels shall be smooth steel conforming to ASTM A675, Grade 70. Dowels must be straight and clean, free of loose flaky rust and loose scale. Dowels may be sheared to length provided deformation from true shape caused by shearing does not exceed 0.04-in on the diameter of the dowel and extends no more than 0.04-in from the end. Bars shall be coated with a bond breaker on the expansion end of the dowel. Expansion caps shall be provided on the expansion end. Caps shall allow for at least 1-1/2-in of expansion.
  2. Dowel Bar Sleeves: Provide Greenstreak two component Speed Dowel System, to accept 1" diameter x 12" long slip dowels. The Greenstreak Group, Inc. Speed Dowel System is comprised of a reusable base and a plastic sleeve. Both pieces shall be manufactured from polypropylene plastic.

F. Bonding Agent

1. Epoxy bonding agent shall be a two-component, solvent-free, moisture insensitive, epoxy resin material conforming to ASTM C 881, Type II. The bonding agent shall be Sikadur 32 Hi-Mod by Sika Corporation of Lyndhurst, N.J.; Concrete Liquid (LPL) by Master Builders of Cleveland, OH or equal. Acrylic may be used if approved by the Engineer.

G. Compressible Joint Filler

1. The joint filler shall be a non-extruded watertight strip material use to fill expansion joints between structures. The material shall be capable of being compressed at least 40 percent for 70 hours at 68 degrees F and subsequently recovering at least 20 percent of its original thickness in the first 1/2 hour after unloading. Compressible Joint filler shall be Evasote 380 E.S.P, by E-Poxy Industries, Inc., Ravena, NY , Sikaflex 1a by Sika or equal.

## PART 3 - EXECUTION

### 3.01 INSTALLATION

A. Standard Waterstops

1. Install waterstops for all joints where indicated on the Drawings. Waterstops shall be continuous around all corners and intersections so that a continuous seal is provided. Provide factory made waterstop fabrications for all changes in direction, intersections and transitions leaving only straight butt joints splices for the field.
2. Horizontal waterstops in slabs shall be clamped in position by the bulkhead (unless previously set in concrete).
3. Waterstops shall be installed so that half of the width will be embedded on each side of the joint. Care shall be exercised to ensure that the waterstop is completely embedded in void-free concrete.
4. Waterstops shall be terminated 3-in below the exposed top of walls. Expansion joint waterstop center bulbs shall be plugged with foam rubber, 1-in deep, at point of termination.

B. Special Waterstops

1. Install special waterstops at joints where specifically noted on the Drawings. Waterstops shall be continuous around all corners and intersections so that a continuous seal is provided. Provide factory made waterstop fabrications for all changes in direction, intersections and transitions leaving only straight butt joints splices for the field.

2. Each piece of the waterstop shall be of maximum practicable length to provide a minimum number of connections or splices. Connections and splices shall conform to the manufacturer's recommendations and as specified herein.
3. Waterstops shall be terminated 3-in below the exposed top of walls.

#### C. Construction Joints

1. Make construction joints only at locations shown on the Drawings or as approved by the Engineer. Any additional or relocation of construction joints proposed by the Contractor, must be submitted to the Engineer for written approval.
2. Additional or relocated joints should be located where they least impair strength of the member. In general, locate joints within the middle third of spans of slabs, beams and girders. However, if a beam intersects a girder at the joint, offset the joint a distance equal to twice the width of the member being connected. Locate joints in walls and columns at the underside of floors, slabs, beams or girders and at tops of footings or floor slabs. Do not locate joints between beams, girders, column capitals, or drop panels and the slabs above them. Do not locate joints between brackets or haunches and walls or columns supporting them.
3. All joints shall be perpendicular to main reinforcement. Continue reinforcing steel through the joint as indicated on the Drawings. When joints in beams are allowed, provide a shear key and inclined dowels as approved by the Engineer.
4. Provide sealant grooves for joint sealant where indicated on the Drawings.
5. At all construction joints and at concrete joints designated on the Drawings to be "roughened", uniformly roughen the surface of the concrete to a full amplitude (distance between high and low points or side to side) of approximately 1/4-in to expose a fresh face. Thoroughly clean joint surfaces of loose or weakened materials by water-blasting or sandblasting and prepare for bonding.
6. Provide waterstops in all wall and slab construction joints in liquid containment structures and at other locations shown on the Drawings.
7. Keyways shall not be used in construction joints unless specifically shown on the Drawings or approved by the Engineer.

#### D. Expansion Joints

1. Do not extend through expansion joints, reinforcement or other embedded metal items that are continuously bonded to concrete on each side of joint.

2. Position premolded joint filler material accurately. Secure the joint filler against displacement during concrete placement and compaction. Place joint filler over the face of the joint, allowing for sealant grooves as detailed on the Drawings. Tape all joint filler splices to prevent intrusion of mortar. Seal expansion joints as shown on the Drawings.
3. Expansion joints shall be 3/4-in in width unless otherwise noted on the Drawings.
4. Where indicated on Drawings, install smooth dowels at right angles to expansion joints. Align dowels accurately with finished surface. Rigidly hold in place and support during concrete placement. Unless otherwise shown on the Drawings, apply oil or grease to one end of all dowels through expansion joints. Provide plastic expansion caps on the lubricated ends of expansion dowels.
5. Provide center bulb type waterstops in all wall and slab expansion joints in liquid containment structures and at other locations shown on the Drawings.

#### E. Control Joints

1. Provide sealant grooves, sealants and waterstops at control joints in slabs on grade or walls as detailed. Provide waterstops at all wall and slab control joints in water containment structures and at other locations shown on the Drawings.
2. Control joints may be sawed if specifically approved by the Engineer. If control joint grooves are sawed, properly time the saw cutting with the time of the concrete set. Start cutting as soon as concrete has hardened sufficiently to prevent aggregates from being dislodged by the saw. Complete cutting before shrinkage stresses have developed sufficiently to induce cracking. No reinforcing shall be cut during sawcutting.
3. Extend every other bar of reinforcing steel through control joints or as indicated on the Drawings. Where specifically noted on the Drawings, coat the concrete surface with a bond breaker prior to placing new concrete against it. Avoid coating reinforcement or waterstops with bond breaker at these locations.

END OF SECTION

## SECTION 03300

### CAST-IN-PLACE CONCRETE

#### PART 1 - GENERAL

##### 1.01 SCOPE OF WORK

- A. Furnish all labor and materials required and install cast-in-place concrete complete as shown on the Drawings and as specified herein.

##### 1.02 RELATED WORK

- A. Concrete Formwork is included in Section 03100.
- B. Concrete Reinforcement is included in Section 03200.
- C. Concrete Joints and Joint Accessories are included in Section 03250.
- D. Concrete Finishes are included in Section 03350.
- E. Grout is included in Section 03600.

##### 1.03 SUBMITTALS

- A. Submit to the Engineer, in accordance with Section 01300, shop drawings and product data including the following:
  - 1. Sources of cement, pozzolan and aggregates.
  - 2. Material Safety Data Sheets (MSDS) for all concrete components and admixtures.
  - 3. Air-entraining admixture. Product data including catalogue cut, technical data, storage requirements, product life, recommended dosage, temperature considerations and conformity to ASTM standards.
  - 4. Water-reducing admixture. Product data including catalogue cut, technical data, storage requirements, product life, recommended dosage, temperature considerations and conformity to ASTM standards.
  - 5. High-range water-reducing admixture (plasticizer). Product data including catalogue cut, technical data, storage requirements, product life, recommended dosage, temperature considerations, retarding effect, slump range and conformity to ASTM standards. Identify proposed locations of use.
  - 6. Concrete mix for each formulation of concrete proposed for use including constituent quantities per cubic yard, water-cementitious

materials ratio, concrete slump, type and manufacturer of cement. Provide either a. or b. below for each mix proposed.

- a. Standard deviation data for each proposed concrete mix based on statistical records.
- b. The curve of water-cementitious materials ratio versus concrete cylinder strength for each formulation of concrete proposed based on laboratory tests. The cylinder strengths shall be the average of the 28 day cylinder strength test results for each mix. Provide results of 7 and 14 day tests if available.

7. Sheet curing material. Product data including catalogue cut, technical data and conformity to ASTM standard.

8. Liquid curing compound. Product data including catalogue cut, technical data, storage requirements, product life, application rate and conformity to ASTM standards. Identify proposed locations of use.

#### B. Samples

1. Fine and coarse aggregates if requested by the Engineer.

#### C. Test Reports

1. Fine aggregates - sieve analysis, physical properties, and deleterious substance.
2. Coarse aggregates - sieve analysis, physical properties, and deleterious substances.
3. Cements - chemical analysis and physical properties for each type.
4. Pozzolans - chemical analysis and physical properties.
5. Proposed concrete mixes - compressive strength, slump and air content.

#### D. Certifications

1. Certify admixtures used in the same concrete mix are compatible with each other and the aggregates.
2. Certify admixtures are suitable for use in contact with potable water after 30 days of concrete curing.
3. Certify curing compound is suitable for use in contact with potable water after 30 days (non-toxic and free of taste or odor).



## 1.04 REFERENCE STANDARDS

### A. American Society for Testing and Materials (ASTM)

1. ASTM C31 - Standard Practice for Making and Curing Concrete Test Specimens in the Field.
2. ASTM C33 - Standard Specification for Concrete Aggregates.
3. ASTM C 39 - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
4. ASTM C42 - Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.
5. ASTM C94 - Standard Specification for Ready-Mixed Concrete.
6. ASTM C 143 - Standard Test Method for Slump of Hydraulic Cement Concrete
7. ASTM C150 - Standard Specification for Portland Cement
8. ASTM C 171 - Standard Specification for Sheet Materials for Curing Concrete
9. ASTM C173 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.
10. ASTM C231 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
11. ASTM C260 - Standard Specification for Air-Entraining Admixtures for Concrete.
12. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
13. ASTM C 494 - Standard Specification for Chemical Admixtures for Concrete.
14. ASTM C 618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete.
15. ASTM C1017 - Standard Specification for Chemical Admixtures for use in Producing Flowing Concrete.

### B. American Concrete Institute (ACI).

1. ACI 304 - Guide for Measuring, Mixing, Transporting and Placing Concrete.

2. ACI 305 - Hot Weather Concreting.
3. ACI 306.1 - Standard Specification for Cold Weather Concreting.
4. ACI 318 - Building Code Requirements for Structural Concrete.
5. ACI 350 - Environmental Engineering Concrete Structures.
6. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

#### 1.05 QUALITY ASSURANCE

- A. Reinforced concrete shall comply with ACI 318, the recommendations of ACI 350R and other stated requirements, codes and standards. The most stringent requirement of the codes, standards and this Section shall apply when conflicts exist.
- B. Only one source of cement and aggregates shall be used on any one structure. Concrete shall be uniform in color and appearance.
- C. Well in advance of placing concrete, discuss with the Engineer the sources of individual materials and batched concrete proposed for use. Discuss placement methods, waterstops and curing. Propose methods of hot and cold weather concreting as required. Prior to the placement of any concrete containing a high-range water-reducing admixture (plasticizer), the Contractor, accompanied by the plasticizer manufacturer, shall discuss the properties and techniques of batching and placing plasticized concrete.
- D. If, during the progress of the work, it is impossible to secure concrete of the required workability and strength with the materials being furnished, the Engineer may order such changes in proportions or materials, or both, as may be necessary to secure the desired properties. All changes so ordered shall be made at the Contractor's expense.
- E. If, during the progress of the work, the materials from the sources originally accepted change in characteristics, the Contractor shall, at his/her expense, make new acceptance tests of aggregates and establish new design mixes.
- F. Testing of the following materials shall be furnished by Contractor to verify conformity with this Specification Section and the stated ASTM Standards.
  1. Fine aggregates for conformity with ASTM C 33 - sieve analysis, physical properties, and deleterious substances.
  2. Coarse aggregates for conformity with ASTM C 33 - sieve analysis, physical properties, and deleterious substances.
  3. Cements for conformity with ASTM C 150 - chemical analysis and physical properties.

4. Pozzolans for conformity with ASTM C618 - chemical analysis and physical properties.
  5. Proposed concrete mix designs - compressive strength, slump and air content.
- G. Field testing and inspection services will be provided by the Owner. The cost of such work, except as specifically stated otherwise, shall be paid by the Owner. Testing of the following items shall be by the Owner to verify conformity with this Specification Section.
1. Concrete placements - compressive strength (cylinders), compressive strength (cores), slump, and air content.
  2. Other materials or products that may come under question.
- H. All materials incorporated in the work shall conform to accepted samples.
- 1.06 DELIVERY, STORAGE AND HANDLING
- A. Cement: Store in weather-tight buildings, bins or silos to provide protection from dampness and contamination and to minimize warehouse set.
  - B. Aggregate: Arrange and use stockpiles to avoid excessive segregation or contamination with other materials or with other sizes of like aggregates. Build stockpiles in successive horizontal layers not exceeding 3 -ft in thickness. Complete each layer before the next is started. Do not use frozen or partially frozen aggregate.
  - C. Sand: Arrange and use stockpiles to avoid contamination. Allow sand to drain to uniform moisture content before using. Do not use frozen or partially frozen aggregates.
  - D. Admixtures: Store in closed containers to avoid contamination, evaporation or damage. Provide suitable agitating equipment to assure uniform dispersion of ingredients in admixture solutions which tend to separate. Protect liquid admixtures from freezing and other temperature changes which could adversely affect their characteristics.
  - E. Pozzolan: Store in weather-tight buildings, bins or silos to provide protection from dampness and contamination.
  - F. Sheet Curing Materials: Store in weather-tight buildings or off the ground and under cover.
  - G. Liquid Curing Compounds: Store in closed containers.

## PART 2 - PRODUCTS

### 2.01 GENERAL

- A. The use of manufacturer's name and model or catalog number is for the purpose of establishing the standard of quality and general configuration desired.
- B. Cement: U.S. made portland cement complying with ASTM C 150. Air entraining cements shall not be used. Cement brands shall be subject to approval by the Engineer and one brand shall be used throughout the Work. The following cement type(s) shall be used:

### 2.02 MATERIALS

- A. Materials shall comply with this Section and any applicable State or Local requirements.
- B. Cement: Domestic portland cement complying with ASTM C 150. Air entraining cements shall not be used. Cement brands shall be subject to approval by the Engineer and one brand shall be used throughout the Work. The following cement type(s) shall be used:
  - 1. Class A,B,C,D Concrete - Type II with the addition of fly ash resulting in  $C_3A$  being below 5 percent of total cementitious content, Type III limited to 5 percent  $C_3A$  or Type V.
- C. Fine Aggregate: Washed inert natural sand conforming to the requirements of ASTM C33.
- D. Coarse Aggregate: Well-graded crushed stone or washed gravel conforming to the requirements of ASTM C33. Grading requirements shall be as listed in ASTM C33 Table 2 for the specified coarse aggregate size number. Limits of Deleterious Substances and Physical Property Requirements shall be as listed in ASTM C33 Table 3 for severe weathering regions. Size numbers for the concrete mixes shall be as shown in Table 1 herein.
- E. Water: Potable water free from injurious amounts of oils, acids, alkalis, salts, organic matter, or other deleterious substances.
- F. Admixtures: Admixtures shall be free of chlorides and alkalis (except for those attributable to water). When it is required to use more than one admixture in a concrete mix, the admixtures shall be from the same manufacturer. Admixtures shall be compatible with the concrete mix including other admixtures and shall be suitable for use in contact with potable water after 30 days of concrete curing.
  - 1. Air-Entraining Admixture: The admixture shall comply with ASTM C260. Proportioning and mixing shall be in accordance with manufacturer's recommendations.

2. Water-Reducing Agent: The admixture shall comply with ASTM C494, Type A. Proportioning and mixing shall be in accordance with manufacturer's recommendations.
  3. High-Range Water-Reducer (Plasticizer): The admixture shall comply with ASTM C 494, Type F and shall result in non-segregating plasticized concrete with little bleeding and with the physical properties of low water/cement ratio concrete. The treated concrete shall be capable of maintaining its plastic state in excess of 2 hours. Proportioning and mixing shall be in accordance with manufacturer's recommendations. Where walls are 14" thick or less and the wall height exceeds 12 ft a mix including a plasticizer must be used.
  4. Admixtures causing retarded or accelerated setting of concrete shall not be used without written approval from the Engineer. When allowed, the admixtures shall be retarding or accelerating water reducing or high range water reducing admixtures.
- G. Pozzolan (Fly Ash): Pozzolan shall be Class C or Class F fly ash complying with ASTM C 618 except the Loss on Ignition (LOI) shall be limited to 3 percent maximum.
- H. Sheet Curing Materials. Waterproof paper, polyethylene film or white burlap-polyethylene sheeting all complying with ASTM C171.
- I. Liquid Curing Compound. Liquid membrane-forming curing compound shall comply with the requirements of ASTM C309, Type 1-D (clear or translucent with fugitive dye) and shall contain no wax, paraffin, or oil. Curing compound shall be approved for use in contact with potable water after 30 days (non-toxic and free of taste or odor). Curing compound shall comply with Federal, State and local VOC limits.

## 2.03 MIXES

- A. Development of mix designs and testing shall be by an independent testing laboratory acceptable to the Engineer engaged by and at the expense of the Contractor.
- B. Select proportions of ingredients to meet the design strength and materials limits specified in Table 1 and to produce concrete having proper placability, durability, strength, appearance and other required properties. Proportion ingredients to produce a homogeneous mixture which will readily work into corners and angles of forms and around reinforcement without permitting materials to segregate or allowing excessive free water to collect on the surface.
- C. The design mix shall be based on standard deviation data of prior mixes with essentially the same proportions of the same constituents or, if such data is not available, be developed by a testing laboratory, acceptable to the Engineer, engaged by and at the expense of the Contractor. Acceptance of

mixes based on standard deviation shall be based on the modification factors for standard deviation tests contained in ACI 318. The water content of the concrete mix, determined by laboratory testing, shall be based on a curve showing the relation between water cementitious ratio and 7 and 28 day compressive strengths of concrete made using the proposed materials. The curves shall be determined by four or more points, each representing an average value of at least three test specimens at each age. The curves shall have a range of values sufficient to yield the desired data, including the specified design strengths as modified below, without extrapolation. The water content of the concrete mixes to be used, as determined from the curve, shall correspond to strengths 16 per cent greater than the specified design strengths. The resulting mix shall not conflict with the limiting values for maximum water cementitious ratio and net minimum cementitious content as specified in Table 1.

- D. Compression Tests: Provide testing of the proposed concrete mix or mixes to demonstrate compliance with the specified design strength requirements in conformity with the above paragraph.
- E. Entrained air, as measured by ASTM C231, shall be as shown in Table 1.
  - 1. If the air-entraining agent proposed for use in the mix requires testing methods other than ASTM C231 to accurately determine air content, make special note of this requirement in the admixture submittal.
- F. Slump of the concrete as measured by ASTM C143, shall be as shown in Table 1. If a high-range water-reducer (plasticizer) is used, the slump indicated shall be that measured before plasticizer is added. Plasticized concrete shall have a slump ranging from 7 to 10-in.
- G. Proportion admixtures according to the manufacturer's recommendations. Two or more admixtures specified may be used in the same mix provided that the admixtures in combination retain full efficiency and have no deleterious effect on the concrete or on the properties of each other.

TABLE 1

CONCRETE MIX REQUIREMENTS

Class	Design Strength (1)	Cement (2)	Fine Aggregate (2)	Coarse Aggregate (3)	Cementitious Content (4)
A	2500	C150 Type II	C33	57	440 min.
B	3000	C150 Type II	C33	57	480 min.

C	4000	C150 Type II	C33	57	560 min.
D	5000	C150 Type II	C33	57	600 min.

Class	W/Cm Ratio (5)	Fly Ash	AE Range (6)	WR (7)	HRWR (8)	Slump Range Inches
A	0.62 max.	--	3.5 to 5	Yes	*	1-4
B	0.54 max.	--	3.5 to 5	Yes	*	1-3
C	0.44 max.	25% max	3.5 to 5	Yes	*	3-5
D	0.40 max.	--	3.5 to 5	Yes	*	3-5

NOTES:

- (1) Minimum compressive strength in psi at 28 days
- (2) ASTM designation
- (3) Size Number in ASTM C33
- (4) Cementitious content in lbs/cu yd
- (5) W/Cm is Water-Cementitious ratio by weight
- (6) AE is percent air-entrainment
- (7) WR is water-reducer admixture
- (8) HRWR is high-range water-reducer admixture
- \* HRWR used at contractor's option except where walls are 14" thick or less and the wall height exceeds 12 ft a mix including a plasticizer must be used.

PART 3 - EXECUTION

3.01 MEASURING MATERIALS

- A. Concrete shall be composed of portland cement, fine aggregate, coarse aggregate, water and admixtures as specified and shall be produced by a plant acceptable to the Engineer. All constituents, including admixtures, shall be batched at the plant except a high-range water-reducer may also be added in the field.
- B. Measure materials for batching concrete by weighing in conformity with and within the tolerances given in ASTM C 94 except as otherwise specified. Scales shall have been certified by the local Sealer of Weights and Measures within 1 year of use.
- C. Measure the amount of free water in fine aggregates within 0.3 percent with a moisture meter. Compensate for varying moisture contents of fine

aggregates. Record the number of gallons of water as-batched on printed batching tickets.

- D. Admixtures shall be dispensed either manually using calibrated containers or measuring tanks, or by means of an automatic dispenser approved by the manufacturer of the specific admixture.
  - 1. Charge air-entraining and chemical admixtures into the mixer as a solution using an automatic dispenser or similar metering device.
  - 2. Inject multiple admixtures separately during the batching sequence.

### 3.02 MIXING AND TRANSPORTING

- A. Batch plants shall have a current NRMCA Certification or equal.
- B. Concrete shall be ready-mixed concrete produced by equipment acceptable to the Engineer. No hand-mixing will be permitted. Clean each transit mix truck drum and reverse drum rotation before the truck proceeds under the batching plant. Equip each transit-mix truck with a continuous, nonreversible, revolution counter showing the number of revolutions at mixing speeds.
- C. Ready-mix concrete shall be transported to the site in watertight agitator or mixer trucks loaded not in excess of their rated capacities as stated on the name plate.
- D. Keep the water tank valve on each transit truck locked at all times. Any addition of water above the appropriate W/Cm ratio must be directed by the Engineer. Added water shall be incorporated by additional mixing of at least 35 revolutions. All added water shall be metered and the amount of water added shall be shown on each delivery ticket.
- E. All central plant and rolling stock equipment and methods shall comply with ACI 318 and ASTM C94.
- F. Select equipment of size and design to ensure continuous flow of concrete at the delivery end. Metal or metal-lined non-aluminum discharge chutes shall be used and shall have slopes not exceeding 1 vertical to 2 horizontal and not less than 1 vertical to 3 horizontal. Chutes more than 20-ft long and chutes not meeting slope requirements may be used if concrete is discharged into a hopper before distribution.
- G. Retempering (mixing with or without additional cement, aggregate, or water) of concrete or mortar which has reached initial set will not be permitted.
- H. Handle concrete from mixer to placement as quickly as practicable while providing concrete of required quality in the placement area. Dispatch trucks from the batching plant so they arrive at the work site just before the concrete is required, thus avoiding excessive mixing of concrete while waiting or delays in placing successive layers of concrete in the forms.



- I. Furnish a delivery ticket for ready mixed concrete to the Engineer as each truck arrives. Each ticket shall provide a printed record of the weight of cement and each aggregate as batched individually. Use the type of indicator that returns for zero punch or returns to zero after a batch is discharged. Clearly indicate the weight of fine and coarse aggregate, cement and water in each batch, the quantity delivered, the time any water is added, and the numerical sequence of the delivery. Show the time of day batched and time of discharge from the truck. Indicate the number of revolutions of the truck mixer.
- J. Temperature and Mixing Time Control
1. In cold weather, do not allow the as-mixed temperature of the concrete and concrete temperatures at the time of placement in the forms to drop below 40 degrees F.
  2. If water or aggregate has been heated, combine water with aggregate in the mixer before cement is added. Do not add cement to mixtures of water and aggregate when the temperature of the mixture is greater than 90 degrees F.
  3. In hot weather, cool ingredients before mixing to maintain temperature of the concrete below the maximum placing temperature of 90 degrees F. If necessary, substitute well-crushed ice for all or part of the mixing water.
  4. The maximum time interval between the addition of mixing water and/or cement to the batch and the placing of concrete in the forms shall not exceed the values shown in Table 2.

TABLE 2

MAXIMUM TIME TO DISCHARGE OF CONCRETE

<u>Air or Concrete Temperature (whichever is higher)</u>	<u>Maximum Time</u>
80 to 90 Degree F (27 to 32 Degree C).....	45 minutes
70 to 79 Degree F (21 to 26 Degree C).....	60 minutes
40 to 69 Degree F (5 to 20 Degree C).....	90 minutes

If an approved high-range water-reducer ( plasticizer) is used to produce plasticized concrete, the maximum time interval shall not exceed 90 minutes.

### 3.03 CONCRETE APPEARANCE

- A. Concrete mix showing either poor cohesion or poor coating of the coarse aggregate with paste shall be remixed. If this does not correct the condition, the concrete shall be rejected. If the slump is within the allowable limit, but excessive bleeding, poor workability, or poor finishability are observed, changes in the concrete mix shall be obtained only by adjusting one or more of the following:
1. The gradation of aggregate.
  2. The proportion of fine and coarse aggregate.
  3. The percentage of entrained air, within the allowable limits.
- B. Concrete for the work shall provide a homogeneous structure which, when hardened, will have the required strength, durability and appearance. Mixtures and workmanship shall be such that concrete surfaces, when exposed, will require no finishing. When concrete surfaces are stripped, the concrete, when viewed in good lighting from 10-ft away, shall be pleasing in appearance, and at 20-ft shall show no visible defects.

### 3.04 PLACING AND COMPACTING

- A. Placing
1. Verify that all formwork completely encloses concrete to be placed and is securely braced prior to concrete placement. Remove ice, excess water, dirt and other foreign materials from forms. Confirm that reinforcement and other embedded items are securely in place. Have a competent workman at the location of the placement who can assure that reinforcing steel and embedded items remain in designated locations while concrete is being placed. Sprinkle semi-porous subgrades or forms to eliminate suction of water from the mix. Seal extremely porous subgrades in an approved manner.
  2. Deposit concrete as near its final position as possible to avoid segregation due to rehandling or flowing. Place concrete continuously at a rate which ensures the concrete is being integrated with fresh plastic concrete. Do not deposit concrete which has partially hardened or has been contaminated by foreign materials or on concrete which has hardened sufficiently to cause formation of seams or planes of weakness within the section. If the section cannot be placed continuously, place construction joints as specified or as approved.
  3. Pumping of concrete will be permitted. Use a mix design and aggregate sizes suitable for pumping and submit for approval.
  4. Remove temporary spreaders from forms when the spreader is no longer useful. Temporary spreaders may remain embedded in

concrete only when made of galvanized metal or concrete and if prior approval has been obtained.

5. Do not place concrete for supported elements until concrete previously placed in the supporting element ( columns, slabs and/or walls) has reached adequate strength.
6. Where surface mortar is to form the base of a finish, especially surfaces designated to be painted, work coarse aggregate back from forms with a suitable tool to bring the full surface of the mortar against the form. Prevent the formation of excessive surface voids.
7. Slabs
  - a. After suitable bulkheads, screeds and jointing materials have been positioned, the concrete shall be placed continuously between construction joints beginning at a bulkhead, edge form, or corner. Each batch shall be placed into the edge of the previously placed concrete to avoid stone pockets and segregation.
  - b. Avoid delays in casting. If there is a delay in casting, the concrete placed after the delay shall be thoroughly spaded and consolidated at the edge of that previously placed to avoid cold joints. Concrete shall then be brought to correct level and struck off with a straightedge. Bullfloats or darbies shall be used to smooth the surface, leaving it free of humps or hollows.
  - c. Where slabs are to be placed integrally with the walls below them, place the walls and compact as specified. Allow 1 hour to pass between placement of the wall and the overlying slab to permit consolidation of the wall concrete. Keep the top surface of the wall moist so as to prevent cold joints.
8. Formed Concrete
  - a. Place concrete in forms using tremie tubes and taking care to prevent segregation. Bottom of tremie tubes shall preferably be in contact with the concrete already placed. Do not permit concrete to drop freely more than 4-ft. Place concrete for walls in 12 to 24-in lifts, keeping the surface horizontal. If plasticized concrete is used, the maximum lift thickness may be increased to 7-ft.
9. Underwater concreting shall be performed in conformity with the recommendations of ACI 304R. The tremie system shall be used to place underwater concrete. Tremie pipes shall be in the range of 8 to 12-in in diameter and be spaced at not more than 16-ft on centers nor more than 8-ft from an end form. Where concrete is being placed around a pipe, there shall be at least one tremie pipe on each side of

each pipe. Where the tremie system is not practical, direct pumped concrete for underwater placement may be used subject to approval of the system including details by the Engineer.

## B. Compacting

1. Consolidate concrete by vibration, puddling, spading, rodding or forking so that concrete is thoroughly worked around reinforcement, embedded items and openings and into corners of forms. Puddling, spading, etc, shall be continuously performed along with vibration of the placement to eliminate air or stone pockets which may cause honeycombing, pitting or planes of weakness.
2. All concrete shall be placed and compacted with mechanical vibrators. The number, type and size of the units shall be approved by the Engineer in advance of placing operations. No concrete shall be ordered until sufficient approved vibrators (including standby units in working order) are on the job.
3. A minimum frequency of 7000 rpm is required for mechanical vibrators. Insert vibrators and withdraw at points from 18 to 30-in apart. At each insertion, vibrate sufficiently to consolidate concrete, generally from 5 to 15 seconds. Do not over vibrate so as to segregate. Keep a spare vibrator on the site during concrete placing operations.
4. Concrete Slabs: Concrete for slabs less than 8-in thick shall be consolidated with vibrating screeds; slabs 8 to 12-in thick shall be compacted with internal vibrators and (optionally) with vibrating screeds. Vibrators shall always be placed into concrete vertically and shall not be laid horizontally or laid over.
5. Walls and Columns: Internal vibrators (rather than form vibrators) shall be used unless otherwise approved by the Engineer. In general, for each vibrator needed to melt down the batch at the point of discharge, one or more additional vibrators must be used to densify, homogenize and perfect the surface. The vibrators shall be inserted vertically at regular intervals, through the fresh concrete and slightly into the previous lift, if any.
6. Amount of Vibration: Vibrators are to be used to consolidate properly placed concrete but shall not be used to move or transport concrete in the forms. Vibration shall continue until:
  - a. Frequency returns to normal.
  - b. Surface appears liquefied, flattened and glistening.
  - c. Trapped air ceases to rise.

- d. Coarse aggregate has blended into surface, but has not disappeared.

### 3.05 CURING AND PROTECTION

A. Protect all concrete work against injury from the elements and defacements of any nature during construction operations.

B. Curing Methods

1. Curing Methods for Concrete Surfaces: Cure concrete to retain moisture and maintain specified temperature at the surface for a minimum of 7 days after placement. Curing methods to be used are as follows:

- a. Water Curing: Keep entire concrete surface wet by ponding, continuous sprinkling or covered with saturated burlap. Begin wet cure as soon as concrete attains an initial set and maintain wet cure 24 hours a day.
- b. Sheet Material Curing: Cover entire surface with sheet material. Securely anchor sheeting to prevent wind and air from lifting the sheeting or entrapping air under the sheet. Place and secure sheet as soon as initial concrete set occurs.
- c. Liquid Membrane Curing: Apply over the entire concrete surface except for surfaces to receive additional concrete. Curing compound shall NOT be placed on any concrete surface where additional concrete is to be placed, where concrete sealers or surface coatings are to be used, or where the concrete finish requires an integral floor product. Curing compound shall be applied as soon as the free water on the surface has disappeared and no water sheen is visible, but not after the concrete is dry or when the curing compound can be absorbed into the concrete. Application shall be in compliance with the manufacturer's recommendations.

2. Specified applications of curing methods.

- a. Slabs for Water Containment Structures: Water curing only.
- b. Slabs on Grade and Footings (not used to contain water): Water curing, sheet material curing or liquid membrane curing.
- c. Structural Slabs (other than water containment): Water curing or liquid membrane curing.
- d. Horizontal Surfaces which will Receive Additional Concrete, Coatings, Grout or Other Material that Requires Bond to the substrate: Water curing.

- e. Formed Surfaces: None if nonabsorbent forms are left in place 7 days. Water cure if absorbent forms are used. Sheet cured or liquid membrane cured if forms are removed prior to 7 days. Exposed horizontal surfaces of formed walls or columns shall be water cured for 7 days or until next placement of concrete is made.
  - f. Surfaces of Concrete Joints: Water cured or sheet material cured.
- C. Finished surfaces and slabs shall be protected from the direct rays of the sun to prevent checking and crazing.
- D. Cold Weather Concreting:
1. "Cold weather" is defined as a period when for more than 3 successive days, the average daily outdoor temperature drops below 40 degrees F. The average daily temperature shall be calculated as the average of the highest and the lowest temperature during the period from midnight to midnight.
  2. Cold weather concreting shall conform to ACI 306.1 and the additional requirements specified herein. Temperatures at the concrete placement shall be recorded at 12 hour intervals (minimum).
  3. Discuss a cold weather work plan with the Engineer. The discussion shall encompass the methods and procedures proposed for use during cold weather including the production, transportation, placement, protection, curing and temperature monitoring of the concrete. The procedures to be implemented upon abrupt changes in weather conditions or equipment failures shall also be discussed. Cold weather concreting shall not begin until the work plan is acceptable to the Engineer.
  4. During periods of cold weather, concrete shall be protected to provide continuous warm, moist curing (with supplementary heat when required) for a total of at least 350 degree-days of curing.
    - a. Degree-days are defined as the total number of 24 hour periods multiplied by the weighted average daily air temperature at the surface of the concrete (eg: 5 days at an average 70 degrees F = 350 degree-days).
    - b. To calculate the weighted average daily air temperature, sum hourly measurements of the air temperature in the shade at the surface of the concrete taking any measurement less than 50 degrees F as 0 degrees F. Divide the sum thus calculated by 24 to obtain the weighted average temperature for that day.
  5. Salt, manure or other chemicals shall not be used for protection.

6. The protection period for concrete being water cured shall not be terminated during cold weather until at least 24 hours after water curing has been terminated.

#### E. Hot Weather Concreting

1. "Hot weather" is defined as any combination of high air temperatures, low relative humidity and wind velocity which produces a rate of evaporation estimated in accordance with ACI 305R, approaching or exceeding 0.2 lbs/sqft/hr).
2. Concrete placed during hot weather, shall be batched, delivered, placed, cured and protected in compliance with the recommendations of ACI 305R and the additional requirements specified herein.
  - a. Temperature of concrete being placed shall not exceed 90 degrees F and every effort shall be made to maintain a uniform concrete mix temperature below this level. The temperature of the concrete shall be such that it will cause no difficulties from loss of slump, flash set or cold joints.
  - b. All necessary precautions shall be taken to promptly deliver, to promptly place the concrete upon its arrival at the job and to provide vibration immediately after placement.
  - c. The Engineer may direct the Contractor to immediately cover plastic concrete with sheet material.
3. Discuss with the Engineer a work plan describing the methods and procedures proposed to use for concrete placement and curing during hot weather periods. Hot weather concreting shall not begin until the work plan is acceptable to the Engineer.

### 3.06 REMOVAL OF FORMS

- A. Except as otherwise specifically authorized by the Engineer, forms shall not be removed before the concrete has attained a strength of at least 70 percent of its specified design strength for beams and slabs and at least 30 percent of its specified design strength for walls and vertical surfaces, nor before reaching the following number of day-degrees of curing (whichever is the longer):

TABLE 3

MINIMUM TIME TO FORM REMOVAL

<u>Forms for</u>	<u>Degree Days</u>
Beams and slabs	500
Walls and vertical surfaces	100

(See definition of degree-days in Paragraph 3.05D above).

- B. Shores shall not be removed until the concrete has attained at least 70 percent of its specified design strength and also sufficient strength to support safely its own weight and construction live loads.

3.07 INSPECTION AND FIELD TESTING

- A. The batching, mixing, transporting, placing and curing of concrete shall be subject to the inspection of the Engineer at all times. The Contractor shall advise the Engineer of his/her readiness to proceed at least 24 hours prior to each concrete placement. The Engineer will inspect the preparations for concreting including the preparation of previously placed concrete, the reinforcing steel and the alignment, cleanliness and tightness of formwork. No placements shall be made without the inspection and acceptance of the Engineer.
- B. Sets of field control cylinder specimens will be taken by the Engineer (or inspector) during the progress of the work, in compliance with ASTM C 31. The number of sets of concrete test cylinders taken of each class of concrete placed each day shall not be less than one set per day, nor less than one set for each 150 cu yds of concrete nor less than one set for each 5,000 sq ft of surface area for slabs or walls.
  1. A "set" of test cylinders consists of four cylinders: one to be tested at 7 days and two to be tested and their strengths averaged at 28 days. The fourth may be used for a special test at 3 days or to verify strength after 28 days if 28 day test results are low.
  2. When the average 28 day compressive strength of the cylinders in any set falls below the specified design strength or below proportional minimum 7 day strengths (where proper relation between seven and 28 day strengths have been established by tests), proportions, water content, or temperature conditions shall be changed to achieve the required strengths.



- C. Cooperate in the making of tests by allowing free access to the work for the selection of samples, providing an insulated closed curing box for specimens, affording protection to the specimens against injury or loss through the operations and furnish material and labor required for the purpose of taking concrete cylinder samples. All shipping of specimens will be paid for by the Owner. Curing boxes shall be acceptable to the Engineer.
- D. Slump tests will be made in the field immediately prior to placing the concrete. Such tests shall be made in accordance with ASTM C 143. If the slump is greater the specified range, the concrete shall be rejected.
- E. Air Content: Test for air content shall be made on fresh concrete samples. Air content for concrete made of ordinary aggregates having low absorption shall be made in compliance with either the pressure method complying with ASTM C231 or by the volumetric method complying with ASTM C173.
- F. The Engineer may have cores taken from any questionable area in the concrete work such as construction joints and other locations as required for determination of concrete quality. The results of tests on such cores shall be the basis for acceptance, rejection or determining the continuation of concrete work.
- G. Cooperate in obtaining cores by allowing free access to the work and permitting the use of ladders, scaffolding and such incidental equipment as may be required. Repair all core holes. The work of cutting and testing the cores will be at the expense of the Owner.
- H. See Specification Section 03900 for Leak Testing.

### 3.08 FAILURE TO MEET REQUIREMENTS

- A. Should the strengths shown by the test specimens made and tested in compliance with the previous provisions fall below the values given in Table 1, the Engineer shall have the right to require changes in proportions outlined to apply to the remainder of the work. Furthermore, the Engineer shall have the right to require additional curing on those portions of the structure represented by the test specimens which failed. The cost of such additional curing shall be at the Contractor's expense. In the event that such additional curing does not give the strength required, as evidenced by core and/or load tests, the Engineer shall have the right to require strengthening or replacement of those portions of the structure which fail to develop the required strength. The cost of all such core borings and/or load tests and any strengthening or concrete replacement required because strengths of test specimens are below that specified, shall be entirely at the expense of the Contractor. In such cases of failure to meet strength requirements the Contractor and Engineer shall confer to determine what adjustment, if any, can be made in compliance with Sections titled "Strength" and "Failure to Meet Strength Requirements" of ASTM C94. The "purchaser" referred to in ASTM C94 is the Contractor in this Section.

- B. When the tests on control specimens of concrete fall below the specified strength, the Engineer will permit check tests for strengths to be made by means of typical cores drilled from the structure in compliance with ASTM C42 and C39. In the case of cores not indicating adequate strength, the Engineer, in addition to other recourse, may require, at the Contractor's expense, load tests on any one of the slabs, beams, piles, caps, and columns in which such concrete was used. Tests need not be made until concrete has aged 60 days.
- C. Should the strength of test cylinders fall below 60 per cent of the required minimum 28 day strength, the concrete shall be rejected and shall be removed and replaced.

### 3.09 PATCHING AND REPAIRS

- A. It is the intent of this Section to require quality work including adequate forming, proper mixture and placement of concrete and curing so completed concrete surfaces will require no patching.
- B. Defective concrete and honeycombed areas as determined by the Engineer shall be repaired as specified by the Engineer.
- C. As soon as the forms have been stripped and the concrete surfaces exposed, fins and other projections shall be removed; recesses left by the removal of form ties shall be filled; and surface defects which do not impair structural strength shall be repaired. Clean all exposed concrete surfaces and adjoining work stained by leakage of concrete, to approval of the Engineer.
- D. Immediately after removal of forms remove plugs and break off metal ties as required by Section 03100. Promptly fill holes upon stripping as follows: Moisten the hole with water, followed by a 1/16-in brush coat of neat cement slurry mixed to the consistency of a heavy paste. Immediately plug the hole with a 1 to 1.5 mixture of cement and concrete sand mixed slightly damp to the touch (just short of "balling"). Hammer the grout into the hole until dense, and an excess of paste appears on the surface in the form of a spiderweb. Trowel smooth with heavy pressure. Avoid burnishing.
- E. When patching exposed surfaces the same source of cement and sand as used in the parent concrete shall be employed. Adjust color if necessary by addition of proper amounts of white cement. Rub lightly with a fine Carborundum stone at an age of 1 to 5 days if necessary to bring the surface down with the parent concrete. Exercise care to avoid damaging or staining the virgin skin of the surrounding parent concrete. Wash thoroughly to remove all rubbed matter.

### 3.10 SCHEDULE

- A. The following (Table 4) are the general applications for the various concrete classes and design strengths:

TABLE 4

CONCRETE SCHEDULE

<u>Class</u>	<u>Design Strength (psi)</u>	<u>Description</u>
A	2,500	Concrete fill and duct encasement
B	3,000	Concrete overlay slabs and pavements
C	4,000	Walls, slabs on grade, suspended slab and beam systems, columns, grade beams and all other structural concrete
D	5,000	Prestressed concrete

END OF SECTION

SECTION 03350  
CONCRETE FINISHES

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. Furnish all labor, materials, equipment and incidentals required and finish cast-in-place concrete surfaces as shown on the Drawings and as specified herein.

1.02 RELATED WORK

- A. Concrete Formwork is included in Section 03100.
- B. Cast-In-Place Concrete is included in Section 03300.
- C. Grout is included in Section 03600.

1.03 SUBMITTALS

- A. Submit to the Engineer, in accordance with Section 01300, shop drawings and product data showing materials of construction and details of installation for:
  - 1. Concrete sealer. Confirmation that the sealer is compatible with additionally applied coatings shall also be submitted.

1.04 REFERENCE STANDARDS

- A. American Society for Testing and Materials (ASTM)
  - 1. ASTM C33 - Standard Specification for Concrete Aggregates.
- B. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.05 QUALITY ASSURANCE

- A. Finishes
  - 1. For concrete which will receive additional applied finishes or materials, the surface finish specified is required for the proper application of the specified manufacturer's products. Where alternate products are approved for use, determine if changes in finishes are required and provide the proper finishes to receive these products.
  - 2. Changes in finishes made to accommodate products different from those specified shall be performed at no additional cost to the Owner.

Submit the proposed new finishes and their construction methods to the Engineer for approval.

3. Services of Manufacturer's Representative

- a. Make available at no extra cost to the Owner, upon 72 hours notification, the services of a qualified field representative of the manufacturer of curing compound, sealer or hardener to instruct the user on the proper application of the product under prevailing job conditions.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Chemical hardener shall be Lapidolith by Sonneborn; Hornolith by A.C. Horn; Penalith by W.R. Meadows or equal fluosilicate base material.
- B. Concrete sealer shall be "Kure-N-Seal", by Sonneborn, Minneapolis, MN or equal.

PART 3 - EXECUTION

3.01 FORMED SURFACES

- A. Forms shall not be removed before the requirements of Section 03300, have been satisfied.
- B. Exercise care to prevent damaging edges orobliterating the lines of chamfers, rustications or corners when removing the forms or performing any other work adjacent thereto.
- C. Clean all exposed concrete surfaces and adjoining work stained by leakage of concrete.
- D. Rough-Form Finish
  1. Immediately after stripping forms and before concrete has changed color, carefully remove all fins and projections.
  2. Promptly fill holes left by tie cones and defects as specified in Section 03300.
- E. Rubbed Finish
  1. Immediately upon stripping forms and before concrete has changed color, carefully remove all fins. While the wall is still damp apply a thin coat of medium consistency neat cement slurry by means of bristle brushes to provide a bonding coat within all pits, air holes or blemishes

in the parent concrete. Avoid coating large areas with the slurry at one time.

2. Before the slurry has dried or changed color, apply a dry (almost crumbly) grout proportioned by volume and consisting of 1 part cement to 1-1/2 parts of clean masonry sand having a fineness modulus of approximately 2.3 and complying with the gradation requirements of ASTM C 33 for such a material. Grout shall be uniformly applied by means of damp pads of coarse burlap approximately 6-in square used as a float. Scrub grout into the pits and air holes to provide a dense mortar in all imperfections.
3. Allow the mortar to partially harden for 1 or 2 hours depending upon the weather. If the air is hot and dry, keep the wall damp during this period using a fine fog spray. When the grout has hardened sufficiently so it can be scraped from the surface with the edge of a steel trowel without damaging the grout in the small pits or holes, cut off all that can be removed with a trowel. (Note: Grout allowed to remain on the wall too long will harden and will be difficult to remove.)
4. Allow the surface to dry thoroughly and rub it vigorously with clean dry burlap to completely remove any dried grout. No visible film of grout shall remain after this rubbing. The entire cleaning operation for any area must be completed the day it is started. Do not leave grout on surfaces overnight. Allow sufficient time for grout to dry after it has been cutoff with the trowel so it can be wiped off clean with the burlap.
5. On the day following the repair of pits, air holes and blemishes, the walls shall again be wiped off clean with dry, used pieces of burlap containing old hardened mortar which will act as a mild abrasive. After this treatment, there shall be no built-up film remaining on the parent surface. If, however, such a film is present, a fine abrasive stone shall be used to remove all such material without breaking through the surface film of the original concrete. Such scrubbing shall be light and sufficient only to remove excess material without changing the texture of the concrete.
6. A thorough wash-down with stiff bristle brushes shall follow the final bagging or stoning operation. No extraneous materials shall remain on the surface of the wall. The wall shall be sprayed with a fine fog spray periodically to maintain a continually damp condition for at least 3 days after the application of the repair grout.

#### F. Abrasive Blast Finish

1. Coordinate with Rubbed Finish application. Do not begin until Rubbed Finish operation is complete or before concrete has reached minimum 7-day strength. The Rubbed Finish application may be deleted by the

Engineer if the unfinished concrete surface is of superior quality. Apply the abrasive blast finish only where indicated on Drawings.

2. Prepare a sample area of minimum 4-ft high by 16-ft wide Blast Finish as directed by Engineer on a portion of new wall construction which will not be exposed in the final work. Sample area shall contain a variety of finishes obtained with different nozzles, nozzle pressures, grit materials and blasting techniques for selection by Engineer. Final accepted sample shall remain exposed until completion of all Blast Finish operations.
3. Blast finish operation shall meet all regulatory agency requirements. Blast Finish contractor shall be responsible for obtaining all required permits and/or licenses.
4. Perform abrasive blast finishing in as continuous an operation as possible, utilizing the same work crew to maintain continuity of finish on each surface or area of work. Maintain patterns or variances in depths of blast as present on the accepted sample.
5. Use an abrasive grit of proper type and gradation as well as equipment and technique to expose aggregate and surrounding matrix surfaces as follows:
  - a. Medium: Generally expose coarse aggregate - 1/4-in to 3/8-in reveal.
6. Abrasive blast corners and edge of patterns carefully, using back-up boards, to maintain uniform corner or edge line. Determine type of nozzle, nozzle pressure and blasting techniques required to match Architect's samples.
7. Upon completion of the Blast Finish operation, thoroughly flush finished surfaces with clean clear water to remove residual dust and grit. Allow to air dry until curing of concrete is complete.
8. After the concrete has cured for a minimum of 28 days, apply a clear acrylic sealer as directed by manufacturer.

### 3.02 FLOORS AND SLABS

#### A. Floated Finish

1. Machine Floating
  - a. Screed floors and slabs with straightedges to the established grades shown on the Drawings. Immediately after final screeding, a dry cement/sand shake in the proportion of two sacks of portland cement to 350 lbs of coarse natural concrete sand shall be sprinkled evenly over the surface at the rate of

approximately 500 lbs /1,000 sq ft of floor. Do not sprinkle neat, dry cement on the surface.

- b. The application of the cement/sand shake may be eliminated at the discretion of the Engineer if the base slab concrete exhibits adequate flatness and homogeneity and the need is not indicated. When the concrete has hardened sufficiently to support the weight of a power float without its digging into or disrupting the level surface, thoroughly float the shake into the surface with a heavy revolving disc type power compacting machine capable of providing a 200 lbf compacting force distributed over a 24-in diameter disc.
- c. Start floating along walls and around columns and then move systematically across the surface leaving a matte finish.
- d. The compacting machine shall be the "Kelly Power Float with Compaction Control" as manufactured by Kelley Industries of SSP Construction Equipment Inc., Pomona, CA or equal. Troweling machines equipped with float (shoe) blades that are slipped over the trowel blades may be used for floating. Floating with a troweling machine equipped with normal trowel blades will not be permitted. The use of any floating or troweling machine which has a water attachment for wetting the concrete surface during finishing will not be permitted.

## 2. Hand Floating

- a. In lieu of power floating, small areas may be compacted by hand floating. The dry cement/sand shake previously specified shall be used unless specifically eliminated by the Engineer. Scream the floors and slabs with straightedges to the established grades shown on the Drawings. While the concrete is still green, but sufficiently hardened to support a finisher and kneeboards with no more than 1/4-in indentation, wood float to a true, even plane with no coarse aggregate visible. Use sufficient pressure on the wood floats to bring moisture to the surface.

## 3. Finishing Tolerances

- a. Level floors and slabs to a tolerance of plus or minus 1/8-in when checked with a 10-ft straightedge placed anywhere on the slab in any direction. Where drains occur, pitch floors to drains such that there are no low spots left undrained. Failure to meet either of the above requirements shall be cause for removal, grinding, or other correction as directed by the Engineer.

## B. Broom Finish



1. Screed slabs with straightedges to the established grades indicated on the Drawings. When the concrete has stiffened sufficiently to maintain small surface indentations, draw a stiff bristle broom lightly across the surface in the direction of drainage, or, in the case of walks and stairs, perpendicular to the direction of traffic to provide a non-slip surface.

C. Steel Trowel Finish

1. Finish concrete as specified in Paragraph 3.04 and 3.05. Then, hand steel trowel to a perfectly smooth hard even finish free from high or low spots or other defects.

D. Concrete Sealer

1. Prepare and seal surfaces indicated on the room finish schedule to receive a sealer as follows:
  - a. Finish concrete as specified in the preceding paragraphs and in accordance with the Schedule in Paragraph 3.05 below.
  - b. Newly Placed Concrete: Surface must be sound and properly finished. Surface is application-ready when it is damp but not wet and can no longer be marred by walking workmen.
  - c. Newly-Cured Bare Concrete: Level any spots gouged out by trades. Remove all dirt, dust, droppage, oil, grease, asphalt and foreign matter. Cleanse with caustics and detergents as required. Rinse thoroughly and allow to dry so that surface is no more than damp, and not wet.
  - d. Aged Concrete: Restore surface soundness by patching, grouting, filling cracks and holes, etc. Surface must also be free of any dust, dirt and other foreign matter. Use power tools and/or strippers to remove any incompatible sealers or coatings. Cleanse as required, following the procedure indicated under cured concrete.
  - e. Methods: Apply sealer so as to form a continuous, uniform film by spray, soft-bristle push broom, long-nap roller or lambswool applicator. Ordinary garden-type sprayers, using neoprene hose, are recommended for best results.
  - f. Applications: For curing only, apply first coat evenly and uniformly as soon as possible after final finishing at the rate of 200 to 400 sq ft per gallon. Apply second coat when all trades are completed and structure is ready for occupancy at the rate of 400 to 600 sq ft per gallon.
  - g. To meet guarantee and to seal and dustproof, two coats are required. For sealing new concrete, both coats shall be applied

full-strength. On aged concrete, when renovating, dustproofing and sealing, the first coat should be thinned 10 to 15 per cent with reducer per manufacturer's directions.

### 3.03 CONCRETE RECEIVING CHEMICAL HARDENER

- A. After 28 days, minimum, concrete cures, apply chemical hardener in three applications to a minimum total coverage of the undiluted chemical of 100 sq ft per gallon and in accordance with manufacturer's recommendations as reviewed.

### 3.04 APPROVAL OF FINISHES

- A. All concrete surfaces, when finished, will be inspected by the Engineer.
- B. Surfaces which, in the opinion of the Engineer, are unsatisfactory shall be refinished or reworked.
- C. After finishing horizontal surfaces, regardless of the finishing procedure specified, the concrete shall be cured in compliance with Section 033 00 unless otherwise directed by the Engineer.

### 3.05 SCHEDULE OF FINISHES

- A. Concrete shall be finished as specified either to remain as natural concrete to receive an additional applied finish or material under another section.
- B. Concrete for the following conditions shall be finished as noted on the Drawings and as further specified herein:
  - 1. Concrete to Receive Dampproofing: Rough-form finish. See Paragraph 3.01D above.
  - 2. Concrete Not Exposed to View and Not Scheduled to Receive an Additional Applied Finish or Material: Rough-form finish. See Paragraph 3.01D above.
  - 3. Exterior Vertical Concrete Above Grade Exposed to View: Rubbed finish. See Paragraph 3.01E above.
  - 4. Interior Vertical Concrete Exposed to View Except in Water Containment Areas: Rubbed finish. See Paragraph 3.01E above.
  - 5. Vertical Concrete in Water Containment Areas. Rubbed finish on exposed surfaces and extending to two feet below normal operating water level: Rough-form finish on remainder of submerged areas. See Paragraphs 3.01E and 3.01D above.
  - 6. Interior and Exterior Underside of Concrete Exposed to View: Rubbed finish. See Paragraph 3.01E above.

7. Exterior surfaces exposed to view and indicated to have an a brasive blast finish. See Paragraph 3.01F above.
8. Interior or Exterior Horizontal Concrete not Requiring Floor Hardener or Sealer: Floated finish. See Paragraph 3.02A above.
9. Concrete for Exterior Walks, Interior and Exterior Stairs: Broomed finish perpendicular to direction of traffic. See Paragraph 3.02B above.
10. Concrete Slabs On Which Process Liquids Flow or In Contact with Sludge: Steel trowel finish. See Paragraph 3.02C above.
11. Concrete to Receive Hardener: See Paragraph 3.03 above.
12. Concrete to Receive Floor Sealer: See Paragraph 3.02D above.
13. Concrete tank bottoms to be covered with grout: See Section 03600.

END OF SECTION

## SECTION 03600

### GROUT

#### PART 1 - GENERAL

##### 1.01 SCOPE OF WORK

- A. Furnish all labor, materials, equipment and incidentals required and install grout complete as shown on the Drawings and as specified herein.

##### 1.02 RELATED WORK

- A. Formwork is included in Section 03100.
- B. Concrete Reinforcement is included in Section 03200.
- C. Concrete Joints and Joint Accessories are included in Section 03350.
- D. Cast-in-Place Concrete is included in Section 03300.

##### 1.03 SUBMITTALS

- A. Submit to the Engineer, in accordance with Section 01300, shop drawings and product data showing materials of construction and details of installation for:
  - 1. Commercially manufactured nonshrink cementitious grout. The submittals shall include catalog cuts, technical data, storage requirements, product life, working time after mixing, temperature considerations, conformity to required ASTM standards and Material Safety Data Sheet.
  - 2. Commercially manufactured nonshrink epoxy grout. The submittal shall include catalog cuts, technical data, storage requirements, product life, working time after mixing, temperature considerations, conformity to required ASTM standards and Material Safety Data Sheet.
  - 3. Cement grout. The submittal shall include the type and brand of the cement, the gradation of the fine aggregate, product data on any proposed admixtures and the proposed mix of the grout.
  - 4. Concrete grout. The submittals shall include data as required for concrete as delineated in Section 03300 and for fiber reinforcement as delineated in Section 03200. This includes the mix design, constituent quantities per cubic yard and the water/cement ratio.

B. Laboratory Test Reports

1. Submit laboratory test data as required under Section 03300 for concrete to be used as concrete grout.

C. Certifications

1. Certify that commercially manufactured grout products and concrete grout admixtures are suitable for use in contact with potable water after 30 days curing.

D. Qualifications

1. Grout manufacturers shall submit documentation that they have at least 10 years experience in the production and use of the proposed grouts which they will supply.

1.04 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM)

1. ASTM C 531 - Standard Test Method for Linear Shrinkage and Coefficient of Thermal Expansion of Chemical Resistant Mortars, Grouts and Monolithic Surfacing and Polymer Concretes
2. ASTM C 579 - Standard Test Method for Compressive Strength of Chemical Resistant Mortars, Grouts and Monolithic Surfacing and Polymer Concretes
3. ASTM C 827 - Standard Test Method for Change in Height at Early Ages of Cylindrical Specimens from Cementitious Mixtures
4. ASTM C 1107 - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink)

B. U.S. Army Corps of Engineers Standard (CRD)

1. CRD C-621 - Corps of Engineers Specification for Nonshrink Grout

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

1.05 QUALITY ASSURANCE

A. Qualifications

1. Grout manufacturer shall have a minimum of 10 years experience in the production and use of the type of grout proposed for the work.

B. Pre-installation Conference

1. Well in advance of grouting, hold a pre-installation meeting to review the requirements for surface preparation, mixing, placing and curing procedures for each product proposed for use. Parties concerned with grouting shall be notified of the meeting at least 10 days prior to its scheduled date.

C. Services of Manufacturer's Representative

1. A qualified field technician of the nonshrink grout manufacturer, specifically trained in the installation of the products, shall attend the pre-installation conference and shall be present for the initial installation of each type of nonshrink grout. Additional services shall also be provided, as required, to correct installation problems.

D. Field Testing

1. All field testing and inspection services required shall be provided by the Owner. The Contractor shall assist in the sampling of materials and shall provide any ladders, platforms, etc, for access to the work. The methods of testing shall comply in detail with the applicable ASTM Standards.
2. The field testing of Concrete Grout shall be as specified for concrete in Section 03300.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to the jobsite in original, unopened packages, clearly labeled with the manufacturer's name, product identification, batch numbers and printed instructions.
- B. Store materials in full compliance with the manufacturer's recommendations. Total storage time from date of manufacture to date of installation shall be limited to 6 months or the manufacturer's recommended storage time, whichever is less.
- C. Material which becomes damp or otherwise unacceptable shall be immediately removed from the site and replaced with acceptable material at no additional expense to the Owner.
- D. Nonshrink cement-based grouts shall be delivered as preblended, prepackaged mixes requiring only the addition of water.
- E. Nonshrink epoxy grouts shall be delivered as premeasured, prepackaged, three component systems requiring only blending as directed by the manufacturer.

## 1.07 DEFINITIONS

- A. Nonshrink Grout: A commercially manufactured product that does not shrink in either the plastic or hardened state, is dimensionally stable in the hardened state and bonds to a clean base plate.

## PART 2 - PRODUCTS

### 2.01 GENERAL

- A. The use of a manufacturer's name and product or catalog number is for the purpose of establishing the standard of quality desired.
- B. Like materials shall be the products of one manufacturer or supplier in order to provide standardization of appearance.

### 2.02 MATERIALS

#### A. Nonshrink Cementitious Grout

1. Nonshrink cementitious grouts shall meet or exceed the requirements of ASTM C 1107, Grades B or C and ASTM C 827. Grouts shall be portland cement based, contain a pre-proportioned blend of selected aggregates and shrinkage compensating agents and shall require only the addition of water. Nonshrink cementitious grouts shall not contain expansive cement or metallic particles. The grouts shall exhibit no shrinkage when tested in conformity with ASTM C 827.
  - a. General purpose nonshrink cementitious grout shall conform to the standards stated above and shall be SikaGrout 212 by Sika Corp.; Set Grout by Master Builders, Inc.; Gilco Construction Grout by Gifford Hill & Co.; Euco NS by The Euclid Chemical Co.; NBEC Grout by U. S. Grout Corp. or equal.
  - b. Flowable (Precision) nonshrink cementitious grout shall conform to the standards stated above and shall be Masterflow 928 by Master Builders, Inc.; Hi-Flow Grout by the Euclid Chemical Co.; SikaGrout 212 by Sika Corp.; Supreme Grout by Gifford Hill & Co.; Five Star Grout by U. S. Grout Corp. or equal.

#### B. Nonshrink Epoxy Grout

1. Nonshrink epoxy-based grouts shall be a pre-proportioned, three component, 100 per cent solids system consisting of epoxy resin, hardener, and blended aggregate. It shall have a compressive strength of 14,000 psi in 7 days when tested in conformity with ASTM D695 and have a maximum thermal expansion of  $30 \times 10^{-6}$  when tested in conformity with ASTM C531. The grout shall be Ceilcote 648 CP by Master Builders Inc.; Five Star Epoxy Grout by U.S. Grout

Corp.; Sikadur 42 Grout-Pak by Sika Corp.; High Strength Epoxy Grout by the Euclid Chemical Co. or equal.

C. Cement Grout

1. Cement grouts shall be a mixture of one part portland cement conforming to ASTM C150, Types I, II, or III and 1 to 2 parts sand conforming to ASTM C33 with sufficient water to place the grout. The water content shall be sufficient to impart workability to the grout but not to the degree that it will allow the grout to flow.

D. Concrete Grout

1. Concrete grout shall conform to the requirements of Section 03 300 except as specified herein. It shall be proportioned with cement, coarse and fine aggregates, water, water reducer and air entraining agent to produce a mix having an average strength of 2900 psi at 28 days, or 2500 psi nominal strength. Coarse aggregate size shall be 1/2-in maximum. Slump should not exceed 5-in and should be as low as practical yet still retain sufficient workability.
2. Synthetic reinforcing fibers as specified in Section 03 200 shall be added to the concrete grout mix at the rate of 1.5 lbs of fibers per cubic yard of grout. Fibers shall be added from the manufacturer's premeasured bags and according to the manufacturer's recommendations in a manner which will ensure complete dispersion of the fiber bundles as single monofilaments within the concrete grout.

E. Water

1. Potable water, free from injurious amounts of oil, acid, alkali, organic matter, or other deleterious substances.

## PART 3 - EXECUTION

### 3.01 PREPARATION

- A. Grout shall be placed over cured concrete which has attained its full design strength unless otherwise approved by the Engineer.
- B. Concrete surfaces to receive grout shall be clean and sound; free of ice, frost, dirt, grease, oil, curing compounds, laitance and paints and free of all loose material or foreign matter which may effect the bond or performance of the grout.
- C. Roughen concrete surfaces by chipping, sandblasting, or other mechanical means to a minimum of 1/4" amplitude or provide a raked finish in order to ensure bond of the grout to the concrete. Remove loose or broken concrete. Irregular voids or projecting coarse aggregate need not be removed if they are sound, free of laitance and firmly embedded into the parent concrete.



1. Air compressors used to clean surfaces in contact with grout shall be the oilless type or equipped with an oil trap in the air line to prevent oil from being blown onto the surface.
- D. Remove all loose rust, oil or other deleterious substances from metal embedments or bottom of baseplates prior to the installation of the grout.
- E. Concrete surfaces shall be washed clean and then kept moist for at least 24 hours prior to the placement of cementitious or cement grout. Saturation may be achieved by covering the concrete with saturated burlap bags, use of a soaker hose, flooding the surface, or other method acceptable to the Engineer. Upon completion of the 24 hour period, visible water shall be removed from the surface prior to grouting. The use of an adhesive bonding agent in lieu of surface saturation shall only be used when approved by the Engineer for each specific location of grout installation.
- F. Epoxy-based grouts do not require the saturation of the concrete substrate. Surfaces in contact with epoxy grout shall be completely dry before grouting.
- G. Construct grout forms or other leakproof containment as required. Forms shall be lined or coated with release agents recommended by the grout manufacturer. Forms shall be of adequate strength, securely anchored in place and shored to resist the forces imposed by the grout and its placement.
  1. Forms for epoxy grout shall be designed to allow the formation of a hydraulic head and shall have chamfer strips built into forms.
- H. Level and align the structural or equipment bearing plates in accordance with the structural requirements and the recommendations of the equipment manufacturer.
- I. Equipment shall be supported during alignment and installation of grout by shims, wedges, blocks or other approved means. The shims, wedges and blocking devices shall be prevented from bonding to the grout by appropriate bonding breaking coatings and removed after grouting unless otherwise approved by the Engineer.

### 3.02 INSTALLATION – GENERAL

- A. Mix, apply and cure products in strict compliance with the manufacturer's recommendations and this Section.
- B. Have sufficient manpower and equipment available for rapid and continuous mixing and placing. Keep all necessary tools and materials ready and close at hand.
- C. Maintain temperatures of the foundation plate, supporting concrete, and grout between 40 and 90 degrees F during grouting and for at least 24 hours thereafter or as recommended by the grout manufacturer, whichever is

longer. Take precautions to minimize differential heating or cooling of baseplates and grout during the curing period.

- D. Take special precautions for hot weather or cold weather grouting as recommended by the manufacturer when ambient temperatures and/or the temperature of the materials in contact with the grout are outside of the 60 and 90 degrees F range.
- E. Install grout in a manner which will preserve the isolation between the elements on either side of the joint where grout is placed in the vicinity of an expansion or control joint.
- F. Reflect all existing underlying expansion, control and construction joints through the grout.

### 3.03 INSTALLATION - CEMENT GROUTS AND NONSHRINK CEMENTITIOUS GROUTS

- A. Mix in accordance with manufacturer's recommendations. Do not add cement, sand, pea gravel or admixtures without prior approval by the Engineer.
- B. Avoid mixing by hand. Mixing in a mortar mixer (with moving blades) is recommended. Pre-wet the mixer and empty excess water. Add premeasured amount of water for mixing, followed by the grout. Begin with the minimum amount of water recommended by the manufacturer and then add the minimum additional water required to obtain workability. Do not exceed the manufacturer's maximum recommended water content.
- C. Placements greater than 3-in in depth shall include the addition of clean, washed pea gravel to the grout mix when approved by the manufacturer. Comply with the manufacturer's recommendations for the size and amount of aggregate to be added.
- D. Place grout into the designated areas in a manner which will avoid segregation or entrapment of air. Do not vibrate grout to release air or to consolidate the material. Placement should proceed in a manner which will ensure the filling of all spaces and provide full contact between the grout and adjoining surfaces. Provide grout holes as necessary.
- E. Place grout rapidly and continuously to avoid cold joints. Do not place cement grouts in layers. Do not add additional water to the mix (retemper) after initial stiffening.
- F. Just before the grout reaches its final set, cut back the grout to the substrate at a 45 degree angle from the lower edge of bearing plate unless otherwise approved by the Engineer. Finish this surface with a wood float (brush) finish.
- G. Begin curing immediately after form removal, cutback, and finishing. Keep grout moist and within its recommended placement temperature range for at

least 24 hours after placement or longer if recommended by the manufacturer. Saturate the grout surface by use of wet burlap, soaker hoses, ponding or other approved means. Provide sunshades as necessary. If drying winds inhibit the ability of a given curing method to keep grout moist, erect wind breaks until wind is no longer a problem or curing is finished.

### 3.04 INSTALLATION - NONSHRINK EPOXY GROUTS

- A. Mix in accordance with the procedures recommended by the manufacturer. Do not vary the ratio of components or add solvent to change the consistency of the grout mix. Do not overmix. Mix full batches only to maintain proper proportions of resin, hardener and aggregate.
- B. Monitor ambient weather conditions and contact the grout manufacturer for special placement procedures to be used for temperatures below 60 or above 90 degrees F.
- C. Place grout into the designated areas in a manner which will avoid trapping air. Placement methods shall ensure the filling of all spaces and provide full contact between the grout and adjoining surfaces. Provide grout holes as necessary.
- D. Minimize "shoulder" length (extension of grout horizontally beyond base plate). In no case shall the shoulder length of the grout be greater than the grout thickness.
- E. Finish grout by puddling to cover all aggregate and provide a smooth finish. Break bubbles and smooth the top surface of the grout in conformity with the manufacturer's recommendations.
- F. Epoxy grouts are self curing and do not require the application of water. Maintain the formed grout within its recommended placement temperature range for at least 24 hours after placing, or longer if recommended by the manufacturer.

### 3.05 INSTALLATION - CONCRETE GROUT

- A. Screed underlying concrete to the grade shown on the Drawings. Prepare the surface according to 3.01B. Protect and keep the surface clean until placement of concrete grout.
- B. Remove the debris and clean the surface by sweeping and vacuuming of all dirt and other foreign materials. Wash the tank slab using a strong jet of water. Flushing of debris into tank drain lines will not be permitted.
- C. Saturate the concrete surface for at least 24 hours prior to placement of the concrete grout. Saturation may be maintained by ponding, by the use of soaker hoses, or by other methods acceptable to the Engineer. Remove excess water just prior to placement of the concrete grout. Place a cement slurry immediately ahead of the concrete grout so that the slurry is moist

when the grout is placed. Work the slurry over the surface with a broom until it is coated with approximately 1/16 to 1/8-in thick cement paste. (A bonding grout composed of 1 part portland cement, 1.5 parts fine sand, an approved bonding admixture and water, mixed to achieve the consistency of thick paint, may be substituted for the cement slurry.)

- D. Place concrete grout to final grade using the scraper mechanism as a guide for surface elevation and to ensure high and low spots are eliminated. Unless specifically approved by the equipment manufacturer, mechanical scraper mechanisms shall not be used as a finishing machine or screed.
- E. Provide grout control joints as indicated on the Drawings.
- F. Finish and cure the concrete grout as specified for cast-in-place concrete.

### 3.06 SCHEDULE

- A. The following list indicates where the particular types of grout are to be used:
- B. General purpose nonshrink cementitious grout: Use at all locations where non shrink grout is called for on the plans except for base plates greater in area than 3-ft wide by 3-ft long and except for the setting of anchor rods, anchor bolts or reinforcing steel in concrete.
- C. Flowable nonshrink cementitious grout: Use under all base plates greater in area than 3-ft by 3-ft. Use at all locations indicated to receive flowable nonshrink grout by the Drawings. The Contractor, at his/her option and convenience, may also substitute flowable nonshrink grout for general purpose nonshrink cementitious grout..
- D. Nonshrink epoxy grout: Use for the setting of anchor rods, anchor bolts and reinforcing steel in concrete and for all locations specifically indicated to receive epoxy grout.
- E. Cement grout: Cement grout may be used for grouting of incidental base plates for structural and miscellaneous steel such as post base plates for platforms, base plates for beams, etc. It shall not be used when nonshrink grout is specifically called for on the Drawings or for grouting of primary structural steel members such as columns and girders.
- F. Concrete grout: Use for overlaying the base concrete under scraper mechanisms of clarifiers to allow more control in placing the surface grade.

END OF SECTION

## SECTION 03740

### MODIFICATIONS AND REPAIR TO CONCRETE

#### PART 1 - GENERAL

##### 1.01 SCOPE OF WORK

- A. Furnish all labor, materials, equipment and incidentals required and cut, remove, repair or otherwise modify parts of existing concrete structures or appurtenances as shown on the Drawings and as specified herein. Work under this Section shall also include bonding new concrete to existing concrete.

##### 1.02 RELATED WORK

- A. Concrete Formwork is included in Section 03100.
- B. Concrete Reinforcement is included in Section 03200.
- C. Concrete Joints and Accessories are included in Section 03250.
- D. Cast-in-Place Concrete is included in Section 03300.
- E. Concrete Finishes are included in Section 03350.
- F. Grout is included in Section 03600.

##### 1.03 SUBMITTALS

- A. Submit to the Engineer, in accordance with Section 01300, a schedule of Demolition and the detailed methods of demolition to be used at each location.
- B. Submit manufacturer's technical literature on all product brands proposed for use, to the Engineer for review. The submittals shall include the manufacturer's installation and/or application instructions.
- C. When substitutions for acceptable brands of materials specified herein are proposed, submit brochures and technical data of the proposed substitutions to the Engineer for approval before delivery to the project.

##### 1.04 REFERENCE STANDARDS

- A. American Society for Testing and Materials (ASTM)
  - 1. ASTM C 881 - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete.
  - 2. ASTM C882 - Standard Test Method for Bond Strength of Epoxy-Resin Systems Used with Concrete by Slant Shear.

3. ASTM C 883 - Standard Test Method for Effective Shrinkage of Epoxy-Resin Systems Used with Concrete.
  4. ASTM D570 - Standard Test Method for Water Absorption of Plastics.
  5. ASTM D638 - Standard Test Method for Tensile Properties of Plastics.
  6. ASTM D 695 - Standard Test Method for Compressive Properties of Rigid Plastics.
  7. ASTM D732 - Standard Test Method for Shear Strength of Plastics by Punch Tool.
  8. ASTM D 790 - Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
- B. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

#### 1.05 QUALITY ASSURANCE

- A. No existing structure or concrete shall be shifted, cut, removed, or otherwise altered until authorization is given by the Engineer.
- B. When removing materials or portions of existing structures and when making openings in existing structures, all precautions shall be taken and all necessary barriers, shoring and bracing and other protective devices shall be erected to prevent damage to the structures beyond the limits necessary for the new work, protect personnel, control dust and to prevent damage to the structures or contents by falling or flying debris. Unless otherwise permitted, shown or specified, line drilling will be required in cutting existing concrete.
- C. Manufacturer Qualifications: The manufacturer of the specified products shall have a minimum of 10 years experience in the manufacture of such products and shall have an ongoing program of training, certifying and technically supporting the Contractor's personnel.

#### 1.06 DELIVERY, STORAGE AND HANDLING

- A. Deliver the specified products in original, unopened containers with the manufacturer's name, labels, product identification and batch numbers.
- B. Store and condition the specified product as recommended by the manufacturer.

## PART 2 - PRODUCTS

### 2.01 MATERIALS

A. General

1. Materials shall comply with this Section and any state or local regulations.

B. Epoxy Bonding Agent

1. General

- a. The epoxy bonding agents shall be a two-component, solvent-free, asbestos-free moisture insensitive epoxy resin material used to bond plastic concrete to hardened concrete complying with the requirements of ASTM C 881, Type II and the additional requirements specified herein.

2. Material

- a. Properties of the cured material:

- i. Compressive Strength (ASTM D695): 8500 psi minimum at 28 days.
- ii. Tensile Strength (ASTM D638): 4000 psi minimum at 14 days.
- iii. Flexural Strength (ASTM D 790 - Modulus of Rupture): 6,300 psi minimum at 14 days.
- iv. Shear Strength (ASTM D732): 5000 psi minimum at 14 days.
- v. Water Absorption (ASTM D 570 - 2 hour boil): One percent maximum at 14 days.
- vi. Bond Strength (ASTM C882) Hardened to Plastic: 1500 psi minimum at 14 days moist cure.
- vii. Effective Shrinkage (ASTM C883): Passes Test.
- viii. Color: Gray.

3. Approved manufacturers include: Sika Corporation, Lyndhurst, NJ - Sikadur 32, Hi-Mod; Master Builder's, Cleveland, OH - Concrete Liquid (LPL) or equal.

C. Epoxy Paste

1. General

- a. Epoxy Paste shall be a two-component, solvent-free, asbestos free, moisture insensitive epoxy resin material used to bond

dissimilar materials to concrete and shall comply with the requirements of ASTM C 881, Type I, Grade 3 and the additional requirements specified herein. It may also be used to patch existing surfaces where the glue line is 1/8-in or less.

2. Material

a. Properties of the cured material:

- i. Compressive Properties (ASTM D 695): 10,000 psi minimum at 28 days.
- ii. Tensile Strength (ASTM D638): 3,000 psi minimum at 14 days. Elongation at Break - 0.3 percent minimum.
- iii. Flexural Strength (ASTM D 790 - Modulus of Rupture): 3,700 psi minimum at 14 days.
- iv. Shear Strength (ASTM D732): 2,800 psi minimum at 14 days.
- v. Water Absorption (ASTM D570): 1.0 percent maximum at 7 days.
- vi. Bond Strength (ASTM C882): 2,000 psi at 14 days moist cure.
- vii. Color: Concrete grey.

3. Approved manufacturer's include:

- a. Sika Corporation, Lyndhurst, N.J. - Sikadur Hi-mod LV 32 ; Master Builders, Inc., Cleveland, OH - Concrecive 1438 or equal.
- b. Overhead applications: Sika Corporation, Lyndhurst, N.J. - Sikadur Hi-mod LV 31; Master Builders, Inc., Cleveland, OH - Concrecive 1438 or equal.

D. Repair Mortar

1. General

- a. Repair mortars shall be a two-component, polymer modified, cement based, fast-setting, trowel grade, structural repair mortar suitable for use on horizontal, vertical and overhead surfaces prepackaged products specifically formulated for the repair of concrete surface defects.



2. Material
  - a. Properties of the cured material:
    - i. Compressive Strength (2 hours 50 percent RH) – 150 psi minimum
    - ii. Compressive Strength (28 days 50 percent RH) – 150 psi minimum
    - iii. Bond Strength (pull off method) – 100 percent concrete substrate failure
    - iv. This system shall conform with ANSI/NSF standards for surface contact with potable water.
3. Approved manufacturer's include:
  - a. Sika Corporation, Lyndhurst, N.J. – SikaTop 122 PLUS or equal.
  - b. Overhead applications: Sika Corporation, Lyndhurst, N.J. – SikaTop 123 PLUS or equal.
- E. Non-Shrink Precision Cement Grout, Non-Shrink Cement Grout, Non-Shrink Epoxy Grout and Polymer Modified mortar are included in Section 03600 GROUT.
- F. Adhesive Capsule type anchor system shall be equal to the HVA adhesive Anchoring System by Hilti Fastening Systems, Tulsa, OK. The capsule shall consist of a sealed glass capsule containing premeasured amounts of polyester or vinylester resin, quartz sand aggregate and a hardener contained in a separate vial within the capsule. Where the adhesive anchor is under sustained tensile loading (i.e. vertically installed anchors) the anchor system shall be Hilti HIT RE-500 SD by Hilti Fastening Systems, Tulsa, OK.
- G. Acrylic Latex Bonding Agents shall not be used for this project.
- H. Crack Repair Epoxy Adhesive
  1. General
    - a. Crack Repair Epoxy Adhesive shall be a two-component, solvent-free, moisture insensitive epoxy resin material suitable for crack routing by injection or gravity feed. It shall be formulated for the specific size of opening or crack being injected.
    - b. All concrete surfaces containing potable water or water to be treated for potable use that are repaired by the epoxy adhesive

injection systems shall be coated with an acceptable epoxy coating system that conforms with ANSI/NSF standards for surface contact with potable water.

2. Material

a. Properties of the cured material

- i. Compressive Properties (ASTM D 695): 10,000 psi minimum at 28 days.
- ii. Tensile Strength (ASTM D638): 5,300 psi minimum at 14 days. Elongation at Break - 2 to 5 percent.
- iii. Flexural Strength (ASTM D 790 - Modulus of Rupture): 12,000 psi minimum at 14 days (gravity); 4,600 psi minimum at 14 days (injection)
- iv. Shear Strength (ASTM D732): 3,700 psi minimum at 14 days.
- v. Water Absorption (ASTM D 570 - 2 hour boil): 1.5 percent maximum at 7 days.
- vi. Bond Strength (ASTM C 882): 2,400 psi at 2 days dry; 2,000 psi at 14 days dry plus 12 days moist.
- vii. Effective Shrinkage (ASTM 883): Passes Test.

3. Approved manufacturer's include:

- a. For standard applications: Sika Corporation, Lyndhurst, NJ - Sikadur Hi-Mod; Master Builders Inc., Cleveland, OH - Concessive 1380 or equal.
- b. For very thin applications; Sika Corporation, Lyndhurst, NJ - Sikadur Hi-Mod LV; Master Builders Inc., Cleveland, OH - Concessive 1468 or equal.

PART 3 - EXECUTION

3.01 GENERAL

- A. Cut, repair, reuse, demolish, excavate or otherwise modify parts of the existing structures or appurtenances, as indicated on the Drawings, specified herein, or necessary to permit completion of the Work. Finishes, joints, reinforcements, sealants, etc, are specified in respective Sections. All work shall comply with other requirements of this of Section and as shown on the Drawings.

- B. All commercial products specified in this Section shall be stored, mixed and applied in strict compliance with the manufacturer's recommendations.
- C. In all cases where concrete is repaired in the vicinity of an expansion joint or control joint the repairs shall be made to preserve the isolation between components on either side of the joint.
- D. When drilling holes for dowels/bolts at new or existing concrete, drilling shall stop if rebar is encountered. As approved by the Engineer, the hole location shall be relocated to avoid rebar. Rebar shall not be cut without prior approval by the Engineer. Where possible, rebar locations shall be identified prior to drilling using "rebar locators" so that drilled hole locations may be adjusted to avoid rebar interference.

### 3.02 CONCRETE REMOVAL

- A. Concrete designated to be removed to specific limits as shown on the Drawings or directed by the Engineer, shall be done by line drilling at limits followed by chipping or jack-hammering as appropriate in areas where concrete is to be taken out. Remove concrete in such a manner that surrounding concrete or existing reinforcing to be left in place and existing in place equipment is not damaged. Sawcutting at limits of concrete to be removed shall only be done if indicated on the Drawings, or after obtaining written approval from the Engineer.
- B. Where existing reinforcing is exposed due to saw cutting/core drilling and no new material is to be placed on the sawcut surface, a coating or surface treatment of epoxy paste shall be applied to the entire cut surface to a thickness of 1/4-in.
- C. In all cases where the joint between new concrete or grout and existing concrete will be exposed in the finished work, except as otherwise shown or specified, the edge of concrete removal shall be a 1-in deep saw cut on each exposed surface of the existing concrete.
- D. Concrete specified to be left in place which is damaged shall be repaired by approved means to the satisfaction of the Engineer.
- E. The Engineer may from time to time direct the Contractor to make additional repairs to existing concrete. These repairs shall be made as specified or by such other methods as may be appropriate.

### 3.03 SURFACE PREPARATION

- A. Connection surfaces shall be prepared as specified below for concrete areas requiring patching, repairs or modifications as shown on the Drawings, specified herein, or as directed by the Engineer.
- B. Remove all deteriorated materials, dirt, oil, grease, and all other bond inhibiting materials from the surface by dry mechanical means, i.e. -

sandblasting, grinding, etc, as approved by the Engineer. Be sure the areas are not less than 1/2-in in depth. Irregular voids or surface stones need not be removed if they are sound, free of laitance, and firmly embedded into parent concrete, subject to the Engineer's final inspection.

- C. If reinforcing steel is exposed, it must be mechanically cleaned to remove all contaminants, rust, etc, as approved by the Engineer. If half of the diameter of the reinforcing steel is exposed, chip out behind the steel. The distance chipped behind the steel shall be a minimum of 1/2-in. Reinforcing to be saved shall not be damaged during the demolition operation.
- D. Reinforcing from existing demolished concrete which is shown to be incorporated in new concrete shall be cleaned by mechanical means to remove all loose material and products of corrosion before proceeding with the repair. It shall be cut, bent or lapped to new reinforcing as shown on the Drawings and provided with a minimum cover all around as specified on the contract drawings or 2-in.
- E. The following are specific concrete surface preparation "methods" are to be used where called for on the Drawings, specified herein or as directed by the Engineer. All installation of anchors shall be according to the manufacturer's recommendations.
  - 1. Method A: After the existing concrete surface at connection has been roughened and cleaned, thoroughly moisten the existing surface with water. Brush on a 1/16-in layer of cement and water mixed to the consistency of a heavy paste. Immediately after application of cement paste, place new concrete or grout mixture as detailed on the Drawings.
  - 2. Method B: After the existing concrete surface has been roughened and cleaned, apply epoxy bonding agent at connection surface. The field preparation and application of the epoxy bonding agent shall comply strictly with the manufacturer's recommendations. Place new concrete or grout mixture to limits shown on the Drawings within time constraints recommended by the manufacturer to ensure bond.
  - 3. Method C: Drill a hole 1/4-in larger than the diameter of the dowel. The hole shall be blown clear of loose particles and dust just prior to installing epoxy. The drilled hole shall first be filled with epoxy paste, and then dowels/bolts shall be buttered with paste then inserted by tapping. Unless otherwise shown on the Drawings, deformed bars shall be drilled and set to a depth of ten bar diameters and smooth bars shall be drilled and set to a depth of fifteen bar diameters. If not noted on the Drawings, the Engineer will provide details regarding the size and spacing of dowels.
  - 4. Method D: Combination of Method B and C.

5. Method E: Capsule anchor system shall be set in existing concrete by drilling holes to the required depth to develop the full tensile and shear strengths of the anchor material being used. The anchor bolts system shall be installed per the manufacturer's recommendation in holes sized as required. The anchor stud bolt, rebar or other embedment item shall be tipped with a double 45 degree chamfered point, securely fastened into the chuck of all rotary percussion hammer drill and drilled into the capsule filled hole.

### 3.04 GROUTING

- A. Grouting shall be as specified in Section 03600.

### 3.05 CRACK REPAIR

- A. Cracks on horizontal surfaces shall be repaired by gravity feeding crack sealant into cracks per manufacturer's recommendations. If cracks are less than 1/16-in in thickness they shall be pressure injected.
- B. Cracks on vertical surfaces shall be repaired by pressure injecting crack sealant through valves sealed to surface with crack repair epoxy adhesive per manufacturer's recommendations.

END OF SECTION

## SECTION 05500

### MISCELLANEOUS METAL

#### PART 1 GENERAL

##### 1.01 SCOPE OF WORK

- A. Furnish all labor, materials, equipment and incidentals required and install all miscellaneous metal complete as shown on the Drawings and as specified herein.

##### 1.02 RELATED WORK

- A. Concrete joint accessories are included in Section 03350.
- B. Painting is included in Division 9.
- C. Sluice gates, slide gates, operators and appurtenances, including wall thimbles, are included in Division 11.
- D. Pipe hangers and sleeves are included in Division 15.
- E. Equipment anchor bolts are included in the respective Sections of Divisions 11, 14 and 15.

##### 1.03 SUBMITTALS

- A. Submit to the Engineer, in accordance with Section 01300, shop drawings and product data showing materials of construction and details of installation for:
  - 1. Shop drawings, showing sizes of members, method of assembly, anchorage and connection to other members.
- B. Samples
  - 1. Submit samples as requested by the Engineer during the course of construction.
- C. Design Data
  - 1. Submit calculations or test data demonstrating that the railings will resist the loads specified in the 2010 Florida Building Code at the post spacing provided.

2. Submit manufacturer's load and deflection tables for grating.

D. Test Reports

1. Certified copy of mill test reports on each aluminum proposed for use showing the physical properties and chemical analysis.

E. Certificates

1. Submit certification that the railing system is in compliance with OSHA requirements and the 2010 Florida Building Code.
2. Certify that welders have been qualified under AWS, within the previous 12 months, to perform the welds required under this Section.

1.04 REFERENCE STANDARDS

A. Aluminum Association (AA)

1. ABH-21 Aluminum Brazing Handbook
2. ASD-1 Aluminum Standards and Data
3. DAF-45 Designation System for Aluminum Finishes
4. SAA-46 Standards for Anodized Architectural Aluminum

B. American Society for Testing and Materials (ASTM)

1. ASTM A36 - Standard Specification for Carbon Structural Steel.
2. ASTM A48 - Standard Specification for Gray Iron Castings.
3. ASTM A53 - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
4. ASTM A108 - Standard Specification for Steel Bars, Carbon, Cold Finished, Standard Quality.
5. ASTM A123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
6. ASTM A153 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

7. ASTM A167 - Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip.
8. ASTM A276 - Standard Specification for Stainless Steel Bars and Shapes.
9. ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, 60,000 Psi Tensile Strength.
10. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
11. ASTM A366 - Standard Specification for Steel, Sheet, Carbon, Cold-Rolled, Commercial Quality.
12. ASTM A500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
13. ASTM A501 - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
14. ASTM A536 - Standard Specification for Ductile Iron Castings.
15. ASTM A570 - Standard Specification for Steel, Sheet and Strip, Carbon, Hot-Rolled, Structural Quality.
16. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
17. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles and Tubes.
18. ASTM B429 - Standard Specification for Aluminum-Alloy Extruded Structural Pipe and Tube.

C. American Iron and Steel Institute (AISI).

1. Specification for Structural Steel Buildings.

D. American Welding Society (AWS)

1. AWS D1.1 - Structural Welding Code Steel.
2. AWS D1.2 - Structural Welding Code Aluminum.



E. Federal Specifications

1. FS-FF-B-575C - Bolts, Hexagonal and Square

F. Occupational Safety and Health Administration (OSHA)

G. 2010 Florida Building Code. (FBC)

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

1.05 QUALITY ASSURANCE

- A. The work of this Section shall be completely coordinated with the work of other Sections. Verify, at the site, both the dimensions and work of other trades adjoining items of work in this Section before fabrication and installation of items herein specified.
- B. Furnish to the pertinent trades all items included under this Section that are to be built into the work of other Sections.
- C. All welding shall be performed by qualified welders and shall conform to the applicable AWS welding code. Welding of steel shall conform to AWS D1.1 and welding of aluminum shall conform to AWS D1.2.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Deliver items to be incorporated into the work of other trades in sufficient time to be checked prior to installation.
- B. Repair items which have become damage or corroded to the satisfaction of the Engineer prior to incorporating them into the work.

1.07 PROJECT/SITE REQUIREMENTS

- A. Field measurements shall be taken at the site, prior to fabrication of items, to verify or supplement indicated dimensions and to ensure proper fitting of all items.

PART 2 PRODUCTS

2.01 GENERAL

- A. The use of manufacturer's name and model or catalog number is for the purpose of establishing the standard of quality and general configuration desired.

- B. Like items of materials shall be the end products of one manufacturer in order to provide standardization for appearance, maintenance and manufacturer's service.

## 2.02 MATERIALS

- A. Unless otherwise noted, materials for miscellaneous metals shall conform to the following standards:

1. Structural Steel
  - a. W Shapes: ASTM A992, Gr.50
  - b. M Shapes: ASTM A36
  - c. S, C and MC Shapes: ASTM A36
  - d. L Shapes: ASTM A36
  - e. Plates, rods and Bars: ASTM A36
2. HSS Rectangular Shapes: ASTM A500, Grade B, 42 ksi
3. HSS Round Shapes: ASTM A500, Grade B, 35 ksi
3. Welded and Seamless Steel Pipe: ASTM A501 or ASTM A53, Type E or S, Grade B Schedule 40. Use standard malleable iron fittings, galvanized for exterior work
4. Steel Sheets: ASTM A366
5. Gray Iron Castings: ASTM A48, Class 35
6. Ductile Iron Castings: ASTM A536, Grade 65-45-12
7. Aluminum Extruded Pipe: ASTM B429, Alloy 6063 T6
8. Aluminum Extruded Shapes: ASTM B221, Alloy 6061 T6
9. Aluminum Sheet and Plate: ASTM B209, Alloy 6061 T6
10. Stainless Steel Plates, Sheets, and Structural Shapes
  - a. Exterior, Submerged or Industrial Use: ASTM A240, Type 316 (Type 316L for welded)
  - b. Interior and Architectural Use: ASTM A240, Type 304
11. Stainless Steel Bolts, Nuts, and Washers: ASTM A276, Type 316

12. Carbon Steel Bolts and Studs	ASTM A307, Grade A or ASTM F1154, Gr.36 (galvanized unless noted otherwise)
13. High Strength Steel Bolts, Nuts and washers	ASTM A325 (mechanically galvanized per ASTM B695, Class 50, where noted)
a. Elevated Temperature Exposure	Type I
b. General Application	Type I or Type II
14. Galvanizing	ASTM A123, Zn w/0.5 percent minimum Ni
15. Galvanizing, hardware	ASTM A153, Zn w/0.5 percent minimum Ni

### 2.03 ANCHORS, BOLTS AND FASTENING DEVICES

- A. Furnish anchors, bolts, fasteners, etc., as necessary for installation of the work of this section or as specified for securing the work of other sections.
- B. Anchor bolt material shall be ASTM F1154, Grade 36, or ASTM A307, Grade A standard headed bolts with heavy hex nuts, Grade A washers, hot-dipped galvanized, unless noted otherwise.
- B. Unless otherwise noted, bolts for the connection of carbon steel or iron shall be steel machine bolts; bolts for the connection of galvanized steel or iron shall be galvanized steel or stainless steel machine bolts; and bolts for the connection of aluminum or stainless steel shall be stainless steel machine bolts.
- C. Unless otherwise noted, expansion anchors shall be zinc plated carbon steel wedge type anchors complete with nuts and washers. Type 316 stainless steel wedge type anchors shall be used where they will be submerged or exposed to the weather or where stainless steel wedge type anchors are required. When the length or embedment of the bolt is not noted on the Drawings, provide length sufficient to place the wedge and expansion sleeve portion of the bolt at least 1-in behind the concrete reinforcing steel. Expansion anchors shall be Hilti, Kwick-bolt III; ITW Ramset; Redhead trubolt, or equal.
- D. Adhesive anchors shall be a two-component chemical resin anchoring system. Capsules shall be self-contained, exactly premeasured amounts of polyester or vinyl ester resin, aggregate and hardener. Stud assemblies shall consist of a stainless steel type 316 all-thread anchor rod with nut and washer. Provide

manufacturer's recommended installation tools for installing anchor components. Install anchors in full compliance with the manufacturer's recommendations. Adhesive capsule anchor system shall be Hilti, HIT-RE 500-SD; Simpson Strong Tie, SET-XP Epoxy-Tie or Acrylic Tie; or approved equal.

- E. Anchors used in masonry construction shall be as indicated in Section 2.03.C above where anchors are installed into solid grouted cells. Additional, Hilti, HIY-HY150 MAX adhesive anchoring system, or approved equal, may also be used in grouted masonry construction. When fastening to hollow concrete block or brick, adhesive anchors shall be a three-part stud, screen and chemical dispenser anchoring system. Adhesive cartridges shall contain premeasured amounts of resin and hardener which are mixed and deposited in a screen tube by a dispenser. Stud assemblies shall consist of a stainless steel type 316 all-thread anchor rod with nut and washer. Anchors shall be Hilti, HIT HY-20 System or approved equal.
- F. Automatic end welded headed anchor studs shall be flux ended studs made from cold drawn steel, ASTM A108 Grades C-1010 through C-1020. Headed anchor studs shall be Nelson, H4L Headed Concrete Anchors or equal.
- G. Machine bolts and nuts shall conform to Federal Specification FF-B-575C. Bolts and nuts shall be hexagon type. Bolts, nuts, screws, washers and related appurtenances shall be Type 316 stainless steel.
- H. Connection bolts for wood members shall be ASTM A307, galvanized where specified.
- I. Toggle bolts shall be Hilti, Toggler Bolt or equal.

## 2.04 METAL GRATING

- A. Grating shall have rectangular, 3/16-in thick, bearing bars spaced 1-3/16-in on center with cross bars spaced at 4-in on center. All grating panels shall be banded with a bar the same size as the bearing bars.
  - 1. Grating shall not exceed the fabricator's maximum recommended span, and meet or exceed the following load and deflection criteria for the maximum span length at the opening being covered by the grating.
    - a. The grating shall produce a deflection of 1/360 of the span or less under a uniform live load of 100 lbs/sq ft on the maximum span.
    - b. The grating shall produce a deflection of 1/360 of the span or less under a concentrated live load of 300 lbs applied at the mid point of the maximum span.

2. Openings 2-in or greater in diameter/dimension and grating edges shall be banded with a bar of the same depth and thickness as the bearing bars. Cut bearing bars or cross bars shall be welded to the banding bar.
  3. Provide trench grating with symmetrical cross bar arrangement.
  4. Grating clamps, nuts, bolts, washers and other fastening devices for grating and grating supports shall be Type 316 stainless steel. All grating shall be anchored to the supporting system using saddle clips.
- B. Aluminum grating material shall be aluminum alloy 6063-T6 with a mill finish. Cross bars shall be attached to the bearing bars with interlocked swaged joints. The grating shall be Type BS by IKG Borden, Houston, TX; Type 19 SG-4 by Ohio Gratings, Inc., Canton, OH; Type 19S4 by Seidelhuber Metal Products, San Carlos, CA or equal.
- C. Metal frames and supports for grating shall be of the same material as the grating unless otherwise shown on the Drawings. Where aluminum supports are used, they shall be fabricated from aluminum alloy 6061-T6.

## 2.05 RAILINGS

- A. Handrail and railing systems shall comply with the requirements of OSHA and FBC.
- B. Aluminum railing and handrail shall be a welded or mechanically fastened, seamless, extruded aluminum pipe system. Rails and posts shall be 6061-T6, 6063-T6 or 6105-T5. Splice and reinforcing sleeves, brackets, end caps, toeboards, etc, shall be aluminum alloy 6061-T6, 6063-T6 or 6105-T5 alloy. Cast fittings shall be aluminum alloy No. 214. Railing system fastening hardware shall be Type 304 stainless steel. Aluminum shall have a mill finish. After welding, aluminum shall be anodized. All railing, posts, toeboards and exposed aluminum shall be anodized with an architectural Class I satin finish providing a minimum coating thickness of 0.7 mils and a minimum coating weight of 32 milligrams per square inch in compliance with AA M10C22A41.
- C. Railings shall be 2 rail welded railing systems, as shown on the Drawings, fabricated with 1-1/2-in nominal diameter pipe. Posts shall be Schedule 80 pipe, minimum and rails and handrail shall be Schedule 40 pipe, minimum. Posts and top rails shall be continuous. The top surface of the top railing at all points, including corners and terminations, shall be smooth and shall not be interrupted by projected fittings or posts. Spacing of posts shall not exceed 5-ft on center and shall be uniformly spaced except as otherwise shown on the Drawings. Posts will be required on each side of structure expansion joints. All railing posts shall be vertical.

- D. Welds shall be circumferential welds ground smooth and even to produce a railing that is neat in appearance and structurally sound. Welding methods shall be in conformity with AWS standards for the materials being joined. All rail to post connections shall be coped and fastened by continuous welds. There shall be no burrs, sharp edges or protrusions on any weld on any part of the handrail system. After fabrication, the welds and surrounding area shall be cleaned and hand buffed to blend with the adjacent finish. All mechanical fasteners shall be unobtrusively located in countersunk holes with the top flush with the surface of the rail. Bends in the railing shall be as indicated by the Drawings. No distortion of the circular railing shape will be allowed. Bends and terminal sections shall be made without the use of fittings. Corner bends shall be mitered and welded bends.
- E. Railing shall be assembled in sections as long as practical but shall not be greater than 24-ft in length. A field splice shall be used when an assembled section is to be attached to another section. Field splices shall be used in all railing panels that cross over structure expansion joints.
1. Field splices shall use internal splice sleeves located within 8-in of railing posts. The sleeve shall be welded to the rail on one side and fastened with a set screw to the rail on other side. The field splice shall be detailed to take the differential expansion between the railing system and the supporting structure.
  2. When the field splice occurs in a railing panel crossing a structure expansion joint, the sleeve shall be welded to the rail on one side and be free to slide in the rail on other side. The field splice shall be detailed to take the same movement as the structure expansion joint.
- F. The bases or supports for railing posts and handrail shall be the types indicated on the Drawings.
1. Where non-removable railing is set in concrete, the posts shall be placed in 2-1/2-in diameter formed concrete openings and firmly caulked with a nonsulphur compound, hydraulic cement equal to Por-Rok by Minwax Construction Products Division Sterling Drug, Montvale, NJ. Collars shall be placed around the post bases and fastened in place with set screws on the side of the post away from the walkway. Posts shall be placed with the centerline 4-in from the edge of the concrete except that posts shall be set at the centerline of concrete curbs.
  2. Stainless steel and aluminum railing posts, which may collect condensation, shall have a 3/16-in drain hole drilled immediately above the concrete encased area, the base flange, or supporting socket on the side away from the walking area. The bottom of the rail post between the drain hole and the

bottom of the post shall be filled with an inert material such as a compressed closed cell neoprene rod.

3. Where handrail is to be fastened to walls, the rails shall be provided with screwed wall flanges fastened to the walls with three 3/8-in stainless steel flat head machine screws.
- G. Safety gates, for railing openings, shall be fabricated of matching pipe and rail material and configuration. The gates shall be self-closing gates with approved stop, latch and stainless steel closure spring and hinges.
  - H. Barrier chains, for railing openings, shall be fabricated of stainless steel chains. Chain shall be 1/4-in stainless steel links, with eleven links per foot as manufactured by Eastern Chain Works, Inc., NY; Lawrence Metal Products, Inc. or equal. Chains shall be fastened to the handrail posts at the elevation of each rail. One end of each chain shall be connected to one post with a 1/4-in diameter stainless steel eye bolt and the other end shall be connected to the other post by means of a heavy chromium plated bronze swivel eye slide harness snap and a similar eye bolt.
  - I. Toeboards shall be provided on all railing adjacent to a drop in elevation of 4-ft or more. Toeboards are not required on the inclined portion of stairway railings or where concrete or steel curbs, 4-in or more in height, are present. Toeboards shall be 4-in high channels of the same material as the railing. The channels shall have a minimum thickness of 1/8-in and have flanges of not less than 3/4-in nor more than 1-1/2-in in width. Toeboards shall be positioned with a maximum clearance of 1/4-in from the floor and fastened to railing posts with 1/4-in stainless steel U-bolts, with J-bolts at corner posts and with clip angles and two 1/4-in stainless steel expansion bolts at walls. Toeboards shall not be welded to the posts.
  - J. All railings shall be properly protected by paper, or by an approved coating or by both against scratching, splashes or mortar, paint, or other defacements during transportation and erection and until adjacent work by other trades has been completed. After protective materials are removed, the surfaces shall be made clean and free from stains, marks, or defects of any kind.
  - K. Aluminum shapes, including mounting brackets, in contact with concrete or a different type of metal shall be separated by a 1/32" neoprene gasket.
  - L. Handrails and guardrails shall be a pre-engineered pipe railing system equal to TUFrail as provided by Thompson Fabricating Company.
- 2.06 ACCESS HATCHES
- A. Access hatches shall have single or double leaf doors as indicated by the Drawings. The doors shall be 1/4-in aluminum diamond pattern plate with

welded stiffeners, as necessary, to withstand a live load of 300 lbs/sq ft with a maximum deflection of 1/150th of the span. Hatches shall have a 1/4-in aluminum channel frame with a perimeter anchor flange or strap anchors for concrete embedment around the perimeter. Unless otherwise noted on the Drawings, use pivot torsion bars for counterbalance or spring operators for easy operation along with automatic door hold open. Hardware shall be durable and corrosion resistant with Type 316 stainless steel hardware used throughout. Provide removable lock handle. Finish shall be the factory mill finish for aluminum doors and frames with bituminous coating on the exterior of the frames in contact with concrete. Hatches shall be watertight and have a 1-1/2-in drainage coupling to the channel frame. Access hatches shall be Types as indicated on the Drawings by Bilco Company, New Haven, CT or equal.

## 2.07 MISCELLANEOUS ALUMINUM

- A. All miscellaneous metal work shall be formed true to detail, with clean, straight, sharply defined profiles and smooth surfaces of uniform color and texture and free from defects impairing strength or durability. Holes shall be drilled or punched. Edges shall be smooth and without burrs. Fabricate supplementary pieces necessary to complete each item though such pieces are not definitely shown or specified.
- B. Connections and accessories shall be of sufficient strength to safely withstand the stresses and strains to which they will be subjected. Exposed joints shall be close fitting and jointed where least conspicuous. Threaded connections shall have the threads concealed where practical. Welded connections shall have continuous welds or intermittent welds as specified or shown. The face of welds shall be dressed flush and smooth. Welding shall be on the unexposed side as much as possible in order to prevent pitting or discoloration of the aluminum exposed surface. Grind smooth continuous welds that will be exposed. Provide holes for temporary field connections and for attachment of the work of other trades.
- C. Miscellaneous aluminum items shall include: beams, angles, closure angles, grates, hatches, floor plates, stop plates, stair nosings, and any other miscellaneous aluminum called for on the Drawings and not otherwise specified.
- D. Angle frames for hatches, beams, grates, etc, shall be complete with welded strap anchors attached.
- E. Aluminum diamond plate and floor plate shall have a minimum thickness of 3/8-in. Frames and supports shall be of aluminum construction. Fastening devices and hardware shall be Type 304 stainless steel. Plates shall have a mill finish.
- F. Stair treads for aluminum stairs shall have abrasive non-slip nosing as approved.



- G. Aluminum nosing at concrete stairs shall be Wooster Products, Inc.; Alumogrit Treads, Type 116; similar by Barry Pattern and Foundry Co.; Andco or equal. Furnish with wing type anchors and flat head stainless steel machine screws, 12-in on center. Nosing shall also be used at concrete ladder openings. Nosing shall a single piece for each step extending to within 3-in at each side of stair or full ladder width. Set nosing flush with stair tread finish at concrete stairs. Furnish treads with heavy duty protective tape cover.
- H. Miscellaneous aluminum items shall have a cleaned and degreased mill finish.

## 2.09 MISCELLANEOUS STEEL

- A. All miscellaneous metal work shall be formed true to detail, with clean, straight, sharply defined profiles and smooth surfaces of uniform color and texture and free from defects impairing strength or durability. Holes shall be drilled or punched. Edges shall be smooth and without burrs. Fabricate supplementary pieces necessary to complete each item though such pieces are not definitely shown or specified.
- B. Connections and accessories shall be of sufficient strength to safely withstand the stresses and strains to which they will be subjected. Exposed joints shall be close fitting and jointed where least conspicuous. Threaded connections shall have the threads concealed where practical. Welded connections shall have continuous welds or intermittent welds as specified or shown. The face of welds shall be dressed flush and smooth. Grind smooth continuous welds that will be exposed. Provide holes for temporary field connections and for attachment of the work of other trades.
- C. Miscellaneous steel items shall include: beams, angles, lintels, metal stairs, support brackets, base plates for other than structural steel or equipment, closure angles, bridge crane rails, monorail hoist beams, holddown straps and lugs, door frames, splice plates, subframing at roof openings and any other miscellaneous steel called for on the Drawings and not otherwise specified.
- D. Structural steel angle and channel door frames shall be shop coated with primer. Frames shall be fabricated with not less than three anchors on each jamb.
- E. Steel pipe pieces for sleeves, lifting attachments and other functions shall be Schedule 40 pipe unless otherwise shown on the Drawings. Wall and floor sleeves, of steel pipe, shall have welded circumferential steel waterstops at mid-length.
- F. Lintels, relief angles or other steel supporting masonry or embedded in masonry shall be shop coated with primer.

- G. All steel finish work shall be thoroughly cleaned, by effective means, of all loose mill scale, rust and foreign matter and shall be given one shop coat of primer compatible with the finish coat after fabrication but before shipment. Paint shall be omitted within 3-in of proposed field welds. Paint shall be applied to dry surfaces and shall be thoroughly and evenly spread and well worked into joints and other open spaces.
- H. Galvanizing, where required, shall be the hot-dip zinc process after fabrication. Coating shall be not less than 2 oz/sq ft of surface.

## 2.08 MISCELLANEOUS STAINLESS STEEL

- A. All miscellaneous metal work shall be formed true to detail, with clean, straight, sharply defined profiles and smooth surfaces of uniform color and texture and free from defects impairing strength or durability. Holes shall be drilled or punched. Edges shall be smooth and without burrs. Fabricate supplementary pieces necessary to complete each item though such pieces are not definitely shown or specified.
- B. Connections and accessories shall be of sufficient strength to safely withstand the stresses and strains to which they will be subjected. Exposed joints shall be close fitting and jointed where least conspicuous. Threaded connections shall have the threads concealed where practical. Welded connections shall have continuous welds or intermittent welds as specified or shown. The face of welds shall be dressed flush and smooth. Grind smooth continuous welds that will be exposed. Provide holes for temporary field connections and for attachment of the work of other trades.
- C. Miscellaneous stainless steel items shall include: beams, angles, bar racks and any other miscellaneous stainless steel called for on the Drawings and not otherwise specified.

## PART 3 EXECUTION

### 3.01 INSTALLATION

- A. Install all items except those to be embedded in concrete or other masonry which shall be installed under Division 3 and Division 4 respectively. Items to be attached to concrete or masonry after such work is completed shall be installed in accordance with the details shown. Fastening to wood plugs in masonry will not be permitted.
- B. Abrasions in the shop primer shall be touched up immediately after erection. Areas left unprimed for welding shall be painted with primer after welding.

- C. Zinc coating which has been burned by welding, abraded, or otherwise damaged shall be cleaned and repaired after installation. The damage area shall be thoroughly cleaned by wire brushing and all traces of welding flux and loose or cracked zinc coating removed prior to painting. The cleaned area shall be painted with two coats of zinc oxide-zinc dust paint conforming to the requirements of Military Specifications MIL-P-15145. The paint shall be properly compounded with a suitable vehicle in the ratio of one part zinc oxide to four parts zinc dust by weight.
- D. Specialty products shall be installed in accordance with the manufacturer's recommendations.
- E. Expansion bolts shall be checked for tightness a minimum of 24 hours after initial installation.
- F. Install adhesive capsule anchors using manufacture's recommended drive units and adapters and in compliance with the manufacturer's recommendations.
- G. Headed anchor studs shall be welded in accordance with manufacturer's recommendations.
- H. All railings shall be erected to line and plumb.
- I. All steel surfaces that come into contact with exposed concrete or masonry shall receive a protective coating of an approved heavy bitumastic troweling mastic applied in accordance with the manufacturer's instructions prior to installation.
- J. Where aluminum contacts a dissimilar metal, apply a heavy brush coat of zinc-chromate primer followed by two coats of aluminum metal and masonry paint to the dissimilar metal.
- K. Where aluminum contacts masonry or concrete, apply a heavy coat of approved alkali resistant paint to the masonry or concrete.
- L. Where aluminum contacts wood, apply two coats of aluminum metal and masonry paint to the wood.
- M. Between aluminum grating, aluminum stair treads, or aluminum handrail brackets and steel supports, insert 1/4-in thick neoprene isolator pads, 85 plus or minus 5 Shore A durometer, sized for full width and length of bracket or support.

END OF SECTION

SECTION 09000  
PAINTING AND PROTECTIVE COATINGS

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. This section of these specifications is intended to cover the furnishing of all materials, labor, tools, and transportation necessary for a complete job of painting or coating in every respect, in the shop or factory and at the project site, whether every item is specifically mentioned or not, and the Contractor is to provide same.
- B. Surfaces to be painted or coated include indicated portions of concrete surfaces, masonry surfaces, wood surfaces, dry wall surfaces, interior piping, above-grade exterior piping, electrical conduit, valves, equipment, pipe supports and hangers, and metal surfaces except as noted below.
- C. The following surfaces shall NOT be painted or coated:
1. Surfaces not intended for painting such as color-pigmented fiberglass tanks, FRP odor control system duct work and vessels, weir plates, baffles, control panels, HDPE tanks, pipes, fittings; glass, etc., unless noted otherwise.
  2. Operating surfaces such as valve stems, sheaves, etc.
  3. Stainless steel.
  4. Galvanized sheet metal, or other corrosion resistant metal, unless otherwise directed.
  5. PVC pipe unless exposed outdoors or otherwise directed.
  6. Buried DI and HDPE piping except for steel couplings, fittings, and tie-rods.
  7. Grease nipples, hose threads, etc.
  8. Equipment name plates.

9. Structural aluminum, aluminum handrailing, stair treads, nosing, and grating end supports.
  10. Galvanized steel and fiberglass components of the secondary clarifiers, except for galvanized surface repairs.
  11. Stormwater inlets.
  12. Expansion joints.
- D. In the event that surfaces not intended to be painted or coated are painted or coated, the Contractor, at his expense, shall remove the paint or coating and recondition the surface if, and as directed by the Engineer.
- E. All painting shall be done in strict accordance with the written procedures and recommendations of the Paint Systems Manufacturer and shall be performed in a manner satisfactory to the Engineer.

#### 1.02 RELATED WORK (NOT USED)

#### 1.03 SUBMITTALS

The Contractor shall submit shop drawings in accordance with Section 01300, Shop Drawings, Submittals and Samples:

- A. Samples: Submit three (3) sample sets of manufacturer's color chips for Owner's selection of colors for the project. Provide color cards for piping color coding and identification.
- B. Product Data Submittals: Submit, for approval, separate packets of product data for each Paint System specified. Clearly label to identify product data with appropriate paint system numbers corresponding to this specification section. Submit the label analysis of the products and manufacturer's recommended surface preparation, cleaning, and application procedures for each paint system.
- C. Test Reports: Submit copies of all tests made by the Contractor as called for hereinafter or by applicable referenced standards.
- D. Certifications: Submit paint manufacturer's written certification that all paint systems specified to be in contact with potable water is certified to meet the requirements of ANSI/NSF Standard 61.

#### 1.04 WORK SEQUENCE (NOT USED)

#### 1.05 REFERENCE STANDARDS

Reference standards and recommended practices referred to in this Specification Section shall be the latest revision of any such document in effect at the bid time. The following documents are a part of this Section. Where this Section differs from these documents, the requirements of this Section shall apply.

##### A. American National Standards Institute (ANSI)

1. ANSI/EIA RS-359—Colors for Identification and Coding.
2. ANSI A13.1—Scheme for Identification of Piping Systems.
3. ANSI/NSF Standard 61 —Drinking Water System Components-Health Effects.
4. ANSI Z53.1—Safety Color Code for Marking Physical Hazards.

##### B. American Society for Testing and Materials (ASTM)

1. ASTM D 2200—Standard Practice for Use of Pictorial Surface Preparation Standards and Guides for Painting Steel Surfaces.
2. ASTM D 3276—Standard Guide for Painting Inspectors (Metal Substrates)
3. ASTM G 62—Standard Test Methods for Holiday Detection in Pipeline Coatings.

##### C. Society for Protective Coatings (SSPC)

1. SSPC-SP 1—Solvent Cleaning.
2. SSPC-SP 2—Hand Tool Cleaning.
3. SSPC-SP 3—Power Tool Cleaning.
4. SSPC-SP 6—Commercial Blast Cleaning.
5. SSPC-SP 7—Brush-off Blast Cleaning.
6. SSPC-SP 10—Near-White Metal Blast Cleaning.
7. SSPC-PA 1—Shop, Field, and Maintenance Painting.
8. SSPC-PA 2—Measurement of Dry Coating Thickness with Magnetic Gauges.
9. SSPC-PA 3—Guide to Safety in Paint Application.
10. SSPC-PA 4—Guide to Maintenance Repainting with Oil Base or Alkyd Painting Systems.

#### 1.06 QUALITY ASSURANCE

- A. Applicator: Painters shall have a minimum of 5 years experience and be a qualified professional in the preparation and application of the painting systems and the type of materials being applied for this project.
- B. Allowable Tolerance: The dry paint film thickness shall be that specified for the system hereinafter. Field measurements taken to show coated surfaces have received the specified dry film thicknesses shall be made in accordance with SSPC-PA 2. The film thickness shall be prepared and applied so that neither the appearance nor the service life of the paint will be detrimentally affected by weather or site conditions during the preparation, application, or within the guarantee period for this project.
- C. Pre-Painting Conference: Before any painting work, shop, or field is started, the Contractor shall arrange a meeting of the Paint Systems Manufacturer, Painting Contractor, and Engineer. All aspects of the Contractors' submitted paint system, surface preparation, application, painting and coating schedule shall be reviewed at this meeting.
- D. Source Quality Control: Products for use on this project shall be of one manufacturer, unless specifically approved otherwise or noted herein. No request for substitutions that decrease the film thicknesses and/or number of coats to be applied or that offer a change from the generic type of coating system specified will be considered. Materials not manufactured or furnished by the manufacturer of the painting and coating system materials specified shall be approved in writing by the Engineer and the Manufacturer as being compatible and not detrimental either to the appearance or service life of the system provided.

#### 1.07 WARRANTIES

- A. Warranties shall be in accordance with General Conditions, Supplemental Conditions, and Specification Section 01740, Warranties and Bonds.

#### 1.08 DELIVERY, STORAGE, AND HANDLING OF MATERIALS

- A. The Contractor shall adhere to the requirements specified in Section 01620, Delivery, Storage and Protection, for storing and protecting the items specified in this Section.
- B. Paint materials shall be delivered in the original factory-sealed containers, labeled to plainly show the designated brand name, formula or specification number, batch number, color, date of manufacture, and name and address of manufacturer. Store all paint materials in a place approved by the

Engineer. Protect materials from exposure to conditions that would affect the application and service life of the system. Flammable coatings shall be stored to conform with city, county, state, and federal safety codes and requirements for flammable coatings and paint materials.

- C. Field touch-up of factory, shop, or field-applied paint and coatings shall be performed by, and at the expense of, the Contractor in accordance with the paint or coating manufacturer's printed instructions to meet the requirements of these specifications.

#### 1.09 QUALIFICATIONS (NOT USED)

#### 1.10 TESTING REQUIREMENTS (NOT USED)

#### 1.11 MOCK-UP (NOT USED)

#### 1.12 PROJECT REQUIREMENTS (NOT USED)

#### 1.13 GUARANTEE

- A. A minimum 2-year guarantee from the date of substantial completion is required for all Paint Systems. The guarantee will cover peeling, excessive chalking, and other similar coating system failures. Provide a guarantee, in a form acceptable to the Owner, for removal and replacement of painting and coating materials, at no additional cost, for any painting or coating found to be unsatisfactory within a 2-year period subsequent to substantial completion. The paint manufacturer and the painting system applicator shall also provide a removal and replacement guarantee for materials and labor if the provided paint system fails within a 2-year period.

### PART 2 PRODUCTS

#### 2.01 MATERIALS

- A. General: Paint systems products used for the work shall be as specified in the Painting Systems and Application Schedule hereinafter. With the exception of special piping color coding, all colors shall be selected by the Owner.
- B. Paints and Coatings: Paint shall arrive at the project site ready-mixed, except for tinting or undercoats, special coating and approved thinning. Paint shall not be settled, caked, or thickened in the container, shall be readily



dispersed with a paddle to a smooth consistency, and shall have excellent application properties.

- C. Tinting Materials: Tinting materials shall be as recommended by the manufacturer for the particular material tinted. Finish coats shall be factory-mixed colors and shall not be tinted in the field.
- D. Thinner: Thinner shall be type and product recommended by the painting or coating systems manufacturer of the materials to be thinned and shall comply with the paint specifications hereinafter.
- E. Cleaning Materials: Shall comply with the requirements of the referenced standards as to type of surface preparation required unless specified otherwise by the manufacturer's approved written instructions. Cleaning materials shall not be detrimental to the application, appearance or service life of the painting system.

## 2.02 EQUIPMENT

- A. Cleaning Equipment: Contractor's equipment shall be suitable and as required for the specified cleaning, in accordance with approved SSPC-PA and SSPC-SP Standards for application and surface preparation specifications for painting listed herein.
- B. Painting Equipment: Equipment shall be adequate and commensurate for the work conditions, materials to be applied and workmanship required herein. Surface preparation, cleaning, and painting equipment shall be in conformance with the Painting Systems Manufacturers written recommendations and instructions.

## PART 3 EXECUTION

### 3.01 PRELIMINARY INSPECTION

- A. Before starting any work, the Contractor and Painting Subcontractor(s) shall examine surfaces to receive paint finishes for defects that cannot be corrected by procedures specified or referenced under this section and which might prevent satisfactory painting results. Work shall not proceed until such damages or defects are corrected by the trades involved. The commencing of work shall be construed as acceptance and approval of the surfaces by the Contractor and Painting Subcontractor(s), and acceptance of full responsibility for satisfactory painting in accordance with this specification.

### 3.02 PREPARATION

- A. Removals: Aluminum doors, hardware, hardware accessories, machined surfaces, plates, lighting fixtures, wall-mounted enclosures, and similar items in contact with painted surfaces and not to be painted shall be removed, masked and coated or otherwise protected prior to surface preparation and painting operations. Such removal and reinstalling shall be done by workmen skilled in the trades involved.
- B. Wood Surfaces: Sandpaper wood surfaces to smooth and even surface, then dust off. Apply shellac, 4 pounds cut, to all knots, pitch, and resinous sapwood prior to application of specified primer coats. After primer coats have dried, putty all nail holes, cracks, open joints, and other defects. Putty shall be colored to match primer. If putty is not compatible with finish, spot prime puttied areas.
- C. Concrete and Masonry: Patch large openings and holes and finish flush with adjacent surface. After priming, fill remaining small holes with prepared patching materials. Remove form oil from poured-in-place concrete by washing concrete with xylol, or exempt-type form oil solvent, as required for complete removal. These surfaces shall be dry. No painting shall be done until surfaces have cured for 28 days and are clean and dry. Concrete and precast concrete shall be prepared in accordance with the Paint System Manufacturer's written recommendations or as directed by the Engineer.
- D. Galvanized Metal Surfaces: Remove dirt and grease with mineral spirits and wipe dry with clean cloths, solvent cleaning per SSPC-SP 1 and in accordance with the Paint System Manufacturer's written recommendations or as directed by the Engineer.
- E. Metal Surfaces: Prepare metal surfaces, masts, poles, and structures to meet the requirements of The Society for Protective Coatings (SSPC) Surface Preparation Specifications referenced in this section and in accordance with the Paint System Manufacturer's written recommendations or as directed by the Engineer.

### 3.03 APPLICATION

- A. General: Only skilled and qualified painters shall be employed to do the work. Application may be by brush, roller, or spray after approval by the Engineer. All materials shall be applied under adequate illumination, evenly spread, and smoothly flowed on to avoid runs, sags, holidays, brush marks, air bubbles, and excessive roller stipple. Coverage and hide shall be

complete. Finish coats shall be free from noticeable laps or brush marks. When color, stain, dirt, or undercoats show through final coat of paint, the surface shall be covered by additional coats until the paint film is of uniform finish, color, appearance, and coverage, at no additional cost to the Owner. All coats shall be dry to manufacturer's recommendations before applying succeeding coats. All suction spots or hot spots in plaster and/or cement after the application of the first coat shall be touched up before applying the second coat. Application of all painting for structural steel structures shall be in strict accordance with the procedures specified in SSPC-PA 1. During paint system application, paint shall be continuously stirred and no thinner shall be added after the paint has been mixed. Paint shall be thoroughly worked into all joints, crevices, and corners.

- B. Cleaning: Surfaces to be painted shall be clean before applying paint or surface treatment. Oil and grease shall be removed with clean cloths and cleaning solvents prior to mechanical cleaning. Solvent cleaning shall conform to SSPC-SP 1. Rust and corrosion shall be removed from metal in accordance with the SSPC and as directed by the Engineer.
  
- C. Environmental Requirements: The requirements of SSPC-PA 1, 3, or 4 and the manufacturer's requirements for surface and ambient temperature, moisture and cover of work being applied, or to be applied, shall be followed throughout the project. Any exceptions shall be approved in writing by the Engineer. Paint shall not be applied when the temperature of the surface or paint is below 40°F or when the temperature of the surface is expected to drop to 40°F or below before paint has dried or properly cured. Provide proper ventilation of space within structures for proper drying of paint. All surfaces shall be dry prior to painting unless specifically approved otherwise. Paint shall not be applied to wet or damp surfaces, and shall not be applied in the rain, fog, mist, or when the temperature of the surface to be painted is less than 5°F above the dew point temperature. No paint shall be applied when it is expected that the surface temperature will drop below the paint system manufacturer's written recommendation within eight hours after application. Dew or moisture condensation should be anticipated, and if such conditions are prevalent, painting shall be delayed until the surface is dry. Further, the day's painting shall be completed well in advance of the probable time of day when moisture condensation will occur, in order to allow the film the required moisture-free drying time as specified by the paint system manufacturer. Care must be taken that the coatings are applied to the film thicknesses or surface area coverages recommended and specified herein to assure proper release of solvents.

- D. Protection: Cleaning and painting shall be so programmed that detrimental amounts of dust or other contaminants do not fall on surfaces prepared for painting or wet, newly-painted surfaces. Surfaces not intended to be painted shall be suitably protected from the effects of cleaning and painting operations.
- E. Scheduling: This work shall be scheduled and coordinated with the Engineer, work of other trades and shall not proceed until other work, climate, and/or job conditions are as required to achieve satisfactory results. The Contractor shall examine the specifications for the various other trades and shall thoroughly familiarize himself with their provisions regarding painting. All walls and ceilings shall be painted before installation of surface-mounted equipment, conduit, or piping.
- F. Workmanship, Exterior Painting: Exterior painting shall not be done during adverse environmental conditions. Avoid painting surfaces in direct hot sun, rain, high humidity conditions, or temperature at or below 40°F.
- G. Damages: Existing utilities, structures, and properties: It shall be the responsibility of the Contractor to locate and avoid damage to any and all existing water, gas, sewer, electric, telephone, and other utilities, structures, and appurtenances. The Contractor shall repair or pay for all damages caused by his operations or his personnel to existing utilities, structures, appurtenances, or properties, either below ground or above ground and shall settle in full all damage suits that may arise as a result of the Contractor's operations.

### 3.04 FIELD QUALITY CONTROL

- A. Testing: As coating and painting progresses, the applicator shall check wet film with a wet film gauge to check thickness required to get dry film thickness. After the paint and coatings have dried and properly cured, the measurement of dry paint thickness on ferrous metal shall be made in accordance with SSPC-PA 2 and on concrete and masonry by means of a dry film thickness device approved by the Engineer and provided by the paint manufacturer. Make five separate spot measurements in each space for each surface such as walls, floor, and ceilings in the presence of the Engineer, unless otherwise specified. Record and submit location and test results to the Engineer for the record.
- B. Testing Equipment and Procedures: The Contractor shall have on the project site the following testing equipment. Equipment shall be in calibration and proper working order. Equipment shall be used in accordance with the

manufacturer's instructions or as directed by the Engineer. The Engineer shall be notified of time of testing so that he might be present to witness testing.

1. Sling Psychrometer: Relative humidity and dewpoint readings shall be taken at intervals throughout the day's work. Readings shall be taken at the start of the morning's work, mid-day, and afternoon. Should environmental conditions change, additional reading shall be taken to assure that coatings are being applied under the conditions as outlined by the coatings manufacturer.
  2. Surface Temperature Thermometer: Surface temperatures shall be taken in areas where work is being performed. Surface temperature shall be that as specified by the coatings manufacturer.
  3. Replica Tape and Micrometer: Testex X-Course Replica Tape shall be employed to determine the surface profile of blasted surfaces. Surface profile shall be as specified.
  4. Dry Film Thickness Measurements: Dry film thickness reading shall be taken with a properly calibrated (per the manufacturer's instructions) Type 1 (magnetic) or Type 2 (electromagnetic) instrument. Dry film thickness reading will be taken and recorded in a frequency and manner as indicated by the Engineer.
  5. Holiday Detection: After completion of any ferrous metal immersion coating system, interior surfaces shall be holiday detected in accordance with ASTM G62 low voltage holiday detection. Holiday detector shall be a Tinker & Razor Model M-1 or equal. Areas found to have holidays shall be marked and repaired in accordance with the paint manufacturer's instructions. The Engineer shall be notified of time of testing so that he might be present to witness testing. The Contractor shall provide ladders, rigging, etc., as necessary to allow the Engineer to spot check paint thickness of each coat.
- C. Coating Cans: Empty coating cans shall be capped and neatly stacked in an area designated by the Engineer. Remove from the project site after being accounted for. A notarized statement shall be provided by the Contractor detailing materials and quantities used in the project.
- D. Adjustment and Cleaning: During progress of the work and at completion, remove and clean all paint where spilled, splashed, splattered, sprayed, or smeared from on all surfaces not scheduled for painting, including glass, light

fixtures, hardware, equipment, painted, and unpainted surfaces. After completion of all painting, the Contractor shall remove from the job site all equipment, surplus materials, and debris resulting from the work.

- E. Overspray: Overspray shall not be allowed. The Contractor shall not apply paint or coatings during windy periods nor allow overspray or dripping of paint to occur. The Contractor shall be responsible for any damage to adjacent structures, automobiles, etc., due to uncontrolled painting or coating.

### 3.05 DAMAGED COATINGS

- A. Damaged coatings, pinholes, and holidays shall have edges feathered and repaired in accordance with the recommendations of the manufacturer, as approved by the Engineer.
- B. All finish coats, including touch-up and damage-repair coats, shall be applied in a manner that will present a uniform texture and color-match appearance.

### 3.06 UNSATISFACTORY APPLICATION

- A. If the item has an improper finish, color, or insufficient film thickness, the surface shall be cleaned and topcoated with the specified material to obtain the specified color and coverage. Specific surface preparation information to be secured from the coatings manufacturer and the Engineer.
- B. All visible areas of chipped, peeled, or abraded paint shall be hand or power-sanded, feathering the edges. The areas shall then be primed and finish coated in accordance with the specifications.
- C. Work shall be free of runs, bridges, shiners, laps, or other imperfections. Evidence of these conditions shall be cause for rejection.
- D. Any defects in the coating system shall be repaired by the Contractor per written recommendations of the coating manufacturer.

### 3.07 GUARANTEE AND ANNIVERSARY INSPECTION

- A. All work shall be warranted for a period of two years from the date of acceptance of the project.
- B. The Owner will notify the Contractor at least 30 days prior to the second anniversary date and shall establish a date for the inspection. Any defects in

the coating system shall be repaired by the Contractor at no additional cost to the Owner. Should a failure occur to 25 percent of the painted surface, either interior or exterior, the entire surface shall be cleaned and painted in accordance with these specifications.

### 3.08 CLEAN UP

- A. All cloths and waste that might constitute a fire hazard shall be placed in closed metal containers or destroyed at the end of each day. Upon completion of the work, all staging, scaffolding, and containers shall be removed from the site and/or destroyed in an approved and legal manner. Paint spots, oil, or stains upon adjacent surfaces and floors shall be completely removed and the entire job left clean and acceptable to the Engineer.

### 3.09 PAINTING SYSTEMS AND APPLICATION SCHEDULE

- A. The following schedule describes the painting systems to be applied to the various structures, equipment, and surfaces included on the project. Colors will be selected by the Owner, unless otherwise noted on the drawings or in these specifications. Each coat applied shall have a dry film thickness within the ranges specified. However, prior to ordering each paint system, the Contractor shall obtain written acknowledgment from the paint system manufacturer verifying that the film thickness range as specified is satisfactory. Any discrepancy shall be immediately brought to the attention of and resolved by the Engineer.
- B. The following schedule defines the painting or coating system to be used on various items identifies specific surfaces to be prepared, cleaned, and painted. In the event that an item or surface is not identified herein, the Contractor shall utilize the appropriate specified paint system which provides the maximum protection for said surface. Note that some items may be delivered with factory or shop applied primer and finish paint; the Contractor need not repeat the completed preparation and painting except for necessary touch-up to the applied finish coating or painting to conform to adjacent piping, structures, or other field painted surfaces colors. The Scheduled items to be painted for each Paint System include, but are not limited to, the following:

1. Paint System No. 1: Submerged ferrous metal surfaces in contact with domestic sewage and interior concrete surfaces of submersible pumping station valve vaults.
  - a. Paint Application Schedule—Apply Paint System No. 1 to the following surfaces:
    - (1) Metal embeds in concrete walls, tanks and other structures, wall pipes, pipe sleeves, slide and sluice gate frames, disks, and thimbles.
    - (2) All submerged ferrous metal surfaces of the Headworks structure, Influent Flow Splitter, Oxidation Ditches, Secondary Clarifiers, Filters, Aerobic Sludge Holding Tank No. 2, Chlorine Contact Basin No. 2, and Reclaimed Water Storage Tank (except stainless steel surfaces).
    - (3) All ferrous metal items submerged and exposed to 1-foot above maximum water level in the Drain Pumping Station wet well, Supernatant Pumping Station wet well, Scum Pumping Station wet well, and Reclaimed Water Transfer Pumping Station wet well.
    - (4) All pumps, DI piping, fittings and supports in the Drain Pumping Station wet well, Supernatant Pumping Station wet well, Scum Pumping Station wet well, and Reclaimed Water Transfer Pumping Station wet well.
    - (5) All interior concrete surfaces of all submersible pumping stations valve vaults.
  - b. Paint System Description
    - (1) General: Coal Tar Epoxy, 2-coat system.
    - (2) Surface Preparation: SSPC-SP 10.
    - (3) Primer Coat(s): 1 coat @ 10.0 mils DFT (8.0 mils DFT minimum to 12.0 mils DFT maximum).



- (4) Finish Coat(s): 1 coat @ 10.0 mils DFT (8.0 mils DFT minimum to 12.0 mils DFT maximum).
  - (5) Total Dry Film Thickness = 18.0-24.0 mils DFT.
  - (6) Acceptable Paint System Manufacturer(s) and Product(s): Tnemec Series 46H-413 (primer and finish coats); Induron Ruff Stuff 2100 Coal Tar Epoxy (primer and finish coats); Carbolite Bitumastic 300 M (primer and finish coats); or approved equal.
2. Paint System No. 2: Exposed ferrous metal surfaces in a mildly corrosive atmosphere.
- a. Paint Application Schedule – Apply Paint System No. 2 to the following surfaces:
    - (1) Exposed ferrous metal surfaces inside and outside of structures with mildly corrosive atmospheric conditions.
    - (2) All non-immersed exterior surfaces exposed ferrous metal surfaces including all above grade interior and exterior DI piping and supports, influent flow meter, and all associated piping, pipe supports and hangers, instrument and control panel supports, and other miscellaneous non-immersed ferrous metal surfaces.
  - b. Paint System Description
    - (1) General: Polyamide Epoxy/Polyurethane, 3-coat system.
    - (2) Surface Preparation: SSPC-SP 6 for non-immersed surfaces and SSPC-SP 10 for steel tankage exterior, non-immersed walls, and appurtenances.
    - (3) Primer Coat(s): 1 coat @ 3.0 mils DFT (2.5 mils DFT minimum to 3.5 mils DFT maximum) unless indicated otherwise.

- (4) Intermediate Coat(s): 1 coat @ 4.0 mils DFT (3.5 mils DFT minimum to 4.5 mils DFT maximum) unless indicated otherwise.
  - (5) Finish Coat(s): 1 coat @ 4.0 mils DFT (3.0 mils DFT minimum to 5.0 mils DFT maximum) unless indicated otherwise.
  - (6) Total Dry Film Thickness = 9.0 to 12.0 mils DFT unless indicated otherwise.
  - (7) Acceptable Paint System Manufacturer(s) and Product(s): Tnemec Series 90-97 (primer coat), Series 66 (intermediate coat), Series 73 (finish coat); Induron P-14 Armorguard Primer (primer coat), Armorguard Polyamide Epoxy (intermediate coat), Indurethane 5500 (finish coat); Sauereisen 501 Conoweld Epoxy Primer (primer coat, 8 mils DFT), 201 Conoglaze Epoxy (intermediate coat, 10 mils DFT), 310 Carbothane Polyurethane (finish coat, 5 mils DFT); Carboline Carboguard 893 SG (primer coat), Carboguard 893 SG (intermediate coat), Carbothane 134 HG (finish coat) or approved equal.
3. Paint System No. 3: Buried ferrous metal surfaces except ductile iron pipe.
- a. Paint Application Schedule – Apply System No. 3 to the following ferrous metal surfaces:
    - (1) Below grade and buried ferrous metal piping, sleeves, couplings, repair clamps, wall pipes, bolts and nuts, and other miscellaneous metals except ductile iron pipe.
  - b. Paint System Description
    - (1) General: Polyamide Epoxy-Coal Tar, 2-coat system.
    - (2) Surface Preparation: SSPC-SP 10 for immersed or submerged service including buried below normal groundwater level. SSPC-SP 6 for non-immersed or buried above normal groundwater level.

- (3) Primer Coat(s): 1 coat @ 9.0 mils DFT (8.0 mils DFT minimum to 10.0 mils DFT maximum).
  - (4) Finish Coat(s): 1 coat @ 9.0 mils DFT (8.0 mils DFT minimum to 10.0 mils DFT maximum).
  - (5) Total Dry Film Thickness = 16.0 to 20.0 mils DFT.
  - (6) Paint System Manufacturer and Product(s): Tnemec Series 46H-413 (primer and finish coats); Induron Ruff Stuff 2100 Coal Tar Epoxy (primer and finish coats); Carbolite Bitumastic 300 M (primer and finish coats) or approved equal.
4. Paint System No. 4: Outdoor exposed copper, bronze, aluminum, and galvanized steel and other non-ferrous metal surfaces.
- a. Paint System Schedule—Apply Paint System No. 4 to the following surfaces:
    - (1) Galvanized pipe and metal surfaces such as plant service water piping, pipe vents, supports, walkways, ladders, hangers, conduit supports, and other surfaces requiring painting to match adjacent painted surfaces.
    - (2) Copper surfaces requiring paint to match adjacent painted surfaces.
  - b. Paint System Description
    - (1) General: Polyamide Epoxy/Polyurethane, 3-coat system.
    - (2) Surface Preparation: Prepare surfaces in accordance with the Paint System Manufacturer's recommendations.
    - (3) Primer Coat(s): 1 coat @ 1.0 mil DFT (0.5 mil DFT minimum to 1.5 mils DFT maximum).
    - (4) Finish Coat(s): 1 coat @ 3.0 mils DFT (2.0 mils DFT minimum to 4.0 mils DFT maximum).

- (5) Intermediate Coat(s): 1 coat @ 3.0 mils DFT (2.0 mils DFT minimum to 4.0 mils DFT maximum).
- (6) Total Dry Film Thickness = 6.0 to 8.0 mils DFT.
- (7) Acceptable Paint System Manufacturer(s) and Product(s): Tnemec Series 66 (Primer), Series 66 (intermediate coat), Series 73 (finish coat); Induron Armorguard Polyamide Epoxy (primer coat), Armorguard Polyamide Epoxy (intermediate coat), Indurethane 5500 (finish coat); Carboline Galoseal WB (primer coat), Carboguard 893 SG (intermediate coat), Carbothane 134 HG (finish coat) or approved equal.

5. Paint System No. 5: Galvanized metal surface repair.

a. Paint System Schedule – Apply Paint System No. 5 to the following surfaces:

- (1) Galvanized metal surfaces with damaged, abraded, chipped, or marred galvanized surfaces.

b. Paint System Description

- (1) General: Zinc-rich Aromatic Urethane, 1-coat system.
- (2) Surface Preparation: Remove rust or corrosion, SSPC-SP 1.
- (3) Primer Coat(s): 1 coat @ 3.0 mils DFT (2.0 mils DFT minimum to 4.0 mils DFT maximum) applied to damaged galvanized steel surface.
- (4) Finish Coat(s): None.
- (5) Acceptable Paint System Manufacturer(s) and Product(s): Tnemec Series 90-97 (primer coat); Induron Z-Rep 52 Primer; Carboline Carbomastic 15 (primer coat) or approved equal.

6. Paint System No. 6: Aluminum and dissimilar metals contact surfaces isolation.

- a. Paint System Schedule – Apply Paint System No. 6 to the following surfaces:
  - (1) Aluminum hand rail anchorages, aluminum grating support frames, supports, slide gate frames, panel support posts, aluminum structures, and embedded aluminum items in contact with concrete and masonry.
  - (2) Aluminum handrail, grating, stair risers, and other aluminum items in contact with steel surfaces.
  - (3) The contact surface between dissimilar metals.
  
- b. Paint System Description:
  - (1) General: Coal-Tar, 1-coat system.
  - (2) Surface Preparation: SSPC-SP 1.
  - (3) Primer Coat(s): 1 coat @ 11.0 mils DFT (10.0 mils DFT minimum to 12.0 mils DFT maximum).
  - (4) Finish Coat(s): If applied by brush, apply additional coats to obtain 10.0 to 12.0 mils DFT total.
  - (5) Acceptable Paint System Manufacturer(s) and Product(s): Tnemec Series 46H-413 (primer and additional coats if necessary); Induron Ruff Stuff 2100 Coal Tar Epoxy (primer and additional coats if necessary); Carbolite Bitumastic 300 M (primer and additional coats if necessary) or approved equal.
  
- 7. Paint System No. 10: Fiberglass (where shown or specified) and polyvinyl chloride (PVC) surfaces exposed to direct or indirect sunlight (outdoor exposures).
  - a. Paint System Schedule – Apply Paint System No. 10 to the following surfaces:
    - (1) FRP enclosure, PVC piping and electrical conduit, junction boxes, terminal boxes, and other miscellaneous items.

b. Paint System Description:

- (1) General: Polyamide Epoxy/Polyurethane, 2-coat system.
- (2) Surface Preparation: As recommended by Paint System Manufacturers for application to new and existing PVC and fiberglass surfaces.
- (3) Primer Coat(s): 1 coat @ 225 SFPG (200 SFPG minimum to 250 SFPG maximum).
- (4) Finish Coat(s): 1 coat @ 375 SFPG (300 SFPG minimum to 450 SFPG maximum).
- (5) Acceptable Paint System Manufacturer(s) and Product(s): Tnemec Series 66 (primer coats), Series 73 (finish coat); Induron Armorguard Polyamide Epoxy (primer coat), Indurethane 5500 (finish coat); Carboline Carboguard 893 SG (primer coat), Carbothane 134 HG (finish coat) or approved equal.

8. Paint System No. 21 : Acid Resistant Submerged and Vapor Lining—submerged or intermittently submerged concrete in raw sewage and concrete surfaces subject to vapor phase exposure of raw sewage:

a. Paint System Schedule – Apply Paint System No. 21 to the following surfaces:

- (1) All interior concrete surfaces continuously or intermittently in contact with severe wastewater and raw sewage (including free board area above the maximum water surface elevation and overhead concrete surfaces in channels and basins) in Headworks Structure, Influent Flow Splitter Box, Scum Pumping Station wet well, and manholes continuously or intermittently in contact with raw sewage. Provide high abrasion resistance.
- (2) All interior concrete surfaces continuously or intermittently exposed in vapor phase severe wastewater and raw sewage in Headworks Structure

and Scum Pumping Station wet well (underside of the concrete roofs).

b. Paint System Description

- (1) General: Epoxy Surfacer/Aliphatic amine epoxy mortar/Polyamine epoxy, 4-coat system.
- (2) Surface Preparation: Abrasive blast or mechanically abrade to remove laitance, form release agents, curing compounds, sealers, fines, and other foreign contaminants to provide a surface profile in accordance with SSPC-SP13/NACE 6, ICRI CSP 3-5. All surfaces must be clean and dry prior to the application of any coatings.
- (3) Epoxy Surfacer: The Contractor shall fill masonry surfaces and concrete surfaces that have pits, pockets, and bug holes following surface preparation with an epoxy surfacer with a minimum solids volume of 100%. Apply one coat to fill voids, pores, and cracks and provide a minimum thickness of 1/8-inch. Apply according to the manufacturer's instructions.
- (4) Prime Coat(s): Epoxy Mortar, one (1) coat @ 125 mils DFT.
- (5) Intermediate Coat (s): one (1) coat @ DFT of 15.0-20.0 mils.
- (6) Finish Coat (s): one (1) coat @ DFT of 15.0-20.0 mils.
- (7) Acceptable Paint System Manufacturer(s) and Product(s): Tnemec 218 Mortar Clad (surfacers), Series 434 Perma-Shield H<sub>2</sub>S modified aliphatic amine epoxy mortar (primer), Series 435 Perma-Glaze modified polyamine epoxy (intermediate and finish coats); Sauereisen F-121 Resurfacer @ 125 mils or 209HB Epoxy Filler @ 125 mils (surfacers), SewerGard Epoxy 210T @ 125 mils (primer coat), SewerGard Epoxy 210G @ 20 mils (intermediate and finish coat); Carbolite Carboguard 510 or 510 SG (surface), Plasite

5371 (primer), Plasite 4500 S (intermediate and finish coats) or approved equal.

9. Paint System No. 23: Concrete interiors in contact with corrosive chemicals:
  - a. Paint System Schedule – Apply Paint System No. 23 to the following surfaces:
    - (1) All interior concrete surfaces continuously or intermittently in contact with sodium hypochlorite solution in sodium hypochlorite tank truck filling station, chemical building pump skids pipe trench, and sodium hypochlorite drain/overflow manhole.
  - b. Paint System Description
    - (1) General: Epoxy Surfacer/ Cycloaliphatic amine epoxy, 3-coat system, Carboline 4-coat system or Sauereisen 4-coat system as specified below.
    - (2) Surface Preparation: Surfaces shall be clean and dry. Allow new concrete to cure for 28 days. Abrasive blast clean per SSPC-SP6 (brush off blast).
    - (3) Epoxy Surfacer: The Contractor shall fill masonry surfaces and concrete surfaces that have pits, pockets, and bugholes following surface preparation with an epoxy surfacer with a minimum solids volume of 100%. Apply one coat to fill voids, pores, and cracks and provide a minimum thickness of 1/8-inch. Apply according to the manufacturer's instructions.
    - (4) Primer Coat (s): one (1) coat @ DFT of 8.0-12.0 mils unless indicated otherwise.
    - (5) Finish Coat(s): one (1) coat @ DFT of 8.0-12.0 mils unless indicated otherwise.
    - (6) Acceptable Paint System Manufacturer(s) and Product(s): Tnemec 218 Mortar Clad (surfacer), series 61 cycloaliphatic amine epoxy (primer and finish coats);



Carboline Semstone 800 Series Patching Mortar (surface), Plasite 800 Series Primer @ 5-6 mils (primer), Plasite 4007 @ 15-17 mils per coat (intermediate and finish coats); Sauereisen F-121 Resurfacer @ min. 125 mils or 209HB Epoxy Filler @ 125 mils (surface), 550 VE Prime @ 3 mils (primer coat), Fiberline 440 Vinyl Ester @ 31 mils (intermediate coat), VE Glaze 472 @ 7 mils (finish coat); or approved equal.

10. Paint System No. A1: New and Existing Gypsum Wallboard and Plaster; Interior:
  - a. Paint System Schedule - Apply Paint System No. A1 to the Administration Building interior new and existing gypsum wallboard and plaster.
  - b. Paint System Description
    - (1) General: Acrylic, 3-coat system.
    - (2) Surface Preparation: Comply with manufacturer's published recommendations for material and surface condition.
    - (3) Primer: Minimum 30% solids, 100% acrylic, primer-sealer; 50 grams per liter VOC, maximum. 1 coat @ 0.8 mils DFT.
    - (4) Finish: Eggshell/Satin: Minimum 34% solids, 100% acrylic latex; 50 grams per liter VOC, maximum. 2 coats, 1.2 mils DFT per coat.
    - (5) Acceptable Paint System Manufacturer(s) and Product(s): Benjamin Moore Eco Spec Latex 231 (primer coat), Eco Spec Latex 223 (finish coats); Sherwin Williams Harmony Low Odor Interior Latex Primer (primer coat), Harmony Low Odor Interior Latex Eggshell (finish coats); Carboline Sanitile 120 (primer coat), Sanitile 155 (finish coats).

11. Paint System No. A2: New and Existing Wood; Interior:

- a. Paint System Schedule - Apply Paint System No. A2 to the Administration Building interior new and existing wood.
- b. Paint System Description
  - (1) General: Acrylic, 3-coat system.
  - (2) Surface Preparation: Comply with manufacturer's published recommendations for material and surface condition.
  - (3) Primer Coat(s): Minimum 30% solids, 100% acrylic, primer-sealer; 50 grams per liter VOC, maximum. 1 coat @ 0.8 mils DFT.
  - (4) Finish Coat(s): Minimum 34% solids, 100% acrylic latex, semi-gloss; 50 grams per liter VOC, maximum. 2 coats, 1.4 mils DFT per coat.
  - (4) Acceptable Paint System Manufacturer(s) and Product(s): Benjamin Moore Eco Spec Latex 231 (primer coat), Eco Spec Latex Enamel 224 (finish coats); Sherwin Williams Harmony Low Odor Interior Latex Primer (primer coat), Harmony Low Odor Interior Latex Semi-Gloss (finish coats); Carboline Sanitile 120 (primer coat), Carbocrylic 3359 (finish coats).

12. Paint System No. A4: Structural steel and metal trim surfaces.

- a. Paint System Schedule - Apply Paint System No. A4 to the following surfaces:
  - (1) Metal doors and frames.
  - (2) Building trim, soffits, and fascia.
  - (3) Bollards, miscellaneous steel items.
- b. Paint System Description

- (1) General: Polyamide Epoxy/Polyurethane, 3-coat system.
- (2) Surface Preparation: SPCC-SP6.
- (3) Primer Coat(s): 1 coat @ 4.0 mils DFT (3.0 mils DFT minimum to 5.0 mils DFT maximum).
- (4) Intermediate Coat(s): 5.0 mils DFT (4.0 mils DFT minimum to 6.0 mils DFT maximum).
- (5) Finish Coat(s): 1 coat @ 2.5 mils DFT (2.0 mils DFT minimum to 3.0 mils DFT maximum).
- (6) Total Dry Film Thickness = 9.0 to 12.0 mils DFT.
- (7) Acceptable Paint System Manufacturer(s) and Product(s): Tnemec Series 66-1211 (primer coat), Series 66-color (intermediate coat), Series 73 (finish coat); Induron P-14 Armorguard Primer (primer coat), Armorguard Polyamide Epoxy (intermediate coat), Indurethane 5500 (finish coat); Carboline Carboguard 893 SG (primer and intermediate coats), Carbothane 134 HG (finish coat) or approved equal.

13. Paint System No. A5: Concrete floor surface clear sealant.

a. Paint System Description

- (1) General: Polyamide Epoxy, 1-coat system.
- (2) Surface Preparation: Prepare concrete floor surfaces in accordance with the Paint System Manufacturer's recommendations.
- (3) Primer Coat(s): 1 coat @ 140 SFPG (130 SFPG minimum to 150 SFPG maximum) unless indicated otherwise.
- (4) Finish Coat(s): None.
- (5) Acceptable Paint System Manufacturer and Product(s): Tnemec Series 201 (primer-seal coat); Induron

Armorguard Epoxy Clear (primer-seal coat); Sauereisen  
Conospread 256 @ 12 mils; Carboline Carboguard  
1340 @ 3-4 mils or approved equal.

14. Paint System No. A6: Concrete waterproofing: One coat, minimum 25 lbs per square yard of Thoroseal by Thorosystem Products; or Sauereisen H2OPRUF F-190 @ 125 mils (two 1/16-inch coats); or approved equal.
15. Paint System No. A7: Primer over bituminous coating: two-coat system, Tnemec series 66 or Carboline Carboguard 890 at 4.0 mils DFT each. Allow bituminous coating to bleed through on first coat. Apply second coat, third coat shall be per service condition schedule.

### 3.10 COLOR CODE SCHEDULE

A. All equipment and pipe shall be painted solid, using a color code according to the following scheme. Safety color coding and marking of physical hazards shall be in accordance with ANSI Z53.1.

B. Description:

<u>Building</u>	<u>Color Name</u>
Interior, exterior	Color selected by Owner

<u>Equipment and Piping</u>	<u>Color Name</u>
All equipment, piping, valves, supports	Match existing and as picked by Owner

<u>Special Piping</u>	<u>Color Name</u>
Chlorine Solution	Safety Yellow

END OF SECTION

SECTION 11000  
GENERAL EQUIPMENT REQUIREMENTS

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. This Section specifies general work requirements regarding the products and execution services that are specified in the Division 11 Sections incorporated in the Contract Documents. The requirements specified herein shall apply to all of the Division 11 Sections, unless noted otherwise.

1.02 RELATED WORK

- A. Other specifications Sections in the Contract Documents contain work that is related to the general work requirements specified in this Section. This related work includes, but is not limited to, the following Sections:

1. Section 00800: Supplemental Conditions
2. Section 01005: General Requirements
3. Section 01300: Shop Drawings, Submittals and Samples
4. Section 01600: Material and Equipment
5. Section 01620: Delivery, Storage and Protection
6. Section 01740: Warranties and Bonds
7. Section 01780: Operation and Maintenance Manuals
8. Section 05501: Miscellaneous Metal
9. Section 09000: Painting and Protective Coatings
10. Section 13310: PLC Control Cabinet
11. Section 13320: Fiber Optic Panels
12. Section 16050: General Provisions

1.03 SUBMITTALS

- A. The Contractor shall furnish submittals to the Engineer in accordance with Sections 01300, Shop Drawings, Submittals and Samples. The submittal contents for equipment, instrumentation, controls and appurtenances specified in the Division 11 Sections shall contain the general information herein below. Additional submittal requirements are required in the Division 11 Sections.

1. A list and description of all deviations from the Contract Documents.
2. A list of equipment and components on each drawing with each product identified by legend reference. Include product name, manufacturer, and model number.
3. Completely dimensioned plan, elevations, and cross-sections of system equipment and sub-assemblies.
4. Shop and erection drawings showing details, anchor bolt locations, and field connections.
5. Manufacturer's equipment installation instructions.
6. Descriptive literature, technical bulletins, and catalog data sheets for all equipment and purchased sub-components.
7. Installation, operation, maintenance, and start-up procedures.
8. Total equipment weight (while operating).
9. Drive mechanism torque rating and bearing life rating.
10. Motor data and catalog information.
11. Submit complete electrical drawings, schematics and interconnecting wiring diagrams and schedules for the equipment control system, instrumentation and control panel (s) showing numbered wiring terminals in the control panel conforming to NEMA ICS-1-101. Identify field device terminals, wire number, wire sizes, control and power wire types, and interfaced elements.
12. Control panel construction and panel layout drawings.
13. Complete technical literature for all factory-applied paint systems. Clearly indicate the components to be coated and the corresponding paint system. manufacturers' descriptive literature, product specifications, and published details.

#### 1.04 QUALITY ASSURANCE

- A. Requirements of Regulatory Agencies: The Contractor shall comply with construction requirements of State, County, and such other local political subdivision specifications as may exceed the requirements of the codes, standards, and approving bodies referenced herein.
1. NFPA Standards: The Contractor shall comply with requirements of the National Fire Protection Association (NFPA) Standards referenced in the various Specifications Sections, and as directly appropriate to the work and workmanship.
  2. Electrical Requirements: The Contractor shall comply with requirements for both the Underwriters' Laboratories, Inc. (UL) Listings, Labels, and Approvals and the National Electrical Manufacturers' Association (NEMA) Stamps or Seals as applicable to electrical equipment or apparatus forming parts of the Mechanical Equipment.
- B. Certificates and Permits: Upon completion of work, and prior to final payment, the Contractor shall furnish to the Engineer formal certification of final inspections from authorities having jurisdiction over the work in this project and secure required permits, if any, from such authorities. Additionally, the Contractor shall prepare any detailed diagrams and drawings that are required by those authorities having jurisdiction over the work of this project at no additional cost to the OWNER.
- C. Source Quality Control: Products used throughout these specifications, and as indicated on the Drawings, shall be of companies having established reputations in the manufacture of the particular materials, equipment, or apparatus specified. Such products may be of their own make, or products of others for which they assume full responsibility when used in said outfits (which are not manufactured completely by them), and with replacement parts available.
- D. Products: The equipment specified in Division 11 was based on the latest models that were available from the specified equipment manufacturers at the time the Contract Documents were developed. If any equipment models specified in the Division 11 Sections have been discontinued or will be discontinued within one year after the bid date, the Contractor shall furnish and install the latest and most recent equipment model at no additional cost to the OWNER.

- E. For each category of materials and equipment (Products) specified in the Division 11 Sections, the Contractor shall provide Products of the same manufacturer and type.
- F. Equipment Selection: The Contractor may furnish equipment of higher electrical characteristics, physical dimensions, capacities, and ratings provided such proposed equipment is approved by the Engineer in writing. Upon receiving the Engineer's approval to provide such equipment, the Contractor shall furnish the connecting mechanical and electrical services including, but not limited to, circuit breakers, conduit, increased control panel enclosure, motors, bases, and any other electrical equipment that is needed to accommodate the higher electrical characteristics at no additional cost to the Owner.
- G. If minimum energy ratings or efficiencies of equipment are specified in Division 11, the Contractor shall furnish and install equipment that meets or exceeds the specified design and commissioning requirements (no exceptions) as determined by the Engineer.
- H. All the equipment specified in the Contract Documents shall be standard units of proven ability as manufactured by a competent organization that is fully experienced, reputable, and qualified in the manufacture of the equipment to be furnished. The equipment shall be designed, constructed, and installed in accordance with the best practice and methods, and shall operate satisfactorily when installed.

#### 1.05 QUALIFICATIONS AND REQUIREMENTS

- A. The manufacturer of each piece of equipment described in the Division 11 Sections shall meet the following requirements, unless noted otherwise:
  - 1. Shall have a record of operation, manufacturing and servicing the items specified in the Division 11 Sections for a minimum of ten years prior to the Bid Date.
  - 2. Shall have a minimum of three installations of equipment similar to specified and meeting the requirements specified herein at municipal wastewater treatment facilities in the state of Florida prior to the bid date.
- B. If the equipment manufacturer that the Contractor proposes to furnish and install the equipment described in the Division 11 specifications does not meet these qualifications and requirements and is not specified in the



Contract Documents, the Engineer reserves the right to not approve the equipment from this manufacturer for use on this project. Any costs incurred by the Contractor as a result of providing equipment from a manufacturer that does not meet the qualifications and requirements described herein shall not be incurred to the Owner.

- C. The Contractor shall furnish documentation that the manufacturer meets these qualifications and requirements as part of the submittals specified in Section 01300.

## 1.06 SPARE PARTS

- A. The Contractor shall furnish the spare parts specified in the Division 11 Sections. The Contractor shall also submit a list of recommended spare parts, special tools, and lubricants for each equipment item. The list shall include contact information for local sources for supply of all parts and professional service.

## PART 2 PRODUCTS

### 2.01 MOTORS

- A. General: The motors specified in the Division 11 Sections shall conform to the latest requirements of NEMA, IEEE, ANSI, NEC, and Anti-Friction Bearing Manufacturer's Association (AFBMA) standards, where applicable.
  1. Motors shall be of sufficient capacity to operate the driven equipment, under all load and operating conditions, without exceeding 100% of the motor nameplate horsepower rating, excluding service factor, and without exceeding the motor's rated temperature limits.
  2. Motors shall be furnished with permanent, highly visible stainless steel motor data plates. Data plates shall include all motor characteristics, ratings, accessories, and special features.
  3. The nameplate motor horsepower/brake horsepower service factor shall be as specified for each motor. The motor shall not exceed this service factor during any operating condition.
  4. In no case shall motors be furnished and installed that are less than the motor horsepower specified in the Division 11 Sections.

5. Motors larger than 5 HP shall be provided with locked-rotor current not exceeding NEMA Code letter "G".
6. All explosion proof motors specified in the Division 11 Sections shall comply with requirements of Class I, Division I, Group D, Hazardous Locations, as defined by the National Electrical Code.
7. Motors shall be equipped with automatic reset winding thermostats.

B. Motor Types:

1. The Contractor shall provide totally enclosed fan cooled (TEFC) motors where motors are located indoors or outdoors, unless specified otherwise.
2. The Contractor shall provide explosion proof motors where motors are located in Class I, Division I operating environments.

C. Motor Windings: Motors may be single-speed, multi-speed or part winding as required for the application specified in the Division 11 Sections.

1. Multi-speed motors shall be designed for operation at one of two or more speeds and shall have separate windings for each speed.
2. Part winding motors shall be designed for part winding starting and shall have two sets of identical windings suitable for parallel operation.
3. Motors for variable speed applications shall be designed for operation at the rated maximum speed and at reduced speed throughout the variable speed range, without overloading. Motors for variable speed operations shall be compatible with the associated variable speed control equipment and operating conditions including the effects of harmonic current and voltage distortion. Motors for variable speed operation shall be equipped with an automatic reset winding thermostat in addition to all accessory equipment recommended by the variable speed equipment manufacturer. Thermostat leads shall be brought to the motor connection box.

- D. Motor Bearings: Motors shall be equipped with ball, open, single-row, deep-groove Conrad type bearings conforming to the AFBMA Standard 20.
1. Bearing life shall be as specified in Division 11 specification or 17,500 hours minimum for belted applications and 100,000 hours minimum for flexible direct-coupled applications, whichever bearing life is greater.
  2. Bearing identification numbers shall be stamped on motor nameplate.
  3. Lubrication system shall consist of a capped grease fitting inlet, a relief plug 180 degrees from inlet, and grease reservoir in bracket and cast inner cap.
  4. Bearings shall be greased by manufacturer with a premium moisture-resistant polyuria-thickened grease containing rust inhibitors and suitable for operation over a temperature range of -25 °C to 120 °C.
- E. Motor Enclosure: Motor enclosure, including frame with integrally-cast feet and/or vertical P-base mounting, end brackets, bearing inner caps, fan guards and conduit box and cover shall be ASTM Type A-48, Class 25 cast iron or an equal that is approved by the Engineer.
1. Motor junction boxes shall be provided to accommodate the number and size of connecting conduits and conductors as shown on Drawings. Junction box shall allow rotation to accommodate conduit entrance. Provision for grounding shall be made, utilizing a mounted clamp-type lug in the junction box.
  2. Motors shall be equipped with lifting lugs. Motor enclosures shall be equipped with stainless steel screens for all openings in accordance with NEMA MG 1 for guarded machines.

## 2.02 CONTROLS

### A. General:

1. All control panels specified in the Division 11 Sections shall be furnished and installed in accordance with Division 13, Sections 13430 and 13440.

2. The Contractor shall furnish and install controls designed to operate on 120 volt, single phase, 60 Hertz electric service unless otherwise specified. The Contractor shall furnish and install 120-volt step-down voltage transformers as specified in Division 16.
3. The Contractor shall furnish and install elapsed time meters in each control panel for each piece of motor-driven equipment being controlled by that control panel. All elapsed time meters shall be furnished and installed in accordance with Division 16.
4. All control panels shall be furnished with a disconnect to enable/disable electric service to the panelboard.
5. All indicating lamps, controls, switches, and displays for each control panel shall be furnished in accordance with the controls descriptions in the Division 11 specifications and conform to the requirements of Division 13.
6. Provide a thermostatically controlled heater inside of each control panel enclosure to prevent condensation.
7. The face of each control panel shall be installed so it is facing towards the North, unless shown in the Drawings otherwise.

## 2.03 EQUIPMENT ANCHORING SYSTEMS

- A. All equipment anchoring systems including, but not limited to, expansion anchors, adhesive anchors, anchor bolts, cinch anchors, and screws that are required to install the equipment and appurtenances specified in the Division 11 specifications shall be AISI Type 316 stainless steel unless noted otherwise.

## 2.04 EQUIPMENT NAMEPLATES

- A. The Contractor shall provide a stamped letter stainless steel nameplate with white that provides the following information for each piece of equipment described in the Division 11 specifications.
  1. Equipment Description (i.e. Mechanical Bar Screen, RAS Pump No. 1, etc).
  2. Equipment No.

- B. Letter height on each nameplate shall not be less than 1/4-inch. Nameplates shall be factory-drilled for fasteners. Secure nameplates to equipment using AISI Type 304 stainless steel fasteners. The locations of each nameplate shall be coordinated with and approved by the OWNER prior to their installation.
- C. The Contractor shall obtain the Engineer's approval for the nameplate information for each equipment item described in the Division 11 specifications prior to ordering these nameplates from the manufacturer.

## PART 3 EXECUTION

### 3.01 INSTALLATION

- A. General: The Contractor shall install the equipment in accordance with manufacturer's instructions and recommendations and approved submittals at the locations shown on the Drawings. If the locations shown on the Drawings will cause the equipment to not operate in accordance with the manufacturer's recommendations or will interfere with the installation or operation of any other item indicated in the Contract Documents, the Contractor shall relocate this equipment and provide the necessary appurtenances to install the equipment in accordance with the manufacturer's recommendations at no additional cost to the Owner. The Contractor shall not proceed with the installation of any equipment at locations not in accordance with the Contract Documents or approved submittals until receiving the Engineer's approval in writing to do so.
- B. The Contractor shall install equipment, slabs, walls level and plumb, parallel and perpendicular to other building and components in exposed interior spaces, unless otherwise shown on the Drawings.
- C. The Contractor shall apply an anti-seize compound to threaded fasteners of equipment components that require removal, replacement, or adjustment as part of any maintenance or inspection procedure.
- D. The Contractor shall furnish and install the required oil and grease for initial operation in accordance with the manufacturer's recommendations.
- E. Provide means of oil lubrication for bearings and other metallic parts in sliding contact. Use alemite industrial type fittings except where otherwise specified. The Contractor shall also perform the following work:

1. Locate Lubrication points on equipment readily accessible without the necessity of removing covers, plates, housings or guards, or without creating safety hazards at installed equipment elevations.
  2. The Contractor shall exhaust pressure Lubricated units to the atmosphere to prevent excessive greasing.
  3. The Contractor shall extend grease fittings to locations that are readily accessible by the Owner. The Contractor shall coordinate the location of these grease fittings with the Owner prior to their installation.
- F. The Contractor furnish and install touch-up paint to any equipment's factory painting finish that is chipped or damaged during installation. All factory finish touch-up paint be mutually compatible with the Factory Finish on the equipment and shall be furnished by the manufacturer of the equipment to be touched-up in the field.
- G. If equipment mounting heights are not shown on the Drawings, the Contractor shall install that piece of equipment to provide the maximum amount of headroom (defined at the distance from the bottom of the structure to the top of finished floor or grade), as possible. In such an instance, the Contractor shall obtain the Engineer's approval for his mounting location prior to installing that piece of equipment in the field.
- H. The Contractor shall furnish and install all mechanical equipment to facilitate service, maintenance, and repair or replacement of the equipment components. The Contractor shall connect equipment for ease of disconnecting, with minimum interference to other installations.

### 3.02 FIELD TESTING

- A. General: The Contractor shall provide services of a factory authorized service representative to perform, approve, and certify the field testing specified herein. Field testing shall generally consist of performing the pre-startup and startup tests as specified in the Division 11 Sections and the final mechanical performance test specified herein. The Contract Documents may require the Contractor to perform factory testing on equipment items before the Engineer approves their use for this project. The Contractor shall refer to the Division 11 Sections for specifications regarding equipment shop testing.

- B. The Contractor shall adhere to the following requirements regarding the field testing to be provided for this project.
1. The service representative shall be employed by the manufacturer of the equipment specified herein at the time field testing is being performed. The service representative shall be authorized by the factory to perform the field testing specified herein. Upon request by the Engineer, the Contractor shall submit a letter from a company officer of the equipment manufacturer stating that the service representative performing the field testing is authorized by the manufacturer.
  2. Prior to scheduling each field test with the equipment manufacturer, the Contractor shall coordinate with the Owner and Engineer to obtain a list of dates that both parties would be available to attend the testing. The Contractor shall notify the Owner and Engineer of the field testing dates no less than fourteen calendar days prior to the date of the field test.
  3. If directed by the Engineer, the Contractor shall perform a second pre-startup and/or startup test, in accordance with the procedures specified in the Division 11 Sections, at no additional cost to the Owner if the original pre-startup and/or startup test did not pass because of any work that was deemed by the Engineer to be non-compliant with the Contract Documents and/or manufacturer's recommendations.
  4. The Contractor shall only perform startup testing after the Contractor has reached Substantial Completion for the project as defined in the Agreement.
  5. The Contractor shall furnish, install, and remove any temporary piping, valves, appurtenances and equipment necessary to perform the pre-startup and startup testing to the Engineer's satisfaction.
  6. All field testing shall be performed, Monday through Friday, at the project site, unless otherwise approved by the Owner.
  7. The duration that the manufacturer's representative is required to be onsite to perform the pre-startup and startup training is specified in the Division 11 Sections.

C. Operating Costs:

1. Costs for Pre-startup and Startup Testing: The Contractor shall include in the Contract Price the following operating costs for satisfactorily completing the Initial Mechanical Performance Tests on equipment being tested.
  - a. Lubricating grease.
  - b. Lubricating oils.
  - c. Such other materials or utilities not specifically identified herein, but required to conduct the pre-startup and startup testing.
  - d. Portable diesel power generation sets and diesel fuel as needed for lighting, portable tools and furnishing electrical to any temporary pumping units used to transfer reclaimed water to each treatment structure for startup testing.
2. Final Mechanical Performance Tests: The Contractor shall provide and pay all costs for the Final Mechanical Performance Test, including the Contractor's and manufacturer's representative's personnel, materials, parts, supplies, lubricants, chemicals, and temporary facilities needed to perform and supervise this testing. The Owner shall pay for electrical power costs.

D. The intent of the field testing for each equipment item specified in the Division 11 Sections is provided herein. If the individual equipment field testing procedures specified in the Division 11 are not sufficient to obtain a Manufacturer's Certification or to demonstrate compliance with the Contract Documents, the Contractor shall perform these additional field test procedures at no additional cost to the Owner.

1. Pre-startup Testing: Upon the Contractor's completion of the installation and adjustment of the equipment; the Contractor, with his own forces and with the manufacturer's representative(s), shall demonstrate to the Engineer's satisfaction that the equipment has been furnished and installed in accordance with the Contract Documents and manufacturer's recommendations.
  - a. Any equipment items that do not pass the pre-startup test, as identified by the Engineer and/or manufacturer's



representative, shall be repaired by the Contractor to the satisfaction of the Engineer prior to performing the startup testing for that equipment.

2. Startup Testing: Upon successful completion of the pre-startup testing, the Contractor shall demonstrate that the mechanical performance and controls of each equipment item, when operated in accordance with the design intent indicated by the Contract Documents, are satisfactory to the Owner and Engineer.
  - a. Startup testing shall be performed with each equipment item and associated treatment structure simulated under similar operating conditions as the final mechanical performance testing specified herein. For equipment that is to operate while being submerged as shown on the Drawings, the Contractor shall fill the respective treatment structure to its maximum water surface with reclaimed water and perform startup testing while that equipment is submerged. The Contractor shall not use wastewater to fill any treatment structures for startup testing.
  - b. After the startup testing procedures specified in the Division 11 Sections have been completed to the satisfaction of the Engineer, the Contractor shall operate that equipment for one successful continuous 72-hour period as a condition of startup testing, without assistance from the Owner. If the equipment needs to be taken out of service for repair during this 72-hour period because it is not operating in accordance with the intent of the Contract Documents, this operating period shall restart and cease until the equipment has been operating in accordance with the Contract Documents and manufacturer's recommendations for at least 72 consecutive hours. The Contractor shall furnish any additional supervision or provisions necessary to verify that each equipment item was successfully operated during this 72-hour operating period.
  - c. Upon completion of the startup test, the Contractor shall dewater each treatment structure in accordance with local and state regulations and in a manner that is satisfactory to the Owner and Engineer.

3. Final Mechanical Performance Testing: The Contractor shall perform final mechanical performance testing of the equipment specified in the Division 11 Sections once the following conditions have been satisfied.

- a. The Contractor has successfully completed the pre-startup and startup testing requirements specified in the Division 11 Sections.
- b. The Contractor has performed the training services specified herein.
- c. The Contractor has procured all of the required permits for each building and treatment structure within the project site.
- d. The Engineer has received and approved all of the manufacturer's certifications of compliance, warranties and operation and maintenance manuals for all required items as specified in the Contract Documents.

The intent of the final mechanical performance test is for the entire facility to be operated by the Owner for a continuous seven-day period while the facility is receiving and treating raw sewage. During this seven-day testing period, the Contractor shall furnish a minimum of six personnel who shall be onsite at all times 24-hours per day during the final mechanical performance test. Of these six persons, at least three personnel shall be electricians and at least three shall be mechanical technicians who are competent in the troubleshooting and repair of the equipment and related electrical and mechanical systems specified in the Contract Documents. The Contractor's electricians and mechanical technicians shall be onsite 24-hours per day to assist with this testing. If the final mechanical performance testing needs to be stopped and suspended due to equipment not operating in accordance with the design intent of the Contract Documents as determined by the Engineer, the following conditions shall apply:

- e. The Contractor shall cause to repair and troubleshoot these items immediately at no additional cost to the Owner.

- f. The seven-day period for the final mechanical performance testing will start over (i.e. be reset to zero hours).
- g. Upon restarting the final mechanical performance testing, the Contractor shall furnish the appropriate personnel defined above continuously onsite for 24 -hours per day during the seven-day period at no additional cost to the Owner, even though the total duration of the final mechanical performance testing (including restarts), may exceed seven days.

The final mechanical performance test shall end when the Engineer determines that all of the equipment and related systems are operating in accordance with the design intent of the Contract Documents and all deficiencies that hinder the normal day-to-day operation of the facility have been corrected to the satisfaction of the Engineer. The Engineer shall notify the Contractor in writing when the final mechanical performance testing has been successfully completed.

### 3.03 TRAINING SERVICES

- A. Upon completion of the pre-startup and startup testing and prior to the final mechanical performance testing, the manufacturer of the equipment specified in the Division 11 and 13 Sections shall provide an authorized representative to train the Owner's personnel in the operation and maintenance of the equipment. The representative shall provide additional onsite startup and troubleshooting services during this training upon request by the Engineer or Owner while performing these training services. The duration of the training services for each equipment item are specified in the Division 11 Sections.

### 3.04 MANUFACTURER'S CERTIFICATIONS OF COMPLIANCE

- A. Upon successful completion of the pre-startup testing, startup testing and training services specified herein, the Contractor shall obtain the equipment manufacturer's certification that the equipment specified in the respective Division 11 Sections has been installed, adjusted and tested in accordance with the manufacturer's recommendations. The Contractor shall furnish the Engineer with manufacturer's certificates of compliance on the form appended to this Section for each specified equipment item

prior to performing the final mechanical performance testing specified herein.

**MANATEE COUNTY SEWRF  
SEPTAGE/GREASE RECEIVING STATION  
MANUFACTURER'S CERTIFICATE OF COMPLIANCE**

OWNER \_\_\_\_\_ SERIAL NO: \_\_\_\_\_

EQUIPMENT TAG NO: \_\_\_\_\_ SYSTEM: \_\_\_\_\_

SPECIFICATION SECTION: \_\_\_\_\_

I hereby certify that the above-referenced equipment/system has been:

(Check Applicable)

\_\_\_\_\_ Installed in accordance with Manufacturer's recommendations.

\_\_\_\_\_ Inspected, checked, and adjusted.

\_\_\_\_\_ Serviced with proper initial lubricants (if applicable).

\_\_\_\_\_ Electrical and mechanical connections meet quality and safety standards.

\_\_\_\_\_ All applicable safety equipment has been properly installed.

\_\_\_\_\_ System has been performance tested, and meets or exceeds specified performance requirements. (When complete system of one manufacturer)

Comments: \_\_\_\_\_

\_\_\_\_\_  
I, the undersigned Manufacturer's Representative, hereby certify that I am (i) a duly authorized representative of the manufacturer, (ii) empowered by the manufacturer to inspect, approve, and operate his equipment and (iii) authorize to make recommendations required to assure that the equipment furnished by the manufacturer is complete and operational, except as may be otherwise indicated herein. I further certify that all information contained herein is true and accurate.

Date: \_\_\_\_\_, 20\_\_

Manufacturer: \_\_\_\_\_

By Manufacturer's Authorized Representative: \_\_\_\_\_

(Authorized Signature)

END OF SECTION